

**DELIVERING THE BOMB: NUCLEAR FORCES, AMBIGUITY, AND THE  
NON-PROLIFERATION ORDER**

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# **DELIVERING THE BOMB: NUCLEAR FORCES, AMBIGUITY, AND THE NON-PROLIFERATION ORDER**

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How do states build their nuclear forces? What about the global nuclear non-proliferation regime allows states to proliferate the means of nuclear delivery? Most studies of nuclear proliferation explain why states build the nuclear bomb and how they do it. What they miss, however, is how states develop the wherewithal to deliver these nuclear weapons – a crucial part of operationalizing any nuclear force. My dissertation posits an original framework to understand how states build the forces to deliver their nuclear weapons. It addresses the empirical puzzle of why the non-proliferation order – instead of constraining the spread of the means of nuclear delivery – enables it. I argue that there exists a Zone of Ambiguity in this order that consists of definitional ambiguity, multipurpose technology, and an indeterminate legal and normative framework. This Zone creates a permissive environment for the transfer of technology related to the means of nuclear delivery through three enabling logics. Each of these logics – economic, geopolitical, and alliance-related – highlight different political interests that states have in proliferating nuclear delivery vehicles. To demonstrate the argument, I conduct historical case studies based on the nuclear force development of three states – the United Kingdom, France, and India. I use newly declassified material from the archives of multiple states to bring forward new historical evidence and uncover an international history of the development of nuclear forces. In the process, I

also trace the historical trajectory of the evolution of the global nuclear non-proliferation regime as it relates to the means of nuclear delivery.

## BIOGRAPHICAL SKETCH

Debak Das grew up in Kolkata, India. Prior to arriving at Cornell University, he graduated from Presidency College, Kolkata in 2009 with a B.A. in History (Hons) from the University of Calcutta. He also obtained an M.A. in Politics (with specialization in International Relations) in 2011, and an M.Phil in Diplomacy and Disarmament in 2013, both from the Jawaharlal Nehru University, New Delhi. From the Department of Government at Cornell University, he obtained another M.A. in 2018, and received his Ph.D. in Government with a major in International Relations in 2021. Debak will be a Stanton Nuclear Security Postdoctoral Fellow at the Center for International Security and Cooperation (CISAC) at Stanford University in 2021-2022

To my grandfather,  
Arabinda Poddar

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## TABLE OF CONTENTS

Biographical Sketch.....	v
Dedication.....	vi
Acknowledgements.....	vii
Table of Contents.....	xvi
List of Figures.....	xvii
List of Tables.....	xviii
List of Abbreviations.....	xix
 <b>Chapter 1:</b> Introduction.....	 1
 <b>Chapter 2:</b> Building a Nuclear Force – Regime Ambiguity and Proliferation of the Means of Nuclear Delivery.....	 22
 <b>Chapter 3:</b> Not So Special Relationship: United Kingdom's ‘Independent’ Deterrent.....	 61
 <b>Chapter 4:</b> Geopolitics and the Proliferation of the Means of Nuclear Delivery: The French <i>Force de Dissuasion</i> .....	 113
 <b>Chapter 5:</b> With a Little Help from Our Friends: The Indian Nuclear Force Structure.....	 158
 <b>Chapter 6:</b> Conclusion and Implications.....	 218
 <b>Bibliography</b> .....	 247



## LIST OF FIGURES

Figure 2.1: Timeline of Nuclear Force Development and Focus of Literature.	25
Figure 2.2: The Zone of Ambiguity that Enables the Proliferation of the Means of Nuclear Delivery.....	33
Figure 2.3: Proliferation of the Means of Nuclear Delivery.....	45
Figure 2.4: Choices Ahead of States Seeking the Means of Nuclear Delivery.	46
Figure 2.5: Enabling Logics to the Proliferation of the Means of Delivery.....	47
Figure 3.1: Alliance Logic to the Proliferation of the Means of Delivery.....	65
Figure 4.1: Geopolitical Logic to the Proliferation of the Means of Delivery..	116
Figure 4.1: Economic Logic to the Proliferation of the Means of Delivery.....	160

## LIST OF TABLES

Table 3.1: Important Dates in the History of British Strategic Nuclear Forces...	67
Table 3.2: Legal and Normative Arrangements Related to the United Kingdom's Nuclear Weapons and Related Systems.....	69
Table 4.1: Overview of the Program Laws Associated with French Nuclear Forces.....	120
Table 4.2: French Nuclear Forces.....	122
Table 5.1: Characteristics of Jaguar Aircraft and its Competitors.....	172
Table 5.2: Indian Space Collaboration with Foreign Countries (1961-1980).....	197

## LIST OF ABBREVIATIONS

ACDA	Arms Control and Disarmament Agency
AEA	Atomic Energy Act of 1954
ALBM	Air-Launched Ballistic Missile
BAE	British Aerospace
BNDSG	British Nuclear Deterrent Study Group
CDS	Chief of Defense Staff (United Kingdom)
CEA	Commissariat à l'Énergie Atomique
CNES	Centre National d'Études Spatiales
CPNE	Conseil de Politique Nucléaire Extérieure
CTBT	Comprehensive Test Ban Treaty
DAE	Department of Atomic Energy, India
DoD	Department of Defense
DPSA	Deep Penetration Strike Aircraft
DRDO	Defence Research and Development Organisation
ENDC	Eighteen Nation Committee on Disarmament
ESRO	European Space Research Organisation
EURATOM	European Atomic Energy Community
FCO	Foreign and Commonwealth Office
FOST	Force Oceanique Strategique
FRUS	Foreign Relations of United States
IAEA	International Atomic Energy Agency

ICBM	Intercontinental Ballistic Missile
INF	Intermediate Nuclear Forces
INSAT	Indian National Satellite System
IRBM	Intermediate Range Ballistic Missile
ISRO	Indian Space Research Organisation
JCAE	Joint Committee on Atomic Energy
JCPL	Jimmy Carter Presidential Library
LoC	Library of Congress
MDA	Mutual Defence Agreement (1958)
MEA	Ministry of External Affairs
MoD	Ministry of Defence
MIRV	Multiple Independently Targetable Re-entry Vehicle
MLF	Multilateral Force
MRBM	Medium Range Ballistic Missile
MRV	Multiple Reentry Vehicles
MSBS	Mer-Sol Balistique Stratégique
MTCR	Missile Technology Control Regime
NAF	National Archives of France
NAI	National Archives of India
NASA	National Aeronautics and Space Administration
NARA	National Archives and Records Administration
NATO	North Atlantic Treaty Organization
NPT	Nuclear Non-proliferation Treaty

NPIHP	Nuclear Proliferation International History Project
NMML	Nehru Memorial Museum and Library
NSAM	National Security Action Memorandum
NSDM	National Security Decision Memorandum
NSSM	National Security Study Memorandum
PMO	Prime Minister's Office
PSA	Polaris Sales Agreement (1963)
RAF	Royal Air Force
ROK	Republic of Korea
RRL	Ronald Reagan Library
SACEUR	Supreme Allied Commander in Europe
SALT	Strategic Arms Limitation Treaty
SEP	Société Européenne de Propulsion
SEREB	Société d'Études et de Recherches sur les Engins Balistiques
SLBM	Submarine Launched Ballistic Missile
SLCM	Submarine Launched Cruise Missile
SLV	Space Launch Vehicle
SNLE	Sous-Marin Nucléaire Lanceur d'Engins
SSBN	Ship, Submersible, Ballistic, Nuclear
SSBS	Sol-Sol Balistique Strategique
START	Strategic Arms Reduction Treaty
TNA	The National Archives (at Kew Gardens, United Kingdom)
USAF	United States Air Force

## Chapter 1: Introduction

In July 2015, Iran and the group of countries known as the E3/EU+3 (France, Germany, the United Kingdom, and the European Union, plus China, Russia, and the USA) concluded the Joint Comprehensive Plan of Action. It stated that Iran “under no circumstances...(would) ever seek, develop or acquire any nuclear weapons,” thus marking the end of a nuclear crisis.<sup>1</sup> However, in August 2017, a series of missile tests and a burgeoning ballistic missile program sparked a new crisis and saw the United States Congress pass, almost unanimously, a bill authorizing new sanctions against Iran.<sup>2</sup> A few months later, in November 2017, North Korea fired an intercontinental ballistic missile (ICBM) that flew for fifty-three minutes and landed 600 miles to the east, in the Sea of Japan. The missile launch was accompanied by a North Korean statement that it could now deliver nuclear warheads to the continental United States.<sup>3</sup> Given that North Korea had been conducting nuclear tests since 2006, why did this ICBM test spark off a new nuclear crisis? Why did the Iranian missile program pose a threat to international security?

The answer in both these cases is simple: both Iran and North Korea, through their missile tests, had credibly demonstrated that they had developed the capability to deliver the bomb.

Most studies of nuclear proliferation explain why states build the nuclear bomb and how they do it. What they miss, however, is how states develop the apparatus to deliver these nuclear weapons – a crucial part of operationalizing any nuclear force. This dissertation examines the determinants of nuclear force structures by studying the strategies that regional nuclear powers

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<sup>1</sup> “Joint Comprehensive Plan of Action,” July 14, 2015, 3, <https://www.state.gov/documents/organization/245317.pdf>.

<sup>2</sup> For the original text of the bill (H.R. 3364 – Countering America’s Adversaries Through Sanctions Act) and the voting records see: <https://www.congress.gov/bill/115th-congress/house-bill/3364>

<sup>3</sup> Mark Landler, Choe Sang-Hun, and Helene Cooper, “North Korea Fires a Ballistic Missile, in a Further Challenge to Trump,” *The New York Times*, November 5, 2017, <https://www.nytimes.com/2017/11/28/world/asia/north-korea-missile-test.html>.

have employed to develop a force to deliver their nuclear weapons.<sup>4</sup> Moving beyond past research that focused on sensitive nuclear assistance in the form of weapons-grade fissile material, and fuel cycle-related technologies to build a nuclear bomb, I argue that the acquisition and development of the means of delivery are important and that they often necessitate a separate diplomatic and technological strategy. I explore networks of interaction among regional powers that navigate different sets of enabling and constraining conditions – related to geopolitics, alliance dynamics, and the non-proliferation regime – to produce their nuclear force structures with foreign assistance.

### **Why Means of Nuclear Delivery?**

There is more to building a nuclear force than just making a nuclear warhead. As Gaurav Kampani highlights, “Analysts often believe that the mere possession of nuclear weapons by a state brings into operation a regime of ‘existential’ deterrence, even when a state may lack the means for delivering those weapons reliably.”<sup>5</sup> In fact, in addition to the nuclear warhead itself, a nuclear force structure consists of a number of other related systems, like aircraft, missiles, and submarines to deliver the weapon; missile silos; submarine bases; airfields; early warning radar systems; and in some cases, ballistic missile defenses.<sup>6</sup> The most important part of a nuclear force structure, alongside the nuclear warhead itself, is the means of warhead delivery. The means of

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<sup>4</sup> I use Vipin Narang’s regional powers framework, which, categorizes seven of the nine nuclear states (all except the United States and the USSR and its successor state, the Russian Federation) as regional nuclear powers. As Narang states, “compared to the superpowers, these states face different constraints and opportunities, have arsenals that are orders of magnitude smaller, and must manage different conflict environments” See: Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton University Press, 2014), 2.

<sup>5</sup> Gaurav Kampani, “New Delhi’s Long Nuclear Journey: How Secrecy and Institutional Roadblocks Delayed India’s Weaponization,” *International Security* 38, no. 4 (April 1, 2014): 80.

<sup>6</sup> For example, the United States’ nuclear force consists of ‘strategic’ and ‘non-strategic’ elements. The strategic part of the force consists of sea-based ballistic missile submarines (SSBNs), Sea-Launched Ballistic Missiles (SLBMs), land-based Intercontinental Ballistic Missiles (ICBMs), Air-based strategic bombers which carry gravity bombs, and nuclear capable, air-launched cruise missiles. The non-strategic part consists of gravity bombs carried by F-15E DCA (dual capable aircraft). See, <https://dod.defense.gov/News/SpecialReports/2018NuclearPostureReview.aspx>.

nuclear delivery determines to what ends a nuclear weapon can be employed by a state, if at all. Additionally, a state's ability to deliver its nuclear weapons is an important indicator of the credibility and effectiveness of the deterrence strategies that it employs.<sup>7</sup> As Vipin Narang puts it, "states care more about what an adversary can credibly *do* with its nuclear weapons than what it *says* about them."<sup>8</sup>

There is variation in how regional powers develop their means of nuclear delivery. While some states choose to build air, land, and sea-based platforms to deliver their nuclear weapons (e.g., France and India), other states choose to limit their forces to one platform (e.g., United Kingdom). Beyond this choice of building a triad, there is also variation in the means of delivery in terms of short/intermediate/long ranges, the size of explosive power, levels of accuracy, and even degrees of hardening (in a warhead and in missile silos) and ballistic missile defense capabilities.

Furthermore, the means of delivery a state has access to or can develop itself influences the nuclear posture that it employs. This is especially true of the first few decades of a state's nuclearization. While the nuclear forces of states are a function of security imperatives, they are also the product of technological capability and availability. How and when these systems related to the delivery of nuclear weapons are available shape the nuclear posture and deployment strategies of states. Importantly, how a state builds its nuclear forces is related to its ability to employ strategies of nuclear deterrence, a secure second-strike capacity, and mutually assured destruction.<sup>9</sup>

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<sup>7</sup> Erik Gartzke, Jeffrey M. Kaplow, and Rupal N. Mehta, "The Determinants of Nuclear Force Structure," *Journal of Conflict Resolution* 58, no. 3 (April 1, 2014): 482.

<sup>8</sup> Narang, *Nuclear Strategy in the Modern Era*, 4.

<sup>9</sup> Gartzke, Kaplow, and Mehta, "The Determinants of Nuclear Force Structure," 482.



Finally, the focus on nuclear delivery systems in this study highlights a separate set of processes independent – but adjacent to – nuclear weapons proliferation related to fissile material and fuel-cycle technologies. While it is important to understand how the bomb is built, it is also important to understand how the capacity to deliver the bomb is developed. This study thus adds another dimension to the existing literature on nuclear proliferation.

### **What Are the Means of Nuclear Delivery? How Do they Proliferate?**

The means of nuclear delivery are all systems that aid a nuclear warhead to reach its target. Most commonly these systems include advanced strike aircraft, bombers, ballistic missiles, cruise missiles, artillery systems.<sup>10</sup> The possession of the means of delivery leads to an increase in a state's military power and gives it the strategic and tactical capability to threaten its adversaries with nuclear weapons. The means of nuclear delivery thus affect considerations about balance of power between great powers, and an increase in them has caused great power competition and arms races in the past. For example, during the Cold War, a misperception of disparity in the number of strategic missiles – conceived of as strategic power – between the United States and the Soviet Union led to an arms race on account of a “missile gap.”<sup>11</sup> The critical factor in a state's ability to decisively “win” a war in this superpower competition was “delivery capability rather than size of the nuclear stockpile.”<sup>12</sup>

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<sup>10</sup> For a full list of nuclear delivery systems employed by states across the world, see the Federation of American Scientists' *Nuclear Notebook* at, <https://thebulletin.org/nuclear-risk/nuclear-weapons/nuclear-notebook/>.

<sup>11</sup> Edmund Beard, *Developing the ICBM: A Study in Bureaucratic Politics* (New York: Columbia University Press, 1976), 4.

<sup>12</sup> Bernard Brodie, *Strategy in the Missile Age* (Princeton, N.J.: Princeton University Press, 1965), 165. Indeed, the war plan for the United States' Strategic Air Command was to conduct an all-out attack that would leave the Soviet Union “a smoking, radiating ruin at the end of two hours.” See, David Alan Rosenberg, “‘A Smoking Radiating Ruin at the End Of Two Hours’: Documents on American Plans for Nuclear War with the Soviet Union, 1954-1955,” *International Security* 6, no. 3 (1982): 11.

However, the United States and the Soviet Union are not the only states that have spent time, money, and technological capital in building their nuclear forces. All states that have developed nuclear warheads have acquired the means to deliver them. States have taken different paths in developing these systems. As this dissertation explores, there are different ways in which these means of delivery proliferate and different aspects of the nuclear non-proliferation regime that enable the process.

The proliferation of the means of nuclear delivery between states can occur in two primary ways. The first route involves the direct transfer of the means of delivery from one state to another. An example of this is the development and transfer of the nuclear-capable Jericho missile (MD-620) by France to Israel.<sup>13</sup> Another such example is the transfer of advance strike aircraft that can be used to deliver nuclear warheads, as in the sale of the F-16 aircraft by the United States to Pakistan, which then incorporated the plane into its nuclear forces.<sup>14</sup>

The second route involves the transfer of materials that enable a state to build its means of nuclear delivery. Foreign aid of this sort can involve the transfer of the designs for a delivery system; transfer of direct or tacit knowledge related to the development of the means of delivery (by training individuals); or transfer of the infrastructure and technology to a state to enable it to develop its own means of delivery. For example, one indirect way in which states have aided the development of the means of nuclear delivery of another state has been through help to space research programs. This is because ballistic missiles are very similar to space launch vehicles in design and performance.<sup>15</sup> For example, Israel provided the *Shavit* space launch vehicle to South

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<sup>13</sup> Avner Cohen, *Israel and the Bomb* (New York: Columbia University Press, 1998), 116.

<sup>14</sup> John R. Harvey, "Regional Ballistic Missiles and Advanced Strike Aircraft: Comparing Military Effectiveness," *International Security* 17, no. 2 (1992): 41–83; Hans M. Kristensen, Robert S. Norris, and Julia Diamond, "Pakistani Nuclear Forces, 2018," *Bulletin of the Atomic Scientists* 74, no. 5 (September 3, 2018): 348–58.

<sup>15</sup> Janne E Nolan, *Trappings of Power: Ballistic Missiles in the Third World* (Washington, D.C.: Brookings Institution, 1991), 40.

Africa in the late-1980s as a part of a possible “missiles for uranium deal.”<sup>16</sup> The launch vehicle would allow both Israel and South Africa to build ICBMs with at least 5000 kilometers range.<sup>17</sup> Additionally, France and Arianespace (the company that operated the European Space Agency’s Ariane space launch program) traded missile technology for satellite launch contracts from 1975 onward.<sup>18</sup>

Another example of indirect aid to the development of a state’s means of nuclear delivery is the help that the United States gave to the French nuclear missile program in the early 1970s. Among other things this aid involved exchanges on propulsion; gas bearing gyros; high pressure nitrogen tanks; missile ignition safety in submarines; hydraulic systems; nuclear hardening methods and testing; and missile maintenance.<sup>19</sup> While the transfer of these materials and technology are not the same as handing over a fully developed missile to another state, it demonstrates how specific and indirect help to a state can help it acquire certain technologies. As Dinshaw Mistry highlights, missile programs require expertise in propellants; metals and materials for airframes, reentry vehicles, and heat shields; electronics for guidance systems; and engineering knowledge to design different parts of a missile.<sup>20</sup>

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<sup>16</sup> Shahram Chubin, Bhupendra Jasani, and Aaron Karp, “South Africa’s Nuclear Tipped Ballistic Missile Capability,” Report of the Secretary-General, Disarmament Study Series (New York: United Nations, 1991), 30, <https://www.un.org/disarmament/publications/studyseries/no-23/>; R. Jeffrey Smith, “Israel Said to Help S. Africa on Missile: Advanced Technology Swapped for Uranium, Sources Say,” *The Washington Post*, October 26, 1989.

<sup>17</sup> “Ballistic and Cruise Missile Proliferation in the Third World: Hearing Before the Subcommittee on Defense Industry and Technology of the Committee on Armed Services United States Senate” (U.S. Government Printing Office, May 2, 1989), 37.

<sup>18</sup> Gary Milhollin and Gerard White, “The Brazilian Bomb: South America Goes Ballistic,” *New Republic*, August 13, 1990. Accessible at: <https://www.wisconsinproject.org/the-brazilian-bomb-south-america-goes-ballistic/>.

<sup>19</sup> Scowcroft to Kissinger, “Penetration and Missiles Field,” 30 August 1973, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges (1973-1974) (1 of 2). Obtained and contributed by William Burr and included in NPIHP Research Update #2.

<sup>20</sup> Dinshaw Mistry, *Containing Missile Proliferation: Strategic Technology, Security Regimes, and International Cooperation in Arms Control* (Seattle, WA: University of Washington Press, 2003), 4.

## Research Questions and Puzzle

This dissertation seeks to shed light on two main questions. First, how do states, particularly, regional powers, build their means of nuclear delivery? This is an undertheorized topic in the study of international security and gives us insight into what happens after a state develops its nuclear weapons. In other words, this dissertation recognizes the development of the means of delivery as a separate process from the development of nuclear warheads and seeks to explain how the operationalization of a nuclear force takes place after a state has built its nuclear weapons.

At the heart of this study lies an empirical puzzle. Why do the means of nuclear delivery proliferate despite the obvious constraints? Through the history of the nuclear non-proliferation regime, from when the norm of non-proliferation was nascent (1946-1968) to the greater institutionalization of the norm through the Nuclear Non-Proliferation Treaty (NPT) from 1968 onward, the transfer and proliferation of nuclear weapons have been prohibited and hence constrained, yet the transfer and sale of the means of nuclear delivery have remained largely unchecked. What explains this?

We would expect that the non-proliferation order, consisting of a number of multilateral treaties, as well as aggressive counterproliferation efforts by individual states like the United States, would constrain the sale and transfer of technology related to nuclear weapons delivery.<sup>21</sup> However, contrary to this expectation, the historical record demonstrates that this has not been the case. If anything, the non-proliferation regime and its constituents have been *enablers* of proliferation related to the means of nuclear delivery. The following sections will explore how and why this is the case.

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<sup>21</sup> Francis J. Gavin, “Strategies of Inhibition: U.S. Grand Strategy, the Nuclear Revolution, and Nonproliferation,” *International Security* 40, no. 1 (July 2015): 9–46.

## Argument

This dissertation explains how states build their means of nuclear delivery. I argue that there is a Zone of Ambiguity in the global non-proliferation order that enables the spread of the means of nuclear delivery instead of constraining it. The global non-proliferation regime in this study refers to the larger ecosystem of laws and treaties that, along with the NPT, seek to stop the spread of nuclear weapons.<sup>22</sup> Taken together with its three component parts – Multipurpose Technology, Ambiguous Definitions, and Legal and Normative Ambiguity – the Zone of Ambiguity creates a permissive environment that enables the direct and indirect transfer of technology related to nuclear delivery. I argue that there are three specific enabling logics through which this proliferation takes place. These logics relate to economic interest, geopolitical consideration, and alliances. Each of these logics provides a rationale for why states proliferate the means of nuclear delivery.

The Zone of Ambiguity has three component parts that are dynamic and interact with each other to produce the outcome of interest in this dissertation – the proliferation of nuclear delivery systems. The component parts are:

- Multipurpose Technology: This refers to the nature of the technology of the means of nuclear delivery which is adaptable to multiple purposes. There are two types of dual-use technologies involved here: civilian vs. military and within the realm of military-use, conventional vs. nuclear use. For example, space launch vehicles can be used for both civilian purposes of putting satellites in space, as well as to launch ballistic missiles. Meanwhile, an F-18 fighter aircraft can deliver both conventional bombs as well as nuclear weapons.

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<sup>22</sup> Grégoire Mallard, *Fallout: Nuclear Diplomacy in an Age of Global Fracture* (Chicago: University of Chicago Press, 2014), 7.

- Ambiguous Definitions: The global non-proliferation regime does not define what elements constitute nuclear weapons – and hence by deliberate omission does not tackle nuclear delivery systems. Indeed, the foundational treaty that prohibits the spread of nuclear weapons – the NPT – does not define the term ‘nuclear weapon,’ creating ambiguity on whether the proliferation of nuclear delivery systems is prohibited or not.
- Legal and Normative Ambiguity: Multipurpose technology and ambiguous definitions produce the legal and normative ambiguities in the global non-proliferation regime. The lack of specificity with regard to the means of nuclear delivery in the regime has led to ambiguity on whether the legal and normative framework to curb the spread of weapons deals with delivery systems at all.

The Zone of Ambiguity creates a permissive environment for the transfer of technology related to the means of nuclear delivery through three enabling logics. Each of these logics highlight different political interests that states have in proliferating the means of nuclear delivery. These logics are:

- Economic Logic: States sell nuclear delivery systems to other states for commercial benefit. For the supplier state, the sale of these systems brings in foreign exchange, capital, and employment for its domestic industry.<sup>23</sup> For the acquiring state, the ability to buy technology directly saves a time, effort, and financial resources.
- Alliances Logic: Whether a state has an ally or not matters in the acquisition of nuclear delivery vehicles. Conventional wisdom suggests that having an ally is beneficial to a state seeking to build its nuclear forces. However, having an ally can be a double-edged sword, as states at times use alliances to further non-proliferation goals. But even when states help others acquire nuclear delivery systems, the Zone of Ambiguity is central in the operationalization of the

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<sup>23</sup> Andrew J. Pierre, *The Global Politics of Arms Sales* (Princeton, New Jersey: Princeton University Press, 1982), 73.

transfer. When it comes to alliances, patronage is not enough. States must still negotiate the larger institutional and normative framework of the international order to be able to achieve their foreign policy goals, which in this case, is the acquisition of the means of nuclear delivery.

- Geopolitics Logic: States provide others with the means of nuclear delivery in order to exercise leverage and gain geopolitical influence. This is often a function of great power rivalry and was most evident in the Cold War period. While the geopolitical logic is used by states to create dependencies and project power, it is also used by states to ensure that the states attempting to build their nuclear forces do not join a rival alliance.

I find that the Zone of Ambiguity, a primary enabling condition in the system, enables the use of each of these logics, i.e. specific enabling conditions, to proliferate the means of nuclear delivery. I find that all three of these logics can operate simultaneously in some measure in each of these cases. These specific enabling logics are not mutually exclusive and there could be a combination of the different logics – economic, geopolitical, and alliance-related – that could produce the outcome of a state acquiring a nuclear delivery vehicle. I have chosen to highlight each of these logics separately and to provide empirical evidence for them (in the subsequent chapters) to establish the plausibility of each of them independently.

I conduct a plausibility probe of the framework to demonstrate the argument by using historical case studies of three states – the United Kingdom, France, and India. The use of international history to provide empirical evidence for, and analyze, the framework also allows me to trace the historical trajectory of the evolution of the global non-proliferation regime as it relates to nuclear delivery systems.

In the case of the United Kingdom (Chapter 3), I use two episodes from the nuclear history of the United Kingdom – the Skybolt Affair which led to the sale of the Polaris missiles by the

United States (1963) and the acquisition of the Trident D5 missiles (1982) – to demonstrate how the Zone of Ambiguity enabled the transfer of these nuclear delivery systems in an alliance-relationship. The case also highlights how the burgeoning norm of non-proliferation that was being shaped by domestic and international legislation such as the Atomic Energy Act of 1946 (MacMahon Act), the Baruch Plan (1946), the Atomic Energy Act of 1954 (as amended), Atoms for Peace (1954), and the International Atomic Energy Agency (1957) enabled the transfer of the means of nuclear delivery. The chapter demonstrates the fraught alliance-relationship between the United Kingdom and the United States. During the Skybolt crisis the United Kingdom had to deal with fears that the United States was attempting to cancel its nuclear forces. Meanwhile, during the late-1970s in the build-up to the Trident deal, the United Kingdom had to ensure that the United States and the Soviet Union did not include its nuclear forces in arms control treaties like the SALT and INF. Elements of all three logics are present (in varying degrees) in this case. A measure of the economic logic was present because the sales of these missiles were financially beneficial to the United States.<sup>24</sup> With the Polaris missiles, and later on, Trident missile system, the British paid the full cost of the sale to the United States, alongside defraying a part of the research and development cost.<sup>25</sup> The sale of the missiles also had important geopolitical interests motivating them. The notion of the United Kingdom as the United States’ “unsinkable aircraft carrier” was an uneasy subject in Britain but demonstrated the geopolitical importance of the state during the Cold War.<sup>26</sup> In this case however, as the chapter demonstrates, the economic and the geopolitical logic

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<sup>24</sup> Brzezinski to Byrd, Correspondence, 15 July 1980, Jimmy Carter Presidential Library (JCPL), accessible at: <https://nsarchive.gwu.edu/document/23825-message-white-house-u-s-embassy-tokyo-enclosing-eyes-only-memorandum-senator-robert>.

<sup>25</sup> Ibid.

<sup>26</sup> United States State Department Bureau of Intelligence and Research, “US-UK Relationship Enters a New Era,” 10 July 1985, Report 1125-AR, accessible at: <https://nsarchive.gwu.edu/document/23836-state-department-bureau-intelligence-and-research-us-uk-relationship-enters-new-era>.



operate within the larger context of the alliance logic, that is dominant and drives the other dynamics.

The French case (Chapter 4) demonstrates how the geopolitical logic interacts with the Zone of Ambiguity to enable the proliferation of the means of nuclear delivery. It focuses on the United States' aid to France's ballistic missile program to show how both states manipulated malleable domestic and international laws and treaties from the early years of the non-proliferation order to the mid-1970s. The role of geopolitical interest is key in this story. For the United States, aiding French nuclear forces helped in creating an extra threat to the Soviet Union in Europe. But more important, France's nuclear delivery capability aided by the United States would help the latter consolidate its relations with Europe and ensure that there was a nuclear rivalry between the French and the United Kingdom that undermined any possibility of a united Europe.

In the French case, the predominant logic enabling the proliferation of the means of nuclear delivery was the geopolitical one. As a state attempting to maintain 'independence' from the United States and NATO, France is difficult to place as a United States ally. However, the two countries were on the same side of the Cold War and as this chapter demonstrates the relationship was driven by geopolitical interest on both sides. The economic benefit for the suppliers from these technology exchanges is not very clear, though for the recipient state, the transfer of data and information saved considerable time and money in the development of nuclear forces. The alliance and the economic logic are thus not the primary lens through which I analyze this case.

Finally, the Indian case (Chapter 5) examines the development of India's nuclear delivery systems in the context of the Zone of Ambiguity in the international nuclear non-proliferation order and economic interest. After India's 1974 Peaceful Nuclear Explosion, NATO's secret intelligence estimates expected that India would build its nuclear delivery systems within six months to a year.

Despite these assessments and their stated commitments to non-proliferation, two NATO states – the United Kingdom and France – proceeded to help India acquire the means of nuclear delivery in the years that followed. The Zone of Ambiguity framework helps explain why this occurred. I analyze India's acquisition of the nuclear-capable Jaguar aircraft from the United Kingdom, and the acquisition of space technology from France which eventually led to India's first Intermediate Range Ballistic Missile (IRBM) and find that a set of legal and normative ambiguities in the nuclear non-proliferation regime helped facilitate the transfer of the means of nuclear delivery. Critically, I also find that the norm of non-proliferation was secondary to the supplier states' economic concerns about capturing market share and building industry. The predominant logic operating in this case is thus the economic one. However, I also find evidence for the geopolitical and alliance-related logics. India's relationship with the Soviet Union and the reliance of the former on the latter's military equipment led the NATO states to try and wean New Delhi away from Moscow. Complicating this was India's non-alignment status during the Cold War.<sup>27</sup> For the supplier states, realigning India from the Soviets was an important goal that worked in conjunction with the economic logic to undermine the norm of non-proliferation in this case.

## **Contributions and Implications**

This study has a number of important implications for the study of nuclear proliferation and international relations. In analyzing the proliferation of the means of nuclear delivery, this dissertation discusses and adds to the literature on global arms sales, international regimes and institutions, norms development, nuclear proliferation, the history of the non-proliferation regime, and Cold War history.

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<sup>27</sup> For more on India in the Cold War see, Manu Bhagavan, ed., *India and the Cold War*, The New Cold War History (Chapel Hill: The University of North Carolina Press, 2019).

First, this dissertation makes a key new contribution to the study of nuclear proliferation. It adds the means of nuclear delivery as an important factor to consider to the study of nuclear proliferation which has hitherto focused only on the proliferation of fissile material and nuclear explosive-related technology.

Second, in adding to this literature, my research challenges the narrative of the success of the non-proliferation regime. Numerous scholars have argued that the non-proliferation regime has been extremely successful owing to the low number of states that have proliferated nuclear weapons after the formal establishment of the NPT as the cornerstone of this regime.<sup>28</sup> I find that when it comes to the means of nuclear delivery, the laws and norms of the non-proliferation regime have been unable to constrain their spread. The power of the norm of non-proliferation and the NPT is thus far more limited than what scholars claim it to be.<sup>29</sup> I find that the non-proliferation order through the Zone of Ambiguity and the specific enabling logics have created a permissive condition for the proliferation of nuclear delivery vehicles. My dissertation shows that the international non-proliferation regime made up of numerous institutions – foremost among which is the NPT – has enabled the proliferation of the means of nuclear delivery. This is a curious finding given the number of institutions that aim to curb nuclear proliferation. This conclusion also contradicts the scholarship that finds the unspecific nature of the NPT to be “constructive ambiguity” and a boon to non-proliferation.<sup>30</sup>

The counterfactual claim that follows this argument is that if the NPT incorporated the means of nuclear delivery then there would not be any proliferation of these technologies. I do not

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<sup>28</sup> Mariana Budjeryn, “The Power of the NPT: International Norms and Ukraine’s Nuclear Disarmament,” *The Nonproliferation Review* 22, no. 2 (April 3, 2015): 203–37; Maria Rost Rublee, “Taking Stock of the Nuclear Nonproliferation Regime: Using Social Psychology to Understand Regime Effectiveness,” *International Studies Review* 10, no. 3 (September 1, 2008): 420–50.

<sup>29</sup> Budjeryn, “The Power of the NPT.”

<sup>30</sup> Reid B. C. Pauly, “Deniability in the Nuclear Nonproliferation Regime: The Upside of the Dual-Use Dilemma,” *International Studies Quarterly*, May 2021, 2.

argue that this would be the case. Instead, I argue that an institutional treaty-based prohibition on the proliferation of the means of nuclear delivery – or multipurpose technologies that could be used for such objectives – would lead to different pathways of proliferation than have been hitherto observed. We would just not see any legal proliferation enabled by the Zone of Ambiguity. Rather, we would likely observe illicit proliferation and attempts to circumvent the legal regime in the way that North Korea, Iraq, and Pakistan have acquired nuclear and fissile materials proscribed by the NPT regime. In other words, I do not argue that inclusion of means of nuclear delivery in the global nuclear non-proliferation regime would stop all proliferation of these technologies. Instead, I argue that if such an inclusion did take place, there would not be any legal proliferation and the path to the acquisition of nuclear delivery vehicles would be very different.

Third, this work also challenges the literature in the field of nuclear proliferation that finds that “there is no discernable relationship between a country’s economic circumstances and the likelihood that it will provide sensitive nuclear assistance.”<sup>31</sup> My research finds that states are often extremely motivated by the logic of economic profit when supplying other states with the means of nuclear delivery.

Fourth, my research directly challenges the claim that the United States has pursued non-proliferation as a central pillar of its grand strategy.<sup>32</sup> Building on this argument, scholars have made the claim that the United States has used tools of coercion at its disposal to further the goals of the non-proliferation regime, which has only been as successful as it has because of these efforts.<sup>33</sup> My research finds the arguments about the success of the non-proliferation regime and

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<sup>31</sup> Matthew Kroenig, *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons* (Ithaca: Cornell University Press, 2010), 4.

<sup>32</sup> Gavin, “Strategies of Inhibition.”

<sup>33</sup> Nicholas L. Miller, “The Secret Success of Nonproliferation Sanctions,” *International Organization* 68, no. 4 (2014): 913–44; Nicholas L. Miller, *Stopping the Bomb: The Sources and Effectiveness of US Nonproliferation Policy* (Ithaca: Cornell University Press, 2018); Jeffrey W. Taliaferro, *Defending Frenemies: Alliances, Politics, and Nuclear Nonproliferation in US Foreign Policy* (Oxford, New York: Oxford University Press, 2019); Rupal N. Mehta,

the United States' role in it to be incorrect. Indeed, the evidence in this dissertation finds that the non-proliferation regime actively enabled the proliferation of the means of nuclear delivery and the United States played a central role in this endeavor. In fact, two of the three case studies find that the United States has been a ready (and extremely innovative) proliferator of the means of nuclear delivery.

Fifth, at the heart of the framework of the Zone of Ambiguity lies the question of how institutions work and how they are designed. Given that the global nuclear order is constituted of these regimes and institutions – international organizations, bilateral and multilateral treaties, export control regimes, and multilateral groups – it is important to understand how they work, and more important, how they impact states engaging in nuclear proliferation. If international regimes are “sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge” then they regularize certain types of behavior in the international system, and it is important for us to understand and update our understandings of how these regimes have come into place.<sup>34</sup> By tracing the evolution of nuclear non-proliferation regime vis-à-vis the means of nuclear delivery I add to the understanding of how the set of “implicit and explicit” principles in regimes are negotiated in the phase of institution design.

Relatedly, an influential stream of neorealist scholarship argues that institutions are simply a product of the distribution of power and hence do not matter.<sup>35</sup> This notion has been challenged

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*Delaying Doomsday: The Politics of Nuclear Reversal*, Bridging the Gap (New York, NY: Oxford University Press, 2020).

<sup>34</sup> Stephen D. Krasner, “Structural Causes and Regime Consequences: Regimes as Intervening Variables,” in *International Regimes*, ed. Stephen D. Krasner (Ithaca [N.Y.]: Cornell University Press, 1983), 2.

<sup>35</sup> John J. Mearsheimer, “The False Promise of International Institutions,” *International Security* 19, no. 3 (1994): 5; Erik Voeten, “Making Sense of the Design of International Institutions,” *Annual Review of Political Science* 22, no. 1 (2019): 148.

by a number of scholars as being incorrect.<sup>36</sup> The research in this dissertation adds to this latter strand of literature by establishing that in the realm of nuclear security – arguably a hard case to establish the importance of treaties and institutions – one can find the latter shaping the behavior of powerful states in the system. Even in the context of geopolitical maneuvers involving the superpower states during the Cold War, institutions shape, and more important, limit the ways in which these states can behave. Furthermore, in cases where institutions and norms are being undermined, state behavior is influenced by the very presence of these institutions and norms that exercise agency in forcing even powerful states to behave in certain ways.

Sixth, the international history of how the NPT and other non-proliferation regimes enabled the proliferation of the means of nuclear delivery discussed in this dissertation also adds to our understanding of the evolution of the regime and its effectiveness. By focusing on the negotiations leading up to – and the international diplomacy in the aftermath of – the NPT this study highlights the process of formulating the non-proliferation regime. This helps explain the effectiveness – or rather the lack of it – in the subsequent years, especially in the context of the means of nuclear delivery.

Seventh, beyond these strands of the academic literature, this dissertation also speaks to the theme of a “new era of counterforce,” one that contends that the technological advances in nuclear weapons technology have made nuclear weapons more usable and so states need to pursue more effective counterforce systems in order to be able to ‘credibly deter’ their adversaries.<sup>37</sup> Some scholars contend that states with hitherto second-strike strategies are now moving towards ‘first-

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<sup>36</sup> Helen V. Milner, “Power, Interdependence, and Nonstate Actors in World Politics: Research Frontiers,” in *Power, Interdependence, and Nonstate Actors in World Politics*, ed. Helen V. Milner and Andrew Moravcsik (Princeton: Princeton University Press, 2009), 6.

<sup>37</sup> Keir A. Lieber and Daryl G. Press, “The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence,” *International Security* 41, no. 4 (April 2017): 9–49.

strike' options by bolstering their counterforce nuclear strike capabilities.<sup>38</sup> This literature argues that new technological advances have made obsolete the peaceful stalemate of the 'nuclear revolution' that had been produced by the non-usability of nuclear weapons.<sup>39</sup> Indeed, the implication of this scholarship is that states will have to expand their nuclear arsenals in order to be able to maintain 'strategic stability.'<sup>40</sup> If this is true then it would be extremely important to understanding how states build and proliferate their means of nuclear delivery. This dissertation provides a framework to do this.

Eighth, new scholarship finds that the acquisition of nuclear weapons affect the foreign policy of a state in various ways, often emboldening state behavior. These behaviors expand a state's foreign policy, making it more aggressive, and sometimes more independent in action.<sup>41</sup> However, this scholarship too fails to highlight if these behaviors of a state are motivated by simply possessing a bomb, or also possessing a robust set of mechanisms to be able to deliver it. My dissertation helps address another aspect of this scholarship on how new nuclear states behave by assessing and highlighting the different ways in which states need to change and adapt their foreign policies in order to ensure that their nuclear forces possess credible means of nuclear delivery.

Ninth, the focus of this dissertation on the international history of the proliferation of the means of nuclear delivery also adds a new layer of complexity to studies of nuclear weapons proliferation which privilege domestic politics explanations.<sup>42</sup> While the domestic determinants of

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<sup>38</sup> Christopher Clary and Vipin Narang, "India's Counterforce Temptations: Strategic Dilemmas, Doctrine, and Capabilities," *International Security* 43, no. 3 (February 1, 2019): 7–52.

<sup>39</sup> Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon*, Cornell Studies in Security Affairs (Ithaca: Cornell University Press, 1989).

<sup>40</sup> Keir A. Lieber and Daryl Grayson Press, *The Myth of the Nuclear Revolution: Power Politics in the Atomic Age* (Ithaca: Cornell University Press, 2020), 127–31.

<sup>41</sup> Mark Bell, *Nuclear Reactions: How Nuclear-Armed States Behave* (Ithaca [New York]: Cornell University Press, 2021), 13–17.

<sup>42</sup> Elizabeth N. Saunders, "The Domestic Politics of Nuclear Choices—A Review Essay," *International Security* 44, no. 2 (October 1, 2019): 146–84.

how nuclear forces are built are important, this study demonstrates that international politics plays just as important a role in the nuclear choices that states make. The ‘international’ in this context is not just the security threats that states perceive from their adversaries, but also the institutional, legal, and normative elements of the international non-proliferation regime which states must navigate to build their means of nuclear delivery. This dissertation thus makes a case for bringing international diplomacy “back in” to the study of nuclear proliferation. The use of international history in this endeavor allows us to leverage sources on the similar issues from the national archives of different states thus facilitating more accurate and rich historical account.

Finally, this dissertation, through its case studies has uncovered an important international aspect of the development of the means of nuclear delivery. Domestic narratives on nuclear history often tend to focus on the indigenous nature of the state’s nuclear forces and its ‘independence.’<sup>43</sup> These myth-making narratives can be produced by techno-nationalist discourse or the imperatives of national identity construction.<sup>44</sup> My dissertation shows that in the cases of India, France, and the United Kingdom, the foreign hand in the development of the means of nuclear delivery was vital. This evidence of crucial international contributions to their nuclear forces call for an update of the nuclear histories of some of these states.

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<sup>43</sup> Indeed, this author was accused of being a spy for the United States recruited by U.S. academy to undermine the ‘perfect non-proliferation record’ of the state in question by a senior former diplomat during an anonymous interview for this dissertation research.

<sup>44</sup> Benoît Pelopidas, “Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies,” *Journal of Global Security Studies* 1, no. 4 (November 1, 2016): 326–36; Itty Abraham, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State* (London: Zed Books, 1998); Jacques E. C Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy* (Cambridge, UK: Cambridge University Press, 2006).



**Note on Sources**

The research in this dissertation is primarily based on archival research in India, France, the United Kingdom, and the United States. In India and France I also conducted a total of 30 elite interviews and meetings related to this research. In India, the archival research was conducted at the Nehru Memorial Museum and Library (NMML) and the National Archives of India (NAI), both in New Delhi. I consulted files from the Prime Minister's Office and the Ministry of External Affairs from 1960 to 1980, as well as the rich collections of former bureaucrats P.N. Haksar and T.N. Kaul (1965-1989). Additionally, I supplemented my archival work by conducting elite interviews with strategic decision-makers, which included former Strategic Force Commanders, former Scientific Advisors to the Prime Minister, chiefs of the Army and Indian Navy, and leaders of the Defense Research and Development Organisation (DRDO) and the Indian Space Research Organisation (ISRO).

In the United Kingdom, I conducted archival research at the National Archives at Kew Gardens, where I consulted documents from the Prime Minister's Office, the Cabinet, the Ministry of Defence, the Ministry of Air, the Foreign Office (later the Foreign and Commonwealth Office (FCO)), the Office of Science and Technology.

In France, I conducted archival research at the *Service Historique de la Defense* (Ministry of Defense Archives) at Vincennes, the *Centre des Archives Diplomatiques de la Courneuve* (Diplomatic Archives), and the *Archives Nationales* (National Archives) at Pierrefitte-sur-Seine. In these archives, I consulted documents from the Ministry of Defense, Ministry of External Affairs, and the President and Prime Minister's offices.

In the United States, I consulted archival holdings at the Library of Congress in Washington, DC, and the Ronald Reagan Presidential Library. At the Library of Congress, I

consulted the papers of (among others), Paul Nitze and Daniel Patrick Moynihan. In the Reagan Library I accessed White House Records (through WHORM – White House Office of Record Management), and the archival collections of different directorates of the National Security Council (NSC) and other White House and NSC officials.

I also made use of the extensive online archival collections of the National Security Archive at George Washington University, and the Wilson Center’s Digital Archive managed by the History and Public Policy Program, both based at Washington, DC.

## Chapter 2: Building a Nuclear Force – Regime Ambiguity and Proliferation of the Means of Nuclear Delivery

“Nuclear weapons are small and light; they are easy to move, easy to hide, and easy to deliver in a number of ways... firing missiles on depressed trajectories, carrying bombs in suitcases, placing nuclear warheads on freighters to be anchored in American harbors. Indeed, someone has suggested that the Soviet Union can always hide warheads in bales of marijuana, knowing we cannot keep them from crossing our borders.”

- Kenneth Waltz (1990)<sup>1</sup>

“...they (Soviets) agreed that those things which were not prohibited were permitted. As long as their noses were not rubbed in these matters, they might not react adversely, but if these interpretations were written in large neon lights, there would be no treaty.”

- United States Department of State (1968)<sup>2</sup>

The international nuclear non-proliferation regime creates a permissive environment for the proliferation of the means of nuclear delivery. In this chapter, I explore how and why this is so. I identify a Zone of Ambiguity in the nuclear non-proliferation regime which enables states to build their nuclear forces. I then go on to develop a framework that explains how and when states take advantage of the Zone of Ambiguity to build their means of nuclear delivery. I find that there are three component parts of this Zone – Ambiguous Definitions, Multipurpose Technology, and Normative and Legal Ambiguity – which are built into the system of non-proliferation such that they facilitate the proliferation of nuclear delivery vehicles. I go on to identify three possible enabling logics that may explain how states take advantage of the Zone of Ambiguity to build their

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<sup>1</sup> Kenneth N. Waltz, “Nuclear Myths and Political Realities,” *The American Political Science Review* 84, no. 3 (1990): 742.

<sup>2</sup> State Department cable 121338 to U.S. Embassy, Bonn, "Non-Proliferation Treaty," 18 January 1967, Record Group 59, Records of the Department of State, 1967-1969 Subject-Numeric Files, DEF 18-6, National Archives and Records Administration (NARA). Accessible at: <https://nsarchive2.gwu.edu/nukevault/ebb253/index.htm>.

nuclear forces. Each of these logics of the proliferation of the means of nuclear delivery – the economic logic, the geopolitical logic, and the alliance-driven logic – explain why states might trade in and/or transfer weapons technologies related to nuclear delivery. The economic logic demonstrates how states proliferate nuclear delivery vehicles with the aim of maximizing market share and commercial benefit. In the geopolitical logic, states transfer the means of nuclear delivery in order to gain geopolitical influence and leverage over a recipient state. Finally, in the alliance logic, states use the transfer of nuclear delivery vehicles to control their allies and establish a dominant position in the relationship. Whether a state is a part of an alliance, and if so, with whom, is thus important in understanding how and when a state will build its means of nuclear delivery. Each of these enabling logics interacts with different elements of the Zone of Ambiguity to result in the proliferation of the means of nuclear delivery. In identifying the Zone of Ambiguity and the enabling logics to the proliferation of the means of nuclear delivery, I posit a new framework that helps us gain analytical leverage regarding how states build their nuclear forces.

The chapter progresses in five sections. First, I provide an overview of the literature on nuclear proliferation and highlight its deficiency with regard to the proliferation of the means of nuclear delivery. In the following section, I introduce the concept of the Zone of Ambiguity and its component parts. In the next section, I discuss how the different paths to the proliferation of the means of delivery operate. In the following section, I discuss the underlying assumptions in the framework. In the final section I discuss how the argument in this chapter will be evaluated.

### **Background and Literature: Proliferation, Nuclear Forces, and Means of Delivery**

There are three things that the academic literature on nuclear proliferation does not immediately tell us. First, how states build the means of delivering the nuclear bomb. Second, how the norms of non-proliferation and the regime associated with it do or do not constrain the spread

of means of nuclear delivery. Third, why states provide the means of nuclear delivery to other states. In this section, I consider where the development of nuclear forces is located in the theories of nuclear proliferation and what we know about it from the existing literature. I find that the literature primarily deals with two categories of nuclear proliferation: 1. the causes of nuclear proliferation and 2. the strategies of proliferation. In discussing nuclear proliferation, the literature focuses on fuel-cycle related technologies that states may use to develop a nuclear bomb. This focus of the literature on the explosive device has left our understanding of the development and proliferation of the means of nuclear delivery deficient. In the section that follows, I put forward my own framework for understanding the three key questions about the development and proliferation of the means of nuclear delivery raised above.

### *Causes and Strategies of Nuclear Proliferation*

The literature on nuclear proliferation highlights security, domestic politics, technological prowess, and considerations of identity as primary motivations for states to build nuclear weapons.<sup>3</sup> This literature distinguishes five different stages of the development of the nuclear weapons but focuses on only the first three (see Fig. 1). The first stage is the period of capacity building when a state decides to build up nuclear capability and acquires the infrastructure to do so.<sup>4</sup> In the second phase, nuclear latency, the state acquires the capability to produce a nuclear

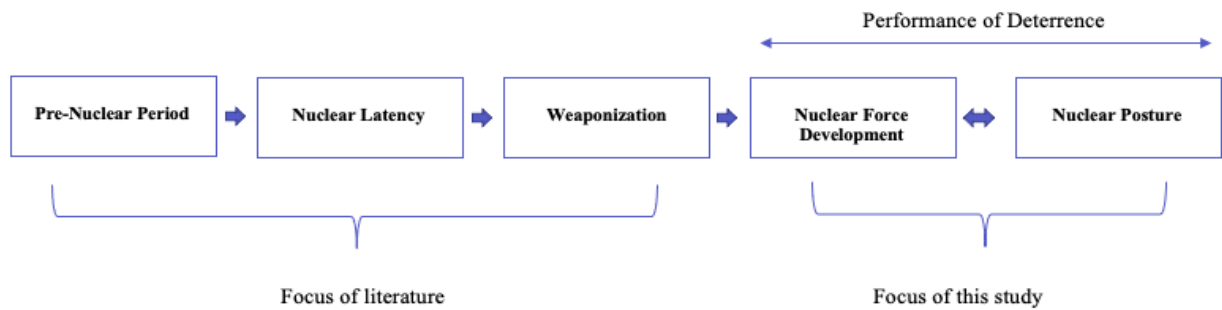
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<sup>3</sup> Scott Sagan, "Why Do States Build Nuclear Weapons?: Three Models in Search of a Bomb," *International Security* 21, no. 3 (1996): 54–86; Hymans, *The Psychology of Nuclear Proliferation*; Sonali Singh and Christopher R. Way, "The Correlates of Nuclear Proliferation: A Quantitative Test," *The Journal of Conflict Resolution* 48, no. 6 (2004): 859–85; Etel Solingen, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East* (Princeton University Press, 2007); Richard K. Betts, "Paranooids, Pygmies, Pariahs & Nonproliferation," *Foreign Policy*, no. 26 (1977): 157–83; Dong-Joon Jo and Erik Gartzke, "Determinants of Nuclear Weapons Proliferation," *Journal of Conflict Resolution* 51, no. 1 (February 1, 2007): 167–94; Nuno P. Monteiro and Alexandre Debs, "The Strategic Logic of Nuclear Proliferation," *International Security* 39, no. 2 (December 3, 2014): 7–51.

<sup>4</sup> Scott Sagan, "The Causes of Nuclear Weapons Proliferation," *Annual Review of Political Science* 14, no. 1 (2011): 225–44.

bomb.<sup>5</sup> In the third, the state explicitly takes the final decision to build the bomb and conducts tests.<sup>6</sup> The fourth stage involves the development of the means of nuclear delivery. It should be noted that in some cases states anticipate this stage well in advance of the weaponization phase.<sup>7</sup> In the final stage, the state integrates its bomb building capacity with its delivery systems and incorporates them into a force posture and doctrine.<sup>8</sup> In states that have possessed nuclear weapons for some time, there is likely to be a feedback loop between nuclear force development and nuclear posture.

**Figure 2.1: Timeline of Nuclear Force Development and Focus of Literature**



The literature on most of these stages has been rich and instructive in our understanding of why states build a nuclear weapon and why they hedge and take different strategies.<sup>9</sup> However, it leaves out an important aspect of nuclear proliferation – the proliferation of the means of nuclear delivery.

<sup>5</sup> Matthew Fuhrmann and Benjamin Tkach, “Almost Nuclear: Introducing the Nuclear Latency Dataset,” *Conflict Management and Peace Science* 32, no. 4 (September 1, 2015): 443–61.

<sup>6</sup> Sonali Singh and Christopher Way characterize these three phases as a continuum that they call “degrees of nuclearness.” They divide this continuum into four stages: no effort at all towards nuclear proliferation, exploration of the possibility to develop weapons, serious pursuit of nuclear weapons, and the acquisition of nuclear weapon capability. See Singh and Way, “The Correlates of Nuclear Proliferation,” 866.

<sup>7</sup> For an account this in the Indian nuclear program, see Kampani, “New Delhi’s Long Nuclear Journey.”

<sup>8</sup> Narang, *Nuclear Strategy in the Modern Era*.

<sup>9</sup> Solingen, *Nuclear Logics*; Vipin Narang, “Strategies of Nuclear Proliferation: How States Pursue the Bomb,” *International Security* 41, no. 3 (January 2017): 110–50.

Why is this so? The answer can be found in what the literature considers to be the issue of proliferation.

*What do we talk about when we talk about nuclear proliferation?*

The literature on the nuclear proliferation focuses on two broad paths to proliferation. The first puts the ability to manufacture/acquire fissile material at the forefront. This scholarship focuses on the proliferation of sensitive nuclear technology, which Kroenig defines as nuclear materials and technology that include “nuclear weapons designs, weapons-grade fissile material, and sensitive fuel-cycle facilities.”<sup>10</sup> As Scott Kemp highlights, since 1975, seven of the eight nuclear weapons aspirants have attempted to pursue centrifuge technology to build the bomb.<sup>11</sup> Studies that have investigated the determinants of nuclear proliferation have thus focused on the determinants of developing the technological capacity to make a nuclear explosive.<sup>12</sup>

The second path to proliferation that the literature considers is dual-use technology. This scholarship considers the spread of civilian nuclear programs which leads to a greater risk of nuclear weapons proliferation.<sup>13</sup> As Matthew Fuhrmann highlights, peaceful nuclear cooperation includes cooperation on nuclear safety; training of scientists and knowledge transfer; transfer of nuclear materials including natural uranium, enriched uranium, and plutonium; research reactors; power reactors; and fuel cycle facilities.<sup>14</sup> States can repurpose the help offered to them through

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<sup>10</sup> Kroenig, *Exporting the Bomb*, 2.

<sup>11</sup> R. Scott Kemp, “The Nonproliferation Emperor Has No Clothes: The Gas Centrifuge, Supply-Side Controls, and the Future of Nuclear Proliferation,” *International Security* 38, no. 4 (May 17, 2014): 44.

<sup>12</sup> Jo and Gartzke, “Determinants of Nuclear Weapons Proliferation.”

<sup>13</sup> Matthew Fuhrmann, *Atomic Assistance: How “Atoms for Peace” Programs Cause Nuclear Insecurity* (Ithaca: Cornell University Press, 2012).

<sup>14</sup> Fuhrmann, 14–17.

legally sanctioned peaceful nuclear cooperation to developing the technological capacity to build nuclear weapons.<sup>15</sup>

An important contribution in this field, one reflective of the current state of play in the nuclear proliferation literature, is the 2014 special issue of the *Journal of Conflict Resolution* edited by Gartzke and Kroenig, which uses new quantitative methods to examine horizontal nuclear proliferation by states.<sup>16</sup> However, their focus on the spread of sensitive nuclear assistance and dual-use technology leaves the discussion rather limited in scope. An exception in the special issue is the article by Gartzke, Kaplow, and Mehta which examines the determinants of the nuclear force structure of states, including the means of nuclear delivery.<sup>17</sup> The article introduces a ‘portfolio theory of nuclear force structure,’ one that considers domestic constraints, bureaucratic politics, conventional threats, nuclear rivalries, and nuclear alliances as the most important factors that influence a state’s decision to diversify its nuclear forces.<sup>18</sup> However, the article does not discuss the horizontal proliferation of the means of nuclear delivery, i.e., it does not address how states acquire their platforms of nuclear delivery, or how states navigate the non-proliferation order in the process of diversifying their nuclear forces.

### *Nuclear Forces in the Literature*

Only one aspect of the development and proliferation of nuclear forces has been addressed in detail by the literature on nuclear proliferation – everything related to the manufacture of the actual nuclear weapon. However, nuclear forces overall have not been completely ignored. They

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<sup>15</sup> Robert L. Brown and Jeffrey M. Kaplow, “Talking Peace, Making Weapons: IAEA Technical Cooperation and Nuclear Proliferation,” *Journal of Conflict Resolution* 58, no. 3 (April 1, 2014): 402–28.

<sup>16</sup> Erik Gartzke and Matthew Kroenig, “Nuclear Posture, Nonproliferation Policy, and the Spread of Nuclear Weapons,” *Journal of Conflict Resolution* 58, no. 3 (April 1, 2014): 395–401.

<sup>17</sup> Gartzke, Kaplow, and Mehta, “The Determinants of Nuclear Force Structure.”

<sup>18</sup> Gartzke, Kaplow, and Mehta, 484–93.



have been addressed in in two primary contexts in the literature. These contexts are, first, in relation to arms control between the United States and the Soviet Union, and second, in the context of ballistic missile proliferation in the Middle East.

An analytically distinct category from proliferation and disarmament, the literature on arms control discusses limiting the number of warheads and means of nuclear delivery of the United States and the Soviet Union.<sup>19</sup> This literature corresponds to the period in the Cold War which led to major bilateral arms limitation treaties, particularly the Strategic Arms Limitation Talks (SALT-I and SALT-II).<sup>20</sup> Both the academic literature and policy outcomes put the United States and the Soviet Union's ability to deliver the bomb at center stage. Scholarship on the arms race and arms control has focused on the causes of the United States and the Soviet Union's development of their nuclear forces. These explanations have ranged from external causes, internal bureaucratic and organizational causes, to cognitive and psychological sources of force development.<sup>21</sup>

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<sup>19</sup> For the foundational work on the arms race and arms control during the Cold War, see, Hedley Bull, *The Control of the Arms Race: Disarmament and Arms Control in the Missile Age* (New York: Praeger for the Institute for Strategic Studies, 1961); Thomas C. Schelling and Morton H. Halperin, *Strategy and Arms Control* (New York: The Twentieth Century Fund, 1961).

<sup>20</sup> Lynn Eden and Steven E Miller, eds., *Nuclear Arguments: Understanding the Strategic Nuclear Arms and Arms Control Debates* (Ithaca: Cornell University Press, 1989); James H. Lebovic, *Flawed Logics: Strategic Nuclear Arms Control from Truman to Obama* (Baltimore: Johns Hopkins University Press, 2013).

<sup>21</sup> See, Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs*, January 1, 1959, <https://www.foreignaffairs.com/articles/1959-01-01/delicate-balance-terror>; Robert Jervis, "Cooperation Under the Security Dilemma," *World Politics* 30, no. 2 (1978): 167–214; David Holloway, "Doctrine and Technology in Soviet Armaments Policy," in *Soviet Military Thinking*, ed. Derek Leebaert (London ; Boston : Allen & Unwin, 1981); David Holloway, *The Soviet Union and the Arms Race* (New Haven: Yale University Press, 1983); Matthew Evangelista, *Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies* (Cornell University Press, 1988); Charles L. Glaser, *Analyzing Strategic Nuclear Policy* (Princeton, N.J: Princeton University Press, 1991); Michael E Brown, *Flying Blind: The Politics of the U.S. Strategic Bomber Program* (Ithaca, N.Y.: Cornell University Press, 1992); Graham Spinardi, *From Polaris to Trident: The Development of US Fleet Ballistic Missile Technology* (Cambridge: Cambridge University Press, 1994); Thomas G. Mahnken, *Technology and the American Way of War* (New York: Columbia University Press, 2008); Dima Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel* (Stanford, Calif.: Stanford University Press, 2010).

It is notable that the means of nuclear delivery feature prominently in the arms control literature in the context of the reduction of nuclear weapons and associated delivery systems. Indeed, identifying and counting nuclear delivery systems is the main constitutive feature of this concept of arms control.<sup>22</sup> It is thus somewhat puzzling that little attention has been given to systematically understanding the *proliferation* of means of nuclear delivery among states other than the two Cold War great powers. This could well be because of the astronomical number of the nuclear delivery systems that the Soviet Union and the United States possess (and have possessed in the past), along with the focus of the political science literature on great power competition. Nevertheless, the focus of arms control in counting – and bringing down – the number of delivery systems of just two states means that there is a need for more academic work on how the horizontal proliferation of the means of nuclear delivery among takes place.

A subset of the means of nuclear delivery – ballistic missile proliferation – has received some attention in academic literature. While this has, on occasion, been linked to the issue of the proliferation of the means of nuclear delivery as a larger category, ballistic missile proliferation received most attention at the end of the Cold War. In particular, this literature focused on the acquisition of missiles by the ‘third world.’<sup>23</sup> Janne Nolan argued that this was largely in reaction to the use of ballistic missiles during the Iran-Iraq war (1980-88), Iraq’s use of ballistic missiles on population centers in Israel and Saudi Arabia during Operation Desert Storm (1991), and new evidence at the time of missile programs in South Africa, Iraq, Libya, and Israel.<sup>24</sup> While Nolan

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<sup>22</sup> Arms control began with a focus on accounting for nuclear delivery systems such as ICBMs, SLBMs, and long-range bombers in the United States and the Soviet Union. See, Thomas W. Wolfe, *The SALT Experience* (Cambridge, Mass: Ballinger Pub. Co, 1979), 10.

<sup>23</sup> See, Nolan, *Trappings of Power*; Aaron Karp, “Space Technology in the Third World: Commercialization and the Spread of Ballistic Missiles,” *Space Policy* 2, no. 2 (May 1, 1986): 157–68; William C. Potter and Harlan W. Jencks, *The International Missile Bazaar: The New Suppliers’ Network* (Routledge, 1994); Dennis M. Gormley, *Missile Contagion: Cruise Missile Proliferation and the Threat to International Security* (Westport, Connecticut: Praeger Security International, 2008).

<sup>24</sup> Nolan, *Trappings of Power*, 8.

and Mistry both highlighted the modest efficacy of the Missile Technology Control Regime, Mistry went on to argue that regimes that focus exclusively on technology but lack political and legal foundations tend to be only temporarily successful.<sup>25</sup> While these studies of proliferation considered missiles primarily in the context of their conventional uses, there was considerable concern that they could be used for delivering chemical and biological weapons by countries like Iran, Iraq, Libya, North Korea, and Syria.<sup>26</sup> As Fetter highlights, while chemical, biological, and nuclear weapons have all have different multilateral arms control treaties related to them, missiles do not have any similar mechanism.<sup>27</sup>

While the development and spread of nuclear weapons has been emphasized in the literature on nuclear proliferation, how these weapons are delivered has not. This has led to a sketchy understanding of the development and proliferation of the means of nuclear delivery in countries other than the United States. Kroenig in his study on sensitive nuclear assistance identifies the question: “Why states decide to help other states develop the platforms that could be used to deliver nuclear weapons, such as bombers, ballistic missiles, and submarines is an interesting question” but does not address it.<sup>28</sup> Kampani in his study of the institutional roadblocks to India’s nuclear weaponization, highlights the importance of nuclear delivery vehicles in the operationalization of nuclear policy.<sup>29</sup> However, his focus lies in organizational politics and domestic causes of delays in India’s nuclear weapons operationalization. It does not consider the process of acquisition of the means of delivery and international sources that led to it.

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<sup>25</sup> Nolan, *Trappings of Power*; Mistry, *Containing Missile Proliferation*, 7.

<sup>26</sup> Steve Fetter, “Ballistic Missiles and Weapons of Mass Destruction: What Is the Threat? What Should Be Done?,” *International Security* 16, no. 1 (1991): 29.

<sup>27</sup> Fetter, 31.

<sup>28</sup> Kroenig, *Exporting the Bomb*, 13.

<sup>29</sup> Kampani, “New Delhi’s Long Nuclear Journey.”

By positing an original framework to address the questions of how states build the means of delivering their nuclear weapons and what role the non-proliferation regime plays in the process, I add to these different strands of literature. The following section of the chapter discusses this framework.

### **The Zone of Ambiguity and the Proliferation of the Means of Nuclear Delivery**

The international context in which a state's nuclear force structure is built is important. I argue that the 'Zone of Ambiguity' in the global non-proliferation regime has created a permissive condition that has undermined the norm of non-proliferation and enabled the spread of the means of nuclear delivery. The global non-proliferation regime in this dissertation refers to the entire "ecosystem" of treaties and agreements – not just the NPT – which attempt to curb the spread of nuclear weapons.<sup>30</sup> The range of non-proliferation obligations produced numerous legal instruments, which taken together provided a framework for the global non-proliferation regime.<sup>31</sup> This regime, while focused on blocking the path to nuclear weapons, has had the side effect of creating a Zone of Ambiguity that has enabled the proliferation of the means of nuclear delivery. "Enabling" here refers to the creation of a permissive environment for the acquisition of technology related to nuclear delivery. This could occur directly by transferring the means of nuclear delivery to a state or indirectly, by allowing a state to access technology related to the development of the means of nuclear delivery. The indirect transfer of technology includes blueprints, resources, goods, services, and other practical support related to the acquisition of

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<sup>30</sup> Mallard, *Fallout*, 7.

<sup>31</sup> Mallard, 7.

technology to build the means of nuclear delivery.<sup>32</sup> The constituents of this zone of ambiguity and how they enable the proliferation of the means of delivery are further examined in this section.

### Zone of Ambiguity

There is ambiguity in the non-proliferation regime on how to treat the means of nuclear delivery which has enabled their proliferation. Ambiguity here refers to the multiple meanings or interpretations of the same legal provisions or terms; that is, it denotes the “vague, incomplete, inconsistent, indeterminate or open-ended language.”<sup>33</sup> Both before and after the NPT was signed in 1968, i.e., when the norm of non-proliferation was nascent and later, when the norm became more institutionalized, the proliferation of the means of nuclear delivery was not addressed. There were two reasons: First, a distinction was made between a nuclear explosive device and its means of delivery. This led to several important laws and treaties to attempt to control only the spread of the nuclear bomb and related fissile materials and not its delivery vehicle. Second, the dual-use nature of the technology has led to a ‘Zone of Ambiguity’ regarding what can and cannot be counted as a part of the means of nuclear delivery. This ambiguity has resulted in the means of delivery of nuclear weapons being either entirely ignored or simply mentioned in passing in major non-proliferation treaties. For example, Sidra Hamidi argues that the ‘technological and textual ambiguities’ in the NPT constitute and create categories like ‘nuclear weapons states’ and ‘non-nuclear weapons states’.<sup>34</sup> These textual ambiguities – especially in Article I and II relating to nuclear weapon transfers – were deliberate and strategic and often produced as a result of collusion

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<sup>32</sup> For a version of this concept of ‘enabling’ in the human rights literature, see: George A. Lopez, “Dealing with ‘Enablers’ in Mass Atrocities: A New Human Rights Concept Takes Shape,” *Carnegie Ethics Online Monthly Column*, June 26, 2012, [https://www.carnegiecouncil.org/publications/ethics\\_online/0070](https://www.carnegiecouncil.org/publications/ethics_online/0070).

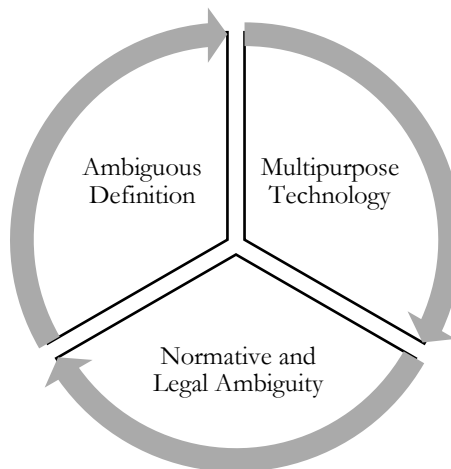
<sup>33</sup> Susanne Therese Hansen, “Taking Ambiguity Seriously: Explaining the Indeterminacy of the European Union Conventional Arms Export Control Regime,” *European Journal of International Relations* 22, no. 1 (March 1, 2016): 195.

<sup>34</sup> Sidra Hamidi, “Law as Discursive Resource: The Politics of the Nuclear/Non-Nuclear Distinction in the Non-Proliferation Treaty,” *European Journal of International Relations* 26, no. 2 (2020): 550.

between the United States and the Soviet Union.<sup>35</sup> Nevertheless, these arbitrary and often nebulous aspects of the nuclear non-proliferation regime are important because they have enabled states to exploit the gaps to transfer the means of nuclear delivery to other states.

A braid of three related strands constitutes the Zone of Ambiguity (see Figure 2.2). The first strand is the multipurpose nature of the technology embedded in the means of nuclear delivery. The second strand is the definitional ambiguity in what constitutes a ‘nuclear weapon’. These form the basis for the third strand – the ambiguity in the normative and legal regime that governs the proliferation of nuclear weapons.

**Figure 2.2: The Zone of Ambiguity that Enables the Proliferation of the Means of Nuclear Delivery**



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<sup>35</sup> Daniel Khalessi, “Strategic Ambiguity: Nuclear Sharing and the Secret Strategy for Drafting Articles I and II of the Nonproliferation Treaty,” *The Nonproliferation Review* 22, no. 3–4 (October 2, 2015): 431.

*Multipurpose Technology – Duality of weapons systems*

The technology of the weapons systems that constitute the means of nuclear delivery is multipurpose in that there is no predetermined single use for the technology.<sup>36</sup> This quality of being adaptable to different purposes creates a permissive condition under which states can engage in the sale and transfer of technology related to nuclear delivery. In the context of this study two types of duality in the technology related to the means of delivery are salient.<sup>37</sup>

The first type of duality is associated with dual-use technologies that can be used for both civilian and military purposes. For example, space technology (launch vehicles, in particular) can be used to launch satellites as well as nuclear warheads: the United States and the Soviet Union both used ICBMs as boosters for space operations. The Atlas and Titan rockets that took the United States' satellites and astronauts into orbit were originally fabricated as nuclear delivery vehicles.<sup>38</sup> Likewise, the Soviet Union's SS-5 and SS-6 ICBMs were used as boosters to place satellites in space.<sup>39</sup>

The second type of duality associated with the means of nuclear delivery is that many military systems have both conventional and nuclear military applications.<sup>40</sup> As a consequence, they can be transferred or sold to other countries as conventional military systems, but may, however, later be incorporated later into a nuclear force as a nuclear delivery system. Dual-capable

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<sup>36</sup> Itty Abraham, “‘Who’s Next?’ Nuclear Ambivalence and the Contradictions of Non-Proliferation Policy,” *Economic and Political Weekly* 45, no. 43 (2010): 52.

<sup>37</sup> Itty Abraham argues in the context of nuclear power that categorizing nuclear power as “dual use” is to reduce it to a binary that does not capture the full range of the ways in which the power can be used. The same is true of the means of nuclear delivery as well. However, in the interest of parsimony, this study will focus on two binaries that help explain the proliferation of these systems. See Abraham, 52.

<sup>38</sup> Gerald M. Steinberg, “Two Missiles in Every Garage,” *Bulletin of the Atomic Scientists* 39, no. 8 (October 1983): 44.

<sup>39</sup> Steinberg, 44.

<sup>40</sup> For an account of how these types of systems increase the risks of inadvertent war, see, James M. Acton, “Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War,” *International Security* 43, no. 1 (August 1, 2018): 56–99.

aircraft that can be used both for conventional military operations as well as nuclear delivery are an example of this type of weapon system. Indeed, dual-capable aircraft were a subject of debate and a point of contention during Intermediate Nuclear Forces (INF) treaty negotiations. As a British Defense Ministry official noted for his Minister, the Soviet Union wanted to include nuclear-capable NATO aircraft in the count of the overall balance of nuclear forces during INF negotiations, and it was:

...impossible to determine how the Russians construct their version of the balance. For example, we note that they attribute 4 “nuclear charges” to NATO dual-capable aircraft and only one to their own aircraft...One caution: dual-capable aircraft are a matter of intense debate and it is impossible to give a definitive figure.<sup>41</sup>

Another example where this type of dual capability was exhibited was the sale of the F-16 aircraft by the United States to Pakistan in the 1980s, which were then incorporated by the latter in its nuclear forces. While the United States claimed that none of the aircraft given to Pakistan were capable of nuclear delivery, it became clear by the late 1980s that the U.S.-supplied F-16s had been modified for nuclear delivery.

### *Definitional Ambiguity – Nuclear Weapons and the Means of Delivery*

The second strand in the Zone of Ambiguity is related to the definitional ambiguity surrounding nuclear weapons and their means of delivery. The distinction drawn between the nuclear bomb and nuclear delivery systems has resulted in non-proliferation efforts focusing on stopping the spread of the nuclear weapons instead of the means to deliver them. The main international non-proliferation proposals in the nascent years of the non-proliferation order (1946-

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<sup>41</sup> Thomas to Daunt, “Mr Rifkind Visit to Moscow: INF and UK Nuclear Forces,” 23 July 1985, The National Archives, Kew Gardens (hereafter TNA) FCO 46/4676.



68) demonstrate this.<sup>42</sup> These proposals, ranging from the Baruch Plan (1946), the Atoms for Peace initiative (1953), the creation of IAEA (1957) and Euratom (1958), the Partial Test Ban Treaty (1963), and the Treaty of Tlatelolco (1967) deal with different aspects of non-proliferation eventually leading up to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).<sup>43</sup> However, none of these proposals dealt with the means of nuclear delivery. Even the United States and the Soviet Union, who played an important role in the propagation of the norm of non-proliferation from before the NPT was signed (albeit for self-interested reasons), did not address the proliferation of the means of nuclear delivery.<sup>44</sup>

The text of the NPT does not even contain a definition of the term “nuclear weapons.”<sup>45</sup> As Hamidi argues, this raises important questions on what Article II of the treaty means. What does the “manufacture” of nuclear weapons mean? Does the treaty refer to a complete nuclear weapon including the means of delivery or simply to the warhead?<sup>46</sup> Mohammed Shaker explains in his account of the NPT negotiations, that there was “...confusion and inadequate consensus on what precisely was to be understood by the term ‘nuclear weapons.’”<sup>47</sup> States likely assumed the definition of the term provided by prior international and domestic legislation like the Treaty of Tlatelolco and the United States Atomic Energy Act of 1954, both of which drew a distinction

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<sup>42</sup> I use the term ‘nascent years of the non-proliferation order’ to mean the period between 1946, when the Baruch Plan was tabled, to 1968, when the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was signed, thus leading to a greater institutionalization of the norm of non-proliferation.

<sup>43</sup> Bertrand Goldschmidt, “A Forerunner of the NPT? The Soviet Proposals of 1947,” *IAEA Bulletin* 28, no. 1 (1986): 59.

<sup>44</sup> Miller, *Stopping the Bomb*, 17.

<sup>45</sup> “Treaty on the Non-Proliferation of Nuclear Weapons (NPT),” July 1968, <https://www.un.org/disarmament/wmd/nuclear/npt/text/>.

<sup>46</sup> Hamidi, “Law as Discursive Resource,” 553.

<sup>47</sup> Mohammed I. Shaker, *The Nuclear Non-Proliferation Treaty: Origin and Implementation, 1959-1979*, vol. 1 (New York: Oceana Publications, Inc., 1980), 202.

between nuclear weapons and their means of delivery.<sup>48</sup> The Treaty of Tlatelolco defined nuclear weapons as,

any device which is capable of releasing nuclear energy in an uncontrolled manner and which has a group of characteristics that are appropriate for use for warlike purposes. An instrument that may be used for the transport or propulsion of the device is *not included* in this definition if it is separable from the device and not an indivisible part thereof.<sup>49</sup>

By excluding any device that could be used for the “transport or propulsion” of a nuclear weapon, the treaty deliberately chose not to attempt to control or regulate the means of nuclear delivery.<sup>50</sup> This had important effects on other treaties of the time and how the means of delivery would be treated by the non-proliferation regime subsequently.

### *‘Twilight Zone’ of Normative and Legal Ambiguity*

The third strand of the zone of ambiguity relates to the normative and legal regime that governs the proliferation of nuclear weapons. The difficulties posed by the multipurpose nature of the technology related to the means of nuclear delivery, and the definitional ambiguities relating to nuclear weapons and delivery systems contribute to the third and perhaps most important strand of the Zone of Ambiguity: the indeterminate normative and legal regime that governs the proliferation of nuclear weapons.

The international non-proliferation regime – because of the lack of restrictions it imposes upon the trade and development of certain dual-use technologies – is an enabler of the proliferation

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<sup>48</sup> Shaker, 1:201.

<sup>49</sup> “Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean,” 1967, <http://disarmament.un.org/treaties/t/tlatelolco>. Emphasis mine.

<sup>50</sup> The Atomic Energy Act (AEA) of 1954, as amended, has a very similar definition and according to Shaker, inspired the wording in the Treaty of Tlatelolco. The AEA defines “atomic weapons” as “...any device utilizing atomic energy, exclusive of the means for transporting or propelling the device (where such means is a separable and divisible part of the device), the principal purpose of which is for use as, or for development of, a weapon, a weapon prototype, or a weapon test device.” For the full text of the act, see: <https://www.nrc.gov/docs/ML1327/ML13274A489.pdf>.

of the means of nuclear delivery. This enabling role of the non-proliferation regime is a feature that can be traced through the Cold War period.

The current non-proliferation regime began in the early-Cold War period with the United Nations Atomic Energy Commission (1946) and President Truman's Atomic Energy Act of 1946.<sup>51</sup> Today it consists of the Nuclear Non-proliferation Treaty (NPT), the Nuclear Suppliers Group, the Missile Technology Control Regime (MTCR), treaties on regional nuclear weapons-free zones, treaties on nuclear testing like the Comprehensive Test Ban Treaty (CTBT), and the United States' non-proliferation laws and efforts, particularly the Atomic Energy Act 1954 and the Nuclear Non-Proliferation Act of 1978.<sup>52</sup> Other informal groups like the Zangger Committee, the Wassenaar Arrangement, the Australia Group, have member states that voluntarily agree to certain export control conditions with regard to the transfer nuclear, and other weapons of mass destruction. However, apart from the Missile Technology Control Regime – an informal (not legally binding) regime established in 1987 to restrict the transfer of missile technology – no other international law or treaty prevents (or even controls) the sale of nuclear delivery vehicles or associated technology.<sup>53</sup>

It should be noted that the means of nuclear delivery were not altogether ignored in non-proliferation negotiations when the norm against the spread of nuclear weapons was being institutionalized. For example, nuclear delivery vehicles were an important topic of debate in the Eighteen Nation Disarmament Committee (ENDC) negotiations both prior to, and during, the NPT negotiations between 1962 and 1968. In 1962, when Premier Nikita Khrushchev invited France to

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<sup>51</sup> Francis J. Gavin, "Nuclear Proliferation and Non-Proliferation during the Cold War," in *The Cambridge History of the Cold War*, ed. Melvyn P. Leffler and Odd Arne Westad, vol. 2 (Cambridge, UK: Cambridge University Press, 2010), 397.

<sup>52</sup> Jan Ruzicka, "Behind the Veil of Good Intentions: Power Analysis of the Nuclear Non-Proliferation Regime," *International Politics* 55, no. 3 (May 1, 2018): 371.

<sup>53</sup> Mistry, *Containing Missile Proliferation*, 16.

participate in disarmament-related negotiations, President Charles de Gaulle highlighted the centrality of the means of delivery by responding that,

...France has unceasingly advocated that the destruction, the banning and the control should first be applied to the means of delivery of nuclear weapons – launching pads, planes, submarines, etc.

Indeed, it still appears possible today to detect these means; furthermore, to abolish these means would undoubtedly mean eliminating almost completely the nuclear danger itself.

Once again, Mr. President, I wish to say that France is ready to participate in any talks...that would have as their immediate goal the destruction, the ban and the control of *all means of delivery of nuclear weapons*...<sup>54</sup>

While France eventually chose not to participate in the ENDC, in keeping with the sentiment that the means of delivery needed to be dealt with as a core issue of the disarmament problem, the draft treaties put forward by the Soviet Union and the United States in 1962 stated that it was necessary to eliminate the means of delivery in the first phase of any framework towards disarmament.<sup>55</sup> By 1965, the language of the early draft NPT which “...keeps all limitations on non-nuclear countries while allowing nuclear weapon countries to continue to manufacture *nuclear weapons and delivery vehicles*” was called “spurious” during the treaty negotiations.<sup>56</sup> Furthermore, in 1966, the eight non-aligned states in the ENDC, in a joint memorandum, called for the “...freeze and a gradual reduction of the stocks of nuclear weapons and the means of their delivery.”<sup>57</sup>

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<sup>54</sup> “De Gaulle’s Reply to Khrushchev Note,” *New York Times*, February 20, 1962, ProQuest Historical Newspapers: The New York Times. Emphasis mine.

<sup>55</sup> Conference of the Eighteen-Nation Committee on Disarmament (United Nations), “Final Verbatim Record of the Conference of the Eighteen-Nation Committee on Disarmament [Meeting 198],” 1964, 15, <http://name.umd.umich.edu/4918260.0065.001>.

<sup>56</sup> U.S. Department of State Policy Planning Council, “Appendix A: Statements Concerning Non-Proliferation and Disarmament,” in “The Further Spread of Nuclear Weapons: Problems for the West,” 14 February 1966, Record Group 59, Records of the Department of State (RG 59), Records of Policy Planning Council, 1965-1968 Subject, Country and Area Files, Box 384, Atomic Energy-Armament, NARA. Accessible at: <https://nsarchive2.gwu.edu/nukevault/ebb253/doc01.pdf>. Emphasis mine.

<sup>57</sup> Shaker, *The Nuclear Non-Proliferation Treaty: Origin and Implementation, 1959-1979*, 1980, 1:56.

However, these efforts did not ultimately bear fruit. Because the means of nuclear delivery constitute weapons systems with both conventional military applications and nuclear delivery roles, states disagreed on what should and should not be considered nuclear delivery vehicles. As the United States representative argued, the means of nuclear delivery constituted a large ‘twilight zone’, i.e., the list of dual capable weapons systems with both conventional and nuclear roles was long.<sup>58</sup> There was no agreed upon definition of what vehicles ‘capable of delivering nuclear weapons’ meant. This made it difficult to regulate these systems.<sup>59</sup> Additionally, the Soviet Union argued that all means of delivery had to be dismantled in the first phase of a disarmament plan. However, the United States was only in favor of a thirty per cent reduction in the means of delivery in the first phase of disarmament. Eventually, the United States and the Soviet Union privately agreed that the NPT would not deal with “delivery vehicles of any kind.”<sup>60</sup> These differences in the definition of the means of nuclear delivery, along with irreconcilable differences between the two superpower blocs during the Cold War on how to constrain the spread of these systems resulted in the treaty regime dealing with non-proliferation being silent on the regulations of weapons systems altogether.

Thus, the Treaty on the Non-Proliferation of Nuclear Weapons (1968) – the cornerstone of the non-proliferation regime – mentions the means of nuclear delivery only once in the text of the treaty, just in the preamble, which states,

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<sup>58</sup> Conference of the Eighteen-Nation Committee on Disarmament (United Nations), “Final Verbatim Record of the Conference of the Eighteen-Nation Committee on Disarmament [Meeting 073],” 1962, 14, <http://name.umd.umich.edu/4918260.0065.001>.

<sup>59</sup> Indeed, as the United Kingdom’s representative to the ENDC noted, certain Soviet civilian aircraft kept the ‘bomb aimer’s windows of their military counterparts’ suggesting that those too could be used for nuclear delivery. This made the ‘twilight zone’ rather long. See, Conference of the Eighteen-Nation Committee on Disarmament (United Nations), “Final Verbatim Record of the Conference of the Eighteen-Nation Committee on Disarmament [Meeting 67],” 1962, 9, <http://name.umd.umich.edu/4918260.0065.001>.

<sup>60</sup> State Department cable 121338 to U.S. Embassy, Bonn, “Non-Proliferation Treaty,” 18 January 1967, Record Group 59, Records of the Department of State, 1967-1969 Subject-Numeric Files, DEF 18-6, National Archives and Records Administration (NARA).

... Desiring to further the easing of international tension and the strengthening of trust between States in order to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons and the *means of their delivery* pursuant to a Treaty on general and complete disarmament under strict and effective international control...<sup>61</sup>

The NPT thus left it to a future treaty to deal with the proliferation of the means of delivery. The exclusion of nuclear delivery systems from any legally binding obligation in the nuclear non-proliferation regime created a permissive condition for transfer of the systems between states. Indeed, the U.S. States reassured its allies that that: “The treaty deals only with what is prohibited, not with what is permitted...It does not *deal with and therefore does not prohibit, transfer of nuclear delivery vehicles or delivery systems*, or control over them to any recipient, so long as such transfer does not involve bombs or warheads.”<sup>62</sup> This interpretation of the NPT was agreed to by United States Secretary of State Rusk and Soviet Foreign Minister Gromyko in 1966.<sup>63</sup>

After the NPT was signed, the Conference of Non-Nuclear Weapons States (1968) met and had, in its final document, a resolution that requested the United Nations General Assembly to recommend that the Eighteen Nation Committee on Disarmament begin negotiations for “...the prevention of the further development and improvement of nuclear weapons and their delivery vehicles” and the “...reduction and subsequent elimination of all stockpiles of nuclear weapons and their delivery systems.”<sup>64</sup>

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<sup>61</sup> “Treaty on the Non-Proliferation of Nuclear Weapons (NPT).” Emphasis mine.

<sup>62</sup> “Questions on the Draft Non-Proliferation Treaty asked by U.S. Allies together with answers given by the United States,” in Undersecretary of State Katzenbach to Secretary of Defense Clifford, Correspondence, 10 April 1968, Record Group 59, Records of the Department of State, 1967-1969 Subject-Numeric Files, DEF 18-6, NARA. Emphasis mine.

<sup>63</sup> Undersecretary of State Katzenbach to Secretary of Defense Clifford, Correspondence, 10 April 1968, Record Group 59, Records of the Department of State, 1967-1969 Subject-Numeric Files, DEF 18-6, NARA.

<sup>64</sup> See, “Final Document of the Conference of Non-Nuclear-Weapon States,” in Mohammed I. Shaker, *The Nuclear Non-Proliferation Treaty: Origin and Implementation, 1959-1979*, vol. 3 (New York: Oceana Publications, Inc., 1980), 1010.

*Regime Ambiguity Possibly a Boon?*

Some scholars consider the dual-use nature of the nuclear technology to be a boon to the nuclear non-proliferation regime because it creates flexibility in the process of counter-proliferation negotiations.<sup>65</sup> The argument here is that institutions like the NPT and the IAEA have *by design* built in plausible deniability that allows potential proliferators to save face and feign ignorance when forced to comply with the demands of the non-proliferation regime.<sup>66</sup> As the discussion of the Zone of Ambiguity and the proliferation of the means of nuclear delivery demonstrates, the focus on the upside of poor institutional design is a charitable reading of the NPT. The room for deniability in the regime which coercive counter-proliferation efforts take advantage of is the same feature that allows states to remain compliant with the nuclear non-proliferation regime while proliferating.<sup>67</sup> Furthermore, the NPT, is seen as the “official platform” that activates the norm of non-proliferation and grants it credibility.<sup>68</sup> Regime ambiguity in this foundational instrument is a weakness that undermines the norm of non-proliferation.<sup>69</sup>

The exclusion of the means of nuclear delivery from the NPT and other instruments of the nuclear non-proliferation regime enables the direct and indirect spread of these weapons systems. Indeed, the direct omission from the legal regime that governs international non-proliferation makes the proliferation of the means of delivery legally permissible. As a U.S. State Department memo during the negotiation of the NPT noted, both the United States and the Soviet Union had

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<sup>65</sup> Pauly, “Deniability in the Nuclear Nonproliferation Regime,” 2.

<sup>66</sup> Pauly, 4.

<sup>67</sup> Wohlstetter in his critique of the NPT states that the “inalienable right” of states to acquire peaceful nuclear energy (that includes reprocessing) presented a “...new natural right to Life, Liberty, and the Pursuit of Plutonium.” Albert Wohlstetter, “Spreading the Bomb without Quite Breaking the Rules,” *Foreign Policy*, no. 25 (1976): 179.

<sup>68</sup> Rublee, “Taking Stock of the Nuclear Nonproliferation Regime,” 428.

<sup>69</sup> It should also be noted that there is ambiguity in the NPT and the global non-proliferation order beyond its indeterminate treatment of the means of nuclear delivery. For example, the both the LTBT and the NPT ambiguous “exit clauses.” See, Mallard, *Fallout*, 29.

agreed that “...those things which were not prohibited were permitted.”<sup>70</sup> Therefore, despite the norm of nonproliferation which prohibits the proliferation of nuclear weapons, the “constructive ambiguity” in the system in reality is a blank check to the nuclear weapons systems proliferators.<sup>71</sup>

It could also be argued that the exclusion of the means of nuclear delivery from the NPT was a deliberate part of the strategy to get the maximum number of signatories to the treaty. Concessions on ensuring the “inalienable right” of states to nuclear material and equipment, as well as to assistance on peaceful nuclear energy were seen as a part of a “grand bargain” to maximize participation.<sup>72</sup> Treaty or regime designs are often results of compromises and states prefer ambiguous provisions in order to arrive at the most widely agreeable arrangement.<sup>73</sup> It could be argued that the Zone of Ambiguity in the nuclear non-proliferation regime was a conscious design feature to arrive at the ‘lowest common denominator’ for maximizing signatories.<sup>74</sup> However, the evidence suggests that this is not the case. In fact, during NPT negotiations in the ENDC, the issue of the means of nuclear delivery was brought up by the non-nuclear states repeatedly indicating that their inclusion in the treaty would likely have widespread support.<sup>75</sup> The exclusion of the means of delivery was likely a part of the larger “Soviet-American collusion” –

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<sup>70</sup> State Department cable 121338 to U.S. Embassy, Bonn, “Non-Proliferation Treaty,” 18 January 1967, National Archives, Record Group 59, Records of the Department of State, 1967-1969 Subject-Numeric Files, DEF 18-6. Accessible at: <https://nsarchive2.gwu.edu/nukevault/ebb253/index.htm>

<sup>71</sup> Pauly, “Deniability in the Nuclear Nonproliferation Regime,” 5.

<sup>72</sup> Jonathan Hunt, “The Birth of an International Community: Negotiating the Treaty on the Non-Proliferation of Nuclear Weapons,” in *Foreign Policy Breakthroughs: Cases in Successful Diplomacy*, ed. Robert L. Hutchings and Jeremi Suri (New York, NY: Oxford University Press, 2015), 90–91.

<sup>73</sup> Hansen, “Taking Ambiguity Seriously,” 195.

<sup>74</sup> For an overview on regime design and discussions of when states prefer precise and specific treaties and when they prefer ambiguous and vague treaty regimes, see, Kenneth W. Abbott and Duncan Snidal, “Hard and Soft Law in International Governance,” *International Organization* 54, no. 3 (2000): 421–56; Barbara Koremenos, Charles Lipson, and Duncan Snidal, “The Rational Design of International Institutions,” *International Organization* 55, no. 4 (2001): 761–99; James D. Fearon, “Bargaining, Enforcement, and International Cooperation,” *International Organization* 52, no. 2 (ed 1998): 269–305.

<sup>75</sup> Conference of the Eighteen-Nation Committee on Disarmament (United Nations), “Final Verbatim Record of the Conference of the Eighteen-Nation Committee on Disarmament [Meeting 198].”



what the West German Chancellor Kiesinger called ‘atomic complicity’ – that irritated a number of delegations during the NPT negotiations.<sup>76</sup> In this case, the ambiguity produced by this collusion was more destructive rather than the “constructive” ambiguity that is often celebrated in the nuclear non-proliferation regime.<sup>77</sup>

It is also important to note that because of the Zone of Ambiguity the transfer of means of nuclear delivery is not – and *does not have to be* – secret. The international non-proliferation regime ensures that the transfer of the means of nuclear delivery can be in the open. This contrasts with the case of states with secret nuclear programs attempting to build nuclear bombs under cover and cheating the non-proliferation system.<sup>78</sup> The following section will highlight how the Zone of Ambiguity enables the proliferation of the means of nuclear delivery.

### **Logics Enabling the Proliferation of the Means of Nuclear Delivery**

How does the Zone of Ambiguity lead to the proliferation of the means of nuclear delivery? I argue that the Zone of Ambiguity is the primary enabling condition that facilitates the operation of three specific enabling logics that lead to the proliferation of the means of nuclear delivery. As Fig. 2.3 illustrates, these enabling logics are the economic logic, the geopolitical logic, and the alliance logic. These logics represent three mechanisms that explain why states might trade in and/or transfer weapons technologies related to the means of nuclear delivery.

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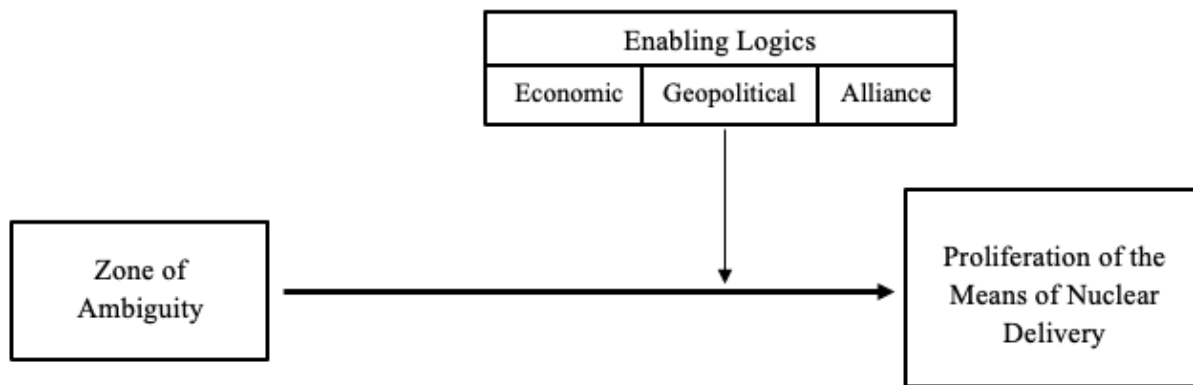
<sup>76</sup> Hunt, “The Birth of an International Community: Negotiating the Treaty on the Non-Proliferation of Nuclear Weapons,” 89; Roland Popp, “Introduction: Global Order, Cooperation between the Superpowers, and Alliance Politics in the Making of the Nuclear Non-Proliferation Regime,” *The International History Review* 36, no. 2 (March 15, 2014): 199.

<sup>77</sup> For the detrimental effects of treaty ambiguity in other contexts, see Itay Fischhendler, “When Ambiguity in Treaty Design Becomes Destructive: A Study of Transboundary Water,” *Global Environmental Politics* 8, no. 1 (2008): 111–36.

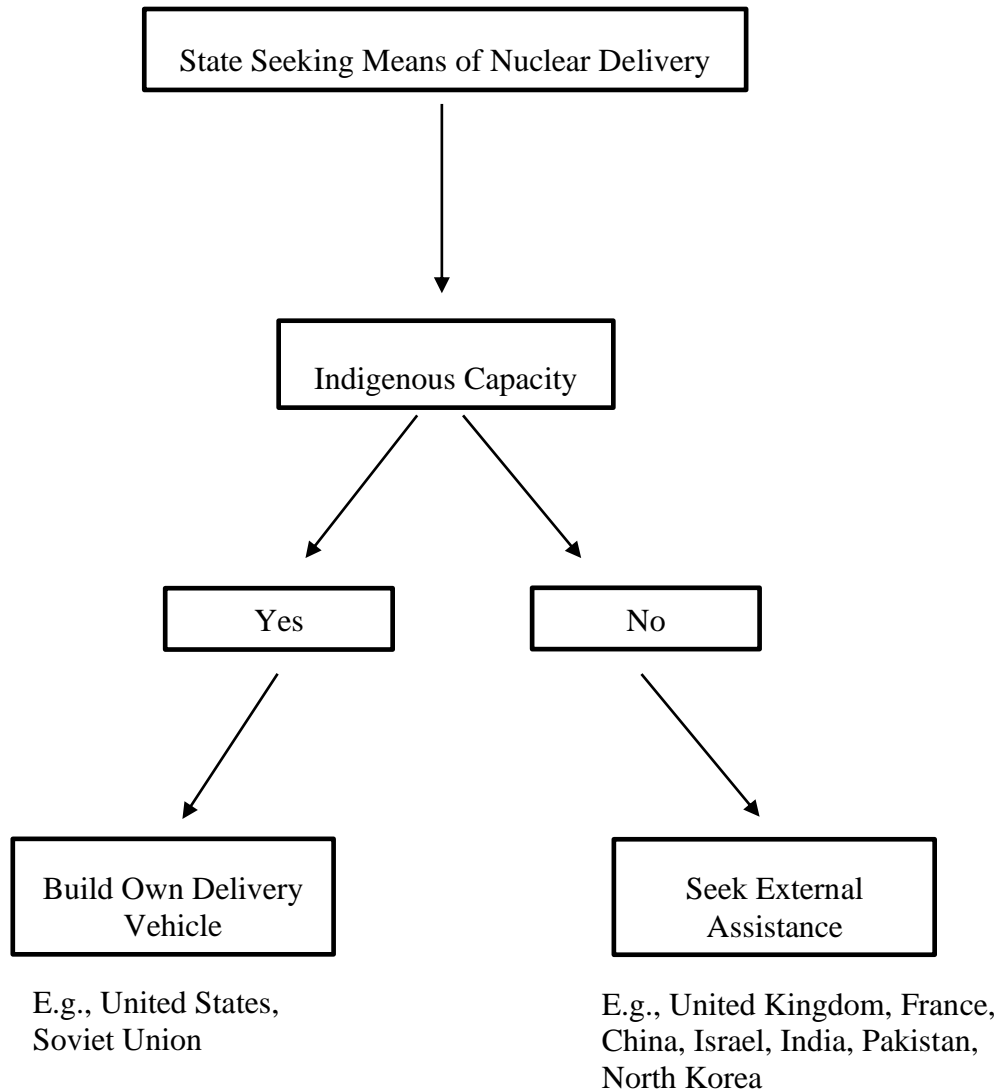
<sup>78</sup> Målfrid Braut-Hegghammer, “Cheater’s Dilemma: Iraq, Weapons of Mass Destruction, and the Path to War,” *International Security* 45, no. 1 (July 1, 2020): 52.

Why a state chooses to develop a certain type of delivery system over another is also related to the enabling logics operating and available. Each of these logics interacts with different elements of the Zone of Ambiguity to result in the proliferation of the means of nuclear delivery. The Zone of Ambiguity thus represents the general enabling condition operating at the systemic level that allows these specific enabling logics to exist and operate.

**Figure 2.3: Proliferation of the Means of Nuclear Delivery**



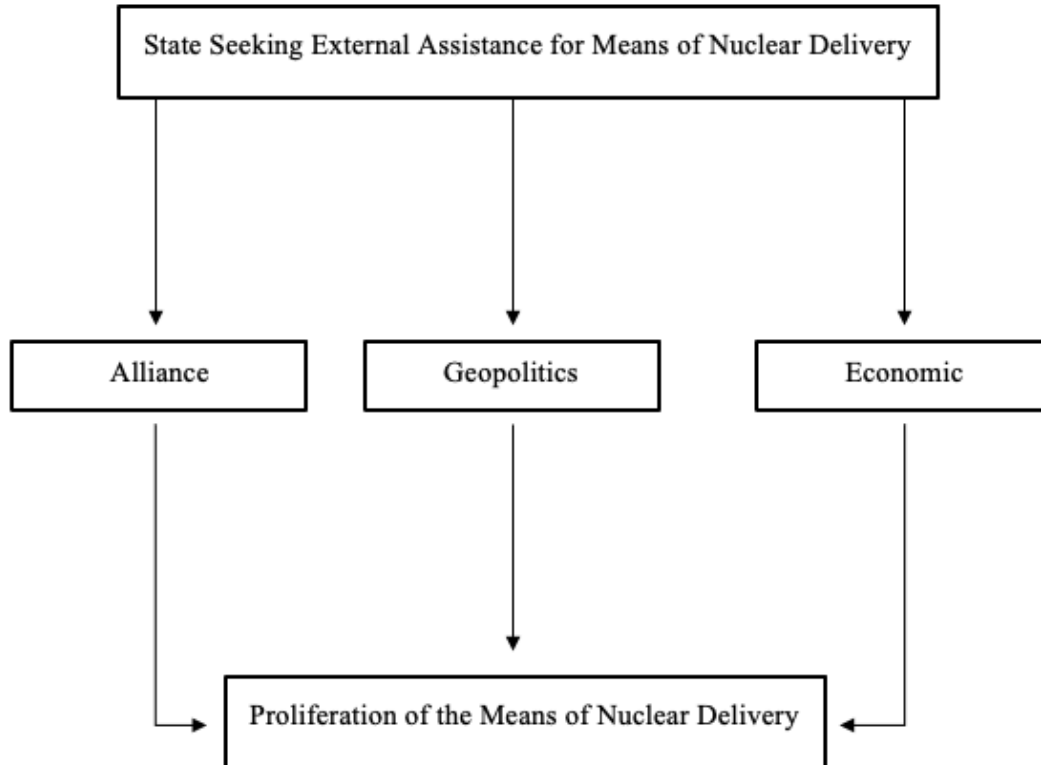
I posit that for states building the means of nuclear delivery the most important question is whether they have the indigenous capability to do so. If the answer is yes, then they go ahead and do so themselves. This outcome is more likely for states with a high level of economic and technological power, typically great powers in the system like the United States and the Soviet Union. However, if the answer is no, then states will have to seek the technology for nuclear delivery from external sources (see Fig 2.4). This is the path taken by most of the nuclear states in the system that are/were not great powers.

**Figure 2.4: Choices Ahead of States Seeking the Means of Nuclear Delivery**

In the pursuit of external assistance to acquire the technology for nuclear delivery, states might make use of three different logics: the alliance logic, the geopolitics logic, and the economic logic (see Fig. 2.5). While I discuss each of the logics in detail in the rest of the chapter, it is important to note here that each of the logics can be operating independently or in conjunction with each other to produce the final outcome of proliferation of the means of nuclear delivery. I explore how each of them operates independently of the others in the rest of the dissertation

highlighting when they might be entangled. This is because even if they may operate together at times and can be difficult to unentangle, they are theoretically distinct logics. And indeed it is theoretically possible for one particular logic to operate independent of the others.

**Figure 2.5: Enabling Logics to the Proliferation of the Means of Delivery**



### *Economic Logic*

Economic imperatives represent an important enabling logic explaining the proliferation of the means of nuclear delivery. We would expect that the non-proliferation regime would be a constraint in the transfer the means of nuclear delivery. Indeed, the NPT prohibits the transfer of “nuclear weapons or other nuclear devices.”<sup>79</sup> While the treaty does not prohibit the sale of the

<sup>79</sup> “Treaty on the Non-Proliferation of Nuclear Weapons (NPT).”

means of nuclear delivery, it does represent a norm of non-proliferation of technology associated with nuclear weapons which includes the means of nuclear delivery. This norm, however, is often undermined at the altar of economic interest.

Economic incentives are important in the sale of any weapons systems. For the suppliers, arms sales bring in foreign exchange, contribute to the balance of payments, and provide capital and employment to the defense industry.<sup>80</sup> For example, by using the commercial sales of military equipment along with the financial assistance to facilitate it, the United States has shaped the force structures and military equipment of a number of recipient states. The reliance of these states on an entire ecosystem of American military products has ensured a steady inflow of capital and a ready market for the United States.<sup>81</sup> An example of this is the sale of the F-5 fighter jets to Egypt in 1978, which required the further sale of \$300 million worth of military equipment to support the jets.<sup>82</sup>

For the buyer, the cost of building a credible nuclear force includes spending money on research and development, as well as production of missiles, aircraft, nuclear submarines, warning systems.<sup>83</sup> Acquiring a system from abroad thus may help a state save considerable expenditure of financial and technological resources.

These economic considerations undermine the norm of non-proliferation. The possibility of commercial benefit for both parties from a sale of technology related to the means of nuclear delivery leads to disregard for non-proliferation concerns. There are two related dynamics at play in this process. The first is the commercial gains for the supplier state. If the buying state has an

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<sup>80</sup> Pierre, *The Global Politics of Arms Sales*, 24.

<sup>81</sup> Mary Kaldor, *The Baroque Arsenal* (New York: Hill and Wang, 1981), 132–33.

<sup>82</sup> Kaldor, 134.

<sup>83</sup> Michael M. May, “Nuclear Weapons Supply and Demand,” *American Scientist* 82, no. 6 (1994): 531.

emerging market that the supplier seeks to capture, the latter will, regardless of its commitments to the non-proliferation regime, seek to increase its presence in this emerging market. Vendor states, even in the nuclear market, seek to maximize market share.<sup>84</sup> Supplier states are hence likely to be tempted to sell technology related to the means of delivery to a state with a growing market in order to maximize their market share. Supplier states (contingent on state structure) in this dynamic may be influenced by powerful private actors, defense companies, and industry interests. For example, with military aircraft contracts the vendors fulfilling the order are generally private companies like Dassault Aviation and Lockheed, or publicly-owned companies like British Aerospace (BAE systems now) and the Russian United Aircraft Corporation. Large international contracts to provide other states with fighter aircraft are a boost to the respective private and public industries and often drive the behavior of the supplier state with regard to aircraft or other military technology sales.

The second dynamic involves economic competition among states (often in the same alliance) which can lead to a scramble to sell technology related to the means of nuclear delivery before peer competitors do the same. The Zone of Ambiguity in the nuclear non-proliferation regime enables this dynamic. In their effort to get the order for the technology or weapons systems, the selling states will compete against each other and often undercut each other, while ignoring proliferation concerns.<sup>85</sup>

The expectation following from the economic logic for the proliferation of the means of nuclear delivery is that supplier states that are likely to economically benefit from the transfer of

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<sup>84</sup> Eliza Gheorghe, "Proliferation and the Logic of the Nuclear Market," *International Security* 43, no. 4 (April 1, 2019): 94.

<sup>85</sup> Contrary to Gheorghe, this work does not assume that the buyer necessarily plays off one supplier against the other. Depending on the market, the sellers may in fact be more proactive in undercutting one another to woo the buyer. See, Gheorghe, 94.

these technology and materials will seek to proliferate. On the demand side, states with limited indigenous capacity will likely seek to acquire nuclear delivery vehicles from external sources to save the time, effort, and cost of independent research, development, and production.

### *Alliance Logic*

The second enabling logic explaining the spread of the means of nuclear delivery concerns allies. Whether a state is a part of an alliance, and if so, with whom, is important in understanding how and when a state will build its means of nuclear delivery. Conventional wisdom assumes that allies are of immense benefit to a state and are intuitively expected to be an enabling factor in the development of a nuclear force. In some cases, states allied against the same enemy will coproduce nuclear delivery vehicles; for example, the Jaguar aircraft, developed together by the United Kingdom and France as a tactical nuclear delivery platform was used in both states' nuclear forces.<sup>86</sup> Another example, is the development of the nuclear-capable-Jericho II missile by Israel and South Africa in the 1980s.<sup>87</sup>

Having allies, however, may not always be beneficial. Alliance coercion is often used as a tool of non-proliferation to stop non-nuclear states from building a bomb.<sup>88</sup> The United States thwarting West Germany's nuclear ambitions is an example of this dynamic.<sup>89</sup> The cases of West Germany, Japan, and South Korea all represent non-nuclear weapons states that were persuaded

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<sup>86</sup> K.C. MacDonald to T.J.B. George, "Jaguar – carriage of nuclear weapons," 10 October 1967, FCO 46/158, The National Archives, Kew Gardens, United Kingdom.

<sup>87</sup> Hans M. Kristensen and Robert S. Norris, "Israeli Nuclear Weapons, 2014," *Bulletin of the Atomic Scientists* 70, no. 6 (November 1, 2014): 107.

<sup>88</sup> Gene Gerzhoy, "Alliance Coercion and Nuclear Restraint: How the United States Thwarted West Germany's Nuclear Ambitions," *International Security* 39, no. 4 (April 1, 2015): 105.

<sup>89</sup> Gerzhoy, 105.

by their allies to not build nuclear weapons.<sup>90</sup> The same dynamic, however, may not apply to alliance relationships between two nuclear states.

When it comes to the proliferation of the means of nuclear delivery, allies matter. Just how they matter depends on the particular circumstances. In an alliance relationship between two nuclear states the stronger ally may both constrain and enable the nuclear forces of the weaker ally. For example, the United States gave significant assistance to the South Korean missile development program during 1975-76.<sup>91</sup> The South Korean missile program was meant to fit strategic missile systems with nuclear warheads. This led to a debate in the United States on whether further export approvals should be given and the State Department declined to do so, stating that, “Linkage of nuclear weapons development to an advanced missile capability would have the most serious strategic implications given ROK’s geographic location.”<sup>92</sup> The Department of Defense meanwhile wanted to approve some exports (particularly a Lockheed rocket propellant plant) but refused to provide further “significant” technology.<sup>93</sup> The United States eventually chose to assist South Korea with the propellant plant and other missile technology in an attempt to “flush out” their more ambitious plans for nuclear delivery.<sup>94</sup> Alliances, thus, while enabling factors, can also be constraints on a state trying to build its nuclear forces.

The Zone of Ambiguity also enables the transfer of the means of nuclear delivery in alliance relationships because such transfers between states are, in general, not illicit or

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<sup>90</sup> Alexander Lanoszka, *Atomic Assurance: The Alliance Politics of Nuclear Proliferation* (Ithaca: Cornell University Press, 2018).

<sup>91</sup> Nicholas Seltzer, “Baekgom: The Development of South Korea’s First Ballistic Missile,” *The Nonproliferation Review* 26, no. 3–4 (May 4, 2019): 311.

<sup>92</sup> Department of State Memorandum for Lieutenant General Brent Scowcroft, “Sale of Rocket Propulsion Technology to South Korea,” 4 February 1975, Gerald R. Ford Presidential Library, National Security Adviser Presidential Country Files for East Asia and the Pacific, Box 9, Korea (3). Available at: <https://digitalarchive.wilsoncenter.org/document/114634>.

<sup>93</sup> Ibid.

<sup>94</sup> Seltzer, “Baekgom,” 318.



clandestine.<sup>95</sup> The Eighteen Nation Disarmament Committee in the pre-NPT negotiations discussed whether the categorization of states in the non-proliferation regime was really going to be “nuclear nations, non-nuclear nations in alliance with nuclear nations, and non-nuclear non-aligned countries.”<sup>96</sup> This was important because the prohibition of the transfer (or co-ownership) of a nuclear warhead and its means of delivery to an ally under the NATO or the Warsaw Pact would be a problem. Definitional ambiguity thus aided in the alliance-related transfer of nuclear weapons and the means of delivery.

The alliance logic represents one way in which states can acquire the means of nuclear delivery. While the intuitive expectation that having an ally leads to the proliferation of the means of nuclear delivery generally holds, this logic is not as straightforward as it seems at first blush. Indeed, as this discussion has explored, and this dissertation later demonstrates, alliance relationships with regard to the sharing of nuclear delivery technology are fraught and interact with the Zone of Ambiguity and the norms of non-proliferation to produce contingent outcomes. Sometimes having an ally helps a state gain the capability to deliver nuclear weapons, but sometimes it hinders the effort. The alliance logic is thus not a predictive one, rather, it helps explain the interactions between states that lead to the outcome of interest in this dissertation.

### *Geopolitical Logic*

The third enabling logic explaining the proliferation of the means of nuclear delivery relates to geopolitical considerations. This involves the supplier state exercising influence and

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<sup>95</sup> It should be noted that even in some cases when they are in fact clandestine, they do not break any laws related to non-proliferation. For example, the United States’ aid to France’s nuclear missile program was secret but not illegal in either international or domestic American law.

<sup>96</sup> It was ultimately decided to have two groups: Nuclear-Weapon States (who had exploded a nuclear bomb or a nuclear device by 1 January 1967) and Non-Nuclear Weapons States. See, Hamidi, “Law as Discursive Resource,” 556; “Treaty on the Non-Proliferation of Nuclear Weapons (NPT).”

leverage over the receiving state for the weapons systems. During the Cold War, the United States and the Soviet Union supplied conventional military equipment to other states in order to exercise leverage and political control.<sup>97</sup> States aid the proliferation of the means of nuclear delivery with similar goals.

The supply of arms to other states creates a dependence in the recipient state on the supplier state. This dependence can be beneficial to the supplier state in two ways. First, a recipient state's dependence on a supplier state for a certain weapons system creates a steady economic incentive for the latter, as it generates employment and helps sustain the defense industry. Second, dependence of a recipient state on a supplier state may also allow the latter to use it as a base for power projection. The United States' supply of weapons to South Korea, and the basing of military units in the peninsula during and after the Cold War is an example of this dynamic. In another example the United States attempted to wrest India away from dependence on the Soviet Union's weapon systems during the Cold War by offering to sell India alternative advanced weapons systems.<sup>98</sup>

This dynamic can cut both ways. As Pierre highlights, there is a "reverse leverage" dynamic in which the recipient states exercise influence over their arms suppliers.<sup>99</sup> A recipient state could renege upon an informal alignment with a supplier, hinting at a potential realignment, thus allowing it to exert more control over the supplier's foreign policy.<sup>100</sup> An example is Taiwan's

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<sup>97</sup> Pierre, *The Global Politics of Arms Sales*, 14–15.

<sup>98</sup> National Security Council Secretariat Report, "India – An Emerging Naval Power," July 1986, Ronald Reagan Library (RRL), Shirin Tahir-Kheli Files, RAC Box 4, India – Naval Power [1986].

<sup>99</sup> Pierre, *The Global Politics of Arms Sales*, 17.

<sup>100</sup> Pierre, 17.

use of its relationship with the United States to leverage the latter's policy in the Taiwan straits crises against China.<sup>101</sup>

These dynamics related to the transfer of conventional weapons are applicable in the case of the transfer of the nuclear delivery vehicles as well. Facilitating a recipient state's ability to deliver its nuclear weapons grants the supplier state geopolitical influence over the recipient.

The purchase of conventional arms can also *enable* a state to bolster its nuclear capability, especially in the area of nuclear delivery. However, in the past, conventional arms transfers have been considered an alternative to nuclear proliferation.<sup>102</sup> The logic here is that states facing significant security threats will be less likely to develop nuclear capability if they are militarily strengthened through provision of conventional weapons.<sup>103</sup> For example, Pierre argues that the United States' sale of F-16 fighter aircraft to Pakistan was intended to reduce its motivation for developing nuclear capability.<sup>104</sup> But the gambit failed, and the sale of the F-16 aircraft to Pakistan actually led to the fighters being incorporated into its nuclear forces and adding to the state's nuclear delivery capability.<sup>105</sup> Thus, rather than an alternative, the sale of conventional arms enabled Pakistan to build its means of nuclear delivery.

Great power competition is an important aspect of the geopolitical logic. For a supplier state, making a nuclear weapons state or potential proliferator dependent on it for its means of delivery is a powerful political tool. For a superpower during the Cold War, this meant attempting to ensure that a future nuclear weapons state did not become part of a rival alliance.

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<sup>101</sup> Thomas C. Schelling, *Arms and Influence*, The Henry L. Stimson Lectures Series (New Haven: Yale University Press, 2008), 43; Brett V. Benson, *Constructing International Security: Alliances, Deterrence, and Moral Hazard* (Cambridge: Cambridge University Press, 2012), 158.

<sup>102</sup> Taliaferro, *Defending Frenemies*, 14.

<sup>103</sup> Pierre, *The Global Politics of Arms Sales*, 29.

<sup>104</sup> Pierre, 30.

<sup>105</sup> Kristensen, Norris, and Diamond, "Pakistani Nuclear Forces, 2018," 352; Rabia Akhtar, *The Blind Eye: U.S. Non-Proliferation Policy Towards Pakistan From Ford to Clinton*, 1st edition (Lahore: University of Lahore Press, 2018).

States may also use the transfer of the means of nuclear delivery as a tool to exert geopolitical influence over regions by shaping order and balance of power. The other side of the same dynamic is that aiding one state with the means of nuclear delivery could help foster geopolitical competition among the regional powers which would aid the superpower state exert influence over the region.

My argument here is in contrast to Kroenig's argument that power-projecting states are reluctant to supply sensitive nuclear assistance to allies or client states because it undermines the importance of the patron state as a security provider.<sup>106</sup> In the case of the proliferation of the means of nuclear delivery, I find that even power-projecting states like the United States and the Soviet Union aid client states and allies to attain weapons systems that will enhance their ability to project power and reduce their dependence on the patron state. Geopolitical considerations in this case help proliferation and do not thwart it.

This logic suggests that supplier states will seek to proliferate the means of nuclear delivery in order to advance their geopolitical interests. We could also expect that recipient states that have geopolitical leverage to offer to other states will likely use it to attain the means of nuclear delivery on favorable terms.

As with the other two enabling logics of the proliferation of the means of nuclear delivery, the geopolitical logic is enabled by the Zone of Ambiguity that allows states to transfer technology, knowhow, and fully developed weapons systems to other states.

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<sup>106</sup> Kroenig, *Exporting the Bomb*, 26.

### **Some Underlying Assumptions and Potential Objections**

For the purpose of my argument in this dissertation, states are considered to be the primary actors in international politics. This is not to undermine the role of sub-state actors, bureaucracies, and other private entities. It is simply theoretically most helpful to the argument in the dissertation to have the state as the primary unit of analysis, given that the acquisition of weapons systems and the diplomacy related to it occurs primarily at a state-to-state level.

Furthermore, the argument does not draw from any one strand of international relations theory. My analysis is not affected by whether a state is seeking the means of nuclear delivery to maximize security, for domestic political reasons, or for prestige. The causes of proliferation do not necessarily affect how a state goes about acquiring the means of nuclear delivery.

It should also be noted that the cases that are being discussed in this dissertation are all overt and licit transfers of technology and weapons systems. This excludes cases like Iraq, Libya, and North Korea which have attempted to acquire technology related to the means of nuclear delivery through covert and illicit means.

There are a few potential objections to the framework that need to be discussed. First, it could be argued that that ambiguity and opacity are normal features of the nuclear non-proliferation regime.<sup>107</sup> Why should the Zone of Ambiguity stand out? Indeed, there are different types of ambiguities related to the proliferation of nuclear technology which have allowed states to develop nuclear capabilities bringing them closer to nuclear latency. Other ambiguities have enables states like Israel to develop the technical capability to explode a nuclear device and keep a bomb in the

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<sup>107</sup> Mallard, *Fallout*.

basement under a “don’t ask-don’t tell” formulation.<sup>108</sup> However, there are two important things to note in this regard. First, in the case of the means of nuclear delivery, the Zone of Ambiguity enables proliferation by design. This is a unique puzzle in that something the conventional wisdom expects to be a constraint to the proliferation of the means of nuclear delivery is in fact an enabling factor. Second, as noted earlier, the interaction between the Zone of Ambiguity and the means of delivery do not require subterfuge and are overt because they are legal transfers.

Another important question that could be asked of this framework is: How much agency does the Zone of Ambiguity really have in enabling or constraining proliferation? This is an important question, especially in the context of powerful states in the system that often bypass international institutions to pursue their interests. In other words the means of delivery will proliferate when and if the superpower states allow the outcome and the Zone of Ambiguity or the nuclear non-proliferation regime is unlikely to be able to constrain that. Indeed, previous scholarship has argued that great powers in the system tend to use their influence to thwart nuclear proliferation, and proliferation increases when they choose not to do so.<sup>109</sup> This argument would be in line with the contention that international order is derived from power of the most powerful states in the system and that institutions do not matter.<sup>110</sup> However, as we have seen in this chapter (and will see in subsequent chapters as well) despite the distribution of power in the system, states (both weak and strong) adhere to the stipulations of the components of the non-proliferation regime. Indeed, powerful states like the United States have often had to go the extra mile to ensure that the ‘letter of the law’ of the law was never transgressed, even if the norm of non-proliferation was cheated. In other words, even powerful states operate – and often alter course – in the

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<sup>108</sup> Or Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals* (Oxford, United Kingdom: Oxford University Press, 2014), 71.

<sup>109</sup> Gheorghe, “Proliferation and the Logic of the Nuclear Market,” 89.

<sup>110</sup> Mearsheimer, “The False Promise of International Institutions.”

international system using the framework of the non-proliferation system as a referent point. In this context the Zone of Ambiguity in this framework becomes even more important. A possible explanation for this is that even powerful states care about their image and reputation with the international audience. Given the high salience of questions of nuclear proliferation, even powerful states seek to conform to the normative expectations of the international community and adhere to the stipulations of the regimes that govern them.<sup>111</sup>

It is also important to address the core counterfactual question of whether the transfer of nuclear delivery vehicles would not have taken place if the NPT had included them. In other words, if the nuclear non-proliferation regime was more specific and included the means of nuclear delivery would there be no proliferation of this technology? The response to this potential concern is that it would be excessive to suggest that the inclusion of nuclear delivery vehicles would stop *all* proliferation. However, the paths to the proliferation of the means of nuclear delivery would have been very different if they had been included in the non-proliferation regime. If we assume that the regime has been successful in prohibiting what it did set out to proscribe (fissile material), then we have some reason to believe that the same could be the case with delivery vehicles. However, just as the cases of Iraq, Libya, Iran, and North Korea, India, Pakistan, and Israel show, when states seek to proliferate nuclear weapons they often do so regardless of the legal regime prohibiting the outcome. Specific legislation to constrain certain types of behavior in the international system are therefore never a panacea to the problem. However, in the cases cited above, the state's actions were still shaped/informed by the non-proliferation regime, even when that meant jumping through hoops to be able to bypass it. One could reasonably expect that in case of the means of nuclear delivery, the same kind of dynamic would be present.

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<sup>111</sup> I expand on this idea of the international audience in a separate paper on nuclear crises and international social reputation.

## Evaluating the Argument

The evidence to support the arguments made in this chapter will be found by evaluating the development of the means of delivery in nuclear states. These arguments require evidence along two lines. The first line of evidence has to do with the Zone of Ambiguity in the non-proliferation regime and establishes that the zone enables the proliferation of the means of delivery. The second line of evidence has to do with the enabling logics to proliferation. To demonstrate that each of the logics – economic, geopolitical, and alliance-related – operate in the manner that this dissertation claims, I conduct a plausibility probe of my framework to find evidence for each. The evidence should demonstrate that the Zone of Ambiguity does in fact enable the logics to the proliferation of the means of nuclear delivery highlighted in this chapter.

The universe of possible cases for this study – as with all studies of nuclear politics – is a small one. At present, it is restricted to ten states.<sup>112</sup> As this dissertation focuses on regional powers, all the nuclear states apart from the United States and the Soviet Union/Russia fall under its purview. Within this world, I use a cross-national historical case study approach to evaluate the cases of the United Kingdom, France, and India. These cases represent a set of similar states, all democracies with considerable financial constraints during the Cold War. However, each state has a distinct geopolitical environment that shaped its interaction with the non-proliferation regime and its supplier/collaborator states. These heterogenous interactions help explain the different outcomes on question of interest in this dissertation – how states build their means of nuclear delivery. I consider the first twenty years of nuclearization in these cases – the United Kingdom

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<sup>112</sup> This includes South Africa as it developed the nuclear bomb and a ballistic missile program to deliver them. See, Anna-Mart van Wyk, “Apartheid’s Bomb and Regional Liberation: Cold War Perspectives,” *Journal of Cold War Studies* 21, no. 1 (April 1, 2019): 151–65. The other nuclear states are the United States, the Soviet Union (now Russia), the United Kingdom, France, China, Israel, India, Pakistan, and North Korea. I do not count Belarus, Kazakhstan, and Ukraine in this list because even though they briefly possessed nuclear weapons and the means of delivery, they inherited them and did not have independent programs to develop these systems.



(1952-72), France (1960-1980), and India (1974-1994) – to understand how they developed their means of nuclear delivery.<sup>113</sup>

This dissertation uses newly declassified material from multiple archives in the United Kingdom, France, India, and the United States. Introducing new archival material as evidence adds several dimensions to the literature. First, beyond contributing a novel theoretical framework to understand the proliferation of the means of nuclear delivery, it adds to the international history of nuclear proliferation. Evaluating sources on similar events from multiple archives enables the development of a more complete historical narrative from the vantage point of different states. Second, an in-depth multi-archival study also demonstrates the complexity of diplomatic and political interactions between different states that produce the different enabling logics of proliferation of the means of nuclear delivery. Finally, the new archival sources add substantively to the nuclear histories of each of the individual states that are evaluated as cases in this dissertation. In doing so they subject the existing interpretations of these histories to revision.<sup>114</sup>

In the chapters that follow, I examine each of the case studies by investigating critical episodes in the development of the means of nuclear delivery in these states.

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<sup>113</sup> I take 1974 to be the year of India's nuclearization. Even though the 1974 test was declared a 'peaceful nuclear explosion', as chapter 5 will show, India began the development and acquisition of its means of delivery around the same time. Moreover, for the West and supplier states, India was considered a nuclear weapons state for all practical purposes after the 1974 test.

<sup>114</sup> As George and Bennett state, all good history must be revisionist history as it should help revise existing interpretations. See Alexander George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge, Mass.: MIT Press, 2005), 99.

### Chapter 3: Not So Special Relationship: United Kingdom's 'Independent' Deterrent

“Can you at present time, deliver a bomb, of whatever sort is desirable, by the existing mechanism?”

- Prime Minister Harold Macmillan (1957)<sup>1</sup>

“Whatever you do, don’t undertake a development like POLARIS. Our people have got a fantastically difficult job ahead of them and I doubt whether they appreciate all the troubles they are going to run in to. I strongly advise you to let them spend the very large amount of money which will be necessary before they get the answer.”

- United States’ Admiral Hyman Rickover to the Chief Scientific Advisor of the United Kingdom’s Ministry of Defence (1958)<sup>2</sup>

“If you walked into a nuclear missile showroom you would buy Trident - it's lovely, it's elegant, it's beautiful, it is – quite simply – the best. And Britain should have the best. In the world of the nuclear missile it is the Savile Row suit, the Rolls Royce Corniche, the Château Lafite 1945. It is the nuclear missile Harrods would sell you!”

- Sir Humphrey Appleby, Cabinet Secretary (1986)<sup>3</sup>

### Introduction

The United Kingdom’s nuclear force today consists of four Vanguard class nuclear submarines (SSBNs) that carry Trident D5 missiles.<sup>4</sup> Each of the nuclear submarines has sixteen missile tubes and can carry up to 48 warheads (with the explosive yield of 100 kilotons each, i.e., approximately 6.6 Hiroshimas).<sup>5</sup> At least one of the four submarines is at sea at any given point in time as a part of the United Kingdom’s ‘Continuous At-Sea Deterrent’ (CASD) posture.<sup>6</sup> All of

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<sup>1</sup> Bishop to Broadbent, Correspondence, November 14, 1957, The National Archives at Kew Gardens, UK (henceforth, TNA), AIR 19/940.

<sup>2</sup> Brundrett to Defence Minister, “Polaris,” 6 February 1958, TNA, DEFE 19/50.

<sup>3</sup> Jonathan Lynn and Antony Jay, *The Complete Yes Prime Minister* (London: BBC Books, 1989), 80. Though fictional, the statement is a telling commentary on the public conversation on Trident at the time.

<sup>4</sup> Also called the ‘Trident II’ missile. For the purposes of specificity and clarity, I will refer to Trident I as the Trident C4, and Trident II as the Trident D5.

<sup>5</sup> Hans M. Kristensen and Robert S. Norris, “British Nuclear Forces, 2011,” *Bulletin of the Atomic Scientists* 67, no. 5 (September 1, 2011): 89–90.

<sup>6</sup> Hans M. Kristensen and Matt Korda, “United Kingdom Nuclear Weapons, 2021,” *Bulletin of the Atomic Scientists* 77, no. 3 (May 4, 2021): 153.

the United Kingdom's Trident missiles and the Mk4 and Mk4A reentry vehicles for their warheads have been supplied by the United States.<sup>7</sup>

Why does United States supply the United Kingdom with all its means of nuclear delivery? What in the Zone of Ambiguity allows this process and why has the non-proliferation regime not restricted this supply of nuclear delivery systems? This chapter examines these questions that by examining two critical events in the United Kingdom's nuclear history – the cancellation of the Skybolt missile in 1962 which led to the U.K.'s purchase of the Polaris missile, and the adoption of the Trident D5 missile in 1982. I find that the Zone of Ambiguity in the global nuclear non-proliferation regime enabled the alliance logic to facilitate the proliferation of the means of nuclear delivery.

This chapter will proceed in four main sections. First, I will briefly discuss the Zone of Ambiguity and the alliance logic to the proliferation of the means of nuclear delivery in the context of this chapter. Next, I will provide a brief background of the United States and United Kingdom's nuclear relationship and how it interacted with the non-proliferation order – and helped shape it – in the decade leading up to the Skybolt episode (1962). This section will focus on the different aspects of the Zone of Ambiguity which enabled the sale of the means of nuclear delivery to the United Kingdom. The following two sections will examine evidence from two episodes of the United Kingdom's nuclear relationship with the United States: the Skybolt affair that led to the U.K.'s acquisition of the Polaris missile system in 1963 and the Trident D5 missile (1982). In

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<sup>7</sup> At the time of this writing (July 2021). In 2020, it was accidentally disclosed that the United States would support a parallel warhead replacement program in the United Kingdom alongside its own W93/Mk7 warhead program. This was followed up by the UK's Defense Secretary lobbying the United States Congress for the new warhead citing it to be critical to the viability of the United Kingdom's nuclear forces and to the future of NATO as an alliance. Julian Borger, "UK Lobbies US to Support Controversial New Nuclear Warheads," *The Guardian*, August 1, 2020, <http://www.theguardian.com/world/2020/aug/01/uk-trident-missile-warhead-w93-us-lobby>. Kristensen and Korda, "United Kingdom Nuclear Weapons, 2021," 156.

analyzing the latter case, I also focus on the role of the SALT and INF negotiations in shaping the ability of the United Kingdom to maintain its nuclear forces.

### **The Zone of Ambiguity, Alliance Logic, and the United Kingdom**

Alliances are generally desirable for states seeking technology especially with regard to the development of weapons systems. However, when it comes of the means of nuclear delivery, the transfer of technology is not as straightforward as the it is in the conventional realm. Using the United Kingdom as a case study this chapter highlights two dynamics with regard to alliances and the development of nuclear forces. First, while it is intuitively assumed that having alliances is helpful for an alliance partner to receive aid with the development of its nuclear forces, this chapter will demonstrate that in the case of the Anglo-American “special relationship” this was not necessarily true. Indeed, the alliance with the United States nearly led to the cancellation of the UK’s nuclear forces. Beyond the McMahon Act (1946), which saw the United States cut off all nuclear technology-related cooperation with the United Kingdom, the Anglo-American relationship also endured crises relating to the transfer of nuclear delivery vehicles. The Skybolt Crisis was one such crisis. It led the United Kingdom to change its main mode of nuclear delivery from an air-launched platform to a sea-based one. In the process, the Polaris Sales Agreement (1963) was signed, and the Polaris missile nuclear submarines (Resolution-class SSBNs) became the mainstay of the United Kingdom’s ‘strategic deterrent’. Subsequently, when the Polaris system gave way to the Trident missiles in the United States in the late 1970s, the United Kingdom – after a long debate on whether it should make the change, too – decided (in the early 1980s) to acquire the Trident D5 missiles.

Second, even in the case of a bilateral alliance, the transfer of the means of delivery happens within the framework of the politics of the international system. During the Cold War, this meant that being in an alliance relationship with a great power could lead to its nuclear forces being counted together by the adversary bloc. “Counting” in this context had two connotations. First the nuclear forces of the ally (in this case, the United Kingdom) could be counted and likely become targets of a Soviet attack in the event of a potential war between the United States and the Soviet Union. Second, the adversary bloc could want to count the nuclear forces of an ally during arms control negotiations. For example, the Soviet Union sought to do this with the counting of the nuclear delivery systems of the United Kingdom and the United States together when negotiating the SALT and the INF treaties. As this chapter discusses, the UK had to navigate this challenge to ensure that its nuclear forces were not cut down by arms control initiatives as a result of its alliance relationship with the United States. Thus, in addition to the Zone of Ambiguity in the nuclear non-proliferation order, there was also an enabling aperture in the arm control negotiations between the United States and the Soviet Union that allowed third-party states to possess their ‘independent’ nuclear forces.

However, despite these challenges, the Zone of Ambiguity eventually helped the transfer of the means of nuclear delivery from the United States to the United Kingdom (see Fig 1). The sale of Polaris and Trident ballistic missile systems to the United Kingdom was enabled by two actions that undercut the nascent norm of non-proliferation in the 1950s. These were the amendment of the Atomic Energy Act of 1954 and the subsequent Mutual Defence Agreement that was signed between Britain and the United States. Both helped create the enabling conditions that allowed the proliferation of the means of nuclear delivery.

**Figure 3.1: Alliance Logic to the Proliferation of the Means of Delivery**

The norm of non-proliferation of nuclear weapons technologies which was established by the McMahon Act of 1946 and the Atomic Energy Act of 1954 and manifested in other international proposals like the Baruch Plan of 1946, Atoms for Peace (1953), creation of the IAEA (1953) and Euratom (1958), was insufficient and unable to address the proliferation of the means of nuclear delivery.

The Zone of Ambiguity in these early years of the non-proliferation order consisted of definitional ambiguity – whether ‘nuclear weapons’ included the means of nuclear delivery – which led to normative and legal ambiguity. However, as this chapter demonstrates, the entry into force of the landmark Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1970 did not change the Zone of Ambiguity by stipulating that it covered the means of delivery. The structural ambiguity in the non-proliferation order was indeed a crucial feature of it and not just a bug.

The case of the United Kingdom is used in this chapter as a crucial case to demonstrate the plausibility of the ‘complex alliances’ argument made in this dissertation. It is important to note that if even an ally with a ‘special relationship’ with the United States cannot get what it needs to build its means of nuclear delivery, then it is safe to assume that less privileged allies likely experience more difficulties.

### **Anglo-American Relations and the Evolution of the Zone of Ambiguity**

The United Kingdom’s interest in nuclear weapons can be traced back to the MAUD Committee report of 1941 during the Second World War, which recommended that the UK build

an atomic weapon, and more important, do so before Germany.<sup>8</sup> Subsequently, British scientists made critical contributions to the Manhattan Project, that led to the development of the atomic weapon by the United States, and there was close ‘Anglo-American atomic partnership’ in the last two years of the war.<sup>9</sup> However, despite this wartime collaboration between the United Kingdom and the United States on the Manhattan Project, in 1946, the U.S. Congress passed the McMahon Act which prohibited the transfer of American nuclear technology and know-how to any other state.<sup>10</sup> The United Kingdom now had a choice of either making its own nuclear weapons or opting out of the ‘atomic weapons business’ altogether.<sup>11</sup> It chose the former option and conducted its first nuclear test in 1952 (see Table 1 for important dates in the history of the British strategic forces).<sup>12</sup> The ‘strategic deterrent’ as the United Kingdom’s nuclear forces came to be called, was aimed towards the Soviet Union.<sup>13</sup>

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<sup>8</sup> Peter Hennessy, ed., *Cabinets and the Bomb*, British Academy Occasional Papers (Oxford, New York: Oxford University Press, 2007), 32–35.

<sup>9</sup> Margaret Gowing and Lorna Arnold, *The Atomic Bomb* (London: Butterworths, 1979), 24.

<sup>10</sup> Hennessy, *Cabinets and the Bomb*, 43.

<sup>11</sup> Lorna Arnold, *Britain and the H-Bomb* (New York: Palgrave, 2001), 35.

<sup>12</sup> For the history of British nuclear decision making in the decades during and after World War II, see: Margaret Gowing, *Britain and Atomic Energy, 1939-1945* (London: St. Martin’s Press, 1964); Andrew J. Pierre, “The Independent Nuclear Force: The British Experience, 1939-1967” (PhD Dissertation, New York, Columbia University, 1968); Margaret Gowing, *Independence and Deterrence: Britain and Atomic Energy, 1945-1952*, vol. 1 (Basingstoke, Hampshire [England]: Palgrave Macmillan, 1974); Timothy J. Botti, *The Long Wait: The Forging of the Anglo-American Nuclear Alliance, 1945-1958* (Wesport, Connecticut: Greenwood Press, Inc., 1987); John Baylis, *Ambiguity and Deterrence: British Nuclear Strategy, 1945-1964* (Oxford: Clarendon Press, 1995); Arnold, *Britain and the H-Bomb*; Matthew Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I: From the V-Bomber Era to the Arrival of Polaris, 1945-1964* (London: Routledge, 2017).

<sup>13</sup> All subsequent references to the British ‘strategic deterrent’ will refer to the British nuclear force, as is the convention followed in the primary material. It should be noted that the use of term in this dissertation does not necessarily imply that the policy of strategic deterrence by the United Kingdom toward the Soviet Union was successful.

**Table 3.1: Important dates in the history of British strategic nuclear forces**

1952	First Nuclear Test
1955	V-bombers enter into service
1957	H-Bomb Test
1962	Polaris Sales Agreement
1969	Polaris enters into service
1982	Trident D5 Agreement
1994	Trident enters into service

The United Kingdom's strategic deterrent was a result of the anxiety of being caught between two superpowers.<sup>14</sup> If a war broke out, Britain was likely to be the first and principal target of Soviet nuclear forces, and at the same time could not rely on the United States to consult or defend British interests.<sup>15</sup> Over time the Government articulated four main reasons for the development and maintenance of British strategic nuclear forces during the Cold War. A top-secret report prepared by an interdepartmental group in the British government articulated them as:

- a. numerical contribution to the assigned forces of NATO;
- b. the contribution of a second centre of nuclear decision-making to Alliance deterrence of the Soviet Union;
- c. a capability for independent defence of national interests;
- d. political status and influence.<sup>16</sup>

The means of nuclear delivery for the United Kingdom would initially be manned aircraft (V-bombers), which entered into service by 1955, but it was projected that by 1965, this bomber force would be supplemented with ballistic missiles.<sup>17</sup> However, the United Kingdom's attempts to build

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<sup>14</sup> Arnold, *Britain and the H-Bomb*, 36.

<sup>15</sup> Arnold, 36.

<sup>16</sup> "Factors Relating to Further Consideration of the Future of the United Kingdom Nuclear Deterrent," 1979, TNA, DEFE 24/2122.

<sup>17</sup> McGrigor, Harding, and Dickson, "United Kingdom Defence Policy: Memorandum by the Chiefs of Staff," 21 May 1954, in Hennessy, *Cabinets and the Bomb*, 106–11.



a nuclear capable missile – Blue Streak – was a failure.<sup>18</sup> The United Kingdom would have to acquire an effective strategic nuclear missile from its close friend and ally, the United States. This missile would be the Skybolt system.

It is also important to note that the failure of the Blue Streak, the imperative to acquire Skybolt (or an adequate replacement), and later, the Trident missile, were products of the poor economic conditions that the United Kingdom was facing and that continued through decades following the end of the Second World War. By the time of the Skybolt crisis, unemployment in the UK was at a post-war record high of 800,000 and there was an economic crisis.<sup>19</sup> The acute economic troubles of the British government continued through the 1960s and 1970s, making expenditure cuts the order of the day.<sup>20</sup> In this constrained economic context, dependence on the United States for nuclear and defense technology increased and at the same time, it allowed the United States more power to constrain the British on nuclear policy.

A number of legal and normative arrangements in the Zone of Ambiguity affected the transfer of the means of nuclear delivery from the United States to the United Kingdom. In the years leading up to the NPT, the main drivers of the non-proliferation regime lay in United States' legislation. Indeed, as Baylis puts it, by the end 1957, the US atomic energy legislation had "become the touchstone of American intention."<sup>21</sup> Nevertheless, despite this legislation against nuclear transfer and fears that cooperation with the UK would be a catalyst for international nuclear

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<sup>18</sup> As Matthew Jones highlights, the liquid-fueled Blue Streak missile was seen as flawed by critics at the time of its conception. The weapon system required a long pre-launch preparation time making it inefficient. See, Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 37.

<sup>19</sup> Suzanne Doyle, "A Foregone Conclusion? The United States, Britain and Trident Missile Agreements, 1977-1982" (Norwich, United Kingdom, University of East Anglia, 2015), 39, [https://ueaeprints.uea.ac.uk/id/eprint/58582/1/Doyle.Corrected.Thesis.FINAL\\_X.pdf](https://ueaeprints.uea.ac.uk/id/eprint/58582/1/Doyle.Corrected.Thesis.FINAL_X.pdf).

<sup>20</sup> Doyle, 50.

<sup>21</sup> John Baylis, "The 1958 Anglo-American Mutual Defence Agreement: The Search for Nuclear Interdependence," *Journal of Strategic Studies* 31, no. 3 (June 1, 2008): 443.

proliferation and sensitive technology could be leaked to the Soviet Union, the United States chose to amend its laws to share technology related to nuclear weapons and their means of delivery.<sup>22</sup>

The main legal and normative arrangements governing the transfer of nuclear material (civilian and military) between the United States and the United Kingdom in the pre-NPT years were the McMahon Act of 1946, the Atomic Energy Act (AEA) of 1954, the amendment to the AEA of 1954 in 1958, the Mutual Defence Agreement of 1958, the Nassau Agreement of 1962, and the Polaris Sales Agreement of 1963 (see Table 2). In addition to domestic United States legislation on the control of nuclear proliferation, there were developments in this field at the international level. In retrospect, antecedents to what became the non-proliferation regime were evident as early as the end of 1945. A Council of Foreign Ministers meeting in Moscow in December 1945 led to the decision to get the United Nations General Assembly to set-up a Commission to explore the control of atomic energy in 1946.<sup>23</sup> This was followed by the Acheson-Lilienthal report that led to the Baruch Plan in 1946, which was ultimately rejected by the USSR.

**Table 3.2: Legal and Normative Arrangements related to the United Kingdom's nuclear weapons and related systems<sup>24</sup>**

Year	Agreement	Significance
1946	McMahon Act (United States Atomic Energy Act of 1946)	- Prohibited the transfer of U.S. nuclear technology and know-how to any other state
1948	Modus Vivendi Agreement	- Allowed U.K. to receive nuclear information in nine specific civil areas

<sup>22</sup> John Baylis, "Exchanging Nuclear Secrets: Laying the Foundations of the Anglo-American Nuclear Relationship," *Diplomatic History* 25, no. 1 (2001): 34.

<sup>23</sup> Gowing, *Independence and Deterrence*, 1:87.

<sup>24</sup> Apart from the United States Atomic Energy Acts in their different iterations, all of these agreements were concluded between the United Kingdom and the United States.

		- U.K gives up the right to veto U.S. use of atomic bomb use against third party <sup>25</sup>
1954	United States Atomic Energy Act of 1954	- Allowed information sharing on external characteristics of nuclear weapons but not on the design and fabrication of nuclear components <sup>26</sup> - Drew distinction between nuclear weapons and their means of delivery
1955	Agreement for Co-operation Regarding Atomic Information for Mutual Defence Purposes	- Allowed information sharing on military uses of atomic energy (excluding warhead design and fabrication) <sup>27</sup>
1955	Agreement for Co-operation on the Peaceful Uses of Atomic Energy	- Information on civil uses of atomic energy and transfer of fissile material <sup>28</sup>
1958	Amendment to the United States Atomic Energy Act of 1954	Allowed the transfer of information related to - nuclear weapons design and production - nuclear delivery systems
1958	Mutual Defence Act	- Exchange of Information on the development of nuclear delivery systems - Transfer of Submarine Nuclear Propulsion Plant <sup>29</sup>
1962	Nassau Agreement	- Agreement to sell Polaris missiles (sans warheads) to the United Kingdom - UK commitment to join a Multilateral Nuclear Force

<sup>25</sup> Pierre, "The Independent Nuclear Force," 194–95.

<sup>26</sup> These external characteristics include "size, weight, shape, yield, and effects." See Pierre, 211.

<sup>27</sup> Pierre, 212.

<sup>28</sup> Pierre, 212.

<sup>29</sup> "Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes," July 3, 1958.

1963	Polaris Sales Agreement	Agreement for the transfer of <ul style="list-style-type: none"> <li>- Polaris missiles (sans warheads but including guidance capsules)</li> <li>- missile launching and handling systems</li> <li>- missile fire control systems</li> <li>- ships navigation systems<sup>30</sup></li> </ul>
1982	Trident II (D5) Agreement	- Arrangements applicable in the Polaris Sales Agreement to apply to Trident D5 missile as well

The 1948 Modus Vivendi agreement paved the way for nuclear sharing which eventually led to the Atomic Energy Act of 1954. Combined with Eisenhower's 1954 Atoms for Peace program, there was now space for nuclear cooperation that was previously restricted. As Botti highlights, in 1955 members of the United States' JCAE were willing to share information on the civilian nuclear reactors as a part of President Eisenhower's Atoms for Peace initiative.<sup>31</sup> However, exchanges between the congressional Joint Committee on Atomic Energy (JCAE) and the Atomic Energy Commission (AEC) established that the Atomic Energy Act (AEA) of 1954 would not allow the transfer of "restricted data on submarine, aircraft, or military package power reactors."<sup>32</sup> Though the AEA of 1954 made a distinction between nuclear weapons and their delivery vehicles, the AEC blocked any transfer to the British of information related to the design of delivery systems that could carry the United States' nuclear weapons.<sup>33</sup>

In 1957, the United States Secretary of Defense and the Joint Chiefs of Staff agreed to provide the United Kingdom with: 1) atomic weapons in the event of a general war, and 2) to co-

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<sup>30</sup> "Polaris Sales Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America," 6 April 1963, TNA, DEFE 24/2125.

<sup>31</sup> Botti, *The Long Wait*, 147.

<sup>32</sup> Botti, 147.

<sup>33</sup> Botti, 149.

ordinate joint atomic strike plans between the United States Air Force (USAF) and the Royal Air Force (RAF).<sup>34</sup> However, the United States Secretary of Defense, C.E. Wilson, wrote to his counterpart, the British Minister of Defence, Duncan Sandys, emphasizing that “...the United States cannot engage in a commitment to transfer custody of such weapons to the Royal Air Force other than by Presidential decision in strict accordance with his constitutional and legislative authority.”<sup>35</sup> The 1954 Atomic Energy Act would not allow any such transfer, even if there were bilateral arrangements made to facilitate it.

There were two important discussions on the means of nuclear delivery that were exceptions to the guardedly unilateral approach of the Americans around the time. These discussions helped to pave the way for a deeper Anglo-American nuclear relationship later in the decade. The first discussion was on ‘Project E’ – an agreement in late 1954 between the United States Air Force and the Royal Air Force that would allow the RAF to carry and deliver US bombs as a part of a joint strike plan.<sup>36</sup> This was an emergency provision and the bombs would be under the United States’ custody as per the existing legislation. The other notable discussion on delivery vehicles at the time concerned the Thor missile. In a 1957 meeting between the UK Secretary of Defence, Duncan Sandys, and the US Secretary of State, Charles Wilson, the United States promised to “do something special” for Britain if an international agreement on ending the production of fissile materials was reached.<sup>37</sup> In this context, the United States offered to base four squadrons of Thor intermediate range ballistic missiles (IRBMs) on British territory.<sup>38</sup> While the

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<sup>34</sup> Sandys to Wilson, Personal Correspondence, 30 January 1957, TNA, AIR 20/12508.

<sup>35</sup> Wilson to Sandys, Personal Correspondence, 1 February 1957, TNA, AIR 20/12508.

<sup>36</sup> Ian Clark, *Nuclear Diplomacy and the Special Relationship : Britain’s Deterrent and America, 1957-1962* (Oxford: Clarendon Press, 1994), 144–45.

<sup>37</sup> Baylis, “The 1958 Anglo-American Mutual Defence Agreement,” 434.

<sup>38</sup> Baylis, 434.

warheads would remain in American custody, the decision to deploy them would be a joint Anglo-American one.

In 1958, there was a major change in the Anglo-American relationship and nuclear proliferation.<sup>39</sup> It followed the 1957 ‘Declaration of Common Purpose’ by President Eisenhower and Prime Minister Macmillan, which led to policy of ‘interdependence’ between the two states.<sup>40</sup> In February 1958, the United States and the British agreed to base nuclear-equipped Thor IRBMs in the United Kingdom under a ‘dual-key’ arrangement, i.e., the missiles could only be launched if both governments agreed that they should be.<sup>41</sup> This agreement was the precursor for two important and related events that followed that year. First, the United States’ Atomic Energy Act of 1954 was amended. And second, the Mutual Defence Agreement between the United States and the United Kingdom was signed. As John Baylis puts it, the framework of nuclear cooperation these agreements helped establish allowed for the exchange of sensitive nuclear information and formed the basis of an Anglo-American partnership that lasted through the Cold War and continued well past it.<sup>42</sup>

The amendment to the 1954 Atomic Energy Act was imperative from the British point of view. This was because, as the Chief Scientific Advisor to the Minister of Defence, Frederick Brundrett, noted to his Minister in early 1958, the British Navy was attempting to keep track of the development of the Polaris missiles and submarines that would carry them, but were being impeded by the McMahon Act. He stated,

Our Navy is keeping in as close touch with this development as is possible under the present McMahon Act, which prevents them from being given access to

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<sup>39</sup> Both Baylis and Jones highlight the role of Suez Crisis (1956) and the launch of Sputnik by the Soviet Union (1957) in bringing this alliance together again. See, Baylis, 433; Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 96–116.

<sup>40</sup> Nigel J. Ashton, *Kennedy, Macmillan and the Cold War: The Irony of Interdependence* (Basingstoke, Hampshire [England]: Palgrave Macmillan, 2002), 152.

<sup>41</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 114.

<sup>42</sup> Baylis, “Exchanging Nuclear Secrets,” 33.

anything which might lead them to gain knowledge of the nuclear head. I hope that when the McMahon Act is altered we shall be able to get much closer, because this may well be a development of the utmost importance in the long term maintenance of the deterrent.<sup>43</sup>

These elements of the United States' non-proliferation legislation had to be circumvented through an amendment in 1958 in order for the Mutual Defence Act to be signed. It paved the way for the agreement for the sale of the Skybolt missiles, the 1962 Nassau Agreement, and the subsequent Polaris Sales Agreement (1963).

The amendment to the Atomic Energy Act of 1954 allowed the exchange of information on design and production of nuclear warheads with allies that had made "substantial progress in the development of atomic weapons."<sup>44</sup> The implication was clear: the United Kingdom's nuclear forces would be aided by the United States. As Lewis Strauss, the chairman of the United States' Atomic Energy Commission (AEC), stated in a letter to the Chairman of the Joint Committee on Atomic Energy (JCAE), the "world situation" had changed considerably, making the 1954 Atomic Energy Act (AEA) "unduly restrictive."<sup>45</sup> Strauss stated that the Soviet Union had greatly improved its delivery systems, thereby creating a need to improve the delivery systems of the United States' allies.<sup>46</sup> He recommended that the AEA of 1954 be amended to allow the communication of information "necessary to make any delivery systems manufacture by our allies fully compatible with our atomic weapons."<sup>47</sup> The entire effort to amend the AEA of 1954 was to provide other states with the capability to deliver nuclear weapons in the event of a war.<sup>48</sup>

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<sup>43</sup> Brundrett to Defence Minister, "Polaris," 6 February 1958, TNA DEFE 19/50.

<sup>44</sup> Pierre, "The Independent Nuclear Force," 215.

<sup>45</sup> "Hearings before the Subcommittee on Agreements for Cooperation of the Joint Committee on Atomic Energy, Congress of the United States, Eighty-Fifth Congress, Second Session on Amending the Atomic Energy Act of 1954-Exchange of Military Information and Material with Allies" (United States Government Printing Office, 1958), 3.

<sup>46</sup> *Ibid.*, 13.

<sup>47</sup> *Ibid.*, 3.

<sup>48</sup> *Ibid.*, 192.

With the amendment of the AEA of 1954, the United States could now provide the British with information on both delivery and training which it had acquired from its own extensive experience in developing delivery vehicles.<sup>49</sup> As General Loper (then Assistant Secretary of Defense for Atomic Energy Matters) stated, there were at the time, two ways in which the United States could equip its allies with nuclear weapons delivery systems. The first was to supply the equipment directly under a military assistance program.<sup>50</sup> The second was to provide enough information to the ally so that it would be able to manufacture its own delivery systems.<sup>51</sup> He argued that the details of the weight, size, and yield of the United States' nuclear warheads had to be shared with allies so that they could plan their delivery systems accordingly.<sup>52</sup> The amendments to the Atomic Energy Act of 1954 were passed by Congress on June 30, 1958.<sup>53</sup> Importantly, the amendments authorized the exchange of sensitive nuclear information only with countries that had made "substantial progress in the development of atomic weapons."<sup>54</sup> Even though it was not named, it was clear that the United Kingdom was the only state that met this criterion.<sup>55</sup>

Shortly after, on July 3, 1958, the United States and the United Kingdom signed a bilateral agreement for "Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes" in Washington, DC. The agreement, also referred to as the Mutual Defence Agreement (MDA) had two significant provisions. First, it allowed for the exchange of information on the "development of delivery systems compatible with the atomic weapons which they carry..."<sup>56</sup> It is important to

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<sup>49</sup> Ibid.

<sup>50</sup> This would ensure that the bomb and the delivery system were compatible.

<sup>51</sup> "Hearings before the Subcommittee on Agreements for Cooperation of the Joint Committee on Atomic Energy on Amending the Atomic Energy Act of 1954," 155.

<sup>52</sup> Ibid., 190.

<sup>53</sup> Baylis, "The 1958 Anglo-American Mutual Defence Agreement," 48.

<sup>54</sup> Pierre, "The Independent Nuclear Force," 215.

<sup>55</sup> Baylis, "Exchanging Nuclear Secrets," 48; Pierre, "The Independent Nuclear Force," 215.

<sup>56</sup> "Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes," 3.



note here that the MDA was specific in defining an atomic weapon as “any device utilizing atomic energy, *exclusive of the means for transporting or propelling the device* (where such means is a separable and divisible part of the device).”<sup>57</sup>

The second significant provision was that the MDA allowed for the transfer of a complete submarine nuclear propulsion plant along with the classified information required for the design, manufacture, and operation of the plant.<sup>58</sup> Additionally, the MDA also gave the United Kingdom a decade-long supply of uranium 235 for reactor fuel.<sup>59</sup>

The 1958 MDA was followed by an amendment in 1959 which enabled the United Kingdom to buy parts of nuclear weapons and exchange the United Kingdom’s plutonium for the United States’ enriched uranium.<sup>60</sup> These agreements led to an elaborate structure of joint working groups that led to exchanges of data on “virtually all our [United States’] nuclear weapons technology with the British...with substantial equipment (including a complete submarine propulsion plant and nuclear materials.”<sup>61</sup>

Taken together, these nuclear agreements helped create a legal and normative architecture that enabled the transfer of nuclear delivery systems and still does to date. John Baylis highlights that there is a debate on whether the Mutual Defence Agreement (MDA) of 1958 encouraged nuclear proliferation and indeed would have broken the ‘letter and spirit’ of the NPT that came

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<sup>57</sup> “Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes,” 7. Emphasis mine.

<sup>58</sup> Ibid., 3.

<sup>59</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 117.

<sup>60</sup> Pierre, “The Independent Nuclear Force,” 216.

<sup>61</sup> Spiers to the Secretary of State, “Visit of British Prime Minister Heath: ‘Nuclear Questions,’” 29 January 1973, Department of State Records, Record Group 59 [RG 59], Subject-Numeric Files, 1970-73, Top Secret Files, box 11, POL U.K., NARA. Accessible at: <https://nsarchive.gwu.edu/document/23797-pm-ronald-i-spiers-deputy-under-secretary-political-affairs-u-alexis-johnson>.

into force about a decade later in 1970.<sup>62</sup> Indeed, after the NPT came into force, the continued implementation of the MDA definitely did. It has been argued that by exchanging nuclear technology, the Mutual Defence Agreement stands in opposition to the Nuclear Non-Proliferation Treaty and its central obligation to restrict the transfer of nuclear technology.<sup>63</sup> Particularly, Article 1 of the NPT, prohibits the direct and indirect transfer of nuclear capabilities to other states.<sup>64</sup> As the following sections indicate, both before and after the establishment of the NPT, the transfer of nuclear capabilities in the context of the means of nuclear delivery continued unabated.

### **Skybolt – Forcing the British out of the Nuclear Business**

The Skybolt affair is an example of the alliance logic to the acquisition of the means of nuclear delivery.<sup>65</sup> Skybolt was a U.S. air-launched ballistic missile (ALBM) designed to be carried under the wings of bomber aircraft.<sup>66</sup> The acquisition of the Skybolt missile by the United Kingdom became important when British efforts at making its own Blue Streak intermediate range ballistic missile failed. Blue Streak was a fixed-based IRBM that the British considered to be a ‘central feature’ of their defense project.<sup>67</sup> As the British Secretary of State for Air wrote to the Minister of Defence in 1957 in a top secret note,

... we must have the ballistic missile. With an American warhead Thor is not part of the British nuclear strike power. There are doubts about it on the score of its vulnerability and range with a British warhead. Therefore we must have Blue Streak which is the most important weapon in our armoury for maintaining the deterrent from 1965 onwards. If we do not we are committing ourselves indefinitely to

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<sup>62</sup> Baylis, “The 1958 Anglo-American Mutual Defence Agreement,” 463.

<sup>63</sup> Nigel Chamberlain, Nicola Butler, and Dave Andrews, “US-UK Nuclear Weapons Collaboration under the Mutual Defence Agreement: Shining a Torch on the Darker Recesses of the ‘Special Relationship,’” BASIC Special Report (British American Security Information Council, June 2004), 25.

<sup>64</sup> Chamberlain, Butler, and Andrews, 25.

<sup>65</sup> For an analysis of the United States’ role in precipitating the crisis, see, Richard E Neustadt, *Report to JFK: The Skybolt Crisis in Perspective* (Ithaca: Cornell University Press, 1999).

<sup>66</sup> The enterprise was a challenging one as the ballistic missile had to be integrated with the aircraft in a special way and would have to be launched from a platform moving at a very high speed. See American Embassy, “Aide Memoire,” 11 December 1962, TNA AIR 19/1036.

<sup>67</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 125.

reliance upon the U.S. for our primary weapons; and we shall be publishing to the world our intention of doing so; and our intention of ensuring that our position in the world, whatever it may be to-day, will in future be less.

...I am advised that there is every likelihood that Blue Streak will remain virtually unstoppable for as far ahead as we can see...I would go on so far as to say that a deliberate slowing down of this programme now – at the outset of the Ballistic Missile era – would have much the same self-handicapping effect as did the post war decision to not enter the field of manned supersonic research.<sup>68</sup>

A clear case of misplaced optimism, Blue Streak had to be cancelled in 1960. The project had become unviable to pursue and the British Nuclear Deterrent Study Group (BNDSG) recommended that the project be abandoned.<sup>69</sup> An “operationally efficient” replacement delivery system had to be acquired from the United States, but with the proviso that there would be “no strings attached.”<sup>70</sup> This system would be the Skybolt missile. In fact, the independent production of the Blue Streak program was cancelled (thus beginning the period of complete reliance on the United States for means of nuclear delivery) only after President Eisenhower assured Prime Minister Macmillan in March 1960 that the United States would provide the Skybolt missile (minus warheads) to the British on a “reimbursable basis.”<sup>71</sup>

Skybolt’s acquisition by the United Kingdom was meant to prolong the operational life of its V-bomber force by a decade through to the 1970s. The United Kingdom had invested about £1000 million over the years in the V-bomber force, and the government was keen to extend its life by buying the Skybolt system.<sup>72</sup> In March 1960, the Skybolt and Polaris missiles were discussed between President Eisenhower and Prime Minister Harold MacMillan, and it was agreed

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<sup>68</sup> “Draft Letter from the Secretary of State to the Minister of Defence,” 6 March 1957, TNA, AIR 19/940.

<sup>69</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 185.

<sup>70</sup> Jones, 185.

<sup>71</sup> “Untitled Report on Thor, Skybolt, and BMEWS,” circa 28 June 1960, Record Group 59, Department of State Records, Bureau of European Affairs, Office of British Commonwealth and Northern European Affairs, Alpha-Numeric Files Relating to the United Kingdom, 1949-1962, box 2, U.K. Nuclear Weapons and Missiles, NARA.

<sup>72</sup> Air Ministry, “Skybolt,” 1962, TNA AIR 19/1036.

that the United States would supply the United Kingdom with the Skybolt system.<sup>73</sup> Even though the possibility of acquiring the Polaris missile was discussed at the time, that system was in its early stages, and the United Kingdom chose the Skybolt missile owing to its previous financial and doctrinal commitments to the V-bomber force.

By 1962, according to Neustadt, “British claims to status as a nuclear power, in possession of an independent nuclear deterrent, were mortgaged to SKYBOLT...”<sup>74</sup> So when the United States Secretary of Defense, Robert McNamara, cancelled the Skybolt program in December 1962, it presented the United Kingdom with a crisis. In November 1962 McNamara had informed the British Ambassador, David Ormsby-Gore, that the costs of the project had gone up considerably. The research and development cost had gone up from the original estimate of \$200 million to \$492 million and was likely to exceed this figure as well.<sup>75</sup> Ormsby-Gore reported back to London that he had told McNamara that the cancellation of Skybolt would be “political dynamite so far as the United Kingdom was concerned. The whole of our (British) defence policy in the strategic nuclear field was founded on the availability of Skybolt.”<sup>76</sup> Ormsby-Gore went on to clarify that the Blue Streak missile development by the United Kingdom was abandoned on the assurance that Skybolt would be made available. The British had even planned modifications on their bombers and were in the process of developing special nuclear warheads to be fitted on Skybolt. McNamara was also told that that the British “...had no alternative delivery vehicle such as the Americans had got...A major part of the United Kingdom’s defence policy would be in ruins...and Anglo-American relations would be put under the severest strain.”<sup>77</sup>

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<sup>73</sup> Ministry of Defence, “Brief for the Prime Minister: Talks with President Kennedy - Skybolt and Polaris,” December 1962, TNA AIR 19/1036.

<sup>74</sup> Neustadt, *Report to JFK*, 29.

<sup>75</sup> Ormsby-Gore to Permanent Under Secretary (Foreign Office), “Skybolt,” 9 November 1962, TNA DEFE 19/78.

<sup>76</sup> *Ibid.*

<sup>77</sup> *Ibid.*

The American side was aware of this. As early as July 1960, when the Missiles Panel, chaired by Frank Long, gave an unfavorable internal review of the Skybolt to the President's Science Advisory Committee, it noted,

The Panel is aware of the fact that the cancellation of Skybolt may possibly result in embarrassment to the United Kingdom, in view of the fact that its development appears to have been used as a rationale for cancelling Blue Streak...the case for Skybolt for the RAF appears weak anyway. Their bombers have such short range that an air alert is almost certainly out of the question for them, and they are less likely than we to have early warning that will be adequate for ground alert.<sup>78</sup>

The Panel went on to conclude that the Skybolt would not pose the Soviet Union with a significantly new defense problem and that the United States should consider cancelling the missile program before more money and effort was spent on it.<sup>79</sup>

Despite the financial and technical reasons highlighted by the Americans, the British government suspected that the United States sought to “force the British out of the nuclear business” by the cancellation of Skybolt.<sup>80</sup> As the Permanent Under Secretary (P.U.S) in the Air Ministry noted to the Air Secretary, “...It is thought that while Mr. McNamara wants to cancel Skybolt for technical reasons, the State department would like to see it killed to get us out of the deterrent business. So there is a mixture of aims.”<sup>81</sup> This suspicion was compounded by the fact that the British government was already uneasy with the Kennedy administration's position that independent deterrents might encourage nuclear proliferation.<sup>82</sup> In his meeting with the British Minister of Defence, McNamara addressed this point by stating that this suggestion was refuted

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<sup>78</sup> Long to President's Science Advisory Committee, “The Skybolt Air-Launched Ballistic Missile Program,” 20 July 1960, Office of the Special Assistant for Science and Technology, Box 12, Missiles 7/60-9/60, Dwight D. Eisenhower Library. Available at: [https://nsarchive.gwu.edu/dc.html?doc=20706378-doc-9-1960-7-20-the\\_skybolt\\_air-launched\\_balli](https://nsarchive.gwu.edu/dc.html?doc=20706378-doc-9-1960-7-20-the_skybolt_air-launched_balli).

<sup>79</sup> Ibid.

<sup>80</sup> Matthew Jones, “Prelude to the Skybolt Crisis: The Kennedy Administration's Approach to British and French Strategic Nuclear Policies in 1962,” *Journal of Cold War Studies* 21, no. 2 (May 1, 2019): 59–60.

<sup>81</sup> P.U.S to Secretary of State for Air, “Skybolt,” 14 December 1962, TNA AIR 19/1036.

<sup>82</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 318.

by the “...tens of millions of dollars that they [the USA] had spent on continuing the SKYBOLT programme, despite the doubts which they themselves had felt, even in the time of the Eisenhower administration.”<sup>83</sup>

Regardless of its stated commitments to Skybolt, the United Kingdom’s suspicions about the United States attempting to drive it out of the nuclear business was not unfounded. In 1961, a U.S. National Security Council policy directive stated that it would be “..desirable if the UK phased out of an independent nuclear deterrent capability.”<sup>84</sup> The directive stated that “...if the development of SKYBOLT is not warranted for US purposes alone, the US should not prolong the life of the UK V-bomber force by this or by other means.”<sup>85</sup> The United States did have a policy directive that intended for the United Kingdom’s independent nuclear deterrent to be cancelled.

The Air Ministry memorandum on Skybolt went on to state that the Polaris proposals were unrealistic and undesirable and that “...if Skybolt falls through I think the lesson may be to stand on our own feet rather than to embark upon another joint enterprise with the United States.”<sup>86</sup>

This sentiment was heightened by the fact that – when asked about the possibility of the Polaris missile being sold instead of Skybolt – McNamara was reticent. He noted that there were legal difficulties involved in the sale of Polaris, “since certain nuclear information was involved in their firing system.”<sup>87</sup> The Ministry of Defence’s (MoD) consideration of what these difficulties were came to the conclusion that there were no legal complications that could not be overcome by

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<sup>83</sup> “Record of a Meeting between the Minister of Defence and the U.S. Secretary of Defense on Tuesday, 11<sup>th</sup> December, 1962,” 17 December 1962, TNA AIR 19/1036.

<sup>84</sup> Albright to Fessenden, “Visit to SAC Headquarters, November 27, 1961 – Highlights Which Relate to Possible Discussions in Paris During NATO Ministerial Meeting,” 7 December 1961, Record Group 59, Department of State Records, Central Decimal Files, 375/12-761, NARA. Accessible at: <https://nsarchive.gwu.edu/dc.html?doc=20706384-doc-15-1962-8-10>.

<sup>85</sup> Ibid.

<sup>86</sup> P.U.S to Secretary of State for Air, “Skybolt,” 14 December 1962, TNA AIR 19/1036.

<sup>87</sup> “Record of a Meeting between the Minister of Defence and the U.S. Secretary of Defense on Tuesday, 11<sup>th</sup> December, 1962,” 17 December 1962, TNA AIR 19/1036.

a Presidential declaration that the Polaris missiles be made available to the United Kingdom.<sup>88</sup> This would be possible because the British would be using their own warheads for the missiles, so question of the American transfer of a nuclear warhead would not arise. The MoD view was that McNamara was “fabricating difficulties” because he did not really want the British to have Polaris, except on a multilateral basis.<sup>89</sup>

McNamara’s reluctance was curious, given that in March 1960 the United States was offering to make mobile Polaris missiles (without warheads) available to other NATO states in order to meet SACEUR’s requirement for MRBMs.<sup>90</sup> It also offered to assist a “joint European production of Polaris” if the United States produced missiles were unacceptable.<sup>91</sup> Furthermore, by July 1960, Prime Minister Macmillan was sounding out President Eisenhower about a private ‘general understanding’ to purchase and acquire designs for the Polaris submarines, even though he did not envision the United Kingdom using these submarines before 1970.<sup>92</sup> In fact, as late as November 1962, when McNamara had first stated to the British Ambassador in Washington, DC that the United States might cancel the Skybolt project, one of the alternate paths discussed was providing the United Kingdom with an “alternative missile system such as Minuteman or Polaris.”<sup>93</sup> The United Kingdom was thoroughly dependent on the Americans providing a successor system to Skybolt. It did not have the wherewithal to make its own system and estimated that any contender worthy of serious consideration would take eight to nine years and around £100 million to develop.<sup>94</sup>

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<sup>88</sup> Kent to P.S. to S. of S. (Air Ministry), “Skybolt/Polaris,” 13 December 1962, TNA AIR 19/1076.

<sup>89</sup> Ibid. The MoD also believed that Admiral Rickover in the United States was opposed to giving the Royal Navy the more advanced nuclear power plants being used in the Polaris submarines.

<sup>90</sup> Prime Minister to Minister of Defence, “Skybolt and Polaris,” March 29, 1960, TNA PREM 11/2940.

<sup>91</sup> Ibid.

<sup>92</sup> de Zulueta to Prime Minister, “Draft Telegram to Washington,” 26 July 1960, TNA, PREM 11/2940.

<sup>93</sup> Ormsby-Gore to Permanent Under Secretary (Foreign Office), “Skybolt,” 9 November 1962, TNA DEFE 19/78.

<sup>94</sup> Ministry of Air, “The Implications of Cancelling Skybolt: The Possible Courses of Action,” 14 December 1962, TNA AIR 19/1036.

McNamara suggested three solutions for the United Kingdom. They could either choose to continue the program themselves, independent of the United States; adopt the American cruise missile Hound Dog for British nuclear forces; or participate in a multi-national force with medium range nuclear weapons on surface ships.<sup>95</sup> None of these options were acceptable to the United Kingdom.

At the same time, it was also clear to the British that the only alternative for an effective strategic deterrent after the cancellation of Skybolt was the acquisition of Polaris. The Ministry of Defence (MoD) estimated that the V-bomber force would lose credibility without the Skybolt, as the RAF would be left with only the Blue Steel missile and free-falling bombs, which would be unusable in strategic roles after 1965/66.<sup>96</sup> In terms of alternatives, missiles stationed on fixed bases were not an option because they were considered too vulnerable to pre-emptive attack.<sup>97</sup> The Ministry of Defence briefed the Prime Minister in a top secret note before his meeting with President Kennedy in Nassau that that the best chance for survival of the British deterrent in the case of a first strike was if its nuclear weapons were stationed on a mobile platform.<sup>98</sup> The submarine-borne Polaris system was the only viable long term solution. The United Kingdom could make its own submarine (with the hull, other fitting, and nuclear propulsion) and nuclear warheads.<sup>99</sup> However, it would need to acquire the missiles themselves from the United States. The inability of the British to make their own missile system necessitated this acquisition.

Additionally, the Admiralty estimated that the first of the British-made nuclear-powered submarines to carry the Polaris missile would be available only in 1970, the MoD estimated that

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<sup>95</sup> Ministry of Defence, "Brief for the Prime Minister: Talks with President Kennedy - Skybolt and Polaris," December 1962, TNA AIR 19/1036.

<sup>96</sup> Thorneycroft to Prime Minister, "Skybolt," 7 December 1962, TNA DEFE 19/78.

<sup>97</sup> Ibid.

<sup>98</sup> Ministry of Defence, "Brief for the Prime Minister: Talks with President Kennedy - Skybolt and Polaris," December 1962, TNA AIR 19/1036.

<sup>99</sup> Ibid.



they would have to borrow two or three complete Polaris-carrying submarines from the United States to tide them over the late-1960s, i.e., the period between the obsolescence of the V-bomber force and the deployment of the Polaris-based submarines.<sup>100</sup>

On the Polaris missiles themselves, the British needed the United States to provide, among other things, "...the missiles themselves together with their associated control, firing, navigational and launching systems, and also test and training facilities and technical knowledge and assistance."<sup>101</sup> In other words, the entire system and associated technical and tacit knowledge would have to be acquired by the United Kingdom. It was not clear, however, if the United States would be forthcoming with this technology.

In general, the British view since the 1960s had been that the United States could be persuaded to remove the restrictions on the sale of Polaris. In a meeting between the Minister of Defence and his department officials on the British nuclear deterrent in November, 1960, the Chief of Defence Staff (CDS), Lord Mountbatten, stated that if Skybolt failed, the Prime Minister would be in a strong position to ask the United States President to lift the political restrictions that made acquiring the Polaris system problematic.<sup>102</sup> Solly Zuckerman, then Chief Scientific Advisor, highlighted that the main concern about Polaris was an operational one, "Could British-owned POLARIS submarines, in fact, operate independently? Or would they of necessity be deployed with the United States and targeted in Omaha?"<sup>103</sup> Ultimately, as the British Ministry of Defence

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<sup>100</sup> Thorneycroft to Prime Minister, "Skybolt," 7 December 1962, TNA DEFE 19/78.

<sup>101</sup> Ministry of Defence, "Brief for the Prime Minister: Talks with President Kennedy - Skybolt and Polaris," December 1962, TNA AIR 19/1036.

<sup>102</sup> Ministry of Defence, "Record of Meeting between the Minister of Defence and Departmental Officials on Tuesday, 22<sup>nd</sup> November, 1960," 25 November 1960, TNA DEFE 19/11.

<sup>103</sup> Ibid.

noted, “the performance of a deterrent force should be judged on the threat it can pose indefinitely; this is the basis on which the number of POLARIS submarines required has been derived.”<sup>104</sup>

Prime Minister Harold Macmillan and President Kennedy met in the Bahamas (at Nassau) from 18-21 December to settle the Skybolt crisis. In the agreement that was eventually reached, the United States agreed to sell the United Kingdom the Polaris missiles. In return, the United Kingdom promised to join a NATO multilateral nuclear force, with the caveat that if “supreme national interests” of the British were ever at stake, they could use the missiles without consulting the Alliance.<sup>105</sup>

#### *Alliance dynamic/Independence and Interdependence*

The Skybolt episode highlights several important aspects of the United Kingdom’s development of nuclear delivery vehicles. It demonstrates that an alliance does not guarantee that an alliance partner will receive the means of nuclear delivery. The negotiation for the acquisition of these weapons systems is a multilayered process. First, as has been previously discussed, the enabling conditions in the Zone of Ambiguity must be present (or willed into presence, as the 1950s legislation in the United States demonstrates). Second, the recipient state have some form of leverage over the supplier state in order to ensure the transfer of the means of nuclear delivery. Given that some officials in the United States who saw the Skybolt episode as an opportunity to push the United Kingdom out of the nuclear business and thus address the “inequalities of nuclear status they saw as adding strain to the Western Alliance” there was need for the United Kingdom to use some political leverage to remain a nuclear power.<sup>106</sup>

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<sup>104</sup> Fakley to Zuckerman, “Comments on:- BND(SG)(60)4, The Air launched Mobile Ballistic Missiles,” 29 August 1960, TNA, DEFE 19/11.

<sup>105</sup> “Text of Joint Communique by President Kennedy and the Prime Minister Following Discussions held in the Bahamas, December 18-21, 1962,” TNA, AIR 18/1056.

<sup>106</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 391.

The United Kingdom had to exercise different kinds of political leverage in order to successfully negotiate with the United States on acquiring nuclear delivery vehicles. One aspect of this leverage was developing technology similar (i.e., can be used for the same purpose) to the technology requested from the supplier state. This was to ensure plausible strategic independence and ensure that the development of the technology could be used as a leverage to compel the supplier state to sell. Certain advanced weapons systems are not necessarily aimed simply towards adversaries. As Ministry of Defence official noted, with a V-bomber force the United Kingdom could not “win friends and influence our enemies” in the 1970s.<sup>107</sup> The means of nuclear delivery had to be formidable enough to influence not only one’s allies but also a state’s adversaries.

On influencing allies, the British Air Minister believed that if the United Kingdom had not worked on the Blue Streak missile system, the United States might never have agreed to give it Skybolt. Despite breakthroughs in 1958 – the amendment of the 1954 Atomic Energy Act and the Mutual Defence Agreement – along with the American promise to give the Skybolt missile to the United Kingdom after Blue Streak was cancelled (in 1960), there were misgivings in the British government about how much the United Kingdom could rely on the United States even before Skybolt was cancelled. The British Secretary of State for Air noted in February 1962,

I do not think that we can rely on obtaining a weapon system under independent British control from the United States for the period envisaged (after 1975). Our chances of securing American help, however, will be greatly increased if we show ourselves determined to develop our own system. I doubt for instance if we should ever have got Skybolt if we had not begun work on Blue Streak.<sup>108</sup>

The independent development of the means of nuclear delivery by the British was a part of gaining leverage over the United States. The United Kingdom would not necessarily have to be solely

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<sup>107</sup> Fakley to Zuckerman, “Comments on:- BND(SG)(60)4, The Air launched Mobile Ballistic Missiles,” 29 August 1960, TNA DEFE 19/11.

<sup>108</sup> Secretary of State for Air, “Note by the Secretary of State,” 19 February 1962, TNA, AIR 19/940.

dependent on the United States and would have more bargaining power. This was important because there was also concern that the United Kingdom and the United States were not on the same page when it came to nuclear doctrine. The American approach of “saturation tactics,” i.e., overwhelming Soviet anti-missile defenses by the sheer numbers of missiles launched, was not economically viable for the British.<sup>109</sup>

In another possible bid to use political leverage – after McNamara informed the United Kingdom of the United States’ intention to cancel Skybolt – the British Minister of Aviation noted to the Minister of Defence that, until the United States agreed to give the British an alternative system, they should not agree to the cancellation of Skybolt, even if it meant suggesting that the British would complete the Skybolt project on their own.<sup>110</sup> The suggestion – though not economically viable – would pressure the Americans to stop the cancellation, or at the very least would cause the U.S. administration embarrassment because the British would be producing a system that American service chiefs favored.<sup>111</sup>

Another aspect of political leverage with regard to alliance politics was the moral obligation argument. The British also hoped that the talks at Camp David would persuade President Kennedy that there was a “...moral obligation on the part of the United States to either complete the full development of Skybolt or provide a substitute.”<sup>112</sup> While this ‘moral obligation’ may not have had universal purchase in Washington, DC, the British firmly believed in it.<sup>113</sup> Providing the United Kingdom with Skybolt was of utmost importance to the Anglo-American relationship, and both sides were cognizant of this. The future of alliances can hang on flagship projects like Skybolt.

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<sup>109</sup> Ibid.

<sup>110</sup> Minister of Aviation to Minister of Defence, Correspondence, 7 December 1962, TNA DEFE 19/78.

<sup>111</sup> Ibid.

<sup>112</sup> Ministry of Defence, “Brief for the Prime Minister: Talks with President Kennedy - Skybolt and Polaris,” December 1962, TNA AIR 19/1036.

<sup>113</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 356.

For example, as the British Air Minister noted in 1962, "...if McNamara is anxious to cancel, he will, I think only be prevented by the strongest possible political pressure and by the fact that the Americans will not wish to throw away the British alliance."<sup>114</sup> In fact, British Defence Secretary, Peter Thorneycroft told McNamara that Skybolt was central to the complementarity between the United States and the United Kingdom, and "...to cancel this project tears the heart out of our relations..."<sup>115</sup> When Prime Minister MacMillan met President Kennedy at Nassau to discuss Skybolt, this moral obligation and the importance it had for the Anglo-American relationship likely played a crucial part in the United States agreeing to sell the Polaris system.

Finally, it is important to note that there is a nuance to the relationship of interdependence that is often overlooked in the literature. It is assumed that perhaps the policy of 'interdependence' pursued by the British government after 1957 may have led to overdependence on the United States and given rise to the possibility of cancellation of the British strategic deterrent because of Skybolt. However, it must be noted that the *interdependence* policy had an important caveat. British 'interdependence' with the United States was (and continues to be) only on nuclear delivery vehicles not the warheads themselves. The British government was cognizant of this and even in its public posture noted that the United Kingdom reserved independence on all aspects of the production the nuclear warhead, whereas interdependence is a 'sensible measure' in the production of nuclear delivery systems.<sup>116</sup> As the British Minister of Defence stated,

Some of my hon. Friends think that interdependence is so desirable and so attainable that we should abandon independence now...There are others who think that interdependence is so uncertain and so distant that we can trust no ally and that we must make every nut and bolt of any deterrent ourselves. I ask the House to

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<sup>114</sup> Minister of Air to Minister of Defense, "Skybolt" (Draft), December 1962, TNA AIR 19/1036.

<sup>115</sup> Neustadt, *Report to JFK*, 71–72.

<sup>116</sup> Ministry of Defence, "Nassau Agreement on Polaris," 11 January 1963, TNA AIR 19/1056.

imagine the possibility that we are somewhere on the hard road between these two schools of thought...<sup>117</sup>

From a more practical standpoint, as Jones highlights, the Polaris submarine crews would be British and the warheads would be made by the United Kingdom, too.<sup>118</sup> That is, the control of the nuclear warheads, means of delivery, and the decision to use them would lie with the British, lending them a degree of independence.<sup>119</sup>

Such a policy was understandable, given the experience of the British with the McMahon Act and being forced to go it alone in the development of nuclear weapons. The British were also aware that, under the Kennedy administration, there was a turn away from supporting the United Kingdom's national deterrent force to favoring a multilateral European nuclear force under NATO.<sup>120</sup> This would undercut the British strategic deterrent and independence of action and no doubt the British government were wary of such an eventuality. There was also a 'shadow of Skybolt' which influenced British strategic thinking after 1962.<sup>121</sup>

It was also around the time of the negotiation of the Skybolt system that the British decided to consult on building their warhead with the United States Air Force in order to avoid the need to make a separate re-entry vehicle in which the nuclear warhead would be housed.<sup>122</sup> The United Kingdom would acquire the re-entry vehicle for their nuclear warhead from the United States along

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<sup>117</sup> Foreign Office to Certain of Her Majesty's Representatives, "The Nassau Agreement," 13 February 1963, TNA FO 371/173395.

<sup>118</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 395.

<sup>119</sup> At least in the 1960s. This degree of independence would devolve considerably in the next few decades. Jake Wallis Simons, "How Washington Owns the UK's Nukes," *Politico*, April 30, 2015, <https://www.politico.eu/article/uk-trident-nuclear-program/>.

<sup>120</sup> Jones, *The Official History of the UK Strategic Nuclear Deterrent, Volume I*, 332.

<sup>121</sup> Jones, 436.

<sup>122</sup> The re-entry vehicle is slender cone that contains the nuclear warhead and helps it survive the rigors of re-entry into the atmosphere after the missile launch. Apart from the warhead itself, the re-entry vehicle contains electronic arming and fusing mechanisms for detonation of the warhead, and other systems to ensure a stable and accurate approach to the target. See, Matthew Bunn, "Technology of Ballistic Missile Reentry Vehicles," in *Review of U.S. Military Research and Development 1984*, ed. Kosta Tsipis and Penny Janeway (Washington: Pergamon-Brassey's International Defense Publishers, 1984), 69.

with the warhead delivery system.<sup>123</sup> This meant that the United States and the United Kingdom would have to agree to consult each other in case either side wanted to changes to their designs in order to ensure continued compatibility.<sup>124</sup>

### **Trident, the Anglo-American relationship, and Zone of Ambiguity**

The shift of the United Kingdom's nuclear forces from the Polaris A3 to the Trident D5 system helps highlight the complexity of alliance relationships and how it affects the transfer of the means of nuclear delivery. The Trident sale does not only highlight aspects of the Zone of Ambiguity in the non-proliferation order (particularly the NPT), but also showcases how the United Kingdom had to overcome arms control negotiations on SALT and INF that could potentially have constrained their ability to have nuclear forces.

By the late 1970s, it was clear that the Polaris missile system that was negotiated in Nassau by Harold Macmillan in 1962 would need to be replaced by the 1990s. A replacement system would take about 10-15 years to develop and produce.<sup>125</sup> The United Kingdom now had to decide whether to stick to the Polaris system or move to a Trident system. The four main options that the United Kingdom considered were to acquire: the Trident C4 missile (with MIRV capacity); an improved Polaris A3 system (which they already possessed); Submarine-launched cruise missiles (SLCMs); and Air-launched Cruise Missiles (ALCMs).<sup>126</sup> In December 1979, the decision was taken by Prime Minister Margaret Thatcher's government to replace the Polaris fleet with the Trident C4 missiles. The missiles would be carried in a new class of submarines to be based on

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<sup>123</sup> Kent to P.S./S. of S. (Air Ministry) and P.S./D.C.A.S., "Skybolt," 9 August 1960, TNA AIR 19/1096.

<sup>124</sup> Ibid.

<sup>125</sup> Kristan Stoddart, *Facing Down the Soviet Union: Britain, the USA, NATO and Nuclear Weapons, 1976-1983* (Basingstoke, Hampshire [England]: Palgrave Macmillan, 2014), 113.

<sup>126</sup> Ministry of Defence, "Visit by the Secretary of State to Washington 15-18 July 1979: Background Note," 11 July 1979, TNA DEFE 24/212.

the US 640 class SSBNs.<sup>127</sup> The agreement on the US sale of the Trident C4 missiles was reached between the Thatcher and Carter administrations in July 1980.<sup>128</sup> By 1981, however, the United States had announced that it would be developing the Trident D5 missiles instead of the C4 and would deploy them by 1989. President Ronald Reagan offered to make the D5 missiles available to the British if they chose that option.<sup>129</sup>

In her letter to President Ronald Reagan seeking the sale of the Trident D5 missile for the United Kingdom's nuclear forces, Prime Minister Margaret Thatcher stated that the transaction would take place, "...subject to in accordance with applicable United States law and procedures"; and "...consistent with the present and prospective international obligations of both parties."<sup>130</sup> What were these laws and procedures, and international obligations? And to what extent was the transfer of the Trident missile as a means of nuclear delivery affected by them?

By the late 1970s, the cooperation between the United Kingdom and the United States was "almost wholly determined by the Agreement for Co-operation on the Uses of Atomic Energy for Mutual Defence Purposes (the 1958 Agreement), and by the 1963 Polaris Sales Agreement."<sup>131</sup> In this context, this section of the chapter examines two aspects of the Trident missile acquisition by the United Kingdom, beginning with the role of the Zone of Ambiguity in enabling the sale of the Trident missile. It is important to note that between the 1962 Nassau Agreement that led to the sale of the Polaris missiles and the agreement to buy the Trident D5 missiles, the NPT was signed, and

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<sup>127</sup> Ministry of Defence, "United Kingdom Strategic Deterrent" (Annex C to Misc (7)), November 1981, TNA AIR 8/2846.

<sup>128</sup> Suzanne Doyle, "A Foregone Conclusion? The United States, Britain and the Trident D5 Agreement," *Journal of Strategic Studies* 40, no. 6 (September 19, 2017): 869.

<sup>129</sup> Ministry of Defence, "United Kingdom Strategic Deterrent" (Annex C to Misc (7)), November 1981, TNA AIR 8/2846. For a detailed account of the negotiations around the shift from the Trident C4 to the D5 missile system, see, Doyle, "A Foregone Conclusion?," September 19, 2017.

<sup>130</sup> Thatcher to Reagan, "Personal Correspondence," 11 March 1982, TNA PREM 19/695.

<sup>131</sup> Ministry of Defence, "Annex A: The Present Strategic Force and its Effective Future Life," in "The Study of Factors Relating to Further Consideration of the Future of the UK Nuclear Deterrent," 1978, TNA DEFE 24/2122.



what had been a nascent nuclear non-proliferation regime (in the 1950s and 1960s) was now a formal nuclear non-proliferation regime with an architecture to control proliferation of nuclear weapons. In the first part of this section I explore how the Zone of Ambiguity was navigated by the United States and the United Kingdom in transferring the means of nuclear delivery. The second feature of the Trident acquisition that I examine is the role of arms control agreements between the United States and the Soviet Union in shaping the sale of the Trident missile system and the British strategic nuclear force.

### *Factors determining Polaris Successor*

The Polaris Sales Agreement (PSA) signed in 1963 allowed the United Kingdom to buy the Polaris missiles themselves, but also permitted the sale of equipment like missile launching and handling systems, fire control systems, ships navigation systems, test and training equipment, missile range facilities, spares, and a host of other related services.<sup>132</sup> The British government concluded that the liaison with the United States on the basis of the PSA and the 1959 Nuclear Cooperation Agreement was vital to the maintenance of the Polaris force through the 1980s and its successor.<sup>133</sup> However, there were other important considerations in the decision to adopt a successor to the Polaris system.

In 1979, British Foreign Minister, Peter Carrington, wrote a top secret note to Prime Minister Margaret Thatcher, outlining the most important factors which were relevant to British decision on its strategic nuclear force. These were arms control; dependence on the United States; comparisons to France; and the attitude of the British allies in Europe.<sup>134</sup>

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<sup>132</sup> Legge to Rose, "Successor to Polaris – Brief for the Washington Team," 6 July 1979, TNA DEFE 24/2122.

<sup>133</sup> Ibid.

<sup>134</sup> Carrington to Prime Minister, "The Successor to Polaris," 29 November 1979, TNA PREM 19/14.

On arms control, Carrington stated that whatever missile system the British adopted, the Soviet Union would seek to apply pressure on them to be constrained through arms control.<sup>135</sup> Furthermore, given that the Defence Secretary had recommended a force of 640 warheads, Carrington was concerned that, “Other governments (including some of our Allies) may feel that the Russians have a case for including such a force in SALT.”<sup>136</sup>

As stated earlier, the dependence on the United States was a concern for British nuclear force decision-making. Carrington had noted that the Trident force would lead to British dependence on the United States for the next 30 years. This would, as he wrote, allow “...the Americans scope to exert political leverage on us.”<sup>137</sup> An important part of the deal for the United States was a concession from the United Kingdom, the “Diego-Trident Package,” that allowed “greater flexibility” to the Americans to expand their military base in the Indian Ocean island of Diego Garcia.<sup>138</sup>

The last two considerations for the British strategic force were to do with the United Kingdom’s foreign policy interests in Europe. The most important of these was its competition with France for primacy in Europe. As Carrington stated,

There is a political case for our maintaining a nuclear deterrent roughly comparable to that of the French: it would be undesirable for European nuclear deterrence to be too French dominated. This might argue marginally in favour of a five-boat force (the French will probably have six). But the four UK submarines armed with Trident C4 MIRVs would not appear any less formidable than the French deterrent.<sup>139</sup>

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<sup>135</sup> Ibid.

<sup>136</sup> Ibid.

<sup>137</sup> Ibid.

<sup>138</sup> Department of State, “Notes for Meeting with the Vice President,” 26 June 1980, Jimmy Carter Presidential Library, accessible at: <https://nsarchive.gwu.edu/document/23824-department-state-notes-meeting-vice-president-circa-26-or-20-june-1980-secret>.

<sup>139</sup> Carrington to Prime Minister, “The Successor to Polaris,” 29 November 1979, TNA PREM 19/14.

Beyond its competition with France, the British considered it important to ensure that its other European allies did not find its development of the Trident submarine force to mean reductions in their conventional contributions for the security of Europe.<sup>140</sup>

The following two sub-sections highlight the two major factors that affected British decision-making with regard to the Trident missile system. At the heart of the conversation about the acquisition of the Trident system was that it was a nuclear delivery system – and an advanced one at that. In the post-NPT world this meant that the transfer of the means of nuclear delivery would have to be undertaken within the legal framework of non-proliferation. The next section highlights how this was done. The next sub-section examines how the alliance relationship and the pressures of arms control affected the UK's ability to acquire these means of nuclear delivery.

#### *The Zone of Ambiguity and the Transfer of the Trident Missile System*

The Nuclear Non-Proliferation Treaty – a constituent element of the Zone of Ambiguity that enables the proliferation of the means of nuclear delivery – had an impact on the ability of states to transfer nuclear missiles. This impact is demonstrated in the discussion of the NPT in the period between 1979 and 1982 during which the British and the United States governments negotiated the terms of the Trident agreement and the logistics of how the missile would be processed. The enabling aspects of the legal and normative ambiguities of the non-proliferation order allowed the United States and the United Kingdom to extend the Polaris Sales Agreement (PSA) signed in 1963 – seven years before the NPT came into force – to process the transfer of Trident missiles through the 1980s and 1990s.

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<sup>140</sup> Ibid.

The United Kingdom saw the PSA as an “open-ended dependable undertaking providing for continuing support of the UK strategic forces as well as the sale of strategic weapon system equipment.”<sup>141</sup> Article IV of the Polaris Sales Agreement (1963) allowed for all future developments, including modifications, relating to the Polaris missile system to be made “reciprocally available” between the United States and the United Kingdom.<sup>142</sup> During discussions in 1973, the United States interpreted the Article IV of the PSA as providing sufficient authority for the sale of the Poseidon weapon system (without warheads) to the United Kingdom.<sup>143</sup> The same principles would apply to the sale of the Trident missile system. Later, when the Trident D5 agreement was reached, it was agreed that all the references to Polaris in the Polaris Sales Agreement of 1963 would be deemed to also be references to the Trident D5 weapon system.<sup>144</sup>

However, two constituent elements of the nuclear non-proliferation architecture had to be managed. One was the NPT, and the other the United States’ Atomic Energy Act of 1954. The problem that needed to be addressed was that both pieces of legislation prohibited the *transfer* of nuclear weapons. As the United Kingdom’s Ministry of Defence noted, dependence on the United States for the processing of the Trident missiles meant that the United Kingdom would need, among other things, to transfer British missiles loaded with nuclear warheads onto the United States’ missile storage and processing facilities and then transfer the missiles back onto the British

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<sup>141</sup> Foreign and Commonwealth Office, “Facilities (Asset Use) Charges,” October 1981, TNA FCO 46/2752.

<sup>142</sup> “Polaris Sales Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America,” 6 April 1963, TNA DEFE 24/2125.

<sup>143</sup> Legge to Rose, “Successor to Polaris – Brief for the Washington Team,” 6 July 1979, TNA DEFE 24/2122. For archival documents on the discussion of the Poseidon missile as a replacement for Polaris, see William Burr, “Concern About Future U.S. Reliability Influenced British Quest for Trident Missiles,” Briefing Book (National Security Archive, July 16, 2021), <https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2021-07-16/concern-about-future-us-reliability-influenced-british-quest>.

<sup>144</sup> “Exchange of Notes between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America concerning the Acquisition by the United Kingdom of the Trident II Weapon System under the Polaris Sales Agreement, signed on 6 April 1963,” 19 October 1982, TNA FCO 46/3567.

SSBNs.<sup>145</sup> At any rate, British nuclear warheads would have to be *transferred* to United States territory and mated with the missiles. The problem was that both the 1954 United States Atomic Energy Act and the Nuclear Non-Proliferation Treaty would not allow the United Kingdom to transfer their nuclear warheads to another state, even if they were being fitted onto missiles. These legal obstacles, as highlighted by a Ministry of Defence official in 1981, were that,

- a. The 1954 US Atomic Energy Act which precludes the US from “exporting” nuclear warheads to other countries. For this reason US warheads supplied for arming the delivery systems of other NATO nations in time of war have to be held under custodial arrangements. Our experience to date is that the US interpret the Act very strictly and would be likely to conclude that British warheads once lodged on US territory, fell under the Act’s provisions.
- b. The Non-Proliferation Treaty which prohibits nuclear weapons States from allowing control of their nuclear weapons to pass to other States directly or indirectly. This would mean that the warheads would have to remain under UK control while in the US.<sup>146</sup>

On the 1954 Atomic Energy Act, the British were unclear if the legislation would have to be amended or if there was scope for American authorities to “interpret it as not applying to warheads belonging to another country.”<sup>147</sup> On the issue of non-US nuclear warheads being stored on United States soil, the British Embassy in Washington DC noted – given that the United States required other countries to accept the presence of American nuclear weapons on their soil – Congress could surely not have difficulty in accepting the principle of storing the nuclear warheads of another allied nation on its soil.<sup>148</sup> Nonetheless, the two possibilities that the British suggested to the Americans in order to address these concerns were,

- a. full processing, ie. involving the handling, processing and storage of both UK missiles and warheads on US soil and the loading of our (British) submarines with headed missiles in US waters;

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<sup>145</sup> Gainsborough to PS/S of S, “Trident: Processing D5 Missiles in the US,” 20 November 1981, TNA AIR 8/2846.

<sup>146</sup> Ibid.

<sup>147</sup> Ibid.

<sup>148</sup> Fretwell to Gillmore, “Processing UK Trident Missiles in the US,” 3 December 1981, TNA FCO 46/2752.

- b. partial processing involving only the handling, processing and storage of UK missiles (ie without their re-entry systems and warheads) on US territory, with the warheads being held and processed in the UK where they would also be mated to the missiles.<sup>149</sup>

It was possible – the British thought – that having the custody of the United Kingdom’s nuclear weapons while they were on the United States’ territory and processing facilities could allow them to circumvent the question of ‘transfer’ because the custody of the weapons would not have been transferred. Such a provision could also help meet the NPT requirements quoted above.<sup>150</sup>

The British Embassy in Washington, meanwhile, noted to the Foreign and Commonwealth Office that the NPT – which prohibited the transfer of “nuclear weapons or other nuclear explosive devices – would be incompatible with the British plans. The note stated that,

Since the warheads are British and to the extent they would remain under our control, it may be possible to argue that storage, loading and off-loading here does not constitute a “transfer”. But since warheads would be involved rather than, as previously, missiles without warheads, we should, *prima facie*, appear to be sailing closer to the wind in terms of Article I than has hitherto been the case (and there certainly are those in Congress who would see such an arrangement in that light).<sup>151</sup>

One of the arrangements considered at the time was direct British control over the warheads at all times precluding the need to transfer custody to the United States at any point.<sup>152</sup> The arrangement – apart from satisfying the non-transfer criterion of the NPT – would still have to be authorized under the provisions of the Atomic Energy Act of 1954 and Article VB of the 1958 MDA between the United States and the United Kingdom which also raised the issue of weapons transfer.<sup>153</sup>

Representatives from the United States agreed as well that there was a sharp distinction between processing just the missiles as opposed to processing missiles *with warheads*. They also

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<sup>149</sup> Gillmore to Fretwell, “Processing UK Trident D5 Missiles in the US,” 23 December 1981, TNA FCO 46/s.

<sup>150</sup> Gainsborough to PS/S of S, “Trident: Processing D5 Missiles in the US,” 20 November 1981, TNA AIR 8/2846.

<sup>151</sup> Fretwell to Gillmore, “Processing UK Trident Missiles in the US,” 3 December 1981, TNA FCO 46/2752.

<sup>152</sup> Gainsborough to PS/S of S, “Trident: Processing D5 Missiles in the US,” 20 November 1981, TNA AIR 8/2846.

<sup>153</sup> Fretwell to Gillmore, “Processing UK Trident Missiles in the US,” 3 December 1981, TNA FCO 46/2752.

agreed that it would be possible to argue that Article I of the NPT was not violated if the British kept the warheads under their control.<sup>154</sup> While American government officials were less sure about Congressional approval, they thought that it was more of a political problem that would have to be worked out in the Senate Committee on Non-Proliferation and the Armed Services and Foreign Affairs Committees.<sup>155</sup>

It was ultimately decided that the missiles would be processed in the United States at King's Bay, Georgia under the general provisions of the Polaris Sales Agreement.<sup>156</sup> While the missiles would be loaded into the submarine in the United States, the warheads would be inserted into the missiles at Clyde Submarine Base at Faslane, Scotland.<sup>157</sup> This arrangement would satisfy the NPT's Article 1 to not transfer nuclear weapons while at the same time ensuring that the means of nuclear delivery were transferred. Nevertheless, not all were convinced, and the British government faced considerable opposition to Trident from the Labour party in Parliament. In fact, Labour had promised to scrap the Trident system and close all nuclear bases, including those of the United States Navy and Air Force, if voted into power in the 1983 general election.<sup>158</sup> It had also put unilateral nuclear disarmament in its platform in 1982 as a response to the European Nuclear Disarmament (END) movement and the UK-based Campaign for Nuclear Disarmament (CND). This was in the context of the anti-nuclear protests against "Euromissiles" and the influence that they had on government policy in Europe.<sup>159</sup> While emphasizing that the party would

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<sup>154</sup> Renwick to Gillmore, "Processing UK Trident Missiles in the US," 14 January 1982, TNA DEFE 24/2123.

<sup>155</sup> Ibid.

<sup>156</sup> Nott to Prime Minister, "United Kingdom Strategic Deterrent: Missile Processing," 7 September 1982, TNA PREM 19/695.

<sup>157</sup> Armstrong to Prime Minister, "United Kingdom Strategic Deterrent: Missile Processing, MISC 7(82)4," 27 July 1982, TNA PREM 19/695.

<sup>158</sup> R.w. Apple Jr., "Labor Party Reinforces Stand On Disarmament By Britain," *The New York Times*, September 30, 1982, <https://www.nytimes.com/1982/09/30/world/labor-party-reinforces-stand-on-disarmament-by-britain.html>.

<sup>159</sup> For more on this and the Euromissile Crisis, see, The Wilson Center, *The Euromissiles Crisis and the End of the Cold War 1977-1987*, Cold War International History Project Document Readers, 2009, [https://www.wilsoncenter.org/sites/default/files/media/uploads/documents/Euromissiles\\_Reader\\_PartI.pdf](https://www.wilsoncenter.org/sites/default/files/media/uploads/documents/Euromissiles_Reader_PartI.pdf).

cancel Trident if it came into office, a Labour MP even stated that the Trident project “breaks the spirit if not the letter of the non-proliferation treaty.”<sup>160</sup>

The Defence Minister, John Nott, denied the charge about breaking the spirit of the non-proliferation treaty and stated that the NPT “...never sought to refer to existing nuclear forces.”<sup>161</sup> However, as this research demonstrates, the governments of both the United Kingdom and the United States went to great lengths to take advantage of the ambiguous definition of nuclear weapons and the normative and legal ambiguity in the nuclear non-proliferation order to transfer the Trident missile system. It is also clear that despite the means of nuclear delivery being independent of nuclear warheads it was seen as a grey area. Indeed, the NPT’s inability to define what nuclear weapons were/are considerably undermined its ability to define what constituted the transfer of nuclear weapons.

#### *INF: Alliances, Problems, and Determinants of Nuclear Force*

In addition to the concerns about international legal considerations relating to the proliferation of the means of nuclear delivery, the United Kingdom had another problem. It was modernizing its nuclear force and acquiring the means of nuclear delivery at a time that arms control between the two superpowers was advancing. Its alliance with the United States – and indeed its dependence on it – meant that British nuclear forces could potentially be included in the arms control arrangements being negotiated between the United States and the Soviet Union. The United Kingdom, however, did not wish to be dragged into any of these arms control agreements. Its alliance with the United States meant that this was a hurdle to be navigated during the acquisition of the Trident D5 system. In keeping with the theme of alliances posing challenges to

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<sup>160</sup> Hansard, “Trident Missile Programme,” 11 March 1982, TNA PREM 19/695.

<sup>161</sup> Ibid.



the nuclear force development/acquisition of a state – i.e., being as much bane as boon – this section explores the role of the arms control agreements between the United States and the Soviet Union (SALT, START and INF treaties) in the British acquisition of the Trident missile system.

The non-circumvention clause in the SALT II agreement between the United States and the Soviet Union posed a problem for the transfer of the Trident D5 system to the United Kingdom as a means of nuclear delivery. The clause stated that in order to ensure the effectiveness and viability of the treaty, both parties would not, “...circumvent the provisions of this Treaty, through any other state or states, or in any other manner.”<sup>162</sup> When the treaty was negotiated, the United Kingdom had raised concerns about this clause and was reassured by the United States that they had made it clear in the negotiating record that transfers of technology to US allies would continue and would not constitute ‘circumvention’.<sup>163</sup> It was thus the view of the British government that the ‘no circumvention’ clause was not a ‘no transfer’ clause.<sup>164</sup> Additionally, the British government also held the view that the UK’s Polaris fleet had been in operation for more than a decade and the Trident system would only represent a maintenance of existing capabilities – i.e., it did not represent a sudden change to the status quo.<sup>165</sup> There was, hence, no need to digress from the previous agreement between the United States and the Soviet Union to exclude the British Strategic Forces from the SALT negotiations.

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<sup>162</sup> “Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Strategic Offensive. Arms, Together with Agreed Statements and Common Understandings regarding the Treaty (SALT II),” Accessed at [https://media.nti.org/documents/salt\\_2.pdf](https://media.nti.org/documents/salt_2.pdf).

<sup>163</sup> Ministry of Defence, “Defensive Note on Non-Circumvention/No Transfer Implications of a Polaris System” (Annex A to “Successor System to Polaris: Brief for Initial Approach to US Government”), 6 July 1979, DEFE 24/2122.

<sup>164</sup> Legge to Hastie Smith, “Successor System: Question and Answer Briefs,” 14 May 1980, TNA DEFE 24/2124.

<sup>165</sup> Ministry of Defence, “Defensive Note on Non-Circumvention/No Transfer Implications of a Polaris System” (Annex A to “Successor System to Polaris: Brief for Initial Approach to US Government”), 6 July 1979, DEFE 24/2122.

The transfer of the Trident system was ultimately not affected by the SALT (I and II) agreements.<sup>166</sup> However, by the early-1980s, the primary concern for the United Kingdom was that negotiations were underway between the United States and the Soviet Union on the reduction in intermediate range nuclear forces in Europe (INF). Like the Strategic Arms Reduction Talks (START), these treaties could affect British nuclear forces as well.<sup>167</sup> In 1981, the British Ministry of Defence noted that “...any US involvement in processing our missiles, could add to the difficulties of continuing to press for the exclusion of the UK deterrent from future SALT negotiations.”<sup>168</sup> This exclusion was already considered contentious in the Soviet Union, which had attempted to include both British and French systems in the SALT I and SALT II agreements. Soviet leader Leonid Brezhnev, at his meeting with President Ford in Vladivostok in November 1974, had agreed to defer the consideration of third-party systems to later and not include them in SALT II. This had led to a furious Soviet defense minister, Marshal Grechko, accusing Brezhnev of “betraying the country” at a politburo meeting.<sup>169</sup>

The Trident D5 force would lead to a qualitative and quantitative improvement in British nuclear delivery capability. Qualitatively, the Trident system would increase British operational capability and allow them to attack hardened Soviet targets.<sup>170</sup> Numerically, the four-boat force envisaged by the British government would have 16 tubes each with 10 re-entry vehicles. This

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<sup>166</sup> Announcements on American decisions to help British nuclear forces in modernizing the Polaris force as well as transferring Trident had to be timed carefully to ensure that the Soviets did not have “further incentive to scuttle SALT.” See, Brzezinski to the President, “Daily Report,” 15 October 1979, Jimmy Carter Presidential Library, accessible at: <https://nsarchive.gwu.edu/document/23814-zbigniew-brzezinski-president-daily-report-15-october-1979-top-secret>.

<sup>167</sup> Ministry of Defence, “Defence Open Government Document 82,” February 1982, TNA PREM 19/694.

<sup>168</sup> Gainsborough to PS/S of S, “Trident: Processing D5 Missiles in the US,” 20 November 1981, TNA AIR 8/2846.

<sup>169</sup> David Holloway, “The Dynamics of the Euromissile Crisis, 1977-1983,” in *The Euromissile Crisis and the End of the Cold War*, ed. Leopoldo Nuti et al., Cold War International History Project Series (Washington, D.C. : Stanford, CA: Woodrow Wilson Center Press ; Stanford University Press, 2015), 13.

<sup>170</sup> Chief of Navy Staff to Secretary of State, “Revised Draft: The Future of the UK Strategic Nuclear Deterrent,” 13 October 1981, TNA AIR 8/2846.

combined force would be the “...equivalent of 6.5 per cent of the total Soviet strategic warheads (assuming SALT II limits), compared with 2 per cent on basis of current Polaris force now (in 1981).”<sup>171</sup> The memo to MISC 7 (a high powered inner-cabinet nuclear committee) from the Defence Department of the FCO also noted that the Russians were “particularly sensitive” about the United States’ Trident D5 program, and hence the supply of these missiles to the United Kingdom would likely be brought up in arms control (START) talks.<sup>172</sup> These developments would lead to additional Soviet pressure to include British and French nuclear forces in the ambit of the START negotiations that were due to begin in 1982.<sup>173</sup>

There were three ways in which the British government saw arms control agreements between the United States and the Soviet Union potentially including the UK’s strategic nuclear forces.<sup>174</sup> The first route could be by a system of “counting in” whereby British nuclear delivery systems would be counted together with American systems as a part of a balance on the principle of parity.<sup>175</sup> The worry for the United Kingdom in this regard was that their means of nuclear delivery could be counted in by the United States without an explicit British agreement. This could infringe upon the ability of the British to maintain a “minimum effective deterrent” potentially leading to awkward political relations in the alliance.<sup>176</sup>

The second path for the inclusion of British nuclear forces in the arms control talks could be on the basis of a “reduction formula,” i.e., arriving at a number of British nuclear delivery

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<sup>171</sup> Defence Department, Foreign & Commonwealth Office, “MISC 7: United Kingdom Strategic Deterrent on 24 November,” 20 November 1981, TNA FCO 46/2752.

<sup>172</sup> Defence Department, Foreign & Commonwealth Office, “MISC 7: United Kingdom Strategic Deterrent on 24 November,” 20 November 1981, TNA FCO 46/2752.

<sup>173</sup> “Cabinet Nuclear Defence Policy: Most Confidential Record to MISSC 7(82) 1<sup>st</sup> Meeting,” Tuesday, 12 January 1982,” 14 January 1982, TNA CAB 130/1182.

<sup>174</sup> These were highlighted in a 1984 draft Misc 7 paper written by the Foreign and Commonwealth Office and Ministry of Defence (cited below).

<sup>175</sup> Foreign and Commonwealth Office and Ministry of Defence, “British Independent Strategic Deterrent and Arms Control,” in Weston to Fewtrell, “Trident and Arms Control,” 7 March 1984, TNA FCO 46/4141.

<sup>176</sup> Ibid.

systems and warheads below the number at the time by lowering the requirement for minimum deterrence.<sup>177</sup> This reduction formula could potentially be expressed in the form of the number of nuclear submarines, tubes or missiles, warheads, combined megatonnage, or operational readiness of the force.<sup>178</sup>

The third and final way in which the British systems could be included in these negotiations was by a commitment to not increase its forces beyond a certain specified number.<sup>179</sup> Such a system would include third party nuclear forces within the framework of strategic parity and would reduce the United Kingdom's vulnerability to Soviet charges of circumvention.<sup>180</sup> This 'no increase' commitment was considered to be the most viable way forward by the British government.

Both the leader of the Soviet Union, Leonid Brezhnev, and the Defense Minister, Marshal Ustinov, had publicly indicated by 1981 that the Soviets would be focusing on the American Trident D5 system in future arms control negotiations.<sup>181</sup> Furthermore, the Soviets had already demanded "compensation" for non-United States but allied systems.<sup>182</sup> In fact, apart from wanting to include the British and French strategic missile systems, the Soviets wanted to include the Tornado (British) and Mirage IV (French) aircraft – that carried tactical nuclear weapons – in the INF balance as well.<sup>183</sup> On the INF at least, the British found the Soviet pressures for the inclusion of the British strategic forces to lack merit. British Ministry of Defence officials noted that,

Even if the Soviet negotiators recognized that British and French submarine-based ballistic missiles were INF weapons: in their draft INF arms control treaty INF missiles were defined in a way which excluded British and French missiles as

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<sup>177</sup> Ibid.

<sup>178</sup> Ibid.

<sup>179</sup> Ibid.

<sup>180</sup> Ibid.

<sup>181</sup> Weston to Gillmore, "UK Strategic Nuclear Forces," 17 September 1981, TNA FCO 46/2753.

<sup>182</sup> Renwick to Gillmore, "Processing UK Trident Missiles in the US," 14 January 1982, TNA DEFE 24/2123.

<sup>183</sup> Thomas to Daunt, "Mr. Rifkind's Visit to Moscow: INF and UK Nuclear Forces," 23 July 1985, TNA FCO 46/4676.

clearly as it excluded the comparable US and Soviet submarine-launched missiles.<sup>184</sup>

This view reflected the British position that the Trident force was a submarine-based strategic deterrent that could not be considered in the INF discussion on land-based nuclear forces. The submarine based ballistic missile systems of the United States and the Soviet Union had been excluded from the INF discussions. For the British, the push to include theirs and French strategic nuclear forces in the negotiations had to do with a Soviet attempt “to justify the perpetuation of its near-monopoly in Europe of longer range intermediate nuclear missiles.”<sup>185</sup>

To the United States, the British made the case that the Soviet negotiating position to include the British and French strategic forces within the INF fold meant that the Soviets would end up having more nuclear weapons than the United States. British Foreign Secretary, Geoffrey Howe, stated to US Secretary of State, George Shultz,

The present Soviet negotiating position means that the Russians claim a contractual right to have as many nuclear weapons as all the other nuclear powers put together, and thus more than the United States. This is inherently undesirable, and any agreement concluded on this basis would almost certainly not be ratified by the US Congress.<sup>186</sup>

Furthermore, the START negotiations were bilateral and between the United States and the Soviet Union – the United Kingdom could not be party to these talks.<sup>187</sup> The British government’s argument was that this was because of the small size of their nuclear forces compared to that of the two superpower states. It was in the joint interest of the alliance of prevent the Soviets from including British and French systems, and in the Foreign Secretary’s view, “plainly absurd” for

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<sup>184</sup> Gozney to Brinkley, “Draft Government Commentary on the CND Parliamentary Briefing on Trident,” 24 August 1984, TNA FCO 46/4142.

<sup>185</sup> Francis to Mann, “CND Trident “Parliamentary Briefing”,” 24 August 1984, TNA FCO 46/4142.

<sup>186</sup> Howe to Shultz, 13 October 1983, Ronald Reagan Library (RRL), Ronald Lehman Files, RAC Box 2, British/French Nuclear Forces, 1983-1984.

<sup>187</sup> Ministry of Defence, “Defence Open Government Document 82,” February 1982, TNA PREM 19/694.

there to be a compensation formula to account for the insignificant (compared to the Soviet numbers) British nuclear forces.<sup>188</sup>

For the UK, there was no scope for the reduction of its strategic nuclear forces without calling into question the essential role of the UK's strategic deterrent altogether.<sup>189</sup> Furthermore, in its view, the SALT and START negotiations were about a "basic principle of strategic parity" between the United States and the Soviet Union which was agreed upon since the Vladivostok meeting between the two sides in 1974.<sup>190</sup> The United Kingdom had no role to play in the fulfilment of this principle. It would, however, maintain its four-boat nuclear force and not increase it to five submarines. As the Foreign Secretary, Peter Carrington, noted to Prime Minister Thatcher, "A four boat force...would be marginally easier to justify, since it is clearly a minimum force and we already have a precedent for excluding our four-boat force from SALT I and II."<sup>191</sup> Carrington highlighted that the United States was also aware that the larger the British nuclear force, the more problems they would have in the SALT process: it was likely that they would have to pay a heavier price for the continue exclusion of the British force.<sup>192</sup>

However, by 1984, the British government took the position that if the Soviet and the United States' nuclear arsenals "were very substantially reduced" as a result of arms control negotiations and if the Soviet anti-ballistic missile systems were not significantly enhanced, then the United Kingdom would "...review its position and consider how best it might contribute to arms control and disarmament in the light of the reduced threat."<sup>193</sup>

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<sup>188</sup> Howe to Shultz, 13 October 1983, Ronald Reagan Library (RRL), Ronald Lehman Files, RAC Box 2, British/French Nuclear Forces, 1983-1984.

<sup>189</sup> Ministry of Defence, "The Successor to Polaris: Q and A Brief," in Legge to Hastie-Smith, "Successor System: Question and Answer Briefs," 14 May 1980, TNA DEFE 24/2124.

<sup>190</sup> Ministry of Defence, "The United Kingdom Trident Programme," in Omand to Whitmore, "Trident," 2 March 1982, TNA PREM 19/695.

<sup>191</sup> Carrington to Prime Minister, "The Successor to Polaris," 29 November 1979, TNA PREM 19/14.

<sup>192</sup> Carrington to Prime Minister, "The Successor to Polaris," 29 November 1979, TNA PREM 19/14.

<sup>193</sup> Francis to Mann, "CND Trident "Parliamentary Briefing", 24 August 1984, TNA FCO 46/4142.

*Trident and the Anglo-American Relationship*

The sale of the Trident missile system underscores three important aspects of the transfer of the means of nuclear delivery between allies. In the aftermath of the NPT, these were distinct from the issues that were salient during the sale of the Skybolt and the negotiation of the Polaris Sales Agreement in the 1950s and early 1960s. First, the alliance relationship with the United States was not an automatic guarantee to receive the means of nuclear delivery. The political tribulations that the UK had to overcome on the issue of adherence to the NPT and to avoid being drawn into arms control agreements demonstrate this point. Second, the question of dependence/independence vis-à-vis the United States remained at the center of the factors determining how the UK would build its nuclear forces. And relatedly, the third consideration deals with the question of collaborating on the means of nuclear delivery with other states. All of these were related factors that were affected by the ‘special relationship’ between the United States and the United Kingdom and in turn influenced it as well.

Its reliance on the United States meant that the United Kingdom needed to ensure that that the transfer of the Trident missiles met not only the stipulations of United States legislation on non-proliferation, but also the stipulations of the NPT. As has been discussed earlier, one of the primary concerns in this regard was to do with missile processing. The Trident missiles were made in, and would be fitted onto the UK’s submarines, in the United States. If the UK’s nuclear warheads were brought on the United States’ soil, it would constitute a transfer of nuclear weapons. While a number of custodial options were explored, ultimately everything but the warhead on the UK’s Trident D5 system was processed at King’s Bay, Georgia.<sup>194</sup> The United Kingdom’s reliance on the alliance for its entire nuclear delivery apparatus (missiles and re-entry vehicles) made it

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<sup>194</sup> Gainsborough, M, “Trident: Processing D5 missiles in the US,” 20 November 1981, TNA AIR 8/2846.

particularly vulnerable to such political and legal troubles. It is, however, important to note here that, while the Atomic Energy Act of 1954 and the Non-Proliferation Treaty were invoked and shaped the logistical arrangements with regard to the transfer of the means of nuclear delivery, nothing in these legal and normative arrangements stopped the transfer of the systems. The Non-Proliferation Treaty, in banning the transfer of nuclear weapons, but not actually defining what constituted a nuclear weapon was, left open a wide berth for states to utilize to justify the proliferation of the means of nuclear delivery.

The UK's alliance with the United States also meant that the Soviet Union would attempt to include its nuclear forces in arms control agreements like, SALT, INF, and START. This posed a problem for the Western alliance as a whole. The problem here for the British was that their forces could be "counted in" within the fold of a bilateral arms control agreement by the United States with or without explicit British agreement.<sup>195</sup> In other words, the United Kingdom was concerned that it could be presented with a *fait accompli*. This would compromise the British government's ability to preserve its "minimum nuclear deterrent."<sup>196</sup>

On the issue of dependence/interdependence, the United Kingdom continued to be wary of the United States. The government noted that "...we must assume that, as in the past, there will always be individual officials in any Administration who see disadvantages for the US in the continued existence of the British and French strategic forces. Congress would be unlikely to dissent from the principle, although moods could, of course, change suddenly, for example, if the

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<sup>195</sup> Foreign and Commonwealth Office and Ministry of Defence, "British Independent Strategic Deterrent and Arms Control," in Weston to Fewtrell, "Trident and Arms Control," 7 March 1984, TNA FCO 46/4141.

<sup>196</sup> Ibid.



dangers of nuclear proliferation become a dominant concern.”<sup>197</sup> Given its experiences with the McMahon Act (1946) and Skybolt (1962), this was not a surprising position.

Not having British warheads fitted onto the Trident D5 missiles at King’s Bay in the United States helped with these allay some of these anxieties. As the British Embassy in Washington noted to the FCO, if British warheads were being “stored, loaded, and off-loaded” in the United States, the substantial amount of dependence on the latter would be too high for the United Kingdom to claim ‘independence’ of its strategic deterrent.<sup>198</sup> The second concern this addressed was about the presence of the UK’s nuclear warheads adding to the United States’ strategic numbers vis-à-vis the SALT II.<sup>199</sup> It would be more difficult for either the United States and the Soviet Union to present the UK with a *fait accompli* and counting its numbers in a strategic arms control agreement if British warheads were not physically on American territory. Of course, this did not stop the Soviets from trying.

Finally, the Anglo-American cooperation on Trident had an impact on Europe and on the Anglo-French relationship. The Ministry of Defence noted that that while the United States’ assistance for a Trident system would be welcome to most of the UK’s European allies, France would likely be an exception.<sup>200</sup> The MoD, however, also held the view that the French could be willing to cooperate with the British on nuclear delivery systems if the UK were to become less dependent on the United States.<sup>201</sup> Ultimately, even if the French were willing, from a technical standpoint, it would be difficult for the UK to collaborate with them. The UK’s weapons systems and nuclear propulsion were so “inextricably mixed with that of US origin” that it would be near

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<sup>197</sup> Ministry of Defence, “Annex F: International Political Aspects of System Choice,” in “The Study of Factors Relating to Further Consideration of the Future of the UK Nuclear Deterrent,” 1978, TNA DEFE 24/2122.

<sup>198</sup> Fretwell to Gillmore, “Processing UK Trident Missiles in the US,” 3 December 1981, TNA FCO 46/2752.

<sup>199</sup> Ibid.

<sup>200</sup> Ministry of Defence, “Annex F: International Political Aspects of System Choice,” in “The Study of Factors Relating to Further Consideration of the Future of the UK Nuclear Deterrent,” 1978, TNA DEFE 24/2122.

<sup>201</sup> Ibid.

impossible to safeguard United States technology that the UK had formal obligations to not share.<sup>202</sup> Anglo-American interdependence/dependence thus foreclosed any option for the British to even consider the possibility of technological cooperation on nuclear delivery vehicles with any other state.

## Conclusion

This chapter has explored how the United Kingdom acquired its nuclear delivery vehicles and how the international nuclear non-proliferation order enabled this process. In particular, I highlight the Zone of Ambiguity in the nascent non-proliferation order and its constituents which enabled the transfer of the means of nuclear delivery from the United States to the United Kingdom. I focus on two important episodes in the history of the British nuclear forces: the cancellation of the Skybolt missile program in 1962 which led to the sale of Polaris missile (1963) and the shift of British strategic forces to sea-based platforms, and the sale of the Trident D5 missile in 1982. In accounting for these developments, I have focused on the alliance logic. Strategic nuclear cooperation between the United States and the United Kingdom was the foundational basis of the “special relationship” and coordination between the two states on a range of foreign and defense policies.<sup>203</sup> Both states sought to maintain this close relationship and one could expect this to lead to the transfer of the means of nuclear delivery. However, as this chapter demonstrates, this was not always the case and the path to the transfer of nuclear delivery vehicles was a contested one. The United Kingdom’s alliance relationship with the United States interacted

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<sup>202</sup> Ministry of Defence, “Annex A: Defensive Note on Possible Anglo-French collaboration,” in “The Study of Factors Relating to Further Consideration of the Future of the UK Nuclear Deterrent,” 1978, TNA DEFE 24/2122.

<sup>203</sup> Brzezinski to Byrd, Correspondence, 15 July 1980, Jimmy Carter Presidential Library (JCPL), accessible at: <https://nsarchive.gwu.edu/document/23825-message-white-house-u-s-embassy-tokyo-enclosing-eyes-only-memorandum-senator-robert>.

with the Zone of Ambiguity in the non-proliferation order to enable this proliferation. There are three key takeaways from this research.

First, this study gives us an insight into the international non-proliferation order and its evolution. It also helps us understand why there is a Zone of Ambiguity when it comes to the proliferation of the means of nuclear delivery. This research shows that in the period before the NPT, American legislation like the McMahon Act of 1946, the Atomic Energy Act of 1954 (as amended), along with international non-proliferation initiatives like Baruch Plan (1946), Atoms for Peace (1954), creation of the IAEA (1957), etc. did not actually prohibit the transfer of the means of nuclear delivery. Most of these legal frameworks that constitute the nascent non-proliferation order did not consider delivery vehicles, and nor did they define the term ‘nuclear weapon’. This definitional ambiguity of what constitutes a nuclear weapon along with the legal and normative ambiguity on what could and could not be transferred led to the manipulation by the United States and the United Kingdom to amend the Atomic Energy Act of 1954, and conclude the agreement to sell Skybolt, and eventually the Polaris Sales Agreement (1963).

The establishment of the NPT (in 1970) did not change this situation. Contrary to what one would expect, it did not affect the transfer of the means of nuclear delivery because the Treaty did not define what constituted a nuclear weapon system. As this chapter shows, with the case of the Trident missile, at best, the NPT was able to impact how the missiles would be processed, ensuring that the nuclear warheads were not transferred from the United Kingdom’s custody to the United States’. While conversations about whether the transfer of Trident violated the spirit of the NPT did arise, it was made clear by the British government that in its view, the letter of the law was not infringed upon. The NPT, to date, does not cover the transfer of the means of nuclear delivery or define what a nuclear weapon is.

The second set of key takeaways from this research pertain to the mechanism of the alliance relationship and its effect on the proliferation of the means of nuclear delivery. The United Kingdom's relationship with the United States sheds light on two important dynamics in the alliance relationship with regard to the transfer of the means of nuclear delivery. The first, which is highlighted by the Skybolt episode, is that an alliance relationship is not automatically beneficial for a state. When it comes to nuclear delivery vehicles, the United States' termination of the Skybolt program nearly led to the cancellation of the United Kingdom's strategic deterrent altogether. Indeed, the United Kingdom thought that this was the goal of the United States, in particular that of Robert McNamara, through the cancellation of the Skybolt program. A decade later, however, United States Secretary of State Kissinger would say to the British Cabinet Secretary John Hunt, "It would really be a tragedy if Britain got out of the nuclear business. In spite of my hegemonic aspirations over Europe, I really think it will be better for Europe to have an independent nuclear deterrent."<sup>204</sup> An alliance relationship could thus both enable or constrain a state's ability to acquire the means of nuclear proliferation.

Another key takeaway on the alliance mechanism and the proliferation of the means of nuclear delivery from this chapter is that the transfer of these systems must be seen in an international context instead of simply bilateral interactions. Maintaining an alliance relationship with another nuclear power means that a state's nuclear forces could be counted together with the nuclear forces of its ally during the determination of either state's nuclear capability. As the Trident case demonstrates, a major anxiety for the United Kingdom with regard to the acquisition of the

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<sup>204</sup> White House Memorandum of Conversation, "Nuclear Release Agreement; Labour Government's Defense Review; UK Polaris Program; Diego Garcia; US-Soviet Threshold Test Ban; French Presidential Elections; Middle East; Washington Energy Conference," 26 April 1974, RG 59, Records of Henry Kissinger, box 7, Apr 1974 Nodis Memcons. Accessible at: [https://nsarchive.gwu.edu/document/23810-memorandum-conversation-nuclear-release-agreement-labour-government-s-defense-review#\\_edn10](https://nsarchive.gwu.edu/document/23810-memorandum-conversation-nuclear-release-agreement-labour-government-s-defense-review#_edn10).

nuclear delivery system was that it would be counted by the Soviets in arms control negotiations like START and INF, in which the UK had no part. The UK had to navigate these potential constraints, and indeed, ensure that these agreements did not infringe upon their ability to acquire the Trident system and build their nuclear forces. Ultimately, these hurdles, instead of constraining the United Kingdom, helped it establish new paths to enable it to ensure the modernization and continuity of its strategic forces.

Finally, this research uses multi-archival research from the United Kingdom and the United States to showcase newly declassified evidence on the development of the British nuclear forces. In doing so, it sheds light on aspects of the Anglo-American relationship, and indeed the role of the international non-proliferation order, in facilitating key aspects of this ‘special relationship’.

## Chapter 4: Geopolitics and the Proliferation of the Means of Nuclear Delivery: The French *Force de Dissuasion*

“...whenever the hand of friendship has been stretched across the sea, General de Gaulle has put a dead fish in it.”

- George Ball (Under Secretary of State) to President Kennedy (1963)<sup>1</sup>

“... We are also very anxious about the capacity and power of the submarine force. We have decided to begin with six, and afterwards we will probably have attack submarines in order to complete the force. We are very anxious to have some technological secrets...Like McNamara told De Gaulle, not to be in a situation for our submarines to be destroyed in the first hour of war.”

- Robert Galley, French Minister of Armed Forces to U.S. Secretary of State Henry Kissinger (1973)<sup>2</sup>

“We must be fully cold-blooded. Tell them they have an overall strategic urgent problem and we could help them to overcome it. Then there are vulnerabilities and there are things that can help them...We must break up the Europeans. And the French are essential.”

- Henry Kissinger, U.S. Secretary of State (1973)<sup>3</sup>

### Introduction

The French nuclear program has perpetuated many myths, of which, the most popular one is that the *Force de Frappe* was entirely indigenous and homegrown.<sup>4</sup> In this chapter, I explore the development of French nuclear forces and the role of geopolitical considerations in enabling the transfer of technology related to the means of nuclear delivery. This chapter shows that the Zone of Ambiguity in the nuclear non-proliferation regime allowed France to acquire the technology to help it deliver its nuclear weapons. France acquired foreign technology associated with the means

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<sup>1</sup> "Memorandum from Under Secretary of State George W. Ball to President Kennedy, 'A Further Nuclear Offer to General De Gaulle'," August 08, 1963, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Records of Undersecretary of State George Ball, box 21, France. Obtained and contributed by William Burr and included in NPIHP Research Update #2 (hereafter, "Burr/NPIHP"). <https://digitalarchive.wilsoncenter.org/document/110245>.

<sup>2</sup> "Memorandum of Conversation with Robert Galley, July 27, 1973," July 27, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges (2 of 2). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113223>.

<sup>3</sup> "Memorandum of Conversation, 'Visit of French Defense Minister Galley; Strategic Programs'," August 17, 1973, History and Public Policy Program Digital Archive, Ford Presidential Library, National Security Adviser, Memoranda of Conversation, box 2, August 17, 1973 Kissinger, Schlesinger, John S. Foster (DOD). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113226>.

<sup>4</sup> Richard H. Ullman, "The Covert French Connection," *Foreign Policy*, no. 75 (1989): 3.

of nuclear delivery from the United States, and the primary mechanism at play was U.S. geopolitical interest in the context of the Cold War relations with Europe and the Soviet Union.

The chapter will progress in seven sections. In the first section, I briefly discuss the geopolitical logic to the proliferation of the means of nuclear delivery, highlighting some of the rationale driving this outcome as it related to France. In the second section, I provide a historical overview of French nuclear forces and their development. In the third section, I analyze the initial reluctance of the United States to help the French missile program because of non-proliferation and geopolitical concerns. In the following section, I showcase the help that France received from the United States in building its ballistic missile program in the 1970s which led to covert (but not necessarily illegal) transfer of technology. Next, in the fifth section, I discuss the Zone of Ambiguity and the laws and agreements that enabled the transfer of nuclear delivery technology to France. In the sixth section, I demonstrate the role of geopolitical interest in the proliferation of these means of nuclear delivery from the United States to France. Finally, I conclude with a discussion of the key takeaways and implications of the chapter.

### **The Geopolitical Logic and France**

The geopolitical logic leading to the proliferation of the means of nuclear delivery highlights the use of influence and leverage by a supplier state. Just as arms sales during the Cold War – like the Soviet Union selling arms to Arab states – were aimed at creating influence and good relations, the sale of the means of nuclear delivery is aimed at creating a similar effect.<sup>5</sup>

In this chapter I focus on the geopolitical side of the transfer of the means of nuclear delivery, i.e., the direct and indirect transfer of critical technologies that enable states to build

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<sup>5</sup> Bruce D. Porter, “Washington, Moscow, and Third World Conflict in the 1980s,” in *The Strategic Imperative: New Policies for American Security*, ed. Samuel Huntington (Cambridge, Mass.: Ballinger Publishing Company, 1982), 253.

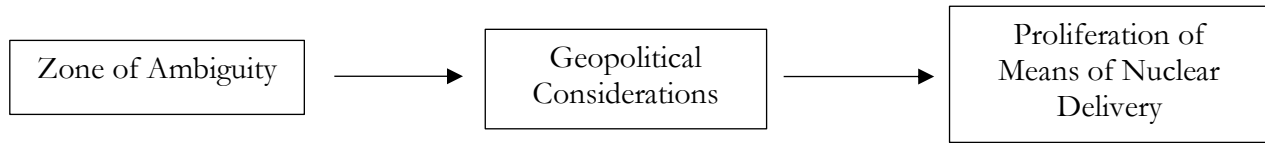
weapons systems to deliver nuclear weapons. I analyze the transfer of ballistic missile technology from the United States to France which helped it build its strategic nuclear forces. Using sources from the U.S. archival record, I demonstrate that U.S. decisionmakers used the Zone of Ambiguity in the non-proliferation regime to ensure that they were able to transfer the technology to France. For the United States, strengthening France's nuclear program presented an opportunity that would allow it to manage its relations with Europe better and, at the same time, present an additional (to NATO) nuclear threat to the Soviet Union.<sup>6</sup> Furthermore, I demonstrate that there was a change in the United States' policy towards the United Kingdom and France as recipients of technology related to the means of nuclear delivery. Under the Nixon administration, the United States sought to keep both states at par (on strategic delivery systems) to signal that if the United States had a back-up in case the other was not compliant with its demands.

The Zone of Ambiguity enables states to proliferate the means of nuclear delivery to gain geopolitical influence or advantage (see Fig. 1). In the case of the transfer of nuclear delivery technology to France, different elements of the Zone of Ambiguity enabled the proliferation. Within the non-proliferation regime (domestic and international) these ranged from domestic laws (the McMahon Act of 1946, the Atomic Energy Act of 1954 (as amended in 1958); executive directives (NSAM 294, NSSM 100); bilateral arrangements (Foster-Blancard agreement), and international treaties (NPT, SALT). While each of these potential constraints presented a challenge for the transfer of the means of nuclear delivery, as this chapter demonstrates, they also contained enabling frameworks to allow the transfers to take place.

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<sup>6</sup> Whether the Soviet Union considered France to be a threat independent of the United States and NATO is another matter.



**Figure 4.1: Geopolitical Logic to the Proliferation of the Means of Delivery**

Elements of the non-proliferation regime (both early and post-NPT) contain the different elements of the Zone of Ambiguity. There was definitional ambiguity in what constitutes a nuclear weapon – i.e., whether the legal stipulations prohibiting the transfer of ‘nuclear weapons’ necessarily proscribe the transfer of the means of nuclear delivery. The multipurpose nature of the technology involved played a role in the transfer of these weapon systems as well. For example, the United States was comfortable transferring missile components and technology to France if they were requisitioned for ‘non-nuclear’ purposes. Taken together, the legal and normative ambiguities arising from definitional ambiguity, multipurpose technology, and legal incertitude in domestic, bilateral, and multilateral non-proliferation led to the proliferation of the means of delivery from the United States to France.

### **Background of French Nuclear Delivery Forces**

In 1954, under Prime Minister Pierre Mendès-France’s government, France began to develop nuclear weapons.<sup>7</sup> In 1958, Prime Minister Félix Gaillard took the decision to test a plutonium bomb in two years (by 1960).<sup>8</sup> Thus, the decision to build the French nuclear bomb was taken under the Fourth Republic and before the political crisis that allowed General Charles de Gaulle to return to power and establish the Fifth Republic in October 1958.

<sup>7</sup> Bertrand Goldschmidt, *L’aventure atomique: ses aspects politiques et techniques* ([Paris]: Fayard, 1962), 116.

<sup>8</sup> Goldschmidt, 117.

There are three primary explanations for French nuclearization. The first is the Gaullist policy of grandeur and prestige which, in fact, preceded de Gaulle's coming to power in 1958.<sup>9</sup> At the heart of this policy was the belief that the possession of nuclear weapons gives a state prestige and power.<sup>10</sup> The development of nuclear weapons in this case was tied to a concept of national identity – and the Gaullist foreign policy of *grandeur* – which would allow France to return to great power status.<sup>11</sup>

The second explanation for French nuclearization is that France sought a “credible security guarantee” after the ignominy of being invaded in the two World Wars; it was expected that nuclear weapons would provide this guarantee.<sup>12</sup> Given the proximity of the Soviet military forces to Western Europe, and the lack of faith that France had in the American nuclear guarantee to NATO and its allies, French nuclear forces would protect the state from being occupied by foreign military forces again.<sup>13</sup>

The third explanation for French nuclearization is that France sought to use nuclear weapons to secure political weight, and independence from allies.<sup>14</sup> This position was precipitated by American reluctance to stand by France in French-Indochina, particularly after its loss at Dien Bien Phu (Vietnam) in 1954.<sup>15</sup> The Suez Crisis of 1956, where the United States browbeat the

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<sup>9</sup> Lawrence Scheinman, *Atomic Energy Policy in France under the Fourth Republic* (Princeton, N.J.: Princeton University Press, 1965), 191.

<sup>10</sup> Sagan, “Why Do States Build Nuclear Weapons?,” 78.

<sup>11</sup> Hymans, *The Psychology of Nuclear Proliferation*, 85. For an account of the interplay between technology and politics that produced the French nuclear program based on the organizing principle of the grandeur and “radiance of France” see, Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, Mass.: MIT Press, 2009).

<sup>12</sup> Bruno Tertrais, “‘Destruction Assurée’: The Origins and Development of French Nuclear Strategy, 1945-1981,” in *Getting MAD: Nuclear Mutual Assured Destruction, Its Origins and Practice*, ed. Henry D. Sokolski (Strategic Studies Institute, U.S. Army War College, 2004), 57.

<sup>13</sup> Tertrais, 57.

<sup>14</sup> Beatrice Heuser, *NATO, Britain, France, and the FRG: Nuclear Strategies and Forces for Europe, 1949-2000* (Houndmills: MacMillan Press, 1997), 94.

<sup>15</sup> Tertrais, “Destruction Assurée,” 4; Avery Goldstein, *Deterrence and Security in the 21st Century: China, Britain, France, and the Enduring Legacy of the Nuclear Revolution* (Stanford, Calif.: Stanford University Press, 2000), 190; Fredrik Logevall, “‘We Might Give Them a Few.’ Did the US Offer to Drop Atom Bombs at Dien Bien Phu?,” *Bulletin*

British and the French to withdraw from Egypt, amplified this sentiment.<sup>16</sup> Beatrice Heuser also argues that securing independence from allies was more critical an impetus for nuclearization than the perceived threat from the Soviet Union – the state at which all of France’s nuclear weapons were aimed.<sup>17</sup> This may help explain the trajectory of the development of French nuclear forces, especially with regard to the means of nuclear delivery.

For a brief period in the late 1950s – under the Eisenhower administration – when the concept of nuclear sharing was being discussed in NATO, it seemed that nuclear weapons with IRBM delivery vehicles would be made available to other NATO countries under joint custody of the United States and the NATO ally.<sup>18</sup> After a 1957 meeting between French and American leaders, the French wanted long-range missiles that could strike the Soviet Union.<sup>19</sup> The United States was sympathetic and sought to reassure the French that in any joint custody arrangement, the United States would technically have custody but in reality the host state would have the weapons “immediately available” to them.<sup>20</sup> However, the dual-key string tied to such an arrangement was just not acceptable to France (even before de Gaulle came to power in 1958). As Trachtenberg points out, the French government had decided by 1957 that it needed a nuclear force that would be under national control, and position became more absolute after 1958 under de Gaulle.<sup>21</sup> However, de Gaulle was willing to set up a national nuclear capability with weapons acquired from the United States. In a meeting with U.S. Secretary of State Dulles, de Gaulle stated that,

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*of the Atomic Scientists*, February 21, 2016, <https://thebulletin.org/2016/02/we-might-give-them-a-few-did-the-us-offer-to-drop-atom-bombs-at-dien-bien-phu/>.

<sup>16</sup> Goldstein, *Deterrence and Security in the 21st Century*, 191.

<sup>17</sup> Heuser, *NATO, Britain, France, and the FRG*, 94.

<sup>18</sup> Marc Trachtenberg, *A Constructed Peace: The Making of the European Settlement, 1945-1963* (Princeton, N.J.: Princeton University Press, 1999), 198.

<sup>19</sup> Trachtenberg, 199.

<sup>20</sup> Trachtenberg, 199.

<sup>21</sup> Trachtenberg, 222–23.

If France were given nuclear weapons or produced them thanks to United States assistance, this would be an economy and thus a reinforcement of the alliance. France would use such weapons as it had used other U.S. military equipment and as the United States had in the past used French military equipment. However, the delicate question, he said, was that of the disposition of these weapons. If the United States were to make weapons available to be used by the United States and French forces on the condition that the order for their use had to be given by the United States or by SACEUR, this proposition had little interest...*the disposition of the arms must be under French responsibility* with U.S. participation. This applied to IRBM's, warheads, NATO stockpile and nuclear arms for U.S. forces.<sup>22</sup>

However, the United States, refused to hand over control of its nuclear weapons, or to help the development of French nuclear forces (without nominal control of the forces) in order to signal to West Germany that it perceived middle powers with national nuclear forces as harmful to Western security.<sup>23</sup> The United States also cited the Atomic Energy Act of 1954 as an impediment to giving France the unilateral control over nuclear forces that it wished for, but de Gaulle simply saw it as an excuse by the Americans to hold on to a nuclear monopoly in the West.<sup>24</sup> France continued its nuclear program and went on to conduct its first nuclear test in February 1960.

### *Building the Triad*

In December 1960, the French government passed a program law to spend close to 12 billion francs on the modernization of the French armed forces over a five year period, focusing on the development of a nuclear *Force de Frappe* (or dissuasion) consisting of nuclear weapons and their means of delivery.<sup>25</sup> The program law, titled, "Projet de loi de programme relative à

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<sup>22</sup> Memorandum of Conversation, "The Secretary's talks with de Gaulle in Paris, July 5, 1958," July 5 1958, in *Foreign Relations of the United States (FRUS)*, 1958–1960, Volume VII, Part 2, Western Europe, eds. Ronald D. Landa, James E. Miller, David S. Patterson, and Charles S. Sampson (Washington: Government Printing Office, 1993), Document 34. Emphasis mine.

<sup>23</sup> Ullman, "The Covert French Connection," 28.

<sup>24</sup> Memorandum of Conversation, "Secretary's Meeting with de Gaulle-Nuclear Stockpiles and NATO," July 5 1958, in *FRUS*, 1958–1960, Volume VII, Part 1, Western European Integration and Security, Canada, eds. Ronald D. Landa, James E. Miller, David S. Patterson, and Charles S. Sampson (Washington: Government Printing Office, 1993), Document 153; Trachtenberg, *A Constructed Peace*, 223.

<sup>25</sup> Goldschmidt, *L'aventure atomique*, 145.

certain *équipements militaires*” commissioned the production of fifty Mirage IV aircraft, development of missiles, and one nuclear submarine.<sup>26</sup> The law allowed for missiles to be bought from outside France or license-produced by foreign companies in France.<sup>27</sup>

**Table 4.1: Overview of the program laws associated with French nuclear forces**<sup>28</sup>

Loi de Programme	Years	Outcomes
First	1960-1964	<ul style="list-style-type: none"> <li>- Development of Mirage IV force (armed with 60kt warheads) and deployment by 1964</li> <li>- Developments toward a nuclear submarine <ul style="list-style-type: none"> <li>• Land-based prototype of nuclear submarine reactor by 1964</li> <li>• Build a trial submarine <i>Gymnote</i> to conduct tests for submarine launched nuclear missiles</li> </ul> </li> <li>- Preliminary study of nuclear warheads for ballistic missiles</li> </ul>
Second	1965-1970	<ul style="list-style-type: none"> <li>- Establishment of nuclear-equipped Mirage IV force by 1967</li> <li>- Development of SSBS system (150kt warheads) to be deployed in the Albion plateau</li> <li>- Development of the MSBS (500 kt warheads) for SNLE</li> <li>- Begin work on three SNLEs with the first entering service by 1970</li> <li>- Development of two tactical nuclear systems: the <i>Pluton</i> missile and an aerial bomb.</li> </ul>
Third	1971-1975	<ul style="list-style-type: none"> <li>- Deployment of the nuclear submarines <i>Redoutable</i> (1971), <i>Terrible</i> (1973) and <i>Foudroyant</i> (1974)</li> <li>- Deployment of the first squadron of the SSBS (1971) and the second squadron (1972)</li> <li>- Delivery of the first Pluton missile (1972)</li> <li>- Development of the fourth and fifth SNLE</li> </ul>
Fourth	1977-1982	<ul style="list-style-type: none"> <li>- Deployment of the nuclear submarines <i>L'Indomptable</i> (1976) and <i>Tonnant</i> (1980)</li> <li>- All SNLEs armed with M-20 missiles (each armed with multiple 1 Mt warheads)</li> <li>- 5 regiments of the <i>Pluton</i> missiles equipped with warheads</li> <li>- Delivery of bombs for the <i>Mirage III</i>, <i>Jaguar</i>, and <i>Super-Etendard</i></li> </ul>

<sup>26</sup> Wilfrid L. Kohl, *French Nuclear Diplomacy*, (Princeton, N.J.: Princeton University Press, 1971), 115; Goldschmidt, *L'aventure atomique*, 145.

<sup>27</sup> Kohl, *French Nuclear Diplomacy*, 115.

<sup>28</sup> Yves Le Baut, “La Genese de l’Arme Nucleaire Francaise et son Evolution,” in *L’Arme Nucleaire et ses Vecteurs: Stratégies, armes et parades* (Colloque d’information sur l’arme nucleaire et ses vecteurs: stratégies, armes et parades, Paris: Le Centre d’Histoire de l’aéronautique et de l’Espace and L’institut d’Histoire des Conflits Contemporains, 1989), 39–43.

		- Launch of a study for a medium-range air to surface missile ( <i>ASMP – l’Air-Sol Moyenne Portée</i> )
Fifth	1984-1988	- Deployment of the nuclear submarine <i>L’Inflexible</i> (1985) - M-4 missiles provided with multiple warheads - 18 Mirage IVs equipped with the ASMP
Sixth	1987-1991	- Continued rehauling and improvement of M-4 missiles and development of the new M-5 missile - Deployment of a new generation of SNLE by 1994 - Mirage 2000 and Super-Etendard equipped with the ASMP - Gradual replacement of the Pluton missile with the Hades missile <sup>29</sup>

France went on to build a triad, i.e., it developed land, air, and sea-based platforms for the delivery of nuclear weapons (see Table 2 for a list of French nuclear forces). The air leg was built first and deployed in 1964 with the Mirage IV aircraft at its core. In August 1971, land-based intermediate range ballistic missiles were deployed at the Plateau d’Albion.<sup>30</sup> And finally, its sea-based nuclear submarine, *Le Redoubtable* became operational in December 1971. The submarine-based *Force Oceanique Strategique* (FOST) eventually became the backbone of the French *Force de Dissuasion* and continues to this day.<sup>31</sup>

<sup>29</sup> It should be noted that while certain technologies were introduced – or rather noted to have been deployed officially – in reality they may not have been effective or indeed operational. For a discussion of this, see, Benoît Pelopidas and Sébastien Philippe, “Unfit for Purpose: Reassessing the Development and Deployment of French Nuclear Weapons (1956–1974),” *Cold War History* 21, no. 3 (2021): 243–60.

<sup>30</sup> Heuser, *NATO, Britain, France, and the FRG*, 104.

<sup>31</sup> Gen. Paul Ély had first conceived of a *capacité de dissuasion* to consist of a strategic air force, missiles, and nuclear submarines in 1957. He also translated the term “strike force” to *Force de Frappe*, which became the most popular term to refer to French nuclear forces. French military circles, however, quickly dropped the *Force de Frappe* term and began to refer to it as the *Force de Dissuasion* (Deterrent Force) to denote a less offense-oriented and more deterrence-oriented objective. The official designation for the forces later became the *Force Nucléaire Stratégique*. See, Kohl, *French Nuclear Diplomacy*, 44–46.

**Table 4.2: French Nuclear Forces<sup>32</sup>**

Air-based Forces	Year Operational
Mirage IV	1964
Jaguar	1973
Mirage 2000	1984
Rafale	2001
Land-based Forces	
Strategic missiles:	
SSBS S-2	1971
SSBS S-3	1980
Tactical missiles:	
Pluton	1974
Hades	1991
Sea-based Forces	
Carrier-based:	
Super-Etendard	1979
Mirage 2000	2000
Rafale	2001
Nuclear Submarine-based:	
MSBS M-1	1971
MSBS M-2	1974
MSBS M-20	1977
MSBS M-4	1985
MSBS M-45	1997
MSBS M-51	2010

### Air Leg of the Triad

In 1956, the *chef d'état major general* (Chief of Defense Staff) General Paul Ély began work on the development of two modes of nuclear delivery: the first involved research work on a long range missile program, and the second was to build the Mirage IV aircraft.<sup>33</sup> First flown in

<sup>32</sup> The Nuclear Submarine based missile forces have been carried in two generations of nuclear submarines, the *Redoubtable* and the *Triomphant* classes. The submarines on the *Redoubtable* class force were: *Le Redoubtable*, *Le Terrible*, *Le Foudroyant*, *L'Indomptable*, *Le Tonnant*, and *L'Inflexible*; and the next generation of nuclear *Triomphant*-class SSBNs were: *Le Triomphant*, *Le Téméraire*, *Le Vigilant*, *Le Terrible*.

<sup>33</sup> Kohl, *French Nuclear Diplomacy*, 46.

1959, the Mirage IV was originally considered for tactical nuclear delivery and a stop-gap measure till France could deploy nuclear missiles.<sup>34</sup> However, later in the Fifth Republic, it was decided to use the Mirage IV for long range strategic missions.<sup>35</sup> With a range of 2500 km the aircraft required in-flight fueling (extending the range to 4800 km) for long-range strategic missions to the Soviet Union.<sup>36</sup> In 1963, the United States agreed to sell France twelve KC-135 aerial refueling tanker aircraft, without which the Mirage IV would not be able to reach Moscow, i.e., without which the French nuclear force at the time would not have a strategic nuclear role at all.<sup>37</sup>

In addition to its limited range, the Mirage IV was not seen as an effective means of nuclear delivery for two other reasons. It was seen as extremely vulnerable to a surprise attack while on the ground and its ability to penetrate and survive Soviet air-defenses was uncertain.<sup>38</sup> Between 1964 and 1971, France had to disperse the small fleet of 36 Mirage IVA aircraft across nine different airfields to ensure survival from potential Soviet preemptive strikes on them.<sup>39</sup>

In fact, the air leg, and particularly the Mirage IV was so weak that it was termed a “military lemon of the highest order” in 1963.<sup>40</sup> By 1967, the French ambassador to the United States, Charles Lucet, noted to the French External Affairs Minister, Maurice Couve de Murville, that it was perhaps only with the introduction of the Nike-X anti-ballistic missile (ABM) system that the ‘powerlessness of the Mirage IV and the British V-bomber force’ could be mitigated.<sup>41</sup>

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<sup>34</sup> Kohl, 46.

<sup>35</sup> Pelopidas and Philippe, “Unfit for Purpose,” 248.

<sup>36</sup> Pierre Messmer, “Notre Politique Militaire,” *de la Revue de Défense Nationale*, May 1963, in Fonds Alain Peyrefitte (1935-2001), Reference Code 20110333/13, Archives Nationales, Pierrefitte-sur-Seine, France.

<sup>37</sup> Heuser, *NATO, Britain, France, and the FRG*, 95.

<sup>38</sup> Kohl, *French Nuclear Diplomacy*, 182.

<sup>39</sup> Goldstein, *Deterrence and Security in the 21st Century*, 205.

<sup>40</sup> Joseph Alsop, “The French Mystery,” *The New York Herald Tribune*, 18 January 1963, in Fonds Alain Peyrefitte (1935-2001), Reference Code 20110333/13, Archives Nationales, Pierrefitte-sur-Seine, France.

<sup>41</sup> Lucet to Couve de Murville, “Stratégie américaine: de la défense anti-missile aux ogives multiple,” 12 October 1967, 91QO/643, Etats-Unis, Direction D’Amérique, No. 9-6-2, Questions Atomiques et Spatiales, 1964-1967, Centre des Archives Diplomatiques de la France, La Courneuve, France.



He added that perhaps a more balanced equilibrium between the forces of the Soviet Union and Western Europe could be attained in the future once submarine-launched ballistic missiles were deployed by France.<sup>42</sup>

### Land-based leg of the Triad

French interest in developing a strategic missile capability dates to 1946, when the French Army initiated a ballistic missile research program that culminated in the development of the liquid-fueled *Veronique* rocket in 1954.<sup>43</sup> There was considerable German assistance to the project; for example, German-based liquid propellant technology was used to launch the French IRBM test program.<sup>44</sup> Different aspects of this technology were being sought from abroad, the decision to set up this land-based strategic force based at the Plateau d'Albion was taken in 1959.

France aimed to deploy the land-based ballistic missile forces, the SSBS (Sol-Sol Balistique Strategique), with a range of 3500 km and carrying a thermonuclear warhead by 1968.<sup>45</sup> While this objective was not met in 1968, by August 1971 the French were able to deploy their first set of nine SSBS S-2 missiles – with a modified range of 3000 km and 150 kiloton warheads – at the Plateau d'Albion.<sup>46</sup> The S-2 missiles were succeeded by the S-3D missile system, which was deployed in 1984.<sup>47</sup> The French IRBM program was an expensive one and in 1996, with the Cold War over, France decided to give up this leg of its nuclear forces.<sup>48</sup>

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<sup>42</sup> Ibid.

<sup>43</sup> Judith H Young, *The French Strategic Missile Programme*, Adelphi Papers 38 (London: Institute for Strategic Studies, 1967), 2.

<sup>44</sup> Young, 8.

<sup>45</sup> Georges Mercier, “La Mise en Place et le Developpement de la 2ème Generation des Forces Nucleaires Strategiques,” in *L'Arme Nucleaire et ses Vecteurs: Stratégies, armes et parades* (Colloque d'information sur l'arme nucleaire et ses vecteurs: stratégies, armes et parades, Paris: Le Centre d'Histoire de l'aéronautique et de l'Espace and L'institut d'Histoire des Conflits Contemporains, 1989), 195.

<sup>46</sup> Mercier, 200.

<sup>47</sup> Mercier, 203.

<sup>48</sup> Goldstein, *Deterrence and Security in the 21st Century*, 208.

### Sea-based Leg of the Triad

Finally, the sea-leg of French nuclear forces (FNS) – the *Force Océanique Stratégique* (FOST) – was (and continues to be) the most important component of the French nuclear forces.<sup>49</sup> It consisted of two parts, the nuclear-powered submarines (SNLE) and the MSBS (Mer-Sol Balistique Stratégique) missiles that they would carry.<sup>50</sup> The French faced two main challenges on this front. The first was the development of the nuclear-powered submarine itself. France did not possess the highly enriched uranium required to build a nuclear submarine reactor and its efforts at making a reactor using natural uranium had failed. This was fixed with help from the United States (discussed in the next section).

The second challenge that French scientists faced in developing the sea-leg concerned the ‘marriage’ of the submarine with the MSBS missiles. Firing sixteen missiles from a submerged SNLE would lead to the loss of 560 tons (35 tons x 16 missiles) that would destabilize the submarine.<sup>51</sup> The SSBS and the MSBS were designed in parallel, with common thrusters that were developed by SEREB as a part of the space launch vehicles leading to the *Diamant* (and eventually *Ariane*).<sup>52</sup> The land-based and sea-based missile development in France occurred in tandem right through the 1960s, and in 1971, the SNLE *Redoutable* conducted its first patrol with sixteen M-1 MSBS.<sup>53</sup> By 1980 France had deployed five SNLEs, with three boats on continuous patrol.<sup>54</sup>

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<sup>49</sup> Jacques J. de Cordemoy, “Les Vecteurs Mer Sol Balistiques Stratégiques,” in *L’Arme Nucleaire et ses Vecteurs: Stratégies, armes et parades* (Colloque d’information sur l’arme nucléaire et ses vecteurs: stratégies, armes et parades, Paris: Le Centre d’Histoire de l’aéronautique et de l’Espace and L’institut d’Histoire des Conflits Contemporains, 1989), 239; Hans M. Kristensen and Matt Korda, “French Nuclear Forces, 2019,” *Bulletin of the Atomic Scientists* 75, no. 1 (January 2, 2019): 51–55.

<sup>50</sup> Gabrielle Hecht notes that the creation of the military division in the CEA in 1956 was overtly with the aim of building a nuclear submarine, though bomb design was investigated by the division as well. See, Hecht, *The Radiance of France*, 77.

<sup>51</sup> de Cordemoy, “Les Vecteurs Mer Sol Balistiques Stratégiques,” 241.

<sup>52</sup> de Cordemoy, 245.

<sup>53</sup> de Cordemoy, 239.

<sup>54</sup> Goldstein, *Deterrence and Security in the 21st Century*, 208.

*International Drivers of the French Means of Nuclear Delivery*

France developed its means of nuclear delivery with considerable international assistance. By 1958, the French had approached the United States for help with its nuclear submarine.<sup>55</sup> This request for help eventually led to United States supplying 440 kilograms of highly enriched uranium (U235) to France under an agreement between the two countries on the use of atomic energy for mutual defense.<sup>56</sup> The only condition attached to this help for the French nuclear submarine was that the enriched uranium could only be used in a land-based installation.<sup>57</sup> As a result, the first naval propulsion reactor made by France was the *Prototype à Terre* (PAT), a land-based nuclear propulsion reactor that was central to France's ability to build nuclear submarines.<sup>58</sup> The episode of the *PAT* reactor demonstrates that while France adhered to the written legal stipulation for the use of the uranium that it was given by the United States, it was able to use it to further its ability to make a means of nuclear delivery. This would be a little teaser for the extensive use of ambiguous legal stipulations and the Zone of Ambiguity in the following decades.

France also collaborated with the United Kingdom to develop other technologies that contributed to its nuclear forces. For example, the nuclear-capable Jaguar aircraft, which was introduced in a tactical nuclear role in both France and the U.K. in the early 1970s, was jointly

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<sup>55</sup> Telegram from Ambassade de France, Washington, DC to Ministère des Affaires Étrangères, 13 September 1958, 91QO/467, Etats-Unis, Direction D'Amérique, No. 9-6-2, Questions Atomiques, Sept 1958-Sept 1959, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>56</sup> "Accord de cooperation entre le Gouvernement des Etats-Unis d'Amerique et le Gouvernement de la République française pour l'emploi de l'énergies atomique a des fins de défense mutuelle," 8 May 1959, 91QO/467, Etats-Unis, Direction D'Amérique, No. 9-6-2, Questions Atomiques, Sept 1958-Sept 1959, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>57</sup> Andre Gempp, "La Mise en Place et le Developpement des Sous-marins Nucleaires Lanceurs d'Engins," in *L'Arme Nucleaire et ses Vecteurs: Stratégies, armes et parades* (Colloque d'information sur l'arme nucleaire et ses vecteurs: stratégies, armes et parades, Paris: Le Centre d'Histoire de l'aéronautique et de l'Espace and L'institut d'Histoire des Conflits Contemporains, 1989), 228; Alain Tournyol du Clos, "France's Choice for Naval Nuclear Propulsion: Why Low-Enriched Uranium Was Chosen," Special Report (Federation of American Scientists, 2016), 2, <https://fas.org/wp-content/uploads/2016/12/Frances-Choice-for-Naval-Nuclear-Propulsion.pdf>.

<sup>58</sup> Gempp, "La Mise en Place et le Developpement des Sous-marins Nucleaires Lanceurs d'Engins," 229.

developed by the two states.<sup>59</sup> The United Kingdom also supplied nuclear submarine reactor parts to France, despite American misgivings.<sup>60</sup> While there was cooperation between the United Kingdom and France on missile technology, these were not related to nuclear warhead delivery (the United Kingdom's expertise in missile technology was also suspect at the time given its heavy reliance on the United States for its own strategic missile systems).

### **American Reluctance to Help the French Missile Program**

The story of the United States aid to the French nuclear force development is one of initial reluctance [till the early-1960s] followed by eventual covert cooperation. The initial reluctance of the United States to supply nuclear weapons and delivery systems to France in the late-1950s and early-1960s was rooted in the laws of non-proliferation at the time as well as geopolitics.

In 1957, France had approached the United Kingdom and Germany for assistance in its nuclear weapons program.<sup>61</sup> French Defense Minister Bourges-Manoury had approached British Foreign Secretary Selwyn Lloyd with the request, and the latter assessed that without assistance from the United States, or the United Kingdom, it would take the French five years to develop a weapons program. The United States Secretary of State, Dulles stated clearly that the United States would not assist the French nuclear program and any U.S. uranium that was supplied to France would only be used for peaceful purposes.<sup>62</sup> The French had also asked the United States for military cooperation in the nuclear submarine field, which, as American officials noted, was

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<sup>59</sup> "Le Jaguar: Avion Bimoteur d'Ecole de combat et d'appui tactique," 10 October 1966, Fonds Joël Le Theule (1950-1980), Reference Code: 571AP/23, Archives Nationales, Pierrefitte-sur-Seine, France.

<sup>60</sup> A.D.F. Pemberton-Pigott, "Supply of Nuclear Submarine Parts to France," 14 September 1962, FO 371/163339, The National Archives, Kew Gardens, UK.

<sup>61</sup> United States Delegation to the Bermuda Meeting, "Atomic Energy Items: (1). French Request (2) Test Limitation", 23 March 1957, National Archives, Record Group 59, Records of the Department of State, Executive Secretariat Conference Files, 1949-72, box 127, CF 861 Bermuda 1957 Memcons. Obtained and contributed by William Burr and included in NPIHP Research Update #2 (hereafter, "Burr/NPIHP").

<sup>62</sup> Ibid.

prevented by U.S. statutory law.<sup>63</sup> However, Secretary Dulles advocated a joint U.K.-U.S. policy of “dragging of feet” with assistance to the French program instead of direct opposition to avoid arousing nationalistic emotions that could speed up the French nuclear program instead.<sup>64</sup>

France sought to develop solid-fueled IRBMs with assistance from the United States in the late-1950s.<sup>65</sup> In particular, it was interested in the licensed-production of American *Polaris* or *Minuteman* missiles to be able to skip the generation of liquid-fueled ballistic missiles that it was developing. France also wished to purchase the guidance system of the *Polaris* missile.<sup>66</sup> This would allow it to attain a level of technological parity with the missiles being produced by the United States.<sup>67</sup> However, there were divisions in Washington on whether France should be helped, with one side advocating giving help France with modern ballistic missile technology and another, more concerned with NATO and non-proliferation, advocating against it.<sup>68</sup>

In 1959, the Société d'études et de recherches sur les engins balistiques (SEREB) was established to coordinate work on the French ballistic missile program, particularly the “...development of launch vehicles for military and space research applications.”<sup>69</sup> The SEREB even signed preliminary agreements with both the Boeing Aircraft Company and the United States government to collaborate on missile launch vehicles and inertial guidance systems.<sup>70</sup> The agreements had to be abandoned a few months later when the United States’ State Department refused permission for the cooperation to take place.<sup>71</sup>

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<sup>63</sup> Ibid.

<sup>64</sup> Ibid.

<sup>65</sup> Young, *The French Strategic Missile Programme*, 3.

<sup>66</sup> John Newhouse, *De Gaulle and the Anglo-Saxons* (New York: The Viking Press, 1970), 24.

<sup>67</sup> Young, *The French Strategic Missile Programme*, 3.

<sup>68</sup> Newhouse, *De Gaulle and the Anglo-Saxons*, 24.

<sup>69</sup> Kohl, *French Nuclear Diplomacy*, 102.

<sup>70</sup> Kohl, 102.

<sup>71</sup> Kohl, 102.

By August 1960, French Chief of Army Staff, General Andre Beaufre had indicated to United States Secretary of Defense Gates that France would offer full cooperation to NATO (including offering its missiles to NATO) if the United States supplied it with some Polaris missiles without warheads.<sup>72</sup> Secretary Gates noted that United States law allowed the Department of State and Defense to conduct 'nuclear sharing' with the France "...by making a finding that the French had made substantial progress..." thus precluding the need for new legislation on the matter.<sup>73</sup> This was the sentiment that would eventually become the basis for U.S.-French missile cooperation a decade later.

Following the 1962 Nassau agreement between the United States and the United Kingdom, the United States offered its Polaris missiles to France as well. President de Gaulle, however, refused. Even though the terms were similar, President de Gaulle turned down the offer because he thought that it was a plot to deny French nuclear independence and tie it to NATO.<sup>74</sup> As was the case earlier, without a commitment to a NATO multilateral force, the United States would not share the Polaris. As a consequence of its refusal of the Polaris missiles, it seemed that France would now have to build its *Force de Frappe* indigenously.

After the rejection of the Polaris offer by President de Gaulle, the United States considered another nuclear offer to France. In a memorandum to President Kennedy, Undersecretary of State, George Ball stated that nuclear aid could help induce the French to sign the Test Ban Treaty as well as help "...restore France as an effective member of the Western Alliance."<sup>75</sup> Ball

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<sup>72</sup> "Memorandum of Conversation, 'Nuclear Sharing'," August 24, 1960, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Records of the Department of State, Records of Policy Planning Staff, 1957-1961, box 116, Atomic Energy – Armaments 1960. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110064>.

<sup>73</sup> Ibid.

<sup>74</sup> Heuser, *NATO, Britain, France, and the FRG*, 95.

<sup>75</sup> "Memorandum from Under Secretary of State George W. Ball to President Kennedy, 'A Further Nuclear Offer to General De Gaulle'," August 08, 1963, History and Public Policy Program Digital Archive, National Archives, Record

underscored that merely providing France with information and physical assistance in underground testing would not be enough; the United States would have to help France to develop its means of nuclear delivery.<sup>76</sup> Particularly, the transfer of technology would have to include information required to operationalize the Mirage IV aircraft and submarine-based missiles for nuclear delivery.<sup>77</sup> The problem, however, was that President de Gaulle would not accept any assistance that had political conditions tied to it, especially if they limited France's right to use these weapons. This position was deeply tied to de Gaulle's consideration of the *Force de Frappe* as "...an expression of French sovereignty and as securing France's claim to great power role."<sup>78</sup> For the United States, however, the offer of this kind of nuclear help without any political conditions could backfire, and Ball noted that it could create "... bitterness in the other nations of the Alliance. It would boost De Gaulle's stock while deflating our own. It would undercut the 'good Europeans' who over the years have been our best friends."<sup>79</sup>

Eventually, it was only during the Nixon presidency, and after France had conducted its first thermonuclear test, that France's nuclear cooperation with the United States really began.<sup>80</sup> According to some historians, this cooperation did not go beyond "negative guidance" because the primary objective of the United States was to ensure that French weapons were safe and would not need to be used too early in case of a crisis.<sup>81</sup>

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Group 59, Records of Undersecretary of State George Ball, box 21, France. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110245>.

<sup>76</sup> Ibid.

<sup>77</sup> Ibid.

<sup>78</sup> Ibid.

<sup>79</sup> Ibid.

<sup>80</sup> Georges-Henri Soutou, "La France et la non-prolifération nucléaire: Une histoire complexe," *Revue historique des armées*, no. 262 (March 15, 2011): 2.

<sup>81</sup> Soutou, 5.

## Missile Help and Guidance to France

The United States ultimately gave the French considerable help in building their ballistic missiles, which were used in both the land and sea-based legs of the *Force de Frappe*. This aid went beyond just ‘negative guidance’ even though that was an important part of circumventing the laws and agreements related to non-proliferation. The assistance, direct and indirect, included (among other things) missile and warhead design, guidance and propulsion systems, operation of ballistic missile submarines, re-entry vehicle hardening technology and MRV (Multiple Reentry Vehicles), and the chemistry of solid fuels for rocket engines.<sup>82</sup>

The United States’ Department of Defense, following the initial French request for missile help in 1970, concluded that,

...the French seem determined to have their own ballistic missile capability, both land based and submarine based, and apparently are well on their way to achievement of their objectives...plans for a land-based IRBM force of three squadrons of nine missiles each, and a sea-based force of four, or possibly five, submarines, each carrying 16 missiles [are reported].<sup>83</sup>

The report, however, also noted that the French had encountered considerable difficulty in developing some of this technology, and had approached scientists in the Department of Defense (DoD), and their Air Force and Navy contacts to request assistance that included information on the Minuteman ICBM and some of its component parts to solve some of their land-based ICBM development problems; information on submarine launching tubes, inertial platforms in submarines and missiles, and accurate navigation and fire control systems.<sup>84</sup>

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<sup>82</sup> Ullman, “The Covert French Connection.”

<sup>83</sup> "Deputy Secretary of Defense Packard to Kissinger, enclosing 'US/French Interchange in Area of Ballistic Missiles'," February 20, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France Vol. V Feb '70-Apr '70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110253>.

<sup>84</sup> Ibid.



In 1971, President Nixon agreed to provide technical assistance to the French ballistic missile program. This led to the agreement between John Foster Jr., Director of Defense Research and Engineering (as the senior United States representative), and the French Ministerial Delegate for Armament, Jean Blancard (as the senior French representative).<sup>85</sup> The areas of cooperation that the two states would explore were: missile reliability, quality control, missile propulsion, and missile testing.<sup>86</sup>

After the first U.S. delegation visited France, it reported that the French were not requesting help with the development of new missiles systems from scratch, but instead were seeking help to solve a number of issues that would lower the cost and time required for the ballistic missile program to succeed.<sup>87</sup> The problem areas that the French required help from the United States on included, "...propulsion...stress corrosion of nitrogen tanks used in thrust vector control systems, gas bearing gyro life, electrical connectors, hydraulic accumulators, missile pyrotechnic safety measures aboard submarines, and simulation techniques for use in RV (re-entry vehicle) hardening programs."<sup>88</sup>

As French Defense Minister, Robert Galley made clear to the United States, the issue of re-entry vehicles was an important one and though France was struggling with the technology, it wished for help from the United States, and not the United Kingdom.<sup>89</sup> As Galley put it, "We

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<sup>85</sup> This understanding came to be called the Foster-Blancard agreement and was the primary bilateral arrangement governing the cooperation in ballistic missiles between the United States and France in this period.

<sup>86</sup> "Letter from Henry A. Kissinger to John S. Foster Jr., Memos and Letters on Offers to French of Military Cooperation," April 27, 1971, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Institutional Files (NSCIF), box 222, NSDM 103 [2 of 2]. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112250>.

<sup>87</sup> "Letter from Melvin R. Laird to Henry A. Kissinger, 'Summary of Agreement for US Assistance to French Missile Program'," July 29, 1971, History and Public Policy Program Digital Archive, FOIA Release. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112255>.

<sup>88</sup> Ibid.

<sup>89</sup> "Memorandum of Conversation with Robert Galley, July 27, 1973," July 27, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges (2 of 2). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113223>.

(France) are technologically able and at a higher level compared to the technology of Britain. We cannot discuss the problem of reentry with the British...They have no idea of the technology of reentry. We prefer to discuss it with you because you make sense.”<sup>90</sup> An example of geopolitical competition in Europe between the French and the British.

Apart from the help on the reliability and control systems of ICBMs, France also requested help on solid propellant rocket motors and how to fabricate them, including information on “bonding, igniters, and propellant characteristics.”<sup>91</sup> Furthermore, the French also indicated that they wished to improve the accuracy of their SLBMs using star tracker guidance and inertial navigation.<sup>92</sup> In this context, the French clarified that their objective was to develop a “...capability for city attack only, not silo.”<sup>93</sup> It was noted on the American side that such guidance technology was *not necessary* for city attack-related accuracy. The claim was indeed a curious one, especially given that that French strategic forces through the Cold War were aimed at city-destroying within the fold of an ‘asymmetric escalation’ nuclear posture.<sup>94</sup>

In July 1972, the French Defense Minister, Michel Debré visited the United States with a wish list of the strategic technology that they wished to obtain. The list added to the agreed upon areas of cooperation in the 1971 Foster-Blancard agreement to include (among other things), full design and production information on the next generation of strategic missiles; maximum possible information on the miniaturization of front end components – i.e., the arming and fuzing systems, the physics package of the nuclear warhead; assistance on training crews for, and the operation of nuclear ballistic missile submarines; and an assessment of fitting Poseidon missiles and warheads

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<sup>90</sup> Ibid.

<sup>91</sup> "Memorandum from Melvin R. Laird to Henry A. Kissinger, 'Assistance to the French Ballistic Missile Program'," July 14, 1970, History and Public Policy Program Digital Archive, FOIA Release. Bur/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113689>.

<sup>92</sup> Ibid.

<sup>93</sup> Ibid. [Emphasis in original]

<sup>94</sup> Narang, *Nuclear Strategy in the Modern Era*, 157.

into French missile submarines with a view towards the possible purchase of the system.<sup>95</sup> This was a comprehensive and sensitive list that went beyond the remit of the presidential guidelines in place at that moment, and perhaps even beyond the strategic nuclear technology that the British had been given.<sup>96</sup>

The areas of strategic cooperation on nuclear delivery systems between the United States and France continued to expand in the early 1970s, and in 1973, the French requested additional help in the field of hardening missile re-entry vehicles, penetration aids, and asked again for access to the design of Poseidon SLBMs to ensure that their next nuclear submarine could be made compatible with it.<sup>97</sup> In a conversation about this strategic assistance between the French Defense Minister, Robert Galley and Henry Kissinger, the latter stated,

We are talking about American assistance to French technology and science in missile and warhead design, and at some point in guidance systems. This can be achieved in a number of ways. You could therefore give information and guidance on the wrong and right road. ...It doesn't make sense for an ally to spend large resources on something our enemy already has.<sup>98</sup>

As Galley stated to Kissinger and Schlesinger, the French were now specifically asking for help with missile technology, and not warheads. Specifically, the French request was for Multiple Independently Targetable Re-entry Vehicle (MIRV) technology on missiles.<sup>99</sup> While Kissinger's

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<sup>95</sup> "Memorandum from Ronald I Spiers to John N. Irwin II, 'Military Cooperation with France: Outcome of the Debré Visit'," August 28, 1972, History and Public Policy Program Digital Archive, National Archive, Record Group 59, Numeric-Subject Files, 1970-73 Top Secret Files, box 25, POL 7 FR. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112408>.

<sup>96</sup> Ibid.

<sup>97</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Missile Assistance to France -- New NSSM'," February 03, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Institutional Files (NSCIF), box 222, NSDM 103 (2 of 2). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112425>.

<sup>98</sup> "Memorandum of Conversation with Robert Galley, July 27, 1973," July 27, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges (2 of 2). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113223>.

<sup>99</sup> Ibid.

statement about saving allies large expenses on technology that had already been mastered suggests that United States sought to help France as an ally in the fight against the Soviet Union.

In the list of additional requested help sent over by France to the United States in 1973 (as was agreed upon by Galley and Kissinger), the French requested advice on the "...overall conception and particular design of the payload of the improved missile SSBS S3...Providing informations (sic) required to develop in France the devices and equipments (sic) useful for multiple reentry vehicle."<sup>100</sup> Additionally, France had also requested the transfer of technology for multiple warhead development, as well as technology for improving the performance and aging of solid propellants for French missiles.<sup>101</sup>

While there was concern in the U. S. government about the wide-ranging nature of the technical assistance being given to the French, the United States, nevertheless, went along with it. As John Foster, Director of Defense Research and Engineering wrote to the Secretary of Defense,

There appears to me a real possibility that France will be "trapped by technologists" – that enchantment with new technology, possibly coupled with a "keeping up with the Joneses" attitude, could lead to development and deployment of systems which do not respond to the fundamental realities of their situation. A case in point is MIRV...It is not at all clear that this is the optimum, or even appropriate, move.<sup>102</sup>

Despite these reservations, Foster noted that "...generally speaking, it seems in our interest, and also in consonance with our national policy, to make the French strategic systems as credible as

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<sup>100</sup> "Scowcroft to Kissinger on the Meeting with Galley," August 30, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges (1973-1974) (1 of 2). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113230>.

<sup>101</sup> Ibid.

<sup>102</sup> Foster to Secretary of Defense, "Ballistic Missile Cooperation with France," 21 May 1973, in "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Nuclear Cooperation with France -- Gallery-Schlesinger Meeting September 25, 1973'," September 24, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Files (NSCF), box 960, France Vol XI April 73-31 December 1973. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113238>.

possible..."<sup>103</sup> It was in the interest of attempting to make the French means of nuclear delivery credible that transfer of technology continued and expanded through the mid-1970s.

In 1974, the French administration changed with President Pompidou's death and Giscard d'Estaing's coming to power. This led to some uncertainty on in the burgeoning Franco-American ballistic missile cooperation. However, the Americans concluded that even if Giscard was not as keen as the previous administration on these military exchanges, for political reasons he would have to go along with them.<sup>104</sup> Indeed the exchange continued and by September 1974, the French told their U.S. counterparts that American help had saved them "two years and 60 kilograms weight" in the ballistic missile reentry vehicle alone.<sup>105</sup> As the Americans noted, this capability meant that the French would have an added payload capability on their ballistic missiles as well as approximately 200 miles of added range.<sup>106</sup>

Cooperation with France on their ballistic missiles continued from the Nixon to the Ford administration. In June 1975, President Ford authorized the extension of the missile assistance program to cover the next generation of French missiles, particularly the M-4 SLBM.<sup>107</sup> In the authorization, Ford stated,

Areas in which assistance may be provided include basic missile design, guidance, propellants, reliability, flight testing, and RV and missile hardening to nuclear effects. Assistance in MRV system may also be provided on the condition that such assistance not provide information applicable to French development of MIRV capability. Assistance on MRV systems should therefore be restricted to multiple

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<sup>103</sup> Ibid.

<sup>104</sup> "Memorandum from Helmut Sonnenfeldt to Henry Kissinger, 'US-French Military Cooperation'," July 04, 1974, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Records of Henry Kissinger, box 5, Nodis Memcons 1974 folder 5. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110634>.

<sup>105</sup> "Memorandum from John B. Walsh to the Secretary of Defense, 'Ballistic Missile and Nuclear Safety Program'," December 06, 1974, History and Public Policy Program Digital Archive, Nixon Presidential Library, Henry A. Kissinger Office Files (HAKO), box 56, French Exchanges [1973-1974] [1 of 2]. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112422>.

<sup>106</sup> Ibid.

<sup>107</sup> "President Ford to Secretary of Defense, 'Missile Cooperation with France'," June 23, 1975, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Office of the Counselor (Helmut Sonnenfeldt), 1955-77, box 14. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112424>.

RV release mechanisms and other information necessary to develop an MRV in which each RV presents a separate aim point to the existing Soviet ABM system.<sup>108</sup>

It is clear here that the main aim for the United States with this transfer was to counter advancing Soviet Anti-Ballistic Missile (ABM) capability by creating an additional threat to it beyond the systems directly under NATO's control.

The impressive array of technology transferred by the United States to help France build its means of nuclear delivery involved navigating the non-proliferation regime. The non-proliferation laws that had to be managed in this case came from US domestic law, bilateral arrangements, as well as international treaties (like the NPT). The following section will analyze how each of these factors shaped the Zone of Ambiguity in the non-proliferation regime which enabled the proliferation of these means of nuclear delivery.

### **The Zone of Ambiguity: Laws and Agreements Enabling Transfer of Technology**

A number of laws and agreements which could potentially have constrained the proliferation of nuclear missile technology from the United States to France had to be managed in order for the transfers to take place. In this section I discuss how domestic law, bilateral arrangements, and international treaties were either changed, managed, or circumvented in the process of the transfer of ballistic missile technology to France. I find that the Zone of Ambiguity and its constituent elements – ambiguous definition, multipurpose technologies, and normative and legal ambiguity – all feature in the story at different points in time.

In March 1962, the United States had decided that it would not discuss "...provision of missiles, missile components or missile technology which would be helpful to the French in developing a nuclear delivery missile capability even if the missiles, missile components and

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<sup>108</sup> Ibid.

missile technology were ostensibly being sought for non-nuclear purposes.”<sup>109</sup> The United States was cognizant of the multipurpose nature of the technology and its potential acquisition as a conventional weapons system, only to be used later as a means of nuclear delivery.

Continuing with the same policy, in 1964 United States National Security Advisor, McGeorge Bundy, in National Security Action Memorandum (NSAM) 294, titled “U.S. Nuclear and Strategic Delivery System Assistance to France,” stated that,

...it continues to be in this government’s interest not to contribute to or assist in the development of a French nuclear warhead capability or a French national strategic nuclear delivery capacity. This includes exchanges of information and technology between the governments, sale of equipment, joint research and development activities, and exchanges between industrial and commercial organizations, either directly or through third parties, which would be reasonably likely to facilitate these efforts by significantly affecting timing, quality or costs or would identify the U.S. as a major supplier or collaborator...the President has directed that effective controls be established immediately to assure that, to the extent feasible, the assistance referred to above is not extended either intentionally or unintentionally.

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NSAM 294 was a comprehensive government policy prohibiting all potential direct and indirect transfer of technology associated with the means of nuclear delivery. The directive, however, allowed cooperation in non-strategic programs and activities, and this would be the basis of Franco-American relations until there was change in both French and United States administrations with Presidents Pompidou and Nixon coming to power in 1969.

In contrast to President Lyndon Johnson’s administration, Richard Nixon’s administration did not wish to let “NATO theology” stand in the way of possible military cooperation with France.

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<sup>109</sup> "Memorandum of Telephone Message from Foy D. Kohler to Paul H. Nitze and Roswell L. Gilpatric," March 09, 1962, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Bureau of European Affairs NATO and Atlantic Politico-Military Affairs, Records Relating to NATO, 1959-1966, box 7, Def 12 Nuclear France 1962. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110243>

<sup>110</sup> "National Security Action Memorandum, NSAM 294, McGeorge Bundy to Secretary of State, 'US Nuclear and Strategic Delivery System Assistance to France'," April 20, 1964, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France vol. V 01 Feb 70-Apr 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110246>.

National Security Advisor, Henry Kissinger, in June 1969 stated that Nixon would not consider the McMahon Act to be a “serious impediment.”<sup>111</sup> France, meanwhile, became more open with the United States on ballistic missile development after President Georges Pompidou came to power, and this manifested itself in reciprocal visits of military officers to missile test facilities.<sup>112</sup> Consequently, in December 1969, the French Minister for Armaments, Blancard reached out to the United States for help on re-entry vehicles for ballistic missiles; star-tracking navigation equipment and technology to improve the accuracy of their missiles, especially for counterforce application; and support for the development and early production of boosters for missiles.<sup>113</sup>

The response to the French request by Deputy Secretary of Defense, David Packard, at the time, was a firm negative. He stated, “...the subject matter related to nuclear weapon development and strategic delivery capabilities must for the time being be excluded from cooperative R&D endeavors with the French. Technical materials on ballistic missile development...and on other strategic delivery systems should not be provided to the French and are not appropriate for discussion at this time.”<sup>114</sup> His statement was in line with the NSAM 294 directive of 1964, which had stated that it was the United States’ policy to “...oppose the development of nuclear forces by additional states, other than those whose forces would be assigned as a part of a NATO nuclear

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<sup>111</sup> "Memorandum of Conversation between Ambassador Shriver and the National Security Council, 'Conversation with Shriver on Pompidou Visit, Military Cooperation with France, and Middle East'," June 27, 1969, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 675, France Vol. III. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110249>

<sup>112</sup> Foster to Secretary of Defense, “Cooperation with the French”, 16 December 1969, in "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Memo from Deputy Assistant Secretary of Defense on Assistance to France on Ballistic Missiles'," January 23, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), Box 676, France Vol. IV 11/69-31 Jan 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110252>.

<sup>113</sup> Ibid.

<sup>114</sup> Deputy Secretary of Defense to the Director of Defense Research and Engineering, “French Requests for Ballistic Missile Cooperation,” 31 December 1969, in "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Memo from Deputy Assistant Secretary of Defense on Assistance to France on Ballistic Missiles'," January 23, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), Box 676, France Vol. IV 11/69-31 Jan 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110252>.



force, targeted in accordance with NATO plans and, except when supreme national interest were at stake, used only for the defensive purposes of the Alliance.”<sup>115</sup> However, in practice, the United States under Kissinger and Nixon would move very far away from NSAM 294.

Despite NSAM 294, France already enjoyed relatively unfettered access to advanced technology that could be used for their nuclear program and for building ballistic missiles. The ambiguity of the technology involved meant that even though licensing arrangements with companies like Lockheed and Boeing for the production of components of missiles like the Polaris and Minuteman were refused in the 1960s, France still received commercial help from the United States. For example, advanced computers procured from the U.S. for non-military purposes may have been used for the French nuclear weapons program.<sup>116</sup> Additionally, as the U.S. Department of Defense noted, France (and other states) had “virtually free access” to broader advanced commercial technology which made it unnecessary to “...invent the transistor or develop, ab initio, integrated circuit techniques, etc.”<sup>117</sup>

The United States changed domestic law and presidential directives on non-proliferation to ensure greater transfer of the technology associated with the means of nuclear delivery to France. After President Nixon’s meeting with President Pompidou in February 1970, the U.S. was open to improving military relations with the French. The NSAM 294 was a hurdle in this enterprise and could not be formally rescinded as this could lead to leaks and controversy with Congressional

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<sup>115</sup> "National Security Action Memorandum, NSAM 294, McGeorge Bundy to Secretary of State, 'US Nuclear and Strategic Delivery System Assistance to France'," April 20, 1964, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France vol. V 01 Feb 70-Apr 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110246>.

<sup>116</sup> "Deputy Secretary of Defense Packard to Kissinger, enclosing 'US/French Interchange in Area of Ballistic Missiles'," February 20, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France Vol. V Feb '70-Apr '70. Obtained and contributed by William Burr and included in NPIHP Research Update #2. <https://digitalarchive.wilsoncenter.org/document/110253>.

<sup>117</sup> Ibid.

committees. The nuclear angle complicated the situation, and the White House sought to circumvent the NSAM (and hence Congress) by producing a new Presidential directive on cooperation with France while setting aside the old one.<sup>118</sup> It was also noted by the White House that there were, “...*no legal* (as distinct from NSAM 294) inhibitions against assistance with missile boosters or to the furnishing of computers unrelated to nuclear weapons systems.”<sup>119</sup>

In terms of domestic laws pertaining to non-proliferation, according to the sections 123d and 144c of the United States’ Atomic Energy Act, the United States required an “Agreement of Cooperation” with a state in order to provide nuclear weapons-related assistance.<sup>120</sup> While an Agreement of Cooperation between the United States and France had been signed in 1961, it was invalidated when France left the NATO command structure in 1966. A new one would require establishing that France was making “substantial and material contributions” to the mutual defense and security of both countries.<sup>121</sup> The other legal requirement that needed to be met for nuclear cooperation under the amended Atomic Energy Act of 1954 was to find that France had made “substantial progress in the development of atomic weapons,” a condition that was introduced originally in 1958 to accommodate nuclear cooperation with the United Kingdom.<sup>122</sup> Both of these legal stipulations could be met by the White House removing any domestic legal obstacles in the way of collaborating on nuclear and strategic weapons with France.

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<sup>118</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Military Cooperation with the French'," February 28, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France vol. V 01 Feb 70-Apr 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113681>.

<sup>119</sup> Ibid.

<sup>120</sup> Sonnenfeldt to Kissinger, “Follow-up on Military Matters Discussed by Presidents Nixon and Pompidou,” 26 February 1970, in "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Military Cooperation with the French'," February 28, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France vol. V 01 Feb 70-Apr 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113681>.

<sup>121</sup> Ibid.

<sup>122</sup> Ibid.

In keeping with the removal of bureaucratic and legal obstacles, in March 1973, Kissinger amended the NSDM 103 to formalize the White House authorization of American assistance to France on the sea-based ballistic missiles M-1, M-2, and M-20, as well as the land-based S-2 and S-3 ICBMs.<sup>123</sup> It was also decided that the United States would help France with MIRV technology for the S-3 missile with a view towards deployment by 1980.<sup>124</sup> This was a major shift and meant that design information for the warheads and the missiles could now be exchanged.

The transfer of the means of nuclear delivery faced non-proliferation and arms control challenges that had to be navigated. By 1968, the NPT had been opened for signature, and in 1970 it came into force. Additionally, the Strategic Arms Limitation Talks (SALT) between the United States and the Soviet Union had begun in 1969 and an important issue in these negotiations was the strategic nuclear forces of third-party states like France and the United Kingdom.

Even though the NPT was central to restricting the transfer of nuclear weapons from one state to the other, it did not have any discernable impact on the transfer of the means of nuclear delivery. As the Director of Defense Research and Engineering John S. Foster highlighted to Secretary of Defense Laird, at a technical level these technologies could be shared, but it would require a political decision by the U.S. government and a reconsideration of Franco-American relations, as well as the relationship of such possible transfers to “obligations under the Nuclear Proliferation Treaty” (NPT).<sup>125</sup> While the NPT did not prohibit the transfer of technology

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<sup>123</sup> Memorandum of Conversation with Robert Galley, August 31, 1973," August 31, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges [2 of 2]. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113231>.

<sup>124</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Nuclear Cooperation with France -- Gallery-Schlesinger Meeting September 25, 1973'," September 24, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Files (NSCF), box 960, France Vol XI April 73-31 December 1973. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113238>.

<sup>125</sup> Foster to Secretary of Defense, "Cooperation with the French", 16 December 1969, in "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Memo from Deputy Assistant Secretary of Defense on Assistance to France on Ballistic Missiles'," January 23, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library

associated with the means of nuclear delivery, there was a sense that such a transfer might violate the spirit of the law. In fact, the U.S. State Department, upon being asked to clarify the legality of the talks and exchanges between the United States and France on nuclear safety, missile, and computer fields, made it very clear that it did not consider them to be a violation of the NPT.<sup>126</sup>

Similar to the experience of the United Kingdom discussed in the previous chapter, the SALT negotiations posed a problem for the possible transfer of the means of nuclear delivery to France. Initially, the issue was brought up in the White House in the context of the star tracker navigation and US contractor support. Star tracker material implied counterforce capabilities, and would suggest, "...semi-public support for the French program" leading to "Congressional reaction, as well as international ramification, such as the effect on SALT."<sup>127</sup>

Additionally, the Soviet Union had already raised the issue of limiting strategic arms transfers to third parties in the SALT negotiations that had commenced in 1969. In June 1970, Gerard Smith, head of the United States delegation to the SALT talks wrote to Henry Kissinger stating that the viability of any SALT deal would be jeopardized if the United States were to help France develop its nuclear delivery systems.<sup>128</sup> In an internal White House memo, Helmut Sonnenfeldt (National Security Council) wrote to National Security Advisor Kissinger in August 1970,

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and Museum, National Security Council Files (NSCF), Box 676, France Vol. IV 11/69-31 Jan 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110252>.

<sup>126</sup> "Memorandum from Theodore L Eliot Jr. to Henry A. Kissinger, 'Joint Committee on Atomic Energy Hearings on Projected Nuclear Safety Talks with the French'," November 16, 1971, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 678, France Apr-Dec 1971 Vol VIII. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112259>

<sup>127</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Assistance to the French Ballistic Missile Program'," April 16, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France Vol. V Feb '70-Apr '70 and Vol. VI May-Sep 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113685>.

<sup>128</sup> Letter from Gerard C. Smith to Henry A. Kissinger, "June 30, 1970, History and Public Policy Program Digital Archive, FOIA Release. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113687>.

If the SALT effort is aimed at creating a more stable strategic relationship with the USSR, it is not compatible with a simultaneous effort to create additional nuclear power centers in the West, which could in time become destabilizing (as far as the Soviets are concerned) and perhaps jeopardize the basic SALT understanding...

...it is also true that the French forces, in sheer numbers, even combined with the British, cannot be regarded as very threatening in a world that permits the US and USSR 2,000 missiles and heavy bombers, with freedom to continue most forms of modernization including MIRVs and no restriction on IR/MRBMs. On the other hand, with low or zero ABM levels, the French and British forces could, in time become more significant (as will the Chinese). A MIRVed French force, to take a far out example, would look to the Soviets as rather formidable in the later 1970s (roughly 300 or more thermonuclear warheads).<sup>129</sup>

The memo concluded that the time had come for the Nixon administration to define the “fundamental orientation” of its policy towards helping the French with nuclear delivery systems and there was a need for a Presidential doctrine to that effect.<sup>130</sup>

Shortly after that, the National Security Study Memorandum (NSSM) 100, an interagency policy review of military cooperation with France in 1971, stated that any significant assistance that the United States might give to France on nuclear delivery could “provoke a verbal reaction and an opportunity for Soviet propaganda” but would not be enough to block a potential SALT agreement.<sup>131</sup> The U.S. had already rejected a “restrictive” Soviet proposal to prohibit the transfer of strategic arms (including technical assistance and components) to third countries, laying emphasis on the position that such transfers were allowed so long as they did not lead to circumvention of the commitments made in SALT.<sup>132</sup> The United States’ Arms Control and Disarmament Agency (ACDA), meanwhile, thought that the Soviet reaction would depend on the

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<sup>129</sup> "Memorandum from Helmut Sonnenfeldt to Henry Kissinger, 'Franco-American Military Relations'," August 03, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Files (NSCF), box 676, France Vol. V Feb '70-Apr '70 and Vol. VI May-Sep '70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/111358>.

<sup>130</sup> Ibid.

<sup>131</sup> "Report of the National Security Council Staff, 'NSSM 100 – Military Cooperation with France (Analytical Summary)'," December, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Institutional Files (NSCIF), box 174, NSDM 100 (3 of 3). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113792>.

<sup>132</sup> Ibid.

scope of the assistance that the French were given. Only a major transfer of strategic weapons and related technology would lead to a Soviet call for a “total and explicit ban” on such transfer to third countries.<sup>133</sup> By contrast, the State Department was opposed to assisting the French because of the possibility of difficulty with the SALT talks and the lack of a *quid pro quo* on missile technology.<sup>134</sup> President Nixon eventually decided that the United States would help the French ballistic missile program, but with only those items that would not give France a “...*distinct new capability* in such areas as guidance systems, missile accuracies, or re-entry vehicle hardening.”<sup>135</sup> The “distinct new capability” phase was important and would be redefined and reinterpreted to expand the scope of the missile assistance from the United States to France.

As Kissinger stated to French Defense Minister Robert Galley in 1973, the primary problems with missile technology transfer which he foresaw were bureaucratic resistance within the United States, the U.S. Congress, and the McMahon Act. The latter, Kissinger stated, was an “ambiguous law” that made France eligible for nuclear assistance in the same way that the United Kingdom was.<sup>136</sup>

The Nixon administration had already made clear that they were willing to help France with *existing* delivery systems, but not with the acquisition of new technology to develop the means of nuclear delivery. In fact, this was one of the important stipulations of the bilateral Foster-

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<sup>133</sup> Ibid.

<sup>134</sup> "Memorandum from Henry A. Kissinger to President Nixon, 'Military Cooperation with France'," March 25, 1971, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 677, France vol. VII, 1 Oct 70- Mar 71. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112246>.

<sup>135</sup> "National Security Decision Memorandum 103, 'Military Cooperation with France'," March 29, 1971, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Institutional Files (NSCIF), box 222, NSDM 103 [2 of 2]. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112247>. Emphasis mine.

<sup>136</sup> "Memorandum of Conversation with Robert Galley, July 27, 1973," July 27, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges (2 of 2). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113223>.

Blancard agreement in 1971, as well. However, Galley's response to Kissinger and this American position was simple:

In the Foster-Blancard accord there is one word, "existing" systems. We have just one word to change, "existing" to "in project." Suppose the French consult you on a project existing on paper at the time you give us the paper. It is of no difference to give us the information or to help the French systems in development.<sup>137</sup>

The definition of an existing system was a fluid one for most of the negotiations on ballistic missile help from the United States to France. For example, when – in a secret meeting in August 1973 between French Minister of Armed Forces Galley and Henry Kissinger at the Western White House in San Clemente, California – Jean Blancard, the French Ministerial Delegate for Armaments asked Kissinger and his colleagues about their agreement in 1971 that the exchanges of information between them would only be on "existing systems" (i.e., excluding MRV and MIRV technologies), his American counterpart John Foster clarified that the agreement was "not to be directed at developing the next generation" of missile systems.<sup>138</sup> For Foster and the United States, MRV (Multiple Reentry Vehicles) technology that could carry multiple nuclear warheads and decoys and a single warhead were the same thing, even though that was obviously not the case. Foster stated, "As I understand Dr. Kissinger, MRV and the single warhead are the same system...If you decide you want *MIRV*, we can reconsider it [the Foster-Blancard agreement]."<sup>139</sup> The line between what was simply an improvement to a current system and what was a truly "next generation" system was quite nebulous.<sup>140</sup> Thus, even though the French were cognizant of, and

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<sup>137</sup> Ibid.

<sup>138</sup> "Memorandum of Conversation with Robert Galley, August 31, 1973," August 31, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges [2 of 2]. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113231>.

<sup>139</sup> Ibid. Emphasis mine.

<sup>140</sup> Foster to Secretary of Defense, "Ballistic Missile Cooperation with France," 21 May 1973, in "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Nuclear Cooperation with France -- Gallery-Schlesinger Meeting September 25, 1973'," September 24, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Files (NSCF), box 960, France Vol XI April 73-31 December 1973. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113238>.

attempted to clarify that they were asking for help with a new generation of nuclear delivery systems, the United States sought to utilize the definitional ambiguity surrounding the weapon systems to proliferate the technology. This episode demonstrates the convergence of the three constituent elements of the Zone of Ambiguity: the use, by states, of ambiguous definitions related to multipurpose technologies leading to normative and legal ambiguities (in the non-proliferation regime) to proliferate the means of nuclear delivery.

Beyond the direct help to the development of French nuclear delivery vehicles discussed above, there was another mechanism that enabled the United States to transfer information on developing the means of nuclear delivery to France. This was the negative guidance method that some of the participants in the exchange called “20 Questions.”<sup>141</sup> It involved the transfer of direct and tacit knowledge associated with the development the means of nuclear delivery. The basic premise of the exchange was that the transfer of certain kinds of sensitive technological guidance related to the means of nuclear delivery was prohibited, so the French would explain to their American interlocutors what they were doing, and the latter would say “yes” or “no” and point them in the right direction. When setting up this system, Kissinger stated to French Defense Minister Galley,

...in some cases we may not be able to give you information, but we can critique what you are doing. We can say “that’s the wrong way.” So there are many ways to give you the information. Because we have to be in a domestic situation that we can defend. It can be like a seminar; you can say you have three possibilities and we can tell you, “that’s wrong; that’s complicated,” etc.<sup>142</sup>

This indirect means of knowledge transfer enabled the United States and France to engage in the proliferation of means of nuclear delivery without directly violating any domestic legal, bilateral,

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<sup>141</sup> Ullman, “The Covert French Connection,” 10.

<sup>142</sup> “Memorandum of Conversation with Robert Galley, August 31, 1973,” August 31, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges [2 of 2]. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113231>.



or international legal and normative arrangements related to non-proliferation. It is important to note that this exchange was not just an informal transfer of information amongst scientists, it was a formal mechanism that was agreed upon by the Presidents of both states. It is telling that in August 1975, French President Giscard d'Estaing in a conversation with President Ford and Secretary of State Kissinger, stated, "We are building submarines and MIRVs. If you could tell more to our people negatively, it would greatly help us to move ahead."<sup>143</sup>

### **Geopolitical Interest and the Proliferation of the Means of Nuclear Delivery**

The United States' help to France's nuclear forces had clear geopolitical motives. In fact, geopolitical interest with regard to Europe and the Soviet Union had weighed on the decision to help the French nuclear effort right through the 1960s and 1970s. There were three issues that prevented a military arrangement between France and the United States at the time. The first two were the French insistence that their nuclear forces must remain solely under their control and the French refusal to re-enter NATO (after 1966) or to integrate their forces with those of other states;<sup>144</sup> and the third, as the director of the Arms Control and Disarmament Agency (ACDA) stated, was that helping the French with the means of nuclear delivery would have the geopolitically undesirable effect of hurting American relations with West Germany.<sup>145</sup>

The question of West Germany was an important consideration in giving nuclear weapons delivery capacity to France. The United States was concerned that West Germany could respond

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<sup>143</sup> "Memorandum of Conversation, 'Economic Policy/Cyprus; French Nuclear Programs; Energy'," August 01, 1975, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Office of the Counselor, 1955-77, box 4, France 1975. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112433>.

<sup>144</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'French-US Military Relations'," February 18, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France Vol. V Feb '70-Apr '70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113677>.

<sup>145</sup> Ibid.

to such a transfer by building its own nuclear weapons and this would lead to a proliferation cascade. In particular, as Undersecretary Ball noted to President Kennedy, the United States was worried that once Germany became stronger and more assertive, it would resent an economically weaker France's position of superiority owing to American nuclear partnership.<sup>146</sup>

Furthermore, the French nuclear program undermined the United States' nuclear guarantee in NATO. As President Kennedy noted to Prime Minister Harold MacMillan, potential American help to France could create divisions in NATO leading to West German nuclear aspirations.<sup>147</sup> Even if France agreed to commit its nuclear forces to NATO, or even consult with the latter on the use of French nuclear forces, the possible consequence of West German nuclear aspirations made such a scenario unacceptable to the United States.<sup>148</sup> Kennedy proposed to check French advances in developing nuclear capability by responding to French security concerns by, among other things, guaranteeing the maintenance of nuclear weapons in Europe for the life of NATO Treaty; committing more U.S. and U.K nuclear forces to NATO; and giving France the assurance that the U.S. would consult them about the use of nuclear weapons anywhere in the world.<sup>149</sup>

On the potential proliferation cascade of nuclear weapons and the means of nuclear delivery, the United States noted that sharing nuclear delivery systems with the French would drive China to press the Soviet Union for help, something East Germany would also be very likely to

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<sup>146</sup> Ball went on to state (somewhat dramatically), "...nothing can be more dangerous for the peace of the world than Germany with a grievance and a sense of isolation. The result in the past has been military adventure and two world wars." See: "Memorandum from Under Secretary of State George W. Ball to President Kennedy, 'A Further Nuclear Offer to General De Gaulle'," August 08, 1963, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Records of Undersecretary of State George Ball, box 21, France. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110245>.

<sup>147</sup> "Department of State Cable 5245 to Embassy United Kingdom, Message from President Kennedy to Prime Minister Macmillan," May 08, 1961, History and Public Policy Program Digital Archive, FOIA release. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/111184>.

<sup>148</sup> Ibid.

<sup>149</sup> Ibid.

do.<sup>150</sup> Helping France to build its means of nuclear delivery thus could have important and disadvantageous geopolitical repercussions.

Another reason that the United States was hesitant to share nuclear technology with the French was mistrust and the French reluctance to comply with any policy that appeared to infringe upon their independence.<sup>151</sup> As the United States State Department put it in a memo,

The real reason that we do not share with the French is that we do not trust them—as we do the British. We are fearful they will trigger us into a nuclear war, since they, unlike the British, follow a foreign policy of their own making...when we and the British differ, the British align themselves with us. When we and the French differ, the French go their own way.<sup>152</sup>

The United States was wary of the French independence over its national nuclear force leading to a crisis with the Soviet Union which they would not be able to control. However, by the end of the 1960s, this position would change.

The position of not helping France's nuclear forces owing to the geopolitical concerns of United States and the NATO alliance changed under the Nixon administration. Aiding France's nuclear delivery capacity was now in the geopolitical interest of the United States and NATO. The U.S. State department assessed that France would be building nuclear weapons and the means of delivering them regardless of external assistance and explained,

Any assessment of the military advantages and disadvantages to the U.S. of expanding our strategic assistance to France must begin with the recognition that the French strategic capability is a reality, and that the French have every intention of taking necessary steps to improve its effectiveness and ability to counter Soviet defensive advances...The question is whether it would be in the U.S. interest to help France achieve a more effective force against the Soviets, more rapidly and at

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<sup>150</sup> "Memorandum of Conversation, 'Nuclear Sharing'," August 24, 1960, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Records of the Department of State, Records of Policy Planning Staff, 1957-1961, box 116, Atomic Energy – Armaments 1960. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110064>.

<sup>151</sup> Robert J. Lieber, "The French Nuclear Force: A Strategic and Political Evaluation," *International Affairs (Royal Institute of International Affairs 1944-)* 42, no. 3 (1966): 421.

<sup>152</sup> "Memorandum by Edward Biegel, Bureau of Western European Affairs, 'WE Answers to the Ball Questionnaire'," May 28, 1962, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Bureau of European Affairs. NATO and Atlantic Politico-Military Affairs, Records Relating to NATO, 1959-1966, box 7, Ref 12 Nuclear France 1962. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/110244>.

less cost, and whether the U.S. assistance could help maximize the relevance of French strategic forces to the overall U.S. strategic problem.<sup>153</sup>

France could now become a geopolitical tool in the Cold War competition against the Soviet Union. The report concluded that the French nuclear forces had the greatest deterrent value to France (with regard to the Soviet Union) as a force independent of NATO and the United States, provided the Soviet Union believed that this independence was real.<sup>154</sup> Indeed, the arms race between the Soviet Union and the United States had qualitatively and technologically advanced considerably, and the United States wanted to ensure that France could keep up without its forces becoming obsolete.<sup>155</sup> In explaining their motivations to help France now, the United States said as much to the French. Henry Kissinger (now Secretary of State) told the French Minister of Armed Forces that, contrary to previous administrations, the Nixon administration thought that it was in the interest of the United States and NATO to ensure that the French nuclear force was relevant and effective.<sup>156</sup>

However, despite this stated interest to have an effective French nuclear force aimed at the Soviet Union, the United States was interested in using the help to French nuclear forces as a geopolitical tool to serve its interest in Europe. There were two such interests that the Nixon White House was pursuing. The first was to manage the United Kingdom, and aiding French means of nuclear delivery would help send them a signal. As Kissinger put it in a White House meeting,

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<sup>153</sup> "NSSM 175: Nuclear Defense Policy towards France," in "Sonnenfeldt to Kissinger, 'Supplementary Checklist for Meeting with French Defense Minister'," July 26, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Files (NSCF), France Vol XI April 73-31 December 1973. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/112434>.

<sup>154</sup> Ibid.

<sup>155</sup> James Cameron and Or Rabinowitz, "Eight Lost Years? Nixon, Ford, Kissinger and the Non-Proliferation Regime, 1969–1977," *Journal of Strategic Studies* 40, no. 6 (September 19, 2017): 847.

<sup>156</sup> "Memorandum of Conversation with Robert Galley, July 27, 1973," July 27, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges (2 of 2). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113223>.

“The British are behaving shitty. If they know we have another option, they might buck up...putting Britain and France on the same nuclear basis would get the point across.”<sup>157</sup>

The U.S. would also be able to use the mistrust and competition between the United Kingdom and France to manage their bilateral relations with both better. As Sonnenfeldt wrote to Kissinger, “It is not too early to think about the question of whether we should bring the French up to the British level, or the British down to the French, or both to an intermediate one.”<sup>158</sup>

The competition between these two states in Europe would help serve the second geopolitical interest that the United States had in providing France with the means of nuclear delivery. There was some anxiety in the United States that Europe as a unified entity was a threat to U.S. geopolitical influence in the region. The Nixon White House sought to break up the Europeans and use France as a tool in the process to drive a wedge between the European states.<sup>159</sup> By helping France develop missiles for nuclear delivery, the United States could manipulate a security competition between the different European states. As Kissinger put it in a conversation with Secretary of Defense James Schlesinger,

We want to keep Europe from developing as a bloc against us. If we keep the French hoping they can get ahead of the British, this would accomplish our objective. If we gave the British MIRV while the French were so far behind, it would be bad. If we could give the British the dispensing mechanism and hold open the MIRV for the French a few years, we could keep them even.<sup>160</sup>

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<sup>157</sup> "Memorandum of Conversation, 'French Nuclear Discussion'," August 09, 1973, History and Public Policy Program Digital Archive, Gerald R. Ford Presidential Library, National Security Advisor, Memoranda of Conversation, box 2, 8/9/73 Kissinger Schlesinger. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113224>.

<sup>158</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Interim Report on NSSM 100: US–French Military Relations'," January 09, 1971, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 677, France vol. VII, 1 Oct 70–Mar 71. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113778>.

<sup>159</sup> "Memorandum of Conversation, 'Visit of French Defense Minister Galley; Strategic Programs'," August 17, 1973, History and Public Policy Program Digital Archive, Ford Presidential Library, National Security Adviser, Memoranda of Conversation, box 2, August 17, 1973 Kissinger, Schlesinger, John S. Foster (DOD). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113226>.

<sup>160</sup> "Memorandum of Conversation—Kissinger and Schlesinger," September 05, 1973, History and Public Policy Program Digital Archive, Ford Presidential Library, Gerald R. Ford Papers, National Security Adviser, Memoranda

In a different conversation, Schlesinger suggested to Kissinger that what scared the British was a 'special relationship' between the U.S. and West Germany.<sup>161</sup>

By giving France help in the means of nuclear delivery, the United States would be able to take advantage of the insecurities and mistrust in Europe to advance its own 'Year in Europe' (in 1974) agenda.<sup>162</sup> The United States wanted to make sure that it had control and leverage over France on the issue. To do this, they would first tell the French that they had an urgent overall strategic problem, along with other vulnerabilities in the means of nuclear delivery that needed to be fixed.<sup>163</sup> Laying out this plan, Kissinger stated, "What we want is something which makes Galley drool but doesn't give him anything but something to study for a while. I will brutalize Galley. Is that doable? Lead them on without giving up anything – we want to get a handle on them without knowing it."<sup>164</sup> This was indeed doable, and as Sonnenfeldt put it in a memo, the substantial missile aid that the United States had planned for the French ballistic missile program, especially on items like MIRV and penetration aids, would establish French dependence on the United States, allowing the latter to then control the pace and volume of advice given.<sup>165</sup>

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of Conversation, box 2, September 5, 1973 – Kissinger, Schlesinger. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113232>.

<sup>161</sup> "Memorandum of Conversation, 'French Nuclear Discussion'," August 09, 1973, History and Public Policy Program Digital Archive, Gerald R. Ford Presidential Library, National Security Advisor, Memoranda of Conversation, box 2, 8/9/73 Kissinger Schlesinger. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113224>.

<sup>162</sup> "Memorandum of Conversation, 'Visit of French Defense Minister Galley; Strategic Programs'," August 17, 1973, History and Public Policy Program Digital Archive, Ford Presidential Library, National Security Advisor, Memoranda of Conversation, box 2, August 17, 1973 Kissinger, Schlesinger, John S. Foster (DOD). Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113226>.

<sup>163</sup> Ibid.

<sup>164</sup> "Memorandum of Conversation, 'French Nuclear Discussion'," August 09, 1973, History and Public Policy Program Digital Archive, Gerald R. Ford Presidential Library, National Security Advisor, Memoranda of Conversation, box 2, 8/9/73 Kissinger Schlesinger. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113224>.

<sup>165</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Nuclear Cooperation with France -- Gallery-Schlesinger Meeting September 25, 1973'," September 24, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, National Security Council Files (NSCF), box 960, France Vol XI April 73-31 December 1973. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113238>.

Despite the Kissinger-driven brazen self-interested geopolitical position of the White House in favor of aid to the French nuclear missile program, in his exchanges with the French government Kissinger was explicit in stating that if the French nuclear and missile program failed, it would leave France weak and that would be a disadvantage to the United States.<sup>166</sup> It was in this context that the United States offered ballistic missile help to France and helped it develop its means of nuclear delivery. The geopolitical leverage that France offered the United States in balancing the Soviet Union in Europe was not simply a ruse by the Americans to sow seeds of division in Europe. It served both ends.

## **Conclusion**

This chapter has focused on the external help that France received in building its means of nuclear delivery. It has explored the direct and indirect transfer of technologies that enable a state to build its means of nuclear delivery. In doing so, the chapter underscores the role of the Zone of Ambiguity in the non-proliferation order to enable the manipulation of a number of domestic, bilateral, and international, laws and legal provisions. In particular, I demonstrate that the help that the United States gave to France to build its ballistic missile program (to deliver nuclear weapons) involved the manipulation of the laws and norms of non-proliferation from its early years in the 1950s through to the mid-1970s, even after the Nuclear Non-Proliferation Treaty (NPT) came into force. At the core of the transfer of this technology was geopolitical interest on the part of the United States which aimed to diversify the nuclear threats being faced by the Soviet Union, and at

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<sup>166</sup> "Memorandum of Conversation with Robert Galley, August 31, 1973," August 31, 1973, History and Public Policy Program Digital Archive, Nixon Presidential Library, HAK Office Files (HAKO), box 56, French Exchanges [2 of 2]. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113231>.

the same time ensure that Europe did not form a unified bloc, thereby diminishing U.S. influence there. There are a few key takeaways from this research.

First, the French acquisition of ballistic missile technology for delivering nuclear weapons highlights the malleable nature of laws and norms of non-proliferation. It demonstrates that the actors in the United States chose to utilize the ambiguous nature of definitions of terms like “nuclear weapon”; took advantage of the dual use nature of technology of ballistic missiles; and freely changed their interpretation of term like “existing systems” to suit their goals of transferring technology associated with nuclear delivery. Ullman argued that this assistance has “almost certainly violated U.S. law.”<sup>167</sup> I find however, that the actors involved were able to manipulate U.S. law as and when it suited them, oftentimes just introducing new executive directives to ensure that their goals were met. The different elements of the Zone of Ambiguity in the non-proliferation order that this dissertation investigates – ambiguous definitions, multipurpose technology, and normative and legal ambiguity – were all present in the case of U.S. transfer of technology to enable France to build their means of nuclear delivery. Despite the evolution of the non-proliferation order, with important pillars like the NPT coming into force (1970) along with bilateral and multilateral efforts at arms control (1969 onwards) were all unable to thwart the proliferation of the means of nuclear delivery. These features of the non-proliferation order continue to persist to this day and still play an ambiguous role.

Some scholars argue that the Nixon administration’s policy of having strong regional partners with nuclear capabilities was a geopolitical strategy to counter the Soviet Union and represents more of an “aversion” to supporting the non-proliferation regime than actively undermining it.<sup>168</sup> However, my research shows that the decisions taken in enabling the acquisition

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<sup>167</sup> Ullman, “The Covert French Connection,” 3.

<sup>168</sup> Cameron and Rabinowitz, “Eight Lost Years?,” 847–48.



of nuclear delivery vehicles very much took advantage of the Zone of Ambiguity and weaknesses within the non-proliferation regime, and as a consequence, undermined it considerably.<sup>169</sup>

Second, the role of geopolitical interest in enabling the proliferation of the means of nuclear delivery is important to note, primarily because it led to the abandonment of any normative principles of non-proliferation. The United States was definitely interested in complicating the geopolitical and nuclear challenge for the Soviet Union, and France, with a credible nuclear delivery capacity would add another vector of worry for Moscow. However, the United States also had other geopolitical interests in helping France with its means of nuclear delivery. These interests were the long term objectives of the United States *vis-à-vis* U.S.-France relations, but also to the tripartite U.S.-France-United Kingdom relations, France-NATO relations, and the United States' overall disposition towards the ability of another state acquiring strategic nuclear delivery capacity.<sup>170</sup> Geopolitical interest and alliance management (in this case, alliance division) all came together to prompt the subversion of the norms and legal provisions associated with nuclear non-proliferation.

Third, in addition to contributing to the historical account of the evolution of the international non-proliferation order, this research also adds to the history of French nuclear force development. Using newly declassified material, the story of foreign aid to French nuclear forces is one that challenges the conventional wisdom that France's nuclear force was an indigenous and

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<sup>169</sup> Gavin, Rabinowitz and Miller and Cameron and Rabinowitz argue that the United States has never actively chosen to undermine the non-proliferation regime as a whole. My analysis does not necessarily disagree with that contention but finds that even if it was not a concerted effort to undermine the non-proliferation regime as a whole, the actions taken by the U.S. to proliferate the means of delivery did expose the cracks in, and perhaps inadvertently undermine the non-proliferation regime. See, Gavin, "Strategies of Inhibition"; Or Rabinowitz and Nicholas L. Miller, "Keeping the Bombs in the Basement: U.S. Nonproliferation Policy toward Israel, South Africa, and Pakistan," *International Security* 40, no. 1 (July 1, 2015): 47–86; Cameron and Rabinowitz, "Eight Lost Years?"

<sup>170</sup> "Memorandum from Helmut Sonnenfeldt to Henry A. Kissinger, 'Assistance to the French Ballistic Missile Program'," April 16, 1970, History and Public Policy Program Digital Archive, Nixon Presidential Library and Museum, National Security Council Files (NSCF), box 676, France Vol. V Feb '70-Apr '70 and Vol. VI May-Sep 70. Burr/NPIHP. <https://digitalarchive.wilsoncenter.org/document/113685>.

independent one.<sup>171</sup> My research shows that the French nuclear forces received considerable technological help from the United States. It also shows that the help was requested by the French and received at a time that the common perception of the Franco-American relationship was that it was deeply troubled owing to the Nassau agreements, the MLF, and the United States' opposition to national nuclear forces.<sup>172</sup> It is an unfortunate consequence of the secretive nature of the narrative-building around French nuclear forces that the archival record of these exchanges in France is classified and will remain so for a few more decades at least.<sup>173</sup>

Finally, it is important to note that this chapter explores one aspect of French nuclear force development enabled by the Zone of Ambiguity and French relations with the United States and NATO. France here is the recipient state and the United States is the supplier state. As we will see in the following chapter, the French relationship with the Zone of Ambiguity and the non-proliferation order was a complex one and it played the role of the supplier state to other recipient countries (like South Africa and India), taking advantage of the same normative and legal ambiguities that had benefitted it.<sup>174</sup> Indeed, in the Indian case, France not only tried to sell it aircraft to help delivery nuclear weapons, but also space launch vehicle technology that helped it develop its first IRBM.

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<sup>171</sup> Lieber, "The French Nuclear Force," 427; Pelopidas and Philippe, "Unfit for Purpose," 15.

<sup>172</sup> Lieber, "The French Nuclear Force," 421.

<sup>173</sup> Pelopidas, "Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies"; Terrence Peterson, "The French Archives and the Coming Fight for Declassification," *War on the Rocks*, March 6, 2020, <https://warontherocks.com/2020/03/the-french-archives-and-the-coming-fight-for-declassification/>.

<sup>174</sup> Anna Konieczna, "Nuclear Twins: French-South African Strategic Cooperation (1964–79)," *Cold War History*, November 30, 2020, 1–18.

## **Chapter 5: With a Little Help From Our Friends: Diplomacy and External Assistance in India's Regional Nuclear Force Structure Development**

“We have an explosion, but what could we deliver it on? A bullock-cart?”

- Dr. Homi Sethna, Chairman of the Indian Atomic Energy Commission,  
December 1974.<sup>1</sup>

### **Introduction**

Ten days after India's first nuclear explosion in 1974, the NATO Situation Centre circulated a secret memo to all state capitals with an assessment of the Indian nuclear program. It stated, “...we think it likely that the Indians, having started this programme, will wish to proceed with the development of more sophisticated weapons and delivery systems with the object of achieving a more credible deterrent.”<sup>2</sup> Shortly after, two NATO states – the United Kingdom and France – competed against each other to provide India with its first means of nuclear delivery. The United Kingdom provided India with the nuclear-capable Jaguar aircraft, while France provided it with the nuclear-capable Mirage 2000H aircraft and also with the technology to build space launch vehicles which India modified to build its first Intermediate Range Ballistic Missile. Why did these states, despite their stated commitments to non-proliferation, sell India technology that enabled it to deliver its nuclear weapons? In this chapter, I argue that that the answer to this question lies in the Zone of Ambiguity and the economic logic.

I find that India, the United Kingdom, and France took advantage of the Zone of Ambiguity in the global non-proliferation order in order to transfer the means of nuclear delivery. I consider two cases related to the development of India's nuclear forces. The first case is the transfer of the

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<sup>1</sup> Pakenham, “Memorandum: Nuclear India,” The National Archives, Kew Gardens, United Kingdom (henceforth, TNA), FCO 37/1734.

<sup>2</sup> India: Explosion of Nuclear Device” NATO Secret, NATO Situation Centre, 28 May 1974, Carton 2252, Inde, Direction Asie-Océanie, No. 15-11-5, Questions Atomiques, May 1974, Centre des Archives Diplomatiques de la France, La Courneuve, France.

Jaguar aircraft from the United Kingdom to India in 1978. The second case is related to space technology that France transferred to India from the mid-1970s onward which led to the development and successful launch of the Space launch Vehicle (SLV)-3 in 1980. The SLV-3 was later used to develop India's first IRBM, the *Agni* missile. I find that in both cases, the supplier states and the recipient took advantage of the ambiguities surrounding the definition of the terms 'nuclear weapon', 'delivery vehicle', and the norm of non-proliferation. Additionally, I highlight the importance of international political processes in the story of India's nuclear force development, a realm that is conventionally defined by the actions of domestic actors.<sup>3</sup>

The chapter will proceed in five main sections. First, I briefly discuss the proliferation of nuclear delivery vehicles to India and the economic logic. Next, I introduce the international political context with regard to India's nuclear history in the 1970s. In particular, this section focuses on the international concerns about India's nuclear delivery capability after its 1974 test. The rest of the chapter is in two sections. The third section deals with the case study of India's acquisition of the Jaguar aircraft in 1978. It highlights the different mechanisms that enabled the acquisition of the aircraft from the United Kingdom. In particular, it highlights the two subgroups of the economic interest logic – the rival sellers mechanism and the buyer's market mechanism. The section also discussing an unexpected finding in the form of the Soviet Union's role in the

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<sup>3</sup> For a primer on India's nuclear history see, George Perkovich, *India's Nuclear Bomb: The Impact on Global Proliferation* (Berkeley: University of California Press, 1999); Sumit Ganguly, "India's Pathway to Pokhran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program," *International Security* 23, no. 4 (1999): 148–77; Raj Chengappa, *Weapons of Peace: The Secret Story of India's Quest to Be a Nuclear Power* (New Delhi: Harper Collins Publishers, India, 2000); Ashley J. Tellis, *India's Emerging Nuclear Posture: Between Recessed Deterrent and Ready Arsenal* (Santa Monica, CA: RAND Corporation, 2001); Bharat Karnad, *Nuclear Weapons & Indian Security: The Realist Foundations of Strategy* (New Delhi: Macmillan, 2002); S. Paul Kapur, *Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia* (Stanford, Calif: Stanford University Press, 2007); Andrew B. Kennedy, "India's Nuclear Odyssey: Implicit Umbrellas, Diplomatic Disappointments, and the Bomb," *International Security* 36, no. 2 (October 1, 2011): 120–53; Verghese Koithara, *Managing India's Nuclear Forces* (Washington, D.C: Brookings Institution Press, 2012); Kampani, "New Delhi's Long Nuclear Journey"; Narang, "Strategies of Nuclear Proliferation."

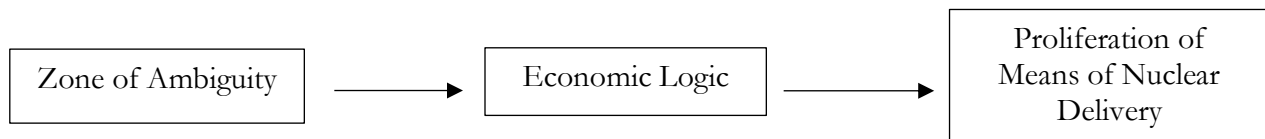
sale of the Jaguar aircraft to India. In the next section, I use the case of India's acquisition of space technology from France in the 1970s to build its Space Launch Vehicle (SLV)-3, which was the basis for the Intermediate Range Ballistic Missile, Agni. In both cases, I find that an interplay of multipurpose technology, and economic incentives led to the ready supply of sensitive nuclear delivery related technologies to India. Finally, I conclude with a discussion of the implications of the case studies on India.

### **The Economic Logic and India**

The economic logic to the proliferation of the means of nuclear delivery finds states prioritize their economic benefit over the imperatives of the non-proliferation order (see fig 5.1). Just as in the sale of conventional weapons, states engage in the sale and transfer of the means of nuclear delivery in order to profit financially. Not only that, supplier states also seek to set up dependent recipient state in order to set up an enduring market and a steady flow of capital.

This chapter finds that for the supplier states – the United Kingdom and France – the norm of non-proliferation came second to the economic interests that proliferating the means of nuclear delivery to India represented. Indeed, it is clear that the highest echelons of the French and British governments were fully aware of the potential nuclear uses of the technology that they were selling to India and chose to ignore them.

**Figure 5.1: Economic Logic to the Proliferation of the Means of Delivery**



As the Jaguar case demonstrates, there are two mechanisms embedded within the economic interest category. These are the ‘rival sellers’ mechanism and the ‘buyer’s market’ mechanism. The first involves competition among the potential suppliers of a particular technology or weapons system. In their effort to get the order for the technology or weapons systems, the selling states will compete against each other and often undercut each other, while ignoring proliferation concerns. In the case of the Jaguar aircraft, France, United Kingdom, Sweden, and the Soviet Union competed against each other to get the order from India, despite concerns that the aircraft could be used to deliver nuclear weapons.

In the Buyer’s Market mechanism, the technology/weapons system-buying state leverages its commercial promise to incentivize the potential suppliers to sell. For example, in the Indian case, potential suppliers like the United Kingdom, France, and Sweden, were all offered licensed-production of at least a hundred aircraft in India – apart from the cost of the aircraft itself, along with spare parts, and other supplies. This would give the supplier state the opportunity to shape the future aircraft industry of the recipient state.

The Zone of Ambiguity in the international non-proliferation regime enables these economic logics to the proliferation of the means of nuclear delivery. The supplier states – the United Kingdom and France – used different aspects of the post-NPT nuclear non-proliferation regime to enable their respective sales. In both cases of sale of the Jaguar and of space technology, the multipurpose nature of the technology was critical. British officials relied on the Jaguar having a conventional military role. Meanwhile, French officials wanted to be sure that the nuclear delivery-related missile technology could be called “civilian” to enable the sale without any difficulty. It is important to note here that at the time of these cases (1970s) both France and India

were not signatories of the NPT.<sup>4</sup> However, we still see both states referring to the NPT and adhering to its stipulations even as they defy the norm of non-proliferation.

Significantly, the evidence shows that despite the lack of legal stipulations that forbid the transfer of nuclear delivery vehicles – the supplier states did deem the NPT and the non-proliferation regime to proscribe the sale of these weapon systems. However, this conclusion was ultimately rendered moot because of the imperatives of the economic logic to the proliferation of the means of nuclear delivery.

### **India's Nuclear Forces: Delivering the Bomb after 1974**

On 18 May 1974, India conducted Operation Smiling Buddha – its first nuclear test. The Indian government, led by Prime Minister Indira Gandhi, called it a ‘peaceful nuclear explosion’ and argued that Indian nuclear technology was geared towards peaceful, civilian applications, disavowing any possible military uses.<sup>5</sup> Despite these assurances, international actors, particularly NATO states, made assessments as to how long it would take India to develop a nuclear weapon and how India would deliver its nuclear weapons. It was in this setting that the Indian nuclear delivery capacity was developed.

Ten days after the Indian nuclear test, the NATO Situation Centre circulated a secret memo to all member state capitals with an assessment of the Indian nuclear program. The assessment originated from the United Kingdom's Foreign and Commonwealth Office (FCO) and stated that, “There are at the moment no worthwhile peaceful applications in India of such an explosion. We therefore consider that the explosion was mainly concerned with the development of nuclear

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<sup>4</sup> India still is not.

<sup>5</sup> Indira Gandhi, *Selected Speeches and Writings of Indira Gandhi, September 1972-March 1977.*, vol. III (New Delhi: Publications Division [Ministry of Information and Broadcasting, Govt. of India], 1984), 413–16.

weapons.”<sup>6</sup> The report went on to state that the “technology for making and testing an underground device is at least as complex as that required for developing a simple fission weapon, and after a successful test of this kind it would be only a matter of 6-12 months before such a weapon could be produced...”<sup>7</sup>

On India’s capacity to deliver its nuclear weapons, the assessment stated that India had three squadrons of ageing Canberra aircraft from the United Kingdom,

...which would have a maximum combat radius of approximately 1000 miles carrying a weapon of the kind India seems capable of producing in the immediate future. Although the Indians are seeking to develop a more advanced strike aircraft and although they have made some statements about their need for missiles, we think it unlikely that they would have such an aircraft or even short-range surface-to-surface missiles before the 1980s.<sup>8</sup>

The assessment went on to state that despite the nuclear test, India’s “few simple weapons and her present inadequate delivery system would not constitute a strategic deterrent to China. However, we think it likely that the Indians...will wish to proceed with the development of more sophisticated weapons and delivery systems...”<sup>9</sup>

The United States in a secret note to NATO assessed that even though some Indians considered “that possession of a rudimentary weapon and a delivery system would provide a deterrent against China and reduce Indian dependence on the Soviet Union,” the actual cost of acquiring nuclear weapons and its associated delivery systems might be received less enthusiastically.<sup>10</sup> As the Canadian delegation to NATO noted,

The long range delivery of nuclear weapons is a more difficult and expensive problem as India does not have bombers or missiles suitable for reaching distant targets...India would have to depend on aircraft for nuclear delivery until well after

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<sup>6</sup> “India: Explosion of Nuclear Device” NATO Secret, NATO Situation Centre, 28 May 1974, Carton 2252, Inde, Direction Asie-Océanie, No. 15-11-5, Questions Atomiques, May 1974, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>7</sup> Ibid.

<sup>8</sup> Ibid.

<sup>9</sup> Ibid.

<sup>10</sup> U.S. Mission to NATO, “Assessment of Indian Nuclear Test,” 5 June 1974, Carton 2253, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.



1980. However the Indian Air Force has been equipped to deal with Pakistan and has no long range aircraft capable of offensive operations against China. Current aircraft such as the SU-7 and the Indian made HF-24 could be used in tactical operations close to the border but unless a major bomber construction programme is started long range aircraft would have to be obtained abroad. The IAF is said to be interested in converting civil Boeing 707s into the ASW role. If this were done, provision for nuclear bombing might be included in order to provide a strategic carrier at minimum cost. A few aircraft might be so converted by the existing Indian aircraft industry in about two years. This is also the time we estimate would be required to manufacture a few aircraft bombs after an initial nuclear test. Thus, India could have a modest nuclear strike force some three years after deciding to go ahead.<sup>11</sup>

Most states at the time did not make a distinction between explosions for peaceful and military purposes, and this included the United States.<sup>12</sup> As Daniel Patrick Moynihan, then Ambassador of the United States to India, wrote in his policy brief, ‘A Strategy to Prevent the Indian Nuclear Explosion Leading to General Nuclear Proliferation,’ India was “not much more than two years away from an IRBM.”<sup>13</sup> Moynihan went on to state that the United States could not expect India to stop the development of nuclear weapons and their delivery systems. It could only buy time, which could be used to facilitate a comprehensive test ban and an international regime to enforce it.<sup>14</sup> Furthermore, the brief, which informed the United States’ reaction to the Indian test, suggested that during Secretary of State, Henry Kissinger’s planned visit to India in September 1974, the United States should get India to privately agree “to go very slow in testing. Nothing more for a year or two. No weapons. Rocketry restraint. No missile system.”<sup>15</sup>

The conclusions we draw from these assessments following the 1974 test by India are that the NATO states – particularly, the United States, the United Kingdom, and France – all assumed

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<sup>11</sup> Canadian Delegation to NATO, “Indian Nuclear Test,” 5 June 1974, Carton 2253, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>12</sup> ‘Personal Diary: May 18’ Moynihan – I:367, Folder 2, Library of Congress (LoC).

<sup>13</sup> “A Strategy to Prevent the Indian Nuclear explosion leading to General Nuclear Proliferation,” Moynihan, DPM Collection I368: Folder 1, July 12, 1974.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

that India could develop a nuclear weapon within six months to a year. And, more important, they all assumed that India sought to build nuclear delivery systems in the form of aircraft and missile systems. All three states demonstrated commitments to non-proliferation, but, although cognizant of India's possible desire to develop nuclear delivery systems, they went ahead and helped India acquire aircraft that would be able to deliver nuclear weapons as well as missile technology that would eventually contribute to the Indian ballistic missile program.

### **India's Acquisition of the Jaguar Aircraft**

The United Kingdom and France supplied India its air-based nuclear delivery systems – the Jaguar SEPECAT and the Mirage 2000H aircraft.<sup>16</sup> India acquired the Anglo-French Jaguar from the United Kingdom in 1978 and the Dassault Aviation-made French Mirage 2000H in 1982. The episode of the Jaguar sale to India is interesting on several counts. First, the aircraft was sold by the United Kingdom to India after clear discussions about its nuclear delivery capacity. The archival record shows open disagreements within the Foreign and Commonwealth Office and the Ministry of Defence (among others) and indicates that arms control and non-proliferation objectives were discussed but put aside during the sale of the nuclear capable aircraft to India.

Furthermore, the French government also sought to sell a similar aircraft (Dassault's F1) to India but lost the bid after intense competition with the United Kingdom. France later concluded a deal to sell the Mirage 2000 in 1982. This aircraft also became a nuclear delivery system for India. The issues that come up during the sale of the Jaguar aircraft to India help us understand how states interact with other nuclear states when they attempt to build up the capacity to deliver

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<sup>16</sup> Hans M. Kristensen and Matt Korda, "Indian Nuclear Forces, 2018," *Bulletin of the Atomic Scientists* 74, no. 6 (November 2, 2018): 362.

their nuclear weapons. An important part of the story is also the United States' attempts to regulate the sale of sensitive weapon systems to both India and Pakistan. The interactions of the United States government in attempting to stop the UK government from selling these weapons helps demonstrate the attempts of the former to shape arms control norms among western countries – and the failure of these attempts. Finally, the role of the Soviet Union in this process is important, not only as a potential supplier of alternative aircraft, but also as an important actor whose influence in India the western states sought to curb. This was an unexpected finding in the case and will be discussed at the end of the section.

*(Non)Proliferation Concerns: A Nuclear Delivery Aircraft?*

The United Kingdom and India first began negotiating a deal for the Jaguar aircraft in 1972. The Jaguar was developed as an Anglo-French venture between British Aircraft Cooperation (BAC) and its partner Avions Marcel Dassault-Breguet Aviation in September 1968. The first British Royal Air Force (RAF) squadron came into service in June 1974. One of Jaguar's main tasks in Europe was to be a part of the Supreme Allied Commander in Europe's (SACEUR) strike commitment, thus requiring it to have nuclear capability.<sup>17</sup> The aircraft was thus developed to carry nuclear weapons for both the British and French nuclear forces.<sup>18</sup>

The United Kingdom and France were not the only states offering India nuclear delivery aircraft in this period. The Soviet Union had offered India a nuclear-capable bomber as early as 1969 when India's relations with China had deteriorated further. Upon hearing that India was

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<sup>17</sup> Hodgkinson to ACDS (OR), "Jaguar – Carriage of Nuclear Weapons," 18 August 1967, TNA FCO 46/158.

<sup>18</sup> Moss to George, "Release of Information about the Nuclear Capability of the Jaguar," 10 April 1968, TNA FCO 46/158.

interested in buying bombers, Chairman Kosygin in a meeting with Indira Gandhi in Delhi stated (according to the top-secret record of the conversation):

...the Soviet Union could offer only Tu-16 bombers – a squadron of 10 to 12 planes. These bombers had a range of 3500 kilometres...it was in these planes that the Chinese tested their atomic devices. In the Soviet Air Force, their main purpose was to carry atom bombs...The Soviet Union was prepared to give India a Squadron of Tu-16.<sup>19</sup>

Prime Minister Indira Gandhi chose to not take up the Soviet offer at the time. This was likely related to how such a sale would be seen in China given the possibility of a friendship treaty between India and the Soviet Union that was already in the works.<sup>20</sup> There could also have been a negative impact of such a sale on relations with the United States.<sup>21</sup>

However, following the poor performance of the Indian Air Force in the 1971 war against Pakistan, India wanted to buy a deep penetration strike aircraft. Indian aircraft at the time did not have the necessary range to attack targets beyond a hundred miles.<sup>22</sup> Indian Air Chief Marshal O.P. Mehra wrote to the then-Defense Minister Sardar Swaran Singh about the need to acquire new strike aircraft and stated, "...The problem assumes added urgency in view of Pakistan's acquisition of Mirage type of aircraft which would make our rear bases vulnerable to enemy air attack. It is common knowledge that, even during 1971, bases as far back as Agra were attacked by the P.A.F. [Pakistan Air Force]"<sup>23</sup>

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<sup>19</sup> "Record of conversation between Prime Minister Indira Gandhi and Chairman A.N. Kosygin on Tuesday, May 6, 1969," in Haksar to P.M., "Prime Minister's Secretariat," 2 June 1969, Haksar Collection, IIIrd Installment, NMML.

<sup>20</sup> Ibid.

<sup>21</sup> For more on this relationship, see: Rudra Chaudhuri, *Forged in Crisis: India and the United States since 1947* (London, England: Hurst & Company, 2014); Srinath Raghavan, *The Most Dangerous Place: A History of the United States and South Asia* (New Delhi, India: Penguin, 2018); Bhagavan, *India and the Cold War*; Tanvi Madan, *Fateful Triangle: How China Shaped U.S.-India Relations during the Cold War* (Washington, District of Columbia: Brookings Institution Press, 2020).

<sup>22</sup> O.P. Mehra to Sardar Swaran Singh, "Immediate Requirements of the Air Force," 9 March 1975, Haksar Collection, IInd Installment, NMML.

<sup>23</sup> Ibid.

In 1971, according to then Assistant Chief of Air Staff Idris Latif, there was an informal enquiry by India to British Aerospace on whether the Jaguar “could carry a nuclear-size weapon.”<sup>24</sup> and India’s Air headquarters confirmed that it could after enquiring “if the Jaguar could carry bombs weighing around a thousand pounds.”<sup>25</sup> As early as 1973, the French government considered that given the Soviet Tu-16’s good range of action, India might seek to buy either the Tu-16 or its successor the Tu-22 as a possible first generation nuclear delivery vehicle in case it decided to make a nuclear weapon.<sup>26</sup> However, India did not ultimately do this.

After the Indian nuclear test of 1974 the United Kingdom’s Foreign and Commonwealth Office (FCO) took the view that the UK could not “...contemplate supplying either the Jaguar or the RB199 engine.”<sup>27</sup> This was based on Whitehall’s assessment that India’s nuclear test was intended to develop a military nuclear capability. In a secret note to the Ministry of Defence, the FCO stated that,

It is our view that we should not be seen to be selling delivery weapons systems, or engines which could form part of those systems, for use in indigenous aircraft, to the Indians. If we were to do so we should undoubtedly face severe criticism from the international community, *more especially because of our own position as a depository power for the nuclear Non-Proliferation Treaty.*<sup>28</sup>

This was significant. It shows that even though the NPT does not prohibit the sale of nuclear delivery systems, the United Kingdom’s government considered it to be proscribed. The reference to the normative position of the UK as a “depository power” of the NPT is also an interesting one. It is most telling however, that despite these qualms about the potential sale of a nuclear delivery

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<sup>24</sup> Chengappa, *Weapons of Peace*, 227.

<sup>25</sup> Chengappa, 227.

<sup>26</sup> Jurgensen to Directors, “Des Ventes d’Armes Sovietiques a l’Inde,” 20 September 1973, ADF Box 2248.

<sup>27</sup> Brimelow to Cary “Relations with India,” TNA FCO 37/1470.

<sup>28</sup> Ibid. Emphasis mine.

system and its implications for non-proliferation, the United Kingdom went on to sell India the Jaguar aircraft.

An important aspect of the Zone of Ambiguity was raised in this context. In June 1975, the South Asian Department in the FCO was consulting the then-Foreign Secretary, James Callaghan “on the issue of principle which would be raised by agreeing to sell to India an aircraft which had a potential nuclear delivery capability.”<sup>29</sup> The department took the position that the UK would allow the sale of the Jaguar aircraft to go through, even if India carried out another nuclear test. In a letter to the Ministry of Defence (MoD), an FCO official stated,

I believe that if we decide that we are ready to sell Jaguar to India, this must be on the basis that we should still allow the sale to go through if the Indians carry out further test explosion. I accept, however, that if at any stage India should declare that she has developed a nuclear weapon capability and intends to deploy forces capable of developing nuclear weapons, we should refuse to allow any Jaguar contract to continue. Indeed, I think that under the Non-Proliferation Treaty we should probably be obliged to do so.<sup>30</sup>

The only stipulation from the NPT that could stop the sale of nuclear delivery systems to India was if the latter declared that it had a nuclear weapon state. However, if it continued testing and conducting “peaceful explosions” like in 1974, that would, under the non-proliferation regime be fine. Callaghan, who later became prime minister, said of the proposal to sell the nuclear-capable Jaguar aircraft to India – “I think we cannot refuse the order.”<sup>31</sup>

At the heart of the nuclear question on Jaguar was multipurpose technology, i.e., its dual capability as a conventional ground attack aircraft that could also deliver nuclear weapons. As a

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<sup>29</sup> O'Neill to Kelly, “Sale of Jaguar to India,” 4 June 1974, TNA FCO 37/1626.

<sup>30</sup> O'Neill to Mr. Male, “Sale of Jaguar Aircraft to India,” 2 June 1975, TNA FCO 37/1626.

<sup>31</sup> Malcolm M. Craig, “‘I Think We Cannot Refuse the Order’: Britain, America, Nuclear Non-Proliferation, and the Indian Jaguar Deal, 1974–1978,” *Cold War History* 16, no. 1 (January 2, 2016): 61.

discussion about Jaguar's nuclear capability in the United Kingdom's Ministry of Defence revealed,

...in order to carry nuclear weapons, the wiring of the weapons release system of Jaguar (as of any aircraft) has for reasons of safety to be of a special standard, in order to minimize the chance of accidental release; but that otherwise the wiring is not different from that normally used in the aircraft, and when nuclear weapons are not mounted the same wiring allows the release of whatever conventional weapons may be carried...<sup>32</sup>

While the norm of non-proliferation would suggest that a nuclear-capable aircraft not be sold to a potential proliferator, British officials interpreted the Jaguar's conventional military role to allow for some leeway on the matter.

Indeed, for US officials as well, it was not clear that the sale of such aircraft was proscribed. In a discussion at the Subcommittee on Foreign Operations of the Senate Appropriations Committee on July 24, 1974, Secretary of State, Kissinger stated, "...there are two aspects to the problem: The delivery of the bomb and the development of nuclear capability... We have not yet formed a conclusion as to what degree of sale of delivery systems can be controlled."<sup>33</sup> In the context of the United States' aircraft sales, the fact that the F-4 could be used for nuclear delivery and F-5 could not formed, according to Kissinger, a part of the consideration of which aircraft were on offer in military assistance and sales to other countries.<sup>34</sup>

In the case of India's acquisition of the Jaguar aircraft, there were three primary mechanisms that worked in its favor, despite the misgivings of the suppliers about the potential for use in a nuclear weapons program. The remainder of this section discusses these mechanisms.

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<sup>32</sup> George to MacDonald, "Jaguar – carriage of nuclear weapons," 6 October 1967, TNA, FCO 46/158.

<sup>33</sup> "Congressional Testimony by Secretary Kissinger on Nuclear Test and Aid to India", July 27, 1974, DPM Collection, LoC, I368, Folder 4.

<sup>34</sup> Ibid.

*The Rival Sellers Mechanism – ‘A disgraceful Saga’*

India's search to equip its air force with a Deep Penetration Strike Aircraft (DPSA) led to intense competition between the United Kingdom (Jaguar), France (Mirage F1), and Sweden (Viggen).<sup>35</sup> As the Defence Sales Organisation in the British Ministry of Defence wrote to the Treasury, "...we should be prepared to offer terms to match any offered by free world competitors."<sup>36</sup> The ministry's position meant that the British were willing to enter into competition even with allies; this manifested in the intense Anglo-French competition over the sale of the Jaguar aircraft, which India would later modify to use as a nuclear delivery aircraft. The competition occurred despite the non-proliferation concerns that the aircraft presented (see Table 5.1 for the characteristics of the different aircraft in competition for the order that eventually went the Jaguar's way).

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<sup>35</sup> While the possibility of Soviet alternatives appeared in these deliberations, they were not a serious contender for this order.

<sup>36</sup> Mackenzie to Rich, "Jaguar Aircraft for India," 19 September 1972, TNA FCO 37/1114.



**Table 5.1: Characteristics of Jaguar Aircraft and its Competitors**

Characteristics	Jaguar ‘S’ <sup>37</sup>	Mirage F1 <sup>38</sup>	Viggen <sup>39</sup>	MiG 23B <sup>40</sup>	Tu-22 <sup>41</sup>
Manufacturer	British Aircraft Corporation	Dassault-Breguet	Saab AB	Mikoyan-Gurevich	Tupolev
Country	United Kingdom	France	Sweden	Soviet Union	Soviet Union
First Flight	1969	1966	1967	1971/72	1959
Maximum speed (at Sea Level)	Mach 1.1	Mach 1.2	Mach 1.1	Mach 1.14	Mach 1.4 (at high altitude)
Weapon Load Maximum	10, 000 lbs	9, 920 lbs	15, 000 lbs	6613 lbs	22, 000 lbs

The choice, for India, alternated between the Mirage and Jaguar aircraft for most part of the 1970s.<sup>42</sup> The contract was eventually awarded to the British in 1978. However, the competition prior to that was so intense that, even a few years after this deal was struck, France attempted to get it cancelled, leading to Parliamentary proceedings in India on the subject. The conflict between

<sup>37</sup> Harrington to Sales 4C, “Pakistan – Jaguar & A7,” 13 March 1977, TNA FCO 37/2055.

<sup>38</sup> René Francillon, *Dassault Mirage F1*, Aerofax Minigraph 17 (Midland Publishing, 1986).

<sup>39</sup> Bill Gunston and Peter Gilchrist, *Jet Bombers: From the Messerschmitt Me 262 to the Stealth B-2*, 1st edition (London: Osprey Publishing, 1993), 243–47.

<sup>40</sup> Miguel Vasconcelos, *Civil Airworthiness Certification: Former Military High-Performance Aircraft* (Washington, D.C: Federal Aviation Administration, 2013), 2146.

<sup>41</sup> Bill Gunston, *The Illustrated Encyclopedia of Major Military Aircraft of the World* (New York: Crescent Books, 1983), 149; Gunston and Gilchrist, *Jet Bombers*, 203–5.

<sup>42</sup> D.P. Dhar to Indira Gandhi, Correspondence, 9 October 1974, Haksar Collection, IIIrd Installment, Subject File 284, NMML.

the British and the French came to the point that by 1980 the British Foreign and Commonwealth Office (FCO) contemplated sending the French government a demarche.

At the heart of the problem was British and French competition in the aircraft industry. This was unusual because the Jaguar aircraft was jointly developed by BAC and Dassault Aviation of France. When the British offered to sell India the Jaguar, they had expected France to back the bid. Instead, the French government threw its support behind Dassault Aviation's offer of the Mirage F-1 aircraft to India. In 1973, the British High Commissioner in Delhi wrote back to London that France was "playing foul" by subsidizing the potential sale of Dassault's Mirage F1.<sup>43</sup> The Indian Air Force's Deputy Chief of Air Staff (DCAS) informed the British High Commission that Dassault – aided by the French government – was offering India a 4 per cent price escalation/inflation rate, whereas the British Aircraft Corporation (BAC) was offering a rate between 10-12 per cent.<sup>44</sup> The High Commissioner further reported that his French "...European-minded Colleague who argued on political and industrial grounds that France should call Dassault to heel has been told by his government to shut up."<sup>45</sup> His note, ironically titled "Entente Cordiale and European Solidarity," recommended that the United Kingdom sound "the whistle loud enough to stop the French game" and, if this was not possible, to match the French inflation rate.<sup>46</sup>

The French had little reason to cooperate. The Defence (Sales) department of the United Kingdom opined that the,

...French Government would be unlikely to agree to abandon the prospect of the sale of an aircraft which is 100% French in favour of one which is only 50% French. Defence (Sales) have pointed out that the French have shown no compunction in the past in running wholly French manufactured equipment against comparable Anglo-French collaborative projects...seems unlikely that the French

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<sup>43</sup> High Commissioner to Wright, "Entente Cordiale and European Solidarity," 28 Dec 1972, TNA FCO 37/1114.

<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

could be persuaded to abstain in this case, where, owing to the proposal for progressive manufacture in India, a successful sale of Mirage could result in the Indian aircraft industry being effectively tied to the French aircraft industry for many years to come.<sup>47</sup>

For India, in the meanwhile, given the rivalry between these two sources of aircraft producers, the best offer would win the day. The Indian DCAS speaking to the British High Commissioner in Delhi “made no bones about it that the French government are subsidizing Dassault’s 4 per cent escalation rate, adding that we [the British] are fools to not match it if we want the business.”<sup>48</sup> At the same time, there were internal divisions within the Indian establishment. Owing to the efforts of France and the United Kingdom to sell their own aircraft in India, a pro-Jaguar and anti-Jaguar lobby had grown up. British High Commissioner in Delhi, Garvey, noted in 1972 that even though the Indian Air Force was sending teams to both England and to France, in the face of very strong international competition, the Indian Scientific Advisor to the Prime Minister, B. D. Nag Chaudhuri and Defense Secretary, K.B. Lall, favored Jaguar.<sup>49</sup> By the end of 1973, this group had increased to include Defense Minister Jagjivan Ram, and the chief of the Indian Air Force, O.P. Mehra.<sup>50</sup> Furthermore, Prime Minister Indira Gandhi herself sent an emissary to the British High Commission to indicate that India wanted to buy the Jaguar.<sup>51</sup>

The development of French and Swedish lobbies to sell their own aircraft undermined the support for Jaguar. French reports indicate that the chief of the pro-Mirage lobby in India was the Indian Ambassador to France, D.N. Chatterjee.<sup>52</sup> This was further complicated by the presence of

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<sup>47</sup> Slater to Balniel, “Sale of Jaguar Aircraft to India,” 29 January 1973, TNA FCO 37/1296.

<sup>48</sup> High Commissioner to Wright, “Entente Cordiale and European Solidarity,” 28 Dec 1972, TNA FCO 37/1114.

<sup>49</sup> Garvey to Mackenzie, “Telegram No. 48,” 6 May, 1972, TNA FCO 37/1114.

<sup>50</sup> Murray to Slater and Chalmers, “Jaguars for India,” 28 September 1973, TNA FCO 37/1297.

<sup>51</sup> Garvey to FCO, “Jaguar for India”, 25 September 1973, TNA FCO 37/1297.

<sup>52</sup> Jurgensen, “Vente de MIRAGE F1 à l’Inde,” June 1973, Carton 2248, Inde, Direction Asie-Océanie, No. 15-7-2, Centre des Archives Diplomatiques de la France, La Courneuve, France.

a Swedish lobby to sell the Viggen aircraft to India. This lobby had reportedly paid the Indian Defence Minister, Bansi Lal, and Prime Minister Indira Gandhi's son, Sanjay Gandhi, to gather support in favor the Viggen.<sup>53</sup> Moreover, to sway the Indians away from their other western competitors, the Swedes had also offered submarines along with the aircraft as a part of a "package deal."<sup>54</sup>

The evolving Indian preference for the Jaguar did not deter the French. While still offering the Mirage F1, they turned around and offered their own version of the Jaguar to India. In addition to very low credit rates, France also promised to divert 18 A versions from the French Air Force to India by the end of 1974.<sup>55</sup> This did not sit well with the British government. As the Ministry of Defense wrote to the High Commission in Delhi, "We believe it necessary to smoke them out because they have been telling us that they are not offering any credit to the Indians. Moreover they have not sought our permission to offer Jaguars to India – the agreed arrangement is that India is BAC's territory as far as the Jaguar is concerned."<sup>56</sup>

Even after the Indian nuclear test in 1974, the South Asia Department in the FCO reported that there remained a small possibility that the Indian government could wish to buy 10 aircraft worth 40 million pounds – importantly, they expected that there would be renewed pressure from France to buy the French version of the Jaguar or the Mirage F1. The memo stated that the India might wish to buy this number of aircraft specifically "to form a small nuclear strike force."<sup>57</sup> The memo went on to add that "If India is now ready to find the foreign exchange to buy a limited number of aircraft of the type of Jaguar for cash I do not think that refusal on our part to supply

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<sup>53</sup> Allinson to MODUK, "Jaguars for India," 9 December 1976, DEFE 68/212.s

<sup>54</sup> Corbie to Directors, "Vente d'Avions Militaires à l'Inde," 24 November 1975, Carton 2248, Inde, Direction Asie-Océanie, No. 15-7-2, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>55</sup> MODUK to High Commission to India, 25 April 1973, TNA FCO 37/1297.

<sup>56</sup> Ibid.

<sup>57</sup> O'Neill to Richards, "Sale of Jaguar to India," 28 May 1975, TNA FCO 37/1626.

Jaguar will stop them. Nor, I suspect would we be able to prevent France from selling her version of Jaguar if she wished to do so, despite the formal provision that France and the United Kingdom should act in agreement in sales to third countries.”<sup>58</sup> In other words, if India was going to buy a nuclear delivery vehicle anyway, it might as well buy it from the United Kingdom, rather than France.

France, meanwhile, had offered India over 40 Jaguars on the condition that India would buy the Mirage as well. According to the Indian Air Force chief, Mehra, collaborative production of the Mirage in India was being offered by the French and this was said to be more attractive than any British offer because the latter would not enter into a collaborative production with India on Jaguar.<sup>59</sup>

The issue came up in the British parliament in January 1975 with Conservative MP Geoffrey Pattie stating that, “The French F1 is being peddled extremely strongly, as the French have a habit of doing. It is an interesting commentary on the French understanding of a collaborative project. The Jaguar is an Anglo-French project and yet here are the French competing hard against the Jaguar with one of their own...Time and again we seem to be the nice guys who stand back and hold the door open for other countries and salesmen to make their pitch.”<sup>60</sup>

Meanwhile, the British FCO argued that the United Kingdom should not let non-proliferation concerns or related pressure from the United States deter it from selling the Jaguar to India. It stated that,

India has always sought to maintain a balance between East and West as suppliers of advanced defence equipment; and it is in our interest that she should. The chosen source of supply for the new deep penetration strike aircraft is clearly the West...If

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<sup>58</sup> Ibid.

<sup>59</sup> British High Commission to MoD UK, “Supply of Jaguars to India,” 9 April 1975, TNA FCO 37/1626.

<sup>60</sup> “Jaguar Aircraft,” 23 January 1975, TNA FCO 37/1626.

the United Kingdom declined to make Jaguar available, the choice would almost certainly go to Mirage, and there is no reason to believe that France would be prepared to follow our example, in spite of United States efforts to gain their cooperation in President Carter's policy [of keeping advanced military aircraft out of South Asia]. British refusal to supply would therefore not mean that more advanced aircraft were kept out of the South Asian region.<sup>61</sup>

In other words, the United Kingdom was not going to let non-proliferation efforts by the United States get in the way of a good economic deal. Interestingly the argument by the British in this context was that the French would almost certainly capitalize on any arms sales vacuum created by non-proliferation considerations.

In late 1977, the Indian Finance Ministry raised the case of the Jaguar with the Air Force. The British Air Advisor in India reported back to London that the questions had been inspired by the rivals of the Jaguar and had tipped the balance in favor of French Mirage F1.<sup>62</sup> In response to France and its agents in Delhi gaining a favorable position, the pro-Jaguar Indian Defence Minister "unexpectedly and deliberately deferred a decision on the DPSA until he can effectively counter the French opposition and be sure that Jaguar, which he believes to be the best, succeeds."<sup>63</sup> The Acting High Commissioner in Delhi went on to state that the strength and effectiveness of the French lobby was concerning and that "in these circumstances British Aerospace would stand to win the deal only if they had a trump card to play."<sup>64</sup>

Eventually, the deal for the sale of Jaguars was concluded in October 1978 and involved the direct sale of 40 aircraft from the United Kingdom to India, plus the licensed manufacture of 110 aircraft in India. This was not, however, the end of the Anglo-French competition over the Jaguar. By 1980, the French government attempted to get the Jaguar deal cancelled and to convince

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<sup>61</sup> O'Neill to Murray and Evans, "Sales of Jaguar Aircraft to India," 19 December 1977, TNA FCO 37/1971.

<sup>62</sup> British High Commission in Delhi to MoD UK, 15 September 1977, TNA FCO 37/1971.

<sup>63</sup> "Message from Leonard Allinson Acting High Commissioner, New Delhi to F W Page Esq CBE, Chairman and Chief Executive, British Aerospace," TNA FCO 37/1971.

<sup>64</sup> Ibid.

the Indian government to buy two squadrons of Mirage F1s and subsequently set up a plant for the local production of the Mirage 2000. In a letter from the British Ministry of Defence to the Director of Dassault, the British government complained that they had "...been disturbed to learn of French sales activities which have gone beyond the positive promotion of French aircraft into what has appeared to be a deliberate effort of damage the Jaguar contract in India."<sup>65</sup> Such was the effect of this on the British government that in August 1980, the Foreign and Commonwealth Office suggested that the issue be raised by Prime Minister Margaret Thatcher to her counterpart President Giscard d'Estaing during the upcoming Anglo-French summit.<sup>66</sup>

To compete against the French offers to India to undercut the Jaguar sale, the United Kingdom contemplated also offering the technologically advanced Tornado aircraft to India.<sup>67</sup> At a more public level, the British attempted to highlight French arms sales to Pakistan as a reason for India to not collaborate with them.<sup>68</sup> Eventually, the British deal survived, and while India did buy the Mirage 2000 in 1982, the Jaguar was the only western aircraft to be license-produced in India. The first Indian nuclear weapon was designed for the Jaguar.<sup>69</sup> By the late-1980s, despite the organizational problems in weaponization, both the Jaguar and the Mirage were modified for nuclear weapons delivery by India.<sup>70</sup>

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<sup>65</sup> Jeffs to Velon, Correspondence, 26 June 1980, TNA FCO 37/2326.

<sup>66</sup> Archer to Watkins, "Defence Cooperation with the French," 20 August 1980, TNA FCO 37/2327.

<sup>67</sup> Coles to Graham, "India: Jaguar," 5 August 1980, TNA FCO 37/2327.

<sup>68</sup> Coles to PS/PUS, "French Arms Sales to Pakistan," TNA FCO 37/2327.

<sup>69</sup> Kampani, "New Delhi's Long Nuclear Journey," 96.

<sup>70</sup> Gaurav Kampani, "Teaching the Leviathan: Secrecy, Ignorance and Nuclear Proliferation" (PhD Dissertation, Cornell University, 2014), 96.

*The Buyer's Market Mechanism - "We must go all out to get the order"*

The cost of the Jaguar deal to India was approximately £800 million – its value to the British industry was about £350 million, and to the French industry close to £220 million.<sup>71</sup> In commercial terms there was no bigger defense deal to be had at the time. For both the British and the French, and to a limited extent, the Soviet Union, the license-production of aircraft in India represented the promise of further business and an opportunity to shape the aircraft industry in India in the coming decades. It was this promise of future business which shaped the contours of the British-Indian negotiations over the sale of the Jaguar aircraft as well as the Anglo-French competition over the aircraft deal, despite the concerns that India could modify – as it later did – the aircraft to deliver nuclear weapons. The commercial promise created a buyer's market mechanism that India was able to exploit in order to acquire its subsequent nuclear delivery system.

A confidential note highlighting the arguments in favor of the United Kingdom selling the Jaguar to India despite arms control concerns highlights the following factors. First, the effect on the British balance of payments. It was estimated in 1975 that if India bought only ten Jaguars, it would pay £40 million, of which 60 per cent (i.e., £25-30 million) would come to the British Aircraft Corporation and associated component manufacturers.<sup>72</sup> Second, without Indian orders for the Jaguar, the production line at Warton would likely end; thus the sale of the aircraft was absolutely necessary for the British aircraft industry.<sup>73</sup> Third, the British government estimated that despite their "large aid effort to India" their current trade balance vis-à-vis India was in deficit. In 1974, British imports from India stood at £201 million while their exports were £125 million:

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<sup>71</sup> Coles to Graham, "India: Jaguar," 5 August 1980, TNA FCO 37/2327.

<sup>72</sup> O'Neill to Wilford, "Arguments in Favour of Agreeing to Sell Jaguar to India," 5 June 1975, TNA FCO 37/1971.

<sup>73</sup> O'Neill to Murray and Evans, "Sales of Jaguar Aircraft to India," 19 December 1977, TNA FCO 37/1971.



the sale of the Jaguar would help fix this imbalance.<sup>74</sup> Fourth, the sale of the Jaguar to India would open the door for the sale of other British aircraft to India. For example, the Indian Navy was interested in the Maritime Harrier aircraft, a deal that was potentially worth £21 million. Finally, through the sale of a technologically advanced military aircraft, the British government hoped to gain advantages in civil aviation industry as well. The Indian government had been denying the British Concorde permission to fly over India at supersonic speeds during its Britain-Australia endurance program. As the confidential note put it, "...a favourable answer on Jaguar might help over Concorde, and an unfavourable answer might conversely be unhelpful."<sup>75</sup>

Additionally, given the importance of defense sales in any bilateral relationship, the United Kingdom was also hopeful that after the sale of the Jaguar aircraft, it would be able to further British industry sales by fulfilling the future Indian requirement of new "...support strike aircraft, anti-tank missiles, low-level surface-to-surface missiles and a new battle tank."<sup>76</sup> As a confidential note by officials from the foreign ministry stated, "All these areas present further opportunities for the British defence industry. Unless British firms win some of these major contracts, our sales of defence equipment are likely to decline in future as the supply of spare parts and components for earlier sales tail off."<sup>77</sup>

Furthermore, when reviewing the policy of supplying arms to the Indian subcontinent, the FCO decided that the only feasible policy that could be enacted was "An avowedly pro-Indian policy imposing a ban or a virtual ban on sales to Pakistan" as it was best aligned with British political and commercial interests.<sup>78</sup> The report goes on to say that given India's power in the

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<sup>74</sup> Ibid.

<sup>75</sup> Ibid.

<sup>76</sup> "Review of Policy towards India – Note by Officials," TNA FCO 37/1971.

<sup>77</sup> Ibid.

<sup>78</sup> Sutherland to Wilford and Norris, "Arms Sales to Pakistan," 2 August 1972, TNA FCO 37/1113.

region, "...our interests in India are greater than in Pakistan. The imbalance has been increased as a result of the 1971 war and the supply of major items of military equipment to Pakistan could seriously affect the present position which we now enjoy in Delhi and affect our general commercial interests."<sup>79</sup> Even though there were concerns of an arms race in South Asia after the 1971 war, British commercial interest was paramount and arms control concerns second. In an interview with the author, the former Indian Foreign Secretary, M.K Rasgotra (Acting High Commissioner to the United Kingdom in 1976 during the Jaguar negotiations) stated, "They [the British] were damn keen on sending the Jaguar...They want(ed) money – and they will sell them to you [India]."<sup>80</sup>

This is best demonstrated after the Indian nuclear test of 1974, when in a secret note to the British Ministry of Defence, the FCO stated that the Jaguar sale should continue despite non-proliferation concerns because they did "... not wish to damage...relations with India by linking our inability to supply such equipment to their nuclear explosion...to make it explicit would be a rebuff to their present feeling of pride...more unpleasant because it would come from their most valued Western friends, the British."<sup>81</sup>

Ultimately, the sale of the Jaguar to India was not simply about just the sale of an aircraft. It was about setting up an entire ecosystem in the Indian aircraft industry that would be dependent on British technology and spare parts. Both the French and the British saw it as such and this commercial promise that India represented led to the intense competition to land the deal. As the United Kingdom Ministry of Defence put it in a secret memo to the Treasury:

Far exceeding the importance of the sale itself is the prospect for a great deal of further business in India for the British aerospace industry. Earlier I mentioned the

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<sup>79</sup> Ibid.

<sup>80</sup> Interview with Ambassador M.K. Rasgotra (Foreign Secretary of India 1982-1984), New Delhi, India, July 2018.

<sup>81</sup> Brimelow to Cary, "Relations with India," 13 June 1974, TNA FCO 37/1470.

Indian intention to develop and build an advanced strike aircraft for the eighties. The Indians realise that they will need assistance to enable them to succeed and have sought proposals from BAC and Marcel Dassault of France. Because they will enter into a manufacturing licence for the aircraft they now purchase, and will establish links with the company that is successful, it is inevitable that the firm from whom they buy this aircraft will be chosen to help with the development of the future one. Already in their discussions with BAC the Indians are seeking to link a purchase with provision of technical assistance in the future. A Jaguar purchase with consequent BAC involvement in the next aircraft will provide opportunities in India for British aerospace companies, possibly over the next 15-20 years at least. If a Mirage is chosen we shall lose all these advantages to the French industry<sup>82</sup>

As the French ambassador to India noted to the French Foreign Minister, “India indeed wants the winner of the competition to participate in the establishment of a local infrastructure which should enable it, in the more or less long term, to ensure for itself, almost 3/4s of the construction of the selected aircraft (70% of spare parts)... At stake is the aeronautical cooperation between France and India in the course of the next twenty years.”<sup>83</sup>

Indeed, it was the incentive to be able to shape the Indian market that even led to the British consider developing a joint Anglo/French offer to counter potential Russian influence despite all the acrimony between the two states over Jaguar. While this is discussed in more detail in the next sub-section, the desperation of the suppliers – the United Kingdom and France – to corner the market for military aircraft in India through selling it the means of nuclear delivery is quite extraordinary.

The Jaguar case clearly demonstrates the economic logic to the proliferation of the means of nuclear delivery in action. The commercial promise of participation in the Indian defense and aircraft industry was an incentive for the United Kingdom to sell the Jaguar aircraft to India despite

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<sup>82</sup> Mackenzie to Rich, “Jaguar Aircraft – India,” 20 December 1972, TNA FCO 37/1114.

<sup>83</sup> Winckler to Guiringaud, “Acquisition par l’Inde d’avions de penetration lointaine,” Carton 2249, Inde, Direction Asie-Oceanie, No. 15-7-2, Centre des Archives Diplomatiques de la France, La Courneuve, France. Emphasis mine.

the non-proliferation concerns that it posed. As a British government official noted, “Decisions on purchases made now will of course set the trend for a further 10 to 20 years, so that if we miss this chance we will have a long wait before we can try again.”<sup>84</sup> In fact, this promise of the military aircraft market not only gave India an advantage in terms of negotiating the mechanics of the deal for the Jaguar but also sparked the competition between the United Kingdom and France get the order for the aircraft, mostly to ensure the survival and sustainability of their own aircraft industries.

### *Jaguar, Alignment, and the Soviet Union – An Unexpected Finding*

An unexpected finding from the investigation of the sale of the Jaguar deal was the role of the Soviet Union in shaping the acquisition of India’s means of nuclear delivery. This involved the Soviet Union, at the last minute of the Jaguar deal, attempting to sell aircraft at a price that defied all competition; the West attempting to wean India away from reliance on the Soviets for military equipment; and India itself attempting to diversify the sources of its military equipment.

For most of the Cold War, India was seen to be close to the Soviet Union. This was because – even though India was a part of the non-alignment movement – the Soviet Union was India’s primary weapons supplier for most of the Cold War.<sup>85</sup> Hence, when an opportunity presented itself to the western states to wrest India away from its dependence on the Soviet Union, they tried their best to do so. In this section I demonstrate that there were two other paths related to alignment concerns which led to the sale of the nuclear-capable Jaguar aircraft to India. First, I show that considerations vis-à-vis the Soviet Union led to increased interest in the United Kingdom and

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<sup>84</sup> Allinson to O’Neill, “Arms Sales to India,” 9 May 1977, TNA DEFE 68/212.

<sup>85</sup> S. Nihal Singh, “Why India Goes to Moscow for Arms,” *Asian Survey* 24, no. 7 (1984): 707.

France to sell the Jaguar and the Mirage aircraft to India – even after the Indian nuclear explosion of 1974. While weighing up the pros and cons of selling the Jaguar aircraft to India in 1975, the British noted that the Soviet Union had become the largest supplier of arms to India. In fact, in the period between 1964-73, the Soviet Union had supplied about \$1270 million compared to \$80 million from the United Kingdom.<sup>86</sup> This was a situation that the British sought to redress. Second, I show that for India, over-reliance on the Soviet Union was a problem that Indian decision-makers were cognizant of and actively attempted to combat – at least in the field of their military aircraft.

### Re-aligning India from the Soviet Union

Reducing Indian dependence on the Soviet Union was the only front on which the United Kingdom and France saw it possible to cooperate. In 1973, in a memo on the sale of the Jaguar, the FCO stated that the situation was dire enough to consider approaching the French “with a view to securing the order on a jointly agreed basis in order to pre-empt a possible Soviet competition.”<sup>87</sup> As the British High Commissioner to India, Garvey, noted in a telegram back to London, “...if neither we nor the French can deal on terms which they (the Soviets) can afford. This outcome would have quite serious long-term consequences for India’s orientation, industrially, militarily and politically.”<sup>88</sup> For France too, internal reports from the Indian embassy stated that India was interested in the Soviet Tu-16 or its successor the Tu-22 bombers. They noted that the Tu-16 possessed a good range and was the aircraft to choose if India wished to build a nuclear weapon and a first-generation delivery vehicle.<sup>89</sup>

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<sup>86</sup> O’Neill to Wilford, “Arguments in Favour of Agreeing to Sell Jaguar to India,” 5 June 1975, TNA FCO 37/1971.

<sup>87</sup> Sutherland to Slater, “Sale of Jaguar Aircraft to India,” 27 January 1973, TNA FCO 37/1296.

<sup>88</sup> Garvey to FCO, “Telegram No. 251,” 26 January 1973, TNA FCO 37/1296.

<sup>89</sup> Jurgensen to Directors, “Des ventes d’armes soviétiques à l’Inde,” 20 September 1973, Carton 2254, Inde, Direction Asie-Océanie, No. 15-7-2, Centre des Archives Diplomatiques de la France, La Courneuve, France.

Garvey further noted that the best chance of keeping Russians out lay in an all-out Anglo/French co-operative effort to sell Jaguar on the best terms available. The joint strategy would, he posited, involve a plan that saw the two governments agree on withdrawal of French support to the Mirage sale; going “all out to sell Jaguar;” and “Combined Ingenuity of both governments to be applied to means of making purchase acceptable to GOI, any sacrifices to that end being equally shared.”<sup>90</sup> France was amenable to the idea, too, as their reports indicated that by 1975 the Soviets had renewed their offer of selling MiGs on very favorable credit terms to India.

The Indians were well aware of this attempt by the British to lure India away from the Soviets. Rasgotra states of the British, “These people [British officials] were always thinking ahead. They knew of India’s nuclear program...that if the need arises you [India] can weaponize. So when they think of giving us the Jaguars or a plane of that kind, which could be molded, refurbished, and so on, these thoughts may have occurred in the process of discussions etc. But they were already very upset of our growing arms relationship with Russia because of the Cold War. Because, this arms relationship they feared would turn India totally into a Moscow ally; if not an ally, a close friend, and antagonize it further against the West. This was a worry with them, the thought occurred to them every now and then.”<sup>91</sup>

Ultimately, as the FCO noted, western interests lay in preventing “...India becoming an exclusive sphere of Soviet influence, by virtue of her size, geographical position and her predominant role in the developing world...would be a major strategic loss if India fell under exclusive Soviet influence.”<sup>92</sup> To this effect, for a brief period even the United States favored the

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<sup>90</sup> Garvey to FCO, “Telegram No. 251,” 26 January 1973, TNA FCO 37/1296.

<sup>91</sup> Interview with Author, July 2018.

<sup>92</sup> “Review of Policy towards India,” 19 April 1977, TNA FCO 37/1971.

Jaguar deal before non-proliferation considerations pulled the government in a different direction. When the then Indian government was looking for credit for the purchase of the Jaguar aircraft in 1975, the United States embassy in Delhi was approached. The British embassy reported that “...The US Embassy favour the IAF getting the British Jaguar for the following reasons: A. Support for the British Aerospace Industry (SIC); B. Exclusion of MIG 23 from India, and C. Exclusion of the Mirage F1E from India with consequent damage to its European prospects and the enhancement of those of the F16 for NATO.”<sup>93</sup> It is evident that while Anglo-American commercial interests were an important consideration, keeping the Soviets out was an even more important endeavor which different NATO states were willing to work towards.

The issue of a possible Soviet sale undercut American efforts to stop the United Kingdom from selling the Jaguar to India. Under President Carter’s ‘General Policy on Arms Transfers’ the United States attempted to stop the introduction of any ‘new major weapons system’ in South Asia.<sup>94</sup> The United Kingdom, however, maintained that “...the Jaguar hardly represented a major new weapons system. If the Indians did not buy from us (UK) they might go for Swedish or French alternatives. Surely it was desirable to move the Indians away from dependence on Soviet arms.”<sup>95</sup> This is important to note especially because as late as April 1978, as India was leaning towards western Europe to buy its DPSA, the chief of the Soviet Air Staff rushed to New Delhi to offer the MiG-23 aircraft at a price that “defied all competition.”<sup>96</sup>

The Soviets generally found it easier to meet Indian requirements and offered credit at rates the western states found difficult to match. As Defense Secretary Lall noted, the Russians, “... for

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<sup>93</sup> Forster to FCO, “Telegram No. 712,” 3 June 1975, TNA 37/1626.

<sup>94</sup> Cortazzi, “Arms Sales to South Asia,” 1 June 1977, TNA DEFE 68/212.

<sup>95</sup> Ibid.

<sup>96</sup> Winckler to Ministry of External Affairs, “Avion de Penetration Profonde,” 18 April 1978, Carton 2249, Inde, Direction Asie-Oceanie, No. 15-7-2, Centre des Archives Diplomatiques de la France, La Courneuve, France.

obvious reasons, found it much easier to meet Indian requirements. Indians had turned down a Russian bid not because of commercial terms, which were acceptable, but because IAF did not like aircraft offered and preferred both Jaguar S version and Mirage F.1 (sic) India would on most grounds prefer to buy Western but if Russians came up with an acceptable aircraft on terms which only they could offer there could be no question which way decision would go.”<sup>97</sup>

### Realignment to Reduce Soviet Dependence

The Soviet Union was the primary arms supplier to India during the Cold War. However, Indian decision-makers were cognizant of this and actively attempted to combat this over-reliance. In May 1977, British reports indicated that Indian Defence Minister, Jagjivan Ram had stated that, “the government did not (repeat not) wish to be dependent on Soviet Sources for Defence equipment and would prefer to shift to the west. Ram personally was in favor of the purchase of ...Jaguars.”<sup>98</sup>

The United Kingdom’s High Commission in Delhi reported that, “...Russians, if they wished, could no doubt produce a contender (for Jaguar). It might not ideally fit IAF’s operational requirement. But beggars can’t be choosers: and fact that both (Jaguar) S version and F.1 are being considered suggests some flexibility (or uncertainty) in definition of requirement.”<sup>99</sup> Additionally, the highest echelons of the Indian armed forces had already indicated that they wished to diversify their forces and not be dependent on the Soviets.<sup>100</sup> This was evident in the fact the Indians held out for western sources of aircraft despite the Soviets offering to sell aircraft for rupees and offering liberal terms of credit.<sup>101</sup> Indian Air Chief, O.P. Mehra also made it clear to the French that he

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<sup>97</sup> Garvey to FCO, “Jaguars for India,” 24 January 1973, TNA FCO 37/1296.

<sup>98</sup> Allison to O’Neill, “Defence Sales to India,” 9 May 1977, TNA DEFE 68/212.

<sup>99</sup> Garvey to FCO, “Telegram No. 251,” 26 January 1973, TNA FCO 37/1296.

<sup>100</sup> Walters to Directorate of Defence Sales 3, “Submarines for the Indian Navy,” 13 March 1972, TNA 37/1113.

<sup>101</sup> Garvey to FCO, “Jaguar for India,” 25 September 1973, TNA FCO 37/1297.



preferred western aircraft over Soviet ones.<sup>102</sup> This may have been because of the difference in the quality of the aircraft on offer. As the French report on the matter highlighted, the MiG 23-B on offer from the Soviet Union could go only 500 hours before requiring a fatigue-related maintenance was necessary. On the contrary, the western aircraft on offer could go around 2500 hours instead.<sup>103</sup>

The USSR did not offer its most technologically advanced and capable weapons to India. And even when it did, there were internal bureaucratic issues in India which had to be navigated. When the Soviet Tu-22 strategic bomber was sought by India as a replacement for the Canberra aircraft, Prime Minister Gandhi interceded at the “highest level” to get the Soviets to agree to give India the aircraft. The Soviets eventually agreed and Principal Secretary Dhar wrote in support of the deal to the Prime Minister in a top secret and personal note, “My own view is that...we should go in for a squadron of TU-22...it could be used as a High Altitude Bomber as well as a Maritime Reconnaissance aircraft.”<sup>104</sup> However, this view did not prevail in policy because Indian defense authorities rejected the deal at the last moment.

The sale of the Jaguar aircraft to India was thus not only a result of the Indian need to acquire a deep penetration strike aircraft and economic competition among western suppliers to provide the aircraft – it was also a function of deep concerns about Indian alignment with the Soviet Union. These alignment concerns manifested themselves in two ways. First, it led to western powers – France and United Kingdom – to attempt to wean India away from the Soviet sphere of influence. Second, and relatedly, India sought to diversify its sources of military aircraft

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<sup>102</sup> Jurgensen to Directors, “Achats d’armements modernes par les forces armees indiennes,” 27 September 1974, Carton 2248, Inde, Direction Asie-Oceanie, No. 15-7-2, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>103</sup> Ibid.

<sup>104</sup> D.P. Dhar to Indira Gandhi, Correspondence, 9 October 1974, Haksar Collection, IIIrd Installment, Subject File 284, NMML.

over concerns of over-reliance on the Soviet Union. In the course of these two dynamics, non-proliferation concerns over the Indian acquisition of nuclear delivery aircraft were given short shrift. This finding about the geopolitical alignment imperatives driving Indian nuclear choices demonstrates that the economic imperative discussed earlier was not the only logic present during this episode of the proliferation of nuclear delivery vehicles. The episode demonstrates that different logics could be operating simultaneously – even if one logic may be more dominant than the other in the final outcome.

Ultimately, the first step by India towards building a nuclear force was to modify its reliable aircraft to carry nuclear weapons.<sup>105</sup> By the late-1980s the Jaguar aircraft, along with the Mirage 2000H acquired from France were rewired and modified to be capable of delivering nuclear weapons.<sup>106</sup>

### **Space Technology, Dual-Use Ambiguity, and India's Missile Development**

Alongside the acquisition of military aircraft that could be modified to deliver nuclear weapons, India also sought to develop nuclear-capable missiles. This was because the air-leg of any nuclear force is vulnerable to pre-emptive strikes from an adversary, and any nuclear mission undertaken by an aircraft requires a high number of support aircraft (approximately 10 support aircraft per nuclear bomb-carrying aircraft), making the enterprise an expensive one.<sup>107</sup> In contrast, land-based missiles are less costly and hence more affordable to develop in the long run. This made it inevitable that India would develop ground-based ballistic missile systems next as a part of the Integrated Guided Missile Development Programme (IGMDP) established in 1983.<sup>108</sup>

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<sup>105</sup> Interview with a former Chairman Chiefs of Staff Committee (COSC), India, 2018.

<sup>106</sup> Interview with a former senior defense official involved in nuclear strategy, India, 2018.

<sup>107</sup> Interview with Vice Admiral Vijay Shankar, Former Strategic Forces Commander (2006-2008), Mumbai, India, March 2018.

<sup>108</sup> Ibid.

Dual-use space technology enabled India to develop nuclear delivery vehicles in the form of ballistic missiles. Space-related rocket technology that helped India make satellite launch vehicles directly contributed to the development of ballistic missiles under the IGMDP. The first stage of India's first Intermediate Range Ballistic Missile (IRBM) Agni was also the first stage of the Indian Space Research Organisation (ISRO) developed Satellite Launch Vehicle (SLV-3), which was successfully tested in 1980.<sup>109</sup> In addition to the first-stage rocket, the heat shield and the guidance system for the IRBM all came from India's space program.<sup>110</sup> Furthermore, in 1993, ISRO was tasked by the Indian Prime Minister to replace the Agni's liquid-fuel second stage, which had been developed by the Defence Research and Development Organisation (DRDO), with a new solid fuel motor, so ISRO ended up building both stages of the nuclear-capable IRBM.<sup>111</sup> India's space program was thus a conduit for the flow of foreign technology into its missile program.

Why were nonproliferation/counterproliferation efforts unable to address this development, especially given that most states expected India to build a ballistic missile capacity after its 1974 nuclear test? India's development of IRBM technology through the use of international cooperation in space technology highlights a pathway to a nuclear delivery vehicle which remains unexplored. Four important factors stand out in the international collaboration that helped India develop the ballistic missiles in its nuclear force structure. First, the Zone of Ambiguity in the global non-proliferation regime created an enabling or permissive condition under which this cooperation took place. Second, the 'dual-use' nature of space technology was

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<sup>109</sup> For a brief introduction to the history and the scope of the ISRO's activities see: Ajey Lele, *Institutions That Shaped Modern India: ISRO* (Rupa Publications India, 2021).

<sup>110</sup> Gary Milhollin, "India's Missiles—With a Little Help from Our Friends," *Bulletin of the Atomic Scientists* 45, no. 9 (November 1, 1989): 31.

<sup>111</sup> Chengappa, *Weapons of Peace*, 387.

exploited to ensure cooperation on the technology. Third, for both the suppliers and the receiver, the implications of this technology sharing vis-à-vis military application was clear. The cooperation nevertheless persisted, owing to the fact that the international non-proliferation regime did not (and to date still does not) have a legally binding restriction on the transfer of missile/space technology that could help a state build ballistic missiles. Although there was a norm against the non-proliferation of technology associated with nuclear weapons in the 1970s, it was not legally binding and states chose to ignore it. And fourth, for the supplier – in this case, France – the most important motivation for engaging in this proliferation of the means of nuclear delivery was commercial benefit, and the potential to shape the Indian space industry in the following decades.

In this section, I will first highlight a brief history of India's development of space technology, then using recently declassified documents from archives in France and India, I will go on to establish that India's use of space technology to develop IRBM technology was not an accident. Instead, it was part of a deliberate strategy to create the technological capacity that would eventually help India develop missile technology to deliver nuclear weapons. In this endeavor, collaboration with the French space agency was critical. After the Indian nuclear test of 1974, when NATO reported that India would develop a missile capability by the 1980s, France, too, had concluded that India would be able to fabricate a nuclear weapon by 1975 and its 'missile vectors' would be available closer to 1980.<sup>112</sup> However, French space collaboration with India continued and even intensified after 1974, leading to an inter-governmental agreement on space cooperation with India in 1976. New evidence from both the French and Indian archives demonstrate that France was fully cognizant of the military implications of space cooperation with India, especially after the 1974 PNE, and chose to ignore the military applications of the technology so long as it

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<sup>112</sup> Ministère des Affaires Étrangères, "de l'explosion nucléaire indienne," 27 May 1974, Carton 2252, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

could be called ‘civilian’ technology.<sup>113</sup> The Zone of Ambiguity and the multipurpose nature of the space technology as well as the lack of structural impediments to constrain the transfer of this technology enabled India to build its IRBMs with foreign help.

*India’s Space Program and Defense Imperatives (1964-74)*

By 1964, space and rocket technology began to get attention from the Department of Atomic Energy, and Homi J. Bhabha, the director of the Indian Atomic Energy Establishment, sought foreign assistance to set up a group of scientists and engineers to develop sounding rockets.<sup>114</sup> In 1965, a British newspaper reported that India had the means to begin manufacturing rockets to defend itself against China in twelve months.<sup>115</sup> Given the overlap between the civilian and military uses of rocket technology this was not a surprising technological jump. Thus, when the report went on to state that “... the production of large rockets capable of delivering atomic bombs to Chinese cities will be several years hence” – it was not an implausible hypothesis.<sup>116</sup>

In 1967, then Principal Secretary to the Prime Minister, L.K. Jha, wrote a top secret note on what to do with the Indian nuclear program in light of the NPT discussions taking place. Jha recommended that India should continue its policy of not developing nuclear weapons and at the same time stated that India, “should recognize that conditions may change in which this policy may have to be given up. Towards that end, we (India) should concentrate a little more on

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<sup>113</sup> For accounts of French and Indian cooperation on nuclear energy, see Jayita Sarkar, “‘Wean Them Away from French Tutelage’: Franco-Indian Nuclear Relations and Anglo-American Anxieties During the Early Cold War, 1948–1952,” *Cold War History* 15, no. 3 (July 3, 2015): 375–94; Jayita Sarkar, “From the Dependable to the Demanding Partner: The Renegotiation of French Nuclear Cooperation with India, 1974–80,” *Cold War History* 21, no. 3 (July 3, 2021): 301–18.

<sup>114</sup> Sarabhai to Itokawa, 3 December 1964, Ministry of External Affairs Disarmament Division, U.IV/1011/8/1964, National Archives of India (NAI).

<sup>115</sup> Anthony Michaelis, “India Prepares to Join Nuclear Club,” *Daily Telegraph*, Ministry of External Affairs Disarmament Division, U.IV/125/57/65, NAI.

<sup>116</sup> Ibid.

developing our missile capacity which, incidentally, is not affected by the Treaty on non-proliferation...”<sup>117</sup> As Chengappa claims, in 1970, the Indira Gandhi government was already considering nuclear delivery vehicles in case India developed nuclear weapons, and feasibility studies for both long-range ballistic missile development (Project Valiant) and a nuclear propelled submarine (Project 937) were sanctioned by the Prime Minister’s Office.<sup>118</sup>

In 1972, when the Space Commission and the Department of Space was set up in India – thus separating the space research organization from the Atomic Energy Commission – a secret cabinet note outlining the organization of the new agencies stated that “Rockets are needed to launch satellites and deep space probes; powerful rocket systems employing solid as well as liquid fuels are required for these purposes. The development of this technology is of great significance from the point of view of missiles in Defence.”<sup>119</sup> The report also acknowledged that India’s rocket launching facility had received “major assistance” from USSR, USA, and France.<sup>120</sup>

Elsewhere, in the Ministry of Defence, a “missile study group” in defense research was created at the behest of V.K. Krishna Menon (then Defence Minister) and Prime Minister Nehru’s approval in the early 1960s.<sup>121</sup> Though it was originally decided to reverse engineer a French wire-guided missile, the Soviet SA-2 missile had suddenly gained popularity by bringing down an American U2 over Russia. This convinced Menon of the need to build something like the SA-2 in India.<sup>122</sup> In 1970, Prime Minister Indira Gandhi asked her chief scientific advisor, Dr. B.D.

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<sup>117</sup> L.K. Jha to Prime Minister, ‘Nuclear Policy’, 3 May 1967, Haksar Collection, IIRd Installment, Subject File 111, NMML.

<sup>118</sup> Chengappa, *Weapons of Peace*, 129–30.

<sup>119</sup> T. Swaminathan, “Note for Cabinet: Setting up of the Space Commission and the Department of Space, and related matters,” 24 May 1972, Prime Minister’s Secretariat, 17/39/72-PMS, NAI.

<sup>120</sup> Ibid.

<sup>121</sup> Robert S. Anderson, *Nucleus and Nation: Scientists, International Networks, and Power in India* (Chicago: University of Chicago Press, 2010), 418.

<sup>122</sup> Anderson, 419.

Nagchaudhari, to start a top-secret feasibility study of developing long range ballistic missiles; this project was named Project Valiant and run by the DRDO.<sup>123</sup>

The Indian defense establishment had demonstrated interest in collaboration and assistance from the Indian Space Research Organisation as well.<sup>124</sup> In 1972, the Ministry of Defence had taken a “keen interest in space technology for their use.”<sup>125</sup> The Indian National Satellite (INSAT) program – even though it was to have overtly civilian development-related goals – was seen to be one of the space-technology related programs from which defense agencies could benefit and greater cooperation between space and defense agencies was recommended.<sup>126</sup>

Recently declassified documents reveal that the Indian space program was geared to develop IRBM/ICBM capacity from very early on. In 1973, a note to the Prime Minister by her scientific advisor titled “INSAT and the Fifth Plan” asked if the government’s intention was to use the Indian National Satellite (INSAT) program as “the public rationale for the nation pursuing an ambitious space programme, particularly the development of very large rockets...broadly equivalent to inter-continental ballistic missiles.”<sup>127</sup> Arguing against the public posture of the Indian government to deny any security uses of its space program, the note states that “however much Government may formally deny the security dimensions of the Space programme, there is adequate evidence that Parliament, the press, the Scientific Community and the educated sections of our population as a whole are convinced that a Space Programme of the character and magnitude being set up is ultimately aimed at meeting Security objectives.”<sup>128</sup> The note went on to argue that,

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<sup>123</sup> Chengappa, *Weapons of Peace*, 129.

<sup>124</sup> Murthy to Haksar, “A Proposal for Organisational Structure for ISRO,” 14 January 1972, 17/39/72-PMS, NAI.

<sup>125</sup> Deshmukh to Parthasarathi, “INSAT Program – a brief re-assessment in light of current situation,” 20 March 1972, Prime Minister’s Secretariat, 17(1015)/72-PMS, NAI.

<sup>126</sup> Deshmukh to Parthasarathi, “INSAT Program – a brief re-assessment in light of current situation,” 20 March 1972, Prime Minister’s Secretariat, 17(1015)/72-PMS, NAI.

<sup>127</sup> Parthasarathi, Ashok, “INSAT and the Fifth Plan,” 29 September 1973, Prime Minister’s Secretariat, 17/1472/73-PMS, NAI. [the blank space denotes an illegible word]

<sup>128</sup> Ibid.

...Government has already made public the national objective of launching a 40 KG Scientific Satellite by a medium sized Indian rocket around 1978. Achieving this objective will involve a direct cost of around Rs. 20 crores over the next 5 years apart from substantial infrastructure costs. Government has not felt the need to give any “developmental” rationale for this project. The argument that a poor country like ours is proposing to undertake this fairly expensive project, including development of its own Satellite launch rocket, because of our stake in the basic research experiments which the Scientific Satellite will carry out, has extremely low credibility from any point of view. For instance, the UK and Germany are using American or French rockets for launching their Scientific Satellites. My point is that foreign countries are fully aware that our “Scientific Satellite Programme” is really aimed at developing the capability to make intermediate range ballistic missiles. Therefore, we are not likely to encounter any greater disbelief or obstacles by extending the rocket development programme in the direction of the inter-continental ballistic missile, i.e. the “cover “ for rocket development does not really need INSAT or \_\_\_\_\_ wide TV system based upon it.<sup>129</sup>

The INSAT program allowed India to expand its cooperation with foreign collaborators in space technology. The technology developed would eventually culminate in the successful Indian SLV-3 launch of 1980. The DRDO would borrow this technology – specifically, the solid-fuel first stage of the SLV-3 rocket – to make the Agni IRBM program after 1982.<sup>130</sup> The Agni I and the SLV-3 first stages had the “...same hardware, same propellant system, same fins.”<sup>131</sup>

#### *With a Little Help From Our Friends*

The Indian space program was highly dependent on foreign help. This help was forthcoming from very early on, despite its obvious defense-related goals. While the United States, European Space Research Organisation (ESRO), Germany, Japan, and the Soviet Union were all involved in space technology-related aid to India, the deepest cooperation that India had on this front was with France.

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<sup>129</sup> Ibid.

<sup>130</sup> Interview with senior official directly related to national security decision-making, India, 2018.

<sup>131</sup> Interview with Dr. Rajaram Nagappa (Former Associate Director, Vikram Sarabhai Space Centre, Indian Space Research Organisation), Bangalore, India, May 2018.



The first step towards setting up space capabilities in India was the development of sounding rockets. This effort began in the early 1960s and India sought help from the United States, Japan, and France. NASA helped set up the Thumba Equatorial Rocket Launching Station (TERLS) in South India where rocket tests could be conducted. It also trained a small group of Indian engineers to assemble imported sounding rockets and their payloads (among other things) at the Goddard Space Flight Center and Wallops Island.<sup>132</sup> In November 1963, a NASA-supplied Nike-Apache rocket was first tested from TERLS with the help of American and French technicians.<sup>133</sup>

India also sought help from Japan to set up a Space Technology Laboratory in India. In 1964, a Japanese rocket expert, Prof. Hideo Itokawa, was asked to help develop a sounding rocket that would be able to reach the height of 1000 kilometers with a payload of 100 kilograms.<sup>134</sup> In the same year, India concluded an arrangement with the French firm Sud-Aviation to manufacture under license a two-stage rocket capable of reaching an altitude of 150 km with a 30 kg payload. A special Rocket Fabrication Facility was set up at Thumba to make solid propellant blocks under license from France.<sup>135</sup> French aid to this rocket propellant plant included visits by Indian scientists and engineers to French solid propellant facilities, and also lists of equipment and designs for the tools to build them.<sup>136</sup>

India's intention to develop a space program leading to a Space Launch Vehicle (SLV) was expressed in a report by Vikram Sarabhai (Chairman of the Atomic Energy Commission of India)

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<sup>132</sup> Interestingly, APJ Abdul Kalam, the man who would lead India's missile program in the 1980s and come to be known as India's 'missile man' was also in this group.

<sup>133</sup> Gopal Raj, *Reach for the Stars: The Evolution of India's Rocket Programme* (New Delhi: Viking, 2000), 16.

<sup>134</sup> Sarabhai to Itokawa, 3 December 1964, Ministry of External Affairs Disarmament Division, U.IV/1011/8/1964, National Archives of India (NAI).

<sup>135</sup> Atomic Energy Commission, "Atomic Energy and Space Research: A Profile for the Decade 1970-80," 22 July 1970, accessed at: <https://inis.iaea.org/collection/NCLCollectionStore/Public/02/006/2006423.pdf>.

<sup>136</sup> Raj, *Reach for the Stars*, 38.

authored ‘Atomic Energy and Space Research - A Profile for the Decade 1970-1980.’ It stated that India would, by the end of the 1970s, develop a launch vehicle capable of placing a 1200 kg satellite into orbit.<sup>137</sup> The SLV-3 was modelled on the American Scout rocket. Indian knowledge of the Scout program and design allowed the ISRO to use it as a model for the configuration, design, and determine other performance requirements of the SLV-3.<sup>138</sup> Even so, the technology for the solid stages, propellants, and electronics had to be developed by the ISRO.<sup>139</sup> This is where cooperation with the space programs of other states, particularly France, would prove to be very useful. In fact, according to the French Ministry of External Affairs, the assistance given by France to India in the domain of space technology was very much ahead of that given by the United States or the Soviet Union.<sup>140</sup>

**Table 5.2: Indian Space Collaboration with Foreign Countries (1961-1980)**

Year	Parties involved		Collaboration
	Indian	Foreign	
1961	Department of Atomic Energy (DAE)	National Aeronautics and Space Association (NASA)	- Satellite Telemetry receiving facility at Physical Research Laboratory (Ahmedabad, India)
1963	DAE	NASA	- Establishment of Thumba Equatorial Rocket Launching Station (TERLS)

<sup>137</sup> Atomic Energy Commission, “Atomic Energy and Space Research: A Profile for the Decade 1970-80,” 22 July 1970, accessed at: <https://inis.iaea.org/collection/NCLCollectionStore/Public/02/006/2006423.pdf>.

<sup>138</sup> Raj, *Reach for the Stars*, 57.

<sup>139</sup> Raj, 58.

<sup>140</sup> Ministère des Affaires Étrangères, “de divers aspects complémentaires de la coopération spatiale franco-indien,” 21 December 1977, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

1964	Indian National Committee for Space Research (INSCOPAR), DAE	Sud-Aviation, France	<ul style="list-style-type: none"> <li>- Licensed production of Centaure sounding rockets in India</li> <li>- Rocket Propellant Plant to start manufacture of propellant grains for Centaure project<sup>141</sup></li> </ul>
1969	Indian National Committee for Space Research (INSCOPAR), DAE	European Space Research Organisation (ESRO)	<ul style="list-style-type: none"> <li>- Exchange of Scientific and Technical information</li> <li>- Fellowships</li> <li>- Indian telemetry support to ESRO scientific satellites<sup>142</sup></li> </ul>
1971	DAE	West Germany	- cooperation in atomic energy and space research <sup>143</sup>
1972	Indian Space Research Organisation	Academy of Sciences, USSR	- Launch of Indian satellite with aid of Soviet rocket carrier <sup>144</sup>
1972	Indian Space Research Organisation	Centre National D'Etudes Spatiales, France	- ISRO/CNES Joint Commission <sup>145</sup>
1974	Department of Space, India	Societe Europeene de Propulsion/Centre National D'Etudes Spatiales, France	<ul style="list-style-type: none"> <li>- Development of ARIANE Satellite Launch Vehicle – India to provide transducers</li> <li>- French to supply know-how to VIKING engine (60 ton liquid propulsion engine)</li> </ul>

<sup>141</sup> Murthy to Haksar, “Rocket Propellant Plant,” 14 January 1972, 17/39/72-PMS, NAI

<sup>142</sup> Sarabhai to Prime Minister, “Collaboration with the European Space Research Organisation (ESRO) in the peaceful uses of outer space,” 9 August 1969, Prime Minister’s Secretariat, 17(1015)/71-PMS, NAI.

<sup>143</sup> Murthy to Haksar, “Collaborative Programmes between ISRO and Foreign Countries,” 14 January 1972, 17/39/72-PMS, NAI

<sup>144</sup> Haksar to Menon, 19 May 1972, Prime Minister’s Secretariat, 17/39/72-PMS, NAI.

<sup>145</sup> JS-I to Prime Minister, 23 May 1975, 17/1015/1975-PMS, NAI.

			- France to train 20-30 Indian engineers on ARIANE launch vehicle and Viking engine <sup>146</sup>
1975	Indian Space Research Organisation	Academy of Sciences, USSR	- Setting up of fixed optical tracking station for satellites in India <sup>147</sup>
1975	Indian Space Research Organisation	French and German Space Agencies	- Indian use of Franco-German SYMPHONIE satellite to conduct Satellite Telecommunications Experiment Project (STEP)
1975-1976	Indian Space Research Organisation	NASA	- Satellite Instructional Television Experiment <sup>148</sup>
1977	Government of India	Government of France	- Framework of inter-governmental cooperation in space technology

As Table 5.2 demonstrates, between 1960 to 1980, there was considerable scientific and technological cooperation between India and foreign countries on the Indian space program which culminated in its space launch vehicle (designated SLV-3). The SLV-3 was planned by Sarabhai to consist of four solid-propellant stages.<sup>149</sup> When Sarabhai's interim successor, M.G.K Menon, was appointed to be chairman of the ISRO, Prime Minister Indira Gandhi wrote to him, "I have long felt that there has to be some linkage between our Space Programme and defence needs. It

<sup>146</sup> Dhawan to Prime Minister, 28 September 1974, 17/1561/74-PMS, NAI.

<sup>147</sup> Dhawan to Prime Minister, "Collaboration with the USSR Academy of Sciences for the setting up in India of a fixed photographic tracking station for satellites and space probes," 6 July 1975, 17/1015/1975-PMS, NAI.

<sup>148</sup> Department of Space, "Indo-US Cooperation in Space Research and Applications," 27 May 1978, 17(1278)/1978, NAI.

<sup>149</sup> PV Manoranjan Rao and P Radhakrishnan, *A Brief History of Rocketry in ISRO* (Universities Press (India), 2012), 82.

might be a good thing if you and Dr. B.D. Nag Chaudhuri [scientific advisor to the Defence Minister] were to discuss...how best this could be achieved.”<sup>150</sup>

Following cooperation on solid fuels in the 1960s, cooperation between India and France on space projects really took off in the 1970s. In 1971, the director general of CNES, Gen. Aubiniere, visited India with a team of specialists for negotiations on cooperation between CNES and ISRO. France was interested in the purchase of Indian sounding rockets (Menaka and Rohini); it also wanted India to take up the development of the fourth stage of the French Diamant BC satellite launch vehicle, along with an instrumentation package for it; to collaborate on flight testing the upper stage of a satellite vehicle; and finally, to conduct rocket experiments from India's Thumba Equatorial Rocket Launching Station (TERLS).<sup>151</sup> The CNES-ISRO dialogue on collaboration on the French “Diamant BC” – the successor to the Diamant B satellite launch vehicle (SLV) – advanced, and ISRO was tasked to make the fourth and last stage (650mm diameter) of the SLV. After detailed discussions between Indian and French experts it was decided that this stage would be common to both the French Diamant BC and the planned Indian SLV-3.<sup>152</sup> While the French eventually abandoned the project halfway through, the fourth stage motor was indeed developed and eventually used by ISRO in the SLV-3.<sup>153</sup>

Further collaboration with France helped India set up other aspects of its space program. Facilitated by the CNES, in 1974 ISRO and a French firm, SEP, signed a contract for “the transfer to ISRO of the complete technology of the VIKING engine developed by SEP.”<sup>154</sup> This was the same VIKING engine used by the Ariane space launch vehicle that was designed by France and

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<sup>150</sup> Prime Minister to Menon, Correspondence, 12 January 1972, quoted in Jairam Ramesh, *Intertwined Lives: P.N. Haksar and Indira Gandhi* (New Delhi: Simon & Schuster, 2018), 244.

<sup>151</sup> Murthy to Haksar, “Collaborative Programmes between ISRO and Foreign Countries,” 14 January 1972, 17/39/72-PMS, NAI

<sup>152</sup> Murthy to Haksar, “Space Science and Technology Centre,” 14 January 1972, 17/39/72-PMS, NAI

<sup>153</sup> Rao and Radhakrishnan, *A Brief History of Rocketry in ISRO*, 87.

<sup>154</sup> JS-I to Prime Minister, 23 May 1975, 17/1015/1975-PMS, NAI.

used by the European Space Agency (ESA). Additionally, CNES provided extensive training to ISRO's scientists and engineers and also gave a complete telemetry and telecommand station to India, which was installed at Thumba.<sup>155</sup> Nagappa states that the Viking technology transfer was a part of a barter arrangement that India did not pay for directly, but through "100 man years of ISRO technical support" to the French space program. The CNES would allocate ISRO scientists and engineers as any project of their choice for 75 "man years" of the total period and ISRO could pick the projects it wanted to be involved in for the remaining twenty-five.<sup>156</sup> In light of these extensive collaborations in "space research technology, and applications" both countries signed an inter-governmental agreement to formalize the exchange.<sup>157</sup> By 1975, ISRO also entered into an agreement with French and German Space agencies to use the Franco-German SYMPHONIE satellite to conduct telecommunication experiments.<sup>158</sup>

### *International View of India's Space Program, and Nuclear Delivery*

The issue of international aid to India in space technology and India's nuclear delivery capability are intertwined. In February of 1973, after a trip to India and meetings with the ISRO, the CNES noted that India had demonstrated a very keen interest to develop large launchers which could eventually have military uses.<sup>159</sup> The CNES, however, was not concerned about this and saw itself as an intermediary between ISRO and French industry, which would presumably be subject to the "standard procedures related to the delivery of sensitive materials."<sup>160</sup>

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<sup>155</sup> Ibid.

<sup>156</sup> Interview with Nagappa, May 2018.

<sup>157</sup> JS-I to Prime Minister, 23 May 1975, 17/1015/1975-PMS, NAI.

<sup>158</sup> Dhawan to Gandhi, 16 October 1975, 17/1278/1975-PMS.

<sup>159</sup> "Coopération spatiale franco-indienne," 14 February 1973, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>160</sup> Ibid.

After India's 1974 test, the Canadian delegation to NATO informed its members in a confidential note that India had set aside about 45 million dollars for the development of satellite launchers – “a project which will assist in the development of ballistic missiles as well as satellite communication system.”<sup>161</sup> At the same time, the French ministry also received a copy of Pakistani Prime Minister Bhutto's letter to Indira Gandhi after the 1974 test, which stated, “...the Indian nuclear explosion is an event which cannot be viewed in isolation from its surrounding circumstances. Your rapidly developing programme for acquiring medium-range missiles and with external assistance, placing a satellite in orbit, thus obtaining a delivery system for nuclear weapons, and your projected building of a nuclear navy are most pertinent in this context.”<sup>162</sup>

However, in June 1974, about a month after India tested its ‘peaceful nuclear device’, the French Ministry of External Affairs (Ministère des Affaires Étrangères) took stock of its scientific and technical cooperation with India and stated its cautious approach to cooperation in space with India. It noted that France and India, through their respective space research organizations, CNES and ISRO, had a strong relationship. CNES was training high level Indian scientists and technicians from ISRO. Furthermore, India was interested in participating in the construction of the European space launch vehicle, Ariane, and also wished to buy the license to the Viking rocket engine (the first and second stages of the Ariane launch vehicle) from the Société Européenne de propulsion (SEP).<sup>163</sup> However, the ministry noted, it was cautious with regard to aid in the construction of space launchers because of the potential military applications. The ministry also noted that India's participation in the Ariane program granted it access to advanced space

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<sup>161</sup> Fowell to Andrews, “The Indian Nuclear Test,” 5 June 1974, Carton 2253, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>162</sup> Bhutto to Gandhi, Personal Correspondence, 10 June 1974, Carton 2253, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>163</sup> Ministère des Affaires Étrangères, “Coopération culturelle, scientifique et technique franco-indienne,” 18 June 1974, Carton 2250, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

technology with minimal contribution on its part. The ministry concluded, however, that the prospects for cooperation with India on space were sufficiently favorable for France to – despite these reservations – fully exploit the situation.<sup>164</sup>

In accordance with this position, France's SEP sold India the license to build the Viking rocket engine the same year.<sup>165</sup> In 1975, Prof. Levy, the president of CNES visited ISRO and noted that India had made considerable progress in the domain of launch vehicles and solid fuels. In fact, he went on to state that progress on the SLV-3 project made it clear that India had already attained "complete mastery" over the different solid fuel stages that were comparable to the ones used in France for nuclear delivery.<sup>166</sup>

The United Kingdom reported in 1976 that through the SLV-3 program, India would be able to develop a missile delivery potential. It was assumed that "...by the early 1980s India should be in a position to present China with a primitive but nonetheless real nuclear deterrent."<sup>167</sup> In August 1976, the French noted that cooperation in space with India might help it develop the means to deliver a nuclear weapon.<sup>168</sup> On the other hand, they also noted that India offered broad prospects for cooperation in space because of the desire of the Indian government to gain industrial autonomy in the area. Cooperation, however, was not going to be easy to set up because of the "strict guarantees" of peaceful use that were required of India.<sup>169</sup>

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<sup>164</sup> Ibid.

<sup>165</sup> Ministère des Affaires Étrangères, "Relations scientifiques franco-indiennes," 29 January 1980, Carton 2251, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>166</sup> Jurgensen to Directors, "Cooperation Spatiale Franco-Indienne," 24 June 1975, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>167</sup> Michael Pakenham, "Nuclear India," 27 April 1976, TNA 37/1734.

<sup>168</sup> "En vue de l'audience accordée par le Ministre à l'Ambassadeur de l'Inde le 3 août 1976," 3 August 1976, Carton 2250, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>169</sup> Ibid.



By 1980, the French Ministry of External Affairs noted that France's help to India did not yield the expected return to French industry.<sup>170</sup> India had not reciprocated the French favor. By maintaining certain specifications for the INSAT launcher (in 1977), ISRO did not allow the French space industry to submit bids to supply equipment or the launcher.<sup>171</sup> For that reason, the CNES decided that from 1980 onward, it would limit its cooperation with ISRO and examine any new avenue of cooperation on a case-by-case basis.<sup>172</sup> ISRO's reluctance to buy French material or allow France to supply the launcher for the INSAT could be explained by India's interest in ensuring the ability to master the entire process of producing a launch vehicle instead of simply buying it. As Parthasarathi had noted in his argument to the Prime Minister in 1973, if India were interested in just putting a telecommunications satellite in space, it could have used American or French rockets to do so. Development of its own satellite launch vehicle along with the associated infrastructure was very obviously geared towards the capability to make intermediate range ballistic missiles.<sup>173</sup>

*The Dual-Use Conundrum: "Peaceful Purposes" or Military?*

The above account highlights two important things about India's space program. First, it was aimed towards an IRBM/ICBM capacity from the early 1970s onward. Second, it tells us that in the process of building up this space capacity, foreign collaboration was crucial, and India gained access to resources and technology from the United States, USSR, the European Space Agency, and—most of all—from France. The question then is, to what extent were India's foreign

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<sup>170</sup> Ministère des Affaires Étrangères, "Relations scientifiques franco-indiennes," 29 January 1980, Carton 2251, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>171</sup> Ibid.

<sup>172</sup> Ibid.

<sup>173</sup> Parthasarathi, Ashok, "INSAT and the Fifth Plan," 29 September 1973, Prime Minister's Secretariat, 17/1472/73-PMS, NAI.

collaborators aware of its plans to use technology from its space launch vehicle to develop an IRBM/ICBM capacity? What about the international non-proliferation order allowed for this – especially after the 1974 nuclear explosion by India?

One explanation for this could be that India's foreign collaborators could not possibly know that India would use the space technology meant for a civilian satellite program towards a military capability. However, this is unlikely. As Prime Minister Indira Gandhi's Special Advisor pointed out in a note to her in 1973, "certainly the USA and France and to an increasing extent the USSR have, by virtue of their own involvement in our Space Program, adequate information on the policy and technical dimensions of our programme, to not be taken in by any such public posture that government may take."<sup>174</sup>

In fact, as early as February 1973, the French CNES noted that India had displayed a keen interest in making "'big launchers' (that could eventually serve military ends)."<sup>175</sup> India was looking for any possible cooperation (ranging from information to technical and industrial means) that France could provide.<sup>176</sup> After the 1974 peaceful nuclear explosion by India, the French embassy in India noted that the most serious question was by when India could develop its nuclear delivery system. Noting India's capability to manufacture rockets and solid fuels, France estimated that in five years (i.e., by 1979), India would be able to produce IRBMs along with their guidance systems.<sup>177</sup> Specifically, the communique stated that this would be a three-stage missile capable of launching a geostationary satellite weighing about one ton.<sup>178</sup>

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<sup>174</sup> Ibid.

<sup>175</sup> "Coopération spatiale franco-indienne," 14 February 1973, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>176</sup> Ibid.

<sup>177</sup> Ministère des Affaires Étrangères, "Vecteurs Indiens," 22 May 1974, Carton 2252, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>178</sup> Ibid.

On the future of an Indian missile-based nuclear delivery system, in July 1974, the French Prime Minister's Jacques Chirac's secretariat noted that nuclear and space research in India were intimately linked and that, "if a political decision directed part of the (Indian) space effort for defense purposes, the experience acquired in matters of propulsion, sounding rockets and launchers, guidance, would be directly usable to make a medium or intermediate range ballistic missile for a nuclear weapon."<sup>179</sup> This assessment, however, did not stop France from cooperating with India on space technology. As a former French civil servant in the Ministry of Industry at the time stated in an anonymous interview, "selecting to cooperate with India in space was a political move and we could not ignore that it would have an effect on military applications. But the military application would not be immediate."<sup>180</sup>

In February, 1975, India had signed a contract with the French firm SEP through which the India would "acquire know-how as well as a license for the manufacture of the Viking Rocket Engine."<sup>181</sup> However, as the Principal Secretary to Prime Minister Indira Gandhi wrote to her in a secret note, after the contract was signed, the Acting Director General of the European Space Research Organisation (ESRO) had instructed SEP to modify the contract with ISRO to include "an explicit statement that the transaction was entirely for peaceful purposes."<sup>182</sup> Furthermore, the French government had communicated to India that it was under pressure from other members of the European Space Agency (ESA) – mainly the United Kingdom and West Germany – to ask ISRO to submit such an undertaking. India was inclined to comply. As the Principal Secretary noted,

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<sup>179</sup> Premier Ministre Secretariat General de la Defense Nationale, "Le Developpement du Programme Spatial en Inde," 16 July 1974, Carton 2254, Inde, Direction Asie-Oceanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>180</sup> Interview with former French Civil Servant in the Ministère de l'Industrie, France, 2018.

<sup>181</sup> Dhar to Prime Minister, 18 February 1975, Prime Minister's Secretariat, 17/1295/75-PMS, NAI.

<sup>182</sup> Ibid.

...we have in the past few years, developed a very good and friendly collaboration with the French Space agency, we must continue this and avoid situations which would embarrass them and impede our valuable collaboration with them. Even ISRO's programme has been always directed towards the utilisation of outer space for peaceful purposes. *This fact in no way precludes Government making use of the knowledge gained and technology developed for other national purposes.*<sup>183</sup>

In other words, India was happy to comply with the French request for two reasons. First, it would keep India's good relations with the French space agency intact and ensure future collaboration. And second, ISRO's commitment to using the technology acquired for expressly peaceful purposes did not preclude other branches of the Indian government to use the technology in other contexts. "Other national purposes" in the note kept open the option to use the technological knowledge acquired in this exchange towards military purposes if the need arose.

In June 1975, after a visit to India, the chief of the CNES noted that India had acquired the complete mastery over the solid fuel stages comparable to those used in the missile systems of the French *Force de Dissuasion*.<sup>184</sup> Levy went on to note that Franco-Indian cooperation on liquid fueled launchers, particularly granting the license of the Viking engine would help advance Indian knowhow related to the complex technology, but it was not related to setting up India's *Force de Dissuasion* – which made it acceptable.<sup>185</sup>

By November 1975, the French Foreign Ministry asked itself the question, in the event of Indian nuclearization, what was France's direct or indirect contribution, via cooperation in space technology, to the realization of India's nuclear delivery capability?<sup>186</sup> The Ministry noted that it was ultimately from this angle that France had to decide on the future of Franco-Indian cooperation

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<sup>183</sup> Ibid. Emphasis mine.

<sup>184</sup> Ministère des Affaires Étrangères, "Coopération Spatiale Franco-Indienne," 24 June 1975, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>185</sup> Ibid.

<sup>186</sup> Ministère des Affaires Étrangères, "Coopération spatiale franco-indienne," 13 November 1975, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-3, Centre des Archives Diplomatiques de la France, La Courneuve, France.

in space and the advisability of signing an official cooperation agreement. However, they also noted that given that the scope of the cooperation was officially within the bounds of “peaceful purposes” it effectively resolved the problem of potential military use.<sup>187</sup>

Interestingly, in December 1975, the Scientific Advisor to India’s Defense Minister, MGK Menon asked the French Ambassador in India for discussion of an agreement on the development and production of missiles during the French Prime Minister’s visit to India.<sup>188</sup> It was also noted that the Indian Foreign Secretary had said that the negotiations need not be made public and that Indo-French collaboration in the domain of missiles was good and that India found French technology especially to be excellent.<sup>189</sup> The Indian offer to have secret negotiations on Franco-Indian development of missiles in 1975 pointed towards India’s seriousness to develop this capability with foreign aid.

The most authoritative treatment of the issue of French space technology being used for a potential Indian nuclear delivery system was in a French Ministry of Defense report from April 1976 on Franco-Indian cooperation in space. It concluded that the bilateral cooperation concerned both civilian and military domains. The civilian domain involved the cooperation on satellite and television-related projects. Cooperation in the military domain, meanwhile, involved, “i. the granting of the license for the engine of the Viking rocket, ii. Indian participation in the management of the Ariane space launch vehicle, iii. the sale of inertial components to India, and iv. Advice for the carrying out of bench tests for large solid fueled launchers.”<sup>190</sup> The report goes on to state that “it is clear that the military domain can also be called “civilian” if one admits that

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<sup>187</sup> Ibid.

<sup>188</sup> Jurgensen, “Vente du Mirage a l’Inde,” 23 December 1975, Carton 2248, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>189</sup> Ibid.

<sup>190</sup> Ministère de la Defense Délégation Ministérielle pour l’Armement, “Coopération spatiale franco-indienne,” 5 April 1976, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

its purpose is to produce launchers that will place civilian satellites into space.”<sup>191</sup> Thus, by simply calling the technology in the military domain “civilian” the French and Indian governments could avoid any non-proliferation concerns. This was the justification for France to go ahead and sign a space cooperation treaty with India later in year.

The intergovernmental treaty between France and India in 1976 formalized and broadened the scope of cooperation in space-related technology. However, recognizing the need to ensure that the technology was seen as “civilian” in nature, the primary issue during the negotiation of this treaty was the inclusion of the word “*lanceurs*,” i.e., launch vehicles. France included the words “*installations de lancement*”, which meant ground-based launching installations. The French side assumed that this would reduce the interest of the Indians in launch vehicles. However, an Indian negotiator noted that the Indian space project was directly interested in “launch vehicles” (*lanceurs*) and not “launching installations” (*installations de lancement*). The French side considered the possibility of cooperating on launch vehicles while keeping close control over the technology developed, but it recognized that if India was able to manufacture “re-entry vehicles” the cooperation would become very risky.<sup>192</sup> It was also noted that, the draft agreement of the European Space Agency and ISRO mentioned launch vehicles as one of the sectors of cooperation. On the Indian side, the government was cognizant of this debate and was eager to sign the agreement as soon as possible. It noted that, “...there appears to have been a little vacillation on their (French) part in regard to concluding an inter-governmental agreement...It will be useful, therefore, to finalise this as soon as possible to minimize the chances of any other developments

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<sup>191</sup> Ibid.

<sup>192</sup> Ministère des Affaires Étrangères, “Projet d’accord de coopération spatiale franco-indien,” 9 June 1976, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

intervening.”<sup>193</sup> Ultimately, to enable some form of deniability, the French side negotiated the inclusion the phrase “exclusively peaceful purposes” in the treaty of cooperation on space between India and France. When India raised objection to the inclusion of the term in the treaty, a French government official remarked, “It is difficult to see why the Indians would continue to oppose this drafting if their intentions are as pure as they claim.”<sup>194</sup>

Transfer of technology between the two states took place through training scientists as well. There were two groups of Indian space scientists from ISRO working with the French space agency. One was associated to the development of the Viking engine and the other was working in the Launch Vehicles Directorate of the French Space Agency, which had the project management responsibilities of the European Ariane launch vehicle project.<sup>195</sup> Between 1974 and 1977, France had received 90 such trainees, some of whom were at a senior level.<sup>196</sup> The CNES recognized that training Indian scientists and engineers through these programs was a form of technology transfer, but given the financial advantages that it derived from these engineers in the launcher division, it would be costly to reduce this cooperation.<sup>197</sup>

Contrary to expectation, it was India which first noted a breach of the peaceful uses clause by France. In 1977, France approved a CNES program to use the Ariane vehicle to launch military reconnaissance satellites. This was in contravention of the ‘exclusively peaceful’ purposes clause of Indian cooperation on the Ariane project as well as the European Space Agency’s guidelines.<sup>198</sup> When asked, however, CNES officials stated that “‘exclusively peaceful’ purposes include

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<sup>193</sup> Dayal to Dhawan, 26 May 1976, Prime Minister’s Secretariat, 17/1015/76-PMS, NAI.

<sup>194</sup> Ministère des Affaires Étrangères, “Projet d’accord de coopération spatiale franco-indien,” 9 June 1976, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>195</sup> JS-1 to Prime Minister, 5 December 1976, Prime Minister’s Secretariat, 17/1278/76-PMS, NAI.

<sup>196</sup> “Etat de la coopération avec l’inde,” 28 October 1977, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>197</sup> Ibid.

<sup>198</sup> Dhawan to Vellodi, 14 December 1977, Prime Minister’s Secretariat, 17/1278/77-PMS, NAI.

anything which is non-aggressive; thus every space activity other than weapon delivery, ‘killer’ satellites and jamming satellites can be covered by the ‘exclusively peaceful’ clause.”<sup>199</sup> This was an indication that even if the French were following the letter of the law, there were liberties being taken with the spirit of it – something the Indians would take advantage of in the next decade.

Concerns about the Indian nuclear program in the Conseil de Politique Nucléaire Extérieure (CPNE), which considered France’s external relations related to nuclear technology, were amplified in 1978 by further French knowledge of India’s parallel pursuit of an ambitious space program.<sup>200</sup> The council concluded that all the indicators in India’s space program – building laboratories for solid and liquid fuels, acquisition of the license for the Viking engine, and India’s cooperation in the Ariane program – could be interpreted as a strong signal to acquire strategic nuclear weapons.<sup>201</sup> However, this discussion did not lead to any reduction in French cooperation on these technologies. In 1978, Canada submitted to the NATO Experts meeting on Eastern and Southern Asia that, “...insofar as a possible future application to a weapons programme is concerned, it is worth noting that the Indian Space Research Organization continues to refine its capacity in rocketry and guidance systems. If, for reasons of health or internal bickering within the Janata party, Morarji Desai were to step down, it is not hard to envisage his successor (even if he were also a member of Janata) once again agreeing to institute an unfettered programme.”<sup>202</sup>

Removing any doubt about these French and Canadian assessments, in the beginning of 1979, Prof. Dhawan, chairman of the ISRO stated to an Indian parliamentary commission that the SLV-3, could, after some modifications be used as a nuclear delivery vehicle in the form of an

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<sup>199</sup> Ibid.

<sup>200</sup> Conseil de Politique Nucléaire Extérieure, “La Politique Nucléaire de l’Inde,” 2 October 1978, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>201</sup> Ibid.

<sup>202</sup> “Prime Minister Desai and Indian Nuclear Policy,” 16 October 1978, Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.



IRBM.<sup>203</sup> In fact, as early as 1971, in a classified paper on self-sufficiency in missiles, Air Commodore Narayanan, a member of the missile panel in the Ministry of Defence, discussed upgrading the ISRO's planned SLV-3 to an IRBM.<sup>204</sup>

The Indian SLV-3 had its first successful test in July 1980. On its first launch, it carried a weight that was only 30 per cent lighter than the first Scout rocket.<sup>205</sup> After the successful SLV-3 launch, Dhawan stated that it had given India the capability to make ballistic missiles.<sup>206</sup> The SLV-3 would have 3 more launches, but its most enduring contribution would be – as Dhawan stated in 1979 – to the IGMDP and the *Agni* IRBM.<sup>207</sup> The *Agni* project was meant to be a 'technology demonstrator' to develop a re-entry vehicle. The design of the missile was based on existing propulsion systems in India and the first stage of the solid fuel SLV-3 was adopted to be the first stage of the *Agni*.<sup>208</sup> The second stage of the missile was initially a modified version of the engine of the *Prithvi* (short range ballistic missile), but it was eventually replaced by a new solid fuel motor built by the ISRO after 1993.<sup>209</sup>

Further evidence of the link between India's space program and ballistic missile program lies in the identical leadership of the two. In 1982, the project director of the ISRO's SLV-3 project, APJ Abdul Kalam, was brought in to be the project director of the IGMDP that developed the nuclear-capable *Agni* and *Prithvi* ballistic missiles.<sup>210</sup> Kalam's success in running the SLV-3

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<sup>203</sup> Corbie to Francois-Poncet, "Commentaires et reactions après la tentative de lancement de "SLV-3," Carton 2254, Inde, Direction Asie-Océanie, No. 15-11-5, Centre des Archives Diplomatiques de la France, La Courneuve, France.

<sup>204</sup> Chengappa, *Weapons of Peace*, 149.

<sup>205</sup> Raj, *Reach for the Stars*, 73.

<sup>206</sup> Chengappa, *Weapons of Peace*, 157.

<sup>207</sup> Ibid.

<sup>208</sup> Avinash Chander, "Agni," in *IGMDP: Integrated Guided Missile Development Programme*, by Defence Research and Development Organisation (DRDO), DRDO Special Publication Series (Delhi: Defence Research & Development Organisation, 2008), 110.

<sup>209</sup> Chengappa, *Weapons of Peace*, 387.

<sup>210</sup> On the *Prithvi* missile, Chengappa notes that, "the *Prithvi*'s primary purpose then and even a decade later was to launch India's nuclear warheads especially to Pakistan." See, Chengappa, *Weapons of Peace*, 320.

project was seen as key to India's ballistic missile ambitions. Eventually his role in developing Indian ballistic missiles would gain him the epithet "Missile Man of India" and he would go on to become the President of India (2002-2007).

As this account demonstrates, in the Indian case, the civilian space agency was used as a channel to acquire foreign technology and knowhow related to space launch vehicles, which were then used in the development of India's ballistic missile capability. While this path to a nuclear delivery mechanism was known and foreseen by the technology supplying foreign states, that did not stop them from cooperating with India.

#### *Explaining Space/Missile Cooperation and the Zone of Ambiguity*

Two related enabling factors from the Zone of Ambiguity in the international non-proliferation order allowed India to develop the ballistic missile vector of its nuclear force. First, and most important, the lack of a legally binding treaty or law to prohibit the proliferation of space technology created (and to date creates) a permissive condition for a potential proliferator to build its missile systems. French aid in critical space technology to India stands out as an example of foreign collaboration that helped the latter build both space launch vehicles and ballistic missiles. In addition to this, India also received help in civilian space technology, as well as other technical assistance from the Soviet Union, the United States, and West Germany.<sup>211</sup> It is clear that France was cognizant of the potential military application of the technology that it was sharing and that this could be used to build a nuclear delivery vehicle. However, this cognizance manifested in the inclusion of ill-defined terms like 'exclusive peaceful purposes' in cooperation agreements and not a reduction in cooperation.

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<sup>211</sup> Nolan, *Trappings of Power*, 2.

The second enabling factor from the Zone of Ambiguity has to do with multipurpose technology. It was this characteristic of space and rocket technology that enabled cooperation between France and India and translated into the development of ballistic missiles that would be a part of India's nuclear delivery systems. On India's part, it publicly pursued a national satellite program which involved the building of a space launch vehicle to place satellites to orbit the Earth. As the recently declassified documents discussed in this chapter show, this capability was meant to contribute to the eventual development of an Indian IRBM/ICBM. Internal French government documents show that France's position was that, if the space technology (shared with India) which was to be used for military uses could also be called "civilian" technology, then France would go ahead with the cooperation. As the discussion between the head of the two space agencies after France had decided to place military satellites in space using civilian space launchers demonstrates, the French definition of "exclusively peaceful uses" was an extremely broad one. This definitional ambiguity allowed it to continue with its cooperation with India.

## **Conclusion**

This chapter has highlighted a number of dynamics which were operational in the process of India's development of its nuclear forces. In particular, the dynamics discussed in this chapter have focused on the international political processes that have influenced India's nuclear program in the area of nuclear delivery vehicles. I have focused on two key illustrative instances from India's nuclear forces in this chapter: the acquisition of the nuclear-capable Jaguar aircraft by India, and the acquisition of the space technology that provided the basis for India's Intermediate Range Ballistic Missiles. There are a few important takeaways from this research.

First, despite India's nuclear explosion in 1974, it received considerable international help in the process of developing its nuclear forces. In the case of the Jaguar aircraft, the United Kingdom, France, Sweden, and Russia all sought to sell a deep penetration strike aircraft (DPSA) to India. The Jaguar aircraft eventually won the bid, and in the process, the competing Mirage 2000 was also bought by India after a decade-long competition between the United Kingdom and France to sell the aircraft. In the case of missile technology, India received considerable aid through its space program. Though this program was publicly civilian and geared towards satellite television and communications, its military objectives were fairly clear and even by the Indian government's own assessment, its collaborators knew the eventual military implications of the technology that was being developed. While the United States, West Germany, and the Soviet Union all collaborated with this program, the most important help to the Indian space program came from France.

Second, neither the fledgling norm against non-proliferation in the 1970s (after the NPT came into force), nor the United States' efforts at non-proliferation through domestic legislation addressed the transfer of technology related to means of weapon delivery. This is puzzling, as one would expect the non-proliferation order to constrain the transfer of nuclear delivery vehicles and associated technology. However, as this chapter demonstrates the Zone of Ambiguity was critical in enabling the trade/transfer of sensitive technology related to nuclear delivery systems.

In the case of the nuclear delivery vehicles, it appears that there was a norm of non-proliferation present, as supplier states like the United Kingdom and France had internal conversations about the appropriateness of their role in helping India develop a nuclear delivery vehicle all through the 1970s. The consequences of violating these norms are, however, not

discussed in the archival record, and indeed, both the United Kingdom and France both went ahead and helped India in the process of building its nuclear delivery vehicles.

Overall, there are two main commonalities between the Jaguar case, and the space technology case. First, in both cases the technology transfers took advantage of Zone of Ambiguity created by the multipurpose nature of the technology in question. In the case of the Jaguar aircraft, this was the dual capability of the aircraft to deliver both conventional weapons and nuclear weapons. Because the technical differences between the capabilities are not profound and mainly have to do with the standard of the wiring of the weapons release system, the plane ultimately sold to India by the United Kingdom could very well be identified as a military aircraft for use in a conventional military role even though it could easily be modified for nuclear weapons delivery.<sup>212</sup> In the case of space technology, multipurpose capability had more to do with the possibility of using the technology transferred for both civilian application and military purposes. In other words, a launch vehicle that could put a satellite in space could also place a ballistic missile re-entry vehicle in space. It is interesting to note that the suppliers of these delivery system-related technologies exploited the dual-use nature of the technology to simply label the technology as civilian and go ahead to make their sales.

The second main commonality is that in both the Jaguar case and the French sale of space technology to India, the primary driver of policy was the economic logic to the proliferation of the means of nuclear delivery. In the case of nuclear capable aircraft, as the archival record demonstrates, the British and French competed with each other with the hope of being able to dominate the market for military aircraft in India for the next 20 years. Likewise, in the transfer of French space technology to India, the expectation was that France would be able to shape Indian

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<sup>212</sup> George to MacDonald, "Jaguar – carriage of nuclear weapons," 6 October 1967, TNA FCO 46/158.

reliance on French technology and gain industrial benefit from that cooperation. This vision was not shared by the Indian side, which eventually led to a reexamination of the cooperation between India and France after 1979. Nevertheless, the examples demonstrate that industrial economic benefits have an advantage over the norm of non-proliferation when it comes to technology associated with nuclear delivery vehicles.

This chapter also makes some important empirical contributions to Indian nuclear history. First, it highlights a strong foreign hand in the development of India's nuclear forces. This is important because previous studies of India's nuclear history have focused on the domestic politics of the nuclear program.<sup>213</sup> By uncovering the role of the Zone of Ambiguity, the economic logic, and international competition in the development of India's nuclear forces, I add a new lens to consider in that history. Second, this chapter also questions the common understanding of India's nuclear program as being indigenous in nature. It demonstrates that at least in the matter of nuclear delivery, there was significant reliance on foreign sources of technology and material. Finally, by uncovering new archival material, this chapter also links the Indian Space Research Organisation's activity to the Indian IRBM project. Previously the ISRO has primarily been seen as a civilian space research organization without much impact on the Indian nuclear program.<sup>214</sup> As this research demonstrates, at least in the 1970s and 1980s, the technology acquired and developed by the organization was directly used in the development of India's ballistic missiles, which have since been inducted into its nuclear forces.

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<sup>213</sup> George Perkovich, *India's Nuclear Bomb: The Impact on Global Proliferation* (Berkeley: University of California Press, 1999); Chengappa, *Weapons of Peace*; Kampani, "Teaching the Leviathan: Secrecy, Ignorance and Nuclear Proliferation."

<sup>214</sup> Rajeswari Pillai Rajagopalan, "India's Emerging Space Assets and Nuclear-Weapons Capabilities," *The Nonproliferation Review* 26, no. 5–6 (September 2, 2019): 465–79.

## Chapter 6: Conclusions and Implications

The proliferation of the means of nuclear delivery is a puzzling outcome in international relations. This study has addressed the puzzle of why these weapons systems spread despite the obvious constraints set up to prevent the proliferation of nuclear weapons. My research has shed light on how states develop their nuclear forces and acquire nuclear delivery vehicles. The theoretical framework of the Zone of Ambiguity in the international non-proliferation order highlights the role of the ambiguous nature of laws, definitions, and technology that have come together to proliferate the means of nuclear delivery. It shows that states use the different aspects of the Zone of Ambiguity to further their economic, geopolitical, and alliance related interests to proliferate nuclear delivery vehicles. This study has made three important interventions in the study of nuclear proliferation. First, it has highlighted the importance of studying the proliferation of nuclear delivery vehicles as a nuclear weapons technology that is distinct from the nuclear bomb. Second, this dissertation has identified an important gap in the nuclear non-proliferation regime. The definitional ambiguity of the term “nuclear weapon” along with the multipurpose nature of the technology of nuclear delivery have meant that the focus of both academic scholarship, as well as the thrust of non-proliferation policy have focused on the fissile materials side of building a nuclear bomb and the proliferation of the materials associated with it.<sup>1</sup> This study identified and addressed this problem by introducing the means of nuclear delivery as an important subject in the study of nuclear proliferation. My dissertation shows that the nuclear non-proliferation regime – instead of constraining proliferation – has enabled the proliferation of the means of nuclear delivery. This has happened because the non-proliferation regime’s omission of the means of nuclear delivery as a subject of interest right from its early days after the second

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<sup>1</sup> Kroenig, *Exporting the Bomb*; Fuhrmann, *Atomic Assistance*.

world war to after its formalization with the Treaty on Nuclear Non-proliferation (NPT) coming into force in 1970. Finally, this dissertation has used multi-archival research from the United Kingdom, France, India, and the United States to uncover an international history of the proliferation of the means of nuclear delivery. In doing so, this research adds new historical and qualitative data to the study of nuclear proliferation and international history.

### **Revisiting the Argument**

This dissertation has answered two central questions. First, how do states, specifically, regional powers, build their nuclear forces and means of delivery? And second, why do the means of nuclear delivery proliferate despite the obvious constraints? To answer these questions, I have introduced the framework of the Zone of Ambiguity in the non-proliferation regime. Chapter 1 introduced this puzzle and established why it is important to study the means of nuclear delivery. I highlighted that the academic literature on nuclear proliferation has ignored the subject despite its importance to the nuclear weaponization process and to international security. Furthermore, I showed that in the policy world the different institutions that constitute the non-proliferation regime have either ignored the means of nuclear delivery, or intentionally kept them out of their scope. What has this meant for the proliferation of the means of nuclear delivery? And specifically, how have states seeking to acquire this technology done it? I addressed these questions in subsequent chapters of the dissertation.

In Chapter 2, I proposed a new framework to understand how states proliferate the means of nuclear delivery. I posited that the Zone of Ambiguity in the nuclear non-proliferation regime creates a permissive condition for the proliferation of the means of nuclear delivery. The direct or indirect transfer of technology associated with nuclear delivery takes place because of the Zone of



Ambiguity and its constituent elements: multipurpose technology, ambiguous definitions; and legal and normative ambiguity. The multipurpose nature of the technology of nuclear delivery vehicles refers to its quality of being adaptable to different purposes. There are two types of duality that are important in this context, technology that can be used for both civilian and military purposes (like space launch vehicles), and technology that can be used for both conventional and nuclear military purposes (military aircraft like the F-16). Ambiguous definition in the nuclear non-proliferation regime refers to the lack of specificity of definitions in it. A case in point is the NPT – the most important pillar of the non-proliferation regime that prohibits the proliferation of nuclear weapons – not defining what the term “nuclear weapon” actually signifies. Finally, the third element of the Zone of Ambiguity is the normative and legal ambiguity in the nuclear non-proliferation regime. This indeterminate normative and legal nature of the regime (produced in part by definitional ambiguity and multipurpose technology) is evidenced in the deliberate exclusion of the means of nuclear delivery from the legal regimes like the NPT, thus enabling the proliferation of the technology while establishing a norm of non-proliferation at the same time.

The Zone of Ambiguity enables, i.e., creates a permissive condition for the direct and/or indirect spread of the means of nuclear delivery and facilitates three specific enabling logics. These three logics to the proliferation of the means of nuclear delivery are – economic, geopolitical, and alliance-related. These logics help explain why states transfer certain technologies related to the means of nuclear delivery. The interaction of the Zone of Ambiguity with each of these logics leads to the development of certain kinds of nuclear forces in regional states. Economic imperatives and the potential for commercial profit lead to competition among supplier states to scramble to sell technology related to the means of delivery that the Zone of Ambiguity enables. Likewise, geopolitical interests shape the incentives of supplier states to transfer critical nuclear

delivery technology to other states. Finally, the alliances logic demonstrates that whether a state is part of an alliance or not is an important factor in its ability to acquire the means of nuclear delivery.

The historical case study of the United Kingdom's nuclear forces in Chapter 3 built on this framework and focused on the alliance logic and the Zone of Ambiguity. The focus of the chapter on two episodes – the Skybolt Affair that led to the sale of the Polaris missiles (1963) and the eventual shift from the Polaris to the Trident missile system (1982) – demonstrated the role of the international non-proliferation order in enabling the transfer of the means of nuclear delivery at two different points of time in history. In doing so, the chapter not only uncovered important aspects of the UK's acquisition of its nuclear delivery systems, but also highlighted the historical evolution of the nuclear non-proliferation regime. This chapter showed that the early nuclear non-proliferation regime, that consisted of domestic and international legislation such as the McMahon Act (1946), the Atomic Energy Act of 1954 (as amended), the Baruch Plan (1946), Atoms for Peace (1954), creation of the IAEA (1957), may have created a burgeoning norm of non-proliferation, but definitely did not stop the transfer of the means of nuclear delivery from the United States to the United Kingdom. Interestingly, even with the NPT coming into force in 1970, the transfer of the means of nuclear delivery remained unchecked. While the archival record shows some concern to ensure that no legal provisions of the NPT were violated in the process of transferring the Trident D5 missile to the UK, this did not constrain the outcome of the missile transfer in way.

Chapter 3 also showed that while the alliance logic enabled the setting up of the UK's nuclear forces, it was also a challenge to be navigated by the United Kingdom as the junior partner/recipient state. In 1962, there was concern that the United States was trying to do away

with the UK's ability to deliver nuclear weapons by canceling the Skybolt missile. Additionally, after the 1970s, the SALT and INF negotiations between the United States and the Soviet Union, led to additional problems for the British, who had to ensure that their nuclear force was not included in these arms control arrangements and counted as a part of the United States' strategic forces.

The case study of France in Chapter 4 examined a different feature of the Zone of Ambiguity and focused on the geopolitics logic to the proliferation of the means of nuclear delivery. It showed that the United States and France were able to exploit the ambiguity in the laws of non-proliferation – both domestic and international – to transfer technology associated with the means of nuclear delivery. Using empirical material from declassified archives, I show that the United States transferred ballistic missile technology to France to help it develop its nuclear forces. In the process, domestic laws, bilateral arrangements, and international treaties were manipulated by the use of flexible and ambiguous definitions and multipurpose technology. As in the British case, this chapter shows that the transition of non-proliferation norms from before and after the NPT did not include the means of nuclear delivery.

Chapter 4 also highlighted the role of geopolitical interest in motivating the proliferation of the means of nuclear delivery. The United States as a supplier state was interested in two geopolitical outcomes. The first was to equip France with a credible nuclear force that would threaten the Soviet Union, thus adding a layer of complexity to the nuclear threat from Europe that added to the force that NATO possessed already. The second geopolitical interest for the United States was to equip France with the means of nuclear delivery as that would lead to mistrust and competition between the United Kingdom and France. For the United States, wary of a unified Europe posing a threat to its sphere of influence in Europe, this was a goal that would help it

manage its relations with Europe, France, the United Kingdom, and NATO all at the same time. In addition to the international history of the French nuclear force development, this chapter also challenges the conventional wisdom that the French nuclear forces were independent and built indigenously.

In Chapter 5, I explored the development of India's nuclear forces. I find that the development of India's means of nuclear delivery from the 1970s onwards – especially after its 'Peaceful Nuclear Explosion' of 1974 – was aided by the Zone of Ambiguity. Unlike the earlier cases of the United Kingdom and France, India was not a U.S. ally, where some slippage in the conformity with non-proliferation norms may have been overlooked intentionally. Indeed, India was seen by the United States and its allies as being uncomfortably close to the Soviet Union. This warranted extra vigilance by the non-proliferation order and the United States on the issue of the spread of the means of nuclear delivery. However, somewhat surprisingly, I found that this was not the case.

For the supplier states, the United Kingdom and France, the economic logic was most salient in providing India with the direct and indirect technologies to build its means of nuclear delivery. I explore two episodes in this chapter, India's acquisition of the Jaguar aircraft from the United Kingdom, and the acquisition of space technology from the France that directly contributed to India's IRBM program. In the case of the Jaguar program, I found that despite concerns about non-proliferation and an international effort against the proliferation of nuclear weapons after 1974, France and the United Kingdom competed to sell India its first means of nuclear delivery, something that was not expressly prohibited in the nuclear non-proliferation treaty.

In the case of French assistance to India in the space and missile domain, I found that it took place with the express knowledge that such help could be used for delivery of nuclear

weapons. France decided to simply call military assistance “civilian” because the solid fuel rockets that could be used for nuclear delivery could also put satellites in space. This use of multipurpose technology allowed France and India to sidestep any laws of non-proliferation in transferring this technology.

In both the cases of the transfer of the Jaguar aircraft and the French space technology to India, the ambiguity created by the dual-capable technology – conventional military use vs. nuclear delivery in the case of Jaguar and civilian use in space vs. making IRBMs/ICBMs – enabled the states to proliferate the means of nuclear delivery. Beyond the Zone of Ambiguity, there was also a strong economic motivation for supplier states. In the case of the Jaguar, both France and the United Kingdom competed to sell India the aircraft to be able to control the military aviation industry in India for the next twenty years. In the case of space technology, France sought to gain Indian reliance on it and secure industrial benefit from the relationship. The Zone of Ambiguity in the nuclear non-proliferation regime thus enabled economic/commercial incentives to facilitate the proliferation of the means of nuclear delivery.

The chapter also made an important empirical contribution to the history of India’s nuclear program. It uncovered hitherto untapped evidence to demonstrate the centrality of international cooperation in the Indian nuclear weapons program. The chapter also showed that even though India did not officially declare itself to be a nuclear weapons state till its 1998 tests, it was in the process of assembling its ability to deliver nuclear weapons after the ‘peaceful explosion’ of 1974.

## Discussion

This dissertation has focused on the proliferation of the means of nuclear delivery. It has shed light on the process of the acquisition of weapons systems and technology that help states deliver the bomb. I have highlighted that the nuclear non-proliferation regime has a Zone of Ambiguity that allows states to proliferate the means of nuclear delivery. The framework of the Zone of Ambiguity helps us understand *how* states manage to sidestep the non-proliferation order, and the different enabling logics to the proliferation of the means of delivery tell us *why* these states chose to do so.

### *Non-Proliferation Order and Arms Control*

It is clear from the evidence discussed in this dissertation that the transfer of the means of nuclear delivery was not seen as illegal, even though the states involved all had discussions on what such transfers meant for the ‘spirit of the law’. A few other interesting implications related to the non-proliferation order emerge from this research.

The non-proliferation order’s inability to account for the means of nuclear delivery was not a bug, but rather a feature of the system. Even before the deliberations on the NPT began in the Eighteen Nation Disarmament Committee (ENDC) in the early 1960s, the means of nuclear delivery were central to the discussion of disarmament. Both the United States and the Soviet Union had presented plans in 1962 – through Secretary of State Rusk and his Soviet counterpart Foreign Minister Gromyko – for the reduction of these weapons.<sup>2</sup> However, disagreements over the definition of ‘means of delivery’, and if all dual-capable conventional systems that could carry

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<sup>2</sup> Conference of the Eighteen-Nation Committee on Disarmament (United Nations), “Final Verbatim Record of the Conference of the Eighteen-Nation Committee on Disarmament [Meeting 198],” 15.

nuclear weapons should be outlawed, led to the nuclear delivery vehicles falling outside the ambit of non-proliferation negotiations.<sup>3</sup>

As a consequence of the dispute in the ENDC, the means of nuclear delivery were transformed from a non-proliferation issue to an arms control issue. They were removed from multilateral forums and instead treated as a bilateral issue between the United States and the Soviet Union beginning with the SALT talks in 1969, and eventually leading to the ABM Treaty, SALT II, INF, START, and New START between the United States and the Soviet Union (later Russia). There were two important consequences of the move to tackle the means of nuclear delivery in a bilateral forum. First, it led to arms control, i.e., the reduction of the means of nuclear delivery, to become an important part of the Cold War superpower bilateral relationship. Thereafter, any discussion of the means of delivery remained in the realm of ‘reduction’ as opposed to proliferation, or spread, to other states. Second, as a consequence of the focus on reduction of Soviet and American strategic arms, the horizontal proliferation of the means of nuclear delivery to other states with nuclear (or latent nuclear) capacity remained unaddressed and effectively unregulated.

This research also shows that the conventional wisdom that one of the core features of the United States’ grand strategy since 1945 across administrations has been to prevent other states from developing or acquiring independent nuclear forces does not hold up to closer scrutiny.<sup>4</sup> Indeed, it was assumed that when the United States failed to stop the proliferation of the nuclear bomb, it attempted to prevent the proliferator from acquiring the means of nuclear delivery such as missile capabilities.<sup>5</sup> By tracing the evolution of the non-proliferation regime, I find that the

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<sup>3</sup> Conference of the Eighteen-Nation Committee on Disarmament (United Nations), “Final Verbatim Record of the Conference of the Eighteen-Nation Committee on Disarmament [Meeting 073],” 14.

<sup>4</sup> Gavin, “Strategies of Inhibition,” 19.

<sup>5</sup> Gavin, 19.

United States played a considerable role in undermining the regime to enable states to develop their means of nuclear delivery. This finding is contrary to the scholarship that claims that the United States never actively attempted to undermine the non-proliferation regime.<sup>6</sup>

### *Comparing the Cases*

Each of the case studies in this study does three things. First, they highlight historical episodes that provide an insight into the evolution of the nuclear non-proliferation regime with regard to the means of nuclear delivery. Second, the cases reveal the international nature of the enterprise of building a nuclear force. By establishing lateral connections between national nuclear force development, the international non-proliferation regime, and other bilateral and multilateral diplomatic relations, each of the case studies demonstrate that building a nuclear force structure is a very international affair. Finally, each of the cases offers a historical account of how regional powers acquire the means of nuclear delivery. I add new evidence and analysis to the history of the nuclear programs the United Kingdom, France, and India.

While the case studies in this analysis enlighten us about the making of the different nuclear force structures in these states, I find that there are a number of similarities and connections across the cases. For example, in every case, despite the claim of independence of nuclear forces, one finds considerable foreign support involved in the construction of a state's means of nuclear delivery. For the United Kingdom, the help came from the United States in the form of the Polaris and Trident missiles. For France, the aid came from the United States for the ballistic missile program and submarine nuclear reactors and from the United Kingdom through collaboration on the Jaguar aircraft. For India, the assistance came from France, through space technology (that

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<sup>6</sup> Gavin, "Strategies of Inhibition"; Rabinowitz and Miller, "Keeping the Bombs in the Basement"; Cameron and Rabinowitz, "Eight Lost Years?"



helped it build ballistic missiles), and Mirage 2000H jets; and from the United Kingdom that sold it the nuclear-capable Jaguar aircraft.

All three cases discussed in this dissertation – the United Kingdom, France, and India – were inter-related, occupying different roles in the proliferation of the means of nuclear delivery to one another. While UK and France were beneficiaries of transfers from the United States, they also cooperated with each other to develop nuclear delivery vehicles for themselves (for example, the Jaguar aircraft). Importantly they also played the role being a supplier state in the context of India's nuclear force development, with the UK supplying it with the Jaguar, and France supplying it with the Mirage 2000 and missile technology.

The inter-connected nature of these networks of proliferation over decades – even though they channel different logics – demonstrate that the proliferation of the means of nuclear delivery was more of an accepted practice than an exception to the norm. Furthermore, in most cases, the transfers of the technology associated with the means of nuclear delivery were overt. The case of the United States' assistance to the French ballistic missile program was an exception, but even then the exchanges—though covert—remained within the bounds of the laws of non-proliferation.

Two of the cases discussed in this research, the United Kingdom and France, parallel each other's experiences and had to overcome similar challenges. While the enabling logics to acquiring their means of nuclear delivery were different, both states took advantage of the same elements of the Zone of Ambiguity in the non-proliferation order from the late 1950s onwards. In fact, the primary difference between the Franco-American and Anglo-American experience of conditional assistance on nuclear delivery vehicles was a consequence of French insistence on having the image of 'independence' associated with its program.<sup>7</sup> The 'independence' label meant that the

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<sup>7</sup> Goldstein, *Deterrence and Security in the 21st Century*, 184.

France could purport to have an independent nuclear force while seeking covert help from the United States.

While the United Kingdom professed ‘independence’ of its strategic nuclear deterrent as well, it was openly dependent on American means of nuclear delivery. The Skybolt missile’s cancellation in 1962 and the acquisition of Polaris missiles in 1963 were public events that led to the ‘independence’ vs. ‘interdependence’ debate on the UK’s nuclear program. While the UK remained independent with regard to the production of the nuclear warhead itself, for the means of nuclear delivery—submarine launched ballistic missiles and the reentry vehicle that the warheads would be fitted in—it would (and still does) rely on the United States.

Another interesting connection between the French and United Kingdom cases is their role as potential third-party states to the bilateral arms control agreements – such as the SALT and the INF – between the United States and the Soviet Union. Both France and the United Kingdom had to ensure that their nuclear forces were not counted in the balance of strategic arms between the United States and the Soviet Union. As the evidence discussed in Chapter 3 and Chapter 4 show, this was often difficult for the United States, and indeed, it is not clear that the Soviet Union saw these forces as independent of or separate from the overall NATO threat.

As a non-aligned, non-European case, India’s nuclear history allows us an insight into a different aspect of regional states attempting to build up their nuclear forces. Its position as an early supporter of disarmament – a member of the ENDC and NPT negotiations – but eventually a non-signatory of the NPT and other institutionalized instruments of the non-proliferation regime gives us a sense of how a state that was on an ambiguous nuclear trajectory used different elements of the Zone of Ambiguity to build its means of nuclear delivery. A non-signatory to the legal instruments of the non-proliferation regime, India still had to maneuver around them to build its

nuclear forces. There are two reasons for this: First, even as a non-signatory to the relevant treaties and arrangements, India sought to adhere to the norms of non-proliferation at the time. This was to avoid any more sanctions after the ‘Peaceful Nuclear Explosion’ in 1974. Second, many of the states providing India with help for its means of nuclear delivery (like the United Kingdom) were tied to the non-proliferation regime.<sup>8</sup> The Zone of Ambiguity had to be navigated in order to ensure that these states did not break with their legal obligations.

### *Geopolitics a Catchall logic?*

In all the cases discussed in this dissertation, one finds geopolitical logic to be present in varying degrees. One could ask then, whether the geopolitics trumps all the other enabling logics discussed. The two cases of France and the United Kingdom certainly showed that United States as a key supplier of technology related to the means of nuclear delivery had very specific geopolitical interests and perhaps simply paid hypocritical lip-service to the goal of non-proliferation. There are two possible responses to this. First, hypocrisy in the action of states is a baseline condition of the international system and can be held constant as we explore the effects of other explanatory factors. Second, it is key to note that the geopolitics logic is present in these all cases in varying degrees, along with the economic logic and the alliance logic. For example, the Indian case demonstrates all three factors to be present in differing degrees as well. In this analysis, I have identified the logic that appears to be the dominant one in each of the cases discussed and explored the plausible explanatory purchase of each of them.

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<sup>8</sup> Milhollin, “India’s Missiles—With a Little Help from Our Friends.”

*Implications for Other Possible Cases*

The framework of the Zone of Ambiguity with its different enabling logics to the proliferation of the means of nuclear delivery highlights the gaps in the non-proliferation regime that have allowed states to develop their nuclear forces. While I use the cases of the United Kingdom, France, and India to highlight the plausibility of the framework, the Zone of Ambiguity has enabled other states to develop their means of nuclear delivery as well. A quick look at other regional nuclear powers states like Israel, Pakistan, South Africa (before it gave up nuclear weapons) show that at different points in time, the Zone of Ambiguity in the nuclear non-proliferation regime aided them to acquire the means of nuclear delivery.

Israel

While Israel does not officially confirm or deny its nuclear status – i.e., it maintains nuclear opacity – it is widely accepted that the state possesses a stockpile of nuclear weapons that can be delivered by aircraft and ballistic missiles.<sup>9</sup> The United States has sold Israel all its nuclear-capable aircraft: the F-4 Phantom, A-4 Skyhawk, F-16 Fighting Falcon, F-15 Ra’am (Thunder).<sup>10</sup> The nuclear-capable surface-to-surface Jericho missile (MD-620) was built by the French company Marcel Dassault for Israel.<sup>11</sup> Its successor, Jericho II, a medium-range ballistic missile, was built by Israel in collaboration with South Africa in the 1980s.<sup>12</sup> Additionally, the sea-based part of Israel’s nuclear forces are deployed on the Dolphin-class diesel-electric submarines were made and sold by Germany. It is reported that the German government knew that Israel would equip the

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<sup>9</sup> Kristensen and Norris, “Israeli Nuclear Weapons, 2014,” 97.

<sup>10</sup> Israel has also bought the F-35A Lightning aircraft from the United States that could be used for nuclear delivery. See, Kristensen and Norris, 99.

<sup>11</sup> Cohen, *Israel and the Bomb*, 116.

<sup>12</sup> Kristensen and Norris, “Israeli Nuclear Weapons, 2014,” 107.

submarines with nuclear missiles.<sup>13</sup> While it is not known exactly which sea-based missiles have been deployed for nuclear use by Israel, the publicly known options are: a sea-launched cruise missile version of the air-to-surface “Popeye Turbo” missile; the United States supplied Harpoon anti-ship missile; and a submarine cruise missile developed and built indigenously by Israel.<sup>14</sup>

The Zone of Ambiguity has played an important part in the transfer of the means of nuclear delivery to Israel. For example, when the F-4 aircraft was being sold by the United States to Israel, the question of nuclear capability came up. The negotiations between the two states were conducted with the knowledge that there was a significant link between the sale of the F-4 aircraft and the nuclear/missile question.<sup>15</sup> In a discussion at the Subcommittee on Foreign Operations of the Senate Appropriations Committee on July 24, 1974, Secretary of State Kissinger stated, “...there are two aspects to the problem: The delivery of the bomb and the development of nuclear capability...We have not yet formed a conclusion as to what degree of sale of delivery systems can be controlled.”<sup>16</sup> The fact that the F-4 could be used for nuclear delivery and F-5 could not formed, according to Kissinger, a part of the consideration of which aircraft were on offer in military assistance and sales to other countries.<sup>17</sup> Interestingly, the F-4 was on offer to other states and Israel’s nuclear delivery capacity was to be the foremost beneficiary of this policy.

Multipurpose technology allowed for the sale of nuclear-capable aircraft in this case. Even though both sides knew that Israel had acquired the ability to build nuclear weapons and planned to modify the aircraft to deliver nuclear weapons, the F-4 was sold to Israel as a conventional military aircraft. As a concession, Israel promised that “it will not be the first power in the Middle

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<sup>13</sup> Kristensen and Norris, 111.

<sup>14</sup> Kristensen and Norris, 108–10.

<sup>15</sup> Cohen, *Israel and the Bomb*, 307.

<sup>16</sup> “Congressional Testimony by Secretary Kissinger on Nuclear Test and Aid to India”, July 27, 1974, DPM Collection, LoC, I368, Folder 4.

<sup>17</sup> Ibid.

East to introduce nuclear weapons and agrees to not use any aircraft supplied by the U.S. as a nuclear weapons carrier.”<sup>18</sup> The promise to not “introduce” nuclear weapons to the Middle East was related to the American pressure on Israel to sign the NPT. It was unclear what the term “introduce nuclear weapons” meant and what step would transform a state from a “non-nuclear weapons state” to a “nuclear weapons state” under the NPT.<sup>19</sup> As Kissinger noted to President Nixon,

The NPT negotiations were deliberately vague on what precise step would transform a state into a nuclear weapon state after the January 1, 1967, cut-off date used in the treaty to define the nuclear states. They implicitly left that up to the conscience of the governments involved. The treaty does, however, describe the obligations of the non-nuclear weapon state as “not to manufacture or otherwise acquire nuclear weapons or other explosive devices.” It does not define “manufacture” or “acquire.”<sup>20</sup>

This formulation meant that the United States could now say that it could assume that it had “...Israel’s assurance that it will remain a non-nuclear state as defined in the NPT.”<sup>21</sup> The implication of this memo was that the NPT’s deliberately ambiguous definition, along with the multipurpose technology of nuclear capable aircraft, would allow Israel to acquire the F-4 aircraft (and its successors) as the means of nuclear delivery.

### Pakistan

Pakistan is another state that has received considerable international help for its means of nuclear delivery. The nuclear delivery options for Pakistan range from the United States-supplied

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<sup>18</sup> Rabin to Warnke, Secret Correspondence, 22 November 1968 in Joseph J. Sisco to the Acting Secretary, “Talking Points for Initial meeting with Israelis on Nuclear and SSM Issue July 29-Briefing Memorandum,” 28 July 1969, United States National Archives. <https://nsarchive2.gwu.edu/israel/documents/battle/14-02.htm>.

<sup>19</sup> Ibid.

<sup>20</sup> Kissinger to the President, “Israel’s Nuclear Program,” 6 November 1969, Nixon Presidential Materials Project (NPMP), National Security Council Files (NSCF), box 605, Israel Vol III. box 605, Israel Vol III. Accessible at, <https://nsarchive2.gwu.edu/NSAEBB/NSAEBB189/IN-25.pdf>.

<sup>21</sup> Ibid.

F-16 A/B aircraft, French-supplied Mirage III/V aircraft, a host of land-based ballistic missiles, and ground, air, and sea-based cruise missiles.<sup>22</sup> Recent debates with regard to Pakistan's nuclear forces have been associated with a concern that its short-range tactical nuclear weapons might lower the threshold for nuclear use in the subcontinent. However, the Pakistan's acquisition of the means of nuclear delivery from international sources is not a recent phenomenon, and occurred right through 1980s with the United States and China as the main suppliers states.

The United States and Pakistan took advantage of the Zone of Ambiguity in the non-proliferation regime in the 1980s to supply the latter with the means of nuclear delivery. Pakistan received 40 F-16 A/B aircraft between 1983 and 1987 (the order was placed in 1981), and even though the United States maintained that these aircraft were not configured for nuclear delivery, it became apparent very quickly that the aircraft had been modified for a nuclear role.<sup>23</sup> The United States eventually stalled the supply of the F-16s remaining from the deal through the 1990s over proliferation concerns. However, the United States, under Presidents Nixon, Ford, Carter, and Reagan knew of Pakistan's nuclear program and sought to undermine the non-proliferation regime by the use of waivers and exemptions. The United States' "blind eye" to Pakistan's nuclear advancement allowed it to develop its nuclear forces as a whole, and the means of nuclear delivery in particular.<sup>24</sup>

While the United States considered selling the F-16 as an incentive to Pakistan to halt its nuclear weapons program – even at the cost of provoking a regional conventional arms race – it ended up providing Pakistan with its first means to deliver nuclear weapons.<sup>25</sup> Indeed, when

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<sup>22</sup> Kristensen, Norris, and Diamond, "Pakistani Nuclear Forces, 2018," 349.

<sup>23</sup> Hans M. Kristensen and Robert S. Norris, "Pakistani Nuclear Forces, 2016," *Bulletin of the Atomic Scientists* 72, no. 6 (November 1, 2016): 372, <https://doi.org/10.1080/00963402.2016.1241520>.

<sup>24</sup> Akhtar, *The Blind Eye*.

<sup>25</sup> "Lake to Vance, "The Pakistan strategy and Future Choices" 8 September 1979, History and Public Policy Program Digital Archive, National Archives, Record Group 59, Records of Anthony Lake. Obtained and contributed by William Burr and included in NPIHP Research Update #6. <https://digitalarchive.wilsoncenter.org/document/114217>.

Pakistan refused to accept its 40 F-16s in 1982 on account of the aircraft not being equipped with the most modern radars that the U.S. Air Force used, the National Intelligence Council noted that that a failure of this deal would deal a “serious blow to US worldwide nonproliferation efforts.”<sup>26</sup> The sale of the means of nuclear delivery – somewhat counterintuitively – was seen to be in the interest of the non-proliferation regime.

The instruments in the Zone of Ambiguity in the nuclear non-proliferation regime that facilitated the transfer of the means of nuclear delivery to Pakistan were, at the international level, the NPT, and at the domestic level, the Symington Amendment, the Pressler amendment, and the Solarz amendment to the United States’ Foreign Assistance Act of 1961. Definitional ambiguities, normative and legal ambiguities, along with the multipurpose technology of nuclear-capable conventional aircraft came together to aid the transfer of the means of nuclear delivery.

The NPT, despite strengthening the norm of non-proliferation, simply did not prevent the proliferation of the means of nuclear delivery. Of the United States domestic legislation that was a part of its global non-proliferation strategy, the Symington amendment prohibited U.S. economic and military assistance to any state that imported or exported nuclear fuels, materials, or technology and did not comply with IAEA full-scope safeguards.<sup>27</sup> The Carter administration invoked the amendment in 1979 and stopped all military and economic assistance to Pakistan.<sup>28</sup> However, this lasted only for a year until the Soviet occupation of Afghanistan in 1979 led to a renewed geopolitical importance of Pakistan to the United States. Pakistan got waivers from the

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<sup>26</sup> Rowen to DDCI [Deputy Director of Central Intelligence McMahon], 19 November 1982, with attached memorandum from National Intelligence Council staffer [name excised], 'Pakistan'," November 19, 1982, History and Public Policy Program Digital Archive, CIA Records Search Tool [CREST]. Obtained and contributed by William Burr and included in NPIHP Research Update #6. <https://digitalarchive.wilsoncenter.org/document/114308>

<sup>27</sup> Seth A. Rotramel, ed., “6. Editorial Note,” in *Foreign Relations of the United States, 1977–1980, Volume XIX, South Asia - Office of the Historian* (Washington, D.C.: Government Printing Office, 2019), <https://history.state.gov/historicaldocuments/frus1977-80v19/d6>.

<sup>28</sup> Akhtar, *The Blind Eye*, 6.



United States despite advancements in its nuclear weapons program and the F-16 deal was facilitated by this waiver.

In 1985, the US Congress adopted the Pressler amendment and the Solarz amendments. The Pressler amendment stated that for the security assistance to continue to Pakistan, the President of the United States would have to certify in writing that Pakistan did not possess a nuclear explosive and that the United States' assistance to the state would significantly reduce the risk that Pakistan would possess a nuclear explosive.<sup>29</sup> The Solarz amendment sought to sanction Pakistan if it attempted to re-export nuclear weapons related materials or equipment from the United States illegally.<sup>30</sup> Despite credible intelligence that Pakistan was in violation of both amendments through the 1980s, the United States continued to turn a blind eye and to supply F-16s to Pakistan.<sup>31</sup>

It should be noted the United States was not the only supplier of nuclear delivery vehicles for Pakistan. China and North Korea were the most important sources of technology for Pakistan's ballistic missile program, with France, the United States, and West Germany aiding the program as well.<sup>32</sup> Even though the Missile Technology Control Regime (MTCR) was in place by the time Sino-Pakistani missile cooperation really took off in the late-1980s, its lack of universality meant that there were no real restrictions on this transfer of technology.

### South Africa

South Africa developed nuclear weapons and delivery vehicles under its apartheid-regime before giving them up in 1989 and signing the NPT in 1991. Even though it never tested a nuclear

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<sup>29</sup> Akhtar, 199.

<sup>30</sup> Leonard Weiss, "Turning a Blind Eye Again? The Khan Network's History and Lessons for U.S. Policy," *Arms Control Today* 35, no. 2 (2005): 14.

<sup>31</sup> Weiss, 18.

<sup>32</sup> Feroz Hassan Khan, *Eating Grass: The Making of the Pakistani Bomb* (Stanford, California: Stanford University Press, 2012), 236–37.

weapon, President de Klerk stated in 1993 that South Africa had built six and a half crude nuclear bombs.<sup>33</sup> While South Africa claimed that the top-secret 15 year nuclear program was entirely indigenous, in the process of building its nuclear forces it received considerable help from France, Israel, the United Kingdom, and the United States.<sup>34</sup> It is important to note that this help with the means of nuclear delivery not only went against the emergent norm of non-proliferation, but were also in defiance of the anti-apartheid sanctions (and an arms embargo) that a majority of the world had imposed on South Africa in the period.

After secret discussions about the acquisition of nuclear weapons in 1975, the South African air force publicly declared that it had used its British-supplied Buccaneer bombers to practice nuclear delivery.<sup>35</sup> The first potential nuclear delivery vehicle for South Africa was supplied by the United Kingdom. From the Buccaneer aircraft, a video-controlled glide bomb with flip-out wings would carry the nuclear device to its target.<sup>36</sup> South Africa also possessed French-supplied Mirage F1 aircraft that could be modified for nuclear delivery.<sup>37</sup> In 1975, Israel offered South Africa its Jericho ballistic missile, the latter considered the suggestion seriously given its lack of credible nuclear delivery systems at the time.<sup>38</sup> While that possibility did not materialize, Israel and South Africa cooperated on rocket technology and space launch vehicles – aimed towards building intermediate range ballistic missiles – through the 1980s.<sup>39</sup> Among the other

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<sup>33</sup> Martha van Wyk, “Sunset over Atomic Apartheid: United States–South African Nuclear Relations, 1981–93,” *Cold War History* 10, no. 1 (February 1, 2010): 52.

<sup>34</sup> See, van Wyk, “Sunset over Atomic Apartheid”; Jo-Ansie van Wyk and Anna-Mart van Wyk, “From the Nuclear Laager to the Non-Proliferation Club: South Africa and the NPT,” *South African Historical Journal* 67, no. 1 (January 2, 2015): 32–46; David Albright and Andrea Stricker, *Revisiting South Africa’s Nuclear Weapons Program: Its History, Dismantlement, Ad Lessons for Today* (Washington, D.C.: Institute for Science and International Security, 2016); van Wyk, “Apartheid’s Bomb and Regional Liberation”; Konieczna, “Nuclear Twins.”

<sup>35</sup> Albright and Stricker, *Revisiting South Africa’s Nuclear Weapons Program*, 77.

<sup>36</sup> Albright and Stricker, 102.

<sup>37</sup> Albright and Stricker, 139.

<sup>38</sup> Albright and Stricker, 176.

<sup>39</sup> Albright and Stricker, 178.

means of nuclear delivery considered were nuclear projectiles using self-propelled 155mm howitzer guns (G6) that were being developed from blueprints clandestinely obtained from the Canadian-American Space Research Corporation.<sup>40</sup> While the different means of delivery were being explored, the Prime Minister John Vorster approved a three-phase plan to construct seven deliverable nuclear weapons.<sup>41</sup>

The United States invoked the Nuclear Non-Proliferation Act in 1978 to limit its civilian relationship with South Africa over its refusal to sign the NPT, but it did not go any further to stop the South African acquisition of the means of nuclear delivery.<sup>42</sup> When it was suspected that the South Africans had tested a nuclear device in September 1979 and December 1980, the United States chose to look away. In fact, by 1982, Washington even approved the sale of items including ballistic re-entry vehicles along with equipment to help fabricate the nuclear bomb, which Reagan administration insisted was not sensitive or a part of any nuclear supplier trigger list.<sup>43</sup> This was because the United States government at the time believed that “non-sensitive exports to safeguarded facilities would help the dialogue with South Africa on nuclear matters.”<sup>44</sup>

The South African case provides us with another example where the Zone of Ambiguity in the nuclear non-proliferation regime allowed for the transfer of the means of nuclear delivery and technology associated with it. The norms of non-proliferation with the NPT and other associated regimes and even the Missile Technology Control Regime (MTCR) were all in place when South Africa was acquiring its means of nuclear delivery. While the argument could be made that states like France and Israel were not part of the non-proliferation regime at the time and were free to

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<sup>40</sup> van Wyk, “Sunset over Atomic Apartheid,” 57.

<sup>41</sup> van Wyk and van Wyk, “From the Nuclear Laager to the Non-Proliferation Club,” 40.

<sup>42</sup> van Wyk, “Sunset over Atomic Apartheid,” 54.

<sup>43</sup> van Wyk, 57.

<sup>44</sup> van Wyk, 57.

proliferate the means of nuclear delivery, that would still not account for the United States' behavior. The use of ambiguous definitions and multipurpose technology that could be seen as overtly conventional and non-military, allowed South Africa to build its means of nuclear delivery before they were eventually dismantled in the early-1990s.

These other possible cases also demonstrate that the non-proliferation regime was primarily concerned with the proliferation of fissile material and worked extremely hard to prevent the acquisition – or 'introduction' in Israel's case – of a nuclear bomb. The regime was less concerned about the proliferation of nuclear delivery vehicles which the Zone of Ambiguity facilitated. In all three cases of Israel, Pakistan, and South Africa, the United States pursued non-proliferation policy aimed at making the states 'keep their bombs in the basement' even if they possessed the capacity to build the weapons.<sup>45</sup> Non-proliferation as a 'pillar' of American grand strategy was extremely limited in its scope and essentially facilitated the spread of the means of nuclear delivery.<sup>46</sup>

Beyond the cases discussed in this dissertation, and these other possible cases, other nuclear states like China and North Korea have given, as well as received assistance on nuclear delivery systems. The Zone of Ambiguity in the nuclear non-proliferation regime, as a framework, thus helps us to understand how the proliferation of the means of nuclear delivery has taken place over time. In different cases, we observe the salience of different elements of this Zone of Ambiguity.

#### *Potential Proliferator/Nuclear Latent States*

Beyond overtly nuclear weapons states, there is another category of cases for which the Zone of Ambiguity framework is useful. This category consists of states that are potential

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<sup>45</sup> Rabinowitz and Miller, "Keeping the Bombs in the Basement."

<sup>46</sup> Gavin, "Strategies of Inhibition."

proliferators or latent nuclear states – i.e., states with the capacity to assemble a nuclear arsenal in short order – and that have acquired the technology to deliver the means of nuclear delivery.<sup>47</sup>

Potential proliferator states like Libya and Iraq were able to acquire the means of nuclear delivery even before they built their nuclear weapons. While these states' nuclear weapons programs may have been covert, their acquisition of the means of nuclear delivery were not always the same. For example, in 1974, a few years after it had begun to explore a nuclear weapons project, Libya bought the nuclear-capable Tu-22 aircraft, and SCUD-B missiles from the Soviet Union.<sup>48</sup> For Iraq too, once radiological bombs were designed in 1988, the weight of the bombs (1,400 kg) meant that the only two aircraft that could deliver them were the Soviet-supplied nuclear-capable bombers Tu 16 or Tu-22, both of which had been acquired by Iraq in the 1970s.<sup>49</sup> Furthermore, the al-Hussein missile that Iraq considered to deliver its nuclear warhead was a modified version of the Soviet-supplied SCUD-B missile.<sup>50</sup>

Latent nuclear states like Japan, Taiwan, and South Korea (among others) possess the capacity to deliver nuclear weapons if they chose to develop it. South Korea and Taiwan have strong ballistic missile programs that have received help from other states (including the United States); these states have also exported this technology to other states.<sup>51</sup> Japan, since the 1950s, has developed a very advanced space research program that could be adapted for a long-range solid-fuel ballistic missile program.<sup>52</sup>

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<sup>47</sup> Fuhrmann and Tkach, "Almost Nuclear," 444.

<sup>48</sup> Målfrid Braut-Hegghammer, *Unclear Physics: Why Iraq and Libya Failed to Build Nuclear Weapons* (Ithaca: Cornell University Press, 2016), 137.

<sup>49</sup> Braut-Hegghammer, 94.

<sup>50</sup> Braut-Hegghammer, 120.

<sup>51</sup> Nolan, *Trappings of Power*, 113; Seltzer, "Baekgom."

<sup>52</sup> Saadia M. Pekkanen and Paul Kallender-Umezu, *In Defense of Japan: From the Market to the Military in Space Policy* (Stanford, Calif.: Stanford University Press, 2010), 97.

For these category of potential proliferators, or nuclear latent states, the Zone of Ambiguity in the nuclear non-proliferation regime facilitates the acquisition of different technologies that would allow them to deliver nuclear weapons if they chose to develop them. Ambiguous definitions, multipurpose technology, and normative and legal ambiguity: the elements of the Zone of Ambiguity all enable the transfer of conventional weapons that can be repurposed for nuclear weapons delivery.

### **Implications for Policy**

This dissertation research also has some key takeaways for non-proliferation policy. More than the acquisition of the nuclear bomb itself, how states build their means of nuclear delivery tells us how they will seek to deploy them. This, in turn, would help states and the international non-proliferation regime understand the security threat posed by such proliferation, and respond to it. From a nuclear strategy perspective, how a state is able to build its nuclear delivery systems impacts what nuclear policy it will adopt. For example, in the United States' case, in 1944, the method of nuclear delivery towards which the atomic program was oriented was "...high altitude (about 30,000 feet above sea level), horizontal bombing, with provision for detonating the bomb well above ground, relying primarily on blast effect to do material damage."<sup>53</sup> This determined the U.S. nuclear strategy of targeting cities and civilians instead of military targets.<sup>54</sup> For India too, as chapter 5 demonstrates, availability of the means of nuclear delivery has led to nuclear posture, not the other way around.

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<sup>53</sup> Parsons to Groves, 19 May 1944, Groves 'Top Secret', file 5F, quoted in, Sean L. Malloy, "'The Rules of Civilized Warfare': Scientists, Soldiers, Civilians, and American Nuclear Targeting, 1940 – 1945," *Journal of Strategic Studies* 30, no. 3 (June 1, 2007): 486.

<sup>54</sup> Malloy, 488.

A greater knowledge of *how* states choose to pursue their nuclear weapons and means of delivery helps the non-proliferation regime mitigate the strategies of proliferation employed by states.<sup>55</sup> One part of understanding how states pursue nuclear weapons is understanding how they build their means of nuclear delivery. Mitigating that will need a better understanding of how and why these means of delivery spread.

Moreover, a historical account of the proliferation of the means of nuclear delivery is instructive for policy in a few ways. First, the Zone of Ambiguity framework tells us what aspects of the legal and normative structure of the non-proliferation order potential proliferator states seek to exploit. The combination of ambiguous definitions, multipurpose technologies, and normative ambiguity that states take advantage of are part of a playbook that the non-proliferation regime can actively seek to address. At the very least, it can begin by defining the term ‘nuclear weapon’ and whether it includes just the nuclear warhead or its delivery vehicles as well. Second, this account also highlights the different kinds of multipurpose technologies that states seek to acquire in order to develop their means of nuclear delivery. Dual capable aircraft, space launch vehicles and the range of dual-use technologies associated with them are red-flags that should alert potential suppliers and the non-proliferation community of the risks of the spread of the means of nuclear delivery. Indeed, signs that a state is attempting to acquire the ability to deliver the bomb should signal that a potential proliferator or nuclear hedger is seeking to cross the nuclear threshold. Third, the sale of conventional weapons that can be used as nuclear delivery vehicles is a major source of the proliferation of the means of nuclear delivery. Institutions like the Missile Technology Control Regime (MTCR) and the Hague Code of Conduct Against Ballistic Missile Proliferation (HCOC), which attempt to address the proliferation of ballistic missiles are not effective because

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<sup>55</sup> Narang, “Strategies of Nuclear Proliferation,” 113.

they are not legally binding or universally enforceable multilateral agreements. A number of states, including India were able to navigate the MTCR quite easily in the development of their nuclear delivery vehicles owing to this. Policymakers will need to take note of this and address the weakness of this institution by introducing a multilateral treaty to stop the spread of ballistic missile technology, and other means of nuclear delivery.

Another important takeaway for policy from this research is in the field of arms control. This study shows that the means of nuclear delivery have been treated as a bilateral arms control problem instead of a non-proliferation issue. As a consequence, policymakers have been concerned with the questions of credible nuclear deterrence and reduction in the means of nuclear delivery in the context of the United States and the Soviet Union. The *spread* and *increase* in the means of nuclear delivery among other states has remained unaddressed (apart from the brief and aborted attempt to reduce/completely disarm the means of nuclear delivery at the Eighteen Nation Committee on Disarmament in the 1960s). Going forward, policymakers will need to consider the means of delivery not just in terms of reduction, but also in terms of their proliferation.

Relatedly, this research has shown how states have managed the third-party nuclear forces in arms control negotiations between the Soviet Union and the United States (during the SALT and INF negotiations). In recent years, with the rise of China and the development of its nuclear forces, a similar problem has plagued the negotiation of arms control treaties (New START) between the United States and Russia.<sup>56</sup> My dissertation shows that the third parties have been considered a serious problem in the counting of nuclear forces between the two sides before, and all the parties were able to adopt strategies to mitigate the barriers to the conclusion of effective

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<sup>56</sup> David M. Allison and Stephen Herzog, “‘What about China?’ And the Threat to US–Russian Nuclear Arms Control,” *Bulletin of the Atomic Scientists* 76, no. 4 (July 3, 2020): 200–205.



arms control treaties. A closer scrutiny of these negotiations may provide a fruitful path forward for the current policy impasse.

### **Future Research**

With ongoing crises over Iran's ballistic missile program and North Korea's increasing missile capabilities, the means of nuclear delivery have become more salient than ever in international politics. However, surprisingly little research has been done on the subject of the proliferation of these weapons systems.

This analysis points to a few fruitful avenues for future research. First, the history of nuclear proliferation would be incomplete without an account of the history of the proliferation of the means of nuclear delivery. The international historical approach taken in this study can and should be expanded to all the nuclear states. With the increasing declassification of new documents in archives across the world, we can now have more detailed historical account of the proliferation of the means of nuclear delivery across all nuclear states.

The study of the means of nuclear delivery raises important questions for the study of nuclear latency. What does it mean for nuclear latent states to possess nuclear delivery vehicles? Could we classify states with certain kinds of nuclear delivery vehicles as being more likely to build nuclear weapons than others? Future research needs to examine what kinds of technology a state needs to possess to have 'latent nuclear delivery' capability. Relatedly, at what point of latent or explicit nuclear delivery capacity can (and should) there be counterproliferation efforts by the international community?

Recent research has indicated that possession of nuclear weapons affects the foreign policy of states in different ways.<sup>57</sup> Possessing the bomb can embolden a state's foreign policy, making it more aggressive, independent, and steadfast.<sup>58</sup> Future research needs to examine to what extent certain kinds of nuclear delivery capabilities "embolden" more than others and whether the means of nuclear delivery embolden latent nuclear states as well, i.e., does the capacity to deliver the nuclear bomb have emboldening effects on states' foreign policies?

Furthermore, the focus on the means of nuclear delivery raises several important questions about the nature of nuclear deterrence and crises. For example, to what extent do the development and possession of different types of nuclear delivery vehicles affect deterrent relationships between states? Does the possession of certain types of means of nuclear delivery vehicles deter an adversary more than others? Relatedly, some scholars have claimed that having more nuclear weapons allows the nuclear superior state to prevail in a crisis.<sup>59</sup> Future research needs to explore these claims further to see if the possession of certain kinds of means of nuclear delivery are more likely to help a state prevail in a crisis more than others. More important, are a wide range of nuclear delivery capabilities more destabilizing in a nuclear crisis?

Beyond the immediate crises with North Korea and Iran, other nuclear states have been adding to their nuclear delivery capabilities. The United States, United Kingdom, China, Russia, India, and Pakistan continuing to modernize their nuclear arsenals. The desire expressed by the signatory states to the NPT to work towards the "...elimination from national arsenals of nuclear weapons and the means of their delivery..." has remained a pipedream.<sup>60</sup> Broadening our

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<sup>57</sup> Mark S. Bell, "Beyond Emboldenment: How Acquiring Nuclear Weapons Can Change Foreign Policy," *International Security* 40, no. 1 (July 2015): 87–119.

<sup>58</sup> Bell, 91.

<sup>59</sup> Matthew Kroenig, "Nuclear Superiority and the Balance of Resolve: Explaining Nuclear Crisis Outcomes," *International Organization* 67, no. 1 (January 2013): 141–71.

<sup>60</sup> "Treaty on the Non-Proliferation of Nuclear Weapons (NPT)."

understanding of how these means of nuclear delivery proliferate and in turn impact international politics, could help academics and policymakers address the problem better.

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