

Counting the Global Aerospace Workforce

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As researchers on MIT's Labor Aerospace Research Agenda (LARA), we began our work with many questions. Are other nations—like the United States—facing a “demographic cliff” as their aerospace workforces age? What strategic decisions are other countries making to insure adequate skills and competencies? How are offsets affecting employment levels? Are American job losses in aerospace matched by job gains elsewhere?

As it turns out, just determining the size of the global aerospace workforce has proved far more complicated than we imagined, although the initial data—and the questions they raise—suggest that this is an important undertaking. The impact of the September 2001 terrorist attacks and the accompanying U.S. economic slowdown will affect the workforce numbers and should influence industry trends dramatically.¹

Charting the Trends

We have verifiable workforce figures for twenty-eight individual countries and the European Union (EU), but notable gaps exist. For example, it is not clear whether the figures for aerospace workers in Russia are unknown or whether they are simply undisclosed; the breakup of the Soviet Union has distributed sectors and facilities across many countries with little coordination. In Eastern Europe, available figures show 59,800 aerospace workers in the Czech Republic, Poland, and Romania. The Republic of China has released figures that vary from 150,000 to 400,000 workers; these workers are employed at industrial complexes that produce a variety of products beyond aircraft and missiles. Adding to the challenge are statistical methods that differ between countries, numbers that are not calculated over equivalent periods of time, and data that must be translated into comparable categories.

The data available to date show a decade-long decline in global employment. There is growth only in a few countries (e.g., Canada, Brazil, and Spain), while other nations (e.g., the United States and the United Kingdom) report sharp declines. Even though employment increased in some countries, the increase was not equivalent to the losses in the United States. Table 1 contains time-series aerospace employment figures from 1990 to 2001, where available. We have included the largest producers of aerospace products for which we could find data—the United States, the EU, Canada, Japan, and Brazil.

¹ Data exist for most countries up to 2001. Data for 2002 may show much sharper trends. We appreciate the data collection and analysis assistance we have received so far. Thanks to MIT graduate students Irwin Rodriguez, Shannon O'Callaghan, and Eric Partlan, Russian aerospace consultant Patrick Duffy, David Napier of the Aerospace Industries Association, and Peder Andersen of the U.S. International Trade Commission.

Table 1. Worldwide Aerospace Employment

Year	Selected Countries/Regions				
	US	EU	Canada	Japan	Brazil
1990	1,302,000	564,595	65,700	39,100	—
1991	1,214,000	528,636	65,600	40,300	—
1992	1,100,000	483,828	61,300	40,200	—
1993	966,000	443,770	53,400	39,600	—
1994	855,000	413,329	54,000	35,000	—
1995	796,000	329,041	57,600	38,300	7,600
1996	796,000	382,012	61,000	35,700	6,500
1997	859,000	395,487	64,000	34,200	8,000
1998	896,000	422,484	73,000	34,100	10,500
1999	847,000	426,730	83,600	34,000	12,000
2000	791,000	429,107	91,500	32,148	14,000
2001	742,000	435,500	95,000	—	15,000

Sources: U.S. Bureau of Labor Statistics, European Association of Aerospace Industries, and national trade associations of each country.

The cyclical nature of the industry is clear from the U.S. and EU figures. Although the entire industry generally shared a decline in the mid- 1990s, employment has been somewhat more stable in Europe. (Within the EU, however, there are significant differences among the individual countries.) Japan has also maintained relatively stable employment. Meanwhile, Canada and Brazil have more than doubled their total aerospace workforces. More analysis is needed to understand the causal factors and institutional arrangements associated with these different patterns.

Outsourcing and Restructuring

The data in Table 1 indicate important national variations in industry employment. The variations derive from many sources: sales, technology, restructuring of work and production, and institutional responses to economic developments. For example, employment in the United States decreased marginally from 1995 to 2000, while sales increased 24 percent. In the EU, employment rose 30 percent, and sales rose 53 percent. Contrast this with regional jet producers Canada and Brazil during the same period—Canadian employment rose 59 percent and sales increased 103 percent, and Brazilian employment grew 84 percent and sales shot up 482 percent. Productivity increases are clearly part of the story, but they don't explain why job growth occurred outside the United States.

Some portion of the U.S. and European aerospace employment decline may show up in different industries across the supply chain. The European Association of Aerospace Industries (AECMA) reports that the European increase in productivity is due to "rationalization and restructuring of the sector," and to outsourcing to the wider supply chain.² This is also happening in the United States as the major companies push to increase point-of-use supplier relations.

U.S. companies have also been involved in restructuring and in making their organizations leaner. Because there has been no recent hiring, the U.S. aerospace workforce is aging. Hourly and salaried groups are approaching a "demographic cliff" as large percentages of the workforce reach their late forties and early fifties.

² AECMA. 2001. *AECMA Facts and Figures 2001*. p. 8.

Time to Plan

Companies must plan now for future skill and competency needs. It is not clear that this is happening, although some companies provide cross-occupational training and promote “multi-skilling” of their workforces. The current efforts are largely aimed at the short term, which begs the question, what are the long-term solutions?

We conclude with an invitation. We still have not yet reached the point where we can give an exact number of workers in the global aerospace workforce. We feel confident that the current workforce is between 1.5 and 2 million employees, but we invite others to help us find the data to reduce the gap in this estimate. There is also the challenge of understanding the employment dynamics. We know that large numbers of jobs have been lost, but are not yet clear how much of that loss is due to developments such as declines in sales, increases in productivity, and outsourcing of work (which causes former “aerospace” jobs to get counted as employment in other industries). There is even less comparative information on the range of institutions associated with the processes of industry adjustment and improvement. Achieving a better understanding of the global employment trends in this industry is in the national interest, as well as in the interest of today’s aerospace workers and enterprises—and we invite others to help us determine how this can best be done.