

**Testimony of Stanley Sorscher,
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2001**

**U.S. House of Representatives Committee on Armed Services
Hearing on the Vocational and skills, economic, and technology
implications of defense trade offsets on the US defense industrial base.**

July 8, 2004

Thank you Mr. Chairman and members of the committee for taking an active interest in the long-term health of America's aerospace industry. I appreciate the opportunity to speak to you on this important subject.

I hope to share my perspective from inside the aerospace technical community. For 20 years, I worked as an engineer and scientist, on various Boeing programs. Currently, I am on staff with SPEEA, a union representing 20,000 engineers, scientists, technical and professional employees at Boeing facilities in several states.

The aerospace industry

Aerospace is a distinctive industry in several respects:

- Our products are complex and heavily engineered
- Design and service life cycles are measured in decades – longer than many individual careers
- Unit costs of our products are huge
- Success depends on very high levels of trust and confidence from our customers and the public

The aerospace industry relies on the competence and judgment of our technical and manufacturing communities, effective flow of information, and networks of relationships.

The Columbia crash investigation provides an apt lesson: critical decisions depend on efficient flow of information across organizational boundaries. Ideas must move among technical specialists, program managers and decision makers, without distortion of technical content or filtering from program pressures.

Aerospace Employment trends

Against this background, the American aerospace industry has steadily contracted over the last two decades, according to employment data from the

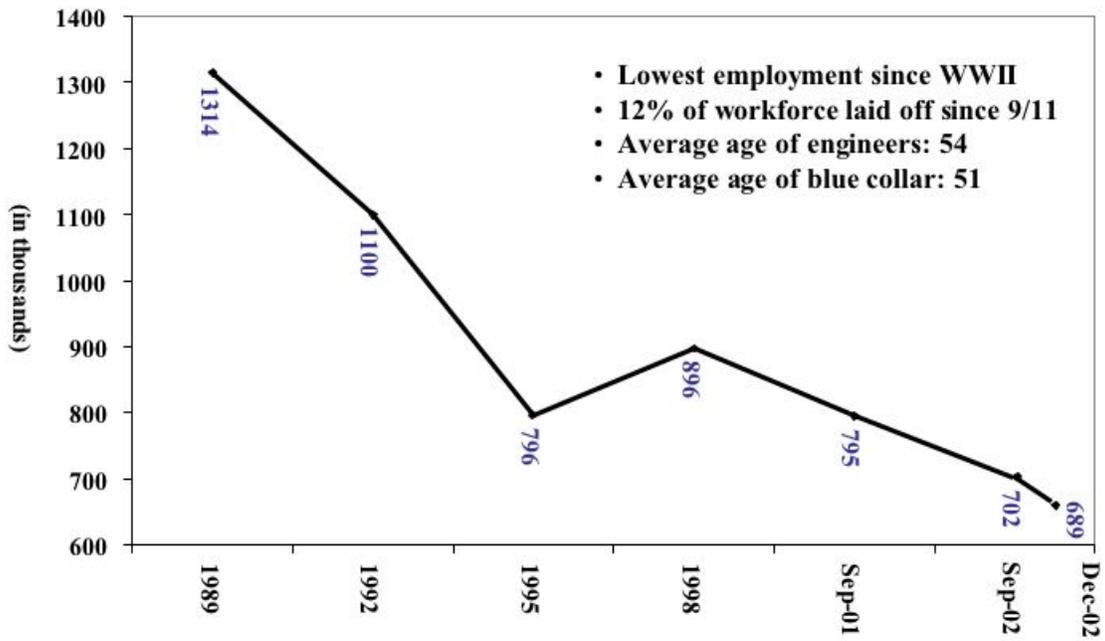
Bureau of Labor Statistics and an analysis of the Aerospace Industries Association.

Between January 1990 and March of this year, BLS figures show total aerospace employment fell by 50% or 564,000 jobs. Production employment fell by 58% or 321,000 jobs.

The AIA reports that from 1986 to 2001, aerospace R&D scientists and engineers suffered a reduction of 83%, leaving just over 21,000 jobs, from a level 145,000 fifteen years earlier.



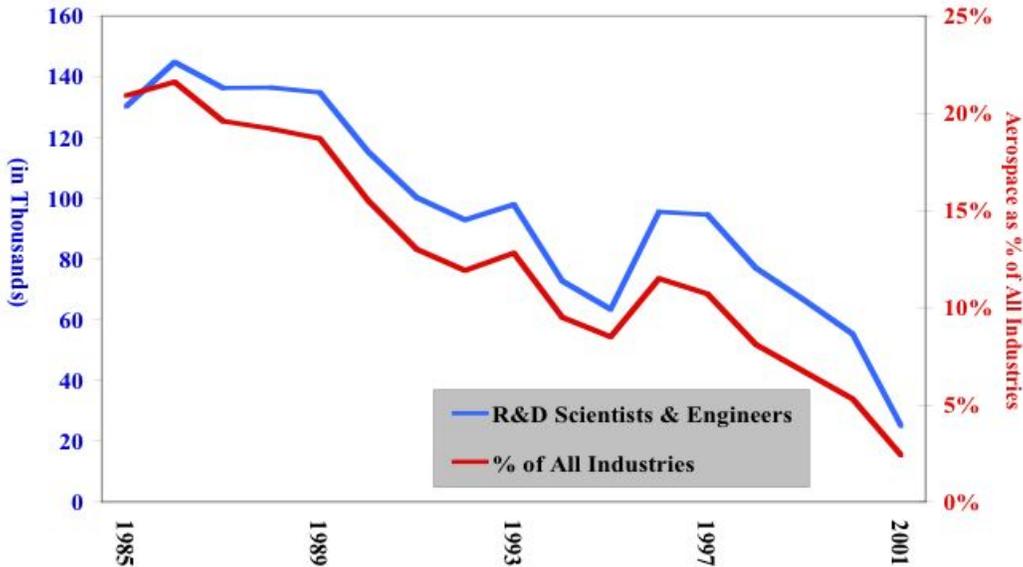
Aerospace Manufacturing Employment





R&D Scientists & Engineers Employment in Space and as % of All Industries

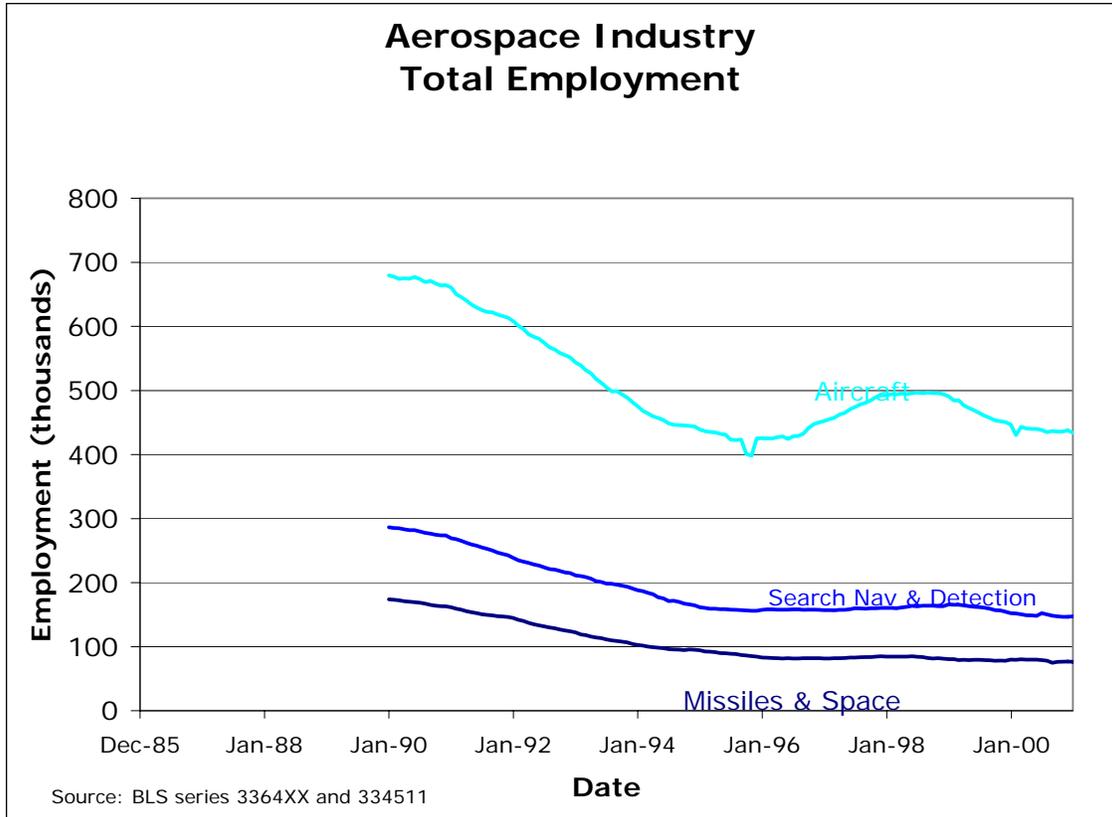
The aerospace industry has gone from a peak of 144,800 aerospace scientists and engineers in 1986 to fewer than 25,100 in 2001.



Missiles, Space and Aircraft Segments

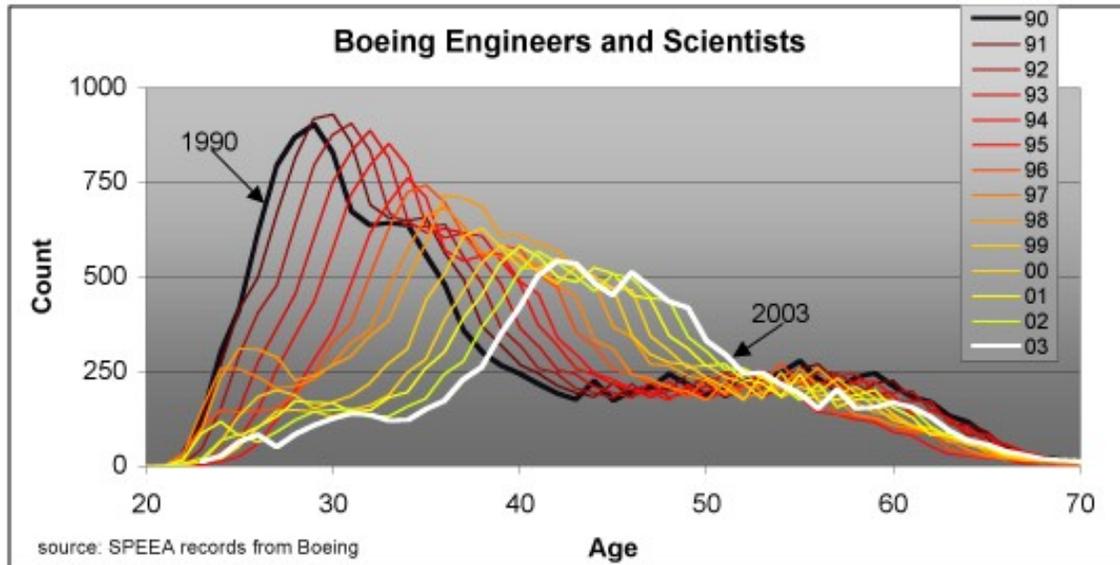
Commercial, space, and military labor markets interact strongly. People move from program to program, so that different market segments combine in making a critical mass of knowledge and experience. BLS data suggest that key military labor markets are small relative to the industry overall. Furthermore, when a skilled engineer leaves aerospace, he or she often finds a new job at Kodak, Hewlett-Packard, Ford or another employer in another industry. Attrition is typically high among new hires, raising the threshold needed to sustain an effective technical community.

Better data are needed for a detailed analysis. However, I think it is fair to say that as aerospace undergoes long-term contraction, military, space and commercial segments will all suffer from erosion of human capital.



This decline dismantles our technical and manufacturing communities from within, eroding the network of relationships, expertise, and authority, developed over decades.

A significant insight into this decline is illustrated in employment records for the large Boeing population in the northwest US. Our data show an alarming characteristic – a steady aging of the workforce, with nearly total elimination of the younger portion of the demographic profile.

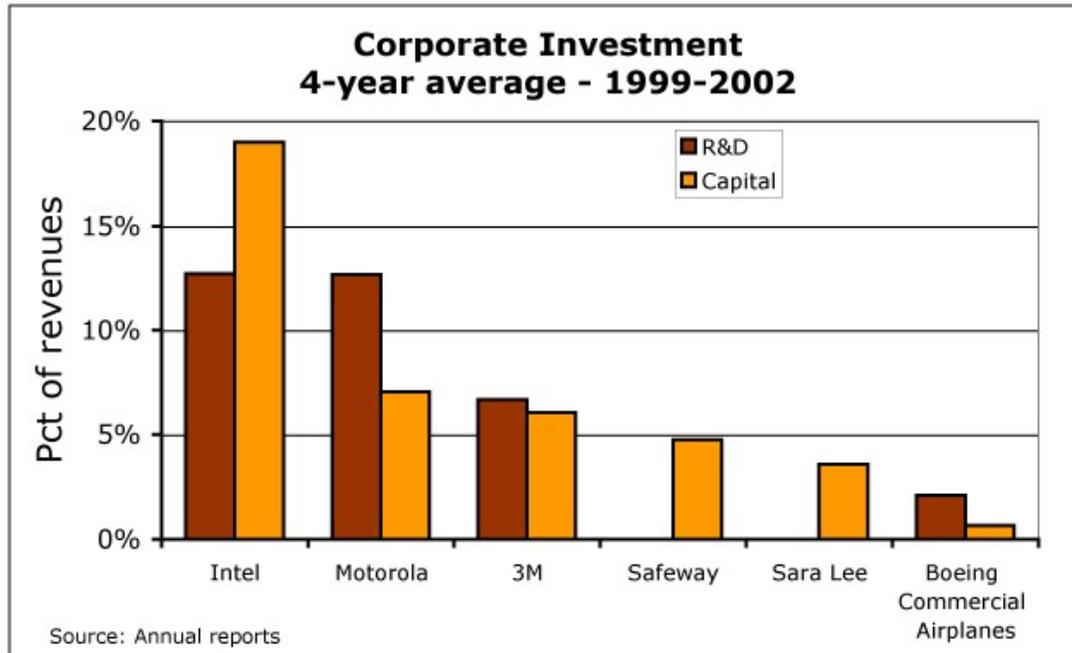


Lacking young people in the workplace, no one is present to capture and retain the body of knowledge accumulated from decades of experience. The next generation of supervisors, managers and system integrators cannot be cultivated if they are not present. Already, a 15-year period of experience has been forgone and cannot be recovered. This demographic trend is not sustainable.

Education must match investment

Furthermore, and I cannot overemphasize this point, it would be irresponsible and futile to educate a new generation of scientists and engineers if we do not also create employment opportunities for them in American facilities. Lack of education did not cause our demographic decline, and more education will not reverse it.

Aerospace R&D and capital investment are low compared to other industries, particularly in the commercial airplanes segment. We are taking capacity out of production, as work packages shift to the global supplier network. Education is a fundamental resource for economic well-being, but it must be matched with investment in productive capacity.



Long-term risks from offsets

In defense transactions, the customers typically introduce the requirement for offsets. On the commercial side, American manufacturers turn to offsets to defend regional market share. However, in practice the offset strategy has failed to secure market share. Rather, our market share in commercial airplanes declines year after year.

As we look at the results in commercial markets, offsets have held share only in one region - the Japanese market, but at the cost of the structural work package of almost the entire 767 and 777 fuselage. For the 7E7, the composite wing and fuselage involve state-of-the-art design and manufacturing – at a scale we have never attempted domestically. When those work packages go offshore, we will be conceding production technology and capacity we have never held ourselves.

A second factor helps drive offsets. Foreign partners share the risk of large financial investments required to develop new products. In exchange for capital investment, foreign firms acquire the knowledge, skills and experience embodied in the work packages sent to their domestic firms. Foreign manufacturers will inherit the competitive advantage of future learning curve benefits, derivatives, and follow-on work. They will learn important institutional lessons, while our body of retained knowledge erodes. While we intend to climb up the value chain we may, in fact, be withdrawing into a corner, where we can be cut off by suppliers who will have positioned themselves to put in place the final piece of the manufacturing puzzle – the role of system integrator.

Market forces versus policy

Market forces are inherently short-sighted. Micro-economic decisions are only indirectly connected to the interests of communities and the general public. Globalization places high priority on shareholder value, while discounting the Social Compact. American manufacturers publicly express their commitment to Canada, Russia, China, and India. Boeing invested \$1.3 billion in Russia, GE invests billions in China, and Microsoft invests heavily in India, as a few examples among many.

The use of offsets is defensive at best, with an arguable record of success. The long-term negative consequences are becoming clear in the erosion of human capital, and deferred investment in R&D, process improvement and new facilities.

The public interest can still be served to the extent that investors' interests coincide, or can be made to coincide, with the public interest. It is reasonable to ask policy makers to seek strategic, long-term balance to market forces, and restore the conditions necessary to promote long-term public interest along with investors' interests.

An AIA fact sheet from February 2003 puts the situation this way:

A highly skilled, stable, secure and renewable aerospace workforce is essential to our national security and economic prosperity. The Commission on the Future of the U.S. Aerospace Industry recommended "that the nation immediately reverse the decline in and promote the growth of a scientifically and technologically trained U.S. aerospace workforce..." adding that "the breakdown of America's intellectual and industrial capacity is a threat to national security and our capability to continue as a world leader."

Mr. Chairman, I agree wholeheartedly, and recommend that any policy initiatives should discourage movement of technology and investment offshore, and instead, encourage long-term investment in an effective and capable domestic aerospace industry.

Thank you Mr. Chairman and members of the committee.