



With defense-related programs winding down and retirements on the rise, leading Aerospace & Defense companies are accelerating efforts to retain and transfer valuable knowledge. (Image © freshidea-fotolia.com)

BRAIN DRAIN

Retirements and downsizing threaten Aerospace & Defense knowledge base

As funding for defense programs wanes, raising the likelihood of layoffs, and the Aerospace & Defense industry's most experienced workers approach retirement, the risk of losing decades of "tribal knowledge" increases. Although experts say many companies are ignoring the threat, others are aggressively seeking solutions.

• *by Tony Velocci*

Retaining specialized know-how learned over many years on the job is a common challenge across industries. Statistics indicate, however, that the Aerospace & Defense (A&D) sector is more exposed to the business risks of lost knowledge than most.

By 2015, the number of aerospace software and systems engineers eligible for retirement will nearly double, while losses among R&D professionals, program managers and hourly manufacturing workers will increase by 50%, according *Aviation Week & Space Technology* magazine's

2012 annual workforce study. In addition, the industry is contracting; in 2012, aerospace companies filled just half of their open positions.

"Aerospace is unique," said Ronald D. Sugar, former chairman and CEO of Northrop Grumman Corporation and a

board member at three multinational companies. "Not only is the design cycle of complex weapons systems long, the full lifecycle of the system sometimes approximates a human lifetime. This poses unique challenges for aerospace."

SHRINKING DEFENSE PROGRAMS

A&D programs take years to complete and involve multidisciplinary teams that push the state of the art. But fewer new projects are being launched with less frequency, especially for government customers. The result? A likely wave of layoffs will only add to the brain-drain precipitated by retirements. It all adds up the potential loss of substantial knowledge that can only be developed through years of specialized training, work experience and trial-and-error engineering.

Many aerospace companies have yet to institute systems for "banking" such expertise, surprising given the most recent Lloyd's of London Risk Index. According to the global survey of more than 500 C-suite and board-level executives, talent and skills shortages are the Number 2 risk facing businesses today, exceeded only by the risk of losing customers.

Edward J. Hoffman, director of the US National Aeronautics and Space Administration (NASA) Academy of Program/Project and Engineering Leadership and the agency's Chief Knowledge Officer, sees it every day. "We receive numerous requests from the private sector to assist with knowledge management, but most of the interest is from outside of aerospace," he said.

Hoffman suggests that aerospace companies rarely consider risk-mitigation as pressing as controlling costs or dealing with export-control regulations. They also tend to have secretive cultures, securing much of their organizational knowledge behind firewalls. "The aerospace workforce has many strengths, but it tends to be highly individualistic and blind to mistakes of the past, which argues for more openness and sharing of lessons learned," Hoffman said.

But while many aerospace companies lag in knowledge capture, others consider it a priority, employing multi-faceted programs to capture skills and measure effectiveness.

FOLLOW THE LEADERS

Rockwell Collins, a US\$5 billion communications and aviation electronics company, employs a system that other companies have used as a benchmark. "Knowledge management is our burning platform issue every day," said Lynda Braksiek, Rockwell's manager of Knowledge and Critical Skills.

Launched in 2001, Rockwell's enterprise-wide program involves three major elements. First, Rockwell formed communities of practice, where groups of professionals share best practices on a wide range of disciplines; of approximately 75 communities, 60% are engineering-oriented. Second is an enterprise knowledge base called "ePedia," where experts record their best practices in a permanent log; the information is then linked to formal training programs. Finally, Rockwell offers a people-finder for locating subject-matter experts throughout the global company.

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Elsewhere, United Technologies Corporation (UTC) initiated its Achieving Competitive Excellence (ACE) system in the 1990s to identify process-improvement opportunities and ensure world-class quality. ACE has since expanded to include tools and processes for resource planning and knowledge-capture across the US\$53 billion company.

"No program for capturing organizational knowledge can hope to succeed if it is not convenient to use and designed for the long term," said Michael McQuade, UTC's senior vice president of Science and Technology. "That means knowledge has to be captured in a way that is both accessible and easy to update."

Central to UTC's effort are 250 technology fellows who "own" the company's science in their respective fields. Fellows are responsible for facilitating knowledge retention and transfer across the enterprise.

LOCATING RETAINED KNOWLEDGE

Like Rockwell and UTC, Northrop Grumman (NG), a US\$25 billion manufacturer of space and missile systems, defense electronics and unmanned air vehicles, actively seeks to enhance its knowledge programs.

"Our engineering population is very large, so with the rate at which Baby Boomers are retiring, we have a lot of knowledge to capture," said Douglas Hoskins, who oversees the NG program as part of his role as director of Engineering Strategy.

NG's system has a shortcoming, however. Its search capability won't allow users to find information quickly or zero in on the information with the greatest value, a gap the company is working to close. "This will be an important enhancement," Hoskins said.

But Sugar, NG's former CEO, suggests that knowledge capture alone is too narrow a focus. "The better question is: How do you ensure a culture of steady innovation, as embodied in the ethos of companies like Apple?"

Sugar suggests that nothing succeeds in attracting top talent like the lure of exciting research and development projects. "While it is important for companies to capture recipe kinds of knowledge, the winning plan is also to create a procurement environment that funds a steady stream of challenging, smaller projects that will keep technologists creatively engaged," Sugar said. "That is how you build long-term value, ensure a vibrant workforce and maintain a competitive enterprise." ♦

Tony Velocci is retired editor-in-chief of Aviation Week & Space Technology magazine.

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