Hitachi Consulting

Many Pieces Make Up the A&D Workforce Puzzle

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Inspire the Next

Aerospace and Defense (A&D) companies are trying to stem the tide of the numbers of employees with many years of experience, specialized skills, industry knowledge, and company know-how from retiring. In what's being called by this industry as a potential 'silver tsunami,' A&D companies are facing significant changes to their workforce as large numbers of employees reach the age when they're prepared to leave the workplace.

Why A&D is Different

But more so than in other industries, the A&D 'brain drain' is wreaking a different kind of havoc. It's about more than just the sheer numbers of retirements on the horizon (according to Aerospace Industries Association (AIA) statistics, almost 60 percent of the U.S. aerospace workforce was age 45 or older in 2007)—it's about filling those jobs with the right mix of advanced talent and skills to take their places. And what the industry is finding is that there aren't many new skilled and talented resources to pull from. As underscored by the data in Figure 1 from the recent Aberdeen Group report *Insight on Aerospace and Defense Workforce Planning Programs*, A&D companies are feeling the pressures around the changing workforce more than other industries in all of the top four measures.

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Figure 1: Top Internal Pressures Driving Workforce Planning

Source: Aberdeen Group, September 2008

The A&D industry is distinctive because of the specialized knowledge and training it takes to fill the job roles in companies handling space and defense projects. According to A&D employers, industry analysts and related industry associations, there just aren't enough people with science, technology, engineering, and math (STEM) backgrounds to fill the future openings. In fact, there has been a lot of press recently around aerospace, aeronautic associations and A&D companies discussing the need to get more students interested in A&D careers despite years of effort already invested in STEM-focused attempts. For years, companies like Lockheed Martin, Boeing, Texas Instruments, Northrop Grumman, and others have been working with students as young as elementary school age to excite them about these important skills and careers. But it hasn't quite had the desired effect.

During a forum last spring focused on A&D workforce concerns, sponsored jointly by AIA and the American Institute of Aeronautics and Astronautics (AIAA), it was pointed out that despite significant investments in both time and money in STEM programs over several years, there has been no measurable gain in the number of students entering those fields. A renewed call for improved STEM action is still needed for teachers, students and programs to spark interest in aerospace and related careers. In a story in the AIA Update, Marion Blakey, AIA president and CEO, told attendees that the issue was bigger than any one group. "A broad cross section of our industry from policy and academia to human resources and public relations has a role in identifying solutions to the workforce challenge," she said.

The Generation Gap

Part of the problem is that the industry doesn't capture the imagination the way it once did. There's an entire generation entering today's workforce that grew up without the glamour and excitement that the space race used to hold. Today's college graduates weren't even born when man first went into orbit or during the Cold War. They never experienced how such events flavored Americans' quest for beating the 'Russians' in all things military and space-related. In those days, these things fueled the fire for engineers and others looking for an exhilarating career to latch onto.

Comparatively, the lure of today's aerospace and defense jobs just doesn't seem as thrilling as it once did. Today's younger Gen Xers and Gen Yers prefer Google and Microsoft to Northrop Grumman and Lockheed Martin. Admittedly there's also a decidedly different take on what it means to work in the 'defense' industry. To younger generations, 'defense' often is considered an ugly word. The idea of producing weapons of war and their related systems are turning away some prospective STEM students from the industry. It's become unattractive to be in A&D.

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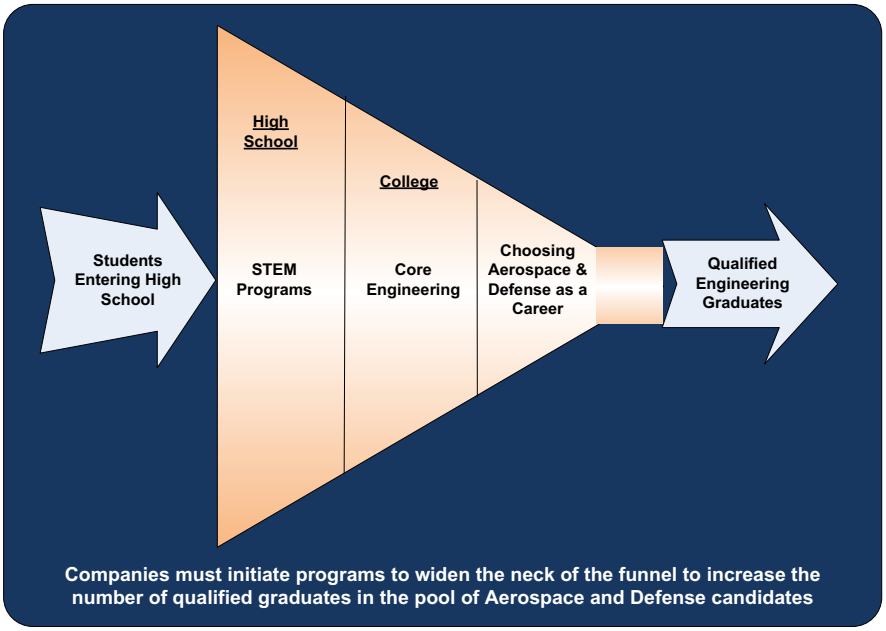
Bridging the Gap

To help overcome these issues, A&D companies must help the industry be more appealing; to be able to compete with high-paying computer science jobs that give employees cool gadgets and benefits, and find ways to develop leadership opportunities and provide career acceleration that appeal to Gen Y employees. They must also continue involvement in STEM-related programs, sponsorships, and investments.

- Invest in research and development (R&D) projects to get undergraduates involved and interested in the industry
- Sponsor corporate outreach programs such as 'Teacher for a Day,' and Junior Achievement
- Invest in a corporate sponsorship of tech centers and fairs, and lab environments
- Provide creative opportunities for engineers that compete with the Google's of the world who allow employees to spend 20 percent of their work time on free project incubation
- Allow for self-initiated research and development, and provide forums for engineers to bring their project ideas to management
- Use advertising that focuses on space and exploration, commercial aircraft, and the 'human' side of space



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Doing all of this means a company must have the ability to track and measure the impact of community outreach efforts. Adding a Marketing Relationship Management (MRM) tool to track marketing effectiveness in recruiting will play a big role. More sophisticated media capability is needed to prepare better corporate advertising and marketing campaigns. Developing university R&D commitments and relationships should be considered. And don't forget to continue focusing on employee selection. Use a recruiting database, innovative or updated networking systems, and take better advantage of Web 2.0 social computing assets such as MySpace, Facebook, and LinkedIn.

Companies also should implement strong training and leadership programs, and enhance performance management plans. Consider developing programs to offer early retirement for underperforming leaders to create leadership opportunities for younger employees.

Déjà Vu All Over Again

But while those transformations are underway, what do companies do in the meantime?

Look to the past.

While working on long-term solutions, A&D companies can gain immediate help from the same pot of employees causing part of the shortage problem—retirees. Consider changing HR policies to hire back retirees (and the knowledge, skills and experience they already have) to work as part-timers, contractors or project-specific staff. Developing programs and policies for short-term measures would allow retirees to fulfill job vacancies while working to recruit for the long-term.

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Create a database of people who left or were laid off to capture exit data and keep retired and laid-off engineers' contact information close at hand for a ready pot of potential fill-in workers. Maintain a robust exit-interview database populated with up-to-date contact information on those people. Instigate an external-facing portal specific to alumni employees and consider starting an alumni network to keep people active and informed. Also implement human capital management programs that would include post-separation plans and develop creative or flexible programs to accommodate flex work schedules to the silver tsunami group so they can more easily work on at least a part-time basis.

It's All in the Timing

But lack of educated and skilled replacements aren't the only reasons A&D companies are facing a workforce crisis. The inherent loss of knowledge from a retiree who's spent anywhere from 10 to 40 years working on an aerospace or military project can be crushing. A&D programs have a protracted product lifecycle on average of more than 15 years once product development, production, time-to-market, product support, and product sunsetting are factored in. Rather than years, A&D products usually last decades.

- The B-52 is at 50+ years of service
- Space shuttles are at 20+ years of service
- Nearly all of the military's launch vehicles have been around since the '60s
- Combat survivable radios? At least 10 years in a low estimate

So when knowledgeable workers head for the fishin' hole, their wealth of information goes with them. So how is 40 years of history captured in the shortest time possible? How do you get all you need to know from a person leaving the project or company? To ease this aspect of the workforce crisis, companies need to implement robust knowledge management systems, long-term succession planning, and transition programs. Having these in place forces a company into longer-range planning and makes them take into consideration knowledge management across several decades.

To do this more effectively, there must be a deeper visibility into workforce assets. A&D firms need robust knowledge management and resource planning tools that include granularity of capabilities, competency and experience, and an inventory of each individual person's knowledge and skills.

Your company should place an emphasis on required knowledge-sharing. Create a culture that supports knowledge transfer, leveraging past experiences, versioning and sharing in an industry that historically benefits people for hording knowledge to become the 'expert.' Have a robust training and mentoring capability using both internal and external resources to help spread knowledge and how-to's. A best practice from other industries is the use of the mentoring programs to build relationships and a network that facilitates the spread and sharing of knowledge. These relationships can evolve into a barrier to exit as younger employees build stronger relationships within the firm.

The Offshore Solution

Oftentimes companies look offshore to help fill employment ranks when the need arises. However, this is less of an option for American defense and space firms with strict security rules, regulations and government contracts. Security clearances are required for a majority of work done at A&D companies and foreign workers usually are not eligible for high-level security clearances.

But that's not the only reason foreign countries aren't really a potential resource for employees. While many overseas colleges and universities are graduating technically capable resources, they aren't from the core engineering disciplines in civil, mechanical and aerospace engineering because the same market forces that make those careers less attractive in the United States are also at work overseas.

But the path to an offshore solution isn't completely blocked. It just requires some creative planning to achieve. Taking a cue from highly classified, compartmentalized projects, break programs into classified and unclassified pieces allowing highly valuable, security cleared employees to focus on the classified pieces instead of diluting them with unclassified work. In some cases, the unclassified pieces can be compartmentalized and taken offshore. Also extend STEM investments into relationships and programs with universities and institutions overseas.

Robust systems for knowledge management, career performance management, skills-based succession planning, and skills development are all tools to help manage the organic growth of experts.

To drive down this path, a company needs processes that combine visibility into clearance management and human capital management, the planning capability to efficiently break programs into classified and non-classified chunks and manage them in one stream, and multi-level security controls for collaboration, design, development, and data management solutions.

Unportability of Engineers

Engineers are just not portable between industries, companies, or even programs within a company. Their skills are highly specialized. For example, there's not much need for orbital analysis outside of A&D. Engineers and the skill sets they've developed are scarce commodities. These valuable, scarce resources can go underutilized if the supply of skilled labor and the demand from programs are not planned and analyzed at a granular enough level.

This is the main function of a mature workforce planning function. Companies need to forecast the requirements for those skill sets and develop a plan to consolidate skills into the minimum number of distinct sets. With that in hand, a company can engage mentoring, job rotation, and apprenticeship programs to grow those skills organically. Consider removing extraneous work from the most senior and knowledgeable individuals to allow them to build the next generation of experts.

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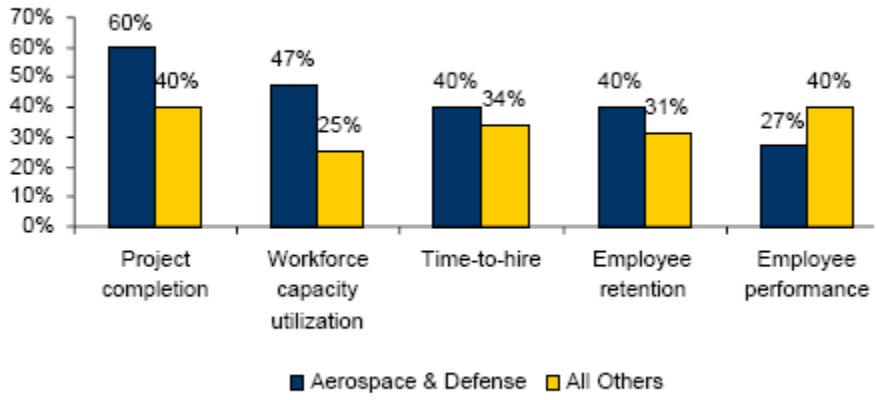
The good news, as evidenced in Figure 4 by the data from A&D respondents to the *Insight on Aerospace and Defense Workforce Planning Programs* survey, is that there is hope. Companies that know how to address these issues are showing direct and significant business improvement from the implementation of these programs, processes, and systems.

Figure 4: Percent of Organizations Citing Key Improvements



Source: Aberdeen Group, September 2008

Conclusion

The loss of knowledge, skills, and experience from the current A&D workforce due to retirement and the reduction in the number of engineers entering the industry has created significant pressures on aerospace and defense companies as they try to maintain critical expertise.

Companies are working hard to mitigate the effects of retirement through alumni networks, updates to their HR policies to access retirees as part-timers, contractors, or project-specific staff, and utilizing information technology to track past workers as potential rehires.

At the same time, immediate actions are available to try and organically grow expertise and experience within the firm. Mentoring, job rotation, and apprenticeship programs are all candidates for skills and experience uplift. Systems, processes, and policies for knowledge management, career performance management, skills-based succession planning, and long-range, granular, program planning for skills needs, are all poised to provide the information necessary to take significant action.

Longer-term investments in STEM educational programs – such as undergraduate research and development projects, Teacher for a Day, Junior Achievement, corporate sponsorship of events such as science fairs -- and creation of creative opportunities coupled with increasingly sophisticated methods for tracking, measuring and assessing the impact of these investments are all working to increase the number of students entering core engineering programs and, subsequently, choosing A&D as a career.

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