AVIATION WEEK NETWORK

Aviation Week 2015 Workforce Study:

A Reality Check as Competition for Talent Increases

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Executive Summary

Since 1997 Aviation Week has tracked employment opportunity and compensation in the aerospace and defense (A&D) industry. Beginning in 2005 this expanded to include:

- Identifying what matters most to professionals overall, young professionals and engineering students in making career decisions.
- Analyzing demographics of the workforce by gender, ethnic background, and age to inform industry, policy makers, and educators.
- Involving executives, educators and young professionals in review and analysis of data.

The 2015 Aviation Week Workforce Study surveyed corporations, 1,156 university engineering students and 1,371 young professionals. The data indicates that 55,000 jobs will be filled this year, despite an overall reduction in the A&D workforce population. As with other high technology industries, A&D is struggling to reflect the face of America in terms of gender and ethnicity. Despite this, significant improvement has been seen in terms of gender and ethnic diversity in the executive suite.

Key findings of the study also found that while technological challenge and the ability to contribute to high-profile projects remains a driving force in the career decisions made by students and employees, total compensation (pay, benefits, bonus structures, signing bonuses) has moved up to top the list of considerations among young professionals.

During the analysis and review meeting with the Workforce Study Advisory Boards, the following issues and recommendations were developed on the basis of the information compiled:

Issues

- Advisory Board members report 2015 will see an increase in retirement rates, based on the first half of the year. However, note that retirement means *withdrawal from active/work life*—it is doubtful this generation of retirees will actually quit working but rather are trending toward transitions to new active, and frequently working, roles.

- Competition for specific engineering skills is broadening and becoming more intense as automotive, high tech and oil and gas industries begin to overlap to a greater extent in terms of technology development.

- Sixty-seven percent of those who voluntary left jobs last year had 0-5 years of service; the leading reason for leaving was “new opportunity” as young professionals (YPs) express frustration with the pace of career advancement by seeking new jobs. Of the YPs who changed jobs in 2014, 14% left the industry entirely. Despite this, voluntary attrition for the industry for all age categories is a mere 5.7%—far below that of other technology-based industry sectors.

- Despite increases in engineering enrollment in U.S. universities to close to half a million students and annual graduation of right at 100,000 students, the percentages of African-American and female students have not increased. Latino engineering enrollment—and Latinos as a percent of the YP population— has increased slightly.

- Student loans remain an issue for close to half of young professionals and students; the rate of student loan exposure is significantly higher among African-American students and YPs.

- Work/life balance gains traction as an issue for the workforce, but it also is a function of age and family situation (children, elder care, etc.). And these variations in need affect a company, depending on the culture of the organization. It is important to understand these needs and ensure knowledge is available to professionals of all ages to enable them to make appropriate choices, preferably within the industry.

Recommendations

- Establish plan to use what is learned from the study
  - Set goals as an industry
    - Voluntary attrition for employees with 0-5 years of service
      - As percentage of total voluntary attrition
      - As percentage of age category
    - Diversity with regard to people of color and gender
      - Increase in population of college engineering students enrolled/graduate
    - Returning active-duty military hiring
    - New graduate hiring
  - Develop profile of what attracts/retains young professionals to A&D
    - Provide to all partners and participants for use by companies/agencies in marketing/recruiting efforts
    - Apply to collaborative initiatives
      - Add to current initiatives between AIAA and Aviation Week, Aviation Week and Wings Club, AIA and U.S. Commerce Department

- Increase fidelity of voluntary separation data
  - Ask for voluntary exits at each age range
  - Continue to ask for voluntary exits by years of service

- A&D needs to do a better job of appealing to the hearts and minds of YPs and the next generation if it intends to compete with other high technology sectors for top talent.

- Recognize that the important factors "new challenge" and "career opportunity" have multiple meanings—new assignments, special projects, lateral movement, change of title to reflect change in tasks, as well as increase in salary and develop systems to support opportunities for change every 24-36 months.

- Define ways, through specific processes, to bridge the leadership gap that results from voluntary attrition among young professionals and the opportunities on the other side of the "gap" that exists in the 35-45 age group. Advisory boards view this gap as a function of the industry as it has persisted for two decades and has been smoothed significantly over the past 10 years.

- Universities estimate that fully one-third of their students who are foreign nationals do not qualify for A&D employment. U.S. government regulations need to be updated to reflect an industrial base that operates globally, to engage U.S.-educated foreign graduates in U.S.-owned companies, and to minimize the unnecessary "export" of talent.

This study is sponsored by the Aviation Week Network, Aerospace Industries Association (AIA), Korn Ferry and Strategy&/PwC, and is conducted in association with the American Institute of Aeronautics and Astronautics, National Defense Industries Association, and NASA.

Overview 2015

Aviation Week launched its 18th annual workforce study in an environment in which workforce data analytics has provided for a much more sophisticated and educated examination of trends ranging from demographics to factors that affect career decisions among specific groups of people. This situation is dramatically different from a mere decade ago when speculation and fears arose about a pending so-called "gray tsunami" that promised to decimate the aerospace and defense industry.

In response to this greater data sophistication, Aviation Week for the first time asked responding corporations and federally funded research centers to provide specific numeric data rather than the percentages provided in the past. This makes year-to-year comparisons difficult, a fact to keep in mind when reviewing the comparisons provided in this report. But the end product is a report that provides more valid and precise information, particularly as it relates to demographics and retention.

As in the past, Aviation Week partnered with industry trade and professional organizations to develop and conduct the surveys involved in the study. This partnership began in 2005 to consolidate several different studies into *a single, credible source of data on the industry* and in response to appeals from industry leaders to *minimize the number of survey requests* received to a single unified effort.

In addition, Aviation Week collaborated with other organizations to redefine the workforce population on the basis of current North American Industry Classification System (NAICS) codes. This expanded the job classifications covered by the study to encompass such capabilities as robotics, autonomous systems, and work related to aircraft connectivity, materials and miniaturized satellites, as well as other emerging technology priorities.

Using this updated definition, the workforce population for the A&D industry swells to 820,000 versus the current data from the U.S. Bureau of Labor Statistics defining the industry as fewer than 500,000 employees. A report due out later this year on the economic impact of the aerospace and defense industry defines the A&D workforce as 1.2 million people strong; however, this number includes various other services that range from facilities management and publishing to high-end consulting, which Aviation Week does not include in the definition of the A&D "industry."

And, while the total employment has been recalculated to this higher level, the reality is that the A&D workforce continues to shrink. PwC estimates the industry employee headcount declined by 2.3% in 2014, on the heels of similar drops in 2013 and 2012. While this decline occurs in the midst of major budget cuts for the U.S. defense budget and realignment of the space sector to a commercially driven enterprise, the reality is that such a decline in employment is hardly a signal that the industry anticipates major growth in the near-term—regardless of strong growth in commercial air transport orders.

The respondents to the Aviation Week Workforce Study represent 569,931employees, or 65% of the total

population. Companies responding in 2015 were not identical to those responding in 2014, due in part to merger and acquisition activity.
Note also that Aviation Week coordinated extensively with AIA's working groups: the Workforce Policy Council, STEM Workforce Working Group, Workforce Analytics Working Group and Workforce Learning and Development Working Group.

Over the past decade, the Aviation Week Workforce Study advisory boards have relied on several core metrics when analyzing the results of the study. These include:

Hiring

- Forecast for 2014 was for hiring 31,000 to fill new and replacement jobs; actual hiring was 55,330.
  - 4.5% of those hired were returning active-duty military (not retired)
  - 10.4% of those hired were new graduates from univerities worldwide
  - 8.5% of those hired were from other A&D organizations
- Industry plans to hire 55,000 in 2015
  - 35,061 of these positions were identified by job discipline
  - 15% of hiring will be from the new graduate population

Industry Reputation

- 73% of students responding to the university student survey indicated an interest in A&D careers, up from 68% a year ago
- 71% of young professionals responding to the YP survey indicated they would recommend the A&D industry to a friend or relative, up from 64% a year ago

Demographics

- 23.5% of the employee population is female
- 23.6% of the employee population is under-represented populations, based on EEO definitions
- The average age of industry employees increased by one year to 47; companies with fewer than 1,000 employees have an average employee age of 43 years

Voluntary Attrition

- Overall rate of attrition was 5.2%
  - 67% of the total were employees with 0-5 years of service
  - Voluntary attrition for engineers was 4.0%
- 1.7% of those over age 62 retired in 2014, roughly the same as the rate of a year ago
  - Rate is highest among largest companies
  - Companies participating in the study believe the percentage of retirements will increase in 2015, based on first- and second-quarter data

Methodology

The Aviation Week Workforce Study has four components:

1. The Corporate Data/Compensation Survey
2. The University Student Survey
3. The Young Professionals Survey
4. The Young Professionals Longitudinal Survey

Using a base listing of 174 aerospace and defense industry companies and federally funded research centers, Aviation Week solicited voluntary responses from the industry. Data was aggregated for the industry as a whole and within four categories based on employee headcount.

These are: 50,000 or more employees; 10,000-49,999 employees; 1,000-9,999 employees; and fewer than 1,000 employees.

Responses were received from 39 companies, representing 569,931employees, 511,000 of whom are in the United States. The companies asked to participate are North American-based, where many of the data points are required reporting for publicly held companies.

Discussions continue with trade associations in other global geographic regions to identify processes that will allow for their participation without undue work burden.

The University Student Survey was conducted at universities identified in the 2014 study as those where the greatest numbers of graduates were hired or those listed as preferred suppliers of critical skills. In addition, executive advisory board members recommended inclusion of several key international universities considered prime sources for international hiring—Delft University of Technology (TU Delft) in the Netherlands, TU Braunschweig (Germany) and the Indian Institute of Technology. The Colleges of Engineering at each institution conducted the survey, providing a link for a random sample of students to use in completing the survey. It is understood that the students responding to a study from Aviation Week already have indicated some interest in the industry by self-selecting to participate. This year 16% of the 8,494 students invited to participate did so.

The Young Professionals Survey is also conducted via a web link, with invitations going out from participating companies to a 10% random sample of salaried employees ages 35 and younger. These companies, along with NASA, volunteer to participate.

A total of 4,644 young professionals were invited to participate in 2015, with a response rate of 30%. Forty-eight percent of those responding believe the survey has value to the industry and to the individual participants. Begun in 2009, the YP study has garnered better than 30% participation each year.

The Longitudinal YP Study is conducted among YPs who have volunteered following participation on the YP Study in prior years. The intent in this study is to determine changes in perceptions by the YPs as their life circumstances change, as well as to track whether job changes represent churn within the industry or an actual loss of talent to other industries.

Chapter 1: Demographics

While A&D leaders have voiced concern about an aging workforce for the past 15 years, among the concerns is the fact that aerospace and defense is viewed as a mature industry. And that makes hiring the best and brightest all the more difficult. This is particularly true in view of the high-tech industry that continues to push beyond the Internet and into additional domains primarily developed by the A&D industry—including robotics, autonomous systems, control engineering, and unmanned vehicles.

Amidst this changing landscape, A&D now finds itself in a battle for employee diversity with the same Silicon Valley companies. After more than three decades of awareness training and hiring efforts, the industry is watching as GAFA—Google, Apple, Facebook and Amazon—come to terms, publicly, with their own lack of diversity. In 2014 these companies, along with Intel and Microsoft, published their first diversity reports. And despite the belief by some in A&D that people of color and women were flocking to Silicon Valley, the reality is much different. Google's workforce is predominately male (70%), women fill only 18% of the technical jobs, and 22% of the company's executives are female. Sixty percent of the tech giant's workforce is white.

Women in Aerospace

Among the most impressive statistics in this year's demographic study is the increase in female engineering executives—doubling the data point from 2014 to 2015. This has long been an area of focus, as many women have forged the path to leadership by starting their own small businesses or by shifting into a different job discipline, such as program management, where women have found a foothold to higher leadership ranks.

2015 Gender Snapshot

	2015	2014
Women in A&D	23.5%	23.7%
Women in Engineering	14.6%	11.23%
Female Engineering Executives	10.5%	5.1%
Female Executives	19.4%	15.5%

The Aviation Week Workforce Study also looked at the percentage of women in software development, as this remains a critical skill area difficult to fill but essential in meeting customer requirements. This data point improved dramatically between 2013 and year-end 2014, from 8.9% to 17.9%.

Looking at the data by size of organization, the largest companies have been the most successful in pushing the data points upward. The smallest organizations continue to struggle in terms of attracting women, and yet are strong in terms of women

engineering executives. Companies having 10,000-49,999 employees—in which just 6.8% of engineering executives are women—face the most difficult situation.

2015 Women in A&D By Headcount Category

	A&D Industry	50,000+ Employees	10,000-49,999 Employees	1,000-9,999 Employees	<1,000 Employees
Women / All Employees	23.8%	24.7%	23.4%	18.2%	16.5%
Women/Executives	19.0%	22.2%	16.0%	14.0%	12.1%
Women/Engineering Executives	10.0%	12.6%	6.8%	17.2%	11.1%
Women/Engineering	14.6%	14.8%	11.7%	17.9%	11.5%
Women/Software	17.9%	18.8%	13.8%	16.9%	11.3%

For comparison purposes, we looked to the high-tech sector as well as to Catalyst, which tracks the trajectory of women in various industry sectors on a global basis, reports that while A&D may have fewer female executives and employees overall, it is doing well above average for women in engineering overall.

Industry Comparisons/Women in the Workforce

	A&D	S&P 500 (*Source: Catalyst*)	High Tech (GAFA+)
Female Executives	19.4%	25.1%	23%
Female Employees	23.5%	45%	30%
Female Engineers	14.6%	9%	17%

The study also looked at the initial stages of women's careers and those of people of color. In the YP Survey, 30% of the respondents were female. Other industries examined did not track YP-specific gender or ethnicity demographics.

Any examination of women in the technical workforce looks through the lens of the pipeline—a general population that is slightly more male than female, a university population that is more female than male, but engineering enrollment dominated by men—82% of the total. Moreover, women

then skew toward a limited number of engineering disciplines, with biomedical and environmental enjoying the benefit of what little growth there is. Important also to note is that while university engineering enrollments are 28% women, just 18% are graduating.

Among the women responding to the YP study, 21% were in engineering careers. This contrasts with the overall population, at 14.6%. But it does point out that at least initially A&D is attracting an above-average number of women upon graduation.

Under-Represented Populations

Under-Represented Populations is the jargon used for U.S. government reporting and reflects the combination of peoples of color. This contrasts with the A&D industry's primary customers—the traveling population and the military. Latino Americans make up 16% of the U.S. workforce, while Black Americans account for 12% of the working population, according to the U.S. Census Bureau. A&D's total under-repreresented population is 23.6% of the workforce.

2015 Diversity Snapshot

	2015	2014
Under-Represented Populations in A&D	23.6%	12.8%
Under-Represented Populations in Engineering	22.9%	20.2%
Under-Represented Populations/ Engineering Executives	9.7%	9.9%

Interestingly, the diversity of the A&D workforce did increase substantially in the past year. While this may be a function of recording actual numbers in data aggregation (versus percentages of percentages in prior years), the fact is that it is much different than a year ago in this overall category. The population of under-represented individuals at the executive level hit double digits for the first time but remained fairly stagnant across the engineering disciplines.

We also looked at the demographics within the YP survey, where it was possible to look at distinct ethnic categories. In this sample, 5% of the respondents under age 35 were Black and 7% were Latino—far below the U.S. workforce figures.

2015 Diversity in A&D By Headcount Category

	A&D Industry	50,000+ Employees	10,000-49,999 Employees	1,000-9,999 Employees	Fewer than 1,000 Employees
Under-Represented Individuals / All Employees	23.5%	25.7%	20.2%	18.9%	16.2%
Under-Represented Individuals / Executives	11.2%	12.9%	9.5%	5.0%	5.0%
Under-Represented Individuals /Engineering Executives	9.7%	11.6%	7.4%	22.2%	22.2%
Under-Represented Individuals /Engineering	22.9%	24.8%	17.7%	13.4%	23.0%
Under-Represented Individuals /Software	25.1%	23.0%	23.0%	23.0%	11.0%

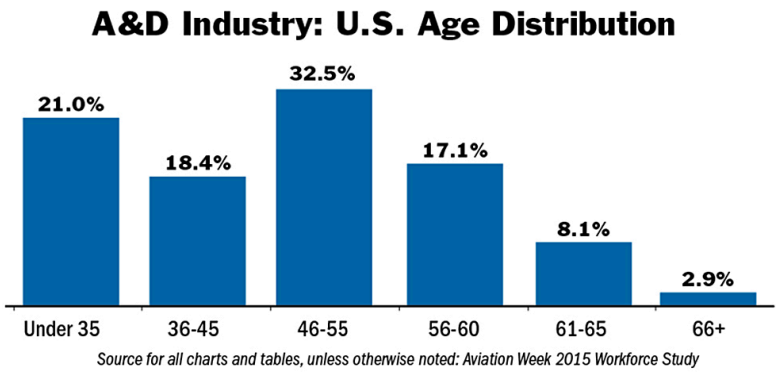
As with women in the workforce, the data representing under-represented individuals is strongest in companies with more than 50,000 employees. However, the percentage of engineering executives is greatest in the smaller organizations, where the addition of even one individual can make a significant change.

In the past, the focus has been on Latino and African-American employment. However, as the advisory board observed this year, no major A&D company has been headed by a person of Asian descent. In addition, there is concern about the need for diversity of thought—a factor that is impossible to measure. As A&D faces increased competition for top talent and overlaps with other industries continue to evolve, will hiring managers in fact be able to hire, develop and retain people who think differently?

Age By the Numbers

Back in 2004 the first urban myths began circulating about 40% of the A&D workforce retiring by 2009. Clearly this did not occur, as a result of the country's greatest recession since the Depression and dramatic requirements emanating from more than a decade of wars, coupled with record demand for commercial aircraft.

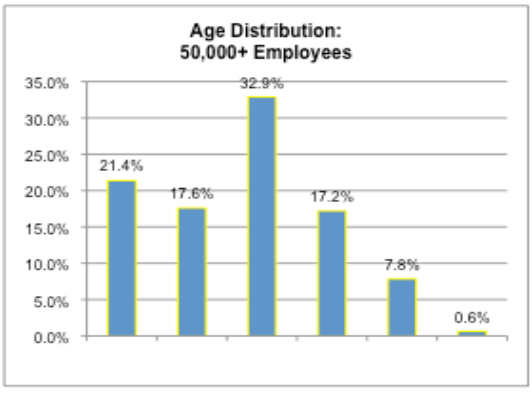
However, note that the average age across the industry has been lingering at 46 or 47 years of age for the past five years. This lack of movement indicates that while retirements in the industry remain modest at a mere 1.7%, the industry is bringing in younger employees to counterbalance the undoubted aging of Baby Boomers.

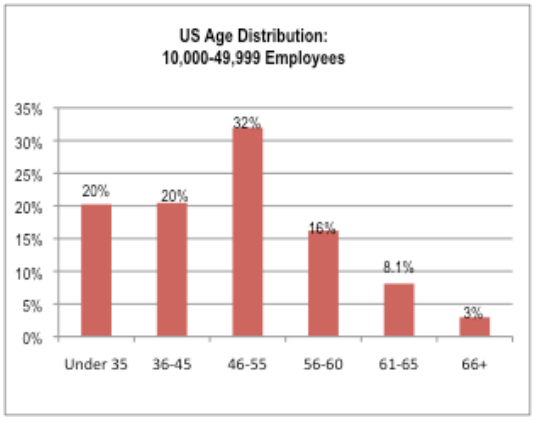


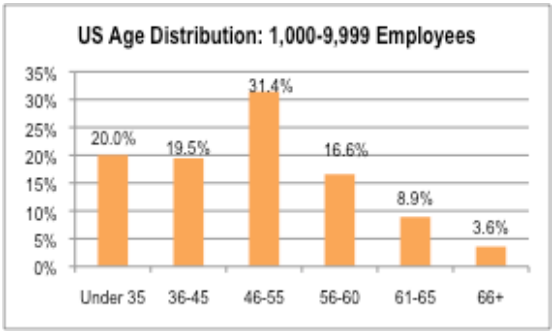
Source for all charts and tables, unless otherwise noted: Aviation Week 2015 Workforce Study

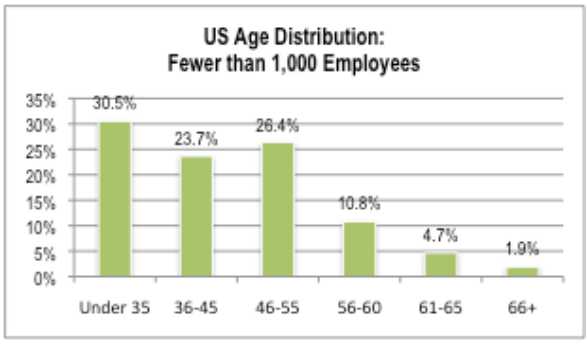
As the chart aboe indicates, just 21% of the workforce is under age 35, or 107,000 individuals. The dip to 18.4% in the 36-45 age category is less dramatic now than in the past. The decline reflects the high rate of voluntary attrition for those with 0-5 years of service, an issue that persists. Also important is the data point concerning people who are over age 66—2.9%. This percentage represents 15,000 people, and 3,500 of them are over the age of 71. Add to this 15,000 the more than 44,200 people who are 61-65 years old and the potential exodus does lead people to jump to the term "gray tsunami." In reality, even if the ratio of retirements doubled to 3.4% in 2015 from 1.7% in 2014 of those over age 62, the total impact would be fewer than 5,000 people retiring.

As with gender and diversity, age data varies by size of organization. The smallest organizations have the highest ratio of employees under age 35 and the lowest ratio of employees in the 46-55 year-old range. A company such as Boeing, with its 170,000 employees, approximately 14,000 of whom are over age 61, faces a sizable issue as the Baby Boomers continue to age. The Aviation Week Workforce Study advisory boards indicate that based on retirement activity during the first half of 2015, retirements will be increasing in 2015 after hitting just 1.7% in 2014.



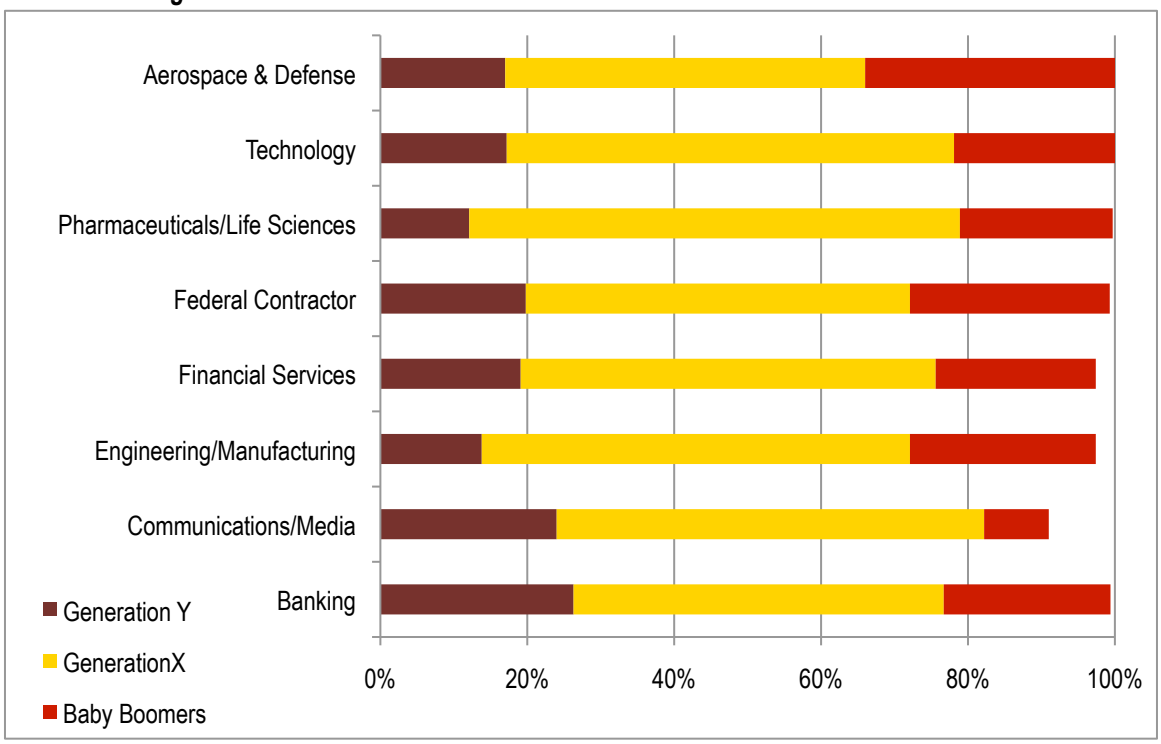






Based on Saratoga Industry Benchmarks, A&D has a higher ratio overall of individuals who fit the definition of Baby Boomer than other industries with which we compete for talent and is near equal with high-tech in terms of the percentage of millenials (usually defined as those born between 1980 and 1995) in the workforce. However, high-tech has a much lower percentage of workers born before 1963.

Age Distribution Comparison with Other Industries
Source: Saratoga/PwC



Challenges for the future will include filling positions in the mid-range age groups (yellow) over time, either by clearly building career paths for young workers or by attracting individuals from other industry sectors. Traditionally the commercial aviation, space and defense sectors turn to

experienced military personnel to fill some of these positions.

But it is helpful to look at A&D's population versus that of the U.S. Workforce, as defined by the U.S. Bureau of Labor Statistics. It is useful to focus on filling the front-end and middle of the workforce pipeline after years of industry worry over retirement. As defined pensions have given way to defined benefits programs, the term retirement itself has less relevance. Retirement, by definition, means withdrawal from active/work life. Few people are exercising the right to withdraw from the workforce completely and are instead choosing to shift their careers—either in terms of hours worked, the organization they lead or follow, or the entire focus of their work.

Chapter 2: Voluntary Attrition

Voluntary attrition is a two-sided metric. If it is too high, it indicates an organization where people are dissatisfied, unfulfilled and motivated to go elsewhere. But if too low, an organization can stagnate, creating a situation where people become frustrated by the lack of opportunity and the "dead wood" factor, and where action must be taken to move people out to enable the company to better adapt to changing conditions.

For A&D, voluntary attrition is dangerously low at 5.2%, a level many human resources professionals believe is too low and may require identifying underperformers and letting them go. This is not something the A&D industry, or any other industry, is particularly good at doing.

However, the rate of voluntary attrition among those with 0-5 years experience is 67% of the total, a troubling factor for an industry seeking to hang on to its young talent. In years past, we have looked at the percentage of voluntary attrition for those under age 25; however, this was not possible this year as the transfer was made to collecting actual numbers rather than percentages. Industry leaders have indicated, already, a willingness to provide the numbers by age cohort next year, which will provide additional insight into when and why young professionals leave—with more validity and precision than data based merely on years of service, which could apply to a mid-career hire as well.

The Defining Moment —Deciding to Stay or Go

Through the YP and Student studies, Aviation Week gained insight into what drives career decisions for these groups. And salary, a basic element, is but one area that forms the initial attraction. Once in a job, when an employee begins feeling underpaid it usually reflects dissatisfaction with one of the other factors, according to our advisory boards.

YPs identified a short list as to what is most important in an initial evaluation of career choices:

1. Benefits+Salary/Opportunities to advance in their careers (tie)
2. Technological work and challenge
3. Geographic location

Once on the job, a different list comes into play.

1. Challenging work/Job that makes good use of my skills (tie)
2. Tools, learning and technology to do my job
3. My organization encourages innovation in technology, processes and business

So what is most important to an individual in making them satisfied with their current job? There was some variation, depending on the demographics of the respondent. Listed in rank order:

Women	Latinos	African-Americans
Independence in my work	Flex time/independence in my work	Flex time
Part of larger team; supervisor values my contribution; flex time	Supervisor values my contribution/Part of larger team	Supervisor values my contribution
Job Stability	Variety in work assignments	Part of larger team/independence in my work

While these are the factors that lead to choosing a job and being satisfied on the job, the bottom line is that when YPs begin the search for a new job the top reasons for doing so are "opportunity" and "career growth."

The Workforce Advisory Board Members queried whether this necessarily meant a promotion, and it may be the case as 25% of the YP respondents reported *never* having been promoted, and 20% reported being promoted in the past 24 months.

However, just as important is the need for growth and change on a consistent basis. That need seems not to have changed for any generation, if the advisory board members (ranging in experience from two years to 37 years in the industry) are a representative sample.

One variation on these themes about job satisfaction is when an employee dislikes the work itself—this factor ranked #3 among those looking *outside the current employer* for a job change. It is also worth noting that women who are looking to leave their current employer cited a lack of recognition, and Black YP respondents indicated a need for change based on personal/family issues.

A&D's Attrition Problem

While much effort is expended on attracting and keeping young professionals, the truth is that A&D overall may not have an attrition problem. At 5.2%, voluntary attrition is low and may have reached the point of stagnation for some companies. Many companies have followed the General Electric practice of identifying 10% of the workforce that is under-performing, and then ensuring these individuals find a "better fit" elsewhere.

Pressure to leave, however, has occurred in an environment where affordable housing

and sale of homes that have lost value have been a problem, student loan debt is staggering (no longer a 3% interest rate bargain with many student loans carrying interest rates of a staggering 7-8%), and the availability of new jobs has been held in check by a slow recovery from the recession.

Today some of this situation has changed: housing is recovering, student loans still exist, and the only jobs benefitting in a job-less recovery have tended to be in technology-related fields.

The YPs responding to the study believe the overarching opportunities are those that overlap with other industries: robotics, cyber security, and software development.

In combination, these factors may result in voluntary attrition climbing among the YPs who will have opportunities with non-traditional and more commercially oriented companies. This year, 67.3% of the total attrition for A&D was among those with 0-5 years of experience, and better than half of these early service employees worked in engineering.

Note also that women and under-represented populations comprise 41% of those who voluntary left their engineering organizations in the first five years of their employment, despite making up a much smaller ratio of the overall engineering population.

One of the factors cited by the YP Study was that African-American employees carry a significantly higher student loan burden; 63% of Black A&D professionals have student loans. Geography, family concerns, and student loan debt are factors affecting career decisions disproportionally for Black employees.

Attrition Comparisons

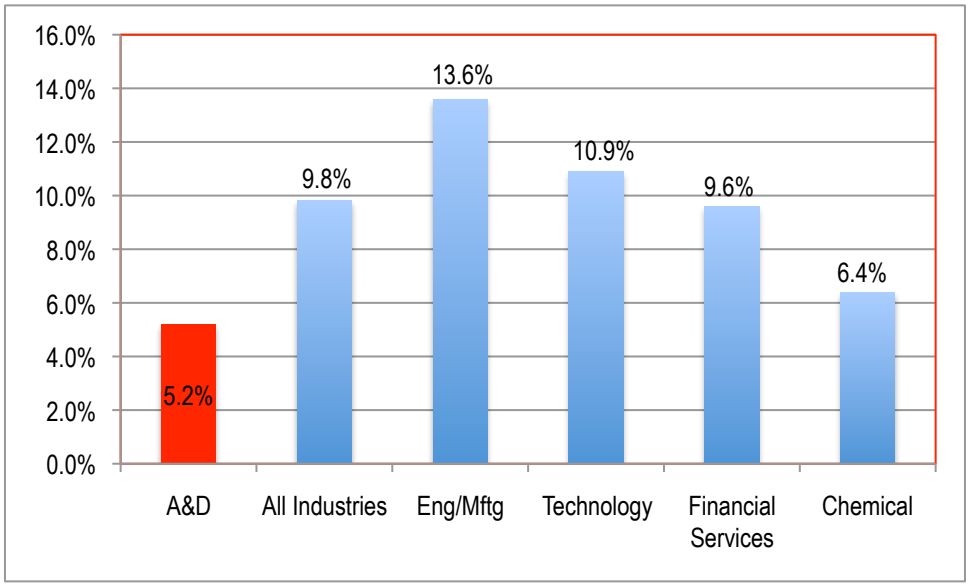
The study looked at attrition through several different lenses. The first was by job category.

Job Discipline	% of Total Vol Attrition
Administrative/Clerical	2.7%
Business Dev/Strat Plng	1.2%
Engineering	22.0%
Engineering Tech/Aides	3.2%
Enterprise IT/Arch	8.6%
Finance	4.9%
Mftg Ops/Exempt	4.4%
Mftg Ops/Hourly	12.5%
Program Mgt	2.6%
Software Dev	3.9&
Supply Chain	5.4%
All Other	27.2%

As noted previously, the industry is driven by a strong engineering population and engineering also paces the overall attrition data. Regardless, the overall attrition rate is low, and is low in comparison to other industries, as indicated in the next chart. The data continue to be of interest as the economy continues to improve.

A&D Voluntary Separation Runs Low

Source: PwC/Saratoga



Note: Add in retirements and A&D separations run at 6.9%, outpacing only the chemical industry and nearly half that of the engineering/manufacturing employment category overall. High-tech voluntary attrition remains at double digits, 10.9%.

Retirement Rates Still Lagging

Retirement rates are what initially drove the need for a single source of demographic data for the A&D industry. Despite staggering forecasts for more than 40% of the workforce to retire by 2009, the mass exodus has yet to begin. However, advisory board members indicate that based on the first half of 2015, the 1.7% rate recorded in 2014 is expected to increase. The 2014 rate held steady with previous years, despite a recovering housing market and economy.

For 2014, only 1.7% of the A&D workforce retired—but 20.6% of employees over age 62 chose to retire. And that's the number to watch.

% of A&D Employees over Age 62 Who Retired in 2014

	Industry	50,000+	10,000-49,999	1,000-9,999	Fewer than 1,000
Overall	20.6%	22.1%	16.1%	20.7%	4.4%
With Secret Clearance	8.7%	8.3%	35.1%	12.0%	Insufficient Data
With Above Secret Clearance	9.4%	9.4%	41.7%	8.9%	0%
Bus Dev/Strat Plng	16.5%	16.4%	19.8%	14.0%	0%
Engineering	16.4%	17.8%	11.6%	14.4%	0%
Eng Tech/Aides	15.4%	20.6%	11.5%	3.8%	0%
Mftg Ops/Salaried	31.9%	18.6%	54.3%	23.7%	0%
Mftg Ops/Hourly	26.5%	31.4%	12.5%	35.0%	7.5%
Program Mgt	15.4%	21.1%	8.3%	19.7%	0%

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Software Dev	14.2%	13.5%	24.5%	5.9%	0%
Supply Chain	20.5%	24.2%	9.0%	23.3%	0%

While the A&D industry has not included retirements in its voluntary separation data in the past, it will do so in 2016. Voluntary separations will be tracked by job discipline, size of organization, and by age categories.

Chapter 3: Employment Forecast

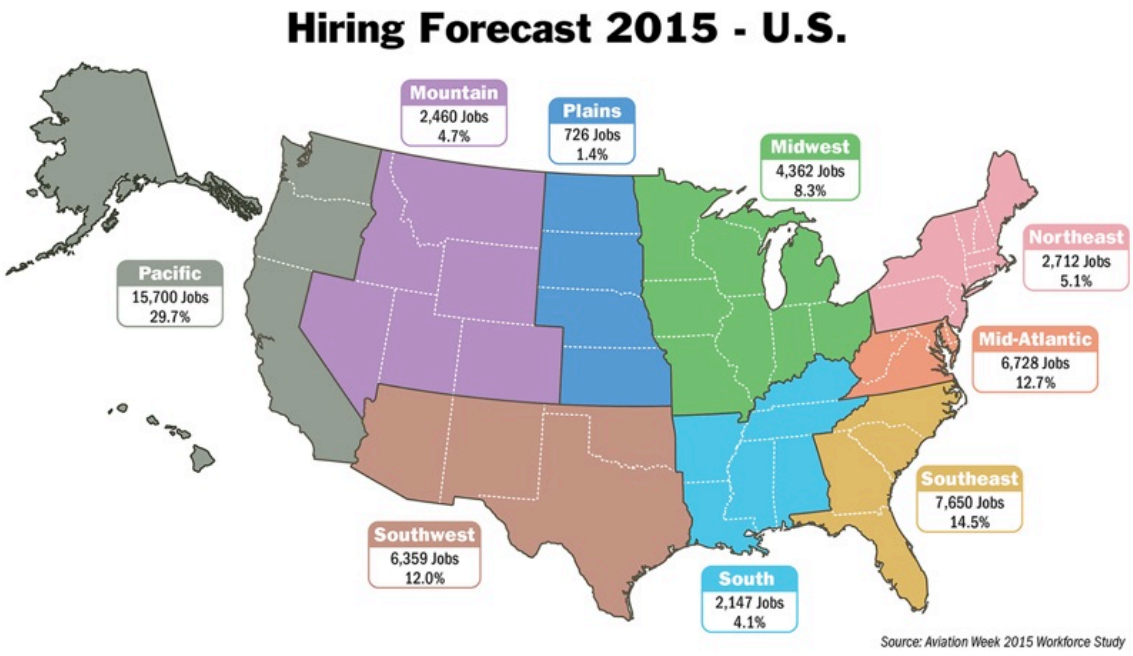
Forecasting hiring is a bottoms-up process that tends to be conservative, by nature. It combines replacement hiring and new positions. For 2014, the industry predicted hiring approximately 32,000 individuals while still downsizing. This was based on the need to hire college graduates, fill specific skills slots and to replace workers leaving through retirement and attrition, which together equaled just over 36,000 people.

The industry actually hired just over 53,000. Of this total, a mere 4.5% of the total were returning active-duty military personnel, despite a focus throughout the country to hire veterans.

Another 10.4% of the new hires came from universities, below the targeted forecast of 20%. And some companies did track whether they hired from within the industry; 8.5% of the positions were reported as filled from inside A&D thought the real number is believed to be much higher.

The remainder of new hires would, then, have come from other industries and from the military or government service.

Looking ahead, the A&D industry plans to hire about an equal number of people in 2015, with little or no new job creation as a result of continued budgetary pressures in the U.S. defense marketplace. However, the companies responding to the study indicate they will place more emphasis on hiring new graduates, increasing the percentage of new hires from universities to 32.6% of the total.



While the West Coast enjoys the highest numbers of projected hiring, it should be noted that the Southeast continues to gain strength. This results from manufacturing growth in Virginia, the Carolinas, Alabama and Mississippi.

In all 55,000 jobs are forecast to be filled, numbers specific to job disciplines were lower at 35,000. More than 37% of the hiring will come in engineering, followed by enterprise IT and architecture—a job function not normally considered a core competency as most companies rely upon specialized IT consultants to provide expertise on major enterprise installations.

Within engineering, the numbers for on-campus hiring will focus primarily on aerospace engineering, computer software engineering, systems and structures engineering.

2015 Job Forecast by Job Discipline

	Industry	
	Number	**%**
Overall	35061	100%
Administrative/Clerical	819	2.3%
Business Develpment/Strategic Planning	688	2.0%
Engineering	13182	37.6%

Engineering Technicians/Aides	1282	3.7%
Enterprise IT & Architecture	4289	12.2%
Finance	1156	3.3%
Manufacturing Ops-Exempt	810	2.3%
Manufacturing Ops-Non-Exempt	2708	7.7%
Program Management	607	1.7%
Software Development	1126	3.2%
Supply Chain	2552	7.3%
All Other	5,842	16.7%

2015 Hiring Forecast by Size of Company
(Based on Job Disciplines)

	Industry	50,000+	10,000-49,999	1,000-9,999	< 1,000
Overall	35061	22052	11104	1588	317
Admin/Clerical	819	496	263	43	17
Bus Dev/Strategic Plng	688	300	336	45	7
Engineering	13182	10450	1861	810	61
Engineering Tech/Aides	1282	415	793	65	9
Enterprise IT & Architecture	4289	1210	3001	77	1
Finance	1156	803	291	50	12
Manufacturing Ops-Exempt	810	401	338	60	11
Manufacturing Ops-NonExempt	2708	822	1604	129	153
Program Management	607	370	196	35	6
Software Development	1126	894	140	77	15
Supply Chain	2552	992	1498	52	10
All Other	5,842	4899	783	145	15

Preferred Suppliers for A&D

Beginning five years ago A&D companies began working with universities as they do with other suppliers of critical resources. The goal is to find preferred suppliers whose graduates are most likely to succeed within a specific organization. One danger, of course,

is that it is left to the universities to meet the need for diversity in terms of gender, ethnicity and fit with the company's mission and culture.

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The list of Top Schools is based on preferred supplier of skills, where the most graduates were hired in 2014 and the top schools as identified by alumni YPs who believe their alma mater and its reputation has a direct correlation to their career success thus far.

2015 Top Schools to Hire for A&D

Preferred Supplier	Where Most Grads Hired	Alma Mater by YPs
1. Pennsylvania State University	1. University of Central Florida	1. California Polytechnic University
2. University of Colorado	2. University of Washington	2. Embry-Riddle Aeronautical University
3. Purdue University	3. Pennsylvania State University	3. Purdue University
4. Georgia Institute of Technology	4. Iowa State University	4. Iowa State University
5. (tie) University of Maryland & University of Florida	5. Arizona State University	5. (tie) Pennsylvania State University & University of Washington

Chapter 4: Where A&D Professionals Want to Work

Every four years Aviation Week conducts a survey of its readers and users to identify the factors they consider most important in evaluating employers. These tend not to change much, though specific needs do change over the course of a career.

Healthcare benefits, for instance, may not be a top priority in the early years of a career, but become more important as family responsibilities expand.

These factors—which have remained technological challenge, opportunity and feeling valued—have not changed since our work began in 2004. We also test this same set with the young professionals in their study. Aviation Week then requests data that links to these factors to identify the top employers in terms of technological challenge, opportunity and learning.

Top Companies Meeting A&D Professionals' Career Needs

Technological Challenge	Valuing the Individual	Professional Opportunity
Analytical Graphics Inc.	AUSCO	Northrop Grumman Corp.
Lockheed Martin Corp.	Ferco Aerospace Group	L-3 Communications

Technological Challenge

Technological Challenge was identified through an index of questions that reflect an organization's commitment to growth and technology.

- 46.1% of A&D industry executives have engineering/technical degrees.
- 20.7% of the industry's revenues are generated by products developed in the last five years.
- The industry invested 3.1% of revenues in independent research and development.

The highest rate of IRAD investment was for the smallest companies, with 4.0%; however, the 2.4% invested by the largest companies certainly represents the most in terms of dollars.

Career Opportunity

Career opportunity also used an index of questions to determine the top companies.

- The industry overall promoted 7.4% of employees
  - The highest rate of promotions came in engineering with 26.1% of engineers receiving a promotion in 2014
  - Companies with 10,000-49,999 had the highest rate of promotion overall, with 8.4%
- Industry spent 4.3% of revenues on training and education, or 1.5% of payroll.
  - 6.2% of A&D employees are in a tuition reimbursement program; 7.8% of the largest companies' workforces are enrolled in such programs
- The A&D industry allocated an average of 15.2 hrs per year for professional development activities.
  - The highest number of hours in training and development were recorded by companies with 10,000-49,999 employees.

Learning and Development	Industry	50,000+	10-49,999	1000-9,999	Fewer than 1,000
Employees in Tuition Reimbursement	6.2%	7.8%	2.9%	3.4%	1.8%
Average Hours in Development	15.2	22.0	56.0	6.6	10.9
% Revenues Spent on Training/Development	4.6%	1.0%	1.8%	1.2%	11.5%
% Payroll Spent on Training/Development	1.6%	3.4%	3.6%	1.0%	1.1%

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Compensation/Benefits

Following the recession, compensation and benefits have gained traction as major concerns at the beginning of the career decision list. This reflects ongoing economic instability and concerns that remain as a result, as well as the continued pressure on space and defense budgets. However, it also reflects the pressure A&D is under from other technology-intensive industries that are targeting the same skills—for driverless cars, unmanned air systems to deliver packages, and cubesats that provide Internet connectivity, as some examples.

This new competition makes assessment of total compensation—the combined package of vacation, education/training opportunities, salary, bonus, signing bonus, healthcare and other benefits—more important than ever. Young professionals—71%—indicate they believe A&D pay and benefits are on par with other industries.

While A&D is competitive on healthcare—the industry on averages carries 78% of the cost for healthcare versus 74% for U.S. industry on average—it is also strong in terms of pay increases, with a 3.1% pay increase on average in 2014. The Hay Group reports that this is slightly ahead of U.S. industry overall, which awarded 3% raises on average. There is no significant change in pay increases forecast for 2015.

It is in other areas that A&D faces competition. YPs, for instance, list vacation, holidays and sick leave as very important. And in a salute to increased knowledge of the importance of retirement planning, 401(k)s were mentioned at the top of the desired benefits for YPs. Benefits and healthcare, as well as compensation, were also noted. In follow-on discussions, sabbaticals and the ability to buy vacation time were cited by the YPs.

It is the pay situation that presents the greatest challenge, in part due to the imposition of government contracting costs and the squeeze on profits on the defense side of A&D companies. This is irrelevant, however, when a high potential engineer has offers that include a $25,000 signing bonus that will put a significant dent in repaying a student loan.

Compensation for Some Critical Skill Jobs 2014 versus 2015
Level I Mid-Point Salary

	2015	2014	% Change
Aerospace Engineer	$71,301	$65,346	9.1%
Software	$71,655	$65,830	8.8%
Electrical	$72,119	$65,852	9.5%
Systems Engineering	$72,905	$66,960	8.9%

Program/Project Mgt	$66,390	$62,109	6.9%

Salary Comparison for Specific Engineering Skills
Sources: Aviation Week/Payscale.com

	Aerospace	Controls	Electrical	Materials	Mechanical	Software	Systems
Aviation Week Level 1	$71,301	Not Asked	$72,119	$77,179	$71,264	$71,655	$72,905
Payscale Yr 3	$68,026	$69,032	$68,124	$69,818	$70,040	$75,602	$71,585
Aviation Week Level 2	$86,703	Not Asked	$84,931	$95,238	$84,078	$86,257	$88,434
Payscale Experienced (5-10)	$82,203	$80,889	$88,823	$92,290	$82,847	$96,664	$80,824

Chapter 5: Student Survey

Among the concerns for A&D leaders is whether the engineering pipeline will support the growth in jobs in specific and highly critical areas in the future. Priorities identified by the Defense Department, those necessary for the 21st century version of the space race, and those linked to improving the transportation infrastructure span a number of industries. Never has it been more important to understand why a young person chooses a technical degree when enrolling in a university, and just as importantly why one specific technical discipline is chosen over another.

One of the ways to assess where A&D stands in this environment is to ask students if they are inclined to consider A&D as a career option. In this year's survey, 73% of students said they are considering careers in A&D, up from 68% a year ago. Just two years ago, the percentage was 60%.

It is assumed that these students are somewhat interested in A&D to begin with on the basis of responding to a study conducted by Aviation Week. However, even with this assumption, the numbers increased. The reasons vary, but can be attributed to some degree to the increased focus on the new space race, something that is supported in no small part to the heavy

media coverage of failures as the shift to a commercial industry advances. In addition, the geographic reach of the industry—it had been a long dry spell since manufacturing plants were built. In the past five years new facilities have been built in Alabama, Mississippi, the Carolinas, Virginia by Airbus, Boeing, GE Aviation and others. Advanced manufacturing, too, has gained the attention of students as new ground is tilled on a seeming monthly basis.

The equation becomes a bit more nuanced when peeling back the demographics of the student respondents. Only 60% of female students have considered a career in the A&D industry compared to 77% of men. Only 43% of Black/African-American respondents, the lowest percentage by far, consider the industry as a viable employer, while 69% of Hispanic/Latino respondents have considered careers in the A&D industry.

One of the data points monitored for the past seven years is one that seemed odd back in 2009—the percentage of students who had never known anyone in the A&D industry. This year 33% of the respondents had never known anyone in the A&D field, down from 38% a year ago.

In the comment section of the survey, students indicated part of their interest was generated by high-profile events. They mentioned, specifically, Tesla Motorcars, new space initiatives, and the ability to improve society. One footnote to this is that students also indicated that they do not always consider

As with the young professionals, student respondents indicate they are attracted to the high-profile jobs and technological challenge the A&D industry provides, as shown in the top three reasons they are interested in the A&D industry:

- The ability to contribute to high profile projects
- Tie—Technological challenge and opportunity for advancement, and
- Availability of jobs/career opportunities

In prior years, students consistently listed *interest in aircraft/defense/space* as their top reason for being interested in A&D careers—seemingly a given. Yet this year students identified this as the fourth-ranked reason.

The top three reasons for ***not*** being interested in the A&D field are: nature of the work, responsibilities, and environment in which the work occurs.

Student Demographics

Seventy-three percent of student respondents were male and 27% female, an increase of 2% in female participation from 2014. This is something that needs to be monitored closely to determine whether this increase—from 21% in 2009—is sustained and continues.

The majority of respondents were White, 60%, the same as 2014, while 21% were Asian, a 3% decrease from 2014. Nine percent of the student respondents identified themselves as Hispanic/Latino, a 3% increase from 2014. Another 4% of respondents were Black, and 10% of the respondents indicated they were of two or more races.

Student Career Expectations

Aviation Week's university student data does not validate the conventional urban myth that most young people will change jobs early and often. In fact, more than 53% of the respondents indicate they will stay with their first employer two to five years, and just 23% think they will stay with their first employer less than two years. What may be more surprising is the number of respondents who believe they will still be with their first employer for more than 15 years —9%. However, a year ago 13% said they planned to stay for 15 years or more.

One-third of the respondents feel they would remain in the same profession until retirement, or about the same percentage as a year ago. However, 15% anticipate changing professions within the first five years.

Eighty-eight percent of students expect to be promoted within 24 months, with a third expecting to be promoted at the 18-month mark. Generally, in A&D promotions do come every 24-36 months. This has not changed over the years, despite the fact that organizations have made efforts to flatten, or decrease the hierarchical levels.

Forty-two percent of respondents have had an internship experience, with 87% noting the experience was useful, and 54% feeling it was very useful. Respondents with internship experience increased by 5% from 2014. Responses from Black/African-American and Hispanic/Latino respondents showed a lower participation in internships, with Black/African-American at 39% and Hispanic/Latino at 33%.

Only 9% of respondents had a co-op experience, with 86% noting the experience was useful. Respondents with co-op experience decreased by 3% from 2014. Responses from Black/African-American and Hispanic/Latino respondents also showed a lower participation in co-op programs, with Black/African-American at 8% and Hispanic/Latino at 5%.

Choosing a University

The number one factor that led students to choose one university over another, at 90%, is the reputation of the specific academic program. Cost is the second most important factor, and scholarship/financial aid availability came in third at 68%.

Personal interest, at 93%, was the overwhelming contributor in determining the respondents' area of study. Respect for the engineering profession remains a top contender, identified by 81% of the students as a leading factor for choosing their degree program. The third-ranked factor, at 76%, is the desire to serve/contribute to society. The ability to make money was ranked fourth, at 74%. This tracked nearly identical to responses in 2014.

Nearly half, 42%, of respondents have had an internship experience with 87% noting the experience was useful. Respondents with internship experience increased by 5% from 2014.

Thirty-eight percent of the respondents are using student loans to finance all or part of their education, a 4% decrease from 2014.

Chapter 6: A&D Manufacturing Baseline

AIA asked that the study this year include questions that would provide a baseline of information around the hourly manufacturing workforce.

Following are the findings of this segment of the study. Overall, industry gave the quality of new hires for 2014 a C+—ranking this satisfaction at 3.4 on a 5.0 scale. And despite overall concerns about availability of qualified people to fill the complex role of today's hourly manufacturing employee, companies indicated relatively little difficulty in hiring new personnel (2.0 on a scale of 1 being not difficult and 5 being very difficult).

What's Most Important When Hiring New Workers?

Rating Manufacturing Skills Important in Hiring New Personnel	Average Rating
PERSONAL SKILLS (Integrity, Initiative, Dependability, Adaptability, Professionalism)	4.5
PEOPLE SKILLS (Teamwork, communication, respect for other individuals and their work)	4.4
APPLIED KNOWLEDGE (Reading, Writing, Mathematics, Science, Technology, Critical Thinking)	4.3
WORKPLACE SKILLS (Planning, Organization, Problem Solving, Decision Making, Business Fundamentals, Customer Focus, Working with Tools and Technology)	4.3

Which Programs Best Prepare Workers?

Effectiveness of Preparation Programs (1-5 Scale)	Industry	50,000+	10-49,999	1-9,999	Under 1,000
Formal apprenticeships	2.9	3.5	3.0	2.7	3.0
Internships	3.4	4.0	1.5	4.0	3.7
Partnerships with community colleges	3.0	3.3	3.0	3.6	2.9
Partnerships with trade schools	3.5	3.3	3.0	3.2	3.8
Partnerships with four-year universities	3.1	2.0	2.0	4.3	3.5
Internal development programs	3.6	4.3	3.5	3.5	3.6
State/Federal workforce grants	3.2	3.7	3.0	3.3	2.7

Trends in Hiring for Some A&D Companies

Forecast for 2015	Industry	
	Number	% Total
Assembly/Production	4253	51.0%
Machinist	962	11.5%
Materials Handler	801	9.6%
Assembly Test	751	9.0%
Other	1572	18.9%
TOTAL	**8339**	**100.0%**
HIRED IN 2014		
Assembly/Production	4605	52.2%
Machinist	1475	16.7%

Materials Handler		732	8.3%
Assembly Test		604	6.8%
Other		1409	16.0%
	TOTAL	**8825**	**100.0%**
Hired for first-time job		71	0.8%

Community Colleges a Top Source for Manufacturing Workers

Hired from Each Source	High Schools	Trade Schools	Community Colleges	Universities	Military	Other
Assembly/Production	268	403	465	7	425	1771
Machinist	87	180	234	2	116	606
Materials Handler	27	49	65	1	53	311
Assembly Test	25	65	87	0	57	297
Other	70	262	213	19	137	582
Totals	**477**	**959**	**1064**	**29**	**788**	**3567**

Education Required for this Position	High School Diploma	Associate's Degree	Bachelor's Degree	Specific Certification
Assembly/Production	81.0%	14.3%	9.5%	23.8%
Machinist	84.2%	5.3%	5.3%	26.3%
Materials Handler	94.7%	10.5%	5.3%	5.3%
Assembly Test	83.3%	16.7%	11.1%	22.2%
Other	62.5%	25.0%	12.5%	50.0%

Appendix A
Viewpoint—Workforce challenges for A&D: the perfect storm creates opportunity

By Jim Adams
PwC Strategy&

The Aerospace and Defense (A&D) industry sectors continue to evolve and face their own special challenges: the growth and record production rates in commercial aerospace that may strain the supply base, the continued affordability challenges in defense, and the growing interest and competition in space. The industry also shares common workforce issues—creating both challenges for the industry to address and emerging opportunities for future A&D employees.

All industries are dealing with the retirement of baby boomers, but A&D has a unique challenge with the threat of a "bursting bubble." While A&D has more baby boomers than any other industry, it also has one of the lowest voluntary attrition and retirement rates. However, as housing prices recover, investment portfolios grow in value (fueled in part by higher A&D share prices), and interest rates (that are likely to impact lump sum pension payouts) rise—and already are for many companies for the first two quarters of 2015. A critical, open question is whether or not we will see a burst of the bubble or an accelerated deflation. We expect that we are still about 5-7 years away from a potential burst, but given the looming vacuum in technical knowledge and leadership, companies should start planning for this event.

The industry is facing several other workforce challenges. First, although the overall voluntary attrition rate in A&D is one of the lowest across the major industries (according to our benchmarks), there is a staggeringly high ratio of those who are leaving who are among early career professionals (0-5 years); 67% of those who chose to leave their employers were from this group. There may be several reasons for this high rate: a perceived (and likely real) idea that career advancement in A&D is slow (related to the boomer bubble), outdated career models that fail to deliver a compelling advancement scenario, and the willingness of younger generations to change jobs.

The second challenge is the employment "gap" for the industry's next generation of leaders. We are seeing a significantly lower percentage of A&D employees (relative to the overall U.S. workforce) in their mid-30s to mid-40s, the midpoint of their careers. As benefits packages change and pensions become increasingly scarce, we may continue to see movement among these mid-career employees leaving for smaller companies or going to other industries. While these issues do present challenges, history has demonstrated that A&D is a resilient industry and uses challenges to create opportunities. In this case, the opportunity is for young and mid-career professionals to fill the coming void in capabilities and leadership. The challenge for the industry is to start identifying these future leaders and create the learning and mentoring opportunities that will prepare them to take the helm in the future.

The third challenge facing the industry is to find and hire the right kind of talent at a time when the talent war is heating up across all industries. The ever-changing work in A&D will require a workforce with new and evolving skills. For example, with the A&D industry programs increasingly software-based, it puts it in competition with technology firms and start-ups for skills such as autonomous and control systems. As a result, there is a need to build and shape the future

pipeline of college graduates, especially with STEM (science, technology, engineering, and mathematics) backgrounds, to deal with the technical challenges facing the A&D industry. Consequently, the war for talent will continue to be fierce, with new graduates seeking companies that are agile and risk-taking. Additionally, A&D often has to deal with the challenge of limited ability to hire international students—a situation non-defense tech companies do not face. [delete: which may not be the case for non-defense contractors.]

Given these challenges, we see a few recommendations the industry should consider.

- First, companies must analytically understand their specific challenges (i.e., quantification of the baseline issues).
- Second, companies must develop programs to address the high voluntary attrition rates among young professionals. Aligned with the first imperative, the development of programs starts with an understanding (through the use of analytics) of the reasons they are leaving. Once the gaps are identified, companies can develop specific actions to address the issues.
- Finally, the industry must start planning for accelerated rates of retirement by building leadership and technical bench strength at least one layer below traditional succession planning. This will require more in-depth succession planning across multiple dimensions, including leadership and technical abilities.

With the right strategies in place, the A&D industry holds the potential for future opportunities — and hopefully will be able to attract the best and brightest, ensuring the industry is a desirable place to work for tomorrow's talent.

Aviation Week Workforce Advisor

Jim Adams is a Los Angeles-based Partner and a member of PwC's Strategy& in the Engineered Products and Services practice specializing in **strategy**-based transformation, total cost transformation, product competitiveness, corporate **strategy** / corporate development, portfolio **strategy**, acquisition due diligence and operations / margin improvement.

Jim is the Los Angeles office managing Partner as well as a the marketing lead for his practice.

Prior to joining Booz & Company, **Jim** worked at Boeing for just under ten years where I held positions in engineering, operations and program management. I also spent two years with Berkeley Space Sciences Laboratory where I assisted in the design and manufacture of ultra-violet sensors for space-based observation. **Jim** also had a short tenure with Toyota Financial Services in the Treasury group as a Derivatives Analyst.

Jim received a MBA from UCLA Anderson School of Management and graduated from the University of California Berkeley with a BS degree in Engineering. I also earned a MS in Engineering from UCLA. While at UCLA I was a Hughes Fellowship recipient.

Appendix B
Thought Leadership:
The definitive four dimensions of leadership and talent

Businesses track and value their assets with precision. They can account for inventory, product quality, operations expenses, profit margin, and client demand because they have accurate metrics for each.

But when measuring talent assets? Few companies are so meticulous.

Industrial psychologists, HR firms, and leadership organizations have, through decades of work, identified hundreds of variables that affect job performance. But which are mission critical for the CEO and which drive engagement for the whole workforce? By leveraging the world's largest set of data on talent—more than 2.5 million assessments of professionals and top executives—the Korn Ferry Institute has categorized the elements of talent and isolated the most potent facets.

Our analysis has determined human performance in the workplace is governed by four factors: *competencies, experiences, traits*, and *drivers*. Research shows these four areas to be highly predictive of performance differences, and correlated with all key talent variables: engagement, retention, productivity, leadership effectiveness, and leadership potential. Companies view talent as a crucial driver of company performance and shareholder value.

- **See more at: http://www.kornferry.com/institute/precision-talent-intelligence-definitive-four-dimensions-leadership-and-talent#sthash.5LZIxZZy.dpuf**

Aviation Week Workforce Advisor

Clarke Havener is the Global Sector Leader, Aerospace and Defense, in Korn/Ferry International's Washington D.C. office. He is a member of the Firm's Global Industrial Market. Clarke has more than 25 years of experience in executive search. He has led numerous board, CEO and functional leadership searches with clients both in the U.S. and abroad.

Prior to joining Korn/Ferry, he spent nine years with another international executive search firm, where he formed and led the company's airlines, aerospace, defense practice. In 1988, he co-founded another global executive search firm, where he served as president, and earlier in his career was with Prentice Hall, and at a consultancy in business and loan restructuring.

Clarke is a board member of the Wharton Aerospace & Defense Forum, the American Institute of Aeronautics and Astronautics, and the Armed Forces Communications & Electronics Association.

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Appendix C
Corporate Data Respondents

Acutec Precision Machining, Inc
Aerojet Rocketdyne
Aerospace Corporation
Analytical Graphics Inc
Aurora Flight Sciences
AUSCO Inc.
BAE Systems Inc.
Ball Aerospace & Technologies Corp
Bell Helicopter
Boeing
CPI Aerostructures, Inc
Crane Aerospace
Cubic Global Defense
Eaton Aerospace
Elbit Systems of America
Ferco Aerospace Group
Honeywell Aerospace
Jabil
Kaman Aerospace
Kemco Aerospace
L-3 Communications
Lockheed Martin
McCann Aerospace
Mitre
Northrop Grumman
Orbital ATK
Precise Machining
Raytheon Company
Rockwell Collins
Rolls-Royce N.A.
RTI International Metal
Spirit AeroSystems
Tech Manufacturing
Textron Systems
United Launch Alliance

Appendix D
Universities participating in University Student Study

Georgia Tech
Massachusetts Institute of Technology
Pennsylvania State University
Purdue University
TU Delft (Netherlands)
TU Braunschweig (Germany)
University of Arizona
University of Central Florida
University of Maryland

Appendix E
Companies Conducting Young Professionals' Study

Aerojet Rocketdyne
Aerospace Corp.
Boeing
Elbit Systems
Honeywell Aerospace
L-3 Communications
Lockheed Martin
NASA
Northrop Grumman
Orbital ATK
Rockwell Collins
Rolls-Royce N.A.

AIA AEROSPACE INDUSTRIES ASSOCIATION

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