



LAUNCH into AEROSPACE



Industry's Response to the Workforce Challenge

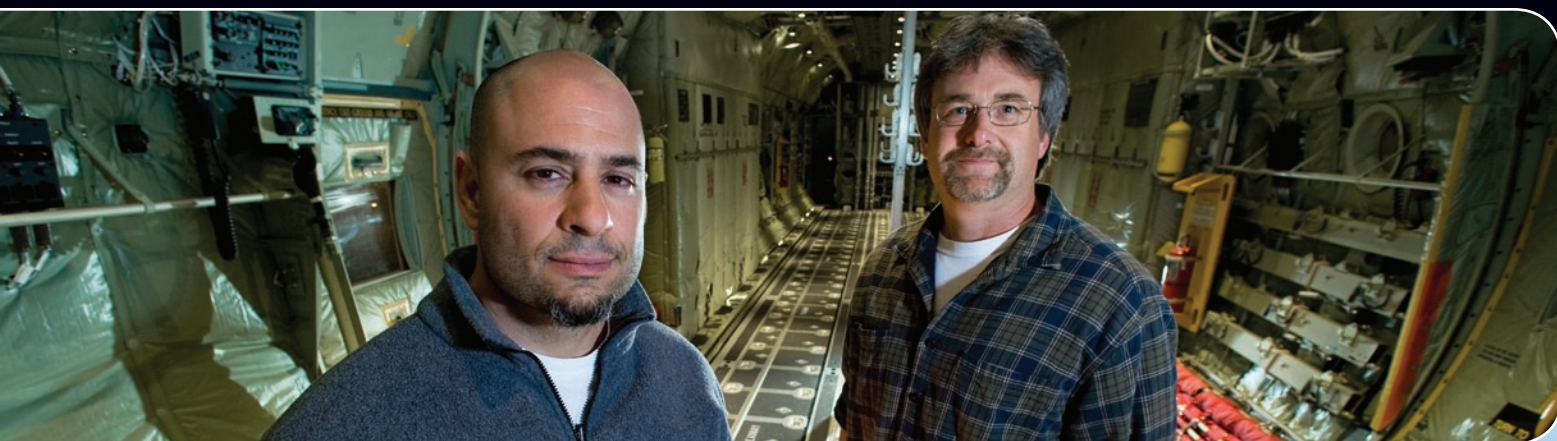
The logo features a stylized graphic on the left consisting of three curved, overlapping shapes in blue, green, and orange. To the right of this graphic, the word "LAUNCH" is written in green, "into" is written vertically in orange, and "AEROSPACE" is written in blue. The entire text is reflected below it.

LAUNCH *into* AEROSPACE

∴ *Industry's Response to the Workforce Challenge*

“Our policymakers need to acknowledge that the nation’s apathy toward developing a scientifically and technologically trained workforce is the equivalent of intellectual and industrial disarmament and is a direct threat to our nation’s capability to continue as a world leader.”

—The Commission on the Future of the U.S. Aerospace Industry



America's leaders must ensure that the nation's aerospace industry remains strong and viable well into the 21st century by cultivating and continuously developing a skilled workforce of U.S. scientists, engineers, technicians and other high-technology professionals.

For decades the U.S. aerospace and defense industry has led the way for American economic prosperity, innovation and national security. In the past 100 years the industry has made tremendous technological advances in commercial and military aviation and in space travel that most people routinely take for granted.

Currently, aerospace represents between 3 and 5 percent of the U.S. GDP, supports more than 10 million jobs and leads the U.S. economy in net exports. The nation has come to expect nothing less than the superlative performance that the U.S. aerospace industry has delivered since its inception.

“America’s requirement for workers who are well-educated in science, technology, engineering and mathematics is falling far short of anticipated need.”

At the core of the industry's success are highly qualified men and women who every day make history and blaze new technological trails. Yet, while this great work is ongoing, the U.S. aerospace industry and its workforce face alarming trends.

Preserving and Nurturing U.S. Intellectual Capital

The need for aerospace professionals is great and will continue to grow for the foreseeable future.

America's failure to produce enough qualified aerospace professionals will jeopardize the ability of the United States to be the world's leader in innovation, eventually endangering the nation's security. The aerospace community risks the loss of intellectual capital and will be unable to meet the forecasted needs for business.

America's requirement for workers who are well-educated in science, technology, engineering and mathematics (STEM) is falling far short of anticipated need. Trends are discouraging, and interest is lacking among American youth. We simply aren't producing enough engineers and non-engineering technical

workers, such as hands-on manufacturing labor. Without dramatic change, these needs will go unmet, the future of the American aerospace industry will be bleak and the consequences for the nation will be extreme.

Here are some facts from an array of credible sources that illustrate today's at-risk aerospace workforce:

AIA Member Companies

3M Company
AAR Manufacturing, Inc.
Accenture
Aerojet
AeroVironment, Inc.
Agilent Technologies, Inc.
AirLaunch LLC
Allfast Fastening Systems, Inc.
American Pacific Corporation
AmSafe Aviation
AMT II Corporation
Analytical Graphics, Inc.
Andrews Space

Aurora Flight Sciences
AUSCO, Inc.
B&E Group, LLC
BAE Systems, Inc.
Barnes Aerospace
B/E Aerospace, Inc.
Belcan Advanced Engineering and Technologies
Best Foam Fabricators, Inc.
The Boeing Company
CAE USA Inc.
Celestica Corporation
Click Bond, Inc.
Click Commerce
Cobham

Computer Sciences Corporation
Crane Aerospace & Electronics
Curtiss-Wright Corporation
Curtiss-Wright Controls Systems, Inc.
Metal Improvement Company
Dassault Falcon Jet Corporation
Doncasters, Inc.
DRS Technologies, Inc.
Ducommun Incorporated
DuPont Company
Eaton Aerospace
Eclipse Aviation
EDS

Elbit Systems of America
Embraer Aircraft Holding Inc.
Erickson Air-Crane Incorporated
ESIS, Inc.
Esterline Technologies
Exostar LLC
Flextronics International USA
FlightSafety International Inc.
FTG Circuits, Inc.
General Atomics Aeronautical Systems, Inc.
General Dynamics Corporation
General Electric Company
GKN Aerospace

- Forecasts and performance statistics from aerospace companies suggest increased demand for skilled workers.
- The U.S. aerospace industry currently has thousands of vacancies. There are so many opportunities that it takes, on average, just 90 days to get hired, according to *Aviation Week & Space Technology* magazine's 2007 employment survey. This is the shortest time required to conduct a successful job search since 2001, before high-tech industry went through major downturns.
- Almost 60 percent of the aerospace workforce was age 45 or older in 2007, according to AIA's statistics.
- The Commission on the Future of the U.S. Aerospace Industry found that 27 percent of the engineering workforce of the aerospace industry will have become qualified for retirement by 2008.
- Aviation Week & Space Technology* magazine's 2007 employment survey reports that 13 percent of the overall aerospace and defense workforce is qualified for retirement, equating to more than 82,000 people.
- Several companies report that within 10 years half of their workforce will be retirement-eligible.

From the standpoint of international competitiveness — as seen in statistics from the National Science Foundation — development of the U.S. aerospace workforce faces unique challenges in the years ahead:



- Currently, more than 50 percent of all engineering doctoral degrees awarded by U.S. engineering colleges go to foreign nationals — many of whom are not eligible for U.S. security clearances.
- About 70,000 engineering bachelor's degrees are awarded annually in the United States. This number includes all fields: architecture, transportation, automotive, mining, civil engineering and many more disciplines not in high demand among aerospace companies.
- Five percent of U.S. bachelor's degrees are in engineering, compared to 20 percent in Asia.

Goodrich Corporation
 W.L. Gore & Associates, Inc.
 Groen Brothers Aviation Inc.
 Harris Corporation
 Hawker Beechcraft Corporation
 HEICO Corporation
 Hexcel Corporation
 HITCO Carbon Composites
 Honeywell
 IBM Corporation
 ITT Corporation
 Kaman Aerospace Corporation
 L-3 Communications
 LAI International, Inc.
 LMI Aerospace, Inc.

Lockheed Martin Corporation
 Lord Corporation
 McKechnie Aerospace
 Meggitt Vibro-Meter Inc.
 Micro-Coax, Inc.
 MicroSat Systems, Inc.
 MOOG Inc.
 Natel Engineering Co., Inc.
 National Machine Group
 National Machine Company
 National Aviation Products, Inc.
 National Technical Systems
 The NORDAM Group
 Northrop Grumman Corporation
 NYLOK Corporation

Omega Air Inc.
 Oracle USA
 Pall Aeropower Corporation
 Parker Aerospace
 Pinkerton Government Services, Inc.
 PRIMUS Technologies Corporation
 Proficiency Inc.
 Raytheon Company
 Remmele Engineering, Inc.
 Rockwell Collins
 Rolls-Royce North America Inc.
 RTI International Metals, Inc.
 Satyam Computer Services Ltd
 Science Applications International Corporation

Siemens PLM Software
 SITA
 SM&A
 Space Exploration Technologies Corporation
 Sparton Corporation
 Spirit AeroSystems
 Textron Inc.
 Timken Aerospace Transmissions, LLC
 Purdy Systems
 United Technologies Corporation
 Hamilton Sundstrand
 Pratt & Whitney
 Sikorsky
 Vought Aircraft Industries, Inc.

- Approximately one-third of U.S. bachelor's degrees are in science or engineering. The number pales next to Thailand's 69 percent, Japan's 63 percent, Singapore's 59 percent, Laos' 57 percent and China's 56 percent.

Invigorating U.S. STEM Careers

While our effort is logically focused on the aerospace industry, the entire U.S. technical sector is similarly concerned with and challenged by the nation's inability to provide sufficient numbers of professionals well-educated in science, technology, engineering and mathematics.



- The number of American youth earning engineering degrees lags behind other nations, according to the National Science Foundation's *Science and Engineering Indicators* study.

- Although U.S. fourth-graders score well against international competition, they fall near the bottom, or dead last, by 12th grade in mathematics and science, according to the U.S. Department of Education's National Center for Education Statistics.

- In a recent survey of more than 270,000 college freshmen conducted by the UCLA Higher Education Research Institute, only 7.5 percent said they intend to major in engineering — the lowest level since the 1970s.

- According to a recent study by the U.S. Department of Education, 68.5 percent of U.S. middle school students were being taught by math educators who had no major or certification in mathematics. For science, the proportion was 57.2 percent.

Inspiring interest in aerospace careers needs to be addressed early in the educational system for American youth — long before their entrance into college. The aerospace industry can play a positive role in making educational improvements in STEM curriculum for K–12 programs across the country.

Essential parts of the solution to this difficult national problem must involve identifying and leveraging those people and factors that influence career orientation of the K–12 students, expanding, for example, opportunities for mid-career and second-career professionals to enter the science and engineering teaching fields at the K–12 level.

WIPRO Inc.
Woodward Governor Company

AIA Associate Member Companies

ADI American Distributors, Inc.
AirBorn Operating L.P.
Airfasco Industries, Inc.
Air Industries Machining Corporation
Albany Engineered Composites
Alcoa Fastening Systems
Alken Industries Inc.
Allegiant Global Services, LLC
Allen Aircraft Products, Inc.

American Brazing
AMETEK Aerospace & Defense
Anaren Microwave, Inc.
Ancon Gear & Instrument Corporation
Arkwin Industries, Inc.
Arrow/Zeus Electronics, a division of
Arrow Electronics
Astronautics Corporation of America
Astronic
Athena Technologies, Inc.
Avnet Electronics Marketing
Ballistic Recovery Systems, Inc.
Banneker Industries, Inc.
Blenheim Capitol Services
Breconridge Manufacturing

Brogdon Tool & Die, Inc.
Brookfield Atlantic
Brush Wellman Inc.
BTC Electronic Components
Burton Industries Aerospace Heat
Treating, Inc.
California Manufacturing Technology
Consulting
Capo Industries Inc.
Celltron Inc.
Chandler/May, Inc.
Cherokee Nation Distributors
Cincinnati Machine, a UNOVA
Company
CMC Electronics

Coalition Solutions Integrated, Inc.
Consolidated Precision Products
Co-Operative Industries Defense, LLC
CPI Aero, Inc.
Crestwood Technology Group
Cytec Engineered Materials
Dassault Systems of America
Data Conversion Laboratory, Inc.
Dayton T. Brown Inc.
Delphi Electronics
Dexter Magnetic Technologies, Inc.
Doyle Center for Manufacturing
Technology
DynaBil Industries, Inc.
East West Associates



Home-grown Talent Vital to U.S. Aerospace

While other industrial sectors can outsource labor to foreign workers, security requirements dictate that most U.S. aerospace and defense systems must be developed in this country by U.S. citizens. Thus, the need for home-grown technical talent is particularly acute for the aerospace industry.

Today, the United States is not meeting the need, and there is strong reason to conclude that, without

Concerns about the viability and stability of the defense and aerospace industry have been leading prospective science and engineering graduates onto other career paths. A lack of career opportunities in defense and aerospace due to the large cutbacks and retrenchments in the early 1990s has had much to do with a lingering perception of unpredictability in the industry.

STEM education is a national challenge, and the aerospace industry recognizes that stakeholders interested in maintaining U.S. global leadership and

“The nation has come to expect nothing less than the superlative performance that the U.S. aerospace industry has delivered since its inception.”

aggressive action from within the industry, the situation will worsen, placing the future of aerospace technology at risk.

competitiveness must react to the pressing workforce challenge as energetically as the nation responded to the former Soviet Union’s launch of Sputnik in 1957.

Electronic/Fasteners, Inc.
 Ellison Surface Technologies
 Embry-Riddle Aeronautical University
 Emhart Technologies, a Black & Decker Company
 Endicott Interconnect Technologies, Inc.
 ENSCO, Inc.
 Exotic Metals Forming Company LLC
 The Ferco Group
 Ferguson Perforating and Wire Company
 Forrest Machining, Inc.
 Frontier Electronic Systems Corporation
 Greene, Tweed & Company
 G.S. Precision, Inc.

GuardianEdge Technologies
 Harvard Custom Manufacturing
 H&S Swansons' Tool Company
 HCL Technologies
 HDL Research Lab, Inc.
 Heartland Precision Fasteners
 Aerospace Plating Company
 Heizer Aerospace
 HGS Aerospace
 J.F. Hubert Enterprises
 Hitachi Consulting
 Hi-Temp Insulation Inc.
 Hobart Machined Products, Inc.
 Hughes Bros. Aircrafters, Inc.
 IDD Aerospace Corp.

Industrial Metals International LTD
 Infotech Enterprises America
 Ingenium Technologies Corp
 Inmedius
 Integrated Sourcing
 International Technegroup Inc.
 TranscenData Division
 ION Corporation
 ITW CIP
 Jabil Defense & Aerospace
 JRH Electronics, LLC.
 A.T. Kearney Public Sector & Defense Services LLC
 KPMG LLP-Risk Advisory Services
 Kreiser Manufacturing Corporation

Kreiser Industrial Corporation
 Kreiser Polska sp. z. o. o.
 Kulite Semiconductor Products, Inc.
 LMI
 M/A-COM, Inc.
 McCann Aerospace Machining Corporation
 Meyer Tool Inc.
 Michigan Aerospace Manufacturers Association
 Microsemi Corporation
 Mid-State Aerospace Inc.
 Millitech, Inc.
 Mil Spec Sales Co.
 Morris Machine Company, Inc.

Aerospace is but one stakeholder, along with the federal government and others. With a great deal riding on the future of the industry, the time has come for the aerospace industry to step forward and seize ownership of the issue. The option of waiting for others to resolve this problem in the hope that it will be addressed in a manner and timeframe advantageous to the industry is past. While many partners will be involved, not one understands the problem better or is better qualified than the industry itself to lead the nation to a solution.

Overcoming Obstacles

Good intentions and piecemeal measures haven't yielded detectable progress to reverse the downward trend of the U.S. aerospace workforce.

Sweeping and coordinated steps are essential now to ensure the ongoing competitiveness and success of U.S. aerospace. Our industry must recognize and

surmount whatever stands in the way of resolving the situation or risk the accusation of neglect and complacency.

Among impediments to achieving progress are:

- ❑ Competitiveness within the industry requiring corporate leaders to focus on the near term, perhaps at the expense of long-term viability.
- ❑ The press of the bottom line and proprietary, competitive concerns reinforcing standard business measures and old paradigms.
- ❑ The long and diverse list of seemingly more urgent priorities reflecting the successful strategies of each company.

The vital importance of educating and attracting the future workforce requires that industry leaders find ways to collaborate for the long-term benefit of the industry and the nation.



MPC Products Corporation
 Nasmyth Precision Products Inc.
 Navigant Consulting, Inc.
 New Breed Corporation
 NMC Group, Inc.
 Norfil Manufacturing, Inc.
 Nor-Ral Plastics Inc.
 Ohio Aerospace Institute
 O'Neil & Associates, Inc.
 Orion Industries
 P3-North America, Inc.
 Parkway Products, Inc.
 PCA Aerostructures
 PCC Airfoils, LLC
 Performance Software Corporation

Perillo Industries, Inc.
 PGM of New England, LLC
 Plexus Corporation
 Plymouth Extruded Shapes
 Plymouth Tube Company
 Powerway Inc.
 Precision Aircraft Machining Company
 Precision Gear
 Precision Machine & Manufacturing Co.
 Precision Tube Bending
 PRTM Management Consultants, LLC
 PTC
 QuEST
 Radant Technologies, Inc.
 Ranal



Together the industry must articulate and publicize its technical achievements and contributions to society in ways that will attract the interest of impressionable young students trying to decide on a career path as well as their parents and teachers. They must join forces with other aerospace stakeholders so that their work is leveraged, rather than duplicated, creating ways to pool resources and work together in a “coalition of coalitions” with common goals.

Finally, education and the workforce must be firmly entrenched as a high corporate and industrywide priority. Because the workforce challenge is enormous and requires sustained focus, commitment, energy and resources, it is easily set aside as something to be resolved another day.

and the personal and professional development of Americans here and abroad.

Throughout industry’s remarkable history, aerospace professionals have been the foundation on which success has been built. The long-term ability to recruit and retain the right professional workforce, with the

“The aerospace community risks the loss of intellectual capital and will be unable to meet the forecasted needs for business.”

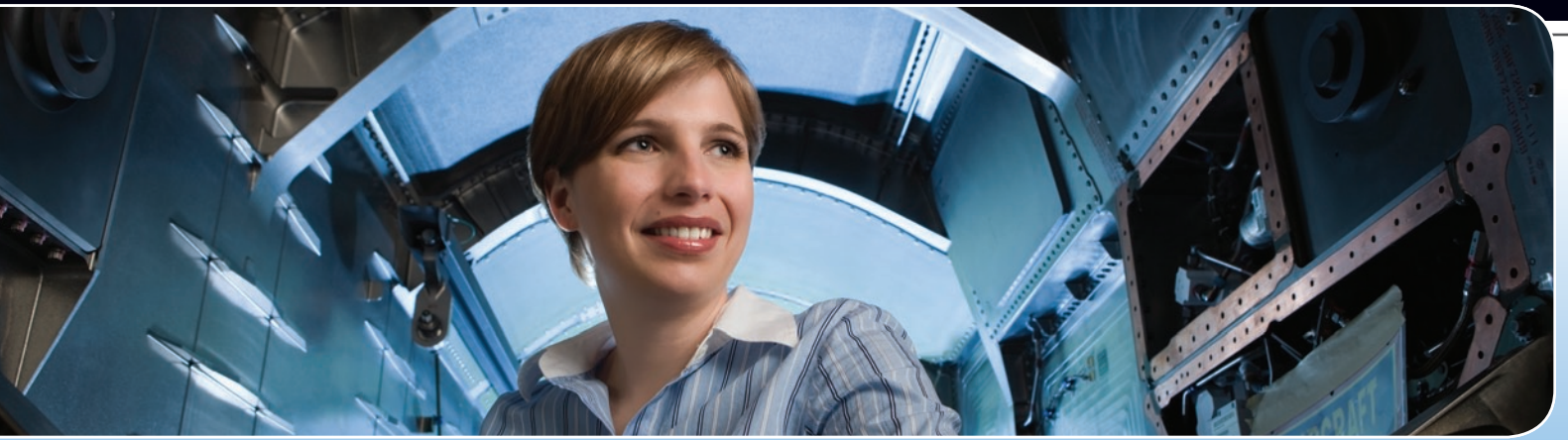
From the top of every organization, industry must embrace the systemic changes required to rebuild the foundation of America’s aerospace workforce.

right skills, will determine the viability of our industry for the remainder of this century and beyond.

The Right Workforce Equals the Right Stuff

American aerospace is a proud industry that has made innumerable contributions to America’s national security, economic growth and stability

The challenges are real and growing, and the future of the industry is at risk. Industry is committed to taking the steps necessary to develop and strengthen the aerospace industry for the remainder of the 21st century workforce.



Workforce Goals and Commitments for America's Aerospace Industry

Alarmed over the critical need for improved development and preparation of America's aerospace workforce for the 21st century, the member companies of the Aerospace Industries Association reaffirm their commitment to intensify support for education and workforce initiatives, including but not limited to:

- ⌘ Partnering with existing programs such as Project Lead the Way, FIRST Robotics and Team America Rocketry Challenge.
- ⌘ Encouraging, supporting and motivating industry professionals to participate in mentoring and other volunteer opportunities in schools and community programs.
- ⌘ Supporting the transition of retirees to K-12 science and mathematics teaching, certification and enrichment programs in paid or volunteer positions.
- ⌘ Earmarking corporate grants to educational programs.

- ⌘ Developing and managing company-initiated educational and workforce development programs.

In declaring our commitment to develop and strengthen the aerospace industry's workforce for the 21st century, we agree to the following goals and actions:

Goal 1. Revitalize the U.S. aerospace and defense workforce.

1. Each AIA company commits to the revitalization of the aerospace and defense workforce by approving the actions recommended in this workforce report.
2. Each AIA company will designate a senior executive responsible for implementing the company's commitment to workforce revitalization. The executive will be aware of all STEM-related education activities in which the company is engaged and ensure the alignment and coordination internally and externally. That executive will be accountable for measurable progress in revitalizing and growing the STEM workforce.

“The time has come for the aerospace industry to step forward and seize ownership of the issue.”

REMEC Defense & Space, Inc.
 Renaissance Services
 Rodelco Electronics Corporation
 Rubbercraft
 Sample Machining, Inc. dba Bitec
 Sanmina-SCI Corporation
 Sea Air Space Machining & Molding
 SEAKR Engineering
 Sechan Electronics, Inc.
 SELEX Sensors and Airborne Systems US Inc.
 Senior Aerospace
 Service Steel Aerospace
 Servotronics, Inc.

Sierracin Corporation
 SIFCO FORGE GROUP
 Sigma Metals, Inc.
 Signal International
 Southco, Inc.
 Southern California Braiding Company
 Spectralux Corporation
 Spincraft
 Spirit Electronics, Inc.
 SPX Precision Components
 Starwin Industries
 Sunshine Metals
 TechSolve, Inc.
 Tedopres International, Inc.

TEK Precision Co. Ltd
 Telephonics Corporation
 Therm, Inc.
 Thermal Solutions, Inc.
 TIGHTCO, Inc.
 Tiodize Co., Inc.
 TMX Aerospace
 Tri Polus Inc.
 TTI, Inc.
 TTM Technologies
 TW Metals
 UMA, Inc.
 Unicircuit Inc.
 United Performance Metals

University of Tennessee – Aerospace
 Defense Clearing House
 Vishay
 Vulcanium Metals Incorporated
 Waer Systems
 West Cobb Engineering & Tool Co. Inc.
 The Wharton School – Executive
 Education
 Wind River Systems
 Windings, Inc.
 Xerox Corporation
 X-Ray Industries
 XyEnterprise
 Yarde Metals

Goal 2. Motivate and inspire young Americans to study and pursue careers in STEM disciplines.

1. Each AIA company, in concert with other stakeholders, will commit to market research to determine how best to inspire young Americans toward careers in science, technology, engineering and mathematics.
2. Through associations and companies, the industry will energetically promote the aerospace and defense industry as offering rewarding and attractive career choices.

Goal 3. Endorse, financially support and promote STEM education, workforce activities and policies that have proven successful.

1. Each AIA company, working with the association and other coalitions, will allocate resources to create an effective national STEM awareness campaign, including making available high-profile spokespersons.
2. Each company will conduct a thorough review and assessment of its current STEM efforts with the goal of coordinating effective programs in a strategic framework within each company and industrywide.

Goal 4. Make government a partner in achieving the future technical workforce.

1. Advocate passage, implementation and funding of STEM-related initiatives, such as the America COMPETES Act. Maintain support for existing programs such as the Interagency Aerospace Revitalization Task Force. Pursue legislative incentives to encourage skilled retirees to become STEM teachers.
2. Make the future of America's technical workforce a top issue for the next administration through engagement with candidates, science advisors, transition teams and executive branch appointees.





Aviation Week Workforce Survey Bolsters Industry Data

In 2008 the respected *Aviation Week & Space Technology* magazine produced its sixth annual aerospace and defense industry workforce survey, a valuable compendium of employment data and trends.

AIA President and Chief Executive Officer Marion C. Blakey is a member of the *Aviation Week Workforce Advisory Board*.

The 2008 report, based on 2007 industry data, looked at several new areas, including:

- ⌘ Voluntary attrition among young professionals.
- ⌘ Percent of workforce population under the age of 35.
- ⌘ Percent of the workforce eligible for retirement.

Some of *Aviation Week's* findings are:

- ⌘ Twenty-two percent of the industry workforce, or 141,300 employees, are under the age of 35. The average age for industry employees remains at 45.
- ⌘ The rate of retirements remains at 2 percent, identical to the figure reported in 2007; 13 percent of the workforce is eligible for retirement (58 years of age and meeting corporate requirements). This translates to 83,499 individuals qualified to retire, based on a December 2007 AIA workforce head count of 642,300 (not including civilian Defense Department and NASA workers.)
- ⌘ Voluntary attrition among young professionals with less than seven years experience is 14 percent, higher than the overall workforce at 10 percent.
- ⌘ There was no measurable increase in females (27 percent) and under-represented minorities (26 percent) in the workforce despite continued efforts toward improvement.
- ⌘ A gap between workers under 35 and those over 45 continues to be problematic in that the industry needs experience and expertise in complex management skills.
- ⌘ The aerospace industry, the study revealed, offers some of the best professional development opportunities compared with other sectors.

“The aerospace industry, the study revealed, offers some of the best professional development opportunities compared with other sectors.”

Working with *Aviation Week* editors, an advisory board of industry leaders has developed six workforce recommendations:

1. Drive down voluntary attrition among young professionals in their first two to five years of employment.
2. Reinforce that learning and professional development opportunities for industry employees exceed those of other high-tech industries, promote tuition reimbursement for any degree, not only work-related studies, and increase use of sabbaticals.
3. Establish processes and programs to transition employees to retirement, including encouraging retirees to participate in K-12 education after retirement.
4. Develop messages that share technical achievements of the industry.
5. Encourage the concept of work-life balance.
6. Compare industry data to that of other high-tech sectors, acknowledging that aerospace and defense competes for new and experienced employees.

The *Aviation Week* Workforce Advisory Board members are:

- ∴ Wanda Austin, President and Chief Executive Officer of The Aerospace Corporation
- ∴ Marion C. Blakey, President and Chief Executive Officer of the Aerospace Industries Association
- ∴ Wes Bush, President and Chief Operating Officer of Northrop Grumman Corporation
- ∴ Thomas J. Cassidy, Jr., President of the Aircraft Systems Group of General Atomics Aeronautical Systems, Inc.
- ∴ Walter P. Havenstein, President and Chief Executive Officer of BAE Systems, Inc.
- ∴ Ed Hoffman, Director of NASA's Academy of Program/Project and Engineering Leadership
- ∴ Clay Jones, Chairman, President and Chief Executive Officer of Rockwell Collins
- ∴ George K. Muellner, President of the American Association of Aeronautics and Astronautics

The Aerospace Industries Association of America

The Aerospace Industries Association of America (AIA) was founded in 1919, only a few years after the birth of flight.

Today, nearly 300 major aerospace and defense companies and suppliers are members of the association, embodying every high-technology manufacturing segment of the U.S. aerospace and defense industry from commercial aviation and avionics, to manned and unmanned defense systems, to space technologies and satellite communications.

AIA represents the nation's leading designers, manufacturers and providers of:

- ✦ Civil, military and business aircraft
- ✦ Helicopters
- ✦ Unmanned aerial vehicles
- ✦ Space systems
- ✦ Aircraft engines
- ✦ Missiles
- ✦ Materiel and related components
- ✦ Equipment
- ✦ Services
- ✦ Information technology

Photos used in this booklet courtesy of The Boeing Company, Lockheed Martin Corporation and Raytheon Company.



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