Fourth MA Summit Addresses Workforce Challenges in the Space Industrial Base

By RAND FISHER
The Aerospace Corporation

The fourth annual U.S. Space Program Mission Assurance Summit (MAS) held on Dec. 1, 2011 in Reston, VA brought together leaders from government and industry to discuss what efforts each organization was prepared to put into action to ensure 100 percent mission success of space programs, with the collaborative focus on the need to maintain workforce excellence in the face of impending budget cuts.

Dr. Wanda Austin, The Aerospace Corporation President and CEO, welcomed approximately 140 attendees and noted that “we have enjoyed an unprecedented string of launch and mission successes in several areas of space” while also cautioning the audience that “with these successes, we now enjoy greater confidence from our customers that the capabilities they need can be achieved quickly and on budget.”

She then introduced the summit’s keynote speaker, General William Shelton, Commander, Air Force Space Command, who highlighted the critical importance of space systems to the nation and the imperative to assure mission success, stating “We can’t allow ourselves to take our eye off the ball, which is mission assurance. We simply cannot afford mistakes, operationally or financially. … Without mission assurance, we risk losing satellites.” General Shelton acknowledged the impending budget constraints, but remained focused on the need for vigilance to ensure operational capability on orbit.

During a candid panel discussion, executive leaders from SMC, NRO, NASA, and MDA shared their perspectives on the priorities and challenges faced by the space industrial base, particularly during a period of potentially severe budget reductions. While all noted the string of successful launches over the past year, they acknowledged that mission success was due in large part to the substantial efforts applied during integration and test to resolve design and parts issues. Resonating with the theme of this year’s summit, it was noted that a trained workforce is especially critical as the government and industry face reductions in workforce.

Under Secretary of the Air Force for Space Richard McKinney provided an update on his office’s strategic planning organization. He highlighted that baseline space programs are not going away. New development activities will be increasingly scrubbed for cost effectiveness, fitting with budgetary priorities. He also discussed the Defense Space Council’s evolving role across DOD and pointed out that the consolidated decision process for space budget, architectures, and program approvals will be chaired by the Executive Agent for Space.

The MAS included four breakout group meetings to discuss a range of workforce excellence topics, resulting in a number of recommendations. The break-out group meetings to discuss a range of workforce excellence topics, resulting in a number of recommendations. The break-

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SUPPLY CHAIN EVENT GROWS AT NASA GSFC

By JONATHAN ROOT
NASA Goddard Space Flight Center

The fifth annual NASA Supply Chain Quality Assurance Conference, held Oct. 18-20 at NASA’s Goddard Space Flight Center (GSFC), achieved a record turnout of more than 275 leaders and practitioners from space industry and related suppliers, NASA, and other agencies such as DCMA, NRO, and NOAA. The growth of the conference reflects the increasing importance of proactively addressing risks and challenges associated with the supply chains for space missions.

The conference, known as Supply Chain 2011, brought together participants from different disciplines, including mission assurance, supplier management, industrial base policy, engineering, and project management to learn from one another and 36 speakers over the three-day event.

Building upon the success of prior conferences, GSFC’s Supply Chain Management Team produced an expanded conference that included two tracks covering 22 topics, an evening supplier social, a tour of GSFC facilities, two seminars, and a case-study workshop.

The conference theme — “Managing Risks to Assure Mission Success”—provided

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The Challenge and Benefits of PMP Data Sharing

By SUSAN HASTINGS and RUSSELL CYKOSKI
The Aerospace Corporation

A recent U.S. Government Accountability Office report, “Space and Missile Defense Acquisitions: Periodic Assessment Needed to Correct Parts Quality Problems in Major Programs” (GAO-11-404), dated July 22, 2011, raised a concern relative to the impact that late-discovered parts, materials, and processes (PMP) problems can have on major space programs.

The report recommended implementing a method for periodic assessment and reporting on the frequency and impact of parts problems in major space and missile programs. The foundation for assessing parts problems is gathering a complete data set of parts problems.

The technical framework is in place to address the GAO concern, so the emphasis will be on improving the existing infrastructure and communication channels.

Several operational systems already exist to help with communication of PMP problems in an accurate and timely manner. Multiple collaborative meetings with differing audiences are required in order to protect International Traffic in Arms Regulations (ITAR) concerns, comply with nondisclosure agreements, and protect information at the appropriate classification levels.

Rapid communication is key to minimizing the impact of PMP issues across the space community. Collaborative meetings include an international and domestic NASA Electronic Parts Assurance Group (NEPAG); NRO Parts, Units, Materials, Processes, and Subassemblies (PUMPS) Teleconferences; and the Aerospace Parts, Materials, and Process Engineering Forum (PMPEF).

All U.S. space acquisition organizations are invited to participate in these forums as long as security and ITAR requirements are satisfied and nondisclosure agreements are in place. The Aerospace Corporation’s Parts, Materials, and Processes Department is represented at all of these forums to provide continuity across the space community.

Complementing the collaborative forums are operational data management systems that support PMP problem tracking and assessment.

Government-Industry Data Exchange Program (GIDEP) Alerts are widely distributed to U.S. contractors and government organizations, and provide highly informative technical and supplier information that has been vetted at both prime contractor and relevant points in the supply chain. Use of GIDEP extends far beyond national space systems, and prime contractors are often concerned about the legal liability associated with identifying failures of parts in their supply chain and widely distributing this information. The legal concerns can delay or preclude sharing of important data. Proper protection of the PMP data surrounding an issue is critical to the continued sharing.

To ameliorate these concerns, the NRO, SMC, NASA, and MDA each have developed and deployed their own operational alert systems that supplement GIDEP Alerts. These resources collect, distribute, and track anomaly and failure information to well-defined internal user groups, enabling assessment of program risk and closure of corrective action. The NRO and SMC both use the PUMPS system and populate it with their own data.

SQIC at 10: Viewing the Past to Improve the Future

By SUSAN HASTINGS
The Aerospace Corporation

For its 10th anniversary meeting, the Space Quality Improvement Council (SQIC) returned to its roots with a heavy focus on quality issues.

Brian Hughitt of NASA briefed his agency’s response to a recent GAO report highlighting parts quality problems in major space programs (see PMP Data Sharing, above). The GAO report contained two recommendations: (1) Establish an MOU between OSD and NASA for increased Mission Assurance; and (2) Implement a mechanism for periodic assessment of the condition of parts quality problems in major space and missile defense programs with periodic reporting to Congress.

Hughitt noted the existing Memorandum of Understanding (MOU) on Interagency Cooperation on Mission Assurance, which was signed by the directors of the four space acquisition agencies: NASA, NRO, MDA and SMC. The MOU, a result of the 2008 Mission Assurance Summit, documented their agreement to “work collaboratively across organizations as partners to share lessons learned and develop best practices that will create an environment with a goal to deliver 100 percent mission success.”

NASA is promoting the use of the SQIC-National Security Space Advisory Forum (NSSAF) Tier-Two system as a primary means of sharing data across the U.S. space enterprise and will continue to participate in the various forums for sharing PMP issues.

To help increase awareness of anomalies and share solutions, an annual Lessons Learned Workshop is conducted at the NRO. Dr. Tom Burns provided an overview of this year’s workshop, and then Andrew King of Boeing and
Data Sharing
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Additionally, the SQIC, composed of U.S. space prime contractors, created the National Security Space Advisory Forum (NSSAF). The NSSAF is a secure, Web-based resource specifically developed to share critical space systems anomaly data and problem reports among SQIC members. The NSSAF is currently an industry-only resource since its contents are often preliminary and unvetted, though the system is currently being updated to also accommodate government customer access to mature alerts.

Between the collaborative forums and the operational data-sharing resources, it is incumbent on the stakeholder organizations and personnel across the national space enterprise to exploit these avenues in order to prioritize and institutionalize data sharing toward the goal of early risk avoidance and program mission success.

For additional information on this topic or for information on how to participate in the parts forums, contact Russell Cykoski, 703.808.1470, russell.c.cykoski@aero.org or Dave Peters, 310.336.5937, david.m.peters@aero.org.

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Dave Pinkley of Ball Aerospace provided examples of specific lessons from current space programs.

The SQIC’s Commercialization Team presented an update on its assessment of commercial mission assurance practices versus government MA practices. The end product will be a detailed matrix that includes specific recommendations for government action. A survey of the members prior to the meeting indicated a need for better early lifecycle activities for improved design integrity. Members indicated that design quality could be improved through systems engineering by establishing stable requirements and verification planning upfront. According to one SQIC member, many design and software anomalies point to poor requirements derivation, allocation, interpretation, and verification/validation. Respondents praised the value of lessons learned and want to drive them back into the design standards.

At the end of the day, senior government leaders from SMC, NRO, NASA, MDA, DCMA, the Deputy Under Secretary of Defense for Acquisition and Technology (DUSD/A&T), Director of Industrial Policy, and Director of National Intelligence (DNI) Acquisition, Technology, and Facilities (AT&F) received a briefing of the day’s activities and provided feedback to the group.

For more information, contact Susan Hastings, 571.307.5866, susan.e.hastings@aero.org.

Did You Know…

Despite documentation, education, and standards barring their use, prohibited materials still make their way into space hardware, often at the supplier or subtier supplier level. Cadmium, zinc, and lead(Pb)-free tin are prohibited in space systems because of their propensity to form whiskers. Cadmium and zinc also sublimate in a vacuum environment, which can lead to shorted circuits.

Connector shells are commonly plated with tin, zinc, or cadmium finishes for corrosion protection. The examples at right show tin whiskers and zinc whiskers growing from D-subminiature connector shells including an example of a whisker bridging from the connector shell to a gold-plated connector pin.

Aerospace TOR-2006(8583)-5236 REV A “Technical Requirements for Electronic Parts, Materials, and Processes Used in Space and Launch Vehicles” specifies the technical baseline for space quality electronic parts. The document lists prohibited materials by commodity and calls out prohibition of Pb-free tin, zinc, and cadmium more than 40 times. NRO, SMC, NASA, and MDA all require primes to comply with this or an equivalent PMP requirements document. Aerospace TOR-2011(3905)-14 “General Program Guidance for Lead(Pb)-Free Electronics” also recommends avoiding any Pb-free solders or finishes.

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out group sessions, each led by a senior government official and facilitated by The Aerospace Corporation, addressed the following topics:

• Retaining space systems design expertise in a constrained budget environment
• Optimizing mission assurance: Posturing the program workforce for efficient execution
• Developing workforce excellence: Knowing what to do and doing it

• Developing effective space systems program managers to achieve acquisition success

The senior government executives met in a separate breakout session to address how to effectively manage the community’s collaborative approach to meet the challenges to mission success, focusing on the effectiveness of the MAS and other related forums.

They noted the positive impact to acquisition policies and mission assurance processes as well as the impact of the products, particularly from the MAIW. They also noted the valuable feedback to senior government leadership on space industrial base issues and concerns but were also sensitive to the need to realize efficiencies in the mission assurance events.

For more information, contact Susan Hastings, 571.307.5866, susan.e.hastings@aero.org.

GETTING IT RIGHT ACRONYM DEFINITIONS

DCMA: Defense Contract Management Agency
JMAC: Joint Mission Assurance Council
MAIW: Mission Assurance Improvement Workshop
MDA: Missile Defense Agency
NASA: National Aeronautics and Space Administration
NOAA: National Oceanic and Atmospheric Administration
NRO: National Reconnaissance Office
NSSAF: National Security Space Advisory Forum
PMP: Parts, Materials, and Processes
SMC: Space and Missile Systems Center
SQIC: Space Quality Improvement Council
SSC: Space Supplier Council
CAFE CANAVERAL CONFERENCES
Mar 19-20
Conference on Quality in Space and Defense Industries
Cape Canaveral, FL
Mar 21-22
NASA Quality Leadership Forum
Cape Canaveral, FL

Mar 20-22
Spacecraft Thermal Control Workshop
El Segundo, CA

CALENDAR

Spring 2012

Feb 27 – Mar 1
Ground System Architectures Workshop (GSAW)
Los Angeles, CA

Feb 29
Space Supplier Council (SSC)
Los Angeles, CA

Judy Bruner, GSFC’s director of Safety and Mission Assurance, and other organizations is essential to the success of NASA mission projects.

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an overall focus for a distinguished lineup of speakers. In kicking off the conference, Judy Bruner, GSFC’s director of safety and mission assurance, emphasized that dedicated teamwork with industry, universities, and other organizations is essential to the success of NASA mission projects.

Conference highlights included:

• NASA Chief Engineer Dr. Michael Ryschkewitsch, who addressed the health of the nation’s space industrial base and associated NASA/inter-agency forums and activities, including ongoing survey work to better understand trends and issues affecting the space industry and supporting suppliers.

• Dr. John Sommer, head of the Space Department at the Johns Hopkins University Applied Physics Laboratory, who provided his perspective on balancing risk, process control, and expert judgment in managing space projects.

• Presentations covering the approach, experience, and results of GSFC’s Supplier Assessment Program, which conducts about 50 assessments per year of prime contractors and lower-tier suppliers for GSFC mission projects.

• Presentations by Vince May of the Americas Aerospace Quality Group and Dan Berry of Ball Aerospace and Technologies Corporation focused on the strategic intent of the updated aerospace standard for quality management (AS 9100C) and lessons learned in achieving conformance with the new features of the standard.

• Presentations covered the approach, experience, and results of GSFC’s Supplier Assessment Program, which conducts about 50 assessments per year of prime contractors and lower-tier suppliers for GSFC mission projects.

An Increase in Software Testing Robustness: Enhancing the Software Development Standard for Space Systems by K. Owens and S. Eslinger; ATR-2011(8404)-3; OK’d for public release

Software Acquisition Best Practices Tutorial: New in 2011 by S. Eslinger; ATR-2011(8404)-5; OK’d for public release

Systems Engineering Perspectives on Technology Readiness Assessments in Software-Intensive System Development by P. Hanton; ATR-2011(8404)-8; OK’d for public release

Best Practices

Space Power Workshop
Manhattan Beach, CA

Joint SQIC/SSC
Colorado Springs, CO

National Space Symposium
Colorado Springs, CO

Space Parts Working Group
Los Angeles, CA

Mission Assurance Improvement Workshop (MAIW)
Laurel, MD

Summer 2012

Apr 16-19
Space Power Workshop
Manhattan Beach, CA

Apr 16
Joint SQIC/SSC
Colorado Springs, CO

Apr 17-20
National Space Symposium
Colorado Springs, CO

Apr 24-25
Space Parts Working Group
Los Angeles, CA

May 9-10
Mission Assurance Improvement Workshop (MAIW)
Laurel, MD

Jun 27
SQIC
Los Angeles, CA

JMAC Develops Strategic Vision

By SUSAN HASTINGS
The Aerospace Corporation

Mission assurance managers from NASA, MDA, NRO, and SMC met at The Aerospace Corporation facility in Chantilly, VA on Dec. 2 to develop a strategic vision for the Joint Mission Assurance Council (JMAC). The members agreed that the JMAC should continue to be a government collaboration forum that provides mutual benefits through shared information and mission assurance tools or capabilities.

The JMAC is one avenue through which the government can leverage resources to the benefit of the entire space community.

Three areas of emphasis for 2012 were selected for JMAC attention: Parts Reliability, Specifications and Standards, and Supply Chain/Industrial Base. As a result of the strategic direction discussion, the JMAC also agreed to ensure all JMAC members are plugged into existing parts forums, and to follow up on the 2011 Mission Assurance Summit action items.

For additional information on the JMAC, contact Mike Fortanbary, 703.808.4486, michael.w.fortanbary@aero.org

Getting It Right is published every two months by the Corporate Chief Engineering Office, Systems Planning, Engineering, and Quality, The Aerospace Corporation. Direct questions and comments to gettingitright@aero.org