AVIATION WEEK

Executive Roundtable: Excellence in Innovation as Base of A&D

Carole Rickard Hedden
Washington DC
March 7, 2012

Leaders from across the aerospace and defense enterprise met March 7 in Washington, DC, to discuss the role, and necessity, of innovation as the engine for aerospace and defense businesses of all sizes. Hosted by Alton D. Romig, VP Advanced Concepts, Lockheed Martin; Daryl Pelc, VP Engineering Boeing Phantom Works; and Tony Velocci, editor in chief for Aviation Week, the meeting was held as part of Aviation Week's Laureates/Innovation Day.

Aviation Week convened its first Executive Roundtable in November 2004 as a means for aerospace and defense leaders to come together in a non-competitive environment to discuss issues and challenges impeding program, business and government performance. In the past eight years, more than three dozen roundtables have been convened to define actions designed to support a healthy enterprise. The roundtable participants divide into small groups to identify challenges, discuss possible solutions and then provide an overview to the group. Attendees then select those areas seen as priorities.

Those attending the March 7 meeting represented finalists and nominees for Aviation Week's Laureate Awards and Innovation Challenge, as well as other A&D organizations: 3D Metal Forming, 3M Clearfix, Adducent Technologies, American Airlines, Analytical Graphics Inc., Aurora Flight Sciences, AV&R Vision and Robotics, BAE Systems, Boeing, BridgeNet International, CSA Engineering, Defense Dept., EADS N.A., Eclypse International, Elixair International, Exotic Metals, Fraunhofer, Federal Express, Georgia Institute of Technology, Gulfstream, Honeywell Aerospace, Hydronalix, IBM, Impact Technologies (a Sikorsky Innovation Company), Industrial Technology Research Institute, Infotech Enterprises, Jackson Weighing Service, Kip Motor Co., L-3 Communications, Lockheed Martin, Logos Technologies, Lord Corp., Luciol Instruments, Lufthansa

SPONSORED BY DASSAULT SYSTEMES

Technik, Makino, Northrop Grumman, Object Computing, Office of the Secretary of Defense, Packet Digital, RTI, Rockwell Collins, Raytheon, Rolls-Royce, Row 44, Swift Engineering, United Airlines, U.S. Air Force, U.S. Navy, and VAS Aero.

Romig and Velocci opened the session with discussion about the role of innovation in aerospace and defense, in the past and in contrast to today. The position remains that innovation challenge is what continues to attract individuals to the industry; invention of new solutions and products is a key element in the economic calculus for any country; and it is time to build an infrastructure that will enable an innovation environment where value and speed are critical components.

The roundtable also heard from several of the individuals who judged this year's Innovation Challenge. Overall, the group was heartened by the ideas and inventive capability of sometimes very small organizations; they indicated a need to better prepare the community for nomination to the Innovation Challenge to assure depth and breadth of solutions, allowing them to percolate to the top and gain additional support/investment.

A highlight of the roundtable was the Innovation Challenge Awards luncheon where the roundtable participants gathered to honor the 11 challenge winners. Then began the task of assuring and building innovation capability within aerospace and defense for the future.

Key findings for the roundtable included:
- Innovation required for the future in the areas of
  - Energy and fuel.
  - New materials.
  - Efficiency of lifecycle design.
  - Procurement processes by government customers.
  - Cyber security.
  - Autonomous systems.
  - People factors and processes.
- Culture to support innovation and specifically
  - Leadership.
  - Vision that drives investment, attracts talent and strengthens the supply chain.
  - Organizational environment that enables innovation and calculated risk-taking.
- Enablers
  - External/investor value of innovation
  - Open architectures that facilitate rapid integration/development.
  - Customers who value and efficiently acquire innovation.

Following are details of the specific table discussions that support these findings.
Table 1 and 2 faced three questions for discussion:
1. As you look across the span of each sector – space, national defense/security, and commercial aviation — what are the top priorities in terms of technological innovation?
2. We have had much discussion with regard to business innovation — what are the areas that demand the most innovation at this time?

3. Continuous improvement is core to how we operate — what are the top needs with regard to innovation that will deliver performance improvement?

➢ Overall, the group had a shared sense of urgency concerning the need for innovation across the civil, space and national security sectors.
➢ Energy, fuel and as a companion – the environment – will be crucial to the future of every sector.
➢ Materials science will affect energy consumption, fuel, and the environment and need to see as part of the solutions.
➢ We need technologies to attack lifecycle costs.
➢ Autonomic intelligence is not unmanned systems; it is learning systems.
➢ The infrastructure for the industry needs innovation to assure there is an industrial base.
➢ People are not the same and we're seeing the difference in attitude – there is a question as to why our experience as a technical workforce is not the same as the technology we use in our private lives.
➢ We have a very traditional concept of organizational structure; are we organized to capitalize / optimize the tools and culture we want to build.
➢ The regulatory environment is not in synch with the innovation culture required – the systems do not support or motivate innovation.
➢ Creating all-new creates jobs – we have to be able to transition people to the new jobs to assure they are motivated to take part in innovation that may, in fact, eliminate their current job.
➢ Intellectual property management needs to advance– the threat of losing IP capitalization via cyber attacks is real.
➢ Has the assignment of process and training to leadership and innovation eliminated disruptive inventors and leaders at a cost?
➢ We demand depth of knowledge and skill, but is this discrete specialization a barrier to creating/inventing new ways of conducting business, organizing, setting processes, building/doing?
➢ We need to achieve product lifecycle efficiency, but to do so we need to develop methods to achieve efficiency at every step along the way.
➢ A barrier is the rotating corporate knowledge found within many government agencies (specifically DoD).

Tables 3 and 4 sought to identify top innovation requirements through three questions:
1. What are the top priorities required in process, business and technological innovation to assure A&D stability and success in the future?
2. Assuming that many larger organizations will need to rely upon smaller or boutique type organizations for emerging innovation, what are the key discriminators in looking for innovation talent?
3. What are the key risks in using emerging innovation technologies and talents and how can these be mitigated?
➢ Ideas are often stifled due to lack of money, skills, and infrastructure.
➢ Innovation people don't always speak financial language; this common language is needed to articulate the value of the innovation.
➢ In a push/pull dynamic, most of the A&D industry works in pull environment vs. pushing out to the customer.
➢ Larger organizations need to better leverage smaller company, university and other sources of intellectual property while not over-valuing internal IP over all other sources;

large companies have the capital but must show return more quickly than usually acceptable.

➢ Better understanding is needed of the constraints that boutique organizations face so as to address; among these, for instance, is the demand by the largest organizations that small share IP but not vice versa.

➢ The cost of getting innovation certified and qualified stymies invention and spiral insertions.

➢ Some of the business-side leaders do not have full exposure to innovation and IP within their own organizations.

➢ As a people, we respond to metrics; should we then set an innovation index that might further inhibit innovation?

➢ Key threat is the gap that is occurring as we transition from down-cycles in space and defense to the innovation required for the future; how do we continue to replenish the talent pool without these two sources?

➢ We need a clear vision of how to bring young talent into this industry; expectations versus reality has created a rift between our industry and those in which a 30-year-old can be a billionaire.

➢ Why not an innovation that refines the way acquisition, regulation, and certification support innovation?

Tables 5 and 6 examined the people issues that crept into every table's discussions. The questions posed included:

1. As the defense and space sectors go through down cycles, how can we be assured that the leaders needed for the future are not lost to other industries?

2. Last year at this event, there was significant discussion about establishing cooperative efforts across industry to maintain research and development skills and recruiting among young professionals. What has occurred in the past year along these lines in your organization; what do you think should occur?

3. There has been significant discussion about integration of more creativity/humanities in STEM studies to assure a future workforce that is better at "connecting the dots" -- what do you see as the risks/opportunities in sending this message to academia?

➢ Need to be able to identify and retain strong leaders, regardless of where they are in the hierarchy.

➢ Skill demand is up in several areas – cyber security, robotics, autonomic systems, sensing, data fusion, and materials.

➢ Many A&D technologies are migrating over to the consumer world where they are highly valued; this provides opportunity to critical talent. We also face competition from consumer electronics, oil, and gas.

➢ There is concern that A&D compensation really is not on par with other industries.

➢ We need to be able to portray A&D as solving really big problems – well beyond a phone or video game problem; we do not beat this drum as well as we could.

➢ STEM efforts are strong, but we have not done a good job with non-collegiate youth; this ties directly to the notion of vocational education and associate-degree level opportunities.

➢ Not every young person strong in math and science is destined to be an engineer – need to assure this is addressed early in a collegiate career; internships and co-op experiences are a significant part of showing rather than telling.

➢ We cannot force creativity as part of the STEM curriculum but we also need to do better in accepting STEM graduates who are creative (think tattoos, hair, etc.)

➢ Mentorships are important but not everyone can be a mentor; need people who assist with risk-taking, with building the person's sense of value, identifying opportunities to get feet

wet (big fish in a small pond e.g. mini project teams where young people can gain insight and experience).

➢ As an industry we need to do better in working with universities to bring students into the problem-solving analysis and responses.

Tables 7 and 8 were challenged to look at innovation across the industry. Their questions were:

1. What is the current requirement in terms of assessing A&D innovation?
2. Please discuss the issue of an innovation index — what factors should be involved in assessing the innovation capacity of an organization?
3. What data do you require to better support/drive innovation in your organization?

➢ The bottom-line metric is profitability; we innovate to create shareholder value.
➢ We need to offset the time required to develop and integrate disruptive technologies; the longer it takes to integrate them, the less the opportunities.
➢ Open architecture and interface standards would ease integration.
➢ Need to acknowledge how innovation spins in this industry; take advanced sensor technology as an example – the platform on which it resides ages decades over its lifespan while the sensors advance every 18 months.
➢ Examples of innovation without government funding – Sikorsky X2, Phantom Eye; the expectation is that it will be required.
➢ Rapid prototyping methods need to be invented; these would feed invention but also true competition.
➢ What if acquisition/procurement professionals were rated on the same thing as those responsible for innovation?
➢ We all have seen RFIs (request for information) that defy the laws of physics; yet we respond. This wastes the limited capital available and does not result in innovation.
➢ Innovation varies – it is the old being done better, a new concept to meet existing need in a different way, something new that creates a need we didn't know we had – examples extend beyond Apple, think Cirque de Soleil.
➢ There is no single index for creativity or innovation but perhaps it is ROI X % Benefit (weight, cost, etc) X % value X % advocacy (will it stick) X % credibility (is this realistic).
➢ Innovation capacity is a function of intellectual capital within an organization, the culture of the organization and past successes.
➢ Things like the Innovation Challenge or an innovation jam – these are important but made difficult due to IP issues; we need to identify ways to protect the smaller firms where innovation thrives.
➢ Innovation among larger organizations is the way we integrate/link through varied capabilities to solve a big issue.