



Aerospace Industry Second Century Innovation, Transformation and Global Collaboration

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It could be said that last month's Paris Air Show marked the beginning of the aerospace industry's second century, and by all accounts, the next century will have both great challenges and opportunities. On the challenge side of the ledger, we see global collaboration, extended-enterprise productivity, fixed-price development contracts, and performance-based lifecycle contracts. On the opportunity side of the ledger, we see next generation air-traffic management systems, new commercial aircraft models, joint space exploration, and commercial aviation safety and security.

Industry leaders must implement business strategies and operating models that will ensure sustained success in a very dynamic economy. Government leaders and industry associations must enable industry segments (defense, civil and space) to develop the best products for the most competitive price. However, the challenge for these industry leaders is aggregating a mix of programs with different schedules and somewhat conflicting requirements and specifications into successful business enterprises. What's needed is flexibility and adaptability toward the changing mix of programs and products, particularly when some could span as much as 100 years (example: the F-35 Lightning II Program or the CVAN-78 Ford Class Carrier Program).

For government and industry associations, they need to help forge a common set of standards to facilitate interoperability, thereby enabling common solutions and approaches for different industry segments: defense, civil and space. The current diversity of standards imposes unnecessary impediments or barriers to industry productivity and synergy among different programs.

So what progress have we made over the last 10 years and how could these lessons impact future plans and strategies? Global virtual enterprises have emerged as crucial to the success of major, multi-national corporations. Design anywhere, build anywhere and service anywhere are no longer visions, but reality. Teams of engineers are collaborating 24X7 around the world to develop the most complex aerospace platforms and systems. These teams can now rely on a single master data file to store and control the evolution of an entire family of advanced aircraft including 3D digital models that allow designers, engineers and production specialists to virtually mock-up every assembly and process in advance of actual program launch. This same master file also is the basis for coordinating hundreds of suppliers to build the right part and sub-system to ensure that manufacturing schedules are synchronized with final assembly. Existing

global virtual enterprises have designed and built a new military aircraft family with full ITAR compliance and a new commercial aircraft family in record time.

The aero engine community is clearly following a similar business model with many global joint ventures and risk-sharing partnerships, often including some of the most formidable of competitors. What is also of interest is the success of some aero engine OEMs in adapting their aerospace products to adjacent markets, such as power generation and marine propulsion. Clearly success in these adjacent markets is strongly dependent on leveraging, to the fullest extent possible, common R&D, designs, special tooling and core infrastructure. The transformation of aero-engine development environments has produced some remarkable results from the standpoint of overall development cycle reduction and performance optimization. In one instance, a leading aerospace company's development cycle times were reduced from 60 to 42 months and now are down to 24 months with a significant reduction in cost when everyday in a development cycle is estimated to cost \$1,000,000.

So what should we explore at the Summit to ensure industry prosperity for the next 100 years? First, the following new challenges should be addressed:

- global supply chain performance,
- complex program management,
- global virtual alliances,
- common industry standards that foster interoperability,
- more synergy among and across defense, commercial and space segments,
- lifecycle enterprise productivity, and
- global collaboration around commercial aviation safety, homeland security and cyber-protection.

Which of these issues might have the greatest sustainable impact on the industry? If Summit participants can agree on just two or three, we could potentially move forward with these initiatives and drive meaningful change across the industry. How the specific enterprises incorporate these recommendations will be an individual matter and decision, but we should share our best practices and lessons learned so the next 100 years in aerospace can duplicate or surpass the breakthroughs of the pioneers and visionaries of the first century.

Our shareholders, citizens and warfighters deserve nothing less than our very best.