

The logo for Aviation Week features a stylized, curved arrow or wing shape on the left, pointing to the right. The word "AVIATION WEEK" is written in a bold, black, sans-serif font to the right of the graphic.

AVIATION WEEK

2013 DTAR Lunch Discussion:

Maintaining Rapid Prototyping for Evolving Mission Requirements

Arlington, VA
March 5, 2013

KNOWLEDGE PARTNER

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Rapid prototyping (RP) has grown in scale and scope during the wars in Iraq and Afghanistan, as has demand for the rapid integration of C4ISR systems to meet operational needs. As a decade of war winds down and budgets decline, can - and should - the Defense Department maintain the velocity in delivering new technologies and new capabilities to warfighters that it has built up in wartime?

Where RP has worked in wartime to deliver solutions that meet urgent operational requirements and quick reaction capabilities, can it be made to work as well in peacetime without the imperative of saving lives? In an environment of reduced defense spending, can the ability to strike the right balance between speed of delivery and tolerance to risk be applied to integrated ISR systems, disseminating information and leverage legacy platforms and networks to meet new and evolving threats?

There needs to be a unified approach to achieving maximum agility in delivering solutions quickly to the warfighter in an environment of reduced funding and rapidly evolving mission needs. Program managers are challenged with balancing speed and risk to ensure that prototype systems are developed and fielded efficiently to meet evolving mission needs, as well as improving efficiencies in C4ISR and Platform Integration to yield reduced costs.

The focus of the March 5 Aviation Week Lunch Discussion, held in Arlington, Va., in conjunction with the 2013 Defense Technology and Affordability Requirements (DTAR) conference, was to determine successful aspects and challenges of Rapid Prototyping and C4ISR integration, as well as applying unique engineering design solutions to meet constantly evolving mission requirement. The goal of the discussion was to examine and determine the need and methods for achieving maximum agility in delivering solutions quickly to the warfighter in an environment of reduced funding and rapidly evolving mission needs.

The roundtable was hosted by Ron Kadish, a Booz Allen Hamilton Senior Vice President and former Director of the Missile Defense Agency, and Graham Warwick, Managing Editor, Technology, at Aviation Week. Booz Allen Hamilton served as the Knowledge Partner for the event.

Organizations participating in the discussion were Alliant TechSystems (ATK); A.T. Kearney Public Sector & Defense Services; BAE Systems; Capital Alpha Partners LLC; EADS North America; Lockheed Martin; National Defense University; and the U.S. Air Force.

Roundtable participants divided into two work groups that were challenged to respond to a set of questions that focused on:

- 1)Challenges and successful aspects of Rapid Prototyping (RP).
- 2)Maintaining Rapid Prototyping (RP) without urgent operational requirements.
- 3)Sustaining velocity, associated with upgrading C4ISR capabilities and existing platforms, to meet emerging threats and new technologies.

The 2013 DTAR Lunch Discussion confirmed the need to determine an approach to maintaining the velocity of RP even in non-mission critical environments, for better efficiency in time and cost. While RP is obvious when the demand is to meet an urgent operational requirement, particularly frontline combat needs, the roundtable concluded that institutionalizing rapid prototyping would significantly help cut down product development time, which for major defense acquisition programs can easily extend a decade or more. Even when there is not the impetus of war, the fast pace of development could be sustained by accepting an increase in the early failure rate to ultimately accelerate the rate of learning, adjusting and modifying.

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KEY FINDINGS:

- “Fail faster, learn faster!” To enhance velocity in C4ISR programs and Rapid Prototyping, an increase in the early rate of failure in integration must be allowed and accepted.
- Rapid Prototyping could be maintained without urgent operational requirements by creating a Red-Flag style environment, replicating what is in place during critical missions.
- To sustain velocity of Rapid Prototyping, all stake holders, sponsors and developers, must accept greater risk. Although the main objective of RP is to mitigate risk, it cannot be accelerated without risk.
- If there could be appropriated funds that are assigned for rapid prototyping to draw on without line item funding, delays associated with the federal budget cycle could be avoided.

Details of topical conversations in the work groups follow.

Does Rapid Prototyping (RP) work? If so, what aspects of it are successful?

- Although group consensus answered “yes, it can be a useful approach”, participants agreed it was dependant on program size, complexity of the unit and demand from users (ex. MRAP).
- RP has been misused. Some larger efforts have sought “rapid” status merely to avoid coming under regular acquisition rules.
- RP is successful when the company and customer see value to the prototype, in black programs, with limited oversight, and a smaller scale in innovation and risk.

When is it not an apt enabler, and why? What are the challenges?

- A key challenge to RP is political leadership of the country, as leadership must perceive a sufficient threat.
- DoD budget bureaucracy is a major hindrance, due to the multitude layers of overseers and management. By limiting oversight, RP velocity may be retained by re-empowering program managers to make decisions.

How can Rapid Prototyping be maintained without urgent operational requirements?

- By appropriating funds assigned for rapid efforts to draw on without line item funding, interruptions and impediments associated with the federal budget could be avoided. The government should consider creating a “Rapid DARPA” agency, one specifically to field systems fast from technology in hand or nearly in hand.
- Although we are transitioning into a non-critical environment, the DoD needs to be prepared for future conflict, due to defense readiness against agile adversaries and reducing learning curves occurring during combat.
- To infuse a sense of urgency – and to avoid waste – rapid prototyping efforts should have mechanisms to turn off projects that are not working, and by enforcing time limits.
- A feedback loop between operators and developers is critical. A prominent suggestion was a Red Flag-style environment for RP, even in non-mission critical environments.

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- Sponsors have to accept the same level of risk as developers. Overall, all stakeholders should accept greater lifecycle risk.
- Configuration control is a major challenge without immediate solutions. Different operators can ask for modifications and get them from a “rapid” culture, but the result can be too many versions of a fielded system.
- Special Operations is an ideal customer, but start with determining the mission need, not the requirements. Evaluate on mission value, instead of whether it met the specifications or not, and the end-user should be involved in determining and writing requirements.
- Iterative prototypes.
- Freedom to select sources/suppliers without protests from other joint decision-makers, as well as resource boundaries must be well understood.

How can the velocity, associated with upgrading C4ISR capabilities and existing platforms, be maintained to meet emerging threats and new technologies?

- The velocity of C4ISR RP depends on:
 - Comprehension of all interfaces, from frontline squads to HQ to aircraft and ships.
 - Stability of requirements.
 - Ownership/responsibility for aggregate (joint) capability – there needs to be a champion/catalyst driving the program and held responsible. “Joint” responsibility can mean someone else is in charge.
 - Government’s appropriate oversight of program.
- Challenges:
 - Translations of operators’ wants/needs to technology ability are still extremely nebulous. Engineers and operators speak different languages.
 - Competition does not necessarily solve prototyping challenges because government still demands a prototype in the contracting process. This is particularly burdensome when dealing with adjustments or modifications to C4ISR system. Although competition of ideas is vital, but competition on source selection will slow things down and can bankrupt industry due to high costs of bidding and reduced number of opportunities.
- Limit technological objectives.
- Increase rate of failure in integration to quickly test and learn.
- Accepting and planning how to sustain and afford the prototype long-term (lifecycle sustainment).

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