A Perspective on Prototyping to Aid in the Formation of a Spiral Development Strategy

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Engagement Systems Department

MISSION:

To conduct analysis, research, development, test & evaluation, systems engineering and integration to field safe, innovative and cost effective engagement systems

Acquisition Focus:

- Technology Opportunities
- Pre-Systems Acquisition
- System Development and Demonstration
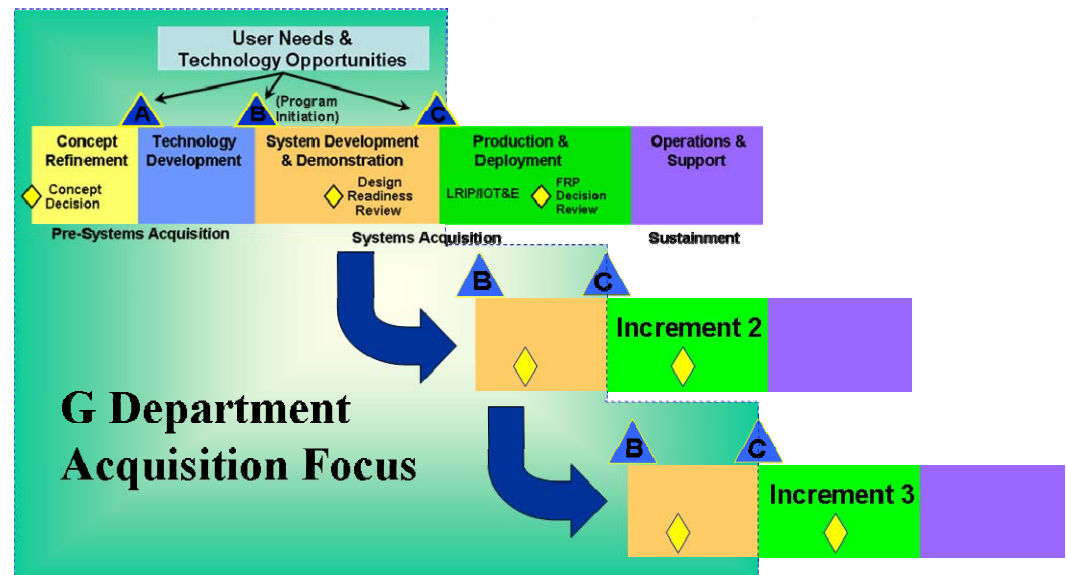
Technology Opportunity – Example Gunslinger

Purpose:

- Demonstrate and/or deploy hostile fire detection and counter-fire capability

Military Relevance:

- Decreased Response Time
- Increased Situational Awareness
- Increased Return Fire Accuracy
- Enhanced Detection and Location

Spiral 1: Integrated weapon and sensors on HMWVV • Stationary capability. (Demonstration Capability) • Evaluated in CONUS	
Spiral 2: Integrated Gunslinger Enclosure on MX-MTV • On-The-Move capability • (Deployed Capability	
Spiral 3: Integrated Miniaturized, modular, networked capability on HMWVV • Evaluated in CONUS • Potential Transition to JLTV & MRAP	

Importance of Prototyping

- Prototyping plays a key role in spiral development
  - Provides a means for quickly assessing technologies,
  - Helps refine concepts and mature technologies
  - Provide concrete data for technology risk assessments
  - Provides data needed to develop a spiral development plan
- We have started using prototyping as part of the technology opportunities development
  - Quickly transition concepts and capabilities into Acquisition programs
  - Provides more refined concepts for transition into Pre-System Acquisition (Reduces time spent in Pre-System Acquisition)
  - Provides needed data for Spiral Development planning

The earlier a user can assess a prototype, the quicker a capability can transition into an acquisition program

Technology Opportunity Development Approach

1. Understand the User Desired Capability

   - Strive to work with User/Warfighter
   - Respond to Urgent Need Statement
   - Focus on desired capabilities and not detailed requirements

2. Develop and Assess Concept to Meet Desired Capability

   - Evaluate emergent technologies
   - Develop a prototype
   - Conduct User evaluation of prototype
   - Ideally, provide to user for "In-Theater" evaluation

3. Transition Concept or promising technologies to Pre-System Acquisition or Acquisition as appropriate

   - Need to gain PM's "Buy-In" during concept development and evaluation
   - Work with the PMs on transition plans

This Approach provides data (not a paper study) on the military relevance of a concept and assists in Spiral Development Planning

Technology Opportunity Development Guidelines

- Integrate innovative technologies into tools for the warfighter
  - Leverage the S&T community (Work with ONR and DDR&E)
  - Build teams with warfighter, industry, academia, other labs
- Use open systems and standards (Adaptability)
- Use tenets of Urgent Material Release process
  - Safe
  - Suitable
  - Sustainable
- In-Theater Deployment is highly desirable
- Shorten Spirals as much as possible (Ideally 6- 10 months)
- Provide PMs relevant data on technology/concept performance, maturity, and military utility
  - Allows PM to formulate Spiral Development Strategy that accounts for actual technology maturity
  - Allows PM to shorten Pre-System acquisition Phase
  - Provide PM actual user input, which is a tenet of Spiral Development and Evolutionary Acquisition

Our Technology Opportunity Development Products

- Military relevance of Concepts and Technologies
- Pipeline of Mature Concepts and Technologies developed as part of the Technology Opportunity activities that can be
  - Transitioned into a reduced Pre-System Acquisition Phase
  - Or… transitioned directly into SDD
- Better understanding of the capabilities desired by the warfighter

Hard Data on Technology Risks that are needed to Successfully plan a spiral Development Approach

Conclusions

- We have successfully used a Spiral development Approach during the Technology Opportunity Activities
  - We are able to determine the Military relevance of Concepts and Technologies
  - We can shorten the overall Acquisition of a Capability
  - We gain a better understanding of the capabilities desired by the warfighter
  - We obtain the Technology Risk Data needed to Successfully plan a spiral Development Approach
- Key Challenges include:
  - Ensure proper POM Cycle Planning needed for follow-on acquisition Programs
  - Understanding the limitations of In-Theater User Evaluations

This Approach Allows the Technology Opportunity Activities to greatly reduce the risk of an acquisition Program and successfully plan for spiral development