Office of the Under Secretary of Defense (Research & Engineering)

DoD Software Science and Technology Strategy (NDAA 2020, Section 255)

Presented to:

NDIA

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Prototyping and Software (P&S)

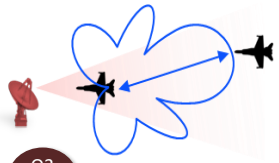
Focus on advancing technology and innovation for the services by delivering operational, leap-ahead Programs, Advanced Concepts, and Technologies to rapidly provide our Warfighters with overmatch capabilities aligned with the National Defense Strategy

- Implement leap-ahead prototypes through a disciplined approach that provides fair evaluation of inputs, with insight by stakeholders, to meet the greatest warfighter needs with available funding
  - Identify Service, CCMD, JS, AD, Agency, Foreign partners, Industry
  - Evaluate proposals to reduce redundancy of prototyping efforts
  - Structure prototype program for rapid delivery
  - Determine co-funding to increase investment and partner buy-in
  - Ensure solid transition plan to counter Valley-of-Death issues

Prototyping Value to DoD

Link 16 Anti-Jam

This project developed adaptive array processing algorithms and waveform enhancements. These technologies transitioned to multiple classified programs of record.



TALONS GARC

A towed-airborne lift of naval systems (TALON) with a small, unmanned vessel for significantly greater communications and sensor ranges. This technology transitioned to NAVSEA LCS Mission Modules Office (PMS 420).

LCASD

An ultra-low cost, long-range unmanned aircraft to conduct strike and/or ISR missions; supports several follow-on projects to include Skyborg, Enigma and Lander, which will develop stores and fire control management for the aircraft

SADL SOPGM

A weapon and platform agnostic bi-directional miniaturized radio to enhance lethality, precision, and mission effectiveness. This capability significantly enhances the strike capability of airborne SOF platforms.

2018 — Q3 2018 — 2019 — Q3 2019 — Q4 2019 — 2020 — Q2 2020

85 FY 18 Transitions — Q4 — Q1 — 108 Successful FY 19 Transitions — Q4 — Q1 — 42 Successful FY 20 Transitions to Date — Q4

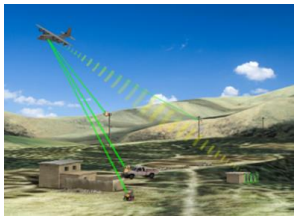
Q1 2019 — Q4 2019 — Q1 2020 — Q4 2020

Solid Oxide Fuel Cell

A fuel cell for the Stalker UAS that increased the overall power output by 100W and the number of power cycles. This technology transitioned to MARSOC for immediate adoption.

QS-64ER

A low-cost wing kit and munitions guidance package which will deliver maritime mines from a safe stand-off distance; QS64-ER conducted external release operational demonstration from a B-52 and transitioned capability to USN Program Manager, Ships (PMS-495)



AHEL

The Airborne High Energy Laser (AHEL) is a risk reduction effort that allows an aircraft to rapidly accelerate deployment of a high energy weapon system. This risk reduction effort directly informed PEO Fixed Wing.

SPECTRE

A hyperspectral imaging system with an 800 lb reduction compared with the current system. This technology will transition to the Army's Program Management Office Sensors – Aerial Intelligence Program Office

A Range of Prototyping Efforts

- Mission Focused Prototyping
  - End-to-end prototypes that support Joint Warfighting Concepts in key mission areas
  - Complements traditional prototyping programs
- Software Prototypes (New)
  - Explores/enhances joint software capabilities to support mission and warfighter needs
- Conceptual Prototypes
  - Explores emerging technologies to quickly determine feasibility and military relevance
- Rapid, low-cost prototypes
  - Quick, low cost prototype capabilities delivered directly to the warfighter
- International Prototypes
  - Operational prototypes where US and partner nation share R&D funding, technology, and industry participation to transition leap-ahead capability

A balanced portfolio of prototypes with various levels of size, risk, and innovation
Typically TRL 4 to 6+

Software Prototyping and Strategy Approach Overview

Improve DoD adoption of commercial software practices and tools

- Minimum viable prototype in 60-90 days followed by frequent updates
- Extensibility and transition clear at the start
- Policy and standards follow commercial enterprise effectiveness

Project selection:
- Strategic mission impact
- AD/TD roadmap
- Applicability of commercial approaches
- Definition of mission relevant architectures

Pull mechanisms:
- Solve Service MDAP problems
- Contribute to Joint Warfighting Concept
- Transition agreements, co-investment

Extend to the Enterprise:
- Prototypes enable enterprise services
- Multi-MDAP application
- Extensible to multiple missions
- Enables SW separation

Software Modernization Opportunities

- Preserving the value of Systems Engineering Lifecycle
  - Appropriate rigor to define warfighter needs
  - Importance of systems thinking to agile success
- Standardizing approach and tools
- Applying commercial approaches and best practices to DoD environment
- Supporting acquisition evolution
- Collaboration
  - Close work within the services as mission owners and support for Combatant Commanders
  - Across OSD to facilitate change and support joint benefits
  - With industry and professional organizations for thought diversity and innovation
- Actions driven by the National Defense Authorization Act
  - NDAA 2020, Section 255, Department-Wide Software Strategy

Software modernization achieved by collaborating across a diverse community

Section 255 Overview

- Section 255 establishes two major requirements from DoD
  - Sec 255 (a) Appoint a senior official to guide DoD in software in six specified areas
  - Sec 255 (b) Develop of a DoD-wide Software Science and Technology Strategy under guidance from the designated senior official

Section 255 Research

Research Areas

(1) Research and development activities on new technologies for the creation of highly secure, scalable, reliable, time-sensitive, and mission-critical software;

(2) Research and development activities on new approaches and tools to software development and deployment, testing, integration, and next generation software management tools to support the rapid insertion of such software into defense systems;

(3) Foundational scientific research activities to support advances in software;

(4) Technical workforce and infrastructure to support defense science and technology and software needs and mission requirements;

(5) Providing capabilities, including technologies, systems, and technical expertise to support improved acquisition of software reliant business and warfighting systems; and

(6) Providing capabilities, including technologies, systems, and technical expertise to support defense operational missions which are reliant on software.

Approach

- Establish standing working group for Services, OSD and industry for ongoing interchange
- Align with research labs and FFRDC to guide
- Conduct software focused prototyping to advance and mature research in software intensive capabilities and to enhance
- Coordinate across major prototyping efforts to align foundational capabilities for joint use

Discussion

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