Evolving Defense Acquisition Through Digital Transformation

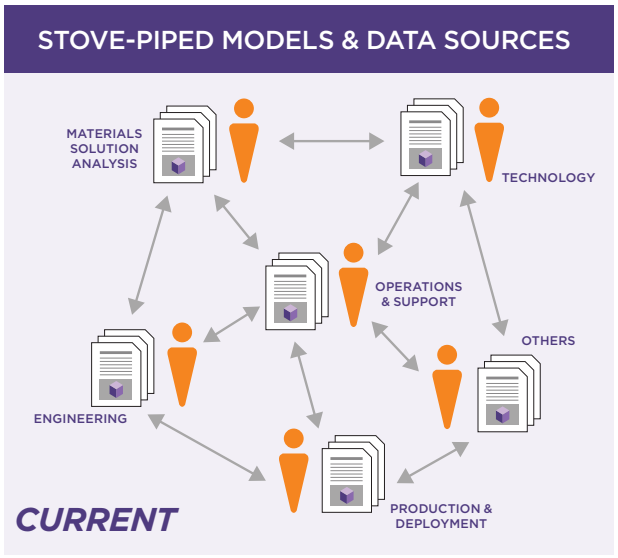
Critical MBE Themes That Enable Collaborative Government-Industry Digital Engineering Throughout the DOD Acquisitions Lifecycle

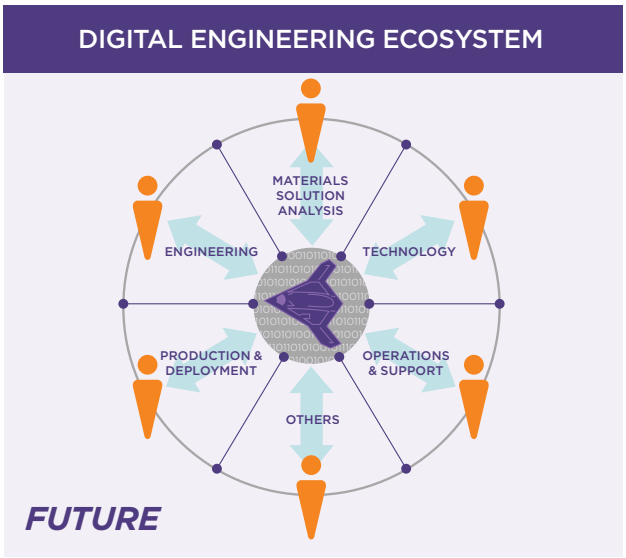
AEROSPACE INDUSTRIES ASSOCIATION

The future threat landscape is becoming more agile and dangerous as our adversaries field new capabilities at an increased pace and complexity. New and emerging technologies such as Artificial Intelligence (AI) swarm logic, multifunction digital electronics, cyber, and advanced anti-access area denial systems are all contributing to an increasingly lethal battle space. If changes aren't made in the near term, the Department of Defense's (DOD) traditional document-centric acquisition processes may be unable to efficiently field solutions that can keep pace with these ever-changing future threats.

We in industry see a critical need to transform the process by which the U.S. government acquires, develops, fields and sustains future weapon systems so that they can keep up with the ever changing and increasingly complex threat landscape of our adversaries. Model Based Systems Engineering (MBSE) offers a solution for such a transformation within the DOD Acquisitions and Development lifecycle process.

MBSE, used in this context, would transition away from the traditional document-centric process of maturing a weapon system from initial conception through sustainment into a much more dynamic, efficient and flexible digital engineering process. Model-based artifacts will enable increased traceability and allow errors, inconsistencies and broken links in the system to be detected earlier in the development lifecycle. This in turn will drive down the cost needed for "re-work," which exponentially increases the later problems are discovered in the lifecycle.





The ultimate vision is to realize a single digital representation of the defense system, where each subsystem component is accurately represented via analytical and descriptive models that can easily be traced to the initial set of mission and requirement definitions.

In 2017, the Aerospace Industries Association (AIA) MBSE working group collaborated with key government stakeholders from the Office of the Deputy Assistant Secretary of Defense to discuss strategic focus areas that would need to be addressed in order to transition from a document-centric to a model-centric paradigm, including:

- Definition of the MBSE CONOPS Objectives and Desired End State
- Information Access Management and Data Rights
- Collaborative Development Practices with MBSE
- MBSE CONOPs Enablers for Deriving Best-Value from Digital Artifacts

We will not achieve creation of the Digital Engineering Ecosystem in one bold step, but incrementally, as tools and protocols evolve to adopt and comply with common standards for interfaces, exchange media and data models. Each step on the path to the ecosystem provides new benefits. Gradually, we will improve the ability of government and industry to collaborate in a model.

When we develop and manage both the government and industry models on an interconnected digital engineering platform that is collaboratively accessed by all stakeholders, we will reduce the time and cost from conception to delivery and improve quality of delivered systems. We will then be able to use the models throughout system life to provide upgrades and future product variants for lower cost.

Critical to this process will be building a collaborative CONOPS that allows all stakeholders to have access to the necessary data and tools in the format or view that is appropriate to their discipline and to collaborate across the entire team. A collaborative, model-centric environment where the right information is shared at the right time in the right format will make the entire DOD Acquisitions and Development lifecycle process more efficient and responsive.

Model Based Systems Engineering offers a promising way to achieve such a transformation. Implementation will be an iterative process, requiring planning and specific activities in the short, medium and long-term. The threat environment will only grow more complex and challenging with time – it is imperative that we evolve to deliver the American warfighter the best capabilities more quickly and efficiently. If we do not, we risk losing the battlefield edge that is decisive in conflicts around the world.

For more information, please read AIA's whitepaper, "Evolving Defense Acquisition Through Digital Transformation" on our website. **https://www.aia-aerospace.org/report/evolving-defense-acquisition-digital-transformation/**