This research will use the enterprise systems of systems methodology developed within the SERC to develop an enterprise transformation model that can be used to provide insight into the value of different acquisition strategies and incentives. It is currently not adequately understood what the impact of digital engineering will be on acquisition processes and the corresponding ecosystem. We expect that the DE could affect:

- How existing engineering processes are performed
- How information is shared
- How engineering functions are structured in organizations
- The entire business eco-system: competition, risk attitudes, business models

Before we make changes and define new policies,... let’s aim to understand the consequences of the policies and how they may transform the acquisition eco-system.

The Interagency Working Group on Engineering Complex Systems defines Digital Engineering as follows [1]:

- Digital Model-based Engineering (DMbE) is the use of digital artifacts, digital environments, and digital tools in the performance of engineering functions.
- DMbE is intended to enable practitioners to engineer capabilities using digital practices and artifacts in a collaborative environment, creating a digitally integrated approach with a federated single source of truth.
- DMbE is intended to allow an organization to progress from documentation-based engineering methods to digital methods that may provide greater flexibility, agility, and efficiency.

The Department of Defense has defined a comprehensive strategy for Digital Engineering:

1. Culture
2. Education
3. Infrastructure & Ecosystem
4. Systems Engineering
5. Program Management
6. Cybersecurity
7. Test & Evaluation
8. Disciplinary design
9. Manufacturing
10. Logistics
11. Model Repositories

The objective of this research is to identify the consequences of the policies and how they may transform the acquisition ecosystem.

- Conduct interviews with key stake holders in the acquisition ecosystem
- Generate diagram and analyze scenarios (with Systemesm “shows”)
- Identify opportunities and challenges (e.g., intellectual property, training, infrastructure,...)
- Identify and analyze potential modifications/improvements to DE and corresponding processes
- Identify short-term and long-term value propositions for each of the key stakeholders
- Identify possible incentives to accelerate adoption
- Conduct a design workshop to agree upon and refine the conceptual model

The project will use a qualitative research method based on semi-structured interviews. Starting from an enterprise analysis, a Systemesm model will be created that identifies key relationships in the enterprise that can be focused on with change strategies. The model identifies key actors, activities, enablers and barriers to change that drive desired system outcomes. Through semi-structured interviews with key stakeholders in DoD and major defense contractors, a conceptual model will be developed via a series of narratives generated in the interview process, and refined in one or more design workshops with key stakeholders in the enterprise. The conceptual model will capture the impact of digital engineering on the emerging model-centric system acquisition process. It will provide a baseline to identify the consequences of Digital Engineering policies and how they may transform the acquisition ecosystem.

Example Stakeholders for Interviews

<table>
<thead>
<tr>
<th>Ground-Based Strategic Deterrent</th>
<th>Digital Warfare Office</th>
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</thead>
<tbody>
<tr>
<td>Combatt Rescue Helicopter</td>
<td>CH 53K</td>
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<tr>
<td>B-21</td>
<td>JPALS</td>
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<tr>
<td>F-15 EPAWSS</td>
<td>Nellis Gen Jammer</td>
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<tr>
<td>APRIL</td>
<td>Model-Based Pilot</td>
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<tr>
<td>GPS III Ground Systems</td>
<td>JPL Aerospace Corp</td>
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</tbody>
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Contacts/References

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