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# A Study of MBSE through the Development of Modeling and Data Exchange Processes

NAVAL SURFACE WARFARE CENTER
PORT HUENEME DIVISION

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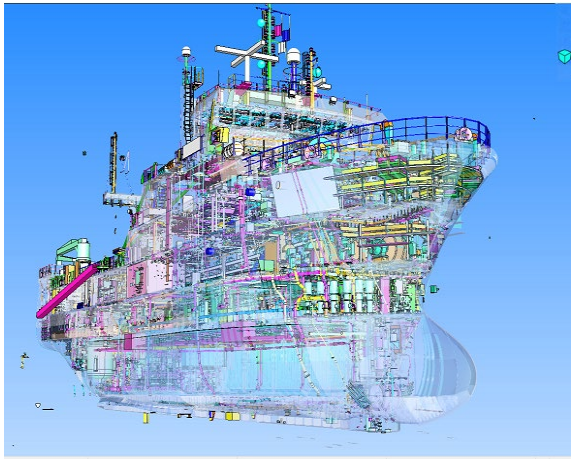
# Problem Overview

- With the need for MBSE capabilities, our capstone team objective was to research the climate of MBSE to provide recommendations as to its application and potential areas of further research

- With the implementation of MBPS on the horizon, our objective was also to assess the impact of the Model Based Product Support program on MBSE



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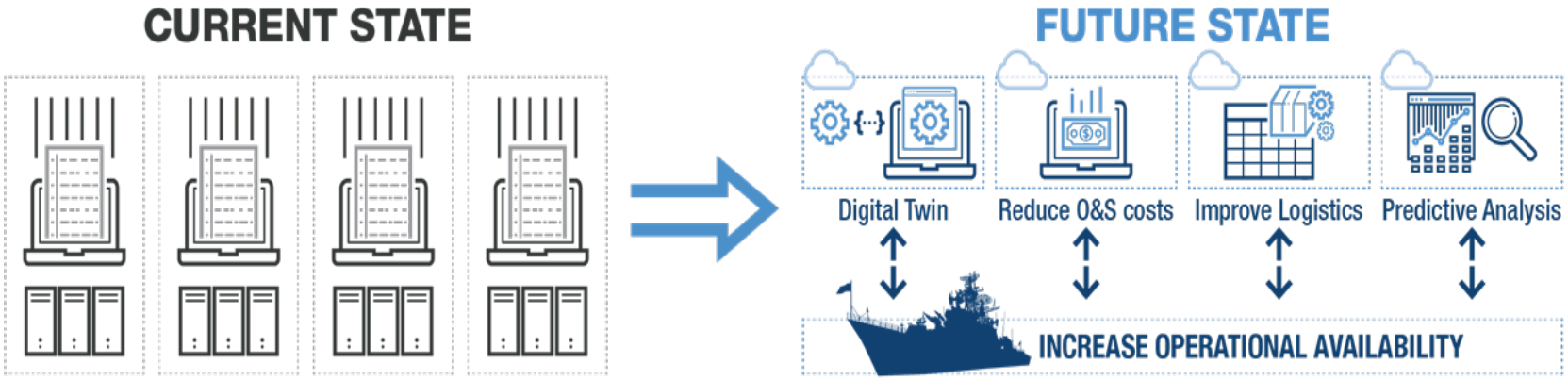
# Model Based Product Support

- *"The Navy maritime **Model Based Product Support (MBPS)** program is a logistics IT transformation effort that will increase weapon system uptime and reduce support costs"* – MBPS Overview Brief by NAVSEA03R

- MBPS is planned to release a set of digital capabilities beginning in FY 21. Some capabilities include:
  - Integrated product data (consolidation of legacy logistics IT)
  - Simulated and predicated readiness analytics
  - Standardized data sets and automated processes



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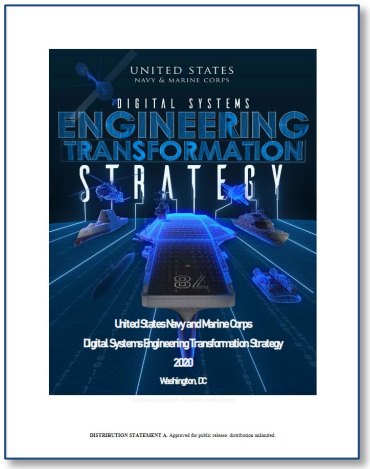
# Model-based Systems Engineering

- Similarly, the systems engineering community is beginning its transformation into a more digital, model-based future.
  - It is desired for MBSE to support Navy processes throughout the lifecycle of Navy systems.


DoD Digital Engineering Strategy (2018)




USN/MC Digital Systems Engineering Transformation Strategy (2020)

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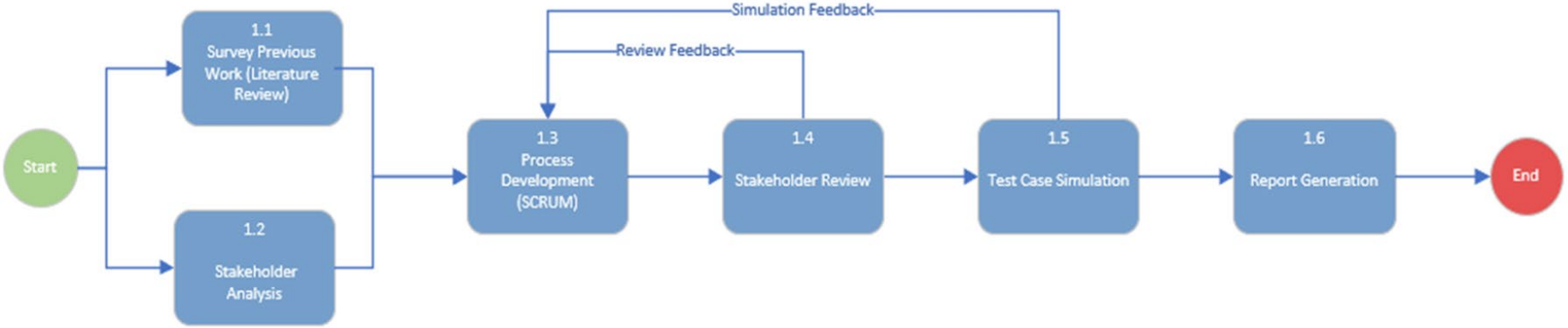
# Project Methodology

- Using a systems engineering approach results were developed using conceptual scenarios to produce example artifacts and verify processes.

- The scrum framework was utilized to document and manage the work identified to meet our objectives.



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# Results

- Results ranged to cover different facets of the MBSE problem, including:
  - Demonstration of tool capabilities
  - Recommendation of mechanisms for creating structure across MBSE/MBPS domains
  - Recommendation for further research into implementation of processes and ontology development

- Resultant artifacts will be placed in the appending slides for reference

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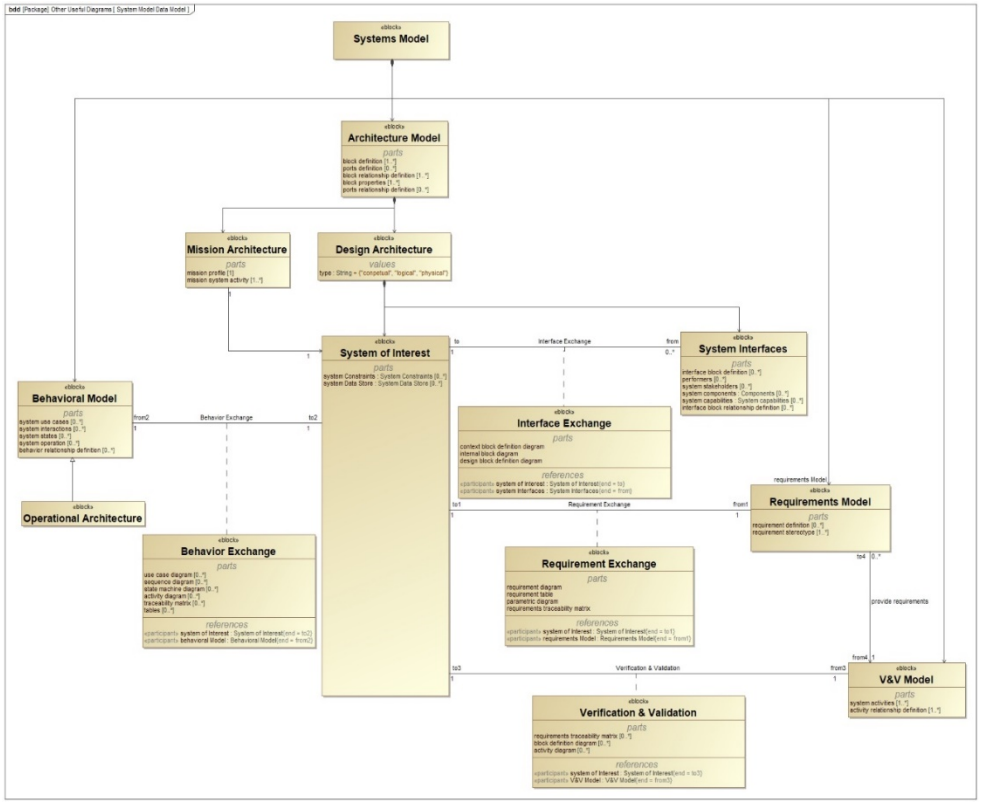
# Need: Common MBSE Ontology




- Like MBPS's use of S3000L, there needs to be a common ontology to identify and describe critical SE information and data to enable data-based decisions.
- Moving into MBSE will prove this need to be critical as we look to understand what data is needed/important for the support of SE technical activities.

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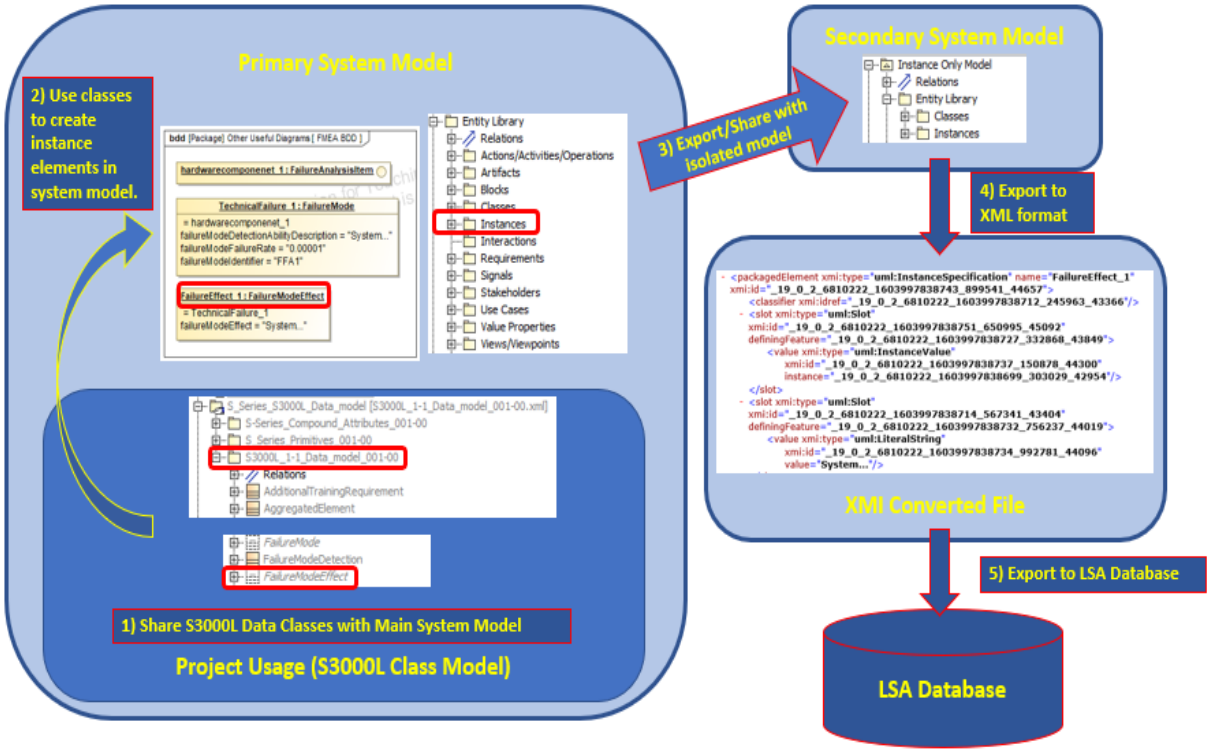
# Data Transfer between Boundaries




- The capstone group studied and documented the process and capability of exporting system model data in the XML format.
- A small FMECA artifact in S-Series acceptable format was developed and exported as an XML file.
- Verification with MBPS is needed with a fully established data model, having relationships among all the S3000L data classes.

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# Questions?

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# Appendix

- Results acknowledged on Slide 6 are presented here below.

https://nps01-my.sharepoint.com/:f:/g/personal/william_emeny_nps_edu/EnzJA3VCeRZNp5aKwBC1LoYBWHayVpblmiQEuecOd_qXqw

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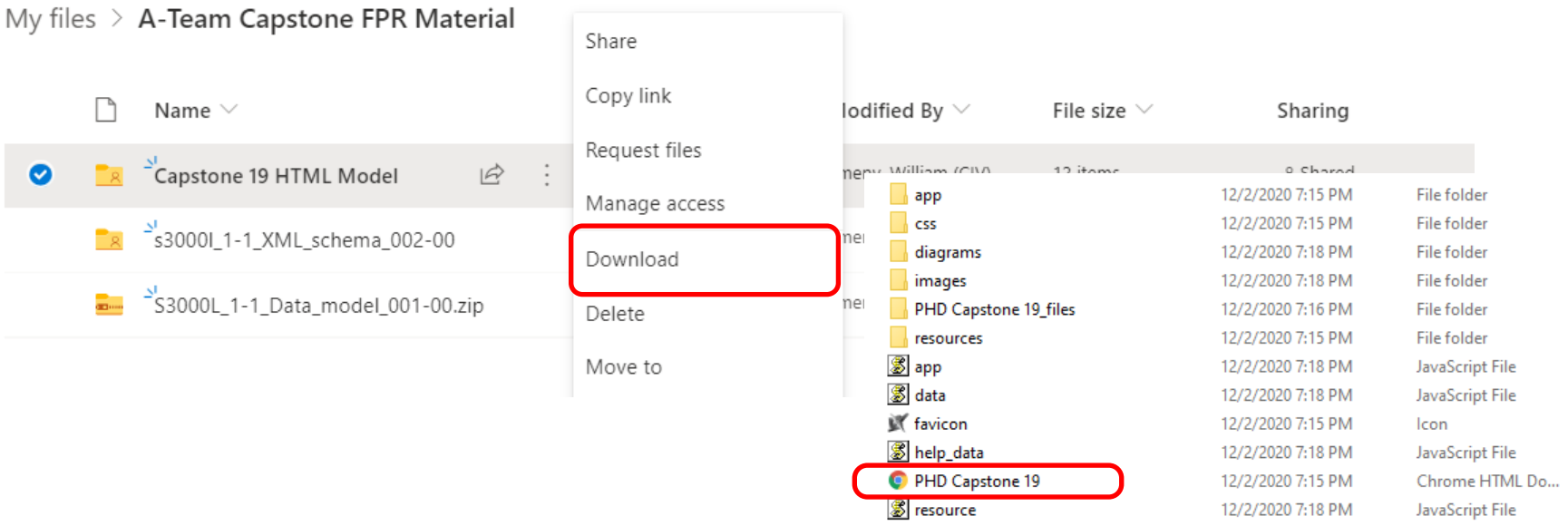
# HTML Model Overview Directions

- Access the html file through this link: https://nps01-my.sharepoint.com/:f:/g/personal/william_emeny_nps_edu/EnzJA3VCeRZNp5aKwBC1LoYBCGLfxPYV1lerxLtGZNhbMw?e=PZeZyk
- Download the entire "Capstone 19 HTML Model" file and unzip to desired folder
- Open the html doc in the unzipped folder



# HTML Model Overview Directions

- Opening the application on the previous page will being up the Cameo Model Portal, click the “Diagrams” tile shown in the first image.
- Open the README folder and select the REA ME content diagram.
- Feel free to navigate from there as you please! **A pdf version of the Model-Based Documentation Generation Process content diagram is placed in the OneDrive Folder.** For some reason it would not print in the html conversion