



MBSE Avionics System Capstone

MASO

Sprint 1 Retrospective

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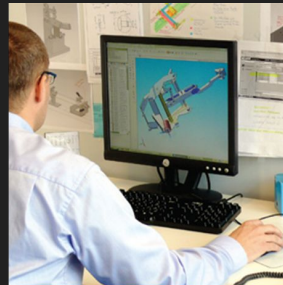
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Model Based Systems Engineering (MBSE)



“Model-based systems engineering (MBSE) is the formalized application of modeling to support system requirements, design, analysis, verification and validation activities beginning in the conceptual design phase and continuing throughout development and later life cycle phases.”

INCOSE SE Vision 2020 (INCOSE-TP-2004-004-02, Sep 2007)



Our Project

- Create an MBSE (Model Based Systems Engineering) model representing a generic avionics subsystem for a notional exploration spacecraft.
- Capture hardware and software configurations derived from high-level system requirements.
- Analyze system behavior and perform failure mode effects analysis (FMEA).
- Demonstrate practices and impact of system of interest agnostic MBSE.

Sprint 1

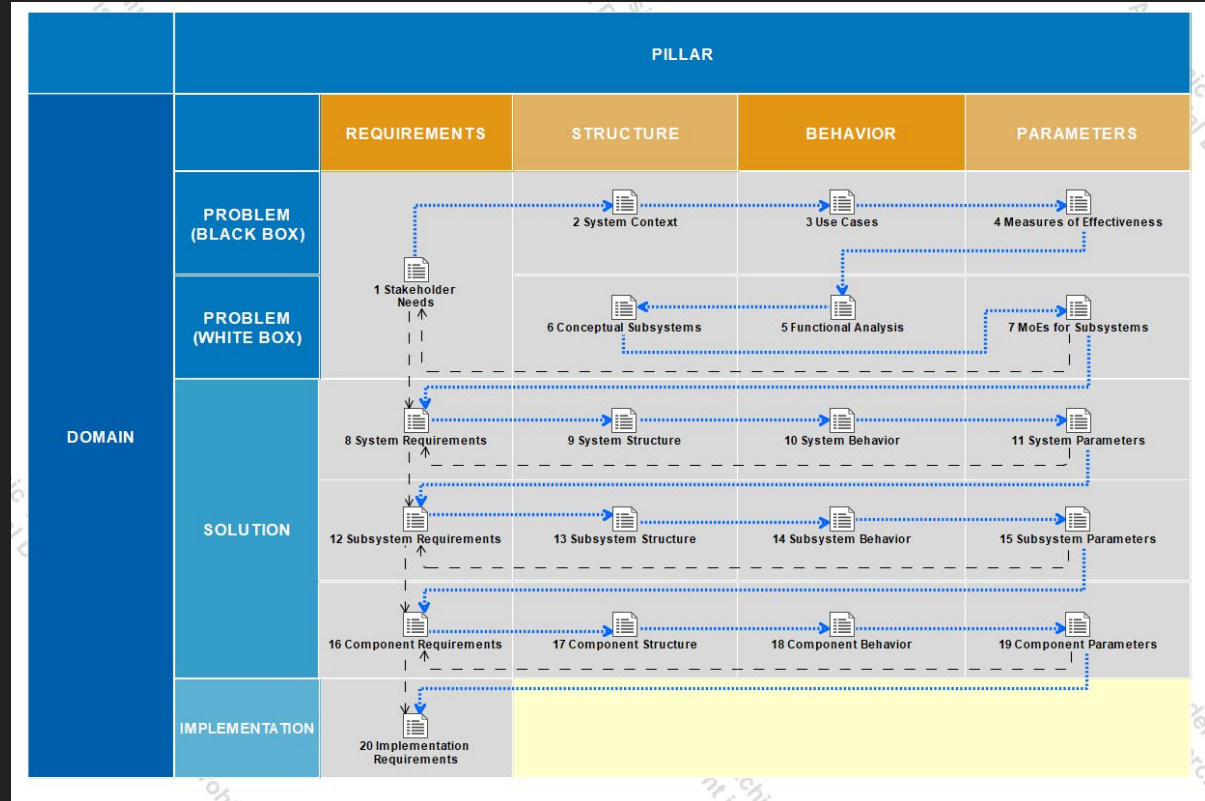
Progress

- Developed contact with representatives from both NASA and Dassault.
- Generated semester and year long goals.
- Decided on tool and framework.
- Conducted extensive literature review.
- Developed documentation and outline for rest of semester.

Challenges

- Shifted customer from NASA to Dassault.
- Blocked from accessing needed tools for the majority of sprint 1.
- Very big project, without a lot of previous research done on the topic.

MagicGrid Framework



Literature Review

MBSE / System of Systems:

- Model of Satellite
- General use cases of Magic tool/framework

Avionics System:

- Being explored by well-known space agencies
- None using the MagicGrid framework (yet)

FMEA / Fault Trees:

- Traditional failure analysis is systematic and exhausting and uses failure cases.
- MBSE can make this process less exhaustive.
- Requires highly detailed modelling as source of truth to be effective.
- Can systems engineers identify unique failure modes using a model source of truth?

Next Sprint Goals

- Gain final access to the tool.
- Generate test models and meet with the customer to validate that we are following standard procedure.
- Receive further training and develop the scope of our model.
- Further research fault modes and determine usability in our model (and benefit to client).

Questions?