A SysML Model Based Simulation of a NTP Ground Test

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Introduction

Product development tends to require commitment to design critical decisions very early. X-in-the-Loop (XIL) simulation may provide a chance to understand systems earlier. For this project, SysML will be used to simulate a Nuclear Thermal Propulsion (NTP) ground test involving the NASA developed Rocket Exhaust Capture System (RECS) in Figure 1.

Preliminary Results

The simulation provides a good indicator of the baseline performance of the RECS system, and can be used to make decisions involving test parameter optimization. The rocket exhaust is successfully processed and converted to nonhazardous bi-products.

Conclusion

Even with minimal information about the system, a model can be built and then updated as more information becomes available. To maximize the effect, the system model will need to have the capability to replace sections with more accurate models and eventually HW devices.

The methods used to build this model will be used to write a generalized methodology for building a model to support changes over the entire lifecycle.

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