Center Innovation Fund: JSC CIF

Risk Informed Design Using Integrated Vehicle Rapid Assessment Tools

Completed Technology Project (2012 - 2013)

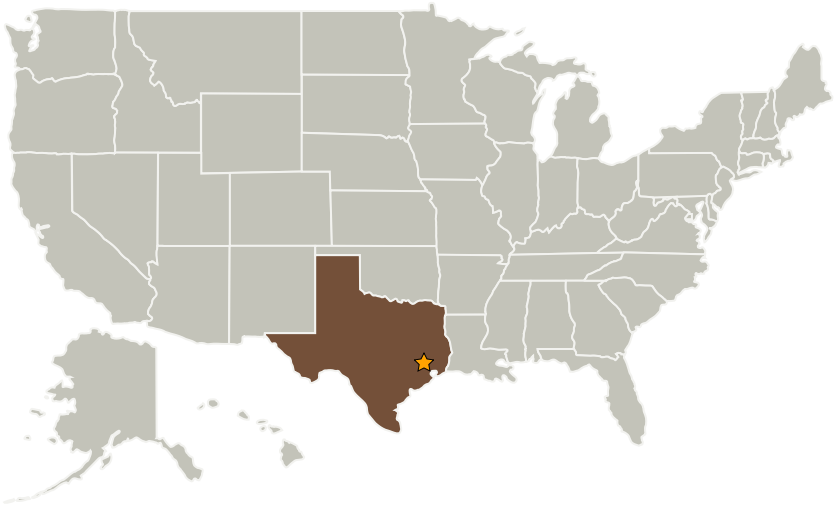
Project Introduction

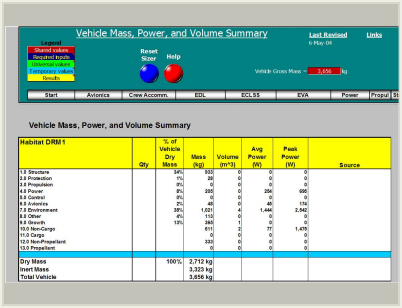
A successful proof of concept was performed in FY 2012 integrating the Envision tool for parametric estimates of vehicle mass and the Rapid Response Risk Assessment (R3A) tool for probabilistic risk analysis of vehicle systems. The initial work implemented the capability to assess an Environmental Control and Life Support System (ECLSS), and demonstrated the integrated operation of the tools with the ability to quickly assess the impacts of system trade option selections. Subsequently, additional systems have been added (prop, avionics). Work remains to implement a complete vehicle architecture capability by adding and addressing the trade space of major systems and to develop a capability ready for use by envisioned NASA and JSC projects and organizations such as the Human Spaceflight Architecture Team (HAT).

Anticipated Benefits

The Product will be a functioning interface tool to perform tradeoffs between risk and mass for an integrated spacecraft architecture, building on the interface tool work successfully completed on Life Support and propulsion systems in the FY12 IR&D effort. The product will provide a two dimensional (mass, reliability) Figure of Merit (FOM) to assess alternative system architectures early in the project design cycle.

Primary U.S. Work Locations and Key Partners





Project Image Risk Informed Design Using Integrated Vehicle Rapid Assessment Tools

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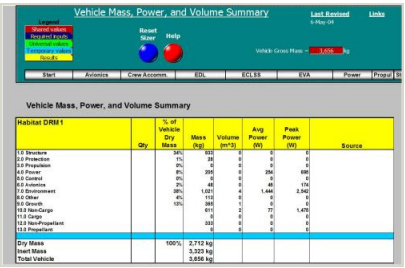
Completed Technology Project (2012 - 2013)

Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations
Texas

Images



12104-1376425435498.jpg
Project Image Risk Informed Design Using Integrated Vehicle Rapid Assessment Tools
(https://techport.nasa.gov/image/2209)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Innovation Fund: JSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

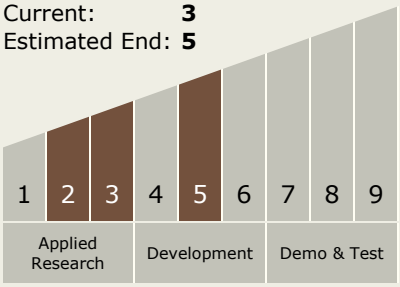
Donald S Winter

Principal Investigator:

Donald S Winter

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **5**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  └ TX11.5 Mission Architecture, Systems Analysis and Concept Development
    └ TX11.5.2 Tools and Methodologies for Performing Systems Analysis