PI: Keon Harmon Systems Engineer/598 Starting TRL: _2__ , Ending TRL: __6__

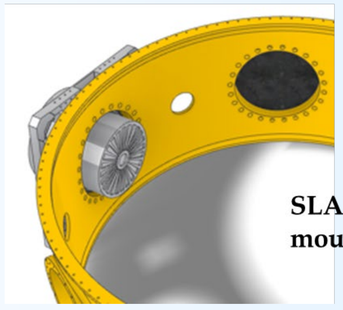
Spacecraft Loads and Acoustic Measurement (SLAM)

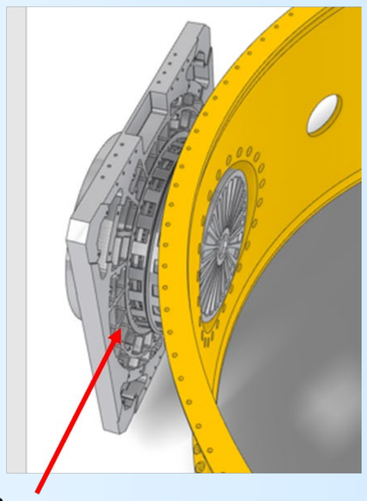
Additional Team Members: Bob Caffery/802, Will Mast/598, Angel Gomez/MIT, Johnny Chen/MIT

Motivation / Problem Statement:

- The lack of measured vibration data for payloads launching on ESPA rings, is preventing Goddard engineers from developing lighter, less expensive, small satellites.

- The SLAM ESPA Payload will capture and transmit in-flight structural loads, vibroacoustic, temperature, and contamination levels encountered by an ESPA spacecraft during launch and ascent.



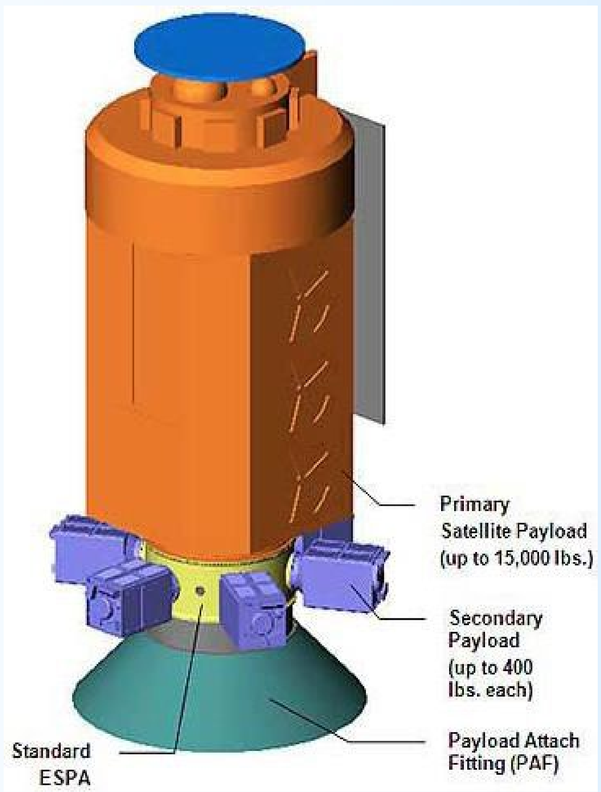


Project Objectives:

- To collect requirements,
- Review past systems,
- Design the overall payload
- Collaborate with partners to define the system

Process / Materials / Methodology:

- By utilizing Model Base Systems Engineering (MBSE) tools the project was able to formalize the SLAM application to support systems requirements and the framework of the design.



Results:

- MIT Interns/ Contractors assembled the SLAM Testbed, installed operating system and wrote software.
- Development of SLAM/MBSE database
- Implementation Plan created
  - Work Breakdown Structure
  - Organization chart
  - System Block Diagram
  - Mission Timeline
  - Payload budget Framework

Conclusions:

- The IRAD was a good first step in developing the high-level requirements and starting those initial concepts with future partners needed to support the SLAM concept.

Future Plans / Next Steps:

1) Develop the SLAM Implementation Plan and review it with partners and stakeholders:
   - Functional Requirements Document (FRD)
   - Interface Requirements Document (IRD)
   - System Implementation Plan (SIP)
2) Identify funding to transition the SLAM IRAD into a flight project, negotiate potential launch opportunities, and begin project formulation and implementation.
3) Work with partners and stakeholders to agree on how many flights per L/V are required.
   (baseline 5 or more flights per launch vehicle and configuration for environments)
5) Work with partners and stakeholders to agree on criteria for updating ESPA payload design guidelines.