

Technology Development Panel

Alison Nordt

Lockheed Martin

Space Astrophysics Landscape for the 2020s and Beyond Symposium

April 1-3, 2019

Potomac, MD



Technology Development Approach

- Technology Roadmap is established
 - Categories defined to identify similar technology areas
 - All technologies graded on current TRL
 - TRL for integrated systems is no greater than the lowest level component
 - Roadmap shared across government and industry participants
- Methods and general plans to advance TRL
 - Laboratory demonstrations
 - Environmental testbeds
 - Subscale flight demos
 - Validated integrated models
- Technologies should be on an established path to TRL 6 by PDR

Example: LUVOIR's VIPPS: Vibration Isolation and Precision Pointing System

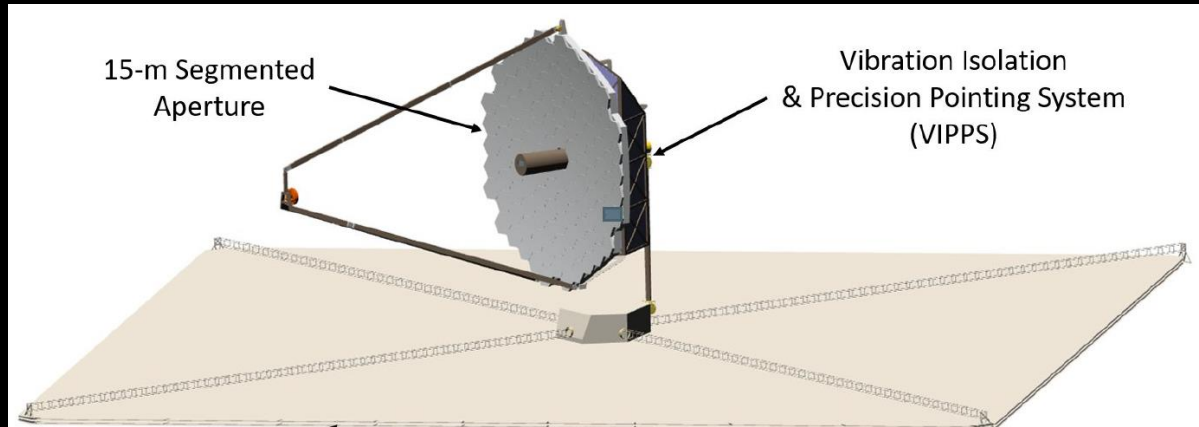
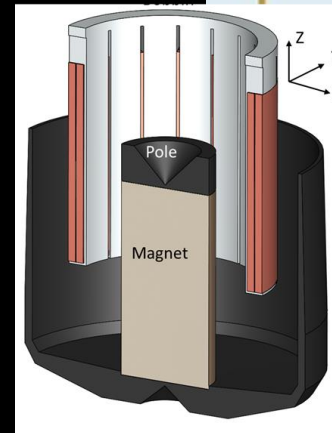
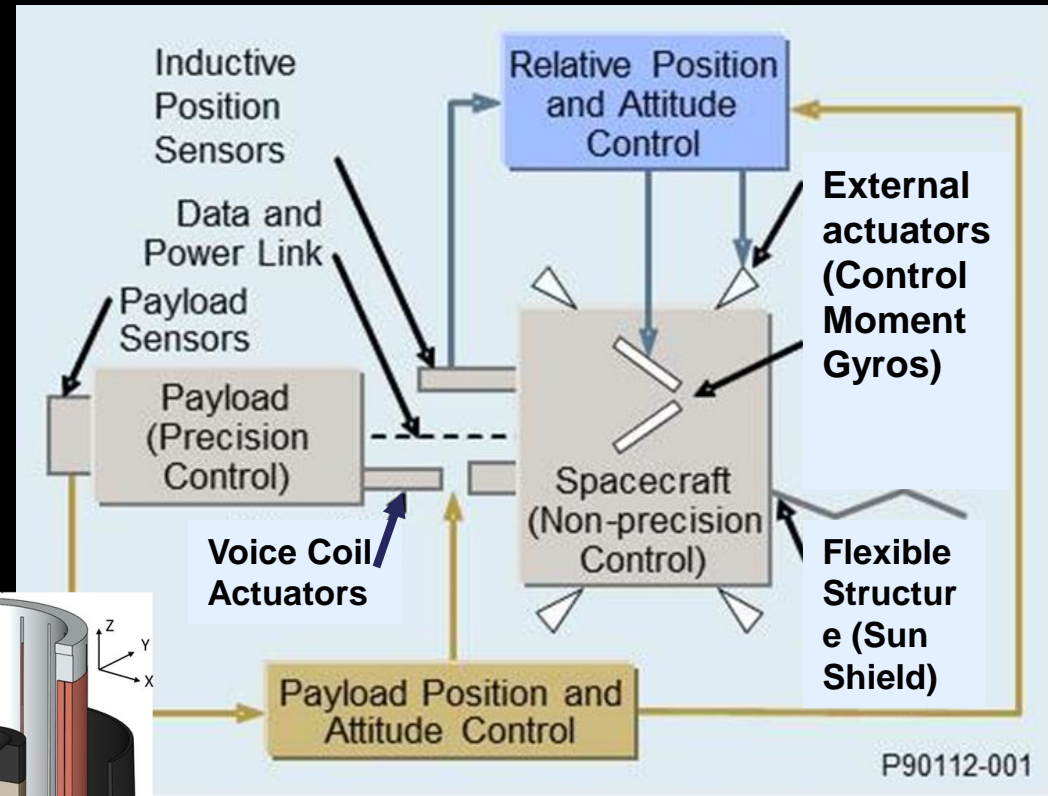


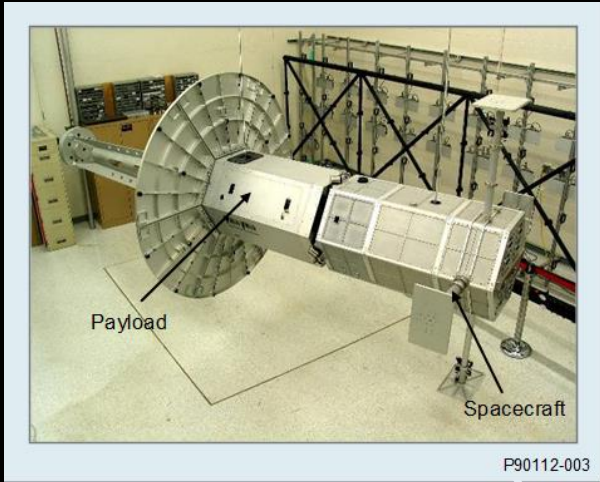
Image credit: Bolcar et al, SPIE 1069800-7

- The payload (telescope) achieves vibration isolation by physical separation from the spacecraft
- The payload controls the telescope line-of-sight by pushing against the spacecraft inertia using a set of six non-contact voice-coil actuators, while the spacecraft controls its inertial attitude such that interface stroke and gap are maintained
- Full 6-DOF payload control is possible, but 3-DOF payload attitude control is baselined for LUVIOR – no thrusters needed during science observations

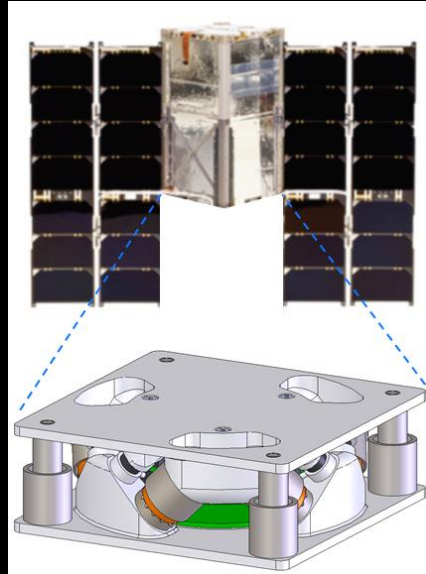


Path to TRL 6 “Disturbance Free Payload” (VIPPS)

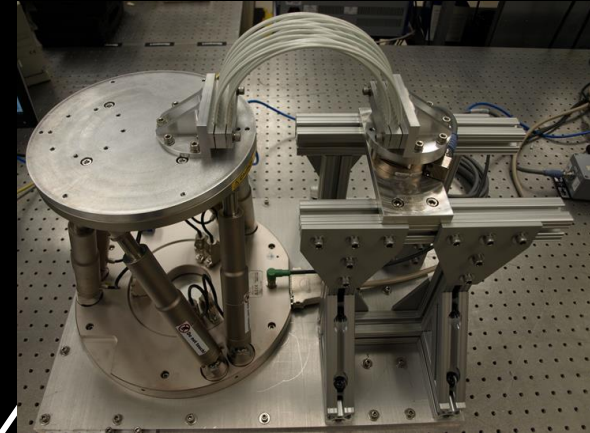
Lab demo with Real Time control



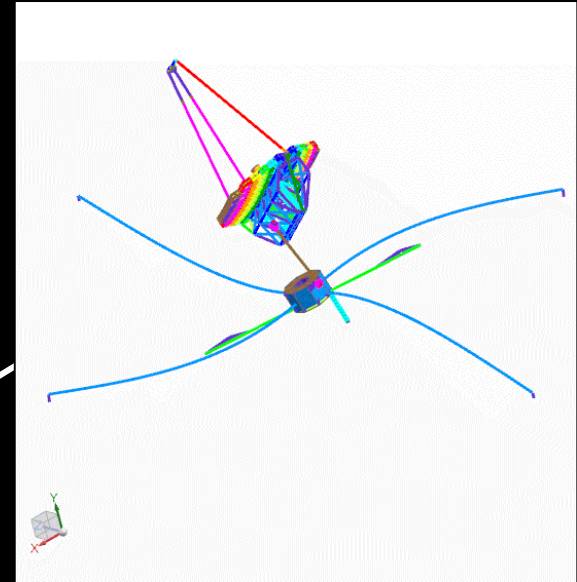
6DOF cubesat subscale flight demo



Cable stiffness testbed



Anchored Control-Structure-Dynamics integrated models



TVac testing of flight-like electronics, actuators & sensors



TRL 6

LOCKHEED MARTIN

