



JWST Project Status for the Astronomy and Astrophysics Advisory Committee

February 9, 2007

Eric P. Smith

Program Scientist

James Webb Space Telescope (JWST)



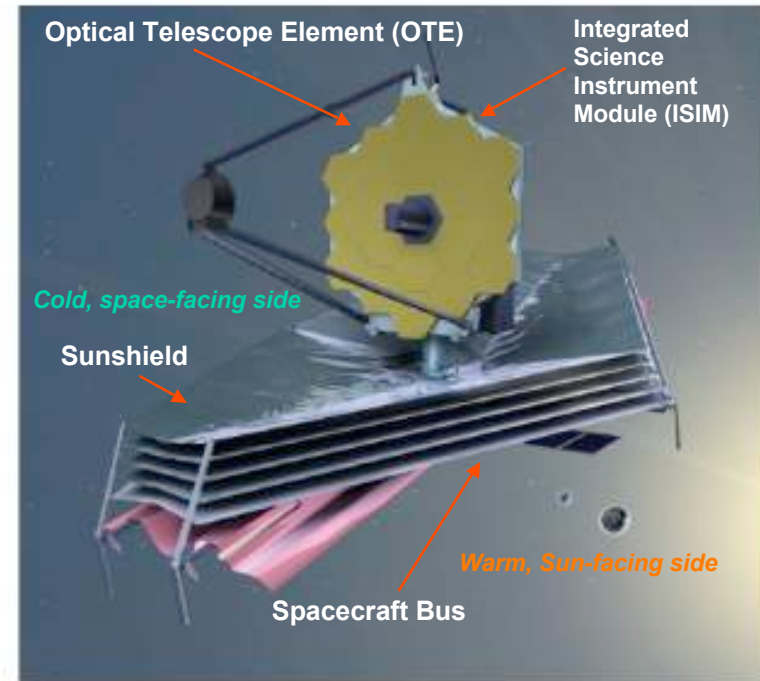
Organization

- Mission Lead: Goddard Space Flight Center
- International collaboration with ESA & CSA
- Prime Contractor: Northrop Grumman Space Technology
- Instruments:
 - Near Infrared Camera (NIRCam) – Univ. of Arizona
 - Near Infrared Spectrograph (NIRSpec) – ESA
 - Mid-Infrared Instrument (MIRI) – JPL/ESA
 - Fine Guidance Sensor (FGS) – CSA
- Operations: Space Telescope Science Institute

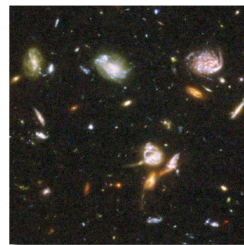
Description

- Deployable infrared telescope with 6.5 meter diameter segmented adjustable primary mirror
- Cryogenic temperature telescope and instruments for infrared performance
- Launch June 2013 on an ESA-supplied Ariane 5 rocket to Sun-Earth L2
- 5-year science mission (10-year goal)

www.JWST.nasa.gov



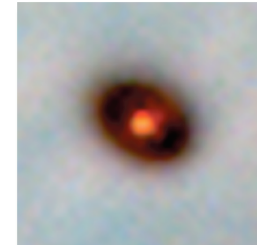
JWST Science Themes



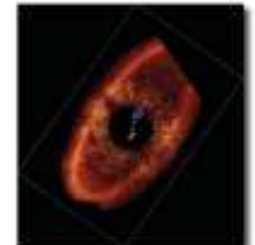
End of the dark ages: First light and reionization



The assembly of galaxies



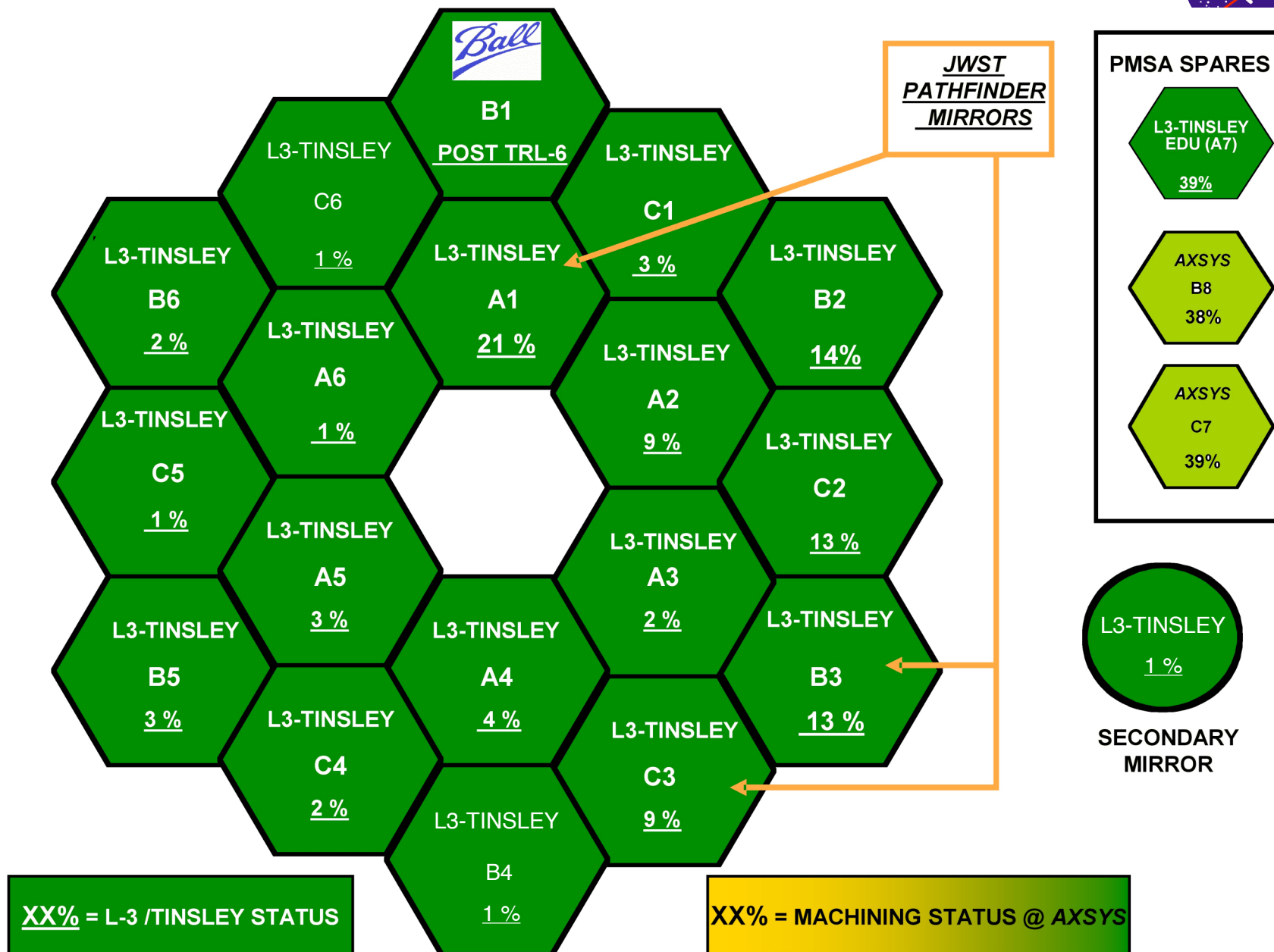
Birth of stars and proto-planetary systems



Planetary systems and the origin of life



Mirror Status



Technology Demonstrations

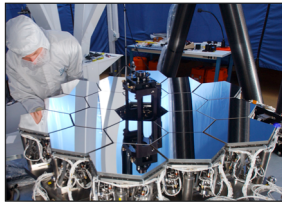


- JWST initial replan schedule (March 2006) placed the non-advocate review (NAR) in 1/07 and the preliminary design review (PDR) in 3/08, which is inconsistent with the NASA convention of conducting the PDR and NAR concurrently.
- Commitment to retire technology risk by 1/07
 - need to hold a formal review at that time to confirm the maturation of technologies to technology readiness level (TRL)-6.
 - Technology Review (TNAR) was designed to address the readiness status of ten specific enabling technologies.
- NAR, conducted at Mission PDR (3/08), will address the remaining technical and all programmatic aspects of JWST.
- This solution has been formalized in a Terms of Reference (ToR) agreement between Science Mission Directorate and the Independent Program Analysis Office (IPAO).

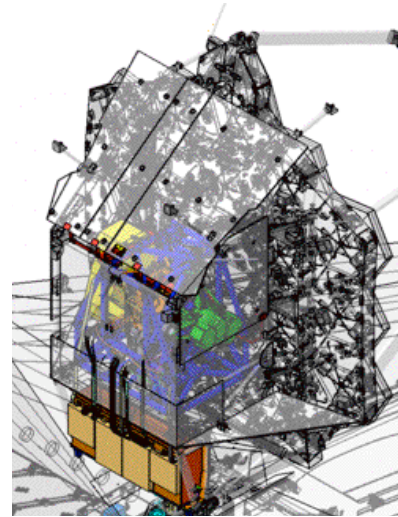
JWST Technology



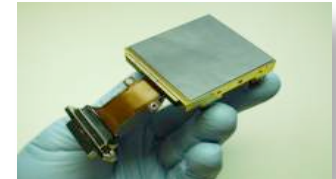
Mirror Phasing Algorithms



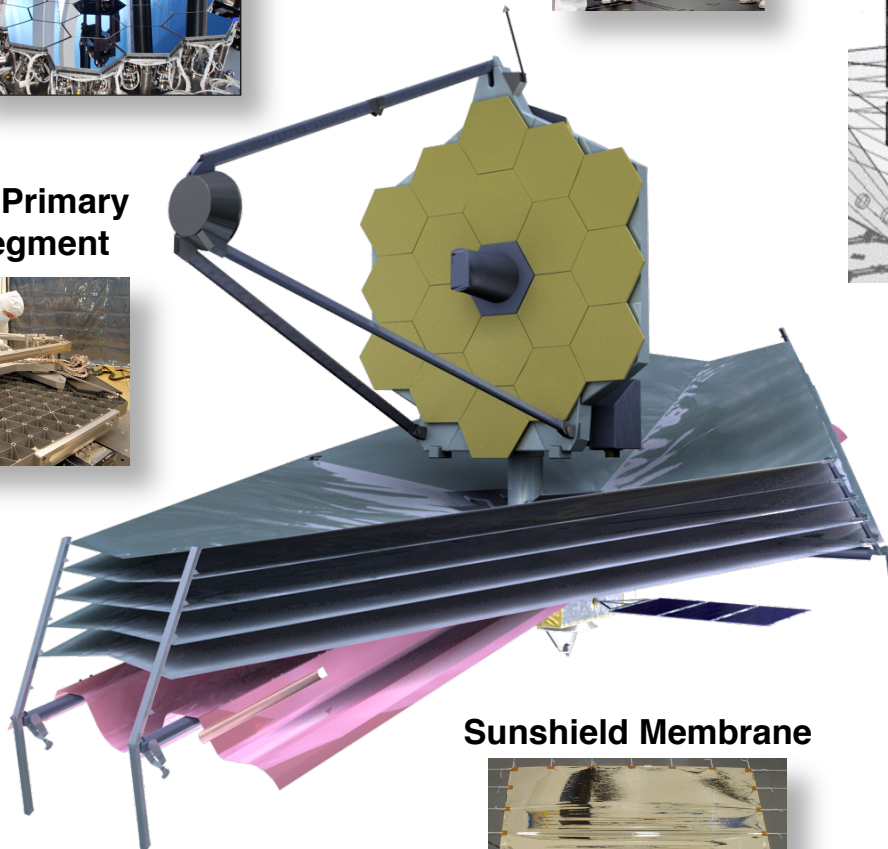
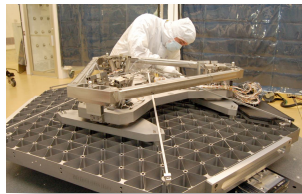
Backplane



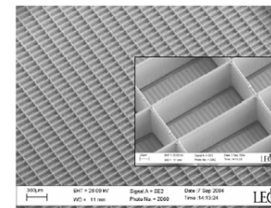
Near-Infrared Detector



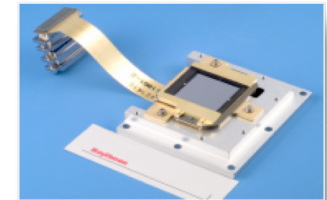
Beryllium Primary Mirror Segment



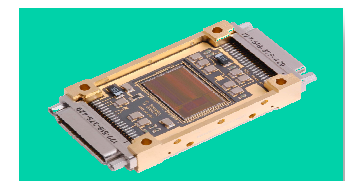
μ Shutters



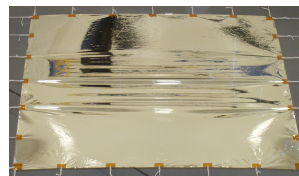
Mid-Infrared Detector



Cryogenic ASICs



Sunshield Membrane



Cryocooler



Review Team Observations

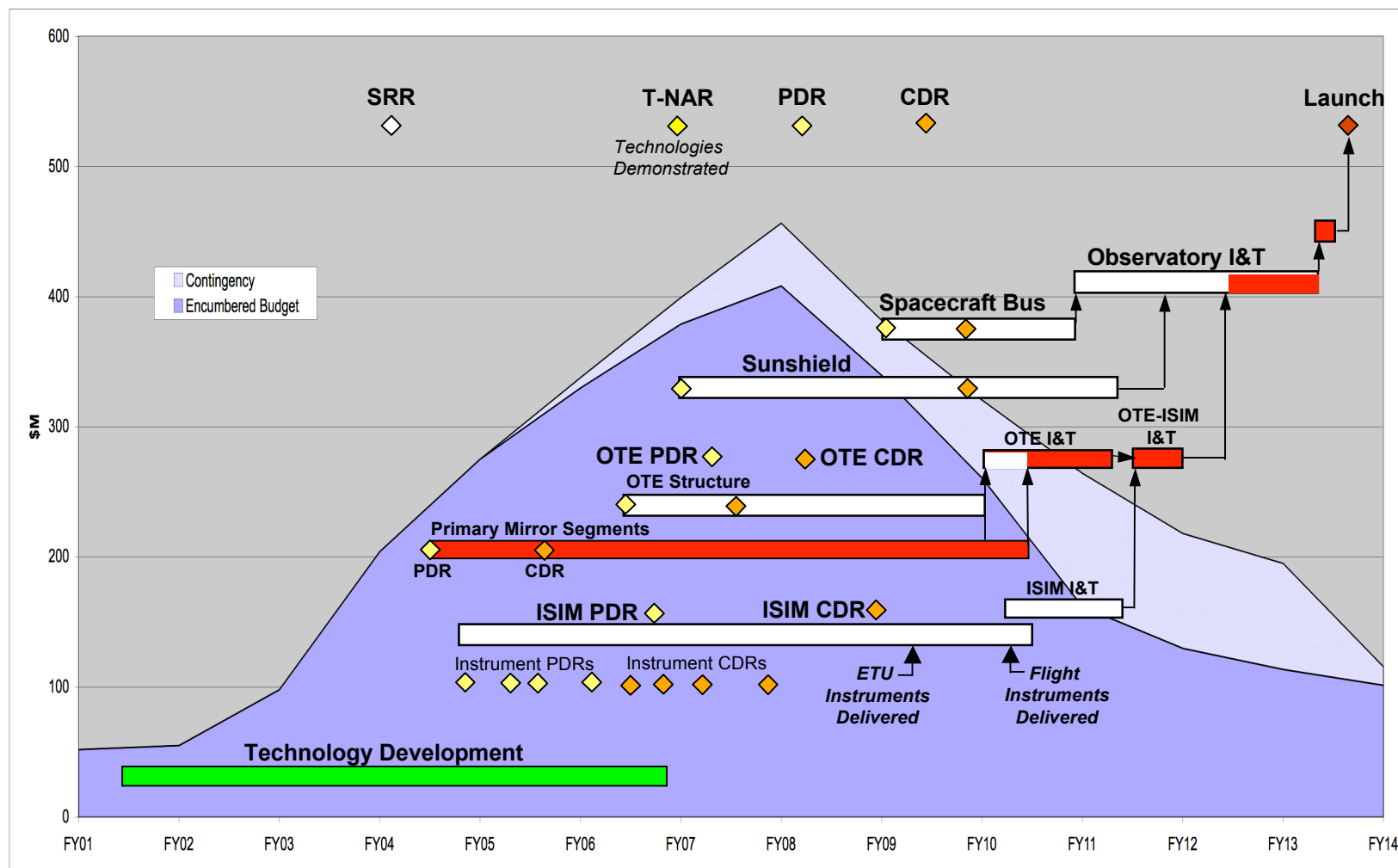


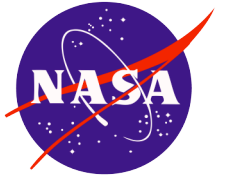
- Status as of January 07
 - Significant energy and accomplishments have been evident by closure of nine out of ten critical technologies
 - A plan has been presented to sustain the momentum to resolve any open issues and to respond to comments by the review team
 - It is clear that the entire government, contractor and international team are focused on mission success leading to a major scientific contribution to astrophysics
 - The project team has provided NASA with a model of achieving technology readiness well ahead of the completion of the PDR



Budget and Schedule

- Contingency added in FY08 and FY09 to Address Independent Review Concern



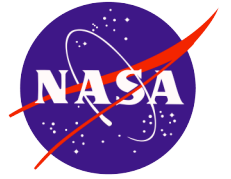


*“The price of [a flagship]
is eternal vigilance”*

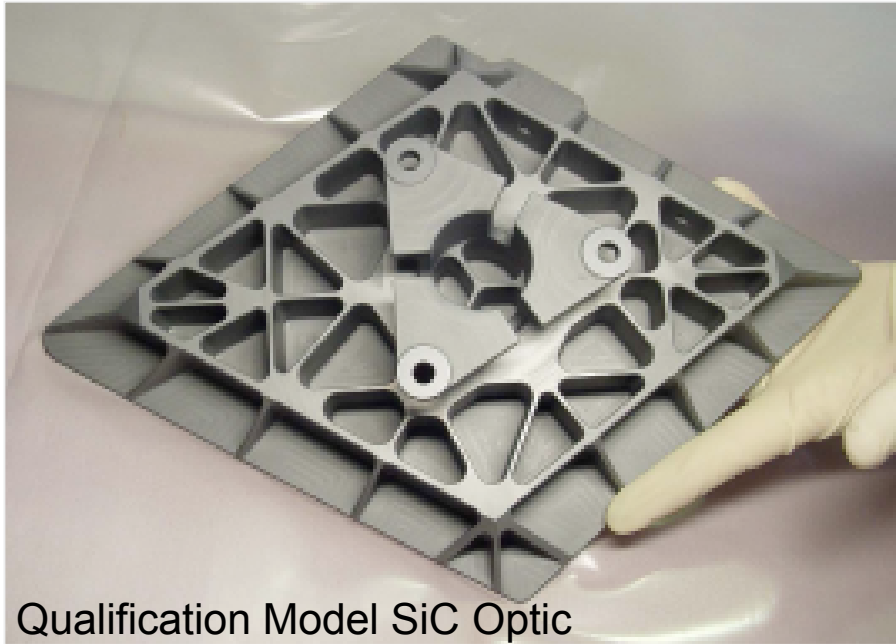


Backup

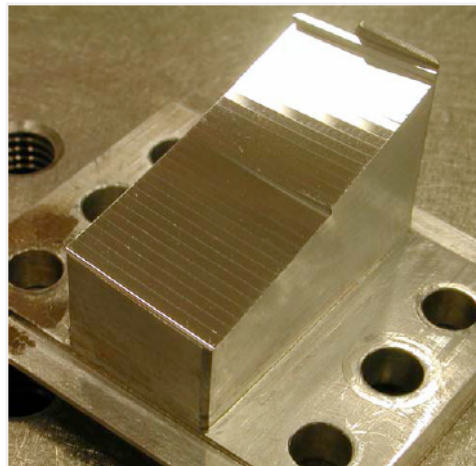
Sunshield Evolutionary Pathfinder (EPF) with all 5 Layers Installed



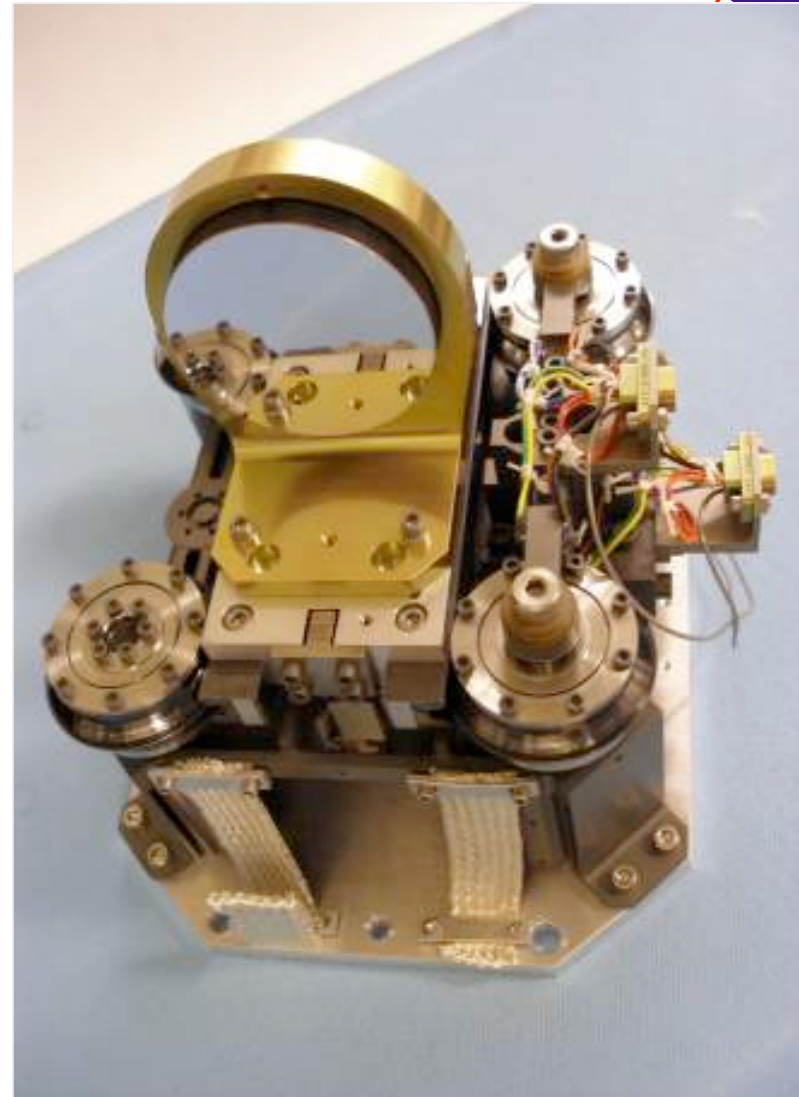
Instrument Qualification Models



Qualification Model SiC Optic



NIRSpec Image
Slicer Mirror



FGS Focus Mechanism Qual Model

Microshutter Array 73



- 1st array tested that meets failed-open and failed-closed specs on initial testing!
- Also meets power dissipation requirement
- Array currently undergoing life testing to evaluate stiction, and will then go to vibe & acoustics test



BSTA Integrated onto BSS



BSTA resting in the BSS in the XRCF's 2K room. The grey arc on the left of the picture is the vacuum chamber