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
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
- Beryllium Primary Mirror Segment
- Sunshield Membrane
- Backplane
- Near-Infrared Detector
- Mid-Infrared Detector
- Cryocooler
- μShutters
- Cryogenic ASICs
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 resting in the BSS in the XRCF's 2K room. The grey arc on the left of the picture is the vacuum chamber.