National Aeronautics and Space Administration

Astrophysics

New Opportunity in Astronomy and Astrophysics

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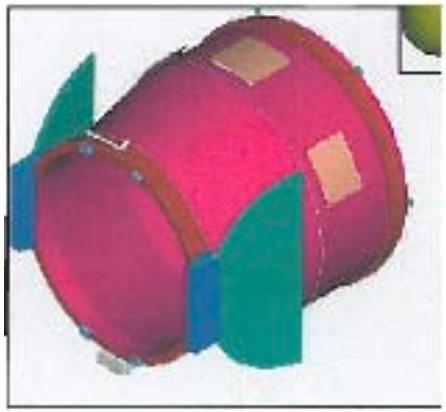
New Opportunity

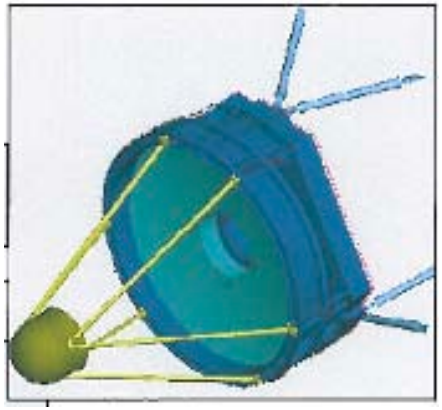
- Over a year ago, the National Reconnaissance Office (NRO) informed NASA that there was residual spacecraft hardware available for transfer.
- The NRO had determined that this hardware was not suitable for future intelligence missions.
- The NRO supported the complete declassification of this hardware.
- NASA determined at the time that this equipment might have value in addressing the science described in the NWNH Report and accepted transfer of the hardware.
- The existence of this hardware and the changing programmatic and budgetary environment has required some thought on the best way forward.

What it is

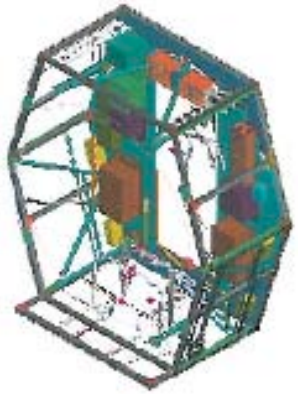
- 2+ sets of space qualified telescope hardware:
  - 2.4m, f/8 with < 20% Obstructed Aperture
  - Field of View: 1.8 degrees unvignetted [error corrected on 6/7/12]
  - Wavefront Quality: < 60 nm rms
  - Stable, f/1.2, Lightweight ULE Primary Mirror
  - Stable, Low CTE Composite and Invar Structures
  - Actuated Secondary Mirror Positioning
  - 1,700 kg mass, including Telescope and Outer Thermal Barrel
- Our early looks indicate this hardware could enable many of the goals from the NWNH Report



Outer Barrel Assembly



Fore Optics Assembly



Payload Radiator Subsystem

Potential Science Applications

Depending on the instruments chosen, the telescopes could be used to address a broad range of NWNH goals including:

- Baryon Acoustic Oscillations
  - Survey 20k deg^2 of sky; > 10^8 galaxies
  - Objects in redshift range: 0.7 < z <2.0
- Weak Lensing
  - Survey 10k deg^2 of sky
- Type Ia Supernovae
  - Identification
  - Observe redshift and evolution
- Exoplanets
  - Light Curves
  - Internal Coronograph
  - Nulling Instruments
- Imaging Science
  - Wide field Vis/NIR camera supports astrophysics
  - Narrow field camera supports HST class astronomy

Current Status

- The hardware, support equipment, documentation and records are in Rochester at the Excelis facility.
  - While the elements have been declassified, there are still issues relating to ITAR and other sensitivities that limit our ability to share detailed information widely. We are working these on a case by case basis.
- NASA does not have any funding dedicated to taking advantage of these telescopes.
  - NASA does have limited funding for studying missions that can be initiated later this decade, and for maturing the necessary technology. This funding is in the SR&T budgets of the Cosmic Origins Program, Exoplanet Exploration Program, and Physics of the Cosmos Program.
- Studies of any future mission, including WFIRST and other NWNH priorities, should consider whether the use of these telescopes can improve the performance of the potential mission, can shorten the time required for development of the potential mission, or can reduce the cost of the potential mission.