Spitzer in Space

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The Spitzer Space Telescope, NASA's Great Observatory for infrared astronomy, was launched into its unique earth-trailing solar orbit on August 25, 2003. *Spitzer* has passed in-orbit checkout and science verification and is six weeks into nominal operations. The lifetime is projected to exceed 5 years. The main components of the flight system are identified on the drawing (provided by Ball Aerospace). Early scientific results show that the *Spitzer* will be a very powerful tool for a wide range of astrophysical exploration. Details of the excellent on-orbit performance are given below:

Image Quality: *Diffraction-limited at 6.5µm or better across field following on-orbit focus adjustment, and at 5.5µm at the center of the field. The three instruments are confocal.*

CryoThermal: *Spitzer's unique radiative-cryogenic cooling system is performing very well. Temperatures of key elements are identified on the drawing. Maintaining the optics temperature of ~5.5K required for the longest wavelength operations requires ~5mW power dissipation in the bath [boiling away ~1 ounce of liquid helium per day]*

Lifetime: *Approximately 42kg of liquid helium remain in the cryostat. The cryogenic lifetime is estimated to be ~5.8 yrs when operational optimization is utilized.*

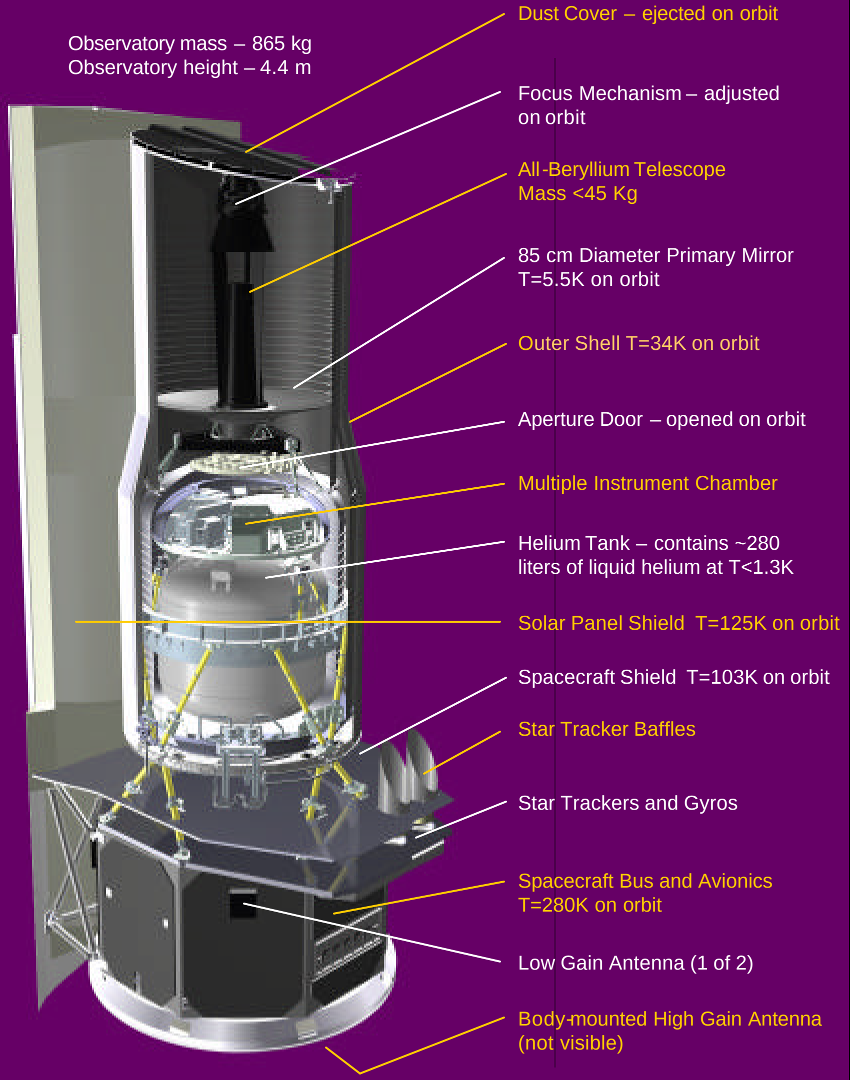
Pointing: *The basic performance of the system is excellent: Stability: better than 0.1", 1-sigma radial, over ~1000 sec; Blind or dead reckoning pointing: better than ~1"; Offset pointing over 30' with subarcsecond precision as required to place targets on spectrograph slits; Moving target tracking demonstrated to ~200"/hr without loss of performance; Pointing reconstruction for position determination should be better than 1"*

Instruments: *The Spitzer Space Telescope has three powerful, efficient focal plane instruments which use state of the art infrared detector arrays:*

- *The Infrared Array Camera (IRAC) – P.I. G. Fazio, SAO. 3.6-to-8µm imaging*
- *The Infrared Spectrograph (IRS) – P.I. J. Houck, Cornell. 5-to-38µm spectroscopy*
- *The Multiband Imaging Photometer for Spitzer (MIPS) – P.I. G. Rieke, Arizona. 24-to-160µm imaging.*

Each instrument provides a many-order-of magnitude increase in capability over that of previous infrared observatories in space.

Operability: *The basic observing modes for Spitzer have been checked out and are now in daily use. The results of the earliest nominal operations campaigns show that we are on target to achieve the ~88% "science efficiency" demonstrated in pre-launch scheduling exercises*



Spitzer Team: Lockheed-Martin: Spacecraft Development and Operations; System Engineering. Ball Aerospace: Cryogenic Telescope Assembly, IRS, and MIPS Development; Goddard Space Flight Center: IRAC Development; SIRTF Science Center, Caltech: Science Operations: Jet Propulsion Laboratory/Caltech: Project Mangement; Mission Operations

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