Data Certification & 
Technology Transfer

**MSX Instrumentation:** All

**Objective**
The absolute radiometric and goniometric calibrations of infrared observations are limited by the imprecision in the knowledge of irradiance and position of standard reference objects. The MSX legacy will be an improved knowledge of the irradiance and position of absolute standard stars and a proven methodology for radiometric and goniometric calibration for high spatial resolution infrared instruments.

**Description**
The absolute calibration for the MSX infrared observations will be based upon three independent measurements, all traceable to NIST:

- The absolute irradiance of these sources is known to within 1.5% at low flux and better than 1% at high flux.
- The infrared sensor has built-in reference sources, shown to be radiometrically stable (±1%) over a duty cycle longer than the MSX mission. They monitor detector stability and relate ground calibrations with those conducted on-orbit.
- The on-orbit radiometric calibrations will be based on two different types of reference sources:
  1. Celestial standard sources selected from the traditional calibration source lists and monitored by contemporary ground-based observations in the atmospheric window bands. The data from the ground-based measurements will verify stellar emission models that predict the irradiance within the MSX sensor passbands. The measurements are accurate to within ±1% in the window bands; the model predictions are accurate to within ±3%.
  2. Specially constructed calibration reference spheres deployed from the spacecraft five times during the mission. Based upon a detailed error analysis, the reference sphere irradiances should be known to within ±3% over the 4- to 28-µm spectral range of the sensor.

The errors in each type of on-orbit external calibration measurements are largely independent and should result in a significant improvement of the absolute calibration for the celestial standard objects. The result of this activity will be a set of radiometrically calibrated standard objects that will be accessible to the entire infrared community.

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