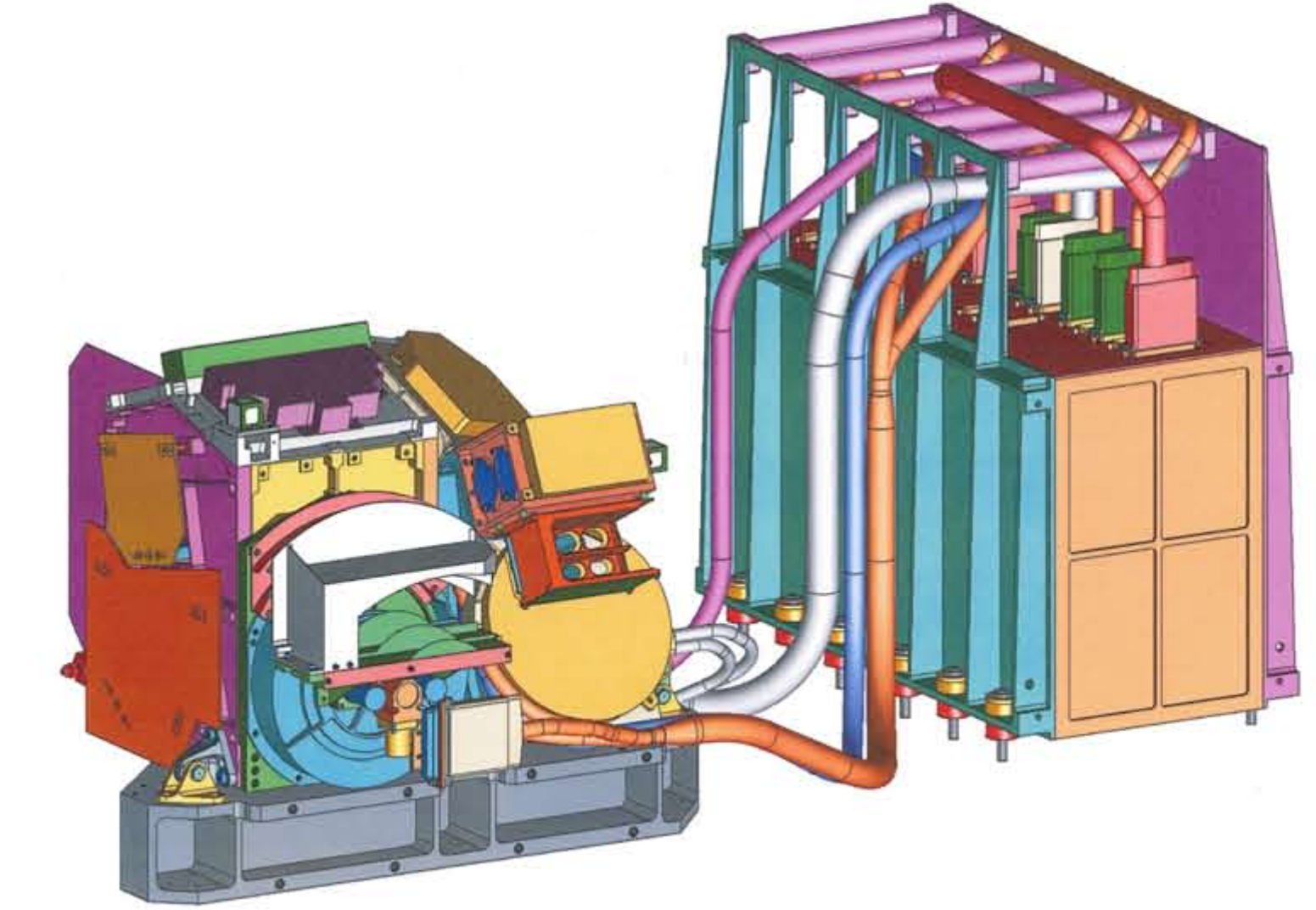


Pre-Launch Radiometric Calibration of the OMPS Instruments

S.J. Lipsky, J.K. Lasnik, and S.C. Bennett
Ball Aerospace & Technologies Corp.



The Ozone Mapping Profiler Suite (OMPS) instrument provides long-term stratospheric ozone monitoring capability for the Joint Polar Satellite System (JPSS). The JPSS OMPS instrument consists of two nadir-viewing hyper-spectral spectrometers that provide total column ozone and ozone vertical profiler measurements. The first flight model of OMPS is currently on-orbit aboard the Suomi National Polar-orbiting Partnership satellite. The ground radiometric calibration of the OMPS instruments is discussed including an overview of techniques for transferring NIST primary standard calibration to OMPS and accounting of calibration uncertainties.



WHAT IS OMPS?

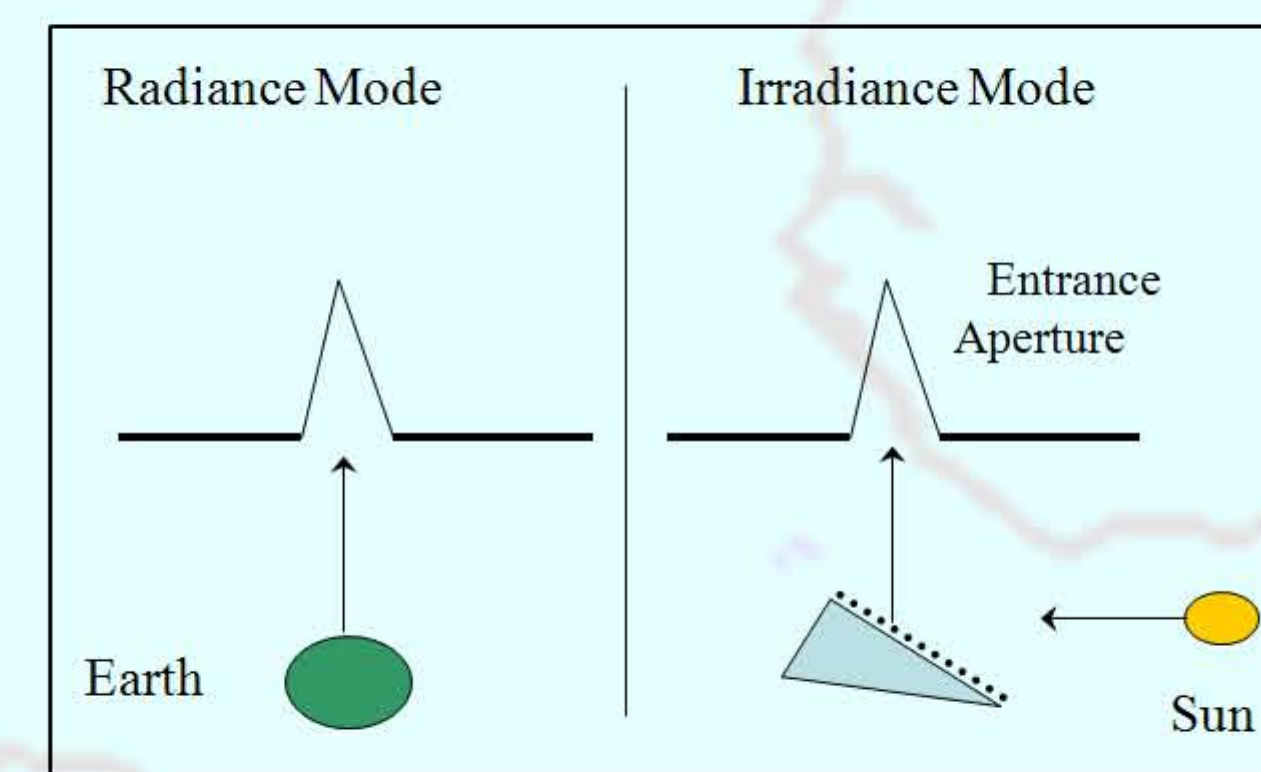
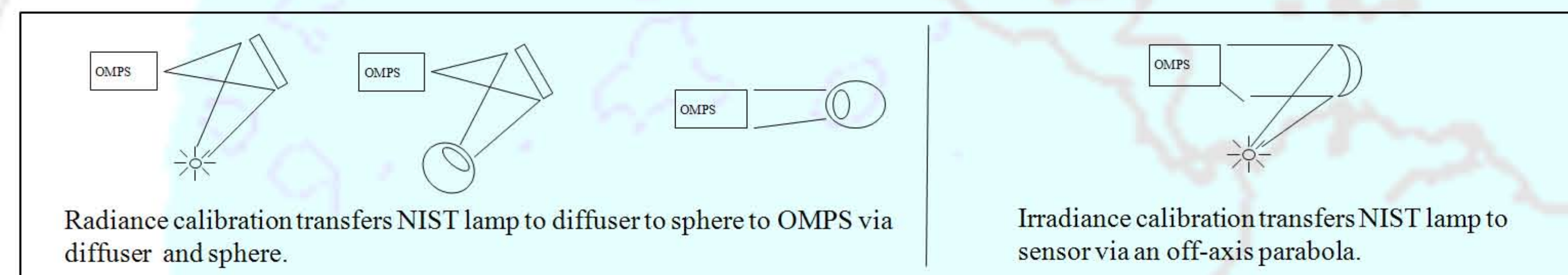
The Ozone Mapping and Profiler Suite (OMPS) is one of five instruments that launched aboard the Suomi National Polar-orbiting Partnership (S-NPP) satellite in 2011. A second OMPS flight unit built by Ball Aerospace will fly on the Joint Polar Satellite System-1 (JPSS-1) which will launch in 2017.

OMPS is a three-part instrument: a nadir mapper that will map global ozone with about 50-km ground resolution, a nadir profiler that will measure the vertical distribution of ozone in the stratosphere, and a limb profiler that measures ozone in the upper troposphere and lower stratosphere with high vertical resolution. The limb sensor is not part of the JPSS-1 OMPS flight unit.

OMPS supports operational weather capabilities by measuring atmospheric ozone and ozone concentration variability with altitude. It provides functionality comparable to both the Solar Backscatter Ultraviolet Radiometer (SBUV/2) and NASA's Total Ozone Mapping Spectrometer (TOMS) with new and improved environmental data records. OMPS collects total column and vertical profile ozone data and continues the daily global data produced by SBUV/2 and TOMS, but with higher calibration accuracy and higher spatial and spectral resolution. The collection of this data contributes to fulfilling the U.S. treaty obligation to monitor the ozone depletion for the Montreal Protocol to ensure there are no gaps in ozone coverage. OMPS data will also be used to determine if synthetic chemicals are affecting the Earth's climate and its habitability.

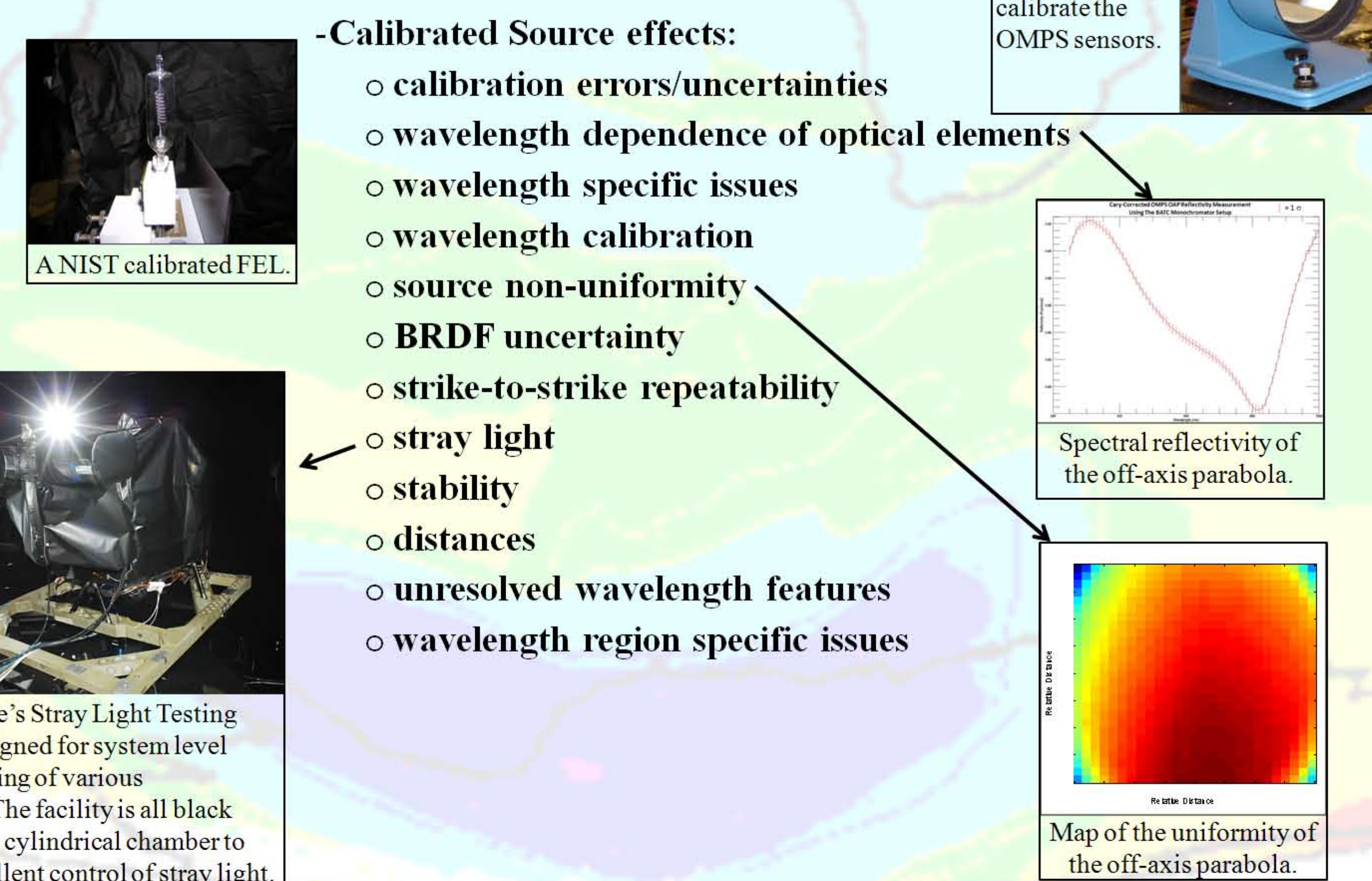
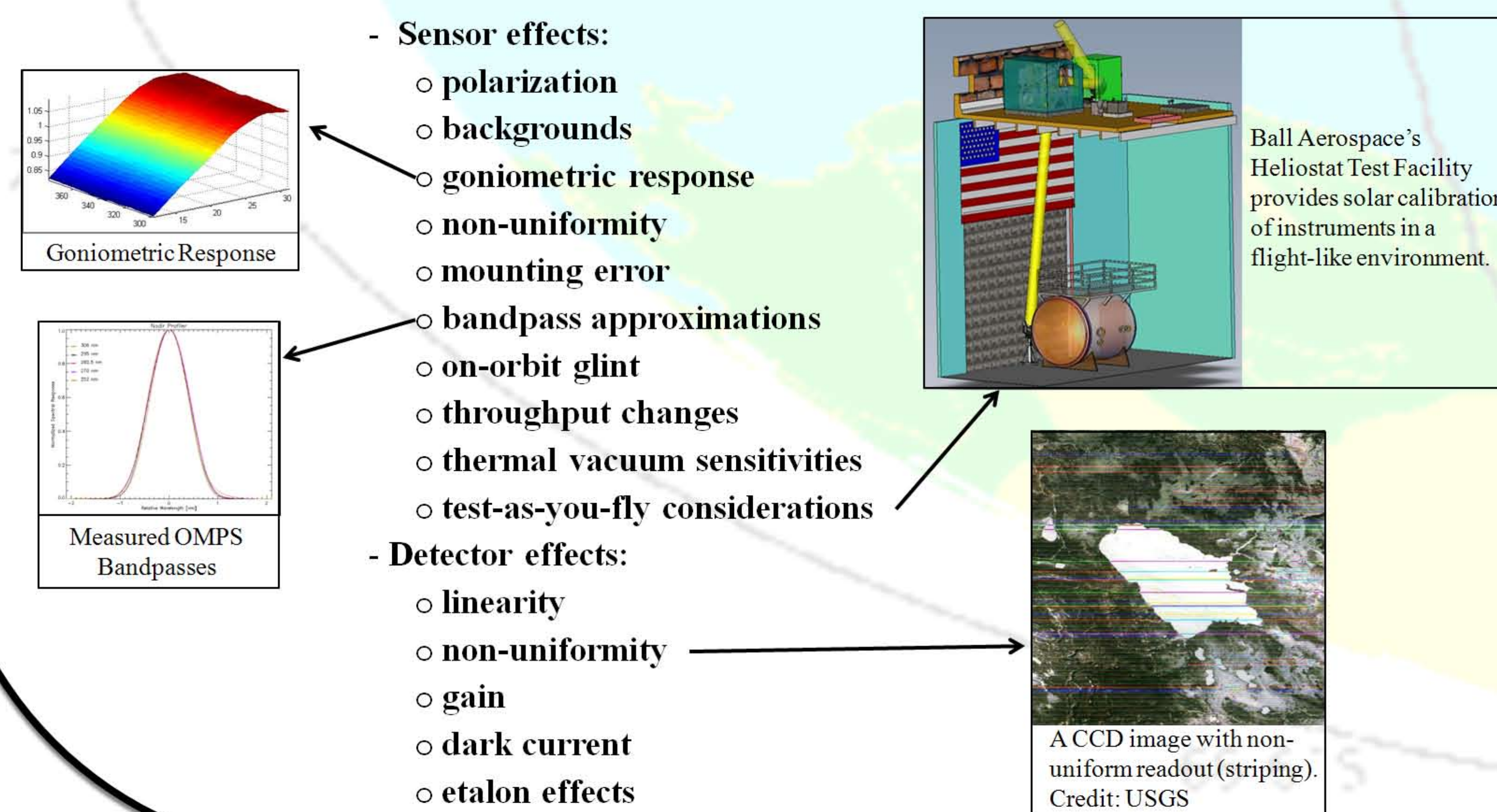
CALIBRATION

Each OMPS spectrometer is calibrated radiometrically on the ground by transferring NIST primary standards to the sensors in both radiance mode and irradiance mode so that albedo measurements can be made on-orbit.



On-orbit, calibration is maintained using solar measurements. Each instrument has two diffusers - working and a reference - which allow for tracking the diffuser degradation. The solar measurements are also used to track the wavelength scale.

For pre-launch radiometric calibration, the following types of effects were considered.



Summary

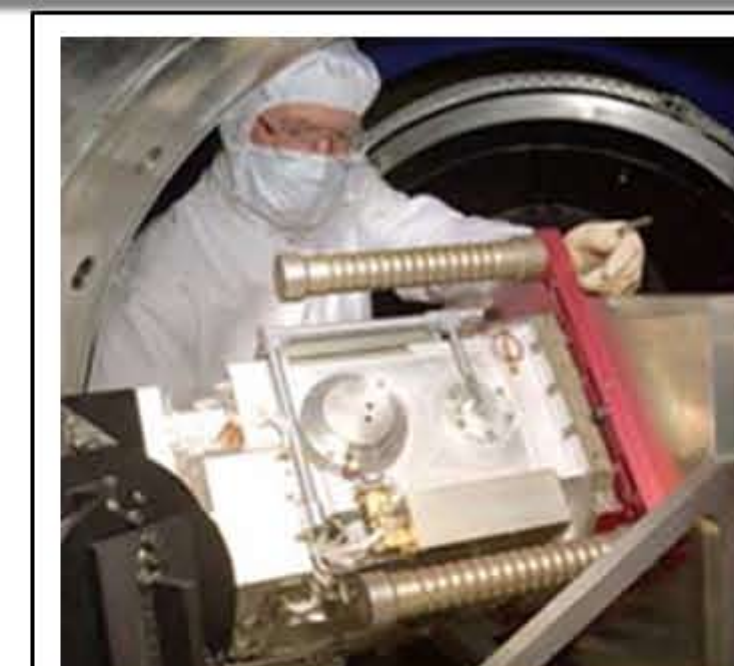
The S-NPP OMPS was calibrated on the ground prior to launch with NIST traceable sources and has been returning high quality data from on-orbit since January 2012. The JPSS-1 OMPS is currently undergoing calibration and will launch in 2017.

A well calibrated sensor can result in superior performance on-orbit after a short commissioning time. We present a range of factors that should be considered when calibrating UV/optical sensors with NIST standards and demonstrate the capabilities Ball Aerospace has to offer when calibrating such sensors.

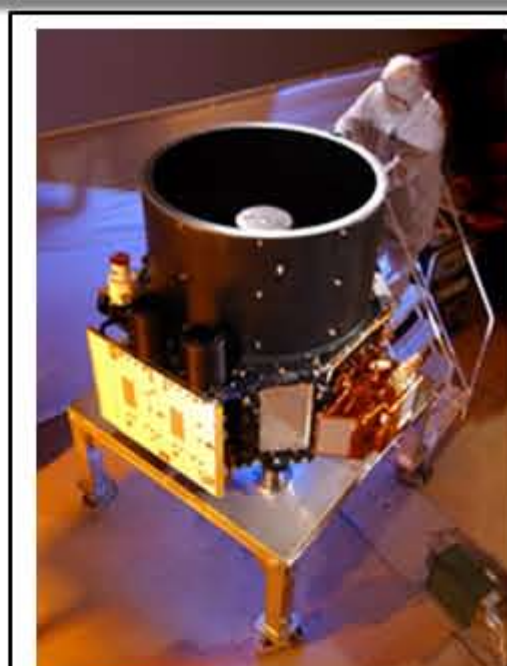
Ball Aerospace supports operational weather with the S-NPP and JPSS-1 spacecrafts as well as the OMPS instruments.

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Watermark credit: NASA



Solar Backscatter Ultraviolet Radiometer (SBUV/2)



Cloud-Aerosol LIDAR and Infrared Pathfinder Satellite Observations (CALIPSO)

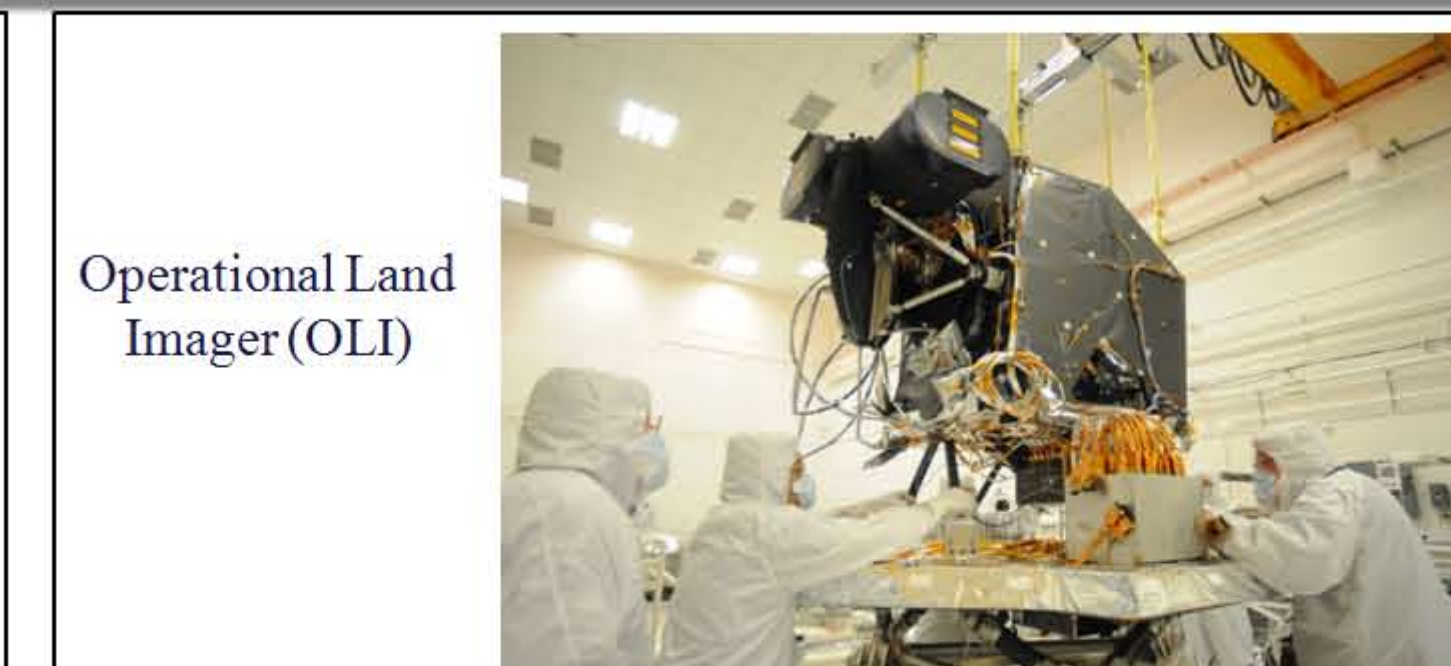


QuickBird

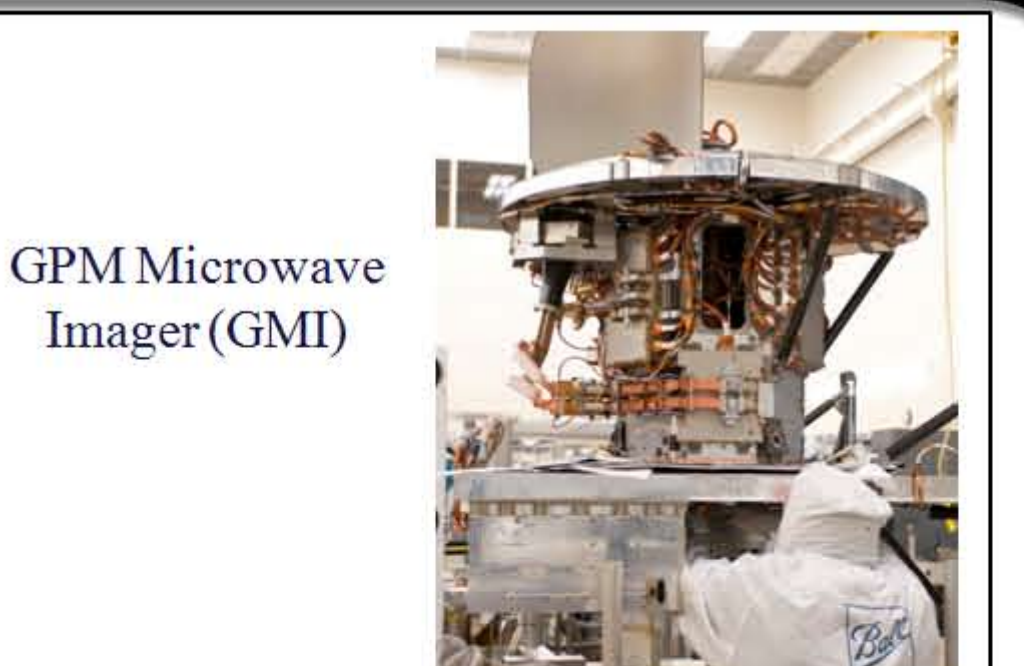
Ball Aerospace has extensive experience with space-qualified hardware assembly, integration, and test. Our philosophy of building a strong relationship with the science investigators, applying solid systems engineering practices to translate the science objectives into requirements, and using integrated tools for design and modeling has led to the success of S-NPP-OMPS, NPP, SBUV/2, CALIPSO, and QuickBird and the future successes of OLI, GMI, JPSS-1 OMPS, and JPSS.



S-NPP Spacecraft



Operational Land Imager (OLI)



GPM Microwave Imager (GMI)