ATMS is a new satellite microwave sounding sensor designed to provide operational weather agencies with atmospheric temperature and moisture profile information for global weather forecasting and climate applications. ATMS will continue the microwave sounding capabilities first provided by its predecessors, the Microwave Sounder Unit (MSU) and Advanced Microwave Sounding Unit (AMSU). The first ATMS was launched October 28, 2011 on board the Suomi National Polar-orbiting Partnership (S-NPP) satellite. Microwave soundings help meet NWP sounding requirements under cloudy sky conditions and provide key profile information near the surface.

**ABSTRACT:**

ATMS is a new satellite microwave sounding sensor designed to provide operational weather agencies with atmospheric temperature and moisture profile information for global weather forecasting and climate applications. ATMS will continue the microwave sounding capabilities first provided by its predecessors, the Microwave Sounder Unit (MSU) and Advanced Microwave Sounding Unit (AMSU). The first ATMS was launched October 28, 2011 on board the Suomi National Polar-orbiting Partnership (S-NPP) satellite. Microwave soundings help meet NWP sounding requirements under cloudy sky conditions and provide key profile information near the surface.

SCANNING PROFILE SELECTION AND SCAN BIAS:

After activating ATMS on orbit, the primary task is to determine the optimal Scan Profile (SP). This selects the least obstructed space view profile among 4 Space View sectors (SPs 1 – 4) centered at 6.66°, 8.33°, 10.00° & 13.33° (below NPP+Y axis). The goal of this task is to assess the impact of spacecraft/or Earth limb interferences, to implement performance evaluation. SP1 was selected because it has the lowest impact. To date, ATMS has demonstrated great on-orbit performance. Like all previous microwave sensors/sounders, ATMS has scan bias. Scan Bias correction is important, both for operations and for atmospheric research, and the ATMS SDR Team is actively analyzing these data.

ATMS has a wider swath than previous MW sounders yielding more ground coverage. Here we show some amazing ATMS weather related snow, rain, and ice images for the US. Super Tropical Cyclone Funso – ATMS Brightness Temperature images of super typhoon Funso showed that Funso brought flooding rain to the coastal regions of Mozambique and Madagascar. It reached Category 4 – powerful storm. Companion S-NPP sensors like VIIRS can provide high-resolution views of Funso, however visible and IR sensors cannot penetrate clouds. On the other hand, microwave sensors such as ATMS provide forecasters and scientists the ability to see inside storms like Funso, providing quantitative data on the internal structure and state that are vital to predict its strength, development, and direction.

ATMS on-orbit NEATs from the launch operational day (Nov. 8, 2011) to April 20, 2012 are calculated from the RDR warm load radiometric calibration counts. For comparison, NEAT values from the pre-launch TV calibration test data are shown by the blue horizontal lines at individual channels. Also listed are the ATMS NEAT Specifications (Spec) for individual channels. The results demonstrate that the on-orbit NEATs agree well with the pre-launch results as expected. The NEATs of channel 22 are plotted in red color (using the right-hand side scale) at the right-bottom part and overlap with channel 21.

**NOAA NESDIS Integrated Cal/Val System**

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**On-orbit Performance Verification**

- **Temperature Stabilization:**
  - **Parameters to be characterized are stability of:** Calibration target temperatures, Receiver shelf temperatures, and Radiometric gain
  - **Scope:** Data from orbit 164 was used to determine that spec-compliant stabilization was achieved; Data from orbit 182 was used to characterized full stabilization (thermal steady-state)
  - **Criteria for spec-compliance assessment:**
    - Drift in calibration target temperatures < 0.001°C / sec
    - Drift in receiver shelf temperatures < 0.001°C / sec
    - Gain drift: < 0.00008 dB/sec for channels 1-11, 16-24
    - < 0.0001 dB/sec for channels 12-15
  - **Example results shown in following charts:** Requirements are satisfied by orbit 164, Steady state achieved by orbit 182

**Geolocation Verification Method**

- **Example: Red Sea**

**Radiometric Sensitivity and Spacecraft Maneuvers**

- **Radiometric Sensitivity:**
  - **Expected ATMS Remap SDR Quality Improvement**
  - **Using the updated B-G remapping coefficient LUT**

**SDR Remapping**

- **Data Processing Chain**

**SUMMARY:**

ATMS on S-NPP is the first of a new series of operational microwave sounders. We have presented a summary of the new microwave sounder ATMS on Suomi-NPP. Early on-orbit performance is good and Cal/Val activities are continuing for this important operational weather and climate sensor.