This paper describes key performance characteristics of the NPOESS CrIS Flight Model 1 determined during prelaunch calibration activities, and plans for verification and validation of the in-flight radiometric and spectral instrument calibration as a coordinated effort of industry and government teams.

**CrIS Sensor Overview:**

The CrIS is a Michelson interferometer covering the spectral range of 3.9 to 15.4 μm (650 to 2550 cm⁻¹). CrIS provides cross-track measurements of top-of-atmosphere (TOA) radiances to permit the calculation of vertical profiles of temperature and moisture in the Earth's atmosphere. There are three bands in the CrIS spectral range each having different spectral resolutions: long-, mid-, and short-wave (denoted as LWIR, MWIR, and SWIR, respectively).

**Proxy CrIS SDR Validation Data Products**

- **AQUA AIRS clear FOR search module** - Utilizes spatial coherence test threshold for clear ocean detection As confidence in VIRS and CrIS geolocation is gained, VIRS data can be used to identify clear CrIS FOVs.
- **AQUA AIRS NCEP GFS model match module** - [AIRS SDR] minus [AIRS SDR simulated from model defined atmosphere] - Radiometric trending approach. Real time global NCEP SST (RTG-SST) compared to AIRS adjusted window radiances (Δ = 11.6 K). A different channel selection will be used for CrIS.

**Instrument Linearity**

- Non-linearity highest in MWIR (~0.5%); smallest in SWIR
- Non-linearity correction minimizes radiance differences (spread) between FOVs

**Spectral Calibration and Instrument Line Shape**

- FM1 meets FWHM spec allocation with margin (better than 5 ppm)
- ILS correction results in less than 0.2% peak to peak residual error

**Radiometric Accuracy**

Radiometric measurement uncertainties are well below instrument specifications

**Summary**

- Instrument pre-launch TVAC calibration of FM1 sensor is complete
- Instrument performance is excellent
- The CrIS SDR calibration plan, a joint effort of industry and government teams, has been baselined: Plan incorporates
  - Comprehensive list CrIS SDR tasks
  - Instrument on-orbit operating procedures
  - Cal-val tools
  - Timelines for validation campaigns
  - On-orbit characterization and SDR algorithm updates
- In development: Cal-Val tools and procedures needed to evaluate instrument measurement accuracy and adjust in-flight calibration parameters

**Key Technical Aspects of CrIS**

- Fourteen radiometric spectrometers: 14 km tail FOV spectral resolution
- Field of regard with 3 x 3 FOVs
- Photovoltaic detectors in 3 bands
- 4-Stage Planar Filter Cooler
- 2200 km swath width
- On-board internal calibration target (ICT)

**Key Components for Onboard Radiometric Calibration**

- Scene Selection Module (scan mirror) - precision and variability
- ILS correction results

**Key Milestones for CrIS Cal/Val**

- TVAC Completion
- Launch Check Out
- ICV Operational Mode

**Proxy CrIS SDR Validation Data Products**

- [AIRS SDR] minus [AIRS SDR simulated from model defined atmosphere]
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