JPSS STAR Science Team Annual Meeting
OMPS SDR Team

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Outlines

- OMPS SDR Team
- Products and Users
- Requirements and Performance
- Accomplishments
- Algorithms Evaluation
- Future Plans for J1
- Summary

OMPS SDR Team

PI Name	Organization	Primary Roles
Fred Wu	NOAA/STAR	Budget and coordination; Instrument and product performance monitoring; J1 code development; TVAC data analysis; SDR algorithm.
Glen Jaross	NASA	Instrument scientist; TVAC data acquisition and analysis; SDR algorithm.
Bhaswar Sen	NGAS	G-ADA test for IDPS operations; TVAC data analysis; SDR algorithm.
Maria Caponi	Aerospace	Algorithm changes coordination; DR and issues tracking
Daniel Cumpton	Raytheon	IDPS operations

Products and Users

- Products:
  - OMPS nadir mapper (NM) and nadir profiler (NP) earth view (EV) and calibration (CAL) SDR in both nominal and diagnostic mode.
- Users:
  - OMPS EDR Team
  - Wider and future users via CLASS

Requirements and Performance

Parameters	Specification/Prediction Value	On-Orbit Performance
Non-linearity	< 2% full well	< 0.46%
Non-linearity Accuracy	< 0.2%	±0.2%
On-orbit Wavelength Calibration	< 0.01 nm	0.15-0.25 nm
Stray Light NM Out-of-Band + Out-of-Field Response	For NM ≤ 2	average < 2%
Intra-Orbit Wavelength Stability	Allocation (flow down from EDR error budget) = 0.02 nm	~ 0.02 nm
SNR	1000	> 1000
Inter-Orbital Thermal Wavelength Shift	Allocation (flow down from EDR error budget) = 0.02 nm	~0.02 nm
CCD Read Noise	60 –e RMS	< 25 –e RMS
Detector Gain	43 (for NP) 46 (for NM)	47 (for NP) 51 (for NM)
Absolute Irradiance Calibration Accuracy	< 7%	< 3% in 300-310 nm: up to ~10 % for both NM and NP
Absolute Radiance Calibration Accuracy	< 8%	< 5% in 300-310 nm: up to ~6 % for NM and NP
Normalized radiance Calibration Accuracy	< 1%	< 1%

Accomplishments

- Beta maturity March 2012
- Provisional maturity March 2013
- Validated maturity
  - Primary review Dec 2013
  - Delta review planned for June 2014
    - Improved stray light correction and wavelength registration, for both NM & NP.
    - CAL SDR transition to GRAVITE is on schedule.

Algorithm Evaluation (1/3)

- Algorithm Description:
  - OMPS has three sensors. NOAA is responsible for SDR of two sensors (NM & NP).
  - Each sensor is configured to acquire earth view (EV) or calibration (CAL) data, in either nominal or diagnostic mode.
  - IDPS processes nominal EV data only
  - Transition is underway to process CAL SDR at GRAVITE
    - To automate the use of CAL SDR in EV SDR processing at IDPS
    - To archive the CAL SDR at CLASS

Algorithm Evaluation (2/3)

- Validation Approach and Datasets
  - Primary validation by examination of SDR characteristics such as dark, linearity, SNR.
  - Further validation:
    - Characteristics of EV SDR
    - Characteristics of EDR
    - Comparison with other measurements (GOME-2, SBUV/2)
    - Comparison with RTM (CRTM, MLS)
- Performance *vs.* Requirements
  - See earlier slide

Algorithm Evaluation (3/3)

- Risks/Issues/Challenges
  - Develop modifications to accommodate J1 upper
  - Produce CAL SDR in Ground System
- Quality Monitoring:
  - In place, and being continuously improved.
- Recommendations: NPOESS algorithm has evolved into the NOAA-endorsed JPSS algorithm and any needed improvements should continue. Substantial changes are expected for J1.

Future Plan for J1 Algorithm

- JPSS-1 Algorithm Milestones
  - May: Unit test for decompressor and aggregator
  - July: Integration of pre-processor into IDPS
  - Aug: functional test of LUTs
  - Sept: Accommodate sparse LUTs
  - Oct: integration test of LUTs with J1 code
  - Nov: delivery to STAR AIT
  - Dec: delivery to DPA

Future Plan for J1 Validation

- Validation Strategies
  - Pre-launch
    - Functional verification of LUT from SCDB
    - Integration tests of new LUTs and the modified code
  - Post-launch
    - Examination of SDR characteristics such as dark, linearity, SNR.
    - Characteristics of EV SDR
    - Characteristics of EDR
    - Comparison with other measurements (GOME-2, SBUV/2)
    - Comparison with RTM (CRTM, MLS)

Summary

- OMPS EV SDR is expected to reach the Validated maturity in June
- OMPS CAL SDR transition to GRAVITE is on schedule despite the setbacks
- Tasks and schedule for J1 preparation are well defined. Risk is low for performance but moderate for schedule and cost.