GOES-R PS-PVR Chair Disposition Form

Product Validation Level

- [ ] Beta
- [ ] Provisional
- [x] Full Validation

Date

06/01/2018

Algorithm

- [x] ABI L1b/CMI
- [ ] EXIS L1b
- [ ] GLM L2
- [ ] MAG L1b
- [ ] SEISS L1b
- [ ] SUVI L1b

1. Review Board Comments

This disposition is for the GOES-16 ABI Level 1b (L1b) and Cloud and Moisture Imagery (CMI) Full Validation Peer Stakeholder Product Validation Review (PS-PVR). This review is a comprehensive evaluation of the products' operations in the intended environment.

Congratulations to both Fred Wu's and Tim Schmit's teams for the achievement of full validation maturity of the GOES-16 ABI L1b and CMI products, repsectively! Kudos for their broad validation efforts and application of their considerable expertise including their in-house analysis as well as instrument vendor analysis. The presentations included a complete review of prior issues which have been steadily remedied since GOES-16 ABI first light. Credit is due to all stakeholders including CWG, AWG, Program, and users alike on the resolution of NUMEROUS issues since the Provisional launch including INR improvements (large nav errors, non-compliance of CCR, unstable FFR), scan mirror emissivity updates: PICA and IR noon and midnight discontinuities, solar calibration time and elimination of post-solar-cal VNIR gain discontinuities, VNIR and 3.9u stray light at midnight during eclipse season, resolution of Band 1/2/3 striping, ICT PRT coefficients. ...this is AMAZING progress!

Issues still remain with Band 2 bias and striping in Bands 14 & 5. Both items have open WRs. The Band 2 bias is a Flight WR and the panel recommends pursuit of a bias correction ASAP instead of accommodating any further delay for the sake of trouble shooting the bias. The flight WR may continue, but a bias correction should be implemented ASAP. The bias correction will yield benefits for several downstream L2 products. An action is assigned to PPO (see below) to facilitate CWG

Approval Status

- [x] Approved
- [ ] Not Approved

2. If not approved, list actions required to become approved.

	PS-PVR Chair	Signature	Date
Not Approved			
Approved	Matthew Seybold	SEYBOLD.MATTHEW.G.1078301500 Digitally signed by SEYBOLD.MATTHEW.G.1078301500 Date: 2018.06.01 17:23:41 -04'00'	06/01/2018

3. Other Notes

L1b FULL VALIDATION CONSIDERATIONS
The three primary categories of evaluation are radiometrics, INR, and Image Quality and Operations. The calibration challenges are Kalman Filter, Uniform Radiometric Calibration, Onboard Solar Channel Calibration. Thermal stress and the angular dependence of scan mirror emissivity.

RADIOMETRICS
- VNIR Noise is stable and better than requirements, but is only better than predicted performance for the 0.47u (band 1) and 0.86u (band 3) channels. 0.64u (band 2) in particular has the least favorable performance with a strong suspicion of a few bad detectors. Indications are band 2 performance changed between predicted performance creation and on-orbit performance.
- IR Noise is better than requirements for all channels. IR Noise is better than predicted performance for all channels, except for 3.9u. This is excellent performance!
- VNIR Accuracy is stable for all channels except for early departures due to ground segment updates.
- IR Accuracy is stable, has small bias, and strong confidence in meeting objective.

INR
- Navigation Errors have improved since Provisional (an order of magnitude in a year) such that they all now meet objectives.
- Nav STD reduced by 1/3 since Provisional.
- Navigation Error Channel-to-Channel Registration (CCR): All channels better than requirements, but not all better than predicted performance: 0.6-3.90 and 3.9-13.3. More stars are need to improve results.
- Navigation Error Frame-to-Frame CoRegistration (FFR) is good across all channels.

PLPTs - AIRBORNE FIELD CAMPAIGN
- Performance metrics: Reflective solar bands (RSB) - 5% uncertainty; Thermal emissive bands (TEB) - 1K uncertainty
- RSB
  -- Large (7%) bias in channel 2 RSB for AVIRISng v/s ABI.
  -- ABI bias relative to S-NPP VIIRS. Channel 2 is ~8% and channel 6 is ~-8%.
- TEB
  -- 13.3u at -1.2 K, but atmosphere above aircraft was not accounted for. All channels pass this independent validation.
- Campaign demonstrated utility of NSS to characterize & valide on-orbit detector-level performance.
- GEO-LEO validation inter-comparison results should include a histogram of collocated pixels to track detector-level impacts which will ensure traceability.
- These collections are unprecedented in geostationary observation and provide valuable results for validation reviews.

PLPTs - 36 tests executed by CWG
- PLPT #16 is more of a task than a test.
- Four PLPTs are incomplete.
- PLPT #14 - Recommend completing this PLPT as soon as possible in order to exhaust all potential causes of striping. Proceed as soon as possible using the currently existing GRATDAT (to L1beta), which will provide at the very least rehearsal for the GRATDAT version with L1b and at best shed light on the striping issue.

CMI FULL VALIDATION CONSIDERATIONS
Validation needs to confirm consistency from radiances to reflectance to brightness temperature.

CMI - Issues discussed at full validation review:
- Band 2 - Reflectance factors are too bright. See Fred Wu L1b slides for details.
- Band 7 - Cold pixels around fires (CPAF). ABI has a measurement accuracy of 1K for brightness temp. Those cold pixels are inaccurate by 50-289K. 3 alternative resampling kernels provided by vendor and currently under examination. Issue is a concern for user confidence. There are two important impacts: (1) Saturated pixels can become masked in RGB and therefore undetected in the RGB enhancement. (2) Small, sub-pixel fires are also a concern and may not be detected. Flight WR open.