GOES-R PS-PVR Chair Disposition Form

Product Validation Level

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

Date: 08/15/2018

Algorithm

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

1. Review Board Comments

This Provisional PS-PVR is for GOES-16 EXIS XRS (X-Ray Irradiance) L1b products. Janet Machol is the CWG PI and SWPC is the primary customer.

Background:
- XRS is used for monitoring solar flares which impacts communication and navigation as well as detection of SEP events.
- Radio blackout warnings are the main end-user product which has dependency on XRS observations.
- Much of the analysis provided originates from LASP.

Analysis Notes:
- The PLPTs (-08,-09,-10-11,-12,-13,-14) are related to MRD IDs 2036, 2037, 2038, 2041 and focus in total on XRS Pointing Knowledge/Mapping Uncertainty, XRS Product Measurement Range, XRS Product Measurement Accuracy, XRS Product Measurement Precision, XRS Long-term Stability.
- Sounds analysis of crossover thresholds in test #8, and #9. Appreciate the short-term result of adjusting threshold and long-term result of using hysteresis with a higher flux threshold.
- Test 13 is for a full month (Sep) in 2017 comparing RHESSI and GOES-16. Comparison appears favorable.
- The presentation highlighted a number of remaining issues, including electron contamination, wrong times in filenames, and a yaw flip flag. Some of these are currently being addressed with ADRs, and others will be taken care of via the L2 algorithms. While the ADR listings are helpful, the list of issues going forward and product caveats needs to be better developed.

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: 2018.08.15 16:17:19 -04'00'	08/15/2018

3. Other Notes

PLPT Results:
- Thresholds were determined and assessed.
- Scaling factors were determined as were uncertainty of fluxes.
- Unclear whether data may be used to estimate flare locations; however, the PLPT objective of detecting within 4 quadrants is met. For high magnitude events and when existing L1b rotation error is accounted for, the accuracy appears relatively good.
- Inter-satellite comparisons provided are purely qualitative. Statistics from the comparisons are needed.
- The NCEI success for the PLPTs appears to be much lower than the Predicted Performance, likely because the SWPC needs are different than the engineering/mission requirements that led to the design-driven MRD. An adequate provisional validation maturity analysis needs to a comparison against predicted performance metrics. Below is a list of the predicted performances as mapped to MRD requirements:
  --- MRD2036 Mapping Uncertainty (< 2 arcmin; MIT/LL predicts < 66 arcsec, "by inspection")
  --- MRD2037 Product Measurement Range -- the limits of the inter-comparison flux ranges would address this, at least to the limit of the solar activity during the study time frame.
  --- MRD2038 Measurement Accuracy (< 20% at 20X min flux) -- the inter-comparisons show this is good
  --- MRD2041 Product Measurement Precision (2%) -- the self-consistency is there, it seems
  --- MRD2042 Long-term Stability ("<+/-5% or ability to track") -- this would come from trending inter-comparisons with other satellites plus the quarterly calibration results (Kumar asked about this)

Customer Statement:
Rodney Viereck from SWPC presented a customer perspective. His slides provided an excellent basis for the utility and importance of detecting (with high refresh rates) X-ray flares. The impacts to communications are far reaching and severe for major solar events.

Disposition:
The GOES-16 EXIS X-Ray Irradiance L1b product is not approved at provisional maturity. Although there is considerable expertise on the team and considerable analysis has undoubtedly taken place, the translation of the analysis results into quantitative comparisons against predicted performance as well as readiness for providing value-added caveats for user consumption are not yet present.

Actions:
The following two actions are requested for completion by August 1, 2018, which allows 2 weeks:
(1) Provide a comparison to predicted performance and the respective tie backs to MRD. Need to go back and look at predicted performance quantitatively and provide to PS-PVR Panel for review. Need simple statistical measures such as the quality of fit results... what is the standard deviation of the inter-comparisons? For cases where comparisons to predicted performance are not practical, explain the rationale for not completing such comparisons.
(2) It is difficult to ascertain what the definitive list of Provisional data caveats are for this product, which will be included in a README. This validation review should provide a strong indication of the caveats which will ultimately be described in the imminent delivery of a README.

After receiving the results of these two actions the panel will review the results virtually and the chair will provide an amended disposition documenting the progress towards or achievement of provisional maturity.

Disposition Update on 8/15/2018: Given the updated chart submission from Janet which includes a comprehensive comparison of results versus predicted performance, EXIS XRS has achieved Provisional! Congrats to the Team!