

## NOAA-20 Algorithm Maturity Review

### June 15, 2018

**Review Team Members:** Mitch Goldberg (chair), Lihang Zhou, Satya Kalluri, Arron Layns, Jim Yoe, Kevin Schrab, Rick Stumpf, Michael Ford, Gary Wick, Tom Renkevans, Jim Gleason

### Summary

All teams did an excellent job presenting N20 cal val results. The review panel recommends the following:

- Surface Reflectance, NUCAPS Trace gases, OLR, and Ozone, Ice, Snow have reached Beta Maturity
- NUCAPS AVMP and AVTP have reached Provisional Maturity
- ATMS TDR/SDR and VIIRS SDR have reached Validated Maturity

The review team recommends that all teams have clear work plans for reaching the next stage of maturity, including any required algorithm changes or deliveries.

### Surface Reflectance

This product has reached **Beta Maturity**. The team showed good visual comparisons between S-NPP and N20, which show very high consistency.

Known issues with planned fixes:

- Missing granule problem (in the JRR framework)
- QF updates to support Vegetation products (This one will take some work)

**Action:** Mitch notes the need for a detailed plan for reaching provisional in November.

### ATMS TDR/SDR

TDR and SDR have reached **Validated Maturity**. Instrument performance is similar or better than SNPP. Pre-launch expected reductions in striping and inter-channel correlations were demonstrated on-orbit. N20 data working in MiRS and NCEP users satisfied with data quality. Tony Reale noted that MiRS running for all satellites (N20, NPP, NOAA-18/19, Metop-A/B) are consistent. There were two liens from this review:

- ATMS team should generate a user's manual (use SPSRB template)
- Add a slide to the final Validated Maturity documentation that shows performance and stability (eg from ICVS) for the ATMS over past 6 months (or since data was available)

Effective date: 6/14/2018 with implementation of PCT v7;

Updated Effective Date: final implementation of PCT v7 in Mx2: 07/06/2018

For the emissivity correction in work, Mitch noted the [ITWG recommendation](#) of "Advance notifications of processing changes should be an integral component of data provision. If a planned change to data processing results in a change in brightness temperature of 0.1K or 20% of NEdT (whichever is smaller), this should be made clear in notifications to users. These

notifications should be made no later than 8 weeks before the change and test data should be provided if possible.”

**Action:** When planning for implementation time, first provide 60 days of test data to users and get feedback before the official delivery to IDPS (tentative November 2018); and work with IDPS/AMP/OSPO to send out notification to users 8 weeks prior to the implementation. Recommend sending out multiple notifications prior to availability on I&T and Ops.

In the MiRs presentation, Chris Grassotti noted on Slide 7 a trend in the TDR Obs-Sim with an unknown cause. Mitch mentions something similar is seen on NPP, so might be in the model.

**Action:** Mitch recommends computing weekly or monthly means (double difference) for NPP and N20 in ICVS

During Andrew Collard’s presentation, NASA asked how much striping (in K) could NCEP handle? Andrew says they have not determined this but should.

## **VIIRS SDR**

VIIRS SDR is at **Validated maturity**. Complete presentations of VIIRS performance in SWIR, TEB and DNB bands and radiometric and geometric performance showing the instrument meeting its requirements were presented. The derived imagery products, including the AWIPS distribution look excellent

Effective date: Now, but note there are some changes in the future (M6 QF)

**Action:** SDR team should continue to investigate the relatively large bias in some of the RSB bands (M5, M7, I2, M4). Differences (between NPP and N20) should be noted in the readme. Likely no impact on real-time applications, but would impact long-term trend studies.

**Action:** Ivan Csiszar asked how all the other QFs (beyond the M6 problem) are working. Changyong mentioned unsure how lunar contamination is affecting the QF. Review Panel agrees VIIRS SDR team review all QFs.

**Action:** Menghua Wang noted something happened to the the data on March 22. VIIRS SDR should to investigate.

Written feedback was also provided by Sasha Ignatov, SST Lead, via email:

SST strongly supports the recent JPSS PO decision to reduce the number of WUCDs from quarterly to annual, on both SNPP and N20. This is a long overdue step in the right direction.

I wanted to state it for the record that we consider this step insufficient and strongly recommend to go to a "per need" schedule, i.e. (1) WUCDs are only scheduled based on demonstrated VIIRS performance concerns, and (2) SDR Team clearly demonstrates the expected benefits of those to address the observed sensor anomaly, based on prior WUCD analyses.

Pending future VIIRS anomalies, the SDR team should

1. perform detailed analyses of the past WUCDs (~26 for SNPP, and ~4 for N20)
2. suggest an improved calibration algorithm which is insensitive to WUCDs (as it should have been, to begin with)
3. test it out and demonstrate on the past historical WUCD data; and
4. implement in the JPSS RDR-to-SDR operations.

Provided that SDR and SST consensus is reached that thermal bands have turned insensitive to WUCDs, SST Team does not object to reinstating the annual (or quarterly, monthly, etc) WUCD schedule.

I please request to put it in writing in the review as SST feedback. Working around the WUCDs, to minimize the artifacts in SST reanalyses (RANs), proved a tremendous waste of time for SST (and I believe also for SDR team). We really would prefer to concentrate on more full exploration of VIIRS potential for SST (which is absolutely outstanding, outside the WUCD periods), rather than wasting our time on minimizing the manually created artifacts, which per the 6 year SNPP practice, have no clear objective or practical outcome.

## **Cryosphere Products**

### **Snow**

Snow cover and fraction have reached **Beta Maturity**. Good results so far with SNPP and IMS. Obviously, the big problem is the missing granules, which will be fixed with next DAP delivery

**Action:** Cryosphere team should provide a clear plan to reach provisional maturity by Sept given the lack of surface-based observations that will be available during NH Summer.

### **Ice**

Ice Age/thickness, Ice concentration, and Ice Surface Temperature products have reached **Beta Maturity**. Good results so far with SNPP, but not enough data to be provisional. Noted problem with Cloud Mask, which should be fixed with Cloud LUT fix going into NDE this week (or next). Jeff key noted the need for Cloud Mask to be provisional prior to cryosphere products being declared provisional.

**Action:** Cryosphere team should provide a clear plan to reach provisional maturity by Sept given the lack of surface-based observations that will be available during NH Summer.

## **NUCAPS**

Atmospheric Moisture and Temperature Profiles are at **Provisional Maturity**. Trace gases, Ozone, and OLR are at **Beta Maturity**. The NUCAPS team showed good quantitative comparisons with ECMWF and sondes.

**Action** (related to Slide 27 of Antonia's presentation): Mitch suggests when collecting N-20 data for focus days for update tuning coefficients, also do it for S-NPP, so they are consistent. If

possible, show all satellites (Metop, NPP, N20) with consistency and tuning on the same focus day.