



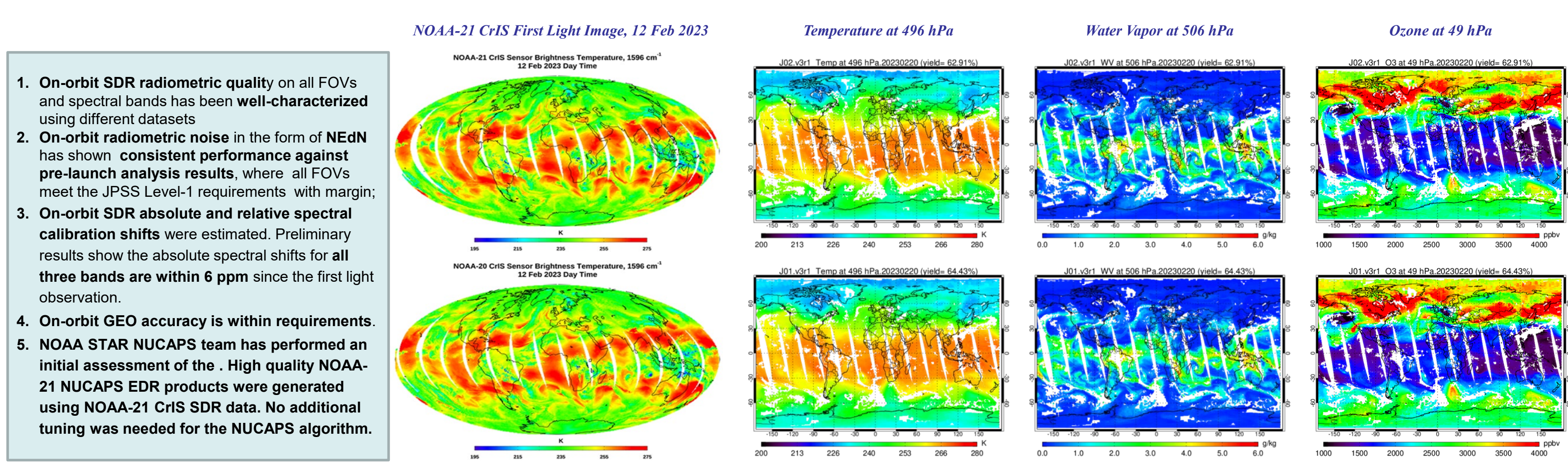
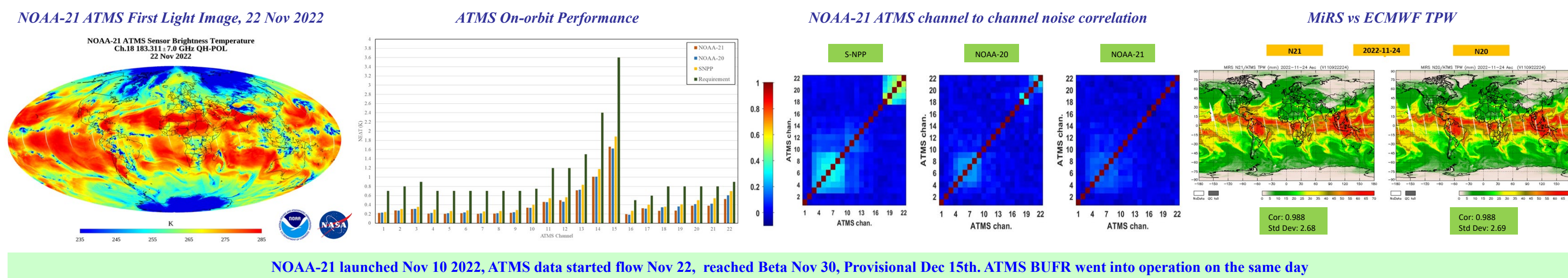
Updates on NOAA-21 Science Product Validation

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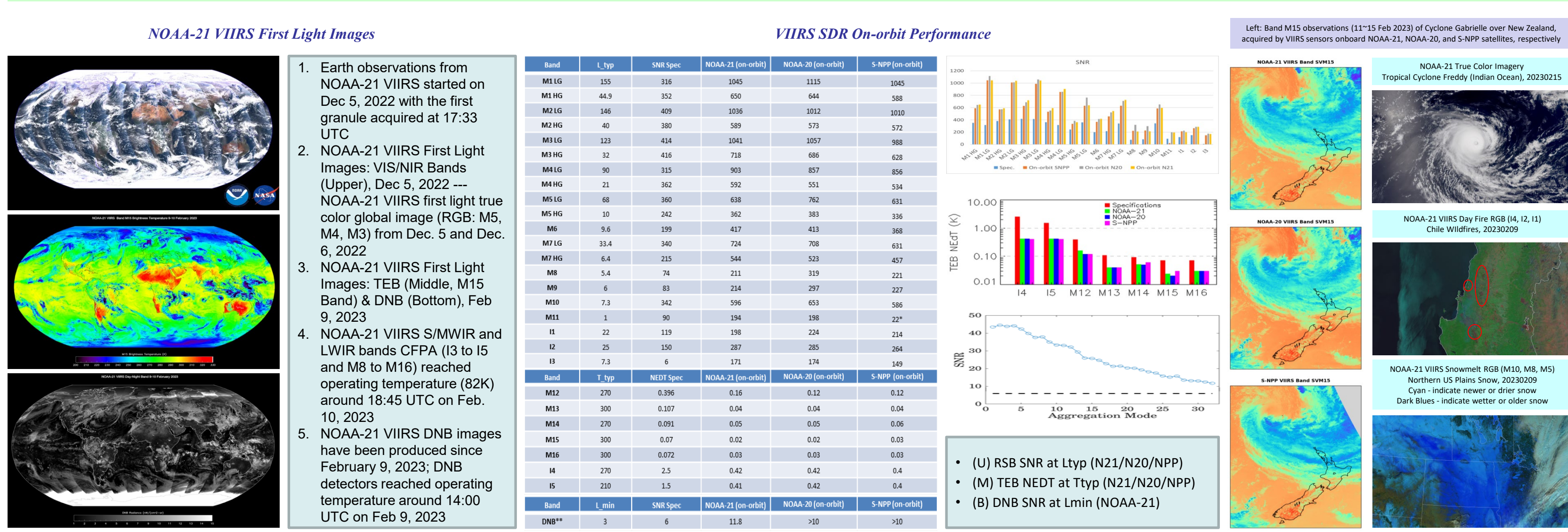
Introduction

The Joint Polar Satellite System (JPSS)-2 (renamed as NOAA-21 post-launch) was launched successfully in November 2022. It hosts an array of instruments similar to those currently operating on S-NPP and NOAA-20 satellites. The NOAA-21 satellite produces baseline as well as new products that are directly resulted from instrument upgrades and science improvements. This paper will present an overview of the NOAA-21 science algorithm updates and share some early results from NOAA-21 product validation and readiness for operation. The schedule of transitioning JPSS enterprise algorithms to NESDIS Common Cloud Framework (NCCF) will also be briefed.

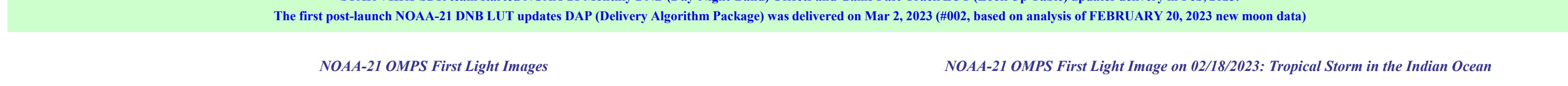
NOAA-21 Science Products Readiness



Good global agreement between the CrIS sensor observations from NOAA-21 (Upper) and NOAA-20 (Bottom) CrIS has been found. Radiances observed at the 1509 cm⁻¹ water vapor channel on February 12, 2023. NOAA-21 NUCAPS retrievals from J2-Ready algorithm matches very well both qualitatively and quantitatively with the NOAA-20 operational NUCAPS products. (Upper: NOAA-21; Bottom: NOAA-20, February 20, 2023)

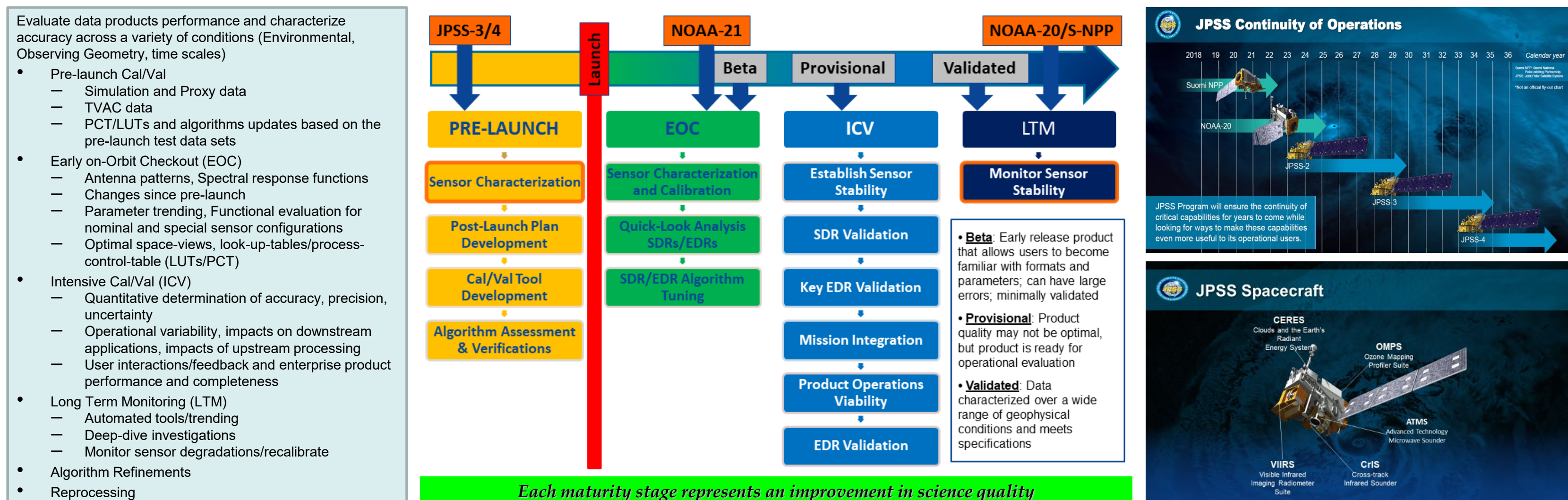


VIIRS SDR CalVal NOAA-21 VIIRS SDR has achieved beta maturity since Feb. 11, 2023 (specifically: Feb. 10, 2023, 18:48 UTC, orbital 131). STAR VIIRS SDR team started NOAA-21 Monthly DNB (Day-Night Band) Offsets and Gain Fast-Track LUT (Look-Up Table) updates delivery in Feb. 2023.



STAR OMPs SDR team started NOAA-21 Weekly Dark Fast-Track LUT (Look-Up Table) updates delivery since 02/23/2023, for both OMPs NM and OMPs NP. The first post-launch OMPs Dark LUT updates were delivered on Jan 26, 2023 (0403).

Calibration and Validation Process/Activities



STAR JPSS science teams delivered the final JPSS-2/Enterprise Cal/Val plans in April 2021. And adjusted the Cal/Val dates due to the recovery of NOAA-21 KATX. Below is the NOAA-21 Monthly Cal/Val maturity review schedule chart (Left), and the Fiscal year (FY) three-completion chart (Right), developed based on the updated Cal/Val schedule.

Table with columns for Team, Product, and Maturity Review Schedule (M, P, V, S) for various products like SDR, Clouds, Aerosol, etc.

NOAA-21 Data Products Cal/Val and Operational Plan

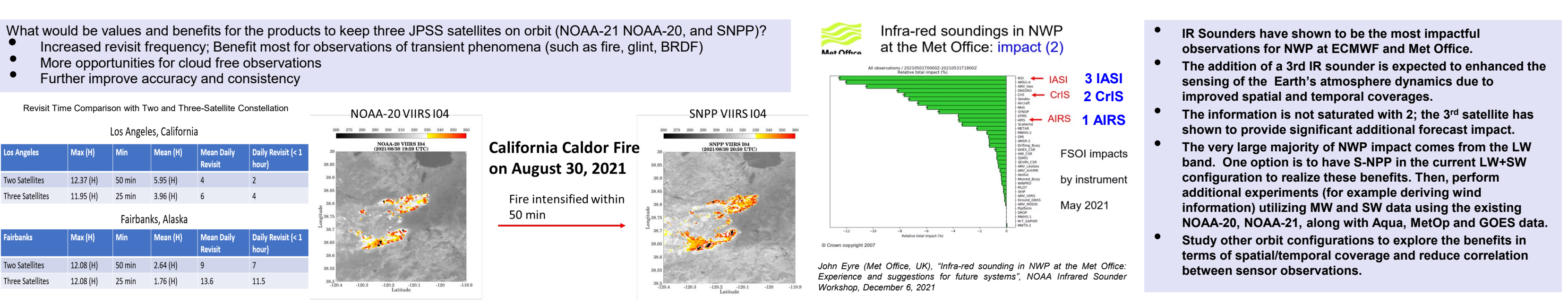
Table showing Mission Unique Products (from IDPS) and Enterprise Products (from NDE/NCCF) with columns for Beta, Provisional, Declares Ready for Operations, and Validated.

Algorithm Refinements/Updates for JPSS-2 (NOAA-21)

Planned algorithm updates/enhancements before JPSS-2 launch:
- Add terrain correction to the VIIRS Imagery EDRs - Implemented in IDPS B2.2 Mx0
- Add VIIRS Imagery EDRs for all 16 M bands - Implemented in IDPS B2.3 Mx4
- High resolution OMPs SDR implementation (10km x 12km) for 12 OMPs NM - Implemented in IDPS B2.3 Mx4
- Remove VIIRS SnowIce and OST file dependencies for OMPs SDR - Implemented in IDPS B2.3 Mx1
- J2-ready Algorithm & PCT LUTs updates based on the pre-launch proxy-simulated real 12 IoT data sets (Initial & Final DAP deliveries. The goal is to have all DAPs integrated and ready for the first J2 end-to-end ICT test (JCT-3) testing in both IDPS & NDE)
- All J2-ready initial/final DAPs have been delivered and implemented in IDPS (OPS) & NDE (I&T), which helps STAR science teams to analyze J2 (NOAA-21) algorithms on-orbit performance (J2 Cal/Val) Below is the summary table of these DAPs changes/updates details.

Large table detailing algorithm refinements and updates for JPSS-2 (NOAA-21) across various products like SDR, Clouds, Aerosol, etc., including Date, Version, and Description of updates.

Potential Benefits of 3 JPSS Satellites



Summary

- 1. OMPs and VIIRS SDR teams started NOAA-21 Weekly/Monthly Fast-Track LUTs update
2. NOAA-21 Algorithm Cal/Val schedule were well defined, all NOAA-21 Products will reach the Beta/Provisional/Validate Maturity by May-2024/Jul-2024/Jul-2025, respectively
3. All J2-ready algorithms are running in IDPS (OPS) & NDE (I&T)
4. NDE is migrating to NCCF. Transition to NCCF timeline is defined. All NOAA-21 EDR products (except VIIRS Imagery EDR) will be operational in NCCF within 2-3 years of launch