The Joint Polar Satellite System (JPSS) program has emerged as one of the core earth observing missions of the US since its launch in 2012 with the ATMS, OMPS, CrIS and VIIRS onboard the S-NPP taking observations in the Microwave, Ultraviolet, Infrared and Visible wavelengths. Measured radiances are concurrently being used for NWP and Climate Applications.

More recently the JPSS instruments are acquiring global acceptability in terms of being used for product generation and also for using as references for monitoring the in-orbit status of their GEO instruments belonging to satellite agencies across the world. Within the framework of the Global Space Based Inter-calibration System (GSICS), the GSICS Coordination Center hosted by NOAA/STAR is currently designing a procedure wherein satellite instruments (such as some of the JPSS instruments) could be accepted as reference instruments by (GSICS) satellite agencies that are spread across 14 member countries.

This goal of this poster is to showcase the acceptance procedure and also to demonstrate some of the uses of the JPSS instruments not only within the NOAA but also satellite agencies (such as KMA, CMA, that are members of the Global Space Based Inter-Calibration System framework).

1. Background

The GSICS Coordination Center at NOAA/STAR has been tasked by the GSICS (comprising 14 Satellite agencies) community to identify a process by which in-orbit instruments can be designated as a GSICS reference instrument. These reference instruments are used to monitor target instruments that fly concurrently. GCC has proposed a selection process that can be used to select reference instruments from a range of in-orbit flying instruments. This process first attempts to strike a balance between User Expectations and availability of candidate instruments and then takes into consideration Routine Monitoring of the In-Orbit health status of the instrument (such as carried out at ICVS), routine CAL/VAL activities of the instrument and an instrument scoring scheme proposed by EUMETSAT (Hewison 2015) to help arrive at a decision.

2. Procedure for identification of a GSICS reference Instrument

Proposed selection criterion takes into consideration.
1. The instrument and Channels sub-group wishes to monitor.
2. The method/s they would employ to monitor (eg single or blended references, use transfer target or not, stability criterion).
3. In addition consider scoring proposed by Tim (if there are more than 1 candidate instruments).
4. Comparison of Instrument design specification (Pre-launch testing) with In-orbit behavior.
5. Consider if in-orbit status of key parameters of Candidate Ref instrument are monitored and available to users (eg ICVS).
6. Take inputs from Info (global coverage, eq. cross time etc) related to instrument available (eg OSCAR).

3. Applications of JPSS/CrIS as a reference instrument

A novel method has been developed that can determines SRF by inter-comparing with a Hyperspectral instrument such as CrIS/IASI.


Japanese Meteorological Agency:
Korean Meteorological Agency:

Candidate reference instruments and their use in GSICS
Candidate reference instruments and their use in GSICS
5. Ozone Mapping Profiler Suite (OMPS)

The Ozone Mapping Profiler Suite (OMPS) onboard the JPSS is the flagship instrument for monitoring global Ozone patterns, which is one of the key indicators used to measure climate change. Sensitive in the UV wavelength length the onboard health of the instrument needs to be constantly monitored to ensure high quality of UV measurements. The key monitoring requirements place by the ozone community are:

1. Pre-Flight Laboratory calibration of the instrument
2. Performance of dual diffusers for OMPS for Solar Measurements (Diffuser and instrument degradation)
3. Ability to track wavelength through measurement based methods.
4. Performance Requirements (Are they good enough?) Comparisons to forward model results using ?
5. Internal consistency
6. Chasing orbits
7. Targets
8. SNO

Selection Process proposed by GCC NOAA for selecting a reference instrument. The scoring scheme (below) is a part of it.

<table>
<thead>
<tr>
<th>Selection Process Reference for MW</th>
<th>Ozone Mapping Profiler Suite (OMPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A sub-group meeting is organized to identify instrument to be monitored</td>
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</tr>
<tr>
<td>Group evaluates ATMS and SAPHIR</td>
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</tr>
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<td>Group assists in monitor QPM satellites spread over a group of roughly 250 to 25N for OQ</td>
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</tr>
<tr>
<td>On the other hand if goal would have been to monitor pibal instruments ATMS could have been a better choice.</td>
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</tr>
</tbody>
</table>

Scoring Scheme proposed by Time Hewison (EUMETSAT) for selecting a reference instrument

Acknowledgement: Authors would like to thank Denis Tremblay of CrIS tSDR eam for his help on the usage of CrIS instrument.