**ATMS Provisional Declaration for TDR, SDR, rSDR**

DPA Systems Engineering Evaluation

19 Dec 2012

Product Definitions

* TDR = scene brightness temperature calibrated against warm load and cold space view (a.k.a. antenna temperature)
* SDR = TDR brightness temperature corrected for scan-dependent bias and beam efficiency
* rSDR = SDR brightness temperature CrIS-geolocated and Backus-Gilbert resampled

Requirements Status

* 3 pre-launch performance metrics are described in D46844, Aug 2010, by NG: radiometric calibration, geolocation accuracy, and footprint matching.
* Science team is focusing on 3 requirements of NeDT, calibration accuracy, and geolocation accuracy.
* The SDR has a production requirement phrased in terms of applied corrections

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| **Req name** | **Req value** | **Req reference** | **Evidence** | **Product** | **Comment** |
| NeDT | Channel-dependent values from 0.5 to 3.6 K | 3 conflicting references: POS, 28300, and STAR | -- Pkg 4 slide 33 says ok  -- Pkg 1 slide 8 says ok  -- STAR memo says ok  -- IDPS single scan average out of spec  -- ICVS out of spec | SDR | OPSCON calls for sampling over 100 scans; calc of NeDT used in memo ambiguous |
| Geolocation accuracy | 0.1, 0.2, 0.3 for 3 different beamwidths | OPSCON | Pkg 6 slides 3-16 | TDR |  |
| Calibration accuracy | Channel-dependent values from 0.67 to 2.0 K | 3 conflicting references: POS, 28300, and STAR | Ch 6-13 show Ok in STAR memo; data missing for other channels | TDR | Reflector emissivity issue outstanding |
| Bias & beam efficiency | TDR antenna temperatures are to be corrected for scan bias and beam efficiency | NPP.SDR.3.9 | Not yet provided | SDR | Hooks are in IDPS, but SciTeam must calculate PCT |
| Remapping quality | Not found | Not found | Pkg 5 slides 16-21 | rSDR |  |

Since SDR is built from the TDR, and rSDR from the SDR, issues at a lower level are inherited at the next level.

Several unresolved technical issues have been identified that are relevant to the provisional declaration, and which must be resolved before operational validation:

1. TDR issue: striping

* DR 4813; no CCR yet
* Effect of order 0.1 K; within calibration requirements
* Fix will require change to TDR calibration code
* Attributed to warm load noise but mathematical algorithm for correction not determined
* To be corrected for TDR validation
* Science team recommends provisional declaration because effect is within calibration requirements

1. TDR issue: reflector emissivity

* No DR filed yet
* Effect of order 1 K for cold scenes (~ 100-200 K), QH at nadir. Marginally at or exceeding calibration requirements
* Manifests as a scan-dependent bias
* STAR proposed compensating in the SDR bias corrections, so no code change is needed for TDR
* Mathematical algorithm for correction determined, but precise coefficients undetermined
* Science team recommends provisional declaration because correction algorithm is understood, and the effect when viewing earth scenes is within calibration requirements

1. SDR issue: beam efficiency and bias correction

* DR 4806; no CCR needed
* EDR PR requirement NPP.SDR.3.9 requires that the SDR contain TDR antenna temperatures corrected for beam efficiency and scan-dependent bias. So far, these corrections have not been applied
* IDPS contains the constructs to allow generation of SDR if the PCT is available. So action is for science team to generate PCT. No IDPS code changes will be needed.
* Science team agrees on beam efficiency calculation approach, but has not agreed on the PCT parameters
* Science team has not agreed on the bias correction
* CrIMSS science team has proposed their own model-dependent bias corrections which will ultimately be coordinated with the bias corrections here
* STAR recommends provisional declaration because “In the provisional presentation package, first three presentations from NWP community, EMC/UKMO/ECMWF, give the TDR data quality preliminary assessment in NWP models”.

1. SDR issue: NeDT

* NeDT requirements don’t specify scan averaging
* Single scan averages of the 4 samples exceed requirements. Longer scan averaging can lead to results which meet requirements
* SDR outputs a single scan average which presumably exceed requirements
* ICVS has longer average but still shows requirements exceeded
* NeDT calculation definition which would prove requirement is not in place
* STAR recommends provisional declaration because “There are a few NEdT calculation methods among team and all results are within specification.”

OPSCON Task Status

The ATMS SDR Validation OpsCon document describes 27 cal/val tasks. A final report will be issued for each task in advance of product validation. Recommend providing table of status per task and outlook for validation.