

# Status of Cross-Track Infrared Sounder (CrIS) Pre-launch Calibration: Update

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**AIRS and NPP Sounding Team Meeting**  
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# Objectives

- Provide update on status of calibration activities, since last AIRS/NPP meeting in October
  - TVAC test status
  - Current FM1 Internal Calibration Target (ICT) emissivity
  - External Calibration Target (ECT) NIST transfer
  - Non-linearity correction
  - Key CalVal milestones
- Poster in lobby area describes over-all calibration and key performance parameters
- Revercomb et al presentation (this session) provides overview of instrument absolute radiometry including correction methodology for non-linearity effects

## TVAC Test Status (1/2)

- CrIS system level testing performed during TVAC1 and TVAC2 in spring and summer ('09) including
  - Cooler, cold start, survival heaters
  - EMI
  - Vibration
  - Dynamic interaction
  - Thermal cycling and balance
  - FOV Slit and Spot Scan
  - Radiometric calibration at 3 different instrument temperature regimes, including NEdN, long and short-term repeatability, non-linearity
  - Spectral ILS and accuracy measurements (Gas Cell) at 3 different instrument temperature regimes (e.g. Mission Nominal, Protoqual Low and Protoqual High)
  - Scan scenario (multiple orbits)
  
- TVAC3 radiometric regression testing using replacement ICT (from EDU3) completed late '09
  - Includes repeat of non-linearity testing
  - Includes test to determine ICT cavity emissivity

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- TVAC3 radiometric regression testing using replacement ICT (from EDU3) completed late '09
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# TVAC Test Status (2/2)

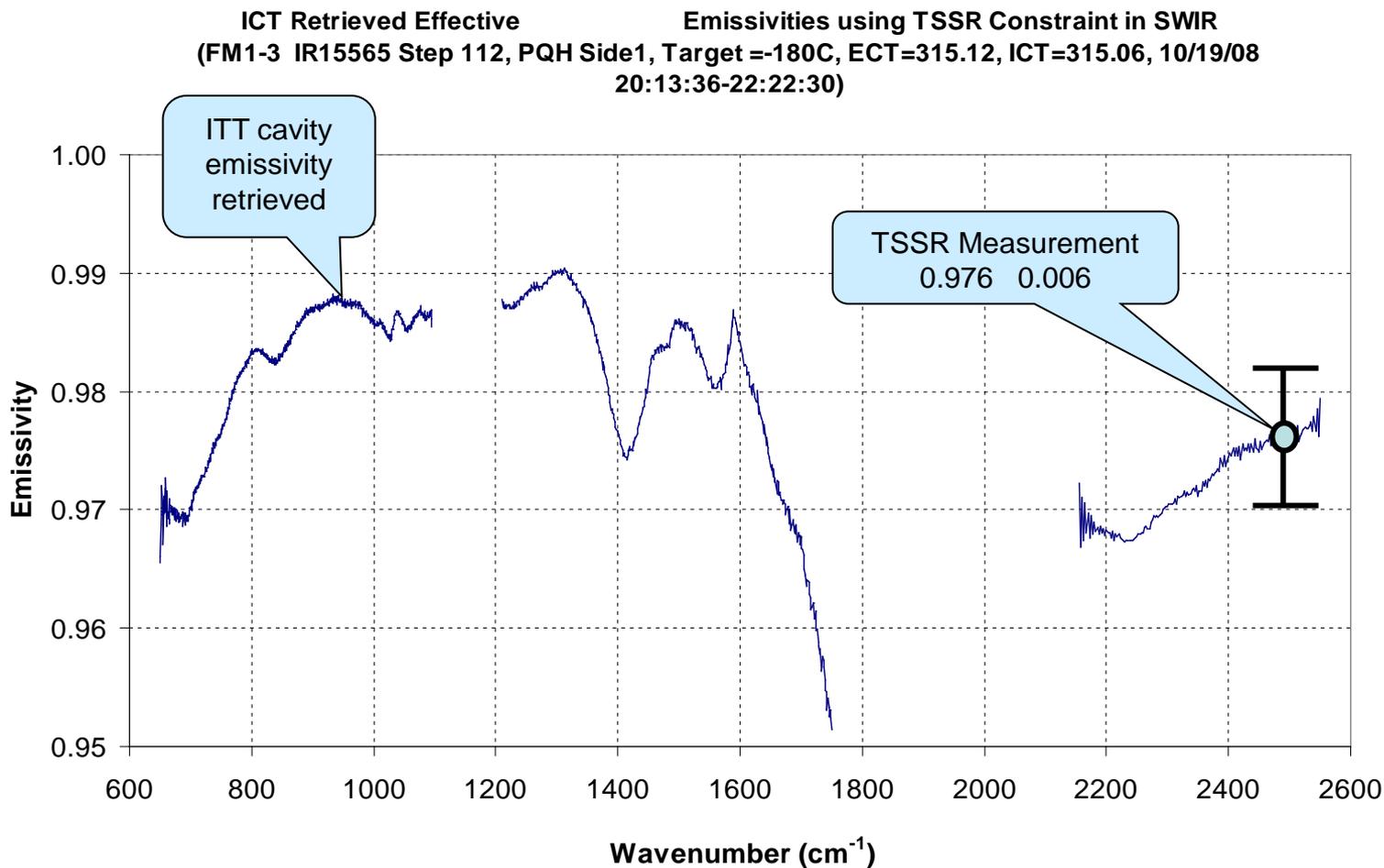
## Summary of Key Performance Analyses

- NEdN Trending
- Spectral overlay and comparisons with line-by-line models
- Non-linearity
- Short and long term repeatability
- Target effective emissivity retrievals
- Spatial registration/spot size and center positions
- Scan scenario
- Dynamic Interaction effects

All analyses are completed

# Current FM1 ICT Emissivity

- Curve shows emissivity values currently used in SDR algorithm for radiometric cal
- ITT Derived ICT cavity effective emissivity almost exactly matches NIST measurements of coating coupon B 'dull' Enhanced Martin Black



# ECT NIST Transfer

- ICT/ECT PRTs NIST traceable
- ECT NIST radiance transfer activities are funded
  - Measure spatial variation of outgoing radiance of ECT using NIST TXR
  - ECT reflectance measurements (under review as new scope)
- TRR held March '09
- Test on hold pending purchase of NIST translation stage
- Measurements should provide additional margin for assessing instrument absolute radiometric uncertainty

# Non-linearity

- Non-linearity corrections incorporated into latest version of SDR algorithm (V2.18)
- Corrections work well, reducing non-linearity to about 0.1% or better for most scene temperatures (See Revercomb et al this session)
- Efforts moving toward addressing on-orbit method for non-linearity assessment

# Key CV Milestones

- CrIS PSR scheduled July 15 '09
- NIST ECT calibration Aug '09 (tentative)
- NPOESS CDR completed (April '09)
  - CrIS NPP and NPOESS C1 SDR CalVal plans under CM at NGAS
  - CrIS EDR CalVal plan in progress for review by external community (Summer '09)

# Back-ups

# CrIS Noise vs. Heritage Sensors

AIRS, CrIS, IASI (NOTE: CrIS and IASI noise is spectrally correlated)

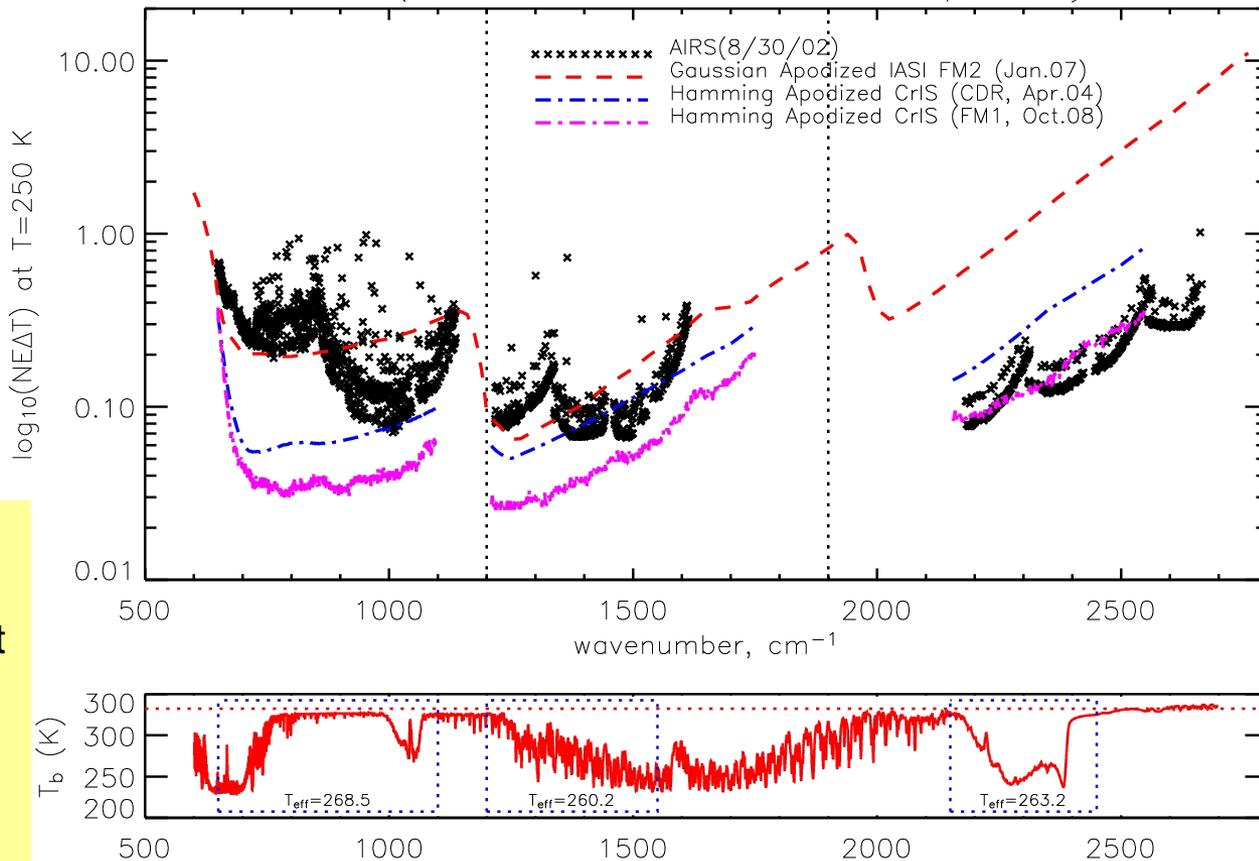


Chart added to address question that arose from M. Chahine at Oct '09 presentation

Courtesy C. Barnet, NOAA