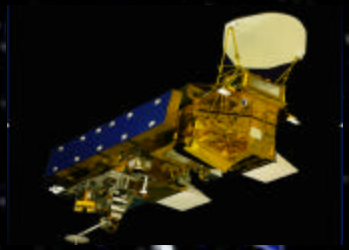
# NPOESS Airborne Sounding Testbed Extended Range (NASTER)

## *Requirements*

NPP/NPOESS



ER-2

Global Hawk

Proteus

# Requirements

**Spectral Limits (SL): ≤ 3.5 to ≥ 15 μm**

**Spectral Resolution (SR): Selectable from ≤ 0.25 to 1.25 $cm^{-1}$**

**Field of Regard (FOR): ≥ 2 km from 20 km flight altitude**

**Ground Resolution (GR): Contiguous at ≤ 500 meters from 20 km flight altitude within a single FOR**

**Cross-track Scan Coverage (CTSC): Selectable from 2.0 km to ≥20 km, depending on spectral resolution, from 20 km flight altitude for an aircraft speed of 400 kts**

**Along-track Scan Coverage (ATSC): FOR contiguity at 20 km for an aircraft speed of 400 kts**

**Noise Equivalent Temperature (NedT): Spectrally random brightness temperature error ≤ 0.25K @ 0.25 $cm^{-1}$ spectral resolution within the spectral range of 4.5 to 14 μm for a scene temperature of ≤ 260 K.**

**Absolute Error (AE): Absolute brightness temperature error ≤ 0.5K within the spectral range of 4.5 to 14 μm for scene temperatures of 200-300 K .**

**Scan Angle Coverage (SAC): Selectable over a range from Zenith (180°) to Horizontal (at either + or - 90°) to any combination of a set of viewing angle steps which together provide contiguous coverage over a range from ± 50 degrees about Nadir (0°).**

**Calibration Sources: Warm Blackbody, Ambient Blackbody, Zenith Sky View**

**Lifetime: ≥ 10 years through parts replacement over time**

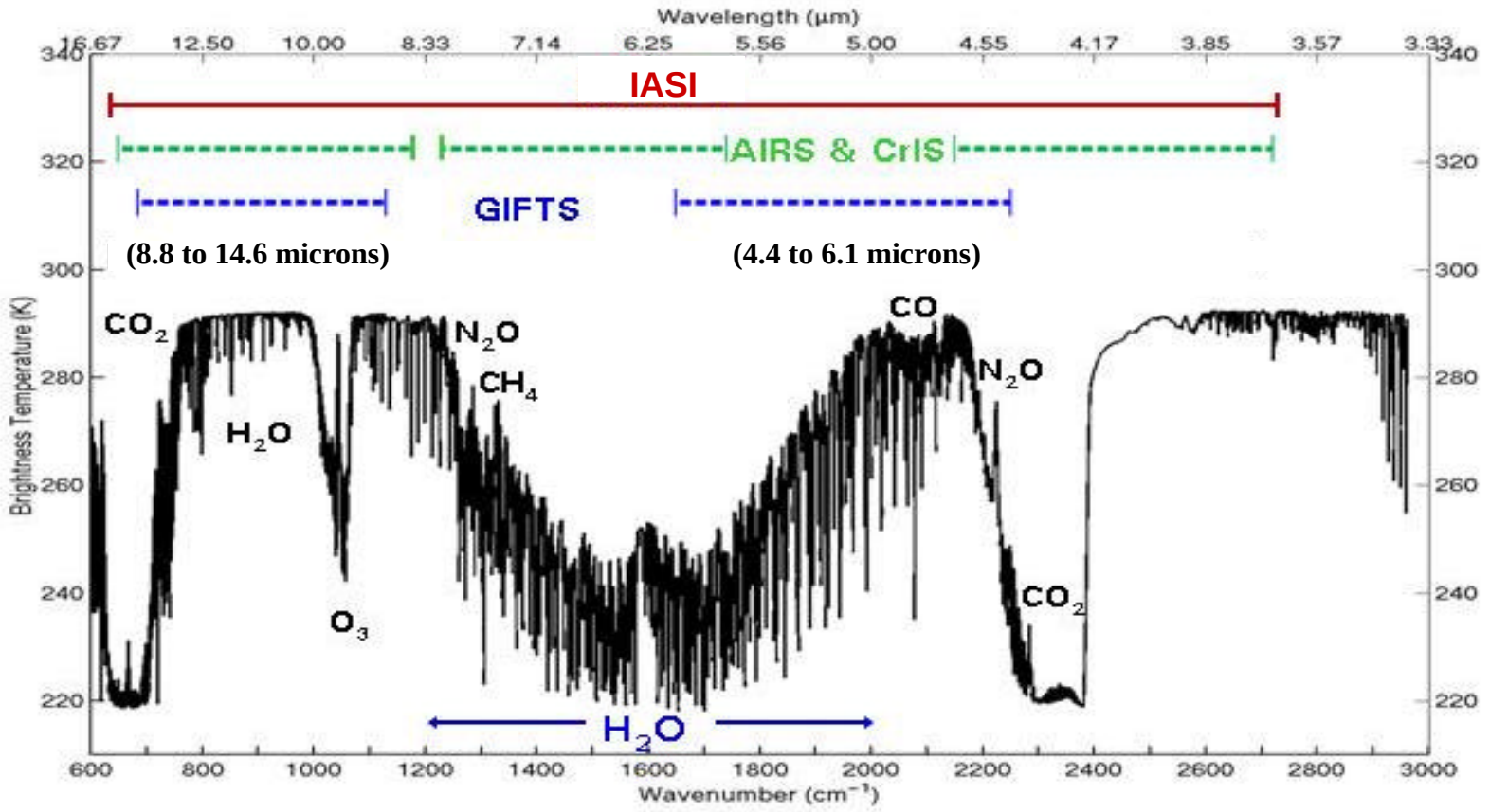
**Design type: Modular to allow for detector, spatial and spectral resolution, and data system upgrades as technology matures throughout the lifetime of the NASTER**

**Operational Requirements: Command Uplink/Data Downlink via over-the-horizon communications**

**Aircraft Compatibility: ER-2 (20 km), Proteus (17km), Global Hawk (20 km), WB-57 (18 km), and, if feasible, the new SCI space plane "Spaceship 1" (55km).**

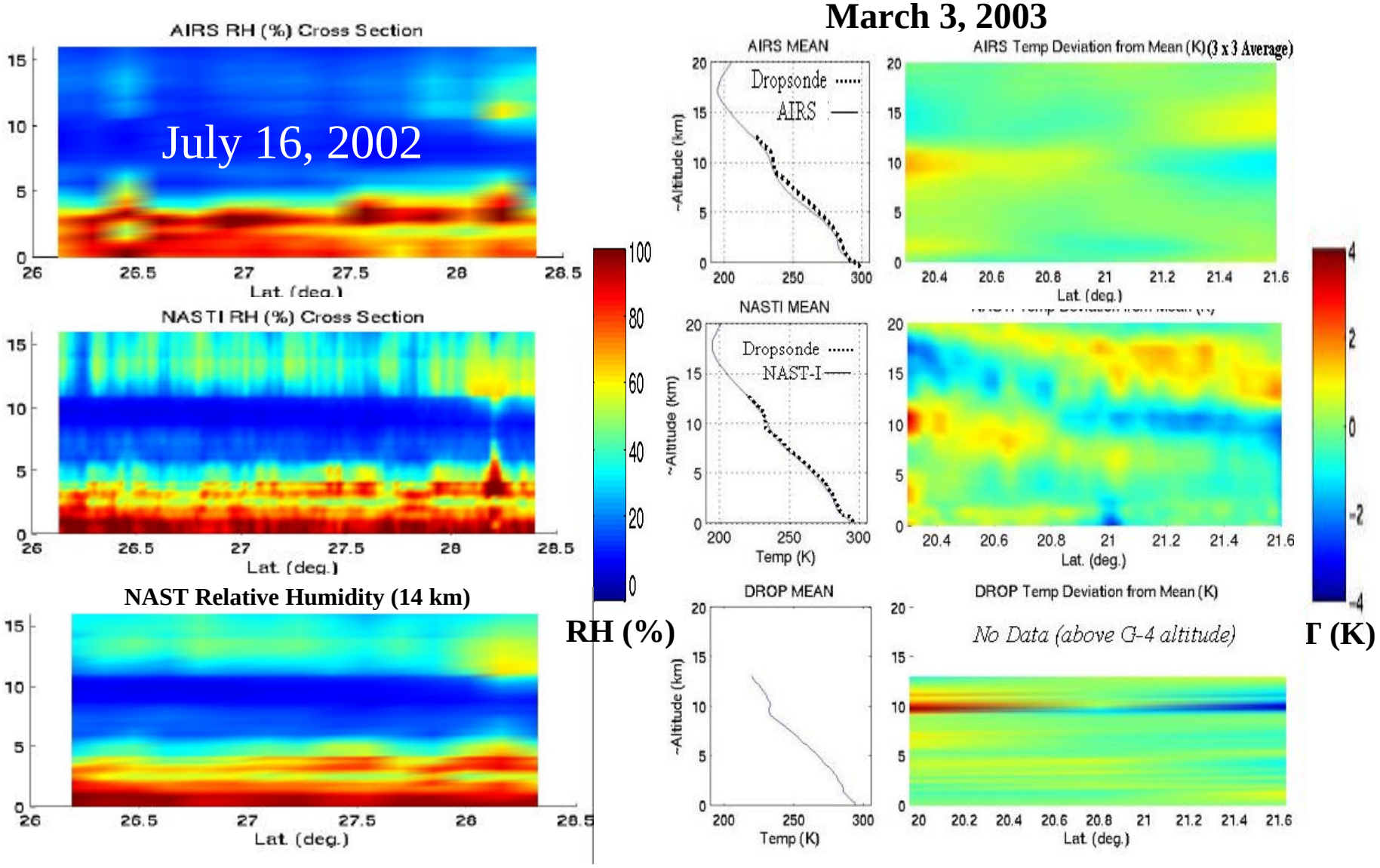
# Spectral Limits: £ 3.5 to ³ 15 mm

***Enable simulation of planned advanced IR sounding instruments***



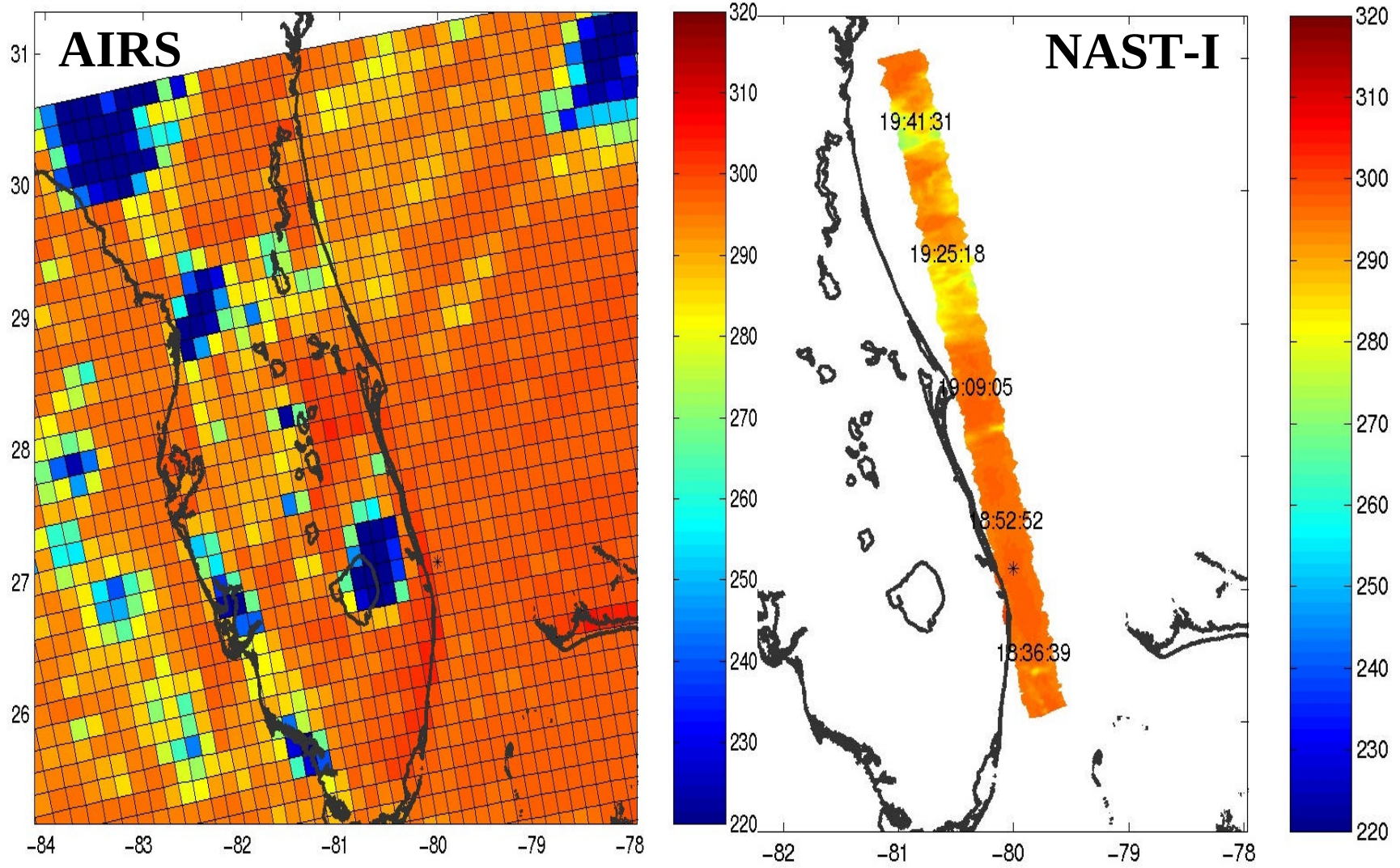
# Spectral Resolution: £ 0.25 to 1.25 $cm^{-1}$

***For high vertical resolution validation of sounding products***



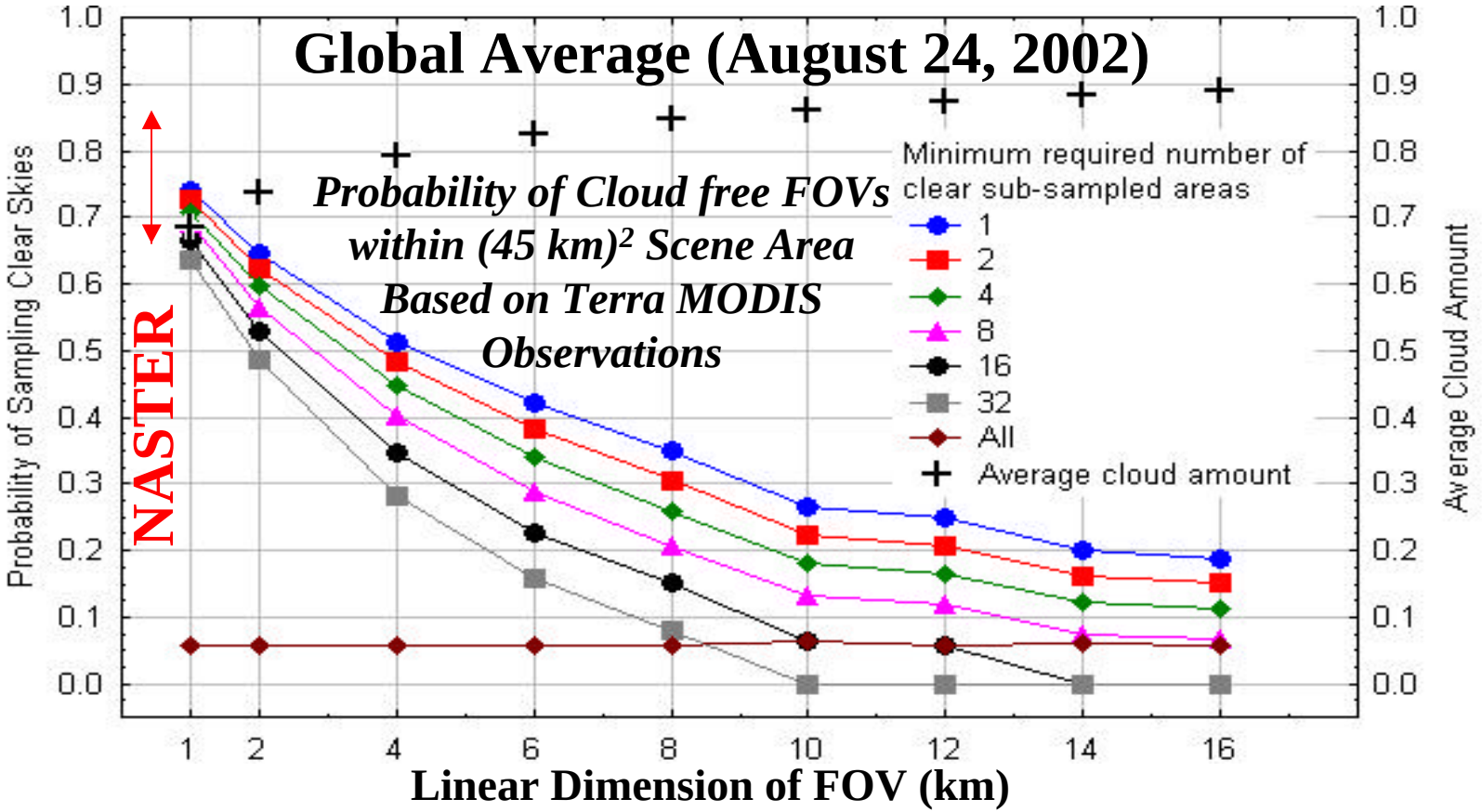
# Field of Regard: ³ 2 km from 20 km flight altitude

**To maximize spatial coverage along aircraft track**



# Ground Resolution: Contiguous at ± 500 meters from 20 km flight altitude

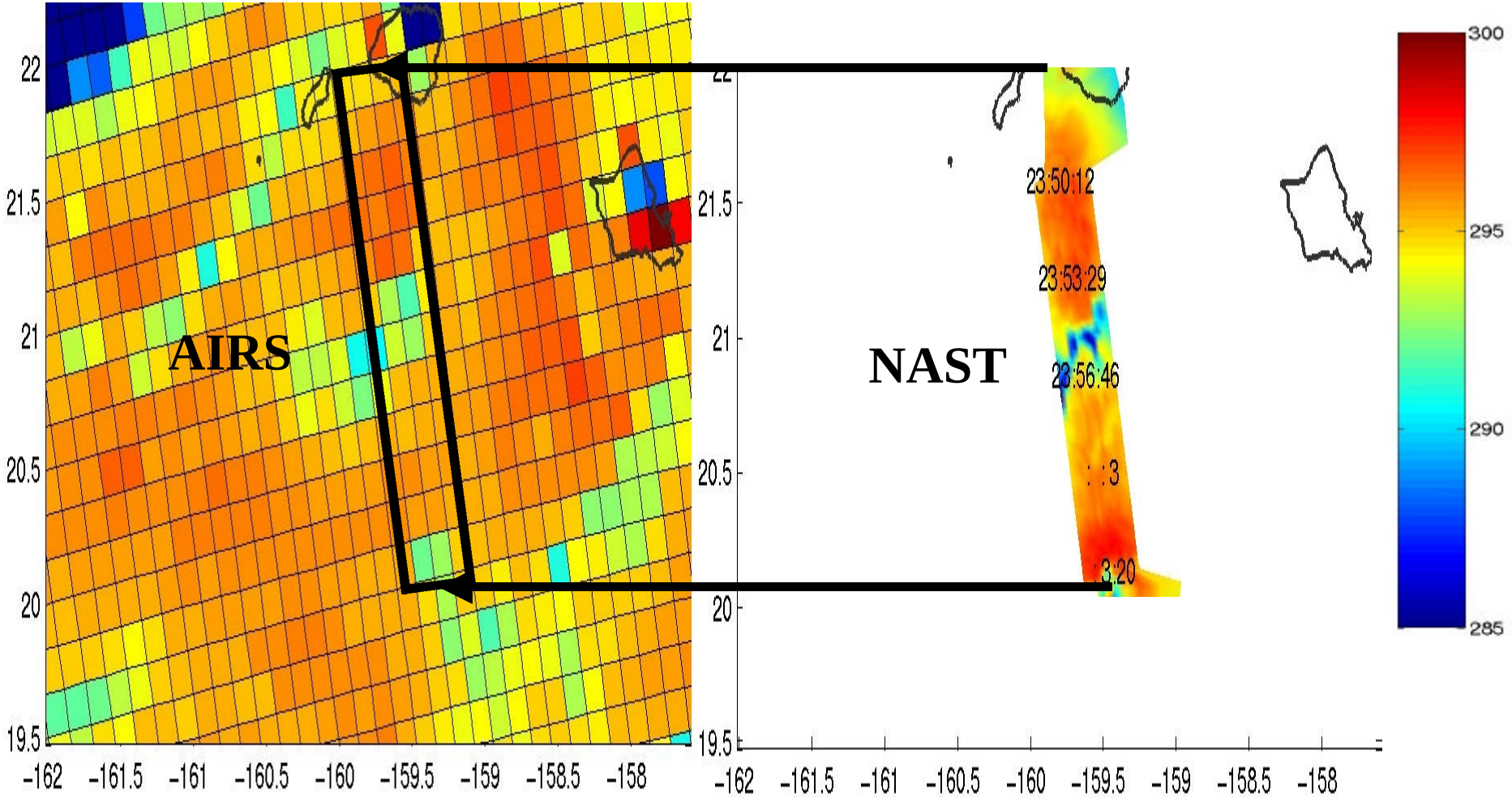
***To maximize spatial resolution for resolving clear interstices of a broken cloud scene and capturing small scale surface features***



***Cross-track Scan Coverage*: Selectable from 2.0 km to ³20 km, depending on spectral resolution, from 20 km flight altitude**

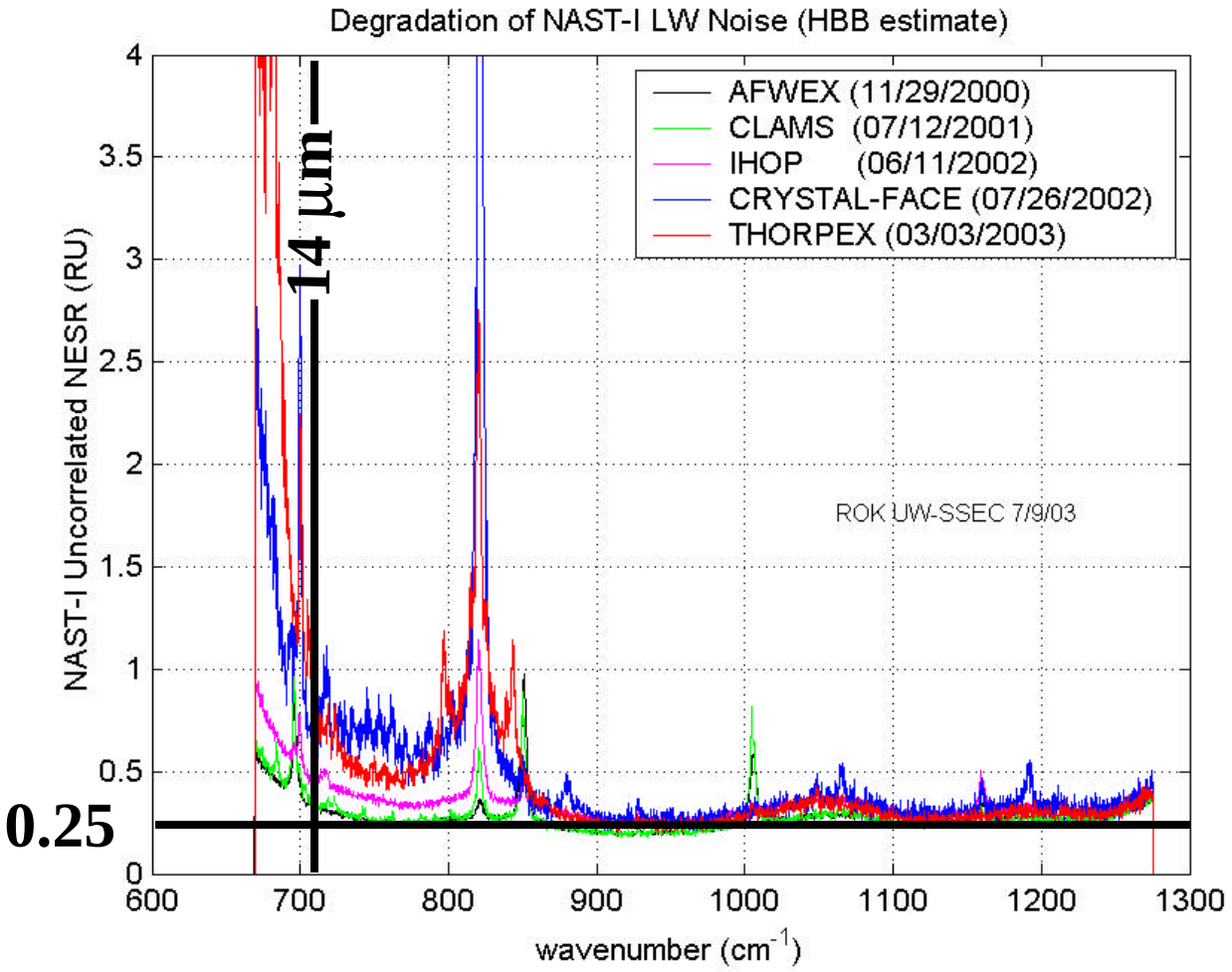
***Along-track Scan Coverage*: FOR contiguity from 20 km altitude**

***To maximize spatial coverage for satellite validation***



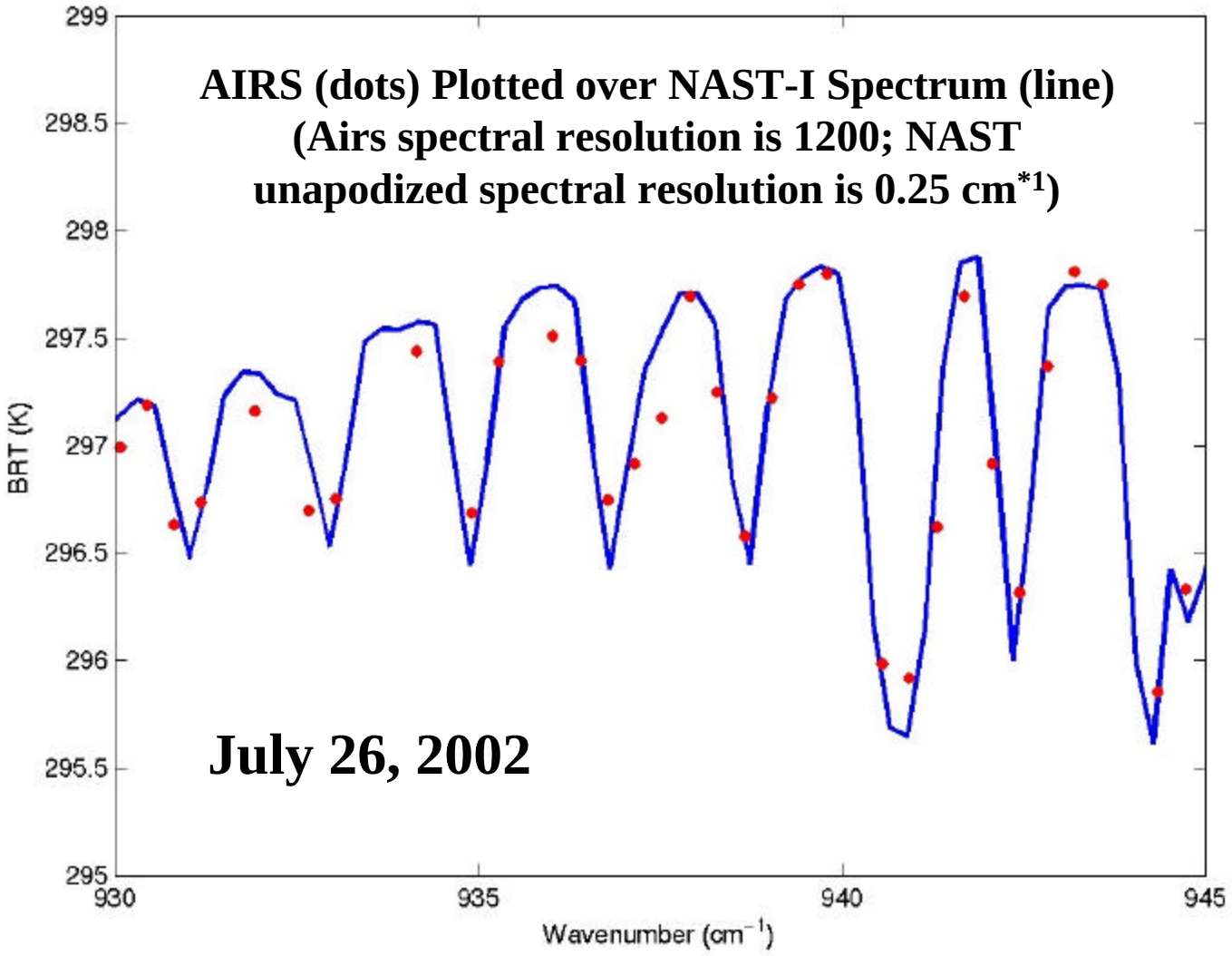
***Noise Equivalent Temperature*: Spectrally random brightness temperature error £ 0.25K @ 0.25 $cm^{-1}$ spectral resolution within the spectral range of 4.5 to 14 mm for a scene temperature of £ 260 K.**

***Vertical resolution, trace gas detection, and spatial sensitivity***



***Absolute Error*: Absolute brightness temperature error £ 0.5K within the spectral range of 4.5 to 14 mm for scene temperatures of 200-300 K**

## *Radiance validation and derived product absolute accuracy*



# Remaining Requirements

**Scan Angle Coverage (SAC):** **Selectable over a range from Zenith (180°) to Horizontal (at either + or - 90°) to any combination of a set of viewing angle steps which together provide contiguous coverage over a range from ± 50 degrees about Nadir (0°).**

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***Aircraft Compatibility:*** **ER-2 (20 km), Proteus (17km), Global Hawk (20 km), WB-57 (18 km), and, if feasible, the new SCI space plane "Spaceship 1" (95km).**