NPOESS Instruments - CrIMSS

NGST Subcontractor – ITT and NG-ES

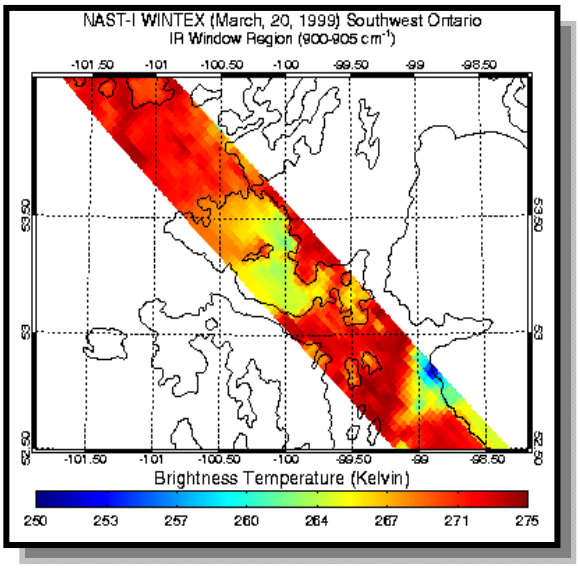
npoess.noaa.gov

Cross-track Infrared and Advanced Technology Microwave Sounders

The Cross-track Infrared Sounder (CrIS) combined with the Advanced Technology Microwave Sounder (ATMS) globally produces atmospheric temperature, moisture and pressure profiles from space. CrIS and ATMS (CrIMSS) are the next generation operational sensor suite selected to fly on the National Polar-orbiting Operational Environmental Satellite System (NPOESS) spacecraft.

CrIS Instrument

Combining both cross-track infrared and microwave sensors aboard the NPOESS satellite provides key Environmental Data Records (EDRs)



Longwave infrared image, averaged over 900-905 cm^{-1} bandwidth

CrIMSS will operationally produce high vertical resolution profile measurements of temperature, water vapor, and pressure.

CrIMSS Mission Products

Primary	**Temperature profiles**
	Moisture profiles
	Pressure profiles
	Calibrated radiances
Secondary	**Total ozone**
	Sea surface temperature
	Cloud top parameters
	Precipitable water
	ERB products

In addition to providing operational temperature, moisture, and pressure profiles, CrIMSS has the potential to provide other surface and atmospheric science data, including total ozone and sea surface temperature.

CrIS Instrument Characteristics

Spectral Range

LWIR Band	650-1095 cm^{-1}
MWIR Band	1210-1750 cm^{-1}
SWIR Band	2155-2550 cm^{-1}

Spectral Resolution

LWIR Band	<0.625cm^{-1}
MWIR Band	<1.25cm^{-1}
SWIR Band	<2.50cm^{-1}

Registration

Band-to-Band Co-registration	<1.4%
FOV Jitter	71 urad/axis
Mapping accuracy	<1.5 km

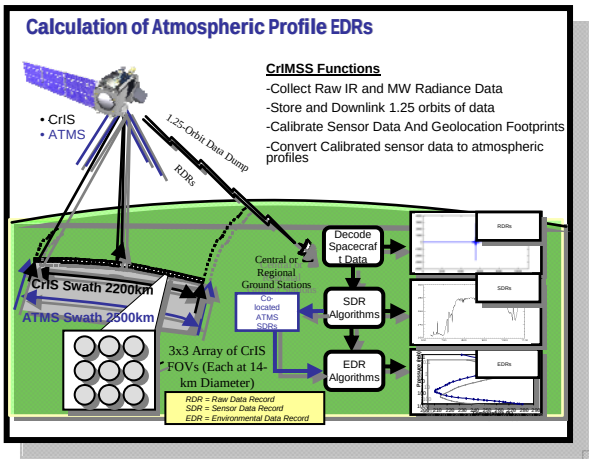
Field-of-Regard (FOR)

# of FOV	3x3
FOV Diameter (round)	14 km at nadir
FOV shape match	0.014 degrees

Stability

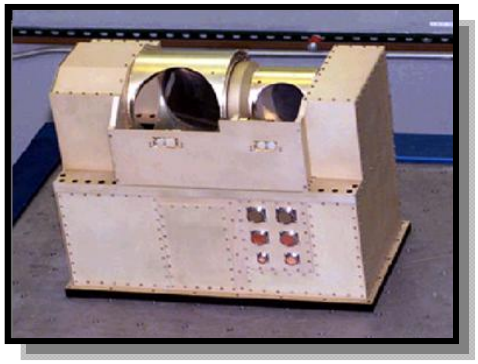
Radiometric
<0.45%LW, <0.58%MW, <0.77%SW

Spectral	ILS <1% of FWHM
Spectral shift errors	<10 ppm
Mass	165 kg spec <165
Power	123 W spec < 141
Data rate	1.5 mbps
Size	878 x 938 x 731 mm



CrIS Data Recovery

ATMS Instrument



ATMS Instrument Characteristics

Channel	Center Frequency (GHz)	Maximum Bandwidth (GHz)	Center Frequency Stability (MHz)	Temperature Sensitivity (K) NEAT	Channel	Center Frequency (GHz)	Maximum Bandwidth (GHz)	Center Frequency Stability (MHz)	Temperature Sensitivity (K) NEAT
1	23.8	0.27	<10	0.70	12	57.290344 ±0.3222 ±0.048	0.036	<1.2	1.20
2	31.4	0.18	<10	0.80	13	57.290344 ±0.3222 ±0.022	0.016	<1.6	1.50
3	50.3	0.18	<10	0.90	14	57.290344 ±0.3222 ±0.010	0.008	<0.5	2.40
4	51.76	0.40	<5	0.70	15	57.290344 ±0.3222 ±0.0045	0.003	<0.5	3.60
5	52.8	0.40	<5	0.70	16	88.2	2.0	<200	0.50
6	53.596 ±0.115	0.17	<5	0.70	17	165.5	3.0	<200	0.60
7	54.40	0.40	<5	0.70	18	183.31±7	2.0	<30	0.80
8	54.94	0.40	<10	0.70	19	183.31±4.5	2.0	<30	0.80
9	55.50	0.33	<10	0.70	20	183.31±3	1.0	<30	0.80
10	57.290344	0.33	<0.5	0.75	21	183.31±1.8	1.0	<30	0.80
11	57.290344 ±0.217	0.078	<0.5	1.20	22	183.31±1	0.5	<30	0.90

ATMS provides high spatial resolution microwave data to support temperature and humidity sounding generation in cloud covered conditions.

In addition, ATMS provides advances in technology that allow the current operational temperature and moisture microwave sounder elements to be packaged in one sensor with less total weight, power, and volume.

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