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Aircraft Scanners



The Aircraft Scanners data set contains digital imagery acquired from several multispectral scanners including the Thematic Mapper (TM), the Advanced Very High Resolution Radiometer (AVHRR), the SeaWiFS, the Sea-Viewing Wide Field-of-View of Radiometer (SeaWiFS), the Thematic Mapper simulator (TMS), scanners and the thermal infrared multispectral scanner (TIMS). Data are collected from selected areas over the conterminous United States, Alaska, and Hawaii. Data are collected by NASA ER-2 and NASA C-130B aircraft operating from the NASA Ames Research Center (ARC) in Moffett Field, California, and by NASA Learjet aircraft operating from Stennis Space Center in Bay St. Louis, Mississippi. Limited international acquisitions also are available.

The NS-001 multispectral scanner was flown aboard a NASA C-130B aircraft and is a line-scanning device designed to simulate Landsat TM sensor performance. The scanner collects multispectral data in the seven LANDSAT-4 Thematic Mapper bands plus a band from 1.13 to 1.35 micrometers. The eight-channel detector subsystem consists of a six-element array and separate detectors for measuring reflected infrared energy and thermal infrared energy. The spectral bandwidths of each channel are fixed by design:

BAND	Wavelength, μm		
1	.458 - .519	IFOV	2.5 mrad
2	.529 - .603	Field of View	100°
3	.633 - .697	Pixels/Scan Line	699
4	.767 - .910	Ground Resolution	7.6m at 300m (10,000 ft)
5	1.13 - 1.35	Swath Width	7.26 Km (3.9 nmi) at 3000 m
6	1.57 - 1.71	Aperture	72.4 cm ²
7	2.10 - 2.38		
8	10.9 - 12.3		

NASA Stennis Space Center (SSC), the Jet Propulsion Laboratory (JPL) and Daedalus Corporation have developed the Thermal Infrared Multispectral Scanner (TIMS) for exploiting mineral signature information. TIMS is a multispectral scanning system using a dispersive grating and a six element Mercury-cadmium-telluride (HgCdTe) detector produce six discrete channels in the 8.2 to 12.2 micron region. Used as an airborne geologic remote sensing instrument, TIMS acquires emitted and reflected thermal data that are useful in the discrimination of silicate, carbonate and hydrothermally altered rocks. TIMS data have been used extensively in geology and volcanology research in the United States, Hawaiian Islands, Europe and Russia.

BAND	Wavelength, μm		
1	8.2 - 8.6	IFOV	2.5 mrad
2	8.6 - 9.0	Field of View	76.564
3	9.0 - 9.4	Pixels/Scan Line	638
4	9.4 - 10.2	Scan Rate	7.3; 8.7; 12; or 25 scans/sec
5	10.2 - 11.2	Ground Resolution	50 m at 20 Km (65,000 ft)
6	11.2 - 12.2	Swath Width	31.3 Km (16.9 nmi)

The Thematic Mapper Simulator (TMS) is a Daedalus AADS-1268 scanner that is flown on the ER-2 aircraft and simulates the LANDSAT Thematic Mapper (TM) instrument, with slightly higher spatial resolution. The TMS is collecting data similar to data collected by the LANDSAT Thematic Mapper with applications including Earth mapping, vegetation/landcover mapping and geologic studies. The sensor acquires data in 12 spectral bands:

Channel	TM Band	Wavelength, μm		
1	A	0.42 - 0.45	IFOV	1.25 mrad
2	1	0.45 - 0.52	Field of View	42.5 μ
3	2	0.52 - 0.60	Pixels/Scan Line	716
4	B	0.60 - 0.62	Scan Rate	12.5 scans/sec
5	3	0.63 - 0.69	Spatial Resolution	25 m at 20 Km (65,000 ft)
6	C	0.69 - 0.75	Swath Width	15.6 Km (8.4 nmi) at 20 Km
7	4	0.76 - 0.90		
8	D	0.91 - 1.05		
9	5	1.55 - 1.75		
10	7	2.08 - 2.35		

11	6	8.5 - 14.0	High Gain
12	6	8.5 - 14.0	Low Gain

Aircraft platforms for TIMS, NS-001 and TMS are operated by the NASA Ames Research Center (ARC) and Stennis Space Center (SSC). ARC operates the high-altitude ER-2, which carries TIMS and TMS and former the medium-altitude C-130B, which carried TIMS and NS-001. SSC operates the medium-altitude Learjet 23 TIMS.

The Aircraft Scanner data are available for distribution from the EROS Data Center (EDC) Distributed Active Center (DAAC) in Sioux Falls, South Dakota. The data can be ordered online through the [EOS Data Gateway](#)

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