AMS Airborne Multispectral Scanner

The AMS system is a dual optical port multispectral scanner which records up to six spectral channels simultaneously directly onto an 8 mm digital tape. The AMS provides calibrated thermal information for the determination of radiometric temperature relationships for various remote sensing applications. The compact scan head and electronics can be installed in a wide range of aircraft using standard 16" aerial camera ports and seat assemblies.

The standard sensor configuration offers a dual element thermal infrared detector and an 8-channel, visible/near infrared spectrometer so that a total of 10 spectral bands are available. Up to six of these bands may be selected for recording by the operator. An ultraviolet detector/dichroic assembly may be substituted for the spectrometer to expand system capabilities.

The system's Built-In Test (BIT) capabilities deliver a high level of confidence in mission success. An on-board image display provides a real-time check of flight line coverage and data quality. A built-in differential ready GPS receiver automatically inserts navigation data into the housekeeping message in the header of each scan line.

The AMS provides operator control via a menu-driven touch screen. An optional printer can provide continuous real-time hard copy images plus a VHS video recording can be made from the monitor output.

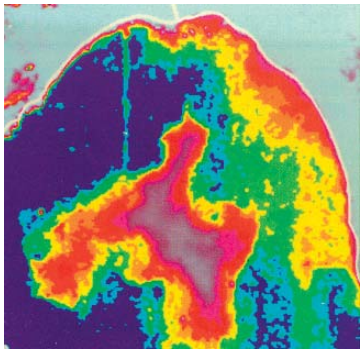
AMS data tapes may be read and processed by ERDAS Imagine® image processing software, using the “Daedalus” importer.

The AMS collects data for applications as diverse as:

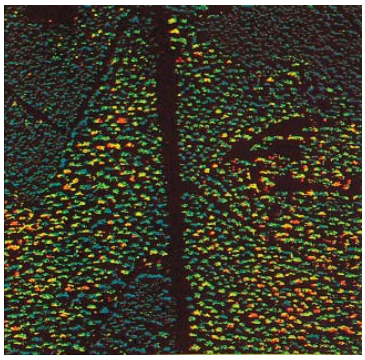
- *Geologic mapping*
- *Forest inventory*
- *Fire mapping*
- *Oil spill detection/mapping*
- *Water chlorophyll studies*
- *And many more.*

System photo depicts one variation of system.

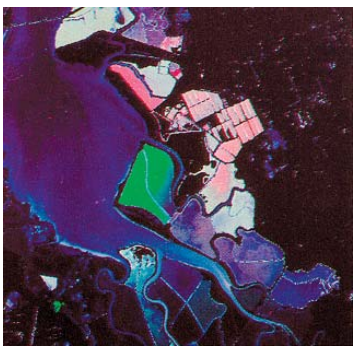
- Digital performance – 8-bit and 12-bit resolution
- Ten spectral channels



Bay Environment Study shows sea water pollution, suspended solids and chlorophyll conditions. *(Courtesy Asia Air Survey Company, Ltd., Japan)*



Acid Rain Study of a forest area shows degradation of healthy trees over a one year period. Red dots are dead trees. *(Courtesy Eurosense, Belgium)*



Imagery of waste settling ponds in the San Francisco Bay area shows dramatic differences in spectral signatures. Diked ponds, some of which are used for industrial processing wastes, require airborne monitoring to detect leakage. *(Courtesy of NASA/Ames Research Center) NASA does not endorse any commercial product.*

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Imaging Group

Environmental Remote Sensing Technology

AMS Airborne Multispectral Scanner

PARTIAL LISTING OF APPLICATIONS:	SPECTRAL BANDS										
		VIS/NIR Spectrometer Channels								3-5 µm SWIR	8.5-12.5 µm LWIR
	UV	1	2	3	4	5	6	7	8		
Geologic Mapping			X	X		X		X		X	X
Water Chlorophyll		X		X					X		X
Water Suspended Sediment				X				X			X
Water Temperature								X			X
Forest Inventory			X	X	X	X		X	X		
Crop Vigor Studies			X	X		X		X			X
Fire Detection/Mapping										X	X
Oil Spill Detection/Mapping	X									X	X

Examples of typical applications and their recommended spectral combinations are depicted in the chart above.

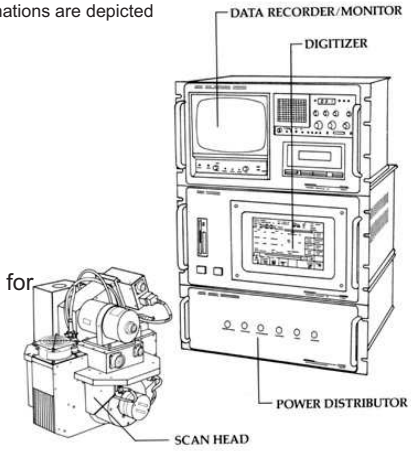
OPTIONS

DETECTORS
Ultraviolet Detector (UV), 320 - 380 nm (5.0 mrad only)
8 Band CZCS Array Assembly
(**Note**: *Detectors can be purchased later as needs develop.*)

HARDCOPY PRINTER
Continuous hardcopy image of raw video data (corrected for s-bend and V/H geometric distortions)

DETECTOR CRYO-COOLING

INSTALLATION ASSISTANCE



SPECTRAL BANDS		NER 2.5 mrad	NER 1.25 mrad
UV Channel (optional) (5.0 mr IFOV)	320 - 380 nm	≤0.02 (5.0 mrad)	
VIS/NIR Spectrometer	0.42 - 0.45 µm	≤0.10	≤0.40
	0.45 - 0.52 µm	≤0.02	≤0.08
	0.52 - 0.60 µm	≤0.02	≤0.08
	0.60 - 0.63 µm	≤0.05	≤0.20
	0.63 - 0.69 µm	≤0.02	≤0.08
	0.69 - 0.75 µm	≤0.02	≤0.08
	0.76 - 0.90 µm	≤0.02	≤0.08
	0.91 - 1.05 µm	≤0.02	≤0.08
		NEΔT	
IR CHANNELS	3.0 - 5.5 µm	≤0.1	≤0.2
	8.5 - 12.5 µm	≤0.1	≤0.1

NER is µW/cm^{2}nmsr and NEΔT in °C (6.25 scans/sec)

PHYSICAL SPECIFICATIONS

	Height		*Width*		*Depth**	
	in	*cm*	*in*	*cm*	*in*	*cm*
Scan Head	15.0	38.0	15.0	38.0	15.0	38.0
Electronics	28.0	71.2	20.0	50.8	20.0	50.8
			lbs	*kg*		
Total System Weight (approx.)			185	84		

** Depth not including connectors and cables*

ENVIRONMENTAL SPECIFICATIONS

	Temperature	*Rel. Humidity (non-condensing)*	*Altitude*
Scan Head	-55° to +70°C	0 - 95%	50,000 ft (15,200 m)
Electronics (operating)	+5° to +40°C	20 - 80%	25,000 ft* (7,600 m)
Electronics (non-operating)	-40° to +60°C	0 - 95%	50,000 ft (15,200 m)

** Video monitor will automatically switch off above 14,500 ft (4,400 m)*

TECHNICAL SPECIFICATIONS

INSTANTANEOUS FIELD OF VIEW
2.5 milliradians (1.25 mrad optional)

DIGITIZED FIELD OF VIEW – 86°
720 pixels @ 2.5 mrad
1440 pixels @ 1.25 mrad

SCAN RATES
100, 50, 25, 12.5, 6.25 scans/sec (operator selectable)

VELOCITY/HEIGHT RATIO (V/H)
0.25 radians/sec @ 100 scans/sec @ 2.5 mrad IFOV; 0.125 radians/sec @ 1.25 mrad IFOV

ROLL CORRECTION
±15° of roll correction (automatic)

POWER REQUIREMENTS
28 ±3 VDC, 30 amps continuous (not including optional hardcopy printer)

IMAGE DISPLAY
9" CRT (640 pixels wide in continuous moving window, RS-170/CCIR output)

DIGITIZATION PRECISION
8-bit or 12-bit (operator selectable)

DATA RECORDING LIMITS
(12-bit words)
4 channels @ 1.25 mrad 100 scans/sec
6 channels @ all other resolutions and scan speeds
(8-bit words, 1.25 or 2.5 mrad)
6 channels maximum @ all scan speeds

RECORD TIME AT 100 SCANS/SEC
(2 channel operation)

2.5 mrad	1.25 mrad
12-bit - 6.2 hrs min	12-bit - 3.2 hrs min
8-bit - 9.2 hrs min	8-bit - 4.7 hrs min

THERMAL REFERENCE SOURCES
Two controllable field-filling blackbody reference sources. Range of -15° to +25°C with respect to scan head heat sink temperature.

GPS RECEIVER
A GPS receiver is integral to the system. Date, time, ground speed, latitude, longitude and track angle are recorded on the system data tape.

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Imaging Group
P.O. Box 1869
Ann Arbor, MI 48106-1869 USA
(734) 769-5649 FAX (734) 769-0429

www.argonst.com

Corporate Headquarters
12701 Fair Lakes Circle, Suite 800, Fairfax, VA 22033
Phone (703) 322-0881 FAX (703) 322-0885