

Enhanced MODIS Airborne Simulator (ARC)

The Enhanced MODIS Airborne Simulator (eMAS) is a multispectral scanner configured to approximate the Moderate-Resolution Imaging Spectrometer (MODIS), an instrument orbiting on the NASA Terra and Aqua satellites. MODIS is designed to measure terrestrial and atmospheric processes. The eMAS was a joint development project of Daedalus Enterprises, Berkeley Camera Engineering, the Space Dynamics Laboratory, and Ames Research Center. The eMAS system acquires 50-meter spatial resolution imagery, in 38 spectral bands, of cloud and surface features from the vantage point of the NASA ER-2 high-altitude research aircraft.

Data acquired by the eMAS are helping to define, develop, test, and refine algorithms for the [Moderate Resolution Imaging Spectroradiometer \(MODIS\)](#), a key sensor of NASA's Earth Observing System (EOS). The MODIS program emphasizes the use of remotely sensed data to monitor variation in environmental conditions for assessing global climate change. All data acquired from the eMAS instrument are freely available to the public, via normal NASA data archive channels (see the MAS website, indicated below.)

The eMAS instrument is maintained and operated by the Airborne Sensor Facility (ASF) at NASA Ames Research Center in Mountain View, California, under the oversight of the EOS Project Science Office at NASA Goddard. Instrument scheduling is coordinated by the ASF, with formal arrangements made via the NASA Airborne Science Program [flight request](#) process.

The eMAS instrument team devotes considerable effort to ensuring the quality and accuracy of its data products. If you publish scientific results involving eMAS data, please include a reference to:

King, Menzel, Grant, Myers, Arnold, Platnick, Gumley, Tsay, Moeller, Fitzgerald, Brown, and Osterwisch, 1996: [Airborne scanning spectrometer for remote sensing of cloud, aerosol, water vapor and surface properties](#). *Journal of Atmospheric and Oceanic Technology*, **13**, 777-794.

The Enhanced MODIS Airborne Simulator Scanner records 38 spectral bands, configured as follows:

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
1	0.4649	0.0397	0.4451-0.4848
2	0.5494	0.0417	0.5285-0.5703
3	0.6550	0.0511	0.6294-0.6805
4	0.7024	0.0415	0.6816-0.7231
5	0.7431	0.0420	0.7221-0.7641
6	0.8248	0.0427	0.8034-0.8461
7	0.8667	0.0414	0.8460-0.8874
8	0.9072	0.0409	0.8867-0.9276
9	0.9476	0.0397	0.9277-0.9674
10	1.6422	0.0519	1.6163-1.6682
11	1.6975	0.0505	1.6722-1.7228
12	1.7499	0.0506	1.7245-1.7752
13	1.8014	0.0491	1.7768-1.8259
14	1.8548	0.0489	1.8303-1.8792
15	1.9044	0.0487	1.8801-1.9288
16	1.9553	0.0483	1.9312-1.9794

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
26	3.70	0.180	
27	6.76	0.200	
28	7.39	0.240	
29	8.34	0.250	
30	8.61	0.230	
31	9.8	0.240	
32	10.28	0.250	
33	11.11	0.260	
34	12.10	0.240	
35	12.68	0.240	
36	13.43	0.250	
37	13.73	0.250	
38	13.99	0.190	

17	2.0048	0.0487	1.9804-2.0291
18	2.0551	0.0484	2.0309-2.0793
19	2.1037	0.0486	2.0794-2.1280
20	2.1532	0.0483	2.1291-2.1774
21	2.2019	0.0481	2.1779-2.2259
22	2.2522	0.0486	2.2278-2.2675
23	2.3021	0.0487	2.2777-2.3265
24	2.3512	0.0476	2.3274-2.3750
25	2.4005	0.0483	2.3764-2.4246

Sensor/Aircraft Parameters:

Spectral Bands: 38 (16-bit resolution)
 IFOV: 2.5 mrad
 Ground Resolution: 163 feet (50 meters at 65,000 feet)
 Swath Width: 19.9 nmi (36 km)
 Total Scan Angle: 85.92 degrees
 Pixels/Scan Line: 716
 Scan Rate: 6.25 Hz
 Ground Speed: 400 kts (206 m/second)
 Roll Correction: Plus or minus 3.5 degrees (approx.)

(See the MAS homepage at: <http://mas.arc.nasa.gov/>)