

FLIGHT SUMMARY REPORT

Flight Number: 11-002-04
Calendar/Julian Date: 11 October 2010 (284)
Sensor Package: Cirrus Digital Camera System (DCS)
MODIS/ASTER Airborne Simulator (MASTER)
Area(s) Covered: San Pedro River Basin, AZ
Investigator(s): French (USDA) **Aircraft:** DoE B200 #796

SENSOR DATA

Accession #:	05984	—
Sensor ID #:	167	124
Sensor Type:	DCS	MASTER
Focal Length:	50mm	—
Film Type:	—	—
Filtration:	Wratten 12	—
Spectral Band:	510-990nm	—
f-Stop:	11	—
Shutter Speed:	1/500	—
# of Frames:	328	—
% Overlap:	60%	—
Quality:	Excellent	Fair
Remarks:		

NASA Airborne Science Program

The National Aeronautics and Space Administration maintains a variety of aircraft and sensor systems dedicated to the support of remote sensing research. Two Lockheed ER-2s (S-model U-2); two WB-57 high altitude aircraft; a DC-8; a Lockheed Orion P-3B; Global Hawk and the Altair unmanned aerial vehicle (supported by General Atomics) provide multi-level platforms for both NASA and investigator-owned sensors. Data are collected for the atmospheric, land, and ocean processes in support of the NASA Earth Science program, as well as for universities and other government agencies.

Additionally contracted aircraft from Department of Energy, and Twin Otter International provide remote sensing platforms for the program.

The NASA aircraft, located at Dryden Flight Research Center and Johnson Space Center, are used as test-beds for advanced sensor design and satellite simulation, as well as to support scientific and operational data collection campaigns. Numerous sensor systems are in use and under development by NASA, including multispectral imaging devices, a SAR system, and a suite of medium-format digital cameras. All instruments are spectrally, spatially, and radiometrically calibrated on a routine basis. The aircraft themselves are equipped with navigation systems that continuously record GPS location and platform attitude data.

Airborne Sensor Facility

The Airborne Sensor Facility at NASA Ames Research Center web site:

<http://asapdata.arc.nasa.gov/>

Additional information regarding flight documentation to include archive searches may be obtained from the following:

Airborne Sensor Facility
MS 244-15
NASA Ames Research Center
Moffett Field, CA 94035
Telephone: (650)604-6252 (FAX 4987)

MASTER (MODIS/ASTER Airborne Simulator)

The MODIS/ASTER Airborne Simulator (MASTER) is similar to MAS, with the thermal bands modified to more closely match the NASA EOS ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer). It is intended primarily to study geologic and other Earth surface properties. It has a variable scan speed which allows data to be acquired on both high and low altitude aircraft. Its fifty spectral bands are configured below:

MASTER AIRBORNE SIMULATOR			ASTER			
Band	Bandwidth	Resolution	Band	Bandwidth	Resolution	
1	0.438-0.482	5-50m				
2	0.479-0.522	5-50m				
3	0.521-0.564	5-50m	1	0.520-0.600	15m	
4	0.562-0.603	5-50m				
5	0.633-0.692	5-50m	2	0.630-0.690	15m	
6	0.692-0.734	5-50m				
7	0.731-0.773	5-50m	3	0.760-0.860	15m	
8	0.781-0.823	5-50m				
9	0.848-0.889	5-50m				
10	0.886-0.927	5-50m				
11	0.927-0.966	5-50m				
12	1.582-1.636	5-50m	4	1.600-1.700	30m	
13	1.638-1.691	5-50m				
14	1.694-1.745	5-50m				
15	1.749-1.801	5-50m				
16	1.803-1.853	5-50m				
17	1.852-1.898	5-50m				
18	1.896-1.953	5-50m				
19	1.956-2.006	5-50m				
20	2.057-2.105	5-50m				
21	2.134-2.185	5-50m	5	2.145-2.185	30m	
22	2.185-2.236	5-50m	6	2.185-2.225	30m	
23	2.233-2.284	5-50m	7	2.235-2.285	30m	
24	2.294-2.363	5-50m	8	2.295-2.365	30m	
25	2.362-2.426	5-50m	9	2.360-2.430	30m	
26	3.075-3.231	5-50m				
27	3.231-3.377	5-50m				
28	3.385-3.535	5-50m				
29	3.538-3.694	5-50m				
30	3.692-3.826	5-50m				
31	3.846-3.999	5-50m				
32	3.999-4.154	5-50m				
33	4.157-4.310	5-50m				
34	4.307-4.460	5-50m				
35	4.456-4.603	5-50m				
36	4.597-4.760	5-50m				
37	4.753-4.911	5-50m				
38	4.906-5.054	5-50m				
39	5.044-5.205	5-50m				
40	5.203-5.342	5-50m				

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MASTER AIRBORNE SIMULATOR			ASTER		
Band	Bandwidth	Resolution	Band	Bandwidth	Resolution
41	7.587-7.943	5-50m			
42	7.950-8.398	5-50m	10	8.125-8.475	90m
43	8.447-8.806	5-50m	11	8.475-8.825	90m
44	8.882-9.307	5-50m	12	8.925-9.275	90m
45	9.503-9.902	5-50m			
46	9.912-10.327	5-50m			
47	10.338-10.922	5-50m	13	10.25-10.95	90m
48	10.977-11.652	5-50m	14	10.95-11.65	90m
49	11.864-12.364	5-50m			
50	12.638-13.119	5-50m			

MASTER/Aircraft Parameters:

Spectral Bands: 50 (16-bit resolution)
IFOV: 2.5mrad
Swath width: 19.9nm (36km) at 65,000ft
Ground Resolution 5-50m (variable w/ altitude)
Total FOV: 85.92 degrees
Pixels/Scanline: 716
Scan Rate: 6.25 – 25 Hz
URL Reference: <http://masterweb.jpl.nasa.gov>

Cirrus Digital Camera System (DCS)

Cirrus Digital Systems provides the digital camera. It consists of a Hasselblad camera body with a Kodak camera back and CCD array. It can be configured to acquire either false color infrared or natural color imagery.

Lens	Array Size	Array Width	Field of View (FOV)	Altitude	Ground Coverage	Nominal Resolution
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	65000'	7.9nm	3.5m
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	45000'	5.4nm	2.5m
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	28000'	3.4nm	1.5m
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	13000'	1.6nm	0.7m
50mm	4072 x 4072 (pixels)	36.72mm	40.3°	6500'	0.8nm	0.4m

Note: Nominal resolution references the smallest target that can be imaged.

CAMERA FLIGHT LINE DATA
FLIGHT NO. 11-002-04

Accession # 05984

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Sensor # 167

Site #	Line #	Run #	Frame #	Time (GMT-hr, min, sec)		Altitude, GPS feet/meters	Cloud Cover/Remarks
				START	END		
SPH	6	1	3173-3204	17:08:51	17:16:20	20700/6310	Clear
SPH	5	1	3205-3214	17:23:00	17:25:10	20700/6310	Clear
SPH	4	1	3215-3224	17:30:00	17:32:10	21100/6440	Clear
SPH	3	1	3225-3236	17:37:43	17:40:21	21200/6470	Clear
SPH	1	1	3237-3245	17:52:03	17:53:58	21900/6680	Clear
SPH	2	2	3246-3254	17:58:37	18:00:32	21500/6560	Clear
SPL	11	1	3255-3333	18:14:53	18:23:53	10900/3330	Clear (Same line as SPH #6)
SPL	10	1	3334-3345	18:32:35	18:33:52	10900/3330	Clear
SPL	6	1	3346-3368	18:38:44	18:41:17	11500/3510	Clear
SPL	2	1	3369-3380	18:45:33	18:46:50	11900/3630	Clear
SPL	7	1	3381-3403	18:51:41	18:54:15	11400/3480	Clear

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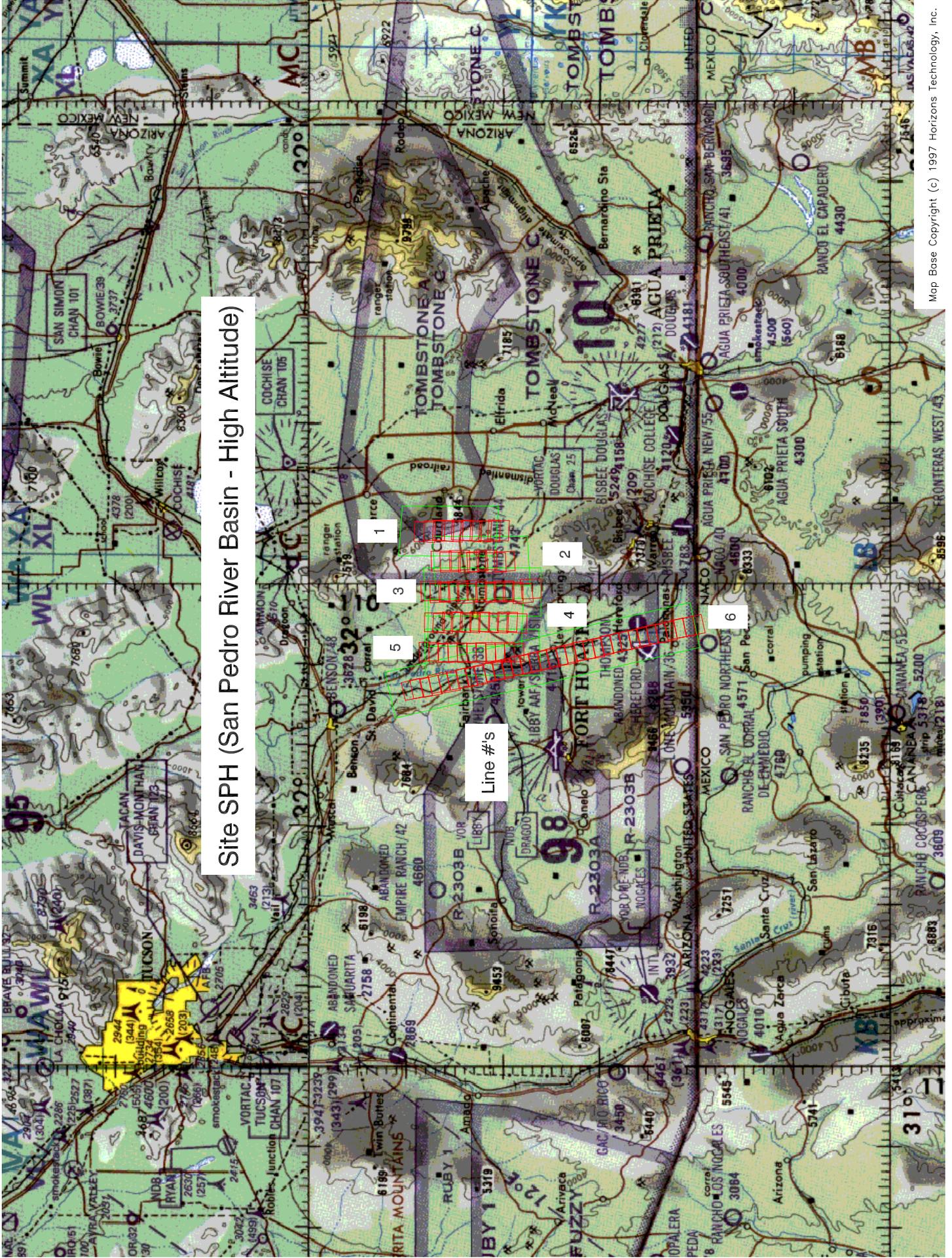
Sensor # 167

Site #	Line #	Run #	Frame #	Time (GMT-hr, min, sec)		Altitude, GPS feet/meters	Cloud Cover/Remarks
				START	END		
SPL	3	1	3404-3419	18:58:05	18:59:49	11700/3570	Clear
SPL	8	1	3420-3437	19:04:32	19:06:30	11300/3450	Clear
SPL	4	1	3438-3455	19:10:54	19:12:53	11600/3540	Clear
SPL	9	1	3456-3469	19:17:32	19:19:03	11100/3390	Clear
SPL	5	1	3470-3491	19:24:02	19:26:29	11500/3510	Clear
SPL	1	1	3492-3500	19:31:04	19:32:00	12200/3720	Clear

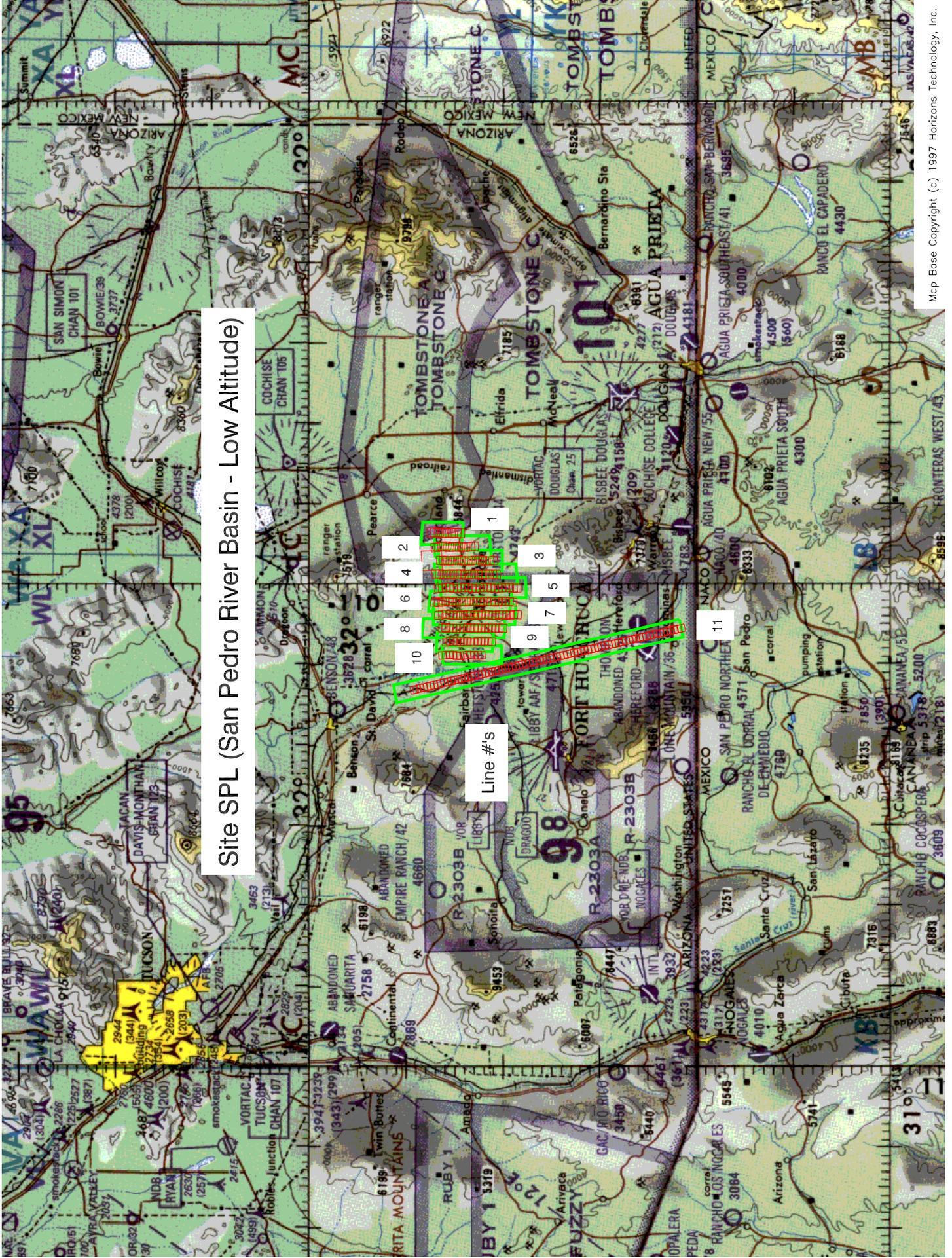
MODIS/ASTER AIRBORNE SIMULATOR (MASTER) FLIGHT LINE INFORMATION FOR 11 Oct 2010
 NASA FLIGHT NUMBER 11-002-04

FLTL	SITE	LINE	RUN	START OF FLIGHT LINE			END OF FLIGHT LINE			FLIGHT DATA				
				TIME HH:MM:SS	LAT DEG	LON DEG	TIME HH:MM:SS	LAT DEG	LON DEG	SCAN LINES	SOLAR ZEN AZIM		HEAD DEG	ALT M (MSL)
1	SP1	06	1	17:08:14	31.858	-110.229	17:16:25	31.332	-110.083	6097	47.3	139.6	167.28	6305
2	SP1	05	1	17:22:23	31.601	-110.141	17:25:18	31.799	-110.140	2183	45.8	143.0	357.64	6296
3	SP1	04	1	17:29:53	31.792	-110.079	17:32:23	31.627	-110.078	1871	44.9	145.3	181.16	6429
4	SP1	03	1	17:37:30	31.599	-110.015	17:40:33	31.800	-110.015	2285	44.0	147.9	358.50	6458
5	SP1	01	1	17:51:27	31.840	-109.888	17:53:59	31.673	-109.888	1886	42.5	152.5	183.42	6685
6	SP1	02	2	17:58:01	31.620	-109.951	18:00:33	31.785	-109.951	1887	41.9	154.7	356.32	6555
7	SP2	11	1	18:14:14	31.849	-110.227	18:23:54	31.356	-110.090	14444	40.3	161.4	168.08	3315
8	SP2	10	1	18:31:56	31.666	-110.146	18:33:54	31.769	-110.146	2940	39.6	166.7	356.65	3312
9	SP2	06	1	18:38:32	31.790	-110.034	18:41:15	31.648	-110.035	4065	39.2	169.5	183.38	3504
10	SP2	02	1	18:45:00	31.685	-109.921	18:46:52	31.782	-109.921	2787	39.0	172.1	355.51	3624
11	SP2	07	1	18:51:31	31.783	-110.063	18:54:13	31.641	-110.062	4043	38.9	174.6	182.25	3468
12	SP2	03	1	18:57:47	31.665	-109.950	18:59:54	31.775	-109.950	3157	38.8	177.1	357.42	3564
13	SP2	08	1	19:03:53	31.801	-110.090	19:06:35	31.660	-110.090	4030	38.7	179.4	182.80	3435
14	SP2	04	1	19:10:14	31.641	-109.978	19:12:56	31.781	-109.978	4017	38.7	182.1	355.44	3531
15	SP2	09	1	19:17:13	31.776	-110.118	19:19:08	31.679	-110.118	2857	38.8	184.5	183.72	3374
16	SP2	05	1	19:23:45	31.625	-110.006	19:26:28	31.774	-110.007	4053	39.0	187.4	356.39	3497
17	SP2	01	1	19:30:46	31.802	-109.893	19:32:06	31.732	-109.893	1994	39.3	190.0	182.83	3722

NUMBER OF FILES FOR THIS FLIGHT = 17
 TOTAL NUMBER OF SCAN LINES = 64596
 DATE THESE FILES WERE PROCESSED = 18-Nov-2010
 DATE THIS LIST WAS CREATED = Mon Nov 22 13:25:43 PST 2010
 GRANULE VERSION = 1

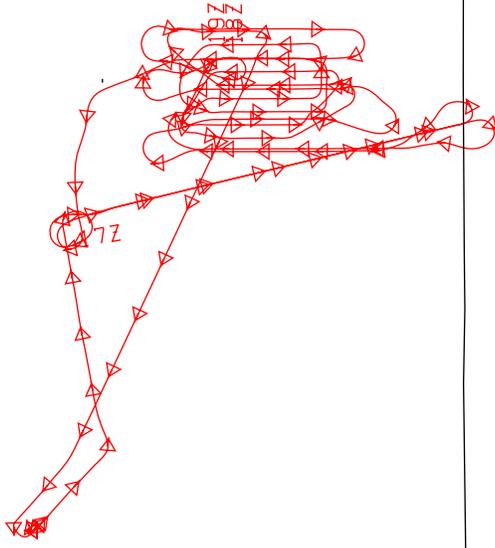


Site SPH (San Pedro River Basin - High Altitude)



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11
11
11
+ 33



55
11
11
11
+ 31: 0

FLIGHT 11-002-04 11 OCTOBER 2010 A/C 796 (DOE B200 ROMEO) MASTER / DCS
LAMBERT CONFORMAL PROJECTION: SP1 = 31.2 SP2 = 32.0 CM = -110.4 ROTATED BY 0.0
16:45:00 TO 19:57:00 UT SCALE 1:1.50E+06 TIME TICK EVERY 2.00 MINUTES