Apollo 11 Photography Index

70mm and 16mm

Prepared by the

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PRELIMINARY SCREENING OF APOLLO 11 PHOTOGRAPHY

1. INTRODUCTION

The objectives of this preliminary screening was to locate and plot the photography of Apollo 11 on a suitable base and obtain any additional information that would aid a principal investigator in the area of his interest.

The photographic phase of Apollo 11 was a success in that overall good quality photographs were returned. Although no near vertical stero strips were obtained, good low and medium obliques were obtained, and excellent photographs of Tranquility Base taken from the Lunar Module and from the surface were returned.

The cameras used in obtaining the photography of Apollo 11 were the 70mm Hasselbad Electric Camera with interchangeable 60, 80, and 250mm focal length lens and the 16mm Data Acquisition Camera with interchangeable 5mm, 10mm, 15mm, and 75mm focal length lens.

2. PROCEDURES

The operational steps taken during the screening of the photography are explained briefly in the following paragraphs.

a. The Richards and K&E portable light tables were used in examining the 70mm transparencies.

b. The Athena stop motion 16mm projector was used in examining the 16mm transparencies.

c. The map used for plotting all photographs was the Aeronautical Chart and Information Center, Lunar Planning Chart, 1:2,500,000 scale, 1st edition, July 1969.

d. The following criteria were determined by the analyst in screening each frame of photography and recorded; (1) focal length of camera, (2) coordinates of the principal point of each frame, (3) forward overlap of each frame, (4) approximate sun angle, (5) approximate tilt of camera, and (6) direction of tilt. In addition, a short description of each frame was written.

e. The finished plots were transferred from the Lunar Planning Chart to drafting stabaline (registered to the Lunar Planning Chart) and labeled as to the mission and magazine.

3. DISCUSSION

Each analyst was assigned a magazine of 70mm transparencies and furnished the necessary tools to complete his task. Two analysts were assigned the 16mm transparencies to screen, describe and plot all plottable sequences.

The locating and plotting of the frames of the Apollo 11 photography on a 1:2,500,000 base as proposed in the Apollo 11 screening plan, proved to be very satisfactory. This has greatly expedited the final drafting stages since the only drafting requirement was to transfer the screening plots onto stabaline to complete the finished product.

The location of frames of photography in the area surrounding Smyth's Sea as on Apollo 10 proved to be the biggest problem encountered.

In this area, due to the extremely high sun angle, the lunar terrain has very poor definition with the large shallow craters almost impossible to identify.

Another problem area in locating the photography is on the lunar farside between 115 and 125 degrees east longitude. In this area, the photographic coverage of the Lunar Orbiter Missions is poor and makes it very difficult to locate features imaged on Apollo 11.

Most of Magazines R and S and all of Magazine Q were taken from the Lunar Module or from the surface at Tranquility Base. These frames were not plotted but photographic panaramas were made of the area from 9 x 10 inch prints.

4. CONCLUSIONS

A total of 1340 frames of 70mm and 58,159 frames of 16mm film from the Apollo 11 mission were screened. Very few problems were encountered in screening this photography. The overall good quality of the frames made it possible to locate and plot most of the 70mm film.

A number of frames were taken in the same vacinity on the lunar surface that had been taken on Apollo 10. Most of these frames were photographs of bright-rayed craters that were photographed from different look angles. Also some of the more geological interesting craters were photographed on Apollo 11 that had been photographed on Apollo 10.

5. RECOMMENDATIONS

It is recommended that the ACIC Lunar Planning Chart be used to plot the photography on future missions. This chart has excellent crater protrayal for its scale and makes a convenient plot base.

MAGAZINE N

(Frames AS11-36-5291 thru Frames 5432)

Magazine N consists of 141 frames of color 70mm film. The major number of frames are of the translunar phase of the mission, with shots of the earth, capsule interiors and operational photographs.

The last twenty-eight frames of the magazine were of the lunar surface containing photographs of: craters IX, 204, 205, 207, 211, 216, 217, 220, 275, 282, 292 and targets of opportunity 30, 34, 46 and 50.

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5219	80						Poor			Spacecraft interior
5292	"						"			"
5293	"						"	65 70		Clouds
5294	"						"	50 55		"
5295	"						"	55 60		"
6296	"						"	50 55		"
5297	"						"	60 65		"
5298	"						Good	50 60		"
5299	"						Poor	65 70		"
5300	"						Good	65 70		"
5301	"						"	50 55		"
5302	"						"	55 60		"
5303	"						"	60 70		"
5304	"						"	60 70		"
5305	"						"	60 70		"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	Approx. Tilt max	Direction Tilt	Description
5306	80						Good	50	60		"
5307	"						"	65	70		"
5308	"						"				"
5309	"						"	60	70		"
5310	"						"				SIVB with LM
5311	"						"				"
5312	"						"				"
5313	"						"				"
5314	"						"				LM
5315	"						"				LM
5316	"						"				LM
5317	"						Poor				Earth shot
5318	"						"				"
5319	"						Good				"
5320	"						"				"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5321	80						Good			Earth shot
5322	"						Poor			"
5323	"						Good			"
5324	"						"			"
5325	"						"			"
5326	"						"			"
5327	"						"			"
5328	"						"			SIVB with LM in place
5329	"						"			"
5330	"						"			"
5331	"						"			Earth shot
5332	"						"			"
5333	"						"			"
5334	250						"			"
5335	"						"			"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5336	250						Good			Earth shot
5337	"						"			"
5338	"						"			"
5339	"						"			Earth shot, Central and North America
5340	"						"			"
5341	"						"			"
5342	"						"			"
5343	"						"			"
5344	"						"			"
5345	"						"			"
5346	"						"			"
5347	"						"			"
5348	"						"			"
5349	"						"			"
5350	"						"			"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5351	250						Good			Earth shot, North and Central America
5352	"						"			Earth shot, Africa and Mediterranean area
5353	"						"			"
5354	"						"			"
5355	"						"			Earth shot, Africa and Arabian Penninsula
5356	"						"			Earth shot, Africa, clouds
5357	"						"			"
5358	"						"			"
5359	"						"			"
5360	"						"			"
5361	"						"			"
5362	"						"			"
5363	80						"			Docking target
5364	"						"			"
5365	"						"			"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5366	250						Good			Earth shot, North and South America
5367	"						"			"
5368	"						"			"
5369	"						"			"
5370	"						"			"
5371	"						"			Earth shot
5372	"						"			"
5373	"						Poor			"
5374	"						Good			"
5375	"						"			"
5376	"						"			Earth shot, Africa, Arabian Penninsula
5377	"						"			"
5378	"						"			"
5379	"						"			"
5380	"						"			Earth shot, North and South America

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5381	250						Good			Earth shot, North and South America
5382	80						Poor			Spacecraft interior
5383	"						"			"
5384	"						"			"
5385	"						"			"
5386	"						"			"
5387	"						Good			"
5388	"						Fair			"
5389	"						Good			"
5390	"						"			"
5391	"						"			Spacecraft interior, Aldrin
5392	"						"			"
5393	"						"			"
5394	"						"			"
5395	"						"			"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5396	80						Good			Spacecraft interior, Aldrin
5397	"						"			"
5398	"						"			"
5399	"						"			"
5400	250						"			Earth shot
5401	"						"			"
5402	"						"			Earth shot, Africa, Arabian Penninsula
5403	80						"			LM, docking target
5404	"						"			"
5405	250	440,000	1.5S	139.5E	0	High	"	5 10	S	North of crater 292
5406	"	854,300	5.5N	144E	0	"	"	55 65	NE	In crater IX
5407	"	1,250,000	16N	150E	0	"	"	70 75	NE	NE of crater IX
5408	"	440,000	1S	139E	0	"	"	5 10	S	North of crater 292
5409	"	1,126,100	9N	139.5E	0	"	"	65 70	NE	Crater IX, TO 34
5410	"	478,000	1N	134E	0	"	"	20 25	NW	South of crater 216

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5411	250	810,000	6N	143E	0	High	Fair	55 60	NE	Crater IX
5412	"	444,000	0.7N	129.5E		"	"	5 10	SE	East of crater 282
5413	80	3,836,800	11N	141.5E		"	"	65 70	NE	Crater IX, TO 30 & 34
5414	"	"	10N	147E		"	"	65 70	NE	"
5415	"					"	Good	70 75	NE	High oblique in vicinity of crater IX, not plotted
5416	"	2,397,200	4N	134.5E		"	Fair	55 65	NE	Craters 216, 217 & IX, TO 30 & 34
5417	"	pp in space				"	"	70 75	NE	"
5418	"	3,253,500	1.5N	133.5E		"	"	60 65	E	"
5419	"	880,100	5.5N	120.5E		"	"	45 55	NW	Crater 211, TO 46
5420	"	2,016,100	6.5N	121E	85	"	"	44 55	N	"
5421	"	2,284,700	5.5N	120E	100	"	"	50 55	NE	Crater 211, 212 and 213, TO 46
5422	"	2,524,600	5N	120.5E	100	"	"	55 60	NE	"
5423	"	678,600	2N	110.5E	0	"	Good	30 40	NE	Crater 204
5424	"	"	1N	112E	50	"	"	30 40	NE	Crater 207
5425	"	3,028,700	11N	113E	0	"	Fair	60 65	NE	Crater 205, TO 50

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine N Film SO 368 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5426	250	807,900	1S	114E	25	High	Good	55 60	SE	Part of crater 275
5427	"	700,000				"	"	75 80	NE	Looking into crater 220
5428	"	1,041,100	5N	158E		"	"	60 65	E	"
5429							Poor			Too dark to locate
5430	250	513,300	6.5N	139E	0	High	Good	60 70	W	Crater IX, TO 30
5431	"	"	1N	133E	0	"	"	25 35	E	South of crater 216
5432	"	731,100	3N	131.5E		"	"	50 55	NW	Crater 216
END										

MAGAZINE O

(FRAMES AS11-38-5556 THRU 5689)

Magazine "O" contains photography of the backside with a short sequence in the Sea of Fertility and another sequence extending into the nearside terminator. There are several shots of the moon and the earth taken after Transearth Insertion. This magazine was photographed with a 250 mm lens. Target of Opportunity 137 was photographed on frames 5605-5608.

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine 0 Film 3400 (R&W) Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min deg	max deg	Direction Tilt	Description
5556	250mm		pp in space			Med	Good	70	75	SW	Crater 305 on horizon
5557	"		pp in space			"	Fair	80	85	SW	"
5558	"	1,174,600	7.5S	172E		"	Good	65	70	SW	Lunar farside
5559	"	830,300	2.0S	172E		"	"	55	60	SW	South of Crater 225
5560	"	"	8.5S	179E		"	"	55	60	S	South of Crater 308
5561	"	731,100	6 S	179E		"	"	50	55	SE	Into Crater 308
5562	"	"	7 S	178.5E		"	"	50	55	SE	Southern portion Crater 308
5563	"	"	7 S	179E		"	"	50	55	SE	"
5564	"	969,200	7.5S	175E		"	"	60	65	S	West of Crater 308
5565	"	830,300	7.5S	173E		"	"	55	60	SE	Lunar farside
5566	"	1,174,600	17.5S	173E		"	"	65	70	S	Crater 307 on horizon TO 19
5567	"	969,200	12 S	159.5E		"	"	60	65	SW	Crater 302
5568	"	830,300	7 S	173E		"	"	55	60	SE	Lunar farside
5569	"	969,200	8.5S	169.5E		"	"	60	65	S	East rim Crater 305
5570	"	"	12 S	163.5E		"	"	60	65	SW	East rim Crater 302, West rim Crater 305

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine 0 Film 3400 Time Reference - GET _____ = GMT _____

B&W

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5571	250	1,174,600	11.5S	160.5E		Med	Good	65 70	S	Crater 302
5572	"	485,500	2 S	153.5E		"	"	20 25	S	West of Crater 299
5573	"	"	2 S	152 E		"	"	20 25	S	"
5574	"	622,200	4 S	151 E		"	"	45 50	SE	NE rim Crater 297
5575	"	969,200	6 S	150 E		"	"	60 65	SW	Floor Crater 297
5576	"	830,300	6.5S	149 E		"	"	55 60	S	West rim Crater 297
5577	"	622,200	4.5S	144.5E		"	"	45 50	S	West of Crater 297
5578	"	493,800	2 S	143 E		"	"	25 30	SW	East of Crater 292
5579	"	550,900	1.5S	139.5E		"	"	35 40	S	North of Crater 292
5580	"	"	1.5S	138.5E	30	"	"	35 40	S	"
5581	"	731,100	4 S	138 E		"	"	50 55	SW	West of Crater 292
5582	"	1,174,600	6 S	173 E		"	"	65 70	SE	Between Craters 305,308
5583	"	"	6 S	166 E		"	"	65 70	SW	Crater 304
5584	"	55,900	2 S	167 E		"	"	35 40	S	North of Crater 304
5585	"	1,174,600	6 S	164 E		"	"	65 70	S	Crater 302

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine 0 Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max deg	Direction Tilt	Description
5586	250	645,200	3 S	161 E		Med	Good	45 50	SE	Southwest of Crater 303
5587	"	601,600	4 S	159 E		"	"	40 45	S	Crater 301
5588	"	550,900	3 S	158 E		"	"	35 40	S	Crater 301
5589	"	969,200	4 S	152 E		"	"	60 70	SW	Crater 297
5590	"	645,200	4 S	151 E		"	"	45 50	SE	NE rim Crater 297
5591	"	"	4 S	151 E		"	"	45 50	SE	"
5592	"	440,600	0	145.5E		"	"	0 5		South of Crater 218
5593	"	550,900	1.5S	139.5E	50	"	"	35 40	SW	North of Crater 292
5594	"	"	1.5E	139 E	50	"	"	35 40	SW	"
5595	"	645,200	4 S	133 E		"	"	45 55	SW	West of Crater 292
5596	"		on horizon			"	"	65 75	W	Foaming Sea
5597	"		on horizon			"	"	65 75	NW	North of Foaming Sea
5598	"	"	2 N	64 E		"	"	65 70	NW	Foaming Sea
5599	"	731,100	1 N	64 E		"	"	50 55	NW	Webb E, Appolonius G
5600	"	583,000	2 S	47.5E		"	"	35 45	SW	Messier, Messier A, D

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine 0 Film 3400 Time Reference - GET _____ = GMT _____

B&W

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
5601	250	601,600	3 S	46 E		Med	Good	40	45	SW	Sea of Fertility, Messier D
5602	"	583,000	2 S	46.5E		"	"	35	45	SW	Sea of Fertility, Messier A
5603	"	550,900	2 S	46 E		"	"	35	40	SE	Sea of Fertility, toward Messier D
5604	"	"	3 S	46 E		"	"	35	40	SW	Sea of Fertility, Messier D
5605	"	767,100	7 S	3 E		Low	"	55	60	S	Muller TO 137
5606	"	699,200	4 S	5 E		"	"	50	55	S	Horrocks and Hipparchus TO 137
5607	"	"	5 S	2.5E		"	"	50	55	S	Hipparchus F TO 137
5608	"	767,100	7 S	4 E		"	"	55	60	S	Hipparchus, Hipparchus J TO 137
5609	"					"	"			S	No identifiable features
5610	"					"	"			S	Darkness
5611	"					"	"			S	"
5612	"					"	"			S	"
5613-83	"						"				Transearth coast
5684-89	"						"				"

MAGAZINE P

(Frames AS11-41-5971 Thru Frames 6159)

Magazine "P" is 70mm black and white photography of the lunar surface taken from the Command Module at approximately 60 nautical mile orbital altitude. The first 132 frames are sequential high obliques with 90-98% forward overlap. The west looking sequence starts near 140° east longitude at the equator and continues to the nearside lunar terminator at 15° east. An 80mm lens was used. The following targets of opportunity were at least partially imaged: TO #34, #67, #80, #84, and #115. Landing Site 2 is also covered by this magazine.

The next 24 frames are a 250mm west looking oblique sequence, commencing at 35° east and continuing to the nearside terminator. Photographic targets of opportunity #80 and #132 are partially imaged.

The remaining frames are south looking obliques, taken on the farside of the moon with a 250mm lens. Target of opportunity #15 is imaged several times. Crater #208 is also covered.

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	Approx. Tilt max	Direction Tilt	Description
5971											Not plotable
											Oblique Sequence Frames 5972 to 6104
5972	80		Above	Horizon	90	Med	Poor	85	90	NW	TO 34 (Western rim of Bay IX)
5973	"		"	"	95	"	"	80	90	NW	"
5974	"		"	"	95	"	Fair	80	85	NW	"
5975	"		"	"	95	"	Fair	70	80	NW	"
5976	"		"	"	93	High	"	70	80	NW	Partial of TO 34
5977	"		"	"	97	"	"	75	80	NW	West of TO 34
5978	"		"	"	95	"	"	75	80	W	Crater 216
5979	"		"	"	93	"	"	80	85	W	West of crater 216
5980	"		"	"	95	"	"	75	80	W	East of crater 282 CP 10-1
5981	"		"	"	95	"	"	80	85	W	Crater 282 CP 10-1
5982	"		"	"	94	"	"	80	85	W	Crater 282 (North of TO 43)
5983	"		"	"	95	"	"	80	85	W	"
5984	"		"	"	95	"	"	80	85	W	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5985	80		Above	Horizon	94	High	Fair	80 85	W	Crater 211 (TO 46)
5986	"		"	"	95	"	"	75 80	W	"
5987	"		"	"	95	"	"	75 80	W	"
5988	"		"	"	95	"	"	80 85	W	"
5989	"		"	"	95	"	"	80 85	W	"
5990	"		"	"	94	"	"	80 85	W	"
5991	"		"	"	92	"	"	80 85	W	East of crater 206
5992	"		"	"	93	"	"	80 85	W	"
5993	"		"	"	93	"	"	80 85	W	Craters 206, 207, 275 (South of TO 50)
5994	"		"	"	94	"	"	80 85	W	"
5995	"		"	"	95	"	"	80 85	W	"
5996	"		"	"	95	"	"	79 81	W	"
5997	"		"	"	95	"	"	80 85	W	Craters, 206, 207, 275, 204
5998	"		"	"	95	"	"	80 85	W	Craters 204, 201, 202
5999	"		"	"	95	"	"	80 85	W	Craters 204, 202

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6000	80		Above	Horizon	95	High	Fair	80 85	W	Crater 202
6001	"		"	"	95	"	"	80 85	W	"
6002	"		"	"	95	"	"	80 85	W	"
6003	"		"	"	95	"	"	80 85	W	Craters 199, 270
6004	"		"	"	95	"	"	80 85	W	"
6005	"		"	"	95	"	"	80 85	W	"
6006	"		"	"	95	"	"	80 85	W	"
6007	"		"	"	95	"	"	80 85	W	Craters 269, 195 (TO 55)
6008	"		"	"	95	"	"	80 85	W	"
6009	"		"	"	95	"	"	80 85	W	"
6010	"		"	"	95	"	"	80 85	W	Crater 269
6011	"		"	"	95	"	"	80 85	W	Craters 192, 189, 267
6012	"		"	"	96	"	"	80 85	W	"
6013	"		"	"	96	"	"	80 85	W	"
6014	"		"	"	96	"	"	80 85	W	Craters 267 and 189

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6015	80		Above	Horizon	97	High	Fair	80 85	W	Crater 189
6016	"		"	"	98	"	"	80 85	W	"
6017	"		"	"	97	"	"	80 85	W	"
6018	"		"	"	97	"	"	80 85	W	Crater 189
6019	"		"	"	98	"	Good	80 85	W	"
6020	"		"	"	97	"	"	80 85	W	Smyths Sea/crater 189
6021	"		"	"	97	"	"	80 85	W	"
6022	"		"	"	97	"	"	80 85	W	"
6023	"		"	"	97	"	"	80 85	W	Smyths Sea
6024	"		"	"	97	"	"	80 85	W	"
6025	"		"	"	96	"	"	80 85	W	"
6026	"		"	"	96	"	"	80 85	W	"
6027	"		"	"	96	"	"	80 85	W	Smyths Sea/crater Neper K
6028	"		"	"	96	"	"	80 85	W	"
6029	"		"	"	96	"	"	80 85	W	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6030	80		Above	Horizon	96	High	Good	80	85	W	Smyth's Sea
6031	"		"	"	96	"	"	80	85	W	"
6032	"		"	"	95	"	"	80	85	W	Smyth's Sea/Schubert
6033	"		"	"	95	"	"	80	85	W	"
6034	"		"	"	97	"	"	80	85	W	Crater Schubert
6035	"		"	"	97	"	"	80	85	W	Crater Banachiewicz
6036	"		"	"	95	"	"	80	85	W	"
6037	"		"	"	95	"	"	80	85	W	Gilbert M, Schubert F
6038	"		"	"	96	"	"	80	85	W	"
6039	"		"	"	96	"	"	80	85	W	Gilbert, Schubert Y and G
6040	"		"	"	95	"	"	80	85	W	Schubert N, Dubiago C
6041	"		"	"	96	"	"	80	85	W	"
6042	"		"	"	95	"	"	80	85	W	Maclaurin L, Dubiago
6043	"		"	"	95	"	"	80	85	W	Dubiago, Dubiago B
6044	"		"	"	96	"	"	80	85	W	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6045	80		Above	Horizon	95	High	Good	80 85	W	Dubiago, Dubiago B
6046	"		"	"	94	"	"	80 85	W	Maclaurin
6047	"		"	"	96	"	"	80 85	W	"
6048	"		"	"	96	"	"	80 85	W	Mare Spumans
6049	"		"	"	96	"	"	80 85	W	"
6050	"		"	"	96	"	"	75 80	W	Mare Spumans, begining of TO 67
6051	"		"	"	95	"	"	75 80	W	"
6052	"		"	"	95	"	"	75 80	W	"
6053	"		"	"	94	"	"	75 80	W	TO 67, Apollonius
6054	"		"	"	95	"	"	75 80	W	TO 67, Apollonius G
6055	"		"	"	95	"	"	75 80	W	Mare Fecunditatis, TO 67
6056	"		"	"	95	"	"	75 80	W	"
6057	"		"	"	95	"	"	75 80	W	"
6058	"		"	"	95	"	"	75 80	W	"
6059	"		"	"	95	"	"	75 80	W	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6060	80		Above	Horizon	95	High	Good	75 80	W	Mare Fecunditatis, TO 67
6061	"		"	"	95	"	"	75 80	W	"
6062	"		"	"	94	"	"	75 80	W	"
6063	"		"	"	94	"	"	75 80	W	"
6064	"		"	"	97	"	"	75 80	W	"
6065	"		"	"	94	"	"	75 80	W	"
6066	"		"	"	92	"	"	70 75	W	"
6067	"		"	"	95	"	"	70 75	W	"
6068	"		"	"	96	"	"	70 75	W	"
6069	"		"	"	92	"	"	70 75	W	End of TO 67
6070	"		"	"	95	"	"	70 75	W	Mare Fecunditatis, Secchi K
6071	"		"	"	95	"	"	70 75	W	Start TO 80, Secchi
6072	"		"	"	95	"	"	70 75	W	TO 80
6073	"		"	"	93	"	"	70 75	W	"
6074	"		"	"	95	"	"	70 75	W	TO 80, 84

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6075	80		Above	Horizon	91	High	Good	70 75	W	TO 80, 84
6076	"		"	"	95	"	"	70 75	W	"
6077	"		"	"	94	"	"	70 75	W	"
6078	"		"	"	90	"	"	70 75	W	"
6079	"		"	"	90	"	"	70 75	W	"
6080	"		"	"	94	"	"	70 75	W	TO 80, Mare Tranquilitatis
6081	"		"	"	90	"	"	70 75	W	"
6082	"		"	"	90	"	"	70 75	W	"
6083	"		"	"	90	"	"	70 75	W	"
6084	"		"	"	92	"	"	70 75	W	"
6085	"		"	"	95	"	"	75 80	W	"
6086	"		"	"	90	"	"	75 80	W	"
6087	"		"	"	90	"	"	75 80	W	End TO 80
6088	"		"	"	90	"	"	75 80	W	Beginning TO 115
6089	"		"	"	95	"	"	75 80	W	TO 115, Landing Site 2

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6090	80		Above	Horizon	92	High	Good	75	80	W	TO 115, Landing Site 2
6091	"		"	"	96	Med	"	75	80	W	"
6092	"		"	"	93	"	"	75	80	W	End TO 115
6093	"		"	"	95	"	"	80	85	W	North of TO 115
6094	"		"	"	95	"	"	80	85	W	Sabine, Ritter, Delambre
6095	"		"	"	95	"	"	80	85	W	"
6096	"		"	"	95	Low	"	80	85	W	Ritter, Delambre
6097	"		"	"	94	"	"	80	85	W	Delambre, Dionysius
6098	"		"	"	95	"	Fair	80	85	W	Theon Jr and Sr, Dionysius
6099	"		"	"	97	"	"	80	85	W	Theon Sr
6100	"		"	"	95	"	"	80	85	W	Nearside terminator
6101	"		"	"	95	"	Poor	80	85	W	"
6102	"		"	"	95	"	"	80	85	W	"
6103	"		"	"	95	"	"	80	85	W	"
6104	"		"	"	95	"	"	+85		W	End of oblique sequence

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6106	80									Darkness, not plotable
6107	"									"
6108	"									"
										Begin 250 mm oblique sequence
6109	250	1,041,100	1N	32.5E	0	High	Fair	60 65	W	Partial TO 80, Maskelyne A
6110	"	"	1N	31.5E	80	"	"	60 65	W	Partial TO 80
6111	"	"	.5N	30.5E	77	"	"	60 65	W	Maskelyne
6112	"	"	1N	29E	83	"	"	60 65	W	Maskelyne B
6113	"	1,126,100	1N	28.5E	90	"	"	60 65	W	"
6114	"	"	1N	26.5E	80	Med	Good	65 70	W	"
6115	"	"	1N	25.5E	85	"	"	65 70	W	Mare Tranquilitatis
6116	"	"	1N	24.5E	85	"	"	65 70	W	Landing Site 2
6117	"	"	1N	23.5E	80	"	"	65 70	W	"
6118	"	"	1N	22.5E	83	"	"	65 70	W	"
6119	"	"	1N	21E	85	"	"	65 70	W	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6120	250	1,126,100	1N	19.5E	85	Med	Good	65 70	W	Sabine, Ritter
6121	"	"	1N	18.5E	86	"	"	65 70	W	"
6122	"	"	1N	18E	80	Low	"	65 70	W	"
6123	"	"	1N	17E	85	"	"	65 70	W	"
6124	"	"	1N	16E	86	"	"	65 70	W	Ritter, Schmidt
6125	"	"	1N	15E	88	"	"	65 70	W	Start TO 132
6126	"	1,227,800	1N	14E	85	"	"	65 70	W	"
6127	"	"	.5N	13E	85	"	"	65 70	W	"
6128	"	"	.5N	12E	85	"	"	65 70	W	"
6129	"	"	.5N	11E	85	"	"	65 70	W	"
6130	"	1,351,500	In darkness		85	"	Fair	70 75	W	"
6131	"	"	"		85	"	"	70 75	W	"
6132	"	1,500,000	"		85	"	"	70 75	W	Start TO 132, Godin
6133	"	1,650,000	"	"	85	"	"	72 75	W	Near side terminator
6134	"									Darkness, not plotted

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Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6135	250									Darkness, not plotted
6136	"									Farside terminator, not plotted
6137	"									Not plotted
6138	"	800,000	11S	172W	0	Low	Fair	50 70	S	TO 15
6139	"	767,100	6S	174.5W		"	"	50 60	SE	"
6140	"	1,041,100	8.5N	175.5W		"	"	60 70	S	"
6141	"	699,200	3.5S	175W		"	"	50 60	S	"
6142	"	622,200	3.5S	175.5W		"	"	45 50	S	"
6143	"	"	4S	176W		"	"	45 50	S	"
6144	"	583,000	3.5S	176W		"	"	40 45	S	"
6145	"	699,200	4.5S	177.5W		"	"	50 55	S	"
6146	"	907,600	8.5S	176.W		"	"	60 65	S	Near TO 15
6147	"	699,200	5.5S	177.5W		"	"	50 55	S	"
6148	"	537,100	3S	179W		"	"	35 40	S	North of crater 308
6149	"	485,500	2S	179W		"	"	25 30	S	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine P Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6150	250	622,200	4S	179.5W		Low	Fair	45 50	S	North of crater 308
6151	"	767,100	6.5S	180W		"	"	55 60	S	Crater 308
6152	"	1,041,100	9.5S	179.5W		"	"	65 70	SE	"
6153	"	767,100	5.5S	179E		"	"	55 60	S	"
6154	"	622,200	3.5S	177.5E		Med	"	45 50	SE	North of crater 308
6155	"	1,041,100	11S	174E		"	"	65 70	S	West of crater 308
6156	"	907,600	8.5S	175E		"	"	60 70	S	"
6157	"	"	7S	173.5E		"	"	50 60	S	"
6158	"	699,200	4S	172E		"	"	50 60	SE	"
6159	"	622,200	3.5S	170E		"	"	40 50	S	"

MAGAZINE Q

(Frames AS11-5737 thru 5843)

Magazine Q contains photography of the Tranquility Base with several shots around the landing area. The magazine was photographed with two different lens, 80mm and 60mm. The 60mm had a reseau image on the lens.

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film SO 3400 Time Reference - GET _____ = GMT _____

Black and White

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5737	80					Low	Fair	Low		Shadow of LM on lunar surface
5738	"					"	"	"		Part of LM leg shadow on surface
5739	"					"	"	"		Shadow of thruster on surface
5740	"					"	"	Med		Shadow of LM on surface
5741	"					"	"	"		"
5742	"					"	"	"		Lunar surface, taken from LM
5743	"					"	"	"		"
5744	"					"	"	"		"
5745	"					"	"	"		Thruster and lunar surface
5746	"					"	"	"		"
5747	"					"	"	"		"
5748	"					"	"	"		Lunar surface taken from LM
5749	"					"	"	"		Shadow of LM on lunar surface
5750	60					"	"	"		"
5751	"					"	"	"		"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film SO 3400 Time Reference - GET _____ = GMT _____
Black and White

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5752	60					Low	Fair	Med		Lunar surface taken from LM
5753	"					"	"	"		Part of thruster and lunar surface
5754	"					"	"	"		"
5755	"					"	"	"		"
5756	60					"	Good	"		Lunar surface from LM
5757	"					"	"	"		"
5758	"					"	Fair	"		"
5759	"					"	"	"		Thruster and lunar surface taken from LM
5760	"					"	"	"		Thruster shadow and surface taken from LM
5761	"					"	Good	"		Shadow of LM Leg on Lunar surface
5762	"					"	"	"		Shadow of LM on surface
5763	"					"	Fair	"		"
5764	"					"	"	"		"
5765	"					"	"	"		"
5766	"					"	"	"		Thruster/surface

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film 3400 Time Reference - GET _____ = GMT _____
Black and White

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5767	60					Low	Fair	Med		Thruster/surface
5768	"					"	"	"		"
5769	"					"	"	"		"
5770	"					"	Good	"		"
5771	"					"	"	"		LM shadow/surface
5772	"					"	"	"		"
5773	"					"	"	"		"
5774	"					"	"	"		LM shadow/thruster/surface
5775	"					"	Fair	"		LM shadow/surface
5776	"					"	Good	"		LM shadow/thruster/surface
5777	"					"	"	"		"
5778	"					"	"	"		"
5779	"					"	"	"		LM shadow/surface
5780	"					"	"	"		LM shadow/thruster/surface
5781	"					"	"	"		"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film 3400 Black and White Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5782	60					Low	Fair	Med		LM shadow/thruster/surface
5783	"					"	"	"		"
5784	"					"	"	"		LM thrusters/surface
5785	"					"	"	"		LM shadow/thrusters/surface
5786	"					"	"	"		LM shadow/surface
5787	"					"	"	"		"
5788	"					"	"	"		"
5789	"					"	"	"		"
5790	"					"	"	"		"
5791	"					"	"	"		"
5792	80					"	Poor	"		"
5793	"					"	"	"		Lunar surface
5794	"					"	Good	"		Thrusters/reflector/surface
5795	"					"	"	"		LM shadow/surface
5796	"					"	"	"		Lunar surface

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film 3400 Time Reference - GET _____ = GMT _____
Black and White

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5797	80					Low	Good	Low		Thrusters/reflector
5798	"					"	"	"		LM shadow/surface
5799	"					"	"	"		"
5800	"					"	"	"		"
5801	"					"	"	"		LM thrusters/surface
5802	"					"	"	"		LM shadow/flag/thruster/surface
5803	"					"	"	"		"
5804	"					"	"	"		LM shadow/flag/surface
5805	"					"	"	"		LM shadow/surface
5806	"					"	"	"		"
5807	"					"	"	"		Thrusters/flag/TV/surface
5808	"					"	"	"		"
5809	"					"	"	"		"
5810	"					"	"	"		"
5811	"					"	"	"		Flag shadow/LM shadow/surface

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film 3400 Time Reference - GET _____ = GMT _____
Black and White

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5812	80					Low	Fair	Low		LM shadow/surface
5813	"					"	"	"		"
5814	"					"	Good	"		Flag/LM shadow/surface
5815	"					"	"	"		Flag/thruster/LM shadow/TV/ surface
5816	"					"	"	"		"
5817	"					"	"	"		LM thrusters/TV/surface
5818	"					"	"	"		"
5819	"					"	"	"		LM shadows/thrusters/flag/ TV/surface
5820	"					"	"	"		"
5821	"					"	"	"		LM shadow/flag/surface
5822	"					"	"	"		LM shadow/flag shadow/surface
5823	"					"	"	"		LM shadow
5824	"					"	"	"		LM shadow/surface
5825	"					"	"	"		"
5826	"					"	"	"		"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film 3400 Black and White Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5827	80					Low	Good	Low		LM shadow/surface
5828	"					"	"	"		LM shadow/flag shadow/surface
5829	"					"	"	"		LM shadow/flag/surface
5830	"					"	"	"		LM shadow/thruster/flag/TV/ surface
5831	"					"	"	"		Thruster/flag/TV/surface
5832	"					"	"	"		LM shadow/surface
5833	"					"	"	"		"
5834	"					"	"	"		LM shadow/flag shadow/surface
5835	"					"	"	"		Flag/thruster/TV/surface
5836	"					"	Fair	"		LM shadow/surface
5837	"					"	"	"		"
5838	"					"	"	"		"
5839	"					"	"	"		LM shadow/flag/surface
5840	"					"	Poor	"		Thrusters/reflector/seismo- meter/surface
5841	"					"	Fair	"		"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine Q Film 3400 Time Reference - GET _____ = GMT _____
Black and White

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5842	80					Low	Fair	Low		Thrusters/reflector/seismometer/surface
5843	"					"	"	"		"

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MAGAZINE R

(Frames AS11-37-5433 thru 5555)

Magazine R contains photographs taken from the LM. Frames 5433 thru 5448 are taken from orbital altitude with the CSM visible over the lunar surface in frames 5443-5448. The remainder of the frames are photographs of the lunar surface from the LM at Tranquility Base.

All photographs were taken with an 80mm lens. Partial coverage of Targets of Opportunity 67 and 115 were taken on frames 5436 and 5437.

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5433	80mm	3,028,700	4.0N	146.0E		High	Fair	60 65	NW	High oblique view centered on Crater 218
5434	"						Good			Earth view and part of LM
5435	"						"			"
5436	"					High	Fair	80 85		Very high oblique of lunar surface, part coverage of TO67
5437	"	3,028,700	0.2N	24.5E		Low	Good	60 65	W	Oblique towards Tranquility Base, part coverage of TO 115
5438	"					Dark	Poor			Unidentified photo in darkness
5439	"					High	"	80 85		High oblique - lunar horizon-earth - LM
5440	"					"	"	80 85		"
5441	"					"	"	75 80		"
5442	"					"	Fair	85 90		"
5443	"	1,385,300	1.5N	57.5E		Med	Good	5 10	N	CSM over east Mare Fecunditatus
5444	"	"	1.5N	54.0E		"	"	5 10	N	"
5445	"	"	1.0N	51.0E		"	"	5 10	N	"
5446	"	1,423,500	1.0N	38.0E		"	"	10 20	N	CSM over east Sea of Tranquility
5447	"	1,385,300	0.5N	23.5E		Low	"	5 10	W	CSM over west Sea of Tranquility

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5448	80mm	1,385,200	0.5N	18.5E		Low	Good	5 10	W	CSM over west Sea of Tranquility
5449	"					"	Fair	70 75	W	Horizon at Sea of Tranquility with thruster in foreground
5450	"					"	"	70 75	W	Horizon
5451	"					"	Poor	Med obl.		LM shadow on surface
5452	"					"	Fair	Low obl.		LM thruster shadow on surface
5453	"					"	"	"		LM shadow on surface
5454	"					"	Poor	"		Horizon and LM shadow on surface
5455	"					"	"	"		"
5456	"					"	Fair	"		Horizon and LM thruster
5457	"					"	Good	"		"
5458	"					"	"	"		"
5459	"					"	"	Med obl.		Low oblique of shallow crater
5460	"					"	Poor	"		LM shadow on surface
5461	"					"	"	"		"
5462	"					"	"	"		"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Principal Point Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description At Tranquility Base
5463	80mm					Low	Poor	Low obl.		LM shadow on surface
5464	"					"	"	"		"
5465	"					"	"	"		Flag shadow and LM shadow on surface of Sea of Tranquility
5466	"					"	Fair	"		" " "
5467	"					"	Good	"		Flag, thruster and TV camera
5468	"					"	"	"		"
5469	"					"	"	High obl.		Thrusters and LM shadow
5470	"					"	"	Med obl.		Flag, thruster, and TV camera
5471	"					"	"	"		"
5472	"					"	"	"		"
5473	"					"	"	"		"
5474	"					"	Fair	"		Flag shadow and LM shadow
5475	"					"	"	"		"
5476	"					"	"	"		"
5477	"					"	"	"		"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description At Tranquility Base
5478	80mm					Low	Fair	Med obl.		Flag and LM shadows
5479	"					"	"	"		"
5480	"					"	Good	"		Flag, LM thruster and TV
5481	"					"	"	"		"
5482	"					"	"	"		"
5483	"					"	"	"		"
5484	"					"	"	"		Flag, LM shadow
5485	"					"	"	"		Flag and LM shadows
5486	"					"	"	"		LM shadow
5487	"					"	"	"		"
5488	"					"	"	"		"
5489	"					"	"	"		"
5490	"					"	"	"		LM and Flag shadows
5491	"					"	"	"		Flag and shadow
5492	"					"	"	"		LM shadow

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine R Film SO 168 (Color) Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description At Tranquility Base
5493	80mm					Low	Good	Med obl.		LM shadow
5494	"					"	"	"		LM shadow and flag
5495	"					"	"	"		Flag, TV
5496	"					"	Fair	"		LM shadow
5497	"					"	"	"		Lunar horizon
5498	"					"	Good	"		LM thruster, laser reflector
5499	"					"	"	"		LM thruster, laser reflector seismometer
5500	"					"	"	"		Lunar surface, horizon
5501	"					"	Fair	"		LM shadow
5502	"					"	"	"		"
5503	"					"	"	"		Lunar surface
5504	"					"	"	"		LM thrusters, laser reflector
5505	"					"	Good	Low obl.		LM strut shadow
5506	"					"	Poor	Hi. obl.		Earth, part of LM
5507	"					"	"	"		"

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Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description At Tranquility Base
5508	80					Low	Poor	High obl.		Earth, Part of LM
5509	"					"	"	"		"
5510	"					"	"	Med obl.		LM shadow
5511	"					"	Good	"		Flag
5512	"					"	"	"		Flag, TV
5513	"					"	"	"		LM thrusters, LM shadow
5514	"					"	"	"		"
5515	"					"	"	"		LM thrusters, LM shadow, TV
5516	"					"	"	"		LM thrusters, flag, TV
5517	"					"	"	"		"
5518	"					"	"	"		TV from LM window
5519	"					"	"	"		Flag from LM window
5520	"					"	"	"		TV and flag from LM window
5521	"					"	"	"		Strut shadow from LM window
5522	"					"	Fair	"		Flag shadow from LM window

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description At Tranquility Base
5523	80					Low	Good	Med obl.		Flag and TV from LM window
5524	"					"	"	"		Flag from LM window
5525	"					"	"	"		Flag shadow from LM window
5526	"					"	"	"		"
5527	"					"	"	"		"
5528	"					"	Poor			Inside spacecraft
5529	"					"	"			"
5530	"					"	"			"
5531	"					"	"			"
5532	"					"	"			"
5533	"					"	"			"
5534	"					"	"			"
5535	"					"	"	Med obl.		Tranquility base, TV, flag, thrusters
5536	"					"	"	"		"
5537	"					"	"	"		"

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Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description At Tranquility Base
5538	80					Low	Poor	Med obl.		TV, flag, thrusters
5539	"					"	"	"		Thrusters and part of LM
5540	"					"	"	"		LM shadow, flag shadow
5541	"					"	"	"		"
5542	"					"	Good	"		TV, LM shadow, thrusters
5543	"					"	"	"		LM shadow, thrusters
5544	"					"	"	"		LM thrusters, TV, flag
5545	"					"	"	"		"
5546	"					"	"	"		"
5547	"					"	"	"		"
5548	"					"	"	"		LM thrusters, seismometer, laser reflector
5549	"					"	"	"		"
5550	"					"	"	"		"
5551	"					"	"	"		"
5552	"					"	"	"		LM thrusters, TV, flag

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine R Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description At Tranquility Base
5553	80					Low	Good	Med obl.		LM thrusters, TV, flag
5554	"					"	"	"		"
5555	"					"	"	"		"

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MAGAZINE S

(FRAMES AS11-40-5844 THRU AS11-40-5970)

Magazine "S" is a color magazine taken with a 60mm lens aboard the LM. With the exception of the first three exposures the entire magazine was taken upon the lunar surface at Tranquility Base. There are a variety of subjects recorded including shots of the astronauts, the LM, the deployment of the experiment packages and pan shots of the lunar horizon. The first three frames include two high altitude views of the lunar surface and one earth shot. Overall photo quality is very good.

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine S Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5844	60mm	1,984,400	4°N	134°E		High	Good	65 70	NW	Craters 216, 217
5845	"						"			Earth
5846	"	2,022,900	2S	44.5E		Med	"	60 70	W	Messier, Messier A
5847	"					"	"		S	View of lunar surface from LM site
5848	"					"	"		S	"
5849	"					"	"		W	"
5850	"					"	"		SE	Lunar surface with LM strut
5851	"					"	"		S	Lunar surface
5852	"					"	"		S	Shallow crater on surface
5853	"					"	"		SW	Small crater on surface
5854	"					"	"		W	Lunar surface from near LM
5855	"					"	"		NW	"
5856	"					"	"		NW	"
5857	"					"	"		N	"
5858	"					"	"		NE	Lunar surface with LM strut

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine S Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5859	60				N/A	Med	Good		S	Lunar surface with LM ladder
5860	"					"	"		S	"
5861	"					"	"		S	"
5862	"					"	"		NE	Armstrong exiting LM
5863	"					"	"		NE	"
5864	"					"	"		NE	LM skirt
5865	"					"	"		E	Lunar surface with LM strut
5866	"					"	"		NE	Armstrong descending ladder
5867	"					"	"		NE	"
5868	"					"	"		NE	"
5869	"					"	"		NE	Armstrong on lunar surface
5870	"					"	"		NE	Lunar surface with LM strut
5871	"					"	"		NE	Lunar surface structure thru LM
5872	"					"	"		SE	Erection of solar wind experiment
5873	"					"	"		SE	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine S Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5874	60				N/A	Med	Good		S	LM with flag and astronaut
5875	"					"	"		S	"
5876	"					"	"			Undisturbed lunar soil
5877	"					"	"			Astronaut footprint
5878	"					"	"			"
5879	"					"	"			"
5880	"					"	"			Astronaut boot
5881	"					"	"		S	Small crater on surface
5882	"					"	"		W	Lunar surface
5882A	"					"	"		NW	"
5883	"					"	"		NW	Lunar surface with TV camera
5884	"					"	"		NE	Flag and solar wind experiment on surface
5885	"					"	"		NE	"
5886	"					"	"		E	LM skirt and strut
5887	"					"	"		SE	Shallow craters on lunar surface

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine S Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5888	60				N/A	Med	Good		SE	Shallow craters on lunar surface
5889	"					"	"		S	Rim of small, shallow crater
5890	"					"	"		S	"
5891	"					"	"		SW	"
5892	"					"	"		NE	Lunar surface beneath LM
5893	"					"	"		NE	Closeup shot of LM ascent stage
5894	"					"	"		N	Closeup shot of LM skirt
5895	"					"	"		N	LM strut
5896	"					"	"		N	"
5897	"					"	Dark		NE	Closeup of LM ladder and plaque
5898	"					"	"		NE	"
5899	"					"	"		NE	"
5900	"					"	"		NE	"
5901	"					"	Good		NE	LM strut
5902	"					"	"		NE	LM strut and astronaut

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine S Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5903	60				N/A	Med	Good		NE	Astronaut
5904	"					"	Poor Focus			Close-up shot of Portable Life Support System
5905	"					"	Good		SW	Flag
5906	"					"	"		W	Lunar surface
5907	"					"	"		NW	TV camera on lunar surface
5908	"					"	"		NW	Lunar surface
5909	"					"	"		N	Shallow crater and rocks on horizon
5910	"					"	"		N	"
5911	"					"	"		N	"
5912	"					"	"		E	Lunar surface
5913	"					"	"		SE	"
5914	"					"	"		S	LM
5915	"					"	"		S	"
5916	"					"	"		S	Astronaut and solar wind experiment
5917	"					"	"		SW	LM footpad

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine S Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5918	60				N/A	Med	Good		SW	LM footpad
5919	"					"	"		S	LM strut
5920	"					"	"		NW	LM strut, solar wind experiment, TV camera
5921	"					"	"		S	LM descent engine nozzle
5922	"					"	"		SW	Closeup of LM
5923	"					"	"			Looking up at LM with earth behind
5924	"					"	"			"
5925	"					"	"		SW	LM footpad
5926	"					"	"		NW	"
5927	"					"	"		NW	LM with astronaut
5928	"					"	"		NW	"
5929	"					"	"		NW	"
5930	"					"	"		W	Lunar surface
5931	"					"	"		NW	LM with astronaut
5932	"					"	"		N	Lunar surface with rocks in foreground

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Magazine S Film SO 168 Color Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5933	60				N/A	Med	Good		N	Lunar surface
5934	"					"	"		NE	"
5935	"					"	"		E	"
5936	"					"	"		E	"
5937	"					"	"		SE	"
5938	"					"	"		S	"
5939	"					"	"		S	Lunar surface with rocks in foreground
5940	"					"	"		SW	"
5941	"					"	"		W	"
5942	"					"	"		S	Astronaut carrying experiment packages
5943	"					"	"		S	"
5944	"					"	"		S	"
5945	"					"	"		S	Astronaut placing experiments on surface
5946	"					"	"		N	Astronaut assembling seismic experiment
5947	"					"	"		N	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

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Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5948	60				N/A	Med	Good		N	Astronaut assembling seismic experiment
5949	"					"	"		N	"
5950	"					"	"		N	Assembled seismometer on surface
5951	"					"	"		N	Astronaut with seismometer
5952	"					"	"		N	Laser target with LM in background
5953	"					"	"		N	Closeup of seismic experiment
5954	"					"	"		NE	Small crater with rocky bottom
5955	"					"	"		NE	"
5956	"					"	"		NE	"
5957	"					"	"		NE	"
5958	"					"	"		N	"
5959	"					"	"		N	"
5960	"					"	"		NW	Lunar surface
5961	"					"	"		NW	Lunar surface with LM
5962	"					"	"		NW	LM

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Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
5963	60				N/A	Med	Good		N	Astronaut and solar wind experiment
5964	"					"	"		N	"
5965	"					"	Dark		E	Closeup of LM skirt
5966	"					"	"		E	"
5967	"					"	Good		N	Solar wind staff in surface
5968	"					"	"		N	"
5969	"					"	"		NW	"
5970	"					"	"		NW	"

MAGAZINE T

(Frames AS11-6349 thru Frames 6539)

Magazine T is 70mm black and white photography of the lunar surface taken from the Command Module at approximately 60 nautical miles orbital altitude. The first 14 frames are oblique with a directional view mostly to the north. The area of coverage begins near 108° east longitude at approximately 5° north latitude and continues to 100° east longitude. A 250mm lens was used. Targets of opportunity numbers 53 and 55 were at least partially imaged.

The next 120 frames are 250mm mostly northeast looking oblique sequences, commencing at the farside terminator (160° west longitude) and continuing to an area just south of the Sea of Crises (60° east longitude). The following targets of opportunity were partially imaged: TO #11, #16, #30, #34, #66, and #67.

The remaining 54 frames are west looking near vertical to obliques taken on the farside of the moon with an 80mm lens. Area of coverage begins at 170° east longitude at the equator and concludes at approximately 110° east, 2.5° north latitude. Targets of opportunity #33 and #46 are partially imaged.

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Magazine T Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	Approx. Tilt max	Direction Tilt	Description
6349	250	731,100	5N	108E	0	High	Good	50	55	N	South of crater 201
6350	"	807,900	6N	100E	0	"	"	55	60	NW	Between craters 195 and 199 TO 55
6351	"		Horizon		0	"	"	70	75	W	Crater 189, Smythii Sea
6352	"	1,126,100	6N	96.5E	0	"	"	65	70	W	Crater 195, TO 55
6353	"	969,200	8N	103.5E	0	"	"	60	65	N	Crater 198, Part of crater 197 TO 53
6354	"	731,100	6N	104E	20	"	"	50	55	N	Just west of crater 201
6355	"	"	6N	103E	10	"	"	50	55	N	Just north of crater 199
6356	"	969,200	9.5N	103E	0	"	"	60	65	N	Craters 198,197,200, TO 53
6357	"	645,200	4.5N	103E	0	"	"	45	50	N	View into crater 199
6358	"	731,100	5N	108.5E	0	"	Poor	50	55	NE	View partially obscure - South of crater 201
6359	"	1,126,100	10.5N	106.5E	0	"	Good	65	70	NE	Looking northeast into crater
6360	"		Horizon		0	"	"	65	75	N	Partial views of craters 194 and 196
6361	"		Horizon		30	"	"	65	75	N	View into crater 194
6362	"	645,200	4.5N	101E	0	"	"	45	50	NE	Just west of crater 199
6363	"	"	4N	101E	80	"	"	45	50	NE	Just west of crater 199

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Magazine T Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6364					0	Low	Poor			E	Crater XV area (not plotted)
6365	250	767,100	0.5S	160W	0	"	"	50	60	E	Crater XV area
6366	"	"	2S	160W	0	"	"	50	60	E	"
6367	"	854,300	Horizon		0	"	"	50	60	NE	Crater XV area, TO 11
6368	"	"	2S	159W	0	"	"	50	60	E	Crater XV area
6369	"	807,900	1S	160W	0	"	"	55	60	E	Crater XV area, near TO 11
6370	"	"	0.5S	162.5W	0	"	"	55	60	E	West of crater XV, near TO 11
6371	"	699,200	0.5S	164.5W	10	"	Fair	45	55	E	"
6372	"	"	1.5S	165W	30	"	"	45	55	E	"
6373	"	"	2S	165.5W	40	"	"	45	55	E	"
6374	"	"	2S	166.5W	40	"	Good	45	55	E	"
6375	"	"	1.5S	166.5W	50	"	"	45	55	E	"
6376	"	"	0.5S	166.5W	50	"	"	45	55	E	"
6377	"	"	0.5S	167.5	50	"	"	45	55	E	"
6378	"		Horizon		0	"	Poor			E	Vicinity of crater XV (not plotted)

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine T Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6379	250	699,200	0.5S	168.5W	0	Low	Good	45 55	E	West of crater XV
6380	"	"	2S	169W	0	"	"	45 55	E	Northwest of crater 310
6381	"	"	1S	169.5W	10	"	"	45 55	SE	"
6382	"	"	0.5S	170W	40	"	"	45 55	E	"
6383	"	"	1.5N	170W	0	"	"	45 55	E	"
6384	"				0	Med	Poor	60 65		Not plotted
6385	"	583,000	0.5S	175W	0	"	Good	35 45	E	South of crater 229
6386	"	"	0	175.5W	40	"	"	35 45	E	"
6387	"	"	1N	176W	0	"	"	35 45	E	"
6388	"	"	1.5N	176W	40	"	"	35 45	E	"
6389	"	"	1.5N	177W	40	"	"	35 45	E	Southwest of crater 229
6390	"	"	2N	177.5W	20	"	"	35 45	E	"
6391	"	"	1N	177W	10	"	"	35 45	E	"
6392	"	"	0.5N	177.5W	70	"	"	35 45	E	"
6393	"	"	1N	177W	70	"	"	35 45	E	"

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Magazine T Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6394	250	969,200	2N	177.5W	0	Med	Fair	60	70	NE	Crater 229 area
6395	"	"	4.5N	177W	0	"	Good	60	70	NE	West of crater 229
6396	"	"	5N	179.5W	50	"	"	60	70	NE	Northwest of crater 229
6397	"	1,041,100	4N	174.5W	0	High	Fair	60	70	NE	Crater 229
6398	"	550,900	0	174.5E	0	Med	Good	35	45	E	East of crater 225
6399	"	"	0.5S	175.5E	0	"	"	35	45	E	"
6400	"	"	0.5S	174.5E	0	"	"	35	45	E	East of crater 225
6401	"	"	0	173E	0	"	"	35	45	E	East edge of crater 225
6402	"	"	0.5S	172E	0	"	"	35	45	E	South edge of crater 225
6403	"	"	2N	173.5E	0	"	"	35	45	NE	Just northeast of crater 225
6404	"	"	1.5N	173E	70	"	"	35	45	NE	"
6405	"	513,300	0	169.5E	0	"	"	30	40	E	Just west of crater 225
6406	"	"	0.5N	169E	10	"	"	30	40	E	"
6407	"	550,900	3N	168.5E	0	High	"	35	45	NE	Between craters 225 and 220
6408	"	1,041,100	7N	175.5E	0	"	"	60	70	NE	Crater 227

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Magazine T Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6409	250		Horizon		40	High	Fair	65	75	NE	Partial view of crater 227
6410	"		Horizon			"	Poor	70	75		Not plotted
6411	"	601,600	2.5N	165.5E	0	Med	Good	40	45	NE	Southeast of crater 220
6412	"	807,900	5.5N	166.5E	0	"	"	55	60	NE	East of crater 220
6413	"	1,041,100	7N	168.5E	0	"	"	60	70	NE	Near crater 220
6414	"	550,900	1.5N	161.5E	0	"	"	30	40	NE	Crater just northwest of crater 303
6415	"	"	1.5N	161E	50	"	"	30	40	NE	"
6416	"	1,041,100	6N	168.5E	0	"	"	60	70	NE	Near crater 220
6417	"	583,000	3N	161.5E	0	"	"	40	45	NE	"
6418	"	1,041,100	7N	164.5E	0	"	"	60	70	NE	"
6419	"	"	5N	160.5E	0	"	"	60	70	NE	"
6420	"	601,600	3N	155.5E	0	High	"	40	45	NE	Southwest of crater 220
6421	"	"	3N	156E	70	"	"	40	45	NE	"
6422	"	"	3N	155E	50	"	"	40	45	NE	"
6423	"	622,200	5N	154.5E	0	"	"	40	50	NE	Area between craters 218,220

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Magazine T Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6424	250				0	High	Poor			NE	Area between craters 218, 220 (not plotted)
6425	"	969,200	8.5N	152E	0	"	Poor	55	65	N	Northeast of crater 218
6426	"	767,100	4N	150E	0	"	Good	50	60	NE	East of crater 218
6427	"	645,200	5.5N	144E	0	"	"	45	50	N	Crater IX area, TO 30
6428	"	699,200	4N	143.5E	0	"	"	40	50	N	"
6429	"	"	4.5N	142E	0	"	"	45	55	NE	Crater IX area, close to TO 30
6430	"	"	4.5N	143E	20	"	"	45	55	NE	"
6431	"	"	4.5N	141.5E	40	"	"	45	55	NE	"
6432	"	"	4N	143.5E	0	"	"	45	55	NE	"
6433	"	"	4.5N	142E	0	"	"	45	55	NE	"
6434	"	495,500	1.5N	138E	0	"	"	20	30	N	East of crater 217
6435	"	471,300	1.5N	136E	0	"	"	15	25	N	Just southeast of crater 217
6436	"	969,200	9N	140.5E	0	"	"	60	65	NE	Crater IX, between TO 30, 34
6437	"	"	8.5N	140E	35	"	"	60	65	NE	"
6438	"	"	7.5N	140E	35	"	"	60	65	NE	"

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Magazine T Film 3400 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	Approx. Tilt max	Direction Tilt	Description
6439	250	807,900	7N	139.5E	40	High	Good	55	60	NE	Crater IX, between TO 30, 34
6440	"	"	6.5N	139.5E	40	"	"	55	60	"	"
6441	"	"	5.5N	139.5E	40	"	"	55	60	"	"
6442	"	731,100	5N	139E	40	"	"	50	55	"	"
6443	"	969,200	5.5N	143E	0	"	"	60	65	"	Crater IX, close to TO 30
6444	"	731,100	5N	131.5E	0	"	"	50	55	N	Just northwest of crater 216
6445	"	465,400	1N	133.5E	0	"	"	15	25	NE	South of crater 216
6446	"	969,200	10N	133.5E	0	"	"	60	65	N	Crater 215 area
6447	"	767,100	6N	130.5E	0	"	"	50	60	N	Just northwest of crater 216
6448	"	"	6N	120E	0	"	Fair	50	60	N	Crater 211
6449	"	"	6N	120.5E	0	"	"	50	60	N	"
6450	"	1,041,100	9.5N	112.5E	0	"	"	60	70	N	Crater 205
6451	"	807,900	8.5N	89.5E	0	High	"	55	60	N	Crater Jansky
6452	"	601,600	4N	89.5E	0	"	"	40	45	N	Northern edge of Smyth Sea
6453	"	854,300	9N	85E	0	"	"	55	65	NE	Crater Neper, Crater Neper G

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Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6454	250	854,300	9N	84.5E	55	High	Good	55 65	NE	Crater Neper, Neper G
6455	"	"	8N	85E	60	"	"	55 65	NE	"
6456	"	" "	8.5N	83.5E	10	"	"	55 65	NE	Craters Neper, Neper G, Neper Q
6457	"	"	8.5N	85E	40	"	"	55 65	NE	Craters Neper, Neper G
6458	"	"	10.5N	84E	40	"	"	55 65	NE	"
6459	"	"	8N	83.5E	60	"	"	55 65	NE	Craters Neper, Neper G, Neper Q
6460	"	"	8N	85E	20	"	"	55 65	NE	"
6461	"	"	8.5N	86.5E	10	"	"	55 65	NE	Crater Neper
6462	"	"	9.5N	86E	40	"	"	55 65	NE	Crater Neper, Partial TO 16
6463	"	"	9.5N	84.5E	20	"	"	55 65	NE	Crater Neper, Neper G, partial TO 16
6464	"	"	6N	79.5E	0	"	Fair	55 65	N	Crater Banachiewicz
6465	"	"	6N	79.5E	90	High	Good	55 60	N	"
6466	"	907,600	7N	76E	0	"	"	55 65	NE	Crater Banachiewicz E
6467	"	854,300	6N	79.5E	0	"	"	55 60	NE	Crater Banachiewicz
6468	"	"	7N	77E	0	"	"	55 60	N	Just east of Banachiewicz E

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Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	Approx. Tilt max	Direction Tilt	Description
6469	250	1,041,100	9N	85.5E	0	High	Good	60	70	E	Craters Neper, Neper Q, partial TO 16
6470	"	"	10N	85.5E	50	"	"	60	70	NE	Craters Neper, Neper Q, Neper G, partial TO 16
6471	"	854,300	2.5N	86E	0	"	"	55	65	E	Smyth's Sea
6472	"		Horizon		0	"	"	70	75	NW	Crater Condorcet, TO 66
6473	"	807,900	8.5N	73E	0	"	"	55	60	N	Crater Condorcet F
6474	"	"	7N	73.5E	50	"	"	55	60	N	"
6475	"	"	6N	79E	0	"	"	55	60	E	Crater Banachiewicz
6476	"		Horizon		0	"	"	70	75	NE	Near crater Hasen B
6477	"		Horizon		0	"	"	65	75	N	Crater Condorcet, TO 66
6478	"	1,227,800	2.5N	80E	0	"	"	65	75	E	Craters Shubert, Shubert B
6479	"	767,100	4N	76.5E	0	"	"	50	60	NE	Crater Shubert G
6480	"	"	4.5N	75E	40	"	"	50	60	NE	"
6481	"	1,126,100	8.5N	73.5E	0	"	"	65	70	N	Crater Condorcet F
6482	"	1,227,800	2.5N	80.5E	0	"	"	65	75	E	Craters Shubert and Shubert B
6483	"	699,200	3.5N	63E	0	"	"	45	55	NE	Crater Apollonius G, TO 67

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Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6484	250		Horizon		0	High	Good	65 75	NW	Sea of Crises, Crater Picard on horizon, TO 70 partial
6485	80	1,472,800	0	170E	0	Med	"	15 25	W	Crater 225
6486	"	"	0	169E	60	"	"	15 25	W	West of crater 225
6487	"	"	0	168E	70	"	"	15 25	W	"
6488	"	"	0	167E	70	"	"	15 25	W	"
6489	"	"	0	165.5E	70	"	"	15 25	W	Between craters 225 and 303
6490	"	"	0	164E	70	"	"	15 25	W	"
6491	"	"	0.5N	163E	70	"	"	15 25	W	"
6492	"	"	0.5N	162E	70	"	"	15 25	W	"
6493	"	"	0.5N	161E	70	"	"	15 25	W	West of crater 303
6494	"	1,493,800	0.5N	159.5E	70	"	"	20 25	W	"
6495	"	"	0.5N	158.5E	70	"	"	20 25	W	"
6496	"	"	0.5N	157.5E	70	"	"	20 25	W	"
6497	"	1,543,200	1N	156E	70	"	"	25 30	W	"
6498	"	"	1N	155E	70	"	"	25 30	"	"

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Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6499	80	1,543,200	1N	154E	70	Med	Good	25	30	W	North of crater 297
6500	"	"	0.5N	153E	70	"	"	25	30	W	"
6501	"	1,821,900	0.5N	152E	70	High	"	35	45	W	"
6502	"	"	1N	151E	70	"	"	35	45	W	"
6503	"	"	1N	149.5E	70	"	"	35	45	W	South of crater 218
6504	"	"	1N	148.5E	70	"	"	35	45	W	"
6505	"	"	1N	147E	70	"	"	35	45	W	"
6506	"	2,184,900	1N	146E	70	"	"	45	55	W	"
6507	"	"	1N	144.5E	70	"	"	45	55	W	Crater IX area
6508	"	"	1N	143.5E	70	"	"	45	55	W	"
6509	"	2,284,700	1N	142E	70	"	"	50	55	W	"
6510	"	"	1.5N	141E	70	"	"	50	55	W	"
6511	"	"	1.5N	139.5E	70	"	"	50	55	W	Craters IX, 217, 216
6512	"	"	1.5N	138.5E	70	"	"	50	55	W	Craters 217,216, near TO 33
6513	"	"	1.5N	137E	70	"	"	50	55	W	"

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Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6514	80	2,284,700	1.5N	136E	70	High	Good	50	55	W	Craters 217, 216, near TO 33
6515	"	"	2N	135E	70	"	"	50	55	W	"
6516	"	2,524,600	1.5N	133.5E	70	"	"	55	60	W	"
6517	"	"	2N	132E	70	"	"	55	60	W	"
6518	"	"	2N	130.5E	70	"	"	55	60	W	South of crater 216
6519	"	"	2N	129E	70	"	"	55	60	W	"
6520	"	3,028,700	2N	127.5E	70	"	"	60	65	W	West of crater 216
6521	"	"	2N	126E	60	"	"	60	65	W	"
6522	"	"	2.5N	125E	60	"	"	60	65	W	"
6523	"	"	2.5N	123E	60	"	"	60	65	W	Crater 282
6524	"	3,519,000	2.5N	121E	60	"	"	65	70	W	Craters 282, 211
6525	"	"	2.5N	119E	60	"	"	65	70	W	"
6526	"	"	3N	117E	60	"	"	65	70	W	West of crater 282
6527	"		Horizon		50	"	"	65	75	W	Partial view of crater 211
6528	"		Horizon		50	"	"	65	75	W	"

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Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6529	80		Horizon		50	High	Good	65	75	W	South of crater 211
6530	"		Horizon		40	"	Fair	70	75	"	Looking west towards craters 206, 207
6531	"		Horizon		40	"	"	70	75	"	"
6532	"		Horizon		40	"	"	70	75	"	"
6533	"		Horizon		40	"	"	75	80	"	Craters 206 and 207
6534	"		Horizon		30	"	"	75	80	"	"
6535	"		Horizon		30	"	"	75	80	"	"
6536	"		Horizon		30	"	"	75	80	"	Crater 204
6537	"		Horizon		30	"	"	75	80	"	"
6538	"		Horizon		20	"	"	75	80	"	Crater 202
6539	"		Horizon		20	"	"	75	80	"	West of crater 202

MAGAZINE U

(Frames AS11-42-6160 thru Frames 6348)

Magazine U was taken from the CSM while on a near circular lunar equatorial orbit. Both the 80 and 250mm lens were used. Magazine U comtains oblique and near vertical black and white views of both the lunar nearside and farside. There are several photographs of the solar corona.

The following targets of opportunity are at least partially imaged: TO #'s 11, 16a, 33, 43, 46, 66 and 67.

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Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6160-6166										No image
6167										Solar corona
6168										"
6169										"
6170-6175										No image
6176										Solar corona
6177										Minute fraction of solar corona
6178										"
6179										Solar corona
6180-6194										No image
6195										Solar corona
6196-6200										No image
6201										Fraction of solar corona
6202										"
6203										No image

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Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6204	80	3,028,700	1N	67E		Med	Fair	60	65	W	Area east of Foaming Sea
6205	"	2,397,200	0.5N	69.5E		"	Poor	50	55	W	"
6206	"	3,253,500	10N	69E		"	Fair	60	65	NW	Area southeast of Sea of Crises
6207	"	2,836,200	12N	69.5E		"	"	60	65	NW	"
6208	"	2,524,600	6.5N	74.5E		High	"	55	60	NW	"
6209	"	3,253,500	10N	63.5E		Med	Poor	65	70	NW	TO 66, partial coverage area southeast of Sea of Crises
6210	"	2,524,600	2.5N	69.5E		"	"	55	60		"
6211	"	3,253,500	10.5N	62.5E		"	"	65	70	NW	"
6212	"	3,028,700	12.5N	70E		"	Fair	60	65	NW	" "
6213	"	3,028,700	12N	65E		"	"	60	65	NW	"
6214	"	3,028,700	9N	63E		"	Poor	60	65	N	TO 67, partial coverage south of Mare Crisium
6215	"	2,524,600	10.5N	70E		"	Fair	55	60	N	TO 66, partial coverage southeast of Mare Crisium
6216	"	2,184,900	2.5S	61.5E		"	"	50	55	W	Area north of Langrenus and Mare Spumans
6217	"	2,669,700	9S	62E		"	"	55	70	SW	Area northeast of Langrenus
6218	"	2,524,600	6S	57.5E		"	"	55	60	SW	Area north of Langrenus

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Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6219	80	2,524,600	1S	58.5E		Med	Poor	55 60	SW	Messier G, Goclenius A
6220	"	2,397,200	7.5N	55.5E		"	Fair	50 55	NW	TO 67, partial coverage south of Mare Crisium
6221	"	3,253,500	15N	57.5E		"	Poor	60 70		TO 70a, partial coverage Mare Crisium on horizon
6222	"	2,524,600	11.5N	62.5E		"	Fair	55 60	N	"
6223	"	2,397,200	10N	56E		"	"	55 60	NW	TO 67, partial coverage, area south of Sea of Crises.
6224	"	1,944,520	2N	52E		"	"	45	W	Messier A, Messier B, Messier
6225	"	2,397,200	5N	48.5E		"	"	55 60	W	TO 67 partial coverage, area south of Mare Crisium
6226	"	2,397,200	5.5N	47.5E		"	"	50 55	NW	"
6227	"	3,253,500	1.5S	48E		"	Good	65	SW	Messier A, Messier B, Messier
6228	"	2,836,200	2.5S	42E	45	"	"	60 65	W	"
6229	"	2,669,700	6.5S	47E		"	"	55 60	SW	Goclenius
6230	"	2,397,200	11N	49E		Low	"	55 60	NW	TO 67 partial coverage, area south of Mare Crisium
6231	"	2,669,700	12N	42.5E		"	"	60 65	W	"
6232	"	3,253,500	10.5N	42E		"	"	60 65	NW	"
6233	"	1,944,500	1S	47E		"	"	45	S	Messier A, Messier B ,Messier

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Magazine U Film _____ Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	Approx. Tilt max	Direction Tilt	Description
6234	80	2,397,200	0.5S	37E		Low	Good	50	55	E	Censorinus N, Censorinus W
6235	"					"	"	70	75	S	Theophilus, Madler, Daguerre
6236	"					"	"	70	75	S	"
6237	"	3,028,700	13S	28.5E		"	"	60	65	S	"
6238	"	1,944,520	2N	28E		"	Poor	45	50	W	Maskelyne
6239	"	"	2.5N	29E		"	"	45	50	W	"
6240	"	"	3S	27.5E		"	"	45	50	SW	Torricelli
6241	"	2,836,200	11.5S	28E		"	"	60	70	SW	Theophilus
6242											Farside terminator, not plotted
6243											"
6244	80	1,604,100	1.5N	155W		Low	Good	25	30	E	TO 11, partial coverage, northwest corner of crater 235
6245	"	1,454,200	0.5N	159.5W		"	"	10	20	E	TO 11
6246	"	"	0.5S	160.5W		"	"	10	20	E	TO 11
6247	"	3,253,500	10.5S	164W		"	"	60	70	S	Crater 312
6248	"	"	11S	163W		"	"	55	65	S	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6249	80					Med	Good	70 75	SW	Crater 310,
6250	"	1,604,100	1S	175.5E		"	Fair	25 30	W	TO 15, partial coverage
6251	"	1,400,700	0.5N	177E		"	"	5 10	W	East of crater 225
6252	"	"	0	169.5E		"	"	5 10	W	West of crater 225
6253	"	1,472,800	2N	165.5E		"	"	20 25	N	East of crater 303
6254	"	1,400,700	1.5N	161E		High	Poor	5 10	SW	West of crater 303
6255	"	1,944,500	4N	160E		"	"	45 50	NW	Crater 220
6256	"	1,821,900	5S	159.5E		"	"	40 45	S	Crater 301
6257	"									
6258	"	2,200,000	4.5S	151.5E		Med	Poor	50 60	S	Crater 297
6259	"	1,390,000	1.5N	143.5E		"	"	5 10	E	South edge of IX
6260	"	1,600,000	2.5S	139.5E		"	"	30	SE	Crater 292 near top TO 33
6261	"	"	2.5S	139.5E		"	"	30	SE	"
6262	"	2,500,000	4S	137.5E		"	"	55 60	SE	Crater 292 on left edge, TO 33
6263	"	"	4S	137.5E		"	"	55 60	SE	"

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Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6264	80	2,500,000	4.5S	124E		High	Good	55 60	SW	Crater 283 in foreground, TO 43
6265	"	"	4.5S	124E		"	"	55 60	SW	"
6266	"					"	Poor			Probably near 123E, 1N; very poor photo, not plotted
6267	"					"	"			"
6268	"	2,500,000	5S	122.5E		"	Fair	55 60	S	Near crater 283, TO 43
6269	"	"	5S	122.5E		"	"	55 60	S	"
6270	"					"	Poor			Position probably S or SW of Crater 211, very poor photo
6271	250	620,000	6N	121E		"	"	45 50	NW	Crater 211, TO 46
6272	80	3,200,000	11N	155W		Low	"	60 65	NW	Crater 234,
6273	"	3,200,000	11N	155W		"	"	60 65	NW	"
6274	"	3,900,000	12N	157W		"	Good	65 70	NE	Near crater 234, window in lower left corner
6275	"	"	8N	155.5N		"	"	65 70	NE	Crater 234, chain craters in center
6276	"	"	10N	163W		"	"	65 70	NE	Crater 232 is the 2nd major one in foreground, limb
6277	"	3,600,000	2S	158E		High	Poor	65 70	E	Near 299
6278	"	"	2.5S	155E		"	"	65 70	E	Crater 299 in middle foreground

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Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6279	80	3,200,000	7.5S	151E		Med	Poor	60 70	SE	Crater 297, limb
6280	"	3,800,000	5.5S	145.5E		"	"	65 70	S	Crater 295 at pp
6281	250	622,000	0	108E		High	Good	40 45	NE	Near crater 202
6282	"	670,000	4.5N	108E		"	"	40 45	NE	About 30 km south of crater 201
6283	"	475,000	2.5N	111.5E		"	Fair	10 20	NW	Between crater 206 and crater 202
6284	"	440,000	3.5N	101.5E		"	Good	5 10	N	On SE rim of crater 199
6285	"	446,000	4.5N	101E		"	Fair	5 10	SE	Bright rayed crater on west lip of crater 199
6286	"	440,000	1.5N	98E		"	Good	5 10	S	North edge of crater 269
6287	"	"	1N	98E		"	"	5 10	E	"
6288	"	470,000	5.5S	90.5E		"	"	20	SE	West edge of crater 226
6289	"	"	5.5S	90.5E		"	"	20	SE	"
6290	"	"	5.5S	90.5E		"	"	20	SE	West edge of crater 226, small rayed crater
6291	"	440,000	0.5S	91E		"	Fair	0 5	SE	Eastern part Mare Smythii
6292	"	446,000	1N	92.5E		"	"	5 10		"
6293	"	510,000	5.5S	91.5E		"	Good	25 30	SE	West edge of crater 226, small bright rayed crater.

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Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6294	250	510,000	5.5S	91.5E		High	Good	30	SE	West edge of crater 226, small bright rayed crater
6295	"	442,000	6.5N	89E		"	Fair	5 10	N	North edge of Mare Smythii small bright rayed crater
6296	"	"	6.5N	89E		"	"	5 10	N	"
6297	"	1,200,000	6.8S	91E		"	Good	65 70	SE	West of crater 226, small bright rayed crater
6298	"	442,000	3.5N	107.5E		"	"	0 5	N	About 100km south of crater 201
6299	"	443,000	2N	110.5E		"	"	5 10	N	About 200km southeast of crater 201
6300	"	440,000	3.5S	46.5E		Med	Poor	0 5	Near Vert	Messier D
6301	"		0	45.5E		"	"	0 5	Near Vert	Secchi K
6302	"		2N	49.5E		"	"	0 5	Near Vert	Taruntius G
6303	"	465,400	1.5S	48E		"	"	10 20	W	Messier
6304	"	"	1.5S	47.5E		"	"	10 20	W	Messier
6305	"	"	1.5S	47.5E		"	"	10 20	W	Messier
6306	"	"	2.5N	43.5E		"	"	10 20	N	Secchi
6307	"	"	0.5N	44E		"	"	10 25	N	Area east of Secchi U.
6308	"	440,000	1N	41.5E		"	"	0 5	Near-Vert	Area west of Secchi U

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Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6309	250	440,600	0.5N	42E		Med	Poor	0	5	Near Vert	Area south of Secchi U
6310	"	"	0.5N	42E		"	"	0	5	Near Vert	"
6311	"	1,041,100	11S	46E		Low	"	65	70	SE	Craters Gutenberg E, Goclenius
6312	"	"	11S	46E		"	"	65	70	SE	"
6313	"	807,900	4.5S	38E		"	"	55	60	SE	Craters Censorinus C, Gutenberg G
6314	"	400,000	0.5N	33.5E		"	Fair	0	5	Near Vert	Area north of Maskelyne A
6315	"	"	1N	33.5E		"	"	0	5	Near Vert	"
6316	"	"	0	32.5E		"	"	0	5	Near Vert	Maskelyne A
6317	"	443,300	2N	28.5E		"	Poor	5	10	NW	Maskelyne B
6318	"	400,000	0.5N	30E		"	"	0	5	Near Vert	Boot Hill, Maskelyne
6319	"	"	0	29.5E		"	"	0	5	Near Vert	Duke Island
6320	"	443,300	2N	30E		"	"	5	10	N	Masklyne
6321	"	"	2N	30.5E		"	"	5	10	NW	"
6322	"	"	2N	29.5E		"	"	5	10	NW	"
6323	"	400,000	0	28.5E		"	"	0	5	Near Vert	Sidewinder Ridge

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Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6324	250	465,400	1.5N	27E		Low	Poor	10	20	NW	Maskelyne B
6325											Dark - not plotted
6326		400,000	2.5N	26.5E		"	Poor	0	5	Near Vert	Maskelyne G
6327											Blank
6328											Blank
6329	250	443,300	0.5N	143.5E		High	Poor	5	10	W	Unnamed crater
6330	"	1,041,100	4S	137.5E		"	Fair	60	70	SE	
6331	"	731,100	1S	140.5E		"	Good	50	55	SW	Unnamed crater north of crater 292
6332	"	731,100	0.5N	133E		Med	Fair	55	60	W	Unnamed crater south of crater 216
6333	"	"	0.5N	133E		"	"	55	60	W	"
6334	"		1N	132.5E		"	Poor	40	45	N	"
6335	80	1,572,100	5.5S	122.5E		"	"	25	30	SW	Partial TO 43(near crater 281)
6336	"	"	5.5S	122.5E		"	"	25	30	SW	"
6337	250	1,041,100	4N	172.5E		"	Fair	60	65	NE	Partial crater 227 (Partial TO 160)
6338	"		above	horizon		"	"	70	75	NE	"

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Magazine U Film 3400 B&W Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min	max	Direction Tilt	Description
6339	250		Above horizon			Med	Fair	70	75	NE	Partial crater 226
6340	"	400,000	1N	162.5E		Low	"	0	5	Near Vert	Unnamed craters north of 303
6341	"	"	1.5N	163E		"	"	0	5	Near Vert	"
6342	"	513,300	2N	161.5E		"	"	25	30	N	"
6343	"	400,000	1.5N	161.5E		"	"	25	30	N	"
6344	"	"	1.5N	161E	20	"	"	25	30	N	"
6345	"	"	1.5N	161E	70	"	"	25	30	N	"
6346	"	"	2N	160E		"	"	25	30	N	"
6347	"	"	1.5N	159.5E	60	"	"	25	30	N	"
6348	"	"	0	159.5E		"	"	0	5	Near Vert	"

MAGAZINE V

(From frames AS11-44-6540 to 6696)

This magazine contains Hasselblad 70mm color pictures (80 and 250mm focal length) of lunar topography before separation of LM and the Command Module, during separation (GET 100:15), during docking, just after TEI (transearth insertion) and pictures of the earth several hours prior to splash-down. Several sequences of lunar topography were taken between the above events, but none were vertical.

Targets of opportunity either fully or partially covered include 15, 35, 36, 43, 46, 47, 50, 53, 55, 57, 61, and 80; a majority of these are high angle obliques.

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6540	80	1,570,000	04 N	117E	80	H	Poor	30	NE	Near Crater 211, thruster in focus
6541	"	2,400,000	05.5N	119E	80	"	"	55 60	NE	Near Crater 211, thruster in focus, limb,TO 46
6542	"	"	06.5N	119E	80	"	"	55 60	NE	"
6543	"	"	06 N	121E	80	"	Good	55 60	NE	"
6544	"	3,600,000	16 N	119E		"	"	68	NE	Crater 205 left edge, 211 lower right, limb, TO 46,47
6545	"	3,300,000	11.5N	113.5E		"	"	66	NE	Crater 205, limb TO 47,50
6546	"	3,400,000	07 N	106E		"	Med	65 70	NW	Crater 201 complex near p.p. limb TO 53
6547	250	1,300,000	03 N	87E	90	"	Good	65 69	W	Earth on horizon, Mare Smythii Region
6548	"	"	03 N	86E	90	"	"	65 69	W	"
6549	"	"	03 N	86E	90	"	"	65 69	W	"
6550	"	"	03 N	85E	90	"	"	65 69	W	"
6551	"	"	03 N	85E	90	"	"	65 69	W	"
6552	"	"	03 N	85E	90	"	"	65 69	W	"
6553	"	"	03 N	85E	90	"	"	65 69	W	"
6554	"	"	03 N	85E	90	"	"	65 69	W	"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6555	250	1,300,000	03N	85E	90	High	Good	65 69	W	Earth on horizon, Mare Smythii Region
6556	"	"	03N	85E	90	"	"	65 69	W	"
6557	"	"	03N	85E	90	"	"	65 69	W	"
6558	"				90	"	"	75	W	"
* 6560	"				90	"	"	75	W	"
6561	"				90	"	"	75	W	"
6562	"				90	"	"	75	W	"
6563	"				90	"	"	75	W	"
6564	"				90	"	"	75	W	"
6565	"						"			20 July 1969 GET=100:15; LM, footpads
6566	"						"			"
6567	"						"			"
6568	"						"			20 July 1969 GET=100:30 LM footpads
6569	"						Poor			"
6570	"						"			"
* 6559	"				90	Med	Good	75	W	Earth on horizon, Mare Smythii region

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____
Black and White

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6571	250						Poor			20 July 1969 GET=100:30; LM footpads
6572	"						"			20 July 1969 GET=100:50; LM, space background
6573	"						"			"
6574	"						Fair			"
6575	"						"			"
6576	"						"			LM and footpads, poor lighting, black space background
6577	"						"			"
6578	"						"			"
6579	"						"			"
6580	"						"			"
6581	"						"			"
6582	"						"			"
6583	"						"			"
6584	"						"			
6585	"						"			"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6586	250						Poor			LM very poor light (20 July 1969)
6587	"						"			"
6588	"						"			"
6589	"						"			"
6590	"						"			"
6591	"						"			"
6592	"						"			"
6593	"						"			"
6594	"						"			"
6595	"						"			"
6596	"						"			"
6597	"						"			"
6598	"						"			"
6599	"						"			"
6600	80						"			

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Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6601	80				80	H	Poor		W	Earth on horizon,Mare Smythii, pp in space,window deposit low left
6602	"				80	"	"		W	"
6603	"				80	"	"		W	"
6604	"				80	"	"		W	"
6605	"				80	"	"		W	"
6606	250	900,000	08S	175W	0	Low	Good	60 65	SW	Crater 310 in foreground TO 15
6607	"	460,000	01S	172.5W	0	"	"	20	SE	Area north of Crater 310
6608	"	800,000	07S	178W	0	"	"	55 60	SW	Crater on horizon, edge of 308 on right side TO 15
6609	"	600,000	04S	179E	0	"	"	50 55	SW	Crater 308, limb
6610	"	800,000	07S	178W	0	"	"	55 60	SW	Crater 309 in background, area 308 in foreground, limb
6611	"	"	04S	179E	0	"	"	55 60	SW	Crater 308, limb
6612	"	560,000	05.5S	177.5E	0	Med	"	40 45	S	Crater 308 lower left
6613	"	800,000	08S	178E	0	"	"	55 60	SE	½ of Crater 308 on left,limb
6614	"	"	08S	174.5E	0	"	"	55 60	S	Near Crater 308
6615	"	"	3.5S	44E	30	"	"	50 55	W	Messier B Mare Fecunditatis, Messier,

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Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6616	250	800,000	01N	41E	30	Med	Good	55 60	W	Mare Fecunditatis, Messier Messier B, TO 80
6617	"	1,200,000	0.5N	27E	20	Low	"	65 70	W	Mare Tranquillitatus, Maskelyne Censorinus, TO 80
6618	"	"	01N	24E	20	"	"	65 70	W	"
6619	"	580,000	0.5N	30	20	"	"	40	W	Mare Tranquillitatus, Maskelyne Censorinus
6620	"	1,200,000	02N	19E	20	"	"	65 75	W	Mare Tranquillitatus, Maskelyne
6621	80	2,400,000	1.5N	105E	30	High	"	55 60	W	Ascent stage of LM, Crater 202 lower left, limb
6622	"	"	1.5N	105E	30	"	"	55 60	W	"
6623	"	"	1.5N	104E	30	"	"	55 60	W	"
6624	"	"	1.5N	103E	"	"	"	55 60	W	"
6625	"	"	1.5N	102.5E	30	"	"	55 60	W	Ascent stage of LM, Crater 199 on right edge TO 55
6626	"	"	1.0N	102E	30	"	"	55 60	W	"
6627	"	"	1.0N	101.5E	10	"	"	55 60	W	Ascent stage of LM, between Craters 270 and 199
6628	"	"	1.0N	101E	10	"	"	55 60	W	Ascent stage of LM, near 270 and 199, Mare Smythii
6629	"	"	1.0N	100.5E	10	"	"	55 60	W	Ascent stage of LM, Crater 269 on left edge, Mare Smythii
6630	"	3,200,000	1.0N	99E	10	"	"	60 65	W	"

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Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6631	80	3,200,000	1.5N	96E	20	High	Good	60 65	W	Ascent stage of LM, Mare Smythii near horizon
6632	"				30	"	Poor	65 75	W	Ascent stage of LM, Mare Smythii, Earth on horizon
6633	"				30	"	"	65 75	W	"
6634	"				30	"	Good	65 75	W	"
6635	"				30	"	Fair	65 75	W	"
6636	"				60	"	"	65 75	W	"
6637	"				60	"	"	65 75	W	"
6638	"				60	"	"	65 75	W	"
6639	"				60	"	"	65 75	W	"
6640	"				60	"	"	65 75	W	"
6641	"	2,800,000	1.5N	88E	60	"	"	60	W	"
6642	"	3,200,000	1.5N	88E	60	"	"	65 75	W	"
6643	"				60	"	"	65 75	W	"
6644	"	790,000	06N	111E	30	"	Good	45	W	206 and 205 in foreground, Mare Marginis on limb, TO 53,55,57
6645	"	800,000	05N	101E	30	"	"	50	W	Mare Marginis & Smythii, Earth on horizon, TO 53,55,57

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale 1:	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6646	80	1,200,000	05.5N	96E	30	High	Good	67	W	Mare Smythii & Marginis, earth, 201 right lower corner
6647	250	1,300,000	02N	84E		"	Poor	70	W	189 on right edge, Mare Smythii, limb
6648	"	"				"	"	70	W	Mare Smythii, earth, space p.p. in
6649	"	"	03.5N	80E	20	"	Good	70	W	Earth, north edge Mare Smythii limb
6650	"	"	06N	81E	20	"	"	70	W	"
6651	"				50	"	"	75	W	"
6652	"				50	"	"	75	W	"
6653	80	5,200,000	04N	91E	50	"	"	70	W	Earth, north edge Mare Smythii limb, TO 57, 61, after TEI
6654	250	4,000,000	02S	104.5E	15	"	"	40	W	After TEI, pp near 270; 198 on right edge, TO 53,55,57
6655	"	6,000,000	4.5N	108.5E	15	"	Fair	07	W	After TEI, pp about 3° south of 201, other Craters 198,205,270
6656	80		40N	110E		"	Good		NW	After TEI, Joliot-Curie on left
6657	"		17S	127E		"	"		SE	Tsiolkovsky near horizon, 276 on right, TO 35,36,43, after TEI
6658	"		17N	125E	80	"	Poor		NE	After TEI, Crater 211 lower right corner, limb
6659	"		17N	125E	80	"	"		NE	"
6660	"		30N	110E		"	Good		NW	Joilot-Curie on left edge, after TEI

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6661	250		5N	80E		High	Good			90% of moon's sphere
6662	"		5N	79E		"	"			"
6663	"		5N	70E		"	"			95% of moon's sphere
6664	"		9N	65E		"	"			Moon's sphere
6665	"		10N	65E		"	"			"
6666	"		7N	68E		"	"			"
6667	"		7N	57E		"	"			"
6668	"					Low	Poor			Earth's sphere, terminator, ¼ illuminated sphere
6669	250					"	"			Earth's sphere, terminator, ½ illuminated sphere
6670	"						Good			"
6671	"						"			"
6672	"						"			"
6673	"						"			"
6674	"						"			"
6675	"						Poor			"

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6676	80						Good			Earth, terminator, 1/3 sphere illuminated, sunglint, E.Africa
6677	"						"			"
6678	"						"			"
6679	"						"			"
6680	"						"			"
6681	"						"			"
6682	"						"			"
6683	"						"			"
6684	"						"			"
6685	"						"			"
6686	"						"			"
6687	"						"			"
6688	"						"			"
6689	"						"			"
6690	250						"			Earth, terminator, Ethiopia, Indian O. 30°N to 30°S visible

APOLLO 11 HASSELBLAD PHOTOGRAPHY

Magazine V Film 368 Time Reference - GET _____ = GMT _____

Frame #	Camera FL mm	Approx. Photo Scale	Principal Point Lat deg	Long deg	Fwd o/l %	Sun Angle H,M,L	Photo Quality	Approx. Tilt min max	Direction Tilt	Description
6691	250						Good			Earth, terminator, Ethiopia Indian O. 30°N to30°S visible
6692	"						"			"
6693	"						"			Earth, terminator
6694	"						"			Earth, terminator, view south along E. Africa coast
6695	"						"			Earth, terminator, Indian Ocean not visible
6696	"						"			Earth, Terminator (poss. forest fire has two distinct
										intense places in about southern Somali), Indian Ocean

TJ-2007

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

There are 13 magazines of 16mm sequence photography with SO 368 and SO 168 film. Five of the magazines contain plottable scenes of the lunar surface. Seven magazines contain photographs of IVA, docking and re-entry. Three magazines contain photography of EVA, which exhibit excellent image quality. The LM descent and ascent photographic sequence produced high quality exposures of the lunar scene.

The majority of the 16mm magazines exposed during the Apollo 11 Mission will be of great value to the scientific community.

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine A Film SO 368

Frame Number	Location	Description	Remarks
1-3386	Earth/space	Short sequence of earth with panoramic to SIVB and LM. Docking of LM to CSM.	No plottable scenes.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine B Film SO 168

Frame Number	Location	Description	Remarks
1-1922		IVA - Armstrong, Aldrin, and Collins	Not plottable.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine C Film SO 168

Frame Number	Location	Description	Remarks
1-5612		Sequence of LM undocking from CSM.	No plottable scenes.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine D Film SO 368

Frame Number	Location	Description	Remarks
1-5554	Sequence from 129.5°E to 85°E	Sequence of CSM tracking LM to maneuver for docking. Lunar farside scene of craters 282, 206, 207, 202, 192, 267, and Mare Smythii. Low to high obliques	Plotted.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine E Film SO 368

Frame Number	Location	Description	Remarks
1-5592		High oblique panoramic photography; photography covering nearly quarter moon. Principal features - Smyth's Sea, Mare Crisium, Langrenus, and Humbolt craters.	Not plottable at map scale.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine F Film SO 368

Frame Number	Location	Description	Remarks
1-659	161°E, 7°S (approximately center of sequence)	High to low oblique panoramic sequence of lunar farside. Principal features are craters 300, 301, 302, 304 and 305.	Plotted.
660-2886	From 20.5°E to 2°W	Sequences starts with low obliques of Sabine, Ritter, and Schmidt, near vertical over Dionysius to Godin, Godin B, Rhaeticus A, low to high obliques of Triesnecker and Agrippa, and ends with low obliques of LLS-3, Blagg and Bruce into terminator.	Plotted.
2887-2976	126°E, 12°N (approximate center of sequence)	High to low oblique panoramic sequence of lunar farside. Prinicpal features are craters 212, 213, 214, and 215.	Plotted.
2977-3075	121°E, 1°N (approximate center of sequence)	High to low oblique panoramic sequence of lunar farside craters 211, 282, and 283.	Plotted.
3076-3186	127°E, 11°N (approximate center of sequence	High to low oblique panoramic sequence of lunar farside craters 210, 212, and 214.	Plotted.
3187-4085	From 127°E to 115.5°E	Low obliques to near vertical sequence of lunar farside craters 208, 211, 213, and 282.	Plotted.
4111-4977		Earthrise-high oblique over Mare Smythii - Neper visible.	Not plottable at map scale

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine G Film SO 168

Frame Number	Location	Description	Remarks
1-429		IVA	Not plottable
430-488	Not located	LM sequence of CSM, overexposed - lunar scene not identifiable.	Not plottable
489-548	Sequence from 50.5°E to 47°E	Low oblique to near vertical sequence over the craters Taruntius G and H.	Plotted
549-1498	Sequence from 32.5°E to 21.5°E	Low oblique to near vertical sequence over Maskelyne, Maskelyne B and G, LLS 2, and Moltke.	Plotted

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine H Film SO 168

Frame Number	Location	Description	Remarks
1-4445	Sequence from 23.5°E to 6.5°E	Sequence photography taken from LM during ascent; from LLS-2 over Sabine, Schmidt past Godin and Godin B.	Plotted

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine I Film SO 168

Frame Number	Location	Description	Remarks
1-70		Sequence of LM tracking CSM	No plottable scene.
71-2398	Sequence from 44.5°E to 26.5°E	Sequence of LM descent. High to low oblique from LM window to roll.	Plotted.
2399-2636		LM roll no scene	Not plottable.
2637-5565	Sequence from 24°E to 23.5°E	High to low oblique of LM landing on lunar surface	Plotted.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine J Film SO 168

Frame Number	Location	Description	Remarks
1-5612	Tranquility Base	Initial sequence of photography from LM on lunar surface. Start of EVA - Armstrong down LM ladder onto lunar surface.	Photography not plottable at map scale.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine K Film SO 168

Frame Number	Location	Description	Remarks
1-5610	Tranquility Base	Sequence of lunar surface EVA (flag, TV - setup).	Photography not plottable at map scale.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine L Film SO 168

Frame Number	Location	Description	Remarks
1-1648	Tranquility Base.	Sequence from LM on lunar surface after EVA.	Not plottable at map scale.
1649-1833	Not located.	Lunar farside scene sequence from LM - overexposed - scene not identifiable.	Not plotted.
1834-2416	Not located.	Earthrise - overexposed scene not identifiable	Not plottable.
2417-2845		Sequence from LM tracking CSM prior to docking.	No plottable scene.

NO. clw 387

APOLLO 11 SEQUENCE PHOTOGRAPHY (16mm)

Magazine M Film SO 368

Frame Number	Location	Description	Remarks
1-5541		Sequence of earth (sunrise/set); re-entry (overexposed). Underexposed - chutes out.	No plottable scenes.

NO. clw 387

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