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OPERATION LION - REPORT FOR NETWORK
ALERT DURING APOLLO 12

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PREFACE

This report has been prepared by Lockheed Electronics Company for the Geophysics Branch of the Lunar and Earth Sciences Division, by Mr. Louis E. Schneider under Action Documentation 3044-AD-03-02 of the NASA Contract NAS 9-5191.

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OPERATION LION - REPORT FOR NETWORK
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INTRODUCTION

Lockheed Electronics Company, under Support Contract NAS 9-5191, again coordinated operation LION for the NASA, MSC, Geophysics Branch. Communications support was furnished by the Smithsonian Center for Short-Lived Phenomena in Cambridge, Massachusetts. Their separate report documents all TLP observations sent in by LION members during the Apollo 12 mission alert.

OBJECTIVES

The primary objective for operation LION during this mission was to obtain spectrograms and/or photographs of transient events.

Several LION associates have sent in clear and interesting photographs of the moon but no spectrograms have been received. The photographs are being studied by qualified people. Results will be announced in the next operations report.

The second objective of this operation was to obtain Apollo confirmation of earth-based lunar event sightings. Confirmation of an event reported in Alphonsus was attempted but was unsuccessful.

EVENT REPORTS

Routine procedures for communications and data recording are now well established and have been described in previous LION reports. A schematic of the communications network is presented in Figure 1.

The LION desk was manned by Lockheed personnel and a NASA monitor from 1200 hours, November 17, to 2400 hours, November 21. During this period, twenty-two positive reports were received through the Smithsonian Center.

Reports mailed to the Center have increased the number of positive reports to fifty-nine. Table I presents a tabulation of event reports recorded in the Staff Support Room during the mission and those received by mail at the Smithsonian Center after splash-down. The last report on this list was not received in time to be included in the Smithsonian report. All other reports are documented in their December 19 publication.

The total number of transient events observed was smaller than the record number observed during Apollo 11. This is probably due to two factors. Adverse weather conditions during part or all of the mission alert were reported from many parts of the world. In addition, the declination of the moon during the first quarter made spectral observations difficult or impossible for some observatories in the northern hemisphere.

Although the number of events reported was smaller than for Apollo 11, the number of event locations was the same. Areas reported active are located on Figure 2.

ALPHONSUS EVENT

On November 20 at 0425 GMT, a report of activity in the crater Alphonsus was received from ASTRONET. Since the event was confirmed by three different observation stations, a request for Apollo confirmation was forwarded to Mission Control.

The transcript of MSL GOSS Line Tape #88/2 that documents the resulting communication is recorded below.

05 15 54 59

CC

Okay, Dick. And we also have one extra thing here. You can observe a transient event. You should take photos and observe Alphonsus at a GET of 136:00:02. You need not change film. You can go with the Hasselblad 80-millimeter lens if you want to take photos, and you can go with f:4,250,

at infinity. The transient event, area 7. Your brightening between the central peak and west wall, 100 nautical miles south of track, use window number 1, and it can be performed in the S-158 attitude.

05 15 56 55	CMP	Roger. I copy at 136:00:02, El Hasselblad, 80 millimeter, f:4, 1/250th, and it's going to be area 7, window 1, 110 south, and say what it is again, please?
05 15 57 12	CC	Okay, Dick, that's a brightening between the central peak and west wall.
05 15 57 29	CMP	Okay. I've got the camera now. I'll take a look at it.
05 15 57 32	CC	Roger, Dick.
05 15 59 41	CMP	Houston, Clipper.
05 15 59 44	CC	Clipper, Houston. Go ahead.
05 15 59 49	CMP	Roger. Is that in the crater Theophilus?
05 15 59 56	CC	Dick, say again. Would you -
05 16 00 03	CMP	The transient event, is that in the crater Theophilus?
05 16 00 08	CC	That's at Alphonsus, Dick.
05 16 00 16	CMP	Okay.
05 16 00 17	CC	Again, Alphonsus and a brightening between the central peak and west wall.
05 16 00 30	CMP	Okay. I've got it.
05 16 04 28	CMP	Houston, this is Clipper. That first pass is completed.
05 16 04 33	CC	Roger, Clipper. Copy complete. What was the visual on that transient event?
05 16 04 43	CMP	I didn't see anything out there. There is a dark area in between the central peak and the west wall, but I can't tell what it is. Looked a little bit darker than the rest of the surrounding area. It's quite a ways away, so - I really can't see much down there.

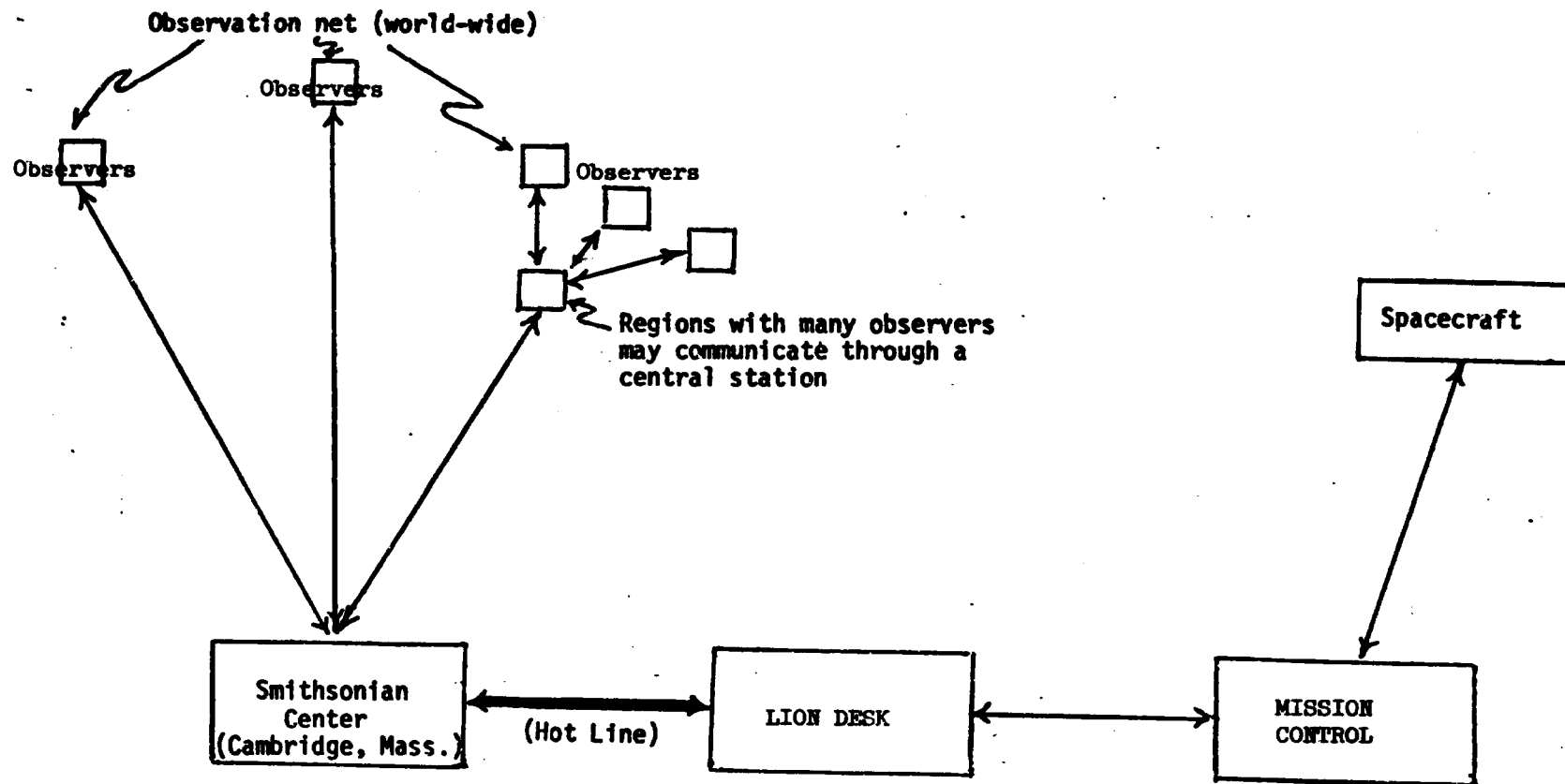
Time laps between the reported event sighting and the Apollo negative report was nearly five hours. Once again, it was unfortunate that the spacecraft was not in a favorable position for observing a lunar feature during the time frame of an event sighting.

COMMENTS

As for previous operation LION mission summaries, it is not possible to arrive at any conclusions. Valuable data have been obtained but they are yet to be evaluated.

A statistical study of event reports acquired during Apollo missions 8 through 12 has been discussed. A tabulation of these data is included in Table 2.

It is obvious that the proposed study will be more meaningful if additional reports can be added to those obtained by the LION operation. Sources of additional data have been made available to operation LION and will be incorporated with reports on file, should a statistical study develop. Such a program would be the subject of a separate report to be mailed to all members of the network.



COMMUNICATIONS FLOW CHART

Lunar International Observers Network

Figure I

TABLE I

Event Reports, Apollo 12

Feature	SSR	Post Mission	Total
Alphonsus	2		2
Argaeus		1	1
Aristarchus	7	8	15
Aristoteles	1		1
Birt		1	1
Caucasus Mts.		1	1
Censorinus		4	4
Chevalier A		1	1
Copernicus	1	1	2
Dionysius	1	1	2
Eratosthenes	2		2
Euclides		1	1
Eudoxus		1	1
Gassendi	1	3	4
Goldschmidt		1	1
Kepler	2		2
Lambert	1		1
Landsberg		1	1
Mare Serenitatus		1	1
Mara Tranquillitatis		1	1
Maskelyne		1	1
Mayer T.		1	1
Minelaus	1	2	3
Piton		1	1
Proclus		2	2
Ptolemaeus		1	1
Ross D	2		2
Schroter's Valley		1	1
50° N, 45 W	1		1
60° S, 80 W		1	1
	22	37	59

TABLE II

Apollo 8 - 12 Report Statistics

Lunar Feature	Reports for Apollo Missions					Reports Confirmed by 2 or more Observers				
	8	10	11	12	Total	8	10	11	12	Total
Alphonsus			1	2	3				2	2
Arago/Sinas			1		1					
Argaeus				1	1					
Aristarchus	7	22	41	15	85	1	5	7	1	14
Aristoteles				1	1					
Atlas		1	1		2					
Baillaud			1		1					
Biela		1			1					
Biot			1		1					
Birt				1	1					
Bouger		1			1					
Cauchy			1		1					
Censorinus		1	1	4	6					
Chevalier A				1	1					
Copernicus				2	2					
Dionysius				2	2					
Eratosthenes				2	2					
Euclides				1	1					
Eudoxus			1	1	2					
Gassendi				4	4					
Goldschmidt				1	1					
Grimaldi	1		5		6					
Guericke	1				1					
Harpalus		2			2					
Janssen			1		1					
Kepler			1	2	3					
Krafft			1		1					
Lambert				1	1					

TABLE II (Continued)

Apollo 8 - 12 Report Statistics

Lunar Feature	Reports for Apollo Missions					Reports Confirmed by 2 or more Observers				
	8	10	11	12	Total	8	10	11	12	Total
Landsberg				1	1					
Langrenus			1		1					
Manilius			1		1					
Manzinus		1	1		2					
Maskelyne		1	1	1	3					
Maurolycus			1		1					
Mayer T.				1	1					
Menelaus			1	3	4					
Moretus			1		1					
Pickering	1				1					
Pierce			2		2					
Piton				1	1					
Posidonius		1			1					
Proclus			2	2	4					
Ptolemaeus				1	1					
Rabi Levi		1			1					
Ross D		2		2	4					
Theophilus			5		5					
Verkes			1		1					
Caucasus Mts.				1	1					
Southern Cusp			1		1					
Schroter's Valley				1	1					
Mare Crisium			2		2					
M Serenitatus				1	1					
M Tranquilitatis			3	1	4					
60N, 45W				1	1					
60S, 80W				1	1					

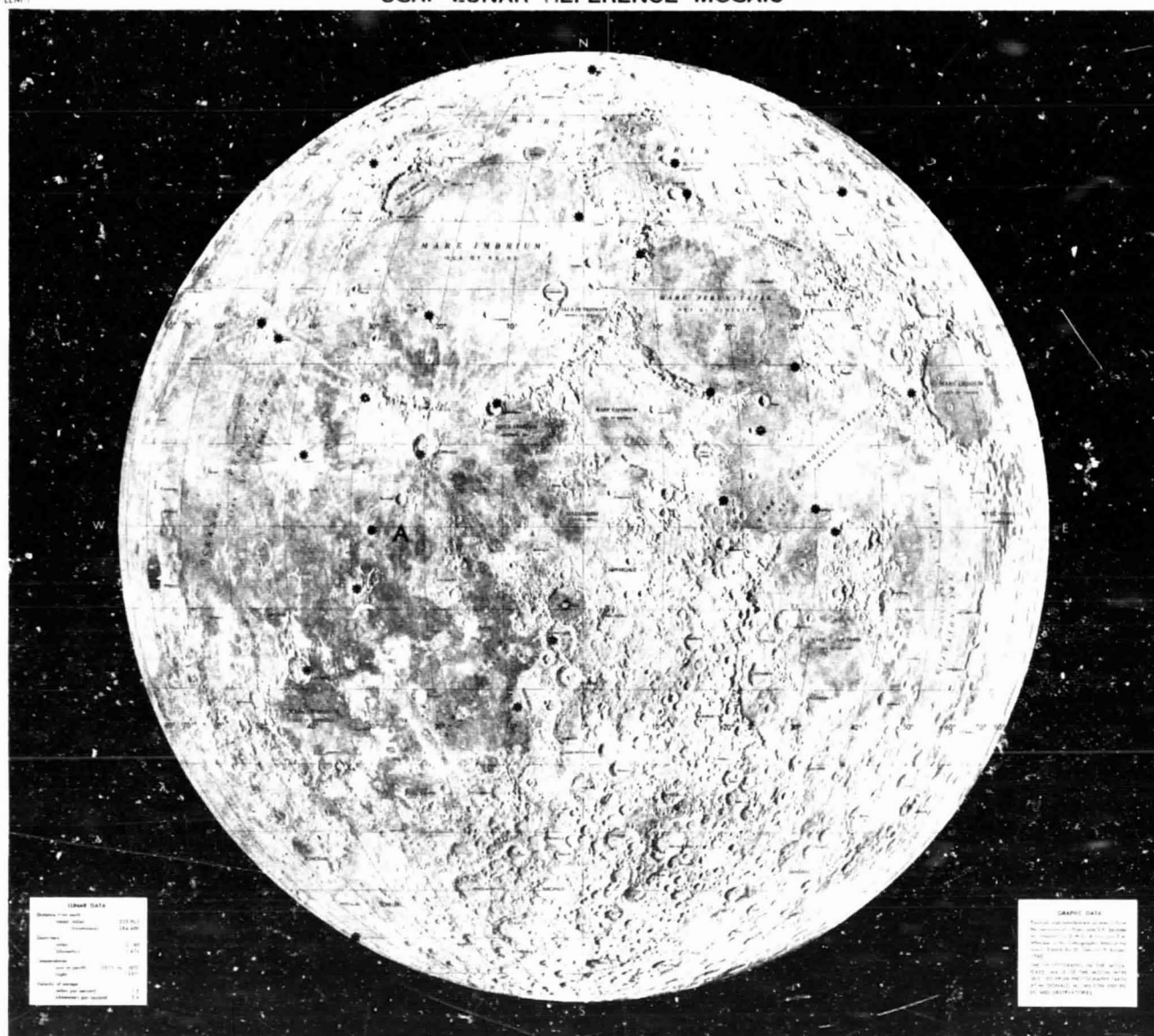
TABLE II (Continued)

Apollo 8 - 12 Report Statistics

Lunar Feature	Reports for Apollo Missions					Reports Confirmed by 2 or more Observers				
	8	10	11	12	Total	8	10	11	12	Total
2° N, 27° E			1		1					
5° N, 8° W			1		1					
12° N, 8° W			1		1					
TOTAL	10	34	83	59	186	1	5	8	3	17
Negative Reports	6	60	151	137	354					

LEM-1

USAF LUNAR REFERENCE MOSAIC



SCALE 1:1,000,000
FIGURE 2



LEM-1
LUNAR EARTHORBIT REENTRY
REENTRY DATA