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SYSTEM
PERFORMANCE EVALUATION TEAM
(FLIGHT MISSION CHARACTERISTICS)
MISSION 4014/64

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DIRECTORATE OF SPECIAL PROJECTS
OFFICE OF THE SECRETARY OF THE AIR FORCE

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SYSTEM
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PERFORMANCE EVALUATION TEAM
REPORT NO. 4014/64

FOREWORD

THIS REPORT PREPARED FOR AND BY DIRECTION OF
THE DIRECTOR OF SPECIAL PROJECTS
OFFICE OF
THE SECRETARY OF THE AIR FORCE

Preparing Unit:

Performance Evaluation Team
Los Angeles AF Station
Los Angeles 45, California

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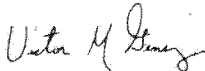
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PUBLICATION REVIEW

This report has been reviewed and is approved.



VICTOR M. GENEZ
Colonel, USAF
Team Manager

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SAFSP PERFORMANCE EVALUATION TEAM

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SECTION I

RESUME OF MISSION 4014

Mission 4014, consisting of the Gambit camera, the Stellar/Index Camera Unit (SIC) and the Orbit Control Vehicle (OCV), was launched into orbit from Point Arguello Launch Complex, Pad 4, at 1858:18Z on 4 December 1964.

The satellite vehicle was boosted into orbit by a Standard Atlas/Agena combination with the following powered flight ascent parameters:

	<u>Nominal (sec)</u>	<u>Actual (sec)</u>
Booster Engine Cut-off	T+132.94	T+130.7
Split No. 1	T+135.94	
Sustainer Engine Cut-off	T+268.5	T+276.9
Vernier Engine Cut-off	T+288.85	T+293.2
Atlas/Agena Separation	T+291.64	T+295.9
Agena Ignition	T+326.31	T+330.45

The satellite vehicle (OCV) achieved an orbit with the following elements:

	<u>Nominal</u>	<u>Actual</u>
Inclination (degrees)	97.0	97.02
Period (minutes)	89.15	89.35
Apogee (nautical miles)	172.65	192.57
Perigee (nautical miles)	85.49	85.43
Eccentricity	.012	.0148

At lift-off a total of 2,710.7 feet of Eastman Type 4404 film for the main camera unit was in the supply spool and a total of 2,435 frames in the SIC supply. This supply was sufficient for full operational R&D and run-out for four days of operations.

The operational objectives of this mission were to conduct a reconnaissance mission to obtain high resolution photography of specific targets selected by the (S) NRO Staff with an option for day five OCV solo experimental operations to demonstrate attitude control and full system capability over a five day lifetime.

Due to a stabilization anomaly which resulted from a loss of stabilization system power supply on Rev 09, these objectives were only partially met. The capsule was de-orbited by the BUSS system on Rev D18 and recovery was effected by air catch at 2215Z, 5 December 1964. Following recovery of the capsule, the OCV was de-orbited with impact predicted at 45° 48'S 179° 59'W.

Useable photography was obtained on Rev D04 through Rev D09 by means of four command messages which were generated and transmitted to the vehicle. Generally, the quality of this photography was

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excellent with ground resolution in the order of 2 - 3 feet.

The photographic take for the six orbits during which the OCV was stabilized consisted of 24 stereo pairs and 40 strip frames for the primary camera unit and 160 reference frames and 373 mapping frames for the Stellar/Index Camera (SIC) unit. Clouds obscured approximately 75% of the total frames exposed.

The following subjective evaluation was submitted by the National Photographic Interpretation Center (NPIC):

1. All imagery evaluation is limited to revolutions 4 through 9 due to the attitude problem that existed on the later revolutions.

2. The imagery on this mission was comparable to the best imagery produced to date by this camera system. The best imagery was presented on Rev D06 Frame 10, Rev D09 Frame 15 and Rev D09 Frame 14. The measured ground resolution was 2.1 feet on known dimensions and appeared to approach this figure on all near vertical photographs.

3. The general exposure was good to excellent with the normal trouble with the higher latitudes for this season of the year.

4. The Yaw slits were slightly overexposed, however there were measureable yaw slits on every frame with suitable imagery in the slit area. In some instances the secondary images were not apparent except under high magnification making it difficult to measure the separations.

5. Nominal attitudes existed throughout the early portion of the mission (Rev 4-9) with the largest excursions being 1 degree in pitch and 1 degree in roll with one exception. The latter portions of the mission had gross attitude errors with the vehicle pitching, rolling, and yawing throughout the limits of rotation. The yaw rotation of the vehicle was 1.9 degrees per second while the pitch-roll component was 2.9 degrees per second. These figures are based on horizon measurements made on the Index Camera.

6. Stellar Camera operation was not up to expectations since most vertical and near vertical exposures were overexposed and stars were generally not visible except in the large negative roll positions. Six to ten stars are visible at times but generally not more than three are visible. There are visible stars on only about 15% of the mission (586) frames.

7. The Index Camera operated throughout the mission serving as an invaluable aid in determination of attitudes in the latter part of the mission. The horizon was visible in 25 frames during the early photography and pitch and roll data was computed for these frames and compared to actual commanded values. In the latter portions of the mission when the vehicle was tumbling and rotating the Index Horizons were the only source of dynamic motion studies.

8. The film speed operated within specifications within the frames however the Looper action was more prominent than on the previous two missions. The transient time for the start up was again about 1/2 second and the variations within the frames were plus or minus 1/2%.

9. The Time Track operated normally however the lack of the second track with the redundant time

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word makes it more difficult to read the time words.

10. The intelligence content of the film was high in all cloud free areas, the target images were easily found and identified and were generally of high quality. The suitability of the film for Photo Interpretation was excellent with the only minus quality being the sparseness of the number of targets covered. The image quality was excellent with extremely good detail in some target areas. There were some areas with snow cover that were overexposed where detail was lacking due to the reflected light. In the haze and cloud covered areas details were still available in most cases.

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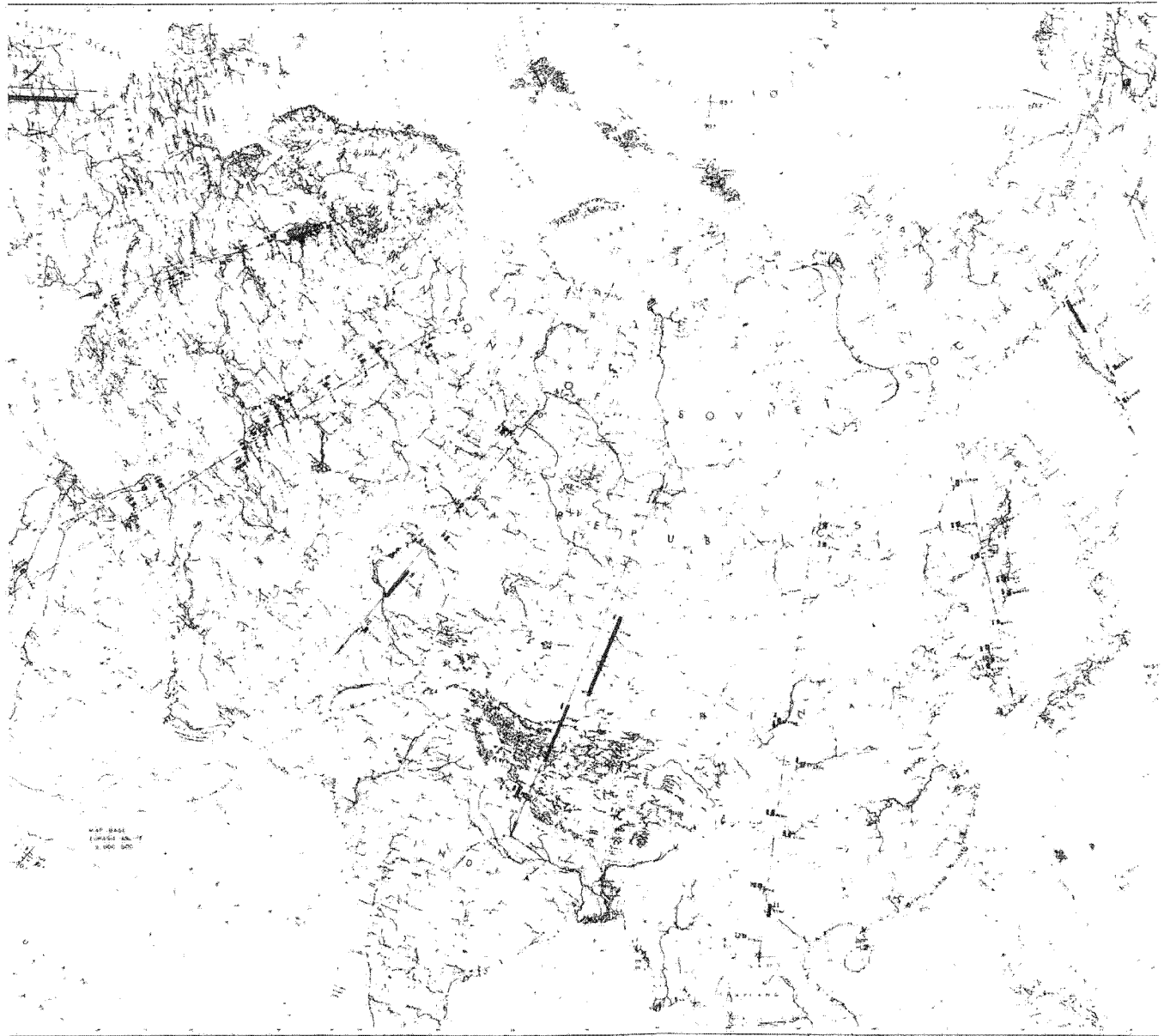
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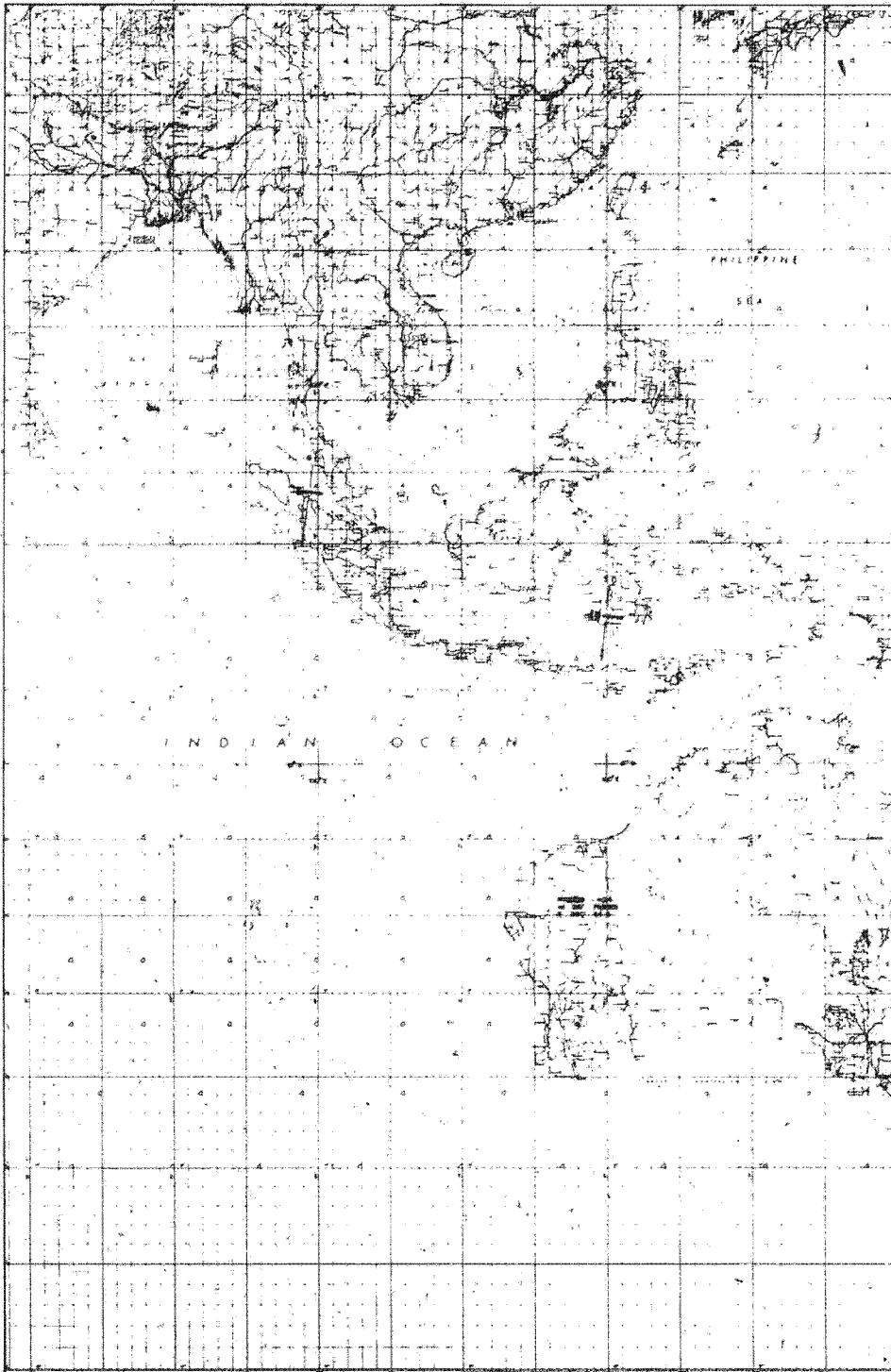


ILLUSTRATION 2

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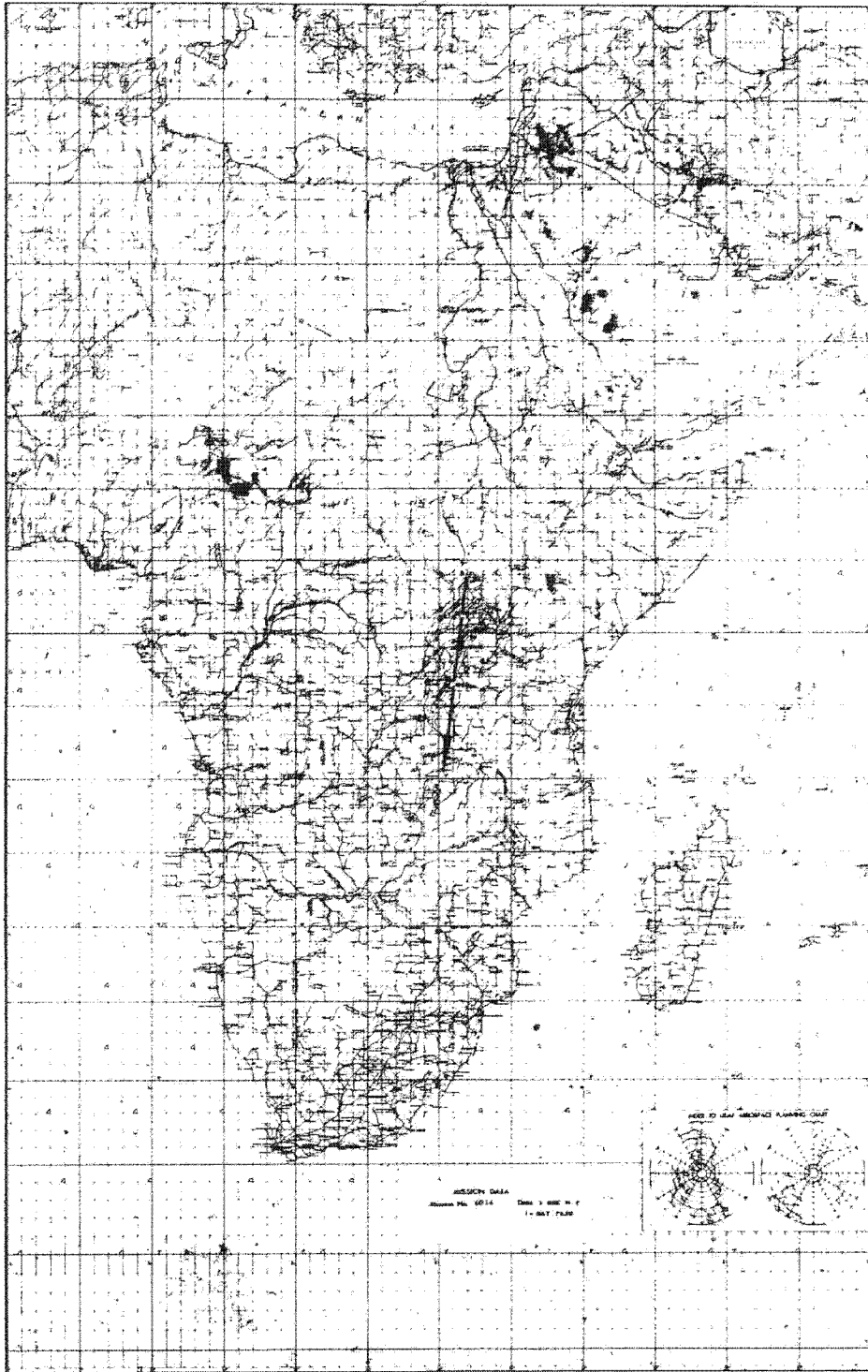


ILLUSTRATION 3

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SECTION II

FLIGHT PROGRAM

A. Performance of the Command System

1. Command Load Summary

All of the commands for the primary camera system for this mission were selected by the STL Mission Profile Generation Program (MPGP). The SIC system was commanded for reference photography during all primary unit operational photography and for mapping operations on Revs 04 thru 07 and Revs 09 thru 13. Due to the vehicle attitude anomaly experienced on Rev 09, no primary camera commands, other than run-out, were loaded after Rev 10. A summary of command loading follows:

- a. Command message 102 was loaded on the pad to obtain 134 SIC mapping frames over the South Pole on Rev 0.
- b. Command message 103 was loaded at Pogo Tracking Station (PTS) on Rev 04 to obtain 6 stereo pair and 8 strip frames for the primary unit and 34 reference and 141 mapping frames for the SIC unit on Rev D04 and Rev D05.
- c. Command message 105 was loaded on Rev 06 at New Hampshire Tracking Station (NHS) to obtain 5 stereo pair and 10 strip frames for the primary unit and 49 reference and 21 mapping frames for the SIC unit on Rev D06 and Rev D07.
- d. Command message 104 was loaded at Vandenberg Tracking Station (VTS) on Rev 08 for primary payload operations to obtain 10 stereo pair and 14 strip frames and for the SIC unit to obtain 56 reference and 44 mapping frames on Rev D08 and D09.
- e. Command message 108 was loaded at Hawaiian Tracking Station (HTS) on Rev 10 to obtain 3 stereo pair and 8 strip frames for the primary unit and 21 reference and 33 mapping frames for the SIC unit on Rev 10.

B. Geopositioning

1. The photographic map match was attempted for every frame of photography. No attempt was made on this mission to select only those frames that had excellent ($\pm 1,000$ feet or better) map source or were stereo pairs. The only limitation was complete cloud coverage or areas where there were no identifiable cultural features. Because of the attitude anomalies encountered Rev 10 and subsequent revs no map match could be accomplished with the primary photography; however, an attitude analysis was performed using the Index Camera photography.

2. For this mission the Performance Evaluation Program (previously described in prior PET Reports) was used for determining the in-track and cross-track miss distances. This program evaluates the vehicle attitude and how well the Best Fit Ephemeris has been determined. Thirty-six frames were successfully plotted and analyzed. Nine pairs of stereo frames were used to compute roll, pitch, and

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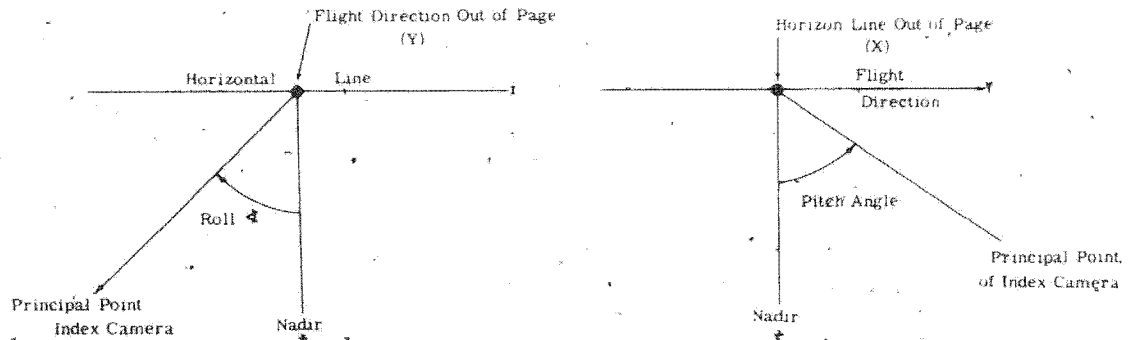
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yaw errors. No error was determined to be of a greater magnitude than one degree thru Rev 09.

3. Several new computer programs were used during this evaluation to help determine the positioning data. Since this was the first use of several of the programs the data was only used to confirm the data derived from the existing Performance Evaluation Program (PEP). One computer program was used to compare the best fit ephemeris with the command ephemeris on a point by point basis. A summary of the results are shown on the Photo-Map Positioning sheets under Command Versus Best Fit Ephemeris comparison column. Another computer program named Engineering Analysis Routine (TEAR) was used for the first time on this PET Operation. This program makes attitude error determinations for strip photographs, as well as, stereo pairs. This is an IBM 7094 program that will be used for forthcoming PET efforts. Any telemetry or Stellar-Index attitude data that is available can be used as inputs in order to help determine the accuracy of the vehicle position attitude. A complete description will be included in the next PET report.

4. The data presented in the Photo-Map sheets under the column BFE versus Photo Position is averaged for several Photographic Bench Marks (PBM) per frame. In areas of good map source the individual PBM positions agree very closely in in-track and cross-track; however, the areas of poor map source Rev 06, 07, and 08 (indicated by asterisks in the map accuracy column) did not have as good agreement. The signs of the in-track and cross-track use (-) for north and (+) for east, this is the direction of the actual from the predicted position of a PBM. Because the vehicle attitude after Rev 9 was continually changing, Map Match could not be accomplished. One frame on Rev 11 was recognizable but because of scale factor and other unknowns the data computed was very unreliable and was not included in the data sheets.

5. The Index Camera photography was used to provide orientation information where horizon image was available. After Rev 09 this is the only attitude data available. The results of this analysis can be seen by data presented in the Photo-Map sheets under the Attitude Index Camera column. The sign convention used for presenting the roll and pitch is as follows:



Caution must be exercised in using the data presented for vehicle orientation. The vehicle attitude

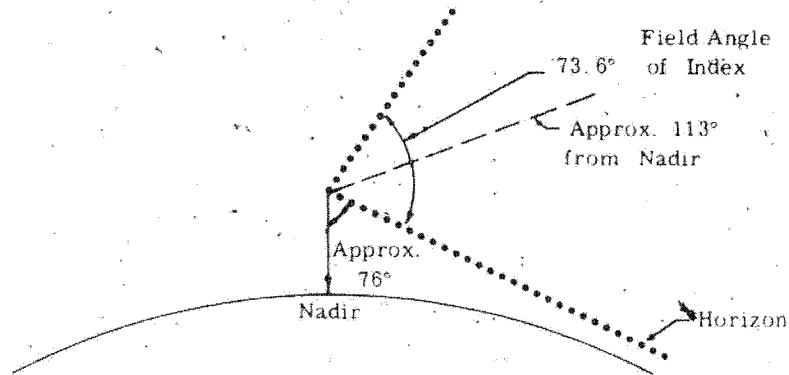
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measurements are presented in terms of pitch and roll only. The Index Camera is a frame camera with a fixed orientation to the vehicle axis. The 1/2 field angle is 36.8° . After the vehicle is displaced approximately 113° from the true nadir position no terrain is available for orientation determination. This is indicated by the lack of data shown between frames 343 - 352, 385 - 389, 391 - 395, 399 - 406, 423 - 428 etc.



See Illustration No. 4 for a line drawing presentation of the horizon orientation. This is a typical sequence taken from the actual index photography. This analysis was conducted thru Rev 13 at which time run out of the film was started in preparation for recovery.

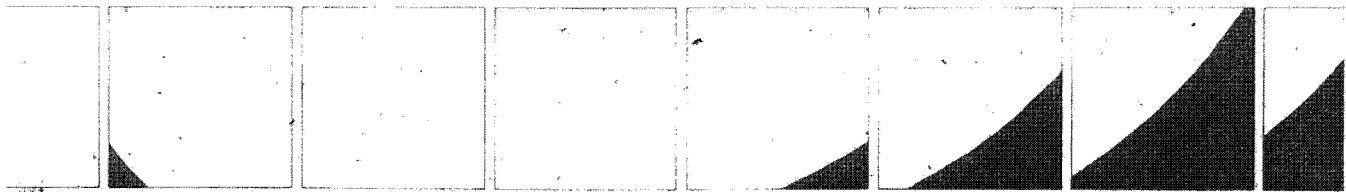
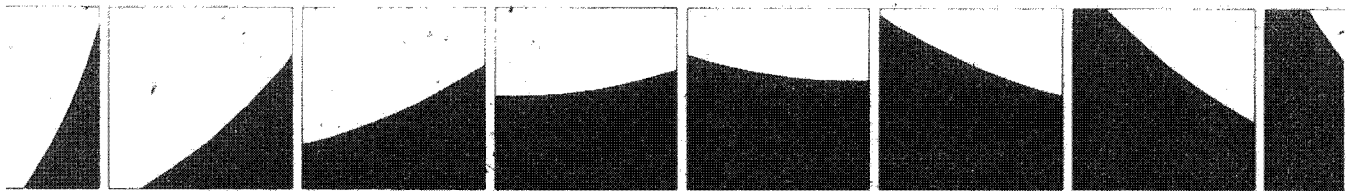
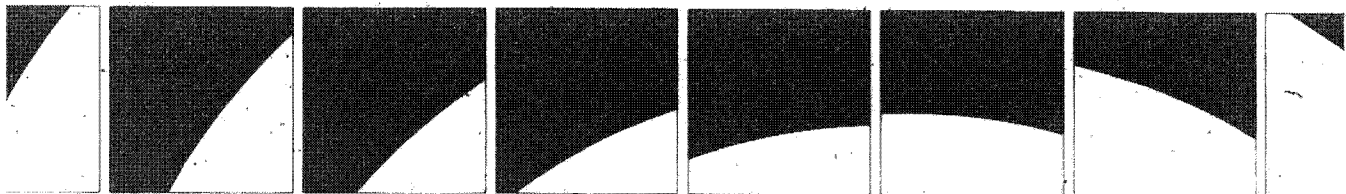
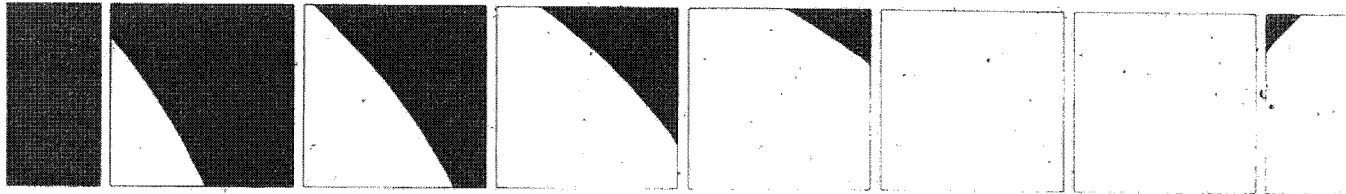
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INDEX ATTITUDE DATA



□ EARTH

■ SPACE

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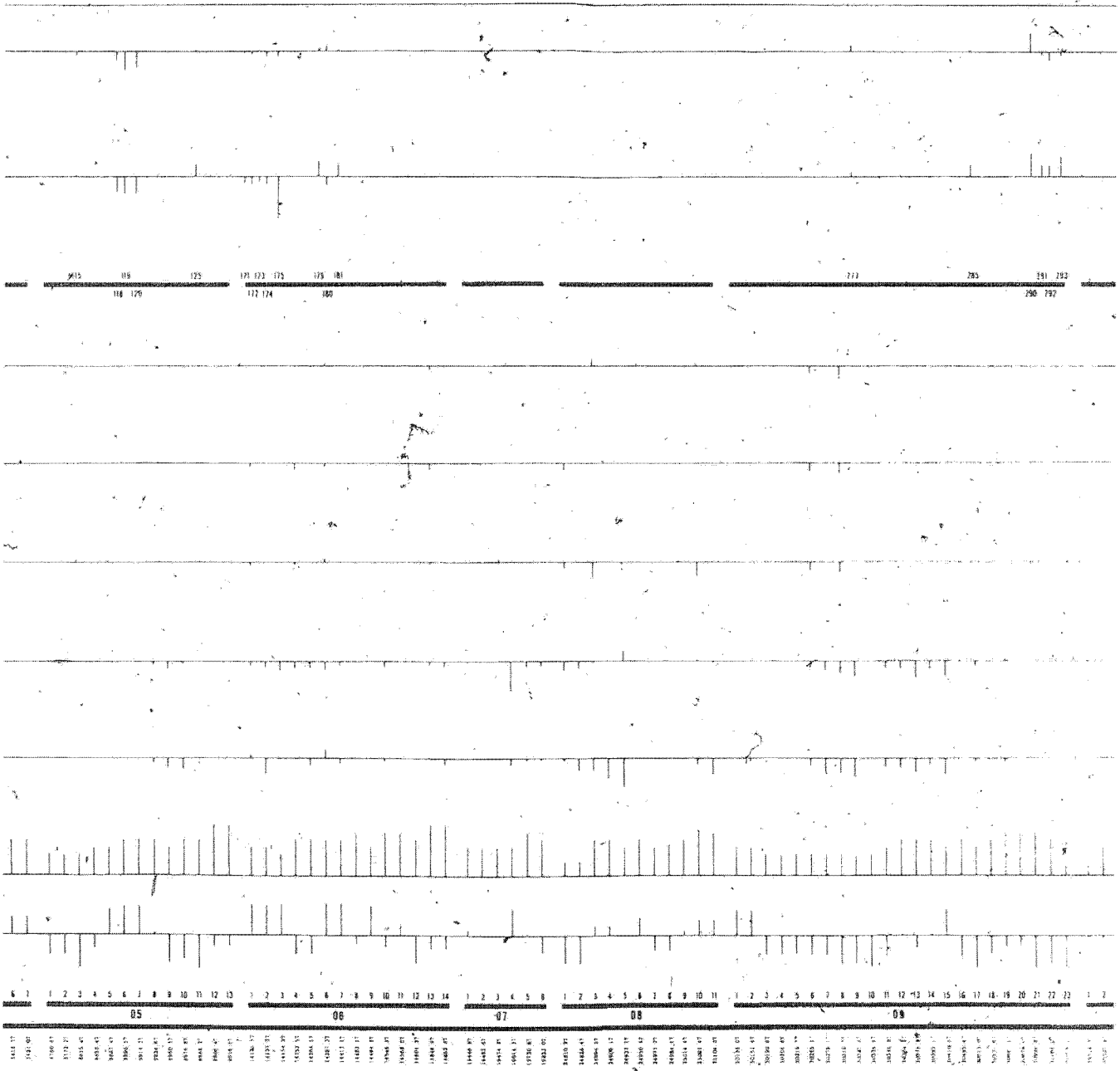
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COMPUTED VEHICLE ATTITUDE



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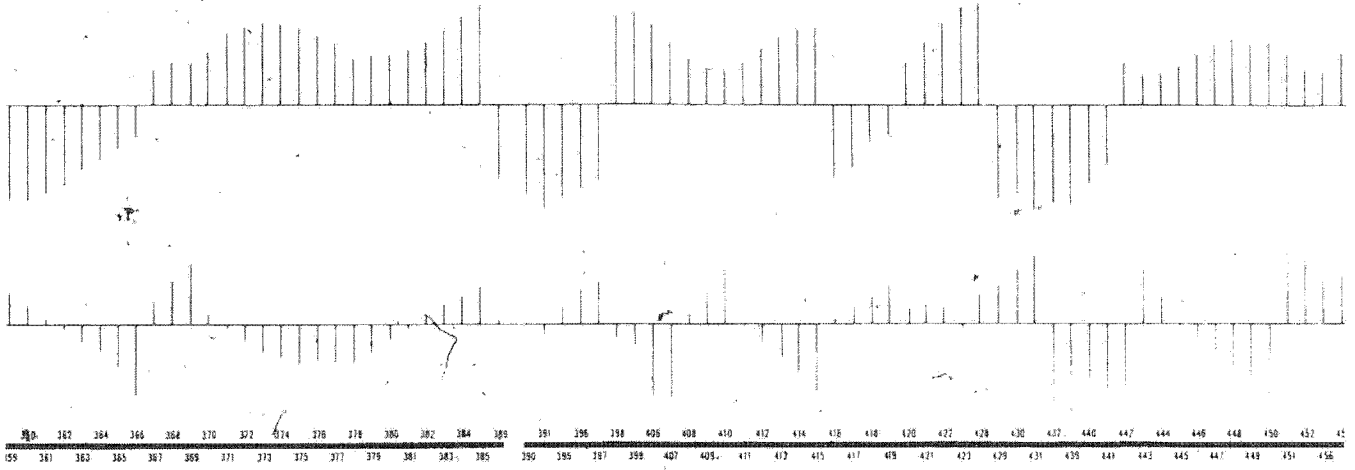
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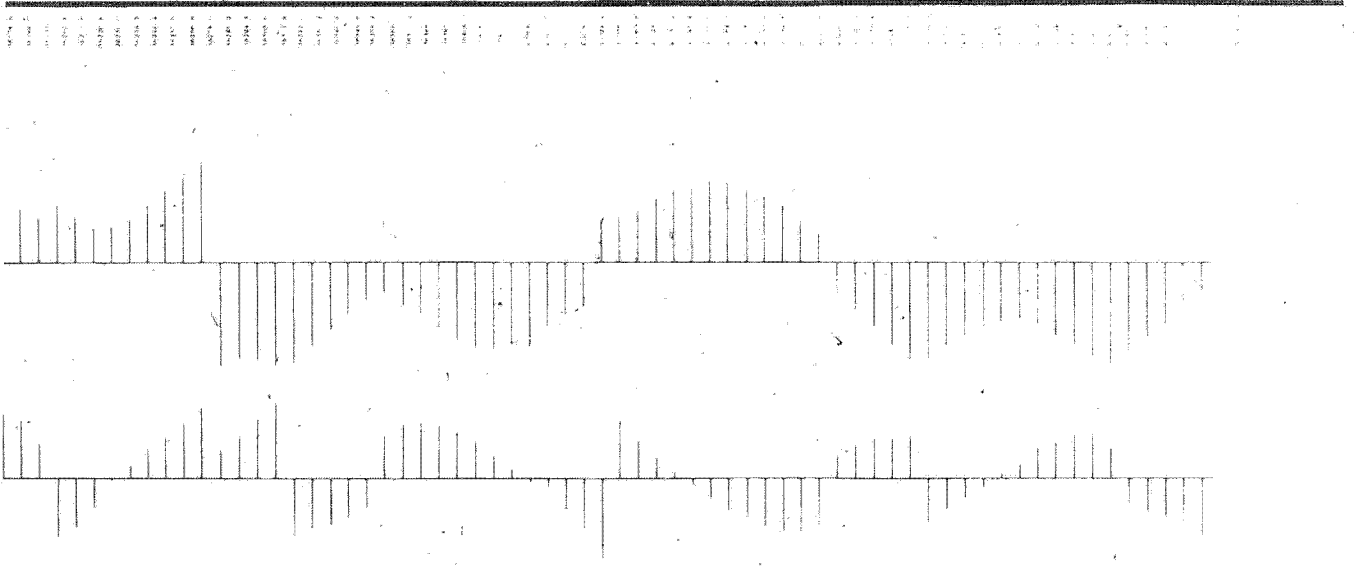
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COMPUTED VEHICLE ATTITUDE



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SECTION III

PHOTOGRAPHIC CHARACTERISTICS EVALUATION SUMMARY

(SPPL Report No. 101-1-40)

The following observations result from analysis of the original negatives from Reconnaissance Satellite Mission 4014:

A. Physical Degradations

1. Imaged Degradations

- a. Five continuous minus-density streaks were visible throughout the Mission.
- b. A narrow plus-density streak, approximately two inches from and parallel to the non-titled edge, was observed throughout the Mission. A faint plus-density streak was also noted, approximately 3.5 inches from and parallel to the titled edge, extending from Rev D08, Frame 002, through the last frame of the Mission.

2. Superficial Degradations

- a. The titled edge on the first seven frames of Rev D08 is slightly deckled.
- b. A continuous scratch, approximately 3 inches from the titled edge, was observed on the base side of all frames, Rev D10.
- c. A few minor abrasions, scratches, and pinholes were noted throughout the Mission.

B. Density

There were approximately 160 density measurements accomplished, and the results are portrayed by range, average, and standard deviation (σ) in the following table:

	Range	Average	Standard Deviation (σ)
Dmin	0.21 - 1.08	0.57	0.24
Dmax	0.88 - 2.28	1.48	0.30
\bar{D}	0.62 - 1.37	1.02	0.18
ΔD	0.22 - 1.82	0.90	0.41
Gross Fog	0.11 - 0.25	0.16	0.04
Dmax Clouds	1.08 - 2.36	1.90	0.31

C. Visual Reciprocal Edge Spread (V-RES)

1. There were 288 measurements accomplished, resulting in V-RES values ranging from 21 to 125 with an overall average of 81.
2. Using a mean Photo Scale Reciprocal (PSR) of 1:120,000, the ground resolution computed from the V-RES values ranged from 18 feet to 3.1 feet, with an average of 4.8 feet.

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SECTION IV

CAMERA SYSTEM OPERATIONS

A. Primary Camera

1. Film Transport: Film velocity plots were made on six frames and these plots indicated that film velocities for these frames were within design specifications. However, there appeared on seven frames evidence of banding as indicated by high frequency slight variations of density. Examples of these variations can be seen in Frames 01, 02, and 03 on Rev D07 and on Frame 03 Rev D09. These variations appeared only in the early frames of Revs D05, D07, D09, and D10. The density variations were very light and probably would not have caused any degradation in areas of interest had they appeared over any of these areas.

2. Yaw Slits: Both tracks are over exposed, however, yaw analysis from the yaw slits can still be performed.

3. Footage Utilization: The flight load consisted of 2,977 feet of 4404 film. Of this total, 266.3 feet were used for pre-flight testing, 26.2 feet were used for on-orbit payload health checks, 324.6 feet for payload operations and 2,350 feet were run-out after the satellite vehicle became unstable.

4. Processing: Full processing was used for 12.8% of the operational take with the remainder receiving intermediate processing or a transition level between full and intermediate.

5. Exposure: Slit No. 2 (.0167 inches) was utilized throughout the mission. A programmable slit capability was available and was planned for use during the last two days of the mission. Due to early termination of the mission, the programmable slit capability was not used. Pre-flight analysis indicated that sun angles of 20 to 22 degrees would be necessary to obtain minimum densities with Slit Number 2. An evaluation of the brightness ratios revealed an average brightness ratio of 3.195. The minimum densities range from .21 to 1.08. These values were obtained from photographs taken at a sun angle of approximately 30 degrees thereby lending credence to statements of Mission 4011 which asserted that wide variations of densities can be created by variations of reflecting capabilities of different targets. As a result, there is a strong need to consider the reflecting characteristics of the target in conjunction with sun elevation when utilizing the programmable slit. Densities, minimum brightness and log of minimum illumination plotted against sun angle are provided in Illustration No. 9.

6. Payload Anomaly: During Rev 13, instrumentation point CPL- 11, Component Support Tube temperature rose 90.2° F, real-time, in contrast to normal readings of 66.8° F on Rev 09 and 77° F on Rev 10. This instrumentation point is adjacent to the GE battery area which for some reason radiated unusual amounts of energy during Rev 13. Subsequent data indicated a return to normal temperature range. No photography was obtained during this anomaly therefore no analysis could be performed to determine effect on payload capability.

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7. Resolution: No CORN targets were photographed since vehicle instability precluded ZI photography prior to early termination of the mission. However, some photographs i. e. of a stadium where rows of seats are readily distinguishable, oil drum storage area and runway markings, were obtained which lead to a conclusion that the payload demonstrated a capability of approximately two feet. One method of measurement contributing to this conclusion was by determining the total number of white parallel lines on a concrete runway. The width of the runway is a known factor thus by counting the number of lines vs the runway width it was determined that the width of one line and one space was 3.2 feet. By such measurement it was determined that the width of the white line was 2.1 feet. Additionally, many instances were noted where it is believed pedestrians are observed walking along a street.

B. Stellar/Index Camera

1. Stellar Camera: The stellar supply consisted of 375 feet of 4401 film. A total of 586 frames were obtained, of which about 15% contained useful star fields. The remaining frames were over-exposed which could be correlated to positive roll angles, earth orientation of the principal ray and vertical photography. The good star field imagery was obtained primarily during negative roll angles when the stellar unit was oriented toward the stellar field. The baffling image is still apparent in the stellar frame.

2. Index Camera: The Index supply contained 675 feet of 4400 film. A total of 586 frames of excellent imagery was obtained. On the latter frames of the index photography vehicle attitude and tumbling rates are registered. Some computations of these rates appear in the NPIC Evaluation Summary in Section I of this report.

C. Experimental Operations

No experimental operations were conducted due to early termination of the mission.

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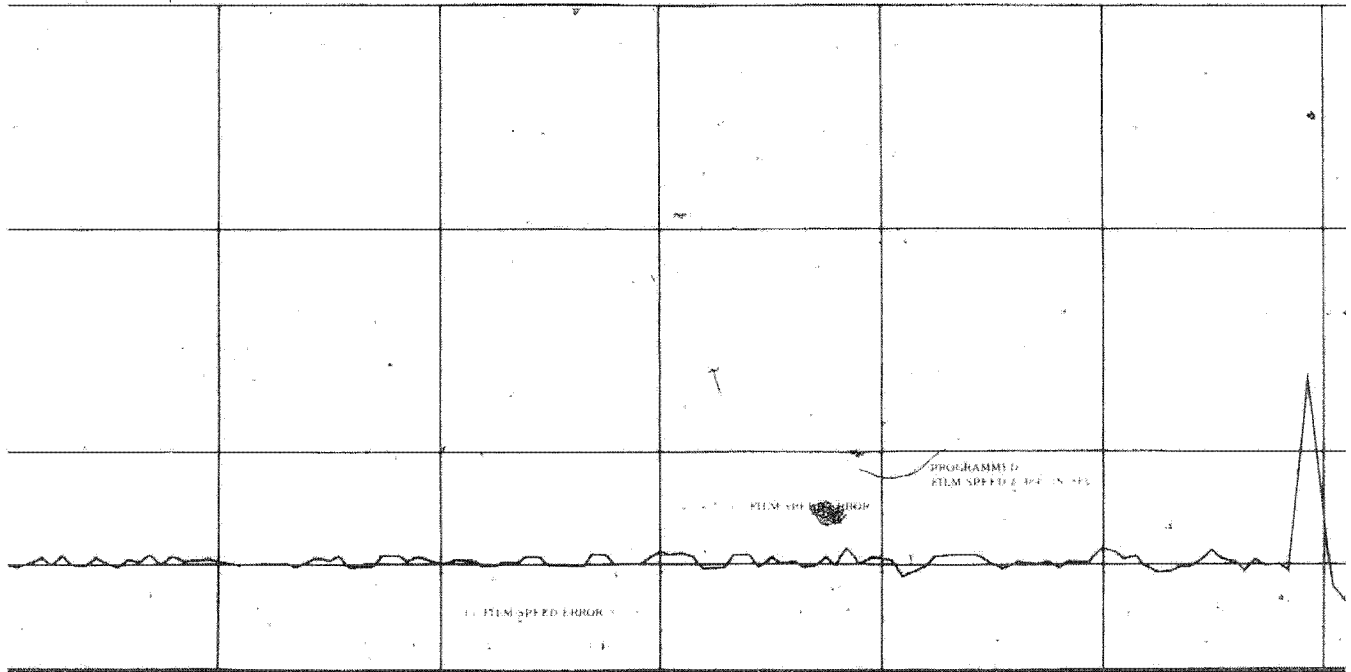
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FILM VELOCITY vs TIME
MISSION 4014 REV 6 FRAME 1



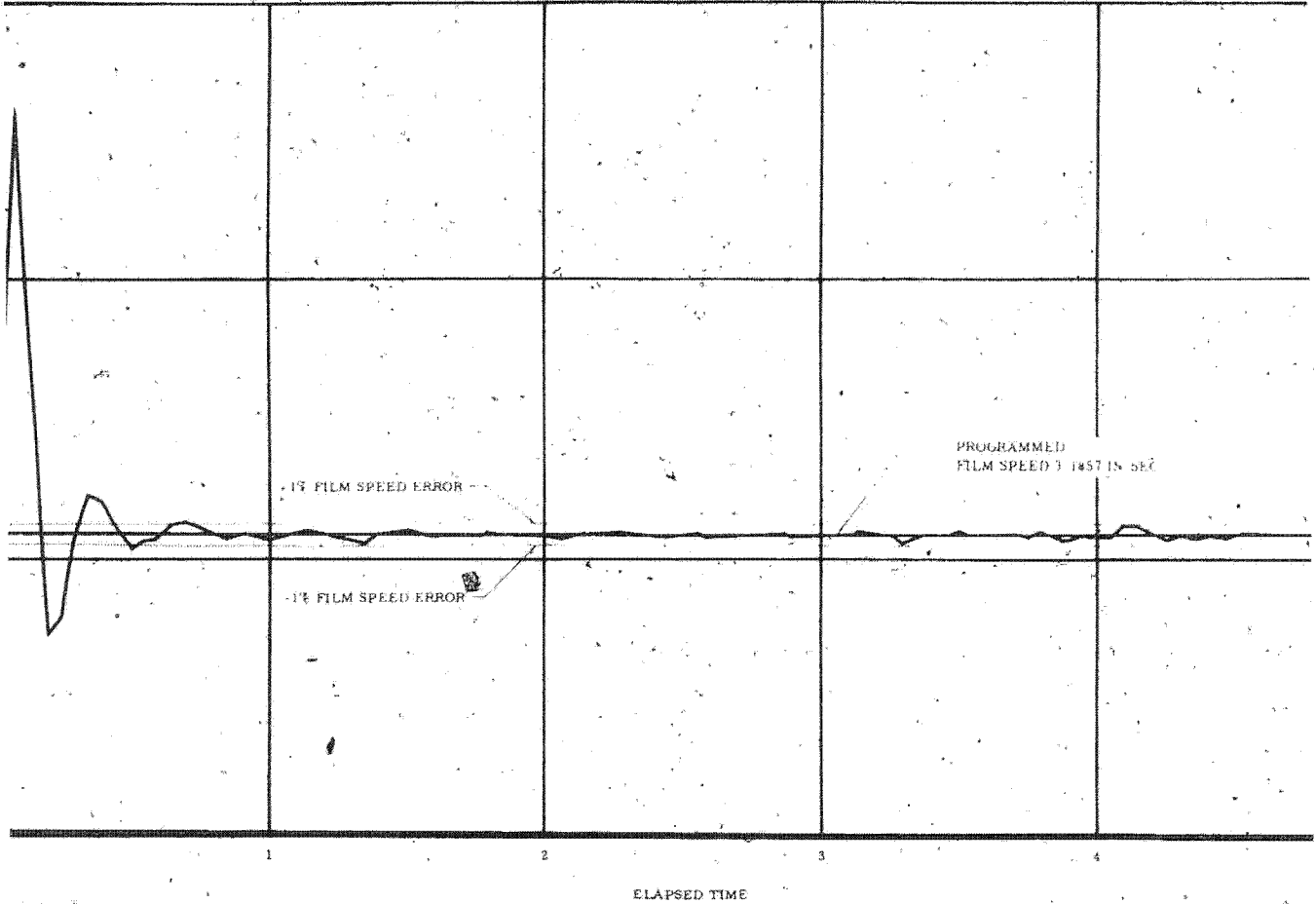
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FILM VELOCITY vs TIME
MISSION 4014 REV. 8 FRAME 5



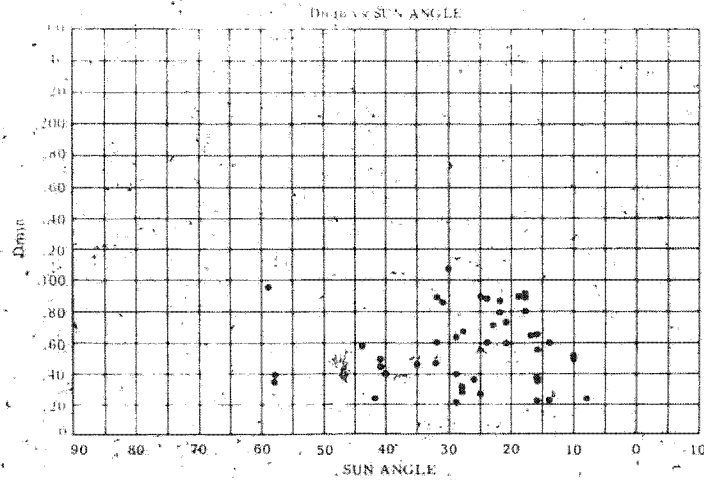
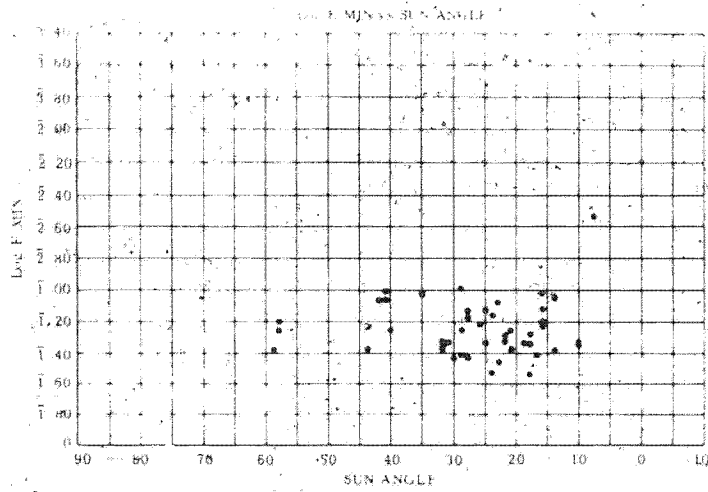
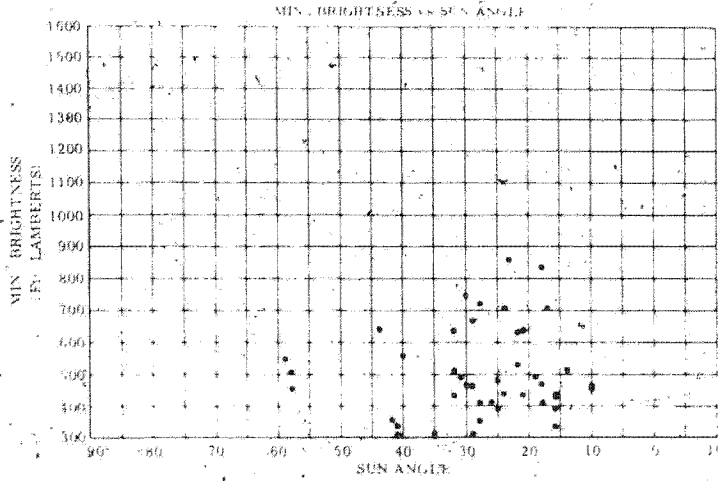
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PHOTO EXPOSURE DATA



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ILLUSTRATION 9

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APPENDIX A

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COMMAND INFORMATION

Rev D04

Acc No.	System Time Sec	Burst Time Sec	Command Position				Best Ephemeris				File Address		Mag. Dist.	Azim.	Alt.
			Lat		Long		Deg		Min		Command	Actual			
			Dec	Min	Dec	Min	Dec	Min	Dec	Min	Dist	Dist			
01	3253.97	5.5	62	33N	160	28E	62	33.22N	160	28.25E	2 884	2 880	15F	2 0	5 67
02	3266.97	5.5					61	31.74N	159	55.47E	2 912	2 916	15A	2 0	5 67
03	3296.07	40.1	59	46N	158	47E	59	46.08N	158	47.65E	2 799	2 798	0	1 5	27 85
04	3378.57	6.5	54	15N	156	07E	54	15.51N	156	07.61E	2 484	2 461	15F	2 0	41 83
05	3395.77	6.5	53	06N	155	39E	53	06.19N	155	38.86E	2 484	2 480	15A	2 0	41 83
06	3418.77	6.9	51	33N	155	02E	51	33.31N	155	02.37E	2 771	2 766	15F	2 5	25 52
07	3431.07	6.9					50	43.56N	154	43.70E	2 771	2 761	15A	2 5	25 52

PHOTO MAP POSITIONING

Rev D04

Acc No.	System Time	Map Accuracy	POSITIONING DATA (NM)				VEHICLE ALTITUDE (Feet)							
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From			Photo Meas				
			In-Track	Cross-Track	In-Track	Cross-Track	Photo	Radar	Baro	Photo	Photo	Photo		
001	3253.97	11000'	0.59N	02E	-1.268	-834								
003	3296.07													
004	3378.57		0.59N	02E										
	3381.0													
	3390.2													
005	3395.77		0.59N	02E										
	3399.4													
007	3431.07	0.59N	02E											

PHOTOGRAPHIC EVALUATION

Rev D04

Acc No.	Density		Density Base + Fog	Sun Angle (degrees)	Brightness Range	Cloud Dmax	Altitude SM
	Dmin	Dmax					
001			.22	6		1.12	101.46
002			.23	6		1.08	100.86
003	0.25	1.89	.24	8	21.14		98.83
004			.23	14		2.05	96.01
005			.24	14		1.98	95.32
006			.22	17		2.10	94.43
007			.23	17		2.03	93.96

Handle via Byeman
Controls Only

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BCS 24588-64

PERFORMANCE EVALUATION TEAM
REPORT NO. 4014 64

COMMAND INFORMATION

Rev. D05

Acc. No.	S. No. (Photo)	Burst Time Sec.	Command Positioning Data						Best Ephemeris				Photo Vehicle Position		Mag. (mm)	Dist. (ft)	Alt. (ft)
			Dr	ML	Dr	ML	Dr	ML	Dr	ML	Command	Actual					
01	8760 67	8 3	53	24N	133	25E	53	28 03N	133	25 34E	2 799	2 780	15F	1 5	-26 23		
02	8772 27	8 3					52	41 24N	133	06 41E	2 855	2 835	15A	1 5	-26 23		
03	8815 47	5 3	49	46N	132	01E	49	46 52N	132	00 56E	2 559	2 550	0	1 5	-42 54		
04	8856 47	6 2	47	00N	131	04E	47	00 13N	131	03 81E	3 348	3 335	0	2 0	-17 72		
05	8887 47	7 5	44	54N	130	24E	44	54 00N	130	23 97E	2 689	2 680	0	2 0	37 57		
06	8898 57	6 2	44	09N	130	10E	44	08 77N	130	10 27E	2 484	2 472	15F	2 5	41 12		
07	8914 37	6 2					43	04 34N	129	51 23E	2 484	2 470	15A	2 5	41 12		
08	8934 67	5 3	41	41N	129	28E	41	41 48N	129	27 51E	3 554	3 538	0	2 5	4 96		
09	8960 57	6 9	39	56N	128	58E	39	55 62N	128	58 37E	2 971	2 955	0	2 0	-36 15		
10	8976 87	5 4	38	49N	128	41E	38	48 93N	128	40 82E	3 185	3 172	0	2 5	-30 48		
11	8988 27	6 3	38	02N	128	29E	38	02 26N	128	28 45E	2 559	2 542	15A	2 5	-43 24		
12	9606 47	6 9	4	26S	119	53E	4	26 53S	119	52 86E	3 249	3 243	15F	3 5	-13 47		
13	9616 67	8 2	5	08S	119	45E	5	08 57S	119	45 14E	3 249	3 243	15A	3 5	-13 47		

PHOTO MAP POSITIONING

Rev. D05

Acc. No.	S. No. (Photo)	Mag. Accuracy (mm)	POSITIONING DATA (MM)				VEHICLE ATTITUDE (DEG)								
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Index Calculated From Measurements					
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Roll	Pitch	Roll	Dr Error		
001	8760 67		71N	02E											
003	8815 47		71N	02E											
005	8898 9											115	-90 15	42 43	13
	8898 0		71N	02E											
	8899 1		71N	02E								116	-90 43	40 03	1 09
	8908 1		71N	02E								119	-90 73	39 93	1 192
007	8914 37		71N	02E											
	8917 5											120	-90 86	39 57	1 17
008	8934 67	600	71N	02E	-577	-534									
009	8960 57	800	71N	02E	-1 213	-1 006									
010	8976 87	500	71N	02E	-1 414	-469									
011	8988 27		71N	02E											
	8999 8		71N	02E											
013	9616 67		54N	01E								125	-90 033	-42 40	85

CLM & BFF

PHOTOGRAPHIC EVALUATION

Rev. D05

Acc. No.	Density		Density Base + Fog	Sun Angle (degrees)	Brightness Range	Cloud Dmax	Altitude (MM)
	Dmin	Dmax					
001			20	14		1 72	95 41
002			16	14		1 70	94 96
003			16	17		1 87	93 33
004			16	20		1 68	91 88
005			15	23		2 08	90 86
006			15	24		2 16	90 52
007	89	1 42	15	24	1 71	2 26	90 04
008	28	1 65	15	25	5 58		89 44
009	36	1 86	15	26	6 00	1 92	88 73
010	33	1 54	15	28	4 30	2 19	88 31
011			15	28		2 21	88 03
012			15	65		2 32	90 10
013			15	65		2 34	90 43

Handle via Byeman
Controls Only

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PERFORMANCE EVALUATION TEAM
REPORT NO. 4014 '64

COMMAND INFORMATION

Rev D06

Acc No.	System Time Sec	Burst Time Sec	Command Position				Best Ephemeris				Film Velocity (m/sec)		Mag Pos	Elev Deg	Roll Angle
			Lat	Long	Deg	Min	Deg	Min	Deg	Min	Command	Actual			
01	14121.57	8.3	54	06N	111	19E	54	06.31N	111	18.87E	2.484	2.480	15F	2.0	41.83
02	14137.37	8.3					53	02.61N	110	52.58E	2.484	2.481	15A	2.0	41.83
03	14154.27	5.0	51	54N	110	26E	51	54.37N	110	25.63E	2.484	2.480	0	1.5	43.24
04	14352.57	6.2	38	27N	106	13E	38	27.17N	106	12.55E	3.092	3.090	15F	2.5	-25.52
05	14364.17	6.2					37	39.66N	106	00.26E	3.154	3.151	15A	2.5	-25.52
06	14397.37	6.2	35	23N	105	26E	35	23.58N	105	28.15E	2.484	2.479	15F	2.5	43.95
07	14413.17	6.2					34	18.72N	105	10.42E	2.484	2.480	15A	2.5	43.95
08	14462.17	7.9	30	57N	104	23E	30	57.40N	104	23.42E	3.698	3.689	0	3.0	-10.63
09	14494.27	5.6	28	45N	103	54E	28	45.33N	103	53.93E	2.534	2.520	15A	2.0	40.41
10	14546.37	5.4	25	10N	103	08E	25	10.73N	103	07.88E	3.698	3.687	0	3.0	-15.59
11	14568.07	14.3	23	41N	102	49E	23	41.27N	102	49.28E	3.589	3.578	0	3.0	16.30
12	14601.37	5.4	21	23N	102	21E	21	23.91N	102	21.29E	3.154	3.138	0	2.5	-36.15
13	14848.97	8.5	4	21N	99	07E	4	21.23N	99	06.99E	3.348	3.338	15F	3.5	-16.30
14	14862.87	6.2	3	23N	98	58E	3	23.83N	98	58.48E	3.348	3.335	15A	3.5	-18.30

PHOTO MAP POSITIONING

Rev D06

Acc PHM No.	System Time	Map Accuracy	POSITIONING DATA (NM)				VEHICLE ATTITUDE (Deg)									
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From			Index Camera Horizontal Measurement						
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Frame No.	Pitch	Roll	Roll Error			
001	14121.57	3800*	26N	001E	606	-738	-245	-245	173				171	-00 083	41 38	-45
	14124.0												172	-00 10	41 27	-56
002	14137.37	3800*			-2.065	-815							173	-00 098	41 40	-43
	14142.4												174	-00 23	42 68	-57
003	14154.27	3200*	26N	001E	-183	-1.318							175	-00 20	40 37	-2.88
	14160.8															
004	14352.57	6400*	15N	001E	268	-933	-234	-491	-0030							
005	14364.17	6400*	11N	001E	-1.050	-847										
006	14397.37	4000*	11N	001E	1.315	-1.246	319	-297	164				179	-00 10	42 88	07
	14399.8												180	-00 21	43 33	63
	14409.0															
007	14413.17	4000*	11N	001E	-725	-658							181	-00 066	42 97	98
	14418.2															
010	14546.37	6000*	086N	001E	-410	-832										
013	14848.97	6000*	02S	001E	134	-653	-192	-476	300							
014	14862.87	6000*	02S	001E	-968	-867										

PHOTOGRAPHIC EVALUATION

Rev D06

Acc No.	Density		Density Base - Fog	Sun Angle (degrees)	Brightness Range	Cloud Dmax	Altitude (NM)
	Dmin	Dmax					
001	.60	1.73	.14	14	5.28		95.68
002	.24	1.70	.15	14	6.86		95.05
003	.22	1.73	.14	16	7.65	1.55	94.40
004	.29	1.75	.13	28	6.03		88.11
005	.68	1.65	.13	28	2.72		87.63
006	.60	2.02	.14	32	5.35	1.90	87.09
007	.47	1.55	.14	32	3.21	1.80	86.77
008			.14	35		2.10	85.90
009			.15	37		2.21	85.44
010	.40	1.08	.14	40	2.28	1.34	84.90
011	.25	1.0	.15	42	3.21	2.18	84.72
012	.59	1.40	.13	44	2.36	2.25	84.59
013	.35	1.65	.13	58	4.60	2.26	86.86
014	.40	1.46	.13	58	3.37	2.12	86.99

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Handle via Byeman
Controls Only

BCS 24588-64

PERFORMANCE EVALUATION TEAM
REPORT NO. 4014/64

COMMAND INFORMATION

Rev D07

Acc No	System Time Sec	Burst Time Sec	Command Position				Best Ephemeris				Film Velocity (m/sec)		Mag Pos	Crab Deg	Roll Angle
			Lat	Long	Lat	Long	Lat	Long	Lat	Long	Command	Actual			
01	19448.87	5.4	57	00N	90	15E	56	59.72N	90	14.55E	3.001	3.000	15F	2.0	8.50
02	19462.67	7.1	56	04N	89	49E	56	04.36N	89	48.51E	3.061	3.052	15F	2.0	0.70
03	19474.27	9.0	55	18N	89	28E	55	17.74N	89	27.43E	3.092	3.085	15A	2.0	0.70
04	19614.37	99.0	45	50N	85	57E	45	50.71N	85	56.84E	2.716	2.714	0	2.0	37.57
05	19730.87	70.1	37	55N	83	42E	37	54.98N	83	41.85E	3.661	3.657	0	3.0	2.83
06	19833.07	13.0	30	55N	82	01E	30	55.47N	82	00.65E	3.519	3.513	0	2.5	-22.68

PHOTO MAP POSITIONING

Rev D07

Acc. No	System Time	Mag Accuracy	POSITIONING DATA (NM)				VEHICLE ATTITUDE (Deg)								
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Indiv Camera Horizon Measurement					
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Camera No	Pitch	Roll	QV Error		
001	19448.87		82N	016E											
004	19614.37	15000*	82N	016E	-902	-3.984									
005	19730.87	15000*	78N	016E	-343	-0.775									
006	19833.07	15000*	75N	014E	-204	-0.617									

PHOTOGRAPHIC EVALUATION

Rev D07

Acc. No.	Density		Density Base	Fog	Sun Angle (degrees)	Brightness Range	Cloud Dmax	Altitude (NM)
	Dmin	Dmax						
001			.14		11		1.51	97.32
002			.14		12		1.46	96.74
003			.12		12		1.25	96.26
004			.11		22		1.84	89.65
005	.21	1.48	.15		29	6.15		87.22
006	.46	2.28	.24		35	18.99		85.79

Handle via Byeman
Controls Only

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BCS 24588-64

Controls Only

PERFORMANCE EVALUATION TEAM
REPORT NO. 4014/64

COMMAND INFORMATION

Rev. D08

Acc No.	System Time Sec	Burst Time Sec	Command Position			Best Ephemeris				Film Velocity in sec		Milt Pos	Clab	Roll Angle	
			Dec	Min	Sec	Dec	Min	Sec	Min	Command	Actual				
01	24810 27	10.7	57	36N	68	10E	57	35.64N	68	09.81E	2 484	2 469	15F	1 0	-38 15
02	24828 47	8.9	56	23N	87	35E	56	22.68N	67	34.74E	2 484	2 471	15A	1 0	-36 15
03	24894 57	8.2	51	57N	65	42E	51	56.42N	65	41.79E	3 061	3 055	15F	2 5	14 18
04	24906 17	8.2	51	10N	85	24E	51	09.51N	65	23.92E	3 061	3 046	15A	2 5	14 18
05	24922 77	5.1	50	02N	84	59E	50	02.30N	64	59.20E	3 185	3 170	15A	2 0	0 70
06	24950 47	5.1	48	10N	64	20E	48	09.96N	64	19.98E	2 855	2 842	15F	2 5	25 52
07	24973 27	7.6	46	37N	63	50E	46	37.31N	63	49.40E	3 061	3 049	15F	2 0	-20 56
08	24984 17	7.6					45	52.96N	63	35.28E	3 122	3 111	15A	2 0	-20 56
09	25018 47	40 1	43	33N	62	53E	43	33.22N	62	52.69E	3 519	3 507	0	2 5	7 79
10	25092 47	6 2	38	31N	61	29E	38	30.79N	61	28.87E	3 092	3 072	15F	3 0	21 97
11	25104 07	6 2					37	43.28N	61	18.57E	3 061	3 051	15A	3 0	21 97

PHOTO MAP POSITIONING

Rev. D08

Acc No.	System Time Sec	Map Accuracy (ft)	POSITIONING DATA (NM)				VEHICLE ATTITUDE (Deg)								
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Index Camera Horizon Measurement					
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Frame No.	Pitch	Roll	Qty Error		
1	24810 27	2500*	22S	011E	-0 306	-1 358	-0 488	-0 478	-0 078						
2	24828 47	2500*	22S	011E	-1 712	-1 063									
3	24894 57	4200*	22S	011E	-1 733	-0 132	-1 167	-0 032	515						
4	24906 17	4200*	22S	011E	-2 892	019									
5	24922 77	3900*	22S	021E	-3 959	1 447									
9	25018 47	15000*	22S	021E	-0 212	009									
10	25092 47	4000*	22S	028E	-0 921	107	-0 947	-0 043	027						
11	25104 07	4000*	22S	028E	-2 276	-0 268									

PHOTOGRAPHIC EVALUATION

Rev. D08

Acc No.	Density		Density Base - Fog	Sun Angle (degrees)	Brightness Range	Cloud Dmax	Altitude NM
	Dmin	Dmax					
001	.50	1.30	.16	10	2 39	2 0	97 54
002	.52	1.30	.16	10	2 33	1.80	96 78
003	.38	1.35	.16	16	3 15	1.65	84 01
004	.37	1.30	.14	16	3 06	1 45	93 58
005	.65	1.40	.18	17	2 18	1.58	93 12
006			.15	20		2 0	92 15
007	.60	1.15	.15	21	1 80	1 70	91 38
008			.16	21		1 60	91 03
009	.72	1.61	.16	23	2 49		89 51
010	.64	1.20	.15	29	1 80		87 98
011	.40	1.30	.14	29	2.86		87 70

Handle via Byeman
Controls Only

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BCS 24588-64

PERFORMANCE EVALUATION TEAM
REPORT NO. 4014 64

COMMAND INFORMATION

Rev D06

Acc No	System Time Sec	Burst Time Sec	Command Position				Best Ephemeris				Film Velocity in sec		Mirror Pos	Crab Deg	Roll Angle	
			Lat	Long			Lat	Long			Command	Actual				
			Deg	Min	Sec	Min	Sec	Min	Sec	Min	Sec	Min	Sec			
01	30138.07	8.0	60	28N	47	19E	60	25.17N	47	18.05E	2.484	2.475	15F	2.0	34.74	
02	30152.47	9.4	59	29N	46	46E	59	25.79N	46	45.91E	2.484	2.457	15A	2.0	34.74	
03	30190.97	7.7	56	55N	45	28E	56	53.80N	45	27.28E	2.771	2.757	15F	1.5	-25.52	
04	30204.67	6.3	56	00N	45	02E	55	58.81N	45	01.52E	2.827	2.818	15A	1.5	-25.52	
05	30219.77	8.3	54	59N	44	35E	54	58.11N	44	34.33E	3.061	3.040	0	1.5	-24.10	
06	30265.17	5.5	51	56N	43	19E	51	55.01N	43	18.06E	2.855	2.836	15F	1.5	-26.23	
07	30278.17	5.5					51	02.43N	42	59.08E	2.884	2.869	15A	1.5	-26.23	
08	30310.77	5.5	48	51N	42	12E	48	50.33N	42	11.60E	2.508	2.492	15F	1.5	-38.99	
09	30325.87	5.5					47	49.03N	41	50.75E	2.559	2.548	15A	1.5	-38.99	
10	30334.47	5.8	47	15N	41	39E	47	14.09N	41	39.17E	2.636	2.619	0	1.5	-41.83	
11	30346.87	5.3	46	24N	41	23E	46	23.86N	41	22.82E	2.684	2.660	15F	2.0	-29.06	
12	30364.37	5.3	45	13N	41	01E	45	12.43N	41	00.43E	3.519	3.505	0	2.5	2.83	
13	30378.67	5.1	45	15N	40	43E	44	14.17N	40	42.68E	3.217	3.200	15A	2.5	-16.30	
14	30392.17	5.3	43	20N	40	27E	43	19.11N	40	26.33E	3.554	3.535	0	2.5	2.83	
15	30410.67	13.1	42	04N	40	05E	42	03.60N	40	04.55E	2.585	2.558	15A	2.0	36.15	
16	30495.47	5.3	36	17N	38	33E	38	16.54N	38	32.40E	3.282	3.275	0	2.5	-29.06	
17	30512.07	5.3	35	09N	38	16E	35	08.45N	38	15.61E	2.771	2.752	0	2.0	-42.54	
18	30531.67	5.3	33	49N	37	56E	33	47.99N	37	56.22E	3.449	3.431	0	2.5	-24.10	
19	30667.17	5.5	24	31N	35	53E	24	30.35N	35	52.59E	3.415	3.406	45F	3.0	-16.30	
20	30678.07	5.5					23	45.41N	35	43.27E	3.449	3.428	15A	3.0	-16.30	
21	30999.87	5.3	1	37N	31	30E	1	36.53N	31	29.99E	2.771	2.753	0	3.0	-43.24	
22	31064.07	5.5	2	47S	30	42E	2	48.36S	30	41.62E	2.534	2.524	15F	2.5	-41.83	
23	31079.17	5.5					3	50.62S	30	50.23E	2.559	2.547	15A	2.5	-41.83	

PHOTO-MAP POSITIONING

Rev D09

Acc PHM No	System Time	Map Accuracy (ft)	POSITIONING DATA (NMI)				VEHICLE ATTITUDE (Deg)								
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Index Camera Horizon Measurement					
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Frame No	Pitch	Roll	Roll Error		
1	30138.07		.67S	.01E											
6	30265.17	400	.68S	.01E	-1.009	-1.034			-579	-596	-573				
7	30278.17	400	.68S	.01E	-1.914	-1.330									
8	30310.77	500	.68S	.01E	-2.033	-1.602			-679	-714	-929				
9	30325.87	500	.68S	.03E	-2.692	-2.045									
10	30334.47		.68S	.03E								273	-00 18	-41 48	.0 35
11	30346.87	500	.68S	.03E	-1.329	-1.084									
12	30364.37	700	.68S	.03E	-1.359	-1.053									
13	30378.67	600	.68S	.03E	-1.989	-2.211									
14	30392.17	600	.68S	.03E	-0.826	-1.011									
15	30410.67	1500	.68S	.03E	-2.027	-2.039									
17	30507.1														
17	30512.07	600	.68S	.03E	-0.492	-0.866									
18	30667.17	2000	.68S	.04E	-0.535	-0.313									
20	30678.07		.69S	.04E											
21	30999.87		.72S	.05E											
22	31002.3											290	-00 60	-41 68	.1 57
22	31064.07		.72S	.05E											
	31066.5											291	-00 26	-41 10	.0 73
	31075.7											292	-00 38	-41 083	.0 75
23	31079.17														
	31084.9		.72S	.05E								293	-00 20	-40 45	.1 38

Handle via Byeman
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REPORT NO. 4014 64

PHOTOGRAPHIC EVALUATION

Rev D00

Act. No.	Density		Density Base + Fog	Sun Angle (degrees)	Brightness Range	Cloud Dmax	Altitude (NM)
	Dmin	Dmax					
001			.13	8		1.46	99 20
002			.15	8		1.60	98 40
003			.15	11		1.89	96 94
004			.18	11		1.78	96 37
005			.20	12		2.00	95 76
006	.66	.88	.21	16	1.34	1.80	94 00
007	.56	1.00	.23	16	1.80	1.82	93.52
008	.80	1.08	.23	18	1.39	2.05	92 35
009	.90	1.30	.23	18	4.56	2.00	91 84
010	.90	1.14	.24	19	1.32	2.10	91 55
011	.74	1.38	.23	21	2.08	4.88	91 14
012	.87	1.10	.23	22	1.30	2.00	90 59
013	.80	1.26	.24	22	1.69	1.87	90 15
014	.60	1.20	.25	24	2.09	1.95	89 75
015	.90	1.50	.21	25	1.94		89.11
016	1.08	1.65	.24	30	1.93	2.24	87 14
017	.86	1.75	.23	31	2.85	2.32	86 79
018	.90	1.81	.21	32	2.99	2.10	86 42
019	.45	1.75	.21	41	5.75		84 72
020	.50	1.78	.19	41	5.33		84 66
021	.95	1.60	.18	59	2.07	2.30	87 84
022			.16	63		2.36	89 66
023			.15	63		2.35	90 14

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PERFORMANCE EVALUATION TEAM
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COMMAND INFORMATION

Rev D10

Acc No	System Time Sec	Burst Time Sec	Command Position				Best Ephemeris				Film Velocity in sec		Mirror Pos	Crab Deg	Roll Angle
			Deg	Min	Deg	Min	Deg	Min	Deg	Min	Command	Actual			
01	35514.37	6.2	60	01N	24	42E	60	03.64N	24	43.45E	3.001		15F	2.0	-2.83
02	35525.87	6.2					59	17.39N	24	17.82E	3.031		15A	2.0	-2.83
03	35554.67	5.4	57	20N	23	18E	57	22.62N	23	18.88E	3.092		0	2.0	17.72
04	35564.67	6.9	56	40N	22	59E	56	42.52N	22	59.55E	2.971		15F	2.0	12.76
05	35576.97	6.9					55	53.14N	22	36.58E	2.971		15A	2.0	12.76
06	35592.17	5.3	54	50N	22	09E	54	52.02N	22	09.31E	3.315		0	2.0	-6.38
07	35600.87	5.3	54	15N	21	53E	54	16.99N	21	54.22E	3.348		0	2.0	-2.83
08	35620.17	6.2	52	57N	21	21E	52	59.16N	21	22.01E	3.154		15F	2.0	-0.70
09	35631.77	6.7	52	10N	21	03E	52	12.31N	21	03.42E	3.154		15A	2.0	-0.70
10	35651.47	5.1	50	50N	20	32E	50	52.64N	20	33.07E	3.217		0	2.0	17.72
11	35675.07	6.3	49	15N	19	58E	49	17.02N	19	58.53E	2.827		15F	2.0	-29.06
12	35700.67	6.1	47	31N	19	23E	47	33.09N	19	23.06E	3.249		0	2.0	19.85
13	35714.17	6.3	46	36N	19	05E	46	38.21N	19	05.12E	3.122		0	2.0	25.52
14	35783.17	6.3					41	56.94N	17	40.28E	2.484		0	2.0	45.37

PHOTOGRAPHIC EVALUATION

Rev D10

Acc No	Density		Density Base + Fog	Sun Angle (degrees)	Brightness Range	Cloud Dmax	Altitude (NM)
	Dmin	Dmax					
001			.13	8			98.84
002			.13	8			98.34
003			.13	10			97.12
004			.13	11			96.70
005			.13	11			96.20
006			.13	12			95.58
007			.13	13			95.24
008			.13	15			94.49
009			.13	15			94.05
010			.14	17		1.89	93.32
011	.92	1.68	.13	18	2.18	1.95	92.48
012			.13	20			91.60
013			.13	21			91.16
014			.13	26		2.08	89.09

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PERFORMANCE EVALUATION TEAM
REPORT NO. 4014 64

PHOTO MAP POSITIONING

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Veh ID	Time	Map Accuracy	A. POSITIONING DATA (NM)				VEHICLE ATTITUDE (DEG)						
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Index Camera Horiz. Measurement			
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Frame No	Pitch	Roll	R _g Error
	35516.8									337	-09 50	-84 08	
	35526.0									338	06 17	-79 67	
	35535.2									339	19 75	-76 93	
	35557.1									340	50 00	-81 73	
	35566.3									341	52 25	-88 55	
	35575.5									342	70 00	-97 63	
	35584.7									343	88 63	-107 78	
	35677.5									352	-55 50	-97 82	
	35686.7									353	-61 33	-48 63	
	35721.5									356	62 00	-79 67	
	35785.6									357	51 16	-91 93	
	36165.6									358	45 66	-100 52	
	36174.8									359	35 33	-105 68	
	36184.0									360	20 25	-105 07	
	36193.2									361	06 83	-98 13	
	36202.4									362	-07 00	-88 45	
	36211.6									363	-21 00	-72 01	
	36220.8									364	-33 87	-60 27	
	36230.0									365	-49 32	-48 08	
	36239.2									366	-80 33	-36 53	
	36248.4									367	25 67	39 32	
	36257.6									368	48 83	47 15	
	36266.8									369	66 33	42 82	
	36276.0									370	71 25	59 63	
	36285.2									371	-05 50	80 35	
	36294.4									372	20 33	87 42	
	36303.6									373	-32 00	91 55	
	36312.8									374	-39 33	90 22	
	36322.0									375	-46 67	85 60	
	36331.2									376	-42 17	77 90	
	36340.4									377	-43 33	69 33	
	36349.6									378	-45 00	51 16	
	36358.2									379	-33 50	55 94	
	36368.0									380	-18 17	55 00	
	36377.2									381	-04 50	60 87	
	36386.5									382	09 25	70 77	
	36395.7									383	21 75	83 50	
	36404.9									384	31 50	97 83	
	36414.1									385	43 00	111 87	
	36450.9									389	04 67	-83 42	

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PERFORMANCE EVALUATION TEAM
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PHOTO-MAP POSITIONING

Acc. Pict. N.	Station ID	Map Accuracy (ft.)	POSITIONING DATA (NM)				VEHICLE ATTITUDE (Deg)						
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Index Camera Horizon Measurement			
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Frame No	Pitch	Roll	R. Error
	40964.5									390	-02 75	-101 17	
	40973.7									391	-13 50	-115 75	
	41010.5									395	19 00	-102 67	
	41019.7									396	39 33	-91 90	
	41028.9									397	46 17	-85 35	
	41038.1									398	-17 67	-99 64	
	41063.6									399	-25 00	114 83	
	41128.0									406	-81 50	90 90	
	41137.2									407	-84 84	70 90	
	41146.4									408	10 33	53 60	
	41155.6									409	37 50	41 73	
	41164.8									410	64 17	41 05	
	41194.0									411	-04 00	49 76	
	41183.2									412	-22 50	63 57	
	41192.4									413	-40 17	77 75	
	41201.6									414	-57 75	85 97	
	41210.8									415	-79 50	88 75	
	41220.0									416	08 25	-81 83	
	41229.2									417	19 50	-70 40	
	41238.4									418	30 00	-43 57	
	41247.6									419	45 00	-34 62	
	41256.8									420	17 00	48 78	
	41292.9									421	21 17	70 97	
	41302.1									422	19 25	92 40	
	41311.3									423	-06 17	112 32	
	41357.3									428	33 84	113 45	
	41366.5									429	42 44	-104 05	
	41375.7									430	60 67	-99 75	
	41384.9									431	75 75	-118 92	
	41394.1									432	-89 00	-109 32	
	41458.5									439	-62 84	-110 17	
	41467.7									440	-64 00	-87 90	
	41476.9									441	-73 25	-66 75	
	41486.1									442	-88 17	48 50	
	41495.3									443	61 50	35 12	
	41504.5									444	29 50	35 08	
	41513.8									445	-02 00	44 52	
	41523.0									446	-22 75	57 75	
	41532.2									447	-39 00	69 46	
	41541.4									448	-55 33	76 20	
	41550.6									449	-70 83	69 72	
	41559.8									450	-84 50	69 97	
	41569.0									451	84 50	57 72	
	41578.2									452	75 33	41 57	
	41615.0									456	50 00	37 72	
	41624.2									457	54 00	59 49	
	41633.4									458	56 50	81 45	
	41642.6									459	60 75	106 15	
	41670.2									462	89 00	61 00	
	41679.4									463	60 25	59 73	

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PERFORMANCE EVALUATION TEAM
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PHOTO-MAP POSITIONING

FIG. 12

Ave. (DME)	Elev. (ft)	Miles Accuracy	POSITIONING DATA (NM)				VEHICLE ATTITUDE (Deg)						
			Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Index Card Horizontal Measurement			
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Frame No.	Pitch	Roll	Dist Error
	47221 5									464	-33 25	58 08	
	47230 7									465	-17 25	66 32	
	47239 9									466	-04 00	76 60	
	47249 1									467	-18 83	84 60	
	47258 3									468	-35 17	89 25	
	47267 5									469	-46 00	86 92	
	47276 7									470	-59 83	79 77	
	47285 9									471	-68 25	79 85	
	47295 1									472	-71 00	55 78	
	47304 3									473	-62 00	41 75	

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PERFORMANCE EVALUATION TEAM
REPORT NO. 4014 64

PHOTO-MAP POSITIONING

REV 13		Map Accuracy	POSITIONING DATA (NM)				VEHICLE ATTITUDE (Deg)						
AUG PBM No	System Time		Command VS Best Fit Ephemeris Comparison		Best Fit Ephemeris Map Match Comparison		Computed From Map Match Miss Distance			Index Camera Horizon Measurement			
			In-Track	Cross-Track	In-Track	Cross-Track	Pitch	Roll	Yaw	Frame No	Pitch	Roll	G _y Error
	51615.8									480	73 00	92 28	
	51625.0									481	71 25	74 22	
	51634.2									482	64 17	60 10	
	51643.4									483	39 50	50 10	
	51652.6									484	-65 33	65 27	
	52407.4									485	-55 00	51 85	
	52416.6									486	-34 17	40 48	
	52425.8									487	-03 17	41 07	
	52435.0									488	14 50	49 70	
	52444.2									489	32 25	64 57	
	52453.4									490	46 87	81 05	
	52462.6									491	61 00	97 97	
	52471.8									492	78 00	113 37	
	52527.0									498	31 17	-116 36	
	52536.2									499	46 75	-108 82	
	52545.4									500	65 17	-109 95	
	52554.6									501	83 33	-115 60	
	52628.3									509	-64 00	-114 42	
	52637.5									510	-56 17	-93 33	
	52646.7									511	-52 50	-76 77	
	52655.9									512	-44 17	-59 12	
	52665.1									513	-33 33	-43 25	
	52692.7									516	48 50	-36 33	
	52701.9									517	59 00	-49 18	
	52711.1									518	61 25	-63 18	
	52720.3									519	59 50	-76 15	
	52729.5									520	51 75	-87 17	
	52738.7									521	41 25	-94 52	
	52747.9									522	26 00	-96 66	
	52757.1									523	10 75	-91 55	
	52766.3									524	-05 67	-83 87	
	52775.5									525	-11 25	-71 66	
	52784.7									526	-36 00	-59 66	
	52793.9									527	-57 75	-51 12	
	52803.1									528	-90 00	47 43	
	52812.3									529	84 67	50 53	
	52821.5									530	42 00	-58 00	
	52830.7									531	23 50	70 42	
	52839.9									532	07 17	80 10	
	52849.1									533	-09 67	87 03	
	52858.4									534	-23 67	91 49	
	52867.6									535	-37 25	90 49	
	52876.8									536	-47 50	84 37	
	52886.0									537	-57 00	74 45	
	52895.2									538	-62 25	62 23	
	52904.4									539	-62 50	49 08	
	52913.6									540	-54 00	36 60	
	52941.2									543	26 00	-40 85	
	52950.4									544	37 83	-56 75	
	52959.6									545	43 25	-73 59	
	52968.8									546	44 67	-93 39	
	52978.0									547	46 17	-110 99	
	53143.7									565	-50 00	-110 72	
	53152.9									566	-35 50	-96 90	
	53162.1									567	-24 25	-84 43	
	53171.3									568	-11 00	-74 35	
	53180.5									569	06 00	-86 77	
	53189.7									570	19 50	-68 25	
	53198.9									571	34 67	-73 20	
	53208.1									572	45 00	-82 03	
	53217.3									573	48 50	-92 58	
	53226.5									574	50 50	-105 83	
	53235.7									575	45 00	-117 23	
	53281.7									580	-28 33	-104 05	
	53290.9									581	-41 25	-87 88	
	53300.1									582	-45 00	-70 42	
	53309.8									583	-57 00	-52 50	
	53319.0									584	-66 25	-39 93	

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