

GUIDANCE, NAVIGATION AND CONTROL

MISSION J1 (AS510/ CM112/ LM 10) G&N ERROR ANALYSIS (APOLLO 15) by F. D. Grant S. B. Helfant B. A. Kriegsman

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OF TECHNOLOGY

MASSACHUSETTS INSTITUTE

JUNE 1971



CHARLES STARK DRAPER LABORATORY

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MISSION J1 (AS 510/CM 112/LM 10) G&N ERROR ANALYSIS (APOLLO 15)

ABSTRACT

This document has three principal sections. The first is concerned with the effects of measured CM and LM IMU test data uncertainties on navigational and orbital uncertainties and compares them with Block II uncertainty effects. The second section covers effects of radar and IMU uncertainties on the powered lunar landing. The third section gives data on G&N system performance and operation for both CM and LM. The electrical power requirements for the CM and LM are presented in the Appendix.

by F.D. Grant S.B. Helfant B.A. Kriegsman

June 1971

iii

TABLE OF CONTENTS

Section

	A	CM AND LM G&N ERROR STUDY
]	В	POWERED LANDING PGNCS ERROR STUDY
(С	G&N SYSTEMS AND INERTIAL COMPONENT PERFORMANCES

Appendix ELECTRICAL POWER REQUIREMENTS

TABLE OF CONTENTS FOR SECTION A

SECTION A	
CM AND LM G&N ERROR	

STUDY

TABLE OF CONTENTS FOR SECTION A

Section					Page
1	INTRODUCTION				. 5
2	IMU UNCERTAINTIES				. 5
3	RESULTS OF ERROR STUDIES FOR C	См			. 6
4	RESULTS OF ERROR STUDIES FOR L	M		• • •	. 7
5	ERROR TABLE DEFINITIONS				. 14
6	ERROR TABLES WITH CM AND LM IM	MU TEST	DATA		
	COMPUTED UNCERTAINTIES				. 15

CM AND LM G&N ERROR STUDY

1. INTRODUCTION

The results of a G&N IMU Error Study for the important CM and LM burns for the Apollo 15 mission are presented here. The detailed effects of IMU test data computed uncertainties, but not of Block II IMU uncertainties, are given here.

For a more complete error analysis, including effects of Block II uncertainties, the reader should refer to MIT/IL Report, E-2427, "Mission G G&N Error Analysis," July 1969. This includes data on mission profile, on burns, on MSFN update uncertainties, and on initial conditions for burns and reentry. Since the profiles for the Apollo 15 and Apollo 11 missions are quite similar, it was decided that only data on the effects of measured IMU test data uncertainties should be presented here. Data on the IMU uncertainties themselves are given in the next section. In Sections 3 and 4 the effects of these IMU uncertainties on CM and LM burn guidance are presented and compared with the effects of Block II IMU uncertainties. Computer-printed error tables in Section 6 give detailed uncertainty data for the various burns and for reentry.

2. IMU UNCERTAINTIES

Only measured test data uncertainties for the CM and LM IMUs are considered here. These were for IMU No. 48 in CM 112 and IMU No. 12 in LM 10. These uncertainties were computed by taking the rms of performance data deviations from the computed average. These uncertainties were received from S. Helfant on June 2, 1971, and are given in Table 1. Those IMU uncertainties, for which test data was not available, were assumed to be the same as Block II uncertainties. These included initial Stable Member misalignments, and acceleration squared sensitive gyro drift and accelerometer indication errors. All these uncertainties are given in the error tables for the different CM and LM burns.

3. RESULTS OF ERROR STUDIES FOR CM

Table 2 summarizes one sigma state vector uncertainties due to measured IMU test data and to Block II uncertainties as well as to MSFN tracking uncertainties. Three-sigma perigee uncertainties are given for the free-fall coasts following EOI, LOI, DOI and the lunar ascent burn. Because the measured rms uncertainty for the CM IMU Y gyro bias drift (NBDY) is 2.4 meru as compared to the Block II figure of 2 meru, the rss altitude and altitude rate uncertainties are about the same or slightly greater than the same uncertainties due to Block II uncertainties for all CM burns.

The IMU Stable Member alignment times prior to some of the burns were changed for the error simulations in accordance with the mission plan. (See "Apollo 15 Preliminary Flight Plan," MSC, April 20, 1971.) For example, the CM IMU is now realigned 225 min before reentry interface instead of 90 min, the figure used for the Apollo 11 mission.

a. Earth Orbit Insertion Indication Uncertainties (Tables 3-8)

Error data is given for EOI, which occurs by definition 10 sec after SIVB cutoff. Cutoff and perigee altitudes are 93.7 and 93.6 nmi, respectively. These are slightly lower than for previous missions, where these altitudes have been about 103 nmi. Table 2 shows that the rss state vector altitude and track uncertainties of 2,596 and 17,900 ft due to IMU test data uncertainties are about 0.8 and 0.7 of the corresponding uncertainties due to Block II uncertainties.

The 3-sigma indicated perigee error due to test data uncertainties is -3.6 nmi, while that due to Block II uncertainties is -6.4 nmi. (By the term "3-sigma perigee error" is meant that there is 99.86% confidence that the actual indicated perigee error will not be less than the given figure.) The largest contributors to perigee uncertainty were X accelerometer bias and the effective Z accelerometer input axis misalignment about YSM, as Table 8 shows. This table also shows the marked non-linearity of perigee error with IMU error. Here perigee error is defined as the scalar difference between the indicated and the nominal perigee altitudes, where the indicated orbit differs from the nominal because of the effect of the particular IMU error on cutoff position and velocity. Figures 1-3 show indicated perigee error and altitude vs various IMU errors. These show the marked change in slope occurring at the origin, and that perigee error sensitivity depends on IMU error polarity. Data for 3-sigma perigee uncertainties was obtained using a Monte Carlo randomization technique. Attention was restricted of course to the negative side of the perigee error distribution.

Average-g computation in the CMC computer is continued for about 2 min after earth parking orbit insertion time. Orbit computations will continue to be affected by IMU accelerometer bias during this period. With measured test data IMU uncertainties indicated 3-sigma perigee uncertainties increase from -3.6 to -3.9 nmi. This is not a serious decrease.

In the computations for the error tables the assumption is implicitly made that the IMU uncertainty prior to launch (or burn ignition) is directly correlated with the uncertainty effective during the burn itself. Under this assumption the position and velocity errors due to the initial misalignment effect are summed directly with errors due to the burn phase to yield the combined errors. If, however, the IMU uncertainty prior to launch is assumed uncorrelated with the uncertainty effective during the burn, the resulting rss position and velocity uncertainties will be quite different. Comparative data (in ft and ft/sec) are given for earth orbit insertion time for IMU test data uncertainties.

IMU Error	Po	sition U	ncert	tainty		Vel	ocity	Unce	ertai	nty
Assumption	Alt	T	k	R	ge	Alt		Tk		Rge
Correl.	2,596	17,	898	1,2	297	8.1		44.2		3.1
Not-Correl.	2,482	17,	934	1,7	798	7.7		44.1		4.2

Note that the most marked difference is in range.

b. TLI Burn Uncertainties (Tables 9-11)

Translunar injection burn duration was 354 sec for this mission, whereas for Apollo II it had been 310 sec. The rss state vector uncertainties due to IMU test data uncertainties range from 1.2 to 0.7 of the corresponding uncertainties due to Block II uncertainties. The rss indicated velocity correction at 10 hours out due to test data uncertainties is 12.0 ft/sec, while that due to Block II uncertainties is 16.4 ft/sec, and that due to MSFN tracking uncertainties is 5.3 ft/sec. Largest contributors to velocity correction uncertainty were the Y gyro bias drift and X PIPA bias uncertainties.

c. LOI Burn Uncertainties (Tables 12-14)

This burn inserts the CSM into a 170 by 58 nmi orbit around the moon with cutoff altitude at 74 nmi and cutoff flight path angle of 2.1 deg. The rss altitude uncertainty of 1,080 ft due to test data uncertainties is about the same for Block II uncertainties. By comparison the uncertainty due to MSFN tracking uncertainty was about three times greater. The 3-sigma perilune error of -10,280 ft due to test data is about the same as that due to Block II uncertainties and is 75% of the error due to tracking uncertainties. Y gyro bias drift (NBDY) was by far the largest contributor to perigee uncertainty as Table 14 shows.

d. DOI Burn Uncertainties (Tables 15-17)

The descent orbit injection burn of 23 sec and delta-V of 208 ft/sec changes the CSM orbit from 170 by 58 nmi to a 58 by 9.6 nmi orbit at a cutoff altitude of 58 nmi. State vector uncertainties at DOI cutoff are predominantly due to accelerometer bias uncertainties. The 3-sigma perilune uncertainty of -1800 ft due to IMU test data uncertainties is greatly less than the uncertainty of -4,480 ft due to Block II uncertainties or the error of -13,150 ft due to MSFN tracking uncertainty.

e. TEI Burn Uncertainties (Tables 22-24)

The transearth injection burn duration for this mission is 139 sec. For Apollo II it was 160 sec. The rss altitude and altitude state vector uncertainties due to IMU test data uncertainties are about the same as those due to Block II uncertainties and are much less than those due to tracking uncertainties. The rss required velocity correction at 20 hours out due to test data uncertainties is 6.3 ft/sec, while that due to Block II uncertainties is 8.3 ft/sec, and that due to MSFN uncertainties is 11.4 ft/sec. Major IMU error sources were the Y and Z gyro bias drift uncertainties and the X accelerometer bias, as Table 24 shows.

f. Reentry Uncertainties (Tables 25-28)

The CEP at drogue parachute deploy (at 23,000 ft altitude) due to IMU test data uncertainties was 1.37 nmi. With Block II uncertainties it was 1.50 nmi. The effect of MSFN update uncertainties was relatively insignificant. Largest IMU error source contributors were Z and X gyro bias drift in track and X accelerometer bias in range. Uncertainties were larger because alignment time of IMU Stable Member was 225 min before reaching 400,000 ft altitude interface. In previous missions this had been 90 min.

4. RESULTS OF ERROR STUDIES FOR LM

a. Lunar Ascent Burn Uncertainties (Tables 18-21)

The ascent burn injects the LM into a 9 by 46 nmi orbit with cutoff altitude of about 9.9 nmi and a resulting 162 deg nominal coast to apogee. These altitudes are relative to the landing side radius. This in turn is about 1.9 nmi less than the mean moon radius. The rss altitude uncertainty at cutoff due to IMU test data uncertainties is 524 ft, while with Block II uncertainties it is 902 ft. With test data uncertainties the 3-sigma perilune error is -1,600 ft while with Block II uncertainties this error is -2,475 ft. Table 21 shows the three major contributors to perilune error are Y gyro bias drift, Y Stable Member misalignment and X accelerometer bias. This table shows that perilune error is approximately linear with IMU error out to 3-sigma levels. MIT/IL Report E-2427 (for Apollo 11) gives curves (Fig. 3.4) for perilune error and altitude vs IMU error up to 40 times the 1σ Block II uncertainty levels for the significant IMU errors.

TABLE 1

Error	Error Units	CM IMU (No. 48)	LM IMU (No. 12)
ACBX ACBY	cm/sec ² cm/sec ²	0.11 0.06	0.06 0.04
ACBZ	cm/sec ²	0.08	0,05
SFEX	PPM	14	34
SFEY	PPM	25	19
SFEZ	PPM	64	25
NBDX	meru	1.5	1.1
NBDY	meru	2.4	1.3
NBDZ	meru	1.1	1.2
ADIAX	meru/g	2.2	2,8
ADIAY	meru/g	4.1	1.7
ADIAZ	meru/g	2.4	2.0
ADSRAX	meru/g	1.8	1.3
ADSRAY	meru/g	3.7	1.0
ADSRAZ	meru/g	1.3	2.0
ADOAX	meru/g	0.5	0.3
ADOAY	meru/g	0.4	0.2
ADOAZ	meru/g	0.5	0.2
Measured Accel	erometer Input Axis	Mislaignments	
XIA abt. YSM	arc secs	+ 45	+ 38
XIA abt. ZSM	arc secs	+ 10	- 11
YIA abt. XSM	arc secs	- 4	+ 18
YIA abt. ZSM	arc secs	- 26	- 22
ZIA abt. XSM	arc secs	+ 8	- 99
ZIA abt. YSM	arc secs	0	0

Test Data RMS Uncertainties for CM and LM IMUs $% \left(\mathcal{M}_{\mathrm{M}}\right) =\left(\mathcal{M}_{\mathrm{M}}\right) \left(\mathcal{$

NOTE:

Test data covers period, Aug. 11, 1970 - May 19, 1971 for CM and period, Sept. 8, 1970 - May 19, 1971 for LM IMU. (Accelerometer IA misalignments are not compensated for.)

TABLE 2

Burn	Burn Time secs	Uncert. Source	RSS Position Uncert. (feet) Alt. Track Range		RSS V Alt.	elocity I (ft/sec) Track	Uncert. Range	^{3σ} Perigee Error (nmi)	
EOI	714	Test Data Block II	2,596	17,898 25,283	1,297	8,08	44.18	3.14	-3,60
TLI	354	Test Data Block II Tkg.	2,021 1,758 828	1,072 1,746 378	600 664 6,857	13.90 11.93 7.89	7.03 11.43 0.19	3.42 3.65 0.88	0,01
LOI	392	Test Data Block II Tkg.	1,081 1,087 3,214	573 1,018 6,950	356 650 3,891	5.85 5.76 1.54	3.02 5.25 11.79	1.72 3.14 1.68	-1.70 -1.73 -2.25
DOI	23	Test Data Block II Tkg.	5 9 3,040	3 9 7,900	4 9 5,150	0.24 0.37 3.30	0.14 0.37 7.45	0.14 0.35 1.10	-0.30 -0.74 -2.20
Lunar Ascen (LM)	t 433	Test Data Block II	524 902	768 1,100	373 797	2.94 4.51	3.97 5.39	1.36 3.27	-0.26 -0.41
TEI	139	Test Data Block II Tkg.	261 236 1,023	127 232 707	59 107 1,000	3.94 3.48 3.91	1.90 3.40 3.22	0.77 1.36 1.94	
Reentry (Drogue Deploy)	524	Test Data Block II Tkg.	25,863 22,143 283	11,680 19,875 1,165	2,182 4,016 614	97.89 82.55 0.68	41.45 66.95 1.99	12.44 11.80 0.39	

Position and Velocity Uncertainties at Burn Cutoff Due to CM/LM IMU and MSFN Tracking Uncertainties



Accelerometer Scale Factor Error - PPM

Figure 1 Indicated Perigee Error and Altitude vs. Accelerometer Bias and Scale Factor Errors for Coast Following Earth Orbit Insertion



Figure 2 Indicated Perigee Error and Altitude vs. MLMY and MLZY Misalignments for Coast Following Earth Orbit Insertion



Figure 3 Indicated Perigee Error and Altitude vs. NBDY and ADSRAY for Coast Following Earth Orbit Insertion

5. ERROR TABLE DEFINITIONS

Definition of Local Vertical Axes - Many error tables give uncertainty data relative to local vertical coordinates axes (indicated or actual) at nominal event time. These axes (positive direction) are defined as follows:

Altitude	=	unit (<u>R</u>)
Track	=	unit ($\underline{V} \times \underline{R}$)
Range	=	unit (Altitude \times Track)

The one exception to the above definitions is at reentry end. Here, range is defined as parallel to the ground track of the descending spacecraft and track as normal to the altitude-range plane.

Symbols for IMU Uncertainties

Accelerometer Bias Uncertainty

ACBX	X accelerometer bias,	etc.
CM/S.SQ.	$centimeters/sec^2$	

Accelerometer Scale Factor Uncertainty

SFUX	X accelerometer scale factor uncertainty, e	etc.
PPM	parts per million	

Accelerometer Acceleration Squared Indication Uncertainty

NCXX	X accelerometer acceleration squared in	dication
	uncertainty, etc.	
MG/GSQ	micro-gs/g-squared	

Gyro Bias Drift

NBDXINIT	Effect on initial SM misalignment due to X-gyro bias drift before burn ignition (for reentry tables before reaching 400,000 ft altitude)
NBDXBURN	Effect of gyro drift during burn (for reentry tables, after reaching 400,000 ft altitude)
NBDXCOMB	Total of combined effect of X gyro bias drift
MERU	Milli-earth rate unit = $0.015 \text{ deg/hour} = 0.90 \text{ sec/min}$.

Gyro Acceleration Sensitive Drift

ADX-Terms	rss of uncertainties due to X gyro's ADIAX, ADSRAX, and ADOAX drift uncertainties
MERU/G	Milli-earth rate unit/g = 0.015 deg/hour/g

Gyro Acceleration Squared Sensitive Drift

ADIXX	X gyro acceleration squared sensitive drift due to acceleration along its input axis
ADSYY	Y gyro acceleration squared sensitive drift due to acceleration along its spin reference axis
ADIZZ	Z gyro acceleration squared sensitive drift due to acceleration along its input axis
MERU/GSQ	Milli-earth rate unit/g 2 = 0.015 deg/hour/g 2

6. ERROR TABLES WITH CM AND LM IMU TEST DATA COMPUTED UNCERTAINTIES

Earth Orbit Insertion

- 3. State Vector Uncertainties at EOI
- 4. State Vector Uncertainties at EOI (AD Terms)
- 5. State Vecotr Uncertainties at EOI Rel. to S. M. Axes
- 6. State Vector Uncertainties at EOI (AD Terms) Rel. to S. M. Axes
- 7. S. M. Misalignments and Drifts at EOI
- 8. Indicated Perigee Deviations for Coast Following EOI

Translunar Injection

- 9. State Vector Uncertainties at TLI Cutoff
- 10. S. M. Misalignments and Drifts at TLI Cutoff
- 11. Velocity Correction and Other Uncertainties at TLI Cutoff

Lunar Orbit Insertion

- 12. State Vector Uncertainties at LOI Cutoff
- 13. S. M. Misalignments and Drifts at LOI Cutoff
- 14. Perilune Deviations for Coast Following LOI

Descent Orbit Injection

- 15. State Vector Uncertainties at DOI Cutoff
- 16. S. M. Misalignments and Drifts at DOI Cutoff
- 17. Perilune Deviations for Coast Following DOI

LM Lunar Ascent Burn

- 18. State Vector Uncertainties at Ascent Burn Cutoff
- 19. State Vector Uncertainties at Ascent Burn Cutoff (AD Terms)
- 20. S. M. Misalignments and Drifts at Ascent Burn Cutoff
- 21. Perilune Deviations for Coast Following Ascent Burn Cutoff

Transearth Injection

- 22. State Vector Uncertainties at TEI Cutoff
- 23. S. M. Misalignments and Drifts at TEI Cutoff
- 24. Velocity Correction and Other Uncertainties at TEI Cutoff

Earth Reentry

- 25. Position Uncertainties at Drogue Parachute Deploy
- 26. Indicated State Vector Uncertainties at Drogue Deploy
- 27. Indicated State Vector Uncertainties at Drogue Deploy (AD Terms)
- 28. S. M. Misalignments and Drifts at Drogue Deploy

INDI	ICATION	UNCE	RTAINT	IES	(INDIC. POSITIO	- N U	TRUE) AT TI		RCM	LAUNCH =	C HR,	11 MIN, 54 VELOCITY	4.500 UNCER	SEC (7 TAINTIES	14.50 IN	SECS)
UNCERT.	ONE S	IGMA				(R	EL. T	O NOM.	AXESI					(REL.	TO NOM.	AXES)	
SOURCE	UNCERT	ATNTY			ALT.			TPACK			RANGE		ALT.		TPACK		RANGE
INITIAL STA	ARLE ME	MRER N	ATSEL I	GNME	NTS (UNC	ORE	FLATE	WTTH I	FFFC	TS	OF IMU UNC	FRIAINT	IES LISTE	PELO	W)		
ABOUT XI	50.0	SEC			16.1			2.173.0			12.2		0.047		5.348		0.028
ABOUT YI	5.0	S=C G	5 -		162.1	_		0.3			229.5	-	C. 563		0.000		0.434
ABOUT 71	5.0	SECO	-		1.0	_		137.5	-		0.7	-	0.001		0-180	-	0.000
ACCELERONET	FR INP	IT AXI	S NTO	ALTG	STHEMAN												
X ABOUT Y	0.0	SEC	3	- LIG	0.0			2.0			0.0		0.000		0-000		0.000
X ABOUT 7	12.0	SECO			6.0			0.0			0.0		0.000		0.000		0.000
Y ABOUT Y	0.0	SEC	2		0.0			0.0			0.0		0.000		0.000		0.000
V ABOUT 7	- 26 0	SEC.	5		0 2			1 120 0			6 3		0 024		2 780		0.014
7 ADOUT Z	12 0	SEC	2		0.0			1,120.7					0.000		0.000		0.000
Z ABOUT X	12.00	SEL			2 070 1			0.0			075 5		6.000		0.015	-	2 51 9
Z ABUUT Y	- 420 0	SEUS	5		4 ,118 . 1	-		0.0	-		C.C.F.C		0.271		10 000		VCH1
ALCEL BIAS	(1/1)	. FACIN	H LEUN	12H 2	• M • MLMS	•	- 00	I TU ALI	3 X -	ć.	3 SECS. ABU	UI YSM,	DUE IU A		1 2 3 5 5 6 3 4	ADJUT	2 003
ACBXINIT					154.5			5/1.6	-		1,059.5		1.022		1.292	-	2.005
ACBXBURN	0.110	CM/3	59		4?2.5	-		7.0			766.1		1.285	-	0.018		1.998
ACBXCOMB					1,177.2			520.4	-		293.1		3.909		1.273	-	0.004
ACRYINIT			_		2.0			262.2	-		1.3	-	0.003	-	0.248	-	0.000
ACBYBURN	0.060	CM/S.	SO		3.4			472.6			2.6		0.010		1.242		0.006
ACBYCOMB					1.4			210.2			1.1		0.006		0.993		0.005
Actinicono					A • 1			6 / J. 6 / 6									
ACBZINIT					0.0			0.0			0.0		0.000		0.000		0.000
ACEZBURN	0.080	CM/S.	50 -		678.8			2.1			318.0		2.133		0.005		0.867
ACBZCOMB			-		678.3			2.1			318.0	-	2.133		0.005		0.867
ACCELEROMET	TER SCA	LE FAC	TOK L	JNCFR	TAINTIS												
SFUX	1.4	PPM	-		61.0			0.9	-		110.9	-	0.175		0.002	-	0.270
SELLY	25	PPM			2.2			0.0			0.0		0.00		0.000		0.000
SFUZ	64	PPM			424.3			2.2			194.5	-	0.922		0.001		0.315
GYRC BIAS	CRIFT	(INTT.	FAFTH	- LCH	S. M. MLM	5.4	PT .XI	- DUE	TO 80	X	347 SECS,	DUE TO	BDY 9	7 SECS	, DUE TO	BDZ	16 SECSI
NBDXINIT	1.50	MERU			112.2		1	5.045.0			85.0		0.320		37.081		0.203
NBDXBURN	(16 AR	CSECS	DRIFT	- 1	0.5	-		72.1	-		0.3	-	0.000	-	0.073		0.000
NBDXCOMB	SINCE	LAUNCH	-1)		111.6		1	4.003.7			84.6		0.329		37.005		0.203
		2 0110						,									
NBDYINIT	2.40	MERU			31.3			4,207.0			23.7		0.091		10.354		0.056
NBDYBURN	1 26 AR	CSECS	DR IFT	r -	347.1			0.3			295.2	-	1.440		0.003		0.767
NBDYCOMB	SINCE	LAUNCH	- (1		315.8			4,207.4			318.0	-	1.348		10.357		0.824
	1 10	MEDI			5 1			700 0			3 0		0.014		1.724		0.009
NBUZINII NBDZBUBN	1.10	LEXT	DDICT	r	1 2			101.2			1.0		0.004		0.626		0.003
NBUZBUKN	CINCE	LAUNCI	• ORIEI JA		6 5			005 2			4 9		0.010		2 251		0 012
NBUZCIMB	SINCE	LAUNCE		DDIC	C 2201 T			ATATTC	DUIC	TO	ADTA ADCO	A AND	ADOA DDIE		DTAINTIE	EUD	EACH CYDON
GARL ACCEL	ERALIUN	SENS	ITIVE	URIE	1 (255 0	ir i	P.UEF I	AINILLS	005	I.L.	AULA, AUSK	A, AND	AUUA URIF	UNCE	RIAINTIES	FUR	EACH GTRUI
AUX- TERMS	2029	1.5,	1.00	×/6				4,90.01			48 e 1		1 701		12. 310		0.007
ADY-TERMS	4.1,	3019	0.4	1/6	41203			6,438.0			544.8		1.721		17.900		1.235
ADZ-TERMS	2.4,	1.3,	1.5 1	V/G	14.2			1,927.9			17.8		0.042		4.879		0.026
GYPD ACCELE	ER ATION	SQUAR	RED St	NSIT	IVE DELE	T											
ADIXX	0.60 M	EPU/G	50 -		0.3	-		47.5	-m->		0.2	-	0.000	-	0.052		0.000
ADSYY	0.60 M	ERU/ GS	50 -		114.4			0.0			115.6	-	0.196		0.000		0.251
ADIZZ	0.60 M	FRU/G	50		0.0			136.0			0.7		0.002		0.362		0.001
RSS HINCEDT.	IFT AN	D FT	5 = ()		2.505.0		1	7. 909. 3			1.295.6		8.078		44. 180		3.140
RSS UNCERT.	(N.MT.	AND F	TISTO)	2.427			2.045			0.213		8.073		44.130		3.140
a service a serv					And a start of the start of the												

TABLE 3 STATE VECTOR UNCERTAINTIES AT EOI

	INDICATI	DA TACES	TAINTIES	(INDIC	ATED -	TRUE) (FE	ET AND	FT/SEC)	AT TIME =	714.	SOO SE	CS.	AXES)	
				ALT.	(REL .	TRACK	1231	RANGE		ALT.		TRACK		RANGE
UNCERTAIN	NTIES DJE	TO GYEO	ACCELER	ATION S	ENSITI	VE DPIFT T	FRMS							
ADTAXINI	Т			2.0		0.0		0.0		0.000		0.000		0.000
ADIAXBUR	RN 2.20	MERUIG	-	C. 7		95.0	81.4	0.5	-	0.001	-	0.093		0.000
ADIAXCOM	MB		-	0.7	-	96 • C	-	0.5	-	0.001	-	0.093		0.000
ADSAXIN	ΙT			0.0		n.n		0.0		0.000		0.000		0.000
ADSAXBUR	RN 1.80	MERU/G		0.0		0.0		0.0		0.000		0.000		0.000
ADSAXCO	MB			0.0		0.0		0.0		0.000		0.000		0.000
ADOAXIN	IT			37.4	-	5,022.0	-	29.4	-	0.110	-	12.361	-	0.068
ADDAXBUR	RN 0.50	MERU/G		. 0.2		31.7		0.2		0.000		0.044		0.000
ADDAXCOM	мв		-	37.2	enta	4,990.3	-	28.2	-	0.110	-	12.316	-	0.068
RSS FOR X	GYRO			37.1		4,991.1		28.1		0.109		12.316		0.067
				0.0		0.0		0.0		0.000		0.000		0.000
ADIAYIN		MEDILIC		0.0		1.1		0.0		0.000		0.000		0.000
ADIAYCO	MB	11- 1070		0.0		0.0		0.0		0.000		0.000		0.000
ADSAYIN	IT			48.3		6,486.0		36.6		C.142		15.964		0.088
ADSAYBU	RN 3.70	MERU/G	-	515.8		0.1		505.8	-	1.842		0.003		1.140
ADSAYCE	MB		-	467.5		6,486.1		542.5	-	1.609		15.967		1 e 2 2 8
ADDAYIN	IT			0.0		0.0		0.0		0.000		0.000		0.000
AD DAY BU	RN 0.40	MERU/G	-	67.0		0.1		51.6	-	0.280		0.001		0.143
AD OA YC OI	MB		-	67.3		0.1		51.6	-	0.280		0.001		0.143
RSS FOR Y	GYRO			472.1		6,486.0		544.8		1.721		15.966		1.235
	TT			11.4		1.529.4		8.6		0.034		3.764		0.021
ADIAZIN	PN 2.40	MERILG		2.9		396.3		2.3		0.009		1.105		0.006
ADIAZCO	MB	, HEROYO		14.3		1,925.7		10.9		C.043		4.869		0.027
AD SAZIN	īΤ			3.2		0.0		0.0		0.000		0.000		0.000
ADSAZBU	RN 1.30	MERU/G		0.0		0.0		0.0		0.000		0.000		0.000
ADSAZCO	MB			0.0		0.0		0.0		0.000		0.000		0.000
ADDAZIN	IT			0.0		0.0		0.0		0.000		0.000		0.000
ADDAZBU	RN 0.50	MERU/G		0.7		94.8		0.5		0.003		0.332		0.002
ADCAZCO	MB			0.7		94.8		0.5		0.003		0.332		0.002
RSS FOR Z	GYRD			14.2		1,927.9		10.8		0.042		4.879		0.025
RSS FOR A	LL GYROS			474.0		8,408.3		545.8		1.726		20.747		1.238

TABLE 4 STATE VECTOR UNCERTAINTIES AT EOI (AD TERMS)

Desition Desition Duckert VELOCITY UPELOCITY UPELOCITY UPELOCITY UPERTAINTIES IN FEVSEC SURGER UNCERTAINTY XSM YSM	INDICATION UNCERTAINTIES	(INDIC	TRU	E) AT TIM	E FRO	M LAUNCH =	0 HR, 1	1 MIN, 54.	500 S	FC (7	14.50	O SECSI
UNCERT. DIVESTIGAN (PEL. 10.NGM, AXES) (PEL. 10.NGM, AXES) (PEL. 10.NGM, AXES) NUMLE VSM YSM		POSITION	UNCE	RTAINTIES	IN	FEET		VELOCITY !	INCERT	AINTIES	IN	FT/SEC
SDUČEĽ UVČERTAJNY X.SM Y.SM Z.SM X.SM Y.SM Z.SM X.SM Y.SM Z.SM Z.SM <thz.sm< th=""> Z.SM Z.SM</thz.sm<>	UNCERT. ONE SIGMA	(REL.	TO NOM. AX	ES)				REL.	TO NOM.	AXFS)	
INITIAL STABLE MEMBER MISALTONMENTS LUNCORRELATED MITH EFFECTS OF TWN UNCEFFAINTIES LISTED MELLIN ABOUT XI 50.0 SECS 0.3 2/173.1 - 0.6 0.003 - 1.46 0.003 - 1.49 0.000 - 1.49 0.000 - 1.49 0.000 - 1.49 0.000 - 1.49 0.000 - 1.49 0.000 - 1.49 0.000 - 0.400 0.000 - 0.001 -	SOURCE UNCERTAINTY	X SM		YSM		ZSM		XSM		YSM		ZSM
ABOUT XI 50.0 SECS 0.3 2,173.1 - 1.6 0.003 6,36.4 - 0.003 6,36.4 - 0.003 6,36.4 - 0.003 6,36.4 - 0.003 6,36.4 - 0.003 6,36.4 - 0.003 0.003 0.000 0	INITIAL STABLE MEMBER MISALIGNME	NTS (UNCOR	RELA	TED WITH EF	FECTS	OF IMU UNCE	ERTAINTI	ES LISTED	RELIN)		
ABOUT YI 5.0 SECS 131.3 - 0.0 2444.4 0.137.5 0.1 0.000 0.400 ABOUT ZI 5.0 SECS 0.0 0.0 0.0 0.000 0.000 0.000 X ABOUT ZI 0.0 SECS 0.0 0.0 0.0 0.000 0.000 0.000 X ABOUT ZI 0.0 SECS 0.0 0.0 0.0 0.000 0.000 0.000 Y ABUUT XI 0.0 SECS 0.0 0.0 0.0 0.000 0.000 0.000 Y ABUUT XI 0.0 SECS 0.0 1.1 0.010 0.000 <t< td=""><td>ABOUT XI 50.0 SECS</td><td>0.3</td><td></td><td>2,173.1</td><td>-</td><td>1.6</td><td></td><td>0.003</td><td></td><td>5.348</td><td>-</td><td>0.010</td></t<>	ABOUT XI 50.0 SECS	0.3		2,173.1	-	1.6		0.003		5.348	-	0.010
ABOUT ZI 5.0 SECS 0.0 - 137.5 0.1 0.000 0.000 X ABOUT Y 0.0 SECS 0.0 0.0 0.0 0.000	ABOUT YI 5.0 SECS	131.3	-	0.0		248.4		0.131	-	0.000		0.699
ACCELERIONETER INPUT AXIS MISALIGNMENTS X ABOUT Z 10.0 5ECS 0.0 0.0 0.0 0.000	ABOUT 71 5.0 SECS	0.0	-	137.5		0.1		0.000	-	0.180		0.000
X ABOUT Y 1.0.0 SECS 0.0 0.0 0.0 0.0 0.0 0.0 0.00 0.00 0.0	ACCELEROMETER INPUT AXIS MISALIG	NMENTS										
A RADUT 2 10.0 SECS 0.0 0.0 0.00 0.000 0.	X ABOUT Y 0.0 SECS	0.0		0.0		0.0		0.000		0.000		0.000
Y ABOUT X 0.0 0.0 0.0 0.0 0.000 0.0	X ABOUT 7 10-0 SECS	0.0		0.0		0.0		0.000		0.000		0.000
Y ABOUT 2 -	Y ABOUT Y 0.0 SECS	0.0		0.0		0.0		0.000		0.000		0.000
2 ABOUT X 12.0 SECS 0.0 0.0 0.0 0.00 C.000 C.000 <thc.000< th=""> <thc.000< th=""> <thc.000< th=""></thc.000<></thc.000<></thc.000<>	V ABOUT $7 - 26.0$ SECS	0.1		1.130.0	-	0.8		0.001		2.780	-	0.005
2 A BOUT Y - 5:0 SECS 6:0 1:5 - 2,247 0.581 0.010 - 6.717 ACCEL, SIAS (INIT, EARTH LAUCH S.M, MURS, DUF TO ACRY = 23 SECS, ABOUT YSM, DUE TO ACRY = 0.611 1.3729 - 3.284 ACBRINIT - 0.10 - 2.566 - 0.611 1.3729 - 3.284 ACBRINIT - 0.0 - 2.62.3 0.2 - 0.000 - 2.422 ACBYNINT - 0.0 - 2.62.3 0.2 - 0.000 1.262 - 0.00 ACBYNINT - 0.0 - 0.0 0.00 0.000 1.262 - 0.00 ACBYNNN 0.080 CM/S.SO 0.0 0.0 0.0 0.000 </td <td>ABOUT X 12-0 SECS</td> <td>0.0</td> <td></td> <td>0.0</td> <td></td> <td>0.0</td> <td></td> <td>0.000</td> <td></td> <td>C. 000</td> <td></td> <td>0.000</td>	ABOUT X 12-0 SECS	0.0		0.0		0.0		0.000		C. 000		0.000
ACCELENTAS LINT.EATH LAUNCH S.H. M.MS DUF TO ACMX - 23 SECS.ABOUT YSM, DUE TO ACMY 13 SECS.ABOUT YSM) ACBKINIT -0041 1.799 -3.741 ACBKINIT -0110 CM/S.SQ 874.5 0.11 -30.3 2.344 0.700 - 7.242 ACBKDURN 0.110 CM/S.SQ 874.5 0.1 - 30.3 2.344 0.700 - 0.242 ACBKDURN 2.66.6 526.6 - 1.180.7 1.752 1.200 - 3.484 ACBYBURN 0.060 CM/S.SQ 0.0 - 262.3 0.0 0.000 - 0.422 - 0.00 0.000 - 0.422 - 0.000 0.900<	7 ABOUT $Y = 45.0$ SECS	69.9		1.5	-	2.294.7		0.581		0.010	-	6.715
ACCELENTIAL CONTROL 100777 CONTROL 100777 CONTROL 1007777 CONTRO	ACCEL BIAS (INIT EADTH LAUNCH S	M. MIMS	-	DUE TO ACRY	_	23 SECS ABOL	UT YSM.	DUE TO ACT	3Y	13 SECS.	AROUT	XSM)
ACD MINIT 0.110 CM/S.SQ B74.7 0.1 - 1.30.3 2.344 0.000 - 0.220 ACB XBURN 0.110 CM/S.SQ B74.7 1.30.3 2.344 0.000 - 0.200 - 0.200 - 0.200 - 0.448 ACB YINIT 0.00 - 262.3 0.2 - 0.000 - 0.000 - 0.000 - 0.000 0.000 0.000 0.000 0.003 - 0.000 ACB ZOUNS 0.000 CM/S.SQ - 23.3 - 0.4 749.2 - 0.100 - 0.000 -	ACDY INIT -	607.7		526.4	-	1.150.3	-	0.611		1.298	-	3.241
ACBACOMB CHO CHUSSIG 266.6 526.6 - 1,100.7 1,752 1,200 - 3,484 ACBY DURN 0.060 CM/S.SC 0.0 472.6 0.2 0.00 1,242 0.00 ACBY DURN 0.060 CM/S.SC 0.0 472.6 0.3 0.000 0.9000 0.9030 - 0.00 ACBY DURN 0.080 CM/S.SC 23.3 - 0.4 749.2 - 0.100 - 0.000 2.794 ACBZONB 0.080 CM/S.SC 23.3 - 0.4 749.2 - 0.100 - 0.000 2.794 ACBZONB 2.46.5 0.0 4.2 - 0.100 - 0.003 2.794 ACBZONB 2.5 0.0 4.2 - 0.100 0.001 2.000 2.794 ACBZONB 2.5 0.0 4.2 - 0.320 0.000 2.794 ACBZONB 2.6 15.066.6 - 1.5 0.025 37.792 0.072 0.965 SFUZ 64 PPM 0.0 72.2	ACRYRIAN O 110 CM/S SO	874 5		0.1	-	30.3		2.364		0.000	-	0.242
ACBYINIT - 0.0 - 262.3 0.2 - 0.00 - 0.248.3 0.00 - 0.00 ACBYINIT - 0.0 472.6 - 0.3 0.000 1.242 - 0.00 ACBYONB 0.060 CM/S.SO 0.0 417.6 - 0.3 0.000 1.242 - 0.00 ACBZONB 0.00 210.2 0.0 0.00 0.000 0.000 0.000 0.000 ACBZONB - 23.3 - 0.4 749.2 - 0.190 - 0.001 2.294 ACCELERMETER SCALE FACTOR UNCERTAINTIES - - 0.3 466.4 - 0.135 - 0.0025 0.0025 0.0025 37.922 - 0.0078 SFUX 14 PPM - 18.3 - 0.3 466.4 - 0.135 - 0.025 37.922 - 0.078 0.073 0.002 0.025 37.008 - 0.0265 37.008 - 0.071 1.50	ACDADURN U.IIU CM/3.30	266 6		526.6	-	1,180,7		1.752		1.299	-	3.484
ACBYINIT - 0.0 - 262.3 0.2 - 0.00 - 0.001 ACBYBURN 0.060 CM/S.SC 0.0 472.6 - 0.3 0.000 1.242 0.001 ACBYDURN 0.060 CM/S.SC 0.0 472.6 - 0.3 0.000 1.242 0.001 ACBZDURN 0.080 CM/S.SC 23.3 - 0.4 749.2 - 0.101 - 0.003 2.294 ACBZLERCMETER SCALE FACTOR UNCERTAINTIES - 0.4 749.2 - 0.100 - 0.003 2.294 ACEELERCMETER SCALE FACTOR UNCERTAINTIES - 0.3 466.4 - 0.102 0.002 0.000 <	ACDACUMD	200.0		520.0		1 4 1 0 0 0 1						
ALB TINIT 0.00 2002 0.0 1.242 - 0.00 ACB YBURN 0.060 CM/S.SC 0.0 210.2 - 0.0 0.000 0.993 - 0.000 ACB YBURN 0.080 CM/S.SC 23.3 - 0.4 749.2 - 0.100 - 0.003 2.294 ACB ZCOMB - 23.3 - 0.4 749.2 - 0.100 - 0.003 2.294 ACELERCMETER SCALE FACTOR UNCERTAINTIES - 0.0 0.0 0.001 0.001 0.001 0	ACRYTHIT	0 0	_	262 3		0.2	-	0.000	_	0.248		0.001
ALB FBORN 0.00 0.00 12.0 0.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.000 <td>ACBYINII 0.000 CH/S SO</td> <td>0.0</td> <td></td> <td>172 6</td> <td>_</td> <td>0.3</td> <td></td> <td>0.000</td> <td></td> <td>1.242</td> <td>-</td> <td>0.002</td>	ACBYINII 0.000 CH/S SO	0.0		172 6	_	0.3		0.000		1.242	-	0.002
ALB TUMB 0.0 0.0 0.0 0.0 0.0 0.00 0.000 </td <td>ACBYBURN U.UOU CM/3.54</td> <td>0.0</td> <td></td> <td>210 2</td> <td>_</td> <td>0.0</td> <td></td> <td>0.000</td> <td></td> <td>0.993</td> <td>-</td> <td>0.000</td>	ACBYBURN U.UOU CM/3.54	0.0		210 2	_	0.0		0.000		0.993	-	0.000
ACBZINIT 0.0 0.0 0.0 0.0 0.00 0.000	ALBYLUMB	0.0		210.2		0.0		0.000				•
ALB ZINIT 0.00 0.00 0.10 74.2 0.100 0.000 2.224 ACB ZEOMB 23.3 0.4 749.2 0.190 0.003 2.224 ACCELER OWBETER SCALE FACTOR UNCERTAINTIES 5 0.0 4.2 0.190 0.000 0.000 SFUX 14 PPM 126.5 0.0 4.2 0.135 0.000 0.000 SFUX 14 PPM 18.3 0.3 466.4 0.135 0.002 0.000 SFUX 1.5 0.0 - 7.22 0.0 0.001 - 0.73 SFUX 1.6 ARCSECS, DRIFT 0.0 - 72.2 0.0 0.001 - 0.778 NBDXEOMB SINCE LAUNCH) 2.6 14,994.3 - 11.4 0.025 37.008 0.001 1.632 NBDYINIT 2.40 MERU 0.7 4,207.2 - 3.1 0.006 10.354 - 0.021 NBDYEONG SINCE LAUNCH) 106.1 0.1 443.1 0.032 - 0.001 1.63		0 0		0.0		0.0		0 000		0.000		0.000
ALB ZBURN 0.0000 CM31 23.3 0.4 744.2 0.190 0.003 2.294 ACB ZCOMB - 23.3 0.4 744.2 - 0.190 - 0.003 2.294 ACB ZCOMB - 126.5 0.0 4.2 - 0.320 0.000 0.001 0.000 0.001 1.632 0.001 1.632 0.001 1.632 0.001 1.632 0.003 0.003 0.003 0.021 0.035 0.001 1.632 0.003 0.000	ACBZINII	0.0		0.0		749 2	_	0.190	-	0.003		2.294
ACB SCUMB 2.3 2 0.4 149.2 0.101 0.101 0.001 0.101 ACCELERANDETER SCALE FACTOR UNCERTAINTIES 0.0 0.0 0.000	ACBZBURN 0.080 CM75.50 -	23.3	-	0.4		747.6		0 190	_	0 003		2.294
ACCELEROMETER SCALE FALTOR UNCERTAINTIES SFUX 14 PPM 126.5 0.0 4.2 0.320 0.000 0.000 SFUY 25 PPM 0.0 0.0 0.00 0.000 0.000 0.000 GYRO.BLAS DRIFT (INIT.EARTH LCH.S.M.MLMS.ABT.XI - DUE TO BOX 347 SECS, DUE TO BOY 97 SFCS, DUE TO PO7 16 SECS) NBDXINIT 1.50 MERU 2.6 15,066.6 - 11.5 0.025 37.92 - 0.078 NBDXEOMB SINCE LAUNCH) 2.6 14,994.3 - 11.4 0.025 37.006 - 0.778 NBDYBURN (16 ARCSECS.DRIFT 106.1 - 0.1 443.1 0.025 37.006 - 0.021 NBDYBURN (26 ARCSECS.DRIFT 106.9 4;207.0 439.9 0.039 10.354 - 0.01 1.632 NBDZEDMB SINCE LAUNCH) 106.9 4;207.0 439.9 0.0239 10.353 1.609 NBDZEDMB SINCE LAUNCH) 0.0 700.9 - 0.4 0.000 0.426 0.001 1.2351 - 0.001 <t< td=""><td>ACBZCOMB -</td><td>23.3</td><td>-</td><td>0.4</td><td></td><td>149.2</td><td>_</td><td>0.1.20</td><td></td><td></td><td></td><td>L • L + 4</td></t<>	ACBZCOMB -	23.3	-	0.4		149.2	_	0.1.20				L • L + 4
SFUX 14 PPM - 12.5.5 0.0 4.2 0.075 0.00	ACCELEROMETER SCALE FACTOR UNCER	RIAINTIES		0 0		1. 2	_	0 320		0.000		0.034
SFUY 25 PPM 0.0 0	SFUX 14 PPM -	126.5		0.0		4.2	_	0.000		0.000		0.000
SFUZ 64 PPM 18.3 0.3 456.4 101103 101111103 1010103 10	SFUY 25 PPM	0.0		0.0		0.0		0.000		0.002		0.045
GYRO.BIAS DRIFT (INIT.EARTH LCH.S. M.MLMS.ABT.XI - DDE HO BOX 347 SECS, DDE HO BOY 37.92 - 0.078 NBDXINIT 1.50 MERU 2.6 15,066.6 - 11.5 0.025 37.908 - 0.900 NBDXEOMB SINCE LAUNCH) 2.6 14,994.3 - 11.4 0.025 37.908 - 0.908 NBDYINIT 2.40 MERU 0.7 4,207.2 - 3.1 0.066 10.354 - 0.021 NBDYBURN (26 ARCSECS.DRIFT 106.1 - 0.1 443.1 0.932 - 0.001 1.632 NBDYCOMB SINCE LAUNCH) 106.9 4,207.0 439.9 0.639 10.354 - 0.901 NBDZENNT 1 1.10 MERU 0.0 700.9 - 0.4 0.000 1.632 - 0.003 NBDZENNT 1 1.10 MERU 0.0 700.9 - 0.4 0.000 1.632 - 0.003 NBDZEMN (12 ARCSECS.DRIFT 0.0 184.2 - 0.0 0.000 0.626 - 0.000 NBDZCOMB SINCE LAUNCH) 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELEATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, AOSRA, AND ADDA DRIFT UNCERTAINTIES FOP EACH GR	SFUZ 64 PPM -	18.3	-	0.3	D D V	455.4		0.1.17	-	0.002	007	16 555 51
NBDXINIT 1.50 MERU 2.6 15,066.6 - 11.5 0.023 37.082 - 0.003 NBDXBURN (16 ARCSECS.DRIFT 0.0 - 72.2 C.0 0.003 - 0.703 0.000 NBDXOMB SINCE LAUNCH) 2.6 14,994.3 - 11.4 0.025 37.008 - 0.001 NBDYBURN (26 ARCSECS.DRIFT 106.1 - 0.1 443.1 0.022 - 0.001 1.632 NBDYEOMB SINCE LAUNCH) 106.9 4,207.0 439.9 0.039 10.353 1.609 NBDZEOMB SINCE LAUNCH) 0.0 700.9 - 0.4 0.000 0.626 - 0.003 NBDZEOMB SINCE LAUNCH) 0.0 700.9 - 0.4 0.000 0.626 - 0.000 NBDZEOMB SINCE LAUNCH) 0.1 85.2 - 0.5 0.001 2.351 - 0.03 NBDZCOMB SINCE LAUNCH 0.1 85.2 - 0.5 0.001 2.351 - 0.003 ADX-TERMS 2.4;	GYRO .BIAS DRIFT (INIT.EARTH LCH	H.S.M.MLMS.	A81.	XI - DUE TO	ROX	347 SELS,	DOF IN	NUY 97	21/21	27 292	F 11 7	0 079
NBOXBURN (16 ARCSECS.DRIFT 0.0 - 72.2 C.0 0.063 - 0.073 0.070 NBDXCOMB SINCE LAUNCH) 2.6 14,994.3 - 11.4 0.025 37.006 - 0.078 NBDYINIT 2.40 MERU 0.7 4.207.2 - 3.1 0.066 10.354 - 0.021 NBDYBURN (26 14,994.3 - 0.1 443.1 0.022 - 0.01 1.632 NBDYCOMB SINCE LAUNCH) 106.9 4,207.0 439.9 0.039 10.353 1.609 NBDZOMB SINCE LAUNCH) 0.0 700.9 - 0.4 0.000 0.526 0.000 NBDZOMB SINCE LAUNCH) 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT 0.8 4,991.4 3.7 0.008 12.316 0.025 4.025 ADZ-TERMS 2.1,1.8, 0.5 M/G 0.2 1.928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION	NBDXINIT 1.50 MERU	2.6		15,066.6	-	11.5		0.025		01.002	_	0.070
NBDXCOMB SINCE LAUNCH 2.6 14,994.3 - 11.4 0.075 51.005 - 0.076 NBDYINIT 2.40 MERU 0.7 4,207.2 - 3.1 0.006 10.354 - 0.021 NBDYBURN (26 ARCSECS.DRIFT 106.1 - 0.1 443.1 0.032 - 0.001 1.632 NBDYCOMB SINCE LAUNCH 0.0 700.9 - 0.4 0.007 1.724 - 0.003 NBDZURN (12 ARCSECS.DRIFT 0.0 184.2 - 0.0 0.000 0.636 - 0.000 NBDZCOMB SINCE LAUNCH 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA, AND ADDA DRIFT UNCERTAINTIES FOR EACH GYRO) ADZ-TERMS 2.2,1 1.8,0.5 M/G 0.8 4,991.4 3.7 0.008 1.2316 0.009 ADZ-TERMS 2.4,1 3.0.5 M/G 0.2 1,928.0 1.3	NBDXBURN (16 ARCSECS.DRIFT	0.0	-	72.2		C.O		0.101	-	0.073		0.000
NBDYINIT 2.40 MERU 0.7 4,207.2 - 3.1 0.006 10.354 - 0.021 NBDYBURN (26 ARCSECS.DRIFT 106.1 - 0.1 443.1 0.032 - 0.001 1.632 NBDYCOMB SINCE LAUNCH) 106.9 4,207.0 439.9 0.039 10.353 1.609 NBDZINIT 1.10 MERU 0.0 700.9 - 0.4 0.000 0.526 0.000 NBDZOMB SINCE LAUNCH) 0.1 885.2 - 0.5 0.001 2.351 - 0.003 NBDZCOMB SINCE LAUNCH) 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA, AND ADOA DRIFT UNCERTAINTIES FOR EACH GYRO) ADX-TERMS 2.4, 1.3, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.0025 ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT - 0.0 - 0.00 - 0.526 0.009 ADX-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,	NBDXCOMB SINCE LAUNCH)	2.6		14,994.3	-	11.4		0.075		21.000	-	0.010
NBDYINIT 2.40 MERU 0.7 4,207.2 - 3.1 0.006 10.534 - 0.021 NBDYBURN (26 ARCSECS.DRIFT 106.1 - 0.1 443.1 0.032 - 0.001 1.632 NBDYCOMB SINCE LAUNCH) 106.9 4,207.0 439.9 0.039 10.353 1.609 NBDZINIT 1.10 MERU 0.0 700.9 - 0.4 0.002 1.724 - 0.003 NBDZINIT 1.10 MEU 0.0 184.2 - 0.0 0.000 0.626 - 0.000 NBDZOMB SINCE LAUNCH) 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT 0.88 4.991.4 3.7 0.008 12.316 - 0.025 ADY-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT - 0.0 - 0.000 - 0.4879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT - <t< td=""><td></td><td></td><td></td><td></td><td></td><td>~ ~</td><td></td><td></td><td></td><td>10 254</td><td></td><td>0.021</td></t<>						~ ~				10 254		0.021
NBDYBURN (26 ARCSECS.DRIFT 106.1 - 0.1 443.1 0.032 - 0.001 1.632 NBDYCOMB SINCE LAUNCH) 106.9 4,207.0 439.9 0.039 10.353 1.609 NBDZINIT 1.10 MERU 0.0 700.9 - 0.4 0.000 0.626 - 0.003 NBDZOMB SINCE LAUNCH) 0.1 184.2 - 0.0 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT 0.8 GFUNCERTAINTIES DUE TO ADIA, ADSRA, AND ADDA DRIFT UNCERTAINTIES FOP EACH GYRO) 0.025 ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.025 ADX-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT ADZ 1.928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT ADZ 1.928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT ADZ 0.60 MERU/GSQ 0.0 0.	NBDYINIT 2.40 MERU	0.7		4,207.2	-	3.1		0.006		10.354	-	0.021
NBDYCOMB SINCE LAUNCH) 106.9 4,207.0 439.9 0.039 10.353 1.609 NBDZINIT 1.10 MERU 0.0 700.9 - 0.4 0.000 0.639 10.353 1.609 NBDZBURN (12 ARCSECS.DRIFT 0.0 184.2 - 0.0 0.000 0.626 - 0.000 NBDZCOMB SINCE LAUNCH) 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA, AND AD0A DRIFT UNCERTAINTIES FOP EACH GYRO) ADX-TERMS 2.2, 1.8, 0.5 M/G 0.2 1.928.0 3.7 0.008 12.316 0.025 ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.2 1.928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.0 1.609 1.609 1.609 1.672 0.000 ADZ-TERMS 2.4, 1.3, 0.60 MEU/GSQ 0.00 - 0.009 0.009 0.009 0.009	. NBDYBURN (26 ARCSECS.DRIFT	106.1	-	0.1		443.1		0.032	-	0.001		1.632
NBDZINIT 1.10 MERU 0.0 700.9 - 0.4 0.000 1.724 - 0.03 NBDZBURN (12 ARCSECS.DRIFT 0.0 184.2 - 0.0 0.000 0.626 - 0.000 NBDZCOMB SINCE LAUNCH 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA, AND ADDA DRIFT UNCERTAINTIES FOP EACH GYRO) ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.025 ADX-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT ADIX 0.60 MERU/GSQ 0.0 - 47.5 0.0 0.000 - 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT D.0 - 47.5 0.0 0.000 - 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT ADIX 0.60 MERU/GSQ 0.0 - 0.000 - 0.000 0.467	NBDYCOMB SINCE LAUNCH)	106.9		4,207.0		439.9		0.039		10.353		1.509
NBDZINIT 1.10 MERU 0.0 700.9 - 0.4 0.009 1.724 - 0.009 NBDZBURN (12 ARCSECS.DRIFT 0.0 184.2 - 0.0 0.000 0.626 - 0.003 NBDZCOMB SINCE LAUNCH 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT OS MUCERTAINTIES DUE TO ADIA, ADSRA, AND ADDA DRIFT UNCERTAINTIES FOP EACH GYRO ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.025 ADY-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.0 0.000 0.000 0.000 0.000 0.000 0.000 ADIXX 0.60 MERU/GSQ 0.0 0.0 0.000 0.000 0.000 0.000 0.000 ADIXX 0.60 MERU/GSQ 0.0 0.0 0.000 0.362	·					<u> </u>		0.000		1 72/		0.002
NBD ZBURN (12 ARCSECS.DRIFT 0.0 184.2 - 0.0 0.000 0.526 - 0.000 NBDZCOMB SINCE LAUNCH 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA, AND ADOA DRIFT UNCERTAINTIES FOP EACH GYRO) ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.003 12.316 0.025 ADX-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.0 0.00 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.0 0.00 0.000 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.0 0.00 0.000 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.0 0.00 0.000 0.000 0.000 0.000 0.000 ADIXX 0.60 MERU/GSQ 0.0 0.0 0.000 0.06362 0.000 0.467 <td>NBDZINIT 1.10 MERU</td> <td>0.0</td> <td></td> <td>700.9</td> <td>-</td> <td>0.4</td> <td></td> <td>0.000</td> <td></td> <td>1.724</td> <td>-</td> <td>0.003</td>	NBDZINIT 1.10 MERU	0.0		700.9	-	0.4		0.000		1.724	-	0.003
NBDZCOMB SINCE LAUNCH 0.1 885.2 - 0.5 0.001 2.351 - 0.003 GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA, AND ADOA DRIFT UNCERTAINTIES FOP EACH GYRO ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.025 ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.025 ADY-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.000 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.000 0.000 0.002 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0467 0.000 0.000	NBD ZBURN (12 ARCSECS.DRIFT	0.0		184.2	_	0.0		0.000		0.526	-	0.000
GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA, AND ADUA DRIFT UNCERTAINTIES FID EACH GYRO) ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.025 ADY-TERMS 4.1, 3.7, 0.4 M/G 219.4 6,485.8 688.8 0.194 15.961 2.146 ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.60 MERU/GSQ 0.0 - 0.052 0.009 ADIX 0.60 MERU/GSQ 0.0 - 47.5 0.0 0.000 - 0.009 ADSYY 0.60 MERU/GSQ 51.3 - 0.0 154.4 0.044 - 0.000 0.467 ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.0 0.000 0.362 - 0.000 RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449 <td>NBDZCOMB SINCE LAUNCH)</td> <td>0.1</td> <td></td> <td>885.2</td> <td>-</td> <td>0.5</td> <td></td> <td>0.001</td> <td></td> <td>2.351</td> <td>-</td> <td>0.003</td>	NBDZCOMB SINCE LAUNCH)	0.1		885.2	-	0.5		0.001		2.351	-	0.003
ADX-TERMS 2.2, 1.8, 0.5 M/G 0.8 4,991.4 3.7 0.008 12.316 0.025 ADY-TERMS 4.1, 3.7, 0.4 M/G 219.4 6,485.8 688.8 0.194 15.961 2.146 ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.00 - 0.052 0.009 ADIXX 0.60 MERU/GSQ 0.0 - 47.5 0.0 0.000 - 0.009 ADSYY 0.60 MERU/GSQ 51.3 - 0.0 154.4 0.044 0.000 0.467 ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.00 0.362 - 0.000 RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	GYRO ACCELERATION SENSITIVE DRI	FT (RSS OF	UNC	ERTAINTIES D	UE TO	ADIA, ADSR.	A, AND A	DUA DRIFT	UNCER	RININI F	S FUE	EACH GYRUI
ACY-TERMS 4.1, 3.7, 0.4 M/G 219.4 6,485.8 688.8 0.194 15.961 2.146 ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.00 0.000 - 0.009 ADIXX 0.60 MERU/GSQ 0.0 - 47.5 0.0 0.000 - 0.009 ADSYY 0.60 MERU/GSQ 51.3 - 0.0 154.4 0.044 0.000 0.467 ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.00 0.000 0.362 - 0.000 RSS UNCERT. (FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT. (N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	ADX-TERMS 2.2, 1.8, 0.5 M/G	0.8		4,991.4		. 2.7		0.008		12.316		0.025
ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.2 1,928.0 1.3 0.002 4.879 0.009 GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.00 0.000 0.000 0.009 ADIXX 0.60 MERU/GSQ 0.0 47.5 0.0 0.000 - 0.009 ADSYY 0.60 MERU/GSQ 51.3 - 0.0 154.4 0.044 - 0.000 0.467 ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.0 0.000 0.362 - 0.000 RSS UNCERT. (FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT. (N.MILAND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	ADY-TERMS 4.1, 3.7, 0.4 M/G	219.4		6,485.8		688.8		0.194		15.961		2.146
GYRO ACCELERATION SQUARED SENSITIVE DRIFT 0.00 - 47.5 0.0 0.000 - 0.052 0.000 ADIXX 0.60 MERU/GSQ 0.0 - 0.0 154.4 0.044 - 0.000 0.467 ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.0 0.000 0.362 - 0.000 RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	ADZ-TERMS 2.4, 1.3, 0.5 M/G	0.2		1,928.0		1.3		0.002		4.879		0.009
ADIXX 0.60 MERU/GSQ 0.0 - 47.5 0.0 0.000 - 0.052 0.000 ADSYY 0.60 MERU/GSQ 51.3 - 0.0 154.4 0.044 - 0.000 0.467 ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.0 0.000 0.362 - 0.000 RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	GYRD ACCELERATION SQUARED SENSI	TIVE DRIFT										
ADSYY 0.60 MERU/GSQ 51.3 - 0.0 154.4 0.044 - 0.000 0.467 ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.0 0.000 0.362 - 0.000 RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	ADIXX 0.60 MERU/GSQ	0.0	-	47.5		0.0		0.000	-	0.052		0.000
ADIZZ 0.60 MERU/GSQ 0.0 136.0 - 0.0 0.000 0.362 - 0.000 RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	ADSYY 0.60 MERU/GSQ	51.3	-	0.0		154.4		0.044	-	0.000		0.467
RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	ADIZZ 0.60 MERU/GSQ	0.0		136.0	-	0.0		0.000		0.362	-	0.000
RSS UNCERT.(FT AND FT/SEC) 441.9 17,899.0 2,863.9 1.935 44.179 8.449 RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449												
RSS UNCERT.(N.MI.AND FT/SEC) 0.072 2.945 0.471 1.935 44.179 8.449	RSS UNCERT. (FT AND FT/SEC)	441.9		17,899.0		2,863.9		1.935		1+1. 179		8.449
	RSS UNCERT. (N.MI.AND FT/SEC)	0.072		2.945		0.471		1.935		44.179		8.449

TABLE 5 STATE VECTOR UNCERTAINTIES AT EOI REL. TO S. M. AXIS

	INDICATI	ON UNCER	TAINTIES	(INDIC	ATED -	TRUE) (FE	ET AND	FT/SEC)	AT TIME =	714	.500 S	ECS.		
				XSM	IKEL.	YSM	AXES)	ZSM		XSM	(RFL.	YSM.	AXESI	ZSM
UNCERTAIN	TIES DUE	TO GYRO	ACCELER	ATION S	ENSITI	VE DRIFT 1	ERMS							
ADIAXINI	T	,		0.0		0.0		0.0		0.000		0.000		0.000
ADIAXBUR	N 2.20	MERU/G		0.0	-	96.0		0.1		0.000	-	0.093		0.001
AUIAXCUM	В			0.0	-	96.0		0.1		0.000	-	0.093		0.001
ADSAXINI	T N 1 90	MEDILLO		0.0		0.0		0.0		0.000		C.000		0.000
ADSAADUK	N 1.80	MERUIG		0.0		0.0		0.0		0.000		0.000		0.000
ADSAACUM	D			0.0		0.0		0.0		0,000		0.000		0.000
ADOAXINI	T	MEDULA	-	0.9	-	5,022.2		3.9	-	0.009	-	12.361		0.026
ADDAXBUK	N 0.50	MERU/G		0.0		31.7		0.0		0.000		0.044		0.000
ADUALCUM	D		-	0.9	-	4,990.5		3.8	-	0.009	-	12.317		0.026
RSS FOR X	GYRO			0.8		4,991.4		3.7		0.008		12.316		0.025
ADIAYINI	т			0.0		0.0		0.0		0.000		0.000		0.000
ADIAYBUR	N 4.10	MERU/G		0.0		0.0		0.0		0.000		0.000		0.000
ADIAYCOM	В			0.0		0.0		0.0		0.000		0.000		0.000
ADSAYINI	Г			1.2		6,486.2	-	5.0		0.011		15.965	-	0.034
ADSAYBURI	N 3.70	MERU/G		217.8	-	0.4		688.8		0.184	-	0.003		2.158
ADSAYCOM	3			219.0		6,485.9		683.8		0.195		15.962		2.124
ADOAYINI	г			0.0		0.0	•	0.0		0.000		0.000		0.000
ADOAYBURI	N 0.40	MERU/G		15.7		0.0		83.1		0.001		0.000		0.315
ADOAYCOM	3			15.7		0.0		83.1		0.001		0.000		0.315
RSS FOR Y	GYRO			219.4		6,485.8		688.8		0.194		15.961		2.146
ADIAZINI	ŕ			0.3		1,529.4	-	1.2		0.003		3.764	-	0.008
ADIAZBURM	2.40	MERU/G		0.1		396.3	-	0.3		0.001		1.105	-	0.002
ADIAZCOM	3			0.3		1,925.8	-	1.4		0.003		4.869	-	0.010
ADSAZINI	Г			0.0		0.0		0.0		0.000		0.000		0.000
ADSAZBURN	1.30	MERU/G		0.0		0.0		0.0		0.000		0.000		0.000
ADSAZCOME	3			0.0		0.0		0.0		0.000		0.000		0.000
ADOAZINII	r			0.0		0.0		0.0		0.000		0.000		0.000
ADOAZBURN	0.50	MERU/G		0.0		94.8		0.0		0.000		0.332		0.000
ADDAZCOME	3			0.0		94.8		0.0		0.000		0.332		0.000
SS FOR Z	YRO			0.2		1,928.0		1.3		0.002		4.879		0.009
SS FOR ALL	. GYROS			219.6		8,408.3		688.8		0.195		20.744		2.147

TABLE 6 STATE VECTOR UNCERTAINTIES AT EOI (AD TERMS) REL. TO S. M. AXIS

INITIAL UNCERT. SOURCE	STABLE MONE	SIGMA	ISALI	GNMENTS AND ML 1. AN	DRIFT GLE ABO	ANGLES	SUMMARY BLE MEME	(AT TIM	E =	714.50	SECS.)	E ABOUT	LDCAL V	ERTI	ICAL AXES
				XSM		VCM		70.4				AF	C-SECS.		
INITIAL	STABLE	MEMBER	MISAL	TONMENTS LUN	CODDEL	ATED WT		LOM			ALI		RACK		RANGE
ABOUT	XI 50	SECS	1. 201	0.00	CUSACL	ATED WI	IH ALIGN	MENT UNC	ERI.DU	E TO LIS	STED GYPC	AND PI	PA UNCER	RT •)	
ABOUT	VI 5	SECS		0.00		0.00	#15	50.00			44.59		0.15	-	22.61
ABOUT	71 5	SECS		0.00		2.00		0.00			0.03		4.99		0.02
TNITTAL	C 11 11	SECS	TOT	5.00		0.00		0.00			2.26		0.04		4.45
ACDY	Some ML	15. DUE	101	MU FRROR EFF	FCTS OF	VEARTH	LAUNCH	EFFCTION	AND A	LIGNMENT	(LAUNCH	FLIGHT	AZIMUTH	= 9	0.100 DEG
ALBA	0.110	CM/5.50	2	0.00	-	23.13	-	12.09			10.63		23.17	-	5.60
ALBY	0.060	CM/S.SI	Q	12.61		0.00		1.95			7.44	-	0.11		10.37
ACRZ	0.080	CM/S. SI	Q	C.00	-	0.00		0.00			0.00	-	0.00		0.00
NBDX	1.50	MERJ		0.00		0.00		346.64			300 14	_	1 15		154 00
NBDY	2.40	MERU		0.00		0.00		66.70			04 22	-	1.1.7	-	156.80
NBDZ	1.10	MERU		0.00		0.00		16 13			80.32		0.32	-	43.78
							_	10012			14.38	-	0.05	-	7.29
ADTAX	2.20	MERU/G		0.00		2.00	-	0.00			0.00	_	0.00		2 00
ADSPAX	1.80	MERU/G		0.00		0.00		0.00			0.00	_	0.00	-	0.00
ADDAX	0.50	MERU/G		- 0.00		0.00		115.54			103 04		0.00		0.00
10.1.1.1								** > * * *			103.04		0.33		52.20
ADIAY	4.10	MERU/G		0.00		0.00		0.00			0.00		0.00		0.00
ADSRAY	3.70	MERU/G		0.00		0.00	-	149.23			133.08		0.40	-	67 50
ADDAY	0.40	MEPU/G		0.00		0.00	-	0.00			0.00	-	0.00	-	0.00
	2														0.00
ADIAL	2.40	MERU/G		0.00		0.00	-	35.13			31.39	-	0-11	-	15.91
ADSRAZ	1.30	MERUIG		0.00		0.00		0.00			0.00		0.00		0.00
ADDAZ	0.50	MERU/G		0.00		0.00	-	0.00			0.00	-	0.00	-	0.00
RSS INI	TIAL S.M	MLMS.		13.57		23.67		411.46			367.02		23.74		186. 47
DRIET A				TET STNCE EN							2				1.005 11
NRDY	1 50	C TU GYP	KU LIK	IFT SINCE FAR	TH LAU	INCH STA	RT								
NDUA	2 60	MERU		16.16	-	0.00		0.00			7.29	-	0.13		14.37
NDDT	2.40	MERU		0.00		25.79		0.00			0.17		25.79		0.15
NBL Z	1.10	MERJ		0.00		0.00		11.82			10.54	-	0.03	-	5.34
ADIAX	2.20	MERUIC		25.78	_	0.00		0.00							
ADSRAX	1.80	MERILG		- 0.00		0.00		0.00			11.66	-	0.21		22.99
ADDAX	0.50	NERUIC		- 2.34	_	0.00	-	0.00		-	0.00		0.00	-	0.00
-DCAA	10000	FEROTO		2 8 4	-	() • (!) }	-	0.00		-	1.05		0.01	-	2.08
ADTAY	4.10	MERU/G		0.00		0.00		0.00			0 00		0.00		
ADSRAY	3.70	MERU/G		0.00		17.32		0.00			0 11		17 33		0.00
ADDAY	0.40	MERU/G		0.00		4.68		0.00			0.03		4.68		0.10
ADTA7	2-40	MERLIC		0.00		0.00		11 33			10.05				is a second
AD SRA7	1.30	MERU/ G		0.00		0.000	-	11.23			10.05	-	0.03	-	5.08
ADDAZ	C . 50	MERUIC		- 0.00		0.00		0.00		-	0.00		0.00		0.00
A JUEL		121070				0.000	-	0.30			5.22	_	0.01	-	2.65
RSS DRI	FT ANGLE	ARCS EC	(\$.)	32.30		31.04		17.73			21.53		31.64		29.91
OVERALL	RSS MLM.	ARCSEC	5.)	35.04		39.50		411,84			367.65		20 54		100 05
OVERALL	RSS MLM.	(MF.)		0.1698		0.1916		1. 0966			1.7824	0	1919		188.85

TABLE 7 S. M. MISALIGNMENTS AND DRIFTS AT EOI

NOMINAL ALTITUDES	*****	* * * * *	* * * * * * *	****	* * *	******	*****	** ***	* * * * * * * * * * * * * * * *	*****	****
PERIGEE = 93.59 N.MI.	INDICATED DEVI	ATION	S IN LA	T TIM	E =	= O HF	2, 11	MIN, 54.5	00 SEC (714	.500 SECSII	
APOGEE = 93.73 N.MI.	*****	* * * * *	*******	*****	* * *	******	*****	****	******	*********	*********
ORB.ANGLE TO PERIGEE = 179.9	DEG.			PEPIG	EE	ALTITU	JDE DI	JE TO ONE	AND THREE SIG	MA POS.+ NEG	.IMU ERKS.
							()	IN NAUTIC	AL MILES)		
UNCERT. ONE SIGMA	ONE SIGMA		DEVIATIO	INS IN	PE	RIGEE	DE	EVIATIONS	IN PERIGEE	ANGLE TO PE	RIGEE (DEG)
SOURCE UNCERTAINTY	PRESENT ALT.	1	DUE TO 1	SIG.	IMU	JERRS.	01	JE TO 3 SI	G.IMU ERRS.	FOR 3 SIG.	IMU ERRS.
	UNCERT.		NEG.			PDS.		NEG.	POS.	NEG.	POS.
INITIAL STABLE MEMBER MISALI	GNMENTS (UNCOR	RELAT	ED WITH	EFFEC	TS	OF IMU	UNCEF	RTAINTIES	LISTED BELOW)		
ABOUT XI 50.0 SECS	0.0027	-	0.0243			0.0240	-	0.0726	0.0674	156.0479	216.0057
ABOUT YI 5.0 SECS -	0.0267	-	0.1647			0.0907	-	0.4997	0.0285	198.9606	29.8670
ABOUT ZI 5.0 SECS -	0.0002		0.0010	-		0.0010		0.0031 -	0.0031	181.0450	178.9736
ACCELEROMETER INPUT AXIS MIS	ALIGNMENTS										
X ABOUT Y 0.0 SECS	0.0000		0.0000			0.0000		0.0000	0.000	179.9893	179.9893
X ABOUT Z 10.0 SECS	0.0000		0.0000			0.0000		0.0000	0.0000	179.9880	179.9907
Y ABOUT X 0.0 SECS	0.0000		0.0000			0.0000		0.0000	0.0000	179.9893	179.9893
Y ABOUT Z - 26.0 SECS	0.0014	-	0.0127			0.0126	-	0.0380	0.0370	171.3181	194.3590
7 ABOUT X 12-0 SECS	0.0000		0.0000	3		0.0000		0.0000	0.0000	179.9877	179.9909
7 ABOUT $Y = 45.0$ SECS	0.3420	-	0-6754	-		0.7611	-	2.2219 -	2.3532	64.8284	241.7972
ACCELEROMETER BLAS	0.5420		0.0151								
ACBYINIT	0.1242	-	0.0296	-		0.7680	-	0.3556 -	2.3127	24.8165	202.5356
ACRYRIDN 0.11 CM/S.SO	0.0696	-	1.3758			0.1322	-	4.1379	0.1314	154.7920	333.0727
ACDYCOMP	0 1938	_	0.8726	_		0.0498	-	2.6957 -	0.3300	113.7041	288.9698
ACDACOHD	0.1.00		0.0120			0.0170					
ACOMINIT	0 0003		0 0016	-		0.0016		0.0049 -	0.0050	181.8364	178.2480
ACBYINIT -	0.0005	_	0.0010			0.0010	-	0.0166	0.0165	175.7092	185.3377
ACBYBURN U.UB CM/3.5W	0.0008	_	0.0039			0.0039	-	0.0117	0.0117	177.2429	183.2201
ACBYCUMB	0.0002	-	0.0039			0.0037		0.0111	O BOLLI	1	I U D OL L OL
ACDITALT	0 0000		0 0000			0 0000		0.0000	0.0000	179,9893	179,9893
ACDZINII	0.0000	-	0.2595			0 1625	_	0.8340 -	0.6723	238-0176	66-6895
ALBZBUKN U.UB CM/S.SU -	0.1117	-	0.2505			0.1625	_	0 8340 -	0.6723	238 0176	66.6895
ACBZCUMB -	U . L L L I	-	0.2909			0.1029		0.0040	() • () 12 3	LDOBOLIS	
ALLELERUMETER SLALE FACTUR U	NUERIAINTIES		0 1202			0 1954		0 1209	0.5632	325 2203	158.5116
SFUX 14.0 PPM -	0.0101		0.1202	-		0.1054		0.0000	0.0000	170 0803	170,0803
SFUY 25.0 PPM	0.0000		0.0000			0.0000		0.0000	0.3741	246 8826	93.6957
SFUZ 64.0 PPM -	0.0098 -		0.0000	-		0.0914		0.0052 -	0.5141	240.0020	13.0151
GYRO BIAS DRIFT .						0.1004		2 2010	0 1214	1/6 2760	217 2045
NBDXINIT 1.5 MERU	0.0194	-	0.1518			0.1084	-	0.3919	0.0014	190 4907	170 5064
NBDXBURN (16 ARCSEC . DRIFT-	0.0001		0.0005	-		0.0005		0.0014 -	0.0014	144 4155	217 2920
NBDXCOMB SINCE S.M. ALIGN)	0.0193	-	0.1613			0.1083	-	0.3911	0.1214	140.4100	511.2027
						0 0/55		0 1272	0 1025	150 5529	247 0000
NBDYINIT 2.4 MERU	0.0052	-	0.0471			0.0455	-	0.1372	0.1025	109.0000	10 0407
NBDYBURN (26 ARCSEC . DRIFT-	0.0571	-	0.2979	-		0.0044	-	0.9216 -	0.2355	220.1498	48.8007
NBDYCOMB SINCE S.M.ALIGN)	- 0.0519	-	0.3321			0.0244	-	1.0100 -	0.1625	214.3034	40.1500
										17/ 1/70	107 0024
NBDZINIT 1.1 MERU	0.0009	-	0.0078	X		0.0078	-	0.0236	0.0232	114.1419	187.9830
NBDZBURN (12 ARCSEC .DR IFT	0.0002	-	0.0026			0.0026	-	0.0079	0.0078	177.9808	182.2258
NBDZCOMB SINCE S.M.ALIGN)	0.0011	-	0.0105			0.0104	-	0.0314	0.0309	172.6727	.191.1402
GYRO ACCELERATION SENSITIVE	DRIFT (RSS OF	UNCER	TAINTIE	S DUE	TO	ADIA,	ADSRA	AND ADDA	UNCERTAINTIES	FUR FACH GY	KU)
ADX-TERMS 2.2, 1.8, 0.5 M/G	0.0060		0.0534			0.0559		0.1083	0.1611	0.0000	0.0000
ADY-TERMS 4.1, 3.7, 0.4 M/G	0.0775		0.4773			0.0393		1.4299	0.2080	0.0000	0.0000
ADZ-TERMS 2.4, 1.3, 0.5 M/G	0.0024		0.0220			0.0217		0.0657	0.0620	0.000	0.000
									100 01 0 000		1055 500.00
3 - SIGMA PERIGEE ERROR (IMU	ONLY)						-	3.6003	199.86 % CON	FID. THAT PER	IGEE ERRUR
									WILL BE MORE	PUS. THAN TH	IS FIGURED

TABLE 8 INDICATED PERIGEE DEVIATIONS FOR COAST FOLLOWING EOI

INDICATION UNCERTAINTIES (INDICATED - TRUE) AT TIME = 0 HR, 5 MIN, 54.000 SECS (354.000 SECS)

						P	OSITIO	N UNCE	RTAINTIES		IN FEET		VELOCITY	UNCERT	AINTIES	IN	ET/SEC
UNCE	RT.	ONE	SI	GMA				(REL .	TO NOM.	AXES)			(REL.	TC NOM.	AXES)
SOUR	CE	UNCE	RTA	INTY			ALT.		TRACK		RANGE		ALT.		TRACK		RANGE
INIT	IAL SI	ABLE	MEI	MBER	MISALIG	SNMENT	S (UNC	ORRELA	TED WITH	GYPO	DRIFT RATE TERM	151					
ABO	UT XS	1 0	• 20	MR.			4.5	-	159.3	-	1.2		0.031	-	0.988	-	0.007
ABO	UT YSM	1 0	•20	MX .	-		309.2	-	2.3		79.3	-	2.113	-	0.014		0.455
ABC	UT ZSM	1 0	.20	MR .			0.2		262.7		0.0		0.001		1.765		0.001
ACCE	LEROME	TER	INPL	JT AX	IS MISA	LIGNM	ENTS										
XA	BOUT	4	5.0	SEC	s –		53.3	-	2.6		167.1	-	0.343	-	0.016		1.037
XA	BOUT	1 1	0.0	SEC	s –		0.3		0.0		0.9	-	0.002		0.000		0.006
YA	BOUT)	(-	4.0	SEC	s –		0.1		15.4		0.2		0.00		0.096		0.001
YA	BOUT 2	2 - 2	6.0	SEC	s –		C. 7		165.5		2.4	-	0.005		1.112		0.016
ZA	BOUT >	(8.0	SEC	S		0.8		0.0		0.2		0.005		0.000		0.001
ZA	BOUT	1	0.0	SEC	S		0.0		0.0		0.0		0.000		0.000		0.000
ACCE	LERCME	TER	BI AS	S (AV	ERAGE C	G COMP	UTATIO	V STAR	TED 30 SE	S. 8	BEFORE BURN IGNI	TION)				
AC.B	X	C .	110	CM/S	• SQ -		81.8		4.0		252.0	-	0.444	-	0.020		1.291
AC B	Y	С.	060	CM/S	• SQ -		0.5		142.6		2.1	-	0.003		0.730		0.011
AC B	Z	0.	080	CM/S	-SQ -		190.7		0.1	-	52.9	-	1.026		0.001	-	0.268
ACCE	LEROME	TER	SC AL	F = AI	CTOF UN	ICERTA	INTIES										
SFU	X	1	4.0	PPM			5.6		0.3	-	17.7		0.039		0.002	-	0.119
SFU	Y	2	5.0	PPM			3.7	-	0.5		0.0		0.000	-	0.003		0.000
SFU	Z	6	4. 0	PPM	-		50.6		0.0	-	14.3	-	0.325		0.000	-	0.088
																	0.000
GYRO	BIAS	DRIF	TI	S. M.	ALIGNE	n 120	MINS.	BEFOR	E BURN IG	ITI	(14						
NBD	XINIT	1.	5	MERU			18.3	-	627.3	-	4.8		0.123	-	3-820	-	0.028
NBD	XBURN	(17	D AP	CSEC	S.DRIFT		0.3	-	11.4	-	C. 1		0.003		0.106	-	0.001
NBD	XCOMB	SIN	CE S	. M. Al	LIGNI		13.5	-	639.7	-	4.9		0.126	-	3. 997	_	0.029
															20 111		0.000
NBD	YINIT	2.	4	MERU	-	1.	947.8	-	14-2		499 9	-	13,312	-	0.088		2 967
NBD	YBURN	(27	2 46	CSEC	S.DRIFT	-	36.8	-	0.3		8.4	-	0.370	-	0.002		0.071
NBD	YCOMB	SIN	CE S	. M. AI	LIGN)-	1,	984.5	-	14.5		508.2	-	13.693	-	0.030		2.938
													230015				20 750
NBD	ZINIT	1.	1	MERU			0.4		759.6		0-0		0.003		5.096		0.002
NB D	ZBURN	(12	5 48	CSEC	S. DRIFT	•	0.0		14.7		0.0		0.000		0.148		0.000
NBD	ZCOMB	SIN	CES	. M. AL	IGN)		0.5		773.2		0.0		0.003		5.244		0.002
GYRO	ACCEL	ERAT	ION	SENS	ITIVE D	RIFT	(RSS DI	F UNCE	RTAINTIES	DUE	TO ADIA. ADSRA.	AND	ADDA DRIFT	UNCER	TAINTIES	EOP	FACH CYPOI
AD X.	- TERMS	2.	2,	1.8,	0.5 M/	G	0.3		10.3		2.1		0.003	0.10.11	0.105		0.001
ADY.	-TERMS	. 4.	1,	3.7,	0.4 M/	'G	22.2		C.2		5-0		0-235		3,002		0.045
ADZ.	-TERMS	2.	4 9	1.3,	0.5 M/	G	0.0		13.1		0.0		C. 000		0.139		0.000
GYRO	ACCEL	ERAT	ION	SQUAF	RED SEN	SITIV	DRIF	T									0.000
ADI	XX	0.6	M	ERJ/	GSQ		0.1	-	1.8		0.0		0.001	_	0-021		0.000
ADS	YY	0.6	N	ERU/	GSQ -		1.4		0.0		0.3	-	0.016		0.000		0.003
ADI	22	0.6	M	ERU/	SSQ		0.0		1.2		0.0		0.000		0.014		0.000
															0.04724		0.000
RSS	IMU UN	CERT				2.0	120.9		1.071.8		599.6		13.001		7.027		3 410
						. /					20100						20410
RSS	TKG . UP	DATE	UNC	ERT.			329.4		277.7		6.857.0		7-996		0.189		0 279
											0,00,000		10000		0.100		0.010
RSS I	INCERT	. (FT	AND	FT/S	SEC)	2.	184.0		1.135.4		6.383.2		15, 292		7.030		3 520
RSS	JNCERT	. (N.	MI . A	ND FT	T/SEC)	1	1.357		0.187		1.132		15.587		7.030		3.529

23

TABLE 9 STATE VECTOR UNCERTAINTIES AT TLI CUTOFF

INITIAL STARLE MEMBER MISALIGNMENTS AND DRIFT ANGLES SUMMARY (AT TIME = 354.000 SECS.)

UNCERT.		SIGMA		MLM.	ANGLE A	BOUT STABLE	MEMBE	P AXES			MLM. ANGLE	A 90	UT LOCAL	VERTI	CAL AXES
300000	UNCLIN	I DVALUT		XSM		YSM	•	75 M			AL T.		TPACK		RANGE
INITIAL	STABLE	MEMBER M	ISALIGN	MENTS (UNCORRE	LATED WITH	GYRO D	RIFT RA	TE TERMS)					
ABOUT X	SM C.2	O MR.		41.25	0.00	0.00	0 1110 3	0.00		-	11.86	-	0.62		39.50
ABOUT Y	SM 0.2	O MR.		0.00)	41.25		0.00		-	0.15		41.24		0.60
ABOUT Z	SM 0.2	O MR.		0.00		0.00		41.25		-	39.50		0.02	-	11.86
RSS INIT	IAL S.M	. MLMS.		41.25		41.25		41.25			41.25		41.25		41.25
DRIFT AN	GLES SI	NCE IMU	STABLE	MEMBER	REALIGN	MENT (ALIG	NED 120	MINS.	BFFORE B	URN I	GNITION)				
NBDX	1.50	MERU		170.43	_	0.00	-	0.00		-	49.02	-	2.58		163.20
NBDY	2.40	MERU		C.00		272.68	-	0.00		-	1.04		272.65		4.00
NBDZ	1.10	MERJ		0.00		0.00		124.98			119.69	-	0.07		35.95
ADIAX	2.20	MERU/G		9.27	-	0.00	_	0.00		-	2.66	-	0.14		8.88
ADSRAX	1.80	MERU/G	-	0.11	-	0.00		0.00			0.23		0.00	-	0.10
ADOAX	0.50	MERU/G	-	1.18		0.00		0.00			0.34		0.01	-	1.13
ADTAY	4.10	MERU/G		0.00		0.25	· _	0.00		_	0.00		0.25		0.00
ADSRAY	3.70	MERU/G		0.00		8.76	-	0.00		-	0.03		8.75		0.12
ADDAY	C.40	MERU/G		0.00		1.68	-	0.00		-	0.00		1.68		0.02
ADIAZ	2.40	MERU/G		0.00		0.00	-	5.68			5.44		0.00		1.63
ADSRAZ	1.30	MERU/G		0.00		0.00		0.08		-	0.07		0.00	-	0.02
ADDAZ	C.50	MERU/G		0.00)	0.00	-	2.10			2.01	-	0.00		0.60
ADIXX	0.6	MEPU/GSG)	2.17	,	0.00	-	0.00		-	0.62	_	0.03		2.08
ADSYY	0.6	MERU/GSG	0	0.00		0.65	-	0.00		-	0.00		0.65		0.00
ADIZZ	0.6	MERU/GSG)	0.00	,	0.00	-	0.65			0.62	-	0.00		0.18
RSS DRIF	T ANGLE	ARCSEC	CS.)	170.70)	272.83		125.13			129.51		272.81		167.43
OVER ALL.	RSS MLM	. (ARCSEC	(5.)	175.61		275.93		131:75			135.92		275.91		172.43
OVERALL	RSS MLM	. (MR.)		0.8514		1.3377		0.6337			0.6589		1.3376		0.8360

TABLE 10 S. M. MISALIGNMENTS AND DRIFTS AT TLI CUTOFF

INDICATION UNCERTAINTIES IN (AT TIME = 0 HR, 5 MIN, 54.000 SEC (354.000 SECS)) ************ ****** ******** UNCERT. ONE SIGMA INERTIAL INFRIIAL INERTIAL REQD. VELOC. CORRECT. SOURCE UNCER TAINTY FLIGHT PATH VELOCITY AZIMUTH LATITUDE LONGITUDE AT INJECT.+ 8 HR. (FPS) ANGLE (DEG) (FT/SEC) (DEG) (ARC-MINS) (ARC-MINS) POS . NEG. INITIAL STABLE MEMBER MISALIGNMENTS (UNCORRELATED WITH GYRD DRIFT RATE TERMS) ABOUT XSM 0.20 MR. . 0.0000 0.0033 0.0016 0.0239 -0.0083 0.0418 0.0418 ABOUT YSM 0.20 MR. 0.0033 0.1941 0.0000 0.0130 1.2831 0.0040 1.2831 ABOUT ZSM 0.20 MR. 0.0000 0.0007 0.0029 -0.0394 0.0134 0.0749 0.0749 ACCELEROMETER INPUT AXIS MISALIGNMENTS X ABOUT Y 45.0 SECS 0.0003 0.9872 0.0000 0.0092 0.0275 4.9682 4.9682 X ABOUT Z 10.0 SE: S 0.0000 0.0059 0.0000 0.0000 0.0002 0.0296 0.0296 Y ABOUT X - 4.0 SECS 0.0000 0.0014 0.0002 -0.0023 0.0003 0.0078 0.0078 Y ABOUT Z - 26.0 SECS 0.0000 0.0157 0.0018 0.0247 0.0089 -0.0929 0.0929 Z ABOUT X 8.0 SECS 0.0000 0.0021 0.0000 0.0000 0.0000 0.0162 0.0162 Z ABOUT Y 0.0 SECS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 ACCELEROMETER BLAS (AVERAGE & COMPUTATION STARTED 30 SECS. BEFORE BURN IGNITION) ACBX 0.110 CM/S.SQ -0.0003 1.2276 0.0000 0.0123 0.0414 6.1156 6.1156 ACBY 0.050 CM/S.50 0.0000 0.0103 0.0012 -0.0213 0.0076 0.0557 0.0557 ACBZ 0.080 CM/S.SQ -0.0017 0.3911 0.0000 ----0.0025 -0.0087 3.2730 3.2730 ACCELEROMETER SCALE FACTOR UNCERTAINTIES SEUX 14. 0 PPM 0.0000 -0.1131 0.0000 0.0009 -0.0029 0.5712 0.5712 SEUY 25.0 PPM 0.0000 0.0000 0.0000 0.0001 0.0000 0.0003 0.0003 SFUZ 64.0 PPM 0.0005 -0.1273 -0.0000 -0.0007 -0.0024 1.0130 1.0130 GYRO BIAS DRIFT (S.M. ALIGNED 120 MINS. BEFORE BURN IGNITION) NBDX IN IT 1.5 MERU 0.0002 -0.0128 0.0063 0.0939 -0.0329 0.1645 0.1645 N3D XBURN (170 ARCSEC . DRIFT 0.0003 0.0000 0.0062 0.0017 -0.0006 0.0062 0.0062 NBDXCOMB SINCE S.M. ALIGN) 0.0002 0.0131 -0.0055 0.0956 -0.0335 0.1706 0.1706 NBDYINIT 2.4 MERU 0.0205 1.2251 0.0001 0.0254 0.0818 8.0837 8.0837 NBD YBURN (272 ARCSEC. DRIFT-0.0005 0.0259 0.0000 0.0004 0.0014 0.2042 0.2042 NBDYCOMB SINCE S.M. ALIGN) -0.0211 1.2511 0.0001 0.0258 0.0832 8.2870 8.2870 NBDZINIT 1.1 MERU 0.0000 0.0024 0.0083 -0.1139 0.0389 0.2163 0.2163 NBDZBURN (125 ARCSEC.DRIFT 0.0000 0.0001 0.0002 -0.0022 0.0008 0.0086 0.0086 NBDZCOMB SINCE S.M. ALIGN) 0.0000 0.0025 0.0085 -2.1161 0.0395 0.2249 0.2249 · GYRO ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA AND ADDA UNCERTAINTIES FOR EACH GYRD) ADX-TERMS 2.2, 1.8, 0.5 M/G 0.0000 0.0003 0.0002 0.0015 0.0005 0.0064 0.0064 ADY-TERMS 4.1, 3.7, 0.4 M/G 0.0004 0.0158 C. COOO .0.0003 0.0008 0.1285 0.1285 ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.0000 0.0001 0.0002 0.0019 0.0006 0.0083 0.0083 RSS IMU UNCERT. 0.0214 2.0669 0.0114 0.1635 0.1128 12.0298 12.0298 RSS TKG. UPDATE UNCERT. 0.0052 0.1381 0.0003 0.3357 1.1269 5.3370 5.3370 RSS UNCERTAINTIES 0.0220 2.0715 0.0114 0.3733 1.1325 13.1605 13.1605

TABLE 11 VELOCITY CORRECTION AND OTHER UNCERTAINTIES AT TLI CUTOFF

TRUE UNCERTAINTIES (TRUE - INDICATED) AT TIME = 0 HR, 6 MIN, 32.040 SECS (392.040 SECS)

				CC CT		VELOCITY I	NCEDTAINTIES	TAI	ET/SEC	
	POSITION	UNCERTAINTIES	IN	FECI		VELOCITY	NUFRIAINTIES	NDM	TIMEL	
UNCERT. ONE SIGMA	(REL.TL	J TRUE AXES AT	NCM. TIM	E1		(FELoIL	TRUE ARES AT	NJM	DANCE	
SOURCE UNCERTAINTY	ALT.	TRACK		RANGE		ALT.	TRACK		RANGE	
INITIAL STABLE MEMBER MISALIGNM	ENTS (UNCOF	RRELATED WITH (GYRC DRI	FT RATE TERMS	5)					
ABOUT XSM 0.20 MR	2.2	12	**	0.4	-	0.002	0.010	-	0.003	
ABOUT YSM 0.20 MR	108.7	- 30.0		9.2	-	0.585	- 0.162		0.045	
ABOUT 75M 0.20 MB -	31.0	99.7	-	35.1	-	0.198	0.526	-	0.186	
ACCELEDOWETER INDUT AVIS NISALL	CNMENTS									
Y ADDIT V AS O SECS	2.2	- 0.5		1.3		0.001	- 0,004	-	0.011	
X ADDUT T 4000 5203	0.0					0.000	0 000		0.000	
X ABUUT Z IU.U SEUS	0.0	0.0		0.0		0.000	0.000		0.000	
Y ABOUT X = 4.0 SECS	0.0	- 0.1		0.0		0.000	- 0.007		0.000	
Y ABOUT Z = 26.0 SECS -	19.5	62.8	-	22.1		0.124	0.332	-	0.117	
Z ABOUT X 8.0 SECS	0.0	0.0		0.0		0.000	0.000		0.000	
Z ABOUT Y O.O SECS	0.7	0.0		0.0		0.000	0.000		0.000	
ACCELEROMETER BIAS (AVERAGE G CO	OMPUTATION	STARTED 30 SEC	CS. BEFO	RE BURN IGNIT	ION)					
ACBX 0-110 CM/S-SO	1.3	- 105.1	-	300.1		0.260	- 0.489	-	1.396	
ACRY C-060 CM/S-SO	48.8	- 157-0		55-1		0.281	- 0.730		0.256	
	220 5	42.2	X	22.2		1 003	0.296	_	0.104	
ACCELED OVETED SCALE FACTOR UNCE	2278 D	0.2 • 2		66.06		1.007.2	0.2.90		0.404	
ACCELERUMETER SCALE FACILE UNCE	RIAINTIES					0.00/	0 013		0 020	
SFUX 14.0 PPM	0.0	- 25		1.3	_	0.000	- 0.015	-	0.050	
SFUY 25.0 PPM	0.0	0.0		. 0.0		0.000	0.000		0.000	
SEUZ 64.0 PPM	0.4	0.1		0.0		0.003	0.001		0.000	
GYRC BLAS DRIFT (S.M. ALIGNED	180 MINS.	BEFORE BURN IG	NITICN)							
NEDVINIT 1.5 MERU -	1.4	7.1	-	2.5		0.014	0.057	-	0.020	
NBDYBURN (252 ARCSECS DRIET	0.0	0-1		0.0		0.000	0.001		0.000	
NODYCOMP STNCE S M ALTONI-	1 5	7 2		2.6		0.014	0.058	-	0.021	
NOUXCUMD SINCE SOMOALIGN -	100	1. 3		200		0.0014	0.0.0		0001.	
						5 520	1 522		0 (20	
NBDYINIT 2.4 MERU -	1,027.4	- 283.3		87.0	-	5.532	- 1.000		0.429	
NBDYBURN (403 ARCSECS.DRIFT-	12.9	- 3.6.		1.0	-	0.104	- 0.029		0.007	
NBDYCOMB SINCE S.M. ALIGNI-	1,040.3	- 287.0		88.0	-	5.636	- 1.562		0.431	
NBDZINIT 1.1 MERU -	134.2	431.7		152.2	-	0.856	2.280	-	0.806	
NBDZBURN (184 ARCSECS.DRIFT-	1.7	5.5	-	1.0	-	0.015	0.044	040	0.016	
NBDZCOMB SINCE S.M. ALIGNI-	135.9	437.2	-	154.1	-	0.871	2.324	-	0.821	
GYRD ACCEL FRATION SENSITIVE DRI	FT (RSS DE	UNCERTAINTIES	DUE TO	ADIA. ADSRA.	AND	ADDA DRIFT	UNCERTAINTIES	FOR	EACH GYRD)	
ADY-TEDNS 2.2. 1.3. 0.5 M/G	0.0	0.0	500 .0	0.0		0.00	0.000	1.1.1.1	0.000	
ADV TERMS 2.029 1.039 0.02 M/G	0.5	0.1		0.0		0.004	0.001		0.000	
AUY-IERMS 4.1, 3.7, 0.4 M/G	0.5	0.1		0.0		0.007	0.001		0.000	
ADZ-TERMS 2.4, 1.3, 0.5 M/G	0.2	U.D		0.2		0.002	0.000		0.002	
GYRD ACCELERATION SQUARED SENSI	TIVE DRIFT			2 No. 1990						
ADIXX 0.6 MERU/GSQ	0.0	0.0		0.0		0.000	0.000		0.000	
ADSYY 0.6 MERJ/GSQ	0.0	0.0		0.0		0.000	0.000		0.000	
ADIZZ 0.6 MERU/GSQ	0.0	0.0		0.0		0.000	0.000		0.000	
DCC THE LINCEDT	1.081.2	572.6		356.3		5.854	3-020		1.716	
KSS INU UNCERTO	1900102	21200		12002		20024	50000			
DEC THE HODATE HAREAT	3 213 =	6 640 7		3, 890, 6		1.530	11.704		1.679	
K33 INGOUPDATE UNCERTO	0,21007	0124201		0,07005		10 20 7			10019	
	2 202 5	1 070 0		2 007 2		6 053	10 175		2 / 01	
RSS UNCERT (FT AND FT/SEC)	3,390.5	6,973.2		3,917.2		0.053	12.175		2.401	
RSS UNCERT (N.MI.AND FT/SEC)	0.558	1.147		0.043		0.053	120115		2.401	

26

TABLE 12 STATE VECTOR UNCERTAINTIES AT LOI CUTOFF

.

INITIAL STAPLE MEMBER MISALIGNMENTS AND DRIFT ANGLES SUMMARY (AT TIME = 392.040 SECS.)

27

UNCERT. ONE SOURCE UNCER	SIGMA T.VALJE	ML M.	ANGLE A	BOUT STABLE ARC-SECS.	AFMRE	R AXES			MLM.ANGLE	ABOL	T LOCAL	VERTI	CAL AXES
		XSM		YSM		ZSM			ALT.		TRACK		PANGE
INITIAL STABLE	MEMBER MISAL	IGNMENTS	(UNCORRE	LATED WITH	GYPC C	RIFT RAT	E TERMS)						
ABOUT XSM 0.2	O MR.	41. ?	5 -	0.00	-	2.00		-	0.05		13.65		38.92
ABOUT YSM 0.2) MR.	- 0.0	0	41.25		0.00		-	11.51		37.37	-	13.12
ABDUT ZSM 0.2	O MR.	- 0.0	0	0.00		41.25		-	39.61	-	10.88		3.76
RSS INITIAL S.M	MLMS .	41.2	5	41.25		41.25			41.25		41.25		41.25
DRIFT ANGLES SI	NCE IMU STAB	LE MEMBER	REALIGN	MENT (ALIGN	ED 180	MINS. B	FFORE BUR	NI	GNITION)				
NBDX 1.50	MERU	252.5	1 -	0.00	-	0.00		-	0.34		83.60		238.26
NBDY 2.40	MERU	- 0.0	0	404.01		0.00		-	112.77		366.02	-	128.58
NBDZ 1.10	MERU	0.0	0 -	0.00	-	185.17			177.81		48.85	-	16.88
ADIAX 2.20	MERU/G	- 3.0	6	0.00		0.00			0.00	-	1.01	-	2.89
ADSRAX 1.80	MERU/G	0.0	2	0.00	-	0.00		-	0.00		0.00		0.00
ADDAX 0.50	MERU/G	- 0.0	1	0.00		0.00			0.00		0.00	-	0.01
ADIAY 4.10	MERU/G	0.0	n –	0.00	-	0.00			0.00	-	0.00		0.00
ADSRAY 3.70	MERU/G	0.0	0	0.09		0.00		-	0.02		0.08	-	0.02
ADDAY 0.40	MERU/G	0.0	0 -	0.55		0.00			0.15	-	0.50		0.17
ADIAZ 2.40	MERU/G	0.0	o –	0.00		0.05			0.05		0.01	_	0.00
ADSRAZ 1.30	MERU/G	0.0	0	0.00	-	0.00			0.00		0.00	-	0.00
ADDAZ 0.50	MERU/G	- 0.0	0	0.00		0.69		-	0.56	-	0.18		0.06
ADIXX 0.6	MERU/G SQ	0.1	ə –	0.00	-	0.00		-	0.00		0.06		0.18
ADSYY 0.6	MERU/GSQ	0.0	0	0.00		0.00		-	0.00		0.00	-	0.00
ADIZZ 0.6	MERU/GSQ	0.0	0 -	0.00	-	0.00			0.00		0.00	-	00.0
RSS DRIFT ANGLE	(ARCSECS.)	252.5	2	404.01		185.17			210.56		378.61		271.29
OVERALL RSS MLM	(ARCSECS.)	255.8	7	406.11		189.71			214.56		380.86		274.41
OVERALL RSS MLM	. (MR.)	1.240	5	1.9689		0.9197			1.0402		.8464		1.3303

TABLE 13 S. M. MISALIGNMENTS AND DRIFTS AT LOI CUTOFF

313,9602 0.0000 313,9602 7 ABOUT Y 0.0 SEC 5 0.0000 0.0000 0.0000 0.0000 ACCELEROMETER BLAS (AVERAGE & COMPUTATION STARTED 30 SECS. BEFORE BURN IGNITION) 733.1541 2160.8039 - 2280.3736 315.0467 312.8223 ACBX C.110 CM/S. SQ 1.3201 - 746.4347 314.0820 48.8436 13.6771 13.5526 -41 4082 40.2877 313.8370 ACBY 0.060 CM/S.SQ 314.4386 313.4898 229.5177 643.7140 645.8787 1924.5617 - 1044.04540.080 CM/S.SQ ACB7 ACCELEROMETER SCALE FACTOR UNCERTAINTIES 313.9292 313.9912 SFUX 14.0. PPM 0.0253 21.0423 -21.0526 63-0961 -63.1887 0.0010 313.9602 313.9602 0.0043 -0.0010 -0.0031 0.0031 SEUY 25.0 PPM 313.9617 313.9587 64.0 PPM 0.4058 2.2719 -2.2718 6 8153 -6.8155 SEUZ GYRC BIAS CRIFT (S.M. ALIGNED 180 MINS. BEFORE BURN TONITION) 13.6337 313.9724 313.9480 1.5 MERU 1.4392 4.5410 4.5433 13.6219 -VBDXINIT _ 0.3401 -0.3401 313.9605 313.9599 NBDXBURN (252 ARCSEC .DRIFT-0.0269 0-1134 0.1134 13.9741 313.9727 313.9477 4.6553 4.6566 13.9617 -NBDXCOMB SINCE S.M. ALIGN) -1.4661 316.4343 9853.7242 311.6924 NBDYINIT 2.4 MERU - 1027.3746 - 3395.3988 3341.8722 -10336.1948 212.9041 313.9138 314.0067 71.0320 71.0185 - 213.1779 NBDYBURN (403 ARCSEC . DR IFT-12,7378 316.4848 NBDYCOMB SINCE S.M. ALIGN) - 1040.3122 - 3467.4566 3411.8184 -10558.0901 10056.5589 311.6497 313.5646 39.5925 111.4426 - 122.5882314.3423 38.3545 NBDZ IN IT 1.1 MERU 134.1816 -1.4026 -1.4067 313.9678 313.9526 NBDZBURN (184 ARCSEC.DRIFT-1.7043 0.4630 0.4684 313. 5567 38.7000 112.6380 - 124.2145314.3497 NBDZCOMB SINCE S.M.ALIGN) - 135.8855 40.0849 GYRD ACCELERATION SENSITIVE DRIFT (RSS OF UNCERTAINTIES DUE TO ADIA, ADSRA AND ADDA UNCERTAINTIES FOR EACH GYRD) 0.0379 0.0379 0.1137 0.1137 0.0000 0.0000 0.00333 ADX-TERMS 2.2, 1.8, 0.5 M/G 8.0942 8.0945 0.0000 0.0000 C. 4753 2.6981 2.6981 ADY-TERMS 4.1, 3.7, 0.4 M/G 0.1396 0.1306 0.0000 0.0000 ADZ-TERMS 2.4, 1.3, 0.5 M/G 0.1703 0.0465 0.0465 -10.300.0000 (99.86 % CONFID. THAT PERIGEE ERROR 3 - SIGMA PERIGEE ERROR (IMU ONLY) WILL BE MORE POS. THAN THIS FIGURE)

DEVIATIONS IN PERIGEF

NEG.

- 356.7947

-

-

0.7621

8.06.39

6.3210

0.1350

0.0094

5.3066 0.1373

DUE TO 1 SIG.IMU ERRS.

-

PCS.

0.7691

9-0298

6.3218

5.3322

0.1323

0.1350 -

0.0084 -

REVIATIONS IN

CINE SIGMA

PRESENT ALT.

2.2437

108.7109

30.9810

0.0029

0.0001

0.0353

19.5254

0.0234

-

UNCERT.

INITIAL STABLE MEMBER MISALIGNMENTS (UNCORRELATED WITH GYRO DRIFT RATE TERMS)

3 - SIGMA PERIGEE ERROR (IMU + TKG.UPDATE)

-17,700.0000

(AT TIME = 0 HR. 6 MIN. 32.040 SEC (392.040 SECS))

NEG.

356.1955 - 1072.1689 1066.7760

2.3070 -

26.6946 -

18.9604 -

(). 4049

0.0252

15.8432 -

0.3969 -

PERIGEE ALTITUDE DUE TO ONE AND THREE SIGMA POS.+ NEG.IMU ERRS.

POS.

2.3074

27.2885

18.9680

0.4049

0.0252

C. 3969

16.0735

ANGLE TO PERIGEE(DEG)

FOR 3 SIG. INU ERRS.

POS.

313.9581

314.2119

313.8701

313.9513

313.9604

313.9604

313.9040

313.9601

NFG.

212.9623

213.7108

314.1496

313,9691

313.9600

313,9601

314.0161

313.9603

(IN FEET)

DEVIATIONS IN PERIGEE

DUE TO 3 SIG. IMU EPPS.

TABLE 14 PERILUNE DEVIATIONS FOR COAST FOLLOWING LOI

28

NOMINAL ALTITUDES

UNCERT.

SOURCE

ABOUT XSM

ABOUT YSM

ABOUT ZSM

7 ABOUT X

X ABOUT Y

PERIGEE = 58.280 N.MI.

APOGEE= 169.999 N.MI.

X ABOUT Z 10.0 SECS

Y ABOUT X - 4.0 SECS

Y ABOUT Z - 26.0 SECS

ORB. ANGLE TO PERIGEE = 312.9 DEG.

ONE SIGMA

UNCERTAINTY

0.20 MR.

0.20 MR.

0.20 MR. ACCELEROMETER INPUT AXIS MISALIGNMENTS

45.0 SECS

8.0 SECS

TRUE UNCERTAINTIES (TRUE - INDICATED) AT TIME = 0 HR, 0 MIN, 22.850 SECS (22.850 SECS)

	NO LT TO N	UNCEDTATATIES			VELOCITY I	INCEDTATINTIES	TH ET/SEC
UNCERT. ONE SIGMA	IPEL TO	TRUE AVES AT	NOM. TIME)		VELOCITY (TOHE AVES AT	NOM TIME
SOURCE LINCERTAINTY	ALT	TPACK	PANCE		ALT	TDACK	DANCE
INITIAL STARLE MEMBER MISALICHM	ENTS LUNCOR	DELATED WITH	VON ODIET DATE	TEDNEL	4610	ALCK	KANOL
ABOUT XSM 0.20 MR.	2.2	- 0.5	0.	0	0.000	- 0.040	3.000
ABOUT YSM 0.20 M3	0.5	0.0	0.	0 -	0.042	0.000	0.000
ABOUT 75M 0-20 M3	0.0	- 0.1	0	0	0.000	- 0.011	0.000
ACCELER OMETER INPUT AVIS MISALT	CNNENTS	(/e).	0.		0.000	0.011	0.000
X ABOUT Y 45-0 SECS -	0.5	0.0	- 0	1 -	0.042	0.000	- 0.011
X ABOUT 7 10-0 SECS	0.0	0.0	0.	0	0.000	0.000	0.000
Y ABOUT $X = 4_0 0$ SECS	0.0	0.0	0	0	0.000	0.004	0.000
Y ABOUT $7 = 26 \circ 0$ SECS	0.0	- 0.1	0.	0	0.000	- 0.007	0.000
7 ABOUT X 8-0 SECS	0.0	0.0	0.	0	0.000	0.000	0.000
7 ABOUT Y 0.0 SECS	0.0	0.0	0.	0	0.000	0.000	0.000
ACCELEROMETER BLAS (AVERAGE G C	OMPLITATION	STARTED 30 SEC	S. BEENDE BUDA	LICATION	0.000	0.000	0.000
ACBY C-110 CM/S-SO	4-3	JINN, ILU DU SEC	3. SETURE BURN	3	0 196	0.000	0.049
ACBY C. C60 CM/S. SO	0.0	- 27	0	0	0.000	- 0.106	- 0.001
ACB7 0.080 CM/S.S0 -	0.0	2.01	2	5 -	0.032	- 0.002	0.001
ACCELED OMETED SCALE EACTOR HNICE	DTAINTIES		5.		0.052	0.002	J#134
CELLY 14 0 DOM	CIAINITES	0.0	0	0	0.001	0.000	0 000
SELLY 25-0 DDM	0.0	0.0	0.		0.001	0.000	0.000
SEU7 64.0 DDM	0.0	0.0	- 0	1	0.002	0.000	0.000
SFOL G40 PPM	0.0	0.0	- 0.	1	0.003	0.000	- 0.012
CYPO BLAS DRIET IS M. ALTONED	CO MINC	READE BUDN TO	TTIONA				
NEDVINIT 1.5 MEDI	00 01050 0	- JRE BURN IG		ò	0.000	0 070	0 001
NEDVELION (02 ADCSECS DOTET	0.0	- 0.9	0.	0	0.000	- 0.079	- 0.001
NEDYCOME STNCE S.M. ALTONN	0.0	- 0.0	0.	0	0.000	0.070	0.000
NOU ALUMD SINCE SOMO ALIGNI	J • J	- 0.9	0.	0	0.000	- 0.019	- 0.001
NODVINIT 2 (MEDII		0.0	2	0	0.101	0.001	
NOUTINII 2.4 MERU -	1. 5	0.0	0.		0.131	- 0.001	0.001
NEDYCOMP SINCE S M. ALTON)-	1.5	0.0	0.	0	0.123	0.000	0.000
NOUTCOND SINCE SOMOALIGNT-	1.00	1 • ()	0.		0.131	- 0.001	0.001
NOD TINIT I I MEDU	0 0		0	0	0 000	2 . 0.1 (0.000
NBUZINII 1.1 MEKU	0.0	- 0.2	C.	0	0.000	- 0.016	0.000
NDDZDURN (59 ARCSECSODRIFT	0.0	- 0.2	0.	0	0.000	0.000	0.000
CVDO ACCELEDATION SENSITIVE DOI			DUE TO ADIA A	DCDA AND	0000.0	- 0.010	0.000
ADY-TERMS 2.2 1.9 0.5 M/C	FI 1835 UF	UNJERTAINTIES	UUC IU ADIA, A	USRA, ANU	ADUA DRIFT	UNCERTAINTIES	FUR EACH GTRU
ADX-1ERMS 41 27 0 4 4/C		0.0	0.0	0	0.000	0.000	0.000
ADT-TERMS 901, 004 M/C	0.0	0.0	0.	0	0.000	0.000	0.000
ADZ-TERMS 2049 1039 000 F70	TIVE DRIFT	0.0	0.	0	0.000	0.000	0.000
ADIVY 0 4 MEDI/CCO	DRIFT	0.0	0	0	0 (00	0 000	0 000
ADIXX U.O MERJ/GSQ	0.0	0.0	0.	0	0.000	0.000	0.000
	J.J.	0.0	. 0.	0	0.000	. 0.000	0.000
AUILL U.O MERU/GSQ	0.0	1.01	. 0.	0	0.000	0.000	0.000
RSS IMU UNCERT.	5.2	2.9	3.	8	0.237	0.138	0.143
RSS TKG.UPDATE UNCERT.	3,044.2	7,003.7	5,154.	6	3.297	7.459	1.129
RSS UNCERT. (FT AND FT/SEC) RSS UNCERT. (N.MI.AND FT/SEC)	3,044.2	7,903.7	5,154.	6	3.306	7.460 7.460	1.138

29

TABLE 15 STATE VECTOR UNCERTAINTIES AT DOI CUTOFF

INITIAL STABLE MEMBER MISALIGNMENTS AND DRIFT ANGLES SUMMARY (AT TIME = 22.850 SECS.)

30

UNCERT.		SIGMA		MLM.	ANGLE	ABOUT STABL	E MEMB	ER AXES		MLM.ANGL	E ABO	UT LOCAL	VERTIC	CAL AXES
3001111	ONOLIN	I STALJL		XSM		YSM	•	7 SM		ALT.		TRACK		RANGE
INITIAL S	STABLE	MEMBER M	ISALIG	NMENTS (UNCORR	ELATED WITH	GYEC (RIFT R	ATE TERMS)					
ABOUT X	SM 0.2	O MR.		41.25	5	0.00		0.00		- 39.92	-	0.08	-	10.37
ABOUT Y	SM 0.2	O MR.		0.00)	41.25		0.00		- 0.20		41.25		0.42
ABOUT ZS	SM 0.2	O MR.		0.00)	0.00		41.25		10.37		0.46	-	39.92
RSS INIT	IAL S.M	MLMS .		41.25	5	41.25		41.25		41.25		41.25		41.25
DRIFT AND	GLES SI	NCE IMU	STABLE	MEMBER	REALIG	NMENT (ALIG	NED 50	MINS	BEFORE BURN	IGNITION)				
NBDX	1.50	MERJ		81.73	3.	- 0.00		0.00		- 79.10	-	0.17		20.56
NBDY	2.40	MERU	-	0.00)	130.77	-	0.00		- 0.64		130.77		1.34
NBDZ	1.10	MERU		0.00).	0.00	-	59.94		- 15.07	-	0.67		58.00
ADIAX	2.20	MERU/G		0.05	5	- 0.00		0.00		- 0.05		0.00	_	0.01
ADSRAX	1.80	MERU/G		0.00		- 0.00		0.00		- 0.00		0.00	-	0.00
ADDAX	0.50	MERU/G		0.04	+	- 0.00		0.00		- 0.04	-	0.00	-	0.01
ADIAY	4.10	MERU/G		0.00	,	- 0.00		0.00		0.00	-	0.00	-	0.00
ADSRAY	3.70	MERU/G		C. 01	7	- 0.34	-	0.00		0.00	-	0.34	-	0.00
ADDAY	0.40	MERU/ G		0.00)	0.01	-	0.00		- 0.00		0.01		0.00
ADIAZ	2.40	MERU/G		0.00)	- 0.00		0.22		0.05		0.00	_	0.21
ADSRAZ	1.30	MERU/G	***	0.00)	0.00	-	0.00		- 0.00	-	0.00		0.00
ADOAZ	0.50	MERU/G	-	0.00	2	0.00	-	0.01		- 0.00	-	0.00		0.01
ADIXX	0.6	MERU/G SQ	2	0.00)	- 0.00		0.00		- 0.00	-	0.00	-	0.00
ADSYY	0.6	MERU/GSG	ç –	0.00		0.01	-	0.00		- 0.00		0.01		0.00
ADIZZ	0.6	MERU/3 SG	2 -	0.00)	0.00		0.01		- 0.00	-	0.00		0.01
RSS DRIFT	F ANGLE	(ARCS FC	CS.)	81.73	3	130.78		59.94		80.53		130.77		61.56
OVERALL	RSS MLM	ARCSEC	(S.)	91.55	5	137.13		72.76		90.48		137.12		74.10
OVERALL I	RSS MLM	. (MR.)		0.4438	3	0.6648		0.3527		0.4386		0.6548		0.3592

TABLE 16 S. M. MISALIGNMENTS AND DRIFTS AT DOI CUTOFF

NOMINAL ALT	ITUDES			***	****	****	****	****	****	***	****	****	*****	******	**	****	*****	*******
PERIGEE =	9.625	• IM •		· · · ·	DEVIA	TICM	VS	IN	(AT	TIM	E = 0 H	R,	C MI	IN, 22.	85	O SEC (2	2.850 SECS11	
APOGEE=	58.439	N.MI.	1.0.0	****	****	***	化水素 家:	*****	****	***	******	****	*****	******	***	********	********	*******
ORB. ANGLE	TO PERIC	SEE =	180.4	DEG.					PE	RIG	EE ALTIT	UDE	DUE	TO ONE	A	NO THREE SIG	MA POS. + NEG	• IMU ERRS•
	0.115			~										(IN	F	EET)		
UNCERT.	ONE	SIGMA		GN	E SIGM	A		DEVIATI	ICNS	IN	PERIGEE		DEVI	ATIONS	SI	N PERIGEE	ANGLE TO PE	PIGEE(DEG)
SOURCE	UNCER	AINTY		PRE	SENT A	LT.		DUFTO	1 2	IG.	IMU ERRS.		DUE	TO 3 9	SIG	•IMU ERRS•	FOR 3 SIG.	IMU ERRS.
2011					UNCERT	•		NEG.			PCS.		ŕ	VEG.		PDS.	NEG.	POS.
INITIAL ST	ABLE MEI	MBER N	ISALI	IGNMEN	ITS (UN	CORF	R EL A	TED WITH	H GYI	RDI	DRIFT RAT	E TE	RMSI)				
ABOUT XSM	0.20	MR .			0.0022			1.746	1	-	1.7449		5	5.2423	-	5.2307	180.4283	180.4288
ABOUT YSM	0.20	MR.	-	-	0.4727		-	C. 543	L.		0.5303	-	1	.6694		1.5516	180.4809	180.3762
ABOUT ZSM	0.20	MR.			0.0005			0.4702	2	-	0.4701]	.4108	-	1.4099	180.4285	180.4286
ACCELEROME	TER INPL	JT AXI	IS MIS	SALIGN	MENTS													
X ABOUT Y	45.0	SECS	-		0.4819			47.7260	0	-	47.7393		143	3.1381	-	143.2573	180.4823	180.3748
X ABOUT Z	10.0	SECS			0.0000			0.000	0		0.0000		. (00000		0.0000	180.4285	180.4285
Y ABOUT X	- 4.0	SECS	-	-	0.0002		-	0.169	2		0.1693		0	.5077		0.5078	180.4286	180.4285
Y ABOUT Z	- 26.0	SECS			0.0004			0.296	3	-	0.2963		(0.8891	-	0.8887	180.4285	180.4286
Z ABOUT X	8.0	SEC S			0.0000			0.0000	0		0.0000		(0.0000		0.0000	180.4285	180. 4285
Z ABOUT Y	0.0	SECS			0.0000			0.0000	0		C.0000		(0.0000		0.0000	180.4285	180.4285
ACCELEROME	TER BIA	S LAVE	RAGE	G CCM	PUTATI	ON S	STAR	TED 30 5	SECS	• B	EFORE BUR	N I	GNIT	ION)				
ACBX	0.110	CM/S.	SQ		4.8797		-	216.028	7		215.7741	-	648	3.8476		646.5558	180.1937	180.6644
ACBY	0.060	CM/S.	SQ		0.0135			4.510	9	-	4.5022		13	3.5589	-	13.4805	180.4279	180.4291
ACBZ	0.080	CM/S.	50 -		0.9224		-	567.363	5		567 . 4259		1701	. 9034		1702.4646	180.4659	180,3907
ACCEL EROME	TER SCAL	E FAC	TOR	INCERT	AINTIE	S												20003701
SELLX	14.0	PPM			0.0083	20		0.8250	0 -		0.8250		1	2.4749	-	2.4749	180.4295	180-4276
SELLY	25.0	PPM			0.0000			0.0000	0		0.0000		(0,000		0.0000	180-4285	180. 4285
SEU 7	64.0	PPM ·			0.0367			52.628	4 -		52.6279		15	7.8869	_	157.8822	180.4249	180.4322
GYRC BLAS	DRIFT	S-M- A	ITGNE	ED 60	MINS	REI	ENRE	BURN TI	GNIT	TON)		2 -			10100022	207012.47	10004022
NBOYINIT	1.5	MERI			0.0044	DC.	CHL	3.439	2	-	3.4342		10	1.3325	_	10,2875	180.4281	180.4290
NBDYBIIPN	1 82 10	CSEC .	DIFT		0.0000			0.011	0	_	0.0110		1	0.320	_	0.0329	190.4285	180.4285
NBDYCOMB	SINCE	C. M. AL	TCNI		0.0044			3.4501	1	_	3.4451		1	2656	_	10.3202	100 4201	180 4200
NDUACJMD	SINCE .	Se Me AL	1 6101		0.0344			5.4201	A .	-	504451		1.	1.3030		100 5202	100.4201	100.42.90
NEDVINIT	2 4	MEDI	-		1 4902		_	1 756	1		1 6262	-		5 6577		4 4801	180 5935	180.2636
NOUTINIT	1120 101	CEC.	DETET-		1. 4072		_	0.009	2		1.0202	_	-	0.0205		0.0205	190.4201	190.4290
NDDYDUKN	CINCE I		TONN		1 (00)		_	1 7(4)	2		0.0090			6000		6 5140	100 5040	100.74200
NBUTCUMB	SINCE	Se Me AL	IGN)	-	1.4924		-	1.100.	3		1.0350	-	-	0909		4.01.49	189.5940	180.2031
NRDZINIT	1 1	MEDII			0 0000			0 678	Q	_	0 6787			0.0372	_	2.0354	180.4284	180.4286
NBDZINI	1 50 400	SECO	DIFT		0.0003			0.002	2	_	0.0022		6	0.0065	_	0.0065	180. 4285	180.4285
NRDZCOMR	STACE	C M AI	TCNI		0 0000			0 6810	0	_	0 6808			0.437	_	2.0419	190 4284	180.4286
CYDO ACCEL	EDATION	CENCI	TIVE	DDIET	1000	OF I	INCE	DTAINTI		115	TO ADIA	ADSO			N 1	INCED TAINTIES		100.4200
GIRU ALLEL	2 2 1	36131	E M/C	DRIFT	0 0000	UFI	JIVCE	0 001			O DOIA	AUSI	A AI	10 4004	4 0	O OCA	POR EACH OF	0 0000
AUX-TERMS	2029 10	7 0	0 M/G	2	0.0000			0.001	1		0.0015		(0124		0 0124	0.0000	0.0000
AUT-TERMS	4.1, 3	1, 0,	4 M/(0	0.0013			0.004	2		0.0041		5	00124		0.0020	0.0000	0.0000
AUZ-TERMS	2049 1		5 M/(3	0.0100			0.001	J		0.0013		(1.0028		0.0035	0.0000	0.0000
3 - SIGMA	PERIGEE	ERROF	R (IML	JONLY	()							-	1,80	00.000	0	(99.86 % CON	FID.THAT PER	IGEE ERROR
3 - SIGMA	PERIGEE	FRROE		1 + TK	G. UPDA	TEI						-1	3.25	50.0000		HILL DE HUKE	FUS# TAM IN	IS FIGURE .

TABLE 17 PERILUNE DEVIATIONS FOR COAST FOLLOWING DOI

INDICATION UNCERTAINTIES (INDICATED - TRUE) AT TIME = 0 HR, 7 MIN, 13.000 SECS (433.000 SECS)

	POSITION	UNCERTAINTIES	IN FEET		VELOCITY	UNCERTAINTIES	IN FT/SEC AXES)
	ALT	TRACK	RANGE		ALT.	TRACK	RANGE
TANTTAL STADLE MENDED MISALICHME	NTS (INCOS	DELATED WITH O	VED DRIET RATE TE	RMS)			
ADOUT YEM 0.44 MD.	0.2	671.0	0.3		0.001	3.623	0.002
	373 3	- 0.1	281.5	-	2.176	0.000	0.961
ABUULTSM 0.40 MR	2/202	212.0	0.1		0.000	0.580	0.000
ADUUT ZSM UNDUT AVIS MISALIC	NHENTS						
ADDIT V 20 0 SECS _	189.4	0.0	33.1	-	1.053	0.000	0.180
$x = \frac{11}{2} + \frac{11}$	0.0	0.0	0.0		0.000	0.000	0.000
A ADUUT Z = 11.0 SECS	0.0	87.8	0-0		0.000	0.474	0.000
V ADOUT A LOOU SECS	0.0	56.9	0.0		0.000	0.155	0.000
7 ADUUT Z = 22 OUS 3203		0.0	0.0		0.000	0.000	0.000
	0.0	2.0	0.0		0.000	0.000	0.000
ACCELEDOMETED DIAS LAVEDACE C.CC	MOUTATION	STARTED 30 SEC	S. BEEDRE BURN IG	SNITION)			
ACRY COLO CM/S SO	214.7	0.0	- 37.5		0.958	0.000	- 0.161
ACBX 0.000 CM/S SQ	0.0	138.4	0-1		0.000	0.588	0.000
	33.7	- 0.1	170-2		0.135	0.000	0.723
ACCELEDONETED CONTERACTOR UNCER	TATATIES		1002				
ACCELERUMETER SCALE FACTOR UNCER	10 0	0.0	3.3		0.057	0.000	0.009
SFUX 34.0 PPM -	10.7	0.0	0.0		0.000	0.000	0.000
SEUY 19.0 PPM	1.5	0.0	- 24.8	-	0.025	0.000	- 0.134
SFUZ ZOOU PPM -	HAD THE	0.0	2.400		0.000		
ACCELERATION SQUARED INDICATION	UNCERT .	0.0	- 0.2		0.003	0.000	- 0.001
NUXX 10 MG/GSQ	1.00	0.0	0.0		0.000	0.000	0.000
NCYY IU MG/GSQ	0.0	0.0	3.6		0.004	0.000	0.023
NUZZ TO MUZUSQ	LO MINC	REEDOE BURN TO	VITICN)		0.000	00000	
GYRU BIAS URIFI ISONO ALIGNEU	40 MINS.	102.9	0.1		0.000	1.046	0.001
NEDXINII 1.1 MERU	0.0	12.0	0.0		0.000	0.110	0.000
NBD XBURN (46 ARUSEUSOURIE)	5.7	207 7	0.1		0.000	1.156	0.001
NBDXCUMB SINCE S.M. ALIGNI	0.0	20101	C. I.		0.000		
	212 2	0.0	160.1	-	1,238	0.000	0.546
NBDYINIT 1.3 MERU -	15 0	0.0	7.4	-	0.130	0.000	0.034
NBUYBURN (. 54 ARCSECSOURIFIE	220 1	0.0	167.5	-	1.368	0.000	0.581
NBUYLUMB SINCE S.M. ALIGN /-	620 e 1	0.0	10105				and the second
1 2 ME211	0 0	111.0	0.1		0.000	0.304	0.000
NBDZINIT 1.2 MERU	0.0	4.2	0.0		0.000	0.011	0.000
NBUZBURN (SI ARUSEUS-DRIFT	0.0	116.0	0.1		0.000	0.315	0.000
NEDZUUMB SINCE SOMOALIGNI	T 1955 OF	LINCEDTAINTIES	DUE TO ADIA. ADS	RA. AND	ADDA DRIFT	UNCERTAINTIES	FOR EACH GYRO
GYRU AUGELERATION SENSITIVE URIT	0.0	87.8			0.000	0.483	0.000
AUX-TERMS 2.89 1.59 0.5 M/G	3 0	5.8	1.7		0.035	0.031	0.008
ADY-IERMS 1.1, 1.0, 0.2 M/C	0.0	6.3	0.0		0.000	0.032	0.000
AUZ-TERMS ZOU; ZOU; DOZ M/G	TVE DOTET	0.0	0.00				
GYRU AULELERATION SUJARED SENSIT	DATE DATE	0.3	0.0		0.000	0.002	0.000
	0.8	0.0	0.3	-	0.008	0.000	0.002
AUSTI U.D MERUJUSU	0.0	0-2	0.0		0.000	0.000	0.000
AUILL U.D MERU/GSQ	0.00	0.2	0.00				
DOG UNCEDE LEE AND ET/CECA	52/ 1	768 1	373.4		2-942	3. 966	1.364
RSS UNLERTOLET AND ETTSECT	0.086	0.126	0,061		2.942	3.966	1.364
KOD UNLERI . IN . MI . ANU FIZZELI	0.000						

32

TABLE 18 STATE VECTOR UNCERTAINTIES AT ASCENT BURN CUTOFF

IND	ICATI	ON JNCERT	AINTIES (INDICAT	ED - TRUE) (FEET AN	D FT/SEC) AT T	IME = 433.000 (PEL	SECS. TO NOM. AXE	5)
			ALT.	TRACK	RANGE	ALT.	TRACK	RANGE
UNCERTAINTIE	S DUE	TO GYRO	ACCELERATION SEM	SITIVE DRIFT TERMS				
AD IAX IN IT			0.0	81.6	0.0	0.000	0.441	0.000
ADIAXBURN	2.80	MERU/G	0.0	6.2	0.0	0.000	0.042	0.000
ADIAXCOMB			0.0	87.8	0.0	0.000	0.483	0.000
ADSAX INIT			0.0	0.0	0.0	0.000	0.000	0.000
ADSAXBURN	1.30	MERU/G	0.0	0.0	0.0	0.000	0.000	0.000
ADSAXCOMB			0.0	0.0	0.0	0.000	0.000	0.000
ADCAX INIT			0.0	0.0	0.0	0.000	0.000	0.000
ADDAXBURN	0.30	MERU/G	2.0	1.2	0.0	0.000	0.010	0.000
ADDAXCOMB			0.0	1.2	0.0	0.000	0.010	0.000
RSS FOR X GYR			0.0	87.8	0.0	0.000	0.483	0.000
ADIAVINIT			0.0	0.0	0.0	0.000	0.000	0.000
ADIAYBURN	1.70	MFRU/G	0.0	0.0	0.0	0.000	0.000	0.000
ADIAYCOMB			0.0	0.0	0.0	0.000	0.000	0.000
ADSAVINIT			0.0	0.0	0.0	0.000	0.000	0.000
ADSAVBUDN	1.00	MERIUG	3.8	0.0 -	1.6	0.035	0.000 -	0.008
ADSAYCOMB	1.000	HERO/ G	3.8	0.0 -	1.6	0.035	0.000 -	0.008
							0.021	
ADDAY IN IT			0.0	5.8	0.0	0.000	0.031	0.000
ADDAYBURN	0.20	MER U/G	- 0.4	0.0	0.2	- 0.003	0.000	0.001
ADDAYCOMB		3	- 0.4	5.8	0.2	- 0.003	0.031	0.001
RSS FOR Y GYR	0		3.9	5.8	1 • 7	0.035	0.031	0.008
ADIAZINIT			0.0	0.0	0.0	0.000	0.000	0.000
ADIAZBURN	2.00	MERU/G	0.0	- 1.9	0.0	0.000 -	0.004	0.000
ADI A ZC OMB			0.0	- 1.9	0.0	0.000 -	0.004	0.000
ADSA7 INIT			0.0	0.0	0.0	0.000	0.000	0.000
ADS A 7 BURN	2.00	MERU/G	0.0	0.0	0.0	0.000	0.000	0.000
ADSAZCOMB			0.0	0.0	0.0	0.000	0.000	0.000
			0.0	5.8	0.0	0.000	0.031	0.000
ADDAZBURN	0.20	MERU/G	0.0	0.1	0.0	0.000	0.000	0.000
ADOAZCOMB			0.0	6.0	0.0	0.000	0.032	0.000
RSS FOR Z GYR	20		0.0	6.3	0.0	0.000	0.032	0.000
RSS FOR ALL G	GYROŞ		3.8	88.2	1.6	0.035	0.485	0.008

TABLE 19 STATE VECTOR UNCERTAINTIES AT ASCENT BURN CUTOFF (AD TERMS)
INITIAL STABLE MEMBER MISALIGNMENTS. AND DRIFT ANGLES SUMMARY (AT TIME = 433.000 SECS.)

UNCERT.		SIGMA			MLM.	ANGLE	ABO	UT STABLE	ME	MBE	R AXES			MLM.ANGLE	ABO	JT LOCAL	VERTIC	AL AXES
300401	UNCER	VALUE			YCM			VCM			7 C M			AL T		TRACK		DANCE
	TARIE	MEMBER	MICALI	CNME	MEA			TED HITH	CVD	0 0		TE TEO	121	ALIO		IRALK		RANGE
ARTINE S	M O.A	6 MP-	MISELI	1	137 50	UNLOR	RELA	D DO	GTR	00	KIFI KA	ALC LERI	m 51	135 30		0.01		24 01
ADOUT XS		O MD		,	0.00			0.00			0.00			135039	-	0.01	-	24.01
ADOUT TS	M U • 4	N MR.			0.00			82.50			0.00			0.01		82.50		0.04
ABUUT ZSI	M (1.e.4	O MR.			0.00			0.00			82.50			14.41	-	0.04		81.23
RSS INITI	AL S.M	MLMS.		1	137.50			82.50			82.50	•		136.16		82.50		84.71
DRIFT ANG	LES SI	NCE IMU	STABL	E ME	MBER	REALI	GNME	NT (ALIGN	ED	40	MINS.	BEFORE	BURN	IGNITION)				
NBDX	1.10	MERU			46.87			0.00)	-	0.00			46.15	-	0.00		8.18
NBDY	1.30	MERU			0.00)		55.39			0.00			C.01		55.39		0.02
NBDZ	1.20	MERJ		-	0.00			0.00		-	51.13		-	8.93		0.02	-	50.34
ADIAX	2.80	MERU/G			18.52			0.00			0.00			18.24	-	0.00	-	3.23
ADSRAX	1.30	MERU/G			0.00			C. 0C			0.00			0.00		0.00		0.00
ADDAX	0.30	MERU/ G			0.77			0.00			0.00			0.76	-	0.00	-	0.13
ADIAY	1.70	MERU/G			C.00)		0.00			0.00			0.00		0.00		0.00
ADSRAY	1.00	MERU/G		-	0.00			2.59	÷,		0.00		-	0.00	-	2.59	-	0.00
ADDAY	0.20	MERU/G		-	0.00			1.32			0.00			0.00		1.32		0.00
ADIAZ	2.00	MERU/G			0.00	~		0.00			5.19			0.90	_	0.00		5.11
ADSRAZ	2.00	MERU/G			0.00			0.00			0.00			0.00		0.00		2.00
ADDAZ	0.20	MERU/G			0.00		-	0.00			1.06			0.18	-	0.00		1.04
ADIXX	0.6	MERU/GS	Q		0.08			0.00			0.00			0.07	-	0.00	_	0.01
ADSYY	0.6	MERU/GS	Q	-	0.00			0.66			0.00			0.00		0.66		0.00
ADIZZ	0.6	MERU/3S	Q	-	0.00)		0.00		-	0.66		-	0.11		0.00	-	0.65
RSS DRIFT	ANGLE	(ARCS E	CS•)		50.40			55.47			51.41			50.43		55.47		51.38
OVERALL R	SS MLM	ARCSE	CS.)	1	146.45	;		99.42			97.21			145.20		99.42		99.07
OVERALL R	SS MLN	. (MR.)		C	.7100			0.4820			0.4713			0.7039		0-4820		2.4803

TABLE 20 S. M. MISALIGNMENTS AND DRIFTS AT ASCENT BURN CUTOFF

PERIGEE =	TUDES 9.026 N.MI.	**************************************	**** NS	**************************************	***** T TIM	******** E = 0 H	**** R , 7	******** MIN, 13.	**************************************	**************************************	** *****
APOGEE= 4	5.598 N.MI.	***********	****	******	*****	******	*****	*****	****	********	*******
ORB. ANGLE TO	D PERIGEE = 342	2 DEG.			PERIG	EE ALTIT	UDE D	UE TO ONE	AND THREE SIG	MA POS. + NEG	.IMU ERRS.
								(IN	FEET)		
UNCERT.	ONE SIGMA	ONE SIGMA		DEVIATIO	INS IN	PERIGEE		EVIATIONS	IN PERIGEF	ANGLE TO PE	RIGEE (DEG)
SOURCE	UNCERTAINTY	PRESENT ALT.		DUE TO 1	SIG	THU FRRS.	с Г	UF TO 3 9	TG.TMU FRRS.	EDR 3 SIG.	IMU FRRS.
0001102		UNCERT .		NEG		POS		NEG	POS	NEG	POSe
INTTINI STAL		ICOMENTS LUNCOR	REI	TED WITH	GVED	DRIFT PAT	E TER	MS I	1000		
ABOUT YSM	0.56 MR.	- 0.1132		0.0069	0110	0-0552		0.1241	0.3102	342.2665	342-2665
ABOUT VSM	0.40 MP	373.31.47		270.6901	_	322.3700		686.5610	- 1160-5778	345.9714	338.3607
ABOUT 75M	O GO MP			0 0015	_	552.0000		0.0045	- 0.0006	342 2648	342.2650
ACCELEDONETI	ED TNDIT AVIS M	TEALTCHMENTE		0.0012	_	0.0000		0.00000	- 0.0000	24202040	34202030
ACCELERUPEII	CR INPUT AKIS M	ISALI GUMENTS		12/ 005/		1/7 /01/		270 72//	171 0700	3/3 0010	240 5422
A ADUUT Y	38.0 SELS	1820 2818		130.09333		14/04914		510.1204	- 4/4.0709	343.9910	340. 3022
X ABUUT Z -	- 11.0 SEUS	0.0000		0.0000		0.0000		0.0000	0.0000	342.02049	34202049
Y ABOUT X	18.0 SEC S	- 0.0193	-	0.0036		0.0045	-	0.0085	0.0159	342.2649	342.2649
Y ABOUT Z .	- 22.0 SECS	- 0.0128		C.C004	-	0.0003		0.0012	- 0.0008	342.2649	342.2649
Z ABOUT X -	- 99.0 SECS	0.0000		0.0000		0.0000		0.0000	0.0000	342.2649	342.2649
Z ABOUT Y	0.0 SEC S	0.0000		0.0000		0.0000		0.0000	0.0000	342.2649	342.2649
ACCELEROMETI	ER BLAS LAVERAGE	E G COMPUTATION	STAF	TED 30 SE	CS. B	EFORE BUR	N IGM	ITION)			
ACBX	0.050 CM/S.SQ	- 214.7420	-	86.6512		78.2580	-	284.9582	209.4304	340.7510	343.7938
ACBY	0.040 CM/S. SQ	- 0.0299		0.0030		0.0037	-	0.0069	0.0131	342.2649	342.2649
ACBZ	0.050 CM/S.SQ	- 30.7029		8.6640	-	8.9339		25.2272	- 27.6603	342.5201	341.9862
ACCELEROMETE	ER SCALE FACTOR	UNCERTAINTIES									
SELLX	34.0 PPM	18-9334 -		1.7516		1.7245	-	5-3363	5.0922	342.3514	342,1785
SELLY	19-0 PPM	0-0000		0.0000		0.0000		0.0000	0.0000	342.2649	342.2649
SEU7	25.0 PPM	4.4557 -		2.5173		2-5040		7.5924	7.4723	342.2048	342.3240
CYPO BIAS DI	DIET IS M. ALICI	NED 40 MINS BE	Eng	BURN TO	ITTON	200040		103744	10 112 5	54202040	JALOJLAU
NEDVINIT	1.1 MEDII	- 0.0607	TUN	0.0069	41 11 014	0.0110	-	0.0099	0.0450	362,2650	342,2650
NODATNI	101 MERU	T0_0021		0.0013		0.0014		0.0036	0.00430	342 2600	242 2660
NOUXDURN (40 ARUSESOURIE	0.0031	_	0.0077		0.0120	-	0.0030	0.0544	346 2047	242 2697
NBUXCUMB	SINCE Somo ALIGN	1 - 0.9434	-	0.0077		0.0129	_	0.0013	0.0344	34202001	34202000
		040 00.4				1-0 -001			500 4405		
NBDYINIT	1.3 MERU	212.3341		165-4565	-	182.5034		446.2469	- 599.6485	344.3984	340.0672
NBDYBURN (54 ARCSEC . DR IF	1.5. /53/		25.7009	-	25.8799		16.5662	- 78.1769	342.4870	342.0426
NBDYCOMB	SINCE S.M. ALIGN	228.0880		189.4211	-	210.1401		507.3791	- 693.8128	344.6162	339.8411
				- Kinger							
NBDZINIT	1.2 MERU	- 0.0244		0.0007	-	0.0005		0.0027	- 0.0010	342.2648	342.2649
NBDZBURN (51 ARCSEC.DRIF	r- C.0010		0.0000		0.0000		0.0001	- 0.0001	342.2649	342.2649
NBDZCOMB	SINCE S.M. ALIGN) - 0.0253		0.0008	-	C.0006		0.0029	- 0.0011	342.2648	342.2649
GYRD ACCELE	RATION SENSITIV	E DRIFT (RSS OF	UNCE	RTAINTIES	S DUE	TO ADIA,	ADSRA	AND ADDA	UNCERTAINTIES	FOR EACH GY	RO)
ADX-TERMS	2.8, 1.3, 0.3 M	/G 0.0193		0.0038		C. 0047		0.0087	0.0167	0.0000	0.0000
ADY-TERMS	1.7, 1.0, 0.2 M	/G 3.8570		7.2828		7.2702		21.8859	21.7733	0.0000	0.0000
ADZ-TERMS	2.0, 2.0, 0.2 M.	/G 0.0014		0.0003		0.0003		0.0008	0.0008	0.0000	0.0000
3 - SIGMA PI	ERIGEE ERROR (I	MU CNLY)					- 1	,600.0000) (99.86 % CDN	FID. THAT PER	IGEE ERROR
									WILL BE MORE	PJS.THAN TH	IS FIGURE)

TABLE 21 PERILUNE DEVIATIONS FOR COAST FOLLOWING ASCENT BURN CUTOFF

TRUE UNCERTAINTIES (TRUE - INDICATED) AT TIME = 0 HR, 2 MIN, 18.970 SECS (138.970 SECS)

UNCERT. ONE SIGMA	POSITION (REL.TO	UNCERTAINTIES TRUE AXES AT	IN NCM.TI	FEET		VELOCITY U	UNCERTAINTIES	IN NOM	FT/SEC
SOURCE UNCERTAINTY	ALT.	TRACK		RANGE		ALT.	TPACK		RANGE
INITIAL STABLE MEMBER MISALIGNM	FNTS (JNCOR	RELATED WITH	GYRO DR	IFT RATE TERM	S)				
ABOUT XSM 0.20 MR.	0.0	- 1.2	**	0.2	-	C.001	- 0.026	-	0.006
ABOUT YSM 0.20 MR	40.2	2.3		2.3	-	0.606	0.033		0.044
ABOUT ZSM 0.20 MR	2.8	- 39.2	-	8.4	-	0.053	- 0.589	-	0.126
ACCELEROMETER INPUT AXIS MISALI	GNMENTS								
X ABOUT Y 45.0 SECS	2.2	- 0.3		1.3		0.002	- 0.006		0.029
X ABOUT Z 10.0 SECS	0.0	0.0		0.0		0.000	0.000		0.000
Y ABOUT X - 4.0 SECS	0.0	0.1		0.0		0.000	0.003		0.001
Y ABOUT 7 - 26.0 SECS -	1.7	- 24.7	-	5.3	-	0.034	- 0.371	-	0.080
7 ABOUT X 8-0 SECS	0.0	0.0		0-0		0.000	0.000		0.000
Z ABOUT Y 0.0 SECS	0.0	0.0		0.0		0.000	0.000		0.000
ACCELEDOMETED BLAS INVEDAGE C.C.	CMPHTATION	STARTED 30 SEC	C. BEE	DE BURN TONT		0.000	0.000		0.000
ACRY 0 110 CM/S SO	0.8	- 10.8	53 ° 51.1	50 2	I LON I	0 078	- 0.127		0.590
ACBY C-060 CM/S-S0	1.0	27.4		5.0		0.031	0.321		0.069
	27 5	- 24	-	1 1		0.444	0.022		0.013
ACCELEDOMETED SCALE EACTOD UNCE	DTAINTIES	- <u><u><u></u></u></u>		1.01		0.444	- 0.020	-	0.013
ACCELERUMETER SCALE FACTUR UNCE	RIAINTIES	0 (2 7		0.00/	0 000		0.043
SFUX 14-0 PPM	0.0	- 0.0		2.01		0.004	- 0.009		0.041
SFUT 25.0 PPM	0.0	0.0		0.0		0.000	0.000		0.000
SFUZ 64.0 PPM	0.4	1).()		0.0		0.009	- 0.001		0.000
CYDO DIAC ODIET IC M ALICAED	120 MINC D	FEDDE DUEN TO	TTCMA						
STRU DIAS DRIFT (S.M. ALIGNED	120 MINS. D	CFURE DURN IGT	V1 / 1 / N/	1 0		0.007	0 103		0.022
NBUXINII 1.5 MERU -	0.2	- 4.0	_	1.0	-	0.006	- 0.103	-	J.022
NBUXBURN (165 ARCSECS.DRIFT	0.0	() • ()		0.0		0.000	- 0.001		0.000
NBDXCOMB SINCE S.M.ALIGN)-	0.2	- 4.6	-	1.0		0.006	- 0.105	-	0.022
NBDYINIT 2.4 MERU -	253.1	14.7		14.8	-	3.820	0.209		0.278
NBDYBURN (264 ARCSECS.DRIFT-	1.7	0.1		0.1	-	0.039	0.002		0.003
NBDYCOMB SINCE S.M. ALIGN)-	254.8	14.8		14.9	-	3.858	0.211		0.282
NBDZINIT 1.1 MERU -	8.0	- 113.1	-	24.2	-	0.154	- 1.701	-	0.363
NBDZBURN (121 ARCSECS.DRIFT-	0.1	- 0.8	-	0.2	-	0.001	- 0.017	-	0.004
NBDZCOMB SINCE S.M. ALIGNI-	8.0	- 113.9	-	24.3	-	0.156	- 1.719	-	0.367
GYRD ACCELERATION SENSITIVE DRI	FT (RSS OF	UNCERTAINTIES	DUE TO	ADIA, ADSRA,	AND	ADDA DRIFT	UNCEPTAINTIES	FOR	EACH GYRD
ADX-TERMS 2.2, 1.3, 0.5 M/G	0.0	0.0		0.0		0.000	0.001		0.000
ADY-TERMS 4.1, 3.7, 0.4 M/G	0.2	0.0		0.0		0.004	0.000		0.000
ADZ-TERMS 2.4. 1.3. 0.5 M/G	0.0	0.2		0.0		0.000	0.005		0.001
GYRO ACCELERATION SQJARED SENSI	TIVE DRIFT								1000000
ADIXX 0.6 MERU/GSQ	0.0	0.0		0.0		0.000	0.000		0.000
ADSYY 0.6 MERJ/GSO	0.0	0.0		2.0		0.000	0.000		0.000
ADIZZ 0.6 MERJ/GSQ	0.0	0.0		0.0		0.000	0.000		0.000
RSS IMU UNCERT.	260.8	127.4		59.1		3.935	1.902		0.771
RSS TKG.UPDATE UNCERT.	1,023.0	706.8		1,001.3		3.913	3.224		1.940
PSS INCEPT (ET AND ET (SEC)	1.055.7	718-2		1.003-0		5. 549	2.742		2 099
RSS UNCERT IN MT AND ET/SECT	0,173	0.118		0.165		5.549	3.743		2.088
NJJ UNCENT OTNOMI OAND FIJJELI	00213	V. 110		0.0102		10177	20142		20000

INITIAL STABLE MEMBER MISALIGNMENTS AND DRIFT ANGLES SUMMARY (AT TIME = 138.970 SECS.)

UNCERT	ONE	SIGMA		MLM. AM	NGLE AB	OUT STABL	E MEMBE	R AXES			MLM.ANGLE	ABO	UT LOCAL	VERTI	CAL AXES
SUUKLE	UNCE	RI • VALJE				ARC-SECS	•						APC-SECS	•	
				XSM		YSM		ZSM			ALT.		TPACK		RANGE
INITIAL	STABLE	MEMBER M	ISALIGN	MENTS (U	NCORREL	ATED WITH	GYRO D	RIFT RA	TE TERMS)						
ABOUT	XSM O.	20 MR.		41.25		0.00		0.00		-	0.62		8.69	-	40.32
ABOUT	YSM 0.	20 MR.		C.00		41.25		0.00		-	2.84		40.23	-	8.63
ABOUT	ZSM O.	20 MR.		0.00	-	0.00		41.25		-	41.15		2.64		1.21
RSS INI	TIAL S.	M. MLMS.		41.25		41.25		41.25			41.25		41.25		41.25
DRIFT A	NCLES S	INCE IMU	STABLE	MEMBER RE	ALIGNM	ENT CALIG	NED 120	MINS.	BEFORE BU	RN I	GNITION)				
NBDX	1.50	MERJ		165.57		0.00		0.00		-	2.52		34.89	-	161.84
NBDY	2.40	MERU		C.00		264.92		0.00		-	18.24	-	258.41	-	55. 42
NBDZ	1.10	MERU	-	0.00	-	0.00	~	121.42			121.12	-	7.78	-	3.57
ADÌAX	2.20	MERU/G	-	3.12	-	0.00		0.00			0.04	-	0.65		3.05
ADSRAX	(1.80	MERU/G		0.00		0.00	-	0.00		-	0.00		0.00	-	0.00
ADOAX	0.50	MERU/G	-	0.03	-	0.00		0.00			0.00	-	0.00		0.03
ADIAY	4.10	MERU/G		0.00	-	0.00		0.00			0.00		0.00		0.00
ADSRAY	3.70	MERU/G		0.00		0.23	-	0.00		-	0.01	-	0.22	_	0.04
ADDAY	0.40	MERU/G	-	0.00	-	0.56	-	0.00			0.03		0.55		0.11
ADIAZ	2.40	MERU/G	-	0.00	-	0.00		0.15			0.15	-	0.00	-	0.00
ADSRAZ	1.30	MERU/G	-	0.00		0.00	-	0.00			0.00	-	0.00	-	0.00
ADOAZ	0.50	MERU/G		0.00		0.00		0.71	-	-	0.70		0.04		0.02
ADIXX	0.6	MERU/GSQ	°.	0.58		0.00		0.00		-	0.00		0.12	-	0.57
ADSYY	0.6	MERU/GSQ		0.00		0.00	-	0.00		-	0.00	-	0.00	-	0.00
ADIZZ	0.6	MERU/G SQ	-	0.00	-	0.00	-	0.00			0.00	-	0.00	-	0.00
RSS DRI	FT ANGL	E (ARCSEC	S .)	165.60		264.92		121.42			122.51		260.88		171.13
OVERALL	RSS ML	M. (ARCSEC	S.)	170.67		268.11		128.24			129.27		264.12		176.03
OVERALL	RSS ML	M. (MR.)		0.8274		1.2998		0.6217			0.6267		1.2805		0-8534

TABLE 23 S. M. MISALIGNMENTS AND DRIFTS AT TEL CUTOFF

					****	****	****	****	*****	****	****	* * * * * * * * * *	*****	*****	*******
						UNCERTA	INTIE	SIN (A	TTIME	= 0 HR	, 2	MIN, 18.9	70 SEC (1	38.970 SECS1)	
	OT	CALC	C T CHA		****	********	*****	*****	******	*******	* * * *	****	******	*********	*******
COUR	CE CE	UNCER	TATAL		10	ERIIAL	. 7	INERTIAL	1	NERIIAL	F	UEL CONC		AT THIECT +20	LURKELI .
2008	UE	UNCER	AIN	I I		GHI PAIR	1	VELUCITY	Д	ZIMUTH	F	UEL CUNS.	LUIJFF IIMF	AT INJECTOTEU	NEC
					ANG	LE (DES)		(FI/SEL)		(DEG))		(100.)	1350301	PUS •	NEGO
INIT	IAL ST	ABLE M	EMBER	MISA	LIGNME	NTS UNC		ATED WITH	GYRO DR	IFT RATE	TFR	MS)			
ABO	UT XSM	1 0.2	O MR			0.0000		0.0057	-	0.0002		0.0152 -	0.0002	0.0293	0.0293
ABO	UT YSM	1 0.2	O MP		-	0.0042		0.0082		0.0002		0.0217	0.0003	0.8744	0.8744
ABO	UT ZSM	1 0.2	C MR.			0.0003		0.1286	16.7 ×	0.0041	-	0.3415 -	0.0050	0.6612	0.6612
ACCF	LEROME	TER IN	PUT A	XIS M	ISALIC	NMENTS					-				
XA	BOUT Y	45.	O SEC	S		0.0000		0.0287		0.0000		0.0762	0.0011	0.0805	0.0806
XA	BOUT Z	10.	O SEC	S		0.0000	-	0.0002		0.0000	-	0.0004	0.0000	0.0005	0.0005
YA	BOUT	(- 4.	O SEC	S		0.0000		0.0006		0.0000		0.0015	0.0000	0.0029	0.0029
YA	BOUT	7 - 26.	O SEC	S	-	0.0002	-	0.0815	-	0.0026		0.2164 -	0.0032	0.4174	0.4174
ZA	BOUT	X 8.	O SET	S		C. 0000		0.0000		0.0000		0.0000	0.0000	0.0002	0.0002
ZA	BOUT Y	r 0.	O SEC	S		0.0000		0.0000		0.0000		0.0000	0.0000	0.0000	0.0000
ACCE	LEROME	TER BI	AS (VERAG	E G CC	MPUTATIC	IN STA	RTED 30 SE	CS. BEF	ORE BURN	IGN	ITION)			
AC B	X	0.11	O CM	15.50		0.0003		0.5933		0.0009		1.5758	0.0232	1.6756	1.6756
ACB	Y	0.06	O CM	5.50		0.0002		0.0706		0.00?2		0.1874	0.0023	0.3577	0.3577
ACB	Z	C.08	0 64/	15.50		0.0031		0.0132	-	0.0002		0.0352	0.0005	0.6842	0.6842
ACCE	LEROME	ETER SC	ALEF	ACTOR	UNCER	TAINTIES	5								
SEU	X	14.	O PP	4		0.0000		0.0415	-	0.0001		0.1102	0.0016	0.1169	0.1169
SFU	Y	25.	O PP	4		0.0000		0.0000		0.0000		0.0001	0.0000	0.0001	0.0001
SFU	Z	64.	O PP	4		0.0001		0.0003		0.0000		0.0007	0.0000	0.0128	0.0128
GYRO	BIAS	DRIFT	(S. M.	ALIG	NED 12	O MINS.	BEFOR	F BURN IGN	ITION)						
NBD	XINIT	1.	5 MER	RU.		0.0000	-	0.0225	-	0.0007	-	0.0598 -	0.0009	0.1155	0.1155
NBD	XBURN	(165 A	RCSEC	.DRIF	Т	0.0000	-	0.0003		0.0000	-	0.0008	0.0000	0.0015	0.0015
NBD	XCOMB	SINCE	S.M.	ALTGN)	0.0000	-	0.0228		0.0007	-	0.0606 -	0.0009	0.1171	0.1171
NBD	YINIT	2.	4 MET	U	-	0.0254		0.0522		0.0015		0.1386	0.0020	5.5090	5.5090
NBD	YBURN	(264 A	RCSEC	DRIF	Τ-	0.0003		0.0010		0.0000		0.0027	0.0000	0.0539	0.0539
NBD	YCOMB	SINCE	S.M.	ALIGN) -	0.0266		0.0532		0.0015		0.1413	0.0021	5.5628	5.5628
NBD	ZINIT	1.	1 MER	2U		0.0009	-	0.3712	-	0.0118		0.9858 .	- 0.0145	1.9092	1.9092
NBD	ZBURN	(121 A	RCSEC	.DRIF	т	0.0000	-	0.0038	-	0.0001	-	0.0100 .	0.0001	0.0196	0.0196
NBD	ZCOMB	SINCE	S .M.	ALIGN) -	0.0009	-	0.3749		C.0119	-	0.9958	- 0.0147	1.9288	1.9288
GYRO	ACCEL	ERATIO	N SEM	SITIV	E DRIF	T (PSS C	F UNC	ERTAINTIES	DUE TO	ADIA, A	DSRA	AND ADDA	UNCERTAINTIE	S FOR EACH GYR	0)
ADX	-TERMS	5 2.2.	1.8,	0.5 M	I/G	0.0000		0.0003		0.0000		0.0008	0.0000	0.0015	0.0015
ADY	-TERMS	5 4.1,	3.7,	0.4 M	/G	0.0000		0.0001		0.0000		0.0003	0.0000	0.0060	0.0060
ADZ	- TERMS	\$ 2.4,	1.3,	0.5 M	/G	0.0000		0.0011		0.0000		0.0029	0.0000	0.0058	0.0058
RSS	IMU UM	NCERT.				0.0272		0.7262		0.0132		1.9287	0.0284	6.2836	6.2836
RSS	TKG.UF	DATE U	NCERT	Γ.		0.0297		2.0933		0.0222		5.5600	0.0820	11.4000	11.4000
RSS	UNCERT	AINTIE	S			0.0402		2.2156		0.0258		5.8850	0.0867	13.0170	13.0170

TABLE 24 VELOCITY CORRECTION AND OTHER UNCERTAINTIES AT TEL CUTOFF

TRUE UNCERTAINTIES (TRUE - INDICATED) AT TIME = 0 HR, 8 MIN, 44.000 SECS (524.000 SECS)

	POSITION	UNCE	RTAINTIES	ICH	N FEET	POSITION	UNCER	TAINTIES	IN	ARC-MINS .
	ALT	J IRU	TDACK	NLP	DANCE	ALT.	0 140	IATITUDE	non	LONGITUDE
THETTAL STADLE MENDED MISALICANEN	ALI.		TED HITH C	VDG	POTET DATE TEDMI	ALIO		LATITUDE		LUNGITUDE
ADDUT YOM O 20 M2	15 TUNCU	ARCLA	702 5		LRIFT RATE TERM.	0 000		0 130	-	0.003
	0.0	-	172.2	_	20 2	0.000		0.001		0.005
ADDUT TSM 0.20 MR.	0.0		1 770 5		2902	0.000	-	0.001	_	0.005
ASUUL ZSM U.S.U MR.	NENTC.	-	1 11 900	_	41.00	0.00		0.292	-	0.000
AUGELERUMETER INPUT AXIS MISALIGN	MENIS		1 - 1		701 5	0 000		0 002		0 120
A ABOUT Y 45.0 SHUS	1.1		1001	-	(80.)	0.000	-	0.002	-	0.000
X ABUUT Z JOOU SECS	0.0		0.0		2.0	0.000		0.000		0.000
Y ABOUT X - 4.0 SECS	0.0		1 100		1.4	0.000	-	0.013		0.000
Y ABOUT $Z = 26.0$ SECS	0.0	68D	1,121.6		20.1	0.000		0.184	-	0.003
Z ABOUT X 8.0 SECS	0.0		0.0		0.9	0.000		0.000		0.000
Z ABOUT Y 0.0 SECS	0.0		0.0		0.0	0.000		0.000		0.000
ACCELEROMETER BIAS (AVERAGE & CCM	PUTATION	STAR	TED 600 SE	CS.	BEFCRE REACHING	400,000 FEET)				
ACBX 0.110 CM/S.SQ	0.0	-	34.8		1,818.8	0.000		0.005		0.318
ACBY 0.060 CM/S.SQ	0.0	-	1,069.6	BCs.	19.6	0.000		0.176		0.003
AC 87 0.080 CM / S. SQ	0.0	-	12.3		798.6	0.000		0.002		0.140
ACCELEROMETER SCALE FACTOR UNCERT	AINTIES									
SFUX 14.0 PPM	0.0		2.2		113.1	0.000		0.000	-	0.020
SFUY 25.0 PPM	0.0		1.1		0.0	0.000		0.000		0.000
SFUZ 64.0 PPM	0.0		1.5	-	106.6	0.000		0.000	-	0.019
GYRD BIAS DRIFT (S.M. ALIGNED 22	5 MINS.	BEFOR	E REACHING	6 400	0,000 FEET)					
NBDXINIT 1.5 MERU	0.0		5,842.7	-	140.4	0.000		0.959	-	0.021
NBDXBURN (316 ARCSECS.DRIFT	0.0	-	96.8		0.0	0.000		0.016		0.000
NBDXCOMB SINCE S.M. ALIGN)	0.0	-	5,939.4		140.4	0.000		0.975	-	0.021
NBDYINIT 2.4 MERU	0.0		35.1		343.8	0.000	-	0.006		0.060
NBDYBURN (505 ARCSECS.DRIFT	0.0		5.9	-	28.8	0.000	-	0.001	-	0.005
NBDYCOMB SINCE S.M. ALIGN)	0.0		41.0		31.5.0	0.000	-	0.007		0.055
NBDZINIT 1.1 MERU	0.0	-	9.609.4	-	221.1	0.000		1.577	-	0.033
NBDZBURN (231 ARCSECS.DRIET	0.0		122.6		0.5	0.000		0.020		0.000
NBD7COMB SINCE S.M. ALIGN)	2.2	-	9.731.0	-	220.6	0.000		1.598		0.033
GYRD ACCELERATION SENSITIVE DRIET	IRSS OF	UNC F	RTAINTIES	DUE	TO ADIA. ADSRA.	AND ADDA DRIF	UNCI	PTAINTIES	FOR	EACH GYRD)
ADY-TERMS 2.2. 1.8. 0.5 M/G	0.0	0,10 0	301.7	0.01	0.4	0.000		0.050		0.000
ADY-TERMS 4.1. 3.7. 0.4 N/C	0.0		1.7		51.0	0.000		0.000		0.009
AD7-TERMS 2.4. 1.3. 0.5 M/G	0.0		243.0		1.2	0.000		0-040		0.000
CVDC ACCELEDATION SOLADED SENSITI	VE DRIFT		2. 1. 2. 0. 1			· · · · · · · · · · · · · · · · · · ·		00010		00000
ADTYY O. 4 MEDII/CCO	0.0	_	285.4	_	1.1	0.000		0.047		0.000
ADENY O & MED L/CCO	0.0		0.5	_	15.0	0.000		0.000	-	0.003
ADTT 0.6 MERU/050	3.3	_	100.0		2.2	0.000		0.017		0.000
AJIZZ U.O MERUJUSW	5.1					0.000		0.011		0.0000
RSS IMU UNCERT.	0.0		11,841.2		2,183.1	0.000		1.944		0.381
DCC THE HOLATE INCEDT	0 0		1.164 5		612.7	0-000		0.000		0.000
KOO INGOULATE JNUERTO	U e U		2120400		01201			0.40000		0.0000
RSS UNCERT (FT AND MINUTES) RSS UNCERT (N.MI.AND MINS.)	0.000		11,898.2		2,267.7	0.000		1.944		0.381
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39

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TABLE 25 POSITION UNCERTAINTIES AT DROGUE PARACHUTE DEPLOY

INDICATION UNCERTAINTIES (INDICATED - TRUE) AT TIME = 0 HR, 8 MIN, 44.000 SECS (524.000 SECS)

	POSITION	UNCERTAINTIES	IN FEET	VELOCITY	UNCERTAINTIES	IN FT/SEC
UNCERT. ONE SIGMA		(REL. TO NOM.	AXES)		(REL. TO NOM.	A XES)
SOURCE UNCERTAINTY	ALT.	TRACK	RANGE	ALT.	TPACK	RANGE
INITIAL STABLE MEMBER MISALI	GNMENTS (JNCO)	RRELATED WITH	GYRO DRIFT RATE TEL	RMS)		
ABOUT XSM 0.20 MR	12.7	793.5	19.1	- 0.032	3.596	0.074
ABOUT YSM 0.20 MR.	2,151.3	- 3.0	- 29.2	8.129	- 0.028	0.933
ABOUT ZSM C.20 MR.	10.2	1,779.5	41.0	0.032	5.519	0.113
ACCELEROMETER INPUT AXIS MIS	ALIGNMENTS					
X ABOUT Y 45.0 SECS	384.9	- 15.1	786.5	1.367	- 0.068	3.564
X ABOUT Z 10.0 SECS -	14	0.0	- 2:0	- 0.004	0.000	- 0.002
Y ABOUT X - 4.0 SECS -	0.2	- 77.0	- 1.4	- 0.001	- 0.349	- 0.006
Y ABOUT Z - 26.0 SECS	2.7	1,121.6	20.7	0.010	3.479	0.064
Z ABOUT X 8.0 SECS -	2.8	0.0	0.9	- 0.008	0.000	0.002
Z ABOUT Y C.O SECS	0.0	0.0	0.0	0.000	0.000	0.000
ACCELEROMETER BLAS (AVERAGE	G COMPUTATION	STARTED 600 S	ECS. BEFORE REACHIN	NG 400,000 FEFT)		
ACBX C.110 CM/S.SO -	908.9	24.8	- 1.818.8	- 2.077	0,050	- 2.642
ACBY 0.060 CM/S-SO	3.1	1.069.6	19.6	0.008	1.584	0.029
ACB7 C-080 CM/S-S0	1.978.1	12.3	798.6	4-525	0, 021	- 1,225
ACCELEROMETER SCALE EACTOR II	NCERTAINTIES	1.4.4.2		40020	00 021	2.062.2
SELLY 14 0 DDM	56.3	- 2.2	113.1	0.200	- 0.007	0.350
	0.0	- 11		0.000	- 0.007	0.000
SEU7 200 PPM	0.0	- 1+1	1000	0.000	- 0.002	0.000
SFUZ 64.0 PPM -	20103	- 1.00	100.0	- 1.210	- 0.007	0.482
CHOO DIAC DRIFT (C. H. ALICA		SECORE DEACUTA	0 (00 000 FFFT			
GTRU BIAS URIFT (Some ALIGN	ED 225 MINS.	BEFURE REACHIN	G 400,000 FEED			0.517
NBDXINII 1.5 MERU -	93.4	5,842.7	140.4	- 0.236	26.419	0.547
NBDXBURN (316 ARCSECS.DRIF	3.8	96.8	0.0	0.004	0.619	0.011
NBDXCOMB SINCE S.M. ALIGN)-	89.6	5,939.4	140.4	- 0.232	27.097	0.559
NBDYINIT 2.4 MERLI	25,343,7	- 35.1	- 343.8	95.766	- 0.339	10,995
NEDVELIEN / 505 ARCSECS DRIE	T 322.1	- 5.9	28 - 8	1,597	- 0.059	0-451
NBDYCOMB SINCE S.M. ALTONI	25.672.7	- 41.0	- 315.0	97.363	- 0.398	11.446
HUDTCOND SINCE SEMEMETONY	20101201	- <u>-</u>	51,500	31.505	0.570	116440
NBDZINIT 1.1 MERU	55.1	9.608.4	221.1	0.173	29.799	0.606
NBDZBURN (231 ARCSECS.DRIF	T- 0.9	122.6	- 0.5	0.002	0.497	0.009
NBDZCOMB SINCE S.M. ALIGN)	54.2	9.731.0	220.6	0.175	30.296	0.616
GYRO ACCELERATION SENSITIVE	DRIFT (RSS OF	UNCERTAINTIES	DUE TO ADIA. ADSR	A. AND ADDA DRIFT	UNCERTAINTIES	FOR EACH GYRO
ADX-TERMS 2.2. 1.8. 0.5 M	16 12.6	301.7	0.4	0.005	1.911	0.040
ADY-TERMS 4.1. 3.7. 0.4 M	16 422.9	1.7	51.0	2.196	0.017	0.761
AD7-TERMS 2.4. 1.3. 0.5 M	16 1.4	243.0	1.2	0,012	1.034	0,041
CYPO ACCELEDATION SOLAPED SE	NSTTIVE DRIET	245.00	L	0.012	70034	0.011
ADTYY 0.6 MEDI/CCO	0.0	285.4	1, 1	- 0.002	1,737	0.037
ADSVV 0.4 MEDIL/CSO	125 /	- 0.5	15.0	0.662	- 0.005	0 227
ADITI 0.6 MERII/CSO	12304	100.0	2.2	0.010	0.639	0.029
ADIZZ D.6 MERJ7GSQ	0.4	LUDe 5	2 • 2	0.010	0.430	0.040
RSS IMU UNCERT.	25,862.7	11,679.8	2,182.4	97.886	41.453	12.441
RSS TKG.UPDATE UNCERT.	283.0	1,164.5	613.7	0.681	1.991	0.385
	0.5					
RSS UNCERT. (FT AND FT/SEC)	25,864.2	11,737.7	2,267.1	97.888	41.501	12.447
NJS UNCERTAINAND FIZELI	40200	1.901	0.515	7 10 300	710 201	1 2 0 44 1

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40

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TABLE 26 INDICATED STATE VECTOR UNCERTAINTIES AT DROGUE DEPLOY

Ī	NDICATI	ON JNCER	TAINTIES	(INDIC	ATED -	TRUE) (FE	EET AND	FT/SEC)	AT TI	ME =	524.	000 SE	CS.	AVEST	
				ALT.	(REL •	TRACK	AKESI	RANGE			ALT.	(DLL®	TRACK	AAL 37	RANGE
UNCERTAINT	IES DUE	TO GYRO	ACCELERA	TICN S	ENSITI	VE DRIFT	TERMS								
ADIAXINIT ADIAXBURN ADIAXCOMB	2.20	MERU/G		0.0 12.6 12.6		0.0 300.4 300.4		0.0			0.000 0.002 0.002		0.000 1.901 1.901		0.000 0.039 0.039
ADSAXINIT ADSAXBURN ADSAXCOME	180	MERU/G		0.0	-	0.0 1.4 1.4	-	0.0 0.1 0.1			0.000		0.000 0.011 0.011		0.000 0.000 0.000
ADDAX IN IT ADDAXBURN ADDAXCOMB	0.50	MERU/G		0.0 0.7 0.7		0.0 27.6 27.6		0.0 0.3 0.3	al.	-	0.000 0.004 0.004		0.000 0.198 0.198		0.000 0.006 0.006
RSS FOR X G	YRO			12.6		301.7		C.4			0.005		1.911		0.040
ADIAYINI ADIAYBURN ADIAYCOME	4•10 3	MERU/G		0.0 25.9 25.9		0.0 0.1 0.1	- 	0•0 6•7 6•7			0.027 0.027		0.000 0.001 0.001	-	0.000 0.027 0.027
AD SA Y IN I 1 AD SAY BURN AD SAYC OME	70 3.70	MERU/G	-	0•0 405•7 405•7		0.0 1.6 1.6	_	0 • 0 49• 6 49• 6		-	0.000 2.122 2.122		0.090 0.017 0.017	-	0.000 0.745 0.745
ADOAY IN IT ADOAY BURN ADOA YC OMB	r N 0.40	MER U/ G		0.0 116.8 115.3	_	0 • 0 0 • 4 0 • 4		0.0 9.8 9.8			0.000 0.557 0.567	, <u> </u>	0.000 0.004 0.004		0.000 0.152 0.152
RSS FOR Y (GYRO			422.9		1.7		51.0			2.196		0.017		0.761
ADIAZINI ADIAZBURN ADIAZCOM	r 1 2•40 3	MERU/G		0.9 0.9	-	0.0 211.7 211.7	-	0.0 1.0 1.0		-	0.000 0.012 0.012	-	0.000 0.913 0.913	-	0•000 0•040 0•040
AD SAZINI ADS AZBURN ADS A ZCOME	T 1.30	MERU/G	-	0.0 0.1 0.1	-	0 • 0 7 • 2 7 • 2	-	0.0 0.3 0.3			000.00 000.0 000.0	-	0.000 0.003 0.003		0.000 0.000 0.000
ADOAZ IN IT ADOAZBURN ADOAZBURN	r N 0.50 3	MERU/G	-	0 • 0 1 • 0 1 • 0		0.0 119.0 119.0	-	C•0 0•4 0•4			0.001 0.001 0.001		0.000 0.484 0.484		0.000 0.011 0.011
RSS FOR Z	GYRO			1.4		243.0		1.2			0.012		1.034		0.041
RSS FOR ALL	GYROS			423.2		387.3		51.0			2.197		2.173		0.763

TABLE 27 INDICATED STATE VECTOR UNCERTAINTIES AT DROGUE DEPLOY (AD TERMS)

INITIAL STABLE MEMBER MISALIGNMENTS AND DRIFT ANGLES SUMMARY (AT TIME = 524.000 SECS.)

42

U	NC FRT.		NE S	I GMA			MLM.	ANGLE	ABO	UT STABL	E MEN	MBE	RAXES			MLM.ANGLE	ABOU	ARC-SECS.	VERTI	CAL AXES
2	UUKUE	UN	LCRI	• VALUE			XSM			YSM	•		ZSM			ALT.		TRACK		RANGE
T		STAR	LE M	EMBER	TLAZIM	GNME	NTS (INCOR	RFLA	TED WITH	GYR	ם ה	RIFT RAT	E TEPMS)					
1	ADDIT	VCM	C-20	MD	110 - 1 1		41.25	5 100.00		0.00	-	-	0.00		-	17.10		0.72	-	37.53
	ADOUT	VCM	0 20	MD			0.00			41.25			0.00			0.08		41.24		0.76
	ABOUT	N21	0.20	MR.			0.00)		0.00			41.25			37.53		0.24	-	17.10
	MJ COI	2011																		
R	SS INI	TJAL	S.M.	MLMS.			41.25			41.25			41.25			41.25		41.25		41.25
D	RIFT	ANGLES	S IN	CE IMU	STAPL	E ME	MBER	REALI	GNME	NT 225 M	INS.	BE	FORE REA	CHING 4	00,00	O FEET				
-	NBDX	1.	50	MERU		3	15.53	3	-	0.01		6.5	0.00		-	130.83		5 • 53	-	287.07
	NBDY	2.	40	MERJ			0.01			504.86		-	0.00			0.99		504.77		9.28
	NBDZ	1.	10	MERJ			0.00)		0.00		-	231.40		-	210.57	-	1.34		95.93
	ADTAY	2	20	MEDILC			30- 87	,		0.00			0.00		-	12.80		0.54	-	28.09
	ADSDA	× 1	80	MERIT/G			0.00	2		0.00			0.00			0.03		0.00		0.08
	ADOAX	0.	50	MERU/G			4.41	Í	-	0.00			0.00		-	1.83		0.07	-	4.02
																				0.00
	ADIAY	. 4 .	10	MERU/G			0.00)		0.21			0.00			0.00		0.21		0.00
	ADSRA	Y 3.	70	MERU/ G	;	-	0.00)		32.69			0.00		uno.	0.05		32.69		0.079
	ADDAY	0.	40	MERU/G			0.00)		5.61		873	0.00			0.00		5.61		0.10
							0.00			0.00			21 21			19.30		0.12	-	8.79
	ADIAL	2 4	40	MERUIC			0.00		_	0.00			0.06			0.06		0.00	-	0.02
	AUSKA	2 .	50	MERUIS			0.00	,		0.00		_	7.01			6.38		0.04		2.90
	ADUAZ	0.	50	MERU/G	,		0.00	.)		0.00			1.01			0.00				
	ADTXX	0	-6 M	FRU/GS	0		27.31	8	-	0.00			0.00		-	11.35		0.48	-	24.92
	ADSYY	(-6 M	ERU/35	0		0.00			10.10			0.00			0.02		10.10		0.18
	ADIZZ	. (.6 4	ERU/35	Q		0.00	0		0.00	a 2 - 9		10.09		-	9.19	-	0.05		4.18
R	SS DR	IFT AM	IGLE	ARCSE	(5.)	3	18.25	5		506.05			232.69			249.51		506.00		305.34
													22/ 22			252.93		507.67		308.11
(VERAL	LRSS	MLM.	(ARCS E	CS .)	3	120.9	1		507.73			230.32			1 2240		2.6612		1.4037
C	VERAL	L RSS	MLM.	(MR.)		٦	.5555	3		2.4615			101451			102200		C 0 401 3		A 0 77 J I

TABLE 28 S. M. MISALIGNMENTS AND DRIFTS AT DROGUE DEPLOY

SECTION B

POWERED LANDING PGNCS ERROR STUDY

TABLE OF CONTENTS FOR SECTION B

S	ection												Page
	1	SUMMARY											47
	2	GENERAL INFORMATION											47
	3	SIMULATION RESULTS .								·			47
	4	REFERENCES											55

IMU ERROR SENSITIVITIES FOR APOLLO 15^{*} POWERED LANDING MANEUVER

1. <u>SUMMARY</u>

Data are presented on the sensitivity of the position and velocity estimation errors during the powered landing maneuver to various IMU measurement errors. The most important point to be seen from these results is that the sensitivities of the down-range and cross-track position errors to accelerometer-bias errors are significantly lower than in the preceding flights, where DOI was performed by the LM about one-half orbit period prior to PDI.

2. GENERAL INFORMATION

Error-sensitivity data have been presented for the Apollo 12 powered-landing maneuver in Refs. (1) and (2). The particular error sources considered here were IMU alignment, gyro drift-rate bias, accelerometer bias, and accelerometer scale-factor.

In the preceding landing missions the DOI maneuver was performed by the LM approximately one-half orbit period prior to PDI. Under these conditions it was not reasonable to assume that LM state-estimation errors introduced during the DOI maneuver would be corrected by subsequent MSFN and landmark-tracking data. A N69 update was used in Apollo 12 to correct down-range position errors.

In Apollo 15 on the other hand, the DOI maneuver will be performed by the CM prior to separation at about 20 hours prior to touchdown. MSFN and landmark-tracking data taken during the orbits subsequent to DOI will be used to update the LM state-vector estimates. Under these conditions, only the powered-landing thrusting maneuver affects the landing-maneuver sensitivity to LM IMU errors (the DOI thrusting maneuver need not be considered here).

3. SIMULATION RESULTS

The basic error-sensitivity data are summarized in Tables 1-11 for the different IMU errors. In interpreting these results, the following points should be noted:

1.) Zero time is taken as the time that the throttle-up command is normally issued during the braking phase (i.e., TIG + 33.5 seconds).

^{*}Except for several minor additions to the text, this section is identical to the information presented in MIT/CSD lab report E-2491 issued for Apollo 13.

- 2.) The last alignment of the IMU prior to PDI occurs about 1800 seconds before the start of the DOI maneuver.
- 3.) The state-vector estimation-error components referred to in the various tables are all expressed in stable-member coordinates.
- 4.) Landing-radar dropout-boundary models developed by D. Dyer of MSC (Ref. 3) were used in the simulation results. The effect here is to cause the altitude updating to start at about 300 seconds after TFTP (TIG + 33.5 seconds), and the velocity updatings at about 400 seconds. The corresponding acquisition altitudes are about 30,000 and 15,000 feet. Since Apollo 12 flight data have indicated acquisitions at altitudes greater than 35,000 feet, the results of this memo will tend to be high.
- 5.) Since LR altitude-data updatings start at about 300 seconds, the sensitivities of RXP to IMU errors are not shown after these times. Likewise, data for VXP, VYP and VZP error sensitivities are not given for times greater than 400 seconds, which was the typical time that LR velocity updating was started in the study.
- 6.) In cases where the error sensitivities were significantly different from the Apollo 12 results, the Apollo 12 sensitivity (Refs. 1 and 2) is shown in parentheses for comparison.

The important results are shown in Tables 4 and 6. It can be seen from Table 4 that the sensitivity of down-range position to X-accelerometer bias has been reduced from about 6.2 X 10^5 ft/fps² to about 3×10^3 ft/fps². Likewise, from Table 6 it can be seen that the sensitivity of down-range position to Z-accelerometer bias has been reduced from about 1.1×10^6 ft/fps² to about 1.2×10^5 ft/fps².

A list of appropriate conversion factors are shown below:

10^{+3} ft/fps ²		33.3 ft/cm/sec 2
10^{+3} fps/fps ²		33.3 fps/cm/sec 2
10^{+2} ft/(deg/hr)	=	1.5 ft/meru
10^{+2} fps/(deg/hr)	=	1.5 fps/meru
10^{+2} ft/(percent)	=	10^{-2} ft/ppm
10^{+2} fps/(percent)	=	10 ⁻² fps/ppm

TABLE 1 SM X-AXIS ALIGNMENT

		ft/mr			fps/mr	
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5 S	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0
0		≈ 0			≈ 0	
100		-62			-1.2	
200		-237			-2.3	
300		-528			-3.5	
400		-950			-4.7	
640	,	-1100				

TABLE 2 SM Y-AXIS ALIGNMENT

Apollo 12 values in parentheses

		ft/mr			fps/mr	
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5 S	0 (-86)	≈ 0	0 (-300)	0 (0.21)	≈ 0	0 (-0.06)
0	0 (-80)		0 (-300)	0.03 (0.30)		-0.01 (-0.06)
100	51		-11 (-315)	1.01 (1.3)		-0.17 (-0.18)
200	209 (173)		-27 (-330)	2.14 (2.4)		-0.09 (-0.10)
300	488 (460)		-25 (-327)	3.45 (3.6)		0.17 (0.19)
400			29 (-260)	4.78 (5.0)	¥ ····	0.60 (0.65)
640			98 (-185)			

TABLE 3 SM Z-AXIS ALIGNMENT

		ft/mr			fps/mr	
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5 S	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0
0		≈ 0			≈ 0	
100		13			0.19	
200		30			0.10	
300		30			-0.16	
400		-10			-0.58	
640		-80				

TABLE 4 X-AXIS ACCELEROMETER BIAS

Apollo 12 values in parentheses

	10^{+3} ft/fps ²			10^{+3} fps/fps ²		
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5	0 (75)	-0	0 (593)	0 (-0.44)	0	0 (0.19)
0	0 (61)		0 (600)	0.03 (-0.42)		0 (0.18)
100	9 (23)		0 (615)	0.13 (-0.34)		0 (0.13)
200	28 (-5)		0 (625)	0.23 (-0.27)		0 (0.07)
300	57 (-21)		0 (630)	0.34 (-0.17)		0 (0.01)
400		¥	1 (627)	0.44 (-0.06)	•	0 (-0.05)
640			3 (620)			

LANDING MANEUVER ERROR SENSITIVITIES

TABLE 5Y-AXIS ACCELEROMETER BIAS

	10^{+3} ft/fps ²			10^{+3} fps/fps ²		
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5 S	0	0	0	0	0 (-0.10)	0
0		0			0.02 (-0.06)	
100		8 (1)			0.12 (0.03)	
200		26 (8)			0.22 (0.12)	
300		53 (26)			0.32 (0.22)	
400	•	91 (55)	v	V	0.41 (0.32)	V
640		122 (84)				

TABLE 6Z-AXIS ACCELEROMETER BIAS

Apollo 12 values in parentheses

	1	0 ⁺³ ft/fps	2	10) ⁺³ fps/fp	s ²
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5 S	0 (-139)	0	0 (836)	0 (-0.64)	0	0 (0.45)
0	0 (-160)		0 (850)	0 (-0.67)		0 (0.46)
100	1 (-232)		8 (902)	0 (-0.75)		0.12 (0.51)
200	1 (-310)		26 (950)	0 (-0.83)		0.22 (0.53)
300	2 (-398)		53 (1008)	0 (-0.91)		0.32 (0.55)
400			90 (1050)	0 (-0.93)		0.41 (0.56)
640			121 (1084)			

-	10 ⁺² ft/(deg/hr)			10^{+2} fps/(deg/hr)		
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5	0	0	0	0	0	0
0		0			-0.01	
100		-13			-0.26	
200		-54			-0.48	
300		-125			-0.87	
400		-232			-1.18	
640		-309				

TABLE 7 X-AXIS DRIFT RATE

TABLE 8 Y-AXIS DRIFT RATE

	10 ⁺² ft/(deg/hr)			10 ⁺² fps/(deg/hr)		
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5	0 (-7)	0	-26	0 (0.01)	0	0
0	0 (-6)		-26	0 (0.02)		0
100	8 (14)		-29	0.27		-0.04
200	52		-34	0.57		-0.02
300	125	¢	-32	0.91	-1	0.04
400		V	-15	1.24		0.16
640						

TABLE 9 Z-AXIS DRIFT RATE

	10^{+2} ft/(deg/hr)			10 ⁺² fps/(deg/hr)		
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5	0	0	0	0	0	0
0	0	0			0	
100	1	3			0.04	
200	1	7			0.03	
300	2	6			-0.04	
400		-4			-0.16	
640		-23				

TABLE 10X-ACCELEROMETER SCALE FACTOR

Apollo 12 values in parentheses

	10^{+2} ft/(percent)			10^{+2} fps/(percent)		
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5	0 (1.4)	0	0 (11)	0 (-0.001)	0	0
0	0 (1.2)		0 (12)	0 (-0.001)		
100	0 (-0.7)		0 (12)	-0.01 (-0.02)		
200	0 (-3)		0 (12)	0 (-0.02)		
300	0 (-4)		0 (12)	0.01 (0.007)		
400			0 (12)	0.05		
640			0 (12)			

TABLE 11

Z-ACCELEROMETER SCALE FACTOR

Apollo 12 values in parentheses

	10^2 ft/(percent)		10^2 fps/(percent)			
Time	RXP	RYP	RZP	VXP	VYP	VZP
-33.5 S	0 (-11)	0	0 (65)	0 (-0.05)	0	0 (0.04)
0	0 (-12)		0 (65)	0 (-0.05)		0 (0.03)
100	1 (-18)		-4 (65)	0 (-0.05)		-0.10 (-0.06)
200	1 (-24)		-20 (54)	0 (-0.06)		-0.21 (-0.16)
300	2 (-30)		-47 (27)	0 (-0.07)		-0.33 (-0.30)
400			-87 (-13)	0 (-0.07)		-0.45 (-0.43)
640			-115 (-44)			

REFERENCES

- 1. Kriegsman, B., and D. Gustafson, "Error Analysis for LM Navigation System During Powered-Landing Maneuver - Apollo 12 Trajectory", MIT Charles Stark Draper Laboratory, Mission Simulation Memo #31-69, October 20, 1969.
- 2. Grant, F., S. Helfant, and B. Kriegsman, "Mission H1 G&N Error Analysis", MIT Charles Stark Draper Laboratory, Report E-2454, October 1969.
- 3. Cox, K., "Preliminary Update of the Simplified LR Operating Boundary Model", MSC Memo #EG23-68-279.

SECTION C

G&N SYSTEMS AND INERTIAL COMPONENT PERFORMANCES

TABLE CF CONTENTS FOR SECTION C

Section			Pa	ge
1	GYR	D DRIFT TEST POSITIONS	. 6	0
2	G&N	MISSION RELIABILITY ANALYSIS	6	1
3	CM &	LM MISALIGNMENT DATA	6	2
4	CM I	MU	6	5
	a.	IRIG and PIPA Performance Tabulation	6	6
	b.	Standard Deviations of the IRIG and PIPA Parameter Uncertainties	8	5
	с.	Proposed Gyro and Accelerometer Performance Compensations	8	5
5	LM I	MU	8	6
	a.	IRIG and PIPA Performance Tabulation	8	7
	b.	Standard Deviations of the IRIG and PIPA Parameter Uncertainties	10	9
	c.	Proposed Gyro and Accelerometer Performance Compensations	10	9
6	DICT	IONARY OF TERMS	11	0

GYRO DRIFT TEST POSITIONS FOR SUNDANCE, LUMINARY, COLOSSUS, AND ON

STABLE MEMBER POSITION	STABLE MEMBER ORIENTATION	HORIZONTAL DRIFT	VERTICAL DRIFT
1	X DOWN Y SOUTH Z WEST	NBDY-ADOAY	
2	X DOWN Y WEST Z NORTH	+ NBDZ - ADOAZ	-NBDZ + ADIAX
3	X SOUTH Y WEST Z NORTH	NBDX - ADOAX	
4	X EAST Y SOUTH Z DOWN	+ NBDY + ADSRAY	+ NBDZ + ADIAZ
5*	X WEST Y UP Z NORTH	+ NBDZ - ADSRAZ	
6*	X SOUTH Y DOWN Z EAST	+ NBDX + ADSRAX	- NBDY+ADIAY
7	X NORTH Y UP-WEST Z UP-EAST	- NBDX + (ADSRAX $/\sqrt{2}$)	
8	X EAST Y UP-NORTH Z UP-SOUTH	(-NBDZ -NBDY)/√2 + (ADIAZ - ADIAY)/2 + (ADSRAY+ADSRAZ)/2	
9	X UP-EAST Y UP-WEST Z SOUTH	- NBDZ + (ADSRAZ/ $\sqrt{2}$)	
10	X UP-NORTH Y UP-SOUTH Z EAST	(NBDY - NBDX) / /2 + (ADIAY - ADIAX) / 2 + ADSRAX / 2	
11	X NORTH Y WEST Z UP	- NBDX - ADOAX	
12	X UP Y SOUTH Z EAST	+ NBDY + ADOAY	
13	X UP Y EAST Z NORTH	+ NBDZ + ADOAZ	

 * Positions 5 and 6 are lab test only

G & N MISSION RELIABILITY ANALYSIS FAILURE RATES EXPRESSED IN ''FAILURES PER 10⁶ HOURS''

		IMU Assembly		IMU Electronics (PSA)		Optics Assembly		Optics Electronics (PSA)		IMU CDU		AGC		DSKY		D&C		Mission Reli ability
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON OFF	ON	OFF	ON	OFF	ON	OFF	
OPER HRS	295	-	295	-	42	-	42	-	295	-	295 -	295	-	295	-	295	-	0.8018
λ	129	10.2	110	6.3	94	-	77	-	155	-	91 -	235	60.3	2.3	-	2.3	-	
OPER HRS	12.5	161.0	12.5	-	12.5	-	12.5	-	12.5	-	12.5-	12.5	-	12.5	-	12.5	-	0.9887
λ	129	1.6	110	-	38	-	1.33	-	155	-	112 -	235	-	110	-	1.2	-	
OPER HRS	13.8	55.6	13.8	55.6	9.1	60.3	9.1	60.3	13.8	55.6	13.8 55.	5 13.8	55.6	13.8	55.6	13.8	55.6	0.9840
λ	129	10.2	110	6.3	94	-	77	-	155	-	91 -	235	60.5	2.3	-	2.3	-	
OPER HRS	3.25	66.3	3.25	66.3	3.25	-	3.25	-	3.25	-	3.25 -	3.25	-	3.25	-	3.25	-	0.9969
λ	129	1.6	110	-	38	-	1.33	-	155	-	112 -	235	-	110	-	1.2	-	
	OPER HRS λ OPER HRS λ OPER HRS λ OPER HRS λ OPER HRS λ	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c } & IMU \\ Assembly \\ \hline ON & OFF \\ \hline OPER HRS & 295 & - \\ \hline \lambda & 129 & 10.2 \\ \hline OPER HRS & 12.5 & 161.0 \\ \hline \lambda & 129 & 1.6 \\ \hline OPER HRS & 13.8 & 55.6 \\ \hline \lambda & 129 & 10.2 \\ \hline OPER HRS & 3.25 & 66.3 \\ \hline \lambda & 129 & 1.6 \\ \hline \end{tabular}$	$\begin{tabular}{ c c c c c } \hline IM U \\ Assembly \\ \hline IM U \\ Assembly \\ \hline IM \\ Electric (PS \\ ON \\ OFF \\ \hline ON \\ OFF \\ \hline OPER HRS \\ \lambda \\ 129 \\ 10.2 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 1.6 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 10.2 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 1.6 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 1.6 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 1.6 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 1.6 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 1.6 \\ 110 \\ \hline OPER HRS \\ \lambda \\ 129 \\ 1.6 \\ 110 \\ \hline OPER HRS \\ 129 \\ 1.6 \\ 100 \\ 100 \\ \hline OPER HRS \\ 129 \\ 1.6 \\ 100 \\ 100 \\ \hline OPER HRS \\ 129 \\ 1.6 \\ 100 \\ 100 \\ \hline OPER HRS \\ 120 \\ 100 \\ 00 \\ 00 \\ 00 \\ 00 \\ 00 \\ $	$\begin{tabular}{ c c c c c } & IMU \\ Assembly & IMU \\ Electronics \\ (PSA) \\ \hline \\ ON \\ OFF & OFF \\ \hline \\ OPER HRS & 295 & - & 295 & - \\ \hline \\ \lambda & 129 & 10.2 & 110 & 6.3 \\ OPER HRS & 12.5 & 161.0 & 12.5 & - \\ \hline \\ \lambda & 129 & 1.6 & 110 & - \\ OPER HRS & 13.8 & 55.6 & 13.8 & 55.6 \\ \hline \\ \lambda & 129 & 10.2 & 110 & 6.3 \\ OPER HRS & 3.25 & 66.3 & 3.25 & 66.3 \\ \hline \\ \lambda & 129 & 1.6 & 110 & - \\ \hline \end{tabular}$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ $	$ \begin{array}{ $	$ \begin{array}{ $



PIPA Misalignments from Ideal Stable Member Axes

(Angle in Sec)

Term	LM-IMU 12	CM-IMU 48
α _{XY}	+38	+45
$^{\alpha}$ XZ	-11	+10
$^{\alpha}$ YZ	-22	-26
α _{YX}	+18	-4
$^{\alpha}$ ZX	-99*	+8

DEFINITION OF POSITIVE SENSE

PIPA INPUT-AXIS MISALIGNMENTS

with respect to

IDEAL STABLE MEMBER AXES

* Waivered: ACSK-C1248



Gimbal Axis Orthogonality Errors and Outer Gimbal Misalignment from Casemounting Axes

	(Angle in	Sec)
Term	LM-IMU 12	CM-IMU 48
ϵ IGA	+30	-10
ϵ MGA	- 8	+6
[€] FLY	+13	+8
$\epsilon_{\rm FLZ}$	-8	-15

DEFINITION OF POSITIVE SENSE GIMBAL AXIS ORTHOGONALITY

and

OUTER GIMBAL ALIGNMENT with respect to CASE MOUNTING ALIGNMENT



IRIG Misalignments from Ideal Stable Member Axes

(Angle in Sec)

Term	LM-IMU 12	CM-IMU 48
$\gamma_{\rm XY}$	-31	-13
$\gamma_{\rm XZ}$	+19	-69
γ_{YZ}	-31	+43
$\gamma_{\rm YX}$	-19	+1
γ_{ZX}	-27	-97
γ_{ZY}	-11	+37

Block II G & N DEFINITION OF POSITIVE SENSE IRIG INPUT-AXIS MISALIGNMENTS with respect to IDEAL STABLE MEMBER AXES MISSION J1 AS-510/CM 112 G&N 217 IMU S/N 48

IRIGS

PIPAS

Х	Ξ	8A119		Х	=	2AP232
Y	=	8A117		Y	=	2AP265R
Z	=	8A125		Ζ	п	2AP179

NASA 8A-119 ACE H-5229 LAST UPDATE 06/17/71 PAGE 24

NASA TEMP MAX THERM SUS SUS XER AVG SD WH THERM PAD XER BIAS TRUE RES ACC SENS SD R CAP SG CAP TG FUNC RDT RDT HRS SG TG RES R + -25JE69 0.4 691.9 .0505 167 4.5 471 TST IMU GEN WHEEL ADIA DELSF+ DELSF- RDT HOURS I+ I- ID ADOA DATE LIC TYP ASSN SYS ADSRA NBD 28MY69 A45 CSS C121 29MY69 A41 CSS (-9.2)(-1.9)(-3.1)C116 - 3.9 **REF H5229** 29MY69 SG 84.3, 68.7, 58.2, TG 53.8, 68.3, 79.3 - 3.8 4JE69 A44 CSS (-12.9)(-1.9)(-0.6)167 - 1.9 (-11.1) (0.3) (- 0.2) 169 9JE69 A44 CSS 10JE69 A44 CSS 168 12JE69 COMP SELECT - 28 - 123 168 85.001 85.000 12JE69 A45 CSS 16JE69 COMP VERIE 72 75 167 85.001 85.000 10JE69 A45 CSS 17JE09 DEMO T/F = 1191.2 17JE69 A45 CSS 62 - 38 167 85.001 85.000 17JE69 VIB IA ALIGN = -0.918JE69 A45 CA1 0.1 - 3.4 - 2.8 - 0.3 - 3.1 - 5.7 307 109 85.000 84.999 - 2.8 18JE69 A45 CA2 0.2 - 2.9 - 2.4 174 18JE69 A45 CA3 20JE69 A45 CB1 - 0.1 - 3.4 - 8.0 - 0.1 - 3.5 - 8.1 85.000 84.999 - 4.7 383 112 20JE69 A45 CB2 169 0.0 - 3.8 - 6.5 20JE69 A45 CB3 22JE69 A45 CC1 2.0 - 3.5 - 5.0 1.5 - 3.0 - 9.0 17 85.000 85.000 - 1.4 22JE69 A45 CC2 220 157 471 22JE69 A45 CC3 1.6 - 3.2 - 8.5 25JE69 NO WAIVERS REQD M/0 TO 0814 UNIT INSTALLED IN IMU S/N 48X.REPLACING 7C-153 1.9 - 2.7 184 374 85.009 3.2 74069 A03 SPO X 48 74069 A03 SPD X 48 2.2 - 4.9 C122 8AU69 A03 SPU X 48 8AU69 A03 SPO X 48 C125 C123 530 84469 A03 SPO X 48 0.9 - 1.2 294 3.5 35E69 A03 SPO x 48 85.002 240 - 10.2 35F69 AC3 SPO X 48 618 0.4 160C69 IMU S/N 48 SHIPPED TO KSC 18NG69 IMU S/N 48 RETURNED TO AC/MKE. 20N069 A01 SPO X 48 3.7 - 4.9 3.7 - 7.9 451 594 C121 85.011 3.6 20NU69 A01 SPO X 48 C122 695 20NU69 A01 SPO X 48 20N069 MILLIWATT IS LESS THAN 2 MW. THROUGHOUT.
 5FE70 A03 SP0 X 48
 - 0.2
 - 14.8

 5FE70 A03 SP0 X 48
 - 0.1
 - 5.8
 3.6 394 541 85.015 6FE70 A03 SPD X 48 12FE70 NO FLUID TRANSIENTS APPARENT IN GRAVITY TRANSIENT TEST. 16FE 70 DATA AFTER WEEKEND STORAGE WITH & DA DOWN FOLLOWS (DIAG 381). 16FE70 A03 SCK X 48 1.0 - 13.4 17FE70 DATA AFTER OVERNIGHT STORAGE WITH X DA UP FOLLOWS. 17FE70 A03 SCK X 48 2.4 - 11.7 18FE70 DATA AFTER OVERNIGHT STORAGE WITH X SRA DOWN FOLLOWS . 18FE70 A03 SCK X 48 4.5 - 8.1

1023 - 14 - 3

		NASA 8A-1	19	ACE	H-5229	LAST	UPDATE	06/1	7/71 PAGE	25
	TST THUL GEN									
DATE LOC	TYP ASSN SYS	NBD	ADSRA	ADIA	DEL SE+	DEL SE-	ROT HOURS	I+	I- ID	ADOA
19FE70 DAT	A AFTER OVERNIG	HT STORAGE	WITH X	SRA UP	FOLLOWS .					
19FE70 A03	SCK X 48	1.2		- 7.9			823			
16MR70 INU	SIN 48 SHIPPED	FROM AC/M	KE TO KS	C.						
12MY70 IMU	S/N 48 SHIPPED	FROM KSC	TO AC/MK	E.						
19MY70 A03	SPO X 48	4.1		- 12.2						
19MY70 A03	SPO X 48	3.8	- 7.2				C121			3.5
22MY 70 A03	SPO X 48	4.1		- 10.6		244				2 7
22MY 70 A03	SPO X 48	4.3	- 6.9		284	361		85.008		3.1
27MTTO NU	FLUID IRANSIENI	5 APPARENI	DURING	GRAVIIT	IKANSIE	11 1521.	0.00			
2/44/0	C (1) (0 CUI 8050	500H 45 4H	NE TO NO				929			
TJL TO INU	SIN 48 SHIPPED	FRUM AC/M	KE TU NK	•						
ISJETO INC	SIN 48 INSTALL	ED IN CH-I	12 IGEN	21().	150	100				
TIAUTO NSC	GEN X 48 217	4.0	- 0.3	- 8.7	079	478	1002			
STAUTU NSC	GEN & 40 217						1002			
310070 NSC	GEN X 40 217	5 1	6 7	0.3	44.4	614	1008			
LENUTU NSC	GEN A 40 211	Del		- 7.3	000	210				
9DE 70 IMU	SIN 48 SHIPPED	FRUM NK I	U DECCU/	NKE.						
4MR 71 AU3	SPU X 48	0.9	6 0	- 10.9						2.0
SMD 71 A02	SPU A 40	1.0	- 0.0		76.1	741		85 017		2.7
7Mp 71 NO	ELUID TRANSFENT	S DETECTED	OUR INC	CP AVITY	TRANSIEN	T TEST		03.011		
OMD 71 TMI		EROM DELC	OLMKE TO	KCC.	INANJICH	11 1231.				
104071 140	48 CEN 217 INC	TALLED IN	CM-112	KJC.						
23MP 71 KOR	GEN X 48 217	1.0	- 10.4	- 5.5	976	680				4.2
134071 KJR	GEN X 48 217	1.4	- 8.0	- 11.0	986	491				5.3
13AP71 KOB	GEN X 48 217	1.7	0.00		100	475				4.1
194P71 K18	GEN X 48 217	2.3								4.4
194P71 KOR	GEN X 48 217	2.0								4-4
194P71 K38	GEN X 48 217	2.5								4.1
19MY71 K94	GEN X 48 217	- 0.1	- 6.9	- 12.1						4.5
10JE71 K94	GEN X 48 217	0.5	- 7.1	- 12.6						4.5
RE	TEST DATA AI	FTER LAU	NCH TO	WER	STRUCK	BY	IGHTNIN	16		
19 JETI KYA	GEN X 43 217	28	- 7.4	-11.5	-					44



G & N 217, CM 112, IMU 48, APOLLO IRIG 8A119, X AXIS

NASA TEMP MAX THERM SUS SUS XFR AVG SD WH THERM PAD XFR BLAS TRUE RES ACC SENS SD R CAP SG CAP TG FUNC RDT RDT HRS SG TG RES R + -21MY69 0.6 723.6 .0500 154 2.6 459 TST IMU GEN WHEEL DATE LOC TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF- RDT HOURS I+ I-ID ADUA 18AP69 A45 CSS C107 18AP 69 A45 CSS (15.3) (2.6) (- 2.2) 11.3 C 98 **REF H5218** 18AP69 SG 84.6, 70.1, 56.0 TG 55.8, 69.2, 84.6 22AP69 A44 CSS (14.1) (0.3) (- 3.8) 150 9.7 9.8 294P69 444 CSS 150 (14.5) (0.4) (-0.9)1MY69 A44 CSS 153 5NY69 COMP SELECT - 159 - 120 151 85.002 85.003 5MY69 A44 CSS 7MY69 COMP VERIF S/F REPADDED DUE TO A HIGH IN SPEC TM - COUNT 7MY69 A44 CSS - 373 - 72 84.997 84.996 7MY69 COMP RESELECT 7MY69 A44 CSS 321 - 96 155 85,002 85,002 7MY69 COMP REVERIF 7MY69 A44 CSS 324 - 55 84.997 84.997 7MY69 DENO 7MY69 A44 CSS 289 - 137 154 84.997 84.998 8MY69 VIB 9MY69 EQUIPMENT MALFUNCTION - SERVO ABORTED 0.2 3.7 3.4 9MY69 A44 CA1 84.995 84.995 11.6 9MY69 A44 CA2 0.2 3.6 4.4 106 - 287 9MY69 A44 CA3 0.7 4.0 4.9 156 12MY69 A44 CB1 1.4 3.2 1.3 - 1.5 12MY69 A44 CB2 1.5 3.0 176 - 362 84.993 84.994 10.1 155 12MY69 A44 CB3 - 0.5 1.4 3.0 15NY69 A45 CC1 1.0 3.2 5.4 31 - 318 85.002 85.001 11.8 15MY69 A45 CC2 0.9 3.1 4.6 158 459 15MY69 A45 CC3 1.0 3.0 4.8 UNIT INSTALLED IN IMU S/N 48Y, REPLACING 7C-188 40 - 351 85.008 1.6 1.9 7AU69 A03 SPD Y 48 0.4 - 0.1 7AU69 A03 SPO Y 48 1.2 C114 8AU69 A03 SPD Y 48 C121 8AU69 A03 SPD Y 48 8AU69 A03 SPD Y 48 C113 518 - 227 - 494 35E69 A03 SPO Y 48 0.4 5.6 85.001 0.6 0.9 2.4 606 35E69 A03 SPO Y 48 160C69 IMU S/N 48 SHIPPED TO KSC 18ND69 IMU S/N 48 RETURNED TO AC/MKE. 20N069 A01 SPO Y 48 2.2 8.1 174 - 240 C110 0.4 85.021 1.4 21N069 A01 SPO Y 48 1.7 C114 682 21N069 A01 SPO Y 48 21ND69 MILLIWATT IS LESS THAN 2 MW. THROUGHOUT. 0.9 - 9.8 5FE70 A03 SPO Y 48 - 7.7 5FE70 A03 SPO Y 48 1.5 6FE 70 AO3 SPO Y 48 85.016 0.0 6FE 70 A03 SPO Y 48 12FE70 NO FLUID TRANSIENTS APPARENT IN GRAVITY TRANSIENT TEST. 16FE70 DATA AFTER WEEKEND STORAGE WITH Y SRA UP FOLLOWS (DIAG. 381).

NASA 8A-117 ACE H- 5218 LAST UPDATE 06/17/71 PAGE 23 TST IMU GEN WHEEL DATE LJC TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF- RDT HOURS I+ I- ID ADDA 16FE70 A03 SCK Y 48 2.5 - 8.9 17FE70 DATA AFTER OVERNIGHT STORAGE WITH Y SRA DOWN FOLLOWS. 17FE70 A03 SCK Y 48 1.3 - 9.5 18FE70 DATA AFTER OVERNIGHT STORAGE WITH Y IA UP FOLLOWS. 4.1 1.3 18FE70 A03 SCK Y 48 0.0 - 11.4 18FE70 A03 SCK Y 48 0.7 19FE70 DATA AFTER OVERNIGHT STORAGE WITH Y IA DOWN FOLLOWS. 1.3 19FE70 A03 SCK Y 48 1.5 2.3 19FE70 A03 SCK Y 48 1.9 - 8.8 811 16MR TO INU S/N 48 SHIPPED FROM AC/MKE TO KSC. 12MY70 IMU S/N 48 SHIPPED FROM KSC TO AC/MKE. 19MY70 A03 SPD Y 48 - 1.1 - 7.4 19MY70 A03 SPO Y 48 - 4.5 C113 1.1 - 1.7 22MY70 A03 SPO Y 48 - 0.1 - 5.5 22MY 70 A03 SPO Y 48 1.1 - 0.8 - 4.2 25MY 70 A03 SPD Y 48 - 294 - 674 916 85.003 27MY70 NO FLUID TRANSIENTS APPARENT DURING GRAVITY TRANSIENT TEST. 7JL 70 IMU S/N 48 SHIPPED FRUM AC/MKE TO NR. 13JL 70 IMU S/N 48 INSTALLED IN CM-112 (GEN 217). 11AU70 NSC GEN Y 48 217 4.7 4.7 0.9 15 - 485 11AUTO ADIAY POSITION 8 - 7.0 31AU70 NSC GEN Y 48 217 990 310C70 NSC GEN Y 48 217 995 18N070 NSC GEN Y 48 217 1.3 11.4 - 0.2 130 - 34819NOTO ADIAY POSITION 8 - 4.3 9DE70 IMU S/N 48 SHIPPED FROM NR TO DELCO/MKE. 4MR71 A03 SPO Y 48 0.3 1.6 4MR 71 A03 SPO Y 48 0.5 11.2 1.6 - 160 - 407 5MR 71 A03 SPD Y 48 85.016 7MR71 ND FLUID TRANSIENTS DETECTED DURING GRAVITY TRANSIENT TEST. 8MR71 IMU S/N 48 SHIPPED FROM DELCO/MKE TO KSC. 19MR 71 IMU 48 GEN 217 INSTALLED IN CM-112. 23MR 71 KOB GEN Y 48 217 0.3 13.8 6.1 - 195 - 200 1.1 23MR 71 ADIAY POSITION 8 1.1 172 - 1141.1 13AP71 KOB GEN Y 48 217 - 1.7 14.4 -3.3 13AP71 ADIAY POSITION & 1.5 1.2 19MY71 K9A GEN Y 48 217 - 3.9 16.4 -7.0 - 1.0 19MY71 ADIAY POSITION 8 - 6.9 1.1 10JE71 K9A GEN Y 48 217 - 3.8 15.1 - 1.3 10JE71 ADIAY POSITION 8 RETEST DATA AFTER LAUNCH TOWER STRUCK BY LIGHTNING 19 JETI K94 GENY 43217 -2.9 15.2 -4.5 1.2 19 JETI ADIAY POSITION 8 -1.7

1023-14-7



G & N 217, CM 112, IMU 48, APOLLO IRIG 8A117, Y AXIS

NASA TENP MAX THERM SUS SUS XFR AVG SO WH THERM PAD XFR BIAS TRQE RES ACC SENS SD R CAP SG CAP TG FUNC RDT RDT HRS SG TG RES R + -31JL69 0.7 681.0 .0505 172 1.8 701 TST IMU GEN WHEEL DATE LJC TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF- ROT HOURS I+ I- ID ADDA 8JL 69 A41 CSS C112 8JL69 A41 CSS (- 1.5) (- 1.0) (0.1) C121 - 0.4 9JL69 SG 84.4, 69.2, 50.9 TG 54.4, 68.3, 90.4 REF H5210 11JL69 A43 CSS (- 3.2) (- 2.4) (1.1) 174 1.3 15JL 69 A43 CSS (-3.3)(-1.1)(-1.0)171 - 1.5 15JL69 A43 CSS 172 18JL 69 COMP SELECT 18JL 69 A44 CSS 259 169 84.987 84.988 - 76 22JL69 COMP VERIF 22JL 69 A44 CSS 99 84.987 84.988 18 22JL69 DEMO T/F = 1196.3 22JL69 A44 CSS - 156 - 32 174 84.988 84.988 22JL 69 VIB / COLD SOLDER JOINTS REPAIRED 22JL69 RE-VIB DA AXIS ONLY IA ALIGN = +2.75 1.3 3.2 - 7.5 23JL69 A41 CA1 23JL 69 A41 CA2 1.4 3.1 - 9.3 759 84.988 84.988 823 23JL69 A41 CA3 - 0.1 3.1 - 6.4 173 25JL69 A45 C81 - 0.2 2.5 - 10.3 25JL69 A45 CB2 - 0.2 3.6 - 9.9 711 816 85.001 85.001 25JL69 A45 CB3 - 0.9 2.9 - 8.5 174 28JL69 A45 CC1 - 0.2 3.5 - 9.1 3.5 - 10.2 28JL69 A45 CC2 - 0.2 521 734 85.001 85.000 174 701 28JL69 A45 CC3 - 0.2 3.4 - 10.4 31JL69 M/0 TO 08-14 21AU69 UNIT INSTALLED IN INU S/N 48-REPLACING 8A-120 35E69 A03 SPO Z 48 - 0.7 3.4 517 227 85.002 0.4 - 1.0 35E69 A03 SPO Z 48 - 10.4 - 1.3 9 SE 69 A03 SCK Z 48 3.0 0.8 - 1.5 789 - 11.7 9 SE 69 A03 SCK Z 48 160C69 IMU S/N 48 SHIPPED TO KSC 18NO69 INU S/N 48 RETURNED TO AC/MKE. 21N069 A01 SPO Z 48 - 2.3 - 13.1 - 2.5 - 3.5 975 651 C109 0.3 21N069 A01 SPO Z 48 85.020 21N069 A01 SPD Z 48 C123 865 21ND69 MILLIWATT IS LESS THAN 2 MW. THROUGHOUT, EXCEPT FOR TWO 4 MW. JOGS. 6FE70 A03 SPO Z 48 - 2.3 - 12-0 8.3 761 451 85.015 0.9 6FE70 A03 SPD Z 48 - 2.5 12FE70 NO FLUID TRANSIENTS APPARENT IN GRAVITY TRANSIENT TEST. 16FE70 DATA AFTER WEEKEND STORAGE WITH Z IA UP FOLLOWS (DIAG. 381). 0.2 16FE70 A03 SCK Z 48 - 4.5 8.3 17FETO DATA AFTER OVERNIGHT STORAGE WITH Z IA DOWN FOLLOWS. 17FE70 A03 SCK 2 48 - 1.4 7.7 1.3 18FE70 DATA AFTER OVERNIGHT STORAGE WITH Z SRA DOWN FOLLOWS. 18FE70 A03 SCK Z 48 - 3.3 - 11.2 0.7 18FE70 A03 SCK Z 48 - 2.7 7.9 19FF70 DATA AFTER OVERNIGHT STORAGE WITH Z SRA UP FOLLOWS.

1023-14-9

					NAS	A 8A-1	25		ACE	H-5210	LAST	UPDATE	06/1	7/71	PAGE	27
DATE	LDC	TST TYP	I MU A SSN	GEN		NBD	ADSRA		ADIA	DEL SF+	DELSF-	WHEEL RDT HOURS	1+	1-	ID	ADDA
19FE 70	A03	SCK	Z 48		-	2.8		-	12.4							
16MR 70	TMU	SUK	48	110050	-	2.8	8.0					994				0.6
12MY 70	INU	SIN	48 54	IL POED	FRU	H ALTH	KE TO KS	SC.								
19MY70	A03	SPO	1 48	ILFFED	-	3.4	IU AU/HI	Kt.	17 2							
19MY70	A03	SPO	L 48		-	2.5	5.2	-	1102			C12/				
22MY 70	A03	SPO	Z 48		-	2.0	205	-	16.6			6120				1.3
22MY 70	A03	SPO	Z 48		-	1.9	4.4		2000							
25MY70	A 03	SPO	Z 48							594	384		85.005			1.1
27MY70	NO F	LUID	TRAN	SIENT	S AP	PARENT	DURING	GR /	AVITY	TRANSIEN	T TEST.		0,000			
27MY70												1099				
1JL 70	IMU	SIN	48 SH	IPPED	FRO	M AC/M	E TO NE	۲.								
114170	UPI	SIN	48 IN	STALLE	DI	N CM-11	2 (GEN	217								
3141170	NSC	GEN	2 48	217	-	1.3 -	- 3.2	-	6.2	979	962					
310070	NSC	GEN	1 40	217								1173				
18N070	NSC	CEN	1 40	217	_							1178				
90E70	IMU	S/N	48 54	PPED	FRO		2.3	-	4.3	1030	836					
4MR 71	A03	SPO	7 48			6.7		PHPL C	2 1							
4MR 71	A03	SPO	Z 48			6.5	0.6	-	2.1							
5MR 71	A03	SPO	Z 48				0.0			1118	741		05 01 /			0.4
7MR 71	NO F	LUID	TRAN	SIENTS	DE	TECTED	DURING	GR A	VIIV	TRANSIEN	T TEST		85.016			
8MR 71	IMU	S/N	48 SH	IPPED	FRO	M DELCO	MKE TO	KS	C.	I NANDICH	1231.					
19MR 71	IMU	48 G	EN 21	7 INST	ALL	ED IN C	M-112.									
23MR 71	KJB	GEN	Z 48	217	- 3	.9 -	2.0	-	1.9	887	869					
13AP 71	KDB	GEN	Z 48	217	- 4	- 5	1.3		0.7	790	872					1.8
19471	K 9A	GEN	Z 48	217	- 4	- 8.4	3.3	-	0.1							0.6
TOJE /1	RYA	GEN	48	217		- 5	3.0	-	0.0	C	DV /					1.0
19 TE 11	1.9A	GEN	Z 42	17 41	TE	~ CAL	NCHT	OH	VER	STRUCK	BY LI	CHINING				
L'UL //		1			7		- 3.2		3.2							04


NA SA ZAP-232 SPERRY 103077-4 LAST UPDATE 06/17/71 PAGE 138

	TST IMU	GEN DELTA	16	NULL	R-IT -AL -I	HUB MAX.	TURQ MON
DATE	LOC TYP ASSN	SYS SF	BLAS	BIAS	ANGLI	E TRANS.	CURRENT
7AP66	S41 ACC	- 154		0.00			103.0326
070166	RETURNED T	U SPERKY-CAMAG	ED HARNE	S			
17JA68	KETURNED T	U AC-OUS SENSO	R				
26NU68	A48 FST	103	0.01		- 13 -	0	
16DE 68	ZAP232 ASSN	TO IMU SIN 48	* X				
20JA69	SPR A03 X 49	(- 198)	(0.44)	(0.50)			103.2469
20JA69	SPR AO3 X 48	(- 206)	1 0.401	0.471			103.2469
21 JA69	A03 SPR X 48	6	0.01	0.12			103.2420
21JA69	AFTER DEGAU	ISSING AND ADJU	STMENT				
7FE69	A03 SPD X 48	133	0.06	0.12			103.2470
ILFE 69	A03 SAL X 48			(0.18)	12	56	
17FE69	INTERMITTEN	T OPEN IN A GS	ECABLE	CAUSED P	IP GAUS	SING	
17FE69	A03 SPO X 48	(257)	(1.11)	(1.12)			103.2375
18FE69	A03 SPO X 48	(257)	(1.12)	(1.14)			103.2372
18FE69	403 SPU X 48	11	-0.41	-0.44			103.2369
18FE69	AFTER DEGAU	SSING					
19FE69	A03 SPU X 48	- 29	-0.37	-0.38			103.2375
11MR.69	A01 GEN X 43	- 90	-0.26				103.2266
12MR 64	A01 GEN X 48				- 13 -	13	
BAU69	A03 SPU X 48	- 190	0.12	0.13			103.2406
8JL 69	FU 3596. NU	LL COINCIDENCE	CHECK				
11AU69	AO3 SAL X 48			(0.15)	38	4 4	
45609	A03 SPU X 48	- 256	0.22	0.24			103-2468
45E69	AO3 SAL X 48			0.21)	42	48	
160069	IMU S/N 40	SHIPPED TO KSC					
18N069	IMU SIN 4H	SHIPPED TO AC/	MKE				
198069	AOI SPO X 48	- 262	0.33	0-12			103-2440
1 3NU69	RAN EU 3596	- NULL COINCI	DENCE CH	CK			
2110069	AO1 SAL X 48		7	0-36)	13	41	
97170	A03 SPC X 48	- 334	0-32	0.31			103-2526
9FE 70	A03 SAL X 48			0.371	20	43	10382324
16MR 70	IMU SIN 48	SHIPPED TO KSC			2.0		
124770	IMU SIN 44	RETURNED TO AC.	MKE				
25MY70	AO3 SPU X 48	- 346	0.47	0.48		0.65	101-2465
26MY70	A03 SAL X 43			0.521	14	44	10701100
7.11 70	IMU S/N 48	SHIPPED FROM A	MKE TO	NR.			
13JL 70	IMU S/N 48	INSTALLED IN C	M-112 (G	N 2171			
114470	NSC GEN X 4H	217 - 296	0.69				
114170	NSC GAL X 4H	217				0	
18N070	NSC GEN X 44	217 - 342	0.57			0	
9.74.70	LAU 43 SHIP	PEU TO MKE					
EME 71	103 SPD X 40	- 393	0.51	(1-7)		0.08	103 2163
6MH 71	AC3 SAL × 48	111	0.50	0.721	11	45	10302303
HMR 71	INUMAR SHID	PED TO KSC	,	10121			
144071	TALL 68. GEN	217. INSTALLE	IN CH-	12			
1 AMR 71	KUN LEN X LQ	/17 = 407	0.17				
1 3AD 71	KOR GEN ¥ 49	217 - 2/2	0.81				
15471	KUA LEN Y 40	217 - 246	0.02				
101571	KOA GEN X	117 - 400	6.86				
103211	RETEST DA	TA AFTER	244111	TO TO	WER	STRICK	BY LIGHTNING
19 JE71	K9A 65NX 4.7.	217 -201	0.84			- noch	
		- 594	U.SE.				

G & N 217, CM 112, IMU 48, APOLLO PIPA 2AP232, X AXIS



SCALE FACTOR DRIFT PLOTTED BY TIME



1 - G BIAS DRIFT PLOTTED BY TIME

NASA 2AP-265R

TST INU GEN DELTA 1G NULL ROT-AL-WOB MAX. TORQ HON UATE LUC TYP ASSN SYS SF BLAS BLAS ANGLE TRANS. CURRENT UNIT INTERNALLY REPAIRED, REBUILT TO P/N 2001730-2 300C68 542 ACC - 122 0.00 0.05 104.3389 REPAIRED UNIT DELIVERED TO AC-MKE 140E68 A44 FST 111 0.31 1 8 16DE 68 UNIT ASSIGNED TO IMU SIN 48 Y
 20JA69 A03 SPR Y 48
 (- 58) (0.32) (0.36)

 21JA69 A03 SPR Y 48
 - 12
 -0.01
 0.34
 104.3775 104.3709 21JA69 AFTER DEGAUSSING & ADJUSTMENT 24JA69 RESELECTION OF R13 & R14 IN CALIBRATION MODULE 7FE69 403 SPO Y 45 11FE69 PIP ADJUSTED - 10 -0.01 -0.04 (1.54) 104-3766 12FE69 A03 SAL Y 48 (-0.07) - 34 - 1013FE69 A03 SPO Y 48 83 0.03 -0.12 104.3720 17FE69 INTERMITTENT UPEN IN A GSE CABLE CAUSED PIP GAUSSING 18FE69 A03 SPU Y 48 (2011 (-0.74) (-0.76) 104.3677 18FE69 A03 SPO Y 48 (202) (-0.94) (-0.95) 104.3696 18FE69 A03 SPO Y 48 71 -0.02 -0.07 103.6760 18FE69 AFTER DEGAUSSING 19FE69 A03 SPD Y 48 32 -0.01 -0.01 104.3685 11MR 09 AOL GEN Y 46 74 -0.24 104.3609 12MR 69 A01 GEN Y 48 - 56 - 34 8AU69 A03 SPD Y 48 32 -0.04 -0.03 104.3776 8JL69 EO 3596. NULL COINCIDENCE CHECK 11AU69 A03 SAL Y 48 (-0.12) - 28 - 6 4 SE69 A03 SPD Y 48 25 -0.06 -0.07 104.3760 55E69 A03 SAL Y 48 - 27 - 6 160C69 INU S/N 48 SHIPPED TO KSC 18NU69 IMU S/N 48 SHIPPED TO AC/MKE 19N069 A01 SPO Y 48 - 23 0.04 -0.03 104.3810 19NU69 RAN ED 3596 - NULL COINCIDENCE CHECK 24N069 AUI SAL Y 48 9FE70 A03 SPO Y 48 (0.04) - 23 - 5 - 65 0.10 0.29 104.3891 96570 403 SAL Y 48 (0.04) - 18 10FE 70 A 03 SAL Y 48 - 8 16MR TO INU S/N 48 SHIPPED TO KSC 12MYTO IMU S/N 48 KETURNED TO AC/MKE 25MY70 A03 SPU Y 48 - 136 0.02 0.00 0.18 104.3826 264470 403 SAL Y 45 (-0.03) - 14 - 127JL TO IMU SIN 48 SHIPPED FROM ACIMKE TO NR. 13JL70 INU S/N 48 INSTALLED IN CM-112 (GEN 217) 114070 HSC GEN Y 48 217 - 70 -0.09 114070 NSC GAL Y 48 217 - 35 - 00 1810070 NSC GEN Y 48 217 - 131 -0.22 90ETO IMU 48 SHIPPEL TO MKE 5MR71 A03 SPO Y 4H - 198 -0.07 -0.09 0.06 104.3710 OMR 71 AOS SAL Y 45 (-0.76) - 27 - 5EMR 71 INU- ++ SHIPPED TO KSC 19ME71 1"J 48, GEN 217, INSTALLED IN CM-112 23MR 71 KUB UEN Y 45 217 - 124 -0.04 134871 KOB GEN Y 48 211 - 140 -0.12 194471 K94 GEN Y 48 217 - 175 -0.06 10JE71 KOA GEN Y 48 217 - 186 -0.12 IBJET RETEST DATA AFTER LAUNCH TOWER STRUCK BY LIGHTNING IBJET KAGENY 43 217 - 182 -0.09

78







G & N 217, CM 112, IMU 48, APOLLO PIPA 2AP265R, Y AXIS

DATE	LOC	TST TYP	I MU A S SN	SYS	DELT	A e	1G I AS		BIAS	F	OT	AN G	-WO	18	MAX. TRANS.	TOR Q MON CURRENT		
141466	\$42	ACC			-	2			0.0							103.1018		
MOU	63		64	K5		R6		R11		RI	2		R13	3	R14			
C11	.0180	b	0190	116.	25	83.75	5	3.51	7	18.	1				249			
22MR66	A48	1 6 A										2	-	8				
2 3MR 6 6	A48	IGA									-	3		5				
254044	845	LCT			- 24	,			0 20			1	- 1	2		103 (303		
194046	A-40	11 5	/117.7	IN CEN	203	1			-0.25			1	- 1	~		103.4389		
21AP66	A 01	503	7 7	IN GGN	- 3	4 -	0.0		-0 - 3 4							100 3360		
214966		FIFE	A0.1	STMENT			0.04		-0.04							100.5390		
174766	A 04	SPO	1 7	JUNEN	- 9	5	0.19		0.17							101.3889		
174766	A04	SPO	1 7		- 9	7	0.31		0.35							103-3925	1.1	BUS
184766	A04	SPU	2 7		- 7	5 -	0.01		0.01							103.3890	HI	BUS
13JE 66	A03	SAL	2 7			-			-0.56)	-	5				20303070		000
13JE66	A03	SPO	Z 7		31	9 -	0.70) .	-0.66									
17JE66	A03	SPO	2 7		- 18	3	0.81		0.84							103.3794		
171666	2	FTER	DEGA	USSING														
18JE60	A03	SPD	2 7		- 19	2	1.00		1.00							103.3916	LU	BUS
18JE66	AU3	SPO	2 7		- 15	9	0.64	,	0.66							103.3939	HI	BUS
21JE66	A03	SPO	Z 7			0	0.00		-0.01							103.3913	/	
21JE66	1	FTER	ADJI	ISTMENT.	SC	ALE F	ACTO	RE	BIAS									
21JE66	A03	SPD	2 7		1	5 -	0.02	-	-0.01							103.4040		
22JE66	A03	SPO	2 7			2	0.19	1	0.20							103.4020	LD	BUS
22JE66	A03	SPU	Z 7		2.	6 -	0.18	-	-0.17							103.4057	HI	BUS
25JE66	A 04	SPO	1 7		- 1	7	0.15		0.15							103.4026		
11JL 60	LE	M II	40 3 1	NSTALL	DIN	GEN	203	FCR	SPEC	IAL	TI	EST	ING					
11JL 66	IN	10 7	UNASS	SIGNED .	URIN	G THI	S PE	RIOL)									
114066	LE	MI	4U 3 F	MAD ERI	JM GE	N 203	• I P	10 7	REIN	STA	LLI	ED						
16AU66	A 21	SQL	2 7		5	7	1.46		1.41									
16AU66	PR	E-AC	CELE	ASELIN	DAT	A												
85E66	A 21	SQL	2 7		7	3	1.57		1.53									
8 SE 66	PC	IST	IBRAI	IUN DAT	A	-												
TOEGO	AZZ	SUL	1		10.	2	1.50	•	1.41									
TUE 06	PL	151 (LIMAI	IL BASE	LINC	7	1 0 1									103 3763		
740.7	AZL	C C L	41 91	LITNE	- 0	·	1.01									103.3/32		
IMRO/	4 21	COL	1 DA :	C LINE	- 8		1 4 7									102 3754		
ALANG	74	DITO	ACCA	TO THE	I S/N	49 7	1.446									10303134		
201469	103	500	7 44	10 10	3714	7) (0.03	3 6	0.23	1						101.3807		
111469	A 03	SPR	7 48	v	_	3 -	0.01		0.02	·						103.3716		
21.1469	AF	TFR	DEGAL	ISSING	ND A	DJUST	MENT	10										
7FEUS	A03	SPU	7 48					(1.10)								
24 1469	RE	SELE	CTICA	OF RIS	ANU	R14	. IN	CAL	ISR A	110	NP	NÜÜ	ULE					
LUFE69	A03	SAL	1 48				6 (A)	(C.03)		1						
LIFE 69	403	SPU	2 48		- (5	0.04		2.00							103.3838		
111609	PI	PAS	JUSTE	0														
13FE69	A03	SPU	1 48		160	0	0.02		0.01							103.3741		
17FE69	IP	TER	TTEM	T UPEN	IN A	CSE	CABL	FLA	WSc D	PI	P	GAU	SSI	NC				
18FE09	A03	SPO	2 48	(240	4) (-	0.81) (-	-U. 51)						103.3734		
186169	AC3	SPU	6 46		240	5) (-	0.78) (-	0.50)						103.3735		

NA SA ZAP-179

		121	- 1	E FU	96	PN .	ULL	1 A	16	NU	LL	RUI	-AL	-MOR	MAX .	TUX I	3 MOIA	
DATE	LUC	TYP	AS	SSN	SY	S	SI	F	BIAS	61	AS		ANG	LE	THANS.	CUI	RENT	
18FE69	A03	SPO	Z	48				28	-0.10	-0	.10					103	. 3724	
18FE69	AF	TER	DE	GAL	ISSI	NG												
19FE69	A03	SPO	Z	48				53	-0.07	-0	.08					103	3745	
11MR 69	AOL	GEN	Z	48			-	36	-0.10							103	.3616	
12MR 69	A01	GEN	1	48									30	- 48				
11AU69	A03	SPO	Z	48			- 13	35	-0.11	-0	. 28					103	3822	
11JL69	EO	35	96.	NL	JLL I	COIN	CIO	ENCE	CHECK									
11AU69	A03	SAL	Z	48						1-0	.11)		4					
45E69	A03	SPO	Z	48			- 14	41	-0.01	-0	.01					103	3800	
45269	A03	SAL	Z	48			-			1-0	.01)	-	6					
1600 69	IM	US	/N	48	SHI	PPED	TO	KSC										
18NU69	IN	US	/N	48	SHI	PPED	TO	AC/	MKE									
19N069	A01	SPO	Z	48			- 1	58	0.00	-0	. 22					103	3842	
19N069	RA	NE	0 3	3596	5 -	NULL	CO	INCI	DENCE	CHECK								
24N069	A01	SAL	Z	42						(0	. 21)		2					
9FE70	A03	SPO	2	48			- 10	89	-0.22	-0	.21		-			103	3928	
9FE 70	A 03	SAL	2	48						(-0	.21)		5					
16MR 70	IM	US	/N	40	SHI	PPED	TO	KSC		•								
12470	IM	US	/N	48	RET	UR NE	DI	O AC	/ MKE									
25MY70	A03	SPO	Z	48		-	- 1	57	-0.06	-0	.26				0.04	103	3747	
26MY 70	A 03	SAL	Z	48						(-0	.)7)	-	6					
7JL 70	IM	US	/N	48	SHI	PPED	FR	OM A	C/MKE	TO NR							· · ·	
13JL 70	EM	US	/N	48	INS	TALL	ED	IN C	M-112	GEN	217)							
11AU70	N SC	GEN	2	48	217		- 21	81	-0.26									
11AU70	N SC	GAL	z	48	217		-							- 62				
1 BNU 70	NSC	GEN	1	48	217		- 11	74	-0.22									
90E70	IN	U 4	8 5	HIP	PED	TO	MKE											
5MR 71	A03	SPO	2	48			- 1	90	-0.24	-0	.23				0.04	103	3762	
6MR 71	A 0 3	SAL	7	48			-			(-0	.221		8					
HMR 71	IM	U-4	8 5	HIP	PED	TO	KSC											
19MR 71	IM	U 4	8.	GEN	1 21	7. 1	NST	ALLE	DINC	M-112								
2 3MR 71	KOB	GEN	2	48	217		- (96	-0.44									
1 3AP 71	KOB	GEN	Z	48	217		- 11	12	-0.20									
19MY71	K 9A	GEN	Z	48	217		- 2	35	-0.22									
10JE71	K 9A	GEN	L	48	217		- 20	20	-0.17									
	RET	E.S	5	DA	TA	A	FTE	R	LIUN	CH	TOM	VE	R	STA	RUCK	BY	LIGHT	NING
19JET	71 K9A	6-21	VZ	48	217	-	- 1'	74	- 0.2	3								

82

G & N 217, CM 112, IMU 48, APOLLO PIPA 2AP179, Z AXIS





G & N 217, CM 112, IMU 48, APOLLO PIPA 2AP179, Z AXIS

STANDARD DEVIATION (1 °) OF THE IRIG AND PIPA PARAMETER UNCERTAINTIES USED FOR MISSION PERFORMANCE SUMMARY CM 112; IMU S/N 48

PARAMETER			
IMU Axis PIPAs Data Compilation Period (8/11/70 - 5/19/71)	Х	Y	Z
Accelerometer Bias (cm $/$ sec 2)	0.11	0.06	0.08
Scale Factor (ppm) 1) Sigma (ppm) 2) Slope (ppm/month) 3) Linear Correlation	14 -11 -0.931	25 -10 -0.781	64**
IRIGs Data Compilation Period (8/11/70 - 5/19/71)			
Bias Drift (MERU)	1.5	2.4	1.1
ADSRA (MERU/g)	1.8	3.7	1.3
ADIA (MERU/g) (8/7/69 - 5/19/71)	2.2	4.1	2.4
ADOA (MERU/g)	0.5	0.4	0.5

Data is based upon performance in the IMU. Point-to-point stability in operation is much better than the above data.

Accelerometer data taken prior to degaussing or adjustment has been excluded. The sigma values for PIPA scale factor were obtained from a least squared fit of the KSC data.

PROPOSED GYRO AND ACCELEROMETER PERFORMANCE COMPENSATIONS

PARAMETER			
IMU Axis PIPAs Accelerometer Bias (cm/sec ²)	+0.86	-0.09	-0.24
Scale Factor (Δ SF/SF ppm) IRIGs	-430	-200	-180
Bias Drift	-2.3*	-2.8	-4.6
ADSRA (MERU/g)	-7	+ 15	-2
ADIA (MERU/g)	-12	- 5	0

*NBDX compensation was selected as average NBD minus ADOA offset of 3.5. **A positive slope and poor linear correlation coefficient indicate that a least square fit of the scale factor data is not the best estimator of scale factor uncertainty. Instead, the standard deviation of the data was obtained. MISSION J1 AS-510/LM 10 G&N 614 IMU S/N 12

IRIGS

PIPAS

Χ	=	8A201	Х	Ξ	2AP172
Y	=	8A203	Y	Ξ	2AP171
Ζ	н	8A202	Z	=	2AP292

SEN	РМ S	SD	R	CAP	SG	SUS	TG	XFR FUN		RDT	SD	г	WH HR S	TH	ERM G	PAD	XF RE	R BIA S R	ST	RQE	RES		
0.	6		683.5	.0	510					135	5.	0	470										
	TCT	T MALA																					
LJC	TYP	ASS	N SYS		NB	0	AD	SRA		ADI	A	DEL	SF+	DEI	LSF-	R	DT	HOURS	I	٠	1-	ID	ADCA
A45	CSS															c	98						
845	CSS RA. 2	. 70	0.5	1	11.	1) (1.6)	(-	2.	4)			EE		CI	03					11.8	
861	2223			1	9	71 /		1 4 1	-	10	6.1			EF	124	02	2.0					10.1	
441	CSS			2	8.	5) (-	0.21	1-	8.						1	30					10.1	
441	CSS			•						0.						1	38					11.0	
COM	P SEI	LECT															30						
A43	CSS												227		153	13	37		85-	016	85-018		
COM	P VEI	RIF	AI V	ALIG	N OC)s -	UNI	T RE-	AL	GNE	D								0.20				
A43	CSS												227		75				85.	017	85.020		
DENO) T	/F =	1191	.5																			
A43	CSS												231		116	14	41		85.	016	85.018		
VIB																							
A43	CAI				0.	1	- 2	2.3	-	10.	9												
A43	CAZ				0.	1	- 2	2.7	-	11.	1		51	-	96				85.	010	85.010	10.6	
A4 3	CAS				0.	Z		2.8	-	10.	3					1.	24						
843	CBI				0.	3		3.0	-	8.	3											20.00	
A43	CBZ				1.	0	- 2	2.6	-	10.1	5 -	-	80	-	89				85.	011	85.012	13.2	
893	CBS				1.	0	- 4		-	9.	5					13	38						
843	CCI				0.	8		1.0	-	9.0	>		270										
843	662				0.	9		-1	-	10.0	-	-	210	-	441				84.	999	84.998	13.3	
ACC	E	10 1	0.001		0.	9	- :		-	Ye.	>						>1	901					
INTI		LCM	0 70	T Max	124			MC A	6-1	0													
A07	sen	x 1:	, 10	-	0.	S	LACI			6.0	c.												
407	SPO	¥ 1	5		0.	-	- 1			40.						610	11						
MO F	LUI	TR	INSTE	NTS		RAVI	TY	PAMS	IFI	1 T	ST.					CIU							1.0
407	SPO	X 1	2				••••	101103				-	274		26				85.	017			
A07	SPO	X 12	2	-	0.	8			-	3.1	5								0.201				
A07	SPO	X 12	2		0.	5	- 3	-1										552					0.7
A 05	SPO	X 12	2	-	2.	6				4.1	3					C10	6						
A05	SPO	X 14	2	-	1.	5	- 1									C10	06						0.9
A 05	SPO	X 12	2										250		317			602	85.0	014			
A07	SPO	X 12	2	-	2.	1			-	0.1	L												
AO7	SPO	X 17	2	-	0.	7	1																0.9
A 07	SPO	X 12	2										107		417				85.0	020			
NO F	LUIC	TRA	NSIE	NTS C	DETE	CTED	DUR	ING	GR /	ALLI	TR	AN	SIEN	TT	EST	•							
A07	SPO	x 12	1															697					
A07	GEN	× 12	616			-							46		280								
A07	GEN	X 12	616		0.	1	- 7	- 3		8.4													
AUT	GEN	X 12	016		0.	3	- 6	-		10.1													
A07	GEN	× 14	616			2	-			0			166		336								
AUT	SOC	× 14	010		1.	4	- 5	- 4		2.4													
405	SPO	× 13	;		1	7	- 0	0		600						(10	5						0.0
A05	SPO	× 13	5		4.0		- 9						304		719	C10	0		86 (11.6			0.8
TMI	SIN	12 0	HIPP		MON	DELC		E TO	KC	C .			379		119				0700	10			
	TEM SEN O. LJC A455 A41 A41 A41 A41 A41 A43 CDMM A43 CDMM A43 A43 A43 A43 A43 A43 A43 A43 A43 A43	TEMP M SENS 0.6 TST LJC TYP A45 CSS A45 CSS A45 CSS A41 CSS A41 CSS A41 CSS A41 CSS A41 CSS A41 CSS CDMP SEI A43 CSS CDMP VEI A43 CSS VIB A43 CA1 A43 CA1 A43 CA1 A43 CA1 A43 CA1 A43 CA1 A43 CA1 A43 CC2 A43 CC3 A43 CC3 A43 CC3 A43 CC1 A43 CC2 A43 CC3 A43	TEMP MAX SENS SD 0.6 TST IMU LJC TYP ASSI A45 CSS A45 CSS A45 CSS A41 CSS A41 CSS A41 CSS A41 CSS A41 CSS CDMP SELECT A43 CSS CDMP VERIF A43 CSS CDMP VERIF A43 CSS DEMO T/F = A43 CSS VIB A43 CA1 A43 CA2 A43 CA3 A43 CA1 A43 CA2 A43 CA3 A43 CC1 A43 CC2 A43 CC3 A43 CC3 A43 CC3 A43 CC3 A43 CC1 A43 CC2 A43 CC3 A43 CC3 A43 CC3 A43 CC1 A43 CC2 A43 CC3 A43 CC3 A43 CC1 A43 CC2 A43 CC3 A43 CC1 A43 CC2 A43 CC3 A43 CC3 A43 CC1 A43 CC2 A43 CC3 A43 CC3 A43 CC3 A43 CC1 A43 CC2 A43 CC3 A43 CC3 A44 CC3 A44 CC3 A44 CC3 A44 CC3 A44 CC3 A44 CC3 A47	TEMP MAX THERM SENS SD R 0.6 683.5 TST IMU GAN LJC TYP ASSN A45 CSS A45 CSS A45 CSS A45 CSS A41 CSS A41 CSS A41 CSS A41 CSS CDMP SELECT A43 CSS DEMO T/F A43 CSS VIB A43 A43 CA1 A43 CA2 A43 CA3 A43 CA2 A43 CA3 A43 CA2 A43 CA3 A43 CA2 A43 CA3 A43 CB2 A43 CB3 A43 CB3 A43 CC3 A43 CC3	TEMP MAX THERM SU SENS SD R CAP 0.6 683.5 .0 TST IMU G&N LJC TYP ASSN SYS A45 CSS .0 A45 CSS .0 A45 CSS .0 A45 CSS .1 A45 CSS .1 A41 CSS .1 COMP SELECT A43 A43 CSS .1 CDEMO T/F 1191.5 A43 CSS .1 DEMO T/F 1191.5 A43 CSS .1 A43 CSS .1 A43 CSS .1 A43 CA2 .4 A43 CA2 .4	TEMP MAX THERM SUS SENS SD R CAP SG 0.6 683.5 .0510 TST IMU GEN LJC TYP ASSN SYS A45 CSS 11. A45 CSS 11. G G4.2, 70.9, 56.0 19. A41 CSS (9. A41 CSS (10. COMP SELECT A43 A43 CSS COMP DEMO T/F 1191.5 A43 CA2 0. A43 CA2 0. A43 CA2 0. A43 CA3 0. A43 CA3 0. A43 CA3 0. A43 CB3 1. A43 CB3 1. A43 CB3 1. A43 CB3 1. A43 CB3	TEMP MAX THERM SUS SUS SENS SD R CAP SG CAP 0.6 683.5 .0510 TST IMU GEN LJC TYP ASSN SYS NBD A45 CSS (11.1) 0 A45 CSS (11.1) 0 G 64.2 70.9 56.0 TG 58.2 A41 CSS (9.7) 0 A41 CSS 0 441 COMP SELECT A43 CSS 0 0.1 A43 CSS 0 0.1 DEMO T/F 1191.5 A43 CA2 0.1 A43 CA2 0.1 A43 CA1 0.1 0.3 A43 CA2 0.1 A43 CA2 0.1 0.3 A43 CA2 0.1 A43 CA3 0.2 0.4 0.3 A43 CB3 1.0 A43 CA2 0.1 0.3 A43 CB3 1.0	TEMP MAX THERM SUS SUS SENS SD R CAP SG CAP TG 0.6 683.5 .0510 TST IMU G&N LJC TYP ASSN SYS NBD AD A45 CSS (11.1) (1 G A45 CSS (11.1) (1 G A45 CSS (11.1) (1 G A41 CSS (11.1) (1 G A41 CSS (1.1.1) (1 G COMP SELECT A43 CSS (0.1 -G COMP VERIF / IA ALIGN 0.1 -G A43 CSS 0.1 -G A43 CSS DEMO T/F 1191.5 A43 CA2 -G -G A43 CA1 0.1 -G A43 CA2 -G -G A43 CA2 0.1 -G A43 CA2 -G -G	TEMP MAX THERN SUS SUS XFR SENS SD R CAP SG CAP TG FUNC 0.6 683.5 .0510 TST IMU G&N LJC TYP ASSN SYS NBD ADSRA A45 CSS (11.1) (1.6) AA5 A45 CSS (11.1) (1.6) AA5 A45 CSS (11.1) (1.6) AA5 A41 CSS (19.7) (-1.4) A41 A43 CSS COMP VERIF / IA ALIGN OOS - 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UNIT RE-ALIGNEI A43 CSI 0.1 -2.3 -10.4 443 CSS COMP VERIF / IA ALIGN OOS - UNIT RE-ALIGNEI A43 CSI -0.1 -0.4 A43	TEMP MAX THERM SUS SUS XFR AVG SD 0.6 683.5 .0510 135 5.0 TST IMU GEN 135 5.0 LJC TYP ASSN SYS NBD ADSRA ADIA A45 CSS (11.1) (1.6) (-2.4) SG SG 84.2,70.9,56.0 TG 58.2,70.9,87.9 A41 CSS COMP SELECT 441 CSS (9.71) (-1.4) (-10.6) A41 CSS (8.5) (0.2) (-8.9) A41 CSS COMP SELECT A43 CSS 0.1 -2.3 -10.9 A43 CSS 0.1 -2.7 -11.1 1.43 CA3 CSS DEMO T/F<=1191.5	TEMP MAX THERM SUS SUS XFR AVG SD SENS SD R CAP SG CAP TG FUNC RDT RDT 0.6 683.5 .0510 135 5.0 TST IMU GEN LJC TYP ASSN SYS NBD ADSRA ADIA DEL A45 CSS (11.1) (1.6) (-2.4) SG 64.2, 70.9, 86.0 TG SSC FO.9, 87.9 A41 CSS (9.7) (-1.4) (-1.0.6) A41 CSS CDMP SELECT A43 CSS COMP VERIF / IA ALIGN OOS - UNIT RE-ALIGNED A43 CSS CIMP VERIF / IA ALIGN OOS - UNIT RE-ALIGNED A43 CSS VIB A43 CA2 0.1 -2.3 -10.9 A43 CA3 O.2 -2.8 -10.3 A43 CB2 1.0 -2.45 -10.43 -3.3 -3.0 -8.8 A43 CB2 1.0 -2.6 -10.8 - - - - -	TEMP MAX THERM SUS SUS XFR AVG SD MH SENS SD R CAP SG CAP TG FUNC RDT RDT HRS 0.6 683.5 .0510 135 5.0 470 TST IMU G&M ADIA DELSF+ A45 CSS (11.1) (1.6) (-2.4) SG 84.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 R A41 CSS (9.7) (-1.4) (-10.6) A41 CSS (9.7) (-1.4) (-10.6) A41 CSS (2.7) 0.2) (-8.9) A43 CSS (2.7) 227 DEMO T/F 1191.5 227 A43 CSS 231 227 DEMO T/F 1191.5 227 A43 CA2 0.1 -2.3 -10.9 A43 CA2 0.1 -2.3 -10.9 A43 CA2 0.1 -2.3 -10.9 A43	TEMP MAX THERM SUS SUS XFR AVG SD MH TM SENS SD R CAP SG CAP TG FUNC RDT RDT RDT HMS SU 0.6 683.5 .0510 135 5.0 470 TST INU GEN ADSRA ADIA DELSF+ DEL A45 CSS (11.1) (1.6) (-2.4) SG 64.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 REF A41 CSS (9.7) (-1.4) (-10.6) A44 CSS 227 CDMP SELECT 227 CDMP VERIF / IA ALIGN ODS - UNIT RE-ALIGNED 227 A43 CSS 231 VIB 227 231 A43 CSS 231 231 VIB 227 A43 CSS 231 231 231 231 VIB A43 CA1 0.1 - 2.3 - 10.6 80 - 443 A43 CB2 1.0 - 2.6 - 10.8 80 - 443<	TEMP MAX THERM SUS SUS XFR AVG SD HH THERM SENS SD R CAP SG CAP TG FUNC RDT RDT RDT HH SG 0.6 683.5 .0510 135 5.0 470 TST IAU GGM ADIA DELSF+ DELSF+ DELSF+ A45 CSS (11.1) (1.6) (-2.4) SG 66.2, 70.9, 5.0 470 A45 CSS (11.1) (1.6) (-2.4) SG 86.3) REF H54 A41 CSS (11.1) (1.6) (-2.4) REF H54 A41 CSS (10.2) (-8.9) REF H54 A41 CSS (10.2) (-8.9) REF H54 A41 CSS (27 75 R43 CSS 227 153 CDMP VERIF / IA ALIGN OOS - UNIT RE-ALIGNED 227 153 A43 CSS 227 1.5	TEMP MAX THERM SUS SUS XFR AVG SD HH THERM PAD SENS SD R CAP SG CAP TG FUNC RDT RDT HRS SG TG 0.6 683.5 .0510 135 5.0 470 HH THERM PAD TST INU G&M HH ISS 5.0 470 HH THERM PAD 120 TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF+ DELSF+ DELSF+ REF H502 A45 CSS (11-1) (1.6) (2.4) CL CL A41 CSS (9.7) (1.4) (1.0.6) 1	TEMP MAX THERM SUS SUS XFR AVG SD MH THERM PAD XFR SENS SD R CAP SG CAP SG CAP TG FUNC RDT RDT HRS SG TG RE 0.6 683.5 .0510 135 5.0 470 MHEEL MHEEL LJC TYN ASSN <sys< td=""> NBD ADSRA ADIA DELSF+ DELSF- REF MHEEL LJC TYN ASSN<sys< td=""> NBD ADSRA ADIA DELSF+ DELSF- REF MHEEL LJC TYN ASSN<sys< td=""> NBD ADSRA ADIA DELSF+ DELSF- REF MHEEL LJC TYN ASSN<sys< td=""> NBD ADSRA ADIA DELSF+ DELSF- REF MHEEL LJC TYN ASSN SG (0.7) F SG TI35 138 A41 CSS (1.0.2) (-0.2) 10.9 Ads Ads CS 227 75 DEMO T/F = 1191.5 Z27 TS3 <td< td=""><td>TEMP MAX THERM SUS SUS XFR AVG SD MH THERM PAD XFR BIA SENS SD R CAP SG CAP SG</td><td>TEMP MAX THERN SUS SUS XFR AVG SO H THERN PAD XFR BIAS T 0-6 683-5 0510 135 5.0 470 TST INU GAN DIAG ADIA DELSF+ DELSF- ROT HOURS I A45 CSS (11-1) (1.6) (- 2.4) C 98 A45 CSS (11-1) (1.6) (- 2.4) C 98 A45 CSS (11-1) (1.6) (- 2.4) C 98 A45 CSS (9.7) (- 1.4) (- 10.3) 138 A41 CSS (8.5) (0.21 (- 8.9) 138 A41 CSS (8.5) (0.21 (- 8.9) 138 A41 CSS (0.1 - 2.3 - 10.9 116 141 85.</td><td>TEMP MAX THERM SUS SUF AVG SD MH THERN PAD KFR AVG 0.6 683.5 0510 135 $5_{-}0$ 470 TST IAU GEN MHEEL MHEEL C103 LJC TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF- ROT HOURS I+ A45 CSS (11.1) (1.6) (-2.4) C103 C104</td><td>TERM MAX THERM SUS SUS MAR AVG SO MH THERM PAD XFR BIAS TROE RES SENS SO R CAPSG CAP TG FUNC ROT ROT MRS SG TG RES 0.6 683.5 .0510 135 5.0 470 TST IMU G6M LJC TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF- ROT HOURS I+ I- A45 CSS A45 CSS (9.71 (-1.4) (-2.4) SG 84.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 A41 CSS (9.71 (-1.4) (-1.6) (-2.4) SG 84.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 A41 CSS (9.71 (-1.4) (-1.6) (-1.6) 138 A41 CSS (9.71 (-1.4) (-1.6) (-1.6) 138 A41 CSS (9.71 (-1.4) (-1.6) (-1.6) 138 A41 CSS (9.71 (-1.4) (-1.6) (-2.4) SG 84.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 A41 CSS (8.5) (0.2) (-8.9) A41 CSS (8.5) (0.2) (-8.9) A43 CSS (0.1 - 2.4] A43 CSS (0.1 - 2.4] A43 CS1 (0.1 - 2.4] - 10.9 A43 CC3 (0.1 - 2.4] - 10.9 A43 CC3 (0.9 - 3.1] - 10.6 A43 CC3 (0.9 - 3.1] - 2.4 A43 CC3 (0.9 - 2.4] A43 CC3 (0.9 - 3.1] - 0.1 A55 CL01 A55 CL01 A55 CL01 A55 CL01 A55 CL01 A55 CL01 A55 CL05 A55 CL05 A55</td><td>TEMP MAX THERM SUS SUS XFR AVG SD M THERM PAD XFR BLAS TRQE RES 0.6 683-5 .0510 135 5.0 470 MHEEL IIII IIIII IIIIII IIIIIIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII</td></td<></sys<></sys<></sys<></sys<>	TEMP MAX THERM SUS SUS XFR AVG SD MH THERM PAD XFR BIA SENS SD R CAP SG CAP SG	TEMP MAX THERN SUS SUS XFR AVG SO H THERN PAD XFR BIAS T 0-6 683-5 0510 135 5.0 470 TST INU GAN DIAG ADIA DELSF+ DELSF- ROT HOURS I A45 CSS (11-1) (1.6) (- 2.4) C 98 A45 CSS (11-1) (1.6) (- 2.4) C 98 A45 CSS (11-1) (1.6) (- 2.4) C 98 A45 CSS (9.7) (- 1.4) (- 10.3) 138 A41 CSS (8.5) (0.21 (- 8.9) 138 A41 CSS (8.5) (0.21 (- 8.9) 138 A41 CSS (0.1 - 2.3 - 10.9 116 141 85.	TEMP MAX THERM SUS SUF AVG SD MH THERN PAD KFR AVG 0.6 683.5 0510 135 $5_{-}0$ 470 TST IAU GEN MHEEL MHEEL C103 LJC TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF- ROT HOURS I+ A45 CSS (11.1) (1.6) (-2.4) C103 C104	TERM MAX THERM SUS SUS MAR AVG SO MH THERM PAD XFR BIAS TROE RES SENS SO R CAPSG CAP TG FUNC ROT ROT MRS SG TG RES 0.6 683.5 .0510 135 5.0 470 TST IMU G6M LJC TYP ASSN SYS NBD ADSRA ADIA DELSF+ DELSF- ROT HOURS I+ I- A45 CSS A45 CSS (9.71 (-1.4) (-2.4) SG 84.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 A41 CSS (9.71 (-1.4) (-1.6) (-2.4) SG 84.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 A41 CSS (9.71 (-1.4) (-1.6) (-1.6) 138 A41 CSS (9.71 (-1.4) (-1.6) (-1.6) 138 A41 CSS (9.71 (-1.4) (-1.6) (-1.6) 138 A41 CSS (9.71 (-1.4) (-1.6) (-2.4) SG 84.2, 70.9, 56.0 TG 58.2, 70.9, 87.9 A41 CSS (8.5) (0.2) (-8.9) A41 CSS (8.5) (0.2) (-8.9) A43 CSS (0.1 - 2.4] A43 CSS (0.1 - 2.4] A43 CS1 (0.1 - 2.4] - 10.9 A43 CC3 (0.1 - 2.4] - 10.9 A43 CC3 (0.9 - 3.1] - 10.6 A43 CC3 (0.9 - 3.1] - 2.4 A43 CC3 (0.9 - 2.4] A43 CC3 (0.9 - 3.1] - 0.1 A55 CL01 A55 CL01 A55 CL01 A55 CL01 A55 CL01 A55 CL01 A55 CL05 A55	TEMP MAX THERM SUS SUS XFR AVG SD M THERM PAD XFR BLAS TRQE RES 0.6 683-5 .0510 135 5.0 470 MHEEL IIII IIIII IIIIII IIIIIIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

	NASA 84-201	ACE H-5402	LAST UPDATE	06/17/71 P/	AGE 41
TST IMU GEN DATE LOC TYP ASSN SYS	NBD ADS RA	ADIA DELSF+	WHEEL DELSF- RDT HJURS	I+ I-	ADDA GI
12mr71 INU 12 GEN 614 INS 17mr71 KJB GEN X 12 614 19my71 K9A GEN X 12 614 11je71 K9A GEN X 12 614 RETEST DATA 17JE71 K9A GEN X 12 614	TALLED IN LM 10. 3.5 - 3.0 - 3.4 - AFTER CAUNCA 3.4 - 5.7 -	4.0 215 6.7 7.6 7.7 7.7	642 57RUCE BY LIE	THTNING	1.4 1.6 1.5 /.5



NASA 84-203 ACE H-5405 LAST UPDATE 06/17/71 PAGE 44

NASA TEMP MAX THERM SUS SUS XFR AVG SD WH THERM PAD XFR BIAS TRQE RES ACC SENS SD R CAP SG CAP TG FUNC RDT RDT HRS SG TG RES R + -4DE69 0.9 683.4 .0505 163 5.3 412 TST IMU GEN WHEEL ACCA GI -I ADIA DELSF+ DELSF- RDT HJURS I+ DATE LOC TYP ASSN SYS NBD ADSRA 140C69 A45 CSS C119 (-14.1) (0.4) (7.0) - 8.7 140C69 A45 CSS C121 140C69 SG 84.7, 68.8, 54.7 TG 53.4, 67.9, 83.5 170C69 A45 CSS (- 14.1) (- 1.0) (4.3) 166 - 7.9 (-11.2) (- 0.1) (1.4) 164 - 6.6 200C69 A44 CSS 166 210C69 A44 CSS 240C69 COMP SELECT - 249 - 144 165 84.999 84.998 240C69 A45 CSS 280C69 COMP VERIF - 308 - 263 85.000 84.998 280C69 A45 CSS 280C69 DEMO T/F = 1192 - 273 - 161 150 84.999 84.998 280C69 A45 CSS 310C69 VIB IA ALIGN = +1.4 3N069 A45 CA1 - 2.0 4.1 4.6 3N069 A45 CA2 - 2.4 4.6 - 366 - 147 84.998 84.997 - 8.3 3.5 3.4 3.1 3.5 3.4 164 3N069 A45 CA3 - 2.4 4.9 5N069 A45 CB1 - 2.6 5.3 84.959 84.998 - 6.6 - 2.1 4.0 - 308 - 120 5ND69 A45 CB2 5N069 A45 CB3 - 2.0 5.2 169 - 2.7 6N069 A45 CC1 3.6 1.7 2.2 - 280 - 59 84.999 84.998 - 7.7 - 1.4 6N069 445 CC2 3.5 160 412 2.9 6N069 A45 CC3 - 1.9 2.9 4DE69 ACC & M/D TO 0814 5DE69 UNIT ASSIGNED TO IMU 12Y REPLACING 4C-5. 17DE69 A07 SPO Y 12 - 0.6 - 0.4 - 1.4 170E69 A07 SPO Y 12 C117 0.7 2.1 17DE69 NO FLUID TRANSIENTS IN GRAVITY TRANSIENT TEST. - 3 350 85.014 18DE69 A07 SPO Y 12 220E69 A07 SPO Y 12 - 1.0 2.5 0.6 1.4 22DE69 A07 SPO Y 12 498 0.9 20MR 70 A 05 SPO Y 12 C123 20MR 70 A 05 SPO Y 12 C126 5.1 3.2 0. - 4.8 23MR 70 A 05 SPO Y 12 0.6 240 474 548 85.015 1.2 23MK 70 A 05 SPO Y 12 - 1.8 24 JE 70 A 07 SPO Y 12 - 0.5 - 0.3 - 0.9 24 JE 70 A 07 SPO Y 12 0.7 24 JE 70 A 07 SPO Y 12 - 1.0 - 0.5 3.2 - 0.9 461 85.016 25 JE 70 A 07 SPO Y 12 94 1JL70 NO FLUID TRANSIENTS DETECTED DURING GRAVITY TRANSIENT TEST. 643 6JL 70 A07 SPO Y 12 95E 70 A07 GEN Y 12 616 1.0 3.9 115E 70 A07 GEN Y 12 616 - 10 209 11 SE 70 A07 GEN Y 12 616 - 1.3 5.9 - 2.4 54 369 24NU 70 A07 GEN Y 12 616 25N070 A07 GEN Y 12 616 - 3.5 4.7 - 5.9
 9FE71 A05 SPO Y 12
 - 0.6

 9FE71 A05 SPO Y 12
 - 1.0
 - 1.5 1.0 C125

9 Õ

	NASA BA-2	203	ACE	H-5405	LAST	UPDATE	06/	17/71 6	AGE	45
TST INU GEN	NBD	ADSRA	ADIA	DEL SE+	DELSE-	WHEEL RDT HOURS	1+	I-	ID	ADDA
11FE71 A05 SPO Y 12			NSC	340	561		82.010			
12MP 71 INU 12 CEN 614 ING	TALLED IN	LM 10-	130.							
17MR 71 KOR GEN Y 12 614	0.3	3.0	- 2-2	320	595					1.0
17MR71 ADIAY POSITION 8		500	- 5.0							
19MY71 K9A GEN Y 12 614	- 1.7	5.0	- 1.2							0.9
19MY71 ADIAY POSITION 8			0.4							
11JE71 K9A GEN Y 12 614	- 2.6	4.7	- 1.0							1.0
11JETI ADIAY POSITION 8			- 0.1		11 121	IC STALA	G			
REIEST DATA AA	TER LAG	INCH ?	TOWER	STRUC	KBY	LICFAININ	0			
17JE11 KYA GEN Y 12614	- 3.1	5.1	- 2.2							0.9
ITJETTALIAY MOSITION &	f		0.0							



G & N 614, LM 10, IMU 12, APOLLO IRIG 8A203, Y AXIS

NASA	TEMP	MAX	THERM	SUS	S	SUS		XFR	AV	G	SD	WH	TH	ERM	PAD	XFR	BIAS	TROE	RES		
ACC	SENS	S SD	R	CAP	SG	CAP	TG	FUNC	RD	T	RDT	HRS	S	G	TG	RES	R	+	-		
3NU 69	1.3	3	692.7	.04	75				17	6	3.2	447									
		TST I	MU GEN												WH	EEL					
DATE	LJC	TYP A	SSN SYS		NB	D	ADS	RA		DIA	DE	LSF+	DE	LSF-	R	DT H	JURS	1+	1-	ID	ADDA
80069	A45	CSS													C1	18					
80669	A45	CSS		(8.	8) (1	.21	-	1.8)				CI	26				1.8	
80669	SG 7	19.8,	67.4, 53	3.5	TG	55.2	, 66	.8, 8	32.9												
130069	A45	CSS		(10.	0) (C	10.01	-	0.2)				1	78				1.9	
150C69	A45	CSS													1	78				3.3	
170C69	A43	CSS		(10.	9) (- 1	.01	-	2.3	3				1	78					
210669	COMP	SELE	CT																		
210669	A43	CSS									-	287	-	117	1	74		85.009	85.009		
220069	COMP	VERI	F																		
220069	A43	CSS									-	328	-	199)			85.012	85.012		
230669	DENC) T/	F = 12/9	5																	
230669	A43	CSS									-	314			1	75		85.005	85.006		
230669	VIB	IA	ALIGN	= -0.	6																
240069	A43	CAI			1.	2	C	0.0		3.9											
240669	A43	CAZ			0.	8	- 0	.3		3.2	-	60 4		458	1			85.010	85.010	4.9	
240669	A43	CA3			0.	8	- 0	.4		7.8					1	71					
270069	A43	CB1		-	1.	0	- 1	0		4.7											
270669	A43	CB2		-	1.	0	- 0	0.6		5.3	-	539	-	263)			85.011	85.011	3.0	
270669	A43	CB3		-	0.	9	- 0	.6		5.3					1	82					
290669	A43	CCI		-	1.	0	- 1	0		6.8											
290669	A43	CCZ		-	0.	5	- 0	0.5		5.3	-	473	-	154		-		85.012	85.012	1.7	
290669		CC3		-	1.	3	- 0	.6		7.0					1	73	447				
3N069	ACC	E M/O	TO 0814	+																	
5DE 69	UNIT	ASSI	GNED TO	IMU	122	REP	LACI	NG 50	-13	•											
170169	AOT	SPO Z	12		0.	4			-	5.5					CI	25					
170669	NUF	LUID	TRANSLET	NTS I	NG	RAVI	14 1	KANSI	ENI	I E	51.							05 01/			
180569	AUT	SPU Z	12	-	0.	1	- 1	• 8			-	514	-	494				85.016			0.3
22DE69	A07	SPO Z	12		1.	0				2.9											
22DE69	AUT	SPU Z	12	-	0.	3	- 1										32				0.5
20MR 70	A 05	SPU Z	12												CL	27					
20MK 70	AUS	SPU Z	12		2	2									CI.	29					
23MK 70	AUS	SPU Z	12		2.0	2				1.1		20.7		34.0				05 014			0.2
23MK 70	A 05	SPU Z	12		0.	0	- 0	07	,	2 0	-	201	-	260			200	83.014			0.2
24JE 10	407	SPO Z	12		0.	6	_ 2			2.0 7	_	104	_	250				85 01 9			0.7
25JE 10	NOF	SPU Z	TOANCIES		U.	7		TNC C	WA CL		TDA	TO 4		230				03.010			0.2
13170	AO7	CDO Z	12	115 0	EIE	LIED	DUR	ING C	M MY	111	1 84	NOIEN		ESI	•		77				
OJL TU	A07	SPU L	12 616								_	401	-	381		0	511				
OSE TO	407	GEN Z	12 616		1	2	_ 2	- 6		0 . 8		40.1		201							
115570	407	GEN Z	12 616		0	6	- 2	-0		8.3											
244070	A 07	GEN Z	12 616		0.0		6				-	221	-	185							
25N() 70	A07	GEN 7	12 616		2.	1	0	-7		5.3				203							
10FF 71	405	SPO Z	12	-	0.	9	0		-	3.7											
10FF 71	A05	SPO 7	12	-	1	2	- 5	.6							C12	29					0.7
11FF71	A05	SPO Z	12			-	-				-	93		40				85.017			
11MR 71	INU	S/N 1	2 SHIPPE		MOM	DELC		ETO	KSC.												
12MR 71	INU	12 661	N 614 I	ISTAL	LED	IN	LM 1	0.													

	NASA 8A-202	ACE H-5403	LAST UPDATE	06/17/71 PAGE 43	
TST IMU GEN DATE LJC TYP ASSN SYS	NBD ADSRA	ADIA DELSF+	WHEEL DELSF- RDT HOURS	I+ I- ID AU	DOA
17MR71 KOB GEN Z 12 614 19MY71 K9A GEN Z 12 614 11JE71 K9A GEN Z 12 614	$ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	5.5 - 80 9.2 9.0	- 19		0.7 0.5 0.5
RETEST DATA 17 ETI KOA GENZ 12614	NITER LAUNCH	TONER ST. 3.0	RUCK BY LIGHTN	C C	2.5



G & N 614, LM 10, IMU 12, APOLLO IRIG 8A202, Z AXIS

UATE	LOC	TST TYP	AS	MU C SN S	EN YS	DE	L T A SF	1 G 81 A S	•	NULL BIAS	R	- Tü A	AL-WONGLE	38	HAX. TRANS.	TORQ MON CURRENT		
300-65	\$48	ACL				-	39			0.0						41.2753		
MOD	С3		C 4	' •	R5		R6		R11		RL	2	R1	3	R14			
C14	.003	48	003	348	96 .	25	103.	75 1	40.7	25	29 .	20.9						
									1001									
14AP66	A48	A3 I											в	4				
15AP66	A48	A3I										-	3	2				
16AP66	A48	AJI											1	5				
174960	A48	151	4	6		-	132			0.00						43.2577		
25AD44	K.		4.4	J IUH	NSF	KUM	CWL	IMIT										
12MV66	A .	S D N	AC	SINI	LyX		GEN O	05			0.01	24	14.0	10	,			
194766	A17	503	X I		0 57	ATE	10		SPAR	0 76	RPL	UT	ZAP-	-19	D	1.1 2267		
194766	4	17 51	RI	SIX	AFTE	R A	DIUST	MENT	2	0.00						43.2201		
28JE66	A17	SPO	XI	2			30	0.6	4	0-47						43.2362		
29JE66	A17	SPO	XI	2			83	0.4	7	0.47						43.2353	1.1	HUS
29JE66	A17	SPO	XI	12			124	0.4	4	0.46						42062333	HI	BUS
24JE66	A17	SPU	XI	12			170	0.4	4	0.42							н	BUS
OJL66	A17	SAL	XI	2						0.33			5 1	18				000
65665	11	10 12	AS	SSN T	OGL	N 6	03 TC	RPL	IMU	6								
85E66	G20	GEN	XI	2 60	3	-	212	.4	0									
225E66	620	GEN	XI	2 60	3	-	198	0.4	5							43.2000		
235E66	G20	GEN	X 1	2 60	3		210	0.4	2							43.2377		
245E66	620	GEN	XI	2 60	3	-	211	0.5	U							43.2324		
29 SE 66	G20	GEN	X 1	2 00	3	-	160	0.4	1							43.2336		
295E66	620	GEN	X 1	2 60	3	-	233	0.5	0									
295E66	G20	GEN	X 1	2 60	3	-	129	0.4	5							43.2341		
29 SE66	620	GEN	X 1	2		-	114	0.4	7							43.2348	L)	BUS
295E00	620	GEN	XI	2		-	225	0.4	5							43.2340	10	BUS
293500	620	GEN	× 1	2		-	90	0.4	8							43.2342	LU	BUS
273200	620	CEN	~ 1	2		-	303	0.4	1							43.2340	HI	BUS
105544	620	CEN		2		_	274	0.4	0							43.2330	HI	RUS
1001066	620	GEN	2 1	2 10	3	_	136	0.4	6							43 . 2344	111	505
220000	620	GEN	xi	2 60	- -	-	363	0.4	0							42 2324		
2200.66	G20	GEN	x 1	2 60	3	_	46	0.4	8							47.2320		
240066	620	GEN	XI	2 60	3	-	200	0.5	7							43-2314		
280066	620	GEN	X 1	2 60	3	-	181	0.5	1							43-2332		
19NJ06	620	GEN	X 1	2 60	3	-	167	.5	2									
12JA67	IM	10 12	EN	TERE	U LEM	1 5	PARE	1										
OFF67	ADA	SAL	X 1	2					(1).41) -	. 1	L					
6-157	80A	SAL	× 1	2					(0.42)	0) 1	8				
6FE67	A 08	SAL	X 1	2					(0.36)							
7FE67	A08	SCK	X 1	2		-	200	• 4	4	.44						43.2318		
9FEB7	A J B	SAL	x 1	2					(C.30) -	- 1						
9FE 67	80A	SAL	* 1	2					(0.37) -	4						
22FEET	AIT	SAL	X 1	2					(0.40)	ć	2	C				
9MR.67	AUB	SAL	× 1	2			2.07		. (0.37		1						
I SMADY	AUB	SCK	× 1	2		-	301	ده .	2	• - 1								
SAD67	020	N JC	× 1	2 60	÷.	_	135	• 3.	6 6	• 2 9								
134967	120	SAL	XI	2 00	-	-		• 21	1	0.13	,			4				
a Jur OI	020	JAN L	~ L	B-						1.072			6	-1				

DATE	TST INU I	SAN DELTA SYS SF	1 G BI AS	NULL	RUT -AL-I	TRAN	. TORO MUN 5. CURFENT	
294467	A08 SCK X 12	- 268	.54	.54				DGS
IJE67	A08 SCK X 12	- 34 (4.201	4.301				005
OIJE67	AUS SCK X 12	0 (4.251	(4.25)				
OLJEGI	ADB SCK LSIX	BEFORE AUJUST	MENI					
LJEOT	AUB SCK X 12	ATTU AD UTTA	1.501					
ULJEOT	AUB SER ESTA	AFTER AUJUST	ENI	1-0 881				
001667	AUB SUN A 12	ACCORE ACCHIST	-U.BOI	1-0.001				
DOJEOT	AUD SER LJIX	DEFUKE AUJUSI	AC AL	- 03				
081667	X121 X12 804	AFTER AD USTA	ENT	÷0 5				
134167	AOR SPOL X 12	- 373	-03	2 2				
284467	A07 GEN X 12 6	- 311	-0.05	8 U &				
55F67	GIA GEN X 12 6	- 322	-0.02					
1700.67	GSC GEN X 12 6	05 - 476	-0-25					
254268	A08 SP3 X 12	- 560	-0-02	0.02			43.2342	
7MY68	A08 SP3 X 12	- 580	0.16	0.04			43.2331	
74768	AOB SAL X 12			(0.16)	24	34		
224468	UNIT SHIPPED	TO GAEC						
224468	IMU S/N 12 I	NSTALLED IN GE	N 607					
294768	620 GEN X 12 60	07 - 649	0.22					
	IMU S/N 12 ,	RETURNED TO A	C MKE					
111469	A17 SPR X 12	(2846) (0.38)	(0.39)			43.2324	
13JA69	A17 SCK X 12	(2938) (0.321	(0.32)			43.2351	
13JA69	THE ABUVE 2	RUNS MADE WITH	PIP IN	CAUSSED	STATE (OUE TO		
	OPERATION IN	C/M LOOP. REF	. AFR 2	2015				
13JA69	A17 SCK X 12	- 18	-0.29	-0.35			43.2328	
14JA69	A17 SCK X 12	- 116	-0.25	-0.20			43.2326	
23JA69	A17 SPO X 12	- 305	-0.01	-0.05			43.2326	
3FE69	AOB SAL X 12			(0.01)	0	28		
17FE 69	INU S/N 12 SI	HIPPED TO KSC						
19FE69	K11 SCK X 12	- 402	-0.18	-0.20			43.2348	
10AP69	K11 SCK X 12	- 526	-0.10	-0.11			43.2334	
301F68	K11 SCK X 12	- 550	0.13	0.08			43.2324	
25AU69	K11 SCK X 12	- 588	-0.10	-0.13			4202312	
	IMU SIN 12 R	TURNED TO AC	MKE					
160069	A05 SPU X 12	- 634	-0.15	-0.17			43.2310	
160169	RAN EU 3596-	NULL CUINCIDE	NCE CHE	CK		27		
170069	AUS SAL X 12		00 NT	1 1.0741	- 0	51		
210069	BIAS AUJUST	U IU +1.07 PLU	I GO	I LO			43 1226	
210669	AUS SPU & 12	- 515	1.60	1 60			43 2221	
180669	AUT SPU X 12	- 031	1.00	1 1 681	.)	3.4	4206363	
190609	AUT SAL A LC	- 954	1.87	1.20	,	30	43.231 5	
24MR 70	ANS SAL X 12	- 0.24	4 00 2	(1.30)	13	36		
26 16 70	ACT SOC X 12	- 841	1-69	1.70		0.01	43-2320	
293670	AC7 SAL X 12	1 - 0		(1.491	20	38		
CSF 70	A07 GEN X 12 61	- 761	1.59					
11 5670	407 GEN X 12 6	- 765	1.60					
250070	A07 GEN X 12 61	- 825	1.65					
11++71	ACS SAL X 12			(1./2)	- 11	38		
12FE71	405 SPU x 12	- 798	1.58	1.72		0.06	43.2320	
10MR 71	INU-12 SHIPPE	D TO KSC FOR	LM-LO I	ASTALLAT	ION			
17MR 71	KUB GEN X 12 61	4 - 938	1.65					

TST INU GEN DELTA IG NULL HUT-AL-WUB MAX. TORQ MUN DATE LOC TYP ASSN SYS SF BLAS BLAS ANGLE TRANS. CURRENT

19MY71 K9A GEN X 12 614 - 914 1.76 11JE71 K9A GEN X 12 614 - 912 1.70 RETEST DATA AFTER LAUNCH TOWER STRUCK BY LIGHTNING 17JE71 KJA GEN X 12 614 - 906 1.73

G & N 614, LM 10, IMU 12, APOLLO PIPA 2AP172, X AXIS



G & N 614, LM 10, IMU 12, APOLLO PIPA 2AP172, X AXIS



NA SA 24P-171 SPEPRY 108077-2

1 JE 67 A08 SEK Y 12

IJEET AOR SCK Y 12

1JE67 AD8 SCK Y 12 8167 A08 SCK Y 12 LAST UPDATE 06/17/71 PAGE 68

DGS

LCA

ADJ

DATE	LOC	TST TYP	ASS	AU G	EN D	SF	1 G BI AS	MULL	ROI	ANGLE	MAX. TRANS.	TOR Q MON CURRENT	
28DE65	\$46	ACC			-	161		0.0				41.3472	
MOD	C 3		C4		R5	Ro		R11	R12	R13	R14		
NO													
C16 .	.003	48	.003	48	98.75	101.	25 14	0.725	19.47	73			
1 3AP 66	A48	ABL							-	25 6			
15AP66	A49	IEA								39 21			
16AP 66	A48	FST				57	0.05		-	19 20		43.3629	
16AP66	R	7= 1	1.75	TURM	S FRU	MCWL	IMIT	R10= 15	.50 T.	IRNS FRO	H LW LI	TIM	
16AP66	21	AP-1	71 A	SSN	TO IMU	S/N 1	1. 4						
124466	RI	3 VM	ASS	N IM	J S/N	12 Y							
19M466	A17	SPR	Y 1	2	-	22	0.00	0.0	2			43.3365	
19M466	A]	17 51	PR L	SIY A	FTER	AUJUST	MENT						
29JE66	A17	SPU	Y 1	2		70	0.51	0.5	2				
247E99	A17	SPU	¥ 1	2		90	0.30	0.4	9				LJ BUS
29JE66	A17	SPO	Y 1	2		133	0.51	0.5	3				HI BUS
29JE66	A17	SPO	Y 1	2		160	0.52	0.5	3				HI BUS
7JL 66	A17	SAL	Y 1	2			0.48		-	26 23			
8 SE 66	G20	GEN	Y 1	2 603		72	.36						
8 SE 6 6	IP	IU SI	NI	2 ASS	N TO	GEN 60:	3						
22 SE66	G20	GEN	Y 1	2 603		66	0.46					43.2000	
235866	620	GEN	Y 1	2 603		1	0.50					43.3458	
245E66	620	GEN	Y 1	2 603		71	0.48					43.4404	
295E66	620	GEN	Y 1	2 603		43	0.42					43.3414	
295E66	G20	GEN	Y 1	₹ 603		54	0.45						
295E66	620	GEN	¥ 1	2 603		96	0.45					43.3423	
245E66	G20	GEN	Y 1	2		69	0.46					43.3425	LJ BUS
295E66	620	GEN	¥ 1	2		86	0.43					43.3425	LO BUS
295E66	620	GEN	Y 1	2		81	0.40					43.3427	LU BUS
295£66	620	GEN	Y 1.	2		107	0.45					43.3419	HI BUS
295E66	620	GEN	Y 1.	2		84	0.50					43.3419	HI BUS
295E66	620	GEN	Y 1.	2		115	0.46					43.3422	HI BUS
100066	620	GEN	Y 1	2 603		67	0.47					43.3404	
220066	620	CEN	¥ 1.	2 603		80	0.49					43.3405	
240666	G20	GEN	Y 1.	2 603		93	0.49					43.3415	
280066	620	GEN	Y 1.	2 603	-	86	6.47					43.3418	
19NJ66	G20	GEN	Y 1.	2 603	-	20	.74						
100266	620	GEN	Y 1.	2 6 C 3		5	.76						
121467		IMU	5/1	N 12	ASSIG	NED TO	LA/SP	1					
7FE.67	A08	SAL	Y 1.	2				1 0.67) -	23 25			
7FE67	804	SCK	Y 1.	2		77	0.61	0.70				43.4413	
23FEOT	A17	SAL	¥ 1.	2				1 0.57) -	23 24			
10MK67	80A	SAL	Y 1.	2				1 0.58) -	21 23			
1 3MR 67	A17	SCK	Y 1	2	-	80	.66	.54					
31MK67	620	SAL	Y 1	2				1 0.57) -	22 24			
31MR 67	G20	SCK	Y 1.	2	-	38	.58	.55					
5AP67	620	130	Y 1.	2 605	-	11	.71						
294407	4(8	SCK	Y 1.	2			.57						DG

250 (4.30) (4.37)

130 (- .96) (- .99)

200 (1.71)

(4.34)

		TST	IM	J GE	N D	ELTA	16	N	JLL	RUT	-AL-	NOB	MAX .	TURO MUN	
DATE	LOC	TYP	ASSI	V SY	S	SF	BLAS	B	IAS		ANGL	E	TRANS.	CURRENT	
8JE67	AOB	SCK	Y 12	2	-	2	01		.01						
12AU67	IP	AU SI	/N 12	2 Y .I	ENTER	ED GI	N 605								
13AU67	408	SPO	Y 12	2	-	297	13	-	.10						
28AU67	A07	GEN	¥ 12	2 605	-	253	-0.05								
55E67	G16	GEN	Y 12	605	-	271	0.02								
170067	G SC	GEN	Y 12	605	-	478	0.15								
25AP68	A 08	SPR	Y 12	2	-	440	0.15	(.15					43.3380	
74768	A08	SPO	Y 12	2	-	316	0.25	1	2.5					43.3374	
7MY68	A08	SAL	Y 12	2		310		1	281	_	32	22		4565514	
22MY68	LIP	IT	SHIP	PED TO	GAH	C		•			25	~ ~			
22MY68	1	111 5	/N 12	INS	TALLE	DIN	GEN 607								
294464	620	GEN	¥ 12	607	-	337	0.35								
2 ////00	1	11 5	/N 12		TURN	FOTO	AC MKE								
111469	A 1 7	SPR	V 13		LIUKA	30341	1 0 521		501					42 2226	
131469	Th	AE AS	INF	PUIN I	MADE		PTP IN C	ALIS			DUE	T O		42.0000	
1 3 3 4 0 7	0	EDA1	TION	INC	MIL		PIP IN U	22.3	201 21	AIC	DUE	10			
131460	A 1 7	SCK	V 1			Ur. /	CF. AFK	22 3	10						
131460	ALT	SCH	1 10			10	C) F		3.401					() 22(0	
153409	A17	SUK	Y 14			18	0.25	1	0.20					43.3300	
14JA09	ALT	SCK	Y 14		-	61	0.22	(.24					43.3300	
23JA09	ALT	SPU	¥ 14		-	180	0.13		1.09					43.3308	
3FE69	AUB	SAL	Y 14	-				((.151	-	41	15			
34569	A 08	SAL	Y L	2			5					20			
17FE 69	11	U SI	/N 12	SHI	PPED	TO KS	C .								
19FE 69	K11	SCK	Y 14	2	-	274	0.23	(.23						
10AP69	K11	SCK	Y 12	2	-	483	0.27	().Z4					43.3364	
30JE69	K11	SCK	Y 12	2	-	527	0.38	(1.34					43.3362	
25AU69	K11	SCK	Y 12	2	-	608	0.26	(.25					43.3341	
	1 1	4U S/	IN 12	RETI	UR NE D	TO /	C/MKE								
170669	A 05	SPC	Y 12	2	-	661	0.31	(.33					43.3352	
1706 69	R4	IN EC	359	96- NI	ULL C	OINCI	DENCE CH	FLK							
170669	A 05	SAL	Y 12	2				()	.381	-	37	19			
210069	ŧ	IAS	ADJU	JSTED	10 +1	1.5 1	LUS OR M	INUS	5).1						
210069	A 05	SPD	Y 12	2	-	492	1.40	1	.40					43.3378	
180E69	A07	SPG	Y 12	2	-	514	1.34	1	.33					43.3365	
19DE69	A07	SAL	Y 12					()	.301	-	31	19			
24MR 70	A 05	SPO	Y 12	2	-	588	1.24	1	.28					43.3368	
25MK 70	A 05	SAL	Y 12					()	. 331	-	16	18			
26 JE 70	A 07	SPO	Y 12	2	-	673	1.34	1	.33				0.05	43.3376	
29JE 70	A 07	SAL	Y 12					()	.231	-	23	17			
95E70	A 07	GEN	Y 12	616	-	629	1.31								
11 SE 70	A 07	GEN	¥ 12	616	-	593	1.35								
25NG 70	A 07	GEN	Y 12	616	-	675	1.37								
11FE 71	A 05	SAL	Y 12					1 1	.401	-	21	18			
15FE 71	A 05	SPO	Y 12		-	794	1.42	1	.43				0.05	43.3366	
10MR 71	IN	10-12	SHI	PPEL	TOK	SC FC	R LM-LC	INST	ALLAT	ION					
17MR 71	KUB	GEN	Y 12	616	-	855	1.17								
19471	KQA	GEN	YI	614	-	852	1.45								
11.1571	KOA	GEN	Y 12	614	-	797	1.40								
	RET	EST	DAT	TA A	FTE	2 1	AUNCH	T	WER	3 5	TRUC	K	BY LI	GHTN'NG	
17JETI	KYA	GEN	1Y	21.14	-	921	1 113								

G & N 614, LM 10, IMU 12, APOLLO PIPA 2AP171, Y AXIS





1 - G BIAS PLOTTED BY TIME

0.4.75	1.00	IST	IMU	GEN	DELTA	16	NULL	ROT-AL-W	OB MAX.	TORQ MUN	
DATE	LUC	ITP	ASSN	242	31	DIMS	DIAS	AN OL L		CONNERT	
25JA67	542	ACC			- 104		0.00			41.6771	
20AP67	A48	124						2	12		
21AP67	A48	124						12	3		
24AP67	A48	A3I						11	2		
LOMY67	A48	FST			21	-0.02	-0.01	11	15		
294467	80 A	SPR	2 12		340	36	29				DGS
23667	AOB	SPR	L 12		(588)	(.07)	(.04)				AD J
2JE67	AOB	SPR	2 12		- 20	01	92				
02JE67	A	08 51	PK LS	12 AFTE	R ADJUS	TMENT					
13AU67	A 08	SPI	2 12		- 555	04	04				01
13AU67	A08	SPO	2 12		- 543	04	. 20				DZ
134067	AOB	SPO	2 12		- 531	00	.01				03
2BAUET	A07	GEN	2 12	605M2	- 517	-0.21					
5SEOT	616	GEN	2 12	605 M2	- 600	-0.10					
170067	GSC	GEN	Z 12	605M2	- 755	-0.21					
25AP68	A 08	SPR	2 12		- 858	-0.02	0.00			43.5604	
7MY68	AOR	SPU	1 12		- 798	-0.17	-0.15			43.5599	
7MY68	AUS	SAL	Z 12				(-0.16)	- 54			
22MY68	U	NIT	SHIPP	ED TO G	AEC						
22MY68	I	MU S.	/N 12	INSTAL	LED IN	GEN 637					
29MY68	G20	GEN	2 12	601	- 801	-0.15					
	I	MU S.	/N 12	, RETL	IRNED TO	AC MKE					
11JA69	A17	SPR	2 12		(1978)	1 0.361	(0.44)			43.5593	
13JA69	T	HE AI	BOVE	RUN WAS	MADE W	ITH PIP	IN GAUSS	ED STATE	DUE TO		
13JA69	0	PERA	TIUN	IN C/M	LCOP. R	EF. AFR	22017				
13JA69	A17	SCK	1 12	2	- 379	-0.09	-0.05			43.5574	
14JA69	A17	SCK	2 12	2	- 385	0.02	0.)4			43.5598	
23JA69	A17	SPO	2 12	2	- 582	-0.02	-0.02			43.5599	
3FE69	ADE	SAL	2 12				1-0.091	- 93			
3FE69	AU8	SAL	2 14	2			(-0.35)	- 97			
17FE69	I	MU S.	/N 14	SHIPPE	J TO KS	C				10101	
1°FE69	K11	SCK	2 12	2	- 666	0.03	0.11			43.5580	
10AP59	K11	SCK	2 12	2	- 903	0.12	0.10			43.3590	
JUJE 69	K11	SCK	2 12		- 988	0.36	0.02			43.5536	
25AU69	KII	SCK	Z 12	2	- 381	0.04	0.10			43.5572	
	I	MU S	11 12	RETURN	ED TO A	C/MKE					
170669	A 05	SPIL	7 12	2	-1068	0.11	0.17			43.5600	
170069	ĸ	AN F	0 350	16- NULI	COINCI	DENCE CH	1EC K				
170669	A05	SAL	2 10	2			(1.48)	- 89			
210669		GLAS	AUJI	USTED TO) +1.5 P	LUS OF P	AINUS 2.1				
210069	A05	SPA	2 12	2	- 898	1.18	1.40			43.5605	
19DE09	A07	SPU	2 12	2	-1022	1.37	1.37			43. 000	
190169	AO7	SAL	2 14	2			(1.34)	- 97			
24MR 70	AC5	SPU	2 14	2	-1159	1.38	1.41			43.5537	
24MR 70	A 05	SAL	Z 12	2			(1.37)	- 92	2 1 -		
26 JE 70	A OT	SPA	2 14	2	-1204	1.34	1.30		0.06	43.5301	
29JE 70	A 07	SAL	Z 1 4	<u> </u>			[1.40]	- 93			
SET0	A 07	GEN	2 14	010	-1177	1.00					
115t 70	AC7	68N	1 1.	1 610	-1186	1.37					
25N070	A 07	6EN	2 12	2 010	-1273	1.34					
11+271	405	SAL	1 10	4			(1.41)	- 90		13 5504	
15FE71	A 05	SPU	2 1.	2	-1292	1.30	1.37		0.06	43.3344	
LIMP 71	I	MIL-1	2 541	PPFF TI	KSC FC	18 LM-10	INSTALLA	I UN			

TST INU GEN DELTA IG NULL ROT-AL-WOB MAX. TORU MON C TYP ASSN SYS SF BIAS BIAS ANGLE TRANS. CURKENT DATE LOC TYP ASSN SYS SF

17MR71 KOB GEN Z 12 614 -1290 1.42 19NY71 K9A GEN I 12 614 -1383 1.42 11JE71 K9A GEN I 12 614 -1339 1.42 RETEST DATA AFTER LAUNCH TOWER STRUCK BY LIEHTNING 17JE71 K9A GEN Z 12614 - 1367 1.41

2000 System Check and G&N Data at DELCO System Check Data at DELCO DELCO System Check and G&N Data at DELCO at KSC 1600 at Before Adjustment GAEC GAEC Check Data Check Data 1200 at KSC at at 800 Data Data Data System System G&N G&N s/c 400 Φ CM / SEC² 0 -400 -800 -1200 CDDT TCP-K-0007 COMP VALUE = -1430 -1600 -2000 1971 1970 1969 1968 1967

SCALE FACTOR DRIFT PLOTTED BY TIME

107

G & N 614, LM 10, IMU 12, APOLLO IRIG 2AP292, Z AXIS



1 - G BIAS DRIFT PLOTTED BY TIME

STANDARD DEVIATION (1°) OF THE IRIG AND PIPA PARAMETER UNCERTAINTIES USED FOR MISSION PERFORMANCE SUMMARY (IRIGS Drifts Corrected for ADOA) LM 10, IMU S/N 12

PARAMETER

Х	Y	Z
0.06	0.04	0.05
		0,00
34 -21 -0.868	19 -36 -0.984	25 -24 -0.939
1.1	1.3	1.2
1.3	1.0	2.0
2.8	1.7	2.0
0.3	0.2	0.2
	X 0.06 34 -21 -0.868 1.1 1.3 2.8 0.3	XY 0.06 0.04 34 19 -21 -36 -0.868 -0.984 1.1 1.3 1.3 1.0 2.8 1.7 0.3 0.2

Data is based upon performance in the IMU. Point-to-point stability in operation is much better than the above data.

Accelerometer data taken prior to degaussing or adjustment has been excluded. The sigma values for PIPA scale factor were obtained from a least squared fit of the KSC data.

PROPOSED GYRO AND ACCELEROMETER PERFORMANCE COMPENSATIONS

PARAMETER

IMU Axis PIPAs	Х	Y	Z
Accelerometer Bias (cm/sec^2)	+1.70	+1.41	+1.42
Scale Factor (${}_{\!$	-980	-990	-1430
IRIGs Bias Drift (MERU)	+3.2	-0.7	+1.4
ADSRA (MERU/g)	-6	+4	-4
ADIA (MERU/g)	+5	-2	+7
Dictionary of Terms

ACC	Acceptance of Data
ACD	After Cooldown
ACE	A.C. Electronics
ADJ	Adjusted
ADOA	Acceleration Sensitive Drift Due to Acceleration along the OA
BCSW	Binary Current Switch
BIA	Bias Adjusted
BUSS	High, Low, or Nominal Direct Current Test
CDN	Post Cooldown
CQL	Component Qualification
CRQ	Component Requalification
CRR	Retest After MUMET Cap and/or Resistor Changes
CRT	Retest Data
CSS	Short Servo Test
CVR	Component Verification
DGI	Degaussed IRIG
DGS	Degaussed
F/F	Float Freedom
FST	Final Stability
GAL	Guidance & Navigation PIPA Alignment
G&N	Guidance & Navigation System Measurement
GP	Gaussed PIPAs
HBS	Hi Bus Voltage
I&A	Inspection and Acceptance
ISS	Inertial Sub-system Data
KSC	Kennedy Space Center
LBS	Lo Bus Voltage
MW	Milliwatt
NAR	North American Rockwell
NBS	Nominal Bus Voltage
OOS	Out of Spec
RDT	Wheel Rundown Time, Seconds

APPENDIX

ELECTRICAL POWER REQUIREMENTS

This section was extracted from the MIT/IL report E-1142 (Rev. 59) "SYSTEM STATUS REPORT". It is included in this report for convenience.

Electrical power and energy reporting is based upon the inflight spacecraft sequence of events for the Design Reference Mission as developed by the Apollo Mission Planning Task Force (AMPTF). (Reference GAEC Report Volume III - LED-540-12, dated 30 October 1964).

The accompanying diagrams present the power drawn through the spacecraft circuit breakers. It is assumed that power is drawn from the spacecraft's primary +28VDC supply and a 400 cps-115 VAC single phase inverter.

Intermittent power peaks can exist, particularly during operation of displays and controls at random times. The energy content in these peaks is considered negligible.

All values (except those mentioned above) are actual expected levels of power at 28.0 VDC. They are based on measured values on G&N systems 207 and 208 for the Block II Command Module and G&N systems 608, 600, and LM learner for the LM. No margin factor has been applied to protect against possible differences between G&N systems and spacecrafts. Thus, these values should not be taken as "not to exceed" extremes.

The following Interface Control Documents serve as the guidelines for reporting power figures.

CM Block II MH01-01327-216 "G&N Electrical Input Power" signed 15 July 1965.

LM

LIS-390-10002 "PGNCS Prime Power Requirements and Characteristics" signed 30 July 1965.



LUNAR MODULE GUIDANCE & NAVIGATION LOAD ON PRIMARY +28 VDC

BASED UPON 106.02 HOURS (4.42 DAY) LUNAR LANDING MISSION

STATUS OCTOBER 1967

REFERENCE GAEC REPORT - LED 540-12, 30 OCTOBER 1964 APOLLO MISSION PLANNING TASK FORCE

Figure A-1

BLOCK I GUIDANCE & NAVIGATION LOAD ON PRIMARY +28 VDC COMMAND MODULE

BASED UPON 198.5 HOURS (8.27 DAY) LUNAR ORBIT MISSION

DESIGN REFERENCE MISSION

STATUS OCTOBER 1967

REFERENCE GAEC REPORT - LED 540-12, 30 OCTOBER 1964 APOLLO MISSION PLANNING TASK FORCE



Figure A-2

E-2587

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