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DEVELOPMENT OF TECHNOLOGY FOR MODELING OF A 1/8-SCALE DYNAMIC MODEL OF THE SHUTTLE SOLID ROCKET BOOSTER (SRB)

by

A. Levy, J. Zalesak, M. Bernstein, and P.W. Mason

July 1974

Final Report – Prepared Under Contract No. NAS 1-10635-14

by

Grumman Aerospace Corporation

Bethpage, New York 11714

Langley Research Center
Hampton, Virginia 23665

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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- Page 22, The column vector on the right of the first matrix equation should be changed to indicate that it represents reaction forces at the support points as follows:

$$\text{from} \begin{Bmatrix} R_1 \\ \theta_1 \\ Z_1 \\ R_2 \\ \theta_2 \\ \theta_3 \end{Bmatrix} \qquad \text{to} \begin{Bmatrix} F_{R_1} \\ F_{\theta_1} \\ F_{Z_1} \\ F_{R_2} \\ F_{\theta_2} \\ F_{\theta_3} \end{Bmatrix}$$

- Page 32, Reference in the first statement, change from Reference 5-1 to Reference 5-5

- Page 34, Reference 5-6, delete and change to:
  MacNeal, R. H. "The NASTRAN Theoretical Manual" NASA SP 221(01) December 1972.

ABSTRACT

This report describes a NASTRAN analysis of the solid rocket booster (SRB) substructure of the space shuttle 1/8-scale structural dynamics model.

The NASTRAN finite element modeling capability was first used to formulate a model of a cylinder 10 in. radius by a 200 in. length to investigate the accuracy and adequacy of the proposed grid point spacing. Results were compared with a shell analysis and demonstrated relatively accurate results for NASTRAN for the lower modes, which were of primary interest.

A finite element model of the full SRB was then formed using CQUAD2 plate elements containing membrane and bending stiffness and CBAR offset bar elements to represent the longerons and frames. Three layers of three-dimensional CHEXAI elements were used to model the propellant. This model, consisting of 4000 degrees of freedom (DOF) initially, was reduced to 176 DOF using Guyan reduction, and solved in Rigid Format 3 to obtain undamped modes and frequencies. The fundamental NASTRAN mode was 56.4 Hz compared to 58.4 Hz calculated for the beam model.

The model was then submitted for complex Eigenvalue analysis under Rigid Format 7. After experiencing considerable difficulty with attempts to run the complete model, it was split into two substructures. These were run separately and combined into a single 116 degree of freedom A set which was successfully run and are reported herein. The calculated modes included:

- First bending at 56.1 Hz with a critical damping of 2.8%
- First torsion mode at 168.3 Hz with 13.6% of critical damping.

The NASTRAN model in the form of IBM cards, listings, and drawings has been delivered to the NASA Langley Research Center Structures and Dynamics Division.

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ABBREVIATIONS

DOF	degrees of freedom
ET	external tank
NASTRAN	Nasa Structural Analysis System
SRB	Solid Rocket Booster

DEVELOPMENT OF TECHNOLOGY FOR MODELING OF A 1/8-SCALE DYNAMIC MODEL OF THE SHUTTLE SOLID ROCKET BOOSTER (SRB)

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INTRODUCTION

This report discusses work that was performed under Master Agreement Contract NAS 1-10635, Task Order 14 for the Structural Mechanics Branch, Structures and Dynamics Division, NASA Langley Research Center, Hampton, Virginia.

The basic objectives of the task were:

(1) Formulation of an analytical NASTRAN representation of the significant dynamic characteristics of the 1/8-scale model of the shuttle solid rocket booster as specified by drawings and design details developed under NAS 1-10635-11 and later revised under a Rockwell International task

(2) Construction of the solid rocket booster models

(3) Participation in a comparison of experimentally determined structural dynamic characteristics with results of the analysis, and proposing modifications in analysis technology as required.

Part (3) of this task was later modified because of unavailable experimental data and the necessity to devote the time to other analytical tasks.

DESCRIPTION OF THE 1/8-SCALE SOLID ROCKET BOOSTER

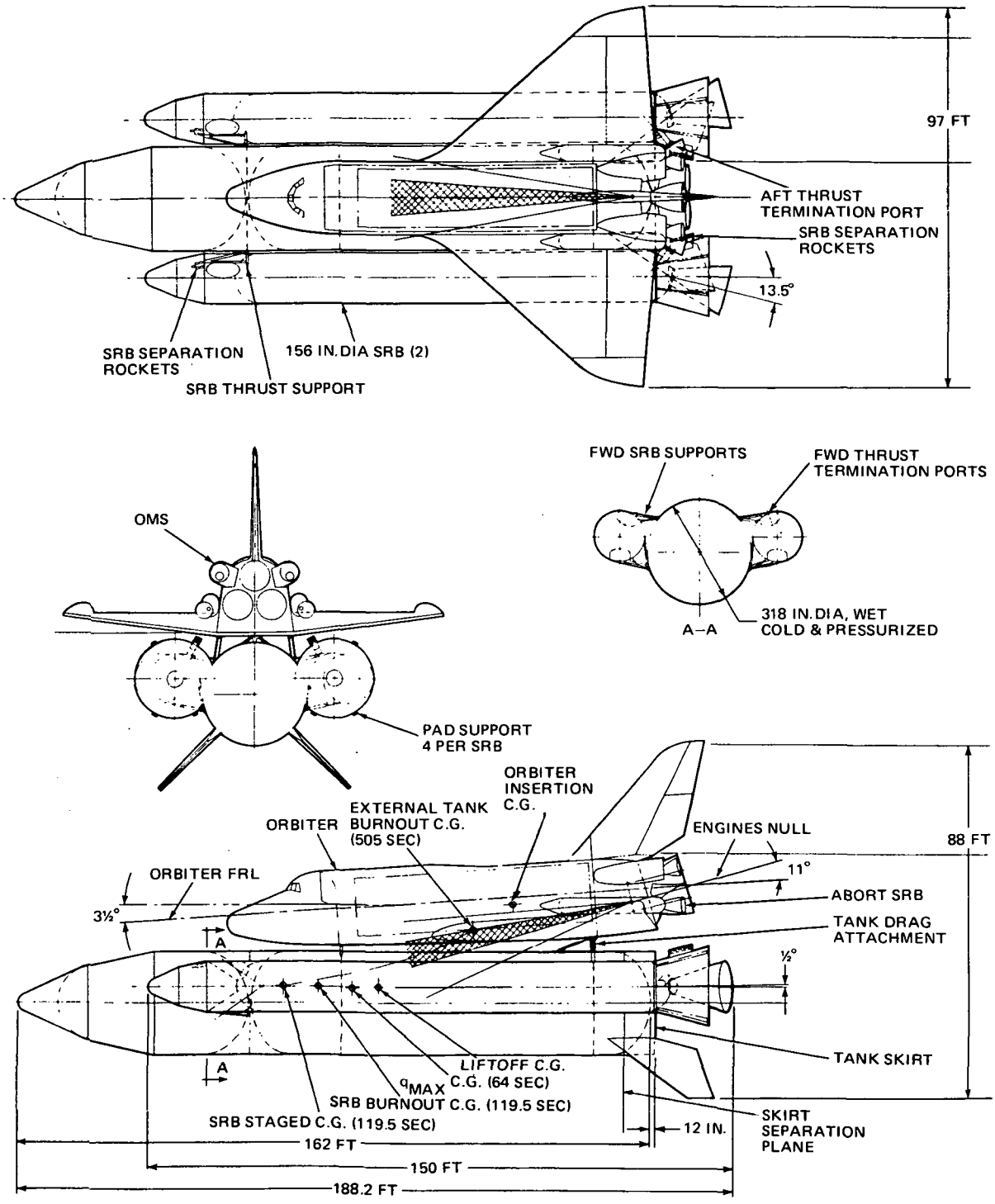
The 1/8-scale shuttle dynamic model is based on Grumman's parallel-burn Space Shuttle Design 619 shown schematically in Fig. 1. A mockup of the 1/8-scale Shuttle model basic configuration is shown in Fig. 2. A detailed structural arrangement of the prototype SRB is shown in Fig. 3. In simplifying the design, a major objective was to keep the model fabrication cost within target while retaining as many of the significant structural dynamic characteristics as possible. For the alloted funds it was thus impossible to consider a replica at the small scale necessary for testing in the existing NASA/Langley facilities. Hence, only the general characteristics of the major SRB components were simulated without attempting to model local details.

The 1/8-scale solid rocket booster model shown assembled in Fig. 4 and schematically in Fig. 5 consists of three separable parts:

- A forward skirt
- A propellant cylinder
- An aft skirt.

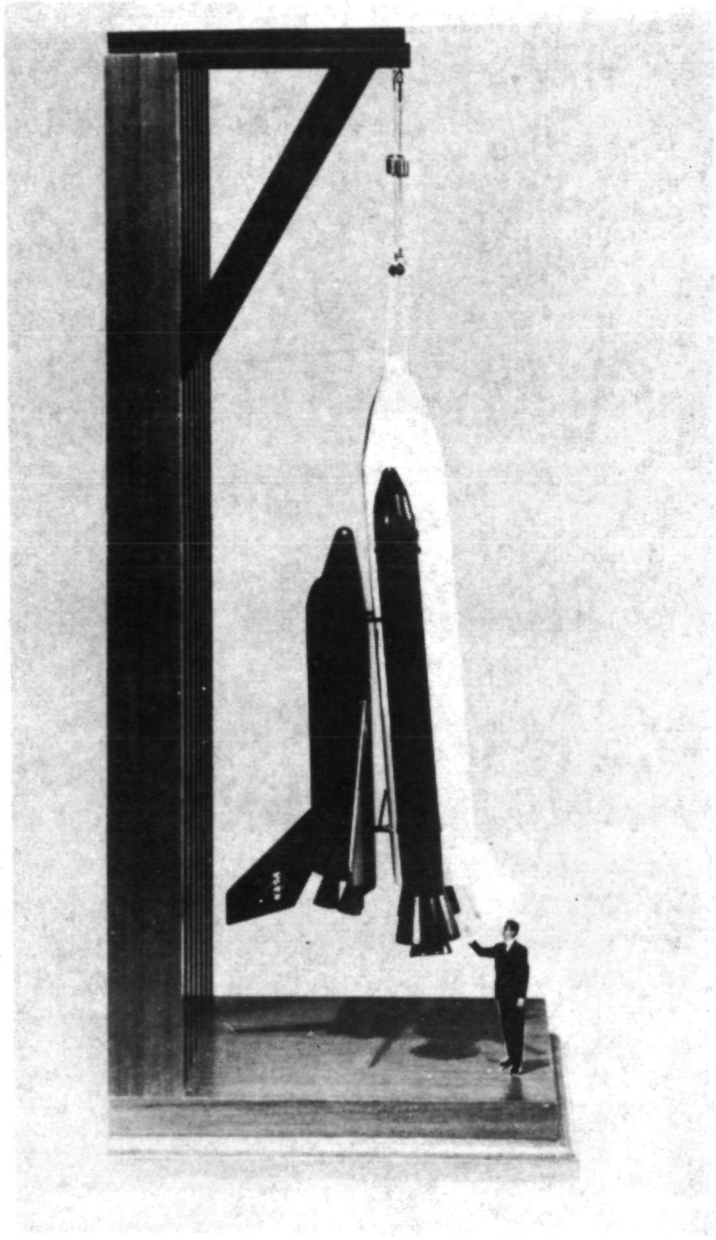
The design is described in Reference 5-1 and in the drawings listed in Table 1. The model described, provides a basis for comparison with the analytical NASTRAN model.

The scaling relationships that must exist between the model and the prototype are shown in Table 2. These directly follow from a dimensional analysis of the various parameters that influence the dynamic behavior of the structure, and from the choice of the model material. Extrapolating prototype behavior from model test data is accomplished by using these scaling relationships directly. It should be noted however, that because of design expediency, some of the scaling rules have been compromised. Some liberty has also been taken in modeling the stiffness characteristics in so far as some lumping was necessary in order to avoid the large expense of exact scaling of very small dimensions. Thus, stiffeners have been lumped to some extent but not eliminated completely.



3-55
T14-1

Fig. 1 Mated Space Shuttle Flight System (Grumman-Proposed Design 619)



S-3
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Fig. 2 Mockup of 1/8-Scale Shuttle Model During Vertical Suspension

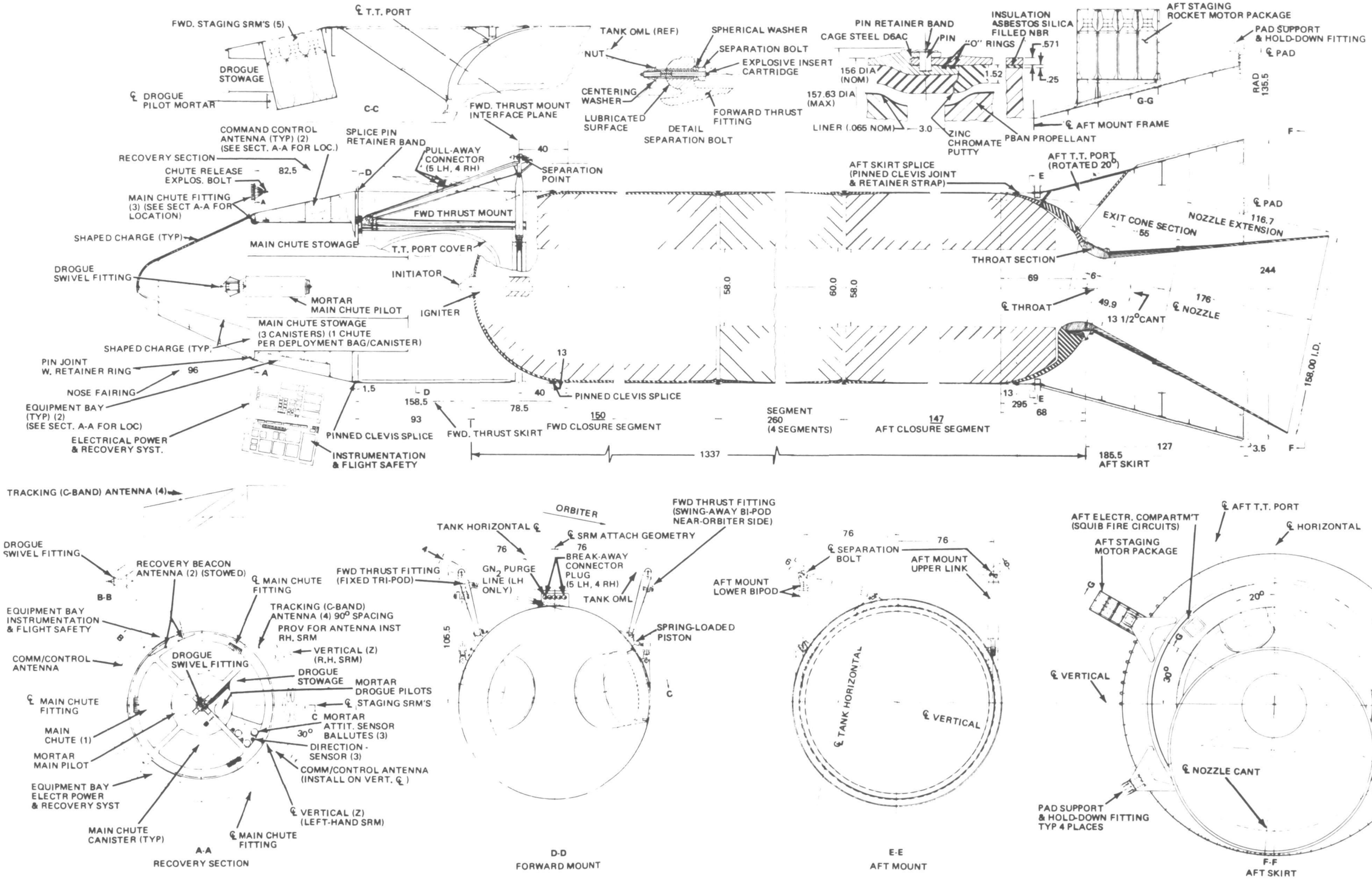
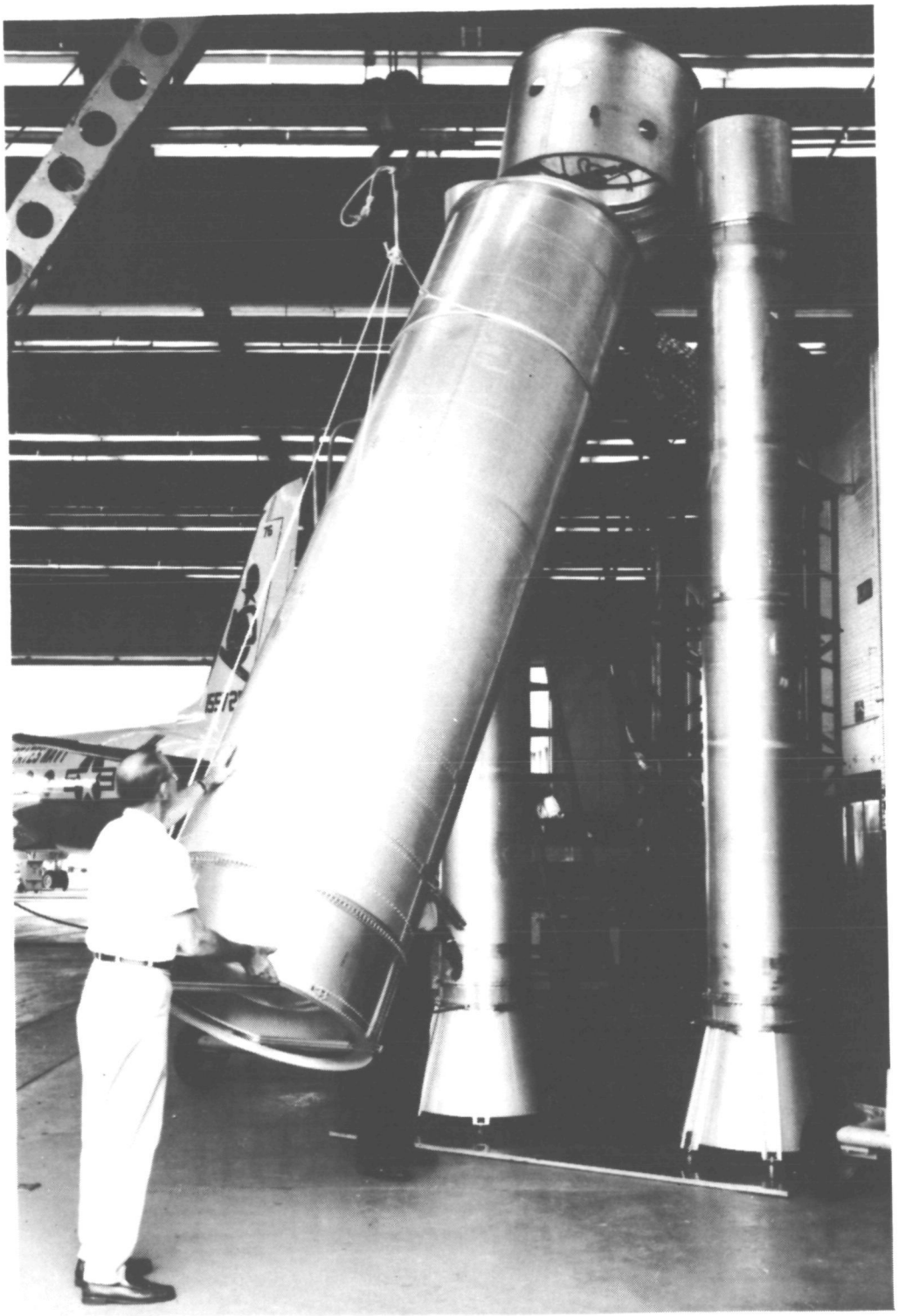
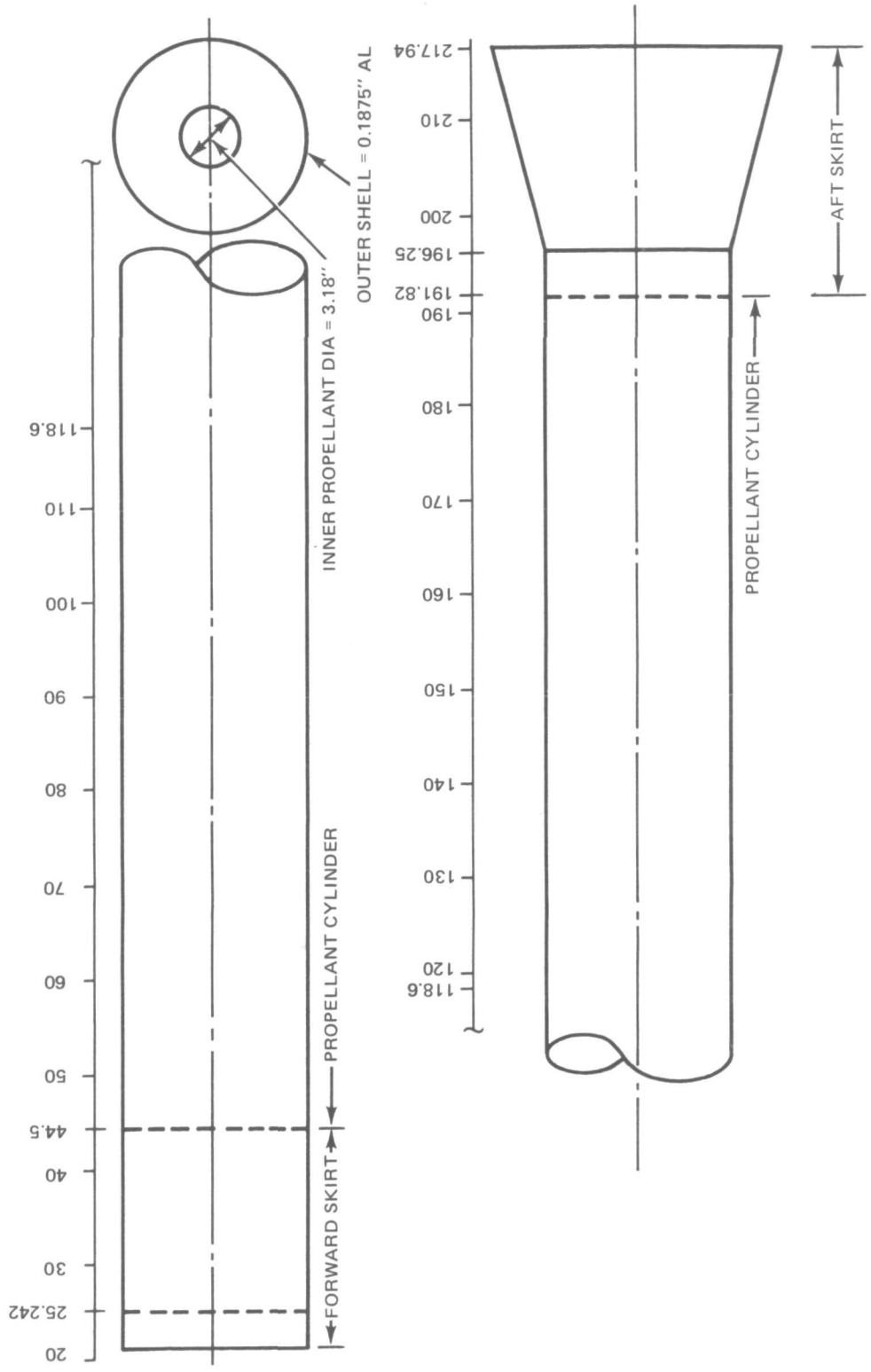


Fig. 3 Prototype SRB Inboard Profi



T14-4

Fig. 4 Assembled 1/8-Scale Model of the Space Shuttle Solid Rocket Booster



T14-5

Fig. 5 Assembled View of 1/8-Scale Model of the Solid Rocket Booster

Table 1 Drawing Descriptions of 1/8-Scale Model

Drawing Number	Description
AD383 -500 A	Model Assembly Suspended (3 Sheets)
-501 A	Shuttle Model Assembly
-502 A	External Tank Assembly
-503 A	SRB Assembly
-504 N/C	Orbiter Assembly
-505 N/C	LO_2 Tank Assembly (2 Sheets)
-506 N/C	Intertank Skirt Assembly
-507 A	LH_2 Tank Assembly (2 Sheets)
-508 N/C	Aft Skirt Assembly
-510 N/C	SRB Forward Skirt Assembly
-511 N/C	SRB Propellant Cylinder Assembly
-512 A	SRB Aft Skirt Assembly
-514 N/C	LH_2 Tank Fitting Installation
-515 A	Rings for External Tank
-516 A	Intertank Skirt Frame Assembly
-517 N/C	LH_2 Tank Frame Assembly
-518 N/C	External Tank Aft Skirt Frame Assembly
-520 A	SRB Rings
-521 N/C	SRB-to-External Tank Thrust Fittings
-522 A	External Tank-to-SRB Thrust Fitting
-525 N/C	Orbiter Forward Section Assembly and Installation
-526 N/C	Orbiter Payload Bay Cover Assembly and Installation
-527 N/C	Orbiter Payload Module Installation
-528 N/C	Orbiter Aft Section Assembly
-529 A	Orbiter Wing Installation
-530 A	Orbiter Fuselage Side and Bottom Skin Panel Assembly and Installation
-531 N/C	Orbiter Keel Assembly and Installation
-532 N/C	Orbiter Wing Beam Carry-Through Assembly
-533 N/C	Orbiter Aft Interstage Fitting Assembly
-534 N/C	Orbiter Engine Support Bulkhead Assembly (2 Sheets)
-535 N/C	Orbiter Fin-Stub Installation
-536 A	Orbiter Fuselage Forward Frame Assembly
-537 N/C	Orbiter Abort SRB Installation
-538 N/C	Model Cosmetic Lines (2 Sheets)
-539 N/C	Orbiter Engine Bulkhead (Station 180.009) Fittings
-541 N/C	Intertank Skirt Assembly (NAR Configuration)
-542 N/C	Frame Installation Intertank Skirt (NAR Configuration)
-543 N/C	SRB Forward Skirt Assembly (NAR Configuration)
-544 N/C	Thrust Fitting-Intertank Skirt (NAR Configuration)
-545 N/C	Thrust Pin (NAR Configuration)
-546	Comparison NAR Shuttle Configuration and 1/8-Scale Dynamic Model

T14-1(T) NOTE:

(1) Copies of each of the above drawings have been submitted separately to NASA/Langley and to North American Rockwell

(2) These drawings are available from the Structural Mechanics Branch, Structures and Dynamics Division, NASA/Langley Research Center, Hampton, Virginia, 23365.

Table 2 Pertinent Scaling Relations for 1/8-Scale Model of SRB

Physical Quantity	Magnitude	
	Propellant	Structure*
Length (Overall) and Displacement	$8L_m = L_p$	$8L_m = L_p$
Mass Density	$\rho_m = \rho_p$	$3\rho_m = \rho_p$
Modulus of Elasticity	$E_m = E_p$	$3E_m = E_p$
Area	$8^2 A_m = A_p$	$8^2 A_m = 3A_p$
Area Moment of Inertia	$8^4 I_m = I_p$	$8^4 I_m = 3I_p$
Volume	$8^3 V_m = V_p$	$8^3 V_m = 3V_p$
Weight	$8^3 \rho_m V_m = \rho_p V_p$	$8^3 \rho_m V_m = \rho_p V_p$
Longitudinal Stiffness	$8^2 E_m A_m = E_p A_p$	$8^2 E_m A_m = E_p A_p$
Bending Stiffness	$8^4 E_m I_m = E_p I_p$	$8^4 E_m I_m = E_p I_p$
Frequency	$f_m = 8f_p$	$f_m = 8f_p$

*Aluminum Used in Model to Represent Steel Prototype

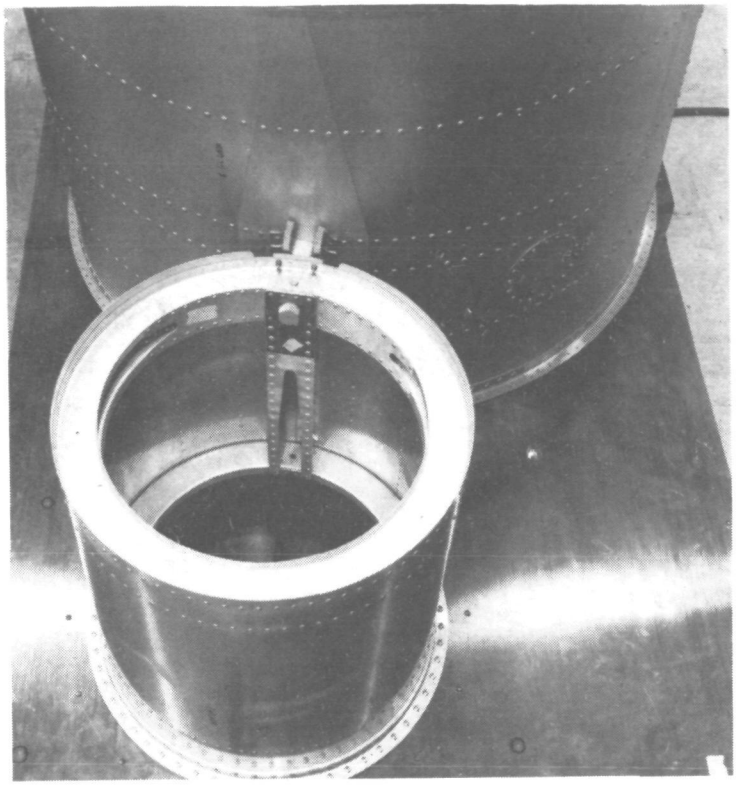
T14-2(T)

While accurate modeling of the prototype was desirable for extrapolating basic Shuttle dynamic characteristics, another prime object of the study was the NASTRAN dynamic analysis and its correlation with model test data. A complete static and dynamic analysis was made using NASTRAN with the structure modeled to a degree of refinement considered sufficient for preliminary design purposes. Therefore, the need for direct scaling of the prototype design to obtain an exact model in every detail was not considered to be crucial. It should also be pointed out that the Shuttle design was still in a state of flux at the beginning of this study, thus any attempt to model the then current vehicle exactly was not overly beneficial to the Shuttle Project.

Forward Skirt - The forward skirt shown in Fig. 6 is designed to typify the solid rocket booster/external tank (ET) interstage connection of the proposed Rockwell International configuration of Nov. 29, 1972. This was a modification to the original design for the 1/8-scale shuttle model. It is constructed of aluminum, consists of a cylinder 19.5 inches in dia and 21 inches long containing one longeron along the azimuth where it is fastened to the ET. In that local area the skin is increased in two steps from the basic 0.040 in. thickness by a riveted doubler which itself is chem milled. The net result is a multi-step variation in thickness from 0.040 in. to 0.188 in. at the ET connection point. Refer to Fig. 13 for a developed view of the forward skirt. The single longeron is designed to distribute the axial loads. It is a variable cross-sectional area, being a maximum at the forward ring where a single pin is used to fasten the SRB to the ET.

Around the top and bottom of the cylinder are frames consisting of two back-to-back channel members separated and fastened by cylindrical inner spacers. A ring riveted to the bottom of the forward skirt contains provisions for machine screw fasteners every 0.66 in. for attaching to the propellant cylinder.

Propellant Cylinders - Three sets of propellant cylinders were formed and loaded with inert solid propellant to represent different weight configurations. All had a 0.1875 in. thick aluminum shell and were 19.5 in. in dia and 147.32 in. long. This length included the machined rings riveted to the ends for fastening the skirts. The length of propellant material in these cylinders is about 145.4 inches. The propellant weight configurations simulated were for lift-off, maximum dynamic pressure, and end burn. The simulated propellant which consisted of inert PBAN described in

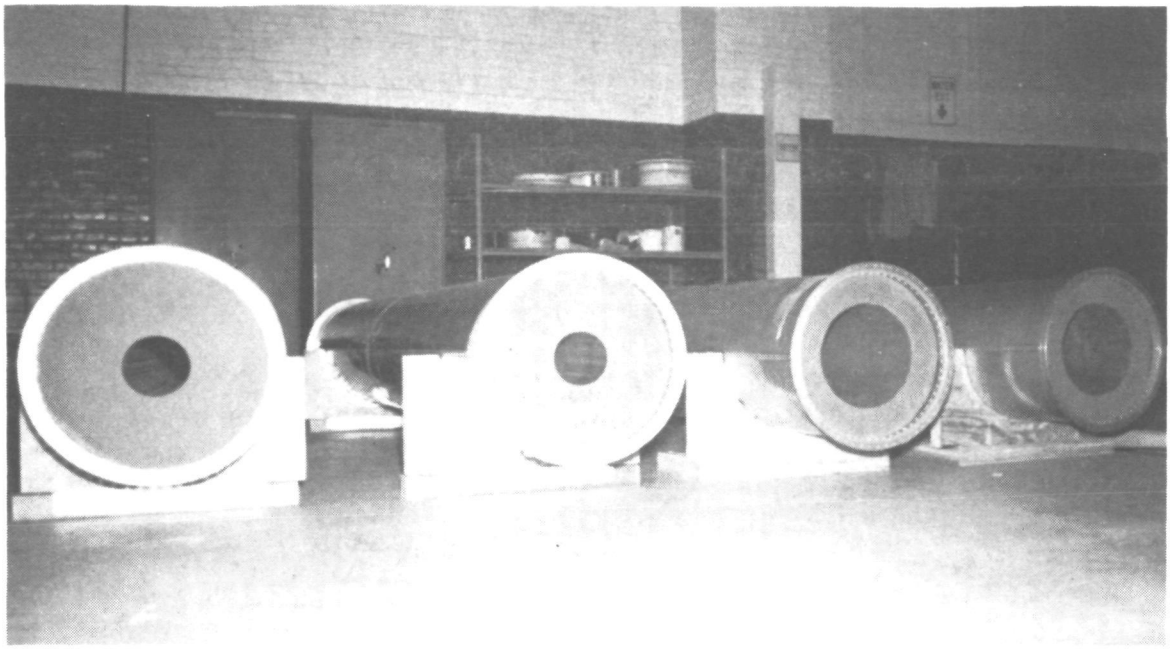


T14-6

Fig. 6 1/8-Scale Solid Rocket Booster Forward Skirt

more detail later was supplied by United Technology Corp (UTC). A photograph showing end views of the two heavier pairs of cylinders for the lift-off and mid-burn weights is presented in Fig. 7. The weight of each cylinder before and after pouring of the simulated propellant as recorded by UTC is shown in Table 3.

Aft Skirt - The aft SRB skirt shown in Fig. 8 is constructed of aluminum and consists of a short cylindrical section and a longer conical section. Skin thickness is 0.062 inches. At the intersection of the conical and upper cylindrical section is the U-shaped ring used for mounting the fittings for the struts attaching the SRB to the ET. At the top of the conical section is the machined ring which mates with the propellant cylinders. The conical section contains four longerons made of double channel sections which terminate in the fittings used to fasten the entire model to the base support structures. At the bottom of the aft SRB skirt, the conical skin is fastened to a ring made of four segments of a channel.



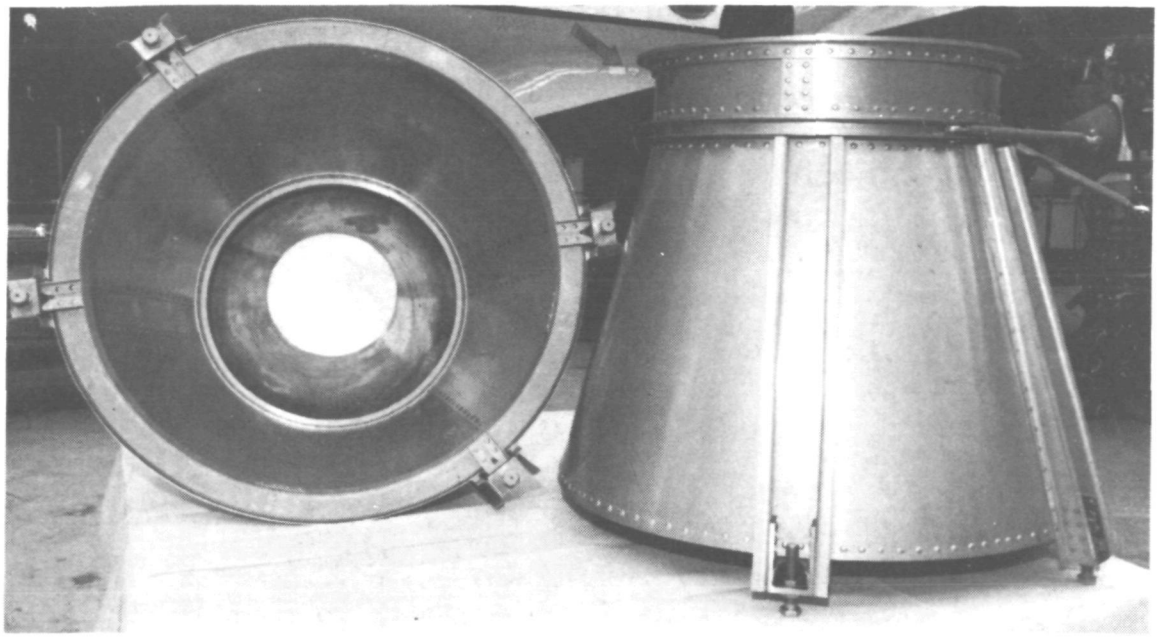
T14-7

Fig. 7 End View of Propellant Cylinders for 1/8-Scale Model of Solid Rocket Booster

Table 3 Summary of Propellant Cylinder Weights

Propellant Cylinder Serial No.	Weight of Empty Container, lb	Weight of Container with Liner, lb	Weight of Loaded Cylinders, lb
1	172.5	179.0	542.0
2	172.0	179.5	580.0
3	172.5	177.0	1720.0
4	173.0	179.5	1706.0
5	173.0	178.0	2526.0
6	172.0	178.5	2520.0

T14-3(T)



T14-8

Fig. 8 1/8-Scale Model Solid Rocket Booster Aft Skirt

Propellant Characteristics - The most significant characteristics of the solid propellant for vibration are the complex moduli corresponding to the range of frequencies encountered. The simulated propellant used for the 1/8-scale model was inert UTI-610 manufactured by United Technology Center Division of United Aircraft Corp. in Sunnyvale, California. This consists of essentially the same binder-fuel-curative components as UTP-3001 propellant used in Titan. Inert sodium chloride and inert ammonium sulphate were substituted for the ammonium perchlorate in the inert UTI-610.

Batch 400-1384 which was used in the 1/8-scale model, yielded samples having a density of 0.0627 lb/cu in., a stress at maximum load of 132 psi and a strain at maximum load of 40 per cent. Estimated tensile and shear properties believed applicable were furnished by UTC (Reference 5-2) and are listed in Table 4.

The moduli vary with both frequency and temperature. The variation with temperature is shown in Fig. 9. The data is applicable for 18°C since the value of a_t is 1.0. If the temperature should be 5°C higher, then the value of a_t becomes 1.58, because the log 1.58 = 0.2. To determine the modulus for this temperature at a specific frequency, form the product and find the corresponding value in Table 4. For the analyses described, the Modulus of Elasticity E, was taken as 25,000 and the loss factor, ρ, as 0.52.

Four containers of propellant were poured as samples during the filling of the SRB cylinders. Each sample contained about 8 lb (two quarts) of propellant. These were delivered to the Langley Research Center with the 1/8-scale SRB model.

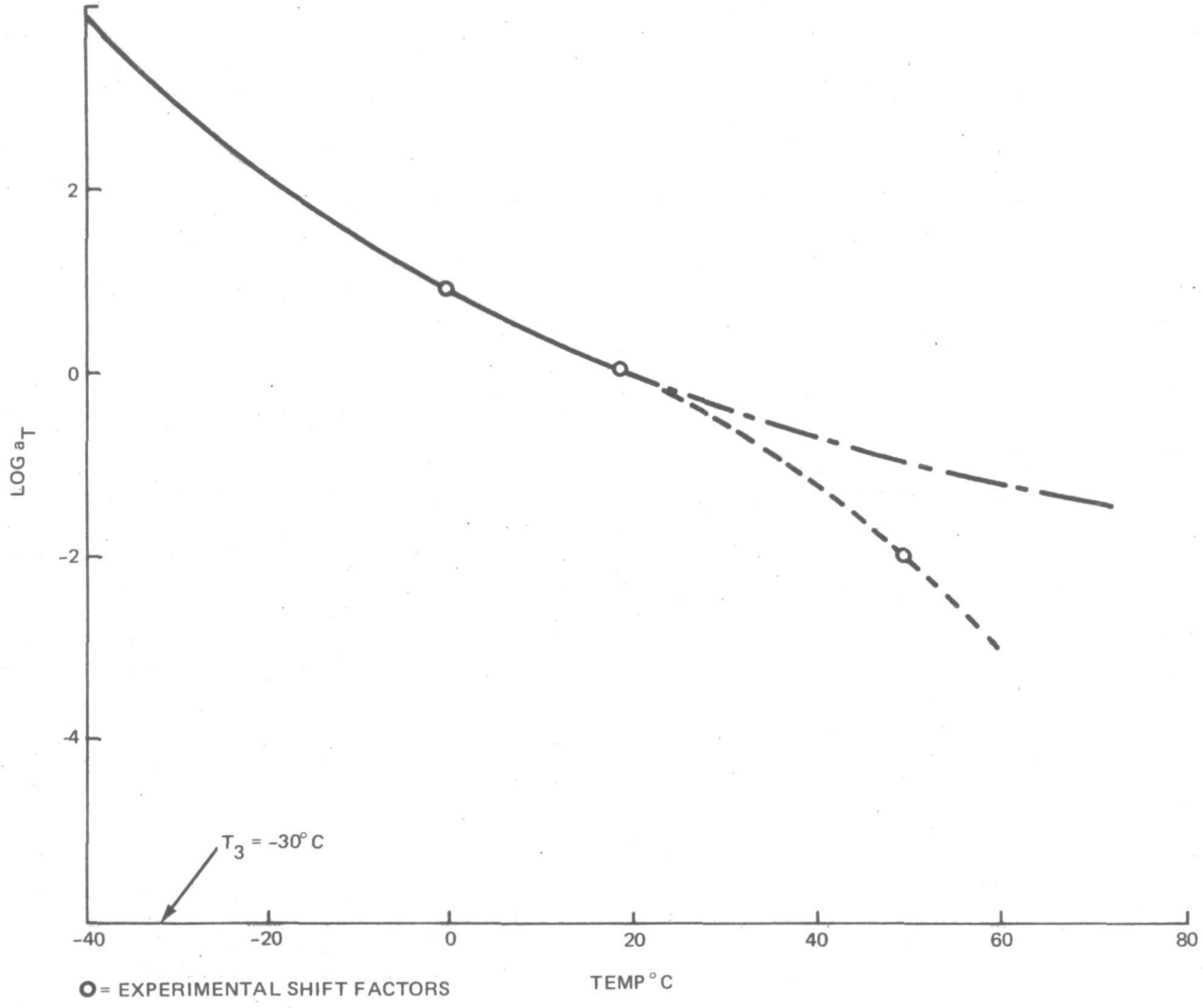
Table 4 Inert Propellant Properties of UTI-610 (UTP 6055/1141) *

$a_T f$ (Hz)	E = E′ + iE″		G = G′ + iG″		$\rho = \frac{G''}{G'}$
	E′ (psi)	E″ (psi)	G′ (psi)	G″ (psi)	
5	9,618	6,110	3,206	2,037	0.64
10	12,831	8,191	4,277	2,730	0.64
20	17,052	9,429	5,684	3,143	0.55
30	19,313	10,140	6,438	3,380	0.52
40	20,995	10,978	6,998	3,659	0.52
50	22,537	11,830	7,512	3,977	0.52
60	24,048	12,592	8,016	4,197	0.52
70	25,540	13,214	8,513	4,405	0.52
80	26,996	13,678	9,000	4,559	0.51
90	28,375	13,991	9,465	4,664	0.49
100	29,719	14,167	9,966	4,722	0.48
200	38,354	12,285	12,785	4,095	0.32
300	41,744	9,560	13,915	3,187	0.23
400	43,231	7,622	14,410	2,541	0.18
500	43,988	6,282	14,663	2,094	0.15

*Taken from Ref. 5-2.

T14-4(T)

E = Complex Modulus of Elasticity; G = Complex Shear Modules



T14-9 **Fig. 9 WLF and Experimental Shift Factors for UTP 6055/1141 Inert Propellant**

NASTRAN FINITE ELEMENT MODEL OF SRB

The idealization of the solid rocket booster, shown in Fig. 10, is a NASTRAN generated plot of the outer shell. The locations of the frames and longerons of the experimental model are indicated by the number and symbol key. The dimensions used to model the frames and longerons are shown in Fig 11. Figure 12 shows the complete finite-element idealization including:

- All the properties
- Geometry of the model
- Tie down points
- Summary of the type and number of elements.

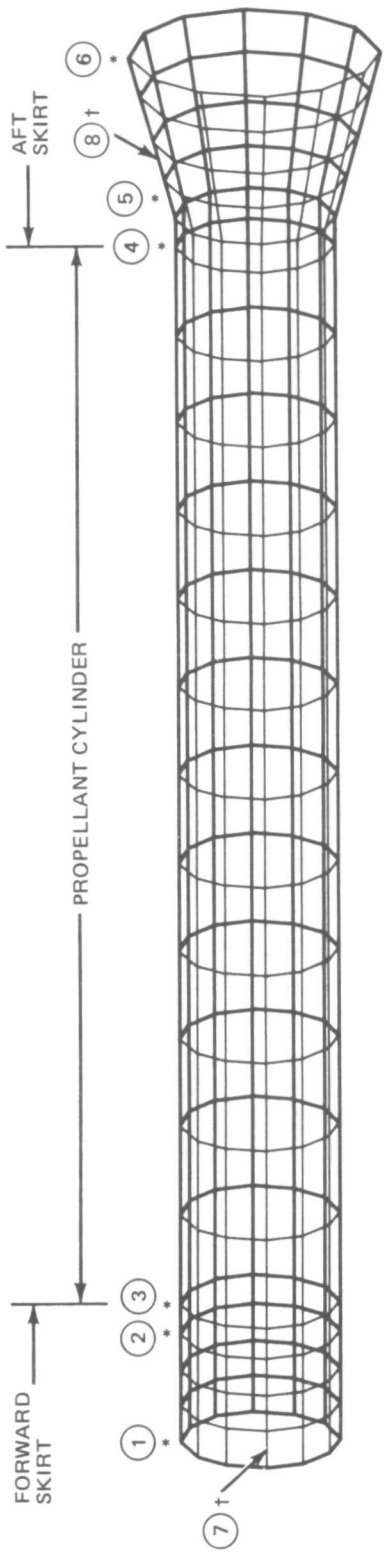
Plate elements (CQUAD2) containing membrane and bending stiffness are used to represent the outer skin. The thickness of the plate elements in the forward skirt includes the effects of the doubler and various straps and plates. Figure 13 shows a developed view. Offset bar elements (CBAR) are used to represent the frames and longerons. Three heavy frames exist: the first at STA 44.5 which is the forward skirt-propellant cylinder connection; the second at STA 191.820 which is at the aft skirt-propellant cylinder connection; and the third at STA 196.250 which is the transition to the conical section of the aft skirt (also the SRB/ET interstage connection). Three-dimensional elements (CHEXAI) are used to model the propellant. Three layers of elements (in the radial direction) are used in the full propellant load (lift-off) condition. The incompressibility of the solid fuel is approximated by using a Poisson ratio of 0.49.

A preprocessor has been developed to generate the finite-element model. This program generates:

(1) A cylindrical shell

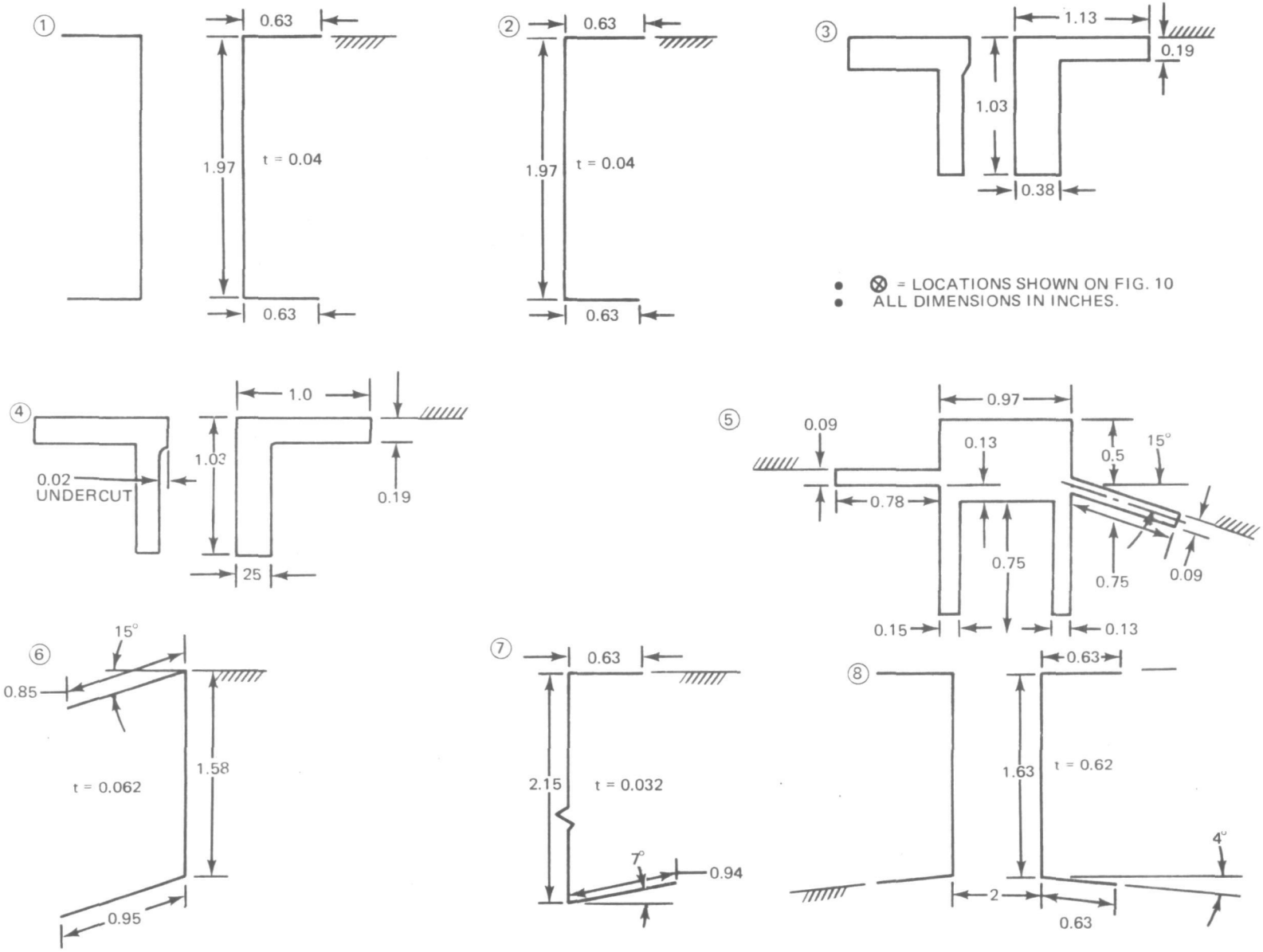
(2) A cylindrical shell with a solid cylindrical interior

(3) A cone-shaped shell (used for the aft skirt)



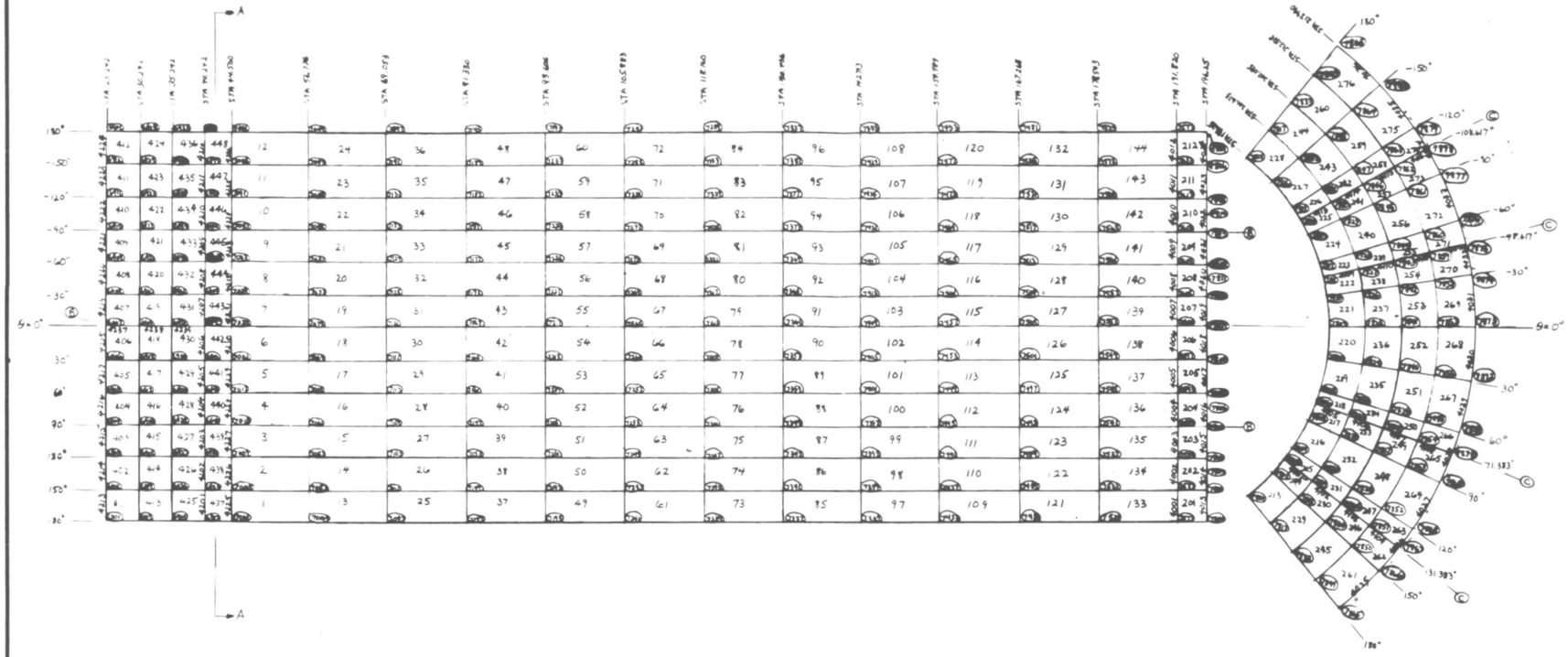
T14-10

Fig. 10 NASTRAN Idealization of 1/8-Scale Solid Rocket Booster Model



T14-11

Fig. 11 Frame and Longeron Sections – Schematic



VIEW A-A
TYPICAL VIEW OF PROPELLANT
STA 44.500 THRU STA 196.250

NOTE 1. 294 SHELL NODES, 468 ADDITIONAL NODES FOR PROPELLANT, 752 TOTAL NODES

NOTE 2. SRM TIE-IN TO TANK AT (A)

NOTE 3. TIE DOWN AT (C)

NOTE 4. FWD SKIRT STA 25.242 THRU STA 44.500
AFT SKIRT STA 191.820 THRU STA 196.250

NOTE 5. PROPELLANT DENSITY = 0.062 LB./IN.^{3}
SKIN DENSITY = 0.1 LB/IN.^{3}
TOTAL WEIGHT = 2,510 LB

REVISIONS						
ZONE	LTR	DESCRIPTION	EFF CODE	MODEL	DATE	APPROVED

FRAMES

STA	OFFSET (r-comp)	A	I
25.242	−0.960	0.259	0.142
40.242	−0.960	0.127	0.071
44.500	0.410	1.068	0.074
191.820	0.365	0.800	0.089
196.250	0.000	0.998	0.130
217.990	−0.790	0.210	0.077

STIFFENERS

ELEMENT NOS.	OFFSET R	OFFSET Z	A	I
4237 THRU 4237	−1.075		0.260	0.150
4101 THRU 4116	0.7327	−0.2071	0.358	0.060

PLATE ELEMENT THICKNESSES

t	ELEMENT NUMBER
0.1875	1 THRU 144
0.062	201 THRU 276
0.040	401 THRU 448 EXCEPT AS FOLLOWS
0.054	417, 420
0.058	429, 432
0.280	406, 407
0.135	415, 419
0.096	430, 431

ELEMENT TYPES

NUMBER	TYPE	TOTAL NO.
1 THRU 144	QUAD2	
201 THRU 276	"	
401 THRU 448	"	268
1081 THRU 1432	HEXA1	
3081 THRU 3432	"	304
4001 THRU 4036	BAR	
4101 THRU 4116	"	
4201 THRU 4239	"	91
		1231

T14-12

FOR PARTS LIST, USAGE DATA, AND DWG SH STATUS, SEE DOCUMENT BASE NUMBER PREFIXED PL

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES			CONTRACT NO.	GRUMMAN AEROSPACE CORPORATION BETHPAGE, NEW YORK 11714
LINEAR TOL	XX	± .03	DRAWN BY A. LEVY	Fig. 12 NASTRAN Model of Solid Rocket Booster
	XXX	± .010	LAYOUT BY	
ANGULAR TOL		± 0°30'	CHECKED BY	
TOL ON LOFTED DELINEATIONS IS			GR LEADER	
			REL GROUP	
			PROJ ENGR M. EHRNSTEIN	SIZE E · CODE IDENT NO. 26512 · AD-383-563
			GOVT APPD	SCALE 1/10 · SHEET 1 OF 1

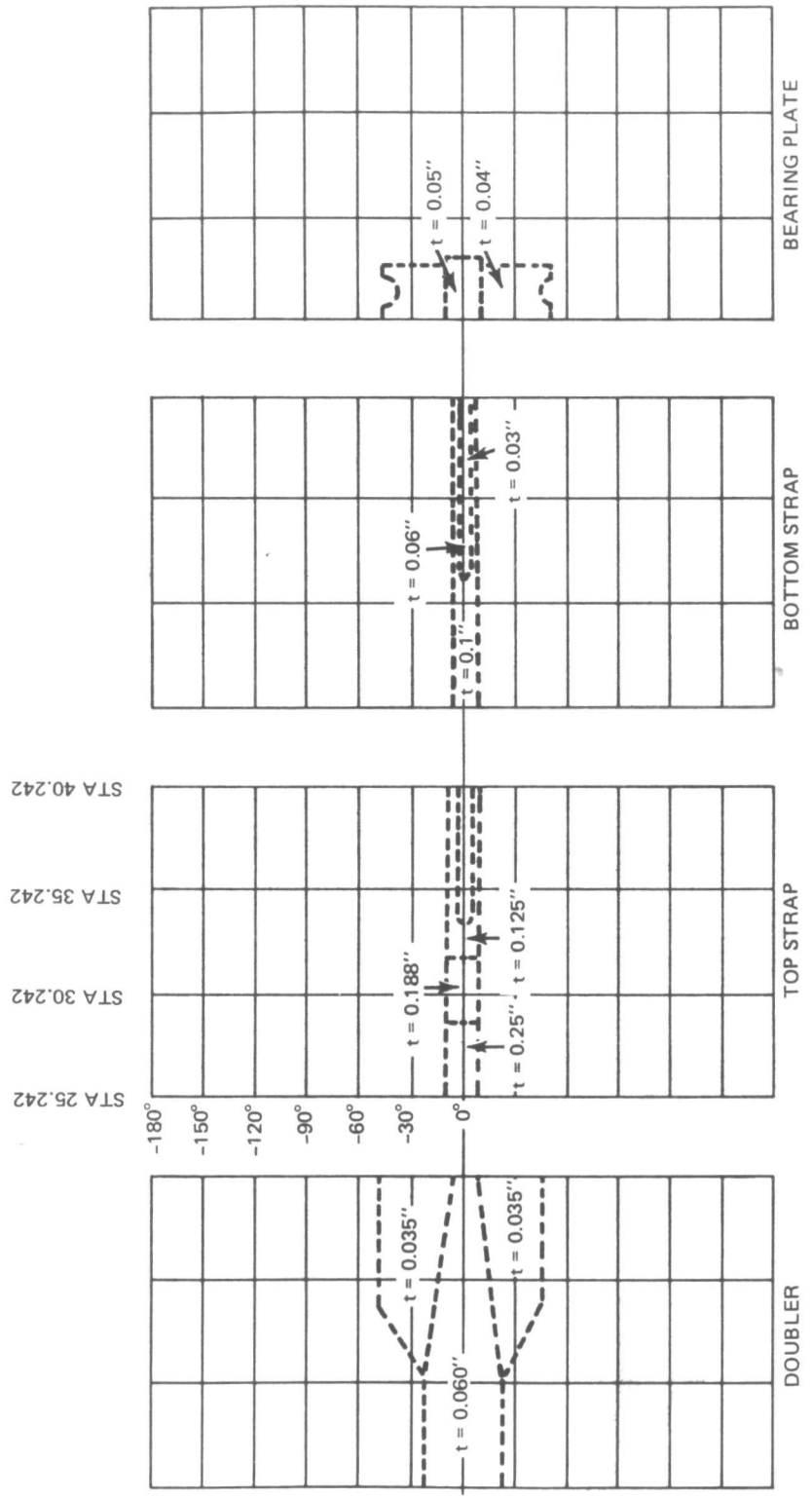


Fig. 13 Idealization of 1/8-Scale Model Solid Rocket Booster Forward Skirt

T14-13

Minor changes are made in the forward skirt model to adjust the thickness of the various elements.

In order to obtain a guide for the accuracy of the NASTRAN program and the adequacy of the SRB finite-element model, the SRB was modeled as a cylinder of radius 0.25 m. (10 in.) and length 5.08 m. (200 in.). The finite-element idealization consisted of 21 bays along the length and 12 bays around the circumference. The following table represents a comparison of results between NASTRAN using the Givens method (Rigid Format 3), Grumman's STARS-2V program (Ref. 5-3) and NASA Langley's SRA program (Ref. 5-4). The STARS -2V and SRA programs are based on thin-shell orthotropic theory. The accuracy of the NASTRAN results are relatively good for the lower modes, which are of primary interest, and depend upon the relative complexity of the Eigenvectors.

Empty Cylinder Vibration Analysis

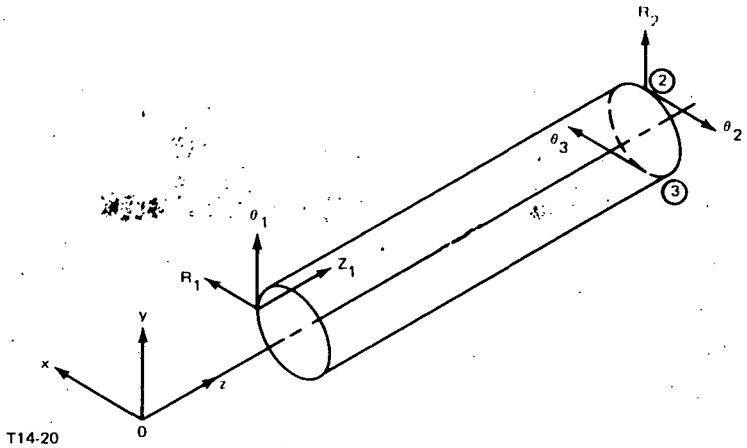
Frequency, Hz			
Stars-2V	SRA	NASTRAN (Givens method)	% Error
52.0 (n = 2, 1st)	51.56 (n = 2, 1st)	55.2	6
52.4 (n = 2, 2nd)	51.66 (n = 2, 2nd)	54.9	5
66.6 (n = 2, 3rd)	66.04 (n = 2, 3rd)	73.9	11
119.3 (n = 1, 1st)	120.46 (n = 1, 1st)	122.5	3
120.4 (n = 2, 4th)	–	171.8	42
147.1 (n = 3, 1st)	–	165.1	12

n = number of circumferential full waves; 1st, 2nd etc. = number of lateral half waves.

T14-7(T)

After establishing confidence in the number and spacing of the grid points, a model was formulated representing the complete SRB including full propellant elements, forward skirt, and aft skirt. This was submitted for NASTRAN real Eigenvalue analysis using Rigid Format 3. As part of this analysis, an equilibrium check

is made on the entire SRB model (skin plus propellant) after the generation of the reduced stiffness and mass matrices. For this purpose, temporary rigid body supports are included as shown below:



T14-20

Equilibrium matrices for the free degrees of freedom are formulated and represent the resultant forces about a chosen point (0). These resultants are compared to the overall resultants at the support points (shown below).

$$\begin{Bmatrix} F_x \\ F_y \\ F_z \\ M_x \\ M_y \\ M_z \end{Bmatrix}_0 = \begin{bmatrix} 1.0 & 0.0 & 0.0 & 0.0 & -1.0 & 0.0 \\ 0.0 & 1.0 & 0.0 & 1.0 & 0.0 & 0.0 \\ 0.0 & 0.0 & 1.0 & 0.0 & 0.0 & 0.0 \\ 0.0 & -Z_1 & 0.0 & -Z_2 & 0.0 & 0.0 \\ Z_1 & 0.0 & R_1 & 0.0 & -Z_2 & Z_3 \\ 0.0 & R_1 & 0.0 & 0.0 & R_2 & R_3 \end{bmatrix} \begin{Bmatrix} R_1 \\ \theta_1 \\ Z_1 \\ R_2 \\ \theta_2 \\ \theta_3 \end{Bmatrix}$$

where

i	Node	R_i	θ_i	Z_i
1	6907	9.75	0.0	25.242
2	7805	9.75	90.0	196.25
3	7813	9.75	-90.0	196.25

T14-8(T)

A detailed description of the DMAP Alter package used for this purpose is presented in Ref. 5-5.

The undamped vibrational modes for the full cylinders are listed in the tables that follow. The model consisted of 4,000 DOF which were reduced to 176 DOF after a Guyan reduction was employed. The modes of most interest are the 1st and 2nd

bending modes and the longitudinal rod and thickness shear mode. The latter involves extension of the outer case and extension and shear deformation of the propellant. Figure 14 shows shematic cross-sectional views of the lateral and longitudinal vibrational motion, and Fig. 15 presents orthographic views of the motion obtained from the NASTRAN analysis. The table titled Vibration Analysis of Full Propellant Cylinder-Undamped, includes the results for simple beam theory for the modes of interest (bending and longitudinal) based on the composite properties of the SRB cylinder.

Using a structural damping factor of 0.52 for the propellant elements which is the material property determined from Table 4, the complex Eigenvalues for the lowest bending and longitudinal modes were obtained using Rigid Format 7. These are compared with the undamped modes as tablulated in the second table below. Simple beam theory (no shear) predicts a value of $1/Q = 0.028$, which agrees with the bending mode damping coefficient, c/cc. The difference between this value and that for the longitudinal mode is due to the thickness shear effects. (Refer to Fig. 14b).

Vibration Analysis of Full Propellant Cylinder – Undamped

Mode	Frequency, Hz	
	NASTRAN	Simple Beam Theory
n = 1, m = 1	56.4	58.4
n = 0, torsion	171.4	–
n = 1, m = 2	173.0	161.0
n = 0, longitudinal	196.1	180.2

T14-9(T)

Vibration Analysis Using Damped Solid Finite Elements

Mode	Frequency, Hz		Damping value, 1/Q*
	Undamped	Damped	
Bending – 1st	56.38	56.39	0.027
Longitudinal – 1st	196.0	197.1	0.056
*1/Q = η where η is the equivalent damping constant.			

T14-10(T)

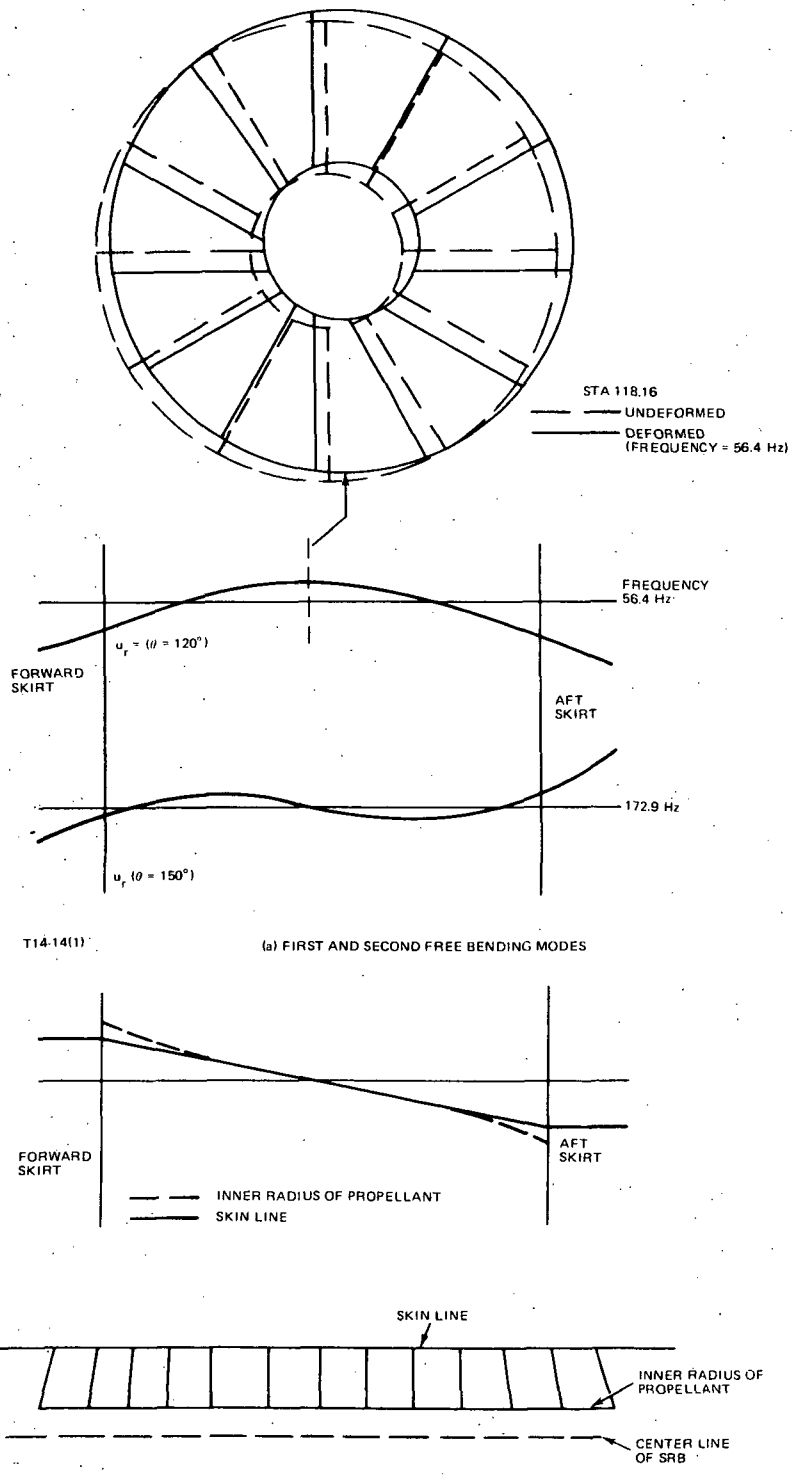
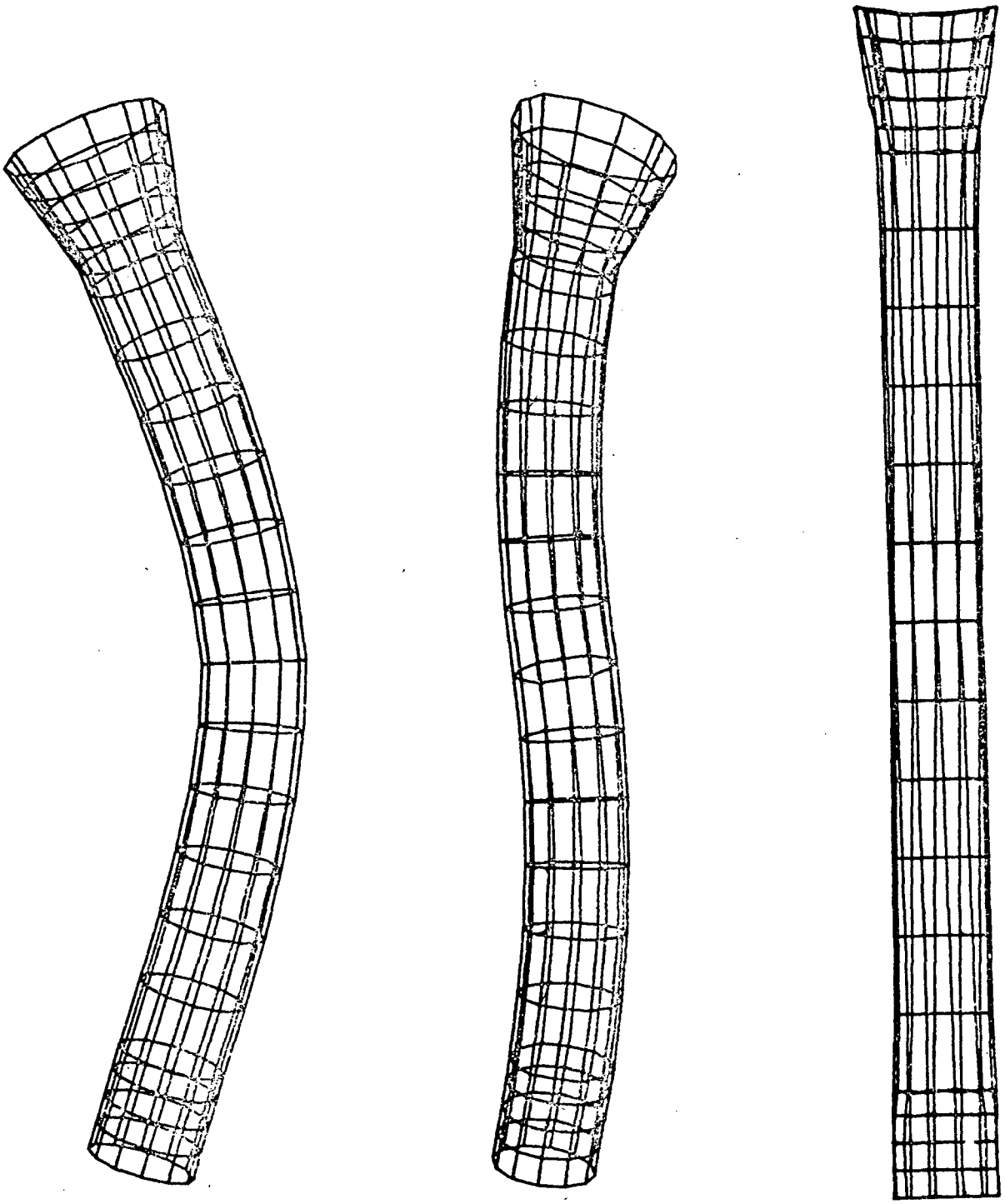


Fig. 14 Shapes for SRB Modes



(a) FIRST FREE BENDING MODE. 56.4 Hz

(b) SECOND FREE BENDING MODE. 173.0 Hz

(c) LONGITUDINAL MODE SHOWING SOME TORSION. 196.1 Hz

T-14-15

Fig. 15 Shapes for SRB Bending Modes

After these initial two Eigenvalues and Eigenvectors were obtained, the NASTRAN model was submitted unsuccessfully several times in an effort to calculate other modes. The model during these submissions had 3,114 degrees of freedom (DOF) in the F set and was set up to omit 2,902 coordinates with 212 remaining. The OMIT Set was finally eliminated but the run took 70 min of CPU time. Attempts to run from the checkpoint tape were not successful, therefore the model was split into two parts. The forward portion consisted of 2,508 DOF in the G set (1,746 in the F set) and 282 in the A set. The NASTRAN data used in this submission is listed in Appendix A. This portion of the model is shown in Fig. 16. The aft portion consisted of 2,310 DOF in the G set (1,548 in the F set) and 266 in the A set. The NASTRAN data used is also included in Appendix A. Figure 17 presents a view of the aft portion of the model. In order to keep the computation time at a reasonable level, these half structure models were not permitted to proceed into the Eigenvalue routines, as may be noted from the alter statements in the Executive Control Data which effectively eliminates all steps between 89 and 162, and 164 through 167. Instead, the submissions were scheduled for EXIT after DMAP statement 88. The reduced models of both portions of the SRB were then copied onto tapes. The DMAP statements and data for the tape copy run are also listed in the appendix. The combined NASTRAN model was then reduced to 116 DOF and successfully ran in Rigid Format 7. Twelve Eigenvalues were obtained (Table 5), using 17 CPU min of computer time. A description of each mode is also shown in the table. NASTRAN plot capability has not been extended to Rigid Format 7. The DMAP Alter statements in the Executive Control Cards for this submission did include statements designed to plot the real part of the complete Eigenvector but they did not function properly for this run, and only two plots were generated. The undeformed model is shown in Fig. 18, and the first bending mode in Fig. 19. These views are included to demonstrate that the DMAP alter statements will work.

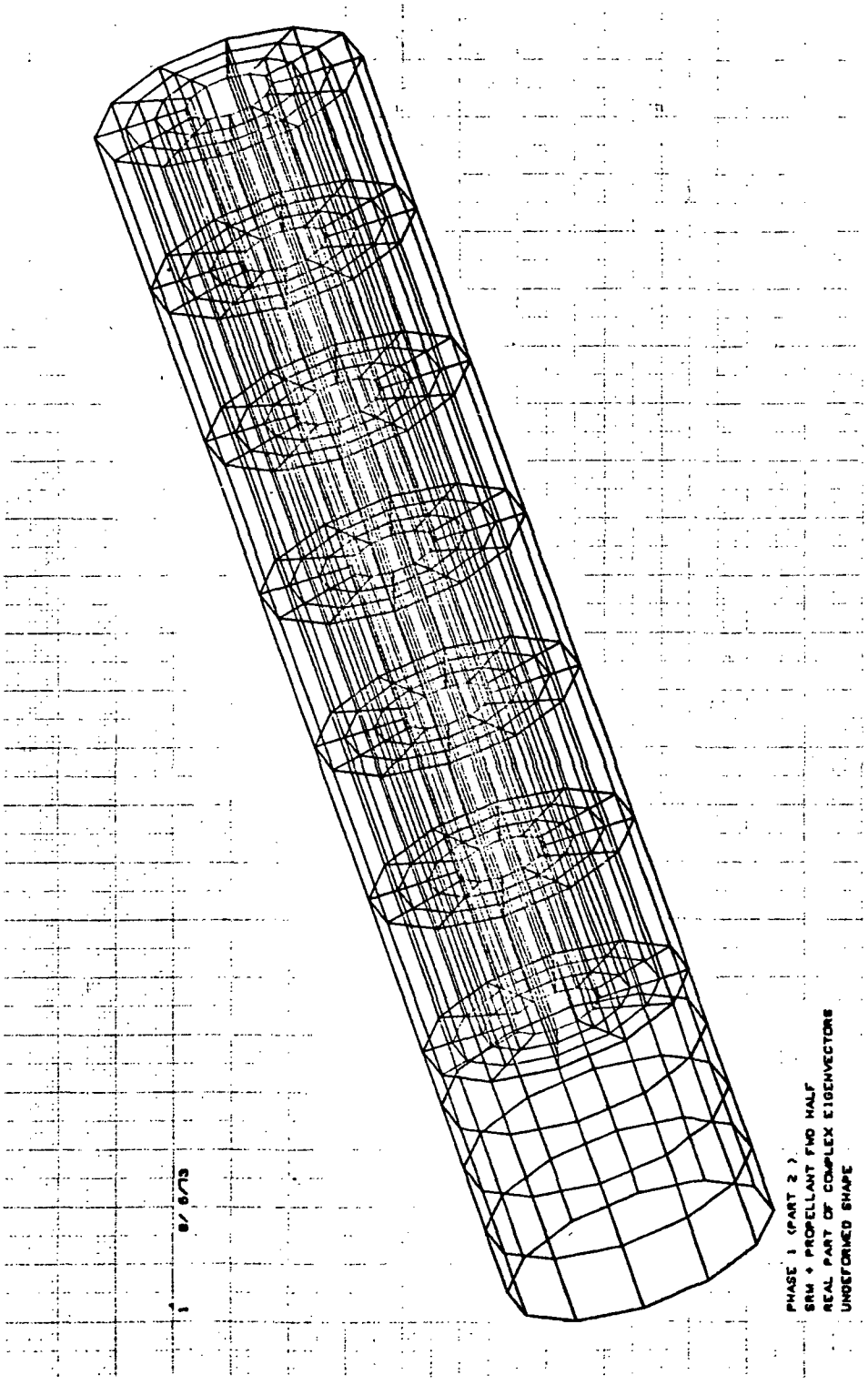


Fig. 16 1/8-Scale Model SRB Finite Element Representation - Forward Half

T14-16

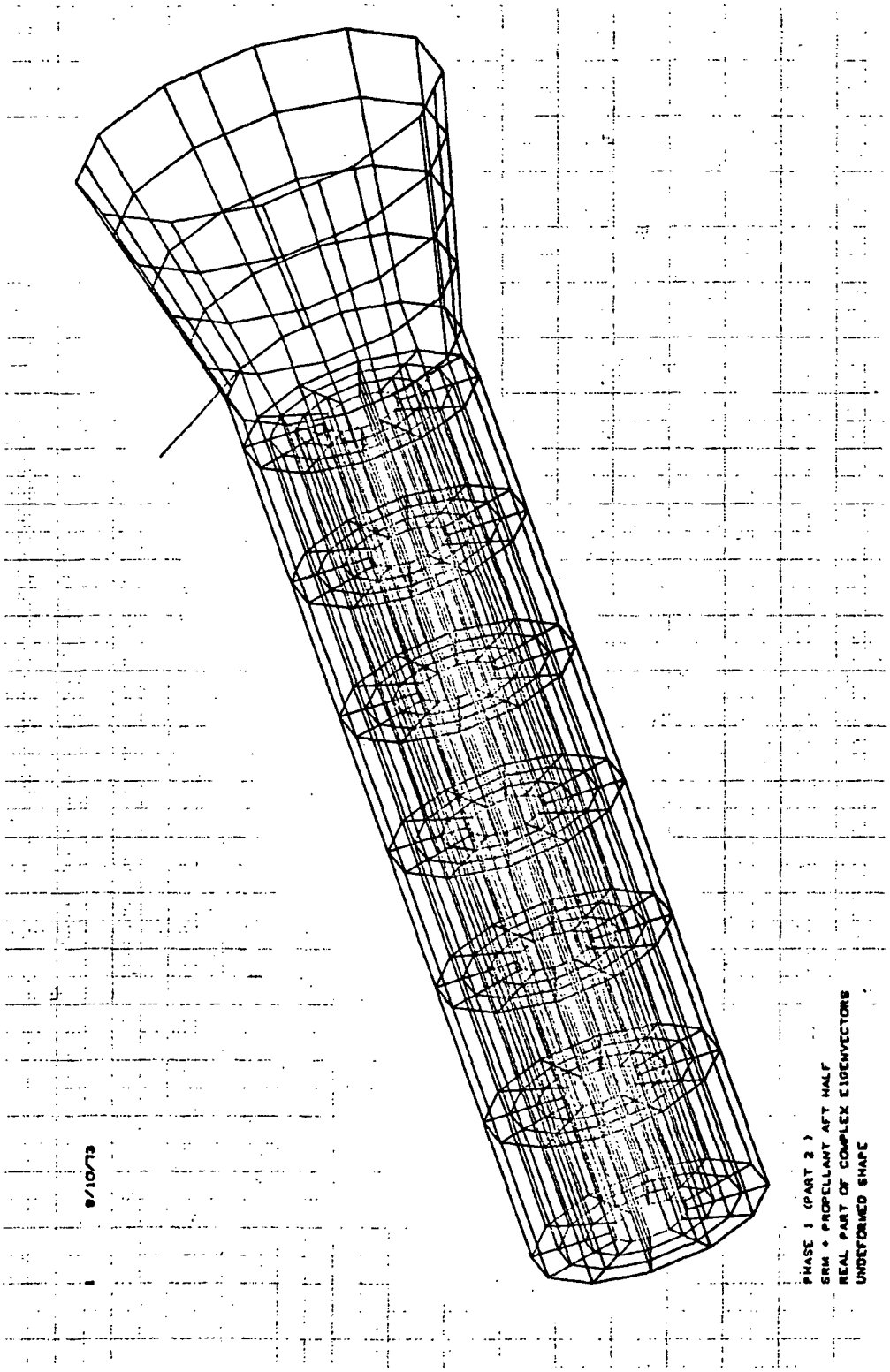


Fig. 17 1/8-Scale Model SRB Finite Element Representation – Aft Half

T14-17

Table 5 Summary of SRB Vibration Analysis (Full Propellant Load [Lift-Off])

Mode Number	Frequency (Hz)	Damping (C/C_c)	Description
1	56.15	0.028	1st Bending Mode about Z Axis
2	56.15	0.028	1st Bending Mode about Y Axis
3	136.65	0.056	2nd Bending Mode about Y Axis
4	136.67	0.056	2nd Bending Mode about Z Axis
5	168.29	0.136	1st Torsion Mode
6	195.11	0.053	1st Axial Mode
7	224.28	0.067	3rd Bending Mode about Y Axis
8	224.42	0.067	3rd Bending Mode about Z Axis
9	245.65	0.005	Local Mode of Aft Skirt Longerons
10	269.35	0.005	Local Ring Mode of Aft Skirt
11	320.87	0.116	4th Bending Mode about Z Axis
12	321.21	0.116	4th Bending Mode about Y Axis

T14-5(T)

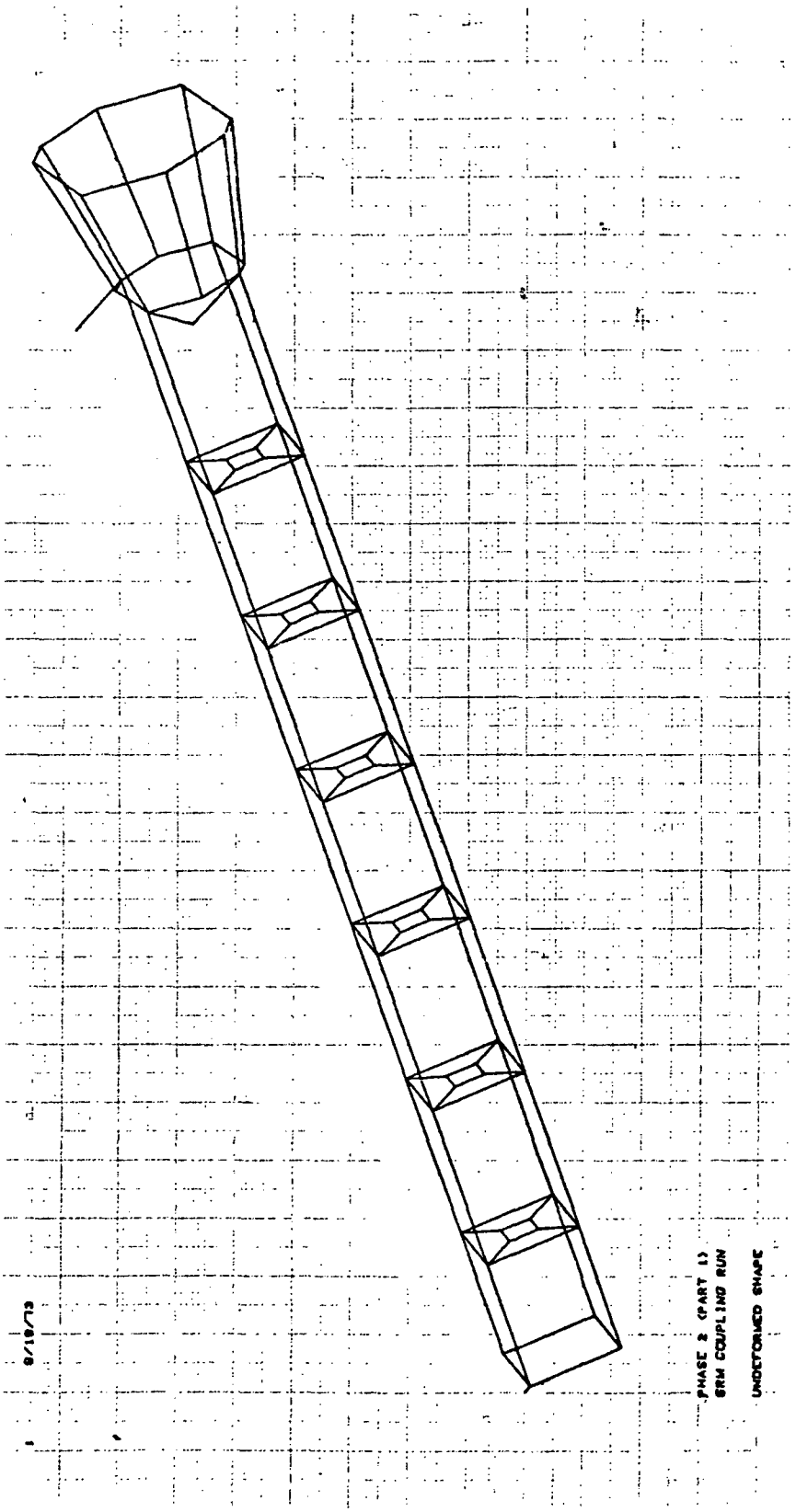


Fig. 18 1/8-Scale Model SRB Undeformed Plot

T14-18

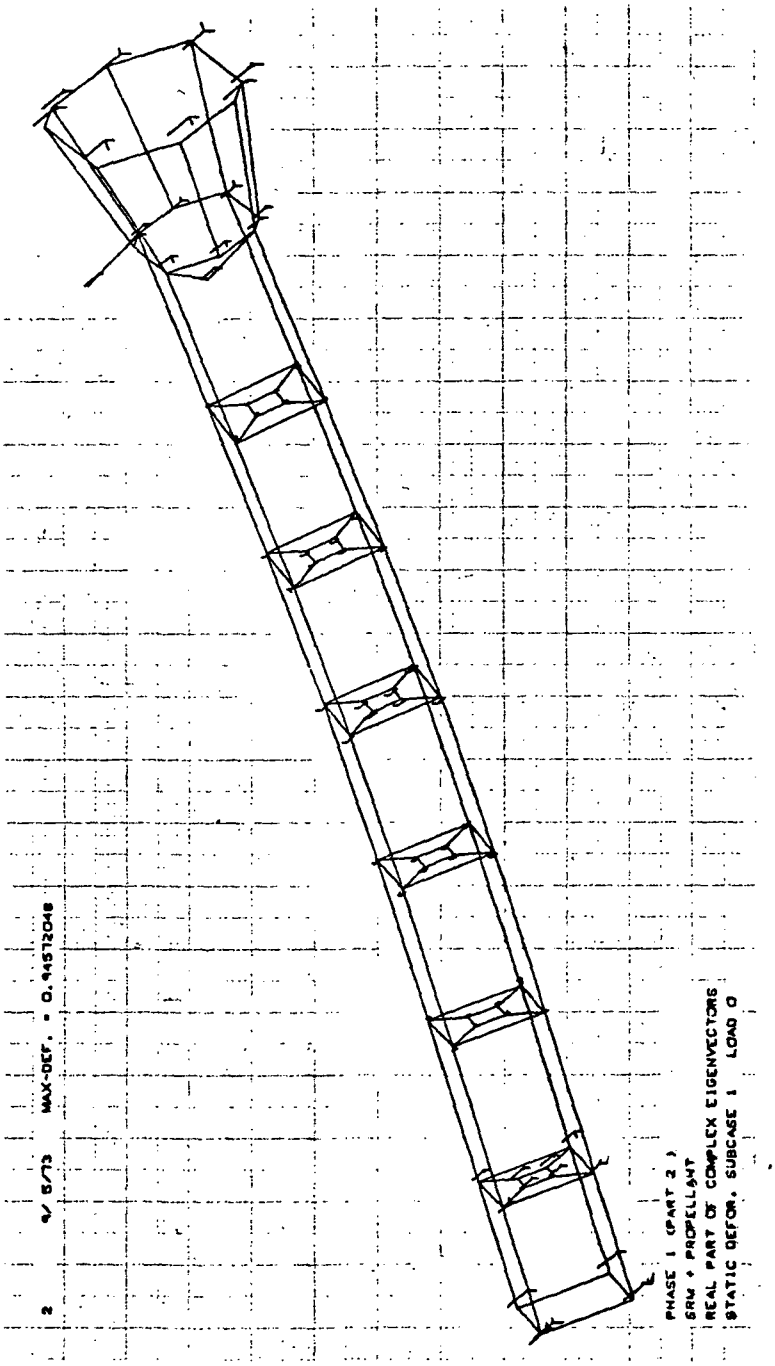


Fig. 19 1/8-Scale Model SRB First Bending Mode

OBSERVATIONS AND CONCLUSIONS

- The NASTRAN model weight was not changed by the Guyan reduction procedure. Table 6 compares the output of the Grid Point Weight Generator (MO) with the weights determined from the reduced mass matrix (MOGG). The latter is determined from the L set (Reference 5-1).
- The NASTRAN model reduced stiffness matrix has adequately low value for the (X) Matrix. This indicates no constraint errors as discussed in Subsection 3.5.5 of the NASTRAN Theoretical Manual (Ref. 5-6).
- Experience has indicated that NASTRAN Eigenvalue problems should be kept to less than 250 DOF in the A set for both an IBM 370-165 with less than 400K core and a CDC 6600 with less than 300K (octal) core. This is particularly true of the Inverse Power or Determinant methods which are to be used as required in Rigid Format 7. The complex arithmetic in Rigid Format 7, while necessary to calculate the damping, results in using two storage locations for each DOF, therefore these numbers would have to be halved, leaving 125 as the practical upper limit.
- The large Guyan reductions required, limit the adequacy of the model, particularly for shell modes. The model does not take advantage of symmetry since the original intent was to use substructuring procedures to couple this model to the remainder of the shuttle. Subsequent work at Langley has shown that limiting the model to 90° between vertical and lateral planes of symmetry (and/or antisymmetry), employing harmonic reduction, and planning for modal coupling, would allow more adequate definition of the shell modes.
- No work was done in comparing analysis with experiments. This task was modified to eliminate that objective due to unavailable experimental data and the necessity to devote the time to other analytical tasks.

Table 6 Weight and Residual Error Comparisons

Direction	SRB Forward Half		SRB Aft Half		Combined SRB Phase II – 116 DOF
	MO	MOGG	MO	MOGG	MOGG
X	1253.79	1253.78	1267.57	1267.56	2521.34
Y	1253.79	1253.79	1267.57	1267.57	2521.37
Z	1253.79	1253.78	1267.57	1267.56	2521.34
R_X	2.5399×10^6	2.5399×10^6	2.222×10^6	2.2219×10^6	4.76185×10^6
R_Y	8.8320×10^6	8.8322×10^6	2.988×10^7	2.9879×10^7	3.8710×10^7
R_Z	8.6925×10^6	8.6923×10^6	3.0086×10^7	3.0086×10^7	3.8778×10^7

Weight Comparison

MO = Weight from Grid Point Weight Generator for Original Model Before Reduction
MOGG = Weight from Reduced Mass Matrix Used in Dynamic Analysis

Parameter	SRB Forward Half	SRB Aft Half	Combined SRB Phase II – 116 DOF
X	None $> 10^{-6}$	None $> 10^{-6}$	None $> 10^{-6}$
Ext	None $> 10^{-6}$	None $> 10^{-4}$	None $> 10^{-4}$

Residual Error Comparison

X = Rigid Body Stiffness Matrix (Ref. 5-6), Should = 0
Ext = Resultant about Arbitrary Origin of X (Ref. 5-5), Should = 0

T14-6(T)

REFERENCES

5-1 Bernstein, M. et al, "Design of a Space Shuttle Structural Dynamics Model," NASA CR 112205, Rev. A, 1973.

5-2 United Technology Center Letter, GRS-27-73M, 13 April 1973.

5-3 Svalbonas, V., "Numerical Analyses of Stiffened Shells of Revolution - Theoretical Manual for STARS-25 -2B -2V Programs," IOM 000-STMECH-038, Grumman Aerospace Corp., 10 May 73.

5-4 Cohen, G.A, "User Document for Computer Programs for Ring-Stiffened Shells of Revolution", NASA CR 2086, 1973.

5-5 Bernstein, M. et al, 'NASTRAN Analysis of the 1/8-Scale Shuttle Dynamic Model", NASA TMX 2893.

5-6 McCormick, C.W., "The NASTRAN Users' Manual", Level 15.5.

APPENDIX

The Appendix contains the following information:

- NASTRAN data for SRB Aft Half Model - 32 pages
- NASTRAN data for SRB Forward Half Model - 30 pages
- NASTRAN data for SRB Copy Run - 5 pages
- NASTRAN data for SRB Combined Model - 212 DOF for Phase II, Part 1 - 17 pages
- NASTRAN data for SRB Combined Model - 116 DOF for Phase II, Part 1 - 17 pages
- NASTRAN data for SRB Combined Model - 116 DOF for Phase II, Part 2 - 14 Pages
- Complex Eigenvalue Summary from 116 DOF Phase II, Part 2 Run - 1 page.

NASTRAN EXECUTIVE CONTROL DECK ECHO

```
ID PHASE1 SRMRIA
CHKPNT  YES
TIME        60
APP         DISP
SOL         7,0
DIAG  2,7,8,13,14,19,21,22
ALTER 2,2$ PARAMETER DEFAULTS
PARAM    //C,N,NOP/V,Y,NOSUB#0
PARAM    //C,N,NOP/V,Y,TPCOPY#-1
PARAM    //C,N,NOP/V,Y,SUBGK#-1
PARAM    //C,N,NOP/V,Y,SUBK4#-1
PARAM    //C,N,NOP/V,Y,SUBB#-1
PARAM    //C,N,NOP/V,N,TRUE#-1
ALTER 25,27
CHKPNT   EST,GEI,ECPT,GPCT
PARAM    //C,N,SUB/V,N,COUPLE/V,Y,NOSUB/C,N,1
PARAM    //C,N,NOP/V,N,NOK4GG#-1
PURGE    KGGX,K4GG,GPST,OGPST/NOSIMP
CHKPNT   KGGX,K4GG,GPST,OGPST
COND     L30,NOSIMP
COND     L25A,GENEL
COND     L25B,COUPLE
LABEL    L25A
PURGE    OGPST/TRUE
CHKPNT   OGPST
LABEL    L25B
ALTER 30,31
CHKPNT   KGGX,K4GG,GPST
LABEL    L30
ALTER 34,35
PARAM    //C,N,AND/V,N,NOBG/V,N,NOBGG/V,Y,SUBB
PARAM    //C,N,AND/V,N,NORK4/V,Y,SUBGK/V,Y,SUBK4
PARAM    //C,N,AND/V,N,NOK4/V,N,NORK4/V,N,NOK4GG
COND     L34A,NOMGG
JUMP     L34B
LABEL    L34A
COND     ERROR3,COUPLE
LABEL    L34B
PURGE    BNN,BFF,BAA,BGGY/NOBG
PURGE    K4GGY,K4NN,K4FF,K4AA/NOK4
CHKPNT         BGGY,K4GGY,K4NN,K4FF,K4AA,MGG,BGG,BNN,BFF,BAA
ALTER 37,37
COND     LBL1,NOMGG
ALTER 42,42 $ IF COUPLING RUN,COMBINES SUBSTRUCTURES.
PURGE    CPGI,KI,MI,KGGI,MGGI,KGGS,MGGS,KGT,MGT/COUPLE
PURGE    K4GGS,K4GGI,K4GT,GIKI,K4II,K4I/COUPLE
PURGE    BI,BGGS,BGGI,BGT,GFAC,KFAC,BFAC/COUPLE
COND     LPC9,COUPLE  $ SKIP,NOT A COUPLING RUN
INPUTT1  /,,,,/C,N,-3/C,N,9/V,Y,TPNAME9 $ LIST TAPE & REWIND
```

NASTRAN EXECUTIVE CONTROL DECK ECHO

```
PARAM   //C,N,NOP/V,N,PASS#1  $ INITIAL LOOP PASS PARAMETER
PURGE   K4GGS,K4GGI,K4GT,GIKI,K4II,K4I,GFAC,KFAC/NORK4
PURGE   GIKI,GFAC/SUBGK/K4I,KFAC/SUBK4/BGGS,BGGI,BGT,BFAC/SUBB
JUMP    LOOPC
LABEL   LOOPC   $ TOP OF LOOP
PARAM   //C,N,SUB/V,N,PASS1/V,N,PASS/C,N,2
INPUTT1 /CPGI,KI,MI,,/C,N,0/C,N,9 $
COND    LPC1,PASS1
JUMP    LPC3
LABEL   LPC1
MERGE,  ,,,KI,CPGI,/KGGS/C,N,-1/C,N,2/C,N,6
MERGE,  ,,,MI,CPGI,/MGGS/C,N,-1/C,N,2/C,N,6
COND    LPC2,NORK4
MERGE,  ,,,,CPGI,/K4GGS/C,N,-1/C,N,2/C,N,6
LABEL   LPC2
COND    LPC3,SUBB
MERGE,  ,,,,CPGI,/BGGS /C,N,-1/C,N,2/C,N,6
LABEL   LPC3
COND    LPC4,PASS1
MERGE,  ,,,KI,CPGI,/KGGI/C,N,-1/C,N,2/C,N,6
MERGE,  ,,,MI,CPGI,/MGGI/C,N,-1/C,N,2/C,N,6
ADD     KGGS,KGGI/KGT $
EQUIV   KGT,KGGS/TRUE
ADD     MGGS,MGGI/MGT $
EQUIV   MGT,MGGS/TRUE
LABEL   LPC4
COND    LPC7,NORK4
COND    LPC5,SUBGK
PARAML      GFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,GIR $
PARAMR  //C,N,EQ/C,N,0,0/C,N,0,0/V,N,GIR/V,N,OUTC/V,N,INC1/V,N,INC2/
        V,N,NOGI $
PURGE   GIKI/NOGI
COND    LPC5,NOGI
PARAMR  //C,N,COMPLEX/C,N,0,0/V,N,GIR/C,N,0,0/V,N,GI $
ADD     KI,/GIKI/V,N,GI $
LABEL   LPC5
COND    LPC6,SUBK4
PARAML      KFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,K4R $
PARAMR  //C,N,EQ/C,N,0,0/C,N,0,0/V,N,K4R/V,N,OUTC/V,N,INC1/V,N,INC2/
        V,N,NOK4I $
PURGE   K4I/NOK4I
COND    LPC6,NOK4I
INPUTT1 /K4I,,,,/C,N,0/C,N,9 $
LABEL   LPC6
ADD     GIKI,K4I/K4II
MERGE,  ,,,K4II,CPGI,/K4GGI/C,N,-1/C,N,2/C,N,6
ADD     K4GGS,K4GGI/K4GT
EQUIV   K4GT,K4GGS/TRUE
LABEL   LPC7
COND    LPC8,SUBB
```

NASTRAN EXECUTIVE CONTROL DECK ECHO

```
PARAML      BFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,BIR $
PARAMR   //C,N,EQ/C,N,0.0/C,N,0.0/V,N,BIR/V,N,OUTC/V,N,INC1/V,N,INC2/
         V,N,NOBI $
COND     LPC8,NOBI
INPUTT1   /BI,,,,/C,N,0/C,N,9 $
MERGE,   ,,,BI,CPGI,/BGGI/C,N,-1/C,N,2/C,N,6
ADD      BGGS,BGGI/BGT $
EQUIV    BGT,BGGS/TRUE
LABEL    LPC8
PARAM    //C,N,ADD/V,N,PASS/V,N,PASS/C,N,1
PARAM    //C,N,SUB/V,N,SKIP2/V,Y,NOSUB/V,N,PASS
COND     LPC9,SKIP2
REPT     LOOPC,20
LABEL    LPC9
CHKPNT   KGGS,MGGS,K4GGS,BGGS
ADD      KGGX,KGGS/KGGY $
CHKPNT   KGGY
ADD      MGG,MGGS/MGGY $
CHKPNT   MGGY
COND     LPC11,NOK4
ADD      K4GG,K4GGS/K4GGY
CHKPNT   K4GGY
LABEL    LPC11
COND     LPC12,NOBG
ADD      BGG,BGGS/BGGY
CHKPNT   BGGY
LABEL    LPC12
EQUIV    KGGY,KGG/NOGENL $
ALTER 45,45
SMA3     GEI,KGGY/KGG/V,N,LUSET/V,N,NOGENL/V,N,NOSIM#1 $
ALTER 51,53
PURGE    GM/MPCF1/GO/OMIT/KFS/SINGLE
EQUIV    KGG,KNN/MPCF1/MGGY,MNN/MPCF1/BGGY,BNN/MPCF1/K4GGY,K4NN/MPCF1
CHKPNT   GM,RG,GO,KFS,USET,KNN,MNN,BNN,K4NN
COND     L53A,NOMGG
ADD      MGG,/WGG/C,Y,ALPHA#%386.4,0.0D $
MATGPR   GPL,USET,SIL,WGG//C,N,G
LABEL    L53A
COND     L53B,COUPLE
JUMP     LBL4
LABEL    L53B
ALTER 63,63
MCE2     USET,GM,KGG,MGGY,BGGY,K4GGY/KNN,MNN,BNN,K4NN
ALTER 74,74
COND     L87,OMIT
ALTER 77,77
ALTER 80,81
COND     LBLB,NOBG
ALTER 85,85
COND     L87,NOK4
```

```
ALTER 87
LABEL   L87
PURGE   CPARL,CPFOA,CPNSF,CPGMN,EQR,EQL,EQA,EQO,EQF,EQN,EQM,EQG/REACT
PURGE   EX,EXT,EQMT,EQNT,EQGT,EQGTC,MOGG,MOGGY/REACT
PURGE   KLL,KLR,KRR,LLL,ULL,DM,X,EQRT,DMT,GOT,GMT/REACT
COND    LCP5,REACT  $ R-SET MUST BE DEFINED TO GENERATE EQG
RBMG1   USET,KAA,/KLL,KLR,KRR,,, $
RBMG2   KLL/LLL,ULL
RBMG3   LLL,ULL,KLR,KRR/DM
CHKPNT  KLL,KLR,KRR,DM
TRNSP   EQR/EQRT
MATGPR  GPL,USET,SIL,EQRT//C,N,R
MPYAD   KLR,DM,KRR/X/C,N,1 $
MATGPR  GPL,USET,SIL,X//C,N,R
MPYAD   EQR,X,/EX/C,N,0/C,N,1/C,N,0 $
TRNSP   EX/EXT
MATGPR  GPL,USET,SIL,EXT//C,N,R
PURGE   CPFOA/OMIT/CPNSF/SINGLE/CPGMN/MPCF1
PURGE   EQO/OMIT/EQM/MPCF1
PURGE   GOT/OMIT/GMT,EQMT/MPCF1
VEC     USET/CPARL/C,N,A/C,N,R/C,N,L $
TRNSP   DM/DMT
MPYAD   EQR,DMT,/EQL/C,N,0/C,N,1/C,N,0
MERGE   EQR,,EQL,,CPARL,/EQA/C,N,1/C,N,2/C,N,2
EQUIV   EQA,EQF/OMIT
COND    LCP1,OMIT
VEC     USET/CPFOA/C,N,F/C,N,0/C,N,A $
TRNSP   GO/GOT
MPYAD   EQA,GOT,/EQO/C,N,0/C,N,1/C,N,0
MERGE   EQO,,EQA,,CPFOA,/EQF/C,N,1/C,N,2/C,N,2
LABEL   LCP1
EQUIV   EQF,EQN/SINGLE
COND    LCP2,SINGLE
VEC     USET/CPNSF/C,N,N/C,N,S/C,N,F $
MERGE,  ,,EQF,,CPNSF,/EQN/C,N,1/C,N,2/C,N,2
LABEL   LCP2
TRNSP   EQN/EQNT
MATGPR  GPL,USET,SIL,EQNT//C,N,N
EQUIV   EQN,EQG/MPCF1
COND    LCP3,MPCF1
VEC     USET/CPGMN/C,N,G/C,N,M/C,N,N $
TRNSP   GM/GMT
MPYAD   EQN,GMT,/EQM/C,N,0/C,N,1/C,N,0
MERGE   EQM,,EQN,,CPGMN,/EQG/C,N,1/C,N,2/C,N,2
TRNSP   EQM/EQMT
MATGPR  GPL,USET,SIL,EQMT//C,N,M
LABEL   LCP3
CHKPNT  CPFOA,CPNSF,CPGMN,CPARL
CHKPNT  EQG
TRNSP   EQG/EQGT
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
ADD     EQGT,/EQGTC/C,Y,ALPHA#X386.4,0.0# $
$  ASSUME CONVERSION OF MASS TO LBS # 386.4
PURGE   MOGG/NOMGG/MOGGY/COUPLE
COND    LCP4,NOMGG
SMPYAD     EOG,MGG,EQGTC,,,/MOGG/C,N,3/C,N,1/C,N,0 $
LABEL   LCP4
COND    LCP5,COUPLE
SMPYAD  EOG,MGGY,EQGTC,,,/MOGGY/C,N,3/C,N,1/C,N,0 $
LABEL   LCP5
MATPRN  MOGG,MOGGY,,,// $
COND    LCP8,TPCOPY
SEEMAT  KAA,,,,//C,N,PRINT
SEEMAT  MAA,,,,//C,N,PRINT
OUTPUT1 GM,GO,KFS,KAA,//C,N,-1/C,N,0/V,Y,TPNAME
OUTPUT1  MAA,,,,// $
COND    LCP7,NOK4
SEEMAT K4AA,,,,//C,N,PRINT
OUTPUT1 K4AA,,,,// $
LABEL  LCP7
COND    LCP8,NOBG
SEEMAT  BAA,,,,//C,N,PRINT
OUTPUT1  BAA,,,,// $
LABEL  LCP8
ALTER 89,162
ALTER 164,167
ENDALTER
CEND
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

ECHO OF FIRST CARD IN CHECKPOINT DICTIONARY TO BE PUNCHED OUT FOR THIS PROBLEM

RESTART PHASE1 ,SAMRIA , 8/ 7/73, 3495,

PHASE 1 %pART 1 ¤
SRM & PROPELLANT AFT HALF

C A S E C O N T R O L D E C K E C H O

CARD COUNT	
1	TITLE # PHASE 1 %PART 1 ¤
2	SUBTITLE # SRM & PROPELLANT AFT HALF
3	MAXLINES # 60000
4	SPC # 1
5	BEGIN BULK

*** USER INFORMATION MESSAGE 207, BULK DATA NOT SORTED.XSORT WILL RE-ORDER DECK.

PHASE 1 %PART 1 U
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1-	ASET1	123	7290	THRU	7292					
2-	ASET1	123	7294	THRU	7296					
3-	ASET1	123	7298	THRU	7300					
4-	ASET1	123	7302	THRU	7304					
5-	ASET1	123	7306	THRU	7308					
6-	ASET1	123	7310	THRU	7312					
7-	ASET1	123	7314	THRU	7316					
8-	ASET1	123	7318	THRU	7320					
9-	ASET1	123	7322	THRU	7324					
10-	ASET1	123	7326	THRU	7328					
11-	ASET1	123	7330	THRU	7332					
12-	ASET1	123	7334	THRU	7336					
13-	ASET1	123	7385	7388	7397					
14-	ASET1	123	7400	7409	7412	7421	7424	7481	7484	
15-	ASET1	123	7493	7496	7505	7508	7517	7520	7801	
16-	ASET1	123	7803	7805	7806	7809	7811	7813	7814	
17-	ASET1	123	7865	7867	7869	7870	7873	7875	7877	
18-	ASET1	123	7878	8352	8355					
19-	ASET1	123456	7289	7293	7297	7301	7305	7309	7313	
20-	ASET1	123456	7317	7321	7325	7329	7333			
21-	CBAR	4001	101	7577	7581	1.0	.0	.0	1	&CB01
22-	&CB01			0.365			0.365			
23-	CBAR	4002	101	7581	7585	1.0	.0	.0	1	&CB02
24-	&CB02			0.365			0.365			
25-	CBAR	4003	101	7585	7589	1.0	.0	.0	1	&CB03
26-	&CB03			0.365			0.365			
27-	CBAR	4004	101	7589	7593	1.0	.0	.0	1	&CB04
28-	&CB04			0.365			0.365			
29-	CBAR	4005	101	7593	7597	1.0	.0	.0	1	&CB05
30-	&CB05			0.365			0.365			
31-	CBAR	4006	101	7597	7601	1.0	.0	.0	1	&CB06
32-	&CB06			0.365			0.365			
33-	CBAR	4007	101	7601	7605	1.0	.0	.0	1	&CB07
34-	&CB07			0.365			0.365			
35-	CBAR	4008	101	7605	7609	1.0	.0	.0	1	&CB08
36-	&CB08			0.365			0.365			
37-	CBAR	4009	101	7609	7613	1.0	.0	.0	1	&CB09
38-	&CB09			0.365			0.365			
39-	CBAR	4010	101	7613	7617	1.0	.0	.0	1	&CB10
40-	&CB10			0.365			0.365			
41-	CBAR	4011	101	7617	7621	1.0	.0	.0	1	&CB11
42-	&CB11			0.365			0.365			
43-	CBAR	4012	101	7621	7577	1.0	.0	.0	1	&CB12
44-	&CB12			0.365			0.365			
45-	CBAR	4013	102	7801	7802	1.0	.0	.0	1	
46-	CBAR	4014	102	7802	7803	1.0	.0	.0	1	
47-	CBAR	4015	102	7803	7804	1.0	.0	.0	1	
48-	CBAR	4016	102	7804	7805	1.0	.0	.0	1	
49-	CBAR	4017	102	7805	7806	1.0	.0	.0	1	
50-	CBAR	4018	102	7806	7807	1.0	.0	.0	1	

PHASE 1 %PART 1 II
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
51-CBAR	4019	102	7807	7808	1.0	.0	.0	1		
52-CBAR	4020	102	7808	7809	1.0	.0	.0	1		
53-CBAR	4021	102	7809	7810	1.0	.0	.0	1		
54-CBAR	4022	102	7810	7811	1.0	.0	.0	1		
55-CBAR	4023	102	7811	7812	1.0	.0	.0	1		
56-CBAR	4024	102	7812	7813	1.0	.0	.0	1		
57-CBAR	4025	102	7813	7814	1.0	.0	.0	1		
58-CBAR	4026	102	7814	7815	1.0	.0	.0	1		
59-CBAR	4027	102	7815	7816	1.0	.0	.0	1		
60-CBAR	4028	102	7816	7801	1.0	.0	.0	1		
61-CBAR	4029	103	7865	7866	1.0	.0	.0	1		&CB29
62-&CB29			-0.78			-0.78				
63-CBAR	4030	103	7866	7867	1.0	.0	.0	1		&CB30
64-&CB30			-0.78			-0.78				
65-CBAR	4031	103	7867	7868	1.0	.0	.0	1		&CB31
66-&CB31			-0.78			-0.78				
67-CBAR	4032	103	7868	7869	1.0	.0	.0	1		&CB32
68-&CB32			-0.78			-0.78				
69-CBAR	4033	103	7869	7870	1.0	.0	.0	1		&CB33
70-&CB33			-0.78			-0.78				
71-CBAR	4034	103	7870	7871	1.0	.0	.0	1		&CB34
72-&CB34			-0.78			-0.78				
73-CBAR	4035	103	7871	7872	1.0	.0	.0	1		&CB35
74-&CB35			-0.78			-0.78				
75-CBAR	4036	103	7872	7873	1.0	.0	.0	1		&CB36
76-&CB36			-0.78			-0.78				
77-CBAR	4037	103	7873	7874	1.0	.0	.0	1		&CB37
78-&CB37			-0.78			-0.78				
79-CBAR	4038	103	7874	7875	1.0	.0	.0	1		&CB38
80-&CB38			-0.78			-0.78				
81-CBAR	4039	103	7875	7876	1.0	.0	.0	1		&CB39
82-&CB39			-0.78			-0.78				
83-CBAR	4040	103	7876	7877	1.0	.0	.0	1		&CB40
84-&CB40			-0.78			-0.78				
85-CBAR	4041	103	7877	7878	1.0	.0	.0	1		&CB41
86-&CB41			-0.78			-0.78				
87-CBAR	4042	103	7878	7879	1.0	.0	.0	1		&CB42
88-&CB42			-0.78			-0.78				
89-CBAR	4043	103	7879	7880	1.0	.0	.0	1		&CB43
90-&CB43			-0.78			-0.78				
91-CBAR	4044	103	7880	7865	1.0	.0	.0	1		&CB44
92-&CB44			-0.78			-0.78				
93-CBAR	4101	104	7803	7819	.9659	.0	-0.2588	1		&CB101
94-&CB101			0.7727		-0.2071	0.7727			-0.2071	
95-CBAR	4102	104	7819	7835	.9659	.0	-0.2588	1		&CB102
96-&CB102			0.7727		-0.2071	0.7727			-0.2071	
97-CBAR	4103	104	7835	7851	.9659	.0	-0.2588	1		&CB103
98-&CB103			0.7727		-0.2071	0.7727			-0.2071	
99-CBAR	4104	104	7851	7867	.9659	.0	-0.2588	1		&CB104
100-&CB104			0.7727		-0.2071	0.7727			-0.2071	

PHASE 1 XPART 1 B
SRM & PROPELLANT AFT HALF

S O R T E D B U L K D A T A E C H O

CARD
COUNT . 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10 .

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  101- CBAR     4105     104      7806     7822     .9659    .0       -0.2588 1        &CB105
  102- &CB105                     0.7727            -0.2071  0.7727            -0.2071
  103- CBAR     4106     104      7822     7838     .9659    .0       -0.2588 1        &CB106
  104- &CB106                     0.7727            -0.2071  0.7727            -0.2071
  105- CBAR     4107     104      7838     7854     .9659    .0       -0.2588 1        &CB107
  106- &CB107                     0.7727            -0.2071  0.7727            -0.2071
  107- CBAR     4108     104      7854     7870     .9659    .0       -0.2588 1        &CB108
  108- &CB108                     0.7727            -0.2071  0.7727            -0.2071
  109- CBAR     4109     104      7811     7827     .9659    .0       -0.2588 1        &CB109
  110- &CB109                     0.7727            -0.2071  0.7727            -0.2071
  111- CBAR     4110     104      7827     7843     .9659    .0       -0.2588 1        &CB110
  112- &CB110                     0.7727            -0.2071  0.7727            -0.2071
  113- CBAR     4111     104      7843     7859     .9659    .0       -0.2588 1        &CB111
  114- &CB111                     0.7727            -0.2071  0.7727            -0.2071
  115- CBAR     4112     104      7859     7875     .9659    .0       -0.2588 1        &CB112
  116- &CB112                     0.7727            -0.2071  0.7727            -0.2071
  117- CBAR     4113     104      7814     7830     .9659    .0       -0.2588 1        &CB113
  118- &CB113                     0.7727            -0.2071  0.7727            -0.2071
  119- CBAR     4114     104      7830     7846     .9659    .0       -0.2588 1        &CB114
  120- &CB114                     0.7727            -0.2071  0.7727            -0.2071
  121- CBAR     4115     104      7846     7862     .9659    .0       -0.2588 1        &CB115
  122- &CB115                     0.7727            -0.2071  0.7727            -0.2071
  123- CBAR     4116     104      7862     7878     .9659    .0       -0.2588 1        &CB116
  124- &CB116                     0.7727            -0.2071  0.7727            -0.2071
  125- CHEXA1   1217     1000     7290     7338     7342     7294     7289     7337     &HX1217
  126- &HX1217      7341     7293
  127- CHEXA1   1218     1000     7291     7339     7343     7295     7290     7338     &HX1218
  128- &HX1218      7342     7294
  129- CHEXA1   1219     1000     7292     7340     7344     7296     7291     7339     &HX1219
  130- &HX1219      7343     7295
  131- CHEXA1   1220     1000     7294     7342     7346     7298     7293     7341     &HX1220
  132- &HX1220      7345     7297
  133- CHEXA1   1221     1000     7295     7343     7347     7299     7294     7342     &HX1221
  134- &HX1221      7346     7298
  135- CHEXA1   1222     1000     7296     7344     7348     7300     7295     7343     &HX1222
  136- &HX1222      7347     7299
  137- CHEXA1   1223     1000     7298     7346     7350     7302     7297     7345     &HX1223
  138- &HX1223      7349     7301
  139- CHEXA1   1224     1000     7299     7347     7351     7303     7298     7346     &HX1224
  140- &HX1224      7350     7302
  141- CHEXA1   1225     1000     7300     7348     7352     7304     7299     7347     &HX1225
  142- &HX1225      7351     7303
  143- CHEXA1   1226     1000     7302     7350     7354     7306     7301     7349     &HX1226
  144- &HX1226      7353     7305
  145- CHEXA1   1227     1000     7303     7351     7355     7307     7302     7350     &HX1227
  146- &HX1227      7354     7306
  147- CHEXA1   1228     1000     7304     7352     7356     7308     7303     7351     &HX1228
  148- &HX1228      7355     7307
  149- CHEXA1   1229     1000     7306     7354     7358     7310     7305     7353     &HX1229
  150- &HX1229      7357     7309
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PHASE 1 XPART 1 H
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
151-	CHEXA1	1230	1000	7307	7355	7359	7311	7306	7354	&HX1230
152-	&HX1230	7358	7310							
153-	CHEXA1	1231	1000	7308	7356	7360	7312	7307	7355	&HX1231
154-	&HX1231	7359	7311							
155-	CHEXA1	1232	1000	7310	7358	7362	7314	7309	7357	&HX1232
156-	&HX1232	7361	7313							
157-	CHEXA1	1233	1000	7311	7359	7363	7315	7310	7358	&HX1233
158-	&HX1233	7362	7314							
159-	CHEXA1	1234	1000	7312	7360	7364	7316	7311	7359	&HX1234
160-	&HX1234	7363	7315							
161-	CHEXA1	1235	1000	7314	7362	7366	7318	7313	7361	&HX1235
162-	&HX1235	7365	7317							
163-	CHEXA1	1236	1000	7315	7363	7367	7319	7314	7362	&HX1236
164-	&HX1236	7366	7318							
165-	CHEXA1	1237	1000	7316	7364	7368	7320	7315	7363	&HX1237
166-	&HX1237	7367	7319							
167-	CHEXA1	1238	1000	7318	7366	7370	7322	7317	7365	&HX1238
168-	&HX1238	7369	7321							
169-	CHEXA1	1239	1000	7319	7367	7371	7323	7318	7366	&HX1239
170-	&HX1239	7370	7322							
171-	CHEXA1	1240	1000	7320	7368	7372	7324	7319	7367	&HX1240
172-	&HX1240	7371	7323							
173-	CHEXA1	1241	1000	7322	7370	7374	7326	7321	7369	&HX1241
174-	&HX1241	7373	7325							
175-	CHEXA1	1242	1000	7323	7371	7375	7327	7322	7370	&HX1242
176-	&HX1242	7374	7326							
177-	CHEXA1	1243	1000	7324	7372	7376	7328	7323	7371	&HX1243
178-	&HX1243	7375	7327							
179-	CHEXA1	1244	1000	7326	7374	7378	7330	7325	7373	&HX1244
180-	&HX1244	7377	7329							
181-	CHEXA1	1245	1000	7327	7375	7379	7331	7326	7374	&HX1245
182-	&HX1245	7378	7330							
183-	CHEXA1	1246	1000	7328	7376	7380	7332	7327	7375	&HX1246
184-	&HX1246	7379	7331							
185-	CHEXA1	1247	1000	7330	7378	7382	7334	7329	7377	&HX1247
186-	&HX1247	7381	7333							
187-	CHEXA1	1248	1000	7331	7379	7383	7335	7330	7378	&HX1248
188-	&HX1248	7382	7334							
189-	CHEXA1	1249	1000	7332	7380	7384	7336	7331	7379	&HX1249
190-	&HX1249	7383	7335							
191-	CHEXA1	1250	1000	7334	7382	7338	7290	7333	7381	&HX1250
192-	&HX1250	7337	7289							
193-	CHEXA1	1251	1000	7335	7383	7339	7291	7334	7382	&HX1251
194-	&HX1251	7338	7290							
195-	CHEXA1	1252	1000	7336	7384	7340	7292	7335	7383	&HX1252
196-	&HX1252	7339	7291							
197-	CHEXA1	1253	1000	7338	7386	7390	7342	7337	7385	&HX1253
198-	&HX1253	7389	7341							
199-	CHEXA1	1254	1000	7339	7387	7391	7343	7338	7386	&HX1254
200-	&HX1254	7390	7342							

PHASE 1 XPART 1 II
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
201-	CHEXA1	1255	1000	7340	7388	7392	7344	7339	7387	&HX1255
202-	&HX1255	7391	7343							
203-	CHEXA1	1256	1000	7342	7390	7394	7346	7341	7389	&HX1256
204-	&HX1256	7393	7345							
205-	CHEXA1	1257	1000	7343	7391	7395	7347	7342	7390	&HX1257
206-	&HX1257	7394	7346							
207-	CHEXA1	1258	1000	7344	7392	7396	7348	7343	7391	&HX1258
208-	&HX1258	7395	7347							
209-	CHEXA1	1259	1000	7346	7394	7398	7350	7345	7393	&HX1259
210-	&HX1259	7397	7349							
211-	CHEXA1	1260	1000	7347	7395	7399	7351	7346	7394	&HX1260
212-	&HX1260	7398	7350							
213-	CHEXA1	1261	1000	7348	7396	7400	7352	7347	7395	&HX1261
214-	&HX1261	7399	7351							
215-	CHEXA1	1262	1000	7350	7398	7402	7354	7349	7397	&HX1262
216-	&HX1262	7401	7353							
217-	CHEXA1	1263	1000	7351	7399	7403	7355	7350	7398	&HX1263
218-	&HX1263	7402	7354							
219-	CHEXA1	1264	1000	7352	7400	7404	7356	7351	7399	&HX1264
220-	&HX1264	7403	7355							
221-	CHEXA1	1265	1000	7354	7402	7406	7358	7353	7401	&HX1265
222-	&HX1265	7405	7357							
223-	CHEXA1	1266	1000	7355	7403	7407	7359	7354	7402	&HX1266
224-	&HX1266	7406	7358							
225-	CHEXA1	1267	1000	7356	7404	7408	7360	7355	7403	&HX1267
226-	&HX1267	7407	7359							
227-	CHEXA1	1268	1000	7358	7406	7410	7362	7357	7405	&HX1268
228-	&HX1268	7409	7361							
229-	CHEXA1	1269	1000	7359	7407	7411	7363	7358	7406	&HX1269
230-	&HX1269	7410	7362							
231-	CHEXA1	1270	1000	7360	7408	7412	7364	7359	7407	&HX1270
232-	&HX1270	7411	7363							
233-	CHEXA1	1271	1000	7362	7410	7414	7366	7361	7409	&HX1271
234-	&HX1271	7413	7365							
235-	CHEXA1	1272	1000	7363	7411	7415	7367	7362	7410	&HX1272
236-	&HX1272	7414	7366							
237-	CHEXA1	1273	1000	7364	7412	7416	7368	7363	7411	&HX1273
238-	&HX1273	7415	7367							
239-	CHEXA1	1274	1000	7366	7414	7418	7370	7365	7413	&HX1274
240-	&HX1274	7417	7369							
241-	CHEXA1	1275	1000	7367	7415	7419	7371	7366	7414	&HX1275
242-	&HX1275	7418	7370							
243-	CHEXA1	1276	1000	7368	7416	7420	7372	7367	7415	&HX1276
244-	&HX1276	7419	7371							
245-	CHEXA1	1277	1000	7370	7418	7422	7374	7369	7417	&HX1277
246-	&HX1277	7421	7373							
247-	CHEXA1	1278	1000	7371	7419	7423	7375	7370	7418	&HX1278
248-	&HX1278	7422	7374							
249-	CHEXA1	1279	1000	7372	7420	7424	7376	7371	7419	&HX1279
250-	&HX1279	7423	7375							

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
251-	CHEXA1	1280	1000	7374	7422	7426	7378	7373	7421	&HX1280
252-	&HX1280	7425	7377							
253-	CHEXA1	1281	1000	7375	7423	7427	7379	7374	7422	&HX1281
254-	&HX1281	7426	7378							
255-	CHEXA1	1282	1000	7376	7424	7428	7380	7375	7423	&HX1282
256-	&HX1282	7427	7379							
257-	CHEXA1	1283	1000	7378	7426	7430	7382	7377	7425	&HX1283
258-	&HX1283	7429	7381							
259-	CHEXA1	1284	1000	7379	7427	7431	7383	7378	7426	&HX1284
260-	&HX1284	7430	7382							
261-	CHEXA1	1285	1000	7380	7428	7432	7384	7379	7427	&HX1285
262-	&HX1285	7431	7383							
263-	CHEXA1	1286	1000	7382	7430	7386	7338	7381	7429	&HX1286
264-	&HX1286	7385	7337							
265-	CHEXA1	1287	1000	7383	7431	7387	7339	7382	7430	&HX1287
266-	&HX1287	7386	7338							
267-	CHEXA1	1288	1000	7384	7432	7388	7340	7383	7431	&HX1288
268-	&HX1288	7387	7339							
269-	CHEXA1	1289	1000	7386	7434	7438	7390	7385	7433	&HX1289
270-	&HX1289	7437	7389							
271-	CHEXA1	1290	1000	7387	7435	7439	7391	7386	7434	&HX1290
272-	&HX1290	7438	7390							
273-	CHEXA1	1291	1000	7388	7436	7440	7392	7387	7435	&HX1291
274-	&HX1291	7439	7391							
275-	CHEXA1	1292	1000	7390	7438	7442	7394	7389	7437	&HX1292
276-	&HX1292	7441	7393							
277-	CHEXA1	1293	1000	7391	7439	7443	7395	7390	7438	&HX1293
278-	&HX1293	7442	7394							
279-	CHEXA1	1294	1000	7392	7440	7444	7396	7391	7439	&HX1294
280-	&HX1294	7443	7395							
281-	CHEXA1	1295	1000	7394	7442	7446	7398	7393	7441	&HX1295
282-	&HX1295	7445	7397							
283-	CHEXA1	1296	1000	7395	7443	7447	7399	7394	7442	&HX1296
284-	&HX1296	7446	7398							
285-	CHEXA1	1297	1000	7396	7444	7448	7400	7395	7443	&HX1297
286-	&HX1297	7447	7399							
287-	CHEXA1	1298	1000	7398	7446	7450	7402	7397	7445	&HX1298
288-	&HX1298	7449	7401							
289-	CHEXA1	1299	1000	7399	7447	7451	7403	7398	7446	&HX1299
290-	&HX1299	7450	7402							
291-	CHEXA1	1300	1000	7400	7448	7452	7404	7399	7447	&HX1300
292-	&HX1300	7451	7403							
293-	CHEXA1	1301	1000	7402	7450	7454	7406	7401	7449	&HX1301
294-	&HX1301	7453	7405							
295-	CHEXA1	1302	1000	7403	7451	7455	7407	7402	7450	&HX1302
296-	&HX1302	7454	7406							
297-	CHEXA1	1303	1000	7404	7452	7456	7408	7403	7451	&HX1303
298-	&HX1303	7455	7407							
299-	CHEXA1	1304	1000	7406	7454	7458	7410	7405	7453	&HX1304
300-	&HX1304	7457	7409							

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
301-	CHEXA1	1305	1000	7407	7455	7459	7411	7406	7454	&HX1305
302-	&HX1305	7458	7410							
303-	CHEXA1	1306	1000	7408	7456	7460	7412	7407	7455	&HX1306
304-	&HX1306	7459	7411							
305-	CHEXA1	1307	1000	7410	7458	7462	7414	7409	7457	&HX1307
306-	&HX1307	7461	7413							
307-	CHEXA1	1308	1000	7411	7459	7463	7415	7410	7458	&HX1308
308-	&HX1308	7462	7414							
309-	CHEXA1	1309	1000	7412	7460	7464	7416	7411	7459	&HX1309
310-	&HX1309	7463	7415							
311-	CHEXA1	1310	1000	7414	7462	7466	7418	7413	7461	&HX1310
312-	&HX1310	7465	7417							
313-	CHEXA1	1311	1000	7415	7463	7467	7419	7414	7462	&HX1311
314-	&HX1311	7466	7418							
315-	CHEXA1	1312	1000	7416	7464	7468	7420	7415	7463	&HX1312
316-	&HX1312	7467	7419							
317-	CHEXA1	1313	1000	7418	7466	7470	7422	7417	7465	&HX1313
318-	&HX1313	7469	7421							
319-	CHEXA1	1314	1000	7419	7467	7471	7423	7418	7466	&HX1314
320-	&HX1314	7470	7422							
321-	CHEXA1	1315	1000	7420	7468	7472	7424	7419	7467	&HX1315
322-	&HX1315	7471	7423							
323-	CHEXA1	1316	1000	7422	7470	7474	7426	7421	7469	&HX1316
324-	&HX1316	7473	7425							
325-	CHEXA1	1317	1000	7423	7471	7475	7427	7422	7470	&HX1317
326-	&HX1317	7474	7426							
327-	CHEXA1	1318	1000	7424	7472	7476	7428	7423	7471	&HX1318
328-	&HX1318	7475	7427							
329-	CHEXA1	1319	1000	7426	7474	7478	7430	7425	7473	&HX1319
330-	&HX1319	7477	7429							
331-	CHEXA1	1320	1000	7427	7475	7479	7431	7426	7474	&HX1320
332-	&HX1320	7478	7430							
333-	CHEXA1	1321	1000	7428	7476	7480	7432	7427	7475	&HX1321
334-	&HX1321	7479	7431							
335-	CHEXA1	1322	1000	7430	7478	7434	7386	7429	7477	&HX1322
336-	&HX1322	7433	7385							
337-	CHEXA1	1323	1000	7431	7479	7435	7387	7430	7478	&HX1323
338-	&HX1323	7434	7386							
339-	CHEXA1	1324	1000	7432	7480	7436	7388	7431	7479	&HX1324
340-	&HX1324	7435	7387							
341-	CHEXA1	1325	1000	7434	7482	7486	7438	7433	7481	&HX1325
342-	&HX1325	7485	7437							
343-	CHEXA1	1326	1000	7435	7483	7487	7439	7434	7482	&HX1326
344-	&HX1326	7486	7438							
345-	CHEXA1	1327	1000	7436	7484	7488	7440	7435	7483	&HX1327
346-	&HX1327	7487	7439							
347-	CHEXA1	1328	1000	7438	7486	7490	7442	7437	7485	&HX1328
348-	&HX1328	7489	7441							
349-	CHEXA1	1329	1000	7439	7487	7491	7443	7438	7486	&HX1329
350-	&HX1329	7490	7442							

PHASE 1 %PART 1 #
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
351-	CHEXA1	1330	1000	7440	7488	7492	7444	7439	7487	&HX1330
352-	&HX1330	7491	7443							
353-	CHEXA1	1331	1000	7442	7490	7494	7446	7441	7489	&HX1331
354-	&HX1331	7493	7445							
355-	CHEXA1	1332	1000	7443	7491	7495	7447	7442	7490	&HX1332
356-	&HX1332	7494	7446							
357-	CHEXA1	1333	1000	7444	7492	7496	7448	7443	7491	&HX1333
358-	&HX1333	7495	7447							
359-	CHEXA1	1334	1000	7446	7494	7498	7450	7445	7493	&HX1334
360-	&HX1334	7497	7449							
361-	CHEXA1	1335	1000	7447	7495	7499	7451	7446	7494	&HX1335
362-	&HX1335	7498	7450							
363-	CHEXA1	1336	1000	7448	7496	7500	7452	7447	7495	&HX1336
364-	&HX1336	7499	7451							
365-	CHEXA1	1337	1000	7450	7498	7502	7454	7449	7497	&HX1337
366-	&HX1337	7501	7453							
367-	CHEXA1	1338	1000	7451	7499	7503	7455	7450	7498	&HX1338
368-	&HX1338	7502	7454							
369-	CHEXA1	1339	1000	7452	7500	7504	7456	7451	7499	&HX1339
370-	&HX1339	7503	7455							
371-	CHEXA1	1340	1000	7454	7502	7506	7458	7453	7501	&HX1340
372-	&HX1340	7505	7457							
373-	CHEXA1	1341	1000	7455	7503	7507	7459	7454	7502	&HX1341
374-	&HX1341	7506	7458							
375-	CHEXA1	1342	1000	7456	7504	7508	7460	7455	7503	&HX1342
376-	&HX1342	7507	7459							
377-	CHEXA1	1343	1000	7458	7506	7510	7462	7457	7505	&HX1343
378-	&HX1343	7509	7461							
379-	CHEXA1	1344	1000	7459	7507	7511	7463	7458	7506	&HX1344
380-	&HX1344	7510	7462							
381-	CHEXA1	1345	1000	7460	7508	7512	7464	7459	7507	&HX1345
382-	&HX1345	7511	7463							
383-	CHEXA1	1346	1000	7462	7510	7514	7466	7461	7509	&HX1346
384-	&HX1346	7513	7465							
385-	CHEXA1	1347	1000	7463	7511	7515	7467	7462	7510	&HX1347
386-	&HX1347	7514	7466							
387-	CHEXA1	1348	1000	7464	7512	7516	7468	7463	7511	&HX1348
388-	&HX1348	7515	7467							
389-	CHEXA1	1349	1000	7466	7514	7518	7470	7465	7513	&HX1349
390-	&HX1349	7517	7469							
391-	CHEXA1	1350	1000	7467	7515	7519	7471	7466	7514	&HX1350
392-	&HX1350	7518	7470							
393-	CHEXA1	1351	1000	7468	7516	7520	7472	7467	7515	&HX1351
394-	&HX1351	7519	7471							
395-	CHEXA1	1352	1000	7470	7518	7522	7474	7469	7517	&HX1352
396-	&HX1352	7521	7473							
397-	CHEXA1	1353	1000	7471	7519	7523	7475	7470	7518	&HX1353
398-	&HX1353	7522	7474							
399-	CHEXA1	1354	1000	7472	7520	7524	7476	7471	7519	&HX1354
400-	&HX1354	7523	7475							

PHASE 1 %PART 1 B
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
401-	CHEXA1	1355	1000	7474	7522	7526	7478	7473	7521	&HX1355
402-	&HX1355	7525	7477							
403-	CHEXA1	1356	1000	7475	7523	7527	7479	7474	7522	&HX1356
404-	&HX1356	7526	7478							
405-	CHEXA1	1357	1000	7476	7524	7528	7480	7475	7523	&HX1357
406-	&HX1357	7527	7479							
407-	CHEXA1	1358	1000	7478	7526	7482	7434	7477	7525	&HX1358
408-	&HX1358	7481	7433							
409-	CHEXA1	1359	1000	7479	7527	7483	7435	7478	7526	&HX1359
410-	&HX1359	7482	7434							
411-	CHEXA1	1360	1000	7480	7528	7484	7436	7479	7527	&HX1360
412-	&HX1360	7483	7435							
413-	CHEXA1	1361	1000	7482	7530	7534	7486	7481	7529	&HX1361
414-	&HX1361	7533	7485							
415-	CHEXA1	1362	1000	7483	7531	7535	7487	7482	7530	&HX1362
416-	&HX1362	7534	7486							
417-	CHEXA1	1363	1000	7484	7532	7536	7488	7483	7531	&HX1363
418-	&HX1363	7535	7487							
419-	CHEXA1	1364	1000	7486	7534	7538	7490	7485	7533	&HX1364
420-	&HX1364	7537	7489							
421-	CHEXA1	1365	1000	7487	7535	7539	7491	7486	7534	&HX1365
422-	&HX1365	7538	7490							
423-	CHEXA1	1366	1000	7488	7536	7540	7492	7487	7535	&HX1366
424-	&HX1366	7539	7491							
425-	CHEXA1	1367	1000	7490	7538	7542	7494	7489	7537	&HX1367
426-	&HX1367	7541	7493							
427-	CHEXA1	1368	1000	7491	7539	7543	7495	7490	7538	&HX1368
428-	&HX1368	7542	7494							
429-	CHEXA1	1369	1000	7492	7540	7544	7496	7491	7539	&HX1369
430-	&HX1369	7543	7495							
431-	CHEXA1	1370	1000	7494	7542	7546	7498	7493	7541	&HX1370
432-	&HX1370	7545	7497							
433-	CHEXA1	1371	1000	7495	7543	7547	7499	7494	7542	&HX1371
434-	&HX1371	7546	7498							
435-	CHEXA1	1372	1000	7496	7544	7548	7500	7495	7543	&HX1372
436-	&HX1372	7547	7499							
437-	CHEXA1	1373	1000	7498	7546	7550	7502	7497	7545	&HX1373
438-	&HX1373	7549	7501							
439-	CHEXA1	1374	1000	7499	7547	7551	7503	7498	7546	&HX1374
440-	&HX1374	7550	7502							
441-	CHEXA1	1375	1000	7500	7548	7552	7504	7499	7547	&HX1375
442-	&HX1375	7551	7503							
443-	CHEXA1	1376	1000	7502	7550	7554	7506	7501	7549	&HX1376
444-	&HX1376	7553	7505							
445-	CHEXA1	1377	1000	7503	7551	7555	7507	7502	7550	&HX1377
446-	&HX1377	7554	7506							
447-	CHEXA1	1378	1000	7504	7552	7556	7508	7503	7551	&HX1378
448-	&HX1378	7555	7507							
449-	CHEXA1	1379	1000	7506	7554	7558	7510	7505	7553	&HX1379
450-	&HX1379	7557	7509							

PHASE 1 %PART 1 #
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
451-	CHEXA1	1380	1000	7507	7555	7559	7511	7506	7554	&HX1380
452-	&HX1380		7558	7510						
453-	CHEXA1	1381	1000	7508	7556	7560	7512	7507	7555	&HX1381
454-	&HX1381		7559	7511						
455-	CHEXA1	1382	1000	7510	7558	7562	7514	7509	7557	&HX1382
456-	&HX1382		7561	7513						
457-	CHEXA1	1383	1000	7511	7559	7563	7515	7510	7558	&HX1383
458-	&HX1383		7562	7514						
459-	CHEXA1	1384	1000	7512	7560	7564	7516	7511	7559	&HX1384
460-	&HX1384		7563	7515						
461-	CHEXA1	1385	1000	7514	7562	7566	7518	7513	7561	&HX1385
462-	&HX1385		7565	7517						
463-	CHEXA1	1386	1000	7515	7563	7567	7519	7514	7562	&HX1386
464-	&HX1386		7566	7518						
465-	CHEXA1	1387	1000	7516	7564	7568	7520	7515	7563	&HX1387
466-	&HX1387		7567	7519						
467-	CHEXA1	1388	1000	7518	7566	7570	7522	7517	7565	&HX1388
468-	&HX1388		7569	7521						
469-	CHEXA1	1389	1000	7519	7567	7571	7523	7518	7566	&HX1389
470-	&HX1389		7570	7522						
471-	CHEXA1	1390	1000	7520	7568	7572	7524	7519	7567	&HX1390
472-	&HX1390		7571	7523						
473-	CHEXA1	1391	1000	7522	7570	7574	7526	7521	7569	&HX1391
474-	&HX1391		7573	7525						
475-	CHEXA1	1392	1000	7523	7571	7575	7527	7522	7570	&HX1392
476-	&HX1392		7574	7526						
477-	CHEXA1	1393	1000	7524	7572	7576	7528	7523	7571	&HX1393
478-	&HX1393		7575	7527						
479-	CHEXA1	1394	1000	7526	7574	7530	7482	7525	7573	&HX1394
480-	&HX1394		7529	7481						
481-	CHEXA1	1395	1000	7527	7575	7531	7483	7526	7574	&HX1395
482-	&HX1395		7530	7482						
483-	CHEXA1	1396	1000	7528	7576	7532	7484	7527	7575	&HX1396
484-	&HX1396		7531	7483						
485-	CHEXA1	1397	1000	7530	7578	7582	7534	7529	7577	&HX1397
486-	&HX1397		7581	7533						
487-	CHEXA1	1398	1000	7531	7579	7583	7535	7530	7578	&HX1398
488-	&HX1398		7582	7534						
489-	CHEXA1	1399	1000	7532	7580	7584	7536	7531	7579	&HX1399
490-	&HX1399		7583	7535						
491-	CHEXA1	1400	1000	7534	7582	7586	7538	7533	7581	&HX1400
492-	&HX1400		7585	7537						
493-	CHEXA1	1401	1000	7535	7583	7587	7539	7534	7582	&HX1401
494-	&HX1401		7586	7538						
495-	CHEXA1	1402	1000	7536	7584	7588	7540	7535	7583	&HX1402
496-	&HX1402		7587	7539						
497-	CHEXA1	1403	1000	7538	7586	7590	7542	7537	7585	&HX1403
498-	&HX1403		7589	7541						
499-	CHEXA1	1404	1000	7539	7587	7591	7543	7538	7586	&HX1404
500-	&HX1404		7590	7542						

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
501-	CHEXA1	1405	1000	7540	7588	7592	7544	7539	7587	&HX1405
502-	&HX1405	7591	7543							
503-	CHEXA1	1406	1000	7542	7590	7594	7546	7541	7589	&HX1406
504-	&HX1406	7593	7545							
505-	CHEXA1	1407	1000	7543	7591	7595	7547	7542	7590	&HX1407
506-	&HX1407	7594	7546							
507-	CHEXA1	1408	1000	7544	7592	7596	7548	7543	7591	&HX1408
508-	&HX1408	7595	7547							
509-	CHEXA1	1409	1000	7546	7594	7598	7550	7545	7593	&HX1409
510-	&HX1409	7597	7549							
511-	CHEXA1	1410	1000	7547	7595	7599	7551	7546	7594	&HX1410
512-	&HX1410	7598	7550							
513-	CHEXA1	1411	1000	7548	7596	7600	7552	7547	7595	&HX1411
514-	&HX1411	7599	7551							
515-	CHEXA1	1412	1000	7550	7598	7602	7554	7549	7597	&HX1412
516-	&HX1412	7601	7553							
517-	CHEXA1	1413	1000	7551	7599	7603	7555	7550	7598	&HX1413
518-	&HX1413	7602	7554							
519-	CHEXA1	1414	1000	7552	7600	7604	7556	7551	7599	&HX1414
520-	&HX1414	7603	7555							
521-	CHEXA1	1415	1000	7554	7602	7606	7558	7553	7601	&HX1415
522-	&HX1415	7605	7557							
523-	CHEXA1	1416	1000	7555	7603	7607	7559	7554	7602	&HX1416
524-	&HX1416	7606	7558							
525-	CHEXA1	1417	1000	7556	7604	7608	7560	7555	7603	&HX1417
526-	&HX1417	7607	7559							
527-	CHEXA1	1418	1000	7558	7606	7610	7562	7557	7605	&HX1418
528-	&HX1418	7609	7561							
529-	CHEXA1	1419	1000	7559	7607	7611	7563	7558	7606	&HX1419
530-	&HX1419	7610	7562							
531-	CHEXA1	1420	1000	7560	7608	7612	7564	7559	7607	&HX1420
532-	&HX1420	7611	7563							
533-	CHEXA1	1421	1000	7562	7610	7614	7566	7561	7609	&HX1421
534-	&HX1421	7613	7565							
535-	CHEXA1	1422	1000	7563	7611	7615	7567	7562	7610	&HX1422
536-	&HX1422	7614	7566							
537-	CHEXA1	1423	1000	7564	7612	7616	7568	7563	7611	&HX1423
538-	&HX1423	7615	7567							
539-	CHEXA1	1424	1000	7566	7614	7618	7570	7565	7613	&HX1424
540-	&HX1424	7617	7569							
541-	CHEXA1	1425	1000	7567	7615	7619	7571	7566	7614	&HX1425
542-	&HX1425	7618	7570							
543-	CHEXA1	1426	1000	7568	7616	7620	7572	7567	7615	&HX1426
544-	&HX1426	7619	7571							
545-	CHEXA1	1427	1000	7570	7618	7622	7574	7569	7617	&HX1427
546-	&HX1427	7621	7573							
547-	CHEXA1	1428	1000	7571	7619	7623	7575	7570	7618	&HX1428
548-	&HX1428	7622	7574							
549-	CHEXA1	1429	1000	7572	7620	7624	7576	7571	7619	&HX1429
550-	&HX1429	7623	7575							

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
551- CHEXA1	1430	1000	7574	7622	7578	7530	7573	7621		&HX1430
552- &HX1430	7577	7529								
553- CHEXA1	1431	1000	7575	7623	7579	7531	7574	7622		&HX1431
554- &HX1431	7578	7530								
555- CHEXA1	1432	1000	7576	7624	7580	7532	7575	7623		&HX1432
556- &HX1432	7579	7531								
557- CONROD	3001	7805	8352	100	.308					
558- CONROD	3002	7809	8355	100	.308					
559- CONROD	3003	7813	8355	100	.308					
560- CORD2C	100	696	74.738	-30.494	6.138	200.0	-30.494	6.138		&CSSRM
561- &CSSRM	74.738	0.0	0.0							
562- CORD2R	101	696	74.738	-30.494	6.138	74.738	-28.570	115.6963		&RSSRM
563- &RSSRM	200.	-30.494	6.138							
564- CORD2R	696	0	-81.5683	0	35.5985	-80.2278	0	57.5136		&RSTANK
565- &RSTANK	68.25	0.0	48.432							
566- CQUAD2	73	100	7289	7337	7341	7293	.0			
567- CQUAD2	74	100	7293	7341	7345	7297	.0			
568- CQUAD2	75	100	7297	7345	7349	7301	.0			
569- CQUAD2	76	100	7301	7349	7353	7305	.0			
570- CQUAD2	77	100	7305	7353	7357	7309	.0			
571- CQUAD2	78	100	7309	7357	7361	7313	.0			
572- CQUAD2	79	100	7313	7361	7365	7317	.0			
573- CQUAD2	80	100	7317	7365	7369	7321	.0			
574- CQUAD2	81	100	7321	7369	7373	7325	.0			
575- CQUAD2	82	100	7325	7373	7377	7329	.0			
576- CQUAD2	83	100	7329	7377	7381	7333	.0			
577- CQUAD2	84	100	7333	7381	7337	7289	.0			
578- CQUAD2	85	100	7337	7385	7389	7341	.0			
579- CQUAD2	86	100	7341	7389	7393	7345	.0			
580- CQUAD2	87	100	7345	7393	7397	7349	.0			
581- CQUAD2	88	100	7349	7397	7401	7353	.0			
582- CQUAD2	89	100	7353	7401	7405	7357	.0			
583- CQUAD2	90	100	7357	7405	7409	7361	.0			
584- CQUAD2	91	100	7361	7409	7413	7365	.0			
585- CQUAD2	92	100	7365	7413	7417	7369	.0			
586- CQUAD2	93	100	7369	7417	7421	7373	.0			
587- CQUAD2	94	100	7373	7421	7425	7377	.0			
588- CQUAD2	95	100	7377	7425	7429	7381	.0			
589- CQUAD2	96	100	7381	7429	7385	7337	.0			
590- CQUAD2	97	100	7385	7433	7437	7389	.0			
591- CQUAD2	98	100	7389	7437	7441	7393	.0			
592- CQUAD2	99	100	7393	7441	7445	7397	.0			
593- CQUAD2	100	100	7397	7445	7449	7401	.0			
594- CQUAD2	101	100	7401	7449	7453	7405	.0			
595- CQUAD2	102	100	7405	7453	7457	7409	.0			
596- CQUAD2	103	100	7409	7457	7461	7413	.0			
597- CQUAD2	104	100	7413	7461	7465	7417	.0			
598- CQUAD2	105	100	7417	7465	7469	7421	.0			
599- CQUAD2	106	100	7421	7469	7473	7425	.0			
600- CQUAD2	107	100	7425	7473	7477	7429	.0			

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9
601-	CQUAD2	108	100	7429	7477	7433	7385	.0	
602-	CQUAD2	109	100	7433	7481	7485	7437	.0	
603-	CQUAD2	110	100	7437	7485	7489	7441	.0	
604-	CQUAD2	111	100	7441	7489	7493	7445	.0	
605-	CQUAD2	112	100	7445	7493	7497	7449	.0	
606-	CQUAD2	113	100	7449	7497	7501	7453	.0	
607-	CQUAD2	114	100	7453	7501	7505	7457	.0	
608-	CQUAD2	115	100	7457	7505	7509	7461	.0	
609-	CQUAD2	116	100	7461	7509	7513	7465	.0	
610-	CQUAD2	117	100	7465	7513	7517	7469	.0	
611-	CQUAD2	118	100	7469	7517	7521	7473	.0	
612-	CQUAD2	119	100	7473	7521	7525	7477	.0	
613-	CQUAD2	120	100	7477	7525	7481	7433	.0	
614-	CQUAD2	121	100	7481	7529	7533	7485	.0	
615-	CQUAD2	122	100	7485	7533	7537	7489	.0	
616-	CQUAD2	123	100	7489	7537	7541	7493	.0	
617-	CQUAD2	124	100	7493	7541	7545	7497	.0	
618-	CQUAD2	125	100	7497	7545	7549	7501	.0	
619-	CQUAD2	126	100	7501	7549	7553	7505	.0	
620-	CQUAD2	127	100	7505	7553	7557	7509	.0	
621-	CQUAD2	128	100	7509	7557	7561	7513	.0	
622-	CQUAD2	129	100	7513	7561	7565	7517	.0	
623-	CQUAD2	130	100	7517	7565	7569	7521	.0	
624-	CQUAD2	131	100	7521	7569	7573	7525	.0	
625-	CQUAD2	132	100	7525	7573	7529	7481	.0	
626-	CQUAD2	133	100	7529	7577	7581	7533	.0	
627-	CQUAD2	134	100	7533	7581	7585	7537	.0	
628-	CQUAD2	135	100	7537	7585	7589	7541	.0	
629-	CQUAD2	136	100	7541	7589	7593	7545	.0	
630-	CQUAD2	137	100	7545	7593	7597	7549	.0	
631-	CQUAD2	138	100	7549	7597	7601	7553	.0	
632-	CQUAD2	139	100	7553	7601	7605	7557	.0	
633-	CQUAD2	140	100	7557	7605	7609	7561	.0	
634-	CQUAD2	141	100	7561	7609	7613	7565	.0	
635-	CQUAD2	142	100	7565	7613	7617	7569	.0	
636-	CQUAD2	143	100	7569	7617	7621	7573	.0	
637-	CQUAD2	144	100	7573	7621	7577	7529	.0	
638-	CQUAD2	201	200	7577	7801	7802	7581		
639-	CQUAD2	202	200	7581	7802	7804	7585		
640-	CQUAD2	203	200	7585	7804	7805	7589		
641-	CQUAD2	204	200	7589	7805	7807	7593		
642-	CQUAD2	205	200	7593	7807	7808	7597		
643-	CQUAD2	206	200	7597	7808	7809	7601		
644-	CQUAD2	207	200	7601	7809	7810	7605		
645-	CQUAD2	208	200	7605	7810	7812	7609		
646-	CQUAD2	209	200	7609	7812	7813	7613		
647-	CQUAD2	210	200	7613	7813	7815	7617		
648-	CQUAD2	211	200	7617	7815	7816	7621		
649-	CQUAD2	212	200	7621	7816	7801	7577		
650-	CQUAD2	213	300	7801	7817	7818	7802	.0	

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SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
651-	CQUAD2	214	300	7802	7818	7819	7803	.0		
652-	CQUAD2	215	300	7803	7819	7820	7804	.0		
653-	CQUAD2	216	300	7804	7820	7821	7805	.0		
654-	CQUAD2	217	300	7805	7821	7822	7806	.0		
655-	CQUAD2	218	300	7806	7822	7823	7807	.0		
656-	CQUAD2	219	300	7807	7823	7824	7808	.0		
657-	CQUAD2	220	300	7808	7824	7825	7809	.0		
658-	CQUAD2	221	300	7809	7825	7826	7810	.0		
659-	CQUAD2	222	300	7810	7826	7827	7811	.0		
660-	CQUAD2	223	300	7811	7827	7828	7812	.0		
661-	CQUAD2	224	300	7812	7828	7829	7813	.0		
662-	CQUAD2	225	300	7813	7829	7830	7814	.0		
663-	CQUAD2	226	300	7814	7830	7831	7815	.0		
664-	CQUAD2	227	300	7815	7831	7832	7816	.0		
665-	CQUAD2	228	300	7816	7832	7817	7801	.0		
666-	CQUAD2	229	300	7817	7833	7834	7818	.0		
667-	CQUAD2	230	300	7818	7834	7835	7819	.0		
668-	CQUAD2	231	300	7819	7835	7836	7820	.0		
669-	CQUAD2	232	300	7820	7836	7837	7821	.0		
670-	CQUAD2	233	300	7821	7837	7838	7822	.0		
671-	CQUAD2	234	300	7822	7838	7839	7823	.0		
672-	CQUAD2	235	300	7823	7839	7840	7824	.0		
673-	CQUAD2	236	300	7824	7840	7841	7825	.0		
674-	CQUAD2	237	300	7825	7841	7842	7826	.0		
675-	CQUAD2	238	300	7826	7842	7843	7827	.0		
676-	CQUAD2	239	300	7827	7843	7844	7828	.0		
677-	CQUAD2	240	300	7828	7844	7845	7829	.0		
678-	CQUAD2	241	300	7829	7845	7846	7830	.0		
679-	CQUAD2	242	300	7830	7846	7847	7831	.0		
680-	CQUAD2	243	300	7831	7847	7848	7832	.0		
681-	CQUAD2	244	300	7832	7848	7833	7817	.0		
682-	CQUAD2	245	300	7833	7849	7850	7834	.0		
683-	CQUAD2	246	300	7834	7850	7851	7835	.0		
684-	CQUAD2	247	300	7835	7851	7852	7836	.0		
685-	CQUAD2	248	300	7836	7852	7853	7837	.0		
686-	CQUAD2	249	300	7837	7853	7854	7838	.0		
687-	CQUAD2	250	300	7838	7854	7855	7839	.0		
688-	CQUAD2	251	300	7839	7855	7856	7840	.0		
689-	CQUAD2	252	300	7840	7856	7857	7841	.0		
690-	CQUAD2	253	300	7841	7857	7858	7842	.0		
691-	CQUAD2	254	300	7842	7858	7859	7843	.0		
692-	CQUAD2	255	300	7843	7859	7860	7844	.0		
693-	CQUAD2	256	300	7844	7860	7861	7845	.0		
694-	CQUAD2	257	300	7845	7861	7862	7846	.0		
695-	CQUAD2	258	300	7846	7862	7863	7847	.0		
696-	CQUAD2	259	300	7847	7863	7864	7848	.0		
697-	CQUAD2	260	300	7848	7864	7849	7833	.0		
698-	CQUAD2	261	300	7849	7865	7866	7850	.0		
699-	CQUAD2	262	300	7850	7866	7867	7851	.0		
700-	CQUAD2	263	300	7851	7867	7868	7852	.0		

PHASE 1 %PART 1 B
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

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CARD
COUNT.   1      2      3      4      5      6      7      8      9     10
  701-CQUAD2  264     300    7852   7868   7869   7853    .0
  702-CQUAD2  265     300    7853   7869   7870   7854    .0
  703-CQUAD2  266     300    7854   7870   7871   7855    .0
  704-CQUAD2  267     300    7855   7871   7872   7856    .0
  705-CQUAD2  268     300    7856   7872   7873   7857    .0
  706-CQUAD2  269     300    7857   7873   7874   7858    .0
  707-CQUAD2  270     300    7858   7874   7875   7859    .0
  708-CQUAD2  271     300    7859   7875   7876   7860    .0
  709-CQUAD2  272     300    7860   7876   7877   7861    .0
  710-CQUAD2  273     300    7861   7877   7878   7862    .0
  711-CQUAD2  274     300    7862   7878   7879   7863    .0
  712-CQUAD2  275     300    7863   7879   7880   7864    .0
  713-CQUAD2  276     300    7864   7880   7865   7849    .0
  714-DMI     BFAC    0      2      1      2             1       1
  715-DMI     BFAC    1      1      1.0
  716-DMI     CPAJC   0      2      1      1             1       1
  717-DMI     CPAJC   1      1      1.0
  718-DMI     EQR     0      2      1      2             6       9
  719-DMI     EQR     1      1      .012047-.980338.196959 33.0854-21.5697&EQ1
  720-&EQ1    -109.382
  721-DMI     EQR     2      1      .05985  .197328 .978504 -26.0164-107.160&EQ2
  722-&EQ2     23.2010
  723-DMI     EQR     3      1      .99813  3      -.06105 1.27813 34.7662 &EQ3
  724-&EQ3     20.8966
  725-DMI     EQR     4      1      .99813  3      -.06105 .913934 43.5110 &EQ4
  726-&EQ4     14.9423
  727-DMI     EQR     5      1     -.012047.980338 -.196959-28.411836.9790 &EQ5
  728-&EQ5    185.7937
  729-DMI     EQR     6      1      .05985  .197328 .978504 -20.9608-183.714&EQ6
  730-&EQ6     38.3298
  731-DMI     EQR     7      1      .99813  3      -.06105 1.14885 24.3945 &EQ7
  732-&EQ7     18.7829
  733-DMI     EQR     8      1     -.012047.980338 -.196959-8.9482536.979  &EQ8
  734-&EQ8    184.6032
  735-DMI     EQR     9      1      .05985  .197328 .978504 -20.9608-183.714&EQ9
  736-&EQ9     38.3298
  737-DMI     GFAC    0      2      1      2             1       1
  738-DMI     GFAC    1      1      1.0
  739-DMI     KFAC    0      2      1      2             1       1
  740-DMI     KFAC    1      1      1.0
  741-GRDSET          100                                100
  742-GRID    7289           9.750  180.000 118.160
  743-GRID    7290           7.560  180.000 118.160
  744-GRID    7291           5.370  180.000 118.160
  745-GRID    7292           3.180  180.000 118.160
  746-GRID    7293           9.750  150.000 118.160
  747-GRID    7294           7.560  150.000 118.160
  748-GRID    7295           5.370  150.000 118.160
  749-GRID    7296           3.180  150.000 118.160
  750-GRID    7297           9.750  120.000 118.160
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PHASE 1 %PART 1 #
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
751-	GRID	7298		7.560	120.000	118.160				
752-	GRID	7299		5.370	120.000	118.160				
753-	GRID	7300		3.180	120.000	118.160				
754-	GRID	7301		9.750	90.000	118.160				
755-	GRID	7302		7.560	90.000	118.160				
756-	GRID	7303		5.370	90.000	118.160				
757-	GRID	7304		3.180	90.000	118.160				
758-	GRID	7305		9.750	60.000	118.160				
759-	GRID	7306		7.560	60.000	118.160				
760-	GRID	7307		5.370	60.000	118.160				
761-	GRID	7308		3.180	60.000	118.160				
762-	GRID	7309		9.750	30.000	118.160				
763-	GRID	7310		7.560	30.000	118.160				
764-	GRID	7311		5.370	30.000	118.160				
765-	GRID	7312		3.180	30.000	118.160				
766-	GRID	7313		9.750	0.0	118.160				
767-	GRID	7314		7.560	0.0	118.160				
768-	GRID	7315		5.370	0.0	118.160				
769-	GRID	7316		3.180	0.0	118.160				
770-	GRID	7317		9.750	-30.000	118.160				
771-	GRID	7318		7.560	-30.000	118.160				
772-	GRID	7319		5.370	-30.000	118.160				
773-	GRID	7320		3.180	-30.000	118.160				
774-	GRID	7321		9.750	-60.000	118.160				
775-	GRID	7322		7.560	-60.000	118.160				
776-	GRID	7323		5.370	-60.000	118.160				
777-	GRID	7324		3.180	-60.000	118.160				
778-	GRID	7325		9.750	-90.000	118.160				
779-	GRID	7326		7.560	-90.000	118.160				
780-	GRID	7327		5.370	-90.000	118.160				
781-	GRID	7328		3.180	-90.000	118.160				
782-	GRID	7329		9.750	-120.000	118.160				
783-	GRID	7330		7.560	-120.000	118.160				
784-	GRID	7331		5.370	-120.000	118.160				
785-	GRID	7332		3.180	-120.000	118.160				
786-	GRID	7333		9.750	-150.000	118.160				
787-	GRID	7334		7.560	-150.000	118.160				
788-	GRID	7335		5.370	-150.000	118.160				
789-	GRID	7336		3.180	-150.000	118.160				
790-	GRID	7337		9.750	180.000	130.437				
791-	GRID	7338		7.560	180.000	130.437				
792-	GRID	7339		5.370	180.000	130.437				
793-	GRID	7340		3.180	180.000	130.437				
794-	GRID	7341		9.750	150.000	130.437				
795-	GRID	7342		7.560	150.000	130.437				
796-	GRID	7343		5.370	150.000	130.437				
797-	GRID	7344		3.180	150.000	130.437				
798-	GRID	7345		9.750	120.000	130.437				
799-	GRID	7346		7.560	120.000	130.437				
800-	GRID	7347		5.370	120.000	130.437				

PHASE 1 %PART 1 II
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
801-	GRID	7348		3.180	120.000	130.437				
802-	GRID	7349		9.750	90.000	130.437				
803-	GRID	7350		7.560	90.000	130.437				
804-	GRID	7351		5.370	90.000	130.437				
805-	GRID	7352		3.180	90.000	130.437				
806-	GRID	7353		9.750	60.000	130.437				
807-	GRID	7354		7.560	60.000	130.437				
808-	GRID	7355		5.370	60.000	130.437				
809-	GRID	7356		3.180	60.000	130.437				
810-	GRID	7357		9.750	30.000	130.437				
811-	GRID	7358		7.560	30.000	130.437				
812-	GRID	7359		5.370	30.000	130.437				
813-	GRID	7360		3.180	30.000	130.437				
814-	GRID	7361		9.750	0.0	130.437				
815-	GRID	7362		7.560	0.0	130.437				
816-	GRID	7363		5.370	0.0	130.437				
817-	GRID	7364		3.180	0.0	130.437				
818-	GRID	7365		9.750	-30.000	130.437				
819-	GRID	7366		7.560	-30.000	130.437				
820-	GRID	7367		5.370	-30.000	130.437				
821-	GRID	7368		3.180	-30.000	130.437				
822-	GRID	7369		9.750	-60.000	130.437				
823-	GRID	7370		7.560	-60.000	130.437				
824-	GRID	7371		5.370	-60.000	130.437				
825-	GRID	7372		3.180	-60.000	130.437				
826-	GRID	7373		9.750	-90.000	130.437				
827-	GRID	7374		7.560	-90.000	130.437				
828-	GRID	7375		5.370	-90.000	130.437				
829-	GRID	7376		3.180	-90.000	130.437				
830-	GRID	7377		9.750	-120.000	130.437				
831-	GRID	7378		7.560	-120.000	130.437				
832-	GRID	7379		5.370	-120.000	130.437				
833-	GRID	7380		3.180	-120.000	130.437				
834-	GRID	7381		9.750	-150.000	130.437				
835-	GRID	7382		7.560	-150.000	130.437				
836-	GRID	7383		5.370	-150.000	130.437				
837-	GRID	7384		3.180	-150.000	130.437				
838-	GRID	7385		9.750	180.000	142.713				
839-	GRID	7386		7.560	180.000	142.713				
840-	GRID	7387		5.370	180.000	142.713				
841-	GRID	7388		3.180	180.000	142.713				
842-	GRID	7389		9.750	150.000	142.713				
843-	GRID	7390		7.560	150.000	142.713				
844-	GRID	7391		5.370	150.000	142.713				
845-	GRID	7392		3.180	150.000	142.713				
846-	GRID	7393		9.750	120.000	142.713				
847-	GRID	7394		7.560	120.000	142.713				
848-	GRID	7395		5.370	120.000	142.713				
849-	GRID	7396		3.180	120.000	142.713				
850-	GRID	7397		9.750	90.000	142.713				

PHASE 1 XPART 1 B
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
851-	GRID	7398		7.560	90.000	142.713				
852-	GRID	7399		5.370	90.000	142.713				
853-	GRID	7400		3.180	90.000	142.713				
854-	GRID	7401		9.750	60.000	142.713				
855-	GRID	7402		7.560	60.000	142.713				
856-	GRID	7403		5.370	60.000	142.713				
857-	GRID	7404		3.180	60.000	142.713				
858-	GRID	7405		9.750	30.000	142.713				
859-	GRID	7406		7.560	30.000	142.713				
860-	GRID	7407		5.370	30.000	142.713				
861-	GRID	7408		3.180	30.000	142.713				
862-	GRID	7409		9.750	0.0	142.713				
863-	GRID	7410		7.560	0.0	142.713				
864-	GRID	7411		5.370	0.0	142.713				
865-	GRID	7412		3.180	0.0	142.713				
866-	GRID	7413		9.750	-30.000	142.713				
867-	GRID	7414		7.560	-30.000	142.713				
868-	GRID	7415		5.370	-30.000	142.713				
869-	GRID	7416		3.180	-30.000	142.713				
870-	GRID	7417		9.750	-60.000	142.713				
871-	GRID	7418		7.560	-60.000	142.713				
872-	GRID	7419		5.370	-60.000	142.713				
873-	GRID	7420		3.180	-60.000	142.713				
874-	GRID	7421		9.750	-90.000	142.713				
875-	GRID	7422		7.560	-90.000	142.713				
876-	GRID	7423		5.370	-90.000	142.713				
877-	GRID	7424		3.180	-90.000	142.713				
878-	GRID	7425		9.750	-120.000	142.713				
879-	GRID	7426		7.560	-120.000	142.713				
880-	GRID	7427		5.370	-120.000	142.713				
881-	GRID	7428		3.180	-120.000	142.713				
882-	GRID	7429		9.750	-150.000	142.713				
883-	GRID	7430		7.560	-150.000	142.713				
884-	GRID	7431		5.370	-150.000	142.713				
885-	GRID	7432		3.180	-150.000	142.713				
886-	GRID	7433		9.750	180.000	154.990				
887-	GRID	7434		7.560	180.000	154.990				
888-	GRID	7435		5.370	180.000	154.990				
889-	GRID	7436		3.180	180.000	154.990				
890-	GRID	7437		9.750	150.000	154.990				
891-	GRID	7438		7.560	150.000	154.990				
892-	GRID	7439		5.370	150.000	154.990				
893-	GRID	7440		3.180	150.000	154.990				
894-	GRID	7441		9.750	120.000	154.990				
895-	GRID	7442		7.560	120.000	154.990				
896-	GRID	7443		5.370	120.000	154.990				
897-	GRID	7444		3.180	120.000	154.990				
898-	GRID	7445		9.750	90.000	154.990				
899-	GRID	7446		7.560	90.000	154.990				
900-	GRID	7447		5.370	90.000	154.990				

PHASE 1 %PART 1 U
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
901-	GRID	7448		3.180	90.000	154.990				
902-	GRID	7449		9.750	60.000	154.990				
903-	GRID	7450		7.560	60.000	154.990				
904-	GRID	7451		5.370	60.000	154.990				
905-	GRID	7452		3.180	60.000	154.990				
906-	GRID	7453		9.750	30.000	154.990				
907-	GRID	7454		7.560	30.000	154.990				
908-	GRID	7455		5.370	30.000	154.990				
909-	GRID	7456		3.180	30.000	154.990				
910-	GRID	7457		9.750	0.0	154.990				
911-	GRID	7458		7.560	0.0	154.990				
912-	GRID	7459		5.370	0.0	154.990				
913-	GRID	7460		3.180	0.0	154.990				
914-	GRID	7461		9.750	-30.000	154.990				
915-	GRID	7462		7.560	-30.000	154.990				
916-	GRID	7463		5.370	-30.000	154.990				
917-	GRID	7464		3.180	-30.000	154.990				
918-	GRID	7465		9.750	-60.000	154.990				
919-	GRID	7466		7.560	-60.000	154.990				
920-	GRID	7467		5.370	-60.000	154.990				
921-	GRID	7468		3.180	-60.000	154.990				
922-	GRID	7469		9.750	-90.000	154.990				
923-	GRID	7470		7.560	-90.000	154.990				
924-	GRID	7471		5.370	-90.000	154.990				
925-	GRID	7472		3.180	-90.000	154.990				
926-	GRID	7473		9.750	-120.000	154.990				
927-	GRID	7474		7.560	-120.000	154.990				
928-	GRID	7475		5.370	-120.000	154.990				
929-	GRID	7476		3.180	-120.000	154.990				
930-	GRID	7477		9.750	-150.000	154.990				
931-	GRID	7478		7.560	-150.000	154.990				
932-	GRID	7479		5.370	-150.000	154.990				
933-	GRID	7480		3.180	-150.000	154.990				
934-	GRID	7481		9.750	180.000	167.267				
935-	GRID	7482		7.560	180.000	167.267				
936-	GRID	7483		5.370	180.000	167.267				
937-	GRID	7484		3.180	180.000	167.267				
938-	GRID	7485		9.750	150.000	167.267				
939-	GRID	7486		7.560	150.000	167.267				
940-	GRID	7487		5.370	150.000	167.267				
941-	GRID	7488		3.180	150.000	167.267				
942-	GRID	7489		9.750	120.000	167.267				
943-	GRID	7490		7.560	120.000	167.267				
944-	GRID	7491		5.370	120.000	167.267				
945-	GRID	7492		3.180	120.000	167.267				
946-	GRID	7493		9.750	90.000	167.267				
947-	GRID	7494		7.560	90.000	167.267				
948-	GRID	7495		5.370	90.000	167.267				
949-	GRID	7496		3.180	90.000	167.267				
950-	GRID	7497		9.750	60.000	167.267				

PHASE 1 XPART 1 B
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
951-	GRID	7498		7.560	60.000	167.267				
952-	GRID	7499		5.370	60.000	167.267				
953-	GRID	7500		3.180	60.000	167.267				
954-	GRID	7501		9.750	30.000	167.267				
955-	GRID	7502		7.560	30.000	167.267				
956-	GRID	7503		5.370	30.000	167.267				
957-	GRID	7504		3.180	30.000	167.267				
958-	GRID	7505		9.750	0.0	167.267				
959-	GRID	7506		7.560	0.0	167.267				
960-	GRID	7507		5.370	0.0	167.267				
961-	GRID	7508		3.180	0.0	167.267				
962-	GRID	7509		9.750	-30.000	167.267				
963-	GRID	7510		7.560	-30.000	167.267				
964-	GRID	7511		5.370	-30.000	167.267				
965-	GRID	7512		3.180	-30.000	167.267				
966-	GRID	7513		9.750	-60.000	167.267				
967-	GRID	7514		7.560	-60.000	167.267				
968-	GRID	7515		5.370	-60.000	167.267				
969-	GRID	7516		3.180	-60.000	167.267				
970-	GRID	7517		9.750	-90.000	167.267				
971-	GRID	7518		7.560	-90.000	167.267				
972-	GRID	7519		5.370	-90.000	167.267				
973-	GRID	7520		3.180	-90.000	167.267				
974-	GRID	7521		9.750	-120.000	167.267				
975-	GRID	7522		7.560	-120.000	167.267				
976-	GRID	7523		5.370	-120.000	167.267				
977-	GRID	7524		3.180	-120.000	167.267				
978-	GRID	7525		9.750	-150.000	167.267				
979-	GRID	7526		7.560	-150.000	167.267				
980-	GRID	7527		5.370	-150.000	167.267				
981-	GRID	7528		3.180	-150.000	167.267				
982-	GRID	7529		9.750	180.000	179.543				
983-	GRID	7530		7.560	180.000	179.543				
984-	GRID	7531		5.370	180.000	179.543				
985-	GRID	7532		3.180	180.000	179.543				
986-	GRID	7533		9.750	150.000	179.543				
987-	GRID	7534		7.560	150.000	179.543				
988-	GRID	7535		5.370	150.000	179.543				
989-	GRID	7536		3.180	150.000	179.543				
990-	GRID	7537		9.750	120.000	179.543				
991-	GRID	7538		7.560	120.000	179.543				
992-	GRID	7539		5.370	120.000	179.543				
993-	GRID	7540		3.180	120.000	179.543				
994-	GRID	7541		9.750	90.000	179.543				
995-	GRID	7542		7.560	90.000	179.543				
996-	GRID	7543		5.370	90.000	179.543				
997-	GRID	7544		3.180	90.000	179.543				
998-	GRID	7545		9.750	60.000	179.543				
999-	GRID	7546		7.560	60.000	179.543				
1000-	GRID	7547		5.370	60.000	179.543				

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1001-	GRID	7548		3.180	60.000	179.543				
1002-	GRID	7549		9.750	30.000	179.543				
1003-	GRID	7550		7.560	30.000	179.543				
1004-	GRID	7551		5.370	30.000	179.543				
1005-	GRID	7552		3.180	30.000	179.543				
1006-	GRID	7553		9.750	0.0	179.543				
1007-	GRID	7554		7.560	0.0	179.543				
1008-	GRID	7555		5.370	0.0	179.543				
1009-	GRID	7556		3.180	0.0	179.543				
1010-	GRID	7557		9.750	-30.000	179.543				
1011-	GRID	7558		7.560	-30.000	179.543				
1012-	GRID	7559		5.370	-30.000	179.543				
1013-	GRID	7560		3.180	-30.000	179.543				
1014-	GRID	7561		9.750	-60.000	179.543				
1015-	GRID	7562		7.560	-60.000	179.543				
1016-	GRID	7563		5.370	-60.000	179.543				
1017-	GRID	7564		3.180	-60.000	179.543				
1018-	GRID	7565		9.750	-90.000	179.543				
1019-	GRID	7566		7.560	-90.000	179.543				
1020-	GRID	7567		5.370	-90.000	179.543				
1021-	GRID	7568		3.180	-90.000	179.543				
1022-	GRID	7569		9.750	-120.000	179.543				
1023-	GRID	7570		7.560	-120.000	179.543				
1024-	GRID	7571		5.370	-120.000	179.543				
1025-	GRID	7572		3.180	-120.000	179.543				
1026-	GRID	7573		9.750	-150.000	179.543				
1027-	GRID	7574		7.560	-150.000	179.543				
1028-	GRID	7575		5.370	-150.000	179.543				
1029-	GRID	7576		3.180	-150.000	179.543				
1030-	GRID	7577		9.750	180.000	191.820				
1031-	GRID	7578		7.560	180.000	191.820				
1032-	GRID	7579		5.370	180.000	191.820				
1033-	GRID	7580		3.180	180.000	191.820				
1034-	GRID	7581		9.750	150.000	191.820				
1035-	GRID	7582		7.560	150.000	191.820				
1036-	GRID	7583		5.370	150.000	191.820				
1037-	GRID	7584		3.180	150.000	191.820				
1038-	GRID	7585		9.750	120.000	191.820				
1039-	GRID	7586		7.560	120.000	191.820				
1040-	GRID	7587		5.370	120.000	191.820				
1041-	GRID	7588		3.180	120.000	191.820				
1042-	GRID	7589		9.750	90.000	191.820				
1043-	GRID	7590		7.560	90.000	191.820				
1044-	GRID	7591		5.370	90.000	191.820				
1045-	GRID	7592		3.180	90.000	191.820				
1046-	GRID	7593		9.750	60.000	191.820				
1047-	GRID	7594		7.560	60.000	191.820				
1048-	GRID	7595		5.370	60.000	191.820				
1049-	GRID	7596		3.180	60.000	191.820				
1050-	GRID	7597		9.750	30.000	191.820				

PHASE 1 %PART 1 #
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1051-	GRID	7598		7.560	30.000	191.820				
1052-	GRID	7599		5.370	30.000	191.820				
1053-	GRID	7600		3.180	30.000	191.820				
1054-	GRID	7601		9.750	0.0	191.820				
1055-	GRID	7602		7.560	0.0	191.820				
1056-	GRID	7603		5.370	0.0	191.820				
1057-	GRID	7604		3.180	0.0	191.820				
1058-	GRID	7605		9.750	-30.000	191.820				
1059-	GRID	7606		7.560	-30.000	191.820				
1060-	GRID	7607		5.370	-30.000	191.820				
1061-	GRID	7608		3.180	-30.000	191.820				
1062-	GRID	7609		9.750	-60.000	191.820				
1063-	GRID	7610		7.560	-60.000	191.820				
1064-	GRID	7611		5.370	-60.000	191.820				
1065-	GRID	7612		3.180	-60.000	191.820				
1066-	GRID	7613		9.750	-90.000	191.820				
1067-	GRID	7614		7.560	-90.000	191.820				
1068-	GRID	7615		5.370	-90.000	191.820				
1069-	GRID	7616		3.180	-90.000	191.820				
1070-	GRID	7617		9.750	-120.000	191.820				
1071-	GRID	7618		7.560	-120.000	191.820				
1072-	GRID	7619		5.370	-120.000	191.820				
1073-	GRID	7620		3.180	-120.000	191.820				
1074-	GRID	7621		9.750	-150.000	191.820				
1075-	GRID	7622		7.560	-150.000	191.820				
1076-	GRID	7623		5.370	-150.000	191.820				
1077-	GRID	7624		3.180	-150.000	191.820				
1078-	GRID	7801		9.75	180.0	196.25	0			
1079-	GRID	7802		9.75	150.0	196.25	0			
1080-	GRID	7803		9.43657	131.383	196.25	0			
1081-	GRID	7804		9.75	120.0	196.25	0			
1082-	GRID	7805		9.75	90.0	196.25	0			
1083-	GRID	7806		9.43657	71.383	196.25	0			
1084-	GRID	7807		9.75	60.0	196.25	0			
1085-	GRID	7808		9.75	30.0	196.25	0			
1086-	GRID	7809		9.75	0.0	196.25	0			
1087-	GRID	7810		9.75	-30.0	196.25	0			
1088-	GRID	7811		9.43657	-48.617	196.25	0			
1089-	GRID	7812		9.75	-60.0	196.25	0			
1090-	GRID	7813		9.75	-90.0	196.25	0			
1091-	GRID	7814		9.43657	-108.617	196.25	0			
1092-	GRID	7815		9.75	-120.0	196.25	0			
1093-	GRID	7816		9.75	-150.0	196.25	0			
1094-	GRID	7817		11.125	180.0	201.6725	0			
1095-	GRID	7818		11.125	150.0	201.6725	0			
1096-	GRID	7819		10.76737	131.383	201.6725	0			
1097-	GRID	7820		11.125	120.0	201.6725	0			
1098-	GRID	7821		11.125	90.0	201.6725	0			
1099-	GRID	7822		10.76737	71.383	201.6725	0			
1100-	GRID	7823		11.125	60.0	201.6725	0			

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1101-	GRID	7824		11.125	30.0	201.6725	0			
1102-	GRID	7825		11.125	0.0	201.6725	0			
1103-	GRID	7826		11.125	-30.0	201.6725	0			
1104-	GRID	7827		10.76737	-48.617	201.6725	0			
1105-	GRID	7828		11.125	-60.0	201.6725	0			
1106-	GRID	7829		11.125	-90.0	201.6725	0			
1107-	GRID	7830		10.76737	-108.617	201.6725	0			
1108-	GRID	7831		11.125	-120.0	201.6725	0			
1109-	GRID	7832		11.125	-150.0	201.6725	0			
1110-	GRID	7833		12.5	180.0	207.095	0			
1111-	GRID	7834		12.5	150.0	207.095	0			
1112-	GRID	7835		12.09817	131.383	207.095	0			
1113-	GRID	7836		12.5	120.0	207.095	0			
1114-	GRID	7837		12.5	90.0	207.095	0			
1115-	GRID	7838		12.09817	71.383	207.095	0			
1116-	GRID	7839		12.5	60.0	207.095	0			
1117-	GRID	7840		12.5	30.0	207.095	0			
1118-	GRID	7841		12.5	0.0	207.095	0			
1119-	GRID	7842		12.5	-30.0	207.095	0			
1120-	GRID	7843		12.09817	-48.617	207.095	0			
1121-	GRID	7844		12.5	-60.0	207.095	0			
1122-	GRID	7845		12.5	-90.0	207.095	0			
1123-	GRID	7846		12.09817	-108.617	207.095	0			
1124-	GRID	7847		12.5	-120.0	207.095	0			
1125-	GRID	7848		12.5	-150.0	207.095	0			
1126-	GRID	7849		13.875	180.0	212.5175	0			
1127-	GRID	7850		13.875	150.0	212.5175	0			
1128-	GRID	7851		13.42897	131.383	212.5175	0			
1129-	GRID	7852		13.875	120.0	212.5175	0			
1130-	GRID	7853		13.875	90.0	212.5175	0			
1131-	GRID	7854		13.42897	71.383	212.5175	0			
1132-	GRID	7855		13.875	60.0	212.5175	0			
1133-	GRID	7856		13.875	30.0	212.5175	0			
1134-	GRID	7857		13.875	0.0	212.5175	0			
1135-	GRID	7858		13.875	-30.0	212.5175	0			
1136-	GRID	7859		13.42897	-48.617	212.5175	0			
1137-	GRID	7860		13.875	-60.0	212.5175	0			
1138-	GRID	7861		13.875	-90.0	212.5175	0			
1139-	GRID	7862		13.42897	-108.617	212.5175	0			
1140-	GRID	7863		13.875	-120.0	212.5175	0			
1141-	GRID	7864		13.875	-150.0	212.5175	0			
1142-	GRID	7865		15.25	180.0	217.94	0			
1143-	GRID	7866		15.25	150.0	217.94	0			
1144-	GRID	7867		14.75977	131.383	217.94	0			
1145-	GRID	7868		15.25	120.0	217.94	0			
1146-	GRID	7869		15.25	90.0	217.94	0			
1147-	GRID	7870		14.75977	71.383	217.94	0			
1148-	GRID	7871		15.25	60.0	217.94	0			
1149-	GRID	7872		15.25	30.0	217.94	0			
1150-	GRID	7873		15.25	0.0	217.94	0			

PHASE 1 %PART 1 #
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1151-	GRID	7874		15.25	-30.0	217.94		0		
1152-	GRID	7875		14.75977	-48.617	217.94		0		
1153-	GRID	7876		15.25	-60.0	217.94		0		
1154-	GRID	7877		15.25	-90.0	217.94		0		
1155-	GRID	7878		14.75977	-108.617	217.94		0		
1156-	GRID	7879		15.25	-120.0	217.94		0		
1157-	GRID	7880		15.25	-150.0	217.94		0		
1158-	GRID	8352	101	196.25	13.87258	9.75	101	456		
1159-	GRID	8355	101	196.25	13.87258	-9.75	101	456		
1160-	MAT1	100	1.0567		.3	.1				
1161-	MAT1	1000	25.063		.49	.0615			.52	
1162-	PARAM	GRDPNT	0							
1163-	PARAM	TPCOPY	1							
1164-	PARAM	TPNAME	SRMP1A							
1165-	PARAM	WTMASS	.002588							
1166-	PBAR	101	100	.80	.054					
1167-	PBAR	102	100	.948	.130					
1168-	PBAR	103	100	.210	.077					
1169-	PBAR	104	100	.356	.060					
1170-	PQUAD2	100	100	.1875						
1171-	PQUAD2	200	100	.062						
1172-	PQUAD2	300	100	.062						
1173-	SPC1	1	456	7290	7291	7292	7294	7295	7296	
1174-	SPC1	1	456	7298	7299	7300	7302	7303	7304	
1176-	SPC1	1	456	7306	7307	7308	7310	7311	7312	
1176-	SPC1	1	456	7314	7315	7316	7318	7319	7320	
1177-	SPC1	1	456	7322	7323	7324	7326	7327	7328	
1178-	SPC1	1	456	7330	7331	7332	7334	7335	7336	
1179-	SPC1	1	456	7338	7339	7340	7342	7343	7344	
1180-	SPC1	1	456	7346	7347	7348	7350	7351	7352	
1181-	SPC1	1	456	7354	7355	7356	7358	7359	7360	
1182-	SPC1	1	456	7362	7363	7364	7366	7367	7368	
1183-	SPC1	1	456	7370	7371	7372	7374	7375	7376	
1184-	SPC1	1	456	7378	7379	7380	7382	7383	7384	
1185-	SPC1	1	456	7386	7387	7388	7390	7391	7392	
1186-	SPC1	1	456	7394	7395	7396	7398	7399	7400	
1187-	SPC1	1	456	7402	7403	7404	7406	7407	7408	
1188-	SPC1	1	456	7410	7411	7412	7414	7415	7416	
1189-	SPC1	1	456	7418	7419	7420	7422	7423	7424	
1190-	SPC1	1	456	7426	7427	7428	7430	7431	7432	
1191-	SPC1	1	456	7434	7435	7436	7438	7439	7440	
1192-	SPC1	1	456	7442	7443	7444	7446	7447	7448	
1193-	SPC1	1	456	7450	7451	7452	7454	7455	7456	
1194-	SPC1	1	456	7458	7459	7460	7462	7463	7464	
1195-	SPC1	1	456	7466	7467	7468	7470	7471	7472	
1196-	SPC1	1	456	7474	7475	7476	7478	7479	7480	
1197-	SPC1	1	456	7482	7483	7484	7486	7487	7488	
1198-	SPC1	1	456	7490	7491	7492	7494	7495	7496	
1199-	SPC1	1	456	7498	7499	7500	7502	7503	7504	
1200-	SPC1	1	456	7506	7507	7508	7510	7511	7512	

PHASE 1 XPART 1 n
SRM & PROPELLANT AFT HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1201-	SPC1	1	456	7514	7515	7516	7518	7519	7520	
1202-	SPC1	1	456	7522	7523	7524	7526	7527	7528	
1203-	SPC1	1	456	7530	7531	7532	7534	7535	7536	
1204-	SPC1	1	456	7538	7539	7540	7542	7543	7544	
1205-	SPC1	1	456	7546	7547	7548	7550	7551	7552	
1206-	SPC1	1	456	7554	7555	7556	7558	7559	7560	
1207-	SPC1	1	456	7562	7563	7564	7566	7567	7568	
1208-	SPC1	1	456	7570	7571	7572	7574	7575	7576	
1209-	SPC1	1	456	7578	7579	7580	7582	7583	7584	
1210-	SPC1	1	456	7586	7587	7588	7590	7591	7592	
1211-	SPC1	1	456	7594	7595	7596	7598	7599	7600	
1212-	SPC1	1	456	7602	7603	7604	7606	7607	7608	
1213-	SPC1	1	456	7610	7611	7612	7614	7615	7616	
1214-	SPC1	1	456	7618	7619	7620	7622	7623	7624	
1215-	SUPORT	7301	2	7313	23	8352	123	8355	123	

ENDDATA

NASTRAN EXECUTIVE CONTROL DECK ECHO

```
ID PHASE1 SRMRIF
CHKPNT  YES
TIME        60
APP        DISP
SOL        7,0
DIAG  2,7,8,13,14,19,21,22
ALTER 2,2$ PARAMETER DEFAULTS
PARAM   //C,N,NOP/V,Y,NOSUB#0
PARAM   //C,N,NOP/V,Y,TPCOPY#-1
PARAM   //C,N,NOP/V,Y,SUBGK#-1
PARAM   //C,N,NOP/V,Y,SUBK4#-1
PARAM   //C,N,NOP/V,Y,SUBB#-1
PARAM   //C,N,NOP/V,N,TRUE#-1
ALTER 25,27
CHKPNT  EST,GEI,ECPT,GPCT
PARAM   //C,N,SUB/V,N,COUPLE/V,Y,NOSUB/C,N,1
PARAM   //C,N,NOP/V,N,NUK4GG#-1
PURGE   KGGX,K4GG,GPST,OGPST/NOSIMP
CHKPNT  KGGX,K4GG,GPST,OGPST
COND    L30,NOSIMP
COND    L25A,GENEL
COND    L25B,COUPLE
LABEL   L25A
PURGE   OGPST/TRUE
CHKPNT  OGPST
LABEL   L25B
ALTER 30,31
CHKPNT  KGGX,K4GG,GPST
LABEL   L30
ALTER 34,35
PARAM   //C,N,AND/V,N,NOBG/V,N,NOBGG/V,Y,SUBB
PARAM   //C,N,AND/V,N,NOBK4/V,Y,SUBGK/V,Y,SUBK4
PARAM   //C,N,AND/V,N,NOK4/V,N,NOBK4/V,N,NOK4GG
COND    L34A,NOMGG
JUMP    L34B
LABEL   L34A
COND    ERROR3,COUPLE
LABEL   L34B
PURGE   BNN,BFF,BAA,BGGY/NOMG
PURGE   K4GGY,K4NN,K4FF,K4AA/NOK4
CHKPNT      BGGY,K4GGY,K4NN,K4FF,K4AA,MGG,BGG,BBB,BFF,BAA
ALTER 37,37
COND    LBL1,NOMGG
ALTER 42,42 $ IF COUPLING RUN, COMBINES SUBSTRUCTURES.
PURGE   CPGI,KI,MI,KGGI,MGGI,KGGS,MGGS,KGT,MGI/COUPLE
PURGE   K4GGS,K4GGI,K4GT,GIKI,K4II,K4I/COUPLE
PURGE   II,MGGS,UGI,PGI,PAS,PEAS,PEAC/COUPLE
COND    LPC9,COUPLE   $ SKIP, NOT A COUPLING RUN
INPUTT1 /,,,,/C,N,-3/C,N,9/V,Y,TPNAME9 $ LIST TAPE & REWIND
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
PARAM    //C,N,NOP/V,N,PASS#1  $ INITIAL LOOP PASS PARAMETER
PURGE    K4GGS,K4GG1,K4GT,GIK1,K411,K41,GEAC,KEAC/NUKK4
PURGE    GIK1,GEAC/SUHGK/K41,KEAC/SUBK4/DGGS,DGG1,DGT,DEAC/SUBG
JUMP     LOOPC
LABEL    LOOPC   $ TOP OF LOOP
PARAM    //C,N,SUB/V,N,PASS1/V,N,PASS/C,N,2
INPUTT1  /CPG1,K1,M1,,/C,N,0/C,N,9 $
COND     LPC1,PASS1
JUMP     LPC3
LABEL    LPC1
MERGE,   ,,,K1,CPG1,/KGGS/C,N,-1/C,N,2/C,N,6
MERGE,   ,,,M1,CPG1,/MGGS/C,N,-1/C,N,2/C,N,6
COND     LPC2,NUKK4
MERGE,   ,,,,CPG1,/K4GGS/C,N,-1/C,N,2/C,N,6
LABEL    LPC2
COND     LPC3,SUBH
MERGE,   ,,,,CPG1,/DGGS /C,N,-1/C,N,2/C,N,6
LABEL    LPC3
COND     LPC4,PASS1
MERGE,   ,,,K1,CPG1,/KGG1/C,N,-1/C,N,2/C,N,6
MERGE,   ,,,M1,CPG1,/MGG1/C,N,-1/C,N,2/C,N,6
ADD      KGGS,KGG1/KG1 $
EQUIV    KG1,KGGS/TRUE
ADD      MGGS,MGG1/MGT $
EQUIV    MGT,MGGS/TRUE
LABEL    LPC4
COND     LPC7,NUKK4
COND     LPC5,SUHGK
PARAML      GEAC//C,N,DM1/C,N,1/V,N,PASS/V,N,GIR $
PARAMR   //C,N,EQ/C,N,0,0/C,N,0,0/V,N,GIR/V,N,OUTC/V,N,INC1/V,N,INC2/
         V,N,NOG1 $
PURGE    GIK1/NOG1
COND     LPC5,NOG1
PARAMR   //C,N,COMPLEX/C,N,0,0/V,N,GIR/C,N,0,0/V,N,G1 $
ADD      K1,/GIK1/V,N,G1 $
LABEL    LPC5
COND     LPC6,SUBK4
PARAML      KEAC//C,N,DM1/C,N,1/V,N,PASS/V,N,K4R $
PARAMR   //C,N,EQ/C,N,0,0/C,N,0,0/V,N,K4R/V,N,OUTC/V,N,INC1/V,N,INC2/
         V,N,NUK41 $
PURGE    K41/NUK41
COND     LPC6,NUK41
INPUTT1  /K41,,,,/C,N,0/C,N,9 $
LABEL    LPC6
ADD      GIK1,K41/K411
MERGE,   ,,,K411,CPG1,/K4GG1/C,N,-1/C,N,2/C,N,6
ADD      K4GGS,K4GG1/K4G1
EQUIV    K4GT,K4GGS/TRUE
LABEL    LPC7
COND     LPC8,SUBB
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
PARAML      BFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,BIP $
PARAMR   //C,N,EQ/C,N,0.0/C,N,0.0/V,N,DIR/V,N,OUTC/V,N,INC1/V,N,INC2/
         V,N,NOBI $
COND     LPC8,NOBI
INPUTT1  /B1,,,,,/C,N,0/C,N,9 $
MERGE,   ,,,B1,CPGI,/BGG1/C,N,-1/C,N,2/C,N,6
ADD      BGGS,BGG1/BGT $
EQUIV    BGT,BGGS/TRUE
LABEL    LPC8
PARAM    //C,N,ADD/V,N,PASS/V,N,PASS/C,N,1
PARAM    //C,N,SUB/V,N,SKIP2//V,Y,NOSUB/V,N,PASS
COND     LPC9,SKIP2
REPT     LOOPC,20
LABEL    LPC9
CHKPNT   KGGS,MGGS,K4GGS,BGGS
ADD      KGGX,KGGS/KGGY $
CHKPNT   KGGY
ADD      MGG,MGGS/MGGY $
CHKPNT   MGGY
COND     LPC11,NOK4
ADD      K4GG,K4GGS/K4GGY
CHKPNT   K4GGY
LABEL    LPC11
COND     LPC12,NOBG
ADD      BGG,BGGS/BGGY
CHKPNT   BGGY
LABEL    LPC12
EQUIV    KGGY,KGG/NOGENL $
ALTER 45,45
SMA3     GE1,KGGY/KGG/V,N,LUSET/V,N,NOGENL/V,N,MPCF1 $
ALTER 51,53
PURGE    GM/MPCF1/GO/OMIT/KFS/SINGLE
EQUIV    KGG,KNN/MPCF1/MGGY,MNN/MPCF1/BGGY,BNN/MPCF1/K4GGY,K4NN/MPCF1
CHKPNT   GM,RG,GO,KFS,USET,KNN,MNN,BNN,K4NN
COND     L53A,NOMGG
ADD      MGG,/WGG/C,Y,ALPHA/(386.4,0.0)$
MATGPR   GPL,USET,SIL,WGG//C,N,6
LABEL    L53A
COND     L53B,COUPLE
JUMP     LBL4
LABEL    L53B
ALTER 63,63
MCE2     USET,GM,KGG,MGGY,BGGY,K4GGY/KNN,MNN,BNN,K4NN
ALTER 74,74
COND     L87,OMIT
ALTER 77,77
ALTER 80,81
COND     LBLB,NOBG
ALTER 85,85
COND     L87,NOK4
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
ALTER 87
LABEL   L67
PURGE   CPARL,CPFDA,CPNSF,CPGMN,EGR,EGL,EOA,EGO,EOF,EGN,EGM,EGG/RLACT
PURGE   LX,LXT,EGMT,EGNT,EGGT,EGGTC,MUGG,MUGGY/RLACT
PURGE   KLL,KLR,KRR,LLL,ULL,DM,X,EGRT,DMT,GOT,GMT/RLACT
COND    LCP5,REACT  $ K-SET MUST BE DEFINED TO GENERATE EOC
RBMG1   USET,KAA,/KLL,KLR,KRR,,,, $
RBMG2   KLL/LLL,ULL
RBMG3   LLL,ULL,KLR,KRR/DM
CHKPNT  KLL,KLR,KRR,DM
TRNSP   EGR/EGRT
MATGPR  GPL,USET,SIL,EGRT//C,N,R
MPYAD   KLR,DM,KRR/X/C,N,1 $
MATGPR  GPL,USET,SIL,X//C,N,R
MPYAD   EGR,X,/LX/C,N,0/C,N,1/C,N,0 $
TRNSP   LX/LXT
MATGPR  GPL,USET,SIL,LXT//C,N,R
PURGE   CPFDA/OMIT/CPNSF/SINGLE/CPGMN/MPCF1
PURGE   EGO/OMIT/EGM/MPCF1
PURGE   GGT/OMIT/GMT,EGMT/MPCF1
VEC     USET/CPARL/C,N,A/C,N,R/C,N,L $
TRNSP   DM/DMT
MPYAD   EGR,DMT,/EGL/C,N,0/C,N,1/C,N,0
MERGE   EGR,,EGL,,CPARL,/EOA/C,N,1/C,N,2/C,N,2
EQUIV   EOA,EOF/OMIT
COND    LCP1,OMIT
VEC     USET/CPFDA/C,N,F/C,N,0/C,N,A $
TRNSP   GO/GOT
MPYAD   EOA,GOT,/EGO/C,N,0/C,N,1/C,N,0
MERGE   EGO,,EOA,,CPFDA,/EOF/C,N,1/C,N,2/C,N,2
LABEL   LCP1
EQUIV   EOF,EGN/SINGLE
COND    LCP2,SINGLE
VEC     USET/CPNSF/C,N,N/C,N,S/C,N,F $
MERGE   ,,EOF,,CPNSF,/EGN/C,N,1/C,N,2/C,N,2
LABEL   LCP2
TRNSP   EGN/EGNT
MATGPR  GPL,USET,SIL,EGNT//C,N,N
EQUIV   EGN,EGG/MPCF1
COND    LCP3,MPCF1
VEC     USET/CPGMN/C,N,G/C,N,M/C,N,N $
TRNSP   GM/GMT
MPYAD   EGN,GMT,/EGM/C,N,0/C,N,1/C,N,0
MERGE   EGM,,EGN,,CPGMN,/EGG/C,N,1/C,N,2/C,N,2
TRNSP   EGM/EGMT
MATGPR  GPL,USET,SIL,EGMT//C,N,M
LABEL   LCP3
CHKPNT  CPFDA,CPNSF,CPGMN,CPARL
CHKPNT  EOG
TRNSP   EGG/EGGT
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
ADD     EOGT,/EOGTC/C,Y,ALPHA#X386.4,0.0# $
$  ASSUME CONVERSION OF MASS TO LBS # 386.4
PURGE   MOGG/NOMGG/MOGGY/COUPLE
COND    LCP4,NOMGG
SMPYAD    EGG,MGG,EOGTC,,,,/MOGG/C,N,3/C,N,1/C,N,0 $
LABEL   LCP4
COND    LCP5,COUPLE
SMPYAD  EOG,MGGY,EOGTC,,,,/MOGGY/C,N,3/C,N,1/C,N,0 $
LABEL   LCP5
MATPRN  MOGG,MOGGY,,,,// $
COND    LCP8,IPCOPY
SEEMAT  KAA,,,,//C,N,PRINT
SEEMAT  MAA,,,,//C,N,PRINT
OUTPUT1 GM,GO,KFS,KAA,,,//C,N,-1/C,N,0/V,Y,IPNAME
OUTPUT1   MAA,,,,// $
COND    LCP7,NUK4
SEEMAT K4AA,,,,//C,N,PRINT
OUTPUT1 K4AA,,,,// $
LABEL   LCP7
COND    LCP8,NUBG
SEEMAT  BAA,,,,//C,N,PRINT
OUTPUT1   BAA,,,,// $
LABEL   LCP8
ALTER 89,162
ALTER 164,167
ENDALTER
CEND
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

ECHO OF FIRST CARD IN CHECKPOINT DICTIONARY TO BE PUNCHED OUT FOR THIS PROBLEM

RESTART PHASE1 .SRMRIF . 8/ 2/73. 17719.

PHASE 1 XPART 1 B
SRM & PROPELLANT FWD HALF

CASE CONTROL DECK ECHO

CARD COUNT	
1	TITLE = PHASE 1 XPART 1 B
2	SUBTITLE = SRM & PROPELLANT FWD HALF
3	MAXLINES = 60000
4	MPC = 2
5	SPC = 1
6	BEGIN BULK

*** USER INFORMATION MESSAGE 207, BULK DATA NOT SORTED, XSORT WILL RE-ORDER DECK.

PHASE 1 APART 1 B
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1-ASET	6907	23								
2-ASET1	123	6901	6904	6910						
3-ASET1	123	7001	7004	7013	7016	7025	7028	7037		
4-ASET1	123	7040	7097	7100	7109	7112	7121	7124		
5-ASET1	123	7133	7136	7194	7196	7205	7208	7217		
6-ASET1	123	7220	7229	7232						
7-ASET1	123	7290	THRU	7292						
8-ASET1	123	7294	THRU	7296						
9-ASET1	123	7298	THRU	7300						
10-ASET1	123	7302	THRU	7304						
11-ASET1	123	7306	THRU	7308						
12-ASET1	123	7310	THRU	7312						
13-ASET1	123	7314	THRU	7316						
14-ASET1	123	7318	THRU	7320						
15-ASET1	123	7322	THRU	7324						
16-ASET1	123	7326	THRU	7328						
17-ASET1	123	7330	THRU	7332						
18-ASET1	123	7334	THRU	7336						
19-ASET1	123	8134								
20-ASET1	123456	7289	7293	7297	7301	7305	7309	7313		
21-ASET1	123456	7317	7321	7325	7329	7333				
22-CBAR	4201	106	6937	6938	1.0	.0	.0	1	BCB201	
23-BCB201			-0.96			-0.96				
24-CBAR	4202	106	6938	6939	1.0	.0	.0	1	BCB202	
25-BCB202			-0.96			-0.96				
26-CBAR	4203	106	6939	6940	1.0	.0	.0	1	BCB203	
27-BCB203			-0.96			-0.96				
28-CBAR	4204	106	6940	6941	1.0	.0	.0	1	BCB204	
29-BCB204			-0.96			-0.96				
30-CBAR	4205	106	6941	6942	1.0	.0	.0	1	BCB205	
31-BCB205			-0.96			-0.96				
32-CBAR	4206	106	6942	6943	1.0	.0	.0	1	BCB206	
33-BCB206			-0.96			-0.96				
34-CBAR	4207	106	6943	6944	1.0	.0	.0	1	BCB207	
35-BCB207			-0.96			-0.96				
36-CBAR	4208	106	6944	6945	1.0	.0	.0	1	BCB208	
37-BCB208			-0.96			-0.96				
38-CBAR	4209	106	6945	6946	1.0	.0	.0	1	BCB209	
39-BCB209			-0.96			-0.96				
40-CBAR	4210	106	6946	6947	1.0	.0	.0	1	BCB210	
41-BCB210			-0.96			-0.96				
42-CBAR	4211	106	6947	6948	1.0	.0	.0	1	BCB211	
43-BCB211			-0.96			-0.96				
44-CBAR	4212	106	6948	6937	1.0	.0	.0	1	BCB212	
45-BCB212			-0.96			-0.96				
46-CBAR	4213	107	6901	6902	1.0	.0	.0	1	BCB213	
47-BCB213			-0.96			-0.96				
48-CBAR	4214	107	6902	6903	1.0	.0	.0	1	BCB214	
49-BCB214			-0.96			-0.96				
50-CBAR	4215	107	6903	6904	1.0	.0	.0	1	BCB215	

PHASE 1 SPART 1 u

SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
51-	$CB215			-0.96			-0.96			
52-	CBAR	4216	107	6904	6905	1.0	.0	.0	1	$CB216
53-	$CB216			-0.96			-0.96			
54-	CBAR	4217	107	6905	6906	1.0	.0	.0	1	$CB217
55-	$CB217			-0.96			-0.96			
56-	CBAR	4218	107	6906	6907	1.0	.0	.0	1	$CB218
57-	$CB218			-0.96			-0.96			
58-	CBAR	4219	107	6907	6908	1.0	.0	.0	1	$CB219
59-	$CB219			-0.96			-0.96			
60-	CBAR	4220	107	6908	6909	1.0	.0	.0	1	$CB220
61-	$CB220			-0.96			-0.96			
62-	CBAR	4221	107	6909	6910	1.0	.0	.0	1	$CB221
63-	$CB221			-0.96			-0.96			
64-	CBAR	4222	107	6910	6911	1.0	.0	.0	1	$CB222
65-	$CB222			-0.96			-0.96			
66-	CBAR	4223	107	6911	6912	1.0	.0	.0	1	$CB223
67-	$CB223			-0.96			-0.96			
68-	CBAR	4224	107	6912	6901	1.0	.0	.0	1	$CB224
69-	$CB224			-0.96			-0.96			
70-	CBAR	4225	108	7001	7005	1.0	.0	.0	1	$CB225
71-	$CB225			0.41			0.41			
72-	CBAR	4226	108	7005	7009	1.0	.0	.0	1	$CB226
73-	$CB226			0.41			0.41			
74-	CBAR	4227	108	7009	7013	1.0	.0	.0	1	$CB227
75-	$CB227			0.41			0.41			
76-	CBAR	4228	108	7013	7017	1.0	.0	.0	1	$CB228
77-	$CB228			0.41			0.41			
78-	CBAR	4229	108	7017	7021	1.0	.0	.0	1	$CB229
79-	$CB229			0.41			0.41			
80-	CBAR	4230	108	7021	7025	1.0	.0	.0	1	$CB230
81-	$CB230			0.41			0.41			
82-	CBAR	4231	108	7025	7029	1.0	.0	.0	1	$CB231
83-	$CB231			0.41			0.41			
84-	CBAR	4232	108	7029	7033	1.0	.0	.0	1	$CB232
85-	$CB232			0.41			0.41			
86-	CBAR	4233	108	7033	7037	1.0	.0	.0	1	$CB233
87-	$CB233			0.41			0.41			
88-	CBAR	4234	108	7037	7041	1.0	.0	.0	1	$CB234
89-	$CB234			0.41			0.41			
90-	CBAR	4235	108	7041	7045	1.0	.0	.0	1	$CB235
91-	$CB235			0.41			0.41			
92-	CBAR	4236	108	7045	7001	1.0	.0	.0	1	$CB236
93-	$CB236			-1.075			-1.075			
94-	CBAR	4237	109	6907	6919	1.0	.0	.0	1	$CB237
95-	$CB237			-1.075			-1.075			
96-	CBAR	4238	109	6919	6931	1.0	.0	.0	1	$CB238
97-	$CB238			-1.075			-1.075			
98-	CBAR	4239	109	6931	6943	1.0	.0	.0	1	$CB239
99-	$CB239									
100-	CHEXA1	1001	1000	7002	7050	7054	7006	7001	7049	$HX1001

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
101-	&HX1001		7053	7005						
102-	CHEXA1	1002	1000	7003	7051	7055	7007	7002	7050	&HX1002
103-	&HX1002		7054	7006						
104-	CHEXA1	1003	1000	7004	7052	7056	7008	7003	7051	&HX1003
105-	&HX1003		7055	7007						
106-	CHEXA1	1004	1000	7006	7054	7058	7010	7005	7053	&HX1004
107-	&HX1004		7057	7009						
108-	CHEXA1	1005	1000	7007	7055	7059	7011	7006	7054	&HX1005
109-	&HX1005		7058	7010						
110-	CHEXA1	1006	1000	7008	7056	7060	7012	7007	7055	&HX1006
111-	&HX1006		7059	7011						
112-	CHEXA1	1007	1000	7010	7058	7062	7014	7009	7057	&HX1007
113-	&HX1007		7061	7013						
114-	CHEXA1	1008	1000	7011	7059	7063	7015	7010	7058	&HX1008
115-	&HX1008		7062	7014						
116-	CHEXA1	1009	1000	7012	7060	7064	7016	7011	7059	&HX1009
117-	&HX1009		7063	7015						
118-	CHEXA1	1010	1000	7014	7062	7066	7018	7013	7061	&HX1010
119-	&HX1010		7065	7017						
120-	CHEXA1	1011	1000	7015	7063	7067	7019	7014	7062	&HX1011
121-	&HX1011		7066	7018						
122-	CHEXA1	1012	1000	7016	7064	7068	7020	7015	7063	&HX1012
123-	&HX1012		7067	7019						
124-	CHEXA1	1013	1000	7018	7066	7070	7022	7017	7065	&HX1013
125-	&HX1013		7069	7021						
126-	CHEXA1	1014	1000	7019	7067	7071	7023	7018	7066	&HX1014
127-	&HX1014		7070	7022						
128-	CHEXA1	1015	1000	7020	7068	7072	7024	7019	7067	&HX1015
129-	&HX1015		7071	7023						
130-	CHEXA1	1016	1000	7022	7070	7074	7026	7021	7069	&HX1016
131-	&HX1016		7073	7025						
132-	CHEXA1	1017	1000	7023	7071	7075	7027	7022	7070	&HX1017
133-	&HX1017		7074	7026						
134-	CHEXA1	1018	1000	7024	7072	7076	7028	7023	7071	&HX1018
135-	&HX1018		7075	7027						
136-	CHEXA1	1019	1000	7026	7074	7078	7030	7025	7073	&HX1019
137-	&HX1019		7077	7029						
138-	CHEXA1	1020	1000	7027	7075	7079	7031	7026	7074	&HX1020
139-	&HX1020		7078	7030						
140-	CHEXA1	1021	1000	7028	7076	7080	7032	7027	7075	&HX1021
141-	&HX1021		7079	7031						
142-	CHEXA1	1022	1000	7030	7078	7082	7034	7029	7077	&HX1022
143-	&HX1022		7081	7033						
144-	CHEXA1	1023	1000	7031	7079	7083	7035	7030	7078	&HX1023
145-	&HX1023		7082	7034						
146-	CHEXA1	1024	1000	7032	7080	7084	7036	7031	7079	&HX1024
147-	&HX1024		7083	7035						
148-	CHEXA1	1025	1000	7034	7082	7086	7038	7033	7081	&HX1025
149-	&HX1025		7085	7037						
150-	CHEXA1	1026	1000	7035	7083	7087	7039	7034	7082	&HX1026

S O R T E D B U L K D A T A E C H O

CARD COUNT	1	2	3	4	5	6	7	8	9	10
151-	&HX1026	7086	7038							
152-	CHEXA1	1027	1000	7036	7084	7088	7040	7035	7083	&HX1027
153-	&HX1027	7087	7039							
154-	CHEXA1	1028	1000	7038	7086	7090	7042	7037	7085	&HX1028
155-	&HX1028	7089	7041							
156-	CHEXA1	1029	1000	7039	7087	7091	7043	7038	7086	&HX1029
157-	&HX1029	7090	7042							
158-	CHEXA1	1030	1000	7040	7088	7092	7044	7039	7087	&HX1030
159-	&HX1030	7091	7043							
160-	CHEXA1	1031	1000	7042	7090	7094	7046	7041	7089	&HX1031
161-	&HX1031	7093	7045							
162-	CHEXA1	1032	1000	7043	7091	7095	7047	7042	7090	&HX1032
163-	&HX1032	7094	7046							
164-	CHEXA1	1033	1000	7044	7092	7096	7048	7043	7091	&HX1033
165-	&HX1033	7095	7047							
166-	CHEXA1	1034	1000	7046	7094	7050	7002	7045	7093	&HX1034
167-	&HX1034	7049	7001							
168-	CHEXA1	1035	1000	7047	7095	7051	7003	7046	7094	&HX1035
169-	&HX1035	7050	7002							
170-	CHEXA1	1036	1000	7048	7096	7052	7004	7047	7095	&HX1036
171-	&HX1036	7051	7003							
172-	CHEXA1	1037	1000	7050	7098	7102	7054	7049	7097	&HX1037
173-	&HX1037	7101	7054							
174-	CHEXA1	1038	1000	7051	7099	7103	7055	7050	7098	&HX1038
175-	&HX1038	7102	7054							
176-	CHEXA1	1039	1000	7052	7100	7104	7056	7051	7099	&HX1039
177-	&HX1039	7103	7055							
178-	CHEXA1	1040	1000	7054	7102	7106	7058	7053	7101	&HX1040
179-	&HX1040	7105	7057							
180-	CHEXA1	1041	1000	7055	7103	7107	7059	7054	7102	&HX1041
181-	&HX1041	7106	7058							
182-	CHEXA1	1042	1000	7056	7104	7108	7060	7055	7103	&HX1042
183-	&HX1042	7107	7059							
184-	CHEXA1	1043	1000	7058	7106	7110	7062	7057	7105	&HX1043
185-	&HX1043	7109	7061							
186-	CHEXA1	1044	1000	7059	7107	7111	7063	7058	7106	&HX1044
187-	&HX1044	7110	7062							
188-	CHEXA1	1045	1000	7060	7108	7112	7064	7059	7107	&HX1045
189-	&HX1045	7111	7063							
190-	CHEXA1	1046	1000	7062	7110	7114	7066	7061	7109	&HX1046
191-	&HX1046	7113	7065							
192-	CHEXA1	1047	1000	7063	7111	7115	7067	7062	7110	&HX1047
193-	&HX1047	7114	7066							
194-	CHEXA1	1048	1000	7064	7112	7116	7068	7063	7111	&HX1048
195-	&HX1048	7115	7067							
196-	CHEXA1	1049	1000	7066	7114	7118	7070	7065	7113	&HX1049
197-	&HX1049	7117	7069							
198-	CHEXA1	1050	1000	7067	7115	7119	7071	7066	7114	&HX1050
199-	&HX1050	7118	7070							
200-	CHEXA1	1051	1000	7068	7116	7120	7072	7067	7115	&HX1051

PHASE 1 XPART 1 H
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD
COUNT . 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10 .

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  201-GHX1051       7119     7071
  202-CHEXA1 1052   1000     7070     7118     7122     7074     7069     7117     GHX1052
  203-GHX1052       7121     7073
  204-CHEXA1 1053   1000     7071     7119     7123     7075     7070     7118     GHX1053
  205-GHX1053       7122     7074
  206-CHEXA1 1054   1000     7072     7120     7124     7076     7071     7119     GHX1054
  207-GHX1054       7123     7075
  208-CHEXA1 1055   1000     7074     7122     7126     7078     7073     7121     GHX1055
  209-GHX1055       7125     7077
  210-CHEXA1 1056   1000     7075     7123     7127     7079     7074     7122     GHX1056
  211-GHX1056       7126     7078
  212-CHEXA1 1057   1000     7076     7124     7128     7080     7075     7123     GHX1057
  213-GHX1057       7127     7079
  214-CHEXA1 1058   1000     7078     7126     7130     7082     7077     7125     GHX1058
  215-GHX1058       7129     7081
  216-CHEXA1 1059   1000     7079     7127     7131     7083     7078     7126     GHX1059
  217-GHX1059       7130     7082
  218-CHEXA1 1060   1000     7080     7128     7132     7084     7079     7127     GHX1060
  219-GHX1060       7131     7083
  220-CHEXA1 1061   1000     7082     7130     7134     7086     7081     7129     GHX1061
  221-GHX1061       7133     7085
  222-CHEXA1 1062   1000     7083     7131     7135     7087     7082     7130     GHX1062
  223-GHX1062       7134     7086
  224-CHEXA1 1063   1000     7084     7132     7136     7088     7083     7131     GHX1063
  225-GHX1063       7135     7087
  226-CHEXA1 1064   1000     7086     7134     7138     7090     7085     7133     GHX1064
  227-GHX1064       7137     7089
  228-CHEXA1 1065   1000     7087     7135     7139     7091     7086     7134     GHX1065
  229-GHX1065       7138     7090
  230-CHEXA1 1066   1000     7088     7136     7140     7092     7087     7135     GHX1066
  231-GHX1066       7139     7091
  232-CHEXA1 1067   1000     7090     7138     7142     7094     7089     7137     GHX1067
  233-GHX1067       7141     7093
  234-CHEXA1 1068   1000     7091     7139     7143     7095     7090     7138     GHX1068
  235-GHX1068       7142     7094
  236-CHEXA1 1069   1000     7092     7140     7144     7096     7091     7139     GHX1069
  237-GHX1069       7143     7095
  238-CHEXA1 1070   1000     7094     7142     7098     7050     7093     7141     GHX1070
  239-GHX1070       7097     7049
  240-CHEXA1 1071   1000     7095     7143     7099     7051     7094     7142     GHX1071
  241-GHX1071       7098     7050
  242-CHEXA1 1072   1000     7096     7144     7100     7052     7095     7143     GHX1072
  243-GHX1072       7099     7051
  244-CHEXA1 1073   1000     7098     7146     7150     7102     7097     7145     GHX1073
  245-GHX1073       7149     7101
  246-CHEXA1 1074   1000     7099     7147     7151     7103     7098     7146     GHX1074
  247-GHX1074       7150     7102
  248-CHEXA1 1075   1000     7100     7148     7152     7104     7099     7147     GHX1075
  249-GHX1075       7151     7103
  250-CHEXA1 1076   1000     7102     7150     7154     7106     7101     7149     GHX1076
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PHASE I SPART I B

SRM 6 PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
251-	&HX1076	7153	7105							
252-	CHEXA1	1077	1000	7103	7151	7155	7107	7102	7150	&HX1077
253-	&HX1077	7154	7106							
254-	CHEXA1	1078	1000	7104	7152	7156	7108	7103	7151	&HX1078
255-	&HX1078	7155	7107							
256-	CHEXA1	1079	1000	7106	7154	7158	7110	7105	7153	&HX1079
257-	&HX1079	7157	7109							
258-	CHEXA1	1080	1000	7107	7155	7159	7111	7106	7154	&HX1080
259-	&HX1080	7158	7110							
260-	CHEXA1	1081	1000	7108	7156	7160	7112	7107	7155	&HX1081
261-	&HX1081	7159	7111							
262-	CHEXA1	1082	1000	7110	7158	7162	7114	7109	7157	&HX1082
263-	&HX1082	7161	7113							
264-	CHEXA1	1083	1000	7111	7159	7163	7115	7110	7158	&HX1083
265-	&HX1083	7162	7114							
266-	CHEXA1	1084	1000	7112	7160	7164	7116	7111	7159	&HX1084
267-	&HX1084	7163	7115							
268-	CHEXA1	1085	1000	7114	7162	7166	7118	7113	7161	&HX1085
269-	&HX1085	7165	7117							
270-	CHEXA1	1086	1000	7115	7163	7167	7119	7114	7162	&HX1086
271-	&HX1086	7166	7118							
272-	CHEXA1	1087	1000	7116	7164	7168	7120	7115	7163	&HX1087
273-	&HX1087	7167	7119							
274-	CHEXA1	1088	1000	7118	7166	7170	7122	7117	7165	&HX1088
275-	&HX1088	7169	7121							
276-	CHEXA1	1089	1000	7119	7167	7171	7123	7118	7166	&HX1089
277-	&HX1089	7170	7122							
278-	CHEXA1	1090	1000	7120	7168	7172	7124	7119	7167	&HX1090
279-	&HX1090	7171	7123							
280-	CHEXA1	1091	1000	7122	7170	7174	7126	7121	7169	&HX1091
281-	&HX1091	7173	7125							
282-	CHEXA1	1092	1000	7123	7171	7175	7127	7122	7170	&HX1092
283-	&HX1092	7174	7126							
284-	CHEXA1	1093	1000	7124	7172	7176	7128	7123	7171	&HX1093
285-	&HX1093	7175	7127							
286-	CHEXA1	1094	1000	7126	7174	7178	7130	7125	7173	&HX1094
287-	&HX1094	7177	7129							
288-	CHEXA1	1095	1000	7127	7175	7179	7131	7126	7174	&HX1095
289-	&HX1095	7178	7130							
290-	CHEXA1	1096	1000	7128	7176	7180	7132	7127	7175	&HX1096
291-	&HX1096	7179	7131							
292-	CHEXA1	1097	1000	7130	7178	7182	7134	7129	7177	&HX1097
293-	&HX1097	7181	7133							
294-	CHEXA1	1098	1000	7131	7179	7183	7135	7130	7178	&HX1098
295-	&HX1098	7182	7134							
296-	CHEXA1	1099	1000	7132	7180	7184	7136	7131	7179	&HX1099
297-	&HX1099	7183	7135							
298-	CHEXA1	1100	1000	7134	7182	7186	7138	7133	7181	&HX1100
299-	&HX1100	7185	7137							
300-	CHEXA1	1101	1000	7135	7183	7187	7139	7134	7182	&HX1101

PHASE 1 XPAT 1 0
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
301-	&HX1101	7186	7138							
302-	CHEXA1	1102	1000	7136	7184	7188	7140	7135	7183	&HX1102
303-	&HX1102	7187	7139							
304-	CHEXA1	1103	1000	7138	7186	7190	7142	7137	7185	&HX1103
305-	&HX1103	7189	7141							
306-	CHEXA1	1104	1000	7139	7187	7191	7143	7138	7186	&HX1104
307-	&HX1104	7190	7142							
308-	CHEXA1	1105	1000	7140	7188	7192	7144	7139	7187	&HX1105
309-	&HX1105	7191	7143							
310-	CHEXA1	1106	1000	7142	7190	7146	7098	7141	7189	&HX1106
311-	&HX1106	7145	7097							
312-	CHEXA1	1107	1000	7143	7191	7147	7099	7142	7190	&HX1107
313-	&HX1107	7146	7098							
314-	CHEXA1	1108	1000	7144	7192	7148	7100	7143	7191	&HX1108
315-	&HX1108	7147	7099							
316-	CHEXA1	1109	1000	7146	7194	7196	7150	7145	7193	&HX1109
317-	&HX1109	7197	7149							
318-	CHEXA1	1110	1000	7147	7195	7199	7151	7146	7194	&HX1110
319-	&HX1110	7198	7150							
320-	CHEXA1	1111	1000	7148	7196	7200	7152	7147	7195	&HX1111
321-	&HX1111	7199	7151							
322-	CHEXA1	1112	1000	7150	7198	7202	7154	7149	7197	&HX1112
323-	&HX1112	7201	7153							
324-	CHEXA1	1113	1000	7151	7199	7203	7155	7150	7198	&HX1113
325-	&HX1113	7202	7154							
326-	CHEXA1	1114	1000	7152	7200	7204	7156	7151	7199	&HX1114
327-	&HX1114	7203	7155							
328-	CHEXA1	1115	1000	7154	7202	7206	7158	7153	7201	&HX1115
329-	&HX1115	7205	7157							
330-	CHEXA1	1116	1000	7155	7203	7207	7159	7154	7202	&HX1116
331-	&HX1116	7206	7158							
332-	CHEXA1	1117	1000	7156	7204	7208	7160	7155	7203	&HX1117
333-	&HX1117	7207	7159							
334-	CHEXA1	1118	1000	7158	7206	7210	7162	7157	7205	&HX1118
335-	&HX1118	7209	7161							
336-	CHEXA1	1119	1000	7159	7207	7211	7163	7158	7206	&HX1119
337-	&HX1119	7210	7162							
338-	CHEXA1	1120	1000	7160	7208	7212	7164	7159	7207	&HX1120
339-	&HX1120	7211	7163							
340-	CHEXA1	1121	1000	7162	7210	7214	7166	7161	7209	&HX1121
341-	&HX1121	7213	7165							
342-	CHEXA1	1122	1000	7163	7211	7215	7167	7162	7210	&HX1122
343-	&HX1122	7214	7166							
344-	CHEXA1	1123	1000	7164	7212	7216	7168	7163	7211	&HX1123
345-	&HX1123	7215	7167							
346-	CHEXA1	1124	1000	7166	7214	7218	7170	7165	7213	&HX1124
347-	&HX1124	7217	7169							
348-	CHEXA1	1125	1000	7167	7215	7219	7171	7166	7214	&HX1125
349-	&HX1125	7218	7170							
350-	CHEXA1	1126	1000	7168	7216	7220	7172	7167	7215	&HX1126

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
351-	&HX1126	7219	7171							
352-	CHEXA1	1127	1000	7170	7218	7222	7174	7169	7217	&HX1127
353-	&HX1127	7221	7173							
354-	CHEXA1	1128	1000	7171	7219	7223	7175	7170	7218	&HX1128
355-	&HX1128	7222	7174							
356-	CHEXA1	1129	1000	7172	7220	7224	7176	7171	7219	&HX1129
357-	&HX1129	7223	7175							
358-	CHEXA1	1130	1000	7174	7222	7226	7178	7173	7221	&HX1130
359-	&HX1130	7225	7177							
360-	CHEXA1	1131	1000	7175	7223	7227	7179	7174	7222	&HX1131
361-	&HX1131	7226	7178							
362-	CHEXA1	1132	1000	7176	7224	7228	7180	7175	7223	&HX1132
363-	&HX1132	7227	7179							
364-	CHEXA1	1133	1000	7178	7226	7230	7182	7177	7225	&HX1133
365-	&HX1133	7229	7181							
366-	CHEXA1	1134	1000	7179	7227	7231	7183	7178	7226	&HX1134
367-	&HX1134	7230	7182							
368-	CHEXA1	1135	1000	7180	7228	7232	7184	7179	7227	&HX1135
369-	&HX1135	7231	7183							
370-	CHEXA1	1136	1000	7182	7230	7234	7186	7181	7229	&HX1136
371-	&HX1136	7233	7185							
372-	CHEXA1	1137	1000	7183	7231	7235	7187	7182	7230	&HX1137
373-	&HX1137	7234	7186							
374-	CHEXA1	1138	1000	7184	7232	7236	7188	7183	7231	&HX1138
375-	&HX1138	7235	7187							
376-	CHEXA1	1139	1000	7186	7234	7238	7190	7185	7233	&HX1139
377-	&HX1139	7237	7189							
378-	CHEXA1	1140	1000	7187	7235	7239	7191	7186	7234	&HX1140
379-	&HX1140	7238	7190							
380-	CHEXA1	1141	1000	7188	7236	7240	7192	7187	7235	&HX1141
381-	&HX1141	7239	7191							
382-	CHEXA1	1142	1000	7190	7238	7194	7146	7189	7237	&HX1142
383-	&HX1142	7193	7145							
384-	CHEXA1	1143	1000	7191	7239	7195	7147	7190	7238	&HX1143
385-	&HX1143	7194	7146							
386-	CHEXA1	1144	1000	7192	7240	7196	7148	7191	7239	&HX1144
387-	&HX1144	7195	7147							
388-	CHEXA1	1145	1000	7194	7242	7246	7198	7193	7241	&HX1145
389-	&HX1145	7245	7197							
390-	CHEXA1	1146	1000	7195	7243	7247	7199	7194	7242	&HX1146
391-	&HX1146	7246	7198							
392-	CHEXA1	1147	1000	7196	7244	7248	7200	7195	7243	&HX1147
393-	&HX1147	7247	7199							
394-	CHEXA1	1148	1000	7198	7246	7250	7202	7197	7245	&HX1148
395-	&HX1148	7249	7201							
396-	CHEXA1	1149	1000	7199	7247	7251	7203	7198	7246	&HX1149
397-	&HX1149	7250	7202							
398-	CHEXA1	1150	1000	7200	7248	7252	7204	7199	7247	&HX1150
399-	&HX1150	7251	7203							
400-	CHEXA1	1151	1000	7202	7250	7254	7206	7201	7249	&HX1151

PHASE 1 XPART 1 H

SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT.	1	2	3	4	5	6	7	8	9	10
401-GHX1151		7253	7205							
402-CHEXA1	1152	1000	7203	7251	7255	7207	7202	7250	GHX1152	
403-GHX1152		7254	7206							
404-CHEXA1	1153	1000	7204	7252	7256	7208	7203	7251	GHX1153	
405-GHX1153		7255	7207							
406-CHEXA1	1154	1000	7206	7254	7258	7210	7205	7253	GHX1154	
407-GHX1154		7257	7209							
408-CHEXA1	1155	1000	7207	7255	7259	7211	7206	7254	GHX1155	
409-GHX1155		7258	7210							
410-CHEXA1	1156	1000	7208	7256	7260	7212	7207	7255	GHX1156	
411-GHX1156		7259	7211							
412-CHEXA1	1157	1000	7210	7258	7262	7214	7209	7257	GHX1157	
413-GHX1157		7261	7213							
414-CHEXA1	1158	1000	7211	7259	7263	7215	7210	7258	GHX1158	
415-GHX1158		7262	7214							
416-CHEXA1	1159	1000	7212	7260	7264	7216	7211	7259	GHX1159	
417-GHX1159		7263	7215							
418-CHEXA1	1160	1000	7214	7262	7266	7218	7213	7261	GHX1160	
419-GHX1160		7265	7217							
420-CHEXA1	1161	1000	7215	7263	7267	7219	7214	7262	GHX1161	
421-GHX1161		7266	7218							
422-CHEXA1	1162	1000	7216	7264	7268	7220	7215	7263	GHX1162	
423-GHX1162		7267	7219							
424-CHEXA1	1163	1000	7218	7266	7270	7222	7217	7265	GHX1163	
425-GHX1163		7269	7221							
426-CHEXA1	1164	1000	7219	7267	7271	7223	7218	7266	GHX1164	
427-GHX1164		7270	7222							
428-CHEXA1	1165	1000	7220	7268	7272	7224	7219	7267	GHX1165	
429-GHX1165		7271	7223							
430-CHEXA1	1166	1000	7222	7270	7274	7226	7221	7269	GHX1166	
431-GHX1166		7273	7225							
432-CHEXA1	1167	1000	7223	7271	7275	7227	7222	7270	GHX1167	
433-GHX1167		7274	7226							
434-CHEXA1	1168	1000	7224	7272	7276	7228	7223	7271	GHX1168	
435-GHX1168		7275	7227							
436-CHEXA1	1169	1000	7226	7274	7278	7230	7225	7273	GHX1169	
437-GHX1169		7277	7229							
438-CHEXA1	1170	1000	7227	7275	7279	7231	7226	7274	GHX1170	
439-GHX1170		7278	7230							
440-CHEXA1	1171	1000	7228	7276	7280	7232	7227	7275	GHX1171	
441-GHX1171		7279	7231							
442-CHEXA1	1172	1000	7230	7278	7282	7234	7229	7277	GHX1172	
443-GHX1172		7281	7233							
444-CHEXA1	1173	1000	7231	7279	7283	7235	7230	7278	GHX1173	
445-GHX1173		7282	7234							
446-CHEXA1	1174	1000	7232	7280	7284	7236	7231	7279	GHX1174	
447-GHX1174		7283	7235							
448-CHEXA1	1175	1000	7234	7282	7286	7238	7233	7281	GHX1175	
449-GHX1175		7285	7237							
450-CHEXA1	1176	1000	7235	7283	7287	7239	7234	7282	GHX1176	

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
451-	GHX1176	7286	7238							
452-	CHEXA1	1177	1000	7236	7284	7288	7240	7235	7283	GHX1177
453-	GHX1177	7287	7239							
454-	CHEXA1	1178	1000	7238	7286	7242	7194	7237	7285	GHX1178
455-	GHX1178	7241	7193							
456-	CHEXA1	1179	1000	7239	7287	7243	7195	7238	7286	GHX1179
457-	GHX1179	7242	7194							
458-	CHEXA1	1180	1000	7240	7288	7244	7196	7239	7287	GHX1180
459-	GHX1180	7243	7195							
460-	CHEXA1	1181	1000	7242	7290	7294	7246	7241	7289	GHX1181
461-	GHX1181	7293	7245							
462-	CHEXA1	1182	1000	7243	7291	7295	7247	7242	7290	GHX1182
463-	GHX1182	7294	7246							
464-	CHEXA1	1183	1000	7244	7292	7296	7248	7243	7291	GHX1183
465-	GHX1183	7295	7247							
466-	CHEXA1	1184	1000	7246	7294	7298	7250	7245	7293	GHX1184
467-	GHX1184	7297	7249							
468-	CHEXA1	1185	1000	7247	7295	7299	7251	7246	7294	GHX1185
469-	GHX1185	7298	7250							
470-	CHEXA1	1186	1000	7248	7296	7300	7252	7247	7295	GHX1186
471-	GHX1186	7299	7251							
472-	CHEXA1	1187	1000	7250	7298	7302	7254	7249	7297	GHX1187
473-	GHX1187	7301	7253							
474-	CHEXA1	1188	1000	7251	7299	7303	7255	7250	7298	GHX1188
475-	GHX1188	7302	7254							
476-	CHEXA1	1189	1000	7252	7300	7304	7256	7251	7299	GHX1189
477-	GHX1189	7303	7255							
478-	CHEXA1	1190	1000	7254	7302	7306	7258	7253	7301	GHX1190
479-	GHX1190	7305	7257							
480-	CHEXA1	1191	1000	7255	7303	7307	7259	7254	7302	GHX1191
481-	GHX1191	7306	7258							
482-	CHEXA1	1192	1000	7256	7304	7306	7260	7255	7303	GHX1192
483-	GHX1192	7307	7259							
484-	CHEXA1	1193	1000	7258	7306	7310	7262	7257	7305	GHX1193
485-	GHX1193	7309	7261							
486-	CHEXA1	1194	1000	7259	7307	7311	7263	7258	7306	GHX1194
487-	GHX1194	7310	7262							
488-	CHEXA1	1195	1000	7260	7308	7312	7264	7259	7307	GHX1195
489-	GHX1195	7311	7263							
490-	CHEXA1	1196	1000	7262	7310	7314	7266	7261	7309	GHX1196
491-	GHX1196	7313	7265							
492-	CHEXA1	1197	1000	7263	7311	7315	7267	7262	7310	GHX1197
493-	GHX1197	7314	7266							
494-	CHEXA1	1198	1000	7264	7312	7316	7268	7263	7311	GHX1198
495-	GHX1198	7315	7267							
496-	CHEXA1	1199	1000	7266	7314	7318	7270	7265	7313	GHX1199
497-	GHX1199	7317	7269							
498-	CHEXA1	1200	1000	7267	7315	7319	7271	7266	7314	GHX1200
499-	GHX1200	7318	7270							
500-	CHEXA1	1201	1000	7268	7316	7320	7272	7267	7315	GHX1201

SORTED BULK DATA ECHO

CARD
COUNT . 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10 .

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501-GHX1201      7319    7271
502-CHEXA1  1202    1000    7270    7318    7322    7274    7269    7317    GHX1202
503-GHX1202      7321    7273
504-CHEXA1  1203    1000    7271    7319    7323    7275    7270    7318    GHX1203
505-GHX1203      7322    7274
506-CHEXA1  1204    1000    7272    7320    7324    7276    7271    7319    GHX1204
507-GHX1204      7323    7275
508-CHEXA1  1205    1000    7274    7322    7326    7278    7273    7321    GHX1205
509-GHX1205      7325    7277
510-CHEXA1  1206    1000    7275    7323    7327    7279    7274    7322    GHX1206
511-GHX1206      7326    7276
512-CHEXA1  1207    1000    7276    7324    7328    7280    7275    7323    GHX1207
513-GHX1207      7327    7279
514-CHEXA1  1208    1000    7278    7326    7330    7282    7277    7325    GHX1208
515-GHX1208      7329    7281
516-CHEXA1  1209    1000    7279    7327    7331    7283    7278    7326    GHX1209
517-GHX1209      7330    7282
518-CHEXA1  1210    1000    7280    7328    7332    7284    7279    7327    GHX1210
519-GHX1210      7331    7283
520-CHEXA1  1211    1000    7282    7330    7334    7286    7281    7329    GHX1211
521-GHX1211      7333    7285
522-CHEXA1  1212    1000    7283    7331    7335    7287    7282    7330    GHX1212
523-GHX1212      7334    7286
524-CHEXA1  1213    1000    7284    7332    7336    7288    7283    7331    GHX1213
525-GHX1213      7335    7287
526-CHEXA1  1214    1000    7286    7344    7250    7242    7285    7333    GHX1214
527-GHX1214      7289    7241
528-CHEXA1  1215    1000    7287    7335    7291    7243    7286    7334    GHX1215
529-GHX1215      7290    7242
530-CHEXA1  1216    1000    7288    7336    7292    7244    7287    7335    GHX1216
531-GHX1216      7291    7243
532-CORD2C  100     696     74.738  -30.494 6.138   200.0   -30.494 6.138   BCSSRM
533-BCSSRM  74.738  0.0     0.0
534-CORD2R  101     696     74.738  -30.494 6.138   74.738  -28.[illegible]  BRSSRM
535-BRSSRM  200.   -30.494  6.138
536-CORD2R  696     0       -81.5683.0      35.5985 -80.2278.0      57.5136 BRSTANK
537-BRSTANK 68.25   0.0     48.432
538-CQUAD2  1       100     7001    7049    7053    7005    .0
539-CQUAD2  2       100     7005    7053    7057    7009    .0
540-CQUAD2  3       100     7009    7057    7061    7013    .0
541-CQUAD2  4       100     7013    7061    7065    7017    .0
542-CQUAD2  5       100     7017    7065    7069    7021    .0
543-CQUAD2  6       100     7021    7069    7073    7025    .0
544-CQUAD2  7       100     7025    7073    7077    7029    .0
545-CQUAD2  8       100     7029    7077    7081    7033    .0
546-CQUAD2  9       100     7033    7081    7085    7037    .0
547-CQUAD2  10      100     7037    7085    7089    7041    .0
548-CQUAD2  11      100     7041    7089    7093    7045    .0
549-CQUAD2  12      100     7045    7093    7049    7001    .0
550-CQUAD2  13      100     7049    7097    7101    7053    .0
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PHASE 1 XPART 1 U
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
551-CQUAD2	14	100		7053	7101	7105	7057	.0		
552-CQUAD2	15	100		7057	7105	7109	7061	.0		
553-CQUAD2	16	100		7061	7109	7113	7065	.0		
554-CQUAD2	17	100		7065	7113	7117	7069	.0		
555-CQUAD2	18	100		7069	7117	7121	7073	.0		
556-CQUAD2	19	100		7073	7121	7125	7077	.0		
557-CQUAD2	20	100		7077	7125	7129	7081	.0		
558-CQUAD2	21	100		7081	7129	7133	7085	.0		
559-CQUAD2	22	100		7085	7133	7137	7089	.0		
560-CQUAD2	23	100		7089	7137	7141	7093	.0		
561-CQUAD2	24	100		7093	7141	7097	7049	.0		
562-CQUAD2	25	100		7097	7145	7149	7101	.0		
563-CQUAD2	26	100		7101	7149	7153	7105	.0		
564-CQUAD2	27	100		7105	7153	7157	7109	.0		
565-CQUAD2	28	100		7109	7157	7161	7113	.0		
566-CQUAD2	29	100		7113	7161	7165	7117	.0		
567-CQUAD2	30	100		7117	7165	7169	7121	.0		
568-CQUAD2	31	100		7121	7169	7173	7125	.0		
569-CQUAD2	32	100		7125	7173	7177	7129	.0		
570-CQUAD2	33	100		7129	7177	7181	7133	.0		
571-CQUAD2	34	100		7133	7181	7185	7137	.0		
572-CQUAD2	35	100		7137	7185	7189	7141	.0		
573-CQUAD2	36	100		7141	7189	7145	7097	.0		
574-CQUAD2	37	100		7145	7193	7197	7149	.0		
575-CQUAD2	38	100		7149	7197	7201	7153	.0		
576-CQUAD2	39	100		7153	7201	7205	7157	.0		
577-CQUAD2	40	100		7157	7205	7209	7161	.0		
578-CQUAD2	41	100		7161	7209	7213	7165	.0		
579-CQUAD2	42	100		7165	7213	7217	7169	.0		
580-CQUAD2	43	100		7169	7217	7221	7173	.0		
581-CQUAD2	44	100		7173	7221	7225	7177	.0		
582-CQUAD2	45	100		7177	7225	7229	7181	.0		
583-CQUAD2	46	100		7181	7229	7233	7185	.0		
584-CQUAD2	47	100		7185	7233	7237	7189	.0		
585-CQUAD2	48	100		7189	7237	7193	7145	.0		
586-CQUAD2	49	100		7193	7241	7245	7197	.0		
587-CQUAD2	50	100		7197	7245	7249	7201	.0		
588-CQUAD2	51	100		7201	7249	7253	7205	.0		
589-CQUAD2	52	100		7205	7253	7257	7209	.0		
590-CQUAD2	53	100		7209	7257	7261	7213	.0		
591-CQUAD2	54	100		7213	7261	7265	7217	.0		
592-CQUAD2	55	100		7217	7265	7269	7221	.0		
593-CQUAD2	56	100		7221	7269	7273	7225	.0		
594-CQUAD2	57	100		7225	7273	7277	7229	.0		
595-CQUAD2	58	100		7229	7277	7281	7233	.0		
596-CQUAD2	59	100		7233	7281	7285	7237	.0		
597-CQUAD2	60	100		7237	7285	7241	7193	.0		
598-CQUAD2	61	100		7241	7289	7293	7245	.0		
599-CQUAD2	62	100		7245	7293	7297	7249	.0		
600-CQUAD2	63	100		7249	7297	7301	7253	.0		

PHASE 1 XPART 1 R
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
601-	CQUAD2	64	100	7253	7301	7305	7257	.0		
602-	CQUAD2	65	100	7257	7305	7309	7261	.0		
603-	CQUAD2	66	100	7261	7309	7313	7265	.0		
604-	CQUAD2	67	100	7265	7313	7317	7269	.0		
605-	CQUAD2	68	100	7269	7317	7321	7273	.0		
606-	CQUAD2	69	100	7273	7321	7325	7277	.0		
607-	CQUAD2	70	100	7277	7325	7329	7281	.0		
608-	CQUAD2	71	100	7281	7329	7333	7285	.0		
609-	CQUAD2	72	100	7285	7333	7289	7241	.0		
610-	CQUAD2	401	400	6901	6913	6914	6902	.0		
611-	CQUAD2	402	400	6902	6914	6915	6903	.0		
612-	CQUAD2	403	400	6903	6915	6916	6904	.0		
613-	CQUAD2	404	400	6904	6916	6917	6905	.0		
614-	CQUAD2	405	400	6905	6917	6918	6906	.0		
615-	CQUAD2	406	403	6906	6918	6919	6907	.0		
616-	CQUAD2	407	403	6907	6919	6920	6908	.0		
617-	CQUAD2	408	400	6908	6920	6921	6909	.0		
618-	CQUAD2	409	400	6909	6921	6922	6910	.0		
619-	CQUAD2	410	400	6910	6922	6923	6911	.0		
620-	CQUAD2	411	400	6911	6923	6924	6912	.0		
621-	CQUAD2	412	400	6912	6924	6913	6901	.0		
622-	CQUAD2	413	400	6913	6925	6926	6914	.0		
623-	CQUAD2	414	400	6914	6926	6927	6915	.0		
624-	CQUAD2	415	400	6915	6927	6928	6916	.0		
625-	CQUAD2	416	400	6916	6928	6929	6917	.0		
626-	CQUAD2	417	401	6917	6929	6930	6918	.0		
627-	CQUAD2	418	404	6918	6930	6931	6919	.0		
628-	CQUAD2	419	404	6919	6931	6932	6920	.0		
629-	CQUAD2	420	401	6920	6932	6933	6921	.0		
630-	CQUAD2	421	400	6921	6933	6934	6922	.0		
631-	CQUAD2	422	400	6922	6934	6935	6923	.0		
632-	CQUAD2	423	400	6923	6935	6936	6924	.0		
633-	CQUAD2	424	400	6924	6936	6925	6913	.0		
634-	CQUAD2	425	400	6925	6937	6938	6926	.0		
635-	CQUAD2	426	400	6926	6938	6939	6927	.0		
636-	CQUAD2	427	400	6927	6939	6940	6928	.0		
637-	CQUAD2	428	400	6928	6940	6941	6929	.0		
638-	CQUAD2	429	402	6929	6941	6942	6930	.0		
639-	CQUAD2	430	405	6930	6942	6943	6931	.0		
640-	CQUAD2	431	405	6931	6943	6944	6932	.0		
641-	CQUAD2	432	402	6932	6944	6945	6933	.0		
642-	CQUAD2	433	400	6933	6945	6946	6934	.0		
643-	CQUAD2	434	400	6934	6946	6947	6935	.0		
644-	CQUAD2	435	400	6935	6947	6948	6936	.0		
645-	CQUAD2	436	400	6936	6948	6937	6925	.0		
646-	CQUAD2	437	400	6937	7001	7005	6938			
647-	CQUAD2	438	400	6938	7005	7009	6939			
648-	CQUAD2	439	400	6939	7009	7013	6940			
649-	CQUAD2	440	400	6940	7013	7017	6941			
650-	CQUAD2	441	400	6941	7017	7021	6942			

PHASE 1 XPART 1 H
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD
COUNT. 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10

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  651-CQUAD2  442     400     6942    7021    7025    6943
  652-CQUAD2  443     400     6943    7025    7029    6944
  653-CQUAD2  444     400     6944    7029    7033    6945
  654-CQUAD2  445     400     6945    7033    7037    6946
  655-CQUAD2  446     400     6946    7037    7041    6947
  656-CQUAD2  447     400     6947    7041    7045    6948
  657-CQUAD2  448     400     6948    7045    7001    6937
  658-DMI     BFAC    0       2       1       2               1       1
  659-DMI     BFAC    1       1       1.0
  660-DMI     CPAJC   0       2       1       1               1       1
  661-DMI     CPAJC   1       1       1.0
  662-DMI     EQR     0       2       1       2               6       6
  663-DMI     EQR     1       1       .012047 -.980338.196959 33.0854 -21.56976E01
  664-&EQ1    -109.382
  665-DMI     EQR     2       1       .05985  .197328 .978504 -26.0104-107.1606E02
  666-&EQ2     23.2010
  667-DMI     EQR     3       1       -.012047.980338 -.196959-13.021921.5697 &E03
  668-&EQ3    108.1918
  669-DMI     EQR     4       1       -.012047.980338 -.196959-28.91483.23439 &E04
  670-&EQ4    17.8664
  671-DMI     EQR     5       1       .05985  .197328 .978504 -25.5831-16.0687&E05
  672-&EQ5     4.80504
  673-DMI     EQR     6       1       .99813  3       -.06105 1.18502 34.4593 &E06
  674-&EQ6     19.3744
  675-DMI     GFAC    0       2       1       2               1       1
  676-DMI     GFAC    1       1       1.0
  677-DMI     KFAC    0       2       1       2               1       1
  678-DMI     KFAC    1       1       1.0
  679-GRDSET          100                                     100
* 680-GRID    6901            9.750   180.000 25.242
  681-GRID    6902            9.750   150.000 25.242
  682-GRID    6903            9.750   120.000 25.242
* 683-GRID    6904            9.750   90.000  25.242
  684-GRID    6905            9.750   60.000  25.242
  685-GRID    6906            9.750   30.000  25.242
* 686-GRID    6907            9.750   0.000   25.242
  687-GRID    6908            9.750   -30.000 25.242
  688-GRID    6909            9.750   -60.000 25.242
* 689-GRID    6910            9.750   -90.000 25.242
  690-GRID    6911            9.750   -120.000025.242
  691-GRID    6912            9.750   -150.00025.242
  692-GRID    6913            9.750   180.000 30.242
  693-GRID    6914            9.750   150.000 30.242
  694-GRID    6915            9.750   120.000 30.242
  695-GRID    6916            9.750   90.000  30.242
  696-GRID    6917            9.750   60.000  30.242
  697-GRID    6918            9.750   30.000  30.242
  698-GRID    6919            9.750   0.000   30.242
  699-GRID    6920            9.750   -30.000 30.242
  700-GRID    6921            9.750   -60.000 30.242
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SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
701-	GRID	6922		9.750	-90.000	30.242				
702-	GRID	6923		9.750	-120.000	30.242				
703-	GRID	6924		9.750	-150.000	30.242				
704-	GRID	6925		9.750	180.000	35.242				
705-	GRID	6926		9.750	150.000	35.242				
706-	GRID	6927		9.750	120.000	35.242				
707-	GRID	6928		9.750	90.000	35.242				
708-	GRID	6929		9.750	60.000	35.242				
709-	GRID	6930		9.750	30.000	35.242				
710-	GRID	6931		9.750	0.000	35.242				
711-	GRID	6932		9.750	-30.000	35.242				
712-	GRID	6933		9.750	-60.000	35.242				
713-	GRID	6934		9.750	-90.000	35.242				
714-	GRID	6935		9.750	-120.000	35.242				
715-	GRID	6936		9.750	-150.000	35.242				
716-	GRID	6937		9.750	180.000	40.242				
717-	GRID	6938		9.750	150.000	40.242				
718-	GRID	6939		9.750	120.000	40.242				
719-	GRID	6940		9.750	90.000	40.242				
720-	GRID	6941		9.750	60.000	40.242				
721-	GRID	6942		9.750	30.000	40.242				
722-	GRID	6943		9.750	0.000	40.242				
723-	GRID	6944		9.750	-30.000	40.242				
724-	GRID	6945		9.750	-60.000	40.242				
725-	GRID	6946		9.750	-90.000	40.242				
726-	GRID	6947		9.750	-120.000	40.242				
727-	GRID	6948		9.750	-150.000	40.242				
728-	GRID	7001		9.750	180.000	44.500				
729-	GRID	7002		7.560	180.000	44.500				
730-	GRID	7003		5.370	180.000	44.500				
731-	GRID	7004		3.180	180.000	44.500				
732-	GRID	7005		9.750	150.000	44.500				
733-	GRID	7006		7.560	150.000	44.500				
734-	GRID	7007		5.370	150.000	44.500				
735-	GRID	7008		3.180	150.000	44.500				
736-	GRID	7009		9.750	120.000	44.500				
737-	GRID	7010		7.560	120.000	44.500				
738-	GRID	7011		5.370	120.000	44.500				
739-	GRID	7012		3.180	120.000	44.500				
740-	GRID	7013		9.750	90.000	44.500				
741-	GRID	7014		7.560	90.000	44.500				
742-	GRID	7015		5.370	90.000	44.500				
743-	GRID	7016		3.180	90.000	44.500				
744-	GRID	7017		9.750	60.000	44.500				
745-	GRID	7018		7.560	60.000	44.500				
746-	GRID	7019		5.370	60.000	44.500				
747-	GRID	7020		3.180	60.000	44.500				
748-	GRID	7021		9.750	30.000	44.500				
749-	GRID	7022		7.560	30.000	44.500				
750-	GRID	7023		5.370	30.000	44.500				

PHASE 1 XPAGT 1 H
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
751-	GRID	7024		3.180	30.000	44.500				
752-	GRID	7025		9.750	0.0	44.500				
753-	GRID	7026		7.560	0.0	44.500				
754-	GRID	7027		5.370	0.0	44.500				
755-	GRID	7028		3.180	0.0	44.500				
756-	GRID	7029		9.750	-30.000	44.500				
757-	GRID	7030		7.560	-30.000	44.500				
758-	GRID	7031		5.370	-30.000	44.500				
759-	GRID	7032		3.180	-30.000	44.500				
760-	GRID	7033		9.750	-60.000	44.500				
761-	GRID	7034		7.560	-60.000	44.500				
762-	GRID	7035		5.370	-60.000	44.500				
763-	GRID	7036		3.180	-60.000	44.500				
764-	GRID	7037		9.750	-90.000	44.500				
765-	GRID	7038		7.560	-90.000	44.500				
766-	GRID	7039		5.370	-90.000	44.500				
767-	GRID	7040		3.180	-90.000	44.500				
768-	GRID	7041		9.750	-120.000	44.500				
769-	GRID	7042		7.560	-120.000	44.500				
770-	GRID	7043		5.370	-120.000	44.500				
771-	GRID	7044		3.180	-120.000	44.500				
772-	GRID	7045		9.750	-150.000	44.500				
773-	GRID	7046		7.560	-150.000	44.500				
774-	GRID	7047		5.370	-150.000	44.500				
775-	GRID	7048		3.180	-150.000	44.500				
776-	GRID	7049		9.750	180.000	56.777				
777-	GRID	7050		7.560	180.000	56.777				
778-	GRID	7051		5.370	180.000	56.777				
779-	GRID	7052		3.180	180.000	56.777				
780-	GRID	7053		9.750	150.000	56.777				
781-	GRID	7054		7.560	150.000	56.777				
782-	GRID	7055		5.370	150.000	56.777				
783-	GRID	7056		3.180	150.000	56.777				
784-	GRID	7057		9.750	120.000	56.777				
785-	GRID	7058		7.560	120.000	56.777				
786-	GRID	7059		5.370	120.000	56.777				
787-	GRID	7060		3.180	120.000	56.777				
788-	GRID	7061		9.750	90.000	56.777				
789-	GRID	7062		7.560	90.000	56.777				
790-	GRID	7063		5.370	90.000	56.777				
791-	GRID	7064		3.180	90.000	56.777				
792-	GRID	7065		9.750	60.000	56.777				
793-	GRID	7066		7.560	60.000	56.777				
794-	GRID	7067		5.370	60.000	56.777				
795-	GRID	7068		3.180	60.000	56.777				
796-	GRID	7069		9.750	30.000	56.777				
797-	GRID	7070		7.560	30.000	56.777				
798-	GRID	7071		5.370	30.000	56.777				
799-	GRID	7072		3.180	30.000	56.777				
800-	GRID	7073		9.750	0.0	56.777				

PHASE 1 SPART 1 D
SRM 6 PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD
COUNT . 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10

801- GRID	7074		7.560	0.0	56.777
802- GRID	7075		5.370	0.0	56.777
803- GRID	7076		3.180	0.0	56.777
804- GRID	7077		9.750	-30.000	56.777
805- GRID	7078		7.560	-30.000	56.777
806- GRID	7079		5.370	-30.000	56.777
807- GRID	7080		3.180	-30.000	56.777
808- GRID	7081		9.750	-60.000	56.777
809- GRID	7082		7.560	-60.000	56.777
810- GRID	7083		5.370	-60.000	56.777
811- GRID	7084		3.180	-60.000	56.777
812- GRID	7085		9.750	-90.000	56.777
813- GRID	7086		7.560	-90.000	56.777
814- GRID	7087		5.370	-90.000	56.777
815- GRID	7088		3.180	-90.000	56.777
816- GRID	7089		9.750	-120.000	56.777
817- GRID	7090		7.560	-120.000	56.777
818- GRID	7091		5.370	-120.000	56.777
819- GRID	7092		3.180	-120.000	56.777
820- GRID	7093		9.750	-150.000	56.777
821- GRID	7094		7.560	-150.000	56.777
822- GRID	7095		5.370	-150.000	56.777
823- GRID	7096		3.180	-150.000	56.777
824- GRID	7097		9.750	180.000	69.053
825- GRID	7098		7.560	180.000	69.053
826- GRID	7099		5.370	180.000	69.053
827- GRID	7100		3.180	180.000	69.053
828- GRID	7101		9.750	150.000	69.053
829- GRID	7102		7.560	150.000	69.053
830- GRID	7103		5.370	150.000	69.053
831- GRID	7104		3.180	150.000	69.053
832- GRID	7105		9.750	120.000	69.053
833- GRID	7106		7.560	120.000	69.053
834- GRID	7107		5.370	120.000	69.053
835- GRID	7108		3.180	120.000	69.053
836- GRID	7109		9.750	90.000	69.053
837- GRID	7110		7.560	90.000	69.053
838- GRID	7111		5.370	90.000	69.053
839- GRID	7112		3.180	90.000	69.053
840- GRID	7113		9.750	60.000	69.053
841- GRID	7114		7.560	60.000	69.053
842- GRID	7115		5.370	60.000	69.053
843- GRID	7116		3.180	60.000	69.053
844- GRID	7117		9.750	30.000	69.053
845- GRID	7118		7.560	30.000	69.053
846- GRID	7119		5.370	30.000	69.053
847- GRID	7120		3.180	30.000	69.053
848- GRID	7121		9.750	0.0	69.053
849- GRID	7122		7.560	0.0	69.053
850- GRID	7123		5.370	0.0	69.053

PHASE 1 XPART 1 B

SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
851-	GRID	7124		3.180	0.0	69.053				
852-	GRID	7125		9.750	-30.000	69.053				
853-	GRID	7126		7.560	-30.000	69.053				
854-	GRID	7127		5.370	-30.000	69.053				
855-	GRID	7128		3.180	-30.000	69.053				
856-	GRID	7129		9.750	-60.000	69.053				
857-	GRID	7130		7.560	-60.000	69.053				
858-	GRID	7131		5.370	-60.000	69.053				
859-	GRID	7132		3.180	-60.000	69.053				
860-	GRID	7133		9.750	-90.000	69.053				
861-	GRID	7134		7.560	-90.000	69.053				
862-	GRID	7135		5.370	-90.000	69.053				
863-	GRID	7136		3.180	-90.000	69.053				
864-	GRID	7137		9.750	-120.000	69.053				
865-	GRID	7138		7.560	-120.000	69.053				
866-	GRID	7139		5.370	-120.000	69.053				
867-	GRID	7140		3.180	-120.000	69.053				
868-	GRID	7141		9.750	-150.000	69.053				
869-	GRID	7142		7.560	-150.000	69.053				
870-	GRID	7143		5.370	-150.000	69.053				
871-	GRID	7144		3.180	-150.000	69.053				
872-	GRID	7145		9.750	180.000	81.330				
873-	GRID	7146		7.560	180.000	81.330				
874-	GRID	7147		5.370	180.000	81.330				
875-	GRID	7148		3.180	180.000	81.330				
876-	GRID	7149		9.750	150.000	81.330				
877-	GRID	7150		7.560	150.000	81.330				
878-	GRID	7151		5.370	150.000	81.330				
879-	GRID	7152		3.180	150.000	81.330				
880-	GRID	7153		9.750	120.000	81.330				
881-	GRID	7154		7.560	120.000	81.330				
882-	GRID	7155		5.370	120.000	81.330				
883-	GRID	7156		3.180	120.000	81.330				
884-	GRID	7157		9.750	90.000	81.330				
885-	GRID	7158		7.560	90.000	81.330				
886-	GRID	7159		5.370	90.000	81.330				
887-	GRID	7160		3.180	90.000	81.330				
888-	GRID	7161		9.750	60.000	81.330				
889-	GRID	7162		7.560	60.000	81.330				
890-	GRID	7163		5.370	60.000	81.330				
891-	GRID	7164		3.180	60.000	81.330				
892-	GRID	7165		9.750	30.000	81.330				
893-	GRID	7166		7.560	30.000	81.330				
894-	GRID	7167		5.370	30.000	81.330				
895-	GRID	7168		3.180	30.000	81.330				
896-	GRID	7169		9.750	0.0	81.330				
897-	GRID	7170		7.560	0.0	81.330				
898-	GRID	7171		5.370	0.0	81.330				
899-	GRID	7172		3.180	0.0	81.330				
900-	GRID	7173		9.750	-30.000	81.330				

PHASE 1 &PART 1 B
SRM & PROPELLANT END HALF

SORTED BULK DATA ECHO

CARD COUNT.	1	2	3	4	5	6	7	8	9	10
901-GRID	7174			7.560	-30.000	81.330				
902-GRID	7175			5.370	-30.000	81.330				
903-GRID	7176			3.180	-30.000	81.330				
904-GRID	7177			9.750	-60.000	81.330				
905-GRID	7178			7.560	-60.000	81.330				
906-GRID	7179			5.370	-60.000	81.330				
907-GRID	7180			3.180	-60.000	81.330				
908-GRID	7181			9.750	-90.000	81.330				
909-GRID	7182			7.560	-90.000	81.330				
910-GRID	7183			5.370	-90.000	81.330				
911-GRID	7184			3.180	-90.000	81.330				
912-GRID	7185			9.750	-120.000	81.330				
913-GRID	7186			7.560	-120.000	81.330				
914-GRID	7187			5.370	-120.000	81.330				
915-GRID	7188			3.180	-120.000	81.330				
916-GRID	7189			9.750	-150.000	81.330				
917-GRID	7190			7.560	-150.000	81.330				
918-GRID	7191			5.370	-150.000	81.330				
919-GRID	7192			3.180	-150.000	81.330				
920-GRID	7193			9.750	180.000	93.607				
921-GRID	7194			7.560	180.000	93.607				
922-GRID	7195			5.370	180.000	93.607				
923-GRID	7196			3.180	180.000	93.607				
924-GRID	7197			9.750	150.000	93.607				
925-GRID	7198			7.560	150.000	93.607				
926-GRID	7199			5.370	150.000	93.607				
927-GRID	7200			3.180	150.000	93.607				
928-GRID	7201			9.750	120.000	93.607				
929-GRID	7202			7.560	120.000	93.607				
930-GRID	7203			5.370	120.000	93.607				
931-GRID	7204			3.180	120.000	93.607				
932-GRID	7205			9.750	90.000	93.607				
933-GRID	7206			7.560	90.000	93.607				
934-GRID	7207			5.370	90.000	93.607				
935-GRID	7208			3.180	90.000	93.607				
936-GRID	7209			9.750	60.000	93.607				
937-GRID	7210			7.560	60.000	93.607				
938-GRID	7211			5.370	60.000	93.607				
939-GRID	7212			3.180	60.000	93.607				
940-GRID	7213			9.750	30.000	93.607				
941-GRID	7214			7.560	30.000	93.607				
942-GRID	7215			5.370	30.000	93.607				
943-GRID	7216			3.180	30.000	93.607				
944-GRID	7217			9.750	0.0	93.607				
945-GRID	7218			7.560	0.0	93.607				
946-GRID	7219			5.370	0.0	93.607				
947-GRID	7220			3.180	0.0	93.607				
948-GRID	7221			9.750	-30.000	93.607				
949-GRID	7222			7.560	-30.000	93.607				
950-GRID	7223			5.370	-30.000	93.607				

PHASE 1 SPART 1 W

SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
951-	GRID	7224		3.180	-30.000	93.607				
952-	GRID	7225		9.750	-60.000	93.607				
953-	GRID	7226		7.560	-60.000	93.607				
954-	GRID	7227		5.370	-60.000	93.607				
955-	GRID	7228		3.180	-60.000	93.607				
956-	GRID	7229		9.750	-90.000	93.607				
957-	GRID	7230		7.560	-90.000	93.607				
958-	GRID	7231		5.370	-90.000	93.607				
959-	GRID	7232		3.180	-90.000	93.607				
960-	GRID	7233		9.750	-120.000	93.607				
961-	GRID	7234		7.560	-120.000	93.607				
962-	GRID	7235		5.370	-120.000	93.607				
963-	GRID	7236		3.180	-120.000	93.607				
964-	GRID	7237		9.750	-150.000	93.607				
965-	GRID	7238		7.560	-150.000	93.607				
966-	GRID	7239		5.370	-150.000	93.607				
967-	GRID	7240		3.180	-150.000	93.607				
968-	GRID	7241		9.750	180.000	105.883				
969-	GRID	7242		7.560	180.000	105.883				
970-	GRID	7243		5.370	180.000	105.883				
971-	GRID	7244		3.180	180.000	105.883				
972-	GRID	7245		9.750	150.000	105.883				
973-	GRID	7246		7.560	150.000	105.883				
974-	GRID	7247		5.370	150.000	105.883				
975-	GRID	7248		3.180	150.000	105.883				
976-	GRID	7249		9.750	120.000	105.883				
977-	GRID	7250		7.560	120.000	105.883				
978-	GRID	7251		5.370	120.000	105.883				
979-	GRID	7252		3.180	120.000	105.883				
980-	GRID	7253		9.750	90.000	105.883				
981-	GRID	7254		7.560	90.000	105.883				
982-	GRID	7255		5.370	90.000	105.883				
983-	GRID	7256		3.180	90.000	105.883				
984-	GRID	7257		9.750	60.000	105.883				
985-	GRID	7258		7.560	60.000	105.883				
986-	GRID	7259		5.370	60.000	105.883				
987-	GRID	7260		3.180	60.000	105.883				
988-	GRID	7261		9.750	30.000	105.883				
989-	GRID	7262		7.560	30.000	105.883				
990-	GRID	7263		5.370	30.000	105.883				
991-	GRID	7264		3.180	30.000	105.883				
992-	GRID	7265		9.750	0.0	105.883				
993-	GRID	7266		7.560	0.0	105.883				
994-	GRID	7267		5.370	0.0	105.883				
995-	GRID	7268		3.180	0.0	105.883				
996-	GRID	7269		9.750	-30.000	105.883				
997-	GRID	7270		7.560	-30.000	105.883				
998-	GRID	7271		5.370	-30.000	105.883				
999-	GRID	7272		3.180	-30.000	105.883				
1000-	GRID	7273		9.750	-60.000	105.883				

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1001- GRID		7274		7.560	-60.000	105.883				
1002- GRID		7275		5.370	-60.000	105.883				
1003- GRID		7276		3.180	-60.000	105.883				
1004- GRID		7277		9.750	-90.000	105.883				
1005- GRID		7278		7.560	-90.000	105.883				
1006- GRID		7279		5.370	-90.000	105.883				
1007- GRID		7280		3.180	-90.000	105.883				
1008- GRID		7281		9.750	-120.000	105.883				
1009- GRID		7282		7.560	-120.000	105.883				
1010- GRID		7283		5.370	-120.000	105.883				
1011- GRID		7284		3.180	-120.000	105.883				
1012- GRID		7285		9.750	-150.000	105.883				
1013- GRID		7286		7.560	-150.000	105.883				
1014- GRID		7287		5.370	-150.000	105.883				
1015- GRID		7288		3.180	-150.000	105.883				
1016- GRID		7289		9.750	180.000	118.160				
1017- GRID		7290		7.560	180.000	118.160				
1018- GRID		7291		5.370	180.000	118.160				
1019- GRID		7292		3.180	180.000	118.160				
1020- GRID		7293		9.750	150.000	118.160				
1021- GRID		7294		7.560	150.000	118.160				
1022- GRID		7295		5.370	150.000	118.160				
1023- GRID		7296		3.180	150.000	118.160				
1024- GRID		7297		9.750	120.000	118.160				
1025- GRID		7298		7.560	120.000	118.160				
1026- GRID		7299		5.370	120.000	118.160				
1027- GRID		7300		3.180	120.000	118.160				
1028- GRID		7301		9.750	90.000	118.160				
1029- GRID		7302		7.560	90.000	118.160				
1030- GRID		7303		5.370	90.000	118.160				
1031- GRID		7304		3.180	90.000	118.160				
1032- GRID		7305		9.750	60.000	118.160				
1033- GRID		7306		7.560	60.000	118.160				
1034- GRID		7307		5.370	60.000	118.160				
1035- GRID		7308		3.180	60.000	118.160				
1036- GRID		7309		9.750	30.000	118.160				
1037- GRID		7310		7.560	30.000	118.160				
1038- GRID		7311		5.370	30.000	118.160				
1039- GRID		7312		3.180	30.000	118.160				
1040- GRID		7313		9.750	0.0	118.160				
1041- GRID		7314		7.560	0.0	118.160				
1042- GRID		7315		5.370	0.0	118.160				
1043- GRID		7316		3.180	0.0	118.160				
1044- GRID		7317		9.750	-30.000	118.160				
1045- GRID		7318		7.560	-30.000	118.160				
1046- GRID		7319		5.370	-30.000	118.160				
1047- GRID		7320		3.180	-30.000	118.160				
1048- GRID		7321		9.750	-60.000	118.160				
1049- GRID		7322		7.560	-60.000	118.160				
1050- GRID		7323		5.370	-60.000	118.160				

SORTED BULK DATA ECHO

CARD COUNT.	1	2	3	4	5	6	7	8	9	10
1051-GRID	7324			3.180	-60.000	118.160				
1052-GRID	7325			9.750	-90.000	118.160				
1053-GRID	7326			7.560	-90.000	118.160				
1054-GRID	7327			5.370	-90.000	118.160				
1055-GRID	7328			3.180	-90.000	118.160				
1056-GRID	7329			9.750	-120.000	118.160				
1057-GRID	7330			7.560	-120.000	118.160				
1058-GRID	7331			5.370	-120.000	118.160				
1059-GRID	7332			3.180	-120.000	118.160				
1060-GRID	7333			9.750	-150.000	118.160				
1061-GRID	7334			7.560	-150.000	118.160				
1062-GRID	7335			5.370	-150.000	118.160				
1063-GRID	7336			3.180	-150.000	118.160				
1064-GRID	8134	696		99.98	-19.410	73.9071	100	456		
1065-MAT1	100	1.0567			.3	.1				
1066-MAT1	1000	25.063			.49	.0615			.52	
1067-MPC	2	6907	1		1.0	8134	1	-1.0		
1068-MPC	2	6907	5		1.0	6907	3	-.642834		&M6907MT
1069-&M6907MT		8134	3		.642834					
1070-MPC	2	6907	6		1.0	6907	2	.642834		&M6907M2
1071-&M6907M2		8134	2		-.642834					
1072-PARAM	GRDPNT	0								
1073-PARAM	IPCOPY	1								
1074-PARAM	IPNAME	SRMPTF								
1075-PARAM	WTMASS	.002590								
1076-PBAR	106	100		.127	.071					
1077-PBAR	107	100		.254	.142					
1078-PBAR	108	100		1.060	.074					
1079-PBAR	109	100		.240	.15					
1080-PQUAD2	100	100		.1875						
1081-PQUAD2	400	100		.040						
1082-PQUAD2	401	100		.054						
1083-PQUAD2	402	100		.058						
1084-PQUAD2	403	100		.230						
1085-PQUAD2	404	100		.135						
1086-PQUAD2	405	100		.096						
1087-SPC1	1	456	7002	7003	7004	7006	7007	7008		
1088-SPC1	1	456	7010	7011	7012	7014	7015	7016		
1089-SPC1	1	456	7018	7019	7020	7022	7023	7024		
1090-SPC1	1	456	7026	7027	7028	7030	7031	7032		
1091-SPC1	1	456	7034	7035	7036	7038	7039	7040		
1092-SPC1	1	456	7042	7043	7044	7046	7047	7048		
1093-SPC1	1	456	7050	7051	7052	7054	7055	7056		
1094-SPC1	1	456	7058	7059	7060	7062	7063	7064		
1095-SPC1	1	456	7066	7067	7068	7070	7071	7072		
1096-SPC1	1	456	7074	7075	7076	7078	7079	7080		
1097-SPC1	1	456	7082	7083	7084	7086	7087	7088		
1098-SPC1	1	456	7090	7091	7092	7094	7095	7096		
1099-SPC1	1	456	7098	7099	7100	7102	7103	7104		
1100-SPC1	1	456	7106	7107	7108	7110	7111	7112		

PHASE 1 %PART 1 B
SRM & PROPELLANT FWD HALF

SORTED BULK DATA ECHO

CARD COUNT • 1	•• 2	•• 3	•• 4	•• 5	•• 6	•• 7	•• 8	•• 9	•• 10
1101- SPC1	1	456	7114	7115	7116	7118	7119	7120	
1102- SPC1	1	456	7122	7123	7124	7126	7127	7128	
1103- SPC1	1	456	7130	7131	7132	7134	7135	7136	
1104- SPC1	1	456	7138	7139	7140	7142	7143	7144	
1105- SPC1	1	456	7146	7147	7148	7150	7151	7152	
1106- SPC1	1	456	7154	7155	7156	7158	7159	7160	
1107- SPC1	1	456	7162	7163	7164	7166	7167	7168	
1108- SPC1	1	456	7170	7171	7172	7174	7175	7176	
1109- SPC1	1	456	7178	7179	7180	7182	7183	7184	
1110- SPC1	1	456	7186	7187	7188	7190	7191	7192	
1111- SPC1	1	456	7194	7195	7196	7198	7199	7200	
1112- SPC1	1	456	7202	7203	7204	7206	7207	7208	
1113- SPC1	1	456	7210	7211	7212	7214	7215	7216	
1114- SPC1	1	456	7218	7219	7220	7222	7223	7224	
1115- SPC1	1	456	7226	7227	7228	7230	7231	7232	
1116- SPC1	1	456	7234	7235	7236	7238	7239	7240	
1117- SPC1	1	456	7242	7243	7244	7246	7247	7248	
1118- SPC1	1	456	7250	7251	7252	7254	7255	7256	
1119- SPC1	1	456	7258	7259	7260	7262	7263	7264	
1120- SPC1	1	456	7266	7267	7268	7270	7271	7272	
1121- SPC1	1	456	7274	7275	7276	7278	7279	7280	
1122- SPC1	1	456	7282	7283	7284	7286	7287	7288	
1123- SPC1	1	456	7290	7291	7292	7294	7295	7296	
1124- SPC1	1	456	7298	7299	7300	7302	7303	7304	
1125- SPC1	1	456	7306	7307	7308	7310	7311	7312	
1126- SPC1	1	456	7314	7315	7316	7318	7319	7320	
1127- SPC1	1	456	7322	7323	7324	7326	7327	7328	
1128- SPC1	1	456	7330	7331	7332	7334	7335	7336	
1129- SUPORT	0134	123	7301	2	7314	2	7325	2	
ENDDATA									

SOLID ROCKET BOOSTER COPY RUN Z701232

NASTRAN EXECUTIVE CONTROL DECK ECHO

```
ID TAPE COPYSRM
APP      DMAP
DIAG  14
TIME     4
BEGIN $ DMAP TO CHECK AND CONSOLIDATE SUBSTRUCTURE PHASE 1 SRM TAPES
(SEE NASTRAN SOURCE PROGRAM COMPILATION FOR LISTING OF DMAP SEQUENCE)
END
CEND
```

TAPE COPY SRM

C A S E C O N T R O L D E C K E C H O

CARD COUNT	
1	TITLE = TAPE COPY SRM
2	BEGIN BULK

*** USER INFORMATION MESSAGE 207, BULK DATA NOT SORTED,XSORT WILL RE-ORDER DECK.

TAPE COPY SRM

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1	DMI	CPSRMA	0	2	1	2		666	1	
2	DMI	CPSRMA	1	168	.0	169	1.0	1.0	1.0	&SRMA1
3	&SRMA1	172	1.0	1.0	1.0	175	1.0	1.0	1.0	&SRMA2
4	&SRMA2	181	1.0	1.0	1.0	187	1.0	1.0	1.0	&SRMA3
5	&SRMA3	193	1.0	1.0	1.0	196	1.0	1.0	1.0	&SRMA4
6	&SRMA4	199	1.0	1.0	1.0	205	1.0	1.0	1.0	&SRMA5
7	&SRMA5	211	1.0	1.0	1.0	217	1.0	1.0	1.0	&SRMA6
8	&SRMA6	220	1.0	1.0	1.0	223	1.0	1.0	1.0	&SRMA7
9	&SRMA7	229	1.0	1.0	1.0	235	1.0	1.0	1.0	&SRMA8
10	&SRMA8	241	1.0	1.0	1.0	244	1.0	1.0	1.0	&SRMA9
11	&SRMA9	247	1.0	1.0	1.0	253	1.0	1.0	1.0	&SRMA10
12	&SRMA10	259	1.0	1.0	1.0	265	1.0	1.0	1.0	&SRMA11
13	&SRMA11	268	1.0	1.0	1.0	271	1.0	1.0	1.0	&SRMA12
14	&SRMA12	277	1.0	1.0	1.0	283	1.0	1.0	1.0	&SRMA13
15	&SRMA13	289	1.0	1.0	1.0	292	1.0	1.0	1.0	&SRMA14
16	&SRMA14	295	1.0	1.0	1.0	301	1.0	1.0	1.0	&SRMA15
17	&SRMA15	307	1.0	1.0	1.0	313	1.0	1.0	1.0	&SRMA16
18	&SRMA16	316	1.0	1.0	1.0	319	1.0	1.0	1.0	&SRMA17
19	&SRMA17	325	1.0	1.0	1.0	331	1.0	1.0	1.0	&SRMA18
20	&SRMA18	337	1.0	1.0	1.0	340	1.0	1.0	1.0	&SRMA19
21	&SRMA19	343	1.0	1.0	1.0	349	1.0	1.0	1.0	&SRMA20
22	&SRMA20	355	1.0	1.0	1.0	361	1.0	1.0	1.0	&SRMA21
23	&SRMA21	364	1.0	1.0	1.0	367	1.0	1.0	1.0	&SRMA22
24	&SRMA22	373	1.0	1.0	1.0	379	1.0	1.0	1.0	&SRMA23
25	&SRMA23	385	1.0	1.0	1.0	388	1.0	1.0	1.0	&SRMA24
26	&SRMA24	391	1.0	1.0	1.0	397	1.0	1.0	1.0	&SRMA25
27	&SRMA25	403	1.0	1.0	1.0	409	1.0	1.0	1.0	&SRMA26
28	&SRMA26	412	1.0	1.0	1.0	415	1.0	1.0	1.0	&SRMA27
29	&SRMA27	421	1.0	1.0	1.0	427	1.0	1.0	1.0	&SRMA28
30	&SRMA28	433	1.0	1.0	1.0	436	1.0	1.0	1.0	&SRMA29
31	&SRMA29	439	1.0	1.0	1.0	445	1.0	1.0	1.0	&SRMA30
32	&SRMA30	451	1.0	1.0	1.0	457	1.0	1.0	1.0	&SRMA31
33	&SRMA31	463	1.0	1.0	1.0	469	1.0	1.0	1.0	&SRMA32
34	&SRMA32	475	1.0	1.0	1.0	481	1.0	1.0	1.0	&SRMA33
35	&SRMA33	487	1.0	1.0	1.0	493	1.0	1.0	1.0	&SRMA34
36	&SRMA34	499	1.0	1.0	1.0	505	1.0	1.0	1.0	&SRMA35
37	&SRMA35	511	1.0	1.0	1.0	517	1.0	1.0	1.0	&SRMA36
38	&SRMA36	523	1.0	1.0	1.0	529	1.0	1.0	1.0	&SRMA37
39	&SRMA37	535	1.0	1.0	1.0	541	1.0	1.0	1.0	&SRMA38
40	&SRMA38	547	1.0	1.0	1.0	553	1.0	1.0	1.0	&SRMA39
41	&SRMA39	559	1.0	1.0	1.0	565	1.0	1.0	1.0	&SRMA40
42	&SRMA40	571	1.0	1.0	1.0	577	1.0	1.0	1.0	&SRMA41
43	&SRMA41	583	1.0	1.0	1.0	589	1.0	1.0	1.0	&SRMA42
44	&SRMA42	595	1.0	1.0	1.0	601	1.0	1.0	1.0	&SRMA43
45	&SRMA43	607	1.0	1.0	1.0	613	1.0	1.0	1.0	&SRMA44
46	&SRMA44	619	1.0	1.0	1.0	625	1.0	1.0	1.0	&SRMA45
47	&SRMA45	631	1.0	1.0	1.0	637	1.0	1.0	1.0	&SRMA46
48	&SRMA46	643	1.0	1.0	1.0	655	1.0	1.0	1.0	&SRMA47
49	&SRMA47	661	1.0	1.0	1.0					
50	DMI	CPSRMF	0	2	1	2		666	1	

TAPE COPY SRM

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10	
51	DMI	CPSRMF 1		1	1.0	1.0	1.0	.0	.0		&SRMF1
52	&SRMF1	7	1.0	1.0	1.0	13	0.0	1.0	1.0		&SRMF2
53	&SRMF2	19	1.0	1.0	1.0	25	1.0	1.0	1.0		&SRMF3
54	&SRMF3	31	1.0	1.0	1.0	37	1.0	1.0	1.0		&SRMF4
55	&SRMF4	43	1.0	1.0	1.0	49	1.0	1.0	1.0		&SRMF5
56	&SRMF5	55	1.0	1.0	1.0	61	1.0	1.0	1.0		&SRMF6
57	&SRMF6	67	1.0	1.0	1.0	73	1.0	1.0	1.0		&SRMF7
58	&SRMF7	79	1.0	1.0	1.0	85	1.0	1.0	1.0		&SRMF8
59	&SRMF8	91	1.0	1.0	1.0	97	1.0	1.0	1.0		&SRMF9
60	&SRMF9	103	1.0	1.0	1.0	109	1.0	1.0	1.0		&SRMF10
61	&SRMF10	115	1.0	1.0	1.0	121	1.0	1.0	1.0		&SRMF11
62	&SRMF11	127	1.0	1.0	1.0	133	1.0	1.0	1.0		&SRMF12
63	&SRMF12	139	1.0	1.0	1.0	145	1.0	1.0	1.0		&SRMF13
64	&SRMF13	151	1.0	1.0	1.0	157	1.0	1.0	1.0		&SRMF14
65	&SRMF14	163	1.0	1.0	1.0	169	1.0	1.0	1.0		&SRMF15
66	&SRMF15	172	1.0	1.0	1.0	175	1.0	1.0	1.0		&SRMF16
67	&SRMF16	181	1.0	1.0	1.0	187	1.0	1.0	1.0		&SRMF17
68	&SRMF17	193	1.0	1.0	1.0	196	1.0	1.0	1.0		&SRMF18
69	&SRMF18	199	1.0	1.0	1.0	205	1.0	1.0	1.0		&SRMF19
70	&SRMF19	211	1.0	1.0	1.0	217	1.0	1.0	1.0		&SRMF20
71	&SRMF20	220	1.0	1.0	1.0	223	1.0	1.0	1.0		&SRMF21
72	&SRMF21	229	1.0	1.0	1.0	235	1.0	1.0	1.0		&SRMF22
73	&SRMF22	241	1.0	1.0	1.0	244	1.0	1.0	1.0		&SRMF23
74	&SRMF23	247	1.0	1.0	1.0	253	1.0	1.0	1.0		&SRMF24
75	&SRMF24	259	1.0	1.0	1.0	265	1.0	1.0	1.0		&SRMF25
76	&SRMF25	268	1.0	1.0	1.0	271	1.0	1.0	1.0		&SRMF26
77	&SRMF26	277	1.0	1.0	1.0	283	1.0	1.0	1.0		&SRMF27
78	&SRMF27	289	1.0	1.0	1.0	292	1.0	1.0	1.0		&SRMF28
79	&SRMF28	295	1.0	1.0	1.0	301	1.0	1.0	1.0		&SRMF29
80	&SRMF29	307	1.0	1.0	1.0	313	1.0	1.0	1.0		&SRMF30
81	&SRMF30	316	1.0	1.0	1.0	319	1.0	1.0	1.0		&SRMF31
82	&SRMF31	325	1.0	1.0	1.0	331	1.0	1.0	1.0		&SRMF32
83	&SRMF32	337	1.0	1.0	1.0	340	1.0	1.0	1.0		&SRMF33
84	&SRMF33	343	1.0	1.0	1.0	349	1.0	1.0	1.0		&SRMF34
85	&SRMF34	355	1.0	1.0	1.0	361	1.0	1.0	1.0		&SRMF35
86	&SRMF35	364	1.0	1.0	1.0	367	1.0	1.0	1.0		&SRMF36
87	&SRMF36	373	1.0	1.0	1.0	379	1.0	1.0	1.0		&SRMF37
88	&SRMF37	385	1.0	1.0	1.0	388	1.0	1.0	1.0		&SRMF38
89	&SRMF38	391	1.0	1.0	1.0	397	1.0	1.0	1.0		&SRMF39
90	&SRMF39	403	1.0	1.0	1.0	409	1.0	1.0	1.0		&SRMF40
91	&SRMF40	412	1.0	1.0	1.0	415	1.0	1.0	1.0		&SRMF41
92	&SRMF41	421	1.0	1.0	1.0	427	1.0	1.0	1.0		&SRMF42
93	&SRMF42	433	1.0	1.0	1.0	436	1.0	1.0	1.0		&SRMF43
94	&SRMF43	439	1.0	1.0	1.0	445	1.0	1.0	1.0		&SRMF44
95	&SRMF44	451	1.0	1.0	1.0	649	1.0	1.0	1.0		
	ENDDATA										

```
TAPE COPY SRM


    N A S T R A N  S O U R C E  P R O G R A M  C O M P I L A T I O N
DMAP DMAP INSTRUCTION
 NO.
  1   BEGIN $ DMAP TO CHECK AND CONSOLIDATE SUBSTRUCTURE PHASE 1 SRM TAPES
  2   INPUTT1 /GMF,GOF,KFSF,,/C,N, 3/C,N,1/C,N,SRMP1F
  3   INPUTT1 /KSRMF,MSRMF,K4SRMF,,/C,N,0/C,N,1/C,N,SRMP1F
  4   OUTPUT1 CPSRMF,KSRMF,MSRMF,K4SRMF,//C,N,-1/C,N,6/C,N,SRMP1
  5   INPUTT1     /GOA,KFSA,,,/C,N,-3/C,N,2/C,N,SRMP1A
  6   INPUTT1 /KSRMA,MSRMA,K4SRMA,,/C,N,0/C,N,2/C,N,SRMP1A
  7   OUTPUT1 CPSRMA,KSRMA,MSRMA,K4SRMA,//C,N,0 /C,N,6/C,N,SRMP1
  8   MATPRN  CPSRMF,CPSRMA,,,// $
  9   END
      **NO ERRORS FOUND   EXECUTE NASTRAN PROGRAM**
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
ID  PHASE2 SRMR1
APP     DISP
CHKPNT  YES
TIME    15
SOL     7,0
DIAG  7,8,13,14,19,21,22
ALTER 2,28 PARAMETER DEFAULTS
PARAM   //C,N,NOP/V,Y,NOSUB=0
PARAM   //C,N,NOP/V,Y,TPCOPY=-1
PARAM   //C,N,NOP/V,Y,SUBGK=-1
PARAM   //C,N,NOP/V,Y,SUBK4#-1
PARAM   //C,N,NOP/V,Y,SUBB=-1
PARAM   //C,N,NOP/V,N,TRUE=-1
ALTER 25,27
CHKPNT  EST,GEI,ECPT,GPCT
PARAM   //C,N,SUB/V,N,COUPLE/V,Y,NOSUB/C,N,1
PARAM   //C,N,NOP/V,N,NOK4GG#-1
PURGE   KGGX,K4GG,GPST,OGPST/NOSIMP
CHKPNT  KGGX,K4GG,GPST,OGPST
COND    L30,NOSIMP
COND    L25A,GENEL
COND    L25B,COUPLE
LABEL   L25A
PURGE   OGPST/TRUE
CHKPNT  OGPST
LABEL   L25B
ALTER 30,31
CHKPNT  KGGX,K4GG,GPST
LABEL   L30
ALTER 34,35
PARAM   //C,N,AND/V,N,NOBG/V,N,NOBGG/V,Y,SUBB
PARAM   //C,N,AND/V,N,NORK4/V,Y,SUBGK/V,Y,SUBK4
PARAM   //C,N,AND/V,N,NOK4/V,N,NORK4/V,N,NOK4GG
COND    L34A,NOMGG
JUMP    L34B
LABEL   L34A
COND    ERROR3,COUPLE
LABEL   L34B
PURGE   BNN,BFF,BAA,BGGY/NOBG
PURGE   K4GGY,K4NN,K4FF,K4AA/NOK4
CHKPNT        BGGY,K4GGY,K4NN,K4FF,K4AA,MGG,BGG,BNN,BFF,BAA
ALTER 37,37
COND    LBL1,NOMGG
ALTER 42,42 $ IF COUPLING RUN,COMBINES SUBSTRUCTURES,
PURGE   CPGI,KI,MI,KGGI,MGGI,KGGS,MGGS,KGI,MGI/COUPLE
PURGE   K4GGS,K4GGI,K4GI,GIKI,K4II,K4I/COUPLE
PURGE   BI,BGGS,BGGI,BGI,GFAC,KFAC,BFAC/COUPLE
CHKPNT  KGGS,MGGS,K4GGS,BGGS
PARAM   //C,N,NOP/V,N,CHECK=0
```

```
COND     LPC9,COUPLE  $ SKIP,NOT A COUPLING RUN
INPUTT1 /,,,,/C,N,-3/C,N,9/V,Y,TPNAME9 $ LIST TAPE & REWIND
PARAM    //C,N,NOP/V,N,PASS=1  $ INITIAL LOOP PASS PARAMETER
PURGE    K4GGS,K4GGI,K4GT,GIKI,K4II,K4I,GFAC,KFAC/NORK4
PURGE    GIKI,GFAC/SUBGK/K4I,KFAC/SUBK4/BGGS,BGGI,BGT,BFAC/SUBB
CHKPNT   K4GGS,BGGS
JUMP     LOOPC
LABEL    LOOPC   $ TOP OF LOOP
PARAM    //C,N,SUB/V,N,PASS1/V,N,PASS/C,N,2
INPUTT1 /CPGI,KI,MI,,/C,N,0/C,N,9 $
COND    LPC1,PASS1
JUMP     LPC3
LABEL    LPC1
MERGE,   ,,,KI,CPGI,/KGGS/C,N,-1/C,N,2/C,N,6
MERGE,   ,,,MI,CPGI,/MGGS/C,N,-1/C,N,2/C,N,6
COND     LPC2,NORK4
MERGE,   ,,,,CPGI,/K4GGS/C,N,-1/C,N,2/C,N,6
LABEL    LPC2
COND     LPC3,SUBB
MERGE,   ,,,,CPGI,/BGGS /C,N,-1/C,N,2/C,N,6
LABEL    LPC3
COND     LPC4,PASS1
MERGE,   ,,,KI,CPGI,/KGGI/C,N,-1/C,N,2/C,N,6
MERGE,   ,,,MI,CPGI,/MGGI/C,N,-1/C,N,2/C,N,6
ADD      KGGS,KGGI/KGT $
EQUIV    KGT,KGGS/TRUE
ADD      MGGS,MGGI/MGT $
EQUIV    MGT,MGGS/TRUE
COND     LPC4A,CHECK
JUMP     LPC4
LABEL    LPC4A
CHKPNT   KGGS,MGGS
LABEL    LPC4
COND     LPC7,NORK4
COND     LPC5,SUBGK
PARAML       GFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,GIR $
PARAMR   //C,N,EQ/C,N,0,0/C,N,0,0/V,N,GIR/V,N,OUTC/V,N,INC1/V,N,INC2//
         V,N,NOGI $
PURGE    GIKI/NOGI
COND     LPC5,NOGI
PARAMR   //C,N,COMPLEX/C,N,0,0/V,N,GIR/C,N,0,0/V,N,GI $
ADD      KI,/GIKI/V,N,GI $
LABEL    LPC5
COND    LPC6,SUBK4
PARAML       KFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,K4R $
PARAMR   //C,N,EQ/C,N,0,0/C,N,0,0/V,N,K4R/V,N,OUTC/V,N,INC1/V,N,INC2/
         V,N,NOK4I $
PURGE    K4I/NOK4I
COND     LPC6,NOK4I
INPUTT1 /K4I,,,,/C,N,0/C,N,9 $
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
LABEL   LPC6
ADD     GIKI,K4I/K4II
MERGE,  ...,K4II,CPGI,/K4GGI/C,N,-1/C,N,2/C,N,6
ADD     K4GGS,K4GGI/K4GT
EQUIV   K4GT,K4GGS/TRUE
COND    LPC7A,CHECK
JUMP    LPC7
LABEL   LPC7A
CHKPNT  K4GGS
LABEL   LPC7
COND    LPC8,SUBB
PARAML    BFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,HIR $
PARAMR  //C,N,EQ/C,N,0,0/C,N,0,0/V,N,BIR/V,N,OUTC/V,N,INC1/V,N,INC2/
        V,N,NOBI $
COND    LPC8A,NOBI
INPUTT1  /BI,,,,/C,N,0/C,N,5 $
MERGE,  ,,,BI,CPGI,/BGGI/C,N,-1/C,N,2/C,N,6
ADD     BGGS,BGGI/BGT $
EQUIV   BGT,BGGS/TRUE
LABEL   LPC8A
COND    LPC8B,CHECK
JUMP    LPC8
LABEL   LPC8B
CHKPNT  BGGS
LABEL   LPC8
PARAM   //C,N,ADD/V,N,PASS/V,N,PASS/C,N,1
PARAM   //C,N,SUB/V,N,SKIP2/V,Y,NOSUB/V,N,PASS
PARAM   //C,N,SUB/V,N,CHECK/V,N,SKIP2/C,N,1
COND    LPC9,SKIP2
REPT    LOOPC,20
LABEL   LPC9
ADD     KGGX,KGGS/KGGY $
CHKPNT  KGGY
ADD     MGG,MGGS/MGGY $
CHKPNT  MGGY
COND    LPC11,NOK4
ADD     K4GG,K4GGS/K4GGY
CHKPNT  K4GGY
LABEL   LPC11
COND    LPC12,NOBG
ADD     BGG,BGGS/BGGY
CHKPNT  BGGY
LABEL   LPC12
EQUIV   KGGY,KGG/NOGENL $
ALTER 45,45
SMA3    GE1,KGGY/KGG/V,N,LUSET/V,N,NOGENL/V,N,NOSIM#1 $
ALTER 51,53
PURGE   GM/MPCF1/GO/OMIT/KFS/SINGLE
EQUIV   KGG,KNN/MPCF1/MGGY,MNN/MPCF1/BGGY,BNN/MPCF1/K4GGY,K4NN/MPCF1
CHKPNT  GM,RG,GO,KFS,USET,KNN,MNN,BNN,K4NN
```

```
COND      L53A,NOMGG
ADD       MGG,/WGG/C,Y,ALPHA#X386,4,0,0D $
MATGPR    GPL,USET,SIL,WGG//C,N,G
LABEL     L53A
COND      L53B,COUPLE
JUMP      LBL4
LABEL     L53B
ALTER 63,63
MCE2      USET,GM,KGG,MGGY,BGGY,K4GGY/KNN,MNN,BNN,K4NN
ALTER 74,74
COND      L87,OMIT
ALTER 77,77
ALTER 80,81
COND      LBLB,NOBG
ALTER 85,85
COND      L87,NUK4
ALTER 87
LABEL     L87
PURGE     CPARL,CPFOA,CPNSF,CPGMN,EQR,EQL,EQA,EQD,EQF,EQN,EQM,LOG/REACT
PURGE     EX,EXT,EQMT,EQNT,EQGT,EQGTC,MOGG,MOGGY/REACT
PURGE     KLL,KLR,KRR,LLL,ULL,DM,X,EQRT,DMT,GDT,GMT/REACT
COND      LCP5,REACT  $ R-SET MUST BE DEFINED TO GENERATE EQG
RBMG1     USET,KAA,/KLL,KLR,KRR,,, $
RBMG2     KLL/LLL,ULL
RBMG3     LLL,ULL,KLR,KRR/DM
CHKPNT    KLL,KLR,KRR,DM
TRNSP     EQR/EQRT
MATGPR    GPL,USET,SIL,EQRT//C,N,R
MPYAD     KLR,DM,KRR/X/C,N,1 $
MATGPR    GPL,USET,SIL,X//C,N,R
MPYAD     EQR,X,/EX/C,N,0/C,N,1/C,N,0 $
TRNSP     EX/EXT
MATGPR    GPL,USET,SIL,EXT//C,N,R
PURGE     CPFOA/OMIT/CPNSF/SINGLE/CPGMN/MPCF1
PURGE     EQD/OMIT/EQM/MPCF1
PURGE     GDT/OMIT/GMT,EQMT/MPCF1
VEC       USET/CPARL/C,N,A/C,N,R/C,N,L $
TRNSP     DM/DMT
MPYAD     EQR,DMT,/EQL/C,N,0/C,N,1/C,N,0
MERGE     EQR,,EQL,,CPARL,/EQA/C,N,1/C,N,2/C,N,2
EQUIV     EQA,EQF/OMIT
COND      LCP1,OMIT
VEC       USET/CPFOA/C,N,F/C,N,0/C,N,A $
TRNSP     GD/GDT
MPYAD     EQA,GDT,/EQD/C,N,0/C,N,1/C,N,0
MERGE     EQD,,EQA,,CPFOA,/EQF/C,N,1/C,N,2/C,N,2
LABEL     LCP1
EQUIV     EQF,EQN/SINGLE
COND      LCP2,SINGLE
VEC       USET/CPNSF/C,N,N/C,N,S/C,N,F $
```

NASTRAN EXECUTIVE CONTROL DECK ECHO

```
MERGE,  ,,EQF,,CPNSF,/EQN/C,N,1/C,N,2/C,N,2
LABEL   LCP2
TRNSP   EQN/EQNT
MATGPR  GPL,USET,SIL,EQNT//C,N,N
EQUIV   EQN,EQG/MPCF1
COND    LCP3,MPCF1
VEC     USET/CPGMN/C,N,G/C,N,M/C,N,N $
TRNSP   GM/GMT
MPYAD   EQN,GMT,/EQM/C,N,0/C,N,1/C,N,0
MERGE   EQM,,EQN,,CPGMN,/EQG/C,N,1/C,N,2/C,N,2
TRNSP   EQM/EQMT
MATGPR  GPL,USET,SIL,EQMT//C,N,M
LABEL   LCP3
CHKPNT  CPFDA,CPNSE,CPGMN,CPARL
CHKPNT  EQG
TRNSP   EQG/EQGT
ADD     EQGT,/EQGTC/C,Y,ALPHA=(386.4,0.0) $
$  ASSUME CONVERSION OF MASS TO LBS = 386.4
PURGE   MOGG/NOMGG/MOGGY/COUPLE
COND    LCP4,NOMGG
SMPYAD    EQG,MGG,EQGTC,,,/MOGG/C,N,3/C,N,1/C,N,0 $
LABEL   LCP4
COND    LCP5,COUPLE
SMPYAD  EQG,MGGY,EQGTC,,,/MOGGY/C,N,3/C,N,1/C,N,0 $
LABEL   LCP5
MATPRN  MOGG,MOGGY,,,,// $
COND    LCP8,TPCOPY
SEEMAT  KAA,,,,//C,N,PRINT
SEEMAT  MAA,,,,//C,N,PRINT
OUTPUT1 GM,GO,KFS,KAA,//C,N,-1/C,N,0/V,Y,TPNAME
OUTPUT1  MAA,,,,// $
COND    LCP7,NOK4
SEEMAT K4AA,,,,//C,N,PRINT
OUTPUT1 K4AA,,,,// $
LABEL   LCP7
COND    LCP8,NOBG
SEEMAT  BAA,,,,//C,N,PRINT
OUTPUT1  BAA,,,,// $
LABEL   LCP8
ALTER 89,162
ALTER 164,167
ENDALTER
CEND
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

ECHO OF FIRST CARD IN CHECKPOINT DICTIONARY TO BE PUNCHED OUT FOR THIS PROBLEM

RESTART PHASE2 ,SRMR1 , 8/25/73, 13926,

PHASE 2 (PART 1)
SRM COUPLING RUN

CASE CONTROL DECK ECHO

```
CARD
COUNT
  1       TITLE = PHASE 2 (PART 1)
  2       SUBTITLE = SRM COUPLING RUN
  3       MAXLINES # 60000
  4       ECHO     = BOTH
  5       MPC      = 6050
  6       OUTPUT(PLOT)
  7       SET 1  # ALL
  8       PLOTTER CALCOMP 765,105
  9       AXES   = MY,X,Z
 10       VIEW   # 30.0,45.0,0.0
 11       FIND SCALE,ORIGIN 1,SET 1
 12       PLOT
 13       BEGIN BULK
```

PHASE 2 %PART 1a
SRM COUPLING RUN

INPUT BULK DATA DECK ECHO

. 1 ..	2 ..	3 ..	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 .
CORD2R	696	0	-81.5683	0.0	35.5985	-80.2278	0.0	57.5136	&RSTANK
&RSTANK	68.25	0.0	48.432						
CORD2C	100	696	74.738	-30.494	6.138	200.0	-30.494	6.138	&CSSRM
&CSSRM	74.738	0.0	0.0						
CORD2R	101	696	74.738	-30.494	6.138	74.738	-28.5701	15.6963	&RSSRM
&RSSRM	200.	-30.494	6.138						
GRID	6901	100	9.750	180.000	25.242	100	456		
GRID	6904	100	9.750	90.000	25.242	100	456		
GRID	6907	100	9.750	0.000	25.242	100	456		
GRID	6910	100	9.750	-90.000	25.242	100	456		
GRID	7001	100	9.750	180.000	44.500	100	456		
GRID	7004	100	3.180	180.000	44.500	100	456		
GRID	7013	100	9.750	90.000	44.500	100	456		
GRID	7016	100	3.180	90.000	44.500	100	456		
GRID	7025	100	9.750	0.0	44.500	100	456		
GRID	7028	100	3.180	0.0	44.500	100	456		
GRID	7037	100	9.750	-90.000	44.500	100	456		
GRID	7040	100	3.180	-90.000	44.500	100	456		
GRID	7097	100	9.750	180.000	69.053	100	456		
GRID	7100	100	3.180	180.000	69.053	100	456		
GRID	7109	100	9.750	90.000	69.053	100	456		
GRID	7112	100	3.180	90.000	69.053	100	456		
GRID	7121	100	9.750	0.0	69.053	100	456		
GRID	7124	100	3.180	0.0	69.053	100	456		
GRID	7133	100	9.750	-90.000	69.053	100	456		
GRID	7136	100	3.180	-90.000	69.053	100	456		
GRID	7193	100	9.750	180.000	93.607	100	456		
GRID	7196	100	3.180	180.000	93.607	100	456		
GRID	7205	100	9.750	90.000	93.607	100	456		
GRID	7208	100	3.180	90.000	93.607	100	456		
GRID	7217	100	9.750	0.0	93.607	100	456		
GRID	7220	100	3.180	0.0	93.607	100	456		
GRID	7229	100	9.750	-90.000	93.607	100	456		
GRID	7232	100	3.180	-90.000	93.607	100	456		
GRID	7289	100	9.750	180.000	118.160	100	0		
GRID	7290	100	7.560	180.000	118.160	100	456		
GRID	7291	100	5.370	180.000	118.160	100	456		
GRID	7292	100	3.180	180.000	118.160	100	456		
GRID	7293	100	9.750	150.000	118.160	100	0		
GRID	7294	100	7.560	150.000	118.160	100	456		
GRID	7295	100	5.370	150.000	118.160	100	456		
GRID	7296	100	3.180	150.000	118.160	100	456		
GRID	7297	100	9.750	120.000	118.160	100	0		
GRID	7298	100	7.560	120.000	118.160	100	456		
GRID	7299	100	5.370	120.000	118.160	100	456		
GRID	7300	100	3.180	120.000	118.160	100	456		
GRID	7301	100	9.750	90.000	118.160	100	0		
GRID	7302	100	7.560	90.000	118.160	100	456		
GRID	7303	100	5.370	90.000	118.160	100	456		
GRID	7304	100	3.180	90.000	118.160	100	456		

PHASE 2 XPART 1H
SRN COUPLING RUN

INPUT BULK DATA DECK ECHO

1	2	3	4	5	6	7	8	9	10
GRID	7305	100	9.750	60.000	118.160	100	0		
GRID	7306	100	7.560	60.000	118.160	100	456		
GRID	7307	100	5.370	60.000	118.160	100	456		
GRID	7308	100	3.180	60.000	118.160	100	456		
GRID	7309	100	9.750	30.000	118.160	100	0		
GRID	7310	100	7.560	30.000	118.160	100	456		
GRID	7311	100	5.370	30.000	118.160	100	456		
GRID	7312	100	3.180	30.000	118.160	100	456		
GRID	7313	100	9.750	0.0	118.160	100	0		
GRID	7314	100	7.560	0.0	118.160	100	456		
GRID	7315	100	5.370	0.0	118.160	100	456		
GRID	7316	100	3.180	0.0	118.160	100	456		
GRID	7317	100	9.750	-30.000	118.160	100	0		
GRID	7318	100	7.560	-30.000	118.160	100	456		
GRID	7319	100	5.370	-30.000	118.160	100	456		
GRID	7320	100	3.180	-30.000	118.160	100	456		
GRID	7321	100	9.750	-60.000	118.160	100	0		
GRID	7322	100	7.560	-60.000	118.160	100	456		
GRID	7323	100	5.370	-60.000	118.160	100	456		
GRID	7324	100	3.180	-60.000	118.160	100	456		
GRID	7325	100	9.750	-90.000	118.160	100	0		
GRID	7326	100	7.560	-90.000	118.160	100	456		
GRID	7327	100	5.370	-90.000	118.160	100	456		
GRID	7328	100	3.180	-90.000	118.160	100	456		
GRID	7329	100	9.750	-120.000	118.160	100	0		
GRID	7330	100	7.560	-120.000	118.160	100	456		
GRID	7331	100	5.370	-120.000	118.160	100	456		
GRID	7332	100	3.180	-120.000	118.160	100	456		
GRID	7333	100	9.750	-150.000	118.160	100	0		
GRID	7334	100	7.560	-150.000	118.160	100	456		
GRID	7335	100	5.370	-150.000	118.160	100	456		
GRID	7336	100	3.180	-150.000	118.160	100	456		
GRID	7385	100	9.750	180.000	142.713	100	456		
GRID	7388	100	3.180	180.000	142.713	100	456		
GRID	7397	100	9.750	90.000	142.713	100	456		
GRID	7400	100	3.180	90.000	142.713	100	456		
GRID	7409	100	9.750	0.0	142.713	100	456		
GRID	7412	100	3.180	0.0	142.713	100	456		
GRID	7421	100	9.750	-90.000	142.713	100	456		
GRID	7424	100	3.180	-90.000	142.713	100	456		
GRID	7481	100	9.750	180.000	167.267	100	456		
GRID	7484	100	3.180	180.000	167.267	100	456		
GRID	7493	100	9.750	90.000	167.267	100	456		
GRID	7496	100	3.180	90.000	167.267	100	456		
GRID	7505	100	9.750	0.0	167.267	100	456		
GRID	7508	100	3.180	0.0	167.267	100	456		
GRID	7517	100	9.750	-90.000	167.267	100	456		
GRID	7520	100	3.180	-90.000	167.267	100	456		
GRID	7801	100	9.75	180.0	196.25	100	456		
GRID	7803	100	9.43657	131.383	196.25	100	456		

PHASE 2 (PART 1)
SRM COUPLING RUN

INPUT BULK DATA DECK ECHO

. 1 ..	2 ..	3 ..	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10
GRID	7805	100	9.75	90.0	196.25	100	456		
GRID	7806	100	9.43657	71.383	196.25	100	456		
GRID	7809	100	9.75	0.0	196.25	100	456		
GRID	7811	100	9.43657	-48.617	196.25	100	456		
GRID	7813	100	9.75	-90.0	196.25	100	456		
GRID	7814	100	9.43657	-108.617	196.25	100	456		
GRID	7865	100	15.25	180.0	217.94	100	456		
GRID	7867	100	14.75977	131.383	217.94	100	456		
GRID	7869	100	15.25	90.0	217.94	100	456		
GRID	7870	100	14.75977	71.383	217.94	100	456		
GRID	7873	100	15.25	0.0	217.94	100	456		
GRID	7875	100	14.75977	-48.617	217.94	100	456		
GRID	7877	100	15.25	-90.0	217.94	100	456		
GRID	7878	100	14.75977	-108.617	217.94	100	456		
GRID	8134	696	99.98	-19.4107	3.9071	100	456		
GRID	8352	101	196.25	13.87258	9.75	101	456		
GRID	8355	101	196.25	13.87258	-9.75	101	456		
PLOTEL	6001	6901	7001		6011	6904	7013		
PLOTEL	6002	7001	7097		6012	7013	7109		
PLOTEL	6003	7097	7193		6013	7109	7205		
PLOTEL	6004	7193	7289		6014	7205	7301		
PLOTEL	6005	7289	7385		6015	7301	7397		
PLOTEL	6006	7385	7481		6016	7397	7493		
PLOTEL	6007	7481	7801		6017	7493	7805		
PLOTEL	6008	7801	7865		6018	7805	7869		
PLOTEL	6021	6907	7025		6031	6910	7037		
PLOTEL	6022	7025	7121		6032	7037	7133		
PLOTEL	6023	7121	7217		6033	7133	7229		
PLOTEL	6024	7217	7313		6034	7229	7325		
PLOTEL	6025	7313	7409		6035	7325	7421		
PLOTEL	6026	7409	7505		6036	7421	7517		
PLOTEL	6027	7505	7809		6037	7517	7813		
PLOTEL	6028	7809	7873		6038	7813	7877		
PLOTEL	6009	7803	7867		6019	7811	7875		
PLOTEL	6029	7806	7870		6039	7814	7878		
PLOTEL	6041	6901	6904		6051	7097	7109		
PLOTEL	6042	6904	6907		6052	7109	7121		
PLOTEL	6043	6907	6910		6053	7121	7133		
PLOTEL	6044	6910	6901		6054	7133	7097		
PLOTEL	6045	7001	7013		6055	7193	7205		
PLOTEL	6046	7013	7025		6056	7205	7217		
PLOTEL	6047	7025	7037		6057	7217	7229		
PLOTEL	6048	7037	7001		6058	7229	7193		
PLOTEL	6061	7289	7301		6065	7385	7397		
PLOTEL	6062	7301	7313		6066	7397	7409		
PLOTEL	6063	7313	7325		6067	7409	7421		
PLOTEL	6064	7325	7289		6068	7421	7385		
PLOTEL	6071	7481	7493		6081	7801	7803		
PLOTEL	6072	7493	7505		6082	7803	7805		
PLOTEL	6073	7505	7517		6083	7805	7806		

PHASE 2 (PART 1B)
SRM COUPLING RUN

INPUT BULK DATA DECK ECHO

1	2	3	4	5	6	7	8	9	10
PLOTEL	6074	7517	7481		6084	7806	7809		
PLOTEL	6091	7865	7867		6085	7809	7811		
PLOTEL	6092	7867	7869		6086	7811	7813		
PLOTEL	6093	7869	7870		6087	7813	7814		
PLOTEL	6094	7870	7873		6088	7814	7801		
PLOTEL	6095	7873	7875		6075	6907	8134		
PLOTEL	6096	7875	7877		6076	7805	8352		
PLOTEL	6097	7877	7878		6077	7809	8355		
PLOTEL	6098	7878	7865		6078	7813	8355		
PLOTEL	6101	7004	7016		6111	7196	7208		
PLOTEL	6102	7016	7028		6112	7208	7220		
PLOTEL	6103	7028	7040		6113	7220	7232		
PLOTEL	6104	7040	7004		6114	7232	7196		
PLOTEL	6105	7100	7112		6115	7292	7304		
PLOTEL	6106	7112	7124		6116	7304	7316		
PLOTEL	6107	7124	7136		6117	7316	7328		
PLOTEL	6108	7136	7100		6118	7328	7292		
PLOTEL	6121	7388	7400						
PLOTEL	6122	7400	7412						
PLOTEL	6123	7412	7424						
PLOTEL	6124	7424	7388						
PLOTEL	6125	7484	7496						
PLOTEL	6126	7496	7508						
PLOTEL	6127	7508	7520						
PLOTEL	6128	7520	7484						
PLOTEL	6131	7001	7004		6141	7013	7016		
PLOTEL	6132	7097	7100		6142	7109	7112		
PLOTEL	6133	7193	7196		6143	7205	7208		
PLOTEL	6134	7289	7292		6144	7301	7304		
PLOTEL	6135	7385	7388		6145	7397	7400		
PLOTEL	6136	7481	7484		6146	7493	7496		
PLOTEL	6151	7025	7028		6161	7037	7040		
PLOTEL	6152	7121	7124		6162	7133	7136		
PLOTEL	6153	7217	7220		6163	7229	7232		
PLOTEL	6154	7313	7316		6164	7325	7328		
PLOTEL	6155	7409	7412		6165	7421	7424		
PLOTEL	6156	7505	7508		6166	7517	7520		
OMIT1	123	7290	7291	7294	7295	7296	7298	7299	
OMIT1	123	7300	7302	7303	7306	7307	7308	7310	
OMIT1	123	7311	7312	7314	7315	7318	7319	7320	
OMIT1	123	7322	7323	7324	7326	7327	7330	7331	
OMIT1	123	7332	7334	7335	7336				
OMIT1	456	7289	7301	7313	7325				
OMIT1	123456	7293	7297	7305	7309	7317	7321	7329	
OMIT1	123456	7333							
PARAM	TPNAME	SRMP2							
PARAM	TPCOPY	1							
PARAM	NOSUB	2							
PARAM	TPNAME9	SRMP1							
PARAM	SUBK4	1							

PHASE 2 (PART 1)
SRM COUPLING RUN

INPUT BULK DATA DECK ECHO

```
*   1  **   2  **   3  **   4  **   5  **   6  **   7  **   8  **   9  **  10  *
DMI       GFAC       0       2       1       2                   1       1
DMI       GFAC       1       1     1.0
DMI       BFAC       0       2       1       2                   1       1
DMI       BFAC       1       1     1.0
DMI       KFAC       0       2       1       2                   2       1
DMI       KFAC       1       1     1.0     1.0
CONROD      1       7001    7097      1    .0000001
MAT1        1      10.5E6               .3
MPC       6050     6907      1     1.0     8134       1      -1.0
SUPORT    8134      123     8352     123     8355     123
DMI       EQR        0       2       1       2                   6       9
DMI       EQR        1       1  -.012047 .980338-.196959-28.9148 3.234396E 01
&EQ1      17.8664
DMI       EQR        2       1   .05985  .197328 .978504-25.5831-16.0687&E02
&EQ2      4.80504
DMI       EQR        3       1   .99813      3     -.06105  1.18502 34.4593&E 03
&EQ3      19.3744
DMI       EQR        4       1   .99813      3     -.06105  .913934 43.5110&E04
&EQ4      14.9423
DMI       EQR        5       1  -.012047 .980338-.196959-28.4118 36.9790&E05
&EQ5      185.7937
DMI       EQR        6       1   .05985  .197328 .978504-20.9608-183.714&E06
&EQ6      38.3298
DMI       EQR        7       1   .99813      3     -.06105  1.14885 24.3945&E07
&EQ7      18.7829
DMI       EQR        8       1  -.012047 .980338-.196959-8.94825 36.979 &EQ8
&EQ8      184.6032
DMI       EQR        9       1   .05985  .197328 .978504-20.9608-183.714&E09
&EQ9      38.3298
ENDDATA
```

TOTAL COUNT= 230

*** USER INFORMATION MESSAGE 207, BULK DATA NOT SORTED, XSORT WILL RE-ORDER DECK.

PHASE 2 %PART 1)
SRM COUPLING RUN

S O R T E D B U L K D A T A E C H O

CARD COUNT.	1	2	3	4	5	6	7	8	9	10	
1-CONROD	1	7001	7097	1	.0000001						
2-CORD2C	100	696	74.738	-30.494	6.138	200.0	-30.494	6.138			&CSSRM
3-&CSSRM	74.738	0.0	0.0								
4-CORD2R	101	696	74.738	-30.494	6.138	74.738	-28.570115.6963				&RSSRM
5-&RSSRM	200.	-30.494	6.138								
6-CORD2R	696	0	-81.5683.0		35.5985	-80.2278.0		57.5136			&RSTANK
7-&RSTANK	68.25	0.0	48.432								
8-DMI	BFAC	0	2	1	2		1	1			
9-DMI	BFAC	1	1	1.0							
10-DMI	EQR	0	2	1	2		8	9			
11-DMI	EQR	1	1	-.012047.980338		-.196959-28.911483.23439					&E01
12-&E01	17.8664										
13-DMI	EQR	2	1	.05985	.197328	.978504	-25.5831-16.0687				&E02
14-&E02	4.80504										
15-DMI	EQR	3	1	.99813	3	-.06105	1.18502	34.4593			&E03
16-&E03	19.3744										
17-DMI	EQR	4	1	.99813	3	-.06105	.913934	43.5110			&E04
18-&E04	14.9423										
19-DMI	EQR	5	1	-.012047.980338		-.196959-28.411836.9790					&E05
20-&E05	185.7937										
21-DMI	EQR	6	1	.05985	.197328	.978504	-20.9608-183.714				&E06
22-&E06	38.3298										
23-DMI	EQR	7	1	.99813	3	-.06105	1.14885	24.3945			&E07
24-&E07	18.7829										
25-DMI	EQR	8	1	-.012047.980338		-.196959-8.9482536.979					&E08
26-&E08	184.6032										
27-DMI	EQR	9	1	.05985	.197328	.978504	-20.9608-183.714				&E09
28-&E09	38.3298										
29-DMI	GFAC	0	2	1	2		1	1			
30-DMI	GFAC	1	1	1.0							
31-DMI	KFAC	0	2	1	2		2	1			
32-DMI	KFAC	1	1	1.0	1.0						
33-GRID	6901	100	9.750	180.000	25.242	100	456				
34-GRID	6904	100	9.750	90.000	25.242	100	456				
35-GRID	6907	100	9.750	0.000	25.242	100	456				
36-GRID	6910	100	9.750	-90.000	25.242	100	456				
37-GRID	7001	100	9.750	180.000	44.500	100	456				
38-GRID	7004	100	3.180	180.000	44.500	100	456				
39-GRID	7013	100	9.750	90.000	44.500	100	456				
40-GRID	7016	100	3.180	90.000	44.500	100	456				
41-GRID	7025	100	9.750	0.0	44.500	100	456				
42-GRID	7028	100	3.180	0.0	44.500	100	456				
43-GRID	7037	100	9.750	-90.000	44.500	100	456				
44-GRID	7040	100	3.180	-90.000	44.500	100	456				
45-GRID	7097	100	9.750	180.000	69.053	100	456				
46-GRID	7100	100	3.180	180.000	69.053	100	456				
47-GRID	7109	100	9.750	90.000	69.053	100	456				
48-GRID	7112	100	3.180	90.000	69.053	100	456				
49-GRID	7121	100	9.750	0.0	69.053	100	456				
50-GRID	7124	100	3.180	0.0	69.053	100	456				

PHASE 2 (PART 1)
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT.	1	2	3	4	5	6	7	8	9	10
51-GRID	7133	100	9.750	-90.000	69.053	100	456			
52-GRID	7136	100	3.180	-90.000	69.053	100	456			
53-GRID	7193	100	9.750	180.000	93.607	100	456			
54-GRID	7196	100	3.180	180.000	93.607	100	456			
55-GRID	7205	100	9.750	90.000	93.607	100	456			
56-GRID	7208	100	3.180	90.000	93.607	100	456			
57-GRID	7217	100	9.750	0.0	93.607	100	456			
58-GRID	7220	100	3.180	0.0	93.607	100	456			
59-GRID	7229	100	9.750	-90.000	93.607	100	456			
60-GRID	7232	100	3.180	-90.000	93.607	100	456			
61-GRID	7289	100	9.750	180.000	118.160	100	0			
62-GRID	7290	100	7.560	180.000	118.160	100	456			
63-GRID	7291	100	5.370	180.000	118.160	100	456			
64-GRID	7292	100	3.180	180.000	118.160	100	456			
65-GRID	7293	100	9.750	150.000	118.160	100	0			
66-GRID	7294	100	7.560	150.000	118.160	100	456			
67-GRID	7295	100	5.370	150.000	118.160	100	456			
68-GRID	7296	100	3.180	150.000	118.160	100	456			
69-GRID	7297	100	9.750	120.000	118.160	100	0			
70-GRID	7298	100	7.560	120.000	118.160	100	456			
71-GRID	7299	100	5.370	120.000	118.160	100	456			
72-GRID	7300	100	3.180	120.000	118.160	100	456			
73-GRID	7301	100	9.750	90.000	118.160	100	0			
74-GRID	7302	100	7.560	90.000	118.160	100	456			
75-GRID	7303	100	5.370	90.000	118.160	100	456			
76-GRID	7304	100	3.180	90.000	118.160	100	456			
77-GRID	7305	100	9.750	60.000	118.160	100	0			
78-GRID	7306	100	7.560	60.000	118.160	100	456			
79-GRID	7307	100	5.370	60.000	118.160	100	456			
80-GRID	7308	100	3.180	60.000	118.160	100	456			
81-GRID	7309	100	9.750	30.000	118.160	100	0			
82-GRID	7310	100	7.560	30.000	118.160	100	456			
83-GRID	7311	100	5.370	30.000	118.160	100	456			
84-GRID	7312	100	3.180	30.000	118.160	100	456			
85-GRID	7313	100	9.750	0.0	118.160	100	0			
86-GRID	7314	100	7.560	0.0	118.160	100	456			
87-GRID	7315	100	5.370	0.0	118.160	100	456			
88-GRID	7316	100	3.180	0.0	118.160	100	456			
89-GRID	7317	100	9.750	-30.000	118.160	100	0			
90-GRID	7318	100	7.560	-30.000	118.160	100	456			
91-GRID	7319	100	5.370	-30.000	118.160	100	456			
92-GRID	7320	100	3.180	-30.000	118.160	100	456			
93-GRID	7321	100	9.750	-60.000	118.160	100	0			
94-GRID	7322	100	7.560	-60.000	118.160	100	456			
95-GRID	7323	100	5.370	-60.000	118.160	100	456			
96-GRID	7324	100	3.180	-60.000	118.160	100	456			
97-GRID	7325	100	9.750	-90.000	118.160	100	0			
98-GRID	7326	100	7.560	-90.000	118.160	100	456			
99-GRID	7327	100	5.370	-90.000	118.160	100	456			
100-GRID	7328	100	3.180	-90.000	118.160	100	456			

PHASE 2 XPART 1B
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9
101-	GRID	7329	100	9.750	-120.000	118.160	100	0	
102-	GRID	7330	100	7.560	-120.000	118.160	100	456	
103-	GRID	7331	100	5.370	-120.000	118.160	100	456	
104-	GRID	7332	100	3.180	-120.000	118.160	100	456	
105-	GRID	7333	100	9.750	-150.000	118.160	100	0	
106-	GRID	7334	100	7.560	-150.000	118.160	100	456	
107-	GRID	7335	100	5.370	-150.000	118.160	100	456	
108-	GRID	7336	100	3.180	-150.000	118.160	100	456	
109-	GRID	7385	100	9.750	180.000	142.713	100	456	
110-	GRID	7388	100	3.180	180.000	142.713	100	456	
111-	GRID	7397	100	9.750	90.000	142.713	100	456	
112-	GRID	7400	100	3.180	90.000	142.713	100	456	
113-	GRID	7409	100	9.750	0.0	142.713	100	456	
114-	GRID	7412	100	3.180	0.0	142.713	100	456	
115-	GRID	7421	100	9.750	-90.000	142.713	100	456	
116-	GRID	7424	100	3.180	-90.000	142.713	100	456	
117-	GRID	7481	100	9.750	180.000	167.267	100	456	
118-	GRID	7484	100	3.180	180.000	167.267	100	456	
119-	GRID	7493	100	9.750	90.000	167.267	100	456	
120-	GRID	7496	100	3.180	90.000	167.267	100	456	
121-	GRID	7505	100	9.750	0.0	167.267	100	456	
122-	GRID	7508	100	3.180	0.0	167.267	100	456	
123-	GRID	7517	100	9.750	-90.000	167.267	100	456	
124-	GRID	7520	100	3.180	-90.000	167.267	100	456	
125-	GRID	7801	100	9.75	180.0	196.25	100	456	
126-	GRID	7803	100	9.43657	131.383	196.25	100	456	
127-	GRID	7805	100	9.75	90.0	196.25	100	456	
128-	GRID	7806	100	9.43657	71.383	196.25	100	456	
129-	GRID	7809	100	9.75	0.0	196.25	100	456	
130-	GRID	7811	100	9.43657	-48.617	196.25	100	456	
131-	GRID	7813	100	9.75	-90.0	196.25	100	456	
132-	GRID	7814	100	9.43657	-108.617	196.25	100	456	
133-	GRID	7865	100	15.25	180.0	217.94	100	456	
134-	GRID	7867	100	14.7597	771.383	217.94	100	456	
135-	GRID	7869	100	15.25	90.0	217.94	100	456	
136-	GRID	7870	100	14.7597	771.383	217.94	100	456	
137-	GRID	7873	100	15.25	0.0	217.94	100	456	
138-	GRID	7875	100	14.75977	-48.617	217.94	100	456	
139-	GRID	7877	100	15.25	-90.0	217.94	100	456	
140-	GRID	7878	100	14.75977	-108.617	217.94	100	456	
141-	GRID	8134	696	99.98	-19.4107	3.9071	100	456	
142-	GRID	8352	101	196.25	13.87258	89.75	101	456	
143-	GRID	8355	101	196.25	13.87258	-9.75	101	456	
144-	MAT1	1	10.566		.3				
145-	MPC	6050	6907	1	1.0	8134	1	-1.0	
146-	OMIT1	123	7290	7291	7294	7295	7296	7298	7299
147-	OMIT1	123	7300	7302	7303	7306	7307	7308	7310
148-	OMIT1	123	7311	7312	7314	7315	7318	7319	7320
149-	OMIT1	123	7322	7323	7324	7326	7327	7330	7331
150-	OMIT1	123	7332	7334	7335	7336			

PHASE 2 (PART 1)
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT.	1	2	3	4	5	6	7	8	9	10
151-OMIT1	456	7289	7301	7313	7325					
152-OMIT1	123456	7293	7297	7305	7309	7317	7321	7329		
153-OMIT1	123456	7333								
154-PARAM	NOSUB	2								
155-PARAM	SUBK4	1								
156-PARAM	TPCOPY	1								
157-PARAM	TPNAME	SRMP2								
158-PARAM	TPNAME9	SRMP1								
159-PLOTEL	6001	6901	7001		6011	6904	7013			
160-PLOTEL	6002	7001	7097		6012	7013	7109			
161-PLOTEL	6003	7097	7193		6013	7109	7205			
162-PLOTEL	6004	7193	7289		6014	7205	7301			
163-PLOTEL	6005	7289	7385		6015	7301	7397			
164-PLOTEL	6006	7385	7481		6016	7397	7493			
165-PLOTEL	6007	7481	7801		6017	7493	7805			
166-PLOTEL	6008	7801	7865		6018	7805	7869			
167-PLOTEL	6009	7803	7867		6019	7811	7875			
168-PLOTEL	6021	6907	7025		6031	6910	7037			
169-PLOTEL	6022	7025	7121		6032	7037	7133			
170-PLOTEL	6023	7121	7217		6033	7133	7229			
171-PLOTEL	6024	7217	7313		6034	7229	7325			
172-PLOTEL	6025	7313	7409		6035	7325	7421			
173-PLOTEL	6026	7409	7505		6036	7421	7517			
174-PLOTEL	6027	7505	7809		6037	7517	7813			
175-PLOTEL	6028	7809	7873		6038	7813	7877			
176-PLOTEL	6029	7806	7870		6039	7814	7878			
177-PLOTEL	6041	6901	6904		6051	7097	7109			
178-PLOTEL	6042	6904	6907		6052	7109	7121			
179-PLOTEL	6043	6907	6910		6053	7121	7133			
180-PLOTEL	6044	6910	6901		6054	7133	7097			
181-PLOTEL	6045	7001	7013		6055	7193	7205			
182-PLOTEL	6046	7013	7025		6056	7205	7217			
183-PLOTEL	6047	7025	7037		6057	7217	7229			
184-PLOTEL	6048	7037	7001		6058	7229	7193			
185-PLOTEL	6061	7289	7301		6065	7385	7397			
186-PLOTEL	6062	7301	7313		6066	7397	7409			
187-PLOTEL	6063	7313	7325		6067	7409	7421			
188-PLOTEL	6064	7325	7289		6068	7421	7385			
189-PLOTEL	6071	7481	7493		6081	7801	7803			
190-PLOTEL	6072	7493	7505		6062	7803	7805			
191-PLOTEL	6073	7505	7517		6083	7805	7806			
192-PLOTEL	6074	7517	7481		6084	7806	7809			
193-PLOTEL	6091	7865	7867		6085	7809	7811			
194-PLOTEL	6092	7867	7869		6086	7811	7813			
195-PLOTEL	6093	7869	7870		6087	7813	7814			
196-PLOTEL	6094	7870	7873		6088	7814	7801			
197-PLOTEL	6095	7873	7875		6075	6907	8134			
198-PLOTEL	6096	7875	7877		6076	7805	8352			
199-PLOTEL	6097	7877	7878		6077	7809	8355			
200-PLOTEL	6098	7878	7865		6078	7813	8355			

PHASE 2 (PART 1)
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
201-PLOTEL	6101	7004	7016			6111	7196	7208		
202-PLOTEL	6102	7016	7028			6112	7208	7220		
203-PLOTEL	6103	7028	7040			6113	7220	7232		
204-PLOTEL	6104	7040	7004			6114	7232	7196		
205-PLOTEL	6105	7100	7112			6115	7292	7304		
206-PLOTEL	6106	7112	7124			6116	7304	7316		
207-PLOTEL	6107	7124	7136			6117	7316	7328		
208-PLOTEL	6108	7136	7100			6118	7328	7292		
209-PLOTEL	6121	7388	7400							
210-PLOTEL	6122	7400	7412							
211-PLOTEL	6123	7412	7424							
212-PLOTEL	6124	7424	7388							
213-PLOTEL	6125	7484	7496							
214-PLOTEL	6126	7496	7508							
215-PLOTEL	6127	7508	7520							
216-PLOTEL	6128	7520	7484							
217-PLOTEL	6131	7001	7004			6141	7013	7016		
218-PLOTEL	6132	7097	7100			6142	7109	7112		
219-PLOTEL	6133	7193	7196			6143	7205	7208		
220-PLOTEL	6134	7289	7292			6144	7301	7304		
221-PLOTEL	6135	7385	7388			6145	7397	7400		
222-PLOTEL	6136	7481	7484			6146	7493	7496		
223-PLOTEL	6151	7025	7028			6161	7037	7040		
224-PLOTEL	6152	7121	7124			6162	7133	7136		
225-PLOTEL	6153	7217	7220			6163	7229	7232		
226-PLOTEL	6154	7313	7316			6164	7325	7328		
227-PLOTEL	6155	7409	7412			6165	7421	7424		
228-PLOTEL	6156	7505	7508			6166	7517	7520		
229-SUPORT	8134	123	8352	123		8356	123			

ENDDATA

SOLID ROCKET BOOSTER COMBINED MODEL PHASE II PT. 1

116 DEGREES OF FREEDOM Z702239

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
ID  PHASE2 SRMK1
APP     DISP
CHKPNT  YES
TIME    15
SOL     7,0
DIAG    7,8,13,14,19,21,22
ALTER   2,2$ PARAMETER DEFAULTS
PARAM   //C,N,NOP/V,Y,NOSUB=0
PARAM   //C,N,NOP/V,Y,TPCOPY=-1
PARAM   //C,N,NOP/V,Y,SUBGK#-1
PARAM   //C,N,NOP/V,Y,SUBK4=-1
PARAM   //C,N,NOP/V,Y,SUBB=-1
PARAM   //C,N,NOP/V,N,TRUE=-1
ALTER   25,27
CHKPNT  EST,GEI,ECPT,GPCT
PARAM   //C,N,SUB/V,N,COUPLE/V,Y,?OSUB/C,N,1
PARAM   //C,N,NOP/V,N,NUK4GG#-1
PURGE   KGGX,K4GG,GPST,OGPST/NOSIMP
CHKPNT  KGGX,K4GG,GPST,OGPST
COND    L30,NOSIMP
COND    L25A,GENEL
COND    L25B,COUPLE
LABEL   L25A
PURGE   OGPST/TRUE
CHKPNT  OGPST
LABEL   L25B
ALTER   30,31
CHKPNT  KGGX,K4GG,GPST
LABEL   L30
ALTER   34,35
PARAM   //C,N,AND/V,N,NUBG/V,N,NOBGG/V,Y,SUBB
PARAM   //C,N,AND/V,N,NORK4/V,Y,SUBGK/V,Y,SUBK4
PARAM   //C,N,AND/V,N,NUK4/V,N,NORK4/V,N,NOK4GG
COND    L34A,NOMGG
JUMP    L34B
LABEL   L34A
COND    ERROR3,COUPLE
LABEL   L34B
PURGE   BNN,BFF,BAA,BGGY/NOBG
PURGE   K4GGY,K4NN,K4FF,K4AA/NUK4
CHKPNT      BGGY,K4GGY,K4NN,K4FF,K4AA,MGG,BGG,BNN,BFF,BAA
ALTER   37,37
COND    LBL1,NOMGG
ALTER   42,42 $ IF COUPLING RUN,COMBINES SUBSTRUCTURES.
PURGE   CPGI,KI,MI,KGGI,MGGI,KGGS,MGGS,KGT,MGT/COUPLE
PURGE   K4GGS,K4GGI,K4GI,GIKI,K4II,K4I/COUPLE
PURGE   BI,BGGS,BGGI,BGI,GFAC,KFAC,BFAC/COUPLE
CHKPNT  KGGS,MGGS,K4GGS,BGGS
PARAM   //C,N,NOP/V,N,CHECK=0
```

```
COND     LPC9,COUPLE  $ SKIP,NOT A COUPLING RUN
INPUTT1  /*,*,*/C,N,-3/C,N,9/V,Y,TPNAME9 $ LIST TAPE & REWIND
PARAM    //C,N,NOP/V,N,PASS=1  $ INITIAL LOOP PASS PARAMETER
PURGE    K4GGS,K4GG1,K4GT,GIK1,K411,K41,GFAC,KFAC/NORK4
PURGE    GIK1,GFAC/SUBGK/K41,KFAC/SUBK4/BGGS,BGG1,BGT,BFAC/SUBB
CHKPNT   K4GGS,BGGS
JUMP     LOOPC
LABEL    LOOPC   $ TOP OF LOOP
PARAM    //C,N,SUB/V,N,PASS1/V,N,PASS/C,N,2
INPUTT1  /CPGI,KI,MI,,/C,N,0/C,N,9 $
COND     LPC1,PASS1
JUMP     LPC3
LABEL    LPC1
MERGE,   ,,,KI,CPGI,/KGGS/C,N,-1/C,N,2/C,N,6
MERGE,   ,,,MI,CPGI,/MGGS/C,N,-1/C,N,2/C,N,6
COND     LPC2,NORK4
MERGE,   ,,,,CPGI,/K4GGS/C,N,-1/C,N,2/C,N,6
LABEL    LPC2
COND     LPC3,SUBB
MERGE,   ,,,,CPGI,/BGGS /C,N,-1/C,N,2/C,N,6
LABEL    LPC3
COND     LPC4,PASS1
MERGE,   ,,,KI,CPGI,/KGG1/C,N,-1/C,N,2/C,N,6
MERGE,   ,,,MI,CPGI,/MGG1/C,N,-1/C,N,2/C,N,6
ADD      KGGS,KGG1/KGT $
EQUIV    KGT,KGGS/TRUE
ADD      MGGS,MGG1/MGT $
EQUIV    MGT,MGGS/TRUE
COND     LPC4A,CHECK
JUMP     LPC4
LABEL    LPC4A
CHKPNT   KGGS,MGGS
LABEL    LPC4
COND     LPC7,NORK4
COND     LPC5,SUBGK
PARAML       GFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,GIR $
PARAMR   //C,N,EQ/C,N,0,0/C,N,0,0/V,N,GIR/V,N,OUTC/V,N,INC1/V,N,INC2/
         V,N,NUG1 $
PURGE    GIK1/NUG1
COND     LPC5,NUG1
PARAMR   //C,N,COMPLEX/C,N,0,0/V,N,GIR/C,N,0,0/V,N,G1 $
ADD      KI,/GIK1/V,N,G1 $
LABEL    LPC5
COND     LPC6,SUBK4
PARAML       KFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,K4R $
PARAMR   //C,N,EQ/C,N,0,0/C,N,0,0/V,N,K4R/V,N,OUTC/V,N,INC1/V,N,INC2/
         V,N,NUK41 $
PURGE    K41/NUK41
COND     LPC6,NUK41
INPUTT1  /K41,,,,/C,N,0/C,N,9 $
```

```
LABEL   LPC6
ADD     GIKI,K4I/K4II
MERGE,  ,,,K4II,CPGI,/K4GGI/C,N,-1/C,N,2/C,N,6
ADD     K4GGS,K4GGI/K4GT
EQUIV   K4GT,K4GGS/TRUE
COND    LPC7A,CHECK
JUMP    LPC7
LABEL   LPC7A
CHKPNT  K4GGS
LABEL   LPC7
COND    LPC8,SUBB
PARAML      BFAC//C,N,DMI/C,N,1/V,N,PASS/V,N,BIR $
PARAMR  //C,N,EQ/C,N,0,0/C,N,0,0/V,N,BIR/V,N,OUTC/V,N,INC1/V,N,INC2/
        V,N,NOBI $
COND    LPC8A,NOBI
INPUTT1   /BI,,,,/C,N,0/C,N,9 $
MERGE,  ,,,BI,CPGI,/BGGI/C,N,-1/C,N,2/C,N,6
ADD     BGGS,BGGI/BGT $
EQUIV   BGT,BGGS/TRUE
LABEL   LPC8A
COND    LPC8B,CHECK
JUMP    LPC8
LABEL   LPC8B
CHKPNT  BGGS
LABEL   LPC8
PARAM   //C,N,ADD/V,N,PASS/V,N,PASS/C,N,1
PARAM   //C,N,SUB/V,N,SKIP2/V,Y,NOSUB/V,N,PASS
PARAM   //C,N,SUB/V,N,CHECK/V,N,SKIP2/C,N,1
COND    LPC9,SKIP2
REPT    LOOPC,20
LABEL   LPC9
ADD     KGGX,KGGS/KGGY $
CHKPNT  KGGY
ADD     MGG,MGGS/MGGY $
CHKPNT  MGGY
COND    LPC11,NOK4
ADD     K4GG,K4GGS/K4GGY
CHKPNT  K4GGY
LABEL   LPC11
COND    LPC12,NOBG
ADD     BGG,BGGS/BGGY
CHKPNT  BGGY
LABEL   LPC12
EQUIV   KGGY,KGG/NOGENL $
ALTER 45,45
SMA3    GPI,KGGY/KGG/V,N,LUSET/V,N,NOGENL/V,N,NOSIM=1 $
ALTER 51,53
PURGE   GM/MPCF1/GO/UMIT/KFS/SINGLE
EQUIV   KGG,KNN/MPCF1/MGGY,MNN/MPCF1/BGGY,BNN/MPCF1/K4GGY,K4NN/MPCF1
CHKPNT  GM,RG,GO,KFS,USET,KNN,MNN,BNN,K4NN
```

```
COND      L53A,NOMGG
ADD       MGG,/WGG/C,Y,ALPHA=%386.4,0.0D $
MATGPR    GPL,USET,SIL,WGG//C,N,G
LABEL     L53A
COND      L53B,COUPLE
JUMP      LBL4
LABEL     L53B
ALTER  63,63
MCE2      USET,GM,KGG,MGGY,BGGY,K4GGY/KNN,MNN,HNN,K4KN
ALTER  74,74
COND      L87,OMIT
ALTER  77,77
ALTER  80,81
COND      LBLB,NOHG
ALTER  85,85
COND      L87,NOK4
ALTER  87
LABEL     L87
PURGE     CPARL,CPFDA,CPNSF,CPGMN,EQR,EQL,EDA,EDD,EQF,EQN,EQM,EDG/REACT
PURGE     EX,EXT,EQMT,EQNT,EQGT,EQGTC,MDGG,MDGGY/REACT
PURGE     KLL,KLR,KRR,LLL,ULL,DM,X,EQRT,DMT,GDT,GMT/REACT
COND      LCP5,REACT   $ R-SET MUST BE DEFINED TO GENERATE EDG
RBMG1     USET,KAA,/KLL,KLR,KRR,,, $
RBMG2     KLL/LLL,ULL
RBMG3     LLL,ULL,KLR,KRR/DM
CHKPNT    KLL,KLR,KRR,DM
TRNSP     EQR/EQRT
MATGPR    GPL,USET,SIL,EQRT//C,N,R
MPYAD     KLR,DM,KRR/X/C,N,1 $
MATGPR    GPL,USET,SIL,X//C,N,R
MPYAD     EQR,X,/EX/C,N,0/C,N,1/C,N,0 $
TRNSP     EX/EXT
MATGPR    GPL,USET,SIL,EXT//C,N,R
PURGE     CPFDA/OMIT/CPNSF/SINGLE/CPGMN/MPCF1
PURGE     EDD/OMIT/EQM/MPCF1
PURGE     GDT/OMIT/GMT,EQMT/MPCF1
VEC       USET/CPARL/C,N,A/C,N,R/C,N,L $
TRNSP     DM/DMT
MPYAD     EQR,DMT,/EDL/C,N,0/C,N,1/C,N,0
MERGE     EQR,,EDL,,CPARL,/EDA/C,N,1/C,N,2/C,N,2
EQUIV     EDA,EQF/OMIT
COND      LCP1,OMIT
VEC       USET/CPFDA/C,N,F/C,N,0/C,N,A $
TRNSP     GD/GDT
MPYAD     EDA,GDT,/EDD/C,N,0/C,N,1/C,N,0
MERGE     EDD,,EDA,,CPFDA,/EQF/C,N,1/C,N,2/C,N,2
LABEL     LCP1
EQUIV     EQF,EQN/SINGLE
COND      LCP2,SINGLE
VEC       USET/CPNSF/C,N,N/C,N,S/C,N,F $
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
MERGE,   ,,EQF,,CPNSF,/EQN/C,N,1/C,N,2/C,N,2
LABEL    LCP2
TRNSP    EQN/EQNT
MATGPR   GPL,USET,SIL,EQNT//C,N,N
EQUIV    EQN,EQG/MPCF1
COND     LCP3,MPCF1
VEC      USET/CPGMN/C,N,G/C,N,M/C,N,N $
TRNSP    GM/GMT
MPYAD    EQN,GMT,/EQM/C,N,0/C,N,1/C,N,0
MERGE    EQM,,EQN,,CPGMN,/EQG/C,N,1/C,N,2/C,N,2
TRNSP    EQM/EQMT
MATGPR   GPL,USET,SIL,EQMT//C,N,M
LABEL    LCP3
CHKPNT   CPFDA,CPNSF,CPGMN,CPARL
CHKPNT   EQG
TRNSP    EQG/EQGT
ADD      EQGT,/EQGTC/C,Y,ALPHA#(386.4,0.0) $
$  ASSUME CONVERSION OF MASS TO LBS # 386.4
PURGE    MQGG/NOMGG/MQGGY/COUPLE
COND     LCP4,NOMGG
SMPYAD     EQG,MGG,EQGTC,,,/MQGG/C,N,3/C,N,1/C,N,0 $
LABEL    LCP4
COND     LCP5,COUPLE
SMPYAD   EQG,MGGY,EQGTC,,,/MQGGY/C,N,3/C,N,1/C,N,0 $
LABEL    LCP5
MATPRN   MQGG,MQGGY,,,// $
COND     LCP8,TPCOPY
SEEMAT   KAA,,,,//C,N,PRINT
SEEMAT   MAA,,,,//C,N,PRINT
OUTPUT1  GM,GO,KFS,KAA,//C,N,-1/C,N,0/V,Y,TPNAME
OUTPUT1   MAA,,,,// $
COND     LCP7,NOK4
SEEMAT   K4AA,,,,//C,N,PRINT
OUTPUT1  K4AA,,,,// $
LABEL    LCP7
COND     LCP8,NOBG
SEEMAT   BAA,,,,//C,N,PRINT
OUTPUT1   BAA,,,,// $
LABEL    LCP8
ALTER 89,162
ALTER 164,167
ENDALTER
CEND
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

ECHO OF FIRST CARD IN CHECKPOINT DICTIONARY TO BE PUNCHED OUT FOR THIS PROBLEM

RESTART PHASE2 ,SRMR1 , 8/28/73, 17786,

PHASE 2 (PART 1)
SRM COUPLING RUN

C A S E C O N T R O L D E C K E C H O

CARD COUNT	
1	TITLE = PHASE 2 (PART 1)
2	SUBTITLE = SRM COUPLING RUN
3	MAXLINES = 60000
4	ECHO = BOTH
5	MPC = 6050
6	OUTPUT(PLOT)
7	SET 1 = ALL
8	PLOTTER CALCOMP 765,105
9	AXES = MY,X,Z
10	VIEW = 30.0,45.0,0.0
11	FIND SCALE,ORIGIN 1,SET 1
12	PLOT
13	BEGIN BULK

INPUT BULK DATA DECK ECHO

. 1 ..	2 ..	3 ..	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 .
CORD2R	696	0	-81.5683	0.0	35.5985	-80.2278	0.0	57.5136	&RSTANK
&RSTANK	68.25	0.0	48.432						
CORD2C	100	696	74.738	-30.494	6.138	200.0	-30.494	6.138	&CSSRM
&CSSRM	74.738	0.0	0.0						
CORD2R	101	696	74.738	-30.494	6.138	74.738	-28.5701	15.6963	&RSSRM
&RSSRM	200.	-30.494	6.138						
GRID	6901	100	9.750	180.000	25.242	100	456		
GRID	6904	100	9.750	90.000	25.242	100	456		
GRID	6907	100	9.750	0.000	25.242	100	456		
GRID	6910	100	9.750	-90.000	25.242	100	456		
GRID	7001	100	9.750	180.000	44.500	100	456		
GRID	7004	100	3.180	180.000	44.500	100	456		
GRID	7013	100	9.750	90.000	44.500	100	456		
GRID	7016	100	3.180	90.000	44.500	100	456		
GRID	7025	100	9.750	0.0	44.500	100	456		
GRID	7028	100	3.180	0.0	44.500	100	456		
GRID	7037	100	9.750	-90.000	44.500	100	456		
GRID	7040	100	3.180	-90.000	44.500	100	456		
GRID	7097	100	9.750	180.000	69.053	100	456		
GRID	7100	100	3.180	180.000	69.053	100	456		
GRID	7109	100	9.750	90.000	69.053	100	456		
GRID	7112	100	3.180	90.000	69.053	100	456		
GRID	7121	100	9.750	0.0	69.053	100	456		
GRID	7124	100	3.180	0.0	69.053	100	456		
GRID	7133	100	9.750	-90.000	69.053	100	456		
GRID	7136	100	3.180	-90.000	69.053	100	456		
GRID	7193	100	9.750	180.000	93.607	100	456		
GRID	7196	100	3.180	180.000	93.607	100	456		
GRID	7205	100	9.750	90.000	93.607	100	456		
GRID	7208	100	3.180	90.000	93.607	100	456		
GRID	7217	100	9.750	0.0	93.607	100	456		
GRID	7220	100	3.180	0.0	93.607	100	456		
GRID	7229	100	9.750	-90.000	93.607	100	456		
GRID	7232	100	3.180	-90.000	93.607	100	456		
GRID	7289	100	9.750	180.000	118.160	100	0		
GRID	7290	100	7.560	180.000	118.160	100	456		
GRID	7291	100	5.370	180.000	118.160	100	456		
GRID	7292	100	3.180	180.000	118.160	100	456		
GRID	7293	100	9.750	150.000	118.160	100	0		
GRID	7294	100	7.560	150.000	118.160	100	456		
GRID	7295	100	5.370	150.000	118.160	100	456		
GRID	7296	100	3.180	150.000	118.160	100	456		
GRID	7297	100	9.750	120.000	118.160	100	0		
GRID	7298	100	7.560	120.000	118.160	100	456		
GRID	7299	100	5.370	120.000	118.160	100	456		
GRID	7300	100	3.180	120.000	118.160	100	456		
GRID	7301	100	9.750	90.000	118.160	100	0		
GRID	7302	100	7.560	90.000	118.160	100	456		
GRID	7303	100	5.370	90.000	118.160	100	456		
GRID	7304	100	3.180	90.000	118.160	100	456		

PHASE 2 (PART 1)
SRM COUPLING RUN

INPUT BULK DATA DECK ECHO

1	2	3	4	5	6	7	8	9	10
GRID	7305	100	9.750	60.000	118.160	100	0		
GRID	7306	100	7.560	60.000	118.160	100	456		
GRID	7307	100	5.370	60.000	118.160	100	456		
GRID	7308	100	3.180	60.000	118.160	100	456		
GRID	7309	100	9.750	30.000	118.160	100	0		
GRID	7310	100	7.560	30.000	118.160	100	456		
GRID	7311	100	5.370	30.000	118.160	100	456		
GRID	7312	100	3.180	30.000	118.160	100	456		
GRID	7313	100	9.750	0.0	118.160	100	0		
GRID	7314	100	7.560	0.0	118.160	100	456		
GRID	7315	100	5.370	0.0	118.160	100	456		
GRID	7316	100	3.180	0.0	118.160	100	456		
GRID	7317	100	9.750	-30.000	118.160	100	0		
GRID	7318	100	7.560	-30.000	118.160	100	456		
GRID	7319	100	5.370	-30.000	118.160	100	456		
GRID	7320	100	3.180	-30.000	118.160	100	456		
GRID	7321	100	9.750	-60.000	118.160	100	0		
GRID	7322	100	7.560	-60.000	118.160	100	456		
GRID	7323	100	5.370	-60.000	118.160	100	456		
GRID	7324	100	3.180	-60.000	118.160	100	456		
GRID	7325	100	9.750	-90.000	118.160	100	0		
GRID	7326	100	7.560	-90.000	118.160	100	456		
GRID	7327	100	5.370	-90.000	118.160	100	456		
GRID	7328	100	3.180	-90.000	118.160	100	456		
GRID	7329	100	9.750	-120.000	118.160	100	0		
GRID	7330	100	7.560	-120.000	118.160	100	456		
GRID	7331	100	5.370	-120.000	118.160	100	456		
GRID	7332	100	3.180	-120.000	118.160	100	456		
GRID	7333	100	9.750	-150.000	118.160	100	0		
GRID	7334	100	7.560	-150.000	118.160	100	456		
GRID	7335	100	5.370	-150.000	118.160	100	456		
GRID	7336	100	3.180	-150.000	118.160	100	456		
GRID	7385	100	9.750	180.000	142.713	100	456		
GRID	7388	100	3.180	180.000	142.713	100	456		
GRID	7397	100	9.750	90.000	142.713	100	456		
GRID	7400	100	3.180	90.000	142.713	100	456		
GRID	7409	100	9.750	0.0	142.713	100	456		
GRID	7412	100	3.180	0.0	142.713	100	456		
GRID	7421	100	9.750	-90.000	142.713	100	456		
GRID	7424	100	3.180	-90.000	142.713	100	456		
GRID	7481	100	9.750	180.000	167.267	100	456		
GRID	7484	100	3.180	180.000	167.267	100	456		
GRID	7493	100	9.750	90.000	167.267	100	456		
GRID	7496	100	3.180	90.000	167.267	100	456		
GRID	7505	100	9.750	0.0	167.267	100	456		
GRID	7508	100	3.180	0.0	167.267	100	456		
GRID	7517	100	9.750	-90.000	167.267	100	456		
GRID	7520	100	3.180	-90.000	167.267	100	456		
GRID	7801	100	9.75	180.0	196.25	100	456		
GRID	7803	100	9.43657	131.383	196.25	100	456		

INPUT BULK DATA DECK ECHO

1	2	3	4	5	6	7	8	9	10
GRID	7805	100	9.75	90.0	196.25	100	456		
GRID	7806	100	9.43657	71.383	196.25	100	456		
GRID	7809	100	9.75	0.0	196.25	100	456		
GRID	7811	100	9.43657	-48.617	196.25	100	456		
GRID	7813	100	9.75	-90.0	196.25	100	456		
GRID	7814	100	9.43657	-108.617	196.25	100	456		
GRID	7865	100	15.25	180.0	217.94	100	456		
GRID	7867	100	14.75977	131.383	217.94	100	456		
GRID	7869	100	15.25	90.0	217.94	100	456		
GRID	7870	100	14.75977	71.383	217.94	100	456		
GRID	7873	100	15.25	0.0	217.94	100	456		
GRID	7875	100	14.75977	-48.617	217.94	100	456		
GRID	7877	100	15.25	-90.0	217.94	100	456		
GRID	7878	100	14.75977	-108.617	217.94	100	456		
GRID	8134	696	99.98	-19.4107	3.9071	100	456		
GRID	8352	101	196.25	13.87258	9.75	101	456		
GRID	8355	101	196.25	13.87258	-9.75	101	456		
PLOTEL	6001	6901	7001		6011	6904	7013		
PLOTEL	6002	7001	7097		6012	7013	7109		
PLOTEL	6003	7097	7193		6013	7109	7205		
PLOTEL	6004	7193	7289		6014	7205	7301		
PLOTEL	6005	7289	7385		6015	7301	7397		
PLOTEL	6006	7385	7481		6016	7397	7493		
PLOTEL	6007	7481	7801		6017	7493	7805		
PLOTEL	6008	7801	7865		6018	7805	7869		
PLOTEL	6021	6907	7025		6031	6910	7037		
PLOTEL	6022	7025	7121		6032	7037	7133		
PLOTEL	6023	7121	7217		6033	7133	7229		
PLOTEL	6024	7217	7313		6034	7229	7325		
PLOTEL	6025	7313	7409		6035	7325	7421		
PLOTEL	6026	7409	7505		6036	7421	7517		
PLOTEL	6027	7505	7809		6037	7517	7813		
PLOTEL	6028	7809	7873		6038	7813	7877		
PLOTEL	6009	7803	7867		6019	7811	7875		
PLOTEL	6029	7806	7870		6039	7814	7878		
PLOTEL	6041	6901	6904		6051	7097	7109		
PLOTEL	6042	6904	6907		6052	7109	7121		
PLOTEL	6043	6907	6910		6053	7121	7133		
PLOTEL	6044	6910	6901		6054	7133	7097		
PLOTEL	6045	7001	7013		6055	7193	7205		
PLOTEL	6046	7013	7025		6056	7205	7217		
PLOTEL	6047	7025	7037		6057	7217	7229		
PLOTEL	6048	7037	7001		6058	7229	7193		
PLOTEL	6061	7289	7301		6065	7385	7397		
PLOTEL	6062	7301	7313		6066	7397	7409		
PLOTEL	6063	7313	7325		6067	7409	7421		
PLOTEL	6064	7325	7289		6068	7421	7385		
PLOTEL	6071	7481	7493		6081	7801	7803		
PLOTEL	6072	7493	7505		6082	7803	7805		
PLOTEL	6073	7505	7517		6083	7805	7806		

PHASE 2 (PART 1)
SRM COUPLING RUN

INPUT BULK DATA DECK ECHO

1	2	3	4	5	6	7	8	9	10
PLOTEL	6074	7517	7481		6084	7806	7809		
PLOTEL	6091	7865	7867		6085	7809	7811		
PLOTEL	6092	7867	7869		6086	7811	7813		
PLOTEL	6093	7869	7870		6087	7813	7814		
PLOTEL	6094	7870	7873		6088	7814	7801		
PLOTEL	6095	7873	7875		6075	6907	8134		
PLOTEL	6096	7875	7877		6076	7805	8352		
PLOTEL	6097	7877	7878		6077	7809	8355		
PLOTEL	6098	7878	7865		6078	7813	8355		
PLOTEL	6101	7004	7016		6111	7196	7208		
PLOTEL	6102	7016	7028		6112	7208	7220		
PLOTEL	6103	7028	7040		6113	7220	7232		
PLOTEL	6104	7040	7004		6114	7232	7196		
PLOTEL	6105	7100	7112		6115	7292	7304		
PLOTEL	6106	7112	7124		6116	7304	7316		
PLOTEL	6107	7124	7136		6117	7316	7328		
PLOTEL	6108	7136	7100		6118	7328	7292		
PLOTEL	6121	7388	7400						
PLOTEL	6122	7400	7412						
PLOTEL	6123	7412	7424						
PLOTEL	6124	7424	7388						
PLOTEL	6125	7484	7496						
PLOTEL	6126	7496	7508						
PLOTEL	6127	7508	7520						
PLOTEL	6129	7520	7484						
PLOTEL	6131	7001	7004		6141	7013	7016		
PLOTEL	6132	7097	7100		6142	7109	7112		
PLOTEL	6133	7193	7196		6143	7205	7208		
PLOTEL	6134	7289	7292		6144	7301	7304		
PLOTEL	6135	7385	7388		6145	7397	7400		
PLOTEL	6136	7481	7484		6146	7493	7496		
PLOTEL	6151	7025	7028		6161	7037	7040		
PLOTEL	6152	7121	7124		6162	7133	7136		
PLOTEL	6153	7217	7220		6163	7229	7232		
PLOTEL	6154	7313	7316		6164	7325	7328		
PLOTEL	6155	7409	7412		6165	7421	7424		
PLOTEL	6156	7505	7508		6166	7517	7520		
OMIT1	123	7290	7291	7294	7295	7296	7298	7299	
OMIT1	123	7300	7302	7303	7306	7307	7308	7310	
OMIT1	123	7311	7312	7314	7315	7318	7319	7320	
OMIT1	123	7322	7323	7324	7326	7327	7330	7331	
OMIT1	123	7332	7334	7335	7336				
OMIT1	456	7289	7301	7313	7325				
OMIT1	123456	7293	7297	7305	7309	7317	7321	7329	
OMIT1	123456	7333							
PARAM	TPNAME	SRMP2							
PARAM	TPCOPY	1							
PARAM	NOSUB	2							
PARAM	TPNAME9	SRMP1							
PARAM	SUBK4	1							

PHASE 2 XPART 1B
SRM COUPLING RUN

INPUT BULK DATA DECK ECHO

```
*   1   **   2   **   3   **   4   **   5   **   6   **   7   **   8   **   9   **  10   *
DMI        GFAC        0           2           1           2                   1           1
DMI        GFAC        1           1         1.0
DMI        BFAC        0           2           1           2                   1           1
DMI        BFAC        1           1         1.0
DMI        KFAC        0           2           1           2                   2           1
DMI        KFAC        1           1         1.0         1.0
CONROD       1        7001        7097          1        .0000001
MAT1         1       10.5E6                   .3
MPC         6050       6907          1         1.0        8134          1        -1.0
SUPORT      8134        123          8352        123        8355         123
DMI        EQR         0           2           1           2                   6           9
DMI        EQR         1           1        -.012047    .980338-.196959-28.9148 3.23439EE01
EE01      17.8664
DMI        EQR         2           1         .05985     .197328    .978504-25.5831-16.0687EE02
EE02      4.80504
DMI        EQR         3           1         .99813        3       -.06105   1.18502 34.4593EE03
EE03      19.3744
DMI        EQR         4           1         .99813        3       -.06105   .913934 43.5110EE04
EE04      14.9423
DMI        EQR         5           1        -.012047    .980338-.196959-28.4118 36.9790EE05
EE05      185.7937
DMI        EQR         6           1         .05985     .197328    .978504-20.9608-183.714EE06
EE06      38.3298
DMI        EQR         7           1         .99813        3       -.06105   1.14885 24.3945EE07
EE07      18.7829
DMI        EQR         8           1        -.012047    .980338-.196959-8.94825 36.979 EE08
EE08      184.6032
DMI        EQR         9           1         .05985     .197328    .978504-20.9608-183.714EE09
EE09      38.3298
OMIT1        1        7004        7016        7028        7040
OMIT1       23        7097        7109        7121        7133
OMIT1      123        7100        7112        7124        7136
OMIT1       23        7193        7205        7217        7229
OMIT1      123        7196        7208        7220        7232
OMIT1        1        7292        7304        7316        7328
OMIT1       23        7385        7397        7409        7421
OMIT1      123        7388        7400        7412        7424
OMIT1        1        7484        7496        7508        7520
OMIT1      123        7803        7806        7811        7814
OMIT1      123        7867        7870        7875        7878
ENDDATA
```

TOTAL COUNT= 241

*** USER INFORMATION MESSAGE 207, BULK DATA NOT SORTED, XSORT WILL BE ORDER DECK.

PHASE 2 (PART 1)
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1-CONROD	1	7001	7097	1	.0000001					
2-CORD2C	100	696	74.738	-30.494	6.138	200.0	-30.494	6.138	&CSSRM	
3-&CSSRM	74.738	0.0	0.0							
4-CORD2R	101	696	74.738	-30.494	6.138	74.738	-28.5701	15.6963	&RSSRM	
5-&RSSRM	200.	-30.494	6.138							
6-CORD2R	696	0	-81.5683	0.0	35.5985	-80.2278	0.0	57.5136	&RSTANK	
7-&RSTANK	68.25	0.0	48.432							
8-DMI	BFAC	0	2	1	2		1	1		
9-DMI	BFAC	1	1	1.0						
10-DMI	EQR	0	2	1	2		6	9		
11-DMI	EQR	1	1	-.012047	.980338	-.196959	-28.9148	3.23439	&EQ1	
12-&EQ1	17.8664									
13-DMI	EQR	2	1	.05985	.197328	.978504	-25.5831	-16.0687	&EQ2	
14-&EQ2	4.80504									
15-DMI	EQR	3	1	.99813	3	-.06105	1.18502	34.4593	&EQ3	
16-&EQ3	19.3744									
17-DMI	EQR	4	1	.99813	3	-.06105	.913934	43.5110	&EQ4	
18-&EQ4	14.9423									
19-DMI	EQR	5	1	-.012047	.980338	-.196959	-28.4118	36.9790	&EQ5	
20-&EQ5	185.7937									
21-DMI	EQR	6	1	.05985	.197328	.978504	-20.9608	-183.714	&EQ6	
22-&EQ6	38.3298									
23-DMI	EQR	7	1	.99813	3	-.06105	1.14885	24.3945	&EQ7	
24-&EQ7	18.7829									
25-DMI	EQR	8	1	-.012047	.980338	-.196959	-8.94825	36.979	&EQ8	
26-&EQ8	184.6032									
27-DMI	EQR	9	1	.05985	.197328	.978504	-20.9608	-183.714	&EQ9	
28-&EQ9	38.3298									
29-DMI	GFAC	0	2	1	2		1	1		
30-DMI	GFAC	1	1	1.0						
31-DMI	KFAC	0	2	1	2		2	1		
32-DMI	KFAC	1	1	1.0	1.0					
33-GRID	6901	100	9.750	180.000	25.242	100	456			
34-GRID	6904	100	9.750	90.000	25.242	100	456			
35-GRID	6907	100	9.750	0.000	25.242	100	456			
36-GRID	6910	100	9.750	-90.000	25.242	100	456			
37-GRID	7001	100	9.750	180.000	44.500	100	456			
38-GRID	7004	100	3.180	180.000	44.500	100	456			
39-GRID	7013	100	9.750	90.000	44.500	100	456			
40-GRID	7016	100	3.180	90.000	44.500	100	456			
41-GRID	7025	100	9.750	0.0	44.500	100	456			
42-GRID	7028	100	3.180	0.0	44.500	100	456			
43-GRID	7037	100	9.750	-90.000	44.500	100	456			
44-GRID	7040	100	3.180	-90.000	44.500	100	456			
45-GRID	7097	100	9.750	180.000	69.053	100	456			
46-GRID	7100	100	3.180	180.000	69.053	100	456			
47-GRID	7109	100	9.750	90.000	69.053	100	456			
48-GRID	7112	100	3.180	90.000	69.053	100	456			
49-GRID	7121	100	9.750	0.0	69.053	100	456			
50-GRID	7124	100	3.180	0.0	69.053	100	456			

PHASE 2 %PART 1B
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
51-GRID	7133	100	9.750	-90.000	69.053	100	456			
52-GRID	7136	100	3.180	-90.000	69.053	100	456			
53-GRID	7193	100	9.750	180.000	93.607	100	456			
54-GRID	7196	100	3.180	180.000	93.607	100	456			
55-GRID	7205	100	9.750	90.000	93.607	100	456			
56-GRID	7208	100	3.180	90.000	93.607	100	456			
57-GRID	7217	100	9.750	0.0	93.607	100	456			
58-GRID	7220	100	3.180	0.0	93.607	100	456			
59-GRID	7229	100	9.750	-90.000	93.607	100	456			
60-GRID	7232	100	3.180	-90.000	93.607	100	456			
61-GRID	7289	100	9.750	180.000	118.160	100	0			
62-GRID	7290	100	7.560	180.000	118.160	100	456			
63-GRID	7291	100	5.370	180.000	118.160	100	456			
64-GRID	7292	100	3.180	180.000	118.160	100	456			
65-GRID	7293	100	9.750	150.000	118.160	100	0			
66-GRID	7294	100	7.560	150.000	118.160	100	456			
67-GRID	7295	100	5.370	150.000	118.160	100	456			
68-GRID	7296	100	3.180	150.000	118.160	100	456			
69-GRID	7297	100	9.750	120.000	118.160	100	0			
70-GRID	7298	100	7.560	120.000	118.160	100	456			
71-GRID	7299	100	5.370	120.000	118.160	100	456			
72-GRID	7300	100	3.180	120.000	118.160	100	456			
73-GRID	7301	100	9.750	90.000	118.160	100	0			
74-GRID	7302	100	7.560	90.000	118.160	100	456			
75-GRID	7303	100	5.370	90.000	118.160	100	456			
76-GRID	7304	100	3.180	90.000	118.160	100	456			
77-GRID	7305	100	9.750	60.000	118.160	100	0			
78-GRID	7306	100	7.560	60.000	118.160	100	456			
79-GRID	7307	100	5.370	60.000	118.160	100	456			
80-GRID	7308	100	3.180	60.000	118.160	100	456			
81-GRID	7309	100	9.750	30.000	118.160	100	0			
82-GRID	7310	100	7.560	30.000	118.160	100	456			
83-GRID	7311	100	5.370	30.000	118.160	100	456			
84-GRID	7312	100	3.180	30.000	118.160	100	456			
85-GRID	7313	100	9.750	0.0	118.160	100	0			
86-GRID	7314	100	7.560	0.0	118.160	100	456			
87-GRID	7315	100	5.370	0.0	118.160	100	456			
88-GRID	7316	100	3.180	0.0	118.160	100	456			
89-GRID	7317	100	9.750	-30.000	118.160	100	0			
90-GRID	7318	100	7.560	-30.000	118.160	100	456			
91-GRID	7319	100	5.370	-30.000	118.160	100	456			
92-GRID	7320	100	3.180	-30.000	118.160	100	456			
93-GRID	7321	100	9.750	-60.000	118.160	100	0			
94-GRID	7322	100	7.560	-60.000	118.160	100	456			
95-GRID	7323	100	5.370	-60.000	118.160	100	456			
96-GRID	7324	100	3.180	-60.000	118.160	100	456			
97-GRID	7325	100	9.750	-90.000	118.160	100	0			
98-GRID	7326	100	7.560	-90.000	118.160	100	456			
99-GRID	7327	100	5.370	-90.000	118.160	100	456			
100-GRID	7328	100	3.180	-90.000	118.160	100	456			

PHASE 2 (PART 1)
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT.	1	2	3	4	5	6	7	8	9	10
101-GRID	7329	100	9.750	-120.000	118.160	100	0			
102-GRID	7330	100	7.560	-120.000	118.160	100	456			
103-GRID	7331	100	5.370	-120.000	118.160	100	456			
104-GRID	7332	100	3.180	-120.000	118.160	100	456			
105-GRID	7333	100	9.750	-150.000	118.160	100	0			
106-GRID	7334	100	7.560	-150.000	118.160	100	456			
107-GRID	7335	100	5.370	-150.000	118.160	100	456			
108-GRID	7336	100	3.180	-150.000	118.160	100	456			
109-GRID	7385	100	9.750	180.000	142.713	100	456			
110-GRID	7388	100	3.180	180.000	142.713	100	456			
111-GRID	7397	100	9.750	90.000	142.713	100	456			
112-GRID	7400	100	3.180	90.000	142.713	100	456			
113-GRID	7409	100	9.750	0.0	142.713	100	456			
114-GRID	7412	100	3.180	0.0	142.713	100	456			
115-GRID	7421	100	9.750	-90.000	142.713	100	456			
116-GRID	7424	100	3.180	-90.000	142.713	100	456			
117-GRID	7481	100	9.750	180.000	167.267	100	456			
118-GRID	7484	100	3.180	180.000	167.267	100	456			
119-GRID	7493	100	9.750	90.000	167.267	100	456			
120-GRID	7496	100	3.180	90.000	167.267	100	456			
121-GRID	7505	100	9.750	0.0	167.267	100	456			
122-GRID	7508	100	3.180	0.0	167.267	100	456			
123-GRID	7517	100	9.750	-90.000	167.267	100	456			
124-GRID	7520	100	3.180	-90.000	167.267	100	456			
125-GRID	7801	100	9.75	180.0	196.25	100	456			
126-GRID	7803	100	9.43657	131.383	196.25	100	456			
127-GRID	7805	100	9.75	90.0	196.25	100	456			
128-GRID	7806	100	9.43657	71.383	196.25	100	456			
129-GRID	7809	100	9.75	0.0	196.25	100	456			
130-GRID	7811	100	9.43657	-48.617	196.25	100	456			
131-GRID	7813	100	9.75	-90.0	196.25	100	456			
132-GRID	7814	100	9.43657	-108.617	196.25	100	456			
133-GRID	7865	100	15.25	180.0	217.94	100	456			
134-GRID	7867	100	14.75977	131.383	217.94	100	456			
135-GRID	7869	100	15.25	90.0	217.94	100	456			
136-GRID	7870	100	14.75977	71.383	217.94	100	456			
137-GRID	7873	100	15.25	0.0	217.94	100	456			
138-GRID	7875	100	14.75977	-48.617	217.94	100	456			
139-GRID	7877	100	15.25	-90.0	217.94	100	456			
140-GRID	7878	100	14.75977	-108.617	217.94	100	456			
141-GRID	8134	696	99.98	-19.4107	3.9071	100	456			
142-GRID	8352	101	196.25	13.87258	9.75	101	456			
143-GRID	8355	101	196.25	13.87258	-9.75	101	456			
144-MAT1	1	10.566		.3						
145-MPC	6050	6907	1	1.0	8134	1	-1.0			
146-OMIT1	1	7004	7016	7028	7040					
147-OMIT1	1	7292	7304	7316	7328					
148-OMIT1	1	7484	7496	7508	7520					
149-OMIT1	23	7097	7109	7121	7133					
150-OMIT1	23	7193	7205	7217	7229					

PHASE 2 XPART 1B
SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT.	1	.. 2	.. 3	.. 4	.. 5	.. 6	.. 7	.. 8	.. 9	.. 10 .
151-OMIT1	23	7385	7397	7409	7421					
152-OMIT1	123	7100	7112	7124	7136					
153-OMIT1	123	7196	7208	7220	7232					
154-OMIT1	123	7290	7291	7294	7295	7296	7298	7299		
155-OMIT1	123	7300	7302	7303	7306	7307	7308	7310		
156-OMIT1	123	7311	7312	7314	7315	7318	7319	7320		
157-OMIT1	123	7322	7323	7324	7326	7327	7330	7331		
158-OMIT1	123	7332	7334	7335	7336					
159-OMIT1	123	7388	7400	7412	7424					
160-OMIT1	123	7803	7806	7811	7814					
161-OMIT1	123	7867	7870	7875	7878					
162-OMIT1	456	7289	7301	7313	7325					
163-OMIT1	123456	7293	7297	7305	7309	7317	7321	7329		
164-OMIT1	123456	7333								
165-PARAM	NOSUB	2								
166-PARAM	SUBKA	1								
167-PARAM	TPCOPY	1								
168-PARAM	TPNAME	SRMP2								
169-PARAM	TPNAME9	SRMP1								
170-PLOTEL	6001	6901	7001		6011	6904	7013			
171-PLOTEL	6002	7001	7097		6012	7013	7109			
172-PLOTEL	6003	7097	7193		6013	7109	7205			
173-PLOTEL	6004	7193	7289		6014	7205	7301			
174-PLOTEL	6005	7289	7385		6015	7301	7397			
175-PLOTEL	6006	7385	7481		6016	7397	7493			
176-PLOTEL	6007	7481	7801		6017	7493	7805			
177-PLOTEL	6008	7801	7865		6018	7805	7869			
178-PLOTEL	6009	7803	7867		6019	7811	7875			
179-PLOTEL	6021	6907	7025		6031	6910	7037			
180-PLOTEL	6022	7025	7121		6032	7037	7133			
181-PLOTEL	6023	7121	7217		6033	7133	7229			
182-PLOTEL	6024	7217	7313		6034	7229	7325			
183-PLOTEL	6025	7313	7409		6035	7325	7421			
184-PLOTEL	6026	7409	7505		6036	7421	7517			
185-PLOTEL	6027	7505	7809		6037	7517	7813			
186-PLOTEL	6028	7809	7873		6038	7813	7877			
187-PLOTEL	6029	7806	7870		6039	7814	7878			
188-PLOTEL	6041	6901	6904		6051	7097	7109			
189-PLOTEL	6042	6904	6907		6052	7109	7121			
190-PLOTEL	6043	6907	6910		6053	7121	7133			
191-PLOTEL	6044	6910	6901		6054	7133	7097			
192-PLOTEL	6045	7001	7013		6055	7193	7205			
193-PLOTEL	6046	7013	7025		6056	7205	7217			
194-PLOTEL	6047	7025	7037		6057	7217	7229			
195-PLOTEL	6048	7037	7001		6058	7229	7193			
196-PLOTEL	6061	7289	7301		6065	7385	7397			
197-PLOTEL	6062	7301	7313		6066	7397	7409			
198-PLOTEL	6063	7313	7325		6067	7409	7421			
199-PLOTEL	6064	7325	7289		6068	7421	7385			
200-PLOTEL	6071	7481	7493		6081	7801	7803			

PHASE 2 (PART 1)

SRM COUPLING RUN

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
201-	PLOTEL	6072	7493	7505		6082	7803	7805		
202-	PLOTEL	6073	7505	7517		6083	7805	7806		
203-	PLOTEL	6074	7517	7481		6084	7806	7809		
204-	PLOTEL	6091	7865	7867		6085	7809	7811		
205-	PLOTEL	6092	7867	7869		6086	7811	7813		
206-	PLOTEL	6093	7869	7870		6087	7813	7814		
207-	PLOTEL	6094	7870	7873		6088	7814	7801		
208-	PLOTEL	6095	7873	7875		6075	6907	8134		
209-	PLOTEL	6096	7875	7877		6076	7805	8352		
210-	PLOTEL	6097	7877	7878		6077	7809	8355		
211-	PLOTEL	6098	7878	7865		6078	7813	8355		
212-	PLOTEL	6101	7004	7016		6111	7196	7208		
213-	PLOTEL	6102	7016	7028		6112	7208	7220		
214-	PLOTEL	6103	7028	7040		6113	7220	7232		
215-	PLOTEL	6104	7040	7004		6114	7232	7196		
216-	PLOTEL	6105	7100	7112		6115	7292	7304		
217-	PLOTEL	6106	7112	7124		6116	7304	7316		
218-	PLOTEL	6107	7124	7136		6117	7316	7328		
219-	PLOTEL	6108	7136	7100		6118	7328	7292		
220-	PLOTEL	6121	7388	7400						
221-	PLOTEL	6122	7400	7412						
222-	PLOTEL	6123	7412	7424						
223-	PLOTEL	6124	7424	7388						
224-	PLOTEL	6125	7484	7496						
225-	PLOTEL	6126	7496	7508						
226-	PLOTEL	6127	7508	7520						
227-	PLOTEL	6128	7520	7484						
228-	PLOTEL	6131	7001	7004		6141	7013	7016		
229-	PLOTEL	6132	7097	7100		6142	7109	7112		
230-	PLOTEL	6133	7193	7196		6143	7205	7208		
231-	PLOTEL	6134	7289	7292		6144	7301	7304		
232-	PLOTEL	6135	7385	7388		6145	7397	7400		
233-	PLOTEL	6136	7481	7484		6146	7493	7496		
234-	PLOTEL	6151	7025	7028		6161	7037	7040		
235-	PLOTEL	6152	7121	7124		6162	7133	7136		
236-	PLOTEL	6153	7217	7220		6163	7229	7232		
237-	PLOTEL	6154	7313	7316		6164	7325	7328		
238-	PLOTEL	6155	7409	7412		6165	7421	7424		
239-	PLOTEL	6156	7505	7508		6166	7517	7520		
240-	SUPORT	6134	123	8352	123	8355	123			
	ENDDATA									

SOLID ROCKET BOOSTER COMBINED MODEL PHASE II PT. 2
116 DEGREES OF FREEDOM Z704247

NASTRAN EXECUTIVE CONTROL DECK ECHO

```
ID PHASE2 SRMP2
TIME          60
APP         DISP
SOL         7,0
DIAG  2,7,8,13,14,19,21,22
ALTER 2,2
FILE     GCO=SAVE/CMC=SAVE
PARAM    //C,N,NOP/V,N,TRUE=-1
PARAM    //C,N,NOP/V,Y,NOK4=-1
PARAM    //C,N,NOP/V,Y,NOBG=-1
PARAM    //C,N,NOP/V,Y,TPCOPY=-1
ALTER 17,17
SAVE     JUMPELCT,PLTFLG,PFILE
ALTER 25,47
CHKPNT   EST,ECPT,GPCT,CEI
ALTER 52,87
INPUTT1 /,,,,/C,N,-3/C,N,9/V,Y,TPNAMES
PURGE    K4AA/NOK4/EAA/NOBG
COND     LTI1,MPCF1
INPUTT1    /GM,,,,/C,N,0/C,N,9 $
LABEL    LTI1
COND     LTI2,CMIT
INPUTT1    /GO,,,,/C,N,0/C,N,9 $
LABEL    LTI2
COND     LTI3,SINGLE
INPUTT1   /KFS,,,,/C,N,0/C,N,9 $
LABEL    LTI3
INPUTT1 /KAA,MAA,,,/C,N,0/C,N,9 $
COND     LTI4,NOK4
INPUTT1 /K4AA,,,,/C,N,0/C,N,9 $
LABEL    LTI4
COND     LTI5,NOBG
INPUTT1   /EAA,,,,/C,N,0/C,N,9 $
LABEL    LTI5
CHKPNT   GM,GMC,RG,GO,GOO,KFS,OPC,USET,KAA,MAA,K4AA,BAA
ALTER 103
COND     L103,TPCOPY
OUTPUT1  ,,,,//C,N,-1/C,N,0/V,Y,TPNAME
LABEL    L103
ALTER 128,128
COND     L128A,NOPCF1
PARAM    //C,N,NOP/V,N,PFILE,-1
JUMP     L128E
LABEL    L128A
PARAM    //C,N,NOP/V,N,KDEK2=-1
LABEL    L128E
ALTER 133,133
GKAD     USETD,GM,GO,KAA,BAA,MAA,K4AA,K2PP,M2PP,B2PP/KDD,BDD,MDD,GMD,
         GOO,K2DD,M2DD,B2DD/C,N,CMPLEV/C,N,DISP/C,N,DIRECT/C,Y,G=0.0/
```

```
        C,N,0.0/C,N,C.0/V,N,NCK2PP/V,N,NOM2PP/V,N,NCB2PP/V,N,MPCF1/
        V,N,SINGLE/V,N,OMIT/V,N,NOUE/V,Y,NOK4/V,Y,NCBG/V,N,KDEK2/C,N,-1$
ALTER 135,135
EQUIV   E2DD,ECD/NCEG/M2DD,MDD/NOGPDT/K2DD,KDD/KDEK2
ALTER 155
PURGE   CPHIG,CPGE,RPHIG,CPHIN,CGMN,CPHIM,PHIG,CNSF,CPHIS,CPHIF/JUMPPLOT
PURGE   CFOA,CPHIO,CPHIA,PHIN/JUMPPLOT
COND    L155,JUMPPLOT
PURGE   CPGE/NOUE
EQUIV   CPHIF,CPHIG/NOUE
COND    L155A,NOUE
VEC     USETD/CPGE/C,N,P/C,N,G/C,N,E
PARTN   CPHIF,,CPGE/CPHIG,,,/C,N,1/C,N,2/C,N,2 $
EQUIV   CPHIG,RPHIG/TRUE
PURGE   CPHIN,CGMN,CPHIM,PHIG,CNSF,CPHIS,CPHIF/TRLE
PURGE   CFOA,CPHIO,CPHIA,PHIN/TRUE
JUMP    L155D
LABEL   L155A
PURGE   CGMN,CPHIN,PHIG/MPCF1
EQUIV   CPHIG,CPHIN/MPCF1
COND    L155E,MPCF1
VEC     USET/CGMN/C,N,G/C,N,M/C,N,N
PARTN   CPHIG,,CGMN/CPHIM,CPHIN,,,/C,N,1/C,N,2/C,N,2/C,N,2 $
MERGE   CPHIN,CPHIN,,,,,CGMN/PHIG/C,N,1/C,N,2/C,N,2 $
EQUIV   PHIG,RPHIG/TRUE
PURGE   CNSF,CPHIS,CPHIF/TRUE
PURGE   CFOA,CPHIO,CPHIA,PHIN/TRUE
JUMP    L155D
LABEL   L155E
PURGE   CNSF,CPHIS,PHIN/SINGLE
EQUIV   CPHIN,CPHIF/SINGLE
COND    L155C,SINGLE
VEC     USET/CNSF/C,N,N/C,N,S/C,N,F
PARTN   CPHIN,,CNSF/CPHIS,CPHIF,,,/C,N,1/C,N,2/C,N,2/C,N,2 $
MERGE   CPHIS,CPHIF,,,,,CNSF/PHIN/C,N,1/C,N,2/C,N,2 $
EQUIV   PHIN,RPHIG/TRUE
PURGE   CFOA,CPHIO,CPHIA/TRUE
JUMP    L155D
LABEL   L155C
PURGE   CFOA,CPHIO,CPHIA,RPHIG/OMIT
COND    L155,OMIT
VEC     USET/CFOA/C,N,F/C,N,O/C,N,A
PARTN   CPHIF,,CFOA/CPHIO,CPHIA,,,/C,N,1/C,N,2/C,N,2/C,N,2 $
MERGE   CPHIO,CPHIA,,,,,CFOA/RPHIG/C,N,1/C,N,2/C,N,2 $
LABEL   L155D
CHKPNT  RPHIG
PARAM   //C,N,SUB/V,N,SCALAR/V,N,NSIL/V,N,LLSET
EQUIV   SIL,SIP/SCALAR/EGPDT,EGPDP/SCALAR
COND    L155E,SCALAR
PLTTRAN EGPDT,SIL/BGPDP,SIP/V,N,LUSET/V,N,LLSEP $
```

N A S T R A N E X E C U T I V E C O N T R O L D E C K E C H O

```
SAVE     LUSEF
LABEL    L155E
CHKPNT   EQPDF,SIP
SCR2     CASEXX,CSTM,,,EQEXIN,SIL,,,BGPDP,,,RPHIG,,/,,CPHIG,,,PPHIG/
         C,N,STATICS $
CFP      CFPIC,,,,,//V,N,CARDNC
SAVE     CARDNC $
PLOT     PLTPAR,GPSETS,ELSETS,CASEXX,BGPDT,EQEXIN,SIL,PPHIG,/PLOTX2/V,N,
         NSIL/V,N,LUSET/V,N,JUMPPLOT/V,N,PLTFLG/V,N,PFILE $
SAVE     PFILE
PFTMSG   PLOTX2// $
LABEL    L155
COND     L155F,TPCOPY
OUTPUT1  CPHIP,RPHIG,,,// $
LABEL    L155F
ALTER 168,169
ENDALTER
CEND
```

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

C A S E C O N T R O L D E C K E C H O

```
CARD
COUNT
 1       TITLE = PHASE 1 (PART 2 )
 2       SUBTITLE = SRM & PROPELLANT
 3       MAXLINES = 50000
 4       MPC    =  6050
 5       ECHO   =  BOTH
 6       CMETHOD = 1
 7       VECTOR  = ALL
 8       LABEL   = REAL PART OF COMPLEX EIGENVECTORS
 9       OUTPUT(PLOT)
10       SET 1  = ALL
11       PLOTTER CALCOMP 765,105
12       AXES    = MY,X,Z
13       VIEW    = 30.0,45.0,0.0
14       FIND SCALE,ORIGIN 1,SET 1
15       PLOT
16       MAXIMUM DEFORMATION 5.0
17       FIND SCALE,ORIGIN 2,SET 1
18       PLOT STATIC DEFORMATION 1 THRU 14,SET 1,ORIGIN 2,SHAPE,VECTOR XYZ
19       BEGIN BULK
```

SUBCASE 1
MODES = 12

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

INPUT BULK DATA DECK ECHO

```
.   1  ..   2  ..   3  ..   4  ..   5  ..   6  ..   7  ..   8  ..   9  ..  10  .
CONROD     1       7001    7097       1     .0000001
MAT1       1       10.E6               .3
CORD2R     696       0    -81.5683  0.0    35.5985-90.2278  0.0     57.51366RSTANK
&RSTANK   66.25     0.0     48.432
CORD2C     100      696     74.738 -30.494    6.138 200.0    -30.494    6.138 &CSSRM
&CSSRM    74.738    0.0      0.0
CORD2R     101      696     74.738 -30.494    6.138  74.738 -28.5701 15.696366SSRM
&RSSRM    200.    -30.494    6.138
GRID        6901   100       9.750 180.000   25.242   100    456
GRID        6904   100       9.750  90.000   25.242   100    456
GRID        6907   100       9.750   0.000   25.242   100    456
GRID        6910   100       9.750 -90.000   25.242   100    456
GRID        7001   100       9.750 180.000   44.500   100    456
GRID        7004   100       3.180 180.000   44.500   100    456
GRID        7013   100       9.750  90.000   44.500   100    456
GRID        7016   100       3.180  90.000   44.500   100    456
GRID        7025   100       9.750   0.0     44.500   100    456
GRID        7028   100       3.180   0.0     44.500   100    456
GRID        7037   100       9.750 -90.000   44.500   100    456
GRID        7040   100       3.180 -90.000   44.500   100    456
GRID        7097   100       9.750 180.000   69.053   100    456
GRID        7100   100       3.180 180.000   69.053   100    456
GRID        7109   100       9.750  90.000   69.053   100    456
GRID        7112   100       3.180  90.000   69.053   100    456
GRID        7121   100       9.750   0.0     69.053   100    456
GRID        7124   100       3.180   0.0     69.053   100    456
GRID        7133   100       9.750 -90.000   69.053   100    456
GRID        7136   100       3.180 -90.000   69.053   100    456
GRID        7193   100       9.750 180.000   93.607   100    456
GRID        7196   100       3.180 180.000   93.607   100    456
GRID        7205   100       9.750  90.000   93.607   100    456
GRID        7208   100       3.180  90.000   93.607   100    456
GRID        7217   100       9.750   0.0     93.607   100    456
GRID        7220   100       3.180   0.0     93.607   100    456
GRID        7229   100       9.750 -90.000   93.607   100    456
GRID        7232   100       3.180 -90.000   93.607   100    456
GRID        7289   100       9.750 180.000  118.160   100    0
GRID        7290   100       7.560 180.000  118.160   100    456
GRID        7291   100       5.370 180.000  118.160   100    456
GRID        7292   100       3.180 180.000  118.160   100    456
GRID        7293   100       9.750 150.000  118.160   100    0
GRID        7294   100       7.560 150.000  118.160   100    456
GRID        7295   100       5.370 150.000  118.160   100    456
GRID        7296   100       3.180 150.000  118.160   100    456
GRID        7297   100       9.750 120.000  118.160   100    0
GRID        7298   100       7.560 120.000  118.160   100    456
GRID        7299   100       5.370 120.000  118.160   100    456
GRID        7300   100       3.180 120.000  118.160   100    456
GRID        7301   100       9.750  90.000  118.160   100    0
GRID        7302   100       7.560  90.000  118.160   100    456
```

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

INPUT BULK DATA DECK ECHO

. 1 ..	2 ..	3 ..	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 .
GRID	7303	100	5.370	90.000	118.160	100	456		
GRID	7304	100	3.180	90.000	118.160	100	456		
GRID	7305	100	5.750	60.000	118.160	100	0		
GRID	7306	100	7.560	60.000	118.160	100	456		
GRID	7307	100	5.370	60.000	118.160	100	456		
GRID	7308	100	3.180	60.000	118.160	100	456		
GRID	7309	100	5.750	30.000	118.160	100	0		
GRID	7310	100	7.560	30.000	118.160	100	456		
GRID	7311	100	5.370	30.000	118.160	100	456		
GRID	7312	100	3.180	30.000	118.160	100	456		
GRID	7313	100	5.750	0.0	118.160	100	0		
GRID	7314	100	7.560	0.0	118.160	100	456		
GRID	7315	100	5.370	0.0	118.160	100	456		
GRID	7316	100	3.180	0.0	118.160	100	456		
GRID	7317	100	5.750	-30.000	118.160	100	0		
GRID	7318	100	7.560	-30.000	118.160	100	456		
GRID	7319	100	5.370	-30.000	118.160	100	456		
GRID	7320	100	3.180	-30.000	118.160	100	456		
GRID	7321	100	5.750	-60.000	118.160	100	0		
GRID	7322	100	7.560	-60.000	118.160	100	456		
GRID	7323	100	5.370	-60.000	118.160	100	456		
GRID	7324	100	3.180	-60.000	118.160	100	456		
GRID	7325	100	5.750	-90.000	118.160	100	0		
GRID	7326	100	7.560	-90.000	118.160	100	456		
GRID	7327	100	5.370	-90.000	118.160	100	456		
GRID	7328	100	3.180	-90.000	118.160	100	456		
GRID	7329	100	5.750	-120.000	118.160	100	0		
GRID	7330	100	7.560	-120.000	118.160	100	456		
GRID	7331	100	5.370	-120.000	118.160	100	456		
GRID	7332	100	3.180	-120.000	118.160	100	456		
GRID	7333	100	5.750	-150.000	118.160	100	0		
GRID	7334	100	7.560	-150.000	118.160	100	456		
GRID	7335	100	5.370	-150.000	118.160	100	456		
GRID	7336	100	3.180	-150.000	118.160	100	456		
GRID	7385	100	5.750	180.000	142.713	100	456		
GRID	7388	100	3.180	180.000	142.713	100	456		
GRID	7397	100	5.750	90.000	142.713	100	456		
GRID	7400	100	3.180	90.000	142.713	100	456		
GRID	7409	100	5.750	0.0	142.713	100	456		
GRID	7412	100	3.180	0.0	142.713	100	456		
GRID	7421	100	5.750	-90.000	142.713	100	456		
GRID	7424	100	3.180	-90.000	142.713	100	456		
GRID	7481	100	5.750	180.000	167.267	100	456		
GRID	7484	100	3.180	180.000	167.267	100	456		
GRID	7493	100	5.750	90.000	167.267	100	456		
GRID	7496	100	3.180	90.000	167.267	100	456		
GRID	7505	100	5.750	0.0	167.267	100	456		
GRID	7508	100	3.180	0.0	167.267	100	456		
GRID	7517	100	5.750	-90.000	167.267	100	456		
GRID	7520	100	3.180	-90.000	167.267	100	456		

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

INPUT BULK DATA DECK ECHO

. 1 ..	2 ..	3 ..	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 .
GRID	7EC1	1CC	9.75	180.0	196.25	100	456		
GRID	7EC3	1CC	9.43657	131.383	196.25	100	456		
GRID	7EC5	1CC	9.75	90.0	196.25	100	456		
GRID	7EC6	1CC	9.43657	71.383	196.25	100	456		
GRID	7EC9	1CC	9.75	0.0	196.25	100	456		
GRID	7E11	1CC	9.43657	-48.617	196.25	100	456		
GRID	7E13	1CC	9.75	-90.0	196.25	100	456		
GRID	7E14	1CC	9.43657	-108.617	196.25	100	456		
GRID	7E65	1CC	15.25	180.0	217.94	100	456		
GRID	7E67	1CC	14.75977	131.383	217.94	100	456		
GRID	7E69	1CC	15.25	90.0	217.94	100	456		
GRID	7E7C	1CC	14.75977	71.383	217.94	100	456		
GRID	7E73	1CC	15.25	0.0	217.94	100	456		
GRID	7E75	1CC	14.75977	-48.617	217.94	100	456		
GRID	7E77	1CC	15.25	-90.0	217.94	100	456		
GRID	7E78	100	14.75977	-108.617	217.94	100	456		
GRID	8134	696	99.98	-19.4107	3.9071	100	456		
GRID	8352	1C1	196.25	13.87258	9.75	101	456		
GRID	8355	1C1	196.25	13.87258	-9.75	101	456		
PLOTEL	6CC1	65C1	7001		6011	6904	7013		
PLOTEL	6CC2	7001	7097		6012	7013	7109		
PLOTEL	6CC3	7097	7193		6013	7109	7205		
PLOTEL	6CC4	7193	7289		6014	7205	7301		
PLOTEL	6CC5	7289	7385		6015	7301	7397		
PLOTEL	6CC6	7385	7481		6016	7397	7493		
PLOTEL	6007	7481	7EC1		6017	7493	7605		
PLOTEL	6CCE	7EC1	7E65		6018	7805	7865		
PLOTEL	6021	65C7	7025		6031	6910	7037		
PLOTEL	6C22	7025	7121		6032	7037	7133		
PLOTEL	6C23	7121	7217		6033	7133	7229		
PLOTEL	6C24	7217	7313		6034	7229	7325		
PLOTEL	6C25	7313	7409		6035	7325	7421		
PLOTEL	6C26	7409	75C5		6036	7421	7517		
PLOTEL	6C27	75C5	78C9		6037	7517	7813		
PLOTEL	6028	78C9	7873		6038	7813	7877		
PLOTEL	6CC9	78C3	7E67		6019	7811	7875		
PLOTEL	6C29	7EC6	7E70		6039	7814	7878		
PLOTEL	6C41	65C1	69C4		6051	7097	7109		
PLOTEL	6042	65C4	69C7		6052	7109	7121		
PLOTEL	6C43	65C7	691C		6053	7121	7133		
PLOTEL	6C44	691C	65C1		6054	7133	7097		
PLOTEL	6C45	7001	7013		6055	7193	7205		
PLOTEL	6046	7013	7025		6056	7205	7217		
PLOTEL	6C47	7025	7037		6057	7217	7229		
PLOTEL	6C4E	7037	7001		6058	7229	7193		
PLOTEL	6C61	7289	7301		6065	7385	7397		
PLOTEL	6C62	7301	7313		6066	7397	7409		
PLOTEL	6C63	7313	7325		6067	7409	7421		
PLOTEL	6C64	7325	7289		6068	7421	7385		
PLOTEL	6C71	7481	7493		6081	7801	7803		

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

INPUT BULK DATA DECK ECHO

```
.   1  ..   2  ..   3  ..   4  ..   5  ..   6  ..   7  ..   8  ..   9  ..  10  .
PLOTEL   6072    7493    7505            6082    7803    7805
PLOTEL   6073    7505    7517            6083    7805    7806
PLOTEL   6074    7517    7481            6084    7806    7809
PLOTEL   6091    7665    7667            6085    7809    7811
PLOTEL   6092    7867    7669            6086    7811    7813
PLOTEL   6093    7869    7870            6087    7813    7814
PLOTEL   6094    7870    7873            6088    7814    7801
PLOTEL   6095    7873    7875            6075    6907    8134
PLOTEL   6096    7875    7877            6076    7805    8352
PLOTEL   6097    7877    7878            6077    7809    8355
PLOTEL   6098    7878    7885            6078    7813    8355
PLOTEL   6101    7004    7016            6111    7196    7208
PLOTEL   6102    7016    7028            6112    7208    7220
PLOTEL   6103    7028    7040            6113    7220    7232
PLOTEL   6104    704C    7004            6114    7232    7196
PLOTEL   6105    7100    7112            6115    7292    7304
PLOTEL   6106    7112    7124            6116    7304    7316
PLOTEL   6107    7124    7136            6117    7316    7328
PLOTEL   6108    7136    7100            6118    7328    7292
PLOTEL   6121    7388    7400
PLOTEL   6122    7400    7412
PLOTEL   6123    7412    7424
PLOTEL   6124    7424    7388
PLOTEL   6125    7484    7496
PLOTEL   6126    7496    7508
PLOTEL   6127    7508    7520
PLOTEL   6128    752C    7484
PLOTEL   6131    7001    7004            6141    7013    7016
PLOTEL   6132    7097    7100            6142    7109    7112
PLOTEL   6133    7193    7196            6143    7205    7208
PLOTEL   6134    7289    7292            6144    7301    7304
PLOTEL   6135    7385    7388            6145    7397    7400
PLOTEL   6136    7481    7484            6146    7493    7496
PLOTEL   6151    7025    7028            6161    7037    7040
PLOTEL   6152    7121    7124            6162    7133    7136
PLOTEL   6153    7217    7220            6163    7229    7232
PLOTEL   6154    7313    7316            6164    7325    7328
PLOTEL   6155    7409    7412            6165    7421    7424
PLOTEL   6156    7505    7508            6166    7517    7520
OMIT1      123    729C    7291    7294    7295    7296    7298    7299
OMIT1      123    73CC    73C2    7303    7306    7307    7308    7310
OMIT1      123    7311    7312    7314    7315    7318    7319    7320
OMIT1      123    7322    7323    7324    7326    7327    7330    7331
OMIT1      123    7332    7334    7335    7336
OMIT1      456    7289    7301    7313    7325
OMIT1   123456    7293    7297    7305    7309    7317    7321    7329
OMIT1   123456    7333
MPC        6C5C    69C7       1     1.0    8134       1    -1.0
OMIT1        1    7004    7016    7028    7040
OMIT1       23    7097    7109    7121    7133
```

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

INPUT BULK DATA DECK ECHO

```
.   1  ..   2  ..   3  ..   4  ..   5  ..   6  ..   7  ..   8  ..   9  ..  10  .
OMIT1      123     7100    7112    7124    7136
OMIT1       23     7193    7205    7217    7229
OMIT1      123     7196    7208    7220    7232
OMIT1        1     7292    7304    7316    7328
OMIT1       23     7385    7397    7409    7421
OMIT1      123     7388    7400    7412    7424
OMIT1        1     7484    7496    7508    7520
OMIT1      123     7EC3    7EC6    7811    7814
OMIT1      123     7EE7    7E70    7875    7878
EIGC         1      INV     MAX                                          &EIGC1
&EIGC1     C.C     3CC.     0.0    2000.    150.     7
PARAM    NOK4       1
PARAM    TPNAMES  SRMP2
ENDDATA
```

TOTAL COUNT= 214

*** USER INFORMATION MESSAGE 207, BULK DATA NOT SORTED.*SORT WILL RE-ORDER DECK.

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

SORTED BULK DATA ECHO

```
CARD
COUNT    1 ..    2 ..    3 ..    4 ..    5 ..    6 ..    7 ..    8 ..    9 ..   10
  1-CONROD  1       7001    7057    1       .0000001
  2-CORD2C  100     656     74.738  -30.494 6.138   200.0   -30.494 6.138   &CSSRM
  3-&CSSRM  74.738  C.C     C.0
  4-CORD2R  101     656     74.738  -30.494 6.138   74.738  -28.570115.6563 &RSSRM
  5-&RSSRM  200.    -30.494 6.138
  6-CORD2R  656     0       -81.5683.0      35.5985 -80.2278.0      57.5136 &RSTANK
  7-&RSTANK 68.25   C.C     48.432                                          &EIGC1
  8-EIGC    1       INV     MAX
  9-&EIGC1  C.C     300.    0.C     2000.   150.    7
 10-GRID    6501    100     5.75C   180.000 25.242  100     456
 11-GRID    6504    100     5.75C   90.000  25.242  100     456
 12-GRID    6507    100     5.750   0.000   25.242  100     456
 13-GRID    651C    100     5.750   -90.000 25.242  100     456
 14-GRID    7001    100     5.750   180.000 44.500  100     456
 15-GRID    7004    100     3.180   180.000 44.500  100     456
 16-GRID    7013    100     5.75C   90.000  44.500  100     456
 17-GRID    7016    100     3.180   90.000  44.500  100     456
 18-GRID    7025    100     5.750   0.0     44.500  100     456
 19-GRID    7028    100     3.18C   C.0     44.500  100     456
 20-GRID    7037    100     5.75C   -90.000 44.500  100     456
 21-GRID    7040    100     3.180   -90.000 44.500  100     456
 22-GRID    7057    100     5.75C   180.000 69.053  100     456
 23-GRID    7100    100     3.180   180.000 69.053  100     456
 24-GRID    7109    100     5.750   90.000  69.053  100     456
 25-GRID    7112    100     3.180   90.000  69.053  100     456
 26-GRID    7121    100     5.75C   0.0     69.053  100     456
 27-GRID    7124    100     3.180   0.0     69.053  100     456
 28-GRID    7133    100     5.75C   -90.000 69.053  100     456
 29-GRID    7136    100     3.180   -90.000 69.053  100     456
 30-GRID    7153    100     5.750   180.000 93.607  100     456
 31-GRID    7156    100     3.180   180.000 93.607  100     456
 32-GRID    7205    100     5.75C   90.000  93.607  100     456
 33-GRID    7208    100     3.180   90.000  93.607  100     456
 34-GRID    7217    100     5.75C   0.0     93.607  100     456
 35-GRID    7220    100     3.180   C.0     93.607  100     456
 36-GRID    7229    100     5.750   -90.000 93.607  100     456
 37-GRID    7232    100     3.180   -90.000 93.607  100     456
 39-GRID    7289    100     5.75C   180.000 118.160 100     0
 39-GRID    7290    100     7.560   180.000 118.160 100     456
 40-GRID    7291    100     8.370   180.000 118.160 100     456
 41-GRID    7292    100     3.180   180.000 118.160 100     456
 42-GRID    7293    100     5.750   150.000 118.160 100     0
 43-GRID    7294    100     7.560   150.000 118.160 100     456
 44-GRID    7295    100     8.370   150.000 118.160 100     456
 45-GRID    7296    100     3.180   150.000 118.160 100     456
 46-GRID    7297    100     5.75C   120.000 118.160 100     0
 47-GRID    7298    100     7.56C   120.000 118.160 100     456
 48-GRID    7299    100     8.370   120.000 118.160 100     456
 49-GRID    73CC    100     3.180   120.000 118.160 100     456
 50-GRID    73C1    100     5.75C   90.000  118.160 100     0
```

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
51-GRID	7302	100		7.560	90.000	118.160	100	456		
52-GRID	7303	100		5.370	90.000	118.160	100	456		
53-GRID	7304	100		3.180	90.000	118.160	100	456		
54-GRID	7305	100		5.750	60.000	118.160	100	0		
55-GRID	7306	100		7.560	60.000	118.160	100	456		
56-GRID	7307	100		5.370	60.000	118.160	100	456		
57-GRID	7308	100		3.180	60.000	118.160	100	456		
58-GRID	7309	100		5.750	30.000	118.160	100	0		
59-GRID	7310	100		7.560	30.000	118.160	100	456		
60-GRID	7311	100		5.370	30.000	118.160	100	456		
61-GRID	7312	100		3.180	30.000	118.160	100	456		
62-GRID	7313	100		5.750	0.0	118.160	100	0		
63-GRID	7314	100		7.560	0.0	118.160	100	456		
64-GRID	7315	100		5.370	0.0	118.160	100	456		
65-GRID	7316	100		3.180	0.0	118.160	100	456		
66-GRID	7317	100		5.750	-30.000	118.160	100	0		
67-GRID	7318	100		7.560	-30.000	118.160	100	456		
68-GRID	7319	100		5.370	-30.000	118.160	100	456		
69-GRID	7320	100		3.180	-30.000	118.160	100	456		
70-GRID	7321	100		5.750	-60.000	118.160	100	0		
71-GRID	7322	100		7.560	-60.000	118.160	100	456		
72-GRID	7323	100		5.370	-60.000	118.160	100	456		
73-GRID	7324	100		3.180	-60.000	118.160	100	456		
74-GRID	7325	100		5.750	-90.000	118.160	100	0		
75-GRID	7326	100		7.560	-90.000	118.160	100	456		
76-GRID	7327	100		5.370	-90.000	118.160	100	456		
77-GRID	7328	100		3.180	-90.000	118.160	100	456		
78-GRID	7329	100		5.750	-120.000	118.160	100	0		
79-GRID	7330	100		7.560	-120.000	118.160	100	456		
80-GRID	7331	100		5.370	-120.000	118.160	100	456		
81-GRID	7332	100		3.180	-120.000	118.160	100	456		
82-GRID	7333	100		5.750	-150.000	118.160	100	0		
83-GRID	7334	100		7.560	-150.000	118.160	100	456		
84-GRID	7335	100		5.370	-150.000	118.160	100	456		
85-GRID	7336	100		3.180	-150.000	118.160	100	456		
86-GRID	7385	100		5.750	180.000	142.713	100	456		
87-GRID	7388	100		3.180	180.000	142.713	100	456		
88-GRID	7397	100		5.750	90.000	142.713	100	456		
89-GRID	7400	100		3.180	90.000	142.713	100	456		
90-GRID	7409	100		5.750	0.0	142.713	100	456		
91-GRID	7412	100		3.180	0.0	142.713	100	456		
92-GRID	7421	100		5.750	-90.000	142.713	100	456		
93-GRID	7424	100		3.180	-90.000	142.713	100	456		
94-GRID	7481	100		5.750	180.000	167.267	100	456		
95-GRID	7484	100		3.180	180.000	167.267	100	456		
96-GRID	7493	100		5.750	90.000	167.267	100	456		
97-GRID	7496	100		3.180	90.000	167.267	100	456		
98-GRID	7505	100		5.750	0.0	167.267	100	456		
99-GRID	7508	100		3.180	0.0	167.267	100	456		
100-GRID	7517	100		5.750	-90.000	167.267	100	456		

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

SORTED BULK DATA ECHO

```
CARD
COUNT.   1  ..   2  ..   3  ..   4  ..   5  ..   6  ..   7  ..   8  ..   9  ..  10
 101-GRID     7520     100      3.180   -90.000 167.267 100      456
 102-GRID     7801     100      9.75     180.0   196.25  100      456
 103-GRID     7803     100      9.43657 131.383 196.25  100      456
 104-GRID     7805     100      9.75     90.0    196.25  100      456
 105-GRID     7806     100      9.43657 71.383  196.25  100      456
 106-GRID     7809     100      9.75     0.0     196.25  100      456
 107-GRID     7811     100      9.43657 -48.617 196.25  100      456
 108-GRID     7813     100      9.75     -90.0   196.25  100      456
 109-GRID     7814     100      9.43657 -108.617196.25  100      456
 110-GRID     7865     100      15.25    180.0   217.94  100      456
 111-GRID     7867     100      14.75977131.383 217.94  100      456
 112-GRID     7869     100      15.25    90.0    217.94  100      456
 113-GRID     7870     100      14.75977 71.383  217.94  100      456
 114-GRID     7873     100      15.25    0.0     217.94  100      456
 115-GRID     7875     100      14.75977-48.617  217.94  100      456
 116-GRID     7877     100      15.25    -90.0   217.94  100      456
 117-GRID     7878     100      14.75977-108.617217.94  100      456
 118-GRID     8134     656      99.98    -19.41073.9071  100      456
 119-GRID     8352     101      156.25   13.87258 9.75   101      456
 120-GRID     8355     101      156.25   13.87258-9.75   101      456
 121-MAT1     1        10.566           .3
 122-MPC      6050     6507     1        1.0     8134    1        -1.0
 123-OMIT1    1        7004     7016     7028    7040
 124-OMIT1    1        7292     7304     7316    7328
 125-OMIT1    1        7484     7496     7508    7520
 126-OMIT1    23       7097     7109     7121    7133
 127-OMIT1    23       7193     7205     7217    7229
 128-OMIT1    23       7385     7397     7409    7421
 129-OMIT1    123      7100     7112     7124    7136
 130-OMIT1    123      7156     7268     7220    7232
 131-OMIT1    123      729C     7291     7294    7295    7296    7298    7299
 132-OMIT1    123      7300     7302     7303    7306    7307    7308    7310
 133-OMIT1    123      7311     7312     7314    7315    7318    7319    7320
 134-OMIT1    123      7322     7323     7324    7326    7327    7330    7331
 135-OMIT1    123      7332     7334     7335    7336
 136-OMIT1    123      7388     7400     7412    7424
 137-OMIT1    123      7803     7806     7811    7814
 138-OMIT1    123      7867     7870     7875    7878
 139-OMIT1    456      7289     7301     7313    7325
 140-OMIT1    123456   7293     7297     7305    7309    7317    7321    7329
 141-OMIT1    123456   7333
 142-PARAM    NOK4     1
 143-PARAM    1PNAMES  SRMP2
 144-PLOTEL   6001     6501     7001             6011    6904    7013
 145-PLOTEL   6002     7001     7097             6012    7013    7109
 146-PLOTEL   6003     7097     7193             6013    7109    7205
 147-PLOTEL   6004     7193     7289             6014    7205    7301
 148-PLOTEL   6005     7289     7385             6015    7301    7397
 149-PLOTEL   6006     7385     7481             6016    7397    7493
 150-PLOTEL   6007     7481     7801             6017    7493    7805
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PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
151-PLOTEL	6008	78C1	7865		6018	7805	7869			
152-PLOTEL	6009	78C3	7867		6019	7811	7875			
153-PLOTEL	6021	69C7	7025		6031	6910	7037			
154-PLOTEL	6022	7025	7121		6032	7037	7133			
155-PLOTEL	6023	7121	7217		6033	7133	7229			
156-PLOTEL	6024	7217	7313		6034	7229	7325			
157-PLOTEL	6025	7313	7409		6035	7325	7421			
158-PLOTEL	6026	7409	7505		6036	7421	7517			
159-PLOTEL	6027	7505	7805		6037	7517	7813			
160-PLOTEL	6028	7805	7873		6038	7813	7877			
161-PLOTEL	6029	78C6	7870		6039	7814	7878			
162-PLOTEL	6041	6901	69C4		6051	7097	7109			
163-PLOTEL	6042	69C4	69C7		6052	7109	7121			
164-PLOTEL	6043	69C7	6910		6053	7121	7133			
165-PLOTEL	6044	6910	69C1		6054	7133	7097			
166-PLOTEL	6045	7001	7013		6055	7193	7205			
167-PLOTEL	6046	7013	7025		6056	7205	7217			
168-PLOTEL	6047	7025	7037		6057	7217	7229			
169-PLOTEL	6048	7037	7001		6058	7229	7193			
170-PLOTEL	6061	7285	7301		6065	7385	7397			
171-PLOTEL	6062	7301	7313		6066	7397	7409			
172-PLOTEL	6063	7313	7325		6067	7409	7421			
173-PLOTEL	6064	7325	7285		6068	7421	7385			
174-PLOTEL	6071	7481	7493		6081	7801	7803			
175-PLOTEL	6072	7493	7505		6082	7803	7805			
176-PLOTEL	6073	7505	7517		6083	7805	7806			
177-PLOTEL	6074	7517	7481		6084	7806	7809			
178-PLOTEL	6091	7865	7867		6085	7809	7811			
179-PLOTEL	6092	7867	7869		6086	7811	7813			
180-PLOTEL	6093	7869	7870		6087	7813	7814			
181-PLOTEL	6094	7870	7873		6088	7814	7801			
182-PLOTEL	6095	7873	7875		6075	6907	8134			
183-PLOTEL	6096	7875	7877		6076	7805	8352			
184-PLOTEL	6097	7877	7878		6077	7809	8355			
185-PLOTEL	6098	7878	7865		6078	7813	8355			
186-PLOTEL	6101	7004	7016		6111	7196	7208			
187-PLOTEL	6102	7016	7028		6112	7208	7220			
188-PLOTEL	6103	7028	7040		6113	7220	7232			
189-PLOTEL	6104	7040	7004		6114	7232	7196			
190-PLOTEL	6105	7100	7112		6115	7292	7304			
191-PLOTEL	6106	7112	7124		6116	7304	7316			
192-PLOTEL	6107	7124	7136		6117	7316	7328			
193-PLOTEL	6108	7136	7100		6118	7328	7292			
194-PLOTEL	6121	73B8	7400							
195-PLOTEL	6122	7400	7412							
196-PLOTEL	6123	7412	7424							
197-PLOTEL	6124	7424	73B8							
198-PLOTEL	6125	7484	7496							
199-PLOTEL	6126	7496	75C8							
200-PLOTEL	6127	7508	7520							

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
201-	PLOTEL	6128	7520	7484						
202-	PLOTEL	6131	7001	7004		6141	7013	7016		
203-	PLOTEL	6132	7097	7100		6142	7109	7112		
204-	PLOTEL	6133	7193	7196		6143	7205	7208		
205-	PLOTEL	6134	7289	7292		6144	7301	7304		
206-	PLOTEL	6135	7385	7388		6145	7397	7400		
207-	PLOTEL	6136	7481	7484		6146	7493	7496		
208-	PLOTEL	6151	7025	7028		6161	7037	7040		
209-	PLOTEL	6152	7121	7124		6162	7133	7136		
210-	PLOTEL	6153	7217	7220		6163	7229	7232		
211-	PLOTEL	6154	7313	7316		6164	7325	7328		
212-	PLOTEL	6155	7409	7412		6165	7421	7424		
213-	PLOTEL	6156	7505	7508		6166	7517	7520		
	ENDDATA									

PHASE 1 (PART 2)
SRM & PROPELLANT

REAL PART OF COMPLEX EIGENVECTORS

C O M P L E X E I G E N V A L U E S U M M A R Y

ROOT NO.	EXTRACTION ORDER	EIGENVALUE (REAL)	EIGENVALUE (IMAG)	FREQUENCY (CYCLES)	DAMPING COEFFICIENT
1	2	-4.941664E 00	3.527739E 02	5.614571E 01	2.801717E-02
2	1	-4.941204E 00	3.528157E 02	5.615236E 01	2.801012E-02
3	4	-2.426610E 01	8.586082E 02	1.366517E 02	5.652427E-02
4	3	-2.431518E 01	8.587512E 02	1.366745E 02	5.663848E-02
5	5	-7.174017E 01	1.057418E 03	1.682933E 02	1.356693E-01
6	6	-3.236387E 01	1.225925E 03	1.951121E 02	5.275660E-02
7	7	-4.693512E 01	1.409203E 03	2.242816E 02	6.661224E-02
8	8	-4.705255E 01	1.410094E 03	2.244235E 02	6.673670E-02
9	9	-4.235460E 00	1.543464E 03	2.456532E 02	5.489180E-03
10	10	-4.456832E 00	1.692409E 03	2.693552E 02	5.307026E-03
11	11	-1.174003E 02	2.016089E 03	3.208704E 02	1.164634E-01
12	12	-1.177475E 02	2.018257E 03	3.212153E 02	1.166824E-01

GRUMMAN AEROSPACE CORPORATION
BETHPAGE, NEW YORK 11714

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