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Finite-Element-Analysis Model and Preliminary Ground Testing of Controls-Structures Interaction Evolutionary Model Reflector

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Abstract

Results of two different nonlinear finite-element analyses and preliminary static test results for the final design of the Controls-Structures Interaction Evolutionary Model reflector are presented. Load-deflection data bases are generated from analysis and testing of the 16-ft diameter, dish-shaped reflector, and natural frequencies and mode shapes are obtained from vibrational analysis. Experimental and analytical results show similar trends; however, future test hardware modifications and finite-element model refinement would be necessary to obtain better correlation. The two nonlinear analysis approaches are both adequate techniques for the analysis of prestressed structures with complex geometry.

Introduction

Future space structures, such as the proposed Space Station Freedom—which consists of a truss structure with many appendages such as antennas and motors—present new challenges to structure and control-system design. The structural design requirement of low mass results in very flexible structures. To be able to meet pointing-control requirements in space, engineers need complete knowledge of the static and dynamic characteristics of the structure.

New technology for ground testing and analysis to characterize controlled flexible space structures is being developed and tested as described in references 1 and 2. Correlation of experimental and analytical results leads to the refinement of the analytical models, which gives engineers more confidence in the analytical predictions. The final goal is to be able to characterize and design space structures by means of analysis only or by means of analysis and testing of individual components of the structure.

Langley Research Center recently conducted closed-loop-control ground tests on the Controls-Structures Interaction Evolutionary Model (CEM), an experimental model that is generically similar to a future space platform to be instrumented to monitor the Earth's climate. Figure 1 shows the main components of the CEM. Preliminary design, test, and analysis results are described in reference 2. As shown in the figure, the Evolutionary Model consists primarily of a flexible truss structure and an antenna-like appendage called a reflector. The reflector, shown in detail in figure 2, is an important dynamic component of the global line-of-sight (LOS) pointing path. To monitor the LOS pointing accuracy, a laser is mounted on the vertical truss tower of the CEM, such that the laser beam reflects upon the reflector mirror. The laser-beam reflection is measured by a photodiode array above the reflector. This laser-reflectordetector system allows the pointing accuracy of the CEM to be measured and controlled. Because of the complexity of the geometry of the reflector, and in an effort to update the finite-element analytical model of the whole structure, testing and analysis of that individual component have been conducted. Reference 3 presents preliminary design, test, and analysis results of the developmental model of the reflector. The present paper describes the results obtained from the finite-element analysis and static test for the final design of the reflector and some preliminary results from vibrational analysis. Nonlinear capabilities of MSC/NASTRAN (ref. 4) were used to account for large-displacements and pretensioning effects in the finite-element analysis of the reflector; results were compared with the nonlinear technique described in reference 3.

Evolutionary Model Reflector

The CEM reflector (figs. 2 and 3) is a dish-shaped structure 185.5 in. in diameter and 19.93 in. deep. The main components are the ribs, hub, and sensor plate. Each of the eight aluminum ribs is 0.25 in. thick and 96 in. long and is tapered in width over its length from 2 in. to 1 in. The ribs are oriented at angles of 45° around the hub—a 3/8-in.-thick aluminum plate, with a 4-in. inside diameter and an 8-in. outside diameter. One end of the ribs is attached to the hub, and the other end is connected to each adjacent rib by a 1/32-in.-diameter steel cable. Tensioning the cable by means of thumb screws on each rib deforms the ribs to obtain the desired shape of the reflector.

The sensor plate is a 1.5-in.-thick fiberglasshoneycomb composite panel with a mirrored surface. The top view of the reflector in figure 3 reveals the octagonal shape of the reflector plate and the circular mirror on its center. Each corner of the octagonal panel is attached to the ribs by swivel-head bolts to prevent transmission of moments from the ribs to the panel. A detailed view of that connection is shown in figure 3. Four aluminum rods stiffen the plate and connect it to the hub. The hub is the connecting linkage between the reflector and the supporting structure. A detailed view of the connections between the hub and sensor plate and between the hub and truss tower is shown in figure 4.

During this investigation, the reflector was statically tested in two positions—horizontally (fig. 5) and inclined 39.1° (fig. 6). The inclined position is the same as for the CEM. It was supported in the horizontal position by a single 10-in. cubical truss bay fixed at the bottom (fig. 5). The supporting structure for the inclined reflector test setup (fig. 6) was the upper section of the truss tower; this tower consisted of a tapered truss bay and one cubic bay that was also fixed at its bottom. The truss members of the cubical bays are aluminum tubes connected by node-ball joints. A typical truss member and nodeball joint are shown in figure 7. The vertical members of the tapered bay are aluminum tubes, and the diagonal and top members are aluminum structural angles. Dynamic analyses were performed only in the inclined position.

Finite-Element Models

The dish shape of the reflector is a result of the deflection of the ribs caused by tensioning the cables. Previous finite-element analysis of a preliminary reflector design (ref. 3) showed that small-deflection nonlinear analysis can be used if the post-tensioned geometry and compressive loads of a typical rib are known. A model of a prestressed reflector following this approach was created by using the MacNeal-Schwendler Corp. MSC/NASTRAN. A second nonlinear analysis, which included MSC/NASTRAN nonlinear analysis capabilities, was used to model the large deflections of the reflector, starting from its undeformed position, to obtain the correct geometry and stiffness of the prestressed structure. The only physical parameter needed for the analysis in this case, other than material properties and basic dimensions, is the tension in the cables for the final configuration. Results from both analyses were compared with test results.

In the finite-element models of the reflector, each rib consists of 12 beam elements dimensioned according to the tapered shape of the ribs. The cables are modeled by using 1/32-in.-diameter rod elements with material properties of steel wire. The hub is modeled with 24 3/8-in.-thick triangular plate elements. The steel bolts connecting the ribs to the hub are represented by 1/4-in.-diameter bar elements. Due to the short length and high stiffness of the bolts 1

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The sensor plate is modeled by using 24 triangular plate elements. Since the material properties of the honeycomb composite panel were unknown, an effective plate thickness of 0.408 in. was computed, and the known material properties of the fiberglass sheets were used as material properties for the equivalent plate. The following equation was used to compute the effective thickness $t_{\rm eff}$ of the composite panel:

$$I = \frac{t_{\text{eff}}^3}{12} \times b = \frac{b\left(h_o^3 - h_i^3\right)}{12}$$

Therefore,

$$t_{\rm eff}^3 = \left(h_o^3 - h_i^3\right)$$

where I is the area moment of inertia for a rectangular cross-sectional element of the panel of length band height h_o . (See fig. 8.) Honeycomb core thickness is denoted by h_i . The mirrored surface of the reflector plate was represented by a lumped mass at its center. The swivel-head bolts connecting the sensor plate to the ribs were modeled with CBAR elements, and the rotational degree of freedom about the axis passing through the eye of each bolt (see detail in fig. 3) was left free by using pin flags. Since CROD elements only have torsional and axial stiffness, they were also used to model the swivel-head bolts; results were compared with those obtained with CBAR elements.

The input geometry of the undeformed rib for the large-displacements nonlinear model should not be represented by a horizontal line. A bifurcation would exist and the ribs could deflect either up or down. To ensure that the ribs would move in the correct direction, the rib was represented by a straight line that made a 6° angle with a horizontal line (fig. 9).

Analysis

The MSC/NASTRAN solution 64 employs an iterative procedure with a modified Newton-Raphson approach to solve geometric nonlinear problems. The large-displacements nonlinear analysis for the reflector involved two steps, which are summarized in figure 10. In the first step, the structure was preloaded and shaped by applying a thermal load to the cables that was equivalent to the measured tension in the cables on the shaped structure. Gravity effects

and target weights were also included. Fifteen iterations were required for force convergence, and the first iteration was the linear static solution. Differential stiffness calculations were skipped to avoid instability or mechanism errors. The second step was a restart from step 1 to apply external loads. Fifteen dummy subcases were required in the case control deck to restart from the last stress state in step 1. Three iterations were required for final convergence in step 2. Superimposing results from steps 1 and 2 gives the displacements that result from external loading. These results are compared with smalldisplacements nonlinear analysis and experimental results.

Analysis with a prestressed reflector model, similar to the analysis described in reference 3, was also performed by using solution 64; however, the geometry input for the ribs was that of a deflected and prestressed rib. Since there were no large deflections of the preshaped structure, the CBEAM elements were replaced by the easier to use CBAR elements. The analysis consisted of the three steps shown in figure 11. First, a thermal load equivalent to the compressive preload is applied to the ribs, which are completely restrained (ref. 3). A thermal preload is also applied to the cables. The constraint forces obtained in this step are the forces required to maintain equilibrium when all degrees of freedom are released in step 2. The second step is to release all degrees of freedom, apply the computed constraint forces, gravity load, and target weights to obtain the final prestress state, which is equivalent to step 1 for the large-displacements nonlinear model. Step 3 involves the application of external loads. Results from steps 2 and 3 are combined to obtain the final displacements. For this case, each step ran independently, no data base was required. Each step required three iterations for convergence—a linear static solution, a differential stiffness calculation, and one nonlinear iteration. Figure 9 shows the geometry of a preloaded rib that results from small-displacements nonlinear analysis and large-displacements nonlinear analyses. Listings of the NASTRAN data decks for both models are included in the appendix.

The analysis results seem very sensitive to different models of swivel-head bolts. Changing the swivel bolt element from CBAR with pin flags to CROD greatly reduces the stiffness of the ribs and smooths the stress distribution along the ribs. Figure 12 shows the deformation of one of the ribs under gravity and target weight for the small-displacements analysis with two different connector models. Significant changes occur in the axial-force distribution along the ribs for the large-displacements nonlinear model. (See table 1.)

Vibrational analysis was also performed by using the data bases generated for the final prestressed states for both the small-displacements and the largedisplacements nonlinear analytical models of the reflector in its inclined position. Mode shapes and frequencies were computed for modes below 10 Hz.

Correlation of Static Tests With Analysis

Static tests of the reflector on its horizontal and inclined configurations were conducted to obtain load-deflection characteristics for comparison with analytical results. Four of the eight reflector ribs, numbered as shown in figure 3, were instrumented with target plates and proximity probes to measure rib-tip and plate-end displacements. Loads were applied at specific locations on the ribs and plate ends to provide the required symmetric or unsymmetric loading condition. Loads were applied and removed in step increments. Table 2 summarizes the loading cycles that were conducted to obtain the data base for this investigation; figure 13 shows the details of the target and weight configurations. Output data from the proximity probes were displayed on voltmeters and were recorded manually.

Load-deflection plots for each loading condition described in table 2 were generated from the test data for comparison with load-deflection plots generated from large-displacements nonlinear and small-displacements nonlinear analyses. Symmetric and asymmetric stiffness characteristics of the reflector ribs for test and analysis of the reflector on its inclined position are shown in figure 14. Both sets of data indicate that the load deflections are linear during load-application and load-relief cycles; there is good correlation between small-displacements and large-displacements nonlinear analysis results. As explained subsequently in this section, correlation between experimental and analytical results is acceptable, considering possible errors in experimental measurements. Similar plots were generated that described load-deflection characteristics of the reflector in its horizontal position when loads were applied at the sensor-plate ends. Experimental and analytical results obtained from symmetric and asymmetric loading of the plate ends are shown in figure 15. For this set of data, because of the symmetry of the structure, all the measured and generated displacement data obtained for each of the four locations on the sensor plate were combined and curve fitted. Experimental data show hysteresis losses during the loading and unloading cycles; however, load-deflection

characteristics can be considered linear. Hysteresis loss is a common characteristic of composite material structures. Even though the present analytical tools do not have the capabilities to model hysteretic energy losses, load-deflection characteristics obtained from both analyses again agree with experimental results, and correlation between results from both analytical models was very good. The symmetry of the horizontal structure is very well described by the analytical models. Table 3 summarizes the percentage error between the slopes of the test and analysis curves for load cycles 1 to 4.

The discrepancies between experimental and analytical results in some tests increase with increasing load and deflection. These discrepancies may be caused by the way the target-plate assembly is attached to the ribs. Before any loads are applied to the ribs or plate ends, the target plates are perpendicular to the proximity probes. When the ribs are displaced by the applied load, the target plates, which are fixed to the ribs, follow the rib displacement; the rib displacement includes rotation. In its final position, the target plate is at an angle with the proximity probe. Therefore, the measured vertical displacement is not the vertical component of the displacement vector of the point of interest on the rib. The error is a function of the horizontal displacement of the target-plate center and the angle the target plate makes with the horizontal. Some of the discrepancies between experimental and analytical results could have been eliminated if swivel joints were used to attach the target assembly to the ribs.

Results of Vibrational Analysis

Vibrational analysis of the reflector has been conducted to correlate results from both analytical models and for future correlation with experimental data. The first 13 natural frequencies for the reflector in its inclined position, obtained from large-displacements nonlinear analysis and small-displacements nonlinear analysis, are listed in table 4. Corresponding mode shapes are shown in figure 16 for the largedisplacements nonlinear model. The eigenvalues and mode shapes obtained from the two analytical models show close agreement.

The first global mode shape identified, mode 4, exhibits a rocking motion of the reflector about the hub. Mode 9, the second global mode, involves torsion of the reflector around the hub center. Modes 1 to 3 and 6 to 8 are different combinations of first bending modes of the individual ribs. Second rib bending modes are in mode 10. Many of the mode shapes are similar and have similar frequencies because of the symmetry of the structure.

Frequency-response functions for random excitation at rib 2 were also generated by using the NASTRAN models. The plot in figure 17 shows a typical frequency-response function (FRF) taken in the vertical plane for rib 2. The point of excitation was the connection between the rib and sensor plate, and the measurement was taken 2.5 ft along the rib from the connector. The two analytical models show similar results.

Concluding Remarks

Two different nonlinear finite-element models for the final design of the Controls-Structures Interaction Evolutionary Model (CEM) reflector were developed and load-deflection data bases were generated for comparison with experimental results. Static tests to obtain load-deflection characteristics of the Controls-Structures Interaction (CSI) Evolutionary Model reflector were conducted. Limited vibrational analysis was also conducted, and preliminary system modes were computed for future system identification.

Excellent agreement between small-displacements and large-displacements nonlinear models for the reflector has been demonstrated. The modeling techniques described could be used in future applications involving the analysis of prestressed structures with complex geometry. The small-displacements nonlinear analysis approach works well for the analysis of prestressed structures where both the shape and the preload are known. During the design stage, the large-displacements nonlinear analysis approach can be used to design shape and prestress simultaneously.

Analytical and experimental results follow similar trends, but there are some discrepancies. These discrepancies may be reduced by modifying the displacement measurement hardware and by incorporating composite material data for the sensor plate into the finite-element models. Further refinement of the swivel-head bolt model is also warranted.

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Appendix

Listing of Finite-Element Analyses

3 RUNSTREAM OF NONLINEAR MODEL, REFLECTOR IN HORIZONTAL POSITION, STEP 1 4 NASTRAN FILES= (DB01) 5 ID STATIC NL ANALYSIS, REFLECTOR IN HORIZONTAL POSITION 6 APP DISPLACEMENT 7 SOL 64 **TIME 120** 8 CEND 9 10 Ś \$ CASE CONTROL DECK FOLLOWS 11 12 13 TITLE = REFLECTOR WITH TAPERED RIBS, NONLINEAR PRELOAD RUN, STEP 1 14 ECHO = SORT 15 SPC = 116 LOAD=100 \$ GRAVITY AND TARGET WEIGHTS 17 TEMP (LOAD) =13 \$ THERMAL LOAD ON CABLES 18 SUBCASE 1 LABEL= LINEAR STATIC SOLUTION 19 20 DISPLACEMENT = ALL 21 ELFOR=ALL 22 SUBCASE 2 23 SUBCASE 3 SUBCASE 4 24 25 SUBCASE 5 26 SUBCASE 6 27 SUBCASE 7 28 SUBCASE 8 29 SUBCASE 9 30 SUBCASE 10 31 SUBCASE 11 32 SUBCASE 12 33 SUBCASE 13 34 SPCF=ALL 35 SUBCASE 14 36 SUBCASE 15 37 SPCF=ALL 38 DISP=ALL 39 ELFOR=ALL 40 \$ FIFTEEN ITERATIONS REQUIRED FOR CONVERGENCE 41 OUTPUT (PLOT) 42 CSCALE=1.8 43 PLOTTER NAST 44 SET 30=ALL 45 AXES Y, X, Z VIEW 0.0,0.0,0.0 46 47 PTITLE=NONLINEAR STATIC ANALYSIS OF HORIZONTAL REFLECTOR FIND SCALE, ORIGIN 30, SET 30 48 49 PLOT STATIC DEFORMATION 0,15, SET 30, ORIGIN 30 50 \$ BULK DATA DECK FOLLOWS 51 Ŝ 52 BEGIN BULK 53 Ś GRAV 386. 54 200 0 0.0 0.0 -1.0 55 LOAD, 100, 1., 1., 60, 1., 200 LOAD, 101, 1., 1., 60, 1., 64, 1., 200 56 57 \$ TARGET WEIGHTS 58 FORCE, 60, 2201, 0, .4, 0., 0., -1. FORCE, 60, 2301, 0, .4, 0., 0., -1. 59 60 FORCE, 60, 2401, 0, .4, 0., 0., -1. 61 FORCE, 60, 2501, 0, .4, 0., 0., -1. FORCE, 60, 2601, 0, .4, 0., 0., -1. 62 63 FORCE, 60, 2701, 0, .4, 0., 0., -1. 64 FORCE, 60, 2801, 0, .4, 0., 0., -1. 65 FORCE, 60, 2901, 0, .4, 0., 0., -1. 66 67 FORCE, 60, 2206, 0, .3, 0., 0., -1. FORCE, 60, 2306, 0, .3, 0., 0., -1. 68 69 FORCE, 60, 2406, 0, .3, 0., 0., -1. 70 FORCE, 60, 2506, 0, .3, 0., 0., -1. 71 FORCE, 60, 2606, 0, .3, 0., 0., -1.

72	FORCE, 60,	2706,0,.3,	0.,0.,-	-1.					
73	FORCE, 60,	2806,0,.3,	0.,0.,-	-1.					
74	FORCE, 60,	2906,0,.3,	0.,0.,-	-1.					
75	\$								
76	PARAM, COU	PMASS,1							
77	PARAM, GRE	PNT, O							
78	PARAM, MAX	RATIO, 5.EH	-06						
79	PARAM, K6P	OT,10.							
80	PARAM, TES	TNEG, -2 \$	SKIP D	IFFERENT	IAL STIF	FNESS CAL	CULATIONS	· ·	
81	CORD2C	4		0.0	0.0	0.0	0.0	0.0	5.0CORD
82	+ORD	5.0	0.0	5.0					
83	Ś		••••						
84	S GRID PC	TNTS - RTE	S GEOM	ETRY					
95	GRIDIC	2001	4	96 00	22.5	8.3705			
86	GRID	2002	4	82.11	22.5	6.8685			
87	GRID	2002	4	71 79	22.5	5.7535			
89	CRID	2003	4	59 66	22 5	4 4415			
00	CRID	2004	4	47 83	22.5	3 1635			
0.9	CRID	2005	-	35 75	22.5	1 8572			
90	CRID	2000		35 35	22.5	2 4375			
91	CRID	2007	-	26.5	22 5	8572			
92	CRID	2008	4	17 25	22.5	3572			
93	GRID	2009	-	17.25	22.5	3125			
94	GRID	2010	1	4 675	22.5	3125			
95	GRID	2011	1	1.025	22.5	0.0			
30	CRID	2012	4	4 625	22.5	0.0			
97	GRID	2013		4.025	22.5	0.0			
30	P CPTD	2014	٨	96 00	67 5	8 3705			
33	GRID	2014	7	90.00	67.5	6 9695			
100	GRID	2015	7	71 70	67.5	5 7535			
101	GRID	2010	7	50 66	27 5	A AA15			
102	GRID	2017	1	39.00	67.5	3 1635			
103	GRID	2010		47.03	67.5	1 9572			
104	GRID	2019	7	35.75	67.5	2 4375			
105	GRID	2020		26 5	27 5	2.4373			
106	GRID	2021		17 25	67.5	3572			
107	GRID	2022		17.25	67.5	3105			
108	GRID	2023	4	4 625	67.5	3125			
1109	GRID	2024	4	4.625	67.5	0.0			
. 110	GRID	2025	7	4 625	67.5	0.0			
	e crib	2020	-	4.025	07.5	0.0			
112	9 00 TD	2027		06 00	310 E	0 3705			
114	CRID	2027	-	90.00	110 5	6 9695			
114	GRID	2020	1	71 70	112.5	5 7535			
115	CRID	2029	1	59 66	112.5	4 4415			
117	CRID	2030		47 93	112.5	3 1635			
110	CRID	2032	-	35 75	112.5	1 8572			
110	CRID	2032	4	35 35	112.5	2 4375			
120	CRID	2033	7	26 5	112.5	2.4373			
120	GRID	2034	1	17 25	112.5	3572			
121	GRID	2035	4	17.25	112.5	3125			
102	GRID	2030		4 626	112.5	3135			
123	CRID	2037		9.025	112.5	0 0		•	
105	GRID	2030	7	4 626	110 5	0.0			
125	é	2039	-	4.025	112.5	0.0			
127	9 0011	2040	' A	96 00	157 F	8 3705			
100	GRID	2040		90.00	157.5	6.3703			
128	GRID	2041		71 70	157.5	5 7535			
129	GRID	2042	4	11.19	157.5	3.7333			
130	GRID	2043	4	39.66	157.5	4.4413			
131	GRID	2044	4	47.83	157.5	3.1635			
132	GRID	2045	4	35.75	15/.5	1.8572			
133	GRID	2046	4	35.35	157.5	2.4375			
134	GRID	2047	4	26.5	157.5	.8572			
135	GRID	2048	4	17.25	157.5	.35/2			
136	GRID	2049	4	8.0	157.5	.3125			
137	GRID	2050	4	4.625	157.5	.3125			
138	GRID	2051	4	8.0	157.5	0.0			
139	GRID	2052	4	4.625	157.5	0.0			
140	\$		-						
141	GRID	2053	4	96.00	202.5	8.3705			
142	GRID	2054	4	82.11	202.5	6.8685			
143	GRID	2055	4	71.79	202.5	5.7535			
144	GRID	2056	4	59.66	202.5	4.4415			
145	GRID	2057	4	47.83	202.5	3.1635			

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146	GRID	2058	4	35.75	202.5	1.8572
147	GRID	2059	4	35.35	202.5	2.4375
148	GRID	2060	4	26.5	202.5	.8572
149	GRID	2061	4	17.25	202.5	.3572
150	GRID	2062	4	8.0	202.5	.3125
151	GRID	2063	4	4.625	202.5	.3125
152	GRID	2064	4	8.0	202.5	0.0
153	GRID	2065	4	4.625	202.5	0.0
155	CRID	2065		06 00	247 E	0 3705
155	GRID	2060	7	90.00	247.5	6.3705
157	GRID	2068	7	71 79	247 5	5 7535
158	GRID	2069	4	59 66	247.5	4 4415
159	GRID	2070	4	47.83	247.5	3.1635
160	GRID	2071	4	35.75	247.5	1.8572
161	GRID	2072	4	35.35	247.5	2.4375
162	GRID	2073	4	26.5	247.5	.8572
- 163	GRID	2074	4	17.25	247.5	.3572
164	GRID	2075	4	8.0	247.5	.3125
165	GRID	2076	4	4.625	247.5	.3125
166	GRID	2077	4	8.0	247.5	0.0
167	GRID	2078	4	4.625	247.5	0.0
169	9 CPTD	2079	A	96 00	202 5	9 3705
170	CRID	2079	4	90.00	292.5	6 8685
171	GRID	2080	4	71 79	292.5	5 7535
172	GRID	2082	4	59.66	292.5	4.4415
173	GRID	2083	4	47.83	292.5	3.1635
174	GRID	2084	4	35.75	292.5	1.8572
175	GRID	2085	4	35.35	292.5	2.4375
176	GRID	2086	4	26.5	292.5	.8572
177	GRID	2087	4	17.25	292.5	.3572
178	GRID	2088	4	8.0	292.5	.3125
179	GRID	2089	4	4.625	292.5	.3125
180	GRID	2090	4	8.0	292.5	0.0
181	GRID	2091	4	4.625	292.5	0.0
182	GRID	2092	4	96 00	337 5	8 3705
184	GRID	2092	4	82 11	337.5	6 8685
185	GRID	2094	4	71.79	337.5	5.7535
186	GRID	2095	4	59.66	337.5	4.4415
187	GRID	2096	4	47.83	337.5	3.1635
188	GRID	2097	4	35.75	337.5	1.8572
189	GRID	2098	4	35.35	337.5	2.4375
190	GRID	2099	4	20.5	337.5	.85/2
192	GRID	2100	4	17.25	337.5	.3372
193	GRID	2102	4	4.625	337 5	3125
194	GRID	2103	4	8.0	337.5	0.0
195	GRID	2104	4	4.625	337.5	0.0
196	GRID	2106	4	0.0	0.0	2.4375
197	\$ HUB					
198	GRID	2110	4	8.5	0.0	0.0
199	GRID	2111	4	7.07	45.0	0.0
200	GRID	2112	4	8.50	90.0	0.0
201	GRID	2113	4	9 50	100 0	0.0
202	GRID	2115	4	7 07	225 0	0.0
204	GRID	2116	4	8.50	270.0	0.0
205	GRID	2117	4	7.07	315.0	0.0
206	\$ SENSOR PL	ATE				
207	GRID	2119	4	8.5	0.0	2.4375
208	GRID	2120	4	8.5	90.0	2.4375
209	GRID	2121	4	8.5	180.0	2.4375
210	GRID	2122	4	8.5	270.0	2.4375
211	S TRUSS BAI	235		7 0711	45 0	0105
212	CRID	313	4	7.0711	45.0	8125
213	GRID	404	4	7.0711	135 0	- 8125
215	GRID	405	4	7.0711	-135.0	8125
216	GRID	313	4	7.0711	45.0	-10.812
217	GRID	314	4	7.0711	-45.0	-10.812
218	GRID	402	4	7.0711	135.0	-10.812
219	GRID	403	4	7.0711	-135.0	-10.812

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220	\$ TARGET LC	CATIONS						
221	GRID,2201,4	,94.012,	22.5,8.	1555				
222	GRID,2301,4	1,94.012,	67.5,8.	1555				
223	GRID,2401,4	,94.012,	112.5,8	.1555				
224	GRID,2501,4	,94.012,	157.5,8	.1555				
225	GRID,2601,4	,94.012,	202.5,8	.1555				
226	GRID, 2701, 4	,94.012,	247.5,8	.1555				
227	GRID,2801,4	,94.012,	292.5,8	.1555				
228	GRID, 2901, 4	,94.012,	337.5,8	.1555				
229	GRID, 2206, 4	41.839/	, 22.3,2	.5157				
230	GRID, 2306, 4	41.8397	, 6/.5,2	.5157				
231	GRID, 2406, 4	1,41.8397 1 A1 8387	157 5	2.3137				
232	GRID, 2506, 4	41 9397	202 5	2.5157				
234	GRID, 2000, 4	41.8397	.247.5.	2.5157				
235	GRID, 2806, 4	. 41.8397	.292.5.	2.5157				
236	GRID, 2906, 4	,41.8397	, 337.5,	2.5157				
237	\$ CONSTRAIN	T POINTS	, BAY B	OTTOM				
238	SPC1	1 1	23456	313				
239	SPC1	1 1	23456	314				
240	SPC1	1 1	23456	402				
241	SPC1	1 1	23456	403				
242	\$ RIBS ELEM	ENTS						
243	CBEAM	1	1	2001	2201	0.0	0.0	1.0
244	CBEAM	2	1	2014	2301	0.0	0.0	1.0
245	CBEAM	3	1	2027	2401	0.0	0.0	1.0
246	CBEAM	4	1	2040	2501	0.0	0.0	1.0
247	CBEAM	5	1	2053	2001	0.0	0.0	1.0
248	CBEAM	7	1	2000	2801	0.0	0.0	1.0
243	CBEAM	é	ī	2092	2901	0.0	0.0	1.0
251	Ś	Ū	-	2072	2302	•••		
252	CBEAM	9	2	2002	2003	0.0	0.0	1.0
253	CBEAM	10	2	2015	2016	0.0	0.0	1.0
254	CBEAM	11	2	2028	2029	0.0	0.0	1.0
255	CBEAM	12	2	2041	2042	0.0	0.0	1.0
256	CBEAM	13	2	2054	2055	0.0	0.0	1.0
257	CBEAM	14	2	2067	2068	0.0	0.0	1.0
258	CBEAM	15	2	2080	2081	0.0	0.0	1.0
259	CBEAM	16	2	2093	2094	0.0	0.0	1.0
260	Ş		2	2003	2004	<u> </u>	0.0	1 0
261	CBEAM	10	2	2003	2004	0.0	0.0	1.0
202	CBEAM	10	2	2029	2030	0.0	0.0	1.0
263	CREAM	20	3	2042	2043	0.0	0.0	1.0
265	CREAM	21	3	2055	2056	0.0	0.0	1.0
266	CBEAM	22	3	2068	2069	0.0	0.0	1.0
267	CBEAM	23	3	2081	2082	0.0	0.0	1.0
268	CBEAM	24	3	2094	2095	0.0	0.0	1.0
269	\$							
270	CBEAM	25	4	2004	2005	0.0	0.0	1.0
271	CBEAM	26	4	2017	2018	0.0	0.0	1.0
272	CBEAM	27	4	2030	2031	0.0	0.0	1.0
213	CBEAM	20	4	2043	2044	0.0	0.0	1.0
275	CBEAM	30	4	2069	2070	0.0	0.0	1.0
276	CBEAM	31	4	2082	2083	0.0	0.0	1.0
277	CBEAM	32	4	2095	2096	0.0	0.0	1.0
278	\$							
279	CBEAM	33	5	2005	2206	0.0	0.0	1.0
280	CBEAM	34	5	2018	2306	0.0	0.0	1.0
281	CBEAM	35	5	2031	2406	0.0	0.0	1.0
282	CBEAM	36	5	2044	2506	0.0	0.0	1.0
283	CBEAM	37	5	2057	2606	0.0	0.0	1.0
284	CBEAM	38	5	2070	2006	0.0	0.0	1.0
283 286	CBEAM	70	5 5	2083	2000	0.0	0.0	1.0
287	Ś		5	2000			v.v	
288	CBEAM	41	6	2006	2008	0.0	0.0	1.00
289	CBEAM	42	6	2019	2021	0.0	0.0	1.00
290	CBEAM	43	6	2032	2034	0.0	0.0	1.00
291	CBEAM	44	6	2045	2047	0.0	0.0	1.00
292	CBEAM	45	6	2058	2060	0.0	0.0	1.00
293	CBEAM	46	6	2071	2073	0.0	0.0	1.00

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294	CBEAM	47	6	2084	2086	0.0	0.0	1.00
295	CBEAM	48	6	2097	2099	0.0	0.0	1.00
290	CDEAM	40		0000		• •		
298	CBEAM	49	٥ ح	2008	2009	0.0	0.0	1.00
299	CBEAM	51	6	2034	2022	0.0	0.0	1.00
300	CBEAM	52	6	2047	2048	0.0	0.0	1 00
301	CBEAM	53	6	2060	2061	0.0	0.0	1.00
302	CBEAM	54	6	2073	2074	0.0	0.0	1.00
303	CBEAM	55	6	2086	2087	0.0	0.0	1.00
304	CBEAM	56	6	2099	2100	0.0	0.0	1.00
305	\$							
306	CBEAM	57	6	2009	2010	0.0	0.0	1.00
307	CBEAM	58	6	2022	2023	0.0	0.0	1.00
308	CBEAM	59	6	2035	2036	0.0	0.0	1.00
310	CDEAM	60	ĉ	2048	2049	0.0	0.0	1.00
311	CBEAM	62	6	2001	2062	0.0	0.0	1.00
312	CBEAM	63	6	2097	2075	0.0	0.0	1.00
313	CBEAM	64	ě	2100	2101	0.0	0.0	1 00
314	\$		•	2100		0.0	0.0	1.00
315	CBEAM	65	6	2010	2011	0.0	0.0	1.00
316	CBEAM	66	6	2023	2024	0.0	0.0	1.00
317	CBEAM	67	6	2036	2037	0.0	0.0	1.00
318	CBEAM	68	6	2049	2050	0.0	0.0	1.00
319	CBEAM	69	6	2062	2063	0.0	0.0	1.00
320	CBEAM	70	6	2075	2076	0.0	0.0	1.00
321	CBEAM	71	6	2088	2089	0.0	0.0	1.00
322	CBEAM	72	6	2101	2102	0.0	0.0	1.00
323	CBEAM, 140	1 2201,200	5 0 . , U	• • • •				
325	CBEAM, 141 CBEAM 142	1, 2301, 201		·, 1.				
326	CBEAM, 143	1.2501.204	1.0.0	., 1				
327	CBEAM, 144	,1,2601,205	4.0.0	1.				
328	CBEAM, 145	,1,2701,206	57,0.,0	.,1.				
329	CBEAM, 146	,1,2801,208	10,0.,0	.,1.				
330	CBEAM, 147	,1,2901,209	3,0.,0	.,1.				
331	CBEAM, 148	,5,2206,200	6,0.,0	.,1.				
332	CBEAM, 149	,5,2306,201	.9,0.,0	.,1.				
333	CBEAM, 150	, 5, 2406, 203	2,0.,0	.,1.				
335	CBEAM, 151	5,2506,204	5,0.,0	.,1.				
336	CBEAM 153	5 2706 207		·,⊥. 1				
337	CBEAM, 154	.5.2806.208	4.0 0	1				
338	CBEAM, 155	,5,2906,209	7.0.0	1.				
339	\$ END TAP	ERED RIBS						
340	\$ START C	ONNECTOR BO	LTS - H	RIBS TO H	IUB			
341	CBAR	73	8	2010	2012	2062		
342	CBAR	74	8	2023	2025	2075		
343	CBAR	75	8	2036	2038	2088		
344	CBAR	76	8	2049	2051	2101		
346	CBAR	70	8	2062	2064	2010		
347	CBAR	79	Å	2073	2011	2025		
348	CBAR	80	ŝ	2101	2103	2049		
349	CBAR	81	8	2011	2013	2063		
350	CBAR	82	8	2024	2026	2076		
351	CBAR	83	8	2037	2039	2089		
352	CBAR	84	8	2050	2052	2102		
353	CBAR	85	8	2063	2065	2011		
354	CBAR	86	8	2076	2078	2024		
355	CBAR	87	8	2089	2091	2037		
357	S STAR		8	2102	2104	2050		
358	CBAR. 89.9	2006.2007	51W25N 2005	RIBS AND	SENSOR	PLATE		
359	, , 6	,,,,,						
360	CBAR, 90, 9,	2019,2020.	2018					
361	,,6							
362	CBAR, 91, 9,	2032,2033,2	2031					
363	,,6							
364								
3.45	CBAR, 92, 9,	2045,2046,2	2044					
365	CBAR, 92, 9, ,,6	2045,2046,2	2044					
365 366 367	CBAR, 92, 9, ,,6 CBAR, 93, 9,	2045,2046,2 2058,2059,2	2044 2057					
365 366 367	CBAR, 92, 9, ,,6 CBAR, 93, 9, ,,6	2045,2046,2 2058,2059,2	2044 2057					

368	CBAR, 94,	9,2071,2072,	2070					
369	,,6							
370	CBAR, 95,	9,2084,2085,	2083					
371	, , 6							
372	CBAR, 96,	9,2097,2098,	2096					
373	6						1	·
374	S START	COMPRESSION	MEMBERS	BETWEEN	HUB AND	SENSOR	PLATE, I)=.375
375	CBAR	97	14	2110	2119	1.0	1.0	
376	CBAR	98	14	2112	2120	1.0	1.0	
377	CBAR	99	14	2114	2121	1,0	1.0	
378	CBAR	100	14	2116	2122	1.0	1.0	
379	S START	TENSION CAB	LE AT TI	OF RIB	Ś			
380	CROD	101	7	2001	2014			
381	CROD	102	7	2014	2027			
302	CROD	103	7	2027	2040			
393	CROD	104	7	2040	2053			
304	CROD	105	7	2053	2066			
205	CROD	106	7	2066	2079			
303	CROD	107	7	2079	2092			
380	CROD	108	7	2092	2001			
207	é monce	DAV	·					
388	\$ TRUSS	105	12	404	405	1.0	1.0	1.0
389	CBAR	105	12	405	316	1.0	1.0	1.0
390	CBAR	107	12	315	316	1.0	1.0	1.0
391	CBAR	107	13	315	405	1.0	1.0	1.0
392	CBAR	108	12	315	404	1.0	1.0	1.0
393	CBAR	109	12	402	404	1.0	1.0	1.0
394	CBAR	110	12	402	405	1 0	1.0	1.0
395	CBAR	111	12	403	315	1 0	1.0	1.0
396	CBAR	112	12	313	316	1.0	1.0	1.0
397	CBAR	113	12	314	403	1.0	1 0	1.0
398	CBAR	114	12	402	403	1.0	1 0	1.0
399	CBAR	115	12	403	314	1.0	1 0	1.0
400	CBAR	116	12	314	402	1.0	1.0	1.0
401	CBAR	117	12	313	402	1 0	1.0	1.0
402	CBAR	118	13	402	404	1 0	1.0	1.0
403	CBAR	119	13	313	315	1 0	1.0	1.0
404	CBAR	120	13	314	316	1 0	1 0	1.0
405	CBAR	121	13	403	402	1 0	1 0	1.0
406	CHAR	122	13	314			0001100110	E
	CDAN			NOAR 001				
407	\$ 1/4"	DIAM BOLTS W	HICH CON	NECT RFI	THOP TO	2111	1	
407 408	\$ 1/4" CELAS2	DIAM BOLTS W 123 1.	HICH CON 5E+08	NECT RFI 315 215	1 2	2111 2111	1	
407 408 409	\$ 1/4" CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1.	HICH CON 5E+08 5E+08	NECT RF1 315 315 215	1 2 3	2111 2111 2111	1 2 3	
407 408 409 410	\$ 1/4" CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1.	HICH CON 5E+08 5E+08 5E+08 5E+08	NECT RFI 315 315 315	1 2 3	2111 2111 2111 2111	1 2 3 4	
407 408 409 410 411	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315	1 2 3 4	2111 2111 2111 2111 2111 2111	1 2 3 4 5	
407 408 409 410 411 412	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS & 123 1. 124 1. 125 1. 126 1. 127 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315	1 2 3 4 5	2111 2111 2111 2111 2111 2111 2111	1 2 3 4 5	
407 408 409 410 411 412 413	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 315	1 2 3 4 5 6	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6	
407 408 409 410 411 412 413 414	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 315 316	1 2 3 4 5 6 1	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1	
407 408 409 410 411 412 413 414 415	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 315 316 316	1 2 3 4 5 6 1 2	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2	
407 408 409 410 411 412 413 414 415 416	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 131 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316	1 2 3 4 5 6 1 2 3	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4	
407 408 409 410 411 412 413 414 415 416 417	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 315 316 316 316 316	1 2 3 4 5 6 1 2 3 4	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5	
407 408 409 410 411 412 413 414 415 416 417 418	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS & 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316 316 316 316	1 2 3 4 5 6 1 2 3 4 5 5	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6	
407 408 409 410 411 412 413 414 415 416 417 418 419	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS & 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 134 1. 134 1. 134 1. 135 1. 129 1. 134 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316 316 316 316	1 2 3 4 5 6 1 2 3 4 5 6	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5	
407 408 409 410 411 412 413 414 415 416 417 418 419 420	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS & 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 134 1. 135 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316 316 316 316 316	1 2 3 4 5 6 1 2 3 4 5 6 1	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2	
407 408 409 410 411 412 413 414 415 416 417 418 419 420 421	¢ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 134 1. 135 1. 136 1. 137 1. 138 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316 316 316 316 316 316	1 2 3 4 5 6 1 2 3 4 5 6 1 2 2 3	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3	
407 408 409 410 411 412 413 414 415 414 415 416 417 418 419 420 421 422	\$ 1/4" CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2 CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 134 1. 135 1. 136 1. 137 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316 316 316 316 316 404 404 404	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4	
407 408 409 410 411 412 413 414 415 414 415 416 417 418 419 420 421 422 423	¢ 1/4" ¢ 1/4" CELAS2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 134 1. 135 1. 136 1. 137 1. 138 1.	HICH CON 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316 316 316 316 316 316 404 404 404	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6	
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407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438	\$ 1/4" CELAS2 CONM2 CONM	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 134 1. 135 1. 136 1. 137 1. 138 1. 139 1. 140 1. 141 1. 142 1. 143 1. 144 1. 145 1. 144 1. 145 1. 146 1. MASS AT RIB 205 206 207 208 209 210	HICH CON 5E+08	NECT RFI 315 315 315 315 315 315 316 316 316 316 316 316 316 316 316 316	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 9 0 0 2 5 9 000 2 5 9 000 2 5 9 000 2 5 9 000 2 5 9 000 2 5 9 000 2 5 9 000 2 5 9 0 0 0 2 5 9 0 0 0 2 5 9 0 0 2 5 9 0 0 0 2 5 9 0 0 2 5 9 0 0 2 5 9 0 2 5 9 0 0 2 5 9 0 0 1 2 5 9 0 0 1 2 5 9 0 0 1 2 5 9 0 0 0 2 5 9 0 0 0 2 5 9 0 0 0 2 5 9 0 0 0 2 5 9 0 0 2 5 9 0 0 1 2 2 3 5 9 0 1 2 2 5 9 0 1 2 5 9 0 0 1 2 5 9 0 0 1 2 5 9 0 0 2 5 9 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6	
407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439	\$ 1/4" CELAS2 CE	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 134 1. 135 1. 136 1. 137 1. 138 1. 138 1. 139 1. 140 1. 141 1. 142 1. 143 1. 144 1. 144 1. 145 1. 144 1. 145 1. 145 1. 146 1. 145 1. 146 1. 145 1. 146 1. 147 1. 147 1. 148 1. 149 1.	HICH CON 5E+08	NECT RFI 315 315 315 315 315 315 316 316 316 316 316 316 316 316 316 316	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 1 2 3 4 5 6 6 1 1 2 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 2 3 4 5 6 6 1 1 2 2 3 4 5 6 6 1 1 2 2 3 4 5 6 6 1 1 2 2 3 4 5 6 6 1 1 2 2 3 4 5 6 6 1 2 2 3 4 4 5 6 6 1 1 2 2 3 4 5 6 6 1 2 3 3 4 5 6 6 1 1 2 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 6 6 1 2 2 3 3 4 5 5 9 0002 5 9 0002 5 9 0000 2 5 9 0000 2 5 9 0000 2 5 9 0000 2 5 9 000 2 5 9 0 0 2 5 9 0 0 1 2 5 9 0 0 1 2 5 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6	
407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440	\$ 1/4" CELAS2 CONM2 CONM2 CONM2 CONM2 CONM2 CONM2 CONM2 CONM2 CONM2	DIAM BOLTS W 123 1. 124 1. 125 1. 126 1. 127 1. 128 1. 129 1. 130 1. 131 1. 132 1. 133 1. 133 1. 134 1. 135 1. 136 1. 137 1. 138 1. 139 1. 140 1. 141 1. 142 1. 143 1. 144 1. 145 1. 145 1. 146 1. 145 1. 146 1. 145 2. 206 207 208 209 210 211 212	HICH CON 5E+08	NECT RF1 315 315 315 315 315 315 316 316 316 316 316 316 316 316 316 316	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 6 1 2 3 3 4 5 6 0 0 2 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 0002 5 9 000 2 5 9 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1	2111 2111 2111 2111 2111 2111 2111 211	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6	

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TOPPORT OF A CONTRACT

442	CONM2	213	402	4	.00142				
443	CONM2	214	403	4	.00106				
444	CONM2	215	404	4	.00124				
445	CONM2	216	405	4	.00124				
446	CONM2	217	313	4	.00124				
447	CONM2	218	314	4	.00142				
448	CONM2	219	315	4	.00124				
449	CONM2		310	4	.00106				
451	COMM2	201	2106		040222				CON
452	+ON	6 795	2100	6 7 9 5	.049225	1	3 5 6 1		CON
453	S SENSOR	PLATE AND H		CEMENTS		1	3.391		
454	CTRIAS	229	11	2104	2013	2010			
455	CTRIA3	230	11	2026	2039	2112			
456	CTRIA3	231	11	2052	2065	2114			
457	CTRIA3	232	11	2078	2091	2116			
458	CQUAD4	261	10	2007	2020	2120	2119		
459	CTRIA3	233	11	2012	2111	2013			
460	CTRIA3	234	11	2111	2025	2026			
461	CTRIA3	235	11	2038	2113	2039			
462	CTRIAS	236	11	2113	2051	2052			
403	COUAD4	262	10	2033	2046	2121	2120		
465	CIRIRS	237	11	2004	2115	2065			
465	CTRIAS	230	11	2000	2117	2078			
467	CTRIAS	240	11	2117	2103	2104			
468	COUAD4	263	10	2059	2072	2122	2121		
469	CTRIA3	241	11	2013	2026	2111			
470	CTRIA3	242	11	2039	2052	2113			
471	CTRIA3	243	11	2065	2078	2115			
472	CTRIA3	244	11	2091	2104	2117			
473	CQUAD4	264	10	2085	2098	2119	2122		
474	CTRIA3	245	11	2110	2012	2013			
475	CTRIA3	246	11	2025	2112	2026			
476	CTRIA3	247	11	2112	2038	2039			
477	CTRIA3	248	11	2051	2114	2052			
478	CTRIA3	249	11	2114	2064	2065			
479	CTRIA3	250	11	2077	2116	2078			
480	CTRIAS	251	11	2110	2090	2091			
482	CTRIAS	253	10	2007	2119	2098			
483	CTRIA3	254	10	2033	2120	2020			
484	CTRIA3	255	10	2059	2121	2046			
485	CTRIA3	256	10	2085	2122	2072			
486	CTRIA3	257	10	2119	2106	2120			
487	CTRIA3	258	10	2120	2106	2121			
488	CTRIA3	259	10	2121	2106	2122			
489	CTRIAS	260	10	2122	2106	2119			
490		TVC							
492	\$ RTBS	123							
493	PBEAM *		1		1		.29	.00151041667	PB1
494	*PB1	.032518	6667		0.0	.00522	150000		
495	PBEAM *		2		1		.3375	.00175781250	PB5
496	*PB5	.051257	8125		0.0	.00	621100		
497	PBEAM *		3		1	_	.384	.002	PB9
498	*PB9	.075497	4720		0.0	.0	071797		
499	PBEAM *	10000	4		1		.43	.00223958333	PB13
500	PBI3	.10600	9333		0.0	•	4775	00249697017	7100
502	*DD17	14516	3070		0 0	0	.4//3 001276	.00248697917	FDI/
503	PBEAM *	.14010.	6		1		.5	.00260416667	PB21
504	*PB21	.16666	6667		0.0	.0	095964		
505	\$ HUB TO	RIBS CONNEC	TORS						
506	PBAR *		8		3	.0490	873859	.000191747598	PB25
507	*PB25	.00019174	7598	.00038	3495197		0.0		PB26
508	\$ SENSOR	PLATE TO RI	BS CC	NNECTORS					
509	PBAR *		9		3	.0283	528741	.639711713E-04	PB29
510	*PB29	. 639711713	E-04	.00012	7942343		0.0		PB30
511	\$ TRUSS E	AY							
512	FBAR	12	11	.12316	.0042	.0042	.0084	0.0	
514	S COMDER	LJ STON MEMBER	14 7 997	0011. 1100 W23W	.0042 1 AND 974	.0042 קרא דם פרא	.0084	0.0	
515	PBAR	14	3	.110446	0009707	0009707.0	019414	0.0	
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516	\$ CABLES						
517	PROD	7 2	.000767	.00	.0	כ	
518	\$ SENSOR PL	ATE		-			
519	PSHELL	10 4	0.40807	4			.000
520	\$ HUB						
521	PSHELL	11 5	.375	5			.000
522	\$ MATERIAL	CARDS					
523	\$ RIBS						
524	MAT1 *	1		1.0E+07	.375093773E+0	7	MATI
525	*MAT1	.0002539		0.0			
526	\$ CABLES						
527	MATI *	2		3.0E+07	.115384615E+0	3	MAT3
528	*MAT3	.0004585	-2	.535E-06			
529	\$ RIB TO HU	B CONNECTORS					
530	MATI *	3		.30E+08	.115384615E+0	3	MAT5
531	*MAT5	.0007332		-			
532	\$ SENSOR PL	ATE					
533	MATI *	4		.65E+07	.25E+0	7	MAT7
534	*MAT7	.0000512					
535	\$ HUB						
536	MATI *	5		.10E+08	.375093773E+0	7	MAT 9
537	*MAT9	.0002751					
538	\$ TRUSS BAY	•					
539	MAT1	11 1.E+07		.3332	.19E-04 0	. 0.	
540	MAT1	12 1.E+07		.3332	.29E-04 0	. 0.	
541	TEMPD	13 15000.					
542	\$						

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NUMBER OF TAXABLE PARTY

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543 ENDDATA

NONLINEAR ANALYSIS STEP 2, RESTART FROM LAST ITERATION IN STEP 1 1 \$ REFLECTOR ON ITS HORIZONTAL POSITION 2 3 NASTRAN FILES=(DB01) 4 ID STATIC NON-LINEAR ANALYSIS 5 SOL 64 6 **TIME 120** 7 CEND S CASE CONTROL DECK FOLLOWS 8 9 TITLE=REFLECTOR WITH TAPERED RIBS, HORIZONTAL POSITION 10 SPC=1 \$ CONSTRAINTS TEMP (LOAD) =13 \$ CABLES THERMAL LOAD 11 12 ECHO=SORT 13 LINE=40 LOAD=100 \$ APPLIED LOADS 14 \$ FIFTEEN DUMMY SUBCASES INCLUDED TO START FROM LATEST STRESS STATE IN STEP 1 15 16 SUBCASE 1 \$DUMMY SUBCASE 2 SDUMMY 17 SUBCASE 3 \$DUMMY 18 19 SUBCASE 4 SDUMMY SUBCASE 5 \$DUMMY 20 21 SUBCASE 6 \$DUMMY 22 SUBCASE 7 \$DUMMY SUBCASE 8 SDUMMY 23 24 SUBCASE 9 \$DUMMY 25 SUBCASE 10 SDUMMY SUBCASE 11 \$DUMMY 26 27 SUBCASE 12 \$DUMMY 28 SUBCASE 13 \$DUMMY SUBCASE 14 SDUMMY 29 30 SUBCASE 15 \$DUMMY 31 SUBCASE 16 SUBCASE 17 32 33 SUBCASE 18 34 DISP=ALL 35 SPCF=ALL 36 ELFOR=ALL 37 \$ PLOTTING 38 OUTPUT (PLOT) CSCALE=1.8 39 40 SCALE=0.1 41 PLOTTER NAST SET 1 INCLUDE ALL 42 43 PTITLE=NL ANALYSIS - SEMI-PRESHAPED REFLECTOR 44 FIND ORIGIN 1, SET 1 45 VIEW 180.0,0.0,0.0 46 PLOT SET 1, ORIGIN 1, SHAPE PLOT STATIC DEFORMATION, SET 1, ORIGIN 1, SHAPE 47 48 PLOT STATIC DEFORMATION 0, SET 1, ORIGIN 1, SYMBOLS 1 \$ BULK DATA FOLLOWS 49 BEGIN BULK 50 \$ LOAD APPLIED AT SENSOR PLATE ENDS 51 52 FORCE, 60, 2006, 0, 0., 0., 0., -1. FORCE, 60, 2019, 0, 0., 0., 0., -1. 53 54 FORCE, 60, 2032, 0, 3., 0., 0., -1. 55 FORCE, 60, 2045, 0, 0., 0., 0., -1. FORCE, 60, 2058, 0, 3., 0., 0., -1. 56 57 FORCE, 60, 2071, 0, 0., 0., 0., -1. 58 FORCE, 60, 2084, 0, 0., 0., 0., -1. 59 FORCE, 60, 2097, 0, 0., 0., 0., -1. 60 \$ TARGET WEIGHTS FORCE, 62, 2201, 0, .4, 0., 0., -1. 61 62 FORCE, 62, 2301, 0, .4, 0., 0., -1. 63 FORCE, 62, 2401, 0, .4, 0., 0., -1. 64 FORCE, 62, 2501, 0, .4, 0., 0., -1. 65 FORCE, 62, 2601, 0, .4, 0., 0., -1. 66 FORCE, 62, 2701, 0, .4, 0., 0., -1. 67 FORCE, 62, 2801, 0, .4, 0., 0., -1. 68 FORCE, 62, 2901, 0, .4, 0., 0., -1. 69 FORCE, 62, 2206, 0, .3, 0., 0., -1. 70 FORCE, 62, 2306, 0, .3, 0., 0., -1. 71 FORCE, 62, 2406, 0, .3, 0., 0., -1. 72 FORCE, 62, 2506, 0, .3, 0., 0., -1. 73 FORCE, 62, 2606, 0, .3, 0., 0., -1. 74 FORCE, 62, 2706, 0, .3, 0., 0., -1.

FORCE, 62, 2806, 0, .3, 0., 0., -1. FORCE, 62, 2906, 0, .3, 0., 0., -1. GRAV, 200, 0, 386., 0.0, 0.0, -1. LOAD, 100, 1., 1., 200, 1., 60, 1., 62 75 76 77 78 PARAM, COUPMASS, 1 PARAM, DLOAD, -1 PARAM, GRDPNT, 0 79 80 81 PARAM, MAXRATIO, 5.E+06 PARAM, SUBSKP, 15 82 83 84 PARAM, TESTNEG, -2 85 PARAM, K6ROT, 10. 86 87 TEMPD, 13, 15000.

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THE OTHER PLAN

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SUS INCOME (118)

ENDDATA

RUNSTREAM OF PRESTRESS MODEL OF INCLINED REFLECTOR , STEP 2 1 \$ APPLIED LOADS ARE CABLE THERMAL LOAD, GRAVITY, TARGET WEIGHTS AND PRESTRESS 2 FORCES 3 4 NASTRAN FILES=(DB01) ID INCLINED REFLECTOR 5 APP DISPLACEMENT 6 SOL 64 7 TIME 120 8 CEND 9 10 \$ Start Case Control Deck TITLE = INCLINED REFLECTOR, PRESTRESS MODEL, STEP 1 11 ECHO = SORT12 13 LINE = 35SET 20 = 2001 THRU 2072, 2101 THRU 2108, 2157 thru 2176 14 15 SPC = 100 \$ Constraints 16 LOAD=262 \$ Applied loads TEMP(LOAD)=13 \$ Thermal load on cables 17 18 SUBCASE 1 19 LABEL= LINEAR STATIC SOLUTION SUBCASE 2 20 21 LABEL = K + DIFFERENTIAL K22 SUBCASE 3 LABEL=FIRST NON-LINEAR ITERATION 23 24 OUTPUT (PLOT) 25 CSCALE=1.8 PLOTTER NAST 26 27 SET 30 = all28 AXES Y, X, Z VIEW=0.,0.,0. 29 PTITLE=SIDE VIEW 30 31 PLOT STATIC DEFORMATION, 3, SET 30, ORIGIN 30 PLOT STATIC DEFORMATION 0, 3, SET 30, ORIGIN 30 32 BEGIN BULK 33 3 34 CORD2C 3 0 615.00 0.00000 56.110 590.22 0.00000 86.707+CS 3 645.60 0.00000 80.885 35 +CS LOAD, 262, 1., 1., 62, 1., 200, 1., 60 36 37 PARAM GRDPNT 0 38 PARAM COUPMASS1 PARAM, K6ROT, 10. 39 40 PARAM, MAXRATIO, 1.5E+05 SPC1,100,123456,261 41 SPC1, 100, 123456, 262 42 43 SPC1,100,123456,263 44 SPC1, 100, 123456, 264 45 ŝ 46 GRAV 200 386. 0. ٥. -1. 0 \$ TARGET WEIGHTS 47 48 FORCE, 60, 2201, 0, .4, 0., 0., -1. 49 FORCE, 60, 2206, 0, .3, 0., 0., -1. FORCE, 60, 2301, 0, .4, 0., 0., -1. 50 FORCE, 60, 2306, 0, .3, 0., 0., -1. 51 FORCE, 60, 2401, 0, .4, 0., 0., -1. 52 FORCE, 60, 2406, 0, .3, 0., 0., -1. 53 54 FORCE, 60, 2501, 0, .4, 0., 0., -1. FORCE, 60, 2506, 0, .3, 0., 0., -1. 55 56 FORCE, 60, 2601, 0, .4, 0., 0., -1. 57 FORCE, 60, 2606, 0, .3, 0., 0., -1. FORCE, 60, 2701, 0, .4, 0., 0., -1. 58 FORCE, 60, 2706, 0, .3, 0., 0., -1. 59 60 FORCE, 60, 2801, 0, .4, 0., 0., -1. 61 FORCE, 60, 2806, 0, .3, 0., 0., -1. 62 FORCE, 60, 2901, 0, .4, 0., 0., ~1. FORCE, 60, 2906, 0, .3, 0., 0., -1. 63 S EXTERNAL APPLIED FORCE AT THE RIBS 64 65 FORCE, 63, 2002, 0, .5, 0., 0., -1. 66 FORCE, 63, 2015, 0, .5, 0., 0., -1. 67 FORCE, 63, 2028, 0, .5, 0., 0., -1. FORCE, 63, 2041, 0, .5, 0., 0., -1. 68 69 FORCE, 63, 2054, 0, .5, 0., 0., -1. 70 FORCE, 63, 2067, 0, .5, 0., 0., -1. 71 FORCE, 63, 2080, 0, .5, 0., 0., -1. FORCE, 63, 2093, 0, .5, 0., 0., -1. 72 73 TEMPD, 13, 235.8 \$ PRESTRESS FORCES GENERATED FROM PRESTRESS CASE FOR TEMP=235.8 DEG F 74

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75	FORCE	62	2001	3	1 39078 7 0 0
75	FORCE	02,	2001,	3,	1.53070,1.,0.,0.
76	FORCE	62,	2001,	3,	-0.00006,0.,1.,0.
77	FORCE	62,	2001,	з,	-3.99135,0.,0.,1.
78	FORCE	62.	2002.	З.	-1.65445.1.0.0.
70	PODCE	60	2002	- ´	-0 00001 0 1 0
19	FORCE	02,	2002,	3,	-0.00001,0.,1.,0.
80	FORCE	62,	2002,	з,	-0.26564, 0., 0., 1.
81	FORCE	62.	2003,	З,	-1.68624,1.,0.,0.
02	FORCE	62	2003	ຈ່	0 00001 0 1 0
02	FORCE	02,	2005,	2,	0.00001,0.,1.,0.
83	FORCE	62,	2003,	з,	-0.03636,0.,0.,1.
84	FORCE	62,	2004,	з,	-0.35100,1.,0.,0.
85	FORCE	62	2004	ું	-0.00002.0.1.0.
0.5	TORCE	~~~	2004,	5	1 20020 0 0 1
86	FORCE	٥ <i>∠</i> ,	2004,	з,	1.20939,0.,0.,1.
87	FORCE	62,	2005,	з,	-1.79837,1.,0.,0.
88	FORCE	62.	2005,	з,	0.00003,0.,1.,0.
90	FORCE	62	2005	વં	0 61360 0 0 1
0.5	FORCE	<u>,</u>	2000,		0.02330,0.,0.,2.
90	FORCE	62,	2006,	3,	-0.93170,1.,0.,0.
91	FORCE	62,	2006,	з,	-0.00001,0.,1.,0.
92	FORCE	62,	2006,	з,	1.04994,0.,0.,1.
02	FORCE	62	2008	ຊ໌	-0 07452 1 0 0
3.5	FORCE	<i>co</i> ,	2000,		0.00000 0 1 0
94	FORCE	62,	2008,	3,	-0.00002,0.,1.,0.
95	FORCE	62,	2008,	з,	0.91970,0.,0.,1.
96	FORCE	62.	2009.	з,	-0.02486,1.,0.,0.
97	FORCE	62	2000	3	0.00004.0.1.0
00	TOTOE	<u> </u>	2000,	5	0 04405 0 0 1
78	FORCE	02,	2009,	3,	0.84485,0.,0.,1.
99	FORCE	62,	2010,	З,	-0.00020,1.,0.,0.
100	FORCE	62.	2010.	з,	-0.00002,0.,1.,0.
101	FORCE	62	2010	9	0 08302 0 0 1
101	PORCE	~~~	2010,		17 10000 1 0 0
102	FORCE	62,	2011,	з,	17.18982,1.,0.,0.
103	FORCE	62,	2011,	з,	-0.00001,0.,1.,0.
104	FORCE	62,	2011,	з,	0.00001,0.,0.,1.
105	FORCE	62.	2014,	з,	1.39077,1.,0.,0.
106	FORCE	62	2014	3.	-0.00004.0.1.0.
107	FORCE	62	2014	-, ۲	-3 99131.0.0.1.
107	TORCE	<i>c</i> o	2014,	2,	-1 65447 1 0 0
108	FORCE	02,	2015,	з,	-1.65447,1.,0.,0,
109	FORCE	62,	2015,	٤,	0.00003,0.,1.,0.
110	FORCE	62,	2015,	З,	-0.26559,0.,0.,1.
111	FORCE	62,	2016,	з,	-1.68624,1.,0.,0.
112	FORCE	62,	2016,	З,	0.00000,0.,1.,0.
113	FORCE	62	2016.	3.	-0.03636.0.0.1.
114	FORCE	62	2017	3	-0 35102 1 0 0
114	FORCE	<i>c</i> 2,	2017,	5,	0.00000 0 1 0
112	FORCE	62,	2017,	3,	0.00000,0.,1.,0.
116	FORCE	62,	2017,	З,	1.20949,0.,0.,1.
117	FORCE	62,	2018,	З,	-1.79836,1.,0.,0.
118	FORCE	62,	2018,	з,	0.00012,0.,1.,0.
119	FORCE	62	2018	з.	0.61359.0.0.1.
120	FORCE	62	2010	3	-0 93171 1 0 0
120	FORCE	<u>.</u>	2019,	2,	
121	FORCE	62,	2019,	3,	0.00007,0.,1.,0.
122	FORCE	62,	2019,	з,	1.05002,0.,0.,1.
123	FORCE	62,	2021,	з,	-0.07452,1.,0.,0.
124	FORCE	62.	2021.	з,	0.00001,0.,1.,0.
125	FORCE	62	2021	ີ່	0 91979 0 0 1
100	FORCE	~~~	2022,	5	0 00496 1 0 0
120	FORCE	02, cc	2022,	5,	0.02400,1.,0.,0.
127	FORCE	02,	2022,	, د	-0.00007,0.,1.,0.
128	FORCE	62,	2022,	З,	0.84470,0.,0.,1.
129	FORCE	62,	2023,	З,	-0.00020,1.,0.,0.
130	FORCE	62	2023.	3.	0.00003.010
191	FORCE	62	2023	2	0 08309 0 1
100	TORCE	22,	2023,	5,	17 10000 1 0 0
132	FORCE	62,	2024,	3,	17.18982,1.,0.,0.
133	FORCE	62,	2024,	З,	0.00009,0.,1.,0.
134	FORCE	62,	2024,	з,	0.00002,0.,0.,1.
135	FORCE	62.	2027.	з.	1.39080,1.,0.,0.
136	FORCE	62	2027	3	-0.00020.0.1.0
127	FORCE	60	2027	3	_3 00135 0 0 1
121	FORCE	02,	2021,	2,	- 3, 33133, 0, , 0, , 1.
138	FORCE	62,	2028,	, د	-1.65446,1.,0.,0.
139	FORCE	62,	2028,	з,	0.00000,0.,1.,0.
140	FORCE	62,	2028,	З,	-0.26561,0.,0.,1.
141	FORCE	62	2029	ิเ	-1.68623.1.0.0
140	FORCE	50	2020	- , - ,	-0 00001 0 1 0
142	FORCE	02,	2029,	5,	- 0.00001,0.,1.,0.
143		L '7	2029,	з,	-0.03858,0.,0.,1.
	FORCE	02,		~	
144	FORCE	62,	2030,	З,	-0.35099,1.,0.,0.
144 145	FORCE FORCE FORCE	62, 62,	2030, 2030,	3, 3,	-0.35099,1.,0.,0. -0.00010,0.,1.,0.
144 145 146	FORCE FORCE FORCE	62, 62, 62,	2030, 2030, 2030.	3, 3, 3.	-0.35099,1.,0.,0. -0.00010,0.,1.,0. 1.20939,00.,1.
144 145 146	FORCE FORCE FORCE	62, 62, 62, 62,	2030, 2030, 2030, 2030,	3, 3, 3,	-0.35099,1.,0.,0. -0.00010,0.,1.,0. 1.20939,0.,0.,1.
144 145 146 147	FORCE FORCE FORCE FORCE	62, 62, 62, 62,	2030, 2030, 2030, 2030, 2031,	3, 3, 3, 3,	-0.35099,1.,0.,0. -0.00010,0.,1.,0. 1.20939,0.,0.,1. -1.79834,1.,0.

THE REAL PROPERTY.

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	149	FORCE	62,	2031,	З,	0.61348,0.,0.,1.
	150	FORCE	62,	2032,	З,	-0.93170,1.,0.,0.
	151	FORCE	62,	2032,	З,	-0.00003,0.,1.,0.
	152	FORCE	62,	2032,	з,	1.04993,0.,0.,1.
	153	FORCE	62,	2034,	З,	-0.07452,1.,0.,0.
	154	FORCE	62,	2034,	З,	0.00002,0.,1.,0.
	155	FORCE	62,	2034,	З,	0.91978,0.,0.,1.
	156	FORCE	62,	2035,	З,	-0.02486,1.,0.,0.
	157	FORCE	62,	2035,	З,	-0.00007,0.,1.,0.
	158	FORCE	62,	2035,	З,	0.84470,0.,0.,1.
	159	FORCE	62,	2036,	З,	-0.00020,1.,0.,0.
	160	FORCE	62,	2036,	З,	0.00006,0.,1.,0.
	161	FORCE	62,	2036,	З,	0.08313,0.,0.,1.
-	162	FORCE	62,	2037,	з,	17.18982,1.,0.,0.
	163	FORCE	62,	2037,	З,	0.00004,0.,1.,0.
	164	FORCE	62,	2037,	З,	-0.00002,0.,0.,1.
-	165	FORCE	62,	2040,	З,	1.39074,1.,0.,0.
	166	FORCE	62,	2040,	З,	0.00004,0.,1.,0.
	167	FORCE	62,	2040,	З,	-3.99126,0.,0.,1.
	168	FORCE	62,	2041,	З,	-1.65445,1.,0.,0.
	169	FORCE	62,	2041,	з,	0.00000,0.,1.,0.
	170	FORCE	62,	2041,	3,	-0.26565,0.,0.,1.
	171	FORCE	62,	2042,	3,	-1.68627,1.,0.,0.
	172	FORCE	62,	2042,	3,	0.00000,0.,1.,0.
	173	FORCE	62,	2042,	3,	-0.03627,0.,0.,1.
	174	FORCE	62,	2043,	3,	-0.35103,1.,0.,0.
	175	FORCE	62,	2043,	3,	0.00003,0.,1.,0.
	176	FORCE	62,	2043,	3,	1.20951,0.,0.,1.
	177	FORCE	62,	2044,	3,	-1./9834,1.,0.,0.
	178	FORCE	62,	2044,	3,	0.00000, 0., 1., 0.
	179	FORCE	62,	2044,	3,	0.61349, 0., 0., 1.
	180	FORCE	62,	2045,	3,	
	191	FORCE	οz,	2045,	3,	
	182	FORCE	62,	2045,	3,	-0.07452] 0.0
	103	FORCE	62,	2047,	2,	
	185	FORCE	62,	2047, 2047	יר, ק	0.00001, 0., 1., 0.
	186	FORCE	62.	2048.	3.	-0.02486.1.0.0.
	187	FORCE	62.	2048.	з.	0.00001.0.,1.,0.
	188	FORCE	62.	2048.	з.	0.84476,0.,0.,1.
	189	FORCE	62,	2049.	3,	-0.00020,1.,0.,0.
	190	FORCE	62,	2049,	з,	-0.00001,0.,1.,0.
	191	FORCE	62,	2049,	з,	0.08306,0.,0.,1.
	192	FORCE	62,	2050,	З,	17.18982,1.,0.,0.
	193	FORCE	62,	2050,	З,	-0.00001,0.,1.,0.
	194	FORCE	62,	2050,	З,	-0.00001,0.,0.,1.
	195	FORCE	62,	2053,	З,	1.39074,1.,0.,0.
	196	FORCE	62,	2053,	З,	-0.00004,0.,1.,0.
	197	FORCE	62,	2053,	З,	-3.99126,0.,0.,1.
	198	FORCE	62,	2054,	З,	-1.65445,1.,0.,0.
	199	FORCE	62,	2054,	з,	-0.00001,0.,1.,0.
	200	FORCE	62,	2054,	3,	-0.26565,0.,0.,1.
	201	FORCE	62,	2055,	3,	-1.68627,1.,0.,0.
	202	FORCE	62,	2055,	3,	
	203	FORCE	62,	2055,	3,	
	205	FORCE	62	2056	3	-0 00003 0 1 0
	206	FORCE	62.	2056.	э.	1.20951.001.
	207	FORCE	62.	2057.	3.	-1.79834.1.0.0.
-	208	FORCE	62.	2057.	3.	0.00000,0.,1.,0.
-	209	FORCE	62,	2057,	з,	0.61349,0.,0.,1.
4	210	FORCE	62,	2058,	з,	-0.93171,1.,0.,0.
-	211	FORCE	62,	2058,	З,	-0.00003,0.,1.,0.
	212	FORCE	62,	2058,	з,	1.04999,0.,0.,1.
-	213	FORCE	62,	2060,	з,	-0.07452,1.,0.,0.
	214	FORCE	62,	2060,	З,	-0.00001,0.,1.,0.
	215	FORCE	62,	2060,	З,	0.91978,0.,0.,1.
;	216	FORCE	62,	2061,	З,	-0.02486,1.,0.,0.
-	217	FORCE	62,	2061,	З,	-0.00001,0.,1.,0.
-	218	FORCE	62,	2061,	З,	0.84476,0.,0.,1.
	219	FORCE	62,	2062,	З,	
-	220	FORCE	62,	2062,	, د	
	221	FORCE	0∠, 67	2002,	3,	0.00300,0.,0.,1. 17 10003 1 / /
	<i>444</i>	FURCE	ο∠,	2003,	з,	11,10902,1.,0.,0.

	_			~	0 00001 0 1 0
223	FORCE	62,	2063,	3,	0.00001,0.,1.,0.
224	FORCE	62.	2063.	з.	-0.00001,0.,0.,1.
227	50000	20	2066		1 39075 1 0 0.
225	FORCE	6Z,	2000,	э,	1.33073,1.,0.,0.
226	FORCE	62,	2066,	з,	-0.00003,0.,1.,0.
007	FORCE	62	2066	3.	-3.99124.0.0.1
221	FORCE	02,	2000,	2,	1 65446 1 0 0
228	FORCE	62,	2067,	з,	-1.65446,1.,0.,0.
229	FORCE	62.	2067.	з,	-0.00004,0.,1.,0.
223		20	0067	ົ່	-0 26560 0 1
230	FORCE	62,	2067,	з,	-0.28380,0.,0.,1.
231	FORCE	62,	2068,	з,	-1.68623,1.,0.,0.
	RODCR	62	2069	٦	0 00001.0.1.0.
232	FORCE	02,	2000,	2,	0.00002,01,01,01
233	FORCE	62,	2068,	З,	-0.03637,0.,0.,1.
234	FORCE	62.	2069.	з.	-0.35099,1.,0.,0.
231		20	0050	່	0 00011 0 1 0
235	FORCE	οz,	2009,	,د	0.00011,0.72.70.
236	FORCE	62,	2069,	З,	1.20940,0.,0.,1.
0.07	FORCE	62	2070.	3.	-1,79834,1.,0.,0.
231	FORCE	~~	0070	2	0 00002 0 1 0
238	FORCE	ΦZ,	2070,	3,	0.00002,0.,2.,0.
239	FORCE	62,	2070,	з,	0.61348,0.,0.,1.
240	FORCE	62	2071.	з.	-0.93170,1.,0.,0.
240	FORCE			- /	0 00000 0 1 0
241	FORCE	62,	2071,	з,	0.00003,0.,1.,0.
242	FORCE	62,	2071,	з,	1.04993,0.,0.,1.
242	PODCP	62	2073	વં	-0 07452.1.0.0.
243	FORCE	02,	2075,		
244	FORCE	62,	2073,	3,	-0.00002,0.,1.,0.
245	FORCE	62,	2073,	З,	0.91978,0.,0.,1.
246	FORCE	62	2074	ຊ່	-0.02486.1.0.0.
240	FURCE	02, 	20/4/	2,	0 00007 0 1 0
247	FORCE	62,	2074,	З,	0.00007,0.,1.,0.
248	FORCE	62.	2074.	з,	0.84470,0.,0.,1.
240	DODGE	60	2075	2	-0 00020 1 0 0
249	FORCE	04,	2075,	5,	-0.00020,1.,0.,0.
250	FORCE	62,	2075,	з,	-0.00008,0.,1.,0.
251	FORCE	62.	2075.	з,	0.08311,0.,0.,1.
050	FORCE	60	2076	3	17 18982 1 0 .0
252	FORCE	σ ∠,	2076,	3,	17.10302,1.,0.,0.
253	FORCE	62,	2076,	з,	-0.00002,0.,1.,0.
254	FORCE	62.	2076.	з,	0.00000,0.,0.,1.
055	FORCE	60	2070		1 39068 1 .0 .0.
255	FORCE	02,	2073,	3,	1.55000,1.70.70.
256	FORCE	62,	2079,	з,	-0.00016,0.,1.,0.
257	FORCE	62.	2079,	з,	-3.99112,0.,0.,1.
201	TODOT	60	2000	3	-1 65447 1 0 0
258	FORCE	02,	2000,	5,	-1.03447,1.,0.,0.
259	FORCE	62,	2080,	з,	-0.00003,0.,1.,0.
260	FORCE	62.	2080.	3,	-0.26559,0.,0.,1.
200	BODGB	60	2001	2	-1 68624 1 0 0
261	FORCE	0 Ζ ,	2001,	3,	-1.00024,1.,0.,0.
262	FORCE	62,	2081,	З,	0.00001,0.,1.,0.
263	FORCE	62.	2081.	з,	-0.03636,0.,0.,1.
200	800.02	c0	2002	່	-0 35102 1 0 0
264	FORCE	02,	2002,	5,	-0.55102,1.,0.,0.
265	FORCE	62,	2082,	з,	-0.00001,0.,1.,0.
266	FORCE	62.	2082.	3.	1.20948,0.,0.,1.
200	Poncu	C D	2002	°.	-1 70934 1 0 0
267	FORCE	٥ <i>∠</i> ,	2085,	3,	-1.13854,1.,0.,0.
268	FORCE	62,	2083,	з,	0.00003,0.,1.,0.
269	FORCE	62.	2083,	з,	0.61348,0.,0.,1.
220	FORCE	60	2084	່ຈ່	-0 93169.1.0.0.
270	FORCE	02,	2004,		0.00005 0 1 0
271	FORCE	62,	2084,	3,	0.00005,0.,1.,0.
272	FORCE	62,	2084,	з,	1.04991,0.,0.,1.
273	FORCE	62	2086	3.	-0.07452.1.0.0.
273	TORCE	20	2006	2	-0 00002 0 1 0
2/4	FORCE	ο ∠ ,	2080,	2,	-0.00002,0.,1.,0.
275	FORCE	62,	2086,	3,	0.91978,0.,0.,1.
276	FORCE	62.	2087.	3.	-0.02486,1.,0.,0.
	FORCE	60	2007	ີ	0 00007 0 1 0
211	FORCE	02,	2007,	3,	0.00007,01,1.,0.
278	FORCE	62,	2087,	3,	0.84470,0.,0.,1.
279	FORCE	62.	2088.	з,	-0.00020,1.,0.,0.
280	FORCE	62	2088	્ર	-0.00003.0.1.0.
280	FORCE	02,	2000,	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	0.00000,01,21,01
281	FORCE	62,	2088,	3,	0.08309,0.,0.,1.
282	FORCE	62,	2089,	з,	17.18982,1.,0.,0.
283	FORCE	62	2089.	з.	-0.00009,0.,1.,0.
200	- 01.0B	60	2000	ີ້	0 00002 0 0 1
284	FORCE	02,	2009,		
285	FORCE	62,	2092,	З,	1.39079,1.,0.,0.
286	FORCE	62	2092.	З.	0.00003,0.,1.,0.
200		60	2002	'	-3 99136 0 0 1
287	FORCE	02,	2092,	3,	
288	FORCE	62,	2093,	3,	-1.65445,1.,0.,0.
289	FORCE	62	2093.	3.	0.00001,0.,1.,0.
200	TODOD	62	2003	- 1	-0 26564 0 0 1
290	FORCE	04,	2033,	, c.	
291	FORCE	62,	2094,	З,	-1.68624,1.,0.,0.
292	FORCE	62.	2094.	3.	-0.00001,0.,1.,0.
202	FORGE	62	2004	- 2'	-0 03636 0 0 1
293	FORCE	οΖ,	2034,	<u> </u>	
294	FORCE	62,	2095,	3,	-0.35100,1.,0.,0.
295	FORCE	62.	2095.	3.	0.00002,0.,1.,0.
222	BODOT	60	2005	'	1 20940 0 1
296	FORCE	ō∠,	∡∪y j,	э,	T. T. C.

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297	FORCE	62,	2096,	3,	-1.79836,1.,0.,0.
298	FORCE	62,	2096,	з,	-0.00003,0.,1.,0.
299	FORCE	62,	2096,	з,	0.61358,0.,0.,1.
300	FORCE	62,	2097,	3,	-0.93170,1.,0.,0.
301	FORCE	62,	2097,	3,	0.00001,0.,1.,0.
302	FORCE	62.	2097.	з,	1.04994,0.,0.,1.
303	FORCE	62.	2099.	з,	-0.07452,1.,0.,0.
304	FORCE	62.	2099.	3.	0.00002.0.1.0.
305	FORCE	62.	2099.	3.	0.91970.0.0.1.
306	FORCE	62	2100		-0 02486 1 0 0
307	FORCE	62	2100,	2,	-0 00004 0 1 0
309	FORCE	62,	2100,	э, ч	0 84485 0 0 1
308	FORCE	62	2100,	3	
309	FORCE	62,	2101,	3,	0.00002.0,1.,0.,0.
310	FORCE	62,	2101,	ے, م	0.00002,0.,1.,0.
311	FORCE	62,	2101,	э, э	
312	FORCE	62,	2102,	3,	17.18982,1.,0.,0.
313	FORCE	62,	2102,	3,	0.00001,0.,1.,0.
314	FORCE	62,	2102,	3,	0.00001,0.,0.,1.
315	FORCE	62,	2123,	3,	-1.49813,1.,0.,0.
316	FORCE	62,	2123,	3,	0.00000,0.,1.,0.
317	FORCE	62,	2123,	З,	-0.50658,0.,0.,1.
318	FORCE	62,	2124,	З,	-1.49811,1.,0.,0.
319	FORCE	62,	2124,	З,	-0.00002,0.,1.,0.
320	FORCE	62,	2124,	З,	-0.50664,0.,0.,1.
321	FORCE	62,	2125,	З,	-1.49814,1.,0.,0.
322	FORCE	62.	2125.	з.	0.00009.010.
323	FORCE	62.	2125.	3.	-0.50655.001.
324	FORCE	62.	2126.	з.	-1.49809.100.
325	FORCE	62.	2126.	з.	-0.00003.010.
326	FORCE	62.	2126.	3.	-0.50670.0.0.1.
327	FORCE	62.	2127.	3.	-1.49809.1.0.0.
328	FORCE	62.	2127.	3.	0 00003.0 .1 .0
329	FORCE	62	2127	3.	-0 50670.0 .0 .1
330	FORCE	62	2128	3	-1 49814 1 0 0
331	FORCE	62	2120,	3	
332	FORCE	62,	2120,	3,	-0.50655 0 0 1
332	FORCE	62,	2120,	3,	
333	FORCE	62,	2129,	3,	
334	FORCE	62,	2129,	3,	0.00001,0.,1.,0.
335	FORCE	62,	2129,	3,	-0.30665,0.,0.,1.
336	FORCE	62,	2130,	3,	-1.49813,1.,0.,0.
337	FORCE	62,	2130,	3,	0.00000,0.,1.,0.
338	FORCE	62,	2130,	3,	-0.50658,0.,0.,1.
232	FORCE	02,	2201,	3,	-0.03391,1.,0.,0.
340	FORCE	62,	2201,	3,	0.00007,0.,1.,0.
341	FORCE	62,	2201,	3,	0.07853,0.,0.,1.
342	FORCE	62,	2206,	3,	-0.00016,1.,0.,0.
343	FORCE	62,	2206,	3,	0.00000,0.,1.,0.
344	FORCE	62,	2206,	3,	0.00089,0.,0.,1.
345	FORCE	62,	2301,	3,	-0.03388,1.,0.,0.
346	FORCE	62,	2301,	3,	0.00002,0.,1.,0.
347	FORCE	62,	2301,	3,	0.07846,0.,0.,1.
348	FORCE	62,	2306,	3,	-0.00014, 1., 0., 0.
349	FORCE	62,	2306,	3,	-0.00017,0.,1.,0.
350	FORCE	62,	2306,	3,	0.00076,0.,0.,1.
351	FORCE	62,	2401,	З,	-0.03390,1.,0.,0.
352	FORCE	62,	2401,	3,	0.00021,0.,1.,0.
353	FORCE	62,	2401,	з,	0.07852,0.,0.,1.
354	FORCE	62,	2406,	з,	-0.00018,1.,0.,0.
355	FORCE	62,	2406,	З,	0.00008,0.,1.,0.
356	FORCE	62,	2406,	з,	0.00098,0.,0.,1.
357	FORCE	62,	2501,	з,	-0.03386,1.,0.,0.
358	FORCE	62,	2501,	З,	-0.00004,0.,1.,0.
359	FORCE	62,	2501,	З,	0.07842,0.,0.,1.
360	FORCE	62,	2506,	з,	-0.00016,1.,0.,0.
361	FORCE	62,	2506,	З,	-0.00003,0.,1.,0.
362	FORCE	62,	2506,	З,	0.00087,0.,0.,1.
363	FORCE	62,	2601,	З,	-0.03386,1.,0.,0.
364	FORCE	62,	2601,	З,	0.00004,0.,1.,0.
365	FORCE	62,	2601,	З,	0.07842,0.,0.,1.
366	FORCE	62,	2606,	З,	-0.00016,1.,0.,0.
367	FORCE	62,	2606,	З,	0.00003,0.,1.,0.
368	FORCE	62,	2606,	З,	0.00087,0.,0.,1.
369	FORCE	62,	2701,	З,	-0.03385,1.,0.,0.
370	FORCE	62,	2701,	З,	0.00006,0.,1.,0.

271	FORCE	62	2701	3	0 07839.0	1.0.1.
3/1	FORCE	02,	2701,	, <u>,</u>	0.07039,0	
372	FORCE	62,	2706,		-0.00018,1	1.,0.,0.
373	FORCE	62,	2706,	, <u>,</u>	-0.00008,0	J., I., U.
374	FORCE	62,	2706,	. З,	0.00098,0	0.,0.,1.
375	FORCE	62,	2801,	, 3,	-0.03379,3	1.,0.,0.
376	FORCE	62,	2801,	, 3,	0.00018,0	0.,1.,0.
377	FORCÉ	62.	2801	3,	0.07825,0	0.,0.,1.
379	FORCE	62	2806	3.	-0.00018.3	100.
370	FORCE	62	2806	,	-0.00008.0	010.
3/3	FORCE	c2,	2000	, <i>J</i> ,	0.00000,	0 0 1
380	FORCE	62,	2806	, <u>s</u> ,	0.00099,0	0.,0.,1.
381	FORCE	62,	2901	, 3,	-0.03392,	1.,0.,0.
382	FORCE	62,	2901.	, З,	-0.00004,	0.,1.,0.
383	FORCE	62,	2901	, 3,	0.07855,0	0.,0.,1.
384	FORCE	62.	2906	. 3.	-0.00016,	1.,0.,0.
395	FORCE	62	2906	3	0.00000.0	010.
202	FORCE	62	2006	, <u>,</u>	0 00090	0 0 1
300	FORCE	02, 170801				.,
387	S REF	LECTO	K SUPP		RUCIORE	25 0000
388	GRID,	261,	0,610	.0000,	5.0000,	35.0000
389	GRID,	262,	0,610	.0000,	-5.0000,	35.0000
390	GRID,	263,	0,620	.0000,	-5.0000,	35.0000
391	GRID.	264.	0,620	.0000,	5.0000,	35.0000
302	CPTD	265	0 610	0000.	5.0000.	45,0000
392	CRID,	200,	0 610	00000	-5 0000	45 0000
393	GRID,	200,	0,610		-5.0000,	45.0000
394	GRID,	267,	0,620	.0000,	-5.0000,	45.0000
395	GRID,	268,	0,620	.0000,	5.0000,	45.0000
396	GRID,	485,	0,610	.0000,	5.0000,	52.0600
397	GRID.	486.	0.610	.0000,	-5.0000,	52.0600
300	CRTD	487	0 620	0000.	-5.0000.	60.1600
200	GRID,	101,	0,010	0000	5 0000	60 1600
399	GRID,	400,	0,620		5.0000,	00.2000
400	\$ RIB	S				
401	GRID,	2001,	3, 92	.6563,	22.5000,	19.7947,3
402	GRID,	2002,	3, 79	.8800,	22.5000,	14.3245,3
403	GRID.	2003.	3, 70	.2500,	22.5000,	10.6072,3
404	GRID	2004	3. 58	7500	22.5000.	6.7322.3
405	CRTD	2005	3 47	2500	22 5000	3 9197 3
405	GRID,	2005,	3, 47	.2300,	22.5000,	1 0570 3
406	GRID,	2006,	3, 35	. /500,	22.5000,	1.8572,3
407	GRID,	2007,	3, 35	.3500,	22.5000,	2.4375,3
408	GRÍD,	2008,	3, 26	.5000,	22.5000,	0.8572,3
409	GRID,	2009,	3, 17	.2500,	22.5000,	0.3572,3
410	GRID,	2010,	3, 8	.0000,	22.5000,	0.3125,3
411	GRID.	2011.	3. 4	. 6000.	22.5000.	0.3125.3
412	GRID	2012	3 8	0000	22 5000	0 0000 3
412	CRID,	2012,	2 4	6000	22.5000,	0.0000 3
413	GRID,	2013,	3, 4		22.5000,	10.0000,3
414	GRID,	2014,	3, 92	. 6563,	67.5000,	19./94/,3
415	GRID,	2015,	3, 79	.8800,	67.5000,	14.3245,3
416	GRID,	2016,	3, 70	.2500,	67.5000,	10.6072,3
417	GRID,	2017,	3, 58	.7500,	67.5000,	6.7322,3
418	GRID,	2018,	3, 47	.2500,	67.5000,	3.9197,3
419	GRID.	2019.	3. 35	.7500.	67.5000.	1.8572.3
420	CRID	2020	3 35	3500	67 5000	2 4375 3
401	CRID,	2020,	3, 33	5000,	67 5000,	2.4575,5 0.0577 3
421	GRID,	2021,	3, 20		67.5000,	0.0572,5
422	GRID,	2022,	3, 11	.2300,	67.5000,	0.3572,3
423	GRID,	2023,	3, 8	.0000,	67.5000,	0.3125,3
424	GRID,	2024,	3, 4	.6000,	67.5000,	0.3125,3
425	GRID,	2025,	3, 8	.0000,	67.5000,	0.0000,3
426	GRID.	2026.	3. 4	. 6000.	67.5000.	0.0000.3
427	CRTD	2027	3 92	6563	112 5000	19 7947 3
400	ONID,	2027,	3 70		110 5000,	14 3045 3
420	GRID,	2020,	3, 79		112.5000,	14.5245,5
429	GRID,	2029,	3, 70	.2500,	112.5000,	10.6072,3
430	GRID,	2030,	3, 58	.7500,	112.5000,	6.7322,3
431	GRID,	2031,	3, 47	.2500,	112.5000,	3.9197,3
432	GRID,	2032,	3, 35	.7500,	112.5000,	1.8572,3
433	GRID	2033	3, 35	.3500	112.5000	2.4375.3
434	GRTD	2034	3, 26	.5000	112.5000	0.8572 3
125	CBTD	2025	2 17	2500	112 5000	0 3572 3
400	GRID,	2033,	2, 1,	.2300,	110 5000,	0.0012,0
436	GRID,	2036,	3, 8	.0000,	112.5000,	0.3125,3
437	GRID,	2037,	3, 4	.6000,	112.5000,	0.3125,3
438	GRID,	2038,	3, 8	.0000,	112.5000,	0.0000,3
439	GRID.	2039,	3, 4	.6000.	112.5000.	0.0000,3
440	GRID	2040	3, 92	. 6563	157.5000	19,7947.3
441	CPTD	2041	3, 70	8800	157.5000	14.3245 3
440	CDTD -	2042	3 70	2500,	157 5000,	10 6070 0
442	GRID,	2042,	3, 10	.2301,	121.2000	10.00/2,3
443	GRID,	2043,	3, 58	. 1500,	157.5000,	b.7322,3
444	GRID,	2044,	3, 47	.2500,	157.5000,	3.9197,3

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445	GRID,2045,	З,	35.7500,157.5000,	1.8572,3
446	GRID,2046,	з,	35.3500,157.5000,	2.4375,3
447	GRID,2047,	з,	26.5000,157.5000,	0.8572,3
448	GRID,2048,	З,	17.2500,157.5000,	0.3572,3
449	GRID,2049,	З,	8.0000,157.5000,	0.3125,3
450	GRID,2050,	з,	4.6000,157.5000,	0.3125,3
451	GRID, 2051,	з,	8.0000,157.5000,	0.0000,3
452	GRID, 2052.	з,	4.6000,157.5000,	0.0000,3
453	GRID. 2053.	з.	92,6563,202,5000,	19.7947,3
454	GRTD 2054	٦.	79.8800.202.5000.	14.3245.3
455	GRTD 2055.	3.	70 2501,202,5000.	10.6072.3
455	CRTD 2056		58 7500 202 5000.	6.7322.3
450	CRID, 2057	3,	47 2500 202 5000	3 9197 3
437	GRID, 2057,	3,	35 7500 202 5000,	1 9572 3
450	CRID, 2058,	2,	35 3500 202 5000	2 4375 3
459	GRID, 2059,	3,	33.3300,202.3000,	0 0570 3
460	GRID, 2060,	3,	26.3000,202.3000,	0.0372,3
461	GRID, 2061,	3,	17.2300,202.3000,	0.3372,3
462	GRID, 2062,	3,	8.0000,202.5000,	0.3125,3
463	GRID,2063,	3,	4.6000,202.5000,	0.3125,3
464	GRID,2064,	з,	8.0000,202.5000,	0.0000,3
465	GRID,2065,	з,	4.6000,202.5000,	0.0000,3
466	GRID,2066,	з,	92.6563,247.5000,	19.7947,3
467	GRID,2067,	з,	79.8800,247.5000,	14.3245,3
468	GRID,2068,	з,	70.2500,247.5000,	10.6072,3
469	GRID,2069,	з,	58.7500,247.5000,	6.7322,3
470	GRID,2070,	з,	47.2500,247.5000,	3.9197,3
471	GRID,2071,	з,	35.7500,247.5000,	1.8572,3
472	GRID,2072,	З,	35.3500,247.5000,	2.4375,3
473	GRID,2073,	з,	26.5000,247.5000,	0.8572,3
474	GRID, 2074,	З,	17.2500,247.5000,	0.3572,3
475	GRID. 2075.	з.	8.0000,247.5000,	0.3125,3
476	GRID. 2076.	з.	4,6000,247.5000,	0.3125,3
477	GRID. 2077.	з.	8,0000,247,5000,	0.0000,3
478	GRID 2078.	3.	4.6000.247.5000.	0.0000.3
470	CRTD 2079		92 6563 292 5000	19.7947.3
4/3	GRID, 2079,	3,	79 8800 292 5000	14 3245.3
480	GRID, 2080,	2,	79.8800,292.5000,	14.5240,5
481	GRID, 2081,	3,	70.2500,292.5000,	10.6072,3
482	GR1D, 2082,	3,	58.7500,292.5000,	6.7322,3
483	GRID, 2083,	3,	47.2500,292.5000,	3.9197,3
484	GRID,2084,	3,	35.7500,292.5000,	1.85/2,3
485	GRID,2085,	٤,	35.3500,292.5000,	2.43/5,3
486	GRID,2086,	З,	26.5000,292.5000,	0.8572,3
487	GRID,2087,	з,	17.2500,292.5000,	0.3572,3
488	GRID,2088,	з,	8.0000,292.5000,	0.3125,3
489	GRID,2089,	з,	4.6000,292.5000,	0.3125,3
490	GRID,2090,	з,	8.0000,292.5000,	0.0000,3
491	GRID,2091,	з,	4.6000,292.5000,	0.0000,3
492	GRID,2092,	З,	92.6563,337.5000,	19.7947,3
493	GRID,2093,	з,	79.8800,337.5000,	14.3245,3
494	GRID,2094,	З,	70.2500,337.5000,	10.6072,3
495	GRID,2095,	З,	58.7500,337.5000,	6.7322,3
496	GRID,2096,	з,	47.2500,337.5000,	3.9197,3
497	GRID,2097,	З,	35.7500,337.5000,	1.8572,3
498	GRID,2098,	З,	35.3500,337.5000,	2.4375,3
499	GRID,2099,	з,	26.5000,337.5000,	0.8572,3
500	GRID,2100,	З,	17.2500,337.5000,	0.3572,3
501	GRID,2101,	з,	8.0000,337.5000,	0.3125,3
502	GRID,2102,	з,	4.6000,337.5000,	0.3125,3
503	GRID,2103,	З,	8.0000,337.5000,	0.0000,3
504	GRID,2104,	З,	4.6000,337.5000,	0.0000,3
505	GRID, 2106,	з,	0.0000, 0.0000,	2.4375,3
506	GRID,2107.	з,	7.3910, 0.0000.	0.0000.3
507	GRID,2108.	з,	8.1500, 37.8500.	0.0000.3
508	GRID, 2109	з.	7,3910, 90.0000.	0.0000.3
509	GRID, 2110	з.	8.1500.142.1500	0.0000.3
510	GRID. 2111	з.	7.3910.180.0000	0.0000.3
511	GRID, 2112	3.	8.1500.217.8500	0.0000.3
512	GRID, 2113	3.	7.3910.270.0000	0.0000.3
513	GRID, 2114	3.	8.1500.322 1500	0.0000.3
514	GRID. 2115	3	7.3910. 0.0000	2.4375.3
515	GRTD 2114	٦, ٦	8 1500, 37 8500	2 4375 2
516	CRTD 2117	3	7 3010 00 0000	2,4375 3
517	CRTD 2110	2,	9 1500 140 1E00	2.43/3,3
518	CRTD 2110,	2,	7 3010 100 0000	2.13/3,3
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519	GRTD. 2120. 3. 8.1500.217.8500. 2.4375.3	3
520	GRTD 2121 3. 7.3910.270.0000. 2.4375.	3
521	GRTD 2122, 3, 8,1500,322,1500, 2,4375,	3
522	GRID.2123, 3, 64.2000, 22.5000, 8.5690,	3
523	GRTD. 2124. 3. 64.2000, 67.5000, 8.5690,	3
524	GRID, 2125, 3, 64.2000, 112.5000, 8.5690,	3
525	GRID, 2126, 3, 64.2000, 157.5000, 8.5690,	3
526	GRID, 2127, 3, 64.2000, 202.5000, 8.5690,	3
527	GRID, 2128, 3, 64.2000, 247.5000, 8.5690,	3
528	GRID, 2129, 3, 64.2000, 292.5000, 8.5690,	3
529	GRID, 2130, 3, 64.2000, 337.5000, 8.5690,	3
530	\$ GRIDS FOR TARGET LOCATION	
531	GRID,2201,3,90.82,22.5,18.9925,3	
532	GRID,2206,3,41.78,22.5,2.9385,3	
533	GRID,2301,3,90.82,67.5,18.9925,3	
534	GRID, 2306, 3, 41.78, 67.5, 2.9385, 3	
535	GRID, 2401, 3, 90.82, 112.5, 18.9925, 3	
536	GRID, 2406, 3, 41.78, 112.5, 2.9385, 3	
537	GRID, 2501, 3, 90.82, 157.5, 18.9925, 3	
538	GRID, 2506, 3, 41.78, 157.5, 2.9385, 3	
539	GRID, 2601, 3, 90.82, 202.5, 18.9925, 3	
540	GRID, 2606, 3, 41. 78, 202.5, 2. 9385, 3	
541	GRID, 2701, 3, 90.82, 247.5, 18.9925, 5	
542	GRID, 2708, 3, 41.78, 247.3, 2.9303, 3	
543	CRTD 2806 3 41 78 292 5.2 9385.3	
545	CRTD 2901 3 90 82 337 5 18 9925 3	
546	GRTD, 2906, 3, 41, 78, 337, 5, 2, 9385, 3	
547	S SUPPORT STRUCTURE	
548	CBAR, 967,12, 261, 265,1.,1.,0.	
549	CBAR, 968,12, 262, 266,1.,1.,0.	
550	CBAR, 969,12, 263, 267,1.,1.,0.	
551	CBAR, 970,12, 264, 268,1.,1.,0.	
552	\$ RFL TRUSS BATTENS	
553	CBAR, 979, 2, 261, 262,1.,0.,1.	
554	CBAR, 980, 2, 262, 263,1.,0.,1.	
555	CBAR, 981, 2, 263, 264,1.,0.,1.	
556	CBAR, 982, 2, 264, 261,1.,0.,1.	
557	CBAR, 983, 2, 265, 266, 1., 0., 1.	
558	CBAR, 984, 2, 266, 267, 1., 0., 1.	
559	$\begin{array}{c} CHAR, & 985, 2, 267, 268, 1., 0., 1. \\ CDAR & 086, 2, 269, 265, 1, 0, 1 \\ \end{array}$	
560	CBAR, 980, 2, 200, 203,1.,0.,1.	
561	ODAD 000 3 261 263 1 0 1	
563	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
564	\$ rfl trues diagonals	
565	CBAR. 991. 3. 263. 266. 0 1 1.	
566	CBAR, 992, 3, 261, 268, 0, , 1, , 1.	
567	CBAR, 993, 3, 262, 265, 1., 0., 1.	
568	CBAR, 994, 3, 264, 267, 1., 0., 1.	
569	\$ START REFLECTOR EID'S	
570	CBAR, 2001,16,2001,2201,0.,0.,1.	
571	CBAR, 2002,16,2014,2301,0.,0.,1.	
572	CBAR, 2003,16,2027,2401,0.,0.,1.	
573	CBAR, 2004,16,2040,2501,0.,0.,1.	
574	CBAR, 2005,16,2053,2601,0.,0.,1.	
575	CBAR, 2006,16,2066,2701,0.,0.,1.	
5/6	CBAR, 2007,16,2079,2801,0.,0.,1.	
577	$\begin{array}{c} \text{CBAR}, \ 2008, 10, 2092, 2901, 0., 0., 1. \\ \text{CBAR}, \ 2008, 17, 2002, 2003, 0, 0, 1 \\ \end{array}$	
579	CBAR, 2010, 17, 2015, 2016, 0., 0., 1.	
580	CBAR. 2011.17.2028.2029.001.	
581	CBAR, 2012, 17, 2041, 2042, 0., 0., 1.	
582	CBAR, 2013, 17, 2054, 2055, 0., 0., 1.	
583	CBAR, 2014, 17, 2067, 2068, 0., 0., 1.	
584	CBAR, 2015,17,2080,2081,0.,0.,1.	
585	CBAR, 2016,17,2093,2094,0.,0.,1.	
586	CBAR, 2017,18,2003,2123,0.,0.,1.	
587	CBAR, 2018, 18, 2016, 2124, 0., 0., 1.	
588	CBAR, 2019, 18, 2029, 2125, 0., 0., 1.	
589	CBAR, 2020, 18, 2042, 2126, 0., 0., 1.	
590	CBAR, 2021,18,2055,2127,0.,0.,1.	
591	CBAR, 2022,18,2068,2128,0.,0.,1.	
392	CDAR, 2023,10,2001,2123,0.,0.,1.	

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593	CBAR, 2024,18,2094,2130,0.,0.,1.
594	\$ RIBS WITH NEW GRID PT.
595	CBAR, 2025, 19, 2123, 2004, 0., 0., 1.
596	CBAR, 2026, 19, 2124, 2017, 0., 0., 1.
597	CBAR, 2027, 19, 2125, 2030, 0., 0., 1.
598	CBAR, 2028, 19, 2126, 2043, 0., 0., 1.
599	CBAR, 2029, 19, 2127, 2056, 0., 0., 1.
600	CBAR, 2030,19,2128,2069,0.,0.,1.
601	CBAR, 2031, 19, 2129, 2082, 0., 0., 1.
602	CBAR, 2032,19,2130,2095,0.,0.,1.
603	CBAR, 2033,20,2005,2206,0.,0.,1.
604	CBAR, 2034,20,2018,2306,0.,0.,1.
605	CBAR, 2035,20,2031,2406,0.,0.,1.
606	CBAR, 2036,20,2044,2506,0.,0.,1.
607	CBAR, 2037,20,2057,2606,0.,0.,1.
608	CBAR, 2038,20,2070,2706,0.,0.,1.
609	CBAR, 2039,20,2083,2806,0.,0.,1.
610	CBAR, 2040,20,2096,2906,0.,0.,1.
611	CBAR, 2041,21,2006,2008,0.,0.,1.
612	CBAR, 2042,21,2019,2021,0.,0.,1.
613	CBAR, 2043,21,2032,2034,0.,0.,1.
614	CBAR, 2044,21,2045,2047,0.,0.,1.
615	CBAR, 2045,21,2058,2060,0.,0.,1.
616	CBAR, 2046,21,2071,2073,0.,0.,1.
617	CBAR, 2047,21,2084,2086,0.,0.,1.
618	CBAR, 2048,21,2097,2099,0.,0.,1.
619	CBAR, 2049,21,2008,2009,0.,0.,1.
620	CBAR, 2050,21,2021,2022,0.,0.,1.
621	CBAR, 2051,21,2034,2035,0.,0.,1.
622	CBAR, 2052,21,2047,2048,0.,0.,1.
623	CBAR, 2053,21,2060,2061,0.,0.,1.
624	CBAR, 2054,21,2073,2074,0.,0.,1.
625	CBAR, 2055,21,2086,2087,0.,0.,1.
626	CBAR, 2056,21,2099,2100,0.,0.,1.
627	CBAR, 2057,21,2009,2010,0.,0.,1.
628	CBAR, 2058,21,2022,2023,0.,0.,1.
629	CBAR, 2059,21,2035,2036,0.,0.,1.
630	CBAR, 2060,21,2048,2049,0.,0.,1.
631	CBAR, 2061,21,2061,2062,0.,0.,1.
632	CBAR, 2062,21,2074,2075,0.,0.,1.
633	CBAR, 2063,21,2087,2088,0.,0.,1.
634	CBAR, 2064,21,2100,2101,0.,0.,1.
635	CBAR, 2065,21,2010,2011,0.,0.,1.
636	CBAR, 2066,21,2023,2024,0.,0.,1.
637	CBAR, 2067,21,2036,2037,0.,0.,1.
638	CBAR, 2068,21,2049,2050,0.,0.,1.
639	CBAR, 2069,21,2062,2063,0.,0.,1.
640	CBAR, 2070,21,2075,2076,0.,0.,1.
641	CBAR, 2071,21,2088,2089,0.,0.,1.
642	CBAR, 2072,21,2101,2102,0.,0.,1.
643	CBAR, 2169,19,2004,2005,0.,0.,1.
644	CBAR, 2170, 19, 2017, 2018, 0., 0., 1.
645	CBAR, 2171,19,2030,2031,0.,0.,1.
646	CBAR, 2172,19,2043,2044,0.,0.,1.
647	CBAR, 2173, 19, 2056, 2057, 0., 0., 1.
648	CBAR, 2174,19,2069,2070,0.,0.,1.
649	CBAR, 2175,19,2082,2083,0.,0.,1.
650	CBAR, 2176,19,2095,2096,0.,0.,1.
651	CBAR, 2177, 16, 2201, 2002, 0., 0., 1.
652	CBAR, 2178, 16, 2301, 2015, 0., 0., 1.
653	CBAR, 2179, 16, 2401, 2028, 0., 0., 1.
654	CBAR, 2180, 16, 2501, 2041, 0., 0., 1.
655	CBAR, 2181, 16, 2601, 2054, 0., 0., 1.
656	CBAR, 2182, 16, 2701, 2067, 0., 0., 1.
657	CBAR, 2183, 16, 2801, 2080, 0., 0., 1.
658	CBAR, 2184, 16, 2901, 2093, 0., 0., 1.
627	CBAR, 2185, 20, 2206, 2005, 0., 0., 1.
000	CBAR, 2186, 20, 2306, 2019, 0., 0., 1.
100	CDAR, 2187, 20, 2406, 2032, 0., 0., 1.
002	CBAR, 2188, 20, 2006, 2045, 0., 0., 1.
660	CDAR, 2103, 20, 2000, 2038, 0., 0., 1.
004 66F	CDAR, 2190, 20, 2700, 2011, 0., 0., 1.
666	CBAR 2192 20 2006 2007 0 0 1
000	~~~~~

\$ END RIBS \$ CONNECTOR BOLTS-RIBS TO HUB CBAR, 2073,23,2010,2012,2062 CBAR, 2074,23,2023,2025,2075 CBAR, 2075,23,2036,2038,2088 CBAR, 2076,23,2049,2051,2101 CBAR, 2077,23,2062,2064,2010 CBAR, 2078,23,2075,2077,2023 CBAR, 2079,23,2088,2090,2036 CBAR, 2080,23,2101,2103,2049 CBAR, 2081,23,2011,2013,2063 CBAR, 2082,23,2024,2026,2076 CBAR, 2083,23,2037,2039,2089 CBAR, 2084,23,2050,2052,2102 CBAR, 2085,23,2063,2065,2011 CBAR, 2086,23,2076,2078,2024 CBAR, 2087,23,2089,2091,2037 CBAR, 2088,23,2102,2104,2050 \$ START CONNECTORS BETWEEN RIBS AND SENSOR PLATE CBAR, 2089,24,2006,2007,2005 ,,6 CBAR, 2090, 24, 2019, 2020, 2018 ..6 CBAR, 2091,24,2032,2033,2031 ,,6 CBAR, 2092,24,2045,2046,2044 ,,6 CBAR, 2093,24,2058,2059,2057 ,,6 CBAR, 2094,24,2071,2072,2070 ..6 CBAR, 2095, 24, 2084, 2085, 2083 , , 6 CBAR, 2096,24,2097,2098,2096 ..6 \$ START COMPRESSION MEMBERS BETWEEN REFLECTOR PLATE AND HUB, D=.375" CBAR, 2097,30,2107,2115,1.,1.,0. CBAR, 2098,30,2109,2117,1.,1.,0. CBAR, 2099,30,2111,2119,1.,1.,0. CBAR, 2100,30,2113,2121,1.,1.,0. \$ CABLES CROD, 2101, 22, 2001, 2014 CROD, 2102, 22, 2014, 2027 CROD, 2103, 22, 2027, 2040 CROD, 2104, 22, 2040, 2053 CROD, 2105, 22, 2053, 2066 CROD, 2106, 22, 2066, 2079 CROD, 2107, 22, 2079, 2092 CROD, 2108, 22, 2092, 2001 \$ REFLECTOR PLATE AND HUB CTRIA3 Ο. Ο. CTRIA3 Ο. CTRIA3 Ο. CTRIA3 Ο. **CTRIA3** 0. CTRIA3 Ο. CTRIA3 Ο. CTRIA3 0. CTRIA3 0. CTRIA3 0. CTRIA3 Ο. **CTRIA3** Ô. CTRIA3 ٥. CTRIA3 0. CTRIA3 0. CTRIA3 Ο. CTRIA3 ٥. **CTRIA3** 0. CTRIA3 Ο. **CTRIA3** Ο. CTRIA3 Ο. CTRIA3 Ο. **CTRIA3** CTRIA3 Ο.

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741	CTRTA3	2133	25	2098	2007	2115	٥		
742	CTRIAS	2134	25	2007	2020	2116	ů.		
743	CTRIAS	2135	25	2020	2033	2117	Õ.		
744	CTRIAS	2136	25	2023	2035	2110	ŏ.		
745	CIRIAS CUDIAS	2130	25	2033	2040	2110	<u>,</u>		
745	CIRIAS	2137	25	2046	2039	2119	0.		
746	CTRIAS	2138	25	2059	2072	2120	0.		
747	CTRIAS	2139	25	2072	2085	2121	0.		
748	CTRIA3	2140	25	2085	2098	2122	0.		
749	CTRIA3	2141	25	2115	2116	2007	0.		
750	CTRIA3	2142	25	2116	2117	2020	ο.		
751	CTRIA3	2143	25	2117	2118	2033	ο.		
752	CTRIA3	2144	25	2118	2119	2046	0.		
753	CTRIA3	2145	25	2119	2120	2059	0.		
754	CTRIA3	2146	25	2120	2121	2072	0.		
755	CTRIA3	2147	25	2121	2122	2085	0.		
756	CTRIA3	2148	25	2122	2115	2098	Ο.		
757	CTRIA3	2149	25	2115	2116	2106	٥.		
758	CTRIA3	2150	25	2116	2117	2106	ο.		
759	CTRIA3	2151	25	2117	2118	2106	Ő.		
760	CTRIA3	2152	25	2118	2119	2106	Ó.		
761	CTRIA3	2153	25	2119	2120	2106	Ó.		
762	CTRIA3	2154	25	2120	2121	2106	0.		
763	CTRIAS	2155	25	2121	2122	2106	0		
764	CTRIAS	2156	25	2122	2115	2106	0		
765	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	תההממזום .זי	DDACKEN	10	2113	2100	υ.		
765	CDND 2157	1 27 265	ASS 264						
760	CDAR, 210	27, 203, 203, 203, 203, 203, 203, 203, 203	405,200). 					
767	CDAR, 2150	2,27,200,	400,201						
768	CBAR, 2153	, 27, 207,	407,200						
763	CBAR, 2160	0, 21, 208, 0.27	488,203						
770	CBAR, 2161	L,28, 267,	488,485	-					
//1	CBAR, 2162	2,28, 268,	487,486						
772	CBAR, 2163	3,28, 265,	486,487						
773	CBAR, 2164	1,28, 266,	485,488						
774	CBAR, 2165	5,28, 265,	488,487						
775	CBAR, 2166	5,28, 266,	487,488						
776									
110	CBAR, 2167	7,29, 485,	488,487	,					
777	CBAR, 2167 CBAR, 2168	7,29, 485, 8,29, 486,	488,487 487,488	1					
777 778	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA	7,29, 485, 3,29, 486, M Bolts W	488,487 487,488 HICH CON	NECT RF1	L; BASE	PLATE TO	SUPPORT	STRUCTURE	
777 778 779	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22	7,29, 485, 3,29, 486, AM BOLTS W 211, 1.5E+	488,487 487,488 HICH CON 08, 488,	NECT RF1	L; BASE 8, 1	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22	7,29, 485, 3,29, 486, M BOLTS W 211, 1.5E+ 212, 1.5E+	488,487 487,488 HICH CON 08, 488, 08, 488,	NECT RF1 1, 2108 2, 2108	L; BASE 8, 1 8, 2	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22 CELAS2, 22	7,29, 485, 3,29, 486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+	488,487 487,488 HICH CON 08, 488, 08, 488, 08, 488,	NECT RF1 1, 2108 2, 2108 3, 2108	L; BASE 8, 1 8, 2 8, 3	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22	7,29, 485, 3,29, 486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 213, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488,	NECT RFJ 1, 2108 2, 2108 3, 2108 4, 2108	L; BASE 8, 1 8, 2 8, 3 8, 4	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783	CBAR, 2167 CBAR, 2168 \$ 1/4" DIF CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22	7,29, 485, 3,29, 486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 214, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488,	INECT RF1 1, 2108 2, 2108 3, 2108 4, 2108 5, 2108	L; BASE 8, 1 8, 2 8, 3 8, 4 8, 5	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784	CBAR, 2167 CBAR, 2168 \$ 1/4" DIF CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22	7,29, 485, 8,29, 486, MM BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 215, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488,	INECT RFJ 1, 2108 2, 2108 3, 2108 4, 2108 5, 2108 6, 2108	L; BASE 3, 1 8, 2 8, 3 8, 4 8, 5 8, 6	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 783 784 785	CBAR, 2167 CBAR, 2168 \$ 1/4" DI7 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22	7,29, 485, 8,29, 486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 216, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488,	INECT RF1 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 1, 2114	L; BASE 8, 1 8, 2 8, 3 8, 4 8, 5 8, 6 0, 1	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 783 784 785 785	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22	7,29, 485, 7,29, 486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 218, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485,	INECT RFI 1, 2103 2, 2103 3, 2104 4, 2105 5, 2105 6, 2105 1, 2110 2, 2110	L; BASE 8, 1 8, 2 8, 3 8, 4 8, 5 8, 6 0, 1 0, 2	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 786 787	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22 CELAS2, 22	7,29, 485, 3,29, 486, MM BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 216, 1.5E+ 218, 1.5E+ 218, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485,	NECT RF1 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 1, 2110 2, 2110 3, 2110	L; BASE 8, 1 8, 2 8, 3 8, 4 8, 5 8, 6 0, 1 0, 2 0, 3	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 786 787 788	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22	7,29, 485, 8,29, 486, 11, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 216, 1.5E+ 216, 1.5E+ 219, 1.5E+ 210, 1.5E+ 210, 1.5E+ 210, 1.5E+ 210, 1.5E+ 210, 1.5E+ 210, 1.5E+ 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 215, 1.5E+ 215, 1.5E+ 215, 1.5E+ 215, 1.5E+ 216, 1.5E+ 216, 1.5E+ 217, 1.5E+ 216, 1.5E+ 216, 1.5E+ 217, 1.5E+ 216, 1.5E+ 217, 1.5E+ 216, 1.5E+ 217, 1.5E+ 216, 1.5E+ 217, 1.5E+ 218, 1.5E+ 218, 1.5E+ 218, 1.5E+ 219, 1.	488,487 487,488 HICH CON 08, 488, 08, 488, 08, 488, 08, 488, 08, 488, 08, 488, 08, 485, 08, 485, 08, 485, 08, 485,	INECT RF1 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 1, 2114 2, 2114 3, 2114 4, 2114	L; BASE 3, 1 3, 2 3, 3 3, 4 3, 5 3, 6 0, 1 0, 2 0, 3 0, 4	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 784 785 786 787 788 789	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22	7,29, 485, 8,29, 486, MM BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 219, 1.5E+ 220, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485,	Intern refi 1, 2108 2, 2108 3, 2100 4, 2108 5, 2108 6, 2108 1, 2110 2, 2111 3, 2110 4, 2110 5, 2110 5, 2110	L; BASE 3, 1 3, 2 3, 3 3, 4 3, 5 3, 6 0, 1 0, 2 0, 3 0, 5 1	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 785 786 785 786 787 788 789 789	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22	7,29,485, 3,29,486, M BOLTS W 211,1.5E+ 212,1.5E+ 213,1.5E+ 214,1.5E+ 214,1.5E+ 216,1.5E+ 217,1.5E+ 218,1.5E+ 219,1.5E+ 221,1.5E+ 221,1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485,	NECT RFJ 1, 2108 2, 2108 3, 2108 4, 2108 5, 2108 6, 2108 1, 2110 2, 2110 3, 2110 4, 2110 5, 2108 5,	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 6 D, 1 D, 2 D, 3 D, 4 D, 5 C, 4 D, 5 C, 4 D, 5 C, 4 C, 5 C, 4 C, 5 C, 5	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 785 786 787 788 789 790	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 218, 1.5E+ 220, 1.5E+ 221, 1.5E+ 222, 1.5E+ 221, 1.5E	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485,	Internet 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 1, 2110 2, 2110 3, 2110 4, 2110 5, 2110 6, 2110 6, 2110 6, 2110 1, 2110 6, 2110 1, 2110	L; BASE 3, 1 3, 2 3, 3 3, 4 3, 5 3, 6 1, 2 0, 2 0, 3 0, 4 0, 5 0, 6 1	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 785 786 785 786 787 788 789 790 790	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 3,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 216, 1.5E+ 218, 1.5E+ 220, 1.5E+ 221, 1.5E+ 222, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 226, 1.5E+ 227, 1.5E+ 227, 1.5E+ 228, 1.5E+ 229, 485, 1.5E+ 229, 486, 1.5E+ 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 217, 1.5E+ 218, 1.5E+ 218, 1.5E+ 219, 1.5E+ 219, 1.5E+ 219, 1.5E+ 219, 1.5E+ 219, 1.5E+ 219, 1.5E+ 219, 1.5E+ 210, 1.5E+ 210, 1.5E+ 210, 1.5E+ 210, 1.5E+ 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 227, 1.5E	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485,085,085,085,085,085,085,085,085,085,0	Internet 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2105 1, 2110 2, 2110 3, 2110 4, 2110 5, 2110 6, 2110 1, 2110 1, 2110 1, 2110 1, 2110 1, 2110 1, 2110 2, 2110	L; BASE 3, 1 3, 2 8, 3 8, 4 8, 5 3, 6 0, 2 0, 2 0, 2 0, 5 0, 6 2, 1	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 785 786 787 788 789 790 791 792	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 3,29,486, M BOLTS W 211,1.5E+ 212,1.5E+ 213,1.5E+ 214,1.5E+ 215,1.5E+ 216,1.5E+ 216,1.5E+ 219,1.5E+ 221,1.5E+ 222,1.5E+ 223,1.5E+ 223,1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,485,085,085,085,085,085,085,085,085,085,0	Internet 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 1, 2114 3, 2114 4, 2114 5, 2114 6, 2114 1, 2114 2, 2114 5, 2114 6, 2114 1, 2114 2, 2114 2, 2114	L; BASE 3, 1 3, 2 3, 3 3, 4 3, 5 3, 6 0, 1 0, 2 0, 3 0, 4 0, 5 0, 6 2, 1 2, 2	PLATE TO	SUPPORT	STRUCTURE	
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777 778 779 780 781 782 783 784 785 786 785 786 785 786 787 788 789 790 791 792 793 794 795 796	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 217, 1.5E+ 217, 1.5E+ 220, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 227, 1.5E+ 228, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,486, 08,486, 08,486, 08,486,	Internet 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2105 1, 2110 2, 2110 3, 2110 4, 2110 5, 2110 6, 2110 1, 2110 5, 2110 6, 2110 3, 2112 3, 2112 4, 2112 5, 2112 6, 2112 6, 2112	L; BASE 3, 1 3, 2 3, 3 3, 4 3, 5 3, 6 1, 2 0, 2 0, 3 0, 2 0, 5 0, 6 1, 2 0, 5 0, 6 1, 2 2, 3 2, 4 2, 5 6	PLATE TO	SUPPORT	STRUCTURE	
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777 778 779 780 781 782 783 784 785 784 785 786 787 788 786 787 790 791 792 791 792 793 794 795 796 797 798. 799	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22	7,29,485, 3,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 216, 1.5E+ 219, 1.5E+ 220, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 227, 1.5E+ 228, 1.5E+ 230, 1.5E+ 30, 1.5E+ 31, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,485,085,485,085,485,085,485,085,485,085,485,085,485,085,485,085,085,485,08	Immet T RFI 1, 2108 2, 2108 3, 2106 4, 2108 5, 2108 6, 2108 1, 2110 2, 2110 3, 2110 4, 2110 5, 2112 6, 2112 3, 2112 4, 2112 5, 2112 3, 2112 4, 2112 5, 2112 3, 2112 4, 2112 5, 2112 3, 2114 4, 2112 5, 2112 3, 2114	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 4 B, 5 B, 4 B, 5 C, 2 C, 1 C, 2 C, 1 C, 2 C, 2 C, 2 C, 4 C, 2 C, 4 C, 2 C, 4 C,	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 784 785 786 787 788 786 787 788 789 790 791 792 791 792 793 794 795 796 797 798	CBAR, 2167 CBAR, 2168 \$ 1/4" DIF CELAS2, 22 CELAS2, 22	7,29,485, 3,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 219, 1.5E+ 220, 1.5E+ 221, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 228, 1.5E+ 229, 1.5E+ 231, 1.5E+ 321, 1.5E+ 322, 1.5E+ 321, 1.5E+ 322, 1.5E+ 322, 1.5E+ 322, 1.5E+ 323, 1.5E+ 324, 1.5E+ 325, 1.5E+ 325, 1.5E+ 325, 1.5E+ 325, 1.5E+ 325, 1.5E+ 326, 1.5E+ 327, 1.5E	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485,55,55,55,55,55,55,55,55,55,55,55,55,5	Intern reprint 1, 2108 2, 2108 3, 2100 4, 2108 5, 2108 6, 2108 1, 2110 2, 2111 3, 2110 4, 2112 5, 2112 6, 2112 3, 2112 4, 2112 5, 2112 3, 2112 4, 2112 5, 2112 3, 2112 4, 2112 5, 2112 3, 2112 4, 2114 3, 2114 4, 2114	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 4 B, 5 B, 4 B, 5 C, 2 C, 1 C, 2 C, 1 C, 2 C,	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 787 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 217, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 227, 1.5E+ 226, 1.5E+ 230, 1.5E+ 230, 1.5E+ 231, 1.5E+ 331, 1.5E+ 33, 1.5E+ 34, 1.5E+ 35, 1.5E+	488,487 488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,487,487,487,487,487,487,487,487,487,48	1, 2104 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 1, 2114 2, 2114 3, 2114 4, 2114 5, 2114 6, 2112 6, 2112 6, 2112 3, 2112 6, 2112 1, 2112 5, 2112 6, 2112 1, 2114 2, 2114 3, 2114 4, 2114 5, 2114	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 4 B, 5 C, 2 C, 3 C, 2 C, 4 C, 2 C, 5 C, 1 C, 2 C, 5 C, 1 C, 2 C, 5 C, 1 C, 2 C, 5 C, 1 C, 5 C, 1 C, 5 C, 5	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 787 785 786 787 788 789 790 791 792 793 794 795 795 796 797 798 798 799 800 801 802	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 227, 1.5E+ 228, 1.5E+ 231, 1.5E+ 331, 1.5E+ 334, 1.5E+ 34,	488,487 488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,487,487, 08,487,487,487,487,487,487,487,487,487,48	Image: Terminal state s	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 4 B, 5 C, 2 C, 5 C, 1 C, 5 C, 1 C, 5 C, 5	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 785 786 787 788 785 786 787 788 789 791 792 793 794 795 796 797 798 799 800 801 802 803	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 226, 1.5E+ 227, 1.5E+ 231, 1.5E+ 231, 1.5E+ 331, 1.5E+ 331, 1.5E+ 331, 1.5E+ 341, 1.5E+	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,487,487, 08,487, 08,487,487, 08,487,487,487,787, 08,487,487,487,787,787,787,787,787,787,78	Internet 1, 2104 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 6, 2104 1, 2114 7, 2114 7, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114 7, 2114 1, 2114	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 6 D, 2 C, 5 C, 1 C, 2 C, 5 C, 1 C, 2 C, 5 C, 1 C, 2 C, 5 C, 2 C, 5 C, 1 C, 2 C, 5 C, 2 C, 5 C, 1 C, 5 C, 5	PLATE TO	SUPPORT	STRUCTURE	
777 778 779 780 781 782 783 784 785 786 787 786 787 786 787 788 789 790 791 792 793 794 795 795 796 797 798 799 800 801 802 803 804	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 3,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 226, 1.5E+ 230, 1.5E+ 231, 1.5E+ 232, 1.5E+ 233, 1.5E+ 234, 1.5E+ 334, 1.5E+ 3289	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,486, 08,487,\\ 08,487,\\ 08	Internet in the second seco	L; BASE 3, 1 3, 2 3, 3 3, 4 3, 5 3, 6 0, 2 0, 2 1, 2 2, 3 4, 1 1, 2 4, 3 4, 4 1, 5 1, 6 0, 142	PLATE TO	SUPPORT	STRUCTURE	+ EA 2011
777 778 779 780 781 782 783 784 785 786 787 788 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805	CBAR, 2167 CBAR, 2168 \$ 1/4" DIA CELAS2, 22 CELAS2, 22	7,29,485, 3,29,485, 3,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 219, 1.5E+ 220, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 227, 1.5E+ 227, 1.5E+ 231, 1.5E+ 33, 1.5E+ 33, 1.5E+ 33, 1.5E+ 33, 1.5E+ 3289 0.	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,486, 08,486, 08,487,487,487,787,787,787,787,787,787,78	Intern replay 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2104 1, 2114 3, 2114 4, 2112 5, 2112 3, 2112 4, 2112 5, 2112 3, 2112 4, 2112 5, 2112 6, 2112 1, 2114 5, 2114 6, 2114 6, 2114 6, 2114 6, 2114 6, 2114 6, 2114	L; BASE 3, 1 3, 2 3, 3 3, 4 3, 5 3, 6 0, 1 0, 2 1, 3 1, 2 1, 3 1, 4 1, 5 1, 6 .00142 0.	РLATE ТО 0. 0.	SUPPORT	STRUCTURE	+EA 2011
777 778 779 780 781 782 783 784 785 786 787 785 786 787 788 789 790 791 792 793 794 795 799 800 801 802 803 804 805 806	CBAR, 2167 CBAR, 2168 \$ 1/4" DIF CELAS2, 22 CELAS2, 22	7,29,485, 7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 217, 1.5E+ 220, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 226, 1.5E+ 226, 1.5E+ 227, 1.5E+ 230, 1.5E+ 231, 1.5E+ 233, 1.5E+ 331, 1.5E+ 332, 1.5E+ 333, 1.5E+ 344, 1.5E+ 3289 0. 3290	488,487 488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,486, 08,486, 08,487,487, 08,487,487,487,784,887,7	Internet 1, 2104 1, 2104 2, 2104 3, 2104 4, 2104 4, 2104 5, 2104 5, 2104 6, 2104 1, 2114 2, 2114 3, 2114 4, 2114 5, 2114 3, 2114 4, 2114 5, 2114 5, 2114 3, 2114 6, 2114 3, 2114 6, 2114 5, 2114 6, 2114 6, 2114 6, 2114 6, 2114	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 6 D, 2 D, 2 D, 5 C, 1 D, 2 D, 4 D, 5 C, 1 C, 2 L, 2 L, 3 L, 4 L, 5 L, 2 L, 3 L, 4 L, 5 L, 2 L, 4 L, 5 L, 6 L, 2 L, 4 L, 5 L, 6 L, 6 L, 6 L, 6 L, 6 L, 7 L, 6 L, 6 L, 6 L, 7 L, 6 L, 7 L, 6 L, 7 L, 7	PLATE TO 0. 0.	SUPPORT 0. 0.	O.	+EA 2011 +EA 2012
777 778 779 780 781 782 783 784 785 786 787 785 786 787 788 789 790 791 792 793 794 795 796 797 798 800 801 802 803 804 805 806 807	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 217, 1.5E+ 221, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 227, 1.5E+ 226, 1.5E+ 227, 1.5E+ 231, 1.5E+ 231, 1.5E+ 331, 1.5E+ 331, 1.5E+ 332, 1.5E+ 332, 1.5E+ 334, 1.5E+ 3289 0. 3290 0. 3290 0. 3290	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,486, 08,486, 08,486, 08,487,887,887,887,887,887,887,887,887,88	Immetria reprint 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 6, 2105 1, 2110 2, 2110 3, 2110 4, 2110 5, 2104 6, 2110 1, 2110 5, 2110 6, 2110 1, 2112 3, 2112 4, 2112 5, 2112 6, 2114 5, 2114 6, 2114 6, 2114 6, 2114 6, 2114	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 4 B, 5 C, 2 C, 3 C, 5 C, 6 C, 2 C, 1 C, 2 C, 3 C, 4 C, 5 C, 2 C, 4 C, 2 C, 4 C, 2 C, 4 C, 2 C, 4 C, 2 C, 4 C, 5 C, 4 C, 5 C, 4 C, 5 C, 4 C, 5 C, 4 C, 5 C, 4 C, 5 C, 5 C, 6 C, 2 C, 5 C, 6 C, 2 C, 5 C, 6 C, 2 C, 5 C, 6 C, 7 C, 6 C, 7 C,	PLATE TO 0. 0. 0. 0.	SUPPORT 0. 0. 0.	O. O.	+EA 2011 +EA 2012
777 7778 779 780 781 782 783 784 785 786 787 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 8001 802 803 804 805 806 805 808	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 216, 1.5E+ 217, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 227, 1.5E+ 226, 1.5E+ 230, 1.5E+ 231, 1.5E+ 231, 1.5E+ 231, 1.5E+ 231, 1.5E+ 232, 1.5E+ 233, 1.5E+ 33, 1.5E+ 33, 1.5E+ 33, 1.5E+ 33, 1.5E+ 3289 0. 3290	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,486, 08,486, 08,486, 08,486, 08,486, 08,487,487,487,487,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,87,784,	Immetria reprint 1, 2104 2, 2104 3, 2104 4, 2105 5, 2104 6, 2105 1, 2114 2, 2114 3, 2112 4, 2112 5, 2114 6, 2112 1, 2112 3, 2112 4, 2114 5, 2112 6, 2114 5, 2114 6, 2114 6, 2114 0 0 0 0 0 0 0 0	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 6 D, 2 D, 3 D, 4 D, 5 D, 6 1, 2 2, 3 4, 1 1, 5 1, 6 00142 00142 00142	PLATE TO 0. 0. 0. 0. 0.	SUPPORT 0. 0. 0. 0. 0.	STRUCTURE 0. 0.	+EA 2011 +EA 2012 +EA 2013
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777 7778 779 780 781 782 783 784 785 786 787 785 786 787 788 785 786 787 791 792 793 791 792 793 794 795 799 800 801 802 803 804 805 806 807 808 806 807 808 809 810 812	CBAR, 2167 CBAR, 2168 \$ 1/4" DIP CELAS2, 22 CELAS2, 22	7,29,485, 7,29,485, 7,29,486, M BOLTS W 211, 1.5E+ 212, 1.5E+ 213, 1.5E+ 214, 1.5E+ 215, 1.5E+ 217, 1.5E+ 221, 1.5E+ 222, 1.5E+ 223, 1.5E+ 224, 1.5E+ 224, 1.5E+ 225, 1.5E+ 226, 1.5E+ 227, 1.5E+ 230, 1.5E+ 231, 1.5E+ 231, 1.5E+ 331, 1.5E+ 331, 1.5E+ 332, 1.5E+ 3289 0. 3290 0. 3291 0. 3292 0. 3292	488,487 487,488 HICH CON 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,488, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,485, 08,486, 08,486, 08,486, 08,487,000,000,000,000,000,000,000,000,000,0	Immetrial 1, 2104 1, 2104 2, 2104 3, 2104 4, 2104 5, 2104 5, 2104 6, 2104 1, 2114 2, 2114 3, 2114 5, 2114 5, 2114 6, 2114 1, 2114 5, 2114 5, 2114 6, 2114 5, 2114 6, 2114 5, 2114 6, 2114 5, 2114 6, 2114 6, 2114 7, 2114 7, 2114 6, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 7, 2114 <t< td=""><td>L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 4 B, 5 C, 2 C, 3 C, 4 C, 2 C, 2 C, 2 C, 4 C, 2 C, 2 C, 2 C, 4 C, 2 C, 2 C, 4 C, 2 C, 2 C, 4 C, 4 C,</td><td>PLATE TO 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.</td><td>SUPPORT 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.</td><td>STRUCTURE 0. 0. 0. 0. 0.</td><td>+EA 2011 +EA 2012 +EA 2013 +EA 2014</td></t<>	L; BASE B, 1 B, 2 B, 3 B, 4 B, 5 B, 4 B, 5 C, 2 C, 3 C, 4 C, 2 C, 2 C, 2 C, 4 C, 2 C, 2 C, 2 C, 4 C, 2 C, 2 C, 4 C, 2 C, 2 C, 4 C,	PLATE TO 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	SUPPORT 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	STRUCTURE 0. 0. 0. 0. 0.	+EA 2011 +EA 2012 +EA 2013 +EA 2014
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٥. Ο. +EA 2016 0. 0. 0. 815 ٥. .00142 ٥ CONM2 3295 266 Ó ٥. 816 +EA 2017 Ο. Ο. Ο. 0. Ο. Ο. 817 .00160 Ο. ٥. 268 0 818 CONM2 3296 +EA 2018 ٥. ٥. 0 Ο. 0. Ο. 819 \$ LUMP MASS AT RIB TIP CONM2, 3501, 2001, 3, 2.59E-04 820 821 822 CONM2, 3502, 2014, 3, 2.59E-04 CONM2, 3503, 2027, 3, 2.59E-04 CONM2, 3504, 2040, 3, 2.59E-04 823 824 825 CONM2, 3505, 2053, 3, 2.59E-04 CONM2, 3506, 2066, 3, 2.59E-04 CONM2, 3507, 2079, 3, 2.59E-04 826 827 828 CONM2, 3508, 2092, 3, 2.59E-04 S MIRROR LUMP MASS 829 CONM2, 3510, 2106, 3, .049223, 0., 0., 0. 830 , 6.795, , 6.795, , , 13.591 831 \$ TRUSS MATI CARDS 832 MAT1, 1, 1.E+07, ,.333, 2.19E-04, 0. 833 MAT1, 2, 1.E+07, ,.333, 2.23E-04, 0. 834 MAT1, 4, 1.E+07, ,.333, 0. 835 836 \$ REFLECTOR MAT1 CARDS 837 MAT1,11, 1.0E+07,.375E+07, ,.0002539,0.0 MAT1,12, 3.0E+07,.11538+8, ,.0004585,-2.535-6 838 839 MAT1,13, .30E+08,.11538+8, ,.0007332 840 MAT1,14, .65E+07,.25000+7, .0000512 MAT1,15, .10E+08,.37509+7, .0003375 841 842 843 MAT1,16, .10E+08,.37509+7, ,.0002539 844 845 \$ TRUSS PID CARDS PBAR, 1, 1, .12316, 4.20E-03, 4.20E-03, 8.40E-03, 0. PBAR, 2, 1, .12316, 4.20E-03, 4.20E-03, 8.40E-03, 0. PBAR, 3, 2, .11660, 4.20E-03, 4.20E-03, 8.40E-03, 0. 846 847 848 849 PBAR, 12, 1, .12316, 4.20E-03, 4.20E-03, 8.40E-03, 0. PBAR, 13, 2, .11660, 4.20E-03, 4.20E-03, 8.40E-03, 0. 850 851 852 \$ REFLECTOR PID CARDS 853 PBAR, 16, 11, .2900000, .0015104, .0325188, .0052215, 0.0 854 PBAR, 17, 11, .3375000, .0017578, .0512578, .0062110, 0.0 855 PBAR,18,11, .3840000, .0020000, .0754975, .0071797, 0.0 PBAR,19,11, .4300000, .0022396, .1060093, .0081380, 0.0 856 857 PBAR,20,11, .4775000, .0024870, .1451640, .0091276, 0.0 PBAR,21,11, .5000000, .0026042, .1666667, .0095964, 0.0 PBAR,23,13, .0490873, .0001918, .0001918, .0003835, 0.0 858 859 860 PBAR, 24, 13, .0283529, .0000640, .0000640, .0001280, 0.0 PROD, 22, 12, .0007670, .0000000, .0000000 861 862 863 864 S SENSOR PLATE PSHELL, 25, 14, .40807, 14 865 866 Ś S HUB 867 PSHELL, 26, 15, .37500, 15 868 869 \$ VERTICAL MEMBER OF SUPPORT STRUCTURE 870 PBAR, 27, 16, .4418 ,1.55E-02 ,1.55E-02 , 3.1E-02 , 0. 871 872 \$ 1X1X5/16" AL ANGLE CROSS MEMBERS 873 PBAR, 28, 16, 0.339, 3.E-02, 3.E-02 , .00439, 0. 874 875 \$ 1X11/4X1/4" AL ANGLE THAT SUPPORTS BASE PLATE 876 , 0. PBAR, 29, 16, .5 ,3.97E-02 ,7.10E-02 , .1107 877 878 \$ COMPRESSION MEMBERS BETWEEN HUB AND SENSOR PLATE 879 PBAR, 30, 13, .110447, .000971, .000971, .001942, 0.0 880 881 ENDDATA 882 883

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	Axial force on rib	Axial force on rib
	elements, lb, for	elements, lb, for
Rib beam element	CBAR connector	CROD connector
1	-11.87	-10.83
. 9	-12.66	11.52
17	-13.12	-11.90
25	-13.50	-12.23
33	-13.65	-12.38
41	115.0	-9.77
49	115.0	-9.11

Table 1. Axial-Force Distribution on Rib 7 Under Gravity and Target Weight for Large-Displacements Nonlinear Analysis

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Table 2. Static Test Matrix for Inclined and Horizontal Positions of Reflector

		Load range,	Increment,
Load cycle	Load location	lb	lb
1	All rib tips	0 to 2	0.5
2	Rib tips 5 and 7	0 to 1.5	0.5
3	All plate ends	0 to 24	3.0
4	Plate ends 1 and 3	0 to 24	3.0

	Small-displacements	1	
	analysis versus	Test versus	Test versus
Load cycle;	large-displacements	small-displacements	large-displacements
measurement	analysis,	analysis,	analysis,
location	percent error	percent error	percent error
	Inclin	ed position	
1; Rib 1	8	10	16
1; Rib 3	6	33	25
1; Rib 5	29	11	14
1; Rib 7	2	18	16
2; Rib 1	13	36	17
2; Rib 3	13	22	7
2; Rib 5	5	12	6
2; Rib 7	3	20	16
	Horizo	ntal position	
3; Plate ends	2	14	12
1, 3, 5, and 7			
4; Plate ends	2	8	9
1 and 3			
4; Plate ends	2	19	17
5 and 7			

Table 3. Test and Analysis Curve-Fitting Errors

 Table 4. Analytical Natural Frequencies for Reflector

	Frequencies, Hz, for	Frequencies, Hz, for
	small-displacements	large-displacements
Mode	analysis	analysis
1	2.524	2.524
2	2.994	3.063
3	2.995	3.064
4	3.172	3.253
5	3.219	3.301
6	3.517	3.563
7	3.529	3.567
8	3.757	3.792
9	5.613	5.447
10	6.583	6.350
11	10.178	9.826
12	10.357	9.995
13	10.895	10.601

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Figure 1. Controls-Structures Interaction Evolutionary Model (CEM).



Figure 2. Controls-Structures Interaction Evolutionary Model reflector.



Figure 3. Side and top views of reflector. All linear dimensions are in inches.

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Figure 4. Detailed view of connections.

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Figure 6. Side and top views of reflector in inclined position. All linear dimensions are in inches.



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Figure 7. Typical truss strut and node-ball joint.





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Figure 9. Rib analytical geometry for initial and prestressed states.



Figure 10. Large-displacements nonlinear analysis data-base dependent steps.

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Figure 11. Small-displacements nonlinear analysis data-base independent steps.



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Figure 12. Sensitivity of rib displacement under gravity and target weight loads to changes in swivel-head bolt model.



Figure 13. Load application and displacement measurement setup.



(a) Load cycle 1: symmetric loading of ribs.



(b) Load cycle 2: asymmetric loading of ribs.



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(a) Load cycle 3: symmetric loading of plate ends.



(b) Load cycle 4: asymmetric loading of plate ends.

Figure 15. Symmetric and asymmetric loading of plate ends. Horizontal position.



(b) Mode 2; 3.063 Hz.

Figure 16. Large-displacements analysis.



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(d) Mode 4; 3.253 Hz.

Figure 16. Continued.

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(f) Mode 6; 3.563 Hz.

Figure 16. Continued.



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(h) Mode 8; 3.792 Hz.

Figure 16. Continued.

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(j) Mode 10; 6.350 Hz.

Figure 16. Continued.



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Figure 16. Continued.



(m) Mode 13; 10.601 Hz.



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Figure 17. Vertical frequency-response function for rib 2.