

IN-61-CTC  
312540  
p 39

# 28-Entity IGES Test File Results Using Computervision CADD5 4X

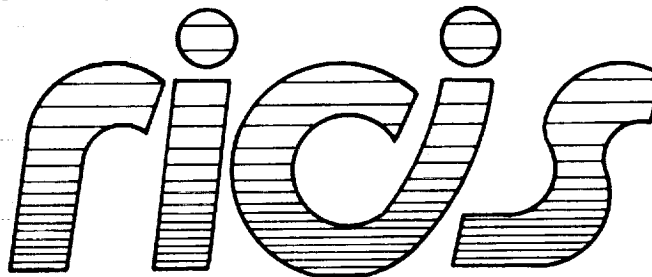
Anchy Kuan  
Saurin Shah  
Kevin Smith

University of Houston-Clear Lake

August 1987

Cooperative Agreement NCC 9-16  
Research Activity SE.8

NASA Johnson Space Center  
Engineering Directorate



Research Institute for Computing and Information Systems  
University of Houston - Clear Lake

N91-13099

Unclas  
0312540

G3/61

(NASA-CR-187402) THE 28-ENTITY IGES TEST  
FILE RESULTS USING COMPUTERVISION CADD5 4X  
(Houston Univ.) 39 p  
CSCL 09R

## *The RICIS Concept*

The University of Houston-Clear Lake established the Research Institute for Computing and Information systems in 1986 to encourage NASA Johnson Space Center and local industry to actively support research in the computing and information sciences. As part of this endeavor, UH-Clear Lake proposed a partnership with JSC to jointly define and manage an integrated program of research in advanced data processing technology needed for JSC's main missions, including administrative, engineering and science responsibilities. JSC agreed and entered into a three-year cooperative agreement with UH-Clear Lake beginning in May, 1986, to jointly plan and execute such research through RICIS. Additionally, under Cooperative Agreement NCC 9-16, computing and educational facilities are shared by the two institutions to conduct the research.

The mission of RICIS is to conduct, coordinate and disseminate research on computing and information systems among researchers, sponsors and users from UH-Clear Lake, NASA/JSC, and other research organizations. Within UH-Clear Lake, the mission is being implemented through interdisciplinary involvement of faculty and students from each of the four schools: Business, Education, Human Sciences and Humanities, and Natural and Applied Sciences.

Other research organizations are involved via the "gateway" concept. UH-Clear Lake establishes relationships with other universities and research organizations, having common research interests, to provide additional sources of expertise to conduct needed research.

A major role of RICIS is to find the best match of sponsors, researchers and research objectives to advance knowledge in the computing and information sciences. Working jointly with NASA/JSC, RICIS advises on research needs, recommends principals for conducting the research, provides technical and administrative support to coordinate the research, and integrates technical results into the cooperative goals of UH-Clear Lake and NASA/JSC.

***28-Entity IGES Test File Results Using  
Computervision CADD5 4X***

## Preface

This research was conducted under the auspices of the Research Institute for Computing and Information Systems by Anchi Kuan, Saurin Shah, and Kevin Smith. Rick Graves, of Barrios Technology, served as Principle Investigator and Sharon Perkins, Associate Professor of Computer Science, at the University of Houston-Clear Lake, served as the RICIS technical representative.

Funding has been provided by the Engineering Directorate, NASA/JSC through Cooperative Agreement NCC 9-16 between NASA Johnson Space Center and the University of Houston-Clear Lake. The NASA technical monitor for this activity was Dave Howes, Information Systems Manager, Engineering Directorate, NASA/JSC.

The views and conclusions contained in this report are those of the author and should not be interpreted as representative of the official policies, either express or implied, of NASA or the United States Government.

28-ENTITY IGES TEST FILE  
RESULTS USING COMPUTERVISION CADDS 4X

Prepared by :

Anchy Kuan  
Saurin Shah  
Kevin Smith

In Support Of :

CTEC 5939  
CAD Systems Analysis  
Summer Semester 1987

With Supervision from :

Rick Graves  
Dr. Sharon Perkins

## TEST PROCEDURE

Our investigation was based on the following steps which were documented in an undated GSFC memorandum (a copy of this memorandum is provided as Attachment 1):

1. Read the 28 Entity IGES Test File into the CAD data base with the IGES post-processor.
2. Make the following modifications to the displayed geometries, which should produce the normalized front view shown in Figure 4 and the drawing entity defined display shown in Figure 5.
  - a) Translate the linear string (106) -2.99 in the X, -26.25 in the Y, and 26.5 in the Z directions.
  - b) Scale the line entities (110) about their midpoints by a factor of 1.5.
  - c) Translate the Circular Arc (100) 14.5 in the X, -32.74 in the Y, and 35.25 in the Z directions.
  - d) Scale the translated circular arc about its center by a factor of 1.67.
3. Produce the drawing entity defined display of the file as it appears in the CAD system after modification to the geometry.
4. Translate the file back to IGES format using the IGES pre-processor.
5. Read the IGES file produced by the pre-processor back into the CAD data base.
6. Produce another drawing entity defined display of the CAD display.
7. Compare the plots resulting from steps 3 and 6. These plots should look like Figure 5 and be identical to each other.

### I. System Configuration Used At Houston ATC For IGES test

#### \* Hardware

- Host Computer : Computervision 4001  
3 MB Memory
- (3) Disk Drives of model:  
41322 300 MB removable
- (1) Magnetic Tape Drive Model 41331
- (6) Instaview Workstations with C size tablets
- Versatec 7200 Electrostatic plotter
- 300 CPS Line Printer

#### \* Software

- Operating system : CGOS 200X version 4.1

Linear dimension	216	Linear dimension
Ordinate dimension	218	Ordinate dimension
Point dimension	220	Ordinate dimension
Radius dimension	222	Radius dimension
Subfigure definition	308	Subfigure part file
Drawing	404	Drawing
Singular subfigure instance	408	Subfigure instance
View	410	View

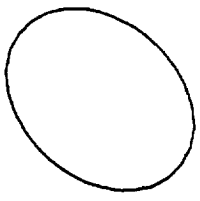
III. The 28 entity IGES test file was post-processed directly from tape to the CV CADDs database. The Tabulated Cylinder and Plane entities were the only entities which were not recovered successfully. The 28 entity part file stored in the CV CADDs database was then pre-processed. The resulting IGES part file is listed in Attachment 2.

#### IV. Figure Index

- Figure 1 presents the 28 entity test file as it was created by GSFC's NASCAD.
- Figure 1A presents the 28 entity test file as it was recovered on the CV CADDs.
- Figure 2 presents a rotated view of the 28 entity NASCAD test file.
- Figure 2A presents CV's corresponding rotated view of the 28 entity test file.
- Figure 3 presents a NASCAD unmodified drawing defined display.
- Figure 3A presents CV's corresponding unmodified drawing defined display.
- Figure 4 presents a NASCAD display of the IGES test file after modification.
- Figure 4A presents CV's corresponding display of the IGES test file after modification.
- Figure 5 presents the NASCAD modified drawing defined

**FIGURES**





CIRCULAR ARC (100)



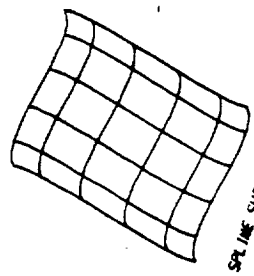
COMPOSITE CURVE (102)



CONE ARC (104)



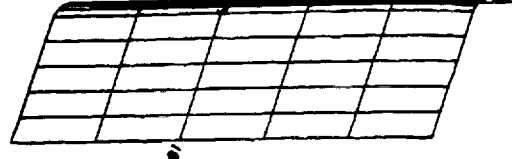
LINE ARC STRING (105)



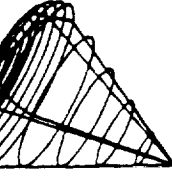
SPLINE (112)

SPLINE SURFACE (114)

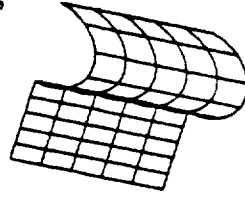
POINT (116)



PLANE (108)



SURF. OF REV. (120)



RULED SURFACE (118)

TABULATED CYLINDER (121)

TEXT 1

TEXT 2

TEXT

GENERAL NOTE (123)

GENERAL LABEL (124)

FLAD NOTE (126)

DIAMETER DIMENSION (128)

ANGULAR DIMENSION (127)

ORDINATE DIMENSION (129)

POINT DIMENSION (122)

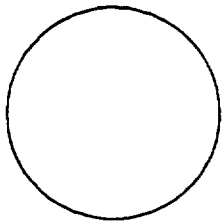
RADIUS DIMENSION (125)

SUBFIGURE (408)

LINEAR DIMENSION (126)

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FIGURE 1-A



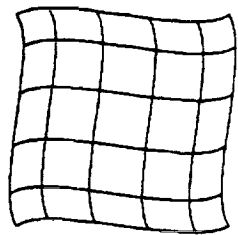
CIRCULAR ARC (100)



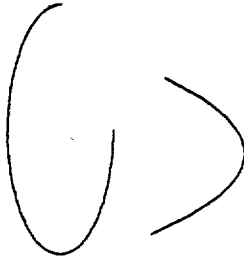
SPLINE (112)



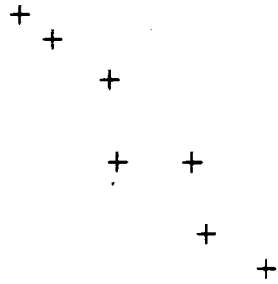
COMPOSITE CURVE (102)



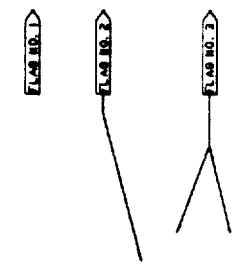
SPLINE SURFACE (114)



CONIC ARC (104)



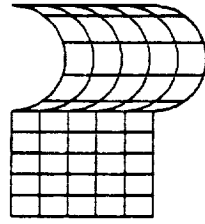
POINT (116)



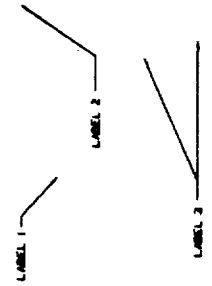
FLAG NOTE (208)



LINEAR STRING (106)

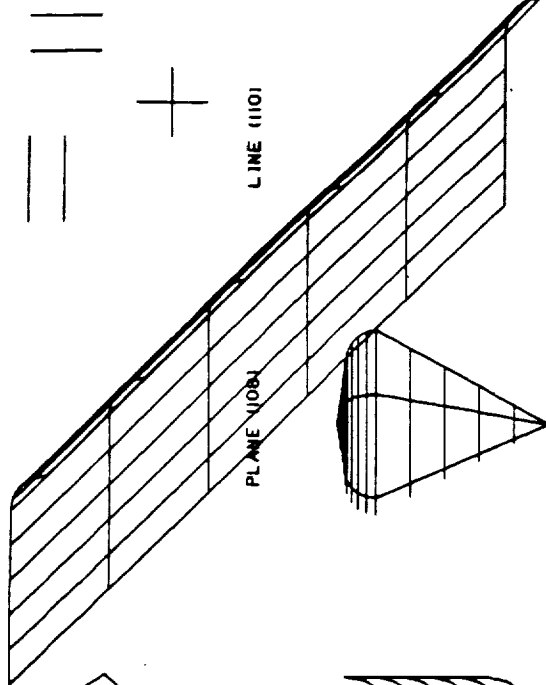


RULED SURFACE (118)

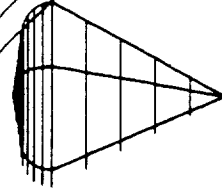


GENERAL LABEL (210)

SUBFIGURE (408)

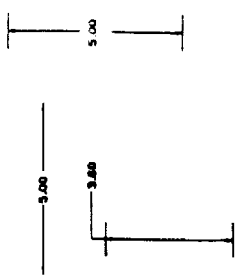


PLANE (108)

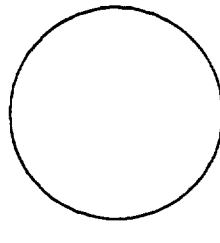


TABULATED CYLINDER (122)

TEXT 1  
TEXT 2  
TEXT 3



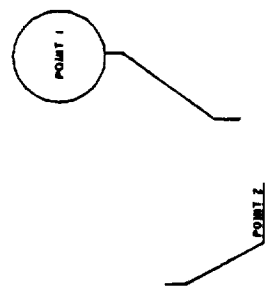
LINEAR DIMENSION (216)



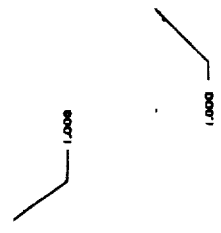
ANGULAR DIMENSION (201)



ORDINATE DIMENSION (218)



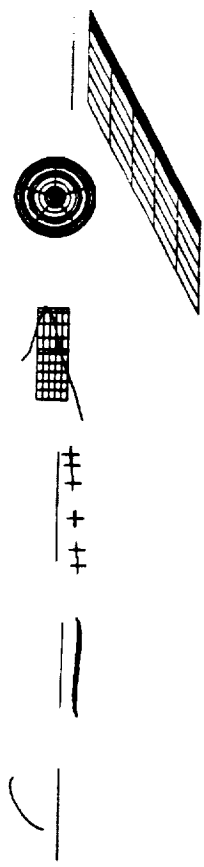
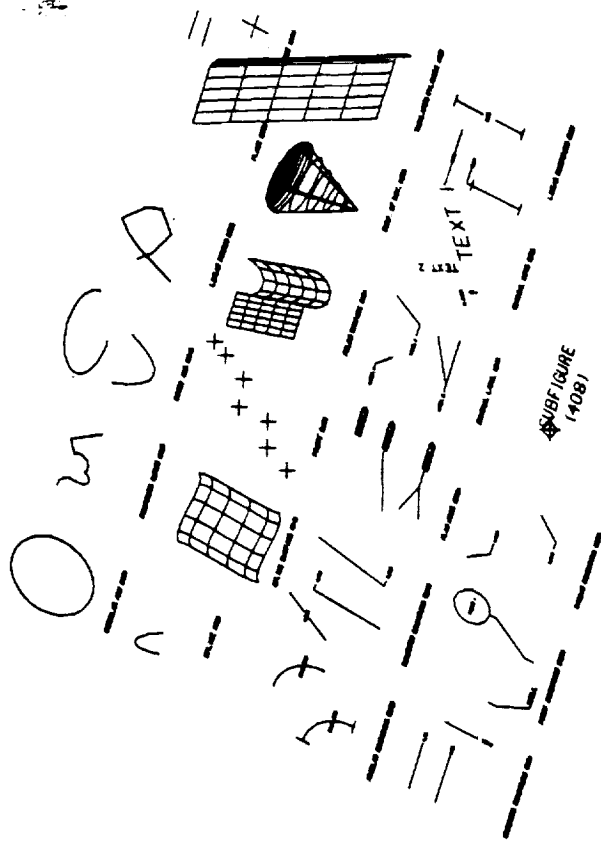
POINT DIMENSION (220)



RADIUS DIMENSION (222)

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FIGURE 2-A



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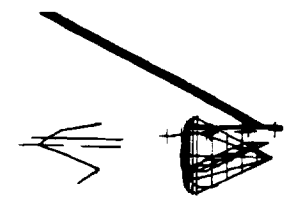
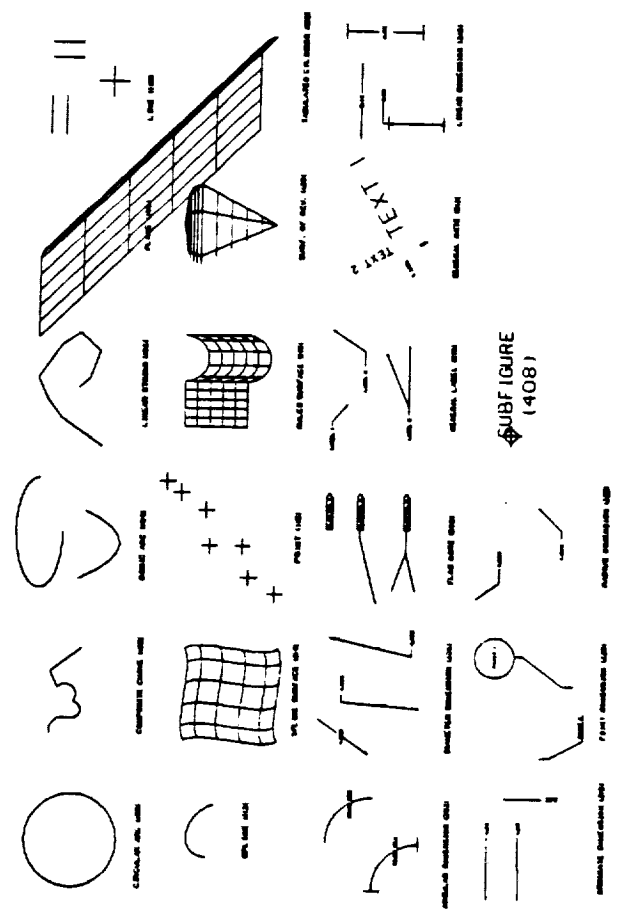
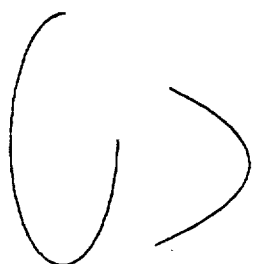
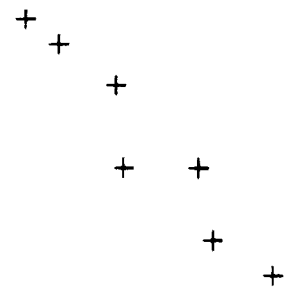


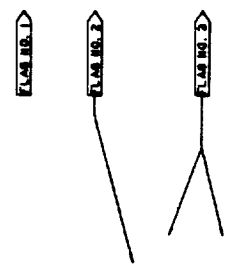
FIGURE 3-A



CONIC ARC (104)



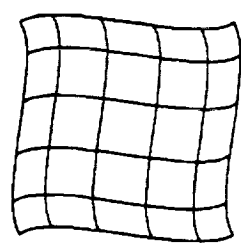
RULED SURFACE (118)



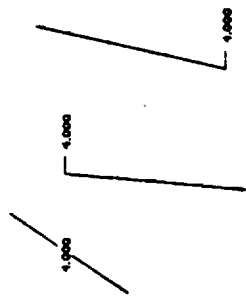
FLAG NOTE (208)



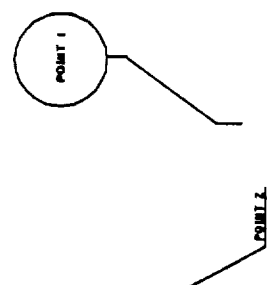
COMPOSITE CURVE (102)



SPLINE SURFACE (114)



DIAMETER DIMENSION (206)

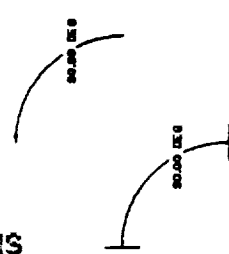


POINT DIMENSION (220)

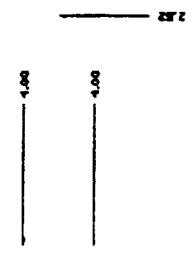


CIRCULAR ARC (100)

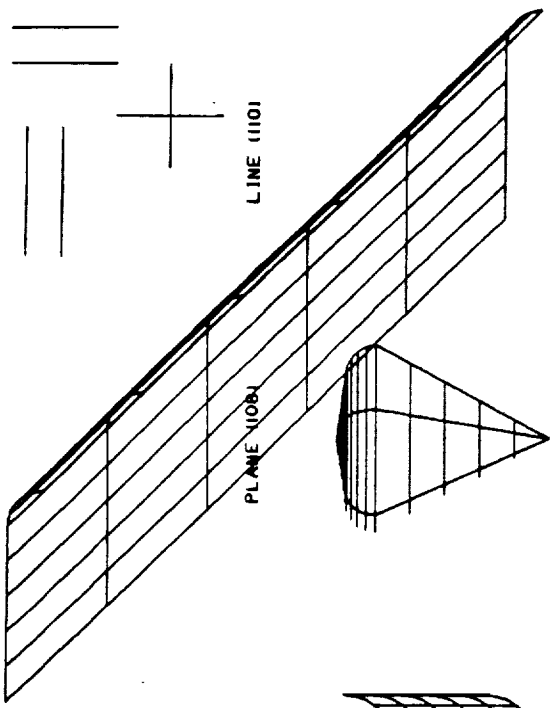
SPLINE (112)



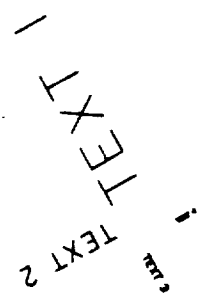
ANGULAR DIMENSION (202)



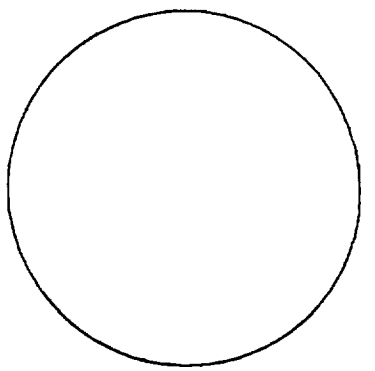
ORDINATE DIMENSION (218)



TABULATED CYLINDER (122)



GENERAL NOTE (212)



GENERAL LABEL (210)

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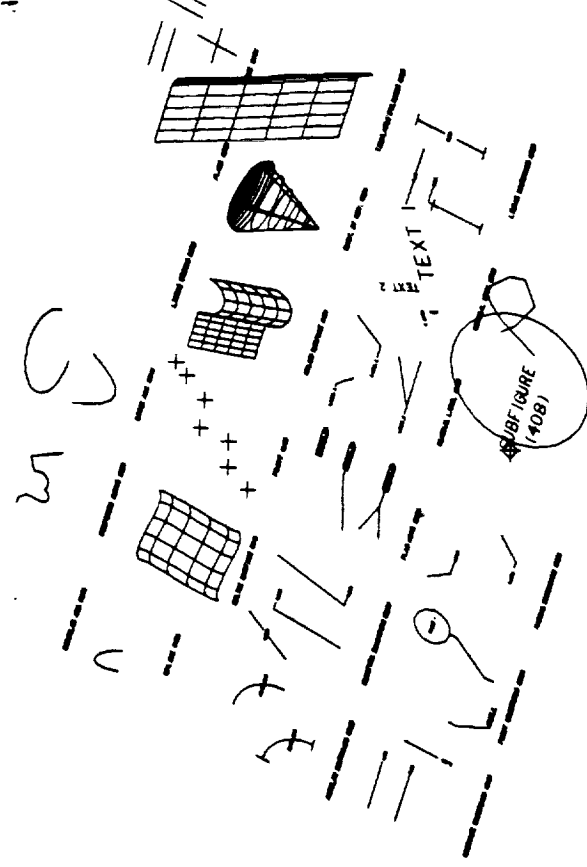
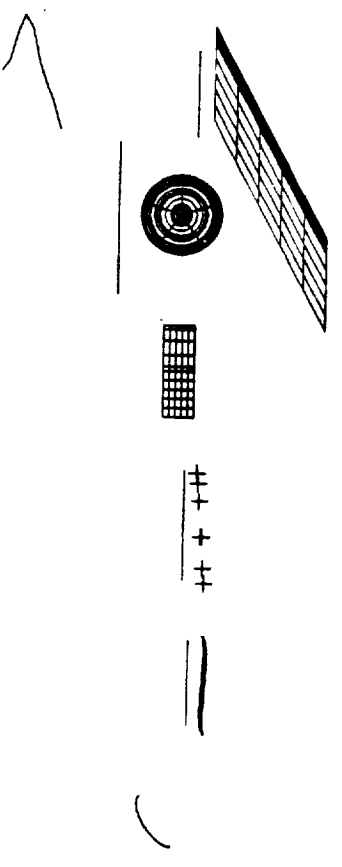
RADIUS DIMENSION (222)

POINT DIMENSION (220)

ORDINATE DIMENSION (218)

ANGULAR DIMENSION (202)

FIGURE 4-A



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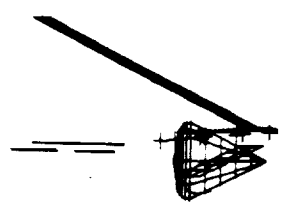
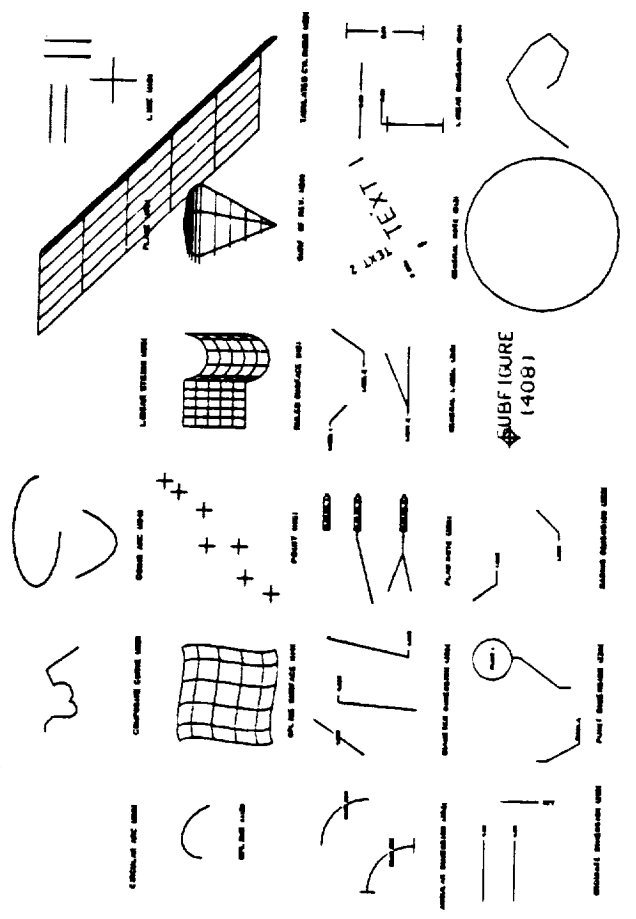


FIGURE 5-A

V. For the entities that CV CADDs supports, they are represented as follows :

\* In the actual CADDs database, each entity has a Part Master Index (PMI) record. This record consists of 8 words. These words consist of 16 bits and are broken down as follows :

- Entity type and layer
- Status
  - Get attention status
  - highlight attention status
  - blanking status
  - deletable status
  - relation status
  - application status
  - other status
  - solid status
  - # of groups entities belong to
- Part data file pointer (PDF pointer)
- Part data file pointer (PDF pointer)
- Pointer to tab and matrix
- Model, drawing or detail entity ; and what drawing the entity belongs to
- Tag name (Master Index Pointer (MIPTR))
- Tag name (MIPTR)

\* In neutral IGES format, each entity is represented in the IGES file by two records of ten fields each in the Directory Entry (DE) section and a number of corresponding records in the Parameter Data (PD) section. The fields of the parameter data record vary from entity to entity. The DE records for each entity consist of the following fields :

- Entity type,
- P.D. pointer,
- IGES version number,
- Line font pattern number,
- Level number,
- View pointer,
- Defining Matrix pointer,
- Label display associativity pointer,
- Status number,
- Sequence number,
- Entity number,
- Line weight number,
- Pen number,
- PD record count number,
- Form number,
- Reserved,
- Reserved,
- Entity label,
- Entity subscript number,
- Sequence number.

National Aeronautics and  
Space Administration



Goddard Space Flight Center  
Greenbelt, Maryland  
20771

Reply to Attn of 753

TO: Distribution

FROM: Engineering Directorate  
Engineering Services Division

SUBJECT: Twenty-Eight (28) Entity Test File and Documentation

Enclosed is a magnetic tape containing the verified 28 entity test file and a copy of the documentation that will be sent with the tape down to COSMIC, the NASA software distribution center. Organizations desiring copies of this documentation and the test tape should obtain them through COSMIC located at the University of Georgia, 112 Barrow Hall, Athens, Georgia 30602, telephone 404-542-3265. There is a nominal fee for organizations not working on NASA projects to obtain the tape and documentation.

In order to use the 28 entity file in another round of testing, follow the procedures outlined in the Test Methodology Section of the enclosed documentation. These are essentially the same testing procedures used in the last round of IGES testing, however, this time we are requesting that you read in and plot the IGES file produced by your CAD system preprocessor to provide further test data.

Please return, both on magnetic tape and electronically, the IGES file produced by your preprocessor. To transfer the file electronically, contact me for the phone number and account to use. Along with the magnetic tape, you should include hardcopy plots of how both the original 28 entity test file and the file produced by your preprocessor display on your CAD system as well as a written description of the steps used to process the file and any problems encountered in processing. The results of the testing should be returned to GSFC no later than May 13, 1985, and please bring whatever results are available to the next OCE meeting.

If you have any questions or problems please call me on FTS 344-1254.

  
Scott Gordon  
Engineering Design Branch

Enclosures: 2

## DOCUMENTATION FOR NASA 28 ENTITY IGES TEST TAPE

This documentation covers the accompanying magnetic tape which contains a test file of Computer Aided Design (CAD) data formatted according to the National Bureau of Standards (NBS) Initial Graphic Exchange Specification (IGES). This file was created for the purpose of conducting a NASA test, sponsored by the NASA Office of Chief Engineer, to determine to what extent dissimilar CAD systems used by NASA could exchange data using the IGES standard formats and IGES translators.

The tape file contains 28 different IGES entities, which were chosen because they define the geometric, annotation, and display formatting information that currently appears to be most important for CAD information transfer on NASA projects. Further information on the IGES format and entities can be found in the NBS IGES Version 2.0 Report, NBSIR 82-2631 (AF).

The test file, which contains sequentially organized, fixed length records containing ASCII characters, was created manually using a text editor. Aside from visual checking against the NBS documents defining IGES, the contents of this file have also been verified by the IGES Data Analysis Company (IDA) for conformance with the IGES Version 2.0 standard. A copy of the IDA verification report (Enclosure 1) is included with this document. The graphics displays shown in the figures were generated from this test file using the NASA Computer Aided Design (NASCAD) program, which contains logic to graphically display IGES files. The NASCAD program and the IGES test data are available through COSMIC located at the University of Georgia, 112 Barrow Hall, Athens, Georgia 30602, telephone 404-542-3265.

### Test File Description

The NASA IGES Test File contains examples of the following entities.

<u>ENTITY NAME</u>	<u>ENTITY TYPE NUMBER</u>
1. Circular Arc	(100)
2. Composite Curve	(102)
3. Conic Arc	(104)
4. Copious Data	(106)
5. Plane	(108)
6. Line	(110)
7. Parametric Spline Curve	(112)
8. Parametric Spline Surface	(114)
9. Point	(116)
10. Ruled Surface	(118)
11. Surface of Revolution	(120)
12. Tabulated Cylindere	(122)
13. Transformation Matrix	(124)
14. Angular Dimension	(202)
15. Diameter Dimension	(206)
16. Flag Note	(208)
17. General Label	(210)
18. General Note	(212)
19. Leader (Arrow)	(214)
20. Linear Dimension	(216)
21. Ordinate Dimension	(218)
22. Point Dimension	(220)
23. Radius Dimension	(222)



d) Scale the translated Circular Arc about its center by a factor of 1.67.

3. Produce the drawing entity defined display of the file as it appears in the CAD system after modification to the geometry.
4. Translate the file back to IGES format using IGES pre-processor.
5. Read IGES file produced by pre-processor back into CAD data base.
6. Produce another drawing entity defined display of the CAD display.
7. Compare the plots resulting from steps 3 and 6. These plots should look like Figure 5 and be identical to each other.

Because of the complexity of the view and drawing information in IGES, many CAD systems do not support or cannot properly process these entities. In the event that the drawing defined by the Drawing Entity cannot be displayed, intermediate test results can be obtained by performing the above steps, using plots of a normalized front view display instead of the drawing entity defined display. The plots can be compared against figure 4 to check results of the processing.

#### File Characteristics

The NASA 28 Entity IGES Test File has been placed on a magnetic tape with the following characteristics:

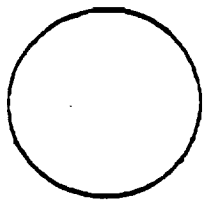
1. 9-Track Tape, 1600 BPI
2. Unlabeled
3. One (1) File on tape
4. All ASCII Characters
5. 80 Characters per Record
6. Ten (10) Records per Block (Blocksize of 800 bytes)

As an aid to insure the correctness of the tape file, Enclosure 2 is a complete listing of the contents of the 28 Entity IGES test file on the tape. In order to check for errors, the following FORTRAN program for a DEC VAX computer with the DEC VMS operating system can be used to perform a checksum calculation, the value of which for this test file is 2153650.

```

C
C THIS FORTRAN PROGRAM COMPUTES A CHECKSUM FOR FILES WITH 80
C CHARACTER RECORDS
C
      CHARACTER*80 C
      ISUM=0
      DOWHILE(.TRUE.)
        READ(5,'(A80)'),END=100)C
        DO I=1,80
          ISUM=ISUM+ICHAR(C(I:I))
        ENDDO
      ENDDO
100 WRITE(6,*)' CHECKSUM = ',ISUM
      END

```



CIRCULAR ARC (1100)



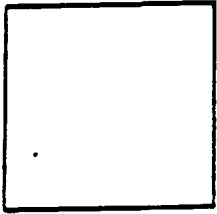
COMPOSITE CURVE (1102)



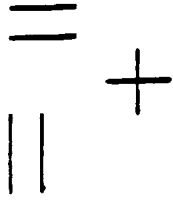
CONIC ARC (1104)



LINEAR STRIP (1106)



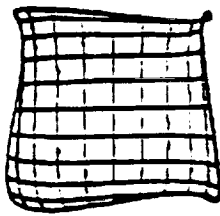
PLANE (1108)



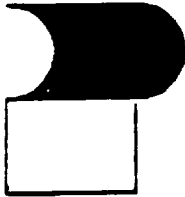
LINE (1109)



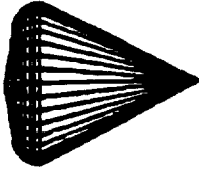
SPHERE (1110)



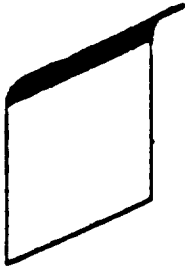
SPLINE SURFACE (1112)



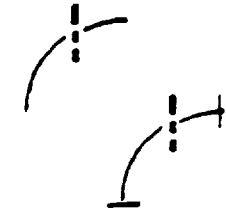
BLENDED SURFACE (1116)



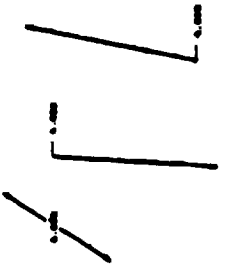
BLUFF OF REV. (1120)



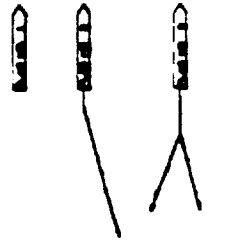
TRANSLATED CYLINDER (1122)



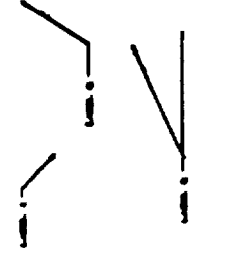
ANGULAR DIMENSION (1201)



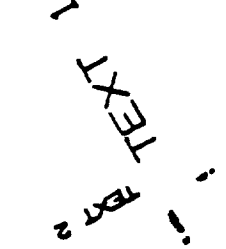
DIAMETER DIMENSION (1203)



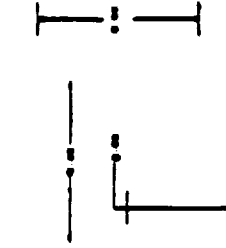
FLAG NOTE (1205)



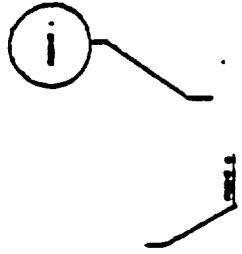
INTERNAL LABEL (1210)



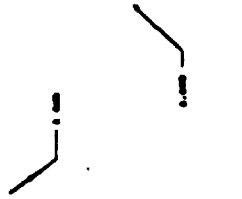
GENERAL NOTE (1212)



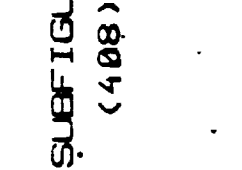
LINEAR DIMENSION (1218)



DEGREE DIMENSION (1219)



FORM DIMENSION (1220)



RADIUS DIMENSION (1221)

SUBFIGURE  
(408)

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28 Entity IGES File Listing

IGES TEST CASE							S	1
THIS FILE CONTAINS AN EXAMPLE OF THE DRAWING ENTITY							C	2
1E..1E:..14HICES TEST FILE.6HTASCAD..32.8.36.8.36.6HFILE 3.1.00.1.							C	1
4HINCH.1.0.10.13H840716.163000.1.00E-05.100.00.9HS. CORDON.4HCSFC;							C	2
124	1	1	1	0	0	0	000000000D	1
124	0	0	2	0	0	0	TITRX ID	2
100	3	1	1	0	343	1	000000000D	3
100	0	0	1	0	0	0	ARC D	4
212	4	1	1	0	341	1	000000100D	5
212	0	0	2	0	0	0	NOTE D	6
102	6	1	1	0	0	1	000000000D	7
102	0	0	1	0	0	0	CURVE D	8
110	7	1	1	0	0	0	000010000D	9
110	0	0	1	0	0	0	LINE D	10
110	8	1	1	0	0	0	000010000D	11
110	0	0	1	0	0	0	LINE D	12
110	9	1	1	0	0	0	000010000D	13
110	0	0	1	0	0	0	LINE D	14
100	10	1	1	0	0	0	000010000D	15
100	0	0	1	0	0	0	ARC D	16
100	11	1	1	0	0	0	000010000D	17
100	0	0	1	0	0	0	ARC D	18
110	12	1	1	0	0	0	000010000D	19
110	0	0	1	0	0	0	LINE D	20
110	13	1	1	0	0	0	000010000D	21
110	0	0	1	0	0	0	LINE D	22
212	14	1	1	0	341	1	000000100D	23
212	0	0	2	0	0	0	NOTE D	24
110	16	1	1	0	0	1	000000000D	25
110	0	0	1	0	0	0	LINE D	26
110	17	1	1	0	0	1	000000000D	27
110	0	0	1	0	0	0	LINE D	28
110	18	1	1	0	0	1	000000000D	29
110	0	0	1	0	0	0	LINE D	30
110	19	1	1	0	0	1	000000000D	31
110	0	0	1	0	0	0	LINE D	32
110	20	1	1	0	0	1	000000000D	33
110	0	0	1	0	0	0	LINE D	34
110	21	1	1	0	0	1	000000000D	35
110	0	0	1	0	0	0	LINE D	36
212	22	1	1	0	341	1	000000100D	37
212	0	0	2	0	0	0	NOTE D	38
112	24	1	1	0	0	1	000000000D	39
112	0	0	35	0	0	0	SPLINE D	40
212	39	1	1	0	341	1	000000100D	41
212	0	0	2	0	0	0	NOTE D	42
118	61	1	1	0	0	1	000000000D	43
118	0	0	1	0	0	0	RSURF D	44
102	62	1	1	0	0	0	000010000D	45
102	0	0	1	0	0	0	CURVE D	46
110	63	0	1	0	0	0	000010000D	47
110	0	0	1	0	0	0	LINE D	48
100	64	1	1	0	0	0	000010000D	49
100	0	0	1	0	0	0	ARC D	50
102	65	1	1	0	0	0	000010000D	51
102	0	1	1	0	0	0	CURVE D	52
110	66	1	1	0	0	0	000010000D	53
110	0	0	1	0	0	0	LINE D	54
100	67	1	1	0	0	0	000010000D	55
100	0	0	1	0	0	0	ARC D	56
212	68	1	1	0	341	1	000000100D	57

214	112	1	1	0	0	000010100D	119
214	0	0	1	3	0	LEADER D	120
206	113	1	1	0	341	000000100D	121
206	0	0	1	0	0	DDIM D	122
212	114	1	1	0	0	000010100D	123
212	0	0	2	0	0	NOTE D	124
214	116	1	1	0	0	000010100D	125
214	0	0	1	3	0	LEADER D	126
214	117	1	1	0	0	000010100D	127
214	0	0	2	3	0	LEADER D	128
206	119	1	1	0	341	000000100D	129
206	0	0	1	0	0	DDIM D	130
212	120	1	1	0	0	000010100D	131
212	0	0	2	0	0	NOTE D	132
214	122	1	1	0	0	000010100D	133
214	0	0	1	3	0	LEADER D	134
214	123	1	1	0	0	000010100D	135
214	0	0	2	3	0	LEADER D	136
212	125	1	1	0	341	000000100D	137
212	0	0	2	0	0	NOTE D	138
104	127	1	1	0	0	000000000D	139
104	0	0	2	1	0	CONIC D	140
104	129	1	1	0	0	000000000D	141
104	0	0	2	3	0	CONIC D	142
212	131	1	1	0	341	000000100D	143
212	0	0	2	0	0	NOTE D	144
106	133	1	1	0	0	000000000D	145
106	0	0	3	12	0	STRING D	146
212	136	1	1	0	341	000000100D	147
212	0	0	2	0	0	NOTE D	148
108	138	1	1	0	0	000000000D	149
108	0	0	1	1	0	PLANE D	150
102	139	1	1	0	0	000010000D	151
102	0	0	1	0	0	CURVE D	152
110	140	1	1	0	0	000010000D	153
110	0	0	1	0	0	LINE D	154
110	141	1	1	0	0	000010000D	155
110	0	0	1	0	0	LINE D	156
110	142	1	1	0	0	000010000D	157
110	0	0	1	0	0	LINE D	158
110	143	1	1	0	0	000010000D	159
110	0	0	1	0	0	LINE D	160
110	144	1	1	0	341	000000100D	161
212	0	0	2	0	0	NOTE D	162
116	146	1	1	0	0	000000000D	163
116	0	0	1	0	0	POINT D	164
116	147	1	1	0	0	000000000D	165
116	0	0	1	0	0	POINT D	166
116	148	1	1	0	0	000000000D	167
116	0	0	1	0	0	POINT D	168
116	149	1	1	0	0	000000000D	169
116	0	0	1	0	0	POINT D	170
116	150	1	1	0	0	000000000D	171
116	0	0	1	0	0	POINT D	172
116	151	1	1	0	0	000000000D	173
116	0	0	1	0	0	POINT D	174
116	152	1	1	0	0	000000000D	175
116	0	0	1	0	0	POINT D	176
212	153	1	1	0	341	000000100D	177
212	0	0	2	0	0	NOTE D	178
210	155	1	1	0	341	000000100D	179

220	198	1	1	0	341	1	000000100D	241
220	0	0	1	0			PNTDIM D	242
212	199	1	1	0	0	0	000010100D	243
212	0	0	2	0			NOTE D	244
214	201	1	1	0	0	0	000010100D	245
214	0	0	2	4			LEADER D	246
100	203	1	1	0	0	0	000010000D	247
100	0	0	1	0			ARC D	248
220	204	1	1	0	341	1	000000100D	249
220	0	0	1	0			PNTDIM D	250
212	205	1	1	0	0	0	000010100D	251
212	0	0	2	0			NOTE D	252
214	207	1	1	0	0	0	000010100D	253
214	0	0	2	4			LEADER D	254
212	209	1	1	0	341	1	000000100D	255
212	0	0	2	0			NOTE D	256
222	211	1	1	0	341	1	000000100D	257
222	0	0	1	0			RADDIM D	258
212	212	1	1	0	0	0	000010100D	259
212	0	0	2	0			NOTE D	260
214	214	1	1	0	0	0	000010100D	261
214	0	0	2	3			LEADER D	262
222	216	1	1	0	341	1	000000100D	263
222	0	0	1	0			RADDIM D	264
212	217	1	1	0	0	0	000010100D	265
212	0	0	2	0			NOTE D	266
214	219	1	1	0	0	0	000010100D	267
214	0	0	1	3			LEADER D	268
212	220	1	1	0	341	1	000000100D	269
212	0	0	2	0			NOTE D	270
122	222	1	1	0	0	1	000000000D	271
122	0	0	1	0			TABCYL D	272
102	223	1	1	0	0	0	000010000D	273
102	0	0	1	0			CURVE D	274
100	224	1	1	0	0	0	000010000D	275
100	0	0	1	0			ARC D	276
110	225	1	1	0	0	0	000010000D	277
110	0	0	1	0			LINE D	278
212	226	1	1	0	341	1	000000100D	279
212	0	0	2	0			NOTE D	280
308	228	1	1	0	0	0	000000200D	281
308	0	0	1	0			F V F D	282
212	229	1	1	0	0	0	000030100D	283
212	0	0	2	0			NOTE D	284
408	231	1	1	0	341	1	000000100D	285
408	0	0	1	0			SUBFIG : D	286
202	232	1	1	0	341	1	000000100D	287
202	0	0	1	0			ANGDIM D	288
212	233	1	1	0	0	0	000010100D	289
212	0	0	2	0			NOTE D	290
214	235	1	1	0	0	0	000010100D	291
214	0	0	1	3			LEADER D	292
214	236	1	1	0	0	0	000010100D	293
214	0	0	1	3			LEADER D	294
202	237	1	1	0	341	1	000000100D	295
202	0	0	1	0			ANGDIM D	296
212	238	1	1	0	0	0	000010100D	297
212	0	0	2	0			NOTE D	298
106	240	1	1	0	0	0	000010100D	299
106	0	0	1	40			WITNESS D	300
106	241	1	1	0	0	0	000010100D	301

110.21.00.26.00.1.00.23.50.26.00.1.00.0.0;	27P	17
110.26.00.27.00.1.00.26.00.25.00.1.00.0.0;	29P	18
110.27.00.27.00.1.00.27.00.25.00.1.00.0.0;	31P	19
110.24.50.24.00.1.00.24.50.22.00.1.00.0.0;	33P	20
110.23.50.23.00.1.00.23.50.23.00.1.00.0.0;	35P	21
212.1.10.3.00.0.30.1.1.5707963.0.0.0.22.00.20.50.	37P	22
0.0.10ELINE (110).0.0;	37P	23
112.3.0.3.15.0.0.0.2719053.0.6714051.0.9433063.1.3425058.	39P	24
1.7423051.2.0142004.2.4137074.2.8132071.3.2127060.	39P	25
3.6122057.4.0117048.4.4112046.4.8107045.5.2102045.5.6097035.	39P	26
-26.0161954.0.0348794.0.0.0.3244740.16.1824389.0.8564018.	39P	27
0.0.-0.1267781.1.9159014.0.5176959.0.0.0.1431206.-26.0001809.	39P	28
0.1068459.0.2646767.-0.0627361.16.4127488.0.8282831.-0.1034142.	39P	29
-0.0215049.2.0595417.0.5494392.0.1167449.-0.0542858.-25.9192617.	39P	30
0.2582843.0.1894875.0.0103111.16.7287662.0.7353175.-0.1292908.	39P	31
-0.0301380.2.2942138.0.6167263.0.0516833.-0.0108403.-25.8264599.	39P	32
0.3936158.0.1978983.-0.0232532.16.9155369.0.6583239.-0.1538747.	39P	33
-0.0261188.2.4655128.0.6424942.0.0430856.-0.0308710.-25.6393087.	39P	34
0.5406028.0.1700295.-0.0264296.17.1523132.0.5228725.-0.1851781.	39P	35
-0.0188928.2.7271161.0.6622822.0.0064463.-0.0288346.-25.3978068.	39P	36
0.6638016.0.1363537.-0.0250792.17.3304415.0.3658696.-0.2078211.	39P	37
-0.0109925.2.990907.0.6837694.-0.0277548.-0.0230826.-25.2076724.	39P	38
0.7334768.0.1178964.-0.0342911.17.4143372.0.2504171.-0.2167878.	39P	39
-0.0080331.3.1661534.0.6335632.-0.0465559.-0.0275076.-24.8980193.	39P	40
0.8112573.0.0767986.-0.0346088.17.4792671.0.0733578.-0.2264155.	39P	41
0.0010430.3.4100766.0.5831921.-0.0795268.-0.0224660.-24.5638719.	39P	42
0.8560486.0.0353200.-0.0363817.17.4725041.-0.1070486.-0.2251654.	39P	43
0.0080932.3.6289368.0.5088935.-0.1064523.-0.0195787.-24.2185640.	39P	44
0.8668497.-0.0082834.-0.0359517.17.394318.-0.2830803.-0.2154657.	39P	45
1153069.3.8140011.0.414641.-0.1299173.-0.0150304.-23.8758721.	39P	46
430176.-0.0513715.-0.0342648.17.247828.-0.4478126.-0.1968807.	39P	47
215453.3.9578862.0.3034637.-0.1479312.-0.0103413.-23.5494709.	39P	48
0.7855659.-0.0924370.-0.0312447.17.0388789.-0.594804.-0.1710587.	39P	49
0.0290698.4.0548506.0.1803155.-0.1603252.-0.0042977.-23.2523828.	39P	50
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0.0268075.4.1010246.0.0501580.-0.1654760.-0.0013400.-22.9964619.	39P	52
0.580202.-0.1618465.-0.0222198.16.4691105.-0.8135644.-0.1040898.	39P	53
0.0556307.4.0945673.-0.0826989.-0.1670819.0.0136968.-22.7919188.	39P	54
0.4402475.-0.1884769.-0.012473.16.1310258.-0.8700961.-0.0374164.	39P	55
-0.037773.4.0357361.-0.2096393.-0.150666.-0.0166505.-22.6469164.	39P	56
0.2836828.-0.2034258.-0.0278086.15.7750432.-0.918077.-0.0825873.	39P	57
0.5315399.3.9268775.-0.3379936.-0.1706218.0.2017731;	39P	58
212.1.12.3.60.0.30.1.1.5707963.0.0.0.-26.00.13.50.0.0.	41P	59
12HSPLINE (112).0.0;	41P	60
118.45.51.0.0.0.0;	43P	61
102.2.47.49.0.0;	43P	62
110.2.00.18.00.3.00.5.00.18.00.3.00.0.0;	47P	63
100.3.00.6.50.18.00.5.00.18.00.8.00.18.00.0.0;	49P	64
102.2.53.55.0.0;	51P	65
110.2.00.14.00.1.00.5.00.14.00.1.00.0.0;	53P	66
100.1.00.6.50.14.00.5.00.14.00.8.00.14.00.0.0;	53P	67
212.1.19.5.70.0.30.1.1.5705963.0.0.0.0.2.00.10.50.0.0.	57P	68
19HSURF SURFACE (118).0.0;	57P	69
120.61.63.0.0.6.2831853.0.0;	59P	70
110.15.25.18.25.2.00.15.25.12.25.2.00.0.0;	61P	71
102.3.65.67.69.0.0;	63P	72
110.15.25.12.25.2.00.17.866.17.134.2.00.0.0;	65P	73
100.2.00.17.00.17.134.17.866.17.134.17.00.18.00.0.0;	67P	74
110.17.00.18.00.2.00.13.25.18.25.2.00.0.0;	69P	75
212.1.19.5.70.0.30.1.1.5705963.0.0.0.0.13.00.10.50.0.0.	71P	76
19HSURF. OF REV. (129).0.0;	71P	77

\*\*\* IGES DATA FILE PARSING \*\*\*

Input file is NASA

\*\*\* Count of records per section in data file \*\*\*

Section	Records
Start	2
Global	2
Directory	346
Parameter	319
Terminate	1

Start Section from input file:

IGES TEST CASE  
THIS FILE CONTAINS AN EXAMPLE OF THE DRAWING ENTITY

Global Section from input file:

1H,,1H;,,14HIGES TEST FILE,6HNASCAD,,32,8,56,8,56,6HFILE 3,1.00,1,  
4HINCH,1,0.10,13H840716.163000,1.00E-05,100.00,9HS. GORDON,4HGSFC;

File and Product Name Information

File name from sender = IGES TEST FILE  
Date and time of file creation = 840716.163000  
Author = S. GORDON Department = GSFC  
Product name from sender =  
Destination product name = FILE 3

Parameter Delimiters

Delimiter = , -- Terminator = ;

Originating System Data

System ID = NASCAD  
Translator version =  
Specification version = IGES 2.0

Precision levels:

Integer bits =	32		
Floating point - Exponent =	8	Mantissa =	56
Double precision - Exponent =	8	Mantissa =	56

Global Model Data

Model scale = 1.0000, Unit flag = 1, Units = INCH  
Line weights = 1, Maximum line thickness = 1.000000e-01

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OF POOR QUALITY



\*\*\* IGES DATA FILE ANALYSIS \*\*\*

Input file is NASA

Originating System Data

System ID = NASCAD  
 Translator version =  
 Specification version = IGES 2.0  
 Precision levels:  
 Integer bits = 32  
 Floating point - Exponent = 8 Mantissa = 56  
 Double precision - Exponent = 8 Mantissa = 56

Global Model Data

Model scale = 1.0000, Unit flag = 1, Units = INCH  
 Line weights = 1, Maximum line thickness = 1.000000e-01  
 Granularity = 1.000000e-05, Maximum coordinate = 1.000000e+02  
 Drafting standard applicable to original data is not specified.

\*\* Status Flag Summary \*\*

Blank status:	Visible	172
	Blanked	1
Independence:	Independent	77
	Physically Subordinate	84
	Logically Subordinate	5
	Totally Subordinate	7
Entity use:	Geometry	52
	Annotation	120
	Definition	1
	Other	0
	Logical/Topological	0
	2D parametric	0
	Not Specified	0
Hierarchy:	Structure DE applies	173
	Subordinate DE applies	0
	Hierarchy property applies	0
	Not Specified	0

\*\* Entity Occurrence Counts \*\*

Entity	Form	Level	Count	Type
100	0	0	8	Circular arc
102	0	0	6	Composite curve
104	1	0	1	Conic arc - ellipse
104	3	0	1	Conic arc - parabola
106	12	0	1	Copious data - Piecewise linear str
106	40	0	7	Witness line

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RADDIM	2
TABCYL	1
SUBFIG	1
ANGDIM	2
RFRONT	1
VMTRX	4
SPLSURP	1
RTOP	1
RRIGHT	1
FRONT	1
ASSOC	2
DRAWING	1

\*\*\* Line widths used in data \*\*\*

Defaulted 173

\*\* Entity Analysis \*\*

\*\* Entity type: 100

\*\* Entity type: 102

\*\* Entity type: 104

\*\* Entity type: 106

\*\* Entity type: 108

\*\* Entity type: 110

-- 21 lines averaging 3.463159e+00 units --

\*\* Entity type: 112

\*\* Entity type: 114

\*\* Entity type: 116

\*\* Entity type: 118

\*\* Entity type: 120

\*\* Entity type: 122

ORIGINAL PAGE IS  
OF POOR QUALITY

\*\* Entity type: 410

\*\*\* End of Analysis of NASA \*\*\*

\*\* \*\* Questionable conditions encountered \*\* \*\*

W Witness line pointer is zero at D 287.  
W Witness line pointer is zero at D 287.  
W Witness line pointer is zero at D 85.

-- ++ -- 0 errors and 3 warnings encountered -- ++ --

Line	Code	Value	Unit	Material	Quantity	Weight	Volume	Area	Notes
1!									S
2!	...	5H28BENT.46HCOMPUTERVISION CADDS4X REV 4.1 GRAPHIC SYSTEM ,16HIGES VERG							
3!	SION	3.0,16,8,24,8,56,,1.0,1,4HINCH,32767,32.767,13H87 626.112420,							G
4!	0.000001...								G
5!	124	1	1	0	0	0	0	0	ID
6!	124	0	0	1	0				D
7!	124	2	1	0	0	0	0	0	ID
8!	124	0	0	1	0				D
9!	124	3	1	0	0	0	0	0	ID
10!	124	0	0	1	0				D
11!	124	4	1	0	0	0	0	0	ID
12!	124	0	0	1	0				D
13!	124	5	1	0	0	0	0	0	ID
14!	124	0	0	1	0				D
15!	124	6	1	0	0	0	0	0	ID
16!	124	0	0	1	0				D
17!	212	7	1	1	0	0	0	0	1010ID
18!	212	0	0	2	0				NOTE D
19!	308	9	1	0	0	0	0	0	2020ID
20!	308	0	0	1	0				D
21!	124	10	1	0	0	0	0	0	ID
22!	124	0	0	1	0				D
23!	124	11	1	0	0	0	0	0	ID
24!	124	0	0	1	0				D
25!	124	12	1	0	0	0	0	0	ID
26!	124	0	0	1	0				D
27!	124	13	1	0	0	0	0	0	ID
28!	124	0	0	1	0				D







239!	218 235	158	1	1	0	171	29	0	1010
240!	218 236	0	0	1	0			ORDDIM	D
241!	212 237	159	1	0	0	0	0	0	101010
242!	212 238	0	0	1	0				D
243!	214 239	160	1	1	0	0	0	0	101010
244!	214 240	0	0	1	3				D
245!	214 241	161	1	1	0	0	0	0	101010
246!	214 242	0	0	2	3				D
247!	206 243	163	1	1	0	171	29	0	1010
248!	206 244	0	0	1	0			DDIM	D
249!	212 245	164	1	0	0	0	0	0	101010
250!	212 246	0	0	1	0				D
251!	214 247	165	1	1	0	0	0	0	101010
252!	214 248	0	0	1	3				D
253!	214 249	166	1	1	0	0	0	0	101010
254!	214 250	0	0	2	3				D
255!	206 251	168	1	1	0	171	29	0	1010
256!	206 252	0	0	1	0			DDIM	D
257!	212 253	169	1	0	0	0	0	0	101010
258!	212 254	0	0	1	0				D
259!	214 255	170	1	1	0	0	0	0	101010
260!	214 256	0	0	1	3				D
261!	214 257	171	1	1	0	0	0	0	101010
262!	214 258	0	0	1	3				D
263!	206 259	172	1	1	0	171	29	0	1010
264!	206 260	0	0	1	0			DDIM	D
265!	212 261	173	1	0	0	0	0	0	101010
266!	212 262	0	0	1	0				D
267!	214 263	174	1	1	0	0	0	0	101010
268!	214 264	0	0	1	3				D



299!	402 295	190	1	0	0	0	0	0	20201D
300!	402 296	0	0	1	3				D
301!	212 297	191	1	1	0	295	29	0	101D
302!	212 298	0	0	2	0			NOTE	D
303!	212 299	193	1	1	0	295	29	0	101D
304!	212 300	0	0	2	0			NOTE	D
305!	212 301	195	1	1	0	295	29	0	101D
306!	212 302	0	0	2	0			NOTE	D
307!	212 303	197	1	1	0	295	29	0	101D
308!	212 304	0	0	2	0			NOTE	D
309!	212 305	199	1	1	0	295	29	0	101D
310!	212 306	0	0	2	0			NOTE	D
311!	212 307	201	1	1	0	295	29	0	101D
312!	212 308	0	0	2	0			NOTE	D
313!	212 309	203	1	1	0	295	29	0	101D
314!	212 310	0	0	2	0			NOTE	D
315!	212 311	205	1	0	0	0	0	0	10101D
316!	212 312	0	0	1	0				D
317!	214 313	206	1	0	0	0	0	0	10101D
318!	214 314	0	0	1	3				D
319!	214 315	207	1	0	0	0	0	0	10101D
320!	214 316	0	0	1	3				D
321!	106 317	208	1	0	0	0	0	0	10101D
322!	106 318	0	0	2	11				D
323!	228 319	210	1	1	0	295	29	0	101D
324!	228 320	0	0	1	0			FLAG	D
325!	212 321	211	1	0	0	0	0	0	10101D
326!	212 322	0	0	1	0				D
327!	214 323	212	1	0	0	0	0	0	10101D
328!	214 324	0	0	1	3				D





479!124,1.0,0.0,0.0,0.0,0.0,0.0,0.0,1.0,0.0,0.0,0.0,0.0,1.0,0.0;	33P
19	
480!108,1.0,0.0,0.0,0.0,-122.0;	35P
20	
481!108,0.0,1.0,0.0,0.0,-94.0;	37P
21	
482!108,1.0,0.0,0.0,0.0,-88.0;	39P
22	
483!108,0.0,1.0,0.0,0.0,-116.0;	41P
23	
484!410,5,1.0,35,37,39,41,0,0,3,385,295,171,1,31;	43P
24	
485!406,1,2HV3;	45P
25	
486!124,0.5,-0.433013,-0.75,0.0,0.433013,0.875,-0.216506,0.0,0.75,	47P
26	
487!-0.216506,0.625,0.0;	47P
27	
488!108,0.5,-0.433013,-0.75,-122.0;	49P
28	
489!108,0.433013,0.875,-0.216506,-24.0;	51P
29	
490!108,0.5,-0.433013,-0.75,-88.0;	53P
30	
491!108,0.433013,0.875,-0.216506,-46.0;	55P
31	
492!410,4,1.0,49,51,53,55,0,0,0,1,45;	57P
32	
493!406,1,2HV2;	59P
33	
494!124,0.75,-0.216506,0.625,0.0,-0.5,0.433013,0.75,0.0,-0.433013,	61P
34	
495!-0.875,0.216506,0.0;	61P
35	
496!108,0.75,-0.216506,0.625,-52.0;	63P
36	
497!108,-0.5,0.433013,0.75,-94.0;	65P
37	
498!108,0.75,-0.216506,0.625,-18.0;	67P
38	
499!108,-0.5,0.433013,0.75,-116.0;	69P
39	
500!410,3,1.0,63,65,67,69,0,0,0,1,59;	71P
40	
501!406,1,2HV1;	73P
41	
502!124,0.75,-0.216506,0.625,0.0,0.433013,0.875,-0.216506,0.0,-0.5,	75P
42	
503!0.433013,0.75,0.0;	75P
43	
504!108,0.75,-0.216506,0.625,-52.0;	77P
44	
505!108,0.433013,0.875,-0.216506,-24.0;	79P
45	
506!108,0.75,-0.216506,0.625,-18.0;	81P
46	
507!108,0.433013,0.875,-0.216506,-46.0;	83P
47	
508!410,2,1.0,77,79,81,83,0,0,3,385,295,171,1,73;	85P
48	

539!	22.0355,0.433333,15.5637,21.0289,1.56814,13.8508,20.3676,1.4746,	139P
	79	
540!	12.5539,21.5864,0.573045,12.157,22.5453,0.421491;	139P
	80	
541!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	141P
	81	
542!	-13.4629,20.6219,-18.3268,-13.4504,20.7095,-18.3064,-13.4379,	141P
	82	
543!	20.797,-18.2861,-13.423,20.8822,-18.2589,0,0,1,0,1,445;	141P
	83	
544!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	143P
	84	
545!	-13.423,20.8822,-18.2589,-13.4011,21.0073,-18.219,-13.3742,	143P
	85	
546!	21.1272,-13.1645,-13.3441,21.2402,-18.1001,0,0,1,0,1,445;	143P
	86	
547!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	145P
	87	
548!	-13.3441,21.2402,-18.1001,-13.3236,21.317,-18.0563,-13.3016,	145P
	88	
549!	21.3906,-13.0079,-13.2781,21.4603,-17.9548,0,0,1,0,1,445;	145P
	89	
550!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	147P
	90	
551!	-13.2781,21.4603,-17.9549,-13.2436,21.5627,-17.8769,-13.2059,	147P
	91	
552!	21.6567,-17.7899,-13.1659,21.7402,-17.6928,0,0,1,0,1,445;	147P
	92	
553!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	149P
	93	
554!	-13.1659,21.7402,-17.6928,-13.1258,21.8238,-17.5968,-13.0834,	149P
	94	
555!	21.8969,-17.4926,-13.0396,21.958,-17.3827,0,0,1,0,1,445;	149P
	95	
556!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	151P
	96	
557!	-13.0396,21.958,-17.3827,-13.0097,21.9997,-17.3078,-12.9792,	151P
	97	
558!	22.0358,-17.2302,-12.9482,22.0662,-17.1505,0,0,1,0,1,445;	151P
	98	
559!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	153P
	99	
560!	-12.9432,22.0662,-17.1505,-12.9027,22.1107,-17.0334,-12.8562,	153P
	100	
561!	22.1428,-16.9117,-12.8098,22.1615,-16.7881,0,0,1,0,1,445;	153P
	101	
562!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	155P
	102	
563!	-12.8098,22.1615,-16.7881,-12.7634,22.1803,-16.6644,-12.717,	155P
	103	
564!	22.1859,-16.5388,-12.6716,22.1781,-16.4136,0,0,1,0,1,445;	155P
	104	
565!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	157P
	105	
566!	-12.6716,22.1781,-16.4136,-12.6261,22.1702,-16.2885,-12.5816,	157P
	106	
567!	22.1491,-16.1638,-12.539,22.115,-16.0421,0,0,1,0,1,445;	157P
	107	
568!	126,3,3,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,	159P
	108	

-	599!222,193,195,-2.0,-4.0; 139	197P
-	600!212,1,5,1.0,0.2,1,1.5708,0.0,0,0,-6.3,-2.6,0.0,5H1.000; 140	199P
-	601!214,3,0.2,0.025,0.0,-8.4,-1.8,-9.0,-1.0,-7.9,-2.5,-7.0,-2.5; 141	201P
-	602!222,199,201,-9.0,-1.0; 142	203P
-	603!212,1,7,1.4,0.2,1,1.5708,0.0,0,0,-17.9,-8.0,0.0,7HPOINT 2; 143	205P
-	604!214,3,0.0,0.0,0.0,0.0,-16.4,-8.1,-18.1,-8.1,-19.3,-5.9,-19.3,-5.3; 144	207P
-	605!220,205,207,0; 145	209P
-	606!212,1,7,1.4,0.2,1,1.5708,0.0,0,0,-13.4,-2.4,0.0,7HPOINT 1; 146	211P
-	607!100,0.0,-12.8,-2.3,-11.5,-2.3,-11.5,-2.3; 147	213P
-	608!214,3,0.0,0.0,0.0,0.0,-12.7,-3.6,-12.7,-4.1,-14.6,-6.7,-14.6,-7.4; 148	215P
-	609!220,211,215,213; 149	217P
-	610!212,1,4,0.8,0.2,1,1.5708,1.57963,0,0,-21.9,-6.5,0.0,4H2.52; 150	219P
-	611!214,1,0.2,0.025,0.0,-22.0,-3.0,-22.0,-5.5; 151	221P
-	612!218,219,221; 152	223P
-	613!212,1,4,0.8,0.2,1,1.5708,0.0,0,0,-24.3,-4.1,0.0,4H4.00; 153	225P
-	614!214,1,0.0,0.0,0.0,0.0,-28.5,-4.0,-24.5,-4.0; 154	227P
-	615!218,225,227; 155	229P
-	616!212,1,4,0.8,0.2,1,1.5708,0.0,0,0,-24.3,-2.1,0.0,4H4.00; 156	231P
-	617!214,1,0.2,0.025,0.0,-28.5,-2.0,-24.5,-2.0; 157	233P
-	618!218,231,233; 158	235P
-	619!212,1,5,1.0,0.2,1,1.5708,0.0,0,0,-12.0,3.0,0.0,5H4.000; 159	237P
-	620!214,2,0.2,0.025,0.0,-12.43,4.55,-11.57,8.45,-11.57,8.45; 160	239P
-	621!214,3,0.2,0.025,0.0,-11.57,8.45,-12.75,3.13,-12.75,3.13,-12.25. 161	241P
-	622!3.13; 162	241P
-	623!206,237,239,241,-12.0,6.5; 163	243P
-	624!212,1,5,1.0,0.2,1,1.5708,0.0,0,0,-15.0,7.5,0.0,5H4.000; 164	245P
-	625!214,2,0.2,0.025,0.0,-15.84,6.49,-16.16,2.57,-16.16,2.57; 165	247P
-	626!214,3,0.2,0.025,0.0,-16.16,2.57,-15.75,7.63,-15.75,7.63,-15.25. 166	249P
-	627!7.63; 167	249P
-	628!206,245,247,249,-16.0,4.53; 168	251P

659!	212,1,21,6.3072,0.3,1,1.5708,0.0,0.0,-18.0,-9.5,0.0,21HPOINT DIM	305P
	199	
660!	ENSION (220);	305P
	200	
661!	212,1,24,7.1961,0.3,1,1.5703,0.0,0.0,-28.0,-9.5,0.0,24HORDINATE	307P
	201	
662!	DIMENSION (218);	307P
	202	
663!	212,1,15,4.5059,0.3,1,1.5708,0.0,0.0,-8.0,0.5,0.0,15HFLAG NOTE (	309P
	203	
664!	208);	309P
	204	
665!	212,1,10,2.0,0.2,1,1.5708,0.0,0.0,-4.5,3.5,0.0,10HFLAG NO. 3;	311P
	205	
666!	214,2,0.2,0.025,0.0,-8.5,3.0,-6.0,3.6,-4.54,3.6;	313P
	206	
667!	214,1,0.2,0.025,0.0,-8.5,4.5,-6.0,3.6;	315P
	207	
668!	106,1,6,0.0,-4.54,3.4,-4.54,3.8,-2.46,3.8,-2.17436,3.6,-2.46,	317P
	208	
669!	3.4,-4.54,3.4;	317P
	209	
670!	228,311,1,317,2,313,315;	319P
	210	
671!	212,1,10,2.0,0.2,1,1.5708,0.0,0.0,-4.5,6.5,0.0,10HFLAG NO. 2;	321P
	211	
672!	214,2,0.2,0.025,0.0,-9.3,5.5,-5.1,6.6,-4.54,6.6;	323P
	212	
673!	106,1,6,0.0,-4.54,6.4,-4.54,6.8,-2.46,6.8,-2.17436,6.6,-2.46,	325P
	213	
674!	6.4,-4.54,6.4;	325P
	214	
675!	228,321,1,325,1,323;	327P
	215	
676!	212,1,10,2.0,0.2,1,1.5708,0.0,0.0,-4.5,8.5,0.0,10HFLAG NO. 1;	329P
	216	
677!	106,1,6,0.0,-4.54,8.4,-4.54,8.8,-2.46,8.8,-2.17436,8.6,-2.46,	331P
	217	
678!	8.4,-4.54,8.4;	331P
	218	
679!	228,329,1,331,0;	333P
	219	
680!	212,1,19,5.6914,0.3,1,1.5708,0.0,0.0,2.0,0.5,0.0,19HGENERAL LABE	335P
	220	
681!	L (210);	335P
	221	
682!	212,1,7,1.4,0.2,1,1.5708,0.0,0.0,1.4,3.39,0.0,7HLABEL 3;	337P
	222	
683!	214,1,0.2,0.025,0.0,7.5,3.5,3.0,3.5;	339P
	223	
684!	214,1,0.2,0.025,0.0,7.0,5.0,3.5,3.5;	341P
	224	
685!	210,337,2,339,341;	343P
	225	
686!	212,1,7,1.4,0.2,1,1.5708,0.0,0.0,4.5,6.3,0.0,7HLABEL 2;	345P
	226	
687!	214,2,0.2,0.025,0.0,8.5,8.5,7.1,6.4,6.1,6.4;	347P
	227	
688!	210,345,1,347;	349P
	228	

- 719!212,1,18,5.402,0.3,1,1.5708,0.0,0.0,-28.0,20.48,0.0,18HCIRCULAR 259	383P
- 720!ARC (100); 260	383P
- 721!402,2,0,43,85; 261	385P
- 722!124,0,75,0.433013,-0.5,1.5,-0.216506,0.875,0.433013,-4.5,0.625, 262	387P
- 723!-0.216506,0.75,-0.65; 263	387P
- 724!408,15,0.0,0.0,0.0,1.0; 264	389P
- 725!100,0,0,26.5,12.5,27.5,12.5,26.5,13.5; 265	391P
- 726!406,3,5,5,0; 266	393P
- 727!122,391,25.5,17.0,-2.67,0,1,393; 267	395P
- 728!110,25,7207,6.07508,13.6397,21.9707,7.15761,10.5147; 268	397P
- 729!406,3,5,5,0; 269	399P
- 730!122,397,25.183,18.0915,-3.51151,0,1,399; 270	401P
- 731!110,18.34,13.5331,7.08001,15.7419,8.28305,8.37905; 271	403P
- 732!110,15.7419,8.28305,8.37905,19.8187,11.9902,8.95663; 272	405P
- 733!406,3,5,5,0; 273	407P
- 734!120,403,405,0.0,6.28319,0,1,407; 274	409P
- 735!110,18.34,13.5331,7.08001,15.7419,8.28305,8.37905; 275	411P
- 736!100,2,0,17.0,17.134,17.866,17.134,17.0,18.0; 276	413P
- 737!406,3,5,5,0; 277	415P
- 738!120,411,413,0.0,6.28319,0,1,415; 278	417P
- 739!110,18.34,13.5331,7.08001,15.7419,8.28305,8.37905; 279	419P
- 740!110,19.5442,12.9354,8.22789,18.34,13.5331,7.08001; 280	421P
- 741!406,3,5,5,0; 281	423P
- 742!120,419,421,0.0,6.28319,0,1,423; 282	425P
- 743!110,7.79423,16.616,-0.397115,10.0442,15.9665,1.47788; 283	427P
- 744!110,7.06218,12.25,-1.03109,9.31218,11.6005,0.84391; 284	429P
- 745!406,3,5,5,0; 285	431P
- 746!118,427,429,0,0,0,1,431; 286	433P
- 747!100,3,0,6.5,18.0,5.0,18.0,8.0,18.0; 287	435P
- 748!100,1,0,6.5,14.0,5.0,14.0,8.0,14.0; 288	437P