Technical Graphics Transfer

Using:

Texas Instruments' Data

MIL-D-28000A (IGES)
MIL-R-28002A (Raster)
MIL-D-28003 (CGM)

Quick Short Test Report

15 March 1993
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Quick Short Test Report
15 March 1993

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1. Introduction

1.1 Background

The Department of Defense (DoD) Air Force Continuous Acquisition and Life-cycle Support (CALS) Test Network (AFCTN) is conducting tests of the military standard for the Automated Interchange of technical Information, MIL-STD-1840A, and its companion suite of military specifications. The AFCTN is a DoD sponsored confederation of voluntary participants from industry and government managed by the Electronic Systems Center (ESC).

The primary objective of the AFCTN is to evaluate the effectiveness of the CALS standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, used by the AFCTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by AFCTN participants. They also allow the AFCTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALS initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the AFCTN technical staff, gain experience using the standards, and develop increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.
1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze Texas Instrument's interpretation and use of the CALS standards in transferring technical graphics data. Texas Instruments used its CALS Technical Data Interchange System to produce data, in accordance with the standards, and delivered it to the AFCTN technical staff on a diskette.

The goal of the test was to evaluate the CGM and IGES files. The files were not names per MIL-STD-1840A and CALS headers were not included.
2. Test Parameters

Test Plan: AFCTB 93-020

Date of Evaluation: 15 March 1993

Evaluators: George Elwood
Air Force CALS Test Bed
Det 2 HQ ESC/AV-2P
Suite 300
4027 Colonel Glenn Hwy
Dayton OH 45431-1672

Data Originator: Michael Hurn
Texas Instruments
6500 Chase Oaks Blvd
P.O. Box 869305
Plano TX 75086

Data Description: Technical Graphics Test
1 Initial Graphics Exchange Specification (IGES) file
4 Computer Graphics Metafile (CGM) files

Data Source System:

<table>
<thead>
<tr>
<th>Source System</th>
<th>HARDWARE</th>
<th>SOFTWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGES</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Raster</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>CGM</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
Evaluation Tools Used:

MIL-D-28000 (IGES)
Sun SparcStation 2
ArborText iges2draw
IGES Data Analysis (IDA) Parser/Verifier v92
IDA IGESView v3.05
International TechneGroup Incorporated
(ITI) IGES/Works v1.3
Rosetta Technologies Prepare
Rosetta Technologies Preview v3.2
Cheetah Gold 486
AUTODESK AutoCAD 386 R12
Cadkey Cadkey v5.02
PC 486/50
AUTODESK Micro Engineering Solution
(MES) CheckMark v2.0c2

MIL-D-28003 (CGM)
SUN SparcStation 2
XSoft CAPS cgm2ps v6.0x
ArborText cgm2draw
Island Graphics IslandDraw v3.0
Cheetah Gold 486
Advance Technology Center
(ATC) MetaView R 1.12
ATC MetaCheck R 2.05
Software Publishing Corporation
(SPC) Harvard Graphics v3.05
Inset Systems HiJaak v2.1
Inset Systems HiJaak v1.0 Windows
Micrografx Designer v3.1
Corel Ventura Publisher

Standards Tested:

MIL-D-28000A
MIL-R-28002A
MIL-D-28003
3. 1840A Analysis

3.1 External Packaging

The diskette arrived at the Air Force CALS Test Bed (AFCTB) enclosed in a overnight shipping envelop. The exterior of the envelop was not marked with the magnetic tape warning label, as required by MIL-STD-1840A, para. 5.3.1.3.

The diskette was enclosed in an anti-static barrier envelop. Enclosed in the envelop was a packing list showing all files recorded on the diskette.

3.2 Transmission Envelope

The diskette received by the AFCTB did not contained MIL-STD-1840A files. The files were not named per the standard conventions.

3.2.1 Tape Formats

Files received on diskette.

3.2.2 Declaration and Header Fields

No Document Declaration file or data file headers were included on the diskette.

4. IGES Analysis

The diskette contained one IGES file. This file was evaluated using IDA's Parser/Verifier set for CALS Class I. This utility reported no CALS errors. It did report two basic IGES errors.

The first of these errors is the radii in entity type 100 was not equal. This error was reported several times.
*** Entity type: 100

ERROR 2242: Radii not equal at D 45; difference is 7.893829E-04.

The second set of errors relate to entity type 104 where the start and end points of the conics were off by a small number.

*** Entity type: 104

WARNING 2265: Start point off conic by 5.546356E-03 at D 51.
WARNING 2039: End point off conic by 5.546234E-03 at D 51.

The AFCTB has several tools for viewing IGES files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor and indication of CALS capability. All operations were performed using the default settings.

The file was converted using AUTODESK's AutoCAD R12 with the 5.1 IGES translator. The error log from this process is included in Appendix A, Section 9 of this report. The AutoCAD translator reported the same errors as IDA's Parser/Verifier program. The output appeared to be complete when compared to the submitted hard copy.

The file was converted using Cadkey's ig2c utility with no reported errors. Cadkey displayed and printed an image that appeared to be complete when compared to the submitted hard copy.

The file was read in using MES' CheckMark with no reported errors. The displayed and printed output compares to the submitted hard copy.

The file was imported directly into IDA's IGESView, displayed and printed. The resulting images compares to the submitted hard copy.

The file was converted using ArborText's iges2draw utility. The resulting file was read into Island Graphics' Island-
Draw, displayed and printed. No discrepancies were noted between the generated image and the provided hard copy.

The file was read directly into ITI's IGESWorks with no reported errors. The resulting images compares to the provided hard copy.

The file was converted using Rosetta Technologies' Prepare and then displayed using Rosetta Technologies' Preview. A minor visual error was noted in the tail section of the aircraft where two lines were seen.

The IGES file meets CALS Class I MIL-D-28000A specification.

5. SGML Analysis

No Standard Generalized Markup Language (SGML) files were included on the diskette.

6. Raster Analysis

One Raster file was included on the tape. This file could not be read by any software available in the AFCTB.

7. CGM Analysis

The diskette contained four CGM files. These files were evaluated using ATC's MetaCheck software with CALS options. This software reported all four files meet CALS MIL-D-28003 specification.

The files were evaluated using the beta AFCTN validcgm utility. This software also reported the files meet the CALS MIL-D-28003 standards.

The AFCTB has several tools for viewing CGM files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use
of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

The four files were converted using XSoft's CAPS cgm2ps utility. The resulting files were then printed. Files SAMP1 and SAMP2 were the same as the provided hard copy. Files ticgm04 and ticgm05 both had problems in the font area where the font was written very large and on to several pages to the right.

The four files were converted using ArborText's cgm2draw utility with no reported errors. Files SAMP1 and SAMP2 were the same as the provided hard copies. Files ticgm04 and ticgm05 had problems with the fonts which were displayed large and across several pages to the right.

The files were imported into Carberry's CADLeaf software without a reported error. The outputs were all the same as the provided hard copies.

The files were imported into the Micrografx Designer without a reported error. The outputs were the same as the provided hard copies.

All four files were imported into SPC's Harvard Graphics v3.05 without a reported error. The generated hard copies were the same as the provided hard copies.

All four files were read into Inset Systems' HiJaak for Windows without a reported error. The generated images were the same as the provided hard copies.

All four files were imported into Island Graphics' Island-Draw. The resulting images were the same as the provided hard copies.

The four files were imported directly into Corel's Ventura Publisher without a reported error. The generated images were the same as the provided hard copies.

The four CGM files meet the CALS MIL-D-28003 specification. These files were some of the best seen across the wide range of software tools available in the AFCTB.
8. Conclusions and Recommendations

The diskette did not meet the CALS MIL-STD-1840A because it lacked the Document Declaration file and data file headers. The files were not named per the standard. This was not considered critical as the test was for the data files.

The IGES files meet the CALS MIL-D-28000A specification.

The Raster file could not be read using any utilities in the AFCTB, and do not meet the CALS MIL-R-28002A specification.

The CGM files meet the CALS MIL-D-28003 specification.
9. Appendix A - Detailed IGES Analysis

9.1 File igstst

9.1.1 Parser/Verifier Log

*** IGES DATA FILE ANALYSIS ***
*** MARCH 1992 ***
*** IGES Data Analysis ***
*** (708) 449-3430 ***

Input file is /novell/9320/igstst.igs

Checking conformance to CALS Class I (MIL-D-28000A 2/10/92)

Today is March 15, 1993 12:28 AM

*** File and Product Name Information ***

File name from sender = 'igstst.igs'
File creation Date-Time = '930302.120229'
Model change Date-Time = '
Author = '
Department = 'InterCAP Graphics Systems'
Product name from sender = 'IGES_CALS'
Destination product name = 'IGES_CALS V78'

*** Parameter Delimiters ***

Delimiter = ',',
Terminator = ';'

*** Originating System Data ***

System ID = 'InterCAP Graphics Systems - V7.8103'
Preprocessor version = 'IGES VERSION 4.0'
Specification version = 6 (IGES 4.0)

*** Precision levels ***

Integer bits = 16
Floating point - Exponent = 8 Mantissa = 24
Double precision - Exponent = 8 Mantissa = 56

NITPICK 2329: Real constant characteristics inconsistent with specification version.

*** Global Model Data ***
Model scale = 1.0000E+00
Unit flag = 1
Units = 'INCH'
Line weights = 20
Maximum line thickness = 1.333200E-01
Minimum line thickness = 6.666000E-03
Granularity = 1.000000E-04
Maximum coordinate = 1.100000E+01

Drafting standard applicable to original data is not specified.

*** Status Flag Summary ***

Blank status: Visible 588
Blanked 0

Independence: Independent 564
Physically Subordinate 22
Logically Subordinate 2
Totally Subordinate 0

Entity use: Geometry 562
Annotation 7
Definition 19
Other 0
Logical/Positional 0
2D parametric 0
Not Specified 0

Hierarchy: Structure DE applies 588
Subordinate DE applies 0
Hierarchy property applies 0
Not Specified 0

*** Entity Occurrence Counts ***

<table>
<thead>
<tr>
<th>Entity</th>
<th>Form</th>
<th>Level</th>
<th>Count</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
<td>0</td>
<td>128</td>
<td>Circular arc</td>
</tr>
<tr>
<td>104</td>
<td>0</td>
<td>0</td>
<td>122</td>
<td>Conic arc - ellipse</td>
</tr>
<tr>
<td>106</td>
<td>0</td>
<td>11</td>
<td>24</td>
<td>Copious data - Piecewise planar, linear string(2D path)</td>
</tr>
<tr>
<td>110</td>
<td>0</td>
<td>0</td>
<td>176</td>
<td>Line</td>
</tr>
<tr>
<td>124</td>
<td>0</td>
<td>0</td>
<td>122</td>
<td>Transformation matrix</td>
</tr>
<tr>
<td>212</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>General note</td>
</tr>
<tr>
<td>230</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>Sectioned area (Standard Crosshatching)</td>
</tr>
<tr>
<td>308</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>Subfigure definition</td>
</tr>
</tbody>
</table>

11
404 0 0 1 Drawing
406 16 0 1 Property - Drawing size
410 0 0 1 View - Orthographic parallel

*** Entity Count by Level ***

Level Count
0 588

*** Labeling Information ***

98% of the entities are labeled.

Unlabeled 9

<table>
<thead>
<tr>
<th>Label</th>
<th>Count</th>
<th>Label</th>
<th>Count</th>
<th>Label</th>
<th>Count</th>
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<tbody>
<tr>
<td>MTL</td>
<td>5</td>
<td>HAT</td>
<td>3</td>
<td>LIN</td>
<td>3</td>
</tr>
<tr>
<td>ARC</td>
<td>2</td>
<td>CGM_ARC</td>
<td>80</td>
<td>CGM_POLY</td>
<td>191</td>
</tr>
<tr>
<td>CGM_ELL</td>
<td>168</td>
<td>MATRIX</td>
<td>122</td>
<td>TXT</td>
<td>1</td>
</tr>
<tr>
<td>BOX</td>
<td>1</td>
<td>DRAWING</td>
<td>1</td>
<td>PROP_SZ</td>
<td>1</td>
</tr>
<tr>
<td>VIEW</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** Line Fonts Used in Data ***

100 102 104 106 108 110 112 114

- - - - - - - - - Undefined
128 - 122 24 - 176 - Solid
- - - - - - - - - Dashed
- - - - - - - - - Phantom
- - - - - - - - - Center-line
- - - - - - - - - Dotted
- - - - - - - - - User defined

116 118 120 122 124 125 126 128

- - - - - - - - - Undefined
- - - - - - - - - Solid
- - - - - - - - - Dashed
- - - - - - - - - Phantom
- - - - - - - - - Center-line
- - - - - - - - - Dotted
- - - - - - - - - User defined
130 132 134 136 138 140 142 144
- - - - - - - Undefined
- - - - - - - Solid
- - - - - - - Dashed
- - - - - - - Phantom
- - - - - - - Center-line
- - - - - - - Dotted
- - - - - - - User defined

*** Line Widths Used in Data ***

<table>
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<tr>
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<th>Count</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defaulted</td>
<td>131</td>
<td>(0.0067)</td>
</tr>
<tr>
<td>1</td>
<td>17</td>
<td>(0.0067)</td>
</tr>
<tr>
<td>4</td>
<td>71</td>
<td>(0.0267)</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
<td>(0.0333)</td>
</tr>
<tr>
<td>3</td>
<td>304</td>
<td>(0.0200)</td>
</tr>
<tr>
<td>2</td>
<td>33</td>
<td>(0.0133)</td>
</tr>
</tbody>
</table>

*** Colors Used in Data ***

Defaulted 588

**************************************************************
***** ENTITY ANALYSIS *****
**************************************************************

*** Entity type: 100

ERROR 2242: Radii not equal at D 45; difference is 7.893829E-04.
ERROR 2242: Radii not equal at D 57; difference is 1.678785E-03.
ERROR 2242: Messages regarding unequal radii suppressed.

*** Entity type: 104

WARNING 2265: Start point off conic by 5.546356E-03 at D 51.
WARNING 2039: End point off conic by 5.546234E-03 at D 51.
WARNING 2265: Start point off conic by 5.435796E-03 at D 71.
WARNING 2039: End point off conic by 1.534992E-03 at D 71.
WARNING 2039: Messages regarding conic end points suppressed.
WARNING 2265: Messages regarding invalid start point suppressed.

*** Entity type: 106

*** Entity type: 110

-- 176 lines averaging 3.933974E-01 units --
*** Entity type: 124

122 transformation matrices, 122 non-zero translations.
NOTE 2341: 122 matrices contain translation information.

*** Entity type: 212

1 text strings in data file.
Average text aspect ratio in file is 0.7430643.
Minimum text aspect ratio in file is 0.7430643.
Maximum text aspect ratio in file is 0.7430643.

**FONTS USED IN FILE**

<table>
<thead>
<tr>
<th>FONT</th>
<th>COUNT</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Default ASCII Style</td>
</tr>
</tbody>
</table>

*** Entity type: 230

*** Entity type: 308

Subfigure name at D  5: 'IGES_ARROW_1'.
Number of included entities = 2.
Subfigure name at D  9: 'IGES_ARROW_2'.
Number of included entities = 1.
Subfigure name at D 13: 'IGES_ARROW_3'.
Number of included entities = 1.
Subfigure name at D 19: 'IGES_ARROW_4'.
Number of included entities = 2.
Subfigure name at D 23: 'IGES_ARROW_5'.
Number of included entities = 1.
Subfigure name at D 27: 'IGES_ARROW_6'.
Number of included entities = 1.
Subfigure name at D 33: 'IGES_ARROW_7'.
Number of included entities = 2.
Subfigure name at D 39: 'IGES_ARROW_8'.
Number of included entities = 2.
Subfigure name at D 43: 'IGES_ARROW_9'.
Number of included entities = 1.

*** Entity type: 404

Drawing at D 1171 contains 1 views.
Drawing at D 1171 contains 0 annotation entities.

*** Entity type: 406
*** Entity type: 410

Scale of view at D  1175 is 1.000000E+00.
Orthographic View entity at D  1175 has 0 clipping planes specified.
   XMIN = Not Set   XMAX = Not Set
   YMIN = Not Set   YMAX = Not Set
   ZMIN = Not Set   ZMAX = Not Set

*** Message Summary ***

2015: 332 Mathematically incorrect definitions.

*** Error Summary ***

   0 fatal errors
   0 severe errors
   118 errors
   214 warnings
   0 cautions
   1 nitpicks
   1 notes

*** End of Analysis of /novell/9320/igstst.igs ***
9.1.2 AutoCAD R12 Log File

Title: IGESIN Journal (v5.1 Nov 05 1992)

File: T:\9320\IGSTST.xli
Date: Mon, Mar 15, 1993
Time: 11:13:10

EVALUATION VERSION -- NOT FOR RESALE

Translator S/N: 117-10075750
Translating from IGES file: I:\9320\IGSTST.IGS
to AutoCAD Drawing: UNNAMED.dwg

Options obtained from: default settings

Curves Approximated to Tolerance of 0.01
Surfaces Approximated to Tolerance of 0.01

Text Font/Style mapping:

<table>
<thead>
<tr>
<th>IGES Text font</th>
<th>Style Name</th>
<th>ACAD Font</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SYMBOL0</td>
<td>iges0</td>
</tr>
<tr>
<td>1</td>
<td>STANDARD</td>
<td>txt</td>
</tr>
<tr>
<td>2</td>
<td>LEROY</td>
<td>txt</td>
</tr>
<tr>
<td>3</td>
<td>FUTURA</td>
<td>txt</td>
</tr>
<tr>
<td>6</td>
<td>COMP80</td>
<td>txt</td>
</tr>
<tr>
<td>12</td>
<td>GOTHIC1</td>
<td>gothic</td>
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<tr>
<td>13</td>
<td>GOTHIC2</td>
<td>gothici</td>
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<tr>
<td>14</td>
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<td>iges1001</td>
</tr>
<tr>
<td>1002</td>
<td>SYMBOL2</td>
<td>iges1002</td>
</tr>
<tr>
<td>1003</td>
<td>SYMBOL3</td>
<td>iges1003</td>
</tr>
<tr>
<td>2001</td>
<td>KANJI</td>
<td>bigfont</td>
</tr>
</tbody>
</table>

IGES Linefont/AutoCAD Linetype mapping

<table>
<thead>
<tr>
<th>IGES Line Font</th>
<th>AutoCAD linetype</th>
<th>Shape file</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>BYLAYER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CONTINUOUS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>DASHED</td>
<td>acad.lin</td>
</tr>
<tr>
<td>3</td>
<td>PHANTOM</td>
<td>acad.lin</td>
</tr>
<tr>
<td>4</td>
<td>CENTER</td>
<td>acad.lin</td>
</tr>
</tbody>
</table>
Parse phase

*** Warning (IAFP_LARGER_SGL_SIG) ***
IGSTST.IGS, line 9: IGES file has greater number of significant digits in single precision numbers than this system.

*** Warning (IAFP_LARGER_DBL_SIG) ***
IGSTST.IGS, line 9: IGES file has greater number of significant digits in double precision numbers than this system.

*** Warning (IEVM_RADII_NOT_EQUAL_100) ***
(DE 45, TF 100:0) Entity's radii are not equal. Start point radius: 2.5702948e+000. Terminate point radius: 2.5710842e+000.

Action taken: Start point moved 3.9469146e-004 units from 2.2463622e+000, 2.4423392e+000 to 2.2461671e+000, 2.4426823e+000. Terminate point moved 3.9469146e-004 units from 1.5065665e+000, 1.8106918e+000 to 1.5068751e+000, 1.8104458e+000.

<<< PART OF Log FILE REMOVED HERE >>>>

*** Warning (IEVM_BAD_START_POINT_104) ***
(DE 227, TF 104:1) Entity's start point not on the conic. Value found was 2.8370570e-001, 3.5463300e-002.

Action taken: Start point moved 3.6393207e-003 units, from 2.8370570e-001, 3.5463300e-002 to 2.8734502e-001, 3.5463300e-002.

<<< PART OF Log FILE REMOVED HERE >>>

*** Warning (IEVM_BAD_END_POINT_104) ***
(DE 355, TF 104:1) Entity's End Point not on the conic. Value found was -7.0926700e-002, 6.5015800e-002.


Start Section:

InterCAP Graphics Systems, Inc.
MIL-D-28000 Conformance to Class I - Technical Illustrations Subset
Destination System: unknown
Destination Company: Texas_Instruments
Sending Company: Texas_Instruments
Contact Person: Tommy_Smith

Global Section:

Parameter Delimiter: ;
Record Delimiter: ;
Sending Product ID: IGES_CALS
File Name: igstst.igs
System ID: InterCAP Graphics Systems - V7.8103
Preprocessor Version: IGES VERSION 4.0
Size of Integer: 16
Sgl. Precision Mag: 8
Sgl. Precision Sig: 24
Db1. Precision Mag: 8
Db1. Precision Sig: 56
Receiving Product ID: IGES_CALS V78
Model Space Scale: 1.000000
Unit Flag: 1
Unit String: INCH
# of Line Weights: 20
Maximum Line Width: 0.133320
Creation Date: 03/02/93 12:02:29
Minimum Resolution: 0.000100
Maximum Coordinate: 11.000000
Author:
Organization: InterCAP Graphics Systems
IGES Version Number: 6
Drafting Standard: 0

Entity Summary:

<table>
<thead>
<tr>
<th>Type</th>
<th>Form</th>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
<td>Circular Arc</td>
<td>128</td>
</tr>
<tr>
<td>104</td>
<td>1</td>
<td>Ellipse</td>
<td>122</td>
</tr>
<tr>
<td>106</td>
<td>11</td>
<td>Planar Piecewise Linear Curve</td>
<td>24</td>
</tr>
<tr>
<td>110</td>
<td>0</td>
<td>Line</td>
<td>176</td>
</tr>
<tr>
<td>124</td>
<td>0</td>
<td>Transformation Matrix</td>
<td>122</td>
</tr>
<tr>
<td>212</td>
<td>0</td>
<td>General Note (Simple)</td>
<td>1</td>
</tr>
<tr>
<td>230</td>
<td>0</td>
<td>Section Area (Standard Fill)</td>
<td>3</td>
</tr>
<tr>
<td>308</td>
<td>0</td>
<td>Subfigure Definition</td>
<td>9</td>
</tr>
<tr>
<td>404</td>
<td>0</td>
<td>Drawing (form 0)</td>
<td>1</td>
</tr>
<tr>
<td>406</td>
<td>16</td>
<td>Property (Drawing Size)</td>
<td>1</td>
</tr>
<tr>
<td>410</td>
<td>0</td>
<td>View</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>588</td>
</tr>
</tbody>
</table>

Translation phase
Drawing Entity (404 Form 0) at DE 1171, with
name = ,
size = 11.000000, 8.500000,
units = IN,
was processed in the AutoCAD drawing file: C:\UNNAMED.dwg

*** Warning (ACAD_NEW_VIEW_VOLUME_GENERATED) ***
(DE: 1175 TF: 410:0)
A new view volume has been generated for the view with:
XMIN (-1.390144), XMAX (12.390144),
YMIN (-1.390144), YMAX (9.890144),
ZMIN (-1.390144), ZMAX (1.390144).

IGES Entity Summary

<table>
<thead>
<tr>
<th>Type</th>
<th>Form</th>
<th>Description</th>
<th>Count</th>
<th>Processed</th>
<th>Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
<td>Circular Arc</td>
<td>130</td>
<td>130</td>
<td>0</td>
</tr>
<tr>
<td>104</td>
<td>1</td>
<td>Ellipse</td>
<td>122</td>
<td>122</td>
<td>0</td>
</tr>
<tr>
<td>106</td>
<td>11</td>
<td>Planar Piecewise Linear Curve</td>
<td>26</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>110</td>
<td>0</td>
<td>Line</td>
<td>176</td>
<td>176</td>
<td>0</td>
</tr>
<tr>
<td>212</td>
<td>0</td>
<td>General Note (Simple)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>230</td>
<td>0</td>
<td>Section Area (Standard Fill)</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>308</td>
<td>0</td>
<td>Subfigure Definition</td>
<td>9</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>404</td>
<td>0</td>
<td>Drawing (form 0)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>406</td>
<td>16</td>
<td>Property (Drawing Size)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>410</td>
<td>0</td>
<td>View</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Totals

AutoCAD Entity Summary

<table>
<thead>
<tr>
<th>Entity</th>
<th>Created</th>
<th>Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE</td>
<td>240</td>
<td>0</td>
</tr>
<tr>
<td>CIRCLE</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>TEXT</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>ARC</td>
<td>126</td>
<td>0</td>
</tr>
<tr>
<td>SOLID</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>INSERT</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>POLYLINE</td>
<td>91</td>
<td>0</td>
</tr>
<tr>
<td>BLOCK</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Totals

Error Summary:

19
The following message was issued 1 time(s)
IGES file has greater number of significant digits in single precision numbers than this system.

The following message was issued 1 time(s)
IGES file has greater number of significant digits in double precision numbers than this system.

The following message was issued 119 time(s)
Entity's radii are not equal. Start point radius: \(7.7e\). Terminate point radius: \(7.7e\).

The following message was issued 109 time(s)
Entity's start point not on the conic. Value found was \(7.7e, 7.7e\).

The following message was issued 109 time(s)
Entity's End Point not on the conic. Value found was \(7.7e, 7.7e\).

The following message was issued 1 time(s)
A new view volume has been generated for the view with:
XMIN (=lf), XMAX (=lf),
YMIN (=lf), YMAX (=lf),
ZMIN (=lf), ZMAX (=lf).

Status: 0
Warning: 340
Error: 0
Fatal: 0

Elapsed Time:

Processor: 00:00:30
Clock: 00:00:30

====================================================================
9.1.3 Output AutoCAD R12

Illustrator 2 version 7.8
9.1.4 Output Cadkey v5.02

Illustrator 2 version 7.8
9.1.5 Output CheckMark v1.00

ILLUSTRATOR 2 VERSION 7.8
9.1.6 Output IGESView

Illustrator 2 version 7.8
9.1.7 Output iges2draw/IslandDraw

Illustrator 2 version 7.8
9.1.8 Output IGESWorks
9.1.9 Output Preview

Illustrator 2 version 7.8
10. Appendix B - Detailed CGM Analysis

10.1 File SAMPI

10.1.1 Parser Log MetaCheck

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93 Time: 10:42:39

Metafile Examined : i:\9320\samp1.cgm
Pictures Examined : All
Elements Examined : All
Bytes Examined : All

--------------------------- Trace Report ---------------------------

Tracing not selected.

---------- CGM Conformance Violation Report ----------

Bulletin 20027: Element Class/ID: 4/1 Offset: 512 octets Element No. 38
Warning; a foreground color has been defined and referenced by a primitive,
while the background color has not been defined.

---------- CALS CGM Profile (MIL-D-28003) Report ----------

No profile discrepancies detected.

---------- Conformance Summary Report ----------

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93 Time: 10:42:45

Name of CGM under test: i:\9320\samp1.cgm
Encoding : Binary

Pictures Examined : All
Elements Examined : All
Bytes Examined : All

BEGIN METAFILE string : "HiJaak 2"
METAFILE DESCRIPTION : "HiJaak 2 MIL-D-28003/BASIC-1"
Picture 1 starts at octet offset 336; string contains: "Awesome!"

Conformance Summary: This file conforms to the CGM specification.

This file meets the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

1 Pictures Tested
2213 Elements Tested
26722 Octets Tested

0 Illegal CGM Elements
0 Incorrect CGM Element Lengths
0 CGM State Errors
0 Required CGM Elements Missing or Wrong
0 CGM Parameter Values Out of Range
0 CGM Structure Errors
0 *** CGM Errors Found (total) ***

0 Profile State Errors
0 Illegal Profile Elements
0 Profile Parameter Values Out of Range
0 Profile Data Limits Exceeded
0 Other Profile Constraints Violated
0 *** Profile Violations Found (total) ***

1 Warnings (Advisory Remarks)

1 distinct errors and warnings were reported.

-------------- End of Conformance Report --------------
10.1.2 validcgm Log

Analysis for file samp1.cgm using table table
(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 3) occurred 1 time
(1, 4) occurred 1 time
(1, 7) occurred 1 time
(1, 8) occurred 1 time
(1, 10) occurred 1 time
(1, 11) occurred 1 time
(2, 1) occurred 1 time
(2, 2) occurred 1 time
(2, 3) occurred 1 time
(2, 4) occurred 1 time
(2, 5) occurred 1 time
(2, 6) occurred 1 time
(2, 7) never occurred, required by standard B
(3, 1) occurred 1 time
(4, 1) occurred 857 times
(5, 3) occurred 162 times
(5, 4) occurred 162 times
(5, 8) occurred 162 times
(5, 14) occurred 162 times
(5, 15) occurred 5 times
(5, 16) occurred 32 times
(5, 22) occurred 2 times
(5, 23) occurred 324 times
(5, 28) occurred 162 times
(5, 29) occurred 162 times
(5, 30) occurred 1 time
10.1.3 Output XSoft cgm2ps

LOTUS 1-2-3 sample .PIC file
version 2.4
10.1.4 Output cgm2draw/IslandDraw

LOTUS 1-2-3 sample .PIC file

version 2.4
10.1.5 Output CADLeaf

LOTUS 1-2-3 sample .PIC file

version 2.4
10.1.6 Output Designer

LOTUS 1-2-3 sample .PIC file

version 2.4
10.1.7 Output Harvard Graphics

LOTUS 1-2-3 sample .PIC file

![Graph Image]
10.1.8 Output HiJaak Windows
10.1.9 Output IslandDraw

version 2.4

[Bar chart showing expenses for different categories: Payroll, Utilities, Rent, Ads, COG Sold. Each category is divided into quartiles Q1, Q2, Q3, Q4.]
10.1.10 Output Ventura Publisher

LOTUS 1-2-3 sample .PIC file
version 2.4

![Bar chart showing expenses for different categories over quarters]

- Payroll
- Utilities
- Rent
- Ads
- COG Sold

Expenses in Thousands:

Q1, Q2, Q3, Q4
10.2 File SAMP2

10.2.1 Parser Log MetaCheck

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93    Time: 10:42:53

Metafile Examined : i:\9320\samp2.cgm
Pictures Examined : All
Elements Examined  : All
Bytes Examined     : All

======================== Trace Report =========================

Tracing not selected.

========== CGM Conformance Violation Report =========

Bulletin 20027: Element Class/ID: 4/1   Offset: 526 octets Element No. 40
Warning: a foreground color has been defined and referenced by a primitive,
while the background color has not been defined.

========== CALS CGM Profile (MIL-D-28003) Report =========

No profile discrepancies detected.

============== Conformance Summary Report ===============

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93    Time: 10:42:57

Name of CGM under test: i:\9320\samp2.cgm
Encoding               : Binary

Pictures Examined      : All
Elements Examined      : All
Bytes Examined         : All

BEGIN METAFILE string : "HiJaak 2"
METAFILE DESCRIPTION  : "HiJaak 2 MIL-D-28003/BASIC-1"

Picture 1 starts at octet offset 336; string contains: "Awesome!"

Conformance Summary    : This file conforms to the CGM specification.
This file meets the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

1 Pictures Tested
597 Elements Tested
13158 Octets Tested

0 Illegal CGM Elements
0 Incorrect CGM Element Lengths
0 CGM State Errors
0 Required CGM Elements Missing or Wrong
0 CGM Parameter Values Out of Range
0 CGM Structure Errors
0 *** CGM Errors Found (total) ***

0 Profile State Errors
0 Illegal Profile Elements
0 Profile Parameter Values Out of Range
0 Profile Data Limits Exceeded
0 Other Profile Constraints Violated
0 *** Profile Violations Found (total) ***

1 Warnings (Advisory Remarks)

1 distinct errors and warnings were reported.

=============== End of Conformance Report ===============
10.2.2 validcgm Log

Analysis for file samp2.cgm using table table
(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 3) occurred 1 time
(1, 4) occurred 1 time
(1, 7) occurred 1 time
(1, 8) occurred 1 time
(1, 10) occurred 1 time
(1, 11) occurred 1 time
(2, 1) occurred 1 time
(2, 2) occurred 1 time
(2, 3) occurred 1 time
(2, 4) occurred 1 time
(2, 5) occurred 1 time
(2, 6) occurred 1 time
(2, 7) never occurred, required by standard B
(3, 1) occurred 1 time
(4, 1) occurred 428 times
(5, 3) occurred 17 times
(5, 4) occurred 17 times
(5, 8) occurred 17 times
(5, 14) occurred 17 times
(5, 15) occurred 3 times
(5, 16) occurred 7 times
(5, 22) occurred 2 times
(5, 23) occurred 34 times
(5, 28) occurred 17 times
(5, 29) occurred 17 times
(5, 30) occurred 1 time
10.2.3 Output XSoft cgms2ps

LOTUS 1–2–3 sample .PIC file
version 24
10.2.4 Output cgm2draw/IslandDraw

LOTUS 1-2-3 sample .PIC file
version 2.4
10.2.5 Output CADLeaf

LOTUS 1-2-3 sample .PIC file
version 2.4
10.2.6 Output Designer

LOTUS 1-2-3 sample .PIC file
version 2.4
10.2.7 Output Harvard Graphics

LOTUS 1-2-3 sample PIC file
version 2.4

- Payroll (23.6%)
- Utilities (17.7%)
- Adm (6.6%)
- Rent (7.3%)
- Office Sal (41.3%)

9320 - HG305 - SAMP2
10.2.8 Output HiJaak Windows
10.2.9 Output IslandDraw

version 2.4

- Payroll (23.6%)
- Utilities (17.7%)
- COG Saled (41.3%)
- Rent (7.9%)
- Ads (9.4%)
10.2.10 Output Ventura Publisher

LOTUS 1-2-3 sample .PIC file
version 2.4
10.3 File ticgm04

10.3.1 Parser Log MetaCheck

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93     Time: 10:43:28

Metafile Examined     : i:\9320\ticgm04.cgm
Pictures Examined    : All
Elements Examined    : All
Bytes Examined       : All

========================== Trace Report ===========================

Tracing not selected.

============ CGM Conformance Violation Report ==============

No Errors Detected

=========== CALS CGM Profile (MIL-D-28003) Report ============

No profile discrepancies detected.

=============== Conformance Summary Report ===============

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93     Time: 10:43:32

Name of CGM under test: i:\9320\ticgm04.cgm
Encoding              : Binary

Pictures Examined    : All
Elements Examined    : All
Bytes Examined       : All

BEGIN METAFILE string : "Micrografx CGM Translator, version 3.9 (T.I. Beta)"
METAFILE DESCRIPTION  : "MIL-D-28003/BASIC-1"

Picture 1 starts at octet offset 128; string contains: "1"

Conformance Summary  : This file conforms to the CGM specification.
This file meets the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

1 Pictures Tested
1111 Elements Tested
15120 Octets Tested

======================================
| No Errors Were Detected |
======================================

============= End of Conformance Report =============
10.3.2 validcgm Log

Analysis for file ticgm04.cgm using table table

(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 3) occurred 1 time
(1, 4) occurred 1 time
(1, 5) occurred 1 time
(1, 6) occurred 1 time
(1, 7) occurred 1 time
(1, 10) occurred 1 time
(1, 11) occurred 1 time
(2, 1) occurred 1 time
(2, 2) occurred 1 time
(2, 3) occurred 1 time
(2, 5) occurred 1 time
(2, 6) occurred 1 time
(2, 7) occurred 1 time
(3, 1) occurred 1 time
(3, 3) occurred 116 times
(3, 4) occurred 3 times
(4, 1) occurred 210 times
(4, 4) occurred 7 times
(4, 17) occurred 1 time
(4, 18) occurred 2 times
(5, 2) occurred 1 time
(5, 3) occurred 310 times
(5, 4) occurred 1 time
(5, 14) occurred 1 time
(5, 15) occurred 1 time
(5, 16) occurred 6 times
(5, 18) occurred 1 time
(5, 23) occurred 116 times
(5, 27) occurred 1 time
(5, 28) occurred 310 times
(5, 29) occurred 1 time
(5, 30) occurred 2 times
10.3.3 Output XSoft cgmxps
10.3.4 Output cgm2draw/IslandDraw

MIRAC FILE SOUR Version Conver Dat.
10.3.5 Output CADLeaf

MIRAGE F-1 CLIPART
FILE NAME: TICGM04.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.3.6 Output Designer

MIRAGE F-1 CLIPART
FILE NAME: TICGM04.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.3.7 Output Harvard Graphics

MIRAGE F-1 CLIPART
FILE NAME: TICGM04.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992

9320 - HG305 - ticgm04
10.3.8 Output HiJaak Windows

MIRAGE F-1 CLIPART
FILE NAME: TICGMO4.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.3.9 Output IslandDraw

FILE NAME: TICGM04.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.3.10 Output Ventura Publisher

MIRAGE F-1 CLIPART
FILE NAME: TICGM04.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.4 File ticgm05

10.4.1 Parser Log MetaCheck

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93      Time: 10:43:40

Metafile Examined : i:\9320\ticgm05.cgm
Pictures Examined  : All
Elements Examined  : All
Bytes Examined     : All

============== Trace Report ===============

Tracing not selected.

============== CGM Conformance Violation Report ===============

No Errors Detected

============== CALS CGM Profile (MIL-D-28003) Report ===============

No profile discrepancies detected.

============== Conformance Summary Report ===============

MetaCheck Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 03/15/93      Time: 10:43:44

Name of CGM under test: i:\9320\ticgm05.cgm
Encoding           : Binary
Pictures Examined  : All
Elements Examined  : All
Bytes Examined     : All

BEGIN METAFILE string : "Micrografx CGM Translator, version 3.9 (T.I. Beta)"
METAFILE DESCRIPTION : "MIL-D-28003/BASIC-1"
Picture 1 starts at octet offset 128; string contains: "1"

Conformance Summary : This file conforms to the CGM specification.
                      This file meets the CALS CGM Profile (MIL-D-28003).
Summary of Testing Performed and Errors Found:

1 Pictures Tested
1198 Elements Tested
17102 Octets Tested

=================================
| No Errors Were Detected |
================================

======== End of Conformance Report ========
10.4.2 validcgm Log

Analysis for file ticgm05.cgm using table table

(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 3) occurred 1 time
(1, 4) occurred 1 time
(1, 5) occurred 1 time
(1, 6) occurred 1 time
(1, 7) occurred 1 time
(1, 10) occurred 1 time
(1, 11) occurred 1 time
(2, 1) occurred 1 time
(2, 2) occurred 1 time
(2, 3) occurred 1 time
(2, 5) occurred 1 time
(2, 6) occurred 1 time
(2, 7) occurred 1 time
(3, 1) occurred 1 time
(3, 3) occurred 140 times
(3, 4) occurred 2 times
(4, 1) occurred 232 times
(4, 4) occurred 7 times
(4, 17) occurred 1 time
(5, 2) occurred 1 time
(5, 3) occurred 324 times
(5, 4) occurred 1 time
(5, 14) occurred 1 time
(5, 15) occurred 1 time
(5, 16) occurred 6 times
(5, 18) occurred 1 time
(5, 22) occurred 2 times
(5, 23) occurred 128 times
(5, 27) occurred 1 time
(5, 28) occurred 324 times
(5, 29) occurred 1 time
(5, 30) occurred 4 times
10.4.3 Output XSoft cgm2ps
10.4.4 Output cgm2draw/IslandDraw
10.4.5 Output CADLeaf

MIRAGE III CLIPART
FILE NAME: TICGM05.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.4.6 Output Designer

MIRAGE III CLIPART
FILE NAME: TICGM05.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.4.7 Output Harvard Graphics

MIRAGE III CLIPART
FILE NAME: TICGM05.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992

9320 - HG305 - ticgm05
10.4.8 Output HiJaak Windows

MIRAGE III CLIPART
FILE NAME: TICGM05.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992
10.4.9 Output IslandDraw

LE NAME: TICGDMUS.CGM

ORCE: CHARISMA

ersion: 2.1

onverter: CGMTI

ersion: 3.9 (BETA)

te: 07 December 1992

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10.4.10 Output Ventura Publisher

MIRAGE III CLIPART
FILE NAME: TICGM05.CGM
SOURCE: CHARISMA
Version: 2.1
Converter: CGMTI
Version: 3.9 (BETA)
Date: 07 December 1992