

<p>NOTICE OF CHANGE</p>

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**MIL-STD-2301
NOTICE 1
12 October 1994**

**MILITARY STANDARD
COMPUTER GRAPHICS METAFILE (CGM) IMPLEMENTATION STANDARD
FOR THE NATIONAL IMAGERY TRANSMISSION FORMAT STANDARD**

TO ALL HOLDERS OF MIL-STD-2301:

1. THE FOLLOWING PAGES OF MIL-STD-2301 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
cover	18 June 1993	cover	reprinted without change
ii	12 October 1994	ii	18 June 1993
11	18 June 1993	11	reprinted without change
12	12 October 1994	12	18 June 1993
13	18 June 1993	13	reprinted without change
14	12 October 1994	14	18 June 1993
89	18 June 1993	89	reprinted without change
90	12 October 1994	90	18 June 1993
95	18 June 1993	95	reprinted without change
96	12 October 1994	96	18 June 1993

2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

3. Holders of MIL-STD-2301 will verify that page changes and additions indicated above have been entered. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the military standard is completely revised or canceled.

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MIL-STD-2301, NOTICE 1, 12 October 1994

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(Project IPSC-0321)

NOT MEASUREMENT
SENSITIVE

MIL-STD-2301
18 June 1993

MILITARY STANDARD

COMPUTER GRAPHICS METAFILE
(CGM)
IMPLEMENTATION STANDARD

FOR THE
NATIONAL IMAGERY TRANSMISSION FORMAT
STANDARD



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FOREWORD

1. The National Imagery Transmission Format Standard (NITFS) is the standard for formatting digital imagery and imagery-related products and exchanging them among members of the Intelligence Community (IC), as defined by Executive Order 12333, the Department of Defense (DOD), and other departments and agencies of the United States Government as governed by Memoranda of Agreement (MOA) with those departments and agencies.
2. The National Imagery Transmission Format Standard Technical Board (NTB) developed this standard based upon currently available technical information.
3. The DOD and members of the Intelligence Community are committed to interoperability of systems used for formatting, transmitting, receiving, and processing imagery and imagery-related information. This standard describes the Computer Graphics Metafile (CGM) implementation and establishes its application within the NITFS.
4. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Center for Standards (CFS), Attention: TBCE, 10701 Parkridge Boulevard, Reston, VA 22091-4398 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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5. DETAILED REQUIREMENTS

5.1 Interface requirements. The following subsections list the required CGM commands along with the binary encoding method as described in the FIPS PUB 128 document. The words "command" and "element" are used synonymously throughout this document.

5.1.1 CGM interface input requirements.

5.1.1.1 Delimiter elements. The Delimiter elements define boundaries for significant structures within the metafile.

5.1.1.1.1 Begin Metafile element input. The CGM implementation for NITFS shall provide the capability to input and interpret the Begin Metafile element using the following formats. The Begin Metafile element name is represented using the character string C1, C2, ... Cn with length n.

TABLE 3. Begin Metafile padded, short form input.

MSB															LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
0					1					parameter list length						
length = n (even)									C1							
C2									• • •							
Cn									0							

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TABLE 4. Begin Metafile nonpadded, short form input.

MSB										LSB										
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0					
0					1					parameter list length										
length = n (odd)										C1										
C2										⋮										
C(n-1)										Cn										

TABLE 5. Begin Metafile padded, long form input.

MSB															LSB
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0						1					31				
parameter list length															
length = n (even)										C1					
C2										• • •					
Cn										0					

= 0x003F

TABLE 6. Begin Metafile nonpadded, long form input

MSB															LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
0					1					31						= 0x003F
parameter list length																
length = n (odd)										C1						
C2										• • •						
C(n-1)										Cn						

5.1.1.1.2 Begin Picture element input. The CGM implementation for NITFS shall provide the capability to input and interpret the Begin Picture element using the following formats. The Begin Picture element name is represented using the character string C1, C2, ... Cn with length n.

TABLE 7. Begin Picture padded, short form input

MSB															LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
0					3					parameter list length						
length = n (even)								C1								
C2								<div>•</div> <div>•</div> <div>•</div>								
Cn								()								

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TABLE 8. Begin Picture nonpadded, short form input.

MSB											LSB				
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0						3					parameter list length				
length = n (odd)									C1						
C2									• • •						
C(n-1)									0						

TABLE 9. Begin Picture padded, long form input.

MSB															LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
0					3					31						
parameter list length																
length = n (even)									C1							
C2									• • •							
Cn									0							

= 0x007F

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5.2.1.2 CGM element position output requirements.

5.2.1.2.1 Begin Metafile element position for output. The CGM implementation for NITFS shall generate the Begin Metafile element as the first command in the metafile.

5.2.1.2.2 Begin Picture element position for output. The CGM implementation for NITFS shall generate the Begin Picture element after all Metafile Descriptor elements in the metafile.

5.2.1.2.3 Begin Picture Body element position for output. The CGM implementation for NITFS shall generate the Begin Picture Body element after each Begin Picture element and its associated Picture Descriptor elements.

5.2.1.2.4 End Picture element position for output. The CGM implementation for NITFS shall generate the End Picture element after any Begin Picture Body element and its associated Attribute and Graphical Primitive elements.

5.2.1.2.5 End Metafile element position for output. The CGM implementation for NITFS shall generate the End Metafile element as the last element in the metafile.

5.2.1.2.6 Metafile Descriptor elements position for output. The CGM implementation for NITFS shall generate all Metafile Descriptor elements after the Begin Metafile element and before any Begin Picture elements. The Metafile Version element, the Metafile Element List element, and the Metafile Description element shall be the first three metafile descriptor elements in that order.

5.2.1.2.7 Picture Descriptor elements position for output. The CGM implementation for NITFS shall generate all Picture Descriptor elements after the Begin Picture element and before the Begin Picture Body element.

5.2.1.2.8 Attribute elements position for output. The CGM implementation for NITFS shall generate any Attribute Element after the Begin Picture Body element and before the Graphical Primitive element to which it applies.

5.2.1.2.9 Graphical Primitive elements position for output. The CGM implementation for NITFS shall generate any Graphical Primitive elements after the Begin Picture Body element and any associated Attribute elements for that Graphical Primitive element and before the End Picture element.

5.2.2 CGM element functional requirements.5.2.2.1 CGM element functional input requirements.

5.2.2.1.1 CGM input required elements. The following CGM elements are required for each CGM that the CGM implementation for NITFS inputs and interprets:

- a. Begin Metafile
- b. Metafile Version

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- c. Metafile Element List
- d. Metafile Description
- e. Begin Picture
- f. Color Selection Mode
- g. VDC Extent
- h. Begin Picture Body
- i. End Picture
- j. End Metafile.

5.2.2.1.2 Metafile Description element contents required for input. The CGM implementation for NITFS shall be able to input and interpret the Metafile Description element that contains the following substring:

"NITF/CGM-APP-2.0."

5.2.2.1.3 Length of parameter strings required for input for the Begin Metafile, Begin Picture, and Metafile Description elements. The CGM implementation for NITFS shall be able to input and interpret the Begin Metafile, Begin Picture, and Metafile Description elements with parameter strings of at least 254 characters.

5.2.2.1.4 Length of parameter strings required for input for the Font List element. The CGM implementation for NITFS shall be able to input and interpret the Font List element with parameter strings of at least 1024 characters.

5.2.2.1.5 Number of Begin Picture elements and Begin Picture Body elements required for input. The CGM implementation for NITFS shall be able to input and interpret one Begin Picture element with only one corresponding Begin Picture Body element.

5.2.2.1.6 End Picture element required for input. The CGM implementation for NITFS shall be able to input and interpret a CGM where an End Picture element occurs for each Begin Picture element.

5.2.2.1.7 VDC Extent element required for input. The CGM implementation for NITFS shall provide the capability to input and interpret a CGM where the VDC extent origin maps to the row and column given in the SLOC field in the National Imagery Transmission Format (NITF) Symbol Subheader and the VDC extent space maps one-to-one to the source coordinates.

5.2.2.1.8 Edge Width Specification Mode element for input. The CGM implementation for NITFS shall be able to input and interpret a CGM where the Edge Width Specification Mode element occurs before any filled-area primitive element.

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5.2.2.1.35. CGM element defaults for input. The CGM implementation for NITF shall assume all CGM default values as stated in the Part 3 - Binary Encoding in the FIPS PUB 128 for each CGM that the CGM implementation inputs and interprets unless otherwise specified in this document. This table includes but is not limited to the following:

TABLE 109. CGM element defaults for input.

VDC TYPE:	16 BIT INTEGER
INTEGER PRECISION:	16 BIT INTEGER
INDEX PRECISION:	16 BIT INTEGER
COLOR PRECISION:	8 BIT INTEGER
TRANSPARENCY:	ON
LINE TYPE:	1 (SOLID)
TEXT PRECISION:	STRING
CHARACTER EXPANSION FACTOR:	1.0
CHARACTER SPACING:	0.0
CHARACTER ORIENTATION:	0, 1, 1, 0
TEXT PATH:	RIGHT
TEXT ALIGNMENT:	NORMAL HORIZONTAL, NORMAL VERTICAL
INTERIOR STYLE:	HOLLOW (EMPTY)
EDGE TYPE:	SOLID
EDGE VISIBILITY:	OFF
LINE COLOR:	DEVICE-DEPENDENT FOREGROUND COLOR
EDGE COLOR:	DEVICE-DEPENDENT FOREGROUND COLOR
FILL COLOR:	DEVICE-DEPENDENT FOREGROUND COLOR
TEXT COLOR:	DEVICE-DEPENDENT FOREGROUND COLOR
BACKGROUND COLOR:	NONE (THIS IS NITF SPECIFIC)
COLOR VALUE EXTENT:	0,0,0 - 255,255,255
VDC INTEGER PRECISION:	16 BIT INTEGER
TEXT FONT INDEX:	1

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5.2.2.1.36 Default colors for unsupported text. The CGM implementation for NITFS shall substitute available system colors for unsupported colors specified in the Text Color element, Fill Color element, Edge Color element, and the Line Color element.

5.2.2.1.37 CGM element substitution. The CGM implementation for NITFS shall report or substitute for any CGM element and associated parameters not supported in the CGM implementation for NITFS and continue to interpret the next element supported in the CGM implementation for the NITFS.

5.2.2.1.38 CGM error messages. The CGM implementation for NITFS should report errors encountered during the input and interpretation of the CGM.

5.2.2.2 CGM element functional output requirements.

5.2.2.2.1 CGM output required elements. The following CGM elements are required for each CGM that the CGM implementation for NITFS generates and outputs:

- a. Begin Metafile
- b. Metafile Version
- c. Metafile Element List
- d. Metafile Description
- e. Begin Picture
- f. Color Selection Mode
- g. VDC Extent
- h. Begin Picture Body
- i. End Picture
- j. End Metafile.

5.2.2.2.2 Metafile Description element contents required for output. The CGM implementation for NITFS shall generate and output the Metafile Description element that contains the following substring:

"NITF/CGM-APP-2.0."

5.2.2.2.3 Length of parameter strings required for output for the Begin Metafile, Begin Picture, and Metafile Description elements. The CGM implementation for NITFS shall generate and output the Begin Metafile, Begin Picture, and Metafile Description elements with parameter strings not to exceed 254 characters.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

- The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
- The submitter of this form must complete blocks 4, 5, 6, and 7.
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1 RECOMMEND A CHANGE:		1 DOCUMENT NUMBER MIL-STD-2301		2 DOCUMENT DATE (YYMMDD) 930618	
3 DOCUMENT TITLE COMPUTER GRAPHICS METAFILE (CGM) IMPLEMENTATION STANDARD FOR THE NITFS					
4 NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)					
5 REASON FOR RECOMMENDATION					
6 SUBMITTER					
a NAME (Last, First, Middle Initial)			b ORGANIZATION		
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c ADDRESS (Include Zip Code) 10701 PARKRIDGE BOULEVARD RESTON, VA 22091-3256			IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5202 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3400 Telephone (703) 741-2340 AUTOVON 289-2340		