NOTICE OF
CHANGE

NOT MEASUREMENT
SENSITIVE
MIL-STD-2500A
NOTICE 2
26 September 1997

DEPARTMENT OF DEFENSE
INTERFACE STANDARD

NATIONAL IMAGERY TRANSMISSION FORMAT (VERSION 2.0)
FOR THE NATIONAL IMAGERY TRANSMISSION FORMAT STANDARD

TO ALL HOLDERS OF MIL-STD-2500A:

1. THE FOLLOWING PAGES OF MIL-STD-2500A HAVE BEEN REVISED AND SUPERSEDE
THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
cover	26 September 1997	cover	reprinted without change
ii	26 September 1997	ii	7 February 1997
v	26 September 1997	v	reprinted without change
vi	26 September 1997	vi	12 October 1994
19	26 September 1997	19	12 October 1994
20	26 September 1997	20	12 October 1994
21	26 September 1997	21	12 October 1994
22	26 September 1997	22	12 October 1994
39	26 September 1997	39	reprinted without change
40	26 September 1997	40	12 October 1994
83	26 September 1997	83	reprinted without change
84	26 September 1997	84	12 October 1994
84a	26 September 1997	not applicable	new page
84b	26 September 1997	not applicable	new page
DD1426	26 September 1997	DD1426	7 February 1997

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

3. Holders of MIL-STD-2500A will verify that the 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.

Custodians:
    Army - SC
    Navy - OM
    Air Force - 90
    Misc - DC4

Preparing Activity:
    NIMA - MP
    (Project INST-000204)

NOTE: The cover page of this standard has been changed for administrative reasons. There are no other changes to this document.

DEPARTMENT OF DEFENSE INTERFACE STANDARD

NATIONAL IMAGERY TRANSMISSION FORMAT STANDARD
(VERSION 2.0)
FOR THE
NATIONAL IMAGERY TRANSMISSION FORMAT STANDARD

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 the 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 NITFS 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 National Imagery Transmission Format (NITF) file format 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 National Imagery and Mapping Agency, 4600 Sangamore Road, Bethesda, MD 20816-5003 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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5.2.1 Incomplete header Several length fields in the file header are needed to parse the file. They contain the lengths of specific components of the file (i.e. FL through LRnnn). In some operational circumstances (e.g., those with critical time or storage constraints) all the information needed to populate the header fields may not be available at the start of file creation and transfer. If any length field in the file header cannot be filled with valid data, a Streaming File Header Data Extension Segment (see paragraph 5.10) shall be used to provide the data needed to complete file header. Incomplete length fields shall be totally filled with "9" characters (0x39) as place holders. A system receiving a file with an incomplete header shall locate the data extension and interpret the data in the DES as though it is actually located at the beginning of the file. As an option it may restore the file header fragment from the DES to populate the header. Any modification of this file shall result in the file being stored with a fully compliant header.

TABLE I. NITF file header

(R) = required, (O) = optional, and (C) = conditional

FIELD	NAME	SIZE	VALUE RANGE	TYPE
FHDR	File Type & Version	9	NITFNN.NN	R
CLEVEL	Compliance Level	2	1-99	R
STYPE	System Type	4	Reserved	O
OSTAID	Originating Station ID	10	Alphanumeric	R
FDT	File Date & Time	14	DDHHMMSSZMONYY	R
FTITLE	File Title	80	Alphanumeric	O
FSCLAS	File Security Classification	1	T, S, C, R, or U	R
FSCODE	File Codewords	40	Alphanumeric	O
FSCTLH	File Control and Handling	40	Alphanumeric	O
FSREL	File Releasing Instructions	40	Alphanumeric	O
FSCAUT	File Classification Authority	20	Alphanumeric	O
FSCTLN	File Security Control Number	20	Alphanumeric	O
FSDWNG	File Security Downgrade	6	Alphanumeric	O
FSDEVT	File Downgrading Event	40	Alphanumeric	C
FSCOP	Message Copy Number	5	0-99999	O
FSCPYS	Message Number of Copies	5	0-99999	O
ENCRYP	Encryption	1	0=Not Encrypted 1=Encrypted	R
FBKGC	File Background Color	3	Unsigned Binary Integer (0x00-0xFF, 0x00-0xFF, 0x00-0xFF) (Default is Not Applicable)	R

TABLE I. <u>NITF file header</u>- Continued.

(R) = required, (O) = optional, and (C) = conditional

FIELD	NAME	SIZE	VALUE RANGE	TYPE
ONAME	Originator's Name	2~74	Alphanumeric	O
OPHONE	Originator's Phone Number	18	Alphanumeric	O
FL	File Length	12	0-999999999999	R
HL	NITF File Header Length	6	0-999999	R
NUMI	Number of Images	3	0-999	R
LISH001	Length of 1st Image Subheader	6	0-999999	C
LI001	Length of 1st Image	10	0-9999999999	C
.....				
LISHnnn	Length of Nth Image Subheader	6	0-999999	C
LInnn	Length of Nth Image	10	0-9999999999	C
NUMS	Number of Symbols	3	0-999	R
LSSH001	Length of 1st Symbol Subheader	4	0-9999	C
LS001	Length of 1st Symbol	6	0-999999	C
.....				
LSSHnnn	Length of Nth Symbol Subheader	4	0-9999	C
LSnnn	Length of Nth Symbol	6	0-999999	C
NUML	Number of Labels	3	0-999	R
LLSH001	Length of 1st Label Subheader	4	0-9999	C
LL001	Length of 1st Label	3	0-320	C
.....				
LLSHnnn	Length of Nth Label Subheader	4	0-9999	C
LLnnn	Length of Nth Label	3	0-320	C
NUMT	Number of Text Files	3	0-999	R
LTSH001	Length of 1st Text Subheader	4	0-9999	C
LT001	Length of 1st Text File	5	0-99999	C
.....				
LTSHnnn	Length of Nth Text Subheader	4	0-9999	C

SUPERSEDES page 20 of MIL-STD-2500A.

TABLE I. <u>NITF file header</u>- Continued.

(R) = required, (O) = optional, and (C) = conditional

FIELD	NAME	SIZE	VALUE RANGE	TYPE
LTnnn	Length of Nth Text File	5	0-99999	C
NUMDES	Number of Data Extension Segments	3	0-999	R
LDSH001	Length of f[t] Data Extension Segment Subheader	4	0-9999	C
LD001	Length of f[t] Data Extension Segment Data Field	9	0-999999999	C
.....				
LDSHnnn	Length of nth Data Extension Segment Subheader	4	0-9999	C
LDnnn	Length of nth Data Extension Segment Data Field	9	0-999999999	C
NUMRES	Number of Reserved Extension Segments	3	0-999	R
LRSH001	Length of f[t] Reserved Extension Segment Subheader	4	0-9999	C
LR001	Length of f[t] Reserved Extension Segment Data Field	7	0-9999999	C
.....				
LRSHnnn	Length of nth Reserved Extension Segment Subheader	4	0-9999	C
LRnnn	Length of nth Reserved Extension Segment Data Field	7	0-9999999	C
UDHDL	User Defined Header Data Length	5	0-99999	R
UDHOFL	User Defined Header Overflow	3	0-999	C
UDHD	User Defined Header Data	*	Registered Tagged Record Extensions	C
XHDL	Extended Header Data Length	5	0-99999	R
XHD	Extended Header Data	**	Controlled Tagged Record Extensions	C

*   As specified in UDHDL
**   As specified in XHDL

TABLE II. NITF file header fields

FHDR	An ASCII character string of the form NITFNN.NN, which indicates this file is formatted using version NN.NN of NITF. The valid values for this field are NITF01.10 and NITF02.00.
CLEVEL	This field shall contain the compliance level required to interpret fully all components of the file. Valid entries are integer values 01 through 07 and 99 and are assigned in accordance with certification requirements established in JIEO Circular 9008. Values 00, and 08 through 98 are reserved for future use.
STYPE	System type or capability. This field is reserved for future use and shall be filled with spaces (ASCII 32, decimal).
OSTAID	This field shall contain the identification code of the originating station.
FDT	This field shall contain the time (Zulu) of the files origination in the format DDHHMMSSZMONYY, where DD is the day of the month (01-31), HH is the hour (00-23), MM is the minute (00-59), SS is the second (00-59), the character Z is required, MON is first three characters of the month; and YY is the last two digits of the year.
FTITLE	This field shall contain the title of the NITF file.
FSCLAS	This field shall contain a valid value representing the classification level of the entire file. Valid values are T (=Top Secret), S (=Secret), C (=Confidential), R (= Restricted), U (=Unclassified).
FSCODE	This field shall contain a valid indicator of the security compartments associated with the file. Valid values are one or more of the following separated by single spaces (ASCII 32, decimal) within the field: digraphs in accordance with table V, trigraphs not contained in table V, and complete codewords or project numbers. The selection of a relevant set of codewords and project numbers is application specific. If this field is all spaces, it shall imply that no codewords apply to the file.
FSCTLH	This field shall contain valid security handling instructions associated with the file. Valid values are one or more of the following separated by single spaces (ASCII 32, decimal) within the field: digraphs in accordance with table V, trigraphs not contained in table V, complete codewords or project numbers, complete words and abbreviations of more than two characters, phrases only if the words within the phrase are separated by hyphens. The selection of a relevant set of security handling instructions is implementation specific. If this field is all spaces, it shall imply that no file control and handling instructions apply.

TABLE IV. <u>NITF image subheader fields</u> Continued.

.....	
ICOMnn	This field shall contain the nnth line of comment text, for 1 < nn value in the NICOM field. See description of ICOM1 for usage. This field shall be omitted if the value in the NICOM field is zero.
IC	This field shall contain a valid code indicating the form of compression used in representing the image data. Valid values for this field are C0, to mean compressed with a user specified algorithm, C1 to mean bi-level, C2 to mean ARIDPCM, C3 to mean JPEG, C4 to mean Vector Quantization and NC to mean the image is not compressed. Also valid are the codes M0, M3 and M4 for compressed images, and NM for uncompressed images, indicating a blocked image that contains a block mask and/or a transparent pixel mask. The format of a mask image is identical to the format of its corresponding non-masked image, except for the presence of an Image Data Mask Subheader at the beginning of the image data area. The format of the Image Data Mask Subheader is described in 5.5.1.5 and is shown in Table IV(A). The definitions of the compression schemes associated with codes C1, C2, C3, and C4 are given, respectively, in MIL-STD-188-196, MIL-STD-188-197A, MIL-STD-188-198A, and MIL-STD-188-199. This field shall not contain C1 or C2 if NBANDS > 1 or NBLOCKS > 1.

TABLE IV. NITF image subheader fields Continued.

COMRAT	If the Image Compression (IC) field contains C0, C1, C2, C3, C4, M0, M3, or M4, this field shall be present and contain a code indicating the compression rate for the image. If the value in IC is C0 or M0, the code shall be user defined but shall not be all blanks. If the value in IC is C1 or M1, the valid codes are 1D, 2DS, and 2DH, where: 1D means one Dimensional Coding, 2DS means two Dimensional Coding Standard Vertical Resolution, K=2 2DH means two Dimensional Coding High Vertical Resolution, K=4 A "0" (zero) will be used for the Y value when custom Q-Tables are used. Explanation of these codes can be found in MIL-STD-188-196. If the value in IC is C2 or M2, this field shall contain a value given in the form n.nn representing the number of bits-per-pixel for the compressed image. Explanation of the compression rate for vector quantization can be found in MIL-STD-188-199. Valid codes in this case are 0.75, 1.40, 2.30, and 4.50. Explanation of these codes can be found in MIL-STD-188-197A. If the value in IC is C3 or M3, this field is used to identify the default quantization table(s) used by the JPEG compression algorithm. In this case, the format of this field is XX.Y where XX is the image data type (00 = general purpose, 01 through 99 are reserved), and Y represents the quality level 1 through 5. Explanation of these codes can be found in MIL-STD-188-198A. If the value in IC is C4 or M4, this field shall contain a value given in the form n.nn representing the number of bits-per-pixel for the compressed image. Explanation of the compression rate for vector quantization can be found in MIL-STD-188-199. This field is omitted if the value in IC is NC or NM.
NBANDS	This field shall contain the number of bands comprising the image. This field and the IREP field are interrelated and independent of the IMODE field. The corresponding values for (IREP, NBANDS) are (MONO, 1); (RGB, 3); (RGB/LUT, 1); (YCbCr601, 3); (MULTI, 2-9).
IREPBAND1	When NBANDS contains the value one, this field shall contain all spaces. In all other cases, this field shall contain a valid indicator of the interpretation of the first band. Valid values are R, G, and B when IREP contains RGB; the band number is a positive integer when IREP contains MULTI. In all other cases, the use of this field is user-defined. However, its purpose is to provide the significance of the first band of the image with regard to the general image type as recorded in IREP. The significance of each band in the image can be derived from the combination of the IREP, IREPBANDnn and ICAT and ISUBCATnn fields.
ISUBCAT1	The use of this field is user-defined. Its purpose is to provide the significance of the first band of the image with regard to the specific category, ICAT, of the overall image. An example would be the wavelength of IR imagery.

TABLE XVII. <u>Data extension segment subheader format</u>

(R) = required, (O) = optional, and (C) conditional

FIELD	NAME	SIZE	VALUE RANGE	TYPE
DE	File Part Type	2	DE	R
DESTAG	Unique DES type identifier	25	Alphanumeric	R
DESVER	Version of the data field definition	2	1 to 99	R
DESSG	Security group	†	(See Table XVIII)	R
DESOFLW	Overflowed header type	6	Alphanumeric	C
DESITEM	Data item overflowed	3	0 to 999	C
DESSHL	Length of user-defined subheader fields	4	0-9999	R
DESSHF	User-defined subheader fields	*	Alphanumeric	C
DESDATA	User-defined data field	**	User defined	R

  †   167 or 207 - table XVIII for explanation
  *   Value specified in DESSHL
  ** Determined by user. If DESTAG = "Registered Extensions" or "Controlled Extensions," this signifies
      the sum of the lengths of the included tagged records.

TABLE XVIII. <u>Data extension segment subheader field definitions</u>

FIELD	VALUE DEFINITIONS AND CONSTRAINTS
DE	This field shall contain the characters "DE" to identify the subheader as a data extension.
DESTAG	This field shall contain a valid alphanumeric identifier properly registered with the NTB.
DESVER	This field shall contain the alphanumeric version number of the use of the tag. The NTB assigns the version number as part of the registration process.
DESSG	This field shall contain a series of fields containing security classification information for the DES as a whole. The fields included shall mirror those of the NITF file header from FSCLAS through FSDEVT, including field length and content, but be applicable to the DES only. The field names shall be DESCLAS through DESDEVT respectively, simply substituting "DE" for "F." The number of bytes consumed by this field group will be 167 or 207, depending on whether the conditional DESDEVT field is present.

TABLE XVIII. Data extension segment subheader field definition. Continued.

DESOFLW	This field shall be present if DESTAG = "Registered Extensions" or "Controlled Extensions." Its presence indicates that the DES contains a tagged record extension that would not fit in the file header or component header where it would ordinarily be located. Its value indicates the data type to which the enclosed tagged record is relevant. If the value of DESTAG is "Controlled Extensions," the valid values for DESOFLOW are XHD, IXSHD, SXSHD, LSXHD or TXSHD. If the value of DESTAG is "Registered Extensions," the valid values for DESOFLW are UDHD and UDID.
DESITEM	This field shall be present if DESOFLW is present. It shall contain the number of the data item in the file, of the type indicated in DESOFLW to which the tagged record extensions in the segment apply. For example, if DESOFLW = UDID and DESITEM = 3, then the tagged record extensions in the segment applies to the third image in the file. If the value of DESOFLW = UDHD, the value of DESITEM shall be 0.
DESSHL	This field shall contain the number of bytes in the field DESSHF. If this field contains 0, DESSHF shall not appear in the DES subheader. This field shall contain 0 if DESTAG = "Registered Extensions" or "Controlled Extensions".
DESSHF	This field shall contain user-defined fields. Data in this field shall be alphanumeric, formatted according to user specification.
DESDATA	This field shall contain data of either binary or character types defined by and formatted according to the user's specification. However, if the DESTAG is "Registered Extensions" or "Controlled Extensions," the tagged records shall appear according to their definition with no intervening bytes. The length of this field shall not cause any other NITF field length limits to be exceeded, but is otherwise fully user-defined.

5.9.2 Reserved extension segments. Structure is provided in the NITF file header to support up to 999 distinct fields of up to 9999999 bytes plus a corresponding subheader of up to 9999 bytes for each field. The combination of each subheader and corresponding data field is called a Reserved Extension Segment. These fields are reserved in that they shall not be present in any header until this standard is modified to define their use. See the definition of the field NUMRES and following field in tables II and III.

5.10 Streaming file header data extension segment. The Data Extension Segment defined in tables XVIII(A) and XVIII(B) contains the replacement file header values described in paragraph 5.2.1. The SFHDR field of this segment shall contain a new version of the file's beginning. A system encountering incomplete file header fields (see paragraph 5.2.1) shall process the file by locating this segment at or near the end of the file and using the updated header values as if they were in the file header. Two unique delimiter fields straddle the characters of the replacement header to facilitate locating this segment by searching the area near the file end in either the forward or reverse direction. To ensure that valid delimiters are found (rather than data containing similar values), the DESCHL length field is repeated and located adjacent to each delimiter; their contents, and the number of characters between the delimiters must all agree. The segment may contain a complete file header, a subset of the file header, or may extend beyond the file header to include fields within the subsequent subheader. If the file contains multiple Data Extension Segments, this DES shall be the final DES.

TABLE XVIII(A). <u>Streaming file header DES subheader format</u>

(R) = required

FIELD	NAME	SIZE	VALUE RANGE	TYPE
DE	File Part Type	2	DE	R
DESTAG	Unique DES type identifier	25	"Streaming File Header "	R
DESVER	Version of the data field definition	2	01	R
DESSG	Security Group.	167	(See table A-1, FSCLAS through FSDWNG)	R
DESSHL	Length of user-defined Subheader Fields	4	0000	R
SFHL	Length of SFHDR field	7	0 - 9999999	R
SFHDELIM1	Unique delimiter 1	4	0x0A6E1D97	R
SFHDR	Replacement Data	**		R
SFHDELIM2	Unique delimiter 2	4	0x0ECA14BF	R
SFHL	Length of SFHDR field	7	0 - 9999999	R

** As specified in SFH-DR

TABLE XVIII(B). <u>Streaming file header DES subheader field definitions</u>

FIELD	VALUE DEFINITIONS AND CONSTRAINTS
DE	This field shall contain the characters "DE" to identify the subheader as a Data Extension Segment.
DESTAG	This field shall contain "Streaming File Header " (without the quotes).
DESVER	This field shall contain 01, the version number of this definition.
DESSG	This field shall contain a series of fields containing security classification information for the DES as a whole. The fields included shall mirror those of the NITF file header from FSCLAS through FSDWNG, including the field length and content, but be applicable to the DES only. The field names shall be DESCLAS through DESDEVT respectively, simply substituting "DE" for "F."
DESSHL	This field shall contain 0000.
SFHL	This field shall contain the number of bytes in the field SFHDR.
SFHDELIM1	This field shall contain the hexadecimal value 0x0A6E1D97. It provides a unique value that can be identified as the beginning of the replacement data.
SFHDR	This field shall contain the byte string replacement for the file header beginning with the FHDR field and continuing for the number of bytes indicated in SFHL. The file header replication shall at least continue through all the file header fields that are marked for correction.
SFHDELIM2	This field shall contain the hexadecimal value 0x0ECA14BF. It provides a unique value that can be identified as the end of the replacement data.
SFHL	A repeat of SFHL, this field shall contain the number of bytes in the field SFHDR.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER **MIL-STD-2500A**	2. DOCUMENT DATE (YYMMDD) **941012**

3. DOCUMENT TITLE
NATIONAL IMAGERY TRANSMISSION FORMAT (VERSION 2.0)

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	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON *(If applicable)*	7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY **NATIONAL IMAGERY AND MAPPING AGENCY (NIMA)**

a. NAME **Danny Rajan**	b. TELEPHONE *(Include Area Code)* (1) Commercial **(301) 227-3696** (2) AUTOVON
c. ADDRESS *(Include Zip Code)* **4600 Sangamore Road** **Bethesda, MD 20816-5003**	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340

DD Form 1426   *Previous editions are obsolete.*