

NOTICE OF CHANGE
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NOT MEASUREMENT SENSITIVE
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MIL-STD-1821  
NOTICE 1  
17 April 1994

MILITARY STANDARD

STANDARD SIMULATOR DATA BASE (SSDB)  
INTERCHANGE FORMAT (SIF)  
DESIGN STANDARD

TO ALL HOLDERS OF MIL-STD-1821

1. THE FOLLOWING PAGES OF MIL-STD-1821 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
21	17 April 1994	21	17 June 1993
22	17 June 1993	-	REPRINTED WITHOUT CHANGE
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2 RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS

3 Holders of MIL-STD-1821 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 cancelled.

4 Changes from previous issue. The margins of this Change Notice are marked with bars to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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Air Force - 11  
Project number 69GP-0129

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5.1.2.1.3.1 SIF File Identifier Record. The field structure of this record shall be as follows:

File Identifier Field (always 'SIF/HDI DATA BASE HEADER')

5.1.2.1.3.2 Transmittal Description Record. The field structure of this record shall be as follows:

Record Keyword Field (always 'TD')  
SIF Format Field  
Originator Field  
Recipient Field  
Transmittal ID Field  
Creation Date Field  
Source Agency/Project Field  
Database Name Field  
Data On This Volume Flag Field  
Security Classification Field  
Control and Handling Field  
Releasing Instructions Field  
Classification Authority Field  
Security Control Number Field  
Security Downgrade Field  
Downgrading Event Field  
SIF Version Number Field (always '00003')

5.1.2.1.3.3 Data Directory Record. The field structure of this record shall be as follows:

Record Keyword Field (always 'DD')  
Number of 2D Static Models Field  
Number of 3D Static Models Field  
Number of 3D Dynamic Models Field  
Number of Culture Tiles Field  
Number of Terrain Tiles Field  
Number of Generic Textures Field  
Number of Stage 3 Specific Model Textures Field  
Number of Stage 2 Specific Model Textures Field  
Number of Stage 1 Specific Model Textures Field  
Number of Stage 3 Specific Areal Textures Field  
Number of Stage 2 Specific Areal Textures Field  
Number of Stage 1 Specific Areal Textures Field  
Number of SMC/FDC Textures Field  
Merged or Layered Culture Field  
Data Base SW Corner Field  
Data Base NE Corner Field

5.1.2.1.3.4 Two-dimensional (2D) Static Model Library Header File Name Record. This record shall be included when the number of 2D Static Models Field in the Data Directory Record is non-zero. The field structure of this record shall be as follows:

Record Keyword Field (always '2L')  
File Name Field

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**5.1.2.1.3.5 2D Static Model Entry Record.** The number of these records shall correspond to the number of 2D Static Models Field in the Data Directory Record. The field structure of this record shall be as follows:

Record Keyword Field (always '2S')  
 Model Data File Name Field  
 Vertex Table File Name Field  
 Model Number Field  
 Model Name Field  
 Model Description Field  
 New Data Flag Field  
 Changed Data Flag Field  
 Security Classification Field  
 Control and Handling Field  
 Releasing Instructions Field  
 Classification Authority Field  
 Security Control Number Field  
 Security Downgrade Field  
 Downgrading Event Field

**5.1.2.1.3.6 Three-dimensional (3D) Static Model Library Header File Name Record.** This record shall be included when the number of 3D Static Models Field in the Data Directory Record is non-zero. The field structure of this record shall be as follows:

Record Keyword Field (always '3L')  
 File Name Field

**5.1.2.1.3.7 3D Static Model Entry Record.** The number of these records shall correspond to the Number of 3D Static Models Field in the Data Directory Record. The field structure of this record shall be as follows:

Record Keyword Field (always '3S')  
 Model Data File Name Field  
 Vertex Table File Name Field  
 Model Number Field  
 Model Name Field  
 Model Description Field  
 New Data Flag Field  
 Changed Data Flag Field  
 Security Classification Field  
 Control and Handling Field  
 Releasing Instructions Field  
 Classification Authority Field  
 Security Control Number Field  
 Security Downgrade Field  
 Downgrading Event Field

**5.1.2.1.3.8 3D Dynamic Model Library Header File Name Record.** This record shall be included when the number of 3D Dynamic Models Field in the Data Directory Record is non-zero. The field structure of this record shall be as follows.

Record Keyword Field (always 'DL')  
 File Name Field

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5.1.2.2 Model data

5.1.2.2.1 Model data encoding. A compressed form of ASCII shall be used. The compression shall take the form of stripping all leading zeros and blanks from numeric strings and all leading and trailing blanks from character strings. Every ASCII field shall be a variable-length field, separated by the ASCII null character ('00'). Since fields are variable-length, records shall also vary in length. Every record (except the SIF file identifier record) shall begin with a 2-character keyword identifying its type. The record keyword for a comment record shall be two consecutive asterisks (\*\*). Following the keyword is the standard ASCII null character ('00') as the field separator. The comment field shall then continue until end of file (EOF) or the end of field separator ('00') is located in the SIF data file. Comment records shall not occur in the middle of any record in the file, but can be placed before or after any other record in the data file. Items in a field are separated by 'space' characters.

5.1.2.2.1.1 Model building standards. Models shall be constructed using a right-handed X-Y-Z Cartesian coordinate system. Models shall be built with the local X-axis identifying the direction of the front of the model, and the Z-axis pointing straight up into the air. For a static model, the front shall be defined as the side facing the nearest road feature. For a dynamic model, the X-axis shall point in the normal direction of motion; however, any dynamic model that launches vertically shall be modeled with its Z-axis pointing vertically. The origin of a static model shall be defined as a point where the model touches the earth. If the model is to appear floating over the earth, it shall have its origin at the point directly below it on the earth. The origin shall be at the center of the base of the model in the X-Y plane. For dynamic models, in the X-Y plane, the origin shall be the centroid of the model. The elevation of the origin shall be where the wheels, tracks, skids, or pontoons contact the ground if it is a surface vehicle, aircraft, or helicopter. All models are specified in units of meters.

5.1.2.2.2 Model section structure. Within a SIF data base, models shall be organized into three general classes: 2-D static models, 3-D static models, and 3-D dynamic models. Each type shall have a single library header file which shall in turn refer to separate Model Files containing the actual model representations. The SIF data base shall support storage of each model at up to nine levels of detail (LODs). LOD 0 shall have the least amount of detail, while LOD 8 has the most detail. A series of tables shall be used to refer to colors, face-based texture references, vertex-to-vertex texture references, model-based texture references, user-defined FACS, and the SIF-defined FACS. Each SIF model shall be described by a file made up of variable-length logical keyword records containing ASCII alphanumeric strings. This file shall consist of both geometry and attribute information. If polygonal geometry exists, then a binary vertex table file shall exist to describe polygon vertices. All models shall share the auxiliary data found in the table files. The IGES Version 4.0 file format shall be used to describe the constructive solid geometry of a model. The SIF/HDI format for models shall be entirely ASCII.

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5.1.2.2.2.1 Field format. Data fields and records shall vary in length. They shall be stored in a compressed form of ASCII unless otherwise noted in this standard. (The Vertex Table File shall be stored in binary format.) All records (except the file identifier record and table entry records) shall begin with a 2-character keyword identifier. Items in a field are separated by 'space' characters.

5.1.2.2.2.2 Section format. The SIF/HDI model section format shall be as follows and as shown in Figure 3.

```

For each model library type
  Model Library Header File
  For each model
    Model Data File
    Vertex Table File [mandatory for
      polygonal format only]
  Data Source Table File
  FACS Table File [optional]
  User-Defined FACS Table File [optional]
  Color Table File [optional]
  Face-Based Texture Reference Table File [optional]
  Vertex-to-Vertex Texture Reference Table File [optional]
  Model-Based Texture Reference Table File [optional]
  Non-Mapped Texture Reference Table File [optional]

```

#### 5.1.2.2.3 Model file structures

5.1.2.2.3.1 Model Library Header File. There shall be a separate Model Library Header File for each of the three library types. These files shall be named "MODEL2DS.LHD" for the 2D Static Model Library, "MODEL3DS.LHD" for the 3D Static Model Library, and "MODEL3DD.LHD" for the 3D Dynamic Model Library. The Model Library Header File format shall be as follows:

```

SIF File Identifier Record
Model Library Header Record

```

5.1.2.2.3.1.1 SIF File Identifier Record. The field structure of this record shall be as follows:

```

Section Identifier Field (always 'SIF/HDI MODELS')
File Identifier Field (always 'MODEL LIBRARY HEADER')

```

5.1.2.2.3.1.2 Model Library Header Record. The field structure of this file shall be as follows:

```

Record Keyword Field (always 'ML')
Model Library Type Field
Security Level Field
Number of Models Field

```

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5.1.2.2.3.2.3 LOD Header Record. The number of these records for a given model group shall correspond to the value contained in the Number of Model LODs field in the Model Header record. The field structure of this record shall be as follows:

```

Record Keyword Field (always 'LH')
Model LOD Field
LOD Resolution Description Field
Number of Components Field
Number of Polygons Field
Number of Edges Field
Number of Vertices Field
Number of Subsidiary Model References Field
Number of Clusters Field
Number of Separation Planes Field
All Convex Clusters Flag Field
P2851 Binary Separation Planes Flag Field
Number of Point Light Strings Field
if MODEL_FORM = POLYGONAL_ONLY or CSG_AND_POLYGONAL then
  All Convex Polygons Flag Field
  Number of Collision Test Points Field
  Number of Model LOD Texture References Field
end if
FACS Table Index Field (defaults to 0 if
                        no optional fields specified)

```

5.1.2.2.3.2.4 Model Cluster Statistics Record. The number of cluster statistics records shall correspond to the value in the Number of Clusters Field in the LOD Header Record. The field structure of this record shall be as follows:

```

Record Keyword Field (always 'CS')
Cluster ID Field
Convex Cluster Flag Field
Number of Polygons Field
Number of Edges Field
Number of Vertices Field
FACS Table Index Field (defaults to 0 if
                        no optional fields specified)

```

5.1.2.2.3.2.5 Separation Plane Record. The number of these records shall correspond to the Number of Separation Planes field in the parent LOD Header record. The field structure of this record shall be as follows:

```

Record Keyword Field (always 'SF')
if MODEL_FORM = POLYGONAL_ONLY or CSG_AND_POLYGONAL then
  Polygon ID Field
end if
Separation Plane Number Field
Separation Plane Coefficients Field

```

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5.1.2.2.3.2.6 Subsidiary Model Reference Record. The number of these records for a given model shall correspond to the value contained in the Number of Subsidiary Model References field in the parent LOD Header record. The field structure of this record shall be as follows:

Record Keyword Field (always 'MR')  
Referenced Model Library Type Field  
Referenced Model Number Field  
Referenced Model LOD Field  
Translation Field  
Scale Factor Field  
Rotation Angles Field  
Articulated Part Flag Field  
FACS Table Index Field

5.1.2.2.3.2.7 Point Light String Record. The number of Point Light String records will correspond to the value in the Number of Point Light Strings field within the LOD Header record. The field structure of this record shall be as follows:

Record Keyword Field (always 'LS')  
Length Field  
Orientation Field  
Light String Shape Field  
Width Field  
Directionality Field  
Light Type Field  
Source ID Number Field  
Predominant Height Field  
Surface Material Category Field  
Color Table Index Field  
Layer Number Field  
Number of Lights Field  
Point Light Positions Subrecord  
FACS Table Index Field (defaults to 0 if  
no optional fields specified)

5.1.2.2.3.2.7.1 Point Light Positions Subrecord. The field structure shall be as follows:

for each light in the string  
Point Light Position Field

5.1.2.2.3.2.8 Collision Test Point Record. The number of these records shall correspond to the value in the Number of Collision Test Points field within the parent LOD Header record. The field structure of each record shall be as follows:

Record Keyword Field (always 'TP')  
Vertex List Position Field

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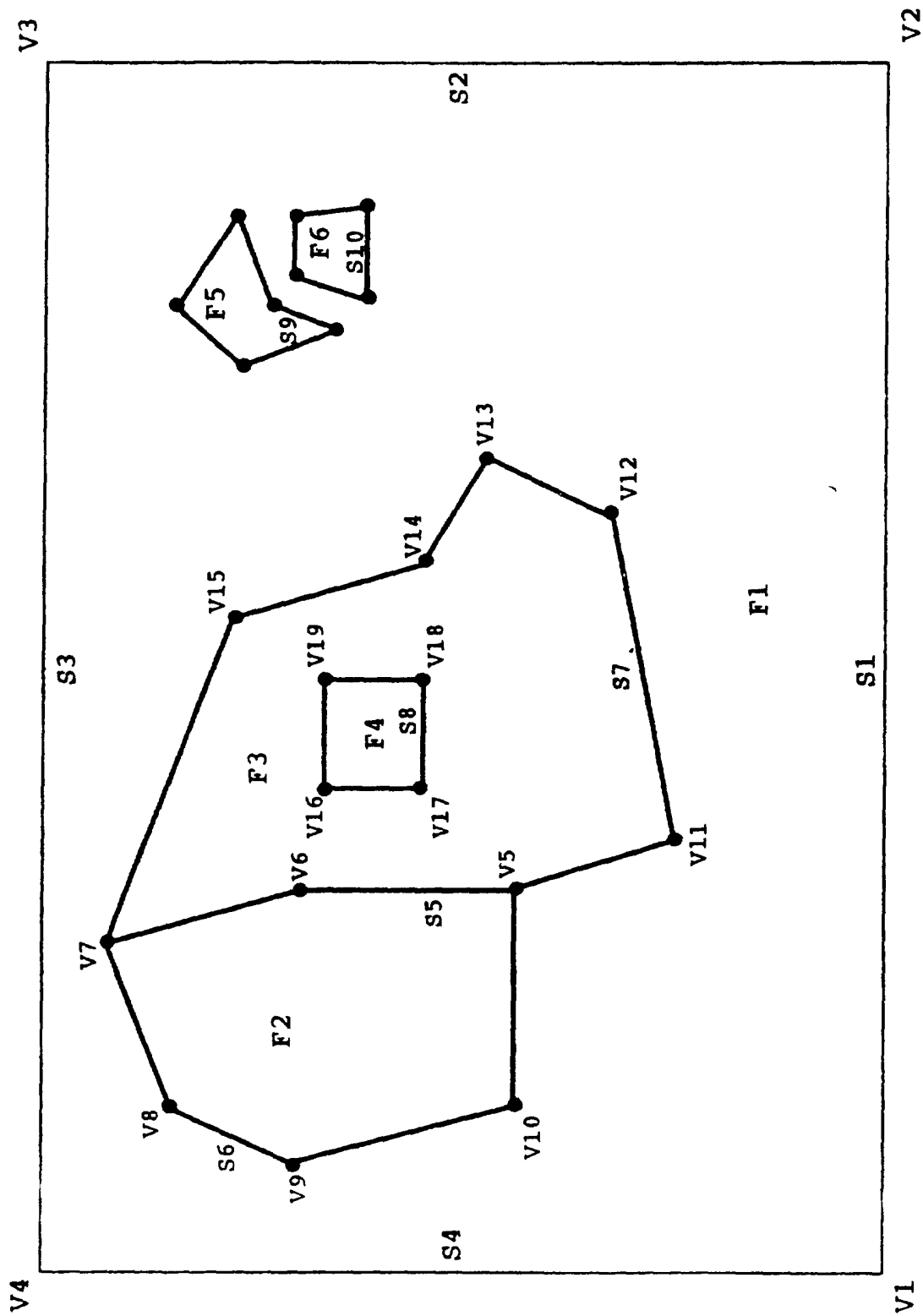


Figure 5 Areal Feature Conventions

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5.1.2.3.1.1.10 Non-redundant Vertices. Vertex coordinates shall be stored non-redundantly within one of two vertex files associated with a culture tile--a 2-D vertex file and a 3-D vertex file. For example, vertex V7 would be stored only once even though it is referenced by three segments (S5, S6, S7). Each segment header shall have a flag indicating whether the vertex coordinates may be found in the 2-D vertex file or the 3-D vertex file.

5.1.2.3.1.1.11 Vertex Ordering. Vertex coordinate records shall be referenced by their relative list position within a vertex file.

5.1.2.3.1.1.12 Feature/Segment Numbering. Feature and segment numbers shall be sequentially assigned, and explicitly encoded within feature and segment records. Each segment shall have a backpointer to the feature(s) which reference it, so that a two-way relationship can be maintained.

5.1.2.3.1.2 Linear Feature Rules. Given a SIP/BDI culture tile with the linear (also referred to as "lineal") features shown in Figure 6, the following rules shall apply.

5.1.2.3.1.2.1 Rendering Priority. Rendering priorities shall be specified via the layer number attribute associated with each feature, not the sequence number.

5.1.2.3.1.2.2 Line Segments. Each linear feature shall consist of one or more line segments. Each segment shall consist of two or more vertex coordinates. A segment shall be split into two segments whenever it is intersected by another segments begin/end points. For example, vertex V3, which is the termination of feature F2 (V3 to V9) where it intersects with F1 (V1 to V5), is used to break up F1 into segments S1 (V1 to V3) and S2 (V3 to V5).

5.1.2.3.1.2.3 Segment Ends. Except for feature intersections, the definition of segment ends may be arbitrary. For example, feature F1 is shown as consisting of two segments, with S1 consisting of vertices V1, V2, and V3, and S2 consisting of vertices V3, V4, and V5; it would be perfectly acceptable to break either S1 or S2 (or both) into two segments containing two vertices each.

5.1.2.3.1.2.4 Shared Segments. When a segment is shared between a linear and an areal feature, it shall be stored only once in the database. For example, segment S4 (defined by vertices V7 and V8) is a common segment shared by linear feature F2 and areal feature F3.

5.1.2.3.1.2.5 Directionality. Uni-directional linears shall be digitized from left to right facing the visible/reflective side; i.e., the visible/reflective side shall be to the right as one traverses the vertex coordinates. For example, if F1 were a uni-directional feature with vertices listed in the sequence from V1 to V5, then the visible/reflective side would be towards the bottom of the diagram.

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5.1.2.3.2.10.1 SIF File Identifier Record. The field structure of this record shall be as follows:

Section Identifier Field (always 'SIF/HDI CULTURE')  
File Identifier Field (always 'NON-MAPPED TEXTURE  
REFERENCE TABLE')

5.1.2.3.2.10.2 Non-Mapped Texture Reference Table Header Record. The Non-Mapped Texture Reference Table Header shall be structured as follows:

Record Keyword Field (always 'NX')  
Number of Texture References Field

5.1.2.3.2.10.3 Non-Mapped Texture Reference Record. The field structure shall be as follows:

Record Keyword Field (always 'NM')  
Texture Reference Table Index Field  
Texture Library Field  
Texture ID Field

5.1.2.3.2.11 Model Reference Table File. This table shall be included if there are any model references. The name of this file shall be "CULrxxxxx.MRF", where "r" is "M" for Merged Culture Data, "0" for LOD 0 Culture Data, "1" for LOD 1 Culture Data, "2" for LOD 2 Culture Data, "3" for LOD 3 Culture Data, "4" for LOD 4 Culture Data, and "5" for LOD 5 Culture Data; and "xxxxx" is the culture tile sequence number. The Model Reference Table File format shall be as follows:

SIF File Identifier Record  
Model Reference Header Record  
for each Model Reference Table Entry  
Model Reference Table Entry Record

5.1.2.3.2.11.1 SIF File Identifier Record. The field structure of this record shall be as follows:

Section Identifier Field (always 'SIF/HDI CULTURE')  
File Identifier Field (always 'MODEL REFERENCE TABLE')

5.1.2.3.2.11.2 Model Reference Header Record. The Model Reference Header shall be structured as follows:

Record Keyword Field (always 'MR')  
Number of Model References Field

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5.1.2.3.2.11.3 Model Reference Table Entry Record. The field structure of this record shall be as follows:

Record Keyword Field (always 'ME')  
Model Reference Table Index Field  
Model Number Field  
Model LOD Field  
Orientation Angle Field  
Correlation Priority Field  
Model Lat Long Field  
Height Above Terrain Field  
Scale Factor Field  
Model Library Type Field  
Number of Substituted Features Field  
for each Substituted Feature  
Substituted Feature Number Field

5.1.2.3.2.12 Superfeature File. This file shall be included if there are any superfeatures defined within the culture tile. The name of this file shall be "CULrxxxx.SFR", where "r" is "M" for Merged Culture Data, "0" for LOD 0 Culture Data, "1" for LOD 1 Culture Data, "2" for LOD 2 Culture Data, "3" for LOD 3 Culture Data, "4" for LOD 4 Culture Data, or "5" for LOD 5 Culture Data; and "xxxx" is the culture tile sequence number. The Superfeature file format shall be as follows:

SIF File Identifier Record  
for each Superfeature  
Superfeature Header Record

5.1.2.3.2.12.1 SIF File Identifier Record. The field structure of this record shall be as follows:

Section Identifier Field (always 'SIF/HDI CULTURE')  
File Identifier Field (always 'SUPERFEATURE FILE')

5.1.2.3.2.12.2 Superfeature Header Record. There shall be a Superfeature header record for each superfeature defined within the culture tile. The field structure of this record shall be as follows:

Record Keyword Field (always 'SF')  
Superfeature ID Field  
Superfeature Description Field  
Bounding Rectangle Coordinates Field  
Number of Aggregate Features Field  
Number of Child Features Field  
Number of Child Superfeatures Field (currently 0 for P2851 SSDB data)  
Number of Parent Superfeatures Field (currently 0 for P2851 SSDB data)  
for each Aggregate Feature  
Feature Number Field  
for each Child Feature  
Feature Number Field  
for each Child Superfeature (currently none for P2851 SSDB data)  
Superfeature ID Field  
for each Parent Superfeature (currently none for P2851 SSDB data)  
Superfeature ID Field

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Field Name	Type	Length (CHARS)	Range	Description
2-D Geometric Correction Flag (Gridded Data Section (GDS))	BOOLEAN	5	TRUE, FALSE	Flag indicating whether an image has been positioned/corrected in 2-D space
2-D/3-D Coordinates Flag	ENUM	2	2D, 3D	Flag indicating the type of coordinates referenced by a culture segment
3-D Geometric Correction Flag (GDS)	BOOLEAN	5	TRUE, FALSE	Flag indicating whether an image has been positioned/corrected in 3-D space
Above Tile Neighbor ID (GDS)	INT	10	0..2147483647	The identifier of the neighboring model specific image above the current image; used only for Stage 3 model textures
Absolute Horizontal Accuracy	STR	16	--	Definition of horizontal accuracy standard applying to a data source product
Absolute Latitude/Longitude (GDS)	STR	22	HDDMMSSSSb HDDMMSSSSS	Actual ground location in absolute geodetic coordinates for areal texture footprint boundary point coordinates and for areal texture control points; H = hemisphere, DD or DDD = degrees, MM = minutes, SSSS = thousandths of seconds, and b = blank character (" ")
Absolute Vertical Accuracy	STR	16	--	Definition of vertical accuracy standard applying to a data source product
Absorptivity	REAL6	12	0.0..1.0	Ratio of radiant (thermal) energy to the energy incident upon it
Accuracy	STR	16	--	Definition of accuracy standard applying to a data source product

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Field Name	Type	Length Range (CHARS)	Description
All Convex Clusters Flag	BOOLEAN	1	T, F Indicates whether all clusters of a model are convex
All Convex Polygons Flag	BOOLEAN	1	T, F Indicates whether all polygons of a model are convex
Articulated Part Flag	BOOLEAN	1	T, F Indicates whether the referenced model is an articulated part
Attachment Level (GDS)	INT	3	0..998 Display level to which a new object is to be attached for editing purposes
Attribute Value	--	--	-- The value assigned to a FACS code. This value will differ based on the type of FACS code. The following list shows the values that can be assigned: one byte integer, two byte integer, four byte integer, real (six significant digits), long real (ten significant digits), integer pair (2 -four byte integers), integer triplet (3 - four byte integers), real pair (2 real numbers with six significant digits), real triple (3 real numbers with six significant digits), long real pair (2 long real numbers with ten significant digits), long real triple (3 long real numbers with ten significant digits), string, enumerated. boolean, or null value

## APPENDIX A to MIL-STD-1821

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Field Name	Type	Length (CHARS)	Range	Description
Data Base SW Corner	STR	24	HDDMMSSSSSb HDDMMSSSSSS	The southwest corner of the coverage contained within a SIF database, where HDDMMSSSSS = hemisphere (N,S), degrees, minutes and ten thousandths of seconds of latitude; b = blank (" "); and HDDMMSSSSS = hemisphere (E,W), degrees, minutes and ten thousandths of seconds of longitude
Data Edition Number	STR	3	--	The edition number of the database
Data On This Volume Flag	BOOLEAN	1	T, F	Flag indicating whether the database files for a SIF database start on the same tape as the SIF Data Base Header File (which is always the first file on the first volume)
Data Range	--	--	--	Defines the valid range for a data type that is used to define User-Defined FACS Code. The definition of the data range depends on the data type. For I1, I2, I4, R6, R10, I2D, I3D, R2D6, R3D6, R2D10, R3D10 data types, their data ranges are defined by a minimum value and a maximum value. For STR data type, its data range is defined by the both, the minimum and the maximum length of the string. For ENU data type, its data range is defined by a list of valid symbols that constitutes the enumerated type. FIA and NO types do not require data ranges.
Data Series Designator	STR	5	--	Product Identifier
Data Source Table File Name	STR	17	--	The name of the data source table file included with SIF/HDI models
Data Sourced Table Index	INT	3	1..127	Index of a data source in a data source table

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Field Name	Type	Length (CHARS)	Range	Description
Database Name	STR	80	--	Textual name associated with a SIF culture database
Default Source Identifier	INT	5	1..32767	Index of a data source in a data source table
Diffuse Reflectance	REAL6	12	0.0..1.0	Radar backscatter coefficient, expressed as a ratio
Directionality	REAL10	16	0.0..360.0	Angle from north by which a point light is visible. A value of '360.0' indicates that the light is omnidirectional
Directivity	ENUM	4	UNI, BI, OMNI	Indicator of shape of the planar response curve of a feature or model to a sensor (visual response)
Directivity (Infrared)	ENUM	4	UNI, BI, OMNI	Indicator of shape of the planar response curve of a feature or model to a sensor (infrared response)
Directivity (Radar)	ENUM	4	UNI, BI, OMNI	Indicator of shape of the planar response curve of a feature or model to a sensor (radar response)
Display Level (GDS)	INT	3	0..999	Unique graphic display level of an image relative to other message components in a composite. A higher number means that the item is to be displayed in front of other items with lower display level values
Downgrading Event	STR	40	--	The description of the event which caused a SIF database or elements within a SIF database to be downgraded



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Field Name	Type	Length (CHARS)	Range	Description
Feature Identification Code (continued)	ENUM	4	F201, F202, F203, F204, F205, F206, F207, F208, F209, F220, F221, F222, F223, F224, F230, F231, F232, F233, F234, F235, F236, F237, F238, F239, F240, F244, F245, F250, F251, F252, F253, F254, F255, F260, F261, F262, F263, F264, F265, F267, F270, F271, F272, F273, F274, F275, F276, F277, F280, F281, F282, F283, F290, F301, F302, F303, F304, F305, F320, F321, F322, F323, F324, F325, F330, F331, F332, F334, F340, F341, F343, F344, F350, F352, F401, F402, F403, F420, F421, F430, F433, F434, F435, F436, F450, F451, F501, F511, F512, F520, F521, F530, F531, F532, F535, F536, F540, F541, F542, F543, F544, F560, F561, F601, F602, F603, F604, F605, F606, F610, F620,	

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Field Name	Type	Length (CHARS)	Range	Description
Feature Identification Code (continued)	ENUM	4	F621, F622, F630, F631, F632, F640, F641, F650, F680, F681, F682, F683, F684, F701, F702, F703, F704, F705, F706, F707, F710, F711, F712, F713, F714, F715, F716, F717, F718, F719, F720, F721, F725, F750, F751, F752, F753, F754, F755, F756, F760, F761, F765, F771, F772, F773, F774, F775, F776, F777, F778, F790, F791, F797, F798, F801, F802, F803, F804, F805, F806, F807, F810, F811, F812, F820, F821, F822, F823, F824, F825, F830, F831, F860, F861, F862, F863, F864, F865, F901, F902, F906, F907, F908, F909, F910, F911, F912, F913, F914, F915, F916, F920, F921, F922, F923, F924, F925, F926, F927, F928, F929, F930, F931, F932, F933, F934, F940, F941, F942, F943, F944, F945, F946, F947, F948, F949,	

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Field Name	Type	Length (CHARS)	Range	Description
Feature Identification Code (continued)	ENUM	4	F950, F951, F952, F953, F954, F955, F956, F960, F961, F962, F963, F964, F965, F966, F967, F980	
Feature Number	INT	10	1..2147483647	Unique feature identifier within a culture tile
Feature Onset	BOOLEAN	1	T, F	Indicator for changing radar backscatter coefficients

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Field Name	Type	Length (CHARS)	Range	Description
FID/FDC Reference Table File Name	STR	17	--	The name of the FID/FDC reference table file included with SIF/HDI culture data
File Identifier	STR	80	--	Alphanumeric string identifying the file type of a SIF file; always in the first record of every ASCII file
File Name Field	STR	17	--	The name of a data file which is located on the SIF tape.
Film Quality (GDS)	STR	20	--	Quality of film used to capture the image
Fixed Order Priority	INT	10	0..2147483647	Number used in determining the order of display of polygons within a model; used for hidden surface computations
Generic Model Flag	BOOLEAN	1	T, F	Indicates whether the model is generic
Generic Texture Set Name (GDS)	STR	20	--	Textual identifier identifying a set of generic textures that represent the same entity, where each member of the set has a different size and/or resolution
Geographic Location Name (GDS)	STR	40	--	A textual name associated with an areal specific image or SMC/FDC image
Geographic Tie Point ID (GDS)	INT	10	0..2147483647	A unique identifier of a geographic tie point

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Field Name	Type	Length (CHARS)	Range	Description
Global Reference Point	INT2D	23	(-2147483648.. 2147483647; -2147483648.. 2147483647)	A point on 2D culture which corresponds to the origin of the texture being mapped
	INT3D	35	(-2147483648.. 2147483647; -2147483648.. 2147483647; -2147483648.. 2147483647)	A point on 3D culture or 3D polygonized terrain which corresponds to the origin of the texture being mapped
Haze Removal Flag (GDS)	BOOLEAN	5	TRUE, FALSE	Flag indicating whether haze has been removed from an image
Height Above Terrain	INT	10	0..2147483647	The z value that is used for the placement point of a model, to identify the height above ground level, expressed in millimeters
Highest Feature Number	INT	10	1..2147483647	Identifier of the highest feature number contained within a culture tile
Highest Segment Number	INT	10	1..2147483647	Identifier of the highest segment number contained within a culture tile
Horizontal Captured Texel Size (GDS)	REAL10	16	0.0.. 1.393796575e+42	Approximate ground distance for a texel (expressed in meters) in the horizontal x-direction
Horizontal Resolution (BOTH)	REAL6	12	0.0..1.93428e+25	Horizontal length of a texel; units are arc-seconds/texel for Stage 3 Areal Texture and meters/texel for all others.
Horizontal Size (GDS)	REAL6	12	0.0..1.93428e+25	The horizontal size of the entire image in meters, e.g., 1000.0 Meters

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Field Name	Type	Length (CHARS)	Range	Description
IGES Sequence Number for Component	INT	4	0..2000	Identifier for an IGES record that defines a component
Image Capture Date and Time (BOTH)	STR	12	YYMMDDHHMMSS	The date and time of day that a SIF image was captured, where YYMMDD = Year, Month and Day, and HHMMSS = Hours (0..24), Minutes and Seconds

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Field Name	Type	Length (CHARS)	Range	Description
Image Sync Code (GDS)	INT	1	0, 4	A field that indicates whether a synchronization code has been provided for uncompressed or ARIDPCM compressed data
Image Title (GDS)	STR	80	--	Title of the image
Image Type (GDS)	STR	8	--	The type of image, such as BW for black and white, TV, SAR, XRAY, MS for multispectral, FAX for facsimile, or IR. Multispectral may be further denoted by TM7 for Thematic Mapper band 7.
Image-to-Image Contrast Enhancement Flag (GDS)	BOOLEAN	5	TRUE, FALSE	Flag indicating whether image to image contrast enhancements have been performed
Inner Image Contrast Enhancement Flag (GDS)	BOOLEAN	5	TRUE, FALSE	Flag indicating whether contrast enhancements have been performed within this image
Internal Material Category	INT	5	1..32767	Category code for material internal to an object
Internal Material Volume	REAL6	12	0.0..1.93428 e+25	Amount of material internal to an object, in liters
Island Number	INT	5	1..32767	Unique identifier within a culture tile of an area of common data resolution
Kappa (GDS)	REAL6	12	0.0..360.0	A rotation angle around the z-axis. A positive angle rotates the x-axis toward the y-axis (expressed in degrees)
Last Maintenance Date	STR	6	YYMMDD	The date when a model was last maintained, where YY = year, MM = month, and DD = day

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Field Name	Type	Length (CHARS)	Range	Description
Last Maintenance Time (GDS)	STR	12	YYMMDDHHMMSS	The last date and time of day that a SIF image was modified, where YYMMDD = Year, Month and Day, and HHMMSS = Hours (0..24), Minutes and Seconds
Latitude/Longitude	STR	22	HDDMMSSSSSb HDDMMSSSSSS	Ground location in absolute coordinates that is being used for an image control point, where H = hemisphere, DD or DDD = degrees, MM = minutes, SSSSS = thousandths of seconds, and b = blank (" ")
Latitude/Longitude	INT2D	23	(-2147483648.. 2147483647; -2147483648.. 2147483647 )	Ground coordinates that are to be used for the identification of: a point on the boundary of the culture database, a point on the boundary of a data resolution island, or a point on the boundary of a culture tile in the database
Layer Number	INT	10	0..2147483647	A relative priority number indicating the sequence in which overlapping culture features, overlapping model polygons, or overlapping textures should be rendered for simulation. Higher values indicate a higher display priority (visual)
Layer Number (Infrared)	INT	10	0..2147483647	A relative priority number indicating the sequence in which overlapping culture features, overlapping model polygons, or overlapping textures should be rendered for simulation. Higher values indicate a higher display priority (infrared)



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Field Name	Type	Length (CHARS)	Range	Description
Model Data File Name	STR	17	--	The name of the model data file included with SIF/HDI models
Model Description	STR	80	--	Description of a model
Model Form	ENUM	4	POLY, CSG, BOTH	Designator indicating the model representations present for a given model (POLYGONAL_ONLY, CSG_ONLY, CSG_AND_POLYGONAL)
Model Lat/Long	INT2D	21	(0..2147483647, 0..2147483647 )	Ground coordinates of a model expressed in ten thousandths of an arc second, relative to the southwest corner of the culture tile
Model Library Type (GDS)	ENUM	15	TWO_D_STATIC, THREE_D_STATIC, THREE_D_DYNAMIC	The ID of a model library
Model Library Type	ENUM	3	2DS, 3DS, 3DD	The ID of a model library (TWO_D_STATIC, THREE_D_STATIC, THREE_D_DYNAMIC)
Model LOD	ENUM	2	L0, L1, L2, L3, L4, L5, L6, L7, L8	The level of detail of a model
Model Name (BOTH)	STR	65	--	Name of a model
Model Number (BOTH)	INT	10	0..2147483647	A unique ID number assigned to a model within a SIF database

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Field Name	Type	Length (CHARS)	Range	Description
Model Reference Point	REAL2D	25	(-1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. mapped 1.93428 e+25 )	A point on a 2D model which corresponds to the origin of the texture being mapped
Model Reference Point	REAL3D	38	(-1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. mapped 1.93428 e+25; -1.93428 e+25.. 1.93428 e+25 )	A point on a 3D model which corresponds to the origin of the texture being mapped
Model Reference Table File Name	STR	17	--	The name of the model reference table file included with SIF/HDI culture data
Model Reference Table Index	INT	10	0..2147483647	A pointer to a model reference in a model reference table
Model String Count	INT	10	0..2147483647	The count of ASCII strings that define a SIF/Dp model
Model Tie Point ID (GDS)	INT	10	0..2147483647	A unique identifier of a model tie point
Model Vertex Limit	INT	5	0..15000	The maximum number of vertices allowed in a model. 0 represents that no limit is specified
Model View Description (GDS)	STR	60	--	Textual description of the view of a model presented within an image, i.e., "Right Side of Truck"
Modified Specific Texture Flag (GDS)	BOOLEAN	5	TRUE, FALSE	Flag indicating whether a specific texture has been modified with synthetic data

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Field Name	Type	Length (CHARS)	Range	Description
Monitor Type	ENUM	4	NOMON, LONGIT, TRANSV, MODIF	Code indicating type of raised portion of roof (NO_MONITOR, LONGITUDINAL, TRANSVERSE, MODIFIED)
NE Corner	STR	24	HDDMMSSSSSSb HDDMMSSSSSSS	The northeast corner of the coverage contained within a SIF database, a culture tile, terrain tile, or specific areal texture, where HDDMMSSSSSS = hemisphere (N,S), degrees, minutes and ten thousandths of seconds of latitude; b = blank (" "); and HDDMMSSSSSS = hemisphere (E,W), degrees, minutes and ten thousandths of seconds of longitude
New Data Flag	BOOLEAN	1	T, F	Flag indicating whether a model, culture tile, terrain tile, or texture is new to the SSDB or originally from the SSDB
Next Feature Number	INT	10	0..2147483647	If a feature is split between two culture tiles, this identifies the feature number in the neighboring culture tile; used by feature continuations and LOD cross-references
Next Manuscript ID	STR	25	--	Name of the neighboring culture tile; used by feature continuations and LOD cross-references
NITF Header Length (GDS)	INT	6	000000..276380	The length in bytes of the NITF header
Noise Removal Flag (GDS)	BOOLEAN	5	TRUE, FALSE	Flag indicating whether noise removal operations have been performed on the image

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Field Name	Type	Length (CHARS)	Range	Description
Normal List Position	INT	5	0..32767	The pointer to a (X, Y, Z) triplet in a vertex table that specifies the normal of a polygon or a vertex
North Tile Neighbor ID (GDS)	INT	10	0..2147483647	The identifier of the neighboring areal specific texture to the north; used only for Stage 3 areal textures
Number of 2D Static Models	INT	10	0..2147483647	The total number of two-dimensional static models that are included in a SIF database
Number of 3D Static Models	INT	10	0..2147483647	The total number of three-dimensional static models that are included in a SIF database
Number of 3D Dynamic Models	INT	10	0..2147483647	The total number of three-dimensional dynamic models that are included in a SIF database
Number of Accuracy Regions	INT	2	0..20	Count of the number of accuracy regions within a tile
Number of Aggregate Features	INT	10	0..2147483647	Total number of aggregate features referenced by a superfeature
Number of Areal Features	INT	10	0..2147483647	Total number of areal features contained within a culture tile
Number of Audio Segments (GDS)	INT	3	000	Not currently supported within NITF, therefore, this value is always 0
Number of Bands (GDS)	INT	1	1..9	The number of bands of image data in the message. Used for color imagery, pseudocolor or multispectral images. The sequence of bands shall be determined by examining the Band Image Type Field. For single band images, the Number of Bands shall be 1

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Field Name	Type	Length (CHARS)	Range	Description
Number of Text Files (GDS)	INT	3	000.999	The number of separate text files that are included in the message. This value will always be '000' for SIF
Number of Texture Pattern Coordinates	INT	5	0..65535	Total number of coordinates associated with a texture; used to warp the texture onto a model or terrain using vertex to vertex mapping techniques; the number should be the same as the number of vertices of the polygon being mapped
Number of Texture References	INT	10	0..2147483647	Number of entries in a texture reference table
Number of Tie Point References (GDS)	INT	10	0..2147483647	The total number of texture references contained in a culture tile
Number of Tiles	INT	5	0..32767	The number of texture maps that share a specific tie point
Number of User-defined FACS Attribute Codes	INT	5	0..32767	The total number of tiles contained within a culture database
Number of Vertex Colors	INT	5	0..15000	Number of user-defined FACS attributes contained in the user defined FACS Table
Number of Vertex Normals	INT	5	0..15000	Number of vertex colors associated with a polygon in a model
Number of Vertices	INT	5	0..15000	Number of vertex normals associated with a polygon in a model
				Number of vertices in a model LOD, a polygon, a model component, or a cluster

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Field Name	Type	Length (CHARS)	Range	Description
Object Or Material Texture Flag (GDS)	ENUM	8	OBJECT, MATERIAL	Flag indicating whether a generic texture is applied to a certain object or if it is representative of a material (e.g., generic texture for a certain tree or a road would be classified as OBJECT; texture for tree bark or asphalt would be classified as MATERIAL)
Object Volume	REAL6	12	0.0..1.93428 e+25	The internal volume of an object, in liters
Occlusion Removal Flag (GDS)	BOOLEAN	5	TRUE, FALSE	A flag indicating whether occluding objects have been removed from an image
Offset Vector	INT2D	21	(-324000000.. 324000000; -648000000, 648000000)	Placement information for a model reference expressed in thousandths of seconds relative to southwest corner. This vector is used to determine the location of a model based on its placement point in relation to the first coordinate of the referencing feature
Omega (GDS)	REAL6	12	0.0..360.0	A rotation angle around the x-axis. A positive angle rotates the y-axis toward the z-axis (expressed in degrees)
Orientation	REAL10	16	0.0..360.0	Orientation of a point, point light, or point light string feature from due north, expressed in degrees
Orientation Angle	REAL10	16	0.0..360.0	The orientation of a model from due north in the clockwise direction, expressed in degrees

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Field Name	Type	Length (CHARS)	Range	Description
Self-Emitter	BOOLEAN	1	T, F	Indicates that an object has self heating characteristics
Sensor ID (GDS)	INT	10	0..2147483647	A unique identifier of a sensor within a SIF texture transmittal
Sensor Name (GDS)	STR	20	--	Name of the sensor used to capture the image, e.g., "LANDSAT-2 RBV" or "MINOLTA 7S-II"
Sensor Type (GDS)	ENUM	18	FRAME, MECHANICAL_ SCANNER, PANORAMIC, PUSHBROOM, STRIP, OTHER	Type of sensor used to capture the image (e.g., any ordinary camera or a metric camera would be FRAME, SPOT satellite would be PUSHBROOM, and LANDSAT satellite would be MECHANICAL_SCANNER)
Sensor Types Supported	ENUM	3	VIS, IR, RAD	Flags indicating support for different types of simulators (VISUAL, INFRARED, or RADAR)
Sensors Supported	BOOLEAN; BOOLEAN; BOOLEAN	5	(T, F; T, F; T, F)	Flags indicating support for different types of simulators (radar, visual, infrared, respectively)
Separation Plane Coefficients	REAL4D6	51	(-1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. 1.93428 e+25 )	The A, B, C, D coefficients of the equation of a separation plane that divides a model into clusters
Separation Plane Number	INT	5	0..32767	The unique ID number assigned to a separation plane

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Field Name	Type	Length Range (CHARS)	Description
Sequence Number	INT	5 0..65535	A unique sequencing identifier of an IGES record
Shading Type	ENUM	6 FIXED, FLAT, SMOOTH	Name of the shading method used to shade a model
Shadow Minimization Flag (GDS)	BOOLEAN	5 TRUE, FALSE	Flag indicating whether operations to minimize the effects of shadows within an image have been performed
Shape Code	ENUM	7 RP, HEMIS, PYRAMID, CONE, CYL, OTH	Code indicating the shape of a feature (RECTANGULAR_PARALLELEPIPED, SPHERE_HEMISPHERE, PYRAMID, CONE, CYLINDER, OTHER)
Shared Segment Flag	BOOLEAN	1 T, F	Flag indicating whether a culture segment is referenced by more than one feature
SIF Format	ENUM	7 SIF_HDI, SIF_DP	Designator indicating one of the two major SIF formats
SIF Version Number	STR	5 --	Released version number for SIF document used in preparing a SIF database
SIF/HDI Sentinel	STR	7 "SIF/HDI", "SIF/END"	Textual flag indicating the start or end of a SIF/HDI record within the NITF record structure
Source Agency/Project (BOTH)	STR	16 --	Name of the agency or project that created the digital source, e.g., "SOFATS", "P2851", etc.
Source Date (BOTH)	STR	6 YYMMDD	Date the digital source was created, where YY = Year, MM = Month, DD = Day
Source ID Number (BOTH)	INT	5 0..32767	Unique identifier of an entry in the data source table



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Field Name	Type	Length (CHARS)	Range	Description
Texture Origin	INT2D	11	(0..99999, 0..99999 )	Location designated as the origin within a texture
Texture Pattern Coordinates	INT2D	11	(0..99999, 0..99999 )	Positions within an image that are to be tied to the vertices of a model polygon when performing a vertex-to-vertex texture mapping
Texture Reference Table File Name	STR	17	--	The name of the texture reference table file included with SIF/HDI culture data
Texture Reference Table Index	INT	5	0..65535	A pointer to a texture reference in a texture reference table
Texture Scale	REAL2D6	25	(0.0.. 1.93428 e+25, 0.0.. 1.93428 e+25 )	Scale parameters applied to a texture map
Texture Type (BOTH)	ENUM	4	RGB, GRAY, MULT, SMFD	Type of data contained within a texture map (RGB, INTENSITY, MULTI_SPECTRAL, SMC_FDC)
Three-D Coordinate File Name	STR	17	--	The name of the three-dimensional coordinate file included with SIF/HDI culture data
Tile Information File Name	STR	17	--	The name of the tile information file included with SIF/HDI culture data

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Field Name	Type	Length (CHARS)	Range	Description
Translation	REAL2D6	25	(-1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. 1.93428 e+25 )	Translation parameters applied to a referenced model or a referenced photo texture
	REAL3D6	38	(-1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. 1.93428 e+25; -1.93428 e+25.. 1.93428 e+25 )	
Translucency	REAL6	12	0.0..100.0	The degree to which a surface is transparent
Transmittal ID	STR	10	YMMDDOXX	Unique identifier of a SIF tape transmittal where YY = Year, MM= month, DD = day of tape creation; OO = unique originator's code supplied by P2851 facility; and XX = sequence number for transmittals by the originator on that day (e.g., 9206152301 would be used for the first SIF tape transmittal created on 15 June 1992 by originator 23)
Transmissivity	REAL6	12	0.0..1.0	Ratio of energy transmitted by an object to the amount of energy incident upon it
Two-D Coordinate File Name	STR	17	--	The name of the two-dimensional coordinate file included with SIF/HDI culture data
UL Corner X/Y Image Coordinates (GDS)	INT2D	15	(-999999.. 999999, -999999.. 999999	X/Y cartesian coordinates of the upper left corner of the image