The
Digital Geographic Information
Exchange Standard
(DIGEST)

Part 2 - Annex A
ISO 8211 ENCAPSULATION SPECIFICATION

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Annex A
ISO 8211 Encapsulation Specification

Annex A - Contents page

A.0 INTRODUCTION

This annex contains specifications for the encapsulation of DIGEST information package as ISO 8211 interchange files. The specifications include the data structures and data descriptions for the following:

- the files of the DIGEST information package;
- the records and fields of each file; and
- the subfields of each field.

The first two items are specified as ordered, rooted fields with an explicit statement of the required or permitted subtrees (see A.2 and each A.3.n File content by Record and Field). The third item is specified as the field descriptions of the component files (see each A.3.n Field Data description). The details of the specification format are given in the next section.

In this annex, the terminology of ISO 8211 is used. This terminology may differ from that used in other annexes of the standard.

A.1 SPECIFICATION OF ISO 8211 EXCHANGE FILE SETS

An ISO 8211 exchange set is usually a large data structure that must be specified in great detail. The following style of presentation is intended to define the specification in a concise yet detailed manner.

A.1.1 Specification of the Exchange Set Content

Note: The following notation is in Backus Naur Form (BNF).

The structural model for a ISO 8211 exchange set is an ordered rooted tree. The general notation for the model is:

```
<tree root>
     <r>-<subtree>

where
      <tree root> is the root of the tree structure
      <r> is the repetition factor of the subtree, <subtree>.
```

In the usual depiction of trees, each subtree type may comprise the root of further subtrees. The complete specification of an exchange set comprises the following generic subtrees:

```
<exchange set>
          <r>-<file type>|<exchange subset>
               <r>-<record type>|<file type>
                    <r>-<field type>|<record type>
                         <r>-<field type>
                              <field description>
```

where

```
<exchange set> is the exchange set name

     <exchange subset> is the exchange subset name

     <r> is a specified repetition factor for a subtree,
           = integer, meaning a specific repetition
             factor
           = null means r = 1
           = R, meaning indefinite repetition
           = R:O, meaning indefinite repetition, order
             of the repetition being significant.
```

<file type>, <record type> and <field type> level may have an instance of the same type as a subtree (i.e. a file can be the subtree of a file, etc.)

```
<file type>    ::= File: external file title
                   i.e., contents of ISO 8211 DDR; tag = 0...0

<record type>  ::= Record: record name

<field type>   ::= <tag>(<structure>:<order>)-<field name>

<tag>          ::= an ISO 8211 field tag (which associates this field
                   uniquely to its data description).

<structure>    ::= a succinct description of the structure {ISO8211 data
                   structure}
```

where

```
      (1)     is an elementary field                      {elementary}
      (n)     is an n-tuple (with n = integer)                {vector}
      (m*n)   is a 2-D array of m rows and n columns           {array}
      (*n)    is a repeating 2-D table with n columns          {array}
      (i*j*k) is a 3-D array with extents i, j and k.          {array}
```

Note: The intention behind <field structure> is to provide the user with a clue to the repetition pattern of the subfields within the field. The integers n,m,i,j,k indicate the maximum numbers of subfields in the field. The actual numbers may be less if optional subfields are omitted.

```
<order>        ::= a succinct statement of any intra- or inter- field
                   ordering requirements.
```

where

```
          O        implies the order of the subfields is significant.
          O,<tag>, implies the order of the subfields is correlated with
the order of the subfields in the field bearing the tag(s), <tag>.

<field name>   ::= the ISO 8211 field name corresponding to <tag>.
```

<field description> is the ISO 8211 data description for a field.
The details of field description are given in the next section.
The presentation diagram for ordered, rooted trees is:

```
<tree root>
|
|-<r><subtree 1>
*-<r><subtree 2>  <subtree 2> or <sub tree 3> but not both.
*-<r><subtree 3>
```

Note: In these representations, the preorder traversal-sequence rule is top-down. The parent of any subtree is readily apparent and the parent tags for fields must coincide with the field description. The traversal of the tree encounters the repetition factor, perhaps the default of one, of a subtree as the subtree is entered. Further repetition may be indicated in the field descriptions.

Spaces may be introduced into the text for readability and for large exchange sets the description may be compartmentalized into subtrees for reasons of clarity. The root of each subtree identifies its nodal position in its parent tree.

The above tree structures for each file defines the order and structure of the data descriptive records (DDRs) and the order and structure of the data records (DRs).

A.1.2 ISO 8211 Data Field Description

The format of the machine- and human-readable field description, contained in each A.3.n Field Data Description section, is described below. The description comprises a set of tables where rows of the table may be converted to lines of tab delimited text. There are six line types: a control line, record title line, tag definition lines, subfield definition lines, subfields group header lines, and interspersed comment lines.

These lines may begin with the requirement codes [req] as described in A.1.3. Tabulation ~~t~~ is shown as a separator. In this annex ~~t~~ is used to represent the TAB character (ISO 646, 0/9) and ~~b~~ is used to represent the SPACE character (ISO 646, 2/0).

Control line:

The control line is the first line of the Field Data Description section.

```
t Control t  ==  t  (see DDR Header in ISO 8211)
```

Record title line:

```
[req] t Record: t Record name
```

Tag definition line (one per field):

```
[req] t  0  t  tag  t  ptag  t  pg field name
```

where	tag	is an ISO 8211 field tag, A
	ptag	is a parent tag, A
	pg	are the printable graphics, A2, (usually ";&")
	name	is an ISO 8211 field name, A48

The ISO 8211 field name described in the following specification "_FIELD" part of the ending will not be considered as mandatory for compliance to this specification.

Note: This optionality is to preserve backward compatibility given that "_FIELD" string was at the end of tag names in former editions of DIGEST.

Subfield definition line (one per subfield) which may be of two different types:

- Description of the elements of the first Vector label part of a Cartesian label describing a 2-d array field:

  [req]t nsi t label t @ t subfield comment

- Description of the elements of the last (or only) Vector label part of a Cartesian label describing a 2-d array field, or Description of the Vector label describing a vector field, or Description of an elementary field:

```
[req]t  nsi t  label t  d w t  subfield definition
```

where	nsi	is a sequence number (1 = first , 999 = end of field description)
	label	is an ISO 8211 label component, Akk
	*label	initiates a vector label in a Cartesian label describing a 2-d data structure
	d	is the subfield data type, A1 (d = A | L | I | R | S | C | B) (see Part 3, 5 for details on data types)
	w	is a fixed subfield width (0|SPACE = delimited, variable width)
	subfield definition	is a definition string

Specificity of Profiles:

Profiles of the DIGEST may be developed that describe in more detail certain conventions that are used to produce a particular series of data in compliance with the standard. Profiles establish additional rules and make choices out of those available in the standard. For example, a raster product specification such as ASRP is a profile. Among the areas of valid choice in the definition of a profile is the specification of the width of subfields. It is permissible for a profile to be more specific on the width of a variable field than the main body of the standard; e.g., ISO 8211 may define a field of type A and a product specification define the same field to be type A 3. As long as the product specification narrows the definition of the permissible width of a subfield it is in compliance with the standard.

Subfield group header lines:

These lines are placed only for grouping subfields when describing the requirement codes.
[req] ~~+~~ (group name)

Comment lines:

Comment records must start with five SPACEs or a "-" and may be located anywhere.

A.1.3 Requirement Codes

The DIGEST use code is given in []s immediately prior the file name, record title, tag description, subfield description, and subfield group header.

DIGEST use codes:

Applicable dataset codes:

C = **C**ommon to all datasets

V = **V**ector datasets at topological level

Vn = **V**ector datasets at topological level **n**

R = **R**aster datasets

A = m**A**trix datasets

Requirement code:

M = presence of data item is **M**andatory

S = **S**trongly recommended

O = presence of data item is **O**ptional

D^{d} = presence of data item is mandatory **D**epending upon the presence or value of another item as described in dependency condition **d**.

In the following description, each file, record, field and subfield description is preceded by a digit representing the rank in the Mandatory / Optional hierarchy, Level 1 in the hierarchical scheme is the top level. The hierarchical rank is followed by the code for the applicable dataset (C, V, R, A, described above) followed by the Optional / Mandatory / Dependent code. Higher level data items confer their optionality to all items at a lower level until another item of equal or higher rank to the original is encountered. For instance:

3[C,O] Data Item A

4[C,M] Data Item B

4[C,O] Data Item C

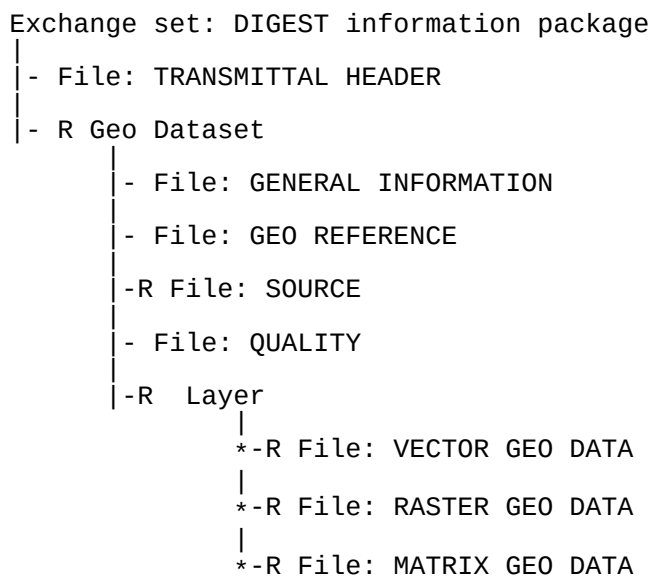
Thus, Item A may be absent, and if it is, then both B and C must be absent. If A is present then B must also be present. Note that if A were mandatory, then at least one item of level 4 must be mandatory.

A.2 SPECIFICATION OF DIGEST INFORMATION PACKAGE [TRANSMITTAL]

A.2.1 Content of a DIGEST Information Package [Transmittal Set] by Files

This clause specifies the content of a DIGEST information package at the file level by an ordered, rooted tree structure.

Note: See A.1 for format interpretation.



A.2.2 File-Naming Convention

The TRANSMITTAL HEADER FILE NAME is always “TRANSH01.THF”.

All other file names conform to the following set of rules, which provide a mechanism to identify those files that together compose a single dataset. Each file label will be of the form:

ZZZZZZDD.XXX, where:

“ZZZZZZ”	are six alphanumeric characters that uniquely identify the dataset to which the file belongs (see Dataset ID or designation).
“DD”	are two alphanumeric characters that identify the occurrence of the file type within the dataset; and

"ZZZZZZDD" will uniquely identify the layer to which the file belongs.

"XXX" is a three-character extension which must be selected from the set of reserved extensions.

Reserved Extensions:

THF	Transmittal Header File
GEN	General Information File
GER	Geographic Reference File
SOU	Source File
QAL	Quality File
VEC	Edges, Nodes, Faces, Features of a Layer in a single file
Vcc	Edges or Nodes or Faces or Features of a Layer with multiple files (where "cc" is the number assigned to the file within the Layer)
IMG	Main Raster Image
Lcc	Raster Legend Image (where "cc" is the number assigned to the image's source graphic)
MTX	Matrix data

The table of two-character codes representing the file number within the Layer or source graphic number (in bold) is shown below:

1 =	**00**	37 =	**10**	. . .	325 =	**90**	361 =	**A0**	. . .	1225 =	**Y0**	1261 =	**Z0**
2 =	**01**	38 =	**11**		326 =	**91**	362 =	**A1**		1226 =	**Y1**	1262 =	**Z1**
:	**:**	:	**:**		:	**:**	:	**:**		:	**:**	:	**:**
:	**:**	:	**:**		:	**:**	:	**:**		:	**:**	:	**:**
10 =	**09**	46 =	**19**		334 =	**99**	370 =	**A9**		1234 =	**Y9**	1270 =	**Z9**
11 =	**0A**	47 =	**1A**	. . .	335 =	**9A**	371 =	**AA**	. . .	1235 =	**YA**	1271 =	**ZA**
12 =	**0B**	48 =	**1B**		336 =	**9B**	372 =	**AB**		1236 =	**YB**	1272 =	**ZB**
:	**:**	:	**:**		:	**:**	:	**:**		:	**:**	:	**:**
:	**:**	:	**:**		:	**:**	:	**:**		:	**:**	:	**:**
36 =	**0Z**	72 =	**1Z**	. . .	360 =	**9Z**	396 =	**AZ**	. . .	1260 =	**YZ**	1296 =	**ZZ**

An example of the use of the Geo Data Subset files structure is depicted below:

NOAMER01.SOU

This example defines a SOURCE_FILE that is part of a dataset uniquely identified with NOAMER. If the dataset contains more than one source file, the file name will be the same except that at least one of the characters, "0" or "1", must be changed.

A.3 SPECIFICATION OF DIGEST FILES BY RECORDS AND FIELDS

This clause specifies the content and structure of each DIGEST file at the record and field level. The specification for each file is given as an ordered rooted tree specifying the file contents by record and field followed by the ISO 8211 data description for each field. (See A.1 for format interpretation).

Alternative Date Format:

Note that DIGEST allows two alternative date formats. The tags, DAT, DAT1, DAT2, DAT3, DAT4, and DAT5 have been retained only for backward compatibility with previous versions of the standard. New datasets should not include the use of DAT, DAT1... or DAT5. Occurrences of dates in the A12 format (per DAT, DAT1... DAT5) will be interpreted to be equivalent to CDV (using A8 format), or CDP (I) and CDV (A8).

The A12 format consists of a three character numeric code, which designates the type of date, followed by a comma separating the actual date in the form YYYYMMDD (e.g., 007,19881126). The latter eight characters are equivalent to CDV while the first three are equivalent to CDP, the codes for which are to be found in the DIGEST Part 4 (FACC Attributes). Thus, the DAT A12 format is a combination of CDP and CDV.

For backward compatibility, wherever CDV alone occurs in the documentation it may be replaced by DAT in A12 format and wherever the pair of CDP and CDV occurs they may be replaced by DATx (x=1,...,5), for backward compatibility.

In the DIGEST document, all occurrences of DAT1,...,DAT5 have been replaced with the pair CDP, CDV. All occurrences of DAT, where the date type is known by context, have been replaced by CDV.

A.3.1 Transmittal Header File

File Content by Record and Field:

1[C,M]	File: TRANSMITTAL HEADER				
2[C,M]	|-	Record: TRANSMITTAL DESCRIPTION			
	|	|-	001	(2)	{RTY = THF, RID = 01}
	|	|-	VD	(6)	Transmittal Header
			R		
	|	|-	FD	(8)	Dataset Description
		R	R		
	|				
2[C,M]	|-	Record: SECURITY AND UPDATE			
	|	|-	001	(2)	{RTY = LCF}
	|	|-	QS	(4)	Security and Release
			R		
	|	|-	QU	(6)	Up to Dateness
		R	V		

Note: The Dataset Description field and Up-to-Dateness field will be repeated once for each dataset present in the DIGEST Information Package [transmittal].

They will be repeated in the same order, there will be a one-to-one mapping between them. A single Up-to-Dateness field will be used when the information applies to all the datasets.

Field Data Descriptions:

	Control	==		(see DDR Header in ISO 8211)
	0	000		{=TRANSMITTAL_HEADER_FILE}
	1			File title field, present only in DDR
	999			
2[C,M]	**Record:**	**TRANSMITTAL DESCRIPTION**		
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = THF}
3[C,M]	2	RID	I	Record id number {RID = 1}
	999			
3[C,M]	0	VDR	001	;& TRANSMITTAL_HEADER
4[C,O]				(originator - addressee)
5[C,O]	1	MSD	A 3	Media recording standard Note: This optional subfield is included for backward-compatibility only. Omission is strongly recommended
5[C,M]	2	VOO	A	Originator
5[C,O]	3	ADR	A	Addressee
5[C,O]	4	NOV	I 1	Number of volumes Note: This optional subfield is included for backward-compatibility only. Omission is strongly recommended
4[C,M]	5	NOF	I	Number of datasets
4[C,M]	6	URF	A	DIGEST information package [Transmittal] Identifier
4[C,M]	7	EDN	I	Edition number
4[C,M]	8	CDV07	A 8	Creation date value
	999			
*3[C,M]	0	FDR	001	;& DATA_SET_DESCRIPTION
4[C,M]	1	NAM	A 6	Dataset Designation {ZZZZZZ}
4[C,O]	2	STR	I	Data structure code
4[C,O]	3	PRT	A	Dataset type
4[C,D[1]]	4	ENC	A 1	Encapsulation {A | X }
4[C,M]	5	SWO	R	Westernmost longitude
4[C,M]	6	SWA	R	Southernmost latitude
4[C,M]	7	NEO	R	Easternmost longitude
4[C,M]	8	NEA	R	Northernmost latitude
	999			

2[C,M]	**Record:**	**SECURITY AND UPDATE**			
3[C,M]	0	001		;& RECORD_ID_FIELD	
3[C,M]	1	RTY	A 3	Record type	{RTY = LCF}
3[C,M]	2	RID	I	Record id number	{RID = 1}
	999				
3[C,M]	0	QSR	001	;& SECURITY_AND_RELEASE	
3[C,M]	1	QSS	A 1	Security classification {T | S | C | R | U }	
3[C,M]	2	QOD	A 1	Downgrading instructions { Y | N }	
3[C,O]	3	CDV10	A 8	Date of downgrading value	
3[C,M]	4	QLE	A	Releasability	
	999				
*3[C,M]	0	QUV	001	;& UP_TO_DATENESS	
4[C,M]				(DIGEST specification)	
5[C,M]	1	SRC1	A	DIGEST edition Id	
5[C,M]	2	CDV12	A 8	DIGEST edition date value	
5[C,M]	3	SPA1	A	DIGEST amendment number	
4[C,O]				(product specification)	
5[C,M]	4	SRC2	A	Specification Edition Id	
5[C,M]	5	CDV22	A 8	Specification edition date value	
5[C,M]	6	SPA2	A	Specification amendment number	
	999				

Dependency conditions for TRANSMITTAL HEADER FILE:

1. **Encapsulation:**
   Must be present when the encapsulation is not homogeneous within the DIGEST information package [transmittal].

A.3.2 General Information File

File Content by Record and Field:

1[C,M]	File: GENERAL INFORMATION			
2[C,M]	|-R	Record: GENERAL INFORMATION		
	|	|- 001	(2)	{RTY = GIN}
	|	|- DSI	(2)	Dataset Id
	|	|- GEN	(30)	General Information
	|	|- SPR	(16)	Dataset Parameters
	|	|- BDF	(*3:O)	Band Id
	|	|- TIM	(*1)	Tile Index Map
	|	|- CID	(2)	Compression ID
	|	|-R LTD	(4)	Compression Lookup Table Description
	|	|-R LTV	(*1)	Compression Lookup Table Values
	|	|- CPM	(*2)	Compression Parameters
	|			
2[C,O]	|-	Record: DATASET DESCRIPTION		
	|	|- 001	(2)	{RTY = DSS}
	|	|- DRF	(5)	Dataset Description

Field Data Descriptions:

	Control	==	(see DDR Header in ISO 8211)	
		0	000	{=GENERAL_INFORMATION_FILE}
		1		File title field, present only in DDR
	999			
*2[C,M]	**Record:**	**GENERAL INFORMATION**		
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = GIN}
3[C,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[C,M]	0	DSI	001	;& DATA_SET_ID
4[C,O]	1	PRT	A	Dataset type
4[C,M]	2	NAM	A 6	Dataset Id {ZZZZZZ}
	999			
3[C,M]	0	GEN	001	;& GENERAL_INFORMATION
4[C,M]	1	STR	I 1	Structure of Data within the Layer
4[C,D[1]]	2	ENC	A 1	Encapsulation of the Layer {A | B | C | D}
4[R/A,D[2]]				(data density)
5[R/A,M]	3	LOD	R	Data Interval E-W direction
5[R/A,M]	4	LAD	R	Data interval N-S direction
5[R/A,M]	5	UNIloa	A	Unit of measurement for LOD & LAD
4[A, D[3]]	6	UNImat	A	Unit of measurement for Matrix Data. Null if not relevant.
4[V,O]	7	MBU	A	MBR and GRP Units
4[V/A,O]	8	COV	I	Data Cover MBR in Percent
4[V,O]	9	FEC	I	Feature Count
4[V,O]	10	POC	I	Point Feature Count
4[V,O]	11	LIC	I	Line Feature Count
4[V,O]	12	ALC	I	Area Feature Count
4[V,O]	13	SGC	I	Segment/Edge Record Count
4[V,O]	14	NEC	I	Node Record Count
4[V,O]	15	FCC	I	Face Record Count
4[V,O]	16	SFT	I	Simple Feature Count
4[R/A,O]	17	ZNA	I	Zone number
		Note:	This field is maintained in the General Information Field for backward compatibility only. Use of the corresponding field within the Projection field of the Geo Reference File is strongly recommended.	
4[C,O]				(WGS84 MBR)
5[C,M]	18	SWO	R	Longitude of SW Corner
5[C,M]	19	SWA	R	Latitude of SW Corner
5[C,M]	20	NEO	R	Longitude of NE Corner
5[C,M]	21	NEA	R	Latitude of NE Corner
4[R,M] [V/A,O]	22	SCA	I	Cartographic Scale (reciprocal scale)
4[R,O]	23	PSP	R	Pixel Spacing, Microns, at capture stage
4[R,O]	24	IMR	A 1	Rectified Image {Y|N}
4[R/A,D[4]]				(pixel ground spacing)

5[R/A,M]	25	ARV	I	Longitude density: Number of pixels / elements in 360 degrees (W-E)
5[R/A,M]	26	BRV	I	Latitude density: Number of pixels in 360 degrees (N-S)
4[R/A,M] [V,O]	27	LSO	R	Longitude/Easting of origin
4[R/A,M] [V,O]	28	PSO	R	Latitude/Northing of origin
4[V,O]	29	CSF	I	Coordinates scale factor
4[C,O]	30	TXT	L	Free Text
	999			
3[C,M]	0	SPR	001	;& DATA_SET_PARAMETERS
4[R/A,O]				(corners of MBR)
5[R/A,M]	1	NUL	I	Row Number; upper right corner of MBR
5[R/A,M]	2	NUS	I	Column Number; upper right corner of MBR
5[R/A,M]	3	NLL	I	Row Number; lower left corner of MBR
5[R/A,M]	4	NLS	I	Column Number; lower left corner of MBR
4[R/A,M]	5	NFL	I	Number of Sub-blocks, vetically
4[R/A,M]	6	NFC	I	Number of Pixels/Sub-block Line
4[R/A,M]	7	PNC	I	Number of Pixels/Sub-block Line
4[R/A,M]	8	PNL	I	Number of Sub-blocks, horizontally
4[R/A,M]	9	COD	I 1	Column Sequence { 0 | 1 }
4[R/A,M]	10	ROD	I 1	Row sequence { 0 | 1 }
4[R/A,M]	11	POR	I 1	Pixel order { 0 | 1 | 2 | 3 | 4 | 5 }
4[R/A,M]	12	PCB	I	Size of Pixel/Element Count in bits (set to 0 if RLE is not used)
4[R/A,M]	13	PVB	I	Size of Pixel/Element Value in bits
4[R/A,O]	14	PVT	A	Type of Pixel/Element Value {INT | SI | B | R | C }
4[C,M]	15	BAD	A 12	Layer file name { ZZZZZZDD.xxx}
4[R/A,M]	16	TIF	A 1	Tile index map flag (Y|N)
	999			
3[R/A,M]	0	BDF	001	;& BAND_ID
*4[R/A,M]	1	*BID	A	Band identification
4[R,D[5]]				(band description)
5[R,M]	2	WS1	I	ON colour code value or Lower limit wavelength in nanometers
5[R,M]	3	WS2	I	OFF colour code value or Upper limit wavelength in nanometers
	999			
3[R/A,D[6]]	0	TIM	001	;& TILE_INDEX_MAP
*4[R/A,M]	1	*TSI	I	Tile Index Map value
	999			
3[R/A,D[7]]	0	CID	001	;& COMPRESSION ID
4[R/A,M]	1	COM	A5	Compression Code RLE (Run Length Encoding), or JPEG, or VQ (Vector Quantization)
4[R/A,O]	2	CPR	A 5	Compression Ratio
	999			

*3[R/A,D^8]	0	LTD	001	;& COMPRESSION_LOOKUP _TABLE_DESCRIPTION
4[R/A,M]	1	LTI	I 5	Compression Lookup Table Id
4[R/A,M]	2	NLR	I	Number of Compression Lookup Table Rows
4[R/A,M]	3	NVA	I	Number of Values per Compression Lookup Table Row
4[R/A,O]	4	VLB	I	Number of bits per Values
	999			
*3[R/A,D^8]	0	LTV	001	;& COMPRESSION_LOOKUP _TABLE_VALUES
*4[R/A,M]	1	*CLV	I 5	Compression Lookup Table Value
	999			
3[R/A,D^9]	0	CPM	001	;& COMPRESSION_PARAMETERS
*4[R/A,M]	1	*CQI	I 5	Compression Parameter Id
4[R/A,M]	2	CPV	R	Compression Parameter Value
	999			
2[C,O]	**Record:**	**DATASET DESCRIPTION**		
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	A 3 Record type {RTY = DSS}
3[C,M]	2	RID	I	Record id number {RID=1}
	999			
3[C,M]	0	DRF	001	;& DATASET_DESCRIPTION
4[C,M]	1	NSH	I 2	Total number of horizontal accuracy sub-regions
4[C,M]	2	NSV	I 2	Total number of vertical accuracy sub-regions
4[C,M]	3	NSP	I 2	Total number of position accuracy sub-regions
4[C,M]	4	NOZ	I 2	Total number of layers
4[C,M]	5	NOS	I 2	Total number of source graphics
	999			

Dependency conditions for GENERAL INFORMATION FILE:

1. **Encapsulation:**
   Must be present when the encapsulation is not homogeneous within the dataset.

2. **Data density: see Pixel ground spacing**
   Raster and matrix data consist of arrays of information pertaining to pixels or points at regularly identified intervals. The dimension of these pixels or intervals must be transmitted. If the dimension of these intervals is based on cartographic coordinates or Cartesian coordinates (USRP), the LOD, LAD and UNIloa subfields must be used. There is no default value for UNIloa.

3. **Unit of measurement for Matrix Data:**
   Must be present when Marix values are actual values.

4. Pixel ground spacing: see Data density
Raster and matrix data consist of arrays of information pertaining to pixels or points at regularly-identified intervals. Dimensions of these pixels or intervals must be transmitted. If dimensions of these intervals are based on geographic coordinates (ASRP), the ARV and BRV subfields must be used.

5. Band description:
The Band identification must be present for any raster: counting the number of BID subfields is the only way to specify the number of raster bands. WS1 and WS2 are mandatory in case of RGB raster data (STR =3) or when PVB = 0. For matrix data, the band identification is required to identify the matrix attributes.

6. Tile index map: Mandatory if TIF = "Y"

7. Compression ID:
Mandatory if the Geo Data Layer is compressed. Strongly recommended for Run Length Encoding (where the option to omit Compression Id is retained for backward compatibility).

8. Compression Look Up Table:
Mandatory if the Compression algorithm requires it.

9. Compression Parameters:
Mandatory if the Compression algorithm requires it.

A.3.3 Geo Reference File

File Content by Record and Field:

1[C,M]	File: GEO REFERENCE				
2[C,M]	|-R	Record: GEO REFERENCE			
	|	|-	001	(2)	{RTY = GEO}
	|	|-	GEP	(13)	Geo Parameters
	|	|-	PRR	(9)	Projection
	|	|-	RPR	(8)	Registration Points
	|	|-	DPR	(9)	Diagnostic Points
2[C,O]	|-R	Record: GRID DESCRIPTION			
	|	|-	001	(2)	{RTY = GRD}
	|	|-	GRI	(2)	Grid Information
	|	|-	GEN	(8)	General Information
	|	|-	SPR	(15)	Dataset Parameters
	|	|-	BDF	(*1)	Band Identification

Field Data Descriptions:

	Control	==		(see DDR Header in ISO 8211)
	0	000		{=GEO_REFERENCE_FILE}
	1			File title field, present only in DDR
	999			
2[C,M]	**Record:**	**GEO REFERENCE**		
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = GEO}
3[C,M]	2	RID	I	Record id number {RID = 1}
	999			
3[C,M]	0	GEP	001	;& GEO_PARAMETERS
4[C,M]	1	TYP	A 3	Data Type { MAP | GEO | DIG }
4[C,M]	2	UNI	A	Unit of measurement for coordinates
4[C,M]	3	ELL	A	Ellipsoid Name
4[C,M]	4	ELC	A 3	Ellipsoid Code
4[C,D1]				(geodetic datum)
5[C,M]	5	DVR	A	Vertical Datum Name
5[C,M]	6	VDCdvr	A4	Vertical Datum Code
4[C,D2]				(vertical datum)
5[C,M]	7	SDA	A	Sounding Datum Name
5[C,M]	8	VDCsda	A 4	Sounding Datum Code
4[C,M]				(sounding datum)
5[C,M]	9	DAG	A	Datum Geodetic Name
5[C,M]	10	DCD	A 4	Datum Geodetic Code
4[C,O]				(grid system)
5[C,M]	11	GRD	A	Grid Code
5[C,O]	12	GRN	A	Grid Description
5[C,O]	13	ZNA	I	Grid Zone number
	999			
4[C,D3]	0	PRR	001	;& PROJECTION
5[C,M]	1	PRN	A	Projection Name
5[C,M]	2	PCO	A 2	Projection Codes (Part 3-6)
5[C,M]	3	PAA	R	Projection Parameter 1
6[C,D4]	4	PAB	R	Projection Parameter 2
7[C,D5]	5	PAC	R	Projection Parameter 3
8[C,D6]	6	PAE	R	Projection Parameter 4
		Note: List of Projection Parameters may be extended as required. Additional subfield labels will range from PAF to PAZ.		
5[C,D7]				(projection false origin)
6[C,M]	7	XOR	R	Easting false Origin
6[C,M]	8	YOR	R	Northing false Origin
5[C,D8]	9	ZOR	R	Z values false Origin
	999			

3[C,O]	0	RPR	001	;& REGISTRATION_POINT
*4[C,M]	1	*PID	A	Registration Point ID
4[C,M]	2	LON	R	Longitude/Easting of Registration Point
4[C,M]	3	LAT	R	Latitude/Northing of Registration Point
4[C,D[9]]	4	ZVL	R	Elevation of Registration Point
4[C,M]	5	DIX	R	Local X Coordinate of Registration Point
4[C,M]	6	DIY	R	Local Y Coordinate of Registration Point
4[C,D[9]]	7	DIZ	R	Local Z Coordinate of Registration Point
4[C,D[10]]	8	BAD	A 12	Located File Name
	999			
3[C,O]	0	DPR	001	;& DIAGNOSTIC_POINT
*4[C,M]	1	*DPD	A	Diagnostic Point ID - Repeating Field
4[C,M]	2	LON	R	Longitude/Easting of Diagnostic Point
4[C,M]	3	LAT	R	Latitude/Northing of Diagnostic Point
4[C,D[11]]	4	ZVL	R	Elevation of Diagnostic Point
4[C,M]	5	DIX	R	Local X Coordinate of Diagnostic Point
4[C,M]	6	DIY	R	Local Y Coordinate of Diagnostic Point
4[C,D[11]]	7	DIZ	R	Local Z Coordinate of Diagnostic Point
4[C,D[12]]	8	BAD	A 12	Controlled File Name
	999			

*2[R/A,O]	**Record :**	**GRID DESCRIPTION**		
3[R/A,M]	0	001		;& RECORD_ID
4[R/A,M]	1	RTY	A 3	Record type {RTY = GRD}
4[R/A,M]	2	RID	I	Record ID number {RID = 1,n}
	999			
3[R/A,M]	0	GRI	001	;& GRID_INFORMATION
4[R/A,O]	1	ZVL	I6	Grid Elevation
4[R/A,M]	2	BAD	A12	Located Image File Name
	999			
3[R/A,M]	0	GEN	001	;& GENERAL_INFORMATION
4[R/A,M]	1	LOD	R 6	Data density in columns
4[R/A,M]	2	LAD	R 6	Data density in rows
4[R/A,M]	3	LSO	R 10	Origin in columns
4[R/A,M]	4	PSO	R 10	Origin in rows
	999			
3[R/A,M]	0	SPR	001	;& DATA_SET_PARAMETERS
4[R/A,M]				(Corners of Location Grid) NUL,NUS,NLL,NLS are used to compute the number of rows and columns of the grid.
5[R/A,M]	1	NUL	I	Row Number of the upper right corner of the location grid
5[R/A,M]	2	NUS	I	Column Number; upper right corner of the location grid
5[R/A,M]	3	NLL	I	Row Number; lower left corner of the location grid
5[R/A,M]	4	NLS	I	Column Number; lower left corner of the location grid
4[R/A,M]	5	NFL	I	Number of Subblocks, vertically{1}
4[R/A,M]	6	NFC	I	Number of Subblocks, horizontally{1}

4[R/A,M]	7	PNC	I	Number of Elements per Profile (= Total number of grid elements left to right)
4[R/A,M]	8	PNL	I	Number of Profiles per Subblock (= Total number of grid elements top to bottom)
4[R/A,M]	9	COD	I 1	Column Sequence { 0 | 1}
4[R/A,M]	10	ROD	I 1	Row Sequence{ 0 | 1}
4[R/A,M]	11	POR	I 1	Pixel Order { 0 | 1 | 4 | 5}
4[R/A,M]	12	PCB	I 1	Size of Pixel Count in bits {0}
4[R/A,M]	13	PVB	I	Size of Pixel Value in bits
4[R/A,M]	14	PVT	A	Type of Pixel/Element Value {INT | SI |R }
4[R/A,M]	15	BAD	A 12	Location Grid File Name{zzzzzzdd.Gcc}
	999			
3[R/A,M]	0	BDF	001	;& BAND_ID
*4[R/A,M]	1	*BID	A	Band Identification {GGX | GGX | CGY | CGY}
	999			

Dependency conditions for GEO REFERENCE FILE:

1. **Vertical Datum:**
   Mandatory if elevation information is present in the dataset (z values).

2. **Sounding Datum:**
   Mandatory if sounding information is present in the dataset (depth values).

3. **Projection field:**
   The projection field is mandatory when the coordinates type is MAP (cartographic coordinates) and forbidden when the coordinates type is GEO (geographic coordinates).

4. **Parameter 2:**
   See Part 3, Clause 6

5. **Parameter 3:**
   See Part 3, Clause 6

6. **Parameter 4:**
   See Part 3, Clause 6

7. **Projection False Origin:**
   When relevant only (usually the case).

8. **Z values False Origin:**
   When relevant only.

9. Elevation Registration Point:
Mandatory if z coordinates must be registered. In this case the Local coordinates will have a Z value.

10. Located File Name:
Mandatory if the Registration Point does not apply to the whole dataset.

11. Elevation Diagnostic Point:
Mandatory if z coordinates must be controlled. In this case the Local coordinates will have a Z value.

12. Controlled File Name:
Mandatory if the Diagnostic Point does not apply to the whole dataset.

A.3.4 Source File

File Content by Record and Field:

1[C,M]	File: SOURCE				
2[C,D]	|-	Record: SOURCE			
	|	|-	001	(2)	{RTY = SOU}
	|	|-	SGF	(*5)	Source Summary
	|	|-	SOR	(30)	Source
	|	|-	MAG	(*10)	Magnetic Rate
	|	|-R	RCI	(*2)	Bounding Polygon Coordinates
	|	|-	PRR	(8)	Projection
	|	|-	QSR	(4)	Security and Release
	|	|-	INS	(*19)	Inset
	|	|-	CPY	(1)	Copyright
2[R,D]	|-R	Record: LEGEND			
	|	|-	001	(2)	{RTY = LEG}
	|	|-	LGI	(2)	Legend
	|	|-	SPR	(16)	Legend Parameters
	|	|-	TIM	(*1)	Tile Index Map
2[R/A,D]	|-R	Record: METRIC SUPPORT			
	|	|-	001	(2)	{RTY = MSD}
	|	|-	NCD	(8)	Normalization Constants
	|	|-	SDC	(14)	Source Datum Coefficients Data
	|	|-	MPC	(20)	Map Projections Coefficients Data
	|	|-	DCC	(7)	Datum Change Constants
	|	|-	SCC	(2)	Source Datum Coefficient Counters
	|	|-	SLG	(*3)	Source Datum Longitude Coefficients
	|	|-	SLT	(*3)	Source Datum Latitude Coefficients
	|	|-	GRC	(3)	Grid Rotation Coefficients
2[C,O]	|-	Record: SUPPLEMENTARY TEXT			
	|	|-	001	(2)	{RTY = SPT}
	|	|-	SUP	(*3)	Supplementary Text

2[R,D]	|-	Record: AUXILIARY PARAMETERS		
	|	|- 001	(2)	{RTY = AUP}
	|	|- SGF	(*1)	Source Summary
	|	|-R RCI	(*2)	Bounding Polygon Coordinates
	|	|- BDF	(*3)	Original scene band id
	|	|- BAP	(25)	Basic auxilliary parameters
	|	|- AAP	(*5)	Additional auxilliary parameters

Field Data Descriptions:

	Control	==		(see DDR Header in ISO 8211)
	0	000		{=SOURCE_FILE}
	1			File title field, present only in DDR
	999			
2[C,D]	**Record:**	**SOURCE**		(Source Graphic Description Only)
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = SOU}
3[C,M]	2	RID	I	Record id number {RID = 1}
3[C,O]	0	SGF	001	;& SOURCE_SUMMARY
*4[C,D1]	1	BAD	A	Name of derived layer
4[R,O]	2	NMI	I	Number of magnetic information
4[C,O]	3	NST	I 4	Number of supplementary text records
4[R,O]	4	NLI	I	Number of legend images
4[R,O]	5	NIN	I	Number of insets
	999			
3[C,M]	0	SOR	001	;&SOURCE
4[C,S]	1	PRT	A	Series Designator for the Series
4[C,M]	2	URF	A	Unique Source ID
4[C,M]	3	EDN	A	Source Edition Number
4[C,S]	4	NAM	A	Full Name of Source Document
4[C,M]	5	CDP	I	Type of significant date
4[C,M]	6	CDV	A 8	Significant Date value
4[C,S]	7	CDV27	A 8	Perishable information date value
4[C,S]	8	SCA	I	Cartographic Scale
4[C,O]				(reciprocal scale)
5[C,M]	9	GRD	A	Grid Code
5[C,O]	10	GRN	A	Grid Description
5[C,O]	11	ZNA	I	Grid Zone number
4[C,O]				(area coverage)
5[C,M]	12	SQU	I	Area Coverage
5[C,M]	13	UNIsqu	A	Unit of Measure for Area Coverage
4[C,O]				(contour interval)
5[C,M]	14	PCI	I	Predominant Contour Interval
5[C,M]	15	UNIpci	A	Unit of Measure for Contour Interval
4[C,O]	16	WPC	I 3	Percentage Covered by Water
4[C,O]	17	NST	I	Navigational System Type
4[C,D2]				(geodetic ellipsoid)
5[C,M]	18	ELL	A	Ellipsoid Name
5[C,M]	19	ELC	A 4	Ellipsoid Code
4[C,D3]				(vertical datum)

5[C,M]	20	DVR	A	Vertical Datum Reference
5[C,M]	21	VDCdvr	A 4	Code for Datum of Vertical Reference
4[C,D[4]]				(sounding datum)
5[C,M]	22	SDA	A	Sounding Datum Name
5[C,M]	23	VDCsda	A 4	Code for Sounding Datum
4[C,D[5]]				(geodetic datum)
5[C,M]	24	DAG	A	Geodetic Datum Name
5[C,M]	25	DCD	A	Geodetic Datum Code
4[C,O]	26	SRN	A	Library/Source Reference Number
4[R,O]				(highest elevation)
5[R,M]	27	HKE	I	Highest known elevation of source
5[R,M]	28	UNIhke	A	Units of elevation value
5[R,S]				(highest elevation point)
6[R,M]	29	LON	R	Longitude/Easting of HKE
6[R,M]	30	LAT	R	Latitude/Northing of HKE
	999			
3[R,O]	0	MAG	001	;& MAGNETIC_RATE
*4[R,M]	1	*CDP	I	Type of magnetic date rate
4[R,M]	2	CDV	A 8	Magnetic rate Date value
4[R,M]	3	RAT	R	Annual magnetic rate of change
4[R,M]	4	UNIrat	A	Units of annual rate of change
4[R,M]	5	GMA	R	Grid north – magnetic north
4[R,M]	6	UNIgma	A	Units of grid magnetic angle
4[R,S]				(magnetic rate reference point)
5[R,M]	7	LON	R	Longitude/Easting of the G-M angle reference point
5[R,M]	8	LAT	R	Latitude/Northing of the G-M angle reference point
4[R,O]				(grid convergence)
5[R,M]	9	GCA	R	Grid convergence angle
5[R,M]	10	UNIgca	A	Units of grid convergence angle
	999			
*3[C,D[6]]	0	RCI	001	;& BOUNDING_POLYGON _COORDINATES
*4[C,M]	1	*LON	R	Longitude/Easting coordinate
4[C,M]	2	LAT	R	Latitude/Northing coordinate
	999			
3[R,S]	0	PRR	001	;& PROJECTION
[V/A,O]				
4[C,M]	1	PRN	A	Projection Name
4[C,M]	2	PCO	A 2	Projection Codes (Part 3-6)
4[C,M]	3	PAA	R	Projection Parameter 1
5[C,D[7]]	4	PAB	R	Projection Parameter 2
6[C,D[8]]	5	PAC	R	Projection Parameter 3
7[C,D[9]]	6	PAE	R	Projection Parameter 4
		Note: List of Projection Parameters may be extended as required. Additional subfield labels will range from PAF to PAZ.		
4[C,D[10]]				(projection false origin)
5[C,M]	7	XOR	R	Easting false Origin
5[C,M]	8	YOR	R	Northing false Origin
	999			

3[C,S]	0	QSR	001	;& SECURITY_AND_RELEASE
4[C,M]	1	QSS	A 1	Highest security classification { T | S | C | R | U }
4[C,M]	2	QOD	A 1	Downgrading instructions { Y | N }
4[C,M]	3	CDV10	A 8	Downgrading date value
4[C,M]	4	QLE	A	Releasability
	999			
3[R,D[11]]	0	INS	001	;& INSET
*4[R,M]	1	*INT	A	Unique ID of an Inset
4[R,M]	2	SCA	I	Cartographic Scale of Inset
4[R,M]	3	NAM	A	Name of Inset
4[R,M]	4	NTL	R	Abs. lon. lower left corner
4[R,M]	5	TTL	R	Abs. lat. lower left corner
4[R,M]	6	NVL	R	Abs. lon. upper left corner
4[R,M]	7	TVL	R	Abs. lat. upper left corner
4[R,M]	8	NTR	R	Abs. lon. upper right corner
4[R,M]	9	TTR	R	Abs. lat. upper right corner
4[R,M]	10	NVR	R	Abs. lon. lower right corner
4[R,M]	11	TVR	R	Abs. lat. lower right corner
4[R,M]	12	NRL	R	Rel. lon. lower left corner
4[R,M]	13	TRL	R	Rel. lat. lower left corner
4[R,M]	14	NSL	R	Rel. lon. upper left corner
4[R,M]	15	TSL	R	Rel. lat. upper left corner
4[R,M]	16	NRR	R	Rel. lon. upper right corner
4[R,M]	17	TRR	R	Rel. lat. upper right corner
4[R,M]	18	NSR	R	Rel. lon. lower right corner
4[R,M]	19	TSR	R	Rel. lat. lower right corner
	999			
3[C,S]	0	CPY	001	;& COPYRIGHT
4[C,M]	1	CPZ	L	Copyright statement
	999			
*2[R,O]	**Record:**	**LEGEND**	(Source Graphic Description Only)	
3[R,M]	0	001		;& RECORD_ID_FIELD
3[R,M]	1	RTY	A 3	Record type {RTY = LEG}
3[R,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[R,M]	0	LGI	001	;& LEGEND
4[R,O]	1	NAM	A	Legend name
4[R,M]	2	STR	I	Structure class code
	999			

3[R,M]	0	SPR	001	;& DATA_SET_PARAMETERS
4[R,O]		(corners)		
5[R,M]	1	NUL	I	Row Number; upper right corner of MBR
5[R,M]	2	NUS	I	Column Number; upper right corner of MBR
5[R,M]	3	NLL	I	Row Number; lower left corner of MBR
5[R,M]	4	NLS	I	Column Number; lower left corner of MBR
4[R,M]	5	NFL	I	Number of Sub-blocks, vertically
4[R,M]	6	NFC	I	Number of Sub-blocks, horizontally
4[R,M]	7	PNC	I	Number of Pixels/Sub-block Line
4[R,M]	8	PNL	I	Number of Scan Lines/Sub-block
4[C,M]	9	COD	I 1	Column Sequence { 0 | 1 }
4[C,M]	10	ROD	I 1	Row sequence { 0 | 1 }
4[C,M]	11	POR	I 1	Pixel order { 0 | 1 | 2 | 3 | 4 | 5 }
4[R,M]	12	PCB	I	Size of Pixel/Element Count in bits
4[R,M]	13	PVB	I	Size of Pixel/Element Value in bits
4[R,O]	14	PVT	A	Type of Pixel/Element Value {INT | SI | B | R | C }
4[R,M]	15	BAD	A 12	Image File name {ZZZZZZDD.Lcc}
4[R,M]	16	TIF	A 1	Tile index map flag ("Y" or "N")
	999			
3[R,D^{12}]	0	TIM	001	;& TILE_INDEX_MAP
*4[R,M]	1	*TSI	I	Tile Index Map value
	999			
R/A,O]	**Record:**	**METRIC SUPPORT**		(Source Graphic Description Only)
3[R/A,M]	0	001		;& RECORD_ID_FIELD
3[R/A,M]	1	RTY	A 3	Record type {RTY = MSD}
3[R/A,M]	2	RID	I	Record id number {RID=1}
	999			
3[R/A,O]	(arc system metric support)			
4[R/A,M]	0	NCD	001	;& NORMALIZATION_CONSTANTS
5[R/A,M]	1	TSF	S	Latitude Scale Factor
5[R/A,M]	2	GSF	S	Longitude Scale Factor
5[R/A,M]	3	TTT	S	Latitude Translation Term
5[R/A,M]	4	GTT	S	Longitude Translation Term
5[R/A,M]	5	NSF	S	Northing Scale Factor
5[R/A,M]	6	ESF	S	Easting Scale Factor
5[R/A,M]	7	NTT	S	Northing Translation Term
5[R/A,M]	8	ETT	S	Easting Translation Term
	999			

4[R/A,M]	0	SDC	001	;& SOURCE_DATUM_COEFFICIENTS _DATA
5[R/A,M]	1	AX1	S	Latitude coefficient 1
5[R/A,M]	2	AX2	S	Latitude coefficient 2
5[R/A,M]	3	AX3	S	Latitude coefficient 3
5[R/A,M]	4	AX4	S	Latitude coefficient 4
5[R/A,M]	5	AX5	S	Latitude coefficient 5
5[R/A,M]	6	AX6	S	Latitude coefficient 6
5[R/A,M]	7	AX7	S	Latitude coefficient 7
5[R/A,M]	8	BX1	S	Longitude coefficient 1
5[R/A,M]	9	BX2	S	Longitude coefficient 2
5[R/A,M]	10	BX3	S	Longitude coefficient 3
5[R/A,M]	11	BX4	S	Longitude coefficient 4
5[R/A,M]	12	BX5	S	Longitude coefficient 5
5[R/A,M]	13	BX6	S	Longitude coefficient 6
5[R/A,M]	14	BX7	S	Longitude coefficient 7
	999			
4[R/A,M]	0	MPC	001	;& MAP_PROJECTIONS_COEFFICIENTS _DATA
5[R/A,M]	1	CX1	S	Northing coefficient 1
5[R/A,M]	2	CX2	S	Northing coefficient 2
5[R/A,M]	3	CX3	S	Northing coefficient 3
5[R/A,M]	4	CX4	S	Northing coefficient 4
5[R/A,M]	5	CX5	S	Northing coefficient 5
5[R/A,M]	6	CX6	S	Northing coefficient 6
5[R/A,M]	7	CX7	S	Northing coefficient 7
5[R/A,M]	8	CX8	S	Northing coefficient 8
5[R/A,M]	9	CX9	S	Northing coefficient 9
5[R/A,M]	10	CXA	S	Northing coefficient 10
5[R/A,M]	11	DX1	S	Easting coefficient 1
5[R/A,M]	12	DX2	S	Easting coefficient 2
5[R/A,M]	13	DX3	S	Easting coefficient 3
5[R/A,M]	14	DX4	S	Easting coefficient 4
5[R/A,M]	15	DX5	S	Easting coefficient 5
5[R/A,M]	16	DX6	S	Easting coefficient 6
5[R/A,M]	17	DX7	S	Easting coefficient 7
5[R/A,M]	18	DX8	S	Easting coefficient 8
5[R/A,M]	19	DX9	S	Easting coefficient 9
5[R/A,M]	20	DXA	S	Easting coefficient 10
	999			
3[R/A,O]	(UTM/UPS system metric support)			
4[R/A,M]	0	DCC	001	;&DATUM_CHANGE_CONSTANTS (Note: units for all datum change constants are in degrees and decimal part of a degree.)
5[R/A,M]	1	TOF	S	Latitude normalizing offset.
5[R/A,M]	2	GOF	S	Longitude normalizing offset.
5[R/A,M]	3	NZT	S	Normalizing factor
5[R/A,M]	4	ELV	S	Eastern limit of validity to use multiple regression equations.
5[R/A,M]	5	WLV	S	Western limit of validity to use multiple regression equations.

5[R/A,M]	6	NLV	S	Northern limit of validity to use multiple regression equations.
5[R/A,M]	7	SLV	S	Southern limit of validity to use multiple regression equations.
	999			
4[R/A,M]	0	SCC	001	;&SOURCE_DATUM_COEFFICIENTS _COUNTER
5[R/A,M]	1	BCT	I	Number of longitude coefficients.
5[R/A,M]	2	ACT	I	Number of latitude coefficients.
	999			
4[R/A,M]	0	SLG	001	;&SOURCE_DATUM_LONGITUDE _COEFFICIENTS
*5[R/A,M]	1	*CBI	I	i index of the coefficient of MRE $b_{i,j}$.
5[R/A,M]	2	CBJ	I	j index of the coefficient of MRE $b_{i,j}$.
5[R/A,M]	3	LGC	S	Coefficient of MRE $b_{i,j}$ ($b_{i,j}$ coefficients are ordered with respect to increasing i then j).
	999			
4[R/A,M]	0	SLT	001	;&SOURCE_DATUM_LATITUDE _COEFFICIENTS
*5[R/A,M]	1	*CAI	I	i index of the coefficient of MRE $a_{i,j}$.
5[R/A,M]	2	CAJ	I	j index of the coefficient of MRE $a_{i,j}$.
5[R/A,M]	3	LTC	S	Coefficient of MRE $a_{i,j}$ ($a_{i,j}$ coefficients are ordered with respect to increasing i then j).
	999			
4[R/A,O]	0	GRC	001	;&GRID_ROTATION_COEFFICIENTS
5[R/A,M]	1	NES	S	Normalized Eastings Shift
5[R/A,M]	2	NNS	S	Normalized Northings shift
5[R/A,M]	3	AOR	S	Angle of orientation from source datum grid to WGS84 UTM grid (positive if clockwise)
	999			
2[C,O]	**Record:**	**SUPPLEMENTARY TEXT**		(Source Graphic Description Only)
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = SPT}
3[C,M]	2	RID	I	Record id number {RID=1}
	999			
3[C,M]	0	SUP	001	;& SUPPLEMENTARY_TEXT
*4[C,M]	1	*TRY	A	Supplementary text record type
4[C,O]	2	TRI	A	Supplementary text field reference identifier
4[C,M]	3	TXT	L	Supplementary text
	999			

2[R,D]	**Record :**	**AUXILIARY PARAMETERS** (Sensor Parameters Description Only)			
3[R,M]	0	001		;& RECORD_ID	
4[R,M]	1	RTY	A 3	Record type	{RTY = AUP}
4[R,M]	2	RID	I	Record id number	{RID = 1}
	999				
3[R,D1]	0	SGF	001	;& SOURCE_SUMMARY	
4[R,M]	1	*BAD	A	Name of derived layer	
	999				
*3[R,D6]	0	RCI	001	;& BOUNDING_POLYGON _COORDINATES	
*4[R,M]	1	*LON	R 10	Longitude/Easting Coordinate	
4[R,M]	2	LAT	R 10	Latitude/Northing Coordinate	
	999				
3[R,M]	0	BDF	001	;& ORIGINAL_SCENE_BAND_ID	
*4[R,M]	1	*BID	A 5	Original Scene Band Identification	
4[R,M]				(Band Description)	
5[R,M]	2	WS1	I 5	Signal Lower Limit	
5[R,M]	3	WS2	I 5	Signal Upper Limit	
	999				
3[R,M]	0	RSD	001	;& RESOLUTION_AND_GROUND _SAMPLE_DISTANCE	
4[R,M]	1	REX	R 6	Resolution at Source E-W Direction	
4[R,M]	2	REY	R 6	Resolution at Source N-S Direction	
4[R,M]	3	GSX	R 6	Ground Sample Distance at Source E-W Direction	
4[R,M]	4	GSY	R 6	Ground Sample distance at Source N-S Direction	
4[R,O]	5	GSL	A	Ground sample Distance Measurement Location	
4[R,O]	6	UNIres	A 3	Unit of resolution measurement	
	999				
3[R,M]	0	BAP	001	;& BASIC_AUXILIARY_PARAMETERS	
4[R,M]	1	VEC	A 8	Vector or Mission Name	
4[R,M]	2	SNS	A 8	Sensor or Instrument Name	
4[R,M]	3	MOD	A 4	Spectral Mode	
4[R,M]	4	PRL	A 5	Processing Level	
4[R,M]	5	CDV07	A 8	Acquisition Date	
4[R,M]	6	ATM	A	Acquisition Time	
4[R,O]				(Incidence Angle)	
5[R,M]	7	ANG	R	Incidence Angle	
5[R,M]	8	UNIang	A 3	Unit of Incidence Angle	
4[R,O]		(Altitude)			
5[R,M]	9	ALT	R 9	Altitude	
5[R,M]	10	UNIalt	A 3	Unit of Altitude	
4[R,O]		(Coordinates of the Original Scene Centre)			
5[R,M]	11	LON	R 10 (2)	WGS84 Longitude of Original Scene Centre	
5[R,M]	12	LAT	R 10 (2)	WGS84 Latitude of Original Scene Centre	

4[R,O]		(Solar Angles at the Original Scene Centre)		
5[R,M]	13	SAZ	R	Solar Azimuth
5[R,M]	14	SEL	R	Solar Elevation
5[R,M]	15	UNIsae	A 3	Unit of Solar Angles
4[R,O]		(Attitude Angles at the Original Scene Centre in the Local Orbital Referential)		
5[R,M]	16	ROL	R	Roll
5[R,M]	17	PIT	R	Pitch
5[R,M]	18	YAW	R	Yaw
5[R,M]	19	UNIrpy	A 3	Unit of Attitude Angles
4[R,O]		(Pixel Time : Start Time of Acquisition)		
5[R,M]	20	PXT	S	Pixel Time
5[R,M]	21	UNIpxt	A 3	Unit of Pixel Time
4[R,O]		(Attitude Speed at the Original Scene Centre in the Local Orbital Referential)		
5[R,M]	22	ROS	R	Roll Speed
5[R,M]	23	PIS	R	Pitch Speed
5[R,M]	24	YAS	R	Yaw Speed
5[R,M]	25	UNIspe	A 3	Unit of Attitude Speed
	999			
3[R,O]	0	AAP	001	;& ADDITIONAL_AUXILIARY_ PARAMETERS
*4[R,M]	1	*API	A 20	Auxiliary Parameter Id
4[R,M]	2	APF	A 1	Auxiliary Parameter Value Format
4[R,D[13]]	3	UNIapx	A 3	Unit of Auxiliary Parameter
4[R,D[14]]	4	APN	I	Auxiliary Parameter Integer Value
4[R,D[15]]	5	APR	R	Auxiliary Parameter Real Value
4[R,D[16]]	6	APA	A	Auxiliary Parameter Characters String Value
	999			

Dependency conditions for SOURCE FILE:

1. **Name of derived layer:**
   Name of the derived layer will be transmitted whenever the source described in the source record does not apply to all layers in the dataset. May repeat once for each derived layer.

2. **Ellipsoid:**
   Mandatory if the projection field is transmitted.

3. **Vertical datum:**
   Strongly recommended if elevation information is present on the source (e.g., contour lines on a raster map) of raster data. Forbidden if no elevation information is present on the source.

4. **Sounding datum:**
   Strongly recommended if sounding information is present in the source (depth values or sounding information on a raster map) of raster data. Forbidden if no sounding information is present on the source.

5. **Geodetic datum:**
   Mandatory if the projection field is transmitted.

6. **Bounding polygon:**
   Mandatory when the source information is not valid for the whole dataset extension.

7. **Parameter 2:** See Part 3, Clause 6
8. **Parameter 3:** See Part 3, Clause 6
9. **Parameter 4:** See Part 3, Clause 6

10. **Projection False Origin:**
    When relevant only (usually the case).

11. **Inset:**
    Mandatory when relevant only.

12. **Tile index Map:**
    Mandatory if TIF = "Y"

13. **Unit of Auxiliary Parameter:**
    Mandatory if APF = "I" or APF = "R"

14. **Auxiliary Parameter Integer Value:**
    Mandatory if APF = "I"

15. **Auxiliary Parameter Real Value:**
    Mandatory if APF = "R"

16. **Auxiliary Parameter Characters String Value:**
    Mandatory if APF = "A"

A.3.5 Quality File

File Content by Record and Field:

1[C,M]	File: QUALITY				
2[C,M]	|-R	Record: QUALITY			
	|	|-	001	(2)	{RTY = QAL}
	|	|-	QSR	(4)	Security and Release
	|	|-	QCC	(*4)	Completeness and Consistency
	|	|-	QCC	(10)	Up_to_Dateness
	|	|-	QAA	(*4)	Attribute Accuracy
	|	|-	CPT	(1)	Colour Patch Type
	|	|-	CPI	(*4)	Colour Patch Id
	|	|-	SPR	(16)	Dataset Parameters
	|	|-	COL	(*10)	Colour Code Id
	|	|-	NOM	(*4)	Nominal Code Id
	|	|-	QOI	(1)	Other Quality Information
	|				
2 [C,D]	|-R	Record: ACCURACY †			
	|	|-	001	(2)	{RTY = QAI}
	|	|-	QAP	(9)	Accuracy
	|	|-	RCI	(*2)	Bounding Polygon Coordinates
	|				
2 [C,D]	|-R	Record: HORIZONTAL ACCURACY ††			
	|	|-	001	(2)	{RTY = HOR}
	|	|-	ASH	(5)	Horizontal Accuracy
	|	|-	RCI	(*2)	Bounding Polygon Coordinates
	|				
2 [C,D]	|-R	|-	Record: VERTICAL ACCURACY ††		
	|	|-	001	(2)	{RTY = VER}
	|	|-	ASV	(5)	Vertical Accuracy
	|	|-	RCI	(*2)	Bounding Polygon Coordinates

† Accuracy alternative 1--used when accuracy values for both horizontal and vertical accuracies are constant within the same bounding polygon.

†† Accuracy alternative 2--used when accuracy values are different and require separate bounding polygons.

Field Data Descriptions:

	Control	==		(see DDR Header in ISO 8211)	
	0	000		{=QUALITY_FILE}	
	1			File title field, present only in DDR	
	999				
2[C,M]		**Record:**	**QUALITY**		
3[C,M]	0	001		;& RECORD_ID_FIELD	
3[C,M]	1	RTY	A 3	Record type	{RTY = QAL}
3[C,M]	2	RID	I	Record id number	{RID = 1}
	999				

3[C,M]	0	QSR	001	;& SECURITY_AND_RELEASE
4[C,M]	1	QSS	A 1	Highest classification within the dataset { T | S | C | R | U }
4[C,M]	2	QOD	A 1	Downgrading instructions { Y | N }
4[C,M]	3	CDV10	A 8	Downgrading date value
4[C,M]	4	QLE	A	Releasability Statement
	999			
3[V,O]	0	QCC	001	;& COMPLETENESS_AND_CONSISTENCY
*4[V,D[1]]	1	*BAD	A	Layer name
4[V,O]	2	QFC	I	Feature Completeness percent
4[V,O]	3	QAC	I	Attribute Completeness percent
4[V,O]	4	QLC	A	Logical Consistency
	999			
3[C,M]	0	QUV	001	;& QUV
4[C,M]	1	EDN	I	Edition Number of Dataset
4[C,M]	2	CDV07	A 8	Creation of dataset date value
4[C,D[2]]	3	CDV24	A 8	Revision or Update date value
4[C,O]	4	REC	I	Recompilation Count
4[C,O]	5	REV	I	Revision Count
4[C,O]				(Product Specification)
5[C,M]	6	SRC	A	Specification ID
5[C,M]	7	CDV22	A 8	Specification date value (null when unspecified)
5[C,M]	8	SPA	A	Specification amendment
4[C,O]	9	CDV20	A 8	Earliest source date value
4[C,O]	10	CDV21	A 8	Latest source date value
	999			
3[V,O]	0	QAA	001	;& ATTRIBUTE_ACCURACY
*4[V,D[3]]	1	*BAD	A	Layer name
4[V,O]	2	QUT	I	Standard Deviation of Quantitative Attributes
4[V,O]	3	QUL	I	Percent Reliability of Qualitative Attributes
4[V,O]	4	CCR	A	Collection Criteria
	999			
3[R,O]	(colour patch description)			
4[R,M]	0	CPT	001	;& COLOUR_PATCH_TYPE
4[R,M]	1	SCR	A	Standard colour patch reference
	999			
4[R,O]	0	CPI	001	;& COLOUR_PATCH_ID
*5[R,M]	1	*PNM	A	Colour Patch Name (e.g. Red)
5[R,M]	2	PIR	I	Patch Intensity Value - Green
5[R,M]	3	PIG	I	Patch Intensity Value - Red
5[R,M]	4	PIB	I	Patch Intensity Value - Blue
	999			

4[R,D4]	0	SPR	001	;& DATA_SET_PARAMETERS
5[R,O]	(corners)			
6[R,M]	1	NUL	I	Row Number; upper right corner of MBR
6[R,M]	2	NUS	I	Column Number; upper right corner of MBR
6[R,M]	3	NLL	I	Row Number; lower left corner of MBR
6[R,M]	4	NLS	I	Column Number; lower left corner of MBR
5[R,M]	5	NFL	I	Number of Sub-blocks, vertically
5[R,M]	6	NFC	I	Number of Sub-blocks, horizontally
5[R,M]	7	PNC	I	Number of Pixels/Sub-block Line
5[R,M]	8	PNL	I	Number of Scan Lines/Sub-block
5[C,M]	9	COD	I 1	Column Sequence { 0 | 1 }
5[C,M]	10	ROD	I 1	Row sequence { 0 | 1 }
5[C,M]	11	POR	I 1	Pixel order { 0 | 1 | 2 | 3 | 4 | 5 }
5[R,M]	12	PCB	I	Size of Pixel/Element Count in bits
5[R,M]	13	PVB	I	Size of Pixel/Element Value in bits
4[R,O]	14	PVT	A	Type of Pixel/Element Value {INT | SI | B | R | C }
5[R,M]	15	BAD	A 12	Image File name { ZZZZZZDD.Lcc}
5[R,M]	16	TIF	A 1	Tile index map flag ("Y" or "N")
	999			
3[R,D5]	0	COL	001	;& COLOUR_CODE_ID
*4[R,M]	1	*CBD	A	Name and/or Description of Colour Code
4[R,M]	2	CCD	I3	Colour Code Assigned in Dataset (0-255)
4[R,O]	(CIE colour description)			
5[R,M]	3	CR1	I	CIEx
5[R,M]	4	CR2	I	CIEy
5[R,M]	5	CR3	I	CIE Reflectivity (y)
4[R,O]	6	FRM	A	Mathematical Relation to other colour-codes (free text) See 10.4
4[R,S]	(RGB colour description)			
5[R,M]	7	NSR	I3	Colour Intensity - Red actual (0-255)
5[R,M]	8	NSG	I3	Colour Intensity - Green actual (0-255)
5[R,M]	9	NSB	I3	Colour Intensity - Blue actual (0-255)
4[R,O]	10	BAD	A	Layer name
	999			
3[A,M]	0	NOM	001	;& NOMINAL_CODE_ID
*4[A,M]	*1	NCI	A	Code Identifier
4[A,M]	2	NDB	A	Description/meaning of code
4[A,M]	3	NCD	I	Nominal code assigned in dataset
4[A,O]	4	BAD	A	Layer name
	999			
3[C,O]	0	QOI	001	;& OTHER_QUALITY_INFORMATION
4[C,M]	1	OQI	L	Free text
	999			

*2[C,D6]	**Record:**	**ACCURACY**		
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = QAI}
3[C,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[C,M]	0	QAP	001	;& POSITIONAL_ACCURACY
3[C,M]	1	AAH	I	Accuracy Absolute Horizontal
3[C,M]	2	UNIaah	A	Unit of measure
3[C,M]	3	AAV	I	Accuracy Absolute Vertical
3[C,M]	4	UNIaav	A	Unit of measure
3[C,M]	5	APH	I	Accuracy Point to Point Horizontal
3[C,M]	6	UNIaph	A	Unit of measure
3[C,M]	7	APV	I	Accuracy Point to Point Vertical
3[C,M]	8	UNIapv	A	Unit of measure
3[C,D7]	9	BAD	A	Layer name
	999			
3[C,D8]	0	RCI	001	;& BOUNDING_POLYGON_COORDINATES
*4[C,M]	1	*LON	R	Longitude/Easting coordinate
4[C,M]	2	LAT	R	Latitude/Northing coordinate
	999			
*2[C,D6]	**Record:**	**HORIZONTAL ACCURACY**		
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = HOR}
3[C,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[C,M]	0	ASH	001	;& HORIZONTAL_ACCURACY
3[C,M]	1	AAH	I	Absolute Horizontal Accuracy
3[C,M]	2	UNIaah	A	Unit of measure
3[C,M]	3	APH	I	Relative Horizontal Accuracy
3[C,M]	4	UNIaph	A	Unit of measure
3[C,D7]	5	BAD	A	Layer name
	999			
3[C,D8]	0	RCI	001	;& BOUNDING_POLYGON_COORDINATES
*4[C,M]	1	*LON	R	Longitude/Easting coordinate
4[C,M]	2	LAT	R	Latitude/Northing coordinate
	999			
*2[C,D6]	**Record:**	**VERTICAL ACCURACY**		
3[C,M]	0	001		;& RECORD_ID_FIELD
3[C,M]	1	RTY	A 3	Record type {RTY = VER}
3[C,M]	2	RID	I	Record id number {RID = 1,n}
	999			

3[C,M]	0	ASV	001	;& VERTICAL_ACCURACY
3[C,M]	1	AAV	I	Absolute Vertical Accuracy
3[C,M]	2	UNIaav	A	Unit of measure
3[C,M]	3	APV	I	Relative Vertical Accuracy
3[C,M]	4	UNIapv	A	Unit of measure
3[C,D[7]]	5	BAD	A	Layer name
	999			
3[C,D[8]]	0	RCI	001	;& BOUNDING_POLYGON_COORDINATES
*4[C,M]	1	*LON	R	Longitude/Easting coordinate
4[C,M]	2	LAT	R	Latitude/Northing coordinate
	999			

Dependency conditions for QUALITY FILE:

1. **Name of layer:**
   The name of the layer will be transmitted whenever the completeness and consistency information does not apply to all layers in the dataset.

2. **Revision date:**
   If relevant only.

3. **Name of layer:**
   The name of the layer will be transmitted whenever the attribute accuracy information does not apply to all layers in the dataset.

4. **Colour patch dataset parameters:**
   The colour patch dataset parameters will be transmitted if the colour patch image file exists.

5. **Colour-coded:**
   Must be defined when raster colour-coded data is transmitted (STR=4). Forbidden otherwise.

6. **Accuracy record:**
   Must be used when both horizontal and vertical accuracy are known and homogeneous on the same area. If it is absent then both horizontal and vertical accuracy records must be present.

7. **Name of layer:**
   The name of the layer will be transmitted whenever the accuracy information does not apply to all layers in the dataset.

8. **Bounding polygon:**
   Mandatory when the source information is not valid for the whole dataset extent.

A.3.6 Vector Geo Data File

File Content by Record and Field:

1[V,M]	File: VECTOR GEO DATA				
2[V,D]	|-R	Record: EDGE			
	|	|-	001	(2)	{RTY = ED-b-}
	|	|-	CNT	(3)	Counter
	|	|-	IRE	(6*3)	Edge Implicit Relation Pointers
	|	|-	IRS	(*3)	Implicit Relations Pointer
	|	|-	IAT	(2*3)	Implicit Attributes
	|	|-	ATT	(*3)	Explicit Attribute Labels and Values
	|	|-	COR	(*3)	Coordinates
	|				
2[V,D]	|-R	Record: NODE			
	|	|-	001	(2)	{RTY = NO-b-}
	|	|-	001	(3)	Counter
	|	|-	IRN	(3)	Node implicit Relation Pointer
	|	|-	IRS	(*3)	Implicit Relations Pointer
	|	|-	ATT	(*3)	Explicit Attribute Labels and Values
	|	|-	COR	(3)	Coordinates
	|				
2[V3,D]	|-R	|- Record: FACE			
	|	|-	001	(2)	{RTY = FE-b-}
	|	|-	CNT	(3)	Counter
	|	|-	IRS	(*3)	Implicit Relations Pointer
	|	|-	IAT	(2*3)	Implicit Attributes
	|	|-	ATT	(*3)	Explicit Attribute Labels and Values
	|				
2[V,M]	|-R	Record: FEATURE			
	|	|-	001	(2)	{RTY = FL-b-| FP-b-| FA-b-| FC-b-}
	|	|-	CNS	(3)	Counter - Explicit Relations
	|	|-	IRS	(*3)	Implicit Relation Pointer
	|	|-	IAS	(9)	Implicit Attributes
	|	|-	ATT	(*3)	Explicit Attribute Labels and Values
	|	|-R	R1L	(1)	Explicit Relation Pointer (ALT | CPO | STK | STU) for Simple Features, (ALT | CPO) for Complex Features
	|	|-R	| R1V	(*3)	Explicit Relation Value
	|				
2[V,O]	|-R	Record: TEXT PLACEMENT			
	|	|-	001	(2)	{RTY = TP-b-}
	|	|-	CNT	(3)	Counter
	|	|-	IRS	(*3)	Implicit Relations Pointers
	|	|-	ATT	(*3)	Explicit Attribute Labels and Values
	|	|-	TXT	(2)	Text
	|	|-	COR	(*2)	Coordinates
	|				

2[V,D]	|-R	Record: FEATURE/ATTRIBUTE ENTRY		
	|	|- 001	(2)	{RTY = DD~~b~~}
	|	|- DFA	(6)	Feature Attribute Entry
	|			
2[V,O]	|-R	Record: FEATURE/ATTRIBUTE ASSOCIATION		
	|	|- 001	(2)	{RTY = DF~~b~~}
	|	|- DAA	(1)	Feature Association
	|	|- AAD	(*1)	Attribute Association
	|			
2[V,D]	|-R	Record: ATTRIBUTE/VALUE ASSOCIATION		
	|	|- 001	(2)	{RTY = DA~~b~~}
	|	|- DAV	(4)	Attribute Format Description
	|	|- VAD	(*2)	Attribute Value Description

Field Data Descriptions:

	Control	==		(see DDR Header in ISO 8211)
	0	000		{=VECTOR_GEO_DATA_FILE}
	1			File title field, present only in DDR
	999			
*2[V,D1]	**Record:**	**EDGE**		
3[V,M]	0	001		;& RECORD_ID_FIELD
3[V,M]	1	RTY	A3	Record type {RTY = ED~~b~~}
3[V,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[V,O]	0	CNT	001	;& COUNTER
4[V,M]	1	EXT	I	Number of explicit attributes
4[V,M]	2	EXC	I	Number of coordinate sets
4[V,D2]	3	NLF	I	Number of Features "composed of" this edge
	999			
3[V**3**,M]				
[V1-2,O]	0	IRE	001	;& EDGE_IMPLICIT_RELATION_ POINTERS
4[V3,M]		(face topology)		
5[V3,M]	1	FAL	@	Left Face Pointer
5[V3,M]	2	FAR	@	Right Face Pointer
4[V3,M]		(edge-node topology)		
[V1-2,O]				
5[V13,M]	3	NOS	@	Start Node Pointer
5[V13,M]	4	NOE	@	End Node Pointer
4[V1-3,O]		(winged-edge topology)		
5[V1-3,M]	5	NER	@	Pointer to Next Right Edge
5[V1-3,M]	6	NEL	@	Pointer to Previous Left Edge
	@			
6[V1-3,M]	1	*RTY	A 3	Record type
6[V1-3,M]	2	RID	I	Record ID
6[V1-3,O]	3	SEC	A 1	Security
	999			

3[V,O]	0	IRS	001	IMPLICIT_RELATIONS_POINTER
*4[V,M]	1	*RTY	A 3	Level 3 {RTY= CFL } Level 2 &1 & 0 {RTY= CFL | CFA }
4[V,M]	2	RID	I	Record ID
4[V,O]	3	SEC	A 1	Security
	999			
3[V,O]	0	IAT	001	;& IMPLICIT_ATTRIBUTES
4[V,M]	1	MIN	@	Minimum
4[V,M]	2	MAX	@	Maximum
	@			
5[V,M]	1	*EAS	R	Easting/Latitude
5[V,M]	2	NOR	R	Northing/Longitude
5[V,D3]	3	ELE	R	Elevation
	999			
3[V,O]	0	ATT	001	;& EXPLICIT_ ATTRIBUTE_LABELS_AND_VALUES
*4[V,M]	1	*ATC	A	Attribute Label
4[V,M]	2	FOR	A	Value Format
4[V,M]	3	VAL	A | I | R | L	Attribute Value
		Note: The data type of VAL subfield will be consistent with the value of FOR subfield		
	999			
3[V,M]	0	COR	001	;& COORDINATES
*4[V,M]	1	*LON	R	Longitude/Easting
4[V,M]	2	LAT	R	Latitude/Northing
4[V,D4]	3	ELE	R	Elevation
	999			
*2[V,D5]	**Record:**	**NODE**		
3[V,M]	0	001		;& RECORD_ID_FIELD
3[V,M]	1	RTY	A3	Record type {RTY = NO~~b~~}
3[V,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[V,O]	0	CNT	001	;& COUNTER
4[V,M]	1	EXT	I	Number of explicit attributes
4[V,M]	2	EXC	I	Number of coordinate sets {EXC = 1}
4[V,D2]	3	NLF	I	Number of Features "composed of" this node
	999			
3[V3,M]	0	IRN	001	;& NODE_IMPLICIT_RELATION _POINTER
4[V3,M]	1	RTY	A3	={FE if isolated node; null if connected node}
4[V3,D6]	2	RID	I	Record ID
4[V3,O]	3	SEC	A 1	Security
	999			

3[V,O]	0	IRS	001	IMPLICIT_RELATIONS_POINTER
*4[V,M]	1	*RTY	A3	{RTY= CFP }
4[V,M]	2	RID	I	Record ID
4[V,O]	3	SEC	A 1	Security
	999			
3[V,O]	0	ATT	001	;& EXPLICIT_ ATTRIBUTE_LABELS_AND_VALUES
*4[V,M]	1	*ATC	A	Attribute Label
4[V,M]	2	FOR	A	Value Format
4[V,M]	3	VAL	A | I | L | R	Attribute Value
		Note: The data type of VAL subfield will be consistent with the value of FOR subfield		
	999			
3[V,M]	0	COR	001	;& COORDINATES
4[V,M]	1	LON	R	Longitude/Easting
4[V,M]	2	LAT	R	Latitude/Northing
4[V,O]	3	ELE	R	Elevation
	999			
*2[V3,M]	**Record:**	**FACE**		
3[V3,M]	0	001		;& RECORD_ID_FIELD
3[V3,M]	1	RTY	A3	Record type {RTY = FE~~b~~}
3[V3,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[V3,O]	0	CNT	001	;& COUNTER
4[V3,M]	1	EXT	I	Number of explicit attributes
4[V3,M]	2	EXC	I	Number of coordinate sets {EXC = Null}
4[V3,D2]	3	NLF	I	Number of Features "composed of" this face
	999			
3[V3,O]	0	IRS	001	IMPLICIT_RELATIONS_POINTER
*4[V3,M]	1	*RTY	A3	{RTY= CFA }
4[V3,M]	2	RID	I	Record ID
4[V3,O]	3	SEC	A 1	Security
	999			
3[V3,O]	0	IAT	001	;& IMPLICIT_ATTRIBUTES
4[V3,M]	1	MIN	@	Minimum
4[V3,M]	2	MAX	@	Maximum
	@			
5[V3,M]	1	*EAS	R	Easting/Latitude
5[V3,M]	2	NOR	R	Northing/Longitude
5[V3,D7]	3	ELE	R	Elevation
	999			

3[V3,O]	0	ATT	001	;& EXPLICIT_ ATTRIBUTE_LABELS_AND_VALUES
*4[V3,M]	1	*ATC	A	Attribute Label
4[V3,M]	2	FOR	A	Value Format
4[V3,M]	3	VAL	A | I | L | R	Attribute Value
		Note: The data type of VAL subfield will be consistent with the value of FOR subfield		
	999			
*2[V,M]	**Record:**	**FEATURE**		
3[V,M]	0	001		;& RECORD_ID_FIELD
3[V,M]	1	RTY	A3	Record type {RTY = FL~~b~~| FP~~b~~| FA~~b~~| FC~~b~~}
3[V,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[V,O]	0	CNS	001	;& COUNTER_FIELD
4[V,M]	1	EXT	I	Number of spatial explicit attributes
4[V,M]	2	EXR	I	Number of explicit relations
4[V,M]	3	EXE	I	Total number of "composed of" relations
	999			
3[V,M]	0	IRS	001	IMPLICIT_RELATIONS_POINTER
*4[V,M]	1	*RTY	A3	FL {RTY= ±ED **level 0-3** } FP {RTY= NO~~b~~ **level 0-3** } FA {RTY= FE~~b~~ **level 3** } { RTY = ± ED | IED | JED **level 0-2** } FC {RTY= FL~~b~~|FP~~b~~|FA~~b~~|FC~~b~~ **level 0-3** }
4[V,M]	2	RID	I	Record ID
4[V,O]	3	SEC	A 1	Security
	999			
3[V,M]	0	IAS	001	;& IMPLICIT_ATTRIBUTES
4[V,M]	1	FAC	A5	FACC identifier code
4[V,O]	(MBR)			
5[V,M]	2	MIE	R	Minimum longitude/easting value
5[V,M]	3	MIN	R	Minimum latitude/northing value
5[V,D^8]	4	ZV1	R	Minimum elevation value
5[V,M]	5	MAE	R	Maximum longitude/easting value
5[V,M]	6	MAI	R	Maximum latitude/northing value
5[V,D^8]	7	ZV2	R	Maximum elevation value
4[V,O]		(control point)		
5[V,M]	8	GLO	R	Longitude/Easting of geographic reference point
5[V,M]	9	GLA	R	Latitude/Northing of geographic reference point
	999			

3[V,O]	0	ATT	001	;& EXPLICIT_ ATTRIBUTE_LABELS_AND_VALUES
*4[V,D9]		(ordered rooted tree links)		
5[V,M]	1	*LLK	I	Left Link
5[V,M]	2	RLK	I	Right Link
Note: Those two first subfields are maintained for backward compatibility only				
4[V,M]		(attribute description)		
5[V,M]	3	ATC	A	Attribute Label
5[V,M]	4	FOR	A	Value Format
5[V,M]	5	VAL	A | I | R | L	Attribute Value
		Note: The data type of VAL subfield will be consistent with the value of FOR subfield.		
	999			
*3[V,O]	(explicit relation)			
4[V,M]	0	R1L	001	;& EXPLICIT_RELATION_POINTERS
5[V,M]	1	ERT	A	Relation type
	999			
5[V,M]	0	R1V	R1L	;& EXPLICIT_RELATION_VALUE
*6[V,M]	1	*RTY	A3	{RTY= FL~~b~~ | FP~~b~~ | FA~~b~~ | FC~~b~~ }
		Note: FC is not appropriate for stacked on/stacked under (STK/STU)relation type		
6[V,M]	2	RID	I	Record id number
6[V,O]	3	SEC	A 1	Security
	999			
2[V,O]	**Record:**	**TEXT PLACEMENT**		
3[V,M]	0	001		;& RECORD_ID_FIELD
3[V,M]	1	RTY	A3	Record type {RTY = TP~~b~~ }
3[V,M]	2	RID	I	Record id number
	999			
3[V,O]	0	CNT	001	;& COUNTER
4[V,M]	1	EXT	I	Number of explicit attributes
4[V,M]	2	EXC	I	Number of coordinate sets
4[V,M]	3	NLF	I	Number of features pointed to by this text
	999			

3[V,O]	0	IRS	001	;& IMPLICIT_RELATION_POINTER
*4[V,M]	1	*RTY	A3	Record type {RTY= FL~~b~~ | FP~~b~~ | FA~~b~~ | FC~~b~~ | CF~~b~~ }
4[V,M]	2	RID	I	Record ID
4[V,O]	3	SEC	A1	Security
	999			
3[V,O]	0	ATT	001	;& EXPLICIT_ ATTRIBUTE_LABELS_AND_VALUES
*4[V,M]	1	*ATC	A	Attribute Label
4[V,M]	2	FOR	A	Value Format
4[V,M]	3	VAL	A | I | I3 | R	Attribute Value
		Note: The data type of VAL subfield will be consistent with the value of FOR subfield		
	999			
3[V,M]	0	TXT	001	;& TEXT
4[V,M]	1	FTX	L	Text
	999			
3[V,M]	0	COR	001	;& COORDINATES
*4[V,M]	1	*LON	R	Longitude/Easting
4[V,M]	2	LAT	R	Latitude/Northing
	999			
*2[V,D^{10}]	**Record:**	**FEATURE/ATTRIBUTE ENTRY**		
3[V,M]	0	001		;& RECORD_ID_FIELD
3[V,M]	1	RTY	A3	Record type {RTY = DD~~b~~ }
3[V,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[V,M]	0	DFA	001	;& FEATURE_ATTRIBUTE_ENTRY
4[V,M]	1	FAQ	I	Feature or attribute {1=Feature; 2=Attribute}
4[V,M]	2	LAB	A	Feature code/name or Attribute label
4[V,O]	3	SOG	A	Source for the feature or attribute
4[V,O]	4	DES	A	Description of originator and/or source
4[V,O]	5	FAN	A	Short name for the feature or attribute
4[V,M]	6	DEF	L	Attribute or feature definition
	999			
*2[V,O]	**Record:**	**FEATURE/ATTRIBUTE ASSOCIATION**		
3[V,M]	0	001		;& RECORD_ID_FIELD
3[V,M]	1	RTY	A3	Record type {RTY = DF~~b~~ }
3[V,M]	2	RID	I	Record id number {RID = 1,n}
	999			
3[V,M]	0	DAA	001	;& FEATURE_ASSOCIATION
3[V,M]	1	LAB	A5	Feature label
	999			

3[V,M]	0	AAD	001	;& ATTRIBUTE_ASSOCIATION
*3[V,M]	1	*ALB	A3	Attribute label
	999			

*2[V,D11]	**Record:**	**ATTRIBUTE/VALUE ASSOCIATION**		
3[V,M]	0	001		;& RECORD_ID_FIELD
3[V,M]	1	RTY	A3	Record type {RTY = DA~~b~~}
3[V,M]	2	RID	I	Record id number {RID = 1,n}
	999			

3[V,M]	0	DAV	001	;& ATTRIBUTE_FORMAT_DESCRIPTION
4[V,M]	1	LAB	A3	Attribute label
4[V,M]	2	AVT	A2	enumerated "EN" or actual value "AV"
4[V,D]	3	AVF	A	Attribute value format
4[V,D]	4	AVU	A	Attribute measurement unit
	999			

3[V,D]	0	VAD	001	;& ATTRIBUTE_VALUE_DESCRIPTION
*4[V,M]	1	*ALB	I	Attribute values
		Note: enumerated values are I only		
4[V,M]	2	AVD	L	Attribute value definition
	999			

Dependency conditions for VECTOR GEODATA FILE

1. **Edge record:**
   Vector geodata files containing only nodes and no edges or faces may exist. Edge record is mandatory if Vector geodata file contains Line or Area feature records. At level 0, it may be replaced by Spatial data record.

2. **NLF counter subfield:**
   The NLF counter subfield is mandatory when the implicit relations pointer is present, in which case it must be consistent with the pointer.

3. **Elevation MBR subfield (edge record):**
   Minimum and maximum elevation must be transmitted if the transmitted coordinates (COR) contain elevation value(s).

4. **Elevation coordinates subfield :**
   Elevation must be absent or present for all transmitted coordinates.

5. **Node record:**
   Vector geodata files without any node record may exist. Node record is mandatory if Vector geodata file contains Point feature records or if Edge record contains edge-node topology description. At level 0, it may be replaced by Spatial data record.

6. **Connected node IRN:**
   RID is null when RTY is null.

7. **Elevation MBR subfield (face record):**
   Minimum and maximum elevation must be transmitted if the bordering edges are transmitted with elevation value(s) in their coordinates field (COR).

8. **Elevation MBR subfields (feature record):**
   If any of the topological entities, composing or bordering the simple feature or any of the simple feature composing the complex feature, contains elevation values in its coordinates field, maximum and minimum elevation values will be transmitted.

9. **Left / right link:**
   Left and right link subfield will exist for all attributes, if there is at least one multi-level attribute.

10. **Feature / attribute entry record:**
    Feature (or attribute) entry record will be present if any Feature (or Attribute) transmitted in the Vector geodata file is not described in FACC (DIGEST Part 4).

11. **Attribute / value association record:**
    Attribute/value association record will be present for each attribute transmitted in the Vector geodata file and not present in FACC.

A.3.7 Raster Geo Data File

File Content by Record and Field:

```
1[R,M]      File: RASTER GEO DATA
2[R,M]      |-R    Record: IMAGE
            |      |-    001   (2)     {RTY = ED}
            |      |-    PAD   (1)     Padding
            |      |-    SCN   (*1)    Pixel Field
```

Field Data Descriptions:

Control	==	(see DDR Header in ISO 8211)
0	000	{=RASTER_GEO_DATA_FILE}
1		File title field, present only in DDR
999		

*2[R,M]	**Record:**	**IMAGE**		
3[R,M]	0	001		;& RECORD_ID_FIELD
3[R,M]	1	RTY	A3	Record type {RTY = IMG}
3[R,M]	2	RID	I	Record id number
	999			
3[R,O]	0	PAD	001	;& PADDING FIELD
4[R,M]	1	PAD	A	Padding Characters to Fill Block
	999			
3[R,M]	0	SCN	001	;& PIXEL_FIELD
*3[R,M]	1	*PIX	B 8	Pixel Values - edit to B(8)
	999			

A.3.8 Matrix Geo Data File

File Content by Record and Field:

```
1[R,M]      File: MATRIX  GEO DATA
2[R,M]      |-R     Record: MATRIX
            |       |-    001    (2)      {RTY = VAR}
            |       |-    PAD    (1)      Padding
            |       |-    SCN    (*1)     Element  Field
```

Field Data Descriptions:

	Control	==	(see DDR Header in ISO 8211)
	0	000	{=MATRIX_GEO_DATA_FILE}
	1		File title field, present only in DDR
	999		
*2[A,M]	**Record:**	**MATRIX**	
3[A,M]	0	001	;& RECORD_ID_FIELD
3[A,M]	1	RTY	A3 Record type {RTY = VAR}
3[A,M]	2	RID	I Record id number
	999		
3[A,O]	0	PAD	001 ;& PADDING FIELD
4[A,M]	1	PAD	A Padding Characters to Fill Block
	999		
3[A,M]	0	SCN	001 ;& ELEMENT_FIELD
*3[A,M]	1	*PIX	B 8 Element Values - edit to B(8)
	999		

A.4 GENERAL REQUIREMENTS

This section contains general requirements for DIGEST interchange files.

- Explicit Relation Coding

Explicit relations should be coded using the ISO 8211 structures depicted below:

```
DDR
     R1L   bbbbbbRELATION;
     R1V   2600;&RELATION VALUE&*RTY!RID!SEC&(A(3),I,A(1));

Note: "0000;&" may be used instead of "bbbbbb".
```

In the above DDR representation, the elementary field R1L refers to the type of relation ("STK" for stacked on), RTY refers to the code used to designate the type of object referenced by the relation (e.g., a line feature - see 12.3.2 for a complete list of codes), RID refers to a numeric identifier, which when combined with RTY uniquely identifies the object referenced by the relation, and SEC refers to the classification of the object being pointed to. It should be noted that R1V is a repeating three-tuple so that a given relation type may reference more than one object.

Example: the feature being represented is stacked on a line feature:

```
DDR   R1L   bbbbbbRELATION;
      R1V   2600;&RELATION VALUE&*RTY!RID!SEC&(A(3),I,A(1));
DR    R1L   STK;
      R1V   FLb2&S;
```

- Decimal Mark Specification

The decimal mark in all numeric representation shall be the FULL STOP, i.e., ISO 646 (2/14).

- DIGEST Specific Data Syntax

Data items having DIGEST specific syntax, e.g., dates, shall be encoded according to the applicable section or annex.

- Rules Governing Empty or Inapplicable Fields / Subfields

For inapplicable or otherwise empty field / subfields, three mechanisms are allowed.

- For fixed format subfields, ASCII spaces will be the value of the subfield.
- For delimited subfields, the values will be null.
- For a transfer, if the field tag or subfield label is consistently not used in the file, the field or subfield may be omitted from the DDR.

A.5 CONFORMANCE REQUIREMENTS

A DIGEST interchange file conforming to ISO 8211 shall also conform to the requirements of this annex and to all applicable requirements of the body, other annexes and conventions of this standard.

A.6 EXAMPLES OF ISO 8211 STRUCTURES

A.6.1 Example of Transmittal Header File

DATA_DESCRIPTIVE_RECORD

```
Tag   Descriptive Data
000   bbbbbbTRANSMITTAL_HEADER_FILE;
001   1600;&RECORD_ID_FIELD&RTY!RID&(A(3),I);
VDR   1600;&TRANSMITTAL_HEADER_FIELD&
      VOO!ADR!NOF!URF!EDN!CDV07&(2A,I,A,I,A(8));
FDR   1600;&DATA_SET_DESCRIPTION_FIELD&NAM!STR!PRT!SWO!SWA
      !NEO!NEA& (A(6),I,A,4R);
QSR   1000;&SECURITY_AND_RELEASE_FIELD&QSS!QOD!CDV10!QLE&
      (2A(1),A(8),A);
QUV   1000;&UP_TO_DATENESS_FIELD&SRC1!CDV12!SPA1!SRC2!CDV22!SPA2&
      (A,A(8),2A,A(8),A);
```

TRANSMITTAL_DESCRIPTION_RECORD

```
Tag   User Data
001   THF1;
VDR   Defense Mapping Agency\Washington, DC&AMT FUR
      MILGEO\EUSKIRCHEN\GERMANY&2&North American Dataset&1&
      19940129;

FDR   NORTHA3&NULL&-329010.00&+127200.00&
      -324000.00&+130200.00;
FDR   NORTHB8&BDD&-365070.00&+145530.30&
       342000.00&+162000.00;
```

SECURITY_AND_UPDATE_RECORD

```
Tag   User Data
001   LCF1;
QSR   RN      ;

QUV   DIGEST  Edition 1.2&199401310&&;
QUV   DIGEST  Edition 1.2&199401310&BDD Level 1 Edition
      1.0&199407310;
```

A.6.2 Example of Record Implementations

The NODE_IMPLICIT_RELATION_POINTER_FIELD and the COORDINATES _FIELD shall be implemented as shown below:

```
IRN     2600;&NODE_IMPLICIT_RELATION_POINTER_FIELD&
        RTY!RID!SEC&(A(3),I,A(1));

ATT     See A.6.4


COR     2200;&COORDINATE_FIELD&*LON!LAT!ELE;
```

Note: "COR" is shown only for explanation. It is the same structure as used with the edge record, and in the DDR would appear only once.

Face Record Implementations:

The IMPLICIT_ATTRIBUTES_FIELD shall be implemented as shown below:

```
IAT     2200;&IMPLICIT_ATTRIBUTES_FIELD&MIN!MAX*EAS!NOR!ELE;

ATT     See A.6.4
```

Note: "IAT" is shown only for explanation. It is the same structure as used with the edge record, and in the DDR would appear only once.

Line Feature Implementations:

The IMPLICIT_RELATION_POINTERS_FIELD and the EXPLICIT_RELATIONS

```
IRS
2600;&IMPLICIT_RELATION_POINTERS_FIELD&*RTY!RID!SEC&(A(3),I,A(1));

        (RTY must be "+ED" or "-ED")

R1L     0000;&RELATION;

R1V     2600;&RELATION_VALUE_FIELD&*RTY!RID!SEC&(A(3),I,A(1));

ATT     See A.6.4
```

Point Feature Implementations:

The IMPLICIT_RELATION_POINTERS_FIELD and the EXPLICIT_RELATIONS_ POINTER_FIELD shall be implemented as shown below:

```
IRS
2600;&IMPLICIT_RELATION_POINTERS_FIELD&*RTY!RID!SEC&(A(3),I,A(1));

        (RTY must be "NOb")

R1L     0000;&RELATION;

R1V     2600;&RELATION_VALUE_FIELD&*RTY!RID!SEC&(A(3),I,A(1));

ATT     See A.6.4
```

Note: The above definitions are shown only for explanation. They would be stated only once in the DDR for all records requiring their use.**Area Feature Implementations:**

The IMPLICIT_RELATION_POINTERS_FIELD and the EXPLICIT_RELATIONS_ POINTER_FIELD shall be implemented as shown below:

```
IRS     2600;&IMPLICIT_RELATION_POINTERS_FIELD&*RTY!RID!SEC&
             (A(3),I,A(1));

        (RTY must be "FEb" at  level 3 , "+ED"|"-ED"|"IED"|"JED" at
        level 1 to 0)

R1L     0000;&RELATION;

R1V     2600;&RELATION_VALUE_FIELD&*RTY!RID!SEC&(A(3),I,A(1));

ATT     See A.6.4
```

Note: The above definitions are shown only for explanation. They would be stated only once in the DDR for all records requiring their use.

Complex Feature Implementations:

The IMPLICIT_RELATION_POINTERS_FIELD and the EXPLICIT_RELATIONS_POINTER_FIELD shall be implemented as shown below:

```
IRS     2600;&IMPLICIT_RELATION_POINTERS_FIELD&*RTY!RID!SEC&
        (A(3),I,A(1));

        (RTY must be "FCb" or "FAb" or "FPb" or "FLb")

R1L     0000;&RELATION;

R1V     2600;&RELATION_VALUE_FIELD&*RTY!RID!SEC&(A(3),I,A(1));
```

```
ATT    See A.6.4
```

Note: The above definitions are shown only for explanation. They would be stated only once in the DDR for all records requiring their use.

A.6.3 Examples of Records Supporting Chain-Node or Planar-Graph Vector Data

Edge Record Implementations:

The EDGE_IMPLICIT_RELATION_POINTERS_FIELD shall be implemented as shown below:

```
IRE     2600;&IMPLICIT_RELATION_POINTERS_FIELD&
               NOS!NOE!NER!NEL*RTY!RID!SEC&(4(A(3),I,A(1)));
```

Node Record Implementations:

There will be no NODE_IMPLICIT_RELATION_POINTER_FIELD.

A.6.4 Examples of Attribution

The most common type of attribution is the single level of attribution. The EXPLICIT_ATTRIBUTES_LABELS_AND_VALUES_FIELD will be described as follows:

```
Record    Tag    Descriptive Data

DDR       ATT    2000;&EXPLICIT_ATTRIBUTE_LABELS_AND_VALUES
                        &*ATC!FOR!VAL&(3A);
DR        ATT    LTN&I&4&MED&I&1&NAM&L&L'Aquitaine&
```

or

```
Record    Tag    Descriptive Data

DDR       ATT    2000;&EXPLICIT_ATTRIBUTE_LABELS_AND_VALUES
                        &*ATC!FOR!VAL&(3A);
DR        ATT    PAT&I&4&COL&I&1&COL&I&19&
```

A.6.5 Example of Implicit Relation Coding

Record FC015 - Implicit relation: COMPOSED OF - No. of relation pointers 3 - Component Features FA06, FP01, FL35 - Security code: Restricted

```
Record    Tag    Descriptive Data

DDR       IRS    2600;&IMPLICIT_RELATION_POINTER_FIELD&*RTY!
                      RID!SEC&(A(3),I,A(1));
DR        IRS    FA␣6&RFP␣1&RFL␣35&R;
```