DGIWG 017

Disposition of DIGEST

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Abstract:	This document provides users guidance regarding the sunsetting of Digital Geographic Exchange Standard (DIGEST). It addresses Parts 1-4 and defines which parts and annexes are no longer relevant, and those that have been (or will be) superseded by standards/standards' profiles.
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Contents

1   Overview

The Digital Geographic Information Working Group (DGIWG) was formed in 1983 to develop standards to support the exchange of Digital Geographic Information (DGI) among its member nations and with NATO. The initial purpose was to allow the Military Mapping Agencies of the various DGIWG countries to be able to exchange and use standardized map and chart products to support interoperability and burden sharing. DGIWG's first standardization effort was the development of the data exchange standard DIGEST. The DIGEST standard subsequently was adopted by NATO under STANAG 7074.

DIGEST Edition 1.0:1983 was developed to address the common exchange of vector data. It provided a common data model and feature data dictionary, known as the Feature and Attribute Coding Catalogue (FACC). Raster and matrix data were added in later versions of DIGEST Edition 1.1: 1991, Edition 1.2, 1992, and Edition 1.2a.

During the early to mid '90's the emphasis of DIGEST shifted from data exchange between Military Mapping Agencies to the exchange of data products using a record oriented format based on the International Standard *ISO/IEC 8211:1994 - Information technology -- Specification for a data descriptive file for information interchange*, and a transactional encoding based on the *ISO 8824:1990 Information technology -- Abstract Syntax Notation One (ASN.1)*. The exchange of vector data was further enhanced by the development of the Vector Relational Format (VRF)[1] which provided a geographic data model that described the data objects and relationships among them. The VRF/VPF was the data format used for the production of the Digital Chart of the World (DCW) which was one of the first vector datasets that had worldwide coverage. The application and use of VRF/VPF to define and produce products enabled the direct use of data.

DIGEST was revised in 1997 with Edition 2.0, and later in 2000 with DIGEST Edition 2.1 which was the last issuance of DIGEST. DIGEST Edition 2.1 is available via the DGIWG website at < https://www.dgiwg.org/dgiwg/htm/documents/historical_documents.htm >. The primary difference between DIGEST edition 1 and DIGEST edition 2 was the shift to support data products rather than data exchange, and the increasing comprehensiveness of the standard so that it could be applied across the mapping and charting communities.

There have been many other developments in the civilian world that focused on the development of geographic information exchange standards and product formats. The DGIWG started working with standards development organizations (SDOs) and standards setting organizations (SSOs) in 1994 to build a set of common standards that would be applicable to both civil and defense communities.

The DGIWG has actively participated in the International Organization for Standards Technical Committee for Geographic Information/Geomatics[2] since its standup in the mid 90's, working to development of foundational layer of standards for data discovery, retrieval, exchange and exploitation. These include standards such as: feature data and encoding, imagery and gridded data, metadata, portrayal, and web services. In 2003 the DGIWG started to adopt and profile ISO 191xx standards, transitioning away from the DIGEST. This document describes how the components of the DIGEST are addressed (or are being addressed) through the adoption and use of civil standards. It is intended to allow the users of DIGEST and of NATO Standardization Agreement 7074 (DIGEST) to transition to the civil standards and the respective military profiles created and maintained by the DGIWG. The

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[1] The U.S. MIL-STD-2407, Vector Product Format, is the U.S. implementing document of VRF, otherwise known as VPF.

[2] The ISO series designator number for Geographic Information/Geomatics standards is 191xx.

following subsections of this report address the disposition DIGEST and its various parts and annexes. Table 1 provides a summary.

2   DIGEST Part 1 - General Description

This part of the DIGEST sets out the scope and purpose of the multi-part standard, describes the alignment with other standardization efforts (at the time that the DIGEST standard was published), defines general terms, list compliance criteria, and includes a set of references. The DIGEST Part 1 document identified that DGIWG has worked to align DIGEST with other standards and identifies areas of compatibility with other standards, both military and civil.

Disposition: There is no normative information in DIGEST Part 1, so there is no need for a reference to transition this part of DIGEST to other more recent standards.

3   DIGEST Part 2 - Theoretical Model Exchange Structure and Encapsulation Specification

DIGEST part 2 addresses the Theoretical Model Exchange Structure and Encapsulation Specifications for DIGEST. The main body of DIGEST Part 2 addresses the Theoretical Model and is discussed in the following subsection (3.1). DIGEST also includes ENCAPSULATION / ENCODING and MEDIA STANDARDS as annexes. Each of these is addressed separately in subsequent sub sections 3.2 to 3.5.

Disposition: Refer to sub sections 3.2 to 3.5

3.1 DIGEST Part 2 - Theoretical Model and Exchange Structure (overview)

This part of the DIGEST standard describes the theoretical model upon which the DIGEST is based. Part 2, Annex C, defines the georelational data model and topology for the exchange of vector data. Part 2, Annex D, defines the Image Interchange format (IIF) used to address the exchange of raster and matrix products. IIF based on the NATO Secondary Imagery format (NSIF), version 1.0, referenced as STANAG 4545, Edition 1.

The DIGEST data model separates the structure and relationships of the data content from the exchange format, a concept that has been adopted by the ISO standards. The data model is at two levels: feature entity relationships, and topological relationships. The description of topological relationships was very important at the time that DIGEST was developed, because computer systems at the time were not adequate to simply recalculate geometric topology from the geometry. This limitation has been overcome in recent years with the use of more powerful computers.

3.1.1 **Vector data**. The DIGEST feature model, as given in DIGEST Part 2 - 5.11, can be fully represented using the *ISO 19109 Geographic information - Rules for Application Schema* standard. The geometry and topology can be fully represented by the *ISO 19107 - Geographic information - Spatial Schema* standard. These ISO standards are much more general than required to support legacy DIGEST data or systems. A set of DGIWG Spatial Schema standards were developed, based on the ISO standards, which address military requirements. The entire DIGEST based data model spatial schema structure maps to the structures in these new DGIWG standards. The data model of DIGEST maps to DGIWG standards DGIWG 100 - *DGIWG 2D Spatial Schema Profile*, and to DGIWG 113 - *DGIWG Profiles of ISO 19107 and GML realization*[3].

The DIGEST feature model uses the FACC as its data dictionary, however does not specify the feature/attribute/enumerant bindings that would be defined in a feature catalogue. DGIWG sponsored a project in ISO to develop a standard, *ISO 19126 Geographic information - Feature concept dictionaries and registers*. A concept dictionary provides the sets of definitions that can be bound to create particular feature catalogues. The DIGEST FACC evolved into the DGIWG Feature Data Dictionary (DFDD). All of the previous DIGEST feature definitions transitioned to the initial DFDD baseline when it was released in 2003. There is ongoing work to develop a feature catalogue using ISO *19110 - Geographic information - Methodology for feature cataloguing* as the framework standard for building the catalogue, and using DFDD items to define the feature concepts.

3.1.2 **Raster data**. DIGEST also provides a simple data model for what it calls "Raster Graphics" in DIGEST Part 2 -5.2 and "Matrix" data in DIGEST Part 2 -5.3. These structures are quadrilateral grids and can be mapped directly to the grid types provided for coverage geometry as described in *ISO 19123 - Geographic information - Coverage geometry and functions*. This ISO standard is much more comprehensive than the DIGEST standard and all legacy structures from DIGEST data and systems can be addressed using this ISO standard.

DIGEST provided an exchange format for raster and matrix data by applying NSIF[4] (STANAG 4545). NSIF based product implementation include the ARC Standard raster Product (ASRP), STANAG 4387, and the UTM/UPS Standard Raster Product (USRP), STANAGs 7077.

At the data model level these structures can all be addressed using the ISO standards. DGIWG has developed an Imagery and Gridded Data (IGD) roadmap to address the handling of IGD. Much of this is related to encoding and metadata.

STANAG 4545 also makes use of DIGEST to provide georeferencing and a set of Geospatial extensions (as specified in DIGEST Part 2 – Annex D (IIF)).

DIGEST raster data may be encoded using either a binary encoding, with structural metadata, or NSIF (STANAG 4545) as specified in Part 2 – Annex D (IIF).

This has been replaced by the use of more modern encoding methods such as GeoTIFF with the specification of DGIWG 108, *GeoTIFF Profile for Georeferenced Imagery and Gridded Data*, or JPEG2000, for which a DGIWG

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[3] DIGEST was limited to 2D planar graph, whereas the DGIWG profile of ISO 19107 supports full 3D.
[4] NSIF, and its U.S. equivalent (National Imagery transmission format), are based on ISO 8211.

GMLJP2 profile is under development (and should be published before end of 2012).

The use of DIGEST Geodetic Codes and Parameters by STANAG 4545 is addressed in section 3.5 of this document. Commonly used extensions include: BNDPL (Bounding Box/Polygon), GeoPS (Geo Positioning Information), GeoLO / MapLO (Geographic / Cartographic Coordinate system, SOURCE (Map Source Description), and ACCPO/HZ/VT (Positional/Horizontal/Vertical Accuracy).

3.1.3 **Cartographic text**. DIGEST provided a special capability for representing Cartographic Text as described in DIGEST Part 2 - 8. This capability mixed portrayal with the spatial data model and was a problematic part of DIGEST. Future DGIWG standards will address the portrayal of data, including addressing cartographic text as a separate concept. DGIWG actively participated in the work in ISO on Portrayal and the ISO standards and the DGIWG standards fully align, with DGIWG having defined specific portrayal catalogues. The ISO standard related to Portrayal, ISO 19117 - Geographic information – *Portrayal,* has been revised to align with the DGIWG work. There are several DGIWG projects that relate to Portrayal and the maintenance of a Portrayal Register, but no DGIWG standards have been published as of the date of this document.

3.1.4 **Metadata**. DGIWG participated in the development of the ISO metadata standard ISO 19115 - Geographic information - *Metadata*, and its XML schema implementation ISO 19139 – Geospatial information – *Metadata – XML schema implementation.* Following this, DGWIG established a profile of ISO 19115 and ISO 19139 enabling the additions of metadata files to DIGEST interchanges in order to supply ISO compatible metadata to emerging implementations of these ISO standards. This is represented in standard DGIWG 103 - *Digital Geographic Information Exchange Standard (DIGEST) Metadata Profile of ISO 19115 and ISO 19139*.

Data Quality metadata is defined in DIGEST Part 2 - 7.1. All of the DIGEST data quality indicators are represented in the DGIWG 103.

DIGEST includes metadata both for the information content and for the data exchange. DIGEST Part 2 - 9 addresses the "DIGEST information package metadata". This is discovery metadata that is associated with every data set. All of the DIGEST information package metadata is covered in the ISO 19115 Geographic information - Metadata standard and the DGIWG 103. It should be noted that not all of the mandatory or conditional metadata fields identified in the ISO standard are necessarily contained and/or populated in legacy DIGEST data sets. This is addressed in DGIWG 103. Some of the metadata makes reference to tables as defined in DIGEST Part 3. In particular the Geodetic Codes and Parameters table is not fully addressed. This is discussed in the subsection of this document addressing DIGEST Part 3.

DGIWG 103 applies to DIGEST based data and products only and the metadata elements defined within DGIWG 103 may not be applicable to all data and products. It is therefore recommended to use ISO 19115 or STANAG 2586 – *NATO Geospatial Metadata Profile*, which is a profile of ISO 19115 addressing NATO metadata requirements, established in coordination with DGIWG. The DGIWG Metadata Foundation, a general ISO 19115 profile for military needs is in development by DGIWG, and is scheduled to be available mid-2013.

Other metadata elements appear in several other ISO standards including ISO 19115 Geographic information - *Metadata,* ISO 19115-2 Geographic Information - *Metadata - Part 2: Extensions for imagery and gridded data,* ISO 19130 Geographic information - *Sensor and data models for imagery and gridded data, and* ISO 19138 Geographic information - *Data quality measures.* Particular spatial referencing metadata is addressed by ISO 19111 Geographic information - *Spatial referencing by coordinates*.

DIGEST provides structural metadata to describe the encoding method and scanning parameters of imagery data. This has been replaced by the use of more modern encoding methods (see 3.1.2).

3.1.5 **Media**. DIGEST Part 2-13 provides a description of a number of media standards that were used to record DIGEST encoded data. This description of media formats is obsolete.

3.2 DIGEST Part 2 - Annex A - ISO 8211 Encapsulation

The four annexes to DIGEST Part 2 provide different encapsulations of the data for different usages. The ISO 8211 Specification for a data descriptive file for information interchange provides a mechanism for encoding DIGEST raster and vector data in a record oriented self describing file format. This format is the original encoding and encapsulation format for DIGEST. It has been in disuse for many years and there is relatively little legacy data that needs to be addressed. The encoding is also used for some types of raster data for scanned paper maps. In this case the record format primarily carries the metadata because the set of gridded points is an array.

Tools exist on many systems to read the existing data products that make use of ISO 8211 encapsulation. These are one way conversions that may be used to recover this legacy data where applicable.

Disposition: Support for the DIGEST A - ISO 8211 is only required for raster products such as ASRP (STANAG 4387) and also USRP (STANAG 7077).

3.3 DIGEST Part 2 - Annex B - ISO 8824 Encapsulation

The ISO 8824 /5 encapsulation encodes DIGEST data in terms of a data stream. The basic building block of this data stream is a tagged element corresponding to a subfield in the ISO 8211 encapsulation. Tagged elements are identified in the context of the implicit syntactic tree representing the entire DIGEST standard. The ISO 8824 standard defines the Abstract Syntax Notation (ASN.1) which is used to describe the syntactic tree. The Abstract Syntax Notation is similar to Baccus Naur Form, which is the rigorous method used in Computer Science for describing computer language syntaxes. The ISO 8824/5 encapsulation places its emphasis on bit-level efficiency in order to minimize the amount of data that needs to be communicated in a message. Coordinates are stored as interleaved normalized binary fractions to reduce the number of bits needed for encoding. This is a very efficient encoding that can be used in transactional applications.

The DIGEST B encapsulation was experimental and no systems or services are known to have used it. The concepts related to bit efficiency have been described in DGIWG 303 *Geography Mark-up Language (GML) Application Schema for the Multinational Geospatial Co-production Program (MGCP).*

Disposition: Further support for DIGEST B - ISO 8824 in not required.

3.4 DIGEST Part 2 - Annex C - VRF/VPF Encapsulation

The DIGEST VRF encapsulation provides a direct use relational table oriented product format for encapsulating vector data in alignment with the U.S. Vector Product Format (VPF) Standard (MIL-STD-2407). The format encapsulates 2D planar graph topology with elevation as an attribute and consists of a set of tables, with extensive cross table relational pointers in a hierarchical folder structure, broken into tiles. At the edge of each tile there are a dual set of pointers that both close the polygons within the tile as well as link to adjacent tiles to provide a seamless structure. This data format was used extensively and there are many legacy products that survive in this form. These products can be converted to modern GIS systems and encoding formats such as GML. The major problems in converting from VPF/VRF data products are related to the evolution of the feature catalogue and to the lack of certain metadata that was not stored with the VRF data files. Metadata is built into the directories and file structure tables, and can be derived. The feature definition conversion problem is a general one not restricted to VRF which is discussed in the section of this document on DIGEST Part 3. It is identified with VRF/VPF data conversion because the majority of legacy data is in the VPF format.

Disposition: Conversion is possible for legacy DIGEST C - VRF encoded data.

3.5 DIGEST Part 2 - Annex D - IIF Encapsulation

The DIGEST 2.1, Part 2 Annex D, Image Interchange Format (IIF) Encapsulation Specification, describes Geospatial Support Data Extensions (GeoSDEs) to the NATO Secondary Imagery Format (NSIF). Implementation guidance for STANAG 4545 (NSIF) is provided by NATO AEDP-4. The AEDP describes the requirements for use of the GeoSDEs.

The DIGEST Part 2 Annex D GeoSDEs are listed in the following table:

GEOPS	GeoPositioning Information Extension
PRJPS	Projection parameters Extension
GRDPS	Grid Reference Data Extension
GEOLO	Local Geographic (lat/long) Extension
MAPLO	Local Cartographic (x/y) Extension
REGPT	Registration Points Extension
BNDPL	Bounding Polygon Extension
ACCPO	Positional Accuracy Extension
ACCHZ	Horizontal Accuracy Extension
ACCVT	Vertical Accuracy Extension
SNSPS	Sensor Parameters Data Extension
SOURCE	Map source Extension

FACCB	FACC Attribute and Value Code Extension

The GeoSDEs are used within NSIF and the U.S. National Imagery Transmission Format Standards (NITFS). NSIF and NITF are nearly identical priofiles of ISO/IEC 12087-5, Basic Image Interchange Format. The GeoSDEs are to be integrated into the U.S. *Compendium of Controlled Extensions for the National Imagery Transmission Format,* STDI-0002, which is available at http://www.gwg.nga.mil/ntb/baseline/docs/stdi0002/index.html.

There are no recorded usages of the FACCB TRE. Therefore the TRE will be discontinued. If future requirements identify a need for a feature catolog, the respective TRE may be added to the TREs maintained within STDI-0002.

The NATO Joint Capability Group on ISR Custodial Support Team for STANAG 4545 and the NITFS Technical Board will continue maintenance of STANAG 4545 and STDI-0002 respectively.

Disposition: The technical descriptions of the GeoSDEs will be publicly available and managed by the U.S. in STDI-0002. The requirements for use of the DIGEST Part 2 – Annex D GeoSDEs within NATO will continue to be documented in AEDP-4, the implementation guidance document associated with STANAG 4545.

4 DIGEST Part 3 - Codes and Parameters

DIGEST part 3 contains a set of data types definitions and code tables for use in the DIGEST standard. Although each of the encapsulations of DIGEST encodes these data elements in different ways, the basic elements remain constant. Different encoding techniques are appropriate to the various encapsulations of DIGEST for efficiency and structural reasons as well as for alignment with the underlying encapsulation specifications, but the semantic elements are independent from the syntax imposed by these encodings.

DIGEST Part 3 contains 9 sub-sections addressing different classes of data types and codes. Sub-sections 1-4 (scope, purpose and field of application; conformancve, references, and terminology respectively) reference DIGEST Part 1, and are not covered in this section

Disposition: Refer to clauses 4.1- 4.5 which address DIGEST Part 3, sub-sections 5-9.

4.1 DIGEST Part 3 (clause 5) - Specification of Data Types

The DIGEST 2.1, Part 3 - 5 defines each of the primitive data elements used in the ISO 8211, ISO 8824/5 (ASN.1), VRF and IIF representations of DIGEST (Annexes A, B, C and D of Part 2 respectively). This material is covered in ISO 19103 Geographic information - *Conceptual Schema Language* section on Basic Types. This information is important in developing a converter to interpret legacy DIGEST based data products, but has no direct relevance to the data content.

Disposition: Data types are covered by ISO 19103.

4.2 DIGEST Part 3 (clause 6) - Geodetic Codes and Parameters

Tables of codes for ellipsoid, datum, projection and grid systems are described in DIGEST 2.1, Part 3 - 6.

Modern military mapping systems tend to use only a single geospatial reference system WGS84 which includes reference to the Earth Gravitational Model (EGM) geoidal surface. It is defined in National Imagery and Mapping Agency Technical Report TR 8350.2 Third Edition, Amendment 1, 1 Jan 2000, "Department of Defense World Geodetic System 1984. Where high accuracy is required, local reference systems such as the North American Datum NAD83 may be used. There are a few other local reference systems in use such as European Terrestrial Reference System 1989 (ETRS89). Also digital geospatial data is almost always un-projected.

Most (nearly all) vector based DIGEST data was produced using the WGS84 reference system. This need for the long list of Geodetic Codes and parameters in DIGEST was primarily to handle scanned paper maps where the coordinate system and projection that was used needed to be recorded. There is a special requirement for the ARC grid system that was used in several series of raster data sets. The ARC system provides an edge matched grid in several bands covering the whole earth that is useful for moving map displays of raster data. The ARC system is described in the DGIWG document DGIWG 016 - *DIGEST Support Document 3 - The ARC System*.

There is a continuing need to maintain the code lists of Geodetic Codes and Parameters from DIGEST to allow for the interpretation of legacy data. The code lists have been extracted from DIGEST and reside within the DGIWG Geodetic Codes and Parameters Registry < https://www.dgiwg.org/Geodetic_Codes/ >. It should be noted that this registry is not a compliant description of coordinate reference systems in alignment with ISO 19111.Geographic information - *Spatial referencing by coordinates*. Further work would be required to add to this registry the information needed for compliance with ISO 19111. Since this is for legacy data such an addition is not warranted. When it is available reference is to be made to the ISO registry of Geodetic Codes and Parameters.

Disposition: The DGIWG Geodetic Codes and Parameters Registry provides the list of geodetic codes and parameters for interpretation of legacy data. The information within the registry is no longer maintained.

4.3 DIGEST Part 3 (clause 7) - Units of Measure

The units of measure used in DIGEST are described in DIGEST Part 3 - 7. Units of measure have been subsumed as a register within the DGIWG Feature and Attribute Data Registry (FAD Registry).

Disposition: Subsumed as data type within the FAD registry.

4.4 DIGEST Part 3 (clause 8) - Use of CIE Values

CIE is an international colour system for defining colour produced by the "Commission Internationale de l'Eclairage". A number of systems for identifying colours, and the difference between colours, have been promulgated by the CIE. These are all based on measuring the Tristimulus values (Red, Green and Blue intensities) of a colour relative to a standard white. DIGEST Part 3 - 8 describes the CIE system used in DGIWG. This is also the method used in the [US] DoD Standard Printing Color Catalog. This information in DIGEST is purely an informative description of the CIE colorimetric system.

4.5 DIGEST Part 3 (clause 9) - Digital Geographic Data Volume Transmittal Form

The DIGEST volume transmittal form is a plain text data exchange header for the transmission of DIGEST data. It includes the necessary sender and recipient metadata and the exchange media and encoding information needed to identify the DIGEST data. This is tightly linked to the DIGEST encodings from the annexes of DIGEST Part 2.

Disposition: Further support for the DIGEST Part 3, clause 9 is not required as this information is obsolete.

5   DIGEST Part 4 - Feature and Attribute Coding Catalogue (FACC)

A key component of DIGEST has been the list of Feature and Attribute definitions. This list has always been dynamic and has evolved through the various editions of DIGEST. Not only have new terms been added, but terms evolve and sometimes meanings change as new requirements are addressed. The initial version of FACC was developed together with DIGEST version 1 and the latest version was included as part of DIGEST Edition 2.1 issued in September 2000.

The DGIWG approach to handling features and attributes changed with the adoption and implementation of ISO 19110 - *Geographic information - Methodology for feature cataloguing*, and ISO 19126 - *Geographic information - Feature concept dictionaries and registers*. DGIWG now maintains a register of concepts with their definitions, in compliance with ISO 19126 and establishes specific feature catalogues for different product specifications in accordance with ISO 19110.

The Feature and Attribute Data (FAD) Registry contains registers of geographic information concepts used to characterize aspects of real world phenomena for different information communities. DGIWG maintains multiple Feature Data Dictionary (FDD) Registers and a set of national extensions of FDDs.

The DGIWG FAD register was based on the last version of the DIGEST FACC form DIGEST 2.1:2000 plus three amendments that occurred up to October 2003. This is described at < https://www.dgiwg.org/FAD/FACC/faq-FACC.jsp >.

To assist users of DIGEST Edition 2.1 in transitioning to use of the DFDD, a lineage trace has been prepared. This is available at <https://www.dgiwg.org/FAD/download/LineageTrace.v1.0.zip>.

The DFDD replaces the FACC. The DFDD register is available at <https://www.dgiwg.org/FAD/>. A handbook DGIWG 500 - *Implementation Guide to the DGIWG Feature Data Dictionary (DFDD)* is available.

Disposition: The DFDD replaces the FACC and a lineage trace is available to assist in transition.

6   DIGEST Reference Table

The following table lists each section of DIGEST and indicates its disposition, including which parts of the new DGIWG standards may be used to replace that part of DIGEST. The intent is to allow legacy DIGEST data to be converted to be used with the new DGIWG suite of standards.

Annex A

Disposition of DIGEST by Part and Annex

DIGEST Part	Comment	Disposition
DIGEST Part 1 (General Description)	No normative information in this part.	None
DIGEST Part 2 - 1 to 4	No normative information	None
DIGEST Part 2 - 5.1 (feature level Vector data model)	Fully covered in DGIWG profiles of: -ISO 19109 Geographic information - Rules for Application Schema standard; and -ISO 19107 - Geographic information - Spatial Schema standard. Alignment with IHO S-57 standard for Hydrographic Charts	- DGIWG 100 (DGIWG 2D Spatial Schema Profile) - DGIWG 113 (DGIWG Profiles of ISO 19107 and GML realization)
DIGEST Part 2 - 5.2 and 5.3 (Raster and Matrix data model)	Fully covered in: -ISO 19123 Geographic information - Coverage geometry and functions.	Encoding of coverage data is still an open topic internationally. DGIWG has a roadmap under project T01 to address the handling of Imagery and Gridded data Existing DIGEST based raster product formats remain valid (e.g. ASRP).
DIGEST Part 2 - 6 (Feature, Attribute and Relation coding)	Fully covered in DGIWG FAD dictionary compliant with: -ISO 19110* Geographic information - Methodology for feature cataloguing; and -ISO 19126 - Geographic information - Feature concept dictionaries and registers. * and 19110 Amendment 1	The DIGEST FACC evolved into the DGIWG Feature and Attribute Dictionary (FAD). All of the previous DIGEST feature definitions can be mapped into the new FAD and a lineage trace is available.
DIGEST Part 2 - 7 (Data Quality)	DIGEST metadata in general is fully covered in ISO 19115* - Geographic information - Metadata with encoding according to ISO 19139 - Geographic information - Metadata - XML schema implementation. Data Quality is addressed in ISO 19157 - Data quality (revision of ISO 19113, 19114 and 19138) * and 19115-2 Geographic information - Metadata Part 2 Extensions for imagery and gridded data	All of the DIGEST data quality indicators are addressed in ISO 19115 and its military profiles (see below, line DIGEST Part 2 -9 (Information Package Metadata)

Annex A

DIGEST Part 2 - 8 (Cartographic Text)	Fully covered in: -19117 - Geographic information - Portrayal	DIGEST cartographic text can be mapped to the new DGIWG Portrayal* standards * in development, none published yet
DIGEST Part 2 - 9 (Information Package Metadata)	DIGEST information package metadata discovery metadata that is associated with every data set. All of the DIGEST information package metadata is covered in the ISO 19115 Geographic information - Metadata standard	Discovery metadata is addressed in: - DGIWG 103, DIGEST Metadata Profile of ISO 19115 (to be used only for data following DIGEST specifications), or - STANAG 2586 – NATO Geospatial Metadata profile, which addresses NATO requirements for discovery metadata, or - DGIWG Metadata Foundation*, the DGIWG general metadata profile for military community *To be published mid-2013.
DIGEST Part 2 - 10 (Dataset [Library] And Layer [Coverage] Metadata Subsets) DIGEST Part 2 - 11 (Geo Data Subset)	DIGEST data set metadata is addressed in: - ISO 19115 Geographic information - Metadata, -ISO 19115-2 Geographic Information - Metadata - Part 2: Extensions for imagery and gridded data, - ISO 19130 Geographic information - Sensor and data models for imagery and gridded data, and - ISO 19138 - Geographic information - Data quality measures. Particular spatial referencing metadata is addressed by: - ISO 19111 Geographic information - Spatial referencing by coordinates.	Dataset metadata is addressed in: - DGIWG 103, DIGEST Metadata Profile of ISO 19115 Some of the DIGEST metadata makes reference to tables as defined in DIGEST Part 3. In particular the Geodetic Codes and Parameters table is not fully addressed. Since DIGEST data products only use WGS84 as the reference horizontal datum, except for scanned paper maps, the issue is minor.
DIGEST Part 2 - 12 (Encapsulation / Encoding)	The DIGEST encapsulations remain as format descriptions for interpreting legacy data	The DIGEST encapsulations for Vector data are only required for the support of STANAG 7072 (VMAP0) and STANAG 7163 (VMAP1) in the NATO systems.
DIGEST Part 2 - 12.2.4 (IIF Encapsulation)	DIGEST provides structural metadata to describe the encoding method and scanning parameters of imagery data.	This is part of encoding and has been replaced by the use of more modern encoding methods such as described in: - GeoTIFF with the specification of DGIWG 108 GeoTIFF Profile for Georeferenced Imagery and gridded data, or - JPEG2000, for which a DGIWG GMLJP2 profile is under development (and should be published before end of 2012)."
DIGEST Part 2 - 13 (Encapsulation / Encoding)	The DIGEST media standards remain as descriptions for interpreting legacy data	This description of media formats is obsolete

Annex A

DIGEST Part 2 - Annex A (ISO 8211 Encapsulation)	This format is the original encoding and encapsulation format for DIGEST. It has been in disuse for many years and there is relatively little legacy data that needs to be addressed. The encoding is also used for some types of raster data for scanned paper maps. In this case the record format primarily carries the metadata	DIGEST A - ISO 8211 encoding can be abandoned
DIGEST Part 2 - Annex B (ISO 8824 Encapsulation)	The DIGEST B encapsulation was experimental and no systems or services were ever built using it.	The DIGEST B concepts related to bit efficiency have be described in the report DGIWG 303. DIGEST B - ISO 8824 encoding can be abandoned.
DIGEST Part 2 - Annex C (VRF/VPF Encapsulation)	The DIGEST VRF encapsulation provides a direct use relational table oriented product format for encapsulating vector data in alignment with the US Vector Product Format (VPF) Standard (MIL-STD-2407). There are many legacy products that survive in this form	Conversion is possible for legacy DIGEST C - VRF encoded data The major problems in converting from VPF/VRF data products to are related to the features as defined by the feature catalogue; and to metadata elements that are part of the VRF data files
DIGEST Part 2 - Annex D (IIF Encapsulation)	DIGEST Part 2 - Annex D, Image Interchange Format (IIF), is aligned with the NATO Secondary Imagery Format NSIF which is based on the ISO/IEC Basic Imagery Interchange Format (BIIF) Standard 12087-5. This corresponds to STANAG 4545. Management of the Geo TREs will be taken up by the NITFS Technical Board and the JCGISR STANAG 4545 Custodial Support Team and recorded in NTB document STDI-0002 Compendium of Controlled Extensions for the National Imagery Transmission Format (UNCLASSIFIED) There are many legacy products, primarily scanned paper, that survive in this form or related standalone product formats.	DIGEST Annex D based products may be readily converted and exchanged using a wide variety of open standards and commercial tools.
DIGEST Part 3 1 to 4 (Codes and Parameters General Part)	DIGEST part 3 contains a set of data types definitions and code tables for use in the DIGEST standard. The general part contains no normative information	none
DIGEST Part 3 -5 (Specification of Data Types)	This section defines each of the primitive data elements used in the ISO 8211, ISO 8824/5 (ASN.1), VRF and IIF representations of DIGEST (Annexes A, B, C and D of Part 2 respectively).	This material is now fully covered by the TC211 standard ISO 19103 Geographic information - Conceptual schema language section on Basic Types.

Annex A

DIGEST Part 3 -6 (Geodetic Codes and Parameters)	Tables of codes for ellipsoid, datum, projection and grid systems are needed to fill in the metadata fields in DIGEST based data sets. They are extremely important for interpreting legacy data. Modern military mapping systems tend to use only a single geospatial reference system WGS84 which includes reference to the Earth Gravitational Model 1996 (EGM96) geoidal surface. It is defined in National Imagery and Mapping Agency Technical Report TR 8350.2. There is a special requirement for the ARC grid system that was used in several series of raster data sets.	New data products should use the WGS84 reference system. The DGIWG Geodetic Codes and Parameters Registry provides the list of codes for interpretation of legacy data. It is available in a register accessible from the DGIWG website. The ARC grid system is addressed by DGIWG 016 DIGEST Support Document 3 - The ARC System
DIGEST Part 3 -7 (Units of Measure)	The units of measure used in DIGEST used in the current DGIWG FAD	All the unit codes are now subsumed into the FAD
DIGEST Part 3 -8 (Use of CIE Values)	This is an informative description of the CIE colorimetric system	None
DIGEST Part 3 -9 (Digital Geographic Data Volume Transmittal Form)	This is tightly linked to the DIGEST encodings from the annexes of DIGEST Part 2	This material is obsolete
DIGEST Part 4 (Feature and Attribute Coding Catalogue (FACC))	The new DGIWG Feature and Attribute Dictionary complies with: - ISO 19110 Geographic information - Methodology for feature cataloguing, - ISO 19126 Geographic information - Feature concept dictionaries and registers, and - ISO 19135 Geographic information - Procedures for registration of geographical information items	The new DGIWG FAD replaces the FACC. It is available in a register accessible from the DGIWG website. A handbook DGIWG 500 Implementation Guide to the DGIWG Feature Data Dictionary (DFDD) describes the FAD A lineage trace is available for transitioning to use of the DFDD from the FACC.