DFBA | DEFENSE FORENSICS AND BIOMETRICS AGENCY

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Department of Defense

Implementation Guidance for DoD Electronic Biometric Transmission Specification (EBTS) v4.1

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Revision History

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1.0 Introduction

1.1 Background

The DoD Electronic Biometric Transmission Specification (EBTS) is based on the American National Standard for Information Systems/National Institute of Standards and Technology - Information Technology Laboratory (ANSI/NIST-ITL) - "Data Format for the Interchange of Fingerprint Facial, & Other Biometric Information" as its foundational reference. ANSI/NIST-ITL provides the framework and minimum set of required data elements for entities which communicate biometric and biographic data; while also allowing for specialized business needs and requirements to be satisfied by implementers. Based on the nature of data transmitted to satisfy the biometric related missions within DoD, these unique capabilities are defined in the DoD EBTS Specification. This approach is consistent with other US Government Organizations which have their own extensions of ANSI/NIST-ITL such as the FBI Electronic Biometric Transmission Specification (EBTS) and the DHS IDENT eXchange Message (IXM) Specification.

DoD EBTS v4.1 also utilizes the National Information Exchange Model (NIEM) v4.1 to harmonize common vocabulary and data elements in eXtensible Markup Language. The use of NIEM provides consistent, reusable data terms and definitions across shared domains (e.g., NIEM Core, NIEM Biometrics Domain, etc.).

The flexibility of DoD EBTS to serve a range of biometric related missions within the DoD provides the opportunity for variations when implementing the standard. For instance, data transmitted as a part of one implementation may not be utilized by another implementation. Because of this, implementation guidance is needed to ensure separate implementations still conform to the necessary components of EBTS.

1.2 Purpose

The purpose of this document is to inform and describe the steps necessary for effective implementation of DoD EBTS. The following topics are identified to satisfy this purpose:

- Provide an understanding of DoD EBTS Applicability and Scope
- Describe Implementation of Logical Record Types
- Describe Implementation of Types of Transactions (ToT)s
- Inform of current DoD EBTS Implementation considerations
- Inform stakeholders of any errors and misrepresentation of the actual intention of the specification through the production and maintenance of the DoD EBTS errata sheet

NOTE: This document is intended to be a "living document" which will be updated and modified as DoD EBTS evolves. Stakeholder feedback will be critical to the impact and usefulness of the document.

1.3 Audience

The intended audience of this document are entities who have implemented or plan to implement the DoD EBTS standard as a part of the DoD biometric enterprise. These entities include, but are not limited to:

- Software Developers
- System Implementers
- Hardware Engineers
- Commercial Vendors and Manufactures
- Conformance Testers and Evaluators

1.4 Scope

The figure below depicts and the Standards Lifecycle Management (SLM) process, which is cyclical in nature and includes six separate sub-processes. Based on the purpose and audience of the document, the primary focus is on the implementation sub-process.

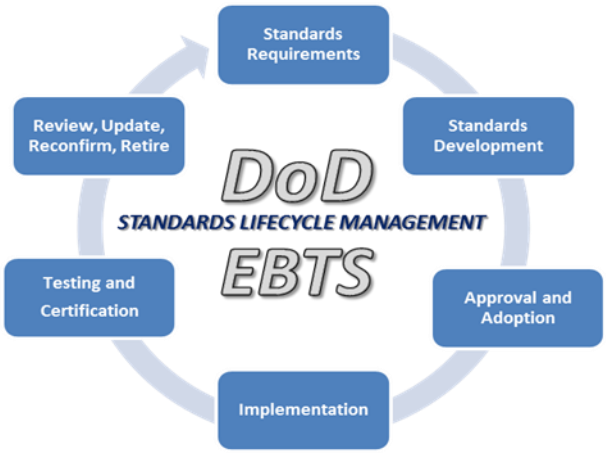

Figure 1 – Standards Lifecycle Management

2.0 DoD EBTS Applicability and Scope

2.1 DoD EBTS Support to the DoD Biometric Enterprise

The ability to transmit biometrics data is critical for enabling the DoD to share and leverage information across the DoD Biometrics Enterprise. This specification is intended for those applications requiring the exchange of biometric samples and related biographic and contextual data both within the DoD Biometrics Enterprise and with external agencies, coalition members and governments. It provides increased flexibility to multiple mission sets, including those which utilize repositories other than DoD Automated Biometric Identification System (ABIS).

Current versions of DoD EBTS standards documents can be freely accessed on the DFBA website here: https://www.dfba.mil/functions/library/standards.html

2.1.1 DoD EBTS Purpose

The primary audience for DoD EBTS consists of software developers who develop, support, and/or test systems that interface with the DoD authoritative repository (DoD ABIS) or other DoD biometric systems. It contains the technical details of the specification. Readers are expected to have working knowledge of the respective ANSI/NIST-ITL standard as a prerequisite for understanding the DoD EBTS standard.

2.1.2 Out of Scope Functionality

DoD EBTS supports many key biometric modalities (Facial/SMT, Fingerprint, Palmprint, and Iris Image) but not all modalities are currently in use today. There are additional modalities supported by ANSI/NIST-ITL, that are currently not included in DoD EBTS, such as:

- Plantar
- Signature Image

In addition, there are DoD capabilities that are related to biometrics but out of scope to DoD EBTS at this time. In certain cases, DoD EBTS data files facilitate these capabilities, but are not directly contained within DoD EBTS. These capabilities include:

- Forensics
- Document Exploitation (DOMEX)
- Match Reports (e.g. MatchML)
- Biometrically Enabled Intelligence (BEI)
- Biometrically Enabled WatchList (WatchML for the BEWL)

Furthermore, for interagency exchange initiated from DoD (e.g. exchange from DoD ABIS to FBI IAFIS/NGI and exchange from DoD ABIS to DHS IDENT/HART), the agreed upon exchange format(s) should be followed. DoD EBTS does not attempt to address partner agency specification requirements. However, DoD EBTS will ensure that the necessary data concepts for the agreed upon transaction or services are supported in order for a DoD EBTS file to be transformed into the format dictated by the partner agency.

The DoD EBTS v4.1 Implementation Guidance is not specific to operational usages and does not specify or limit how DoD EBTS v4.1 is used. For example, it does not dictate biometric applications such as physical or logical access.

2.2 ANSI/NIST-ITL and DoD EBTS Evolution

DoD EBTS is an extension of ANSI/NIST-ITL "Data Format for the Interchange of Fingerprint Facial, & Other Biometric Information" as it builds upon the base standard to meet DoD requirements. The structure and organization of the specification is updated to meet the expanding operational needs of the DoD Biometrics Enterprise and the progression of its base standards.

Within both ANSI/NIST-ITL and DoD EBTS, data within a single file or transmission is categorized into logical records (also known as "types"). Logical records allow for transmission capabilities to be developed and deployed in a modular fashion. With the exception of Type-1 and Type-2 records, a logical record type is most often associated with a biometric modality or similar capability. As ANSI/NIST-ITL and DoD EBTS have been improved throughout the years, enhancements have been made to the logical records including adding new data fields and records based on requirements. Table 1 describes the enhancements from DoD EBTS version 1.2 to 4.1. The paragraphs following adds additional context to the progression in the table.

Table 1 – Logical Records Supported by EBTS Version

EBTS v1.2 NOV '06	EBTS v2.0 MAR '09	EBTS v3.0 DEC '11	EBTS v4.0 and EBTS v4.1 SEP '15 and April '19
Type-1: Transaction Information	Type-1: Transaction Information	Type-1: Transaction Information	Type-1: Transaction Information
Type-2: User Defined Descriptive Text	Type-2: User Defined Descriptive Text	Type-2: User Defined Descriptive Text	Type-2: User Defined Descriptive Text
Type-4: High Resolution Greyscale Fingerprint Image	(Deprecated)	(Deprecated)	(Deprecated)
Type-7: User Defined Image (used for FBI EFTS v7.1 Latent Images)	(Deprecated)	(Deprecated)	(Deprecated)
Type-9: Minutiae Data (using AFIS Feature Set)	Type-9: Minutiae Data (using IAFIS and INCITS M1-378 Feature Sets)	Type-9: Minutiae Data (using IAFIS and INCITS M1-378 Feature Sets)	Type-9: Minutiae Data (using IAFIS, INCITS M1-378, and Extended Feature Sets)
Type-10: Facial & Scars/Marks/Tattoos Images	Type-10: Facial & Scars/Marks/Tattoos Images	Type-10: Face, Other Body Part, or Scar, Mark, Tattoo (SMT) Image	Type-10: Photographic Body Part Imagery (including Face and SMT)
			Type-11: Forensic and Investigatory Voice Data
Type-13: Latent Image Data (Variable Resolution)	Type-13: Variable-resolution Latent Image	Type-13: Variable-resolution Latent Friction Ridge Image	Type-13: Friction-Ridge Latent Image
Type-14: Tenprint Fingerprint Impressions (Variable Resolution)	Type-14: Variable-resolution Fingerprint Image	Type-14: Variable-resolution Fingerprint Image	Type-14: Variable-resolution Fingerprint Image
	Type-15: Variable-resolution Palm print Image	Type-15: Variable-resolution Palm print Image	Type-15: Variable-resolution Palm print Image
Type-16: User-Defined Testing Image Data (Used for Iris Images)	(Deprecated)	(Deprecated)	(Deprecated)
	Type-17: Iris Image (formerly kept in Type-16)	Type-17: Iris Image	Type-17: Iris Image
		Type-18: DNA Data	Type-18: DNA Data
		Type-20: Source Representation	Type-20: Source Representation
		Type-21: Associated Context	Type-21: Associated Context
		Type-98: Information Assurance	Type-98: Information Assurance
	Type-99: CBEFF Biometric Data Record	Type-99: CBEFF Biometric Data Record	Type-99: CBEFF Biometric Data Record

2.3 DoD EBTS v1.2 Progression

DoD EBTS version v1.2 was based on the ANSI/NIST-ITL 1-2000 and FBI Electronic Fingerprint Transmission Specification (EFTS) v7.0. After the release of DoD EBTS v1.2, a number of events shaped the release of future versions of DoD EBTS and the latest v4.1:

- As biometric support for various DoD mission activities evolved, so did the requirements for a more flexible standard.
- The scope of DoD biometric data collection and sharing expanded to a wider range of operational scenarios. This broader set of scenarios necessitated the use of a mechanism to tailor the DoD EBTS to individual transactions. These transactions are called Types of Transactions (ToTs). It is used to describe customizations for individual operational scenarios that make use of the DoD EBTS.
- Data elements pertaining to biometric data collection and sharing have been defined in a Glossary, a Data Dictionary, and a Data Model. All of the data elements used in the DoD EBTS are defined in the DoD Integrated Data Dictionary (IDD), as separate document to compliment the DoD EBTS specification.

- ANSI/NIST-ITL 1-2011 evolved to include new biometric modalities such as voice and DNA.
- The DoD ABIS has evolved into the Biometric Enabling Capability (BEC) with an IT box approach, which includes new functionality in capability drops.
- DoD EBTS needs to be usable for communications with DoD biometric repositories in addition to DoD ABIS (or BEC).
- FBI EFTS v7.0 progressed over time to FBI EBTS v10.x to reflect ANSI/NIST-ITL 1-2011.

2.4 DoD EBTS v3.0 Progression

Following the release of DoD EBTS v2.0, over 30 change requests were submitted. The accepted change requests are listed in the following section below. DoD EBTS v3.0 addresses the needs of the DoD Biometric Enterprise and adds new functionality adopted from ANSI/NIST-ITL 1-2011 as follows:

- Type-18 in DoD EBTS v3.0 shall be used to exchange DNA and related data
- Type-20 in DoD EBTS v3.0 shall contain the source representation(s) (a source representation is used to generate one or more representations for use in other record types) from which other Record Types were derived
- Type-21 in DoD EBTS v3.0 shall contain an associated context, audio/visual recording or other related data (i.e., pocket litter)
- Type-98 in DoD EBTS v3.0 shall contain security information that allows for the assurance of the authenticity and/or integrity of the transaction including such information as binary data hashes, attributes for audit or identification purposes and digital signatures

DoD EBTS v3.0 was restructured to contain the requirements (i.e. Field ID, Mnemonic and Cardinality) of individual fields and the structure of logical records in the ToTs Baseline Profile. The DoD EBTS v3.0 Extensible Markup Language (XML) Information Exchange Packet Documentation (IEPD) is aligned with the traditional encoding and is provided separately.

2.5 DoD EBTS v4.0 and v4.1 Progression

DoD EBTS v4.0 was developed based off of ANSI/NIST-ITL 2011: Update 2013 and NIEM v3.2 alpha. DoD EBTS v4.0 was completed and approved by the DoD biometrics community, but the XML encoding versions of ANSI/NIST-ITL and NIEM were not harmonized. The United States Government biometrics community consisting of the DoD, FBI, and DHS recognized this and set up the ITL XML Working Group to harmonize XML based transactions using ANSI/NIST-ITL 2011: Update 2015 and NIEM v4.1. DoD EBTS v4.1 utilized the successful outcome of this effort.

2.6 Specification Document

The DoD EBTS is a transmission specification to be used between DoD systems that capture biometric data and repositories that match and store biometric data. DoD EBTS describes the rules and concepts that apply to transactions. This includes identifying the logical records supported for each biometric modality, transaction control numbers, origination identifiers, error handling, and image quality requirements. It additionally addresses unique requirements for the use of ToTs, the domain for a transaction, character encoding, and structure of Data Fields including Field IDs, Information Item Order, Mnemonic and Cardinality.

The Information Exchange Package (IEP) v2.1 contains all applicable schemas as well as XML instances of the ToTs defined in the specification. The IEPD describes the contents and use of all of the artifacts included in the IEP.

The DoD EBTS does not attempt to specify all data used in all biometric enabled applications. It leverages the Integrated Data Dictionary, which standardizes a broad range of data elements available for implementation in DoD biometric systems. In addition, definitions for transactions are provided in the baseline ToTs matrix. Each available transaction list the quantities necessary and mandatory data elements for each logical record for that particular transaction.

2.7 Integrated Data Dictionary (IDD)

The DFBA IDD product is one of the Biometrics Published Data Products. It is the authoritative source for DoD biometric data elements. As part of DFBA's mission to lead activities to program, integrate and synchronize biometric technologies, it requires the definition and promotion of transmission data standards for use by the DoD Biometrics Enterprise.

The IDD helps to accomplish DFBA's mission by:

1. Identifying the high-value data exchanged across DoD biometric systems (both current and future),
2. Establishing authoritative definitions for those data, and
3. Documenting standards for them (for example, field size, character type and valid values).

Both DoD EBTS and its ToTs leverage the data elements defined within the IDD. While the specification defines how a field should be exchanged by providing information such as Field ID, Mnemonic and the minimum and maximum occurrences, the IDD defines how the elements should be built by providing characteristics such as size, character type, valid values, value constraints, format, etc.).

The IDD defines all DoD user-defined data elements that are to be used when data are exchanged among DoD Biometric Systems. The IDD also imports necessary elements from other base standards (ANSI/NIST ITL and FBI EBTS and DHS IXM) which DoD may reference for transmitting so that all of the data elements are centralized in one place.

All data elements within the IDD are represented in a consistent manner. All the IDD elements are categorized into subject area sections to provide proper context for usage. Each subject area corresponds to a logical record type referenced by DoD EBTS. Within each section, the IDD contains three types of data constructs: set, information items and standalone elements. A set is a natural grouping of two or more elementary information items that are usually treated as a single field. A standalone element has no information item. Neither an information item nor a standalone element can be further decomposed. This structure directly supports the DoD EBTS traditional encoding format. In addition, the XML elements within the XML IEP Schema can be directly mapped to the data elements within the IDD.

As standards and usages evolve over time, the IDD must reflect the transition and retirement of dictionary elements. The IDD does this by tracking the lifecycle of the dictionary elements through the following element states:

Table 2 – IDD Element States

State	Description
Active	Currently viable and fully usable dictionary element.
Deprecated	Element is still usable in current implementations, but it should not be used going forward. It will gradually be phased out with a new element(s) that incorporates the functionality of the deprecated element. The IDD provides the superseding element(s) and any qualifying condition. This helps identify the transition path from As-Is to To-Be.
Sunset	Used for alerting the user community that an element may be retired in the future.
Retired	Used to alert the user community that the retired element shall not be used for current and future applications.
Legacy Derivable	Pertains to FBI elements only. The element should only be used when exchanging directly with FBI. It can be derived from DoD element(s). The IDD provides the DoD elements and any qualifying condition(s) from which this element can be derived.
Emerging	A DoD Type-2 element that can be considered for future capability. It has not yet been approved by FBSWG for use and can be subject to change.

Each element within the IDD has an assigned state. Deprecated, Sunset, Retired, Legacy Derivable and Emerging elements have been clearly marked within the IDD to alert the user community.

2.8 DoD EBTS XML IEP

The National Information Exchange Model (NIEM) is an XML-based standard for information exchange. The NIEM is a United States (U.S.) government-sponsored initiative to facilitate information sharing within government organizations and their business partners. The NIEM is a common vocabulary that enables efficient information exchange across diverse public and private organizations. NIEM can save time and money by providing consistent, reusable data terms and definitions, and repeatable processes. Using the NIEM helps the Department of Defense (DoD) to meet the requirements of HSPD-5, Homeland Security Presidential Directive 5: Management of Domestic Incidents and associated Executive Orders. HSPD-5 directs the DoD to establish appropriate relationships and mechanisms for cooperation and coordination with other departments and agencies responsible for protecting national security.

DFBA uses NIEM conformance requirements and naming conventions to guide the design of the XML schema defined in its DoD Electronic Biometric Transmission Specification (EBTS) standard. The

design results are then packaged and distributed in an archive format to meet NIEM requirements for IEP. The DoD EBTS IEP is a collection of XML schema, XML instance documents, metadata, and other information artifacts that document the rules governing the exchange of biometric information with the United States DoD.

The 2.1 version of the DoD EBTS IEP contains files required by the NIEM IEPD specification for the XML documents defined using DoD EBTS v4.1. To view the IEP files, extract all of the files from the zip archive to a folder, then open the file named catalog.html in a browser. Once extracted from the archive, all of the files in the package can be accessed through hypertext links in the catalog.html file.

The catalog file displays a link to the IEPD master documentation file, 'DoD EBTS IEPD v2.1.pdf'. This document presents an overview of the IEPD and describes the overall structure and contents of the IEP. The master documentation also provides background on optional technologies that can be used to create efficient transfer and compact storage solutions for systems that process DoD EBTS v4.1 XML instance documents.

2.9 Enterprise Architecture Support for DoD EBTS Implementation

The use of architecture products and views to support the implementation of EBTS is best understood in the context of the Department of Defense Architecture Framework (DoDAF), which serves as the principal guide for development of architectures in DoD; and a purpose of the DoDI 8330.01, Interoperability of Information Technology (IT), Including National Security Systems (NSS), which is to establish a capability-focused, architecture-based approach for interoperability analysis.

For the purposes of architecture development, for capabilities requiring DoD EBTS conformance, architectural descriptions should depict information and system data exchanges enabled by adoption and use of DoD EBTS, and establish a documented basis for understanding technical interoperability requirements.

This kind of interoperability is often centered on (communication) protocols and the infrastructure needed for those protocols to operate. The Biometrics Enterprise will adhere to published interface standards that have been developed for biometrics. These standards include TCP/IP, Hypertext Transfer Protocol, HTTP, and World Wide Web.

By way of reference, technical standards in architecture are reflected in the Standards Profile View (StdV-1) and the Standards Forecast View (StdV-2) in the current version of DoDAF - found here (https://dodcio.defense.gov/Library/DoD-Architecture-Framework/). These views are typically developed to delineate the various system standards, rules, and conventions that implement and sometimes constrain the choices that can be made in the design and implementation of architecture. When the standards profile is tied to the system elements to which they apply, the StdV-1 serves as the bridge between the system views and the technical standards views. The StdV-1 consists of the applicable portions of the DISR (DoD Information Technology Standards Registry) tailored to a standard profile. The Systems Resource Flow Matrix (SV-6) draws from this StdV-1 to identify the standards applicable to the data exchanges listed in the SV-6.

3.0 Implementation of Logical Record Types

Logical records (LRs) are designed to separate the various biometric and biographic data being collected stored and shared in a single DoD EBTS v4.1 electronic file. Each logical record has a specific purpose, requirements and limitations for the data which shall be stored as defined in DoD EBTS v4.1. The following table describes the contents of each logical record for DoD EBTS v4.1.

Table 3 – Logical Record Descriptions

Record Contents	Record Identifier
Transaction information Transmissions to be exchanged are required to contain one and only one Type-1 record per transaction. The Type-1 record shall always be the first record within the transaction. At least one more record shall be present in the file. The Type-1 record shall provide information describing type and use or purpose for the transaction involved, a listing of each record included in the transaction, the originator or source of the physical record, and other useful and required information items.	**Type-1**
User-defined descriptive text Type-2 records shall contain user-defined textual fields providing identification and descriptive information associated with the subject of the transaction. Each entry in a Type-2 record shall have a definition and format that is listed with the Domain owner.	**Type-2**
Minutiae data Type-9 records shall contain and be used to exchange minutiae or other friction ridge feature data. Each record shall represent the processed (automated and/or manual) image data from which the characteristics are stated. The primary use of this record type shall be for remote searching of latent prints.	**Type-9**
Face, other body part, or scar, mark tattoo (SMT) image Type-10 image records shall contain and be used to exchange image data from the face, scars, marks, and tattoos (SMT). New to this version of the standard is the extension of the record type to handle images of other body parts.	**Type-10**
Forensic investigatory voice Type-11 voice records shall contain and be used to exchange forensic and investigatory voice data. Each record shall represent the processed data from which the characteristics are stated. The primary use of this record type shall be for remote searching of voice capture together with fixed and user defined textual information pertinent to voice recognition.	**Type-11**

Variable-resolution latent friction ridge image Type-13 image records shall contain and be used to exchange variable-resolution latent friction ridge image data (fingerprint and/or palmprint) together with fixed and user defined textual information fields pertinent to the digitized image.	**Type-13**
Variable-resolution fingerprint image Type-14 image records shall contain fingerprint image data. Fixed and user-defined textual information fields pertinent to the digitized image may also be included. While the Type-14 record may be used for the exchange of 19.69 ppmm (500 ppi) images, it is strongly recommended that the resolution for fingerprint images be 39.37 ppmm (1000 ppi). It should be noted that as the class resolution is increased, more detailed ridge and structure information becomes available in the fingerprint image. However, in all cases the class resolution shall be at least 19.69 ppmm (500 ppi). The variable-resolution fingerprint image data contained in the Type-14 record may be in a compressed form. DoD EBTS specifies a set number of Type-14 records for an enrollment, ten rolled impressions of the individual fingers, two plain impressions of the thumbs, and two plain impressions of the remaining fingers of each hand. If fewer than 10 fingers were printed, Field 14.018: Amputated or bandaged should be populated with the reason. If Type-14 is not included in the transaction and fingerprint images were required, then the reason for omission should include in Field 2.084: Amputated or bandaged.	**Type-14**
Variable-resolution palmprint image Type-15 image records shall contain and be used to exchange palm print image data together with fixed and user-defined textual information fields pertinent to the digitized image. While the Type-15 record may be used for the exchange of 19.69 ppmm (500 ppi) images, it is strongly recommended that the class resolution for Type-15 images be 39.37 ppmm (1000 ppi). It should be noted that as the resolution is increased, more detailed ridge and structure information becomes available in the image. However, in all cases the class resolution shall be at least 19.69 ppmm (500 ppi). The variable-resolution palm print image data contained in the Type-15 record may be in a compressed form. A typical transaction utilizing Type-15 includes: a writer's palm with an upper and lower palm from each hand and two full palmprints.	**Type-15**
Iris image Type-17 image records shall contain iris image data. This record type was developed to provide a basic level of interoperability and harmonization with the ANSI INCITS 379-2004 Iris image interchange format and the ISO/IEC 19794-6 Iris image data interchange format. It also contains optional descriptive data fields and (new to this version of the standard) image markup fields. Generic iris images may be exchanged using the mandatory fields of this record type.	**Type-17**

DNA data The Type-18 record shall contain and be used to exchange DNA and related data. With full consideration to privacy, this standard only uses the non-coding regions of DNA. The regions of the DNA that encode phenotypic information are deliberately avoided. While DoD ABIS, does not currently store DNA profiles or DNA reference numbers, the Type-18 along with contextual information in Type-2 allows a method to do so.	**Type-18**
Source representation The Type-20 record shall contain the source representation(s) from which other Record Types were derived. Typically, one Type-20 source representation is used to generate one or more representations for use in other record types. When a source representation (in a Type-20 record) is processed and the derived representation is to be used as the source for further derivations, then the derived representation is contained in a Type-20 record. In some cases, several Type-20 records may be processed to derive a single modality record. Some possible uses of the Type-20 record are shown here. • From a group photo stored in a Type-20 record, a subject's face is segmented and stored in a Type-10 record. • From a high-resolution color image in a Type-20 record, two latent fingerprint images are segmented, rescaled and gray-scaled for storage in separate Type-13 records. • From a series of off-angle face images stored in separate Type-20 records, a single 2D face image is generated (using fusion) that is stored in a Type-10 record.	**Type-20**
Associated context The Type-21 record shall contain an associated context image, audio / visual recording or other related data. This record type does NOT contain information used to derive biometric information contained in other records. Record Type-20 serves that function. Record Type-21 may be used to convey contextual information, such as an image of the area where latent fingerprints were captured.	**Type-21**
Information assurance The Type-98 record shall contain security information that allows for the assurance of the authenticity and/or integrity of the transaction, including such information as binary data hashes, attributes for audit or identification purposes, and digital signatures.	**Type-98**

CBEFF biometric data record Type-99 records shall contain and be used to exchange biometric data that is not supported by other ANSI/NIST-ITL record types. This provides a basic level of interoperability and harmonization with other biometric interchange formats. This is accomplished by using a basic record structure that is conformant with ANSI INCITS 398-2005, the Common Biometric Exchange Formats Framework (CBEFF) and a biometric data block specification registered with the International Biometrics Industry Association (IBIA), http://www.ibia.org.	**Type-99**

4.0 Implementation of ToTs

ToTs build upon logical records to provide a purpose to the data which is being transmitted. Each ToT and the associated responses are described below.

Table 4 – ToT Descriptions

ToT	Transaction Name	DoD Implementation
Biometric Transactions		
CAR	Criminal Tenprint Submission (Answer Required)	Submission used for detainees, enemy combatants, enemy prisoners of war (EPWs), or persons of interest (known or suspected terrorists).
CNA	Criminal Tenprint Submission (No Answer Required)	Submission used for detainees, enemy combatants, enemy prisoners of war (EPWs), or persons of interest (known or suspected terrorists). CNA is used when a response is not required.
CPDR	Criminal Fingerprint Direct Route (Direct Route to CJIS)	Submission used for detainees, enemy combatants, enemy prisoners of war (EPWs), or persons of interest (known or suspected terrorists).
DEK	Known Deceased	Submission used for deceased subject whose identity is known.
DEU	Unknown Deceased	Submission used for deceased subject whose identity is not known.
DPRS	DoD Flat Print Rap Sheet Search	This is only used in special circumstances.
ERRT	Tenprint Transaction Error	Error response.
MAP	Miscellaneous Applicant	Submission used as part of a background check for local nationals and third country nationals who require access to U.S. military installations or other restricted areas.
RPSR	Rapid Print Image Search Response	This notification will be sent to the submitter of a CPDR transaction as configured by the DFSC BOD staff. Once the Yellow Resolve has been properly adjudicated by the BEST, the SRE response will be sent.
SRE	Submission Results - Electronic	Response containing an Ident/Non-Ident decision; will contain an electronic rap sheet if requested.
TPRR	Tenprint Rapsheet Response	TPRR responses are rapid responses to a TPRS transaction with SRE responses sent at a later time.
TPRS	10-print Rap Sheet Search	Performs a search only, non-retain, and can return an unconfirmed-identification (“yellow”) identification.
Latent Print Transactions		
ERRL	Latent Transaction Error	Error response.

LFIS	Latent Fingerprint Image Search	Used for latent image submission and searches.
LFFS	Latent Fingerprint Feature Search	Used for latent feature submission and searches.
SRL	Submission Results -Latent	Latent response including a candidate list comprising names and identifier of each candidate.

4.1 CAR: Criminal Tenprint Submission (Answer Required)

The Criminal Tenprint Submission (CAR) shall be used for detainees, enemy combatants, enemy prisoners of war (EPWs), or persons of interest (known or suspected terrorists). DoD Biometrics policy requires 10-print rolled fingerprints for subjects in a detained situation" (remove "or flat prints" from sentence)**.** CAR contains ten rolled or flat and four plain impressions of all ten fingers. It may also contain up to 6 Iris Images, 5 Facial Images, and 8 Palmprint Images.

The two valid responses to a CAR submission are SRE or ERRT. An SRE will be returned with the search results (Identification/Non-identification) if no errors exist in the submission. An ERRT transaction will be returned with details of the specific error should a syntax error and/or image quality problem exist

4.2 CNA: Criminal Tenprint Submission (No Answer Required)

The CNA submission shall be used for detainees, enemy combatants, enemy prisoners of war (EPWs), or persons of interest (known or suspected terrorists). It is identical to the CAR submission but it does not require an answer to be returned. DoD Biometrics policy requires 10-print rolled or flat fingerprints for subjects in a detained situation. CNA contains ten rolled or flat and four plain impressions of all ten fingers. It may also contain up to 6 Iris Images, 5 Facial Images, and 8 Palmprint Images.

An ERRT transaction will be returned with details of the specific error should a syntax error and/or image quality problem exist.

4.3 CPDR: Criminal Fingerprint Direct Route

This transaction consists of a criminal arrest fingerprint submission that will be directly routed to a CJIS internal log application for special processing. The submission contains ten rolled and four plain impressions and detention data. It is identical to the CAR request described above with the inclusion of a mandatory Type of Search Request (TSR) field. CJIS will ensure the required EBTS fields and a Type of Search Requested (TSR) of "C" are present; otherwise, the submission will be rejected. If the TSR of "C" is present and the ToT is something other than CPDR, the submission will be rejected.

Note: CPDR is a limited-use ToT that requires coordination with DFSC Operations prior to use.

4.4 MAP: Miscellaneous Applicant

The MAP transaction type is typically used as part of a background check for local nationals and third country nationals who desire access to U.S. military installations or other restricted areas. DoD Biometrics policy requires 10-print rolled or flat fingerprints (14 images including slaps) for these subjects. Rolled prints are always preferred and should be collected whenever possible.

Valid responses to this submission are SRE or ERRT. An SRE will be returned with the search results (Identification/Non-identification) provided that no errors exist in the submission. If a syntax error is present or there is a problem with image quality, an ERRT transaction will be returned with details of the specific error.

4.5 DEK: Known Deceased and DEU: Unknown Deceased

The DEK transaction type is used for a deceased subject whose identity is known. The DEU transaction type is used for a deceased subject whose identity is not known. DoD Biometrics policy requires 10-print rolled fingerprints for these types of submissions.

Valid responses to this submission are SRE or ERRT. An SRE will be returned with the search results (Identification/Non/identification) provided that no errors exist in the submission. If a syntax error is present or there is a problem with image quality, an ERRT transaction will be returned with details of the specific error.

4.6 TPRS: Tenprint Rap Sheet Search

The TPRS transaction type may be used as part of a quick background check by the U.S military. Uses include highly mobile applications, check points, and situations with a very limited time on target. This transaction is for flat fingerprints only. One to 10 flat prints are required. This transaction is always search only (non-retain). TPRS requires no demographic or biographic information to be collected from the subject.

Valid responses to this submission are TPRR, SRE or ERRT. If a syntax error is present or there is a problem with image quality, an ERRT transaction will be returned with details of the specific error.

4.7 DPRS: DoD Flat Print Rap Sheet Search

The DPRS transaction type shall only be used in certain circumstances. These circumstances include legacy data submission and situations where acquiring full rolled fingerprints is not feasible. Highly mobile or limited time on target situations may warrant the use of this transaction type. DPRS data submission requires special coordination with DoD Biometrics. Submissions of this type may require special processing. In all situations, DoD Biometrics policy is to collect as much data as possible. DoD entities must contact DFSC BOD for specific guidance on the use of this transaction type. The DPRS transaction will accept flat or rolled fingerprints. One to 14 fingerprint images are required. Mug shot images may be included in this transaction as a Type-10 record. Iris images may be included in this transaction as a Type-17 record. The DPRS transaction type is a superset of the TPRS transaction type.

An SRE will be returned with the search results provided that no errors exist in the submission. If a syntax error is present or there is a problem with image quality, an ERRT transaction will be returned with details of the specific error.

4.8 LFIS: Latent Friction Ridge Image Search and LFFS: Latent Friction Ridge Features

LFIS and LFFS transaction types shall be used for latent submissions and searches. Information regarding the latent print is required. All feature searches (LFFS) are required to contain both the fingerprint image as well as feature data. Additionally, DoD Biometrics requires the name of the latent technician (i.e., the lifter or processor) and the name of the submitter (i.e., the AFIS operator).

An SRL will be returned with the search files provided that no errors exist in the submission. A candidate list is not returned. The response will contain an identification or non-identification. If a syntax error is present or there is a problem with image quality, an ERRL transaction will be returned with details of the specific error.

4.9 Logical Record Requirements by Type of Transaction (ToT)

Requirements for inclusion of logical records have been established to meet the purpose of individual ToTs. These requirements include which logical records can be used (as well as number of occurrences) for each ToT. These requirements are detailed in Table

Table 5 – Logical Record Requirements

TOT	T-1	T-2	T-9	T- 10	T- 13	T- 14	T- 15	T- 17	T- 18	T- 20	T- 21	T- 98	T- 99
CAR	1	1		0-20**		0-14*	0-8***	0-6****	0-5	0-10	0-10		
CNA	1	1		0-20**		0-14*	0-8***	0-6****	0-5	0-10	0-10		
CPDR	1	1		0-20**		0-14*	0-8***	0-6****					
MAP	1	1		0-20**		0-14*	0-8***	0-6****			0-10		
DEK	1	1		0-20**		0-14*	0-8***	0-6****	0-5	0-10	0-10		
DEU	1	1				0-14*	0-8***	0-6****	0-5	0-10	0-10		
TPRS	1	1	0-10			0-10+							
DPRS	1	1	0-14	0-20**		0-14*	0-8***	0-6****					
LFIS	1	1-2			0-10	0-10	0-8***		0-5	0-10	0-10		
LFFS	1	1-2	1-10		0-10	0-10			0-5	0-10	0-10		
SRE	1	1		0-1									
SRL	1	1				0-Number of Candidates Requested (NCR)							
RPSR	1	1											
TPRR	1	1											

ERRT	1	1											
ERRL	1	1											

Notes:
A plus sign (+) indicates up to 10 Type-14 images may be submitted for this transaction. DoD EBTS specifies a set number of Type-14 records for an enrollment. For this transaction a Complete Fingerprint Image Set will consist of:

10 Images:
- One Rolled or Flat image of each of the 10 fingers.

An explanation for any required but missing fingerprints shall be provided in field 2.084, Amputated or Bandaged Code. Field 2.084 shall accurately represent the reason a required Type-14 record is missing. This field has two subfields: Finger Number (FGP) and Amputated or Bandaged Code (AMPCD). Both subfields are required if field 2.084 is present. Subfield FGP is a two-digit code that specifies which finger is missing. Subfield AMPCD uses the value "XX" when there is an actual amputation and the value "UP" (unable to print) for all other situations.

A single asterisk (*) indicates up to 14 Type-14 images may be submitted for this transaction. DoD EBTS specifies a set number of Type-14 records for an enrollment. Complete Fingerprint Image Sets consist of one of the following options:

14 Images:
- Rolled or Flat image of each of the 10 fingers
- One Four Finger Slap image of the right hand (no thumb)
- One Four Finger Slap image of the left hand (no thumb)
- One Flat image of the right thumb
- One Flat image of the left thumb

13 Images:
- Rolled or Flat image of each of the 10 fingers
- One Four Finger Slap image of the right hand (no thumb)
- One Four Finger Slap image of the left hand (no thumb)
- One Two-Thumb Slap Fingerprint image

An explanation for any required but missing fingerprints in a plain two thumb slap or four finger slap image shall be provided in field 14.018 Amputated or Bandaged. Field 14.018 shall accurately represent the reason for each missing fingerprint. This field has two subfields: Finger Position Code (FGP) and Amputated or Bandaged Code (AMPCD). Both subfields are required if field 14.018 is present. Subfield FGP is a two-digit code that specifies which finger is missing. Subfield AMPCD uses the value "XX" when there is an actual amputation and the value "UP" (unable to print) for all other situations.

DoD EBTS v4.1 recommends the use of ANSI/NIST ITL 1-2011: Update 2015 Field 14.018 in order to adhere to business rules developed for this standard. However, Field 2.084 Amputated or Bandaged and its two information items should be used to include the reason for a missing finger if a Type-14 record is not submitted or to indicate why a slap image and/or plain thumb image is missing.

DoD EBTS v4.1 does not recommend the practice of stitching fingerprint images (e.g., the right and left thumb images were captured separately, but combined prior to transmission to create a single artificial two-thumb image). For devices which are not able to submit the four finger slap image and/or two thumb slap image due to limitations on the capturing device, the 2.084 AMP field shall instead be populated to indicate the Finger Position Code and Amputated or Bandaged Code.

A double asterisk (**) indicates that up to 10 Type-10 images may be submitted for this transaction. DoD EBTS specifies a minimum of one Type-10 record for an enrollment: a facial full frontal pose. If the full frontal pose is not provided, then the reason for omission should be included in Field 2.8117: Facial Image Omitted Reason. A full set of facial images consists of the following 5 poses, however only the full frontal pose is required:

- Full Frontal, 0 degrees (Mandatory);
- Left Full Profile, 90 degrees left side;
- Left Half Profile, 45 degrees left side;
- Right Full Profile, 90 degrees right side;
- Right Half Profile, 45 degrees right side.

Up to 5 facial images may be included in the as Type-10 records, an additional 5 images are allowed for SMTs and Other Body Parts.

A triple asterisk (***) indicates that up to 8 Type-15 images may be submitted for this transaction. An explanation for any missing palmprint images is optional. Field 15.018 Amputated or bandaged should be used to indicate any missing images.

A complete palmprint set contains the following images for both hands:

- One writer's palm and
- Either one full palm image (the entire area of the full palm extending from the wrist bracelet to the tips of the fingers) or
- One upper palm image (extends from the bottom of the interdigital area to the upper tips of the fingers); and
- One lower palm image (shall extend from the wrist bracelet to the top of the interdigital area (third finger joint)) or
- One palm thenar area image, one palm hypothenar area image, and one palm interdigital area image

A **quadruple asterisks (****)** indicates that up to 6 Type-17 images may be submitted for this transaction. This record type shall contain iris images. DoD EBTS v1.2 allowed for iris images in Type-16 records; DoD EBTS v4.1 does not. DoD EBTS v4.1 specifies a set number of Type-17 records for an enrollment, 1 iris image of each eye. An iris record shall contain an image of a single iris. If either iris image could not be captured, Field 17.028: Damaged or Missing Eye should be populated with the reason. If Type-17 is not included in the transaction, then the reason for omission should be included in Field 2.8110: Iris Image Omitted Reason.

5.0 Implementation of ToTs

ToTs are utilized by designating which mission(s) for which the transmission is being used. The DoD EBTS is the DoD Biometrics Enterprise specification used by numerous customers to meet specific needs; as such it must be broad enough to incorporate a range of data interchange capabilities.

For instance, the DoD EBTS v4.1 data collected by an Army Soldier on the ground will differ from that of a Naval Seaman on a vessel, which will differ from Special Operation Forces on a targeted endeavor. Furthermore, data which is shared with international and interagency partners (as well as the rules surrounding releasability of data) will differ based on the operational mission.

ToTs in place to align similar missions and facilitate interoperability between systems, databases and devices which must communicate necessary biometric and biographic data to meet their mission needs.

5.1 ToTs Defined

ToTs are commonly referenced in the IT community, and generally refers to the adaptation, constraint, and/or augmentation of a base standard (or a set of base standards) to suit the needs of a particular collection/response. The process of a ToT definition may include one or more of the following actions:

- Selection of a core sub-set of requirements and provisions of the base standards (e.g., elements and/or fields from the EBTS specification and/or DoD IDD) expressed as a mandated sub-set which must be supported as a minimum);
- Addition of requirements (e.g., elements and/or fields) in a prescribed manner to the base specification (e.g., addition of a new ToT using data elements defined in the DoD IDD);
- Restriction of the ranges of values given in the base specification, or selection of parameter values from the value lists given in the base specification.

ToTs characterize the submissions and responses base set of standards, with options necessary to accomplish the desired purpose of interoperability, providing a construct that links detailed reference information to an instance within the enterprise. The ToT is not intended to replace or duplicate detailed information describing the base standard (i.e., ANSI/NIST-ITL).

For DoD EBTS v4.1 purposes, a ToT shall:

1. Contain a definition of any and all data that is required to create, validate, and process an EBTS file within a given solution.
2. Contain an XML instance file that provides a sample of that transaction in an operational environment.
3. Contain a document that defines the DoD EBTS v4.1 usage scenario in a specific application domain.
4. Include the following necessary elements in Table 6 – Electronic File Transaction.
5. Adhere to the following naming convention:
    a. Implementation: This will be the Government Department or other organizational entity that is governing the ToTs.
    b. Agency: This will be the operational agency that is defining the ToTs for operational use.

c. Domain Name: This will be the domain name with the Implementation and Agency of a discrete EBTS Domain within each ToT.
d. Domain version: This will be a specific version of the Domain Name.

Table 6 – Electronic File Transaction

Electronic File Transaction (.eft)	**Layer**	**Elements**	**Comments**
	Data layer	EBTS specification	The "verification file[1]" defining EBTS TOT, record content field definitions, numbering, mandatory or optional, occurrences, etc.
		EBTS data	An actual EBTS file created with and adherent to an EBTS specification as defined above. The file format can be traditional binary or xml formats.
	Processing Layer	Processing rules that are solution implementation specific	How the .eft interacts and is parsed will be determined by the system or solution the EBTS data is feeding into. Items such as policy, service level agreements, architecture, interface with other systems, etc. will all control or affect the business processing aspects of the EBTS data. Process flows here can be static or determined by the actual EBTS file contents.
Solution Business Layer			

[1] A verification file entails examination of the transaction file for compliance with the general transaction format given by the ANSI/NIST-ITL specification or by a more specific implementation like the DoD EBTS specification. The user could determine if the transaction is compliant or if it is not, generate a detailed list of errors.

5.2 ToT Decision and Approval Process

The decision to develop a new ToT should be made after performing the proper analysis of existing ToTs in the DoD EBTS v4.1 ToT Matrix and determining that no existing transactions meet the requirements of the customer. Coordination with the DFBA is required to ensure consistency throughout the process.

Key factors that may indicate the need for a new transaction include but are not limited to:

- The need for new data elements not defined in the current version of the Integrated Data Dictionary (IDD)
    - The addition of new data elements requires maintenance and modification of the IDD. This may also impact the current version of the Electronic Biometric Transmission Specification
- The need to transmit a new logical record not defined in other ToTs.
    - Each transaction type shall have requirements for including a certain number of logical records of each type.
- The requirement to change data fields from mandatory to optional from existing Types of Transactions (ToTs)

If a new data element or elements are needed to the current version of the IDD a formal Change Request needs to be submitted to the DFBA. Once the request is received, DFBA will send out a call to the Forensic and Biometric Standards Working Group (FBSWG). The FBSWG is responsible for taking that CR and forming a position based on the feedback and comments from DoD stakeholders. The FBSWG will also perform a DoD impact assessment. The DoD impact assessment normalizes the feedback received from the DoD stakeholders. The stakeholders are asked to comment and provide information as it relates to their response/intentions from their own entities. Based on the position taken from the FBSWG, the DFBA will draft a position on whether to accept changes to the IDD. If changes are needed, the DFBA will make edits to the IDD and determine if there are any impacts to EBTS or existing transactions.

The DFBA assists the customer in making the final determination of developing a new ToT, but the customer or ToT requestor is responsible for submitting a request and providing all relevant information regarding the transaction. DFBA reviews the request and determines if a new ToT is needed or an existing transaction should be utilized.

Based on the final consensus, a new ToT will be developed, an existing ToT will be modified (a rare outcome), or an existing ToT will be reused. In addition, the ToT must be verified for integrity through generation of a valid verification text file. Implementation of the ToT should follow the processes described above. Approval of implementation by the applicable stakeholders will follow the proper governance structure which may need to elevate to executive governance processes. It is the responsibility of PM DoD Biometrics and DFBA to determine if the transaction passes the testing phase and to implement the ToT into the authoritative repository (i.e., DoD ABIS).

6.0 International Caveats

International sharing of biometric data can become complex when considering legal and privacy obligations. In order to appropriately handle sharing of biometric data, an International Caveat data field was developed.

As Partner Nations (PNs) began to integrate biometrics into their support of coalition operations, the need for flexible data handling rules evolved. This evolution has identified differences between U.S. law and the laws of international partners.

The data handling requirements of any given partner nation are unique due to the varying laws and cultures of every nation. Partner nations may require that data is labeled in a certain way, or they may impose restrictions on how the data may be used or shared. These restrictions can vary by mission, organization or use.

The differences between how DoD handles its own data, and how it is expected to handle partner nation data are rationalized during the development of sharing agreements. However, the rules outlined in these agreements have not always been easy to implement in DoD biometric systems which handle a partner nation's data. For this reason, it is always recommended that the DoD team involved in engagements with Partner Nations include someone who can advise on the technical feasibility of options being discussed. This helps ensure that DoD only makes commitments which it is fully able to meet.

Data sharing agreements with partner nations will be a major method of biometric data collection as the gradual reduction in overseas contingency operations result in a decrease in live enrollments by U.S. military forces.

The International Caveats data field enables business rules to provide flexible controls which can be customized for each partner nation, ensuring that DoD appropriately handles data from each partner nation. Once this solution is implemented, it will be possible to implement biometric data sharing agreements more quickly.

Annex A: DoD EBTS v4.1 errata sheet

Although each version of the DoD Electronic Biometric Transmission Specification has been submitted to careful proofreading by the Editor and the COI through the staffing process, errors do sometimes go undetected. When it is determined that a published version of the standard contains an error or errors, an errata sheet may be published at the discretion of the Editor. Annex A contains the latest attachment of errors reported back to DFBA. As any new errors or bugs are found by system developers, they should continue to provide the appropriate feedback to DFBA.

Errata are considered to be text erroneously published in the DoD EBTS or its supplements that does not accurately reflect the intended requirements as approved by the COI. The attached errata sheet is intended to correct errors and alleviate potential confusion. In each case, the object is to promote accuracy, clarity, consistency and thoroughness.

The issuance of an erratum does not lessen the value of the original publication. Since the vast majority of EBTS content is unaffected by errata, an errata sheet should be viewed as a *supplement* to a viable publication. The errata sheet is a living document and the latest version is attached below.

DoD EBTS v4.1
errata sheet.docx

ANNEX B: External Resources

[1] ANSI/NIST-ITL 1-2011: Update 2015, NIST Special Publication 500-290e3, Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information. Retrieved from https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.500-290e3.pdf

[2] Department of Defense (DoD) Electronic Biometric Transmission Specification (EBTS) v4.1 standard. Retrieved from https://www.dfba.mil/functions/library/standards_docs/DoD%20EBTS%20v4.1.pdf

[3] Department of Defense (DoD) Electronic Biometric Transmission Specification (EBTS) IEPD v2.1. Retrieved from https://www.dfba.mil/functions/library/standards_docs/DoD%20EBTS%20-%20IEP%20v2.1.zip

[4] Integrated Data Dictionary for the Department of Defense (DoD). Retrieved from https://www.dfba.mil/functions/library/standards_docs/DoD%20EBTS%20v4.1%20IDD.pdf

[5] National Information Exchange Model Naming and Design Rules. Retrieved from https://www.niem.gov/documentsdb/Documents/Technical/NIEM-NDR-1-3.pdf

[6] NIEM Namespace Index. Retrieved from https://release.niem.gov/niem/4.1/

[7] Requirements for a National Information Exchange Model (NIEM) Information Exchange Package Documentation (IEPD) Specification. Version 2.1, 2006. Retrieved from http://www.docstoc.com/docs/22552615/NIEM-IEPD-Template-Requirements