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STANAG 4607 JAS (EDITION 2)– NATO GROUND MOVING TARGET INDICATOR (GMTI) FORMAT

Reference

NSA/0251-AIR/4607, dated 11 March 2005 - STANAG 4607,Edition 1

1. The enclosed NATO Standardization Agreement which has been ratified by nations as reflected in the NATO Standardization Document Database (NSDD) is promulgated herewith.

2. The reference listed above is to be destroyed in accordance with local document destruction procedures.

3. The NAFAG JISRCG considers this an editorial edition of the STANAG; previous ratifying references and implementation details are deemed to be valid.

Juan A. MORENO
Vice Admiral, ESP(N)
Director, NATO Standardization Agency

Enclosure:
STANAG 4607 (Edition 2)

NORTH ATLANTIC TREATY ORGANISATION
(NATO)

NATO STANDARDISATION AGENCY
(NSA)

STANDARDISATION AGREEMENT
(STANAG)

SUBJECT: NATO Ground Moving Target Indicator (GMTI) Format

Promulgated on 2 August 2007

Juan A. MORENO
Vice Admiral, ESP(N)
Director, NATO Standardization Agency

RECORD OF AMENDMENTS

NO	Reference/date of amendment	Date entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.

2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.

3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet http://nsa.nato.int; NATO Secure WAN http://nsa.hq.nato.int).

FEEDBACK

5. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - BE.

NATO STANDARDIZATION AGREEMENT
(STANAG)

NATO GROUND MOVING TARGET INDICATOR FORMAT (GMTIF)

Annexes: A. GROUND MOVING TARGET INDICATOR FORMAT
B. TERMS AND DEFINITIONS

The following Standardisation Agreements (STANAGs), Military Standards (MIL-STDs), International Telecommunication Union (ITU) Recommendations and International Standards (ISs) contain provisions which, through references in this text, constitute provisions of this STANAG. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this STANAG are encouraged to investigate the possibility of applying the most recent editions of the STANAGs, MIL-STDs, ITU Recommendations and ISs listed below. NATO maintains registers of currently valid STANAGs.

Related Documents:

Earth Gravity Model 96 (EGM96), October 1996	http://cddisa.gsfc.nasa.gov/926/egm96/egm96.html
FIPS PUB 10-4, April 1995	Countries, Dependencies, Areas of Special Sovereignty, and Their Principal Administrative Divisions
ISO/IEC 7498-1	Open Systems Interconnection Model (ISO/IEC 7498-1).
MIL-PRF-8902A, 19 April 1996	Performance Specification, Digital Terrain Elevation Data (DTED)
MIL-STD-2500B, Dated 22 August 1997, with Notice 1, 2 October 1998, Notice 2, 1 March 2001	Department of Defense Interface Standard, National Imagery Transmission Format, Version 2.1, for the National Imagery Transmission Format Standard
NASA/TP-1998-206861, July 1998	The Development of the Joint NASA GSFC and the National Imagery and Mapping Agency (NIMA) Geopotential Model EGM96, http://cddisa.gsfc.nasa.gov/926/egm96/egm96.html
STANAG. 4545	NATO Secondary Imagery Format
STANAG 7023,	Air Reconnaissance Primary Imagery Format

NC3A Technical Note 732, October 1998	Formats for the Representation of Alliance Ground Surveillance (AGS) Pre-Exploitation Data Types, Version 2.01
NIMA STDI-0002, Version 2.1, 16 November 2000	The Compendium of Controlled Extensions (CE) for the National Imagery Transmission Format (NITF)
NIMA Technical Report TR8350.2, Third Edition, Amendment 1, 3 January 2000	Department of Defense World Geodetic System 1984, Its Definition and Relationships with Local Geodetic Systems

AIM

1. The aim of this agreement is to promote interoperability for the exchange of ground moving target indicator radar data among North Atlantic Treaty Organisation (NATO) Intelligence, Surveillance, and Reconnaissance (ISR) Systems. The NATO Ground Moving Target Indicator Format (GMTIF) defines a standard for the data content and format for the products of ground moving target indicator radar systems and a recommended mechanism for relaying tasking requests to the radar sensor system.

AGREEMENT

2. This NATO Standardisation Agreement (STANAG) is promulgated by the Chairman of the NATO Standardisation Agency (NSA) under the authority vested in him by the NATO Military Committee. No departure may be made from the agreement without consultation with the Custodian. Participating nations agree to develop GMTI data formats with reference to this STANAG. Nations may propose changes at any time to the control authority where they will be processed in the same manner as the original agreement. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

DEFINITIONS

3. The terms and definitions used in this document are listed in Annex B.

GENERAL SECTION

4. This agreement contains two annexes with associated appendixes. Annex A contains the details of the GMTI format and Annex B lists the terms and definitions that apply to this agreement.

DETAILS OF AGREEMENT

5. The GMTIF STANAG defines a presentation layer protocol as defined in the International Standards Organisation - Open Systems Interconnection model (ISO/IEC 7498-1). Additionally, this STANAG is part of the NATO Imagery Interoperability Architecture (NIIA) which includes the data format standards STANAG 7023 for primary and STANAG 4545 for secondary imagery. The GMTIF standard alone does not guarantee interoperability. Compatibility must also be assured at other protocol layers. Certifiable implementation of the GMTIF for support of interoperability is subject to constraints not specified in this STANAG.

IMPLEMENTATION OF THE AGREEMENT

6. This STANAG is implemented by a nation when it has issued instructions that all such equipment procured for its forces will be in accordance with the characteristics detailed in this agreement.

TABLE OF CONTENTS

GMTI DATA FORMAT

PART 1 – DATA FORMAT DESCRIPTIONS

1.0 Introduction.

This section provides a general description of the document and details of the data and packet structure.

1.1 Scope.

This document provides a Ground Moving Target Indicator Format (GMTIF). Note that the term "Ground MTI" is interpreted to mean targets on the surface of the earth, to include terrestrial, littoral, and deep water areas, stationary rotators, and targets flying at low speeds close to the surface of the earth.

1.1.1 General.

The data format described in this document provides a means for the transmission of Ground Moving Target Indicator (GMTI) detection data. It also offers a format for requesting surveillance service from the sensor and for receiving acknowledgment that the requested surveillance will or will not be performed.

This NATO STANAG is capable of supporting the GMTI dissemination needs of the member nations, and shall be used in conjunction with other standards for the dissemination of complementary data.

The GMTIF is a binary, message-oriented format for the prompt dissemination of MTI data. It may be sent as a stand-alone format or it may be embedded in a frame-oriented format, such as the NATO Secondary Imagery Format (NSIF, STANAG 4545) or the National Imagery Transmission Format (NITF, MIL-STD-2500) for the dissemination of secondary imagery, or in a message-oriented format such as the NATO Primary Imagery Format (STANAG 7023) for the dissemination of primary imagery.

1.1.2 Organization.

Part 1 of this document provides introductory material and descriptions of the data format structure. Part 2 provides layout tables and definitions of required headers, segments, data fields and data subfields for data dissemination. Part

3 provides layout tables and definitions of recommended segments, data fields, and data subfields for requesting and acknowledging sensor services. Appendix 1 provides a listing of the GMTIF alphanumeric character sets.

This document shall be used in conjunction with the separately published Allied Engineering Documentation Publication No. 7 (AEDP-7), the NATO Ground Moving Target Indicator (GMTI) Format Implementation Guide. The AEDP provides additional technical references for the use of STANAG 4607. Technical sections of the AEDP include the following:

- a rationale and notional employment concept for using the GMTIF;
- a suggested technique for embedding the GMTIF data into NATO imagery formats;
- a preliminary description of the data format for a Range-Doppler Chip Segment;
- an overview of coordinate location systems;
- suggested groupings of GMTIF data fields to support five data exploitation classes;
- communications issues for dissemination of the GMTIF; and
- frequently asked questions pertaining to STANAG 4607.

Non-technical sections of the AEDP include:

- acquisition guidance;
- test and validation procedures;
- a configuration management plan;
- sample software; and
- a glossary of terms.

AEDP-7 also includes a Registry of Controlled Extensions which have been approved for use with STANAG 4607.

1.2 Definitions.

Acronyms, abbreviations, and definitions of terms used in describing radar systems, coordinate systems, time standards, and numbering conventions are included in Annex B.

1.3 Data and Packet Structure.

1.3.1 Packet Organization.

Data transmission in accordance with this format document shall be accomplished by means of packets. Each packet, consisting of a Packet Header and a number of Message Segments, will contain GMTI data pertinent to one radar job. If the amount of data exceeds the size limit of a GMTIF packet or if it is necessary to send the data in support of time-critical missions, the format allows a portion of the data to be sent in one GMTIF packet and the remainder of the data to be sent in subsequent GMTIF packets.

A Segment Header, which defines the type of message and the length (in bytes) of the following segment, precedes each Message Segment. Message Segments defined in this document include Mission, Dwell, HRR, Job Definition, Free Text, Test/Status, Processing History, and Platform Location. Dwell Segments may include Target Reports and the HRR Segment may include Scatterer Reports, as applicable.

Table 1-3 lists the Header and Message Segments that appear in this document and the paragraphs in which they are described. Note that the Range-Doppler, Group, Attached, LRI, and System-Specific Segments listed in this table are not implemented in this version of the standard.

Table 1-3. Header and Message Segment Listing

Segment Name	Ref. Paragraph
Packet Header	2.1
Segment Header	2.2
Mission Segment	2.3
Dwell Segment (Includes Target Reports)	2.4
HRR Segment (Includes HRR Scatterer Data)	2.5
Range-Doppler Segment (Includes Range-Doppler Scatterer Data) *	2.6
Job Definition Segment	2.7
Free Text Segment	2.8
LRI Segment *	2.9
Group Segment *	2.10
Attached Segment *	2.11
Test and Status Segment	2.12
System-Specific Segment *	2.13
Processing History Segment	2.14
Platform Location Segment	2.15
Job Request Segment	3.1
Job Acknowledge Segment	3.2

*Indicates segments to be defined in a later version

The Packet Header is sent at the beginning of each packet. It provides basic information concerning the platform, the job, the mission, nationality, security, and the length of the packet.

The Segment Header specifies the type and size of the segment that follows.

The Mission Segment provides information concerning the mission plan, the flight plan, the platform type and configuration, and the reference time for the mission.

The Dwell Segment is sent for each dwell of the radar beam. It provides information related to dwells and revisits, the sensor location, the coverage area, the time of the dwell, sensor orientation, and sensor parameters. It includes Target Reports for any GMTI detections observed within that dwell and shall be sent even if no targets are detected.

The High Range Resolution (HRR) Segment provides data on HRR measurements, which may be performed in conjunction with MTI detections. It includes HRR Scatterer Data pertaining to the HRR measurements.

The Job Definition Segment provides a definition of the radar job performed by the sensor, including information pertaining to the geolocation model used in the sensor measurement.
The Free Text Segment provides a means of sending alphanumeric text messages. The Test and Status Segment provides a means of exchanging health and status information of the platform systems.

The Processing History Segment provides a means of annotating the radar data to show its history as it is processed through various systems during transmission.

The Platform Location Segment provides the means for the platform to transmit its location during periods when it is not collecting data.

The Job Request and Job Acknowledge Segments are recommendations only and are not required for this format. The Job Request Segment provides a recommended format for requesting service from the sensor platform. The Job Acknowledge Segment provides a recommended format for acknowledging a sensor service request by a sensor platform, defining the job to be performed by the sensor, and notifying the requesting operator whether the task can be accomplished or not during the mission.

The Range-Doppler Segment is under development and appears in the AEDP for STANAG 4607 as a preliminary description only. It provides data on HRR reports and can also be used for High-Range Resolution Inverse Synthetic Array Radar (HRR-ISAR) targets.

The Group, Attached, LRI, and System-Specific Segments are undefined at this time and left for future definition.

Refer to the Registry of Controlled Extensions in the NATO Ground Moving Target Indicator (GMTI) Format Implementation Guide, AEDP-7, for additional segments which have been approved for use with STANAG 4607.

1.3.2 Data Transmission.

GMTIF information is transmitted in a message-oriented manner, with the message lengths defined by the Segment Headers. Multiple message segments of any type may be sent within the same packet. Figure 1-1 illustrates the general structure of the GMTIF data packet, showing representative message segments. The structure is constrained by the packet assembly rules described for each segment type, as defined in Parts 2 and 3 of this document. Note that the figure illustrates a typical GMTI packet structure and is not to be construed as representing all possible combinations of segments within a packet.

The data format described herein allows for loss of packets but assumes that the packets received are error-free. There is no provision or need within STANAG 4607 for Start- or End-of Message characters to be transmitted. The format does not specify error detection/correction, encryption, or the physical transmission of the data. The format requires these functions to be accomplished by the lower layers of the communications media that transmit the data.

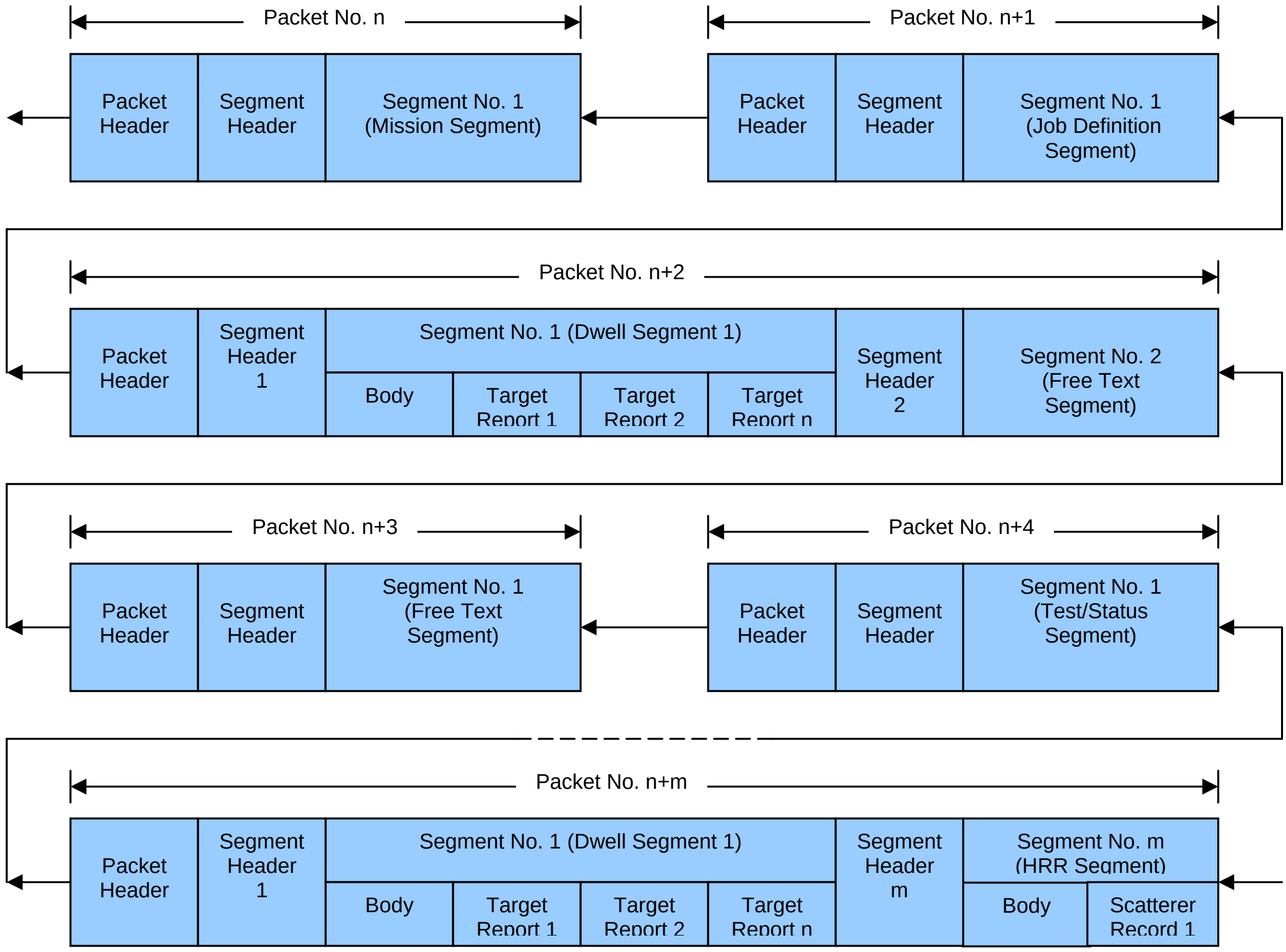

Figure 1-1. Notional Data Transmission for GMTIF Data

1.3.3 Data Fields.

Headers and data segments are defined in terms of data fields with various byte lengths. Each data field provides information pertaining to: the field identification; an indication of whether the field is Mandatory, Conditional, or Optional; the field name; the number of bytes within that field; the format of the data; the value range of the data; and the unit of measure (or appropriate comments) pertaining to the data. The segment layout tables and descriptions in Parts 2 and 3 of this document provide detailed descriptions of the data fields.

Note that the values shown in the Value Range column of the Segment Layout Tables may be given in decimal, hexadecimal, or alphanumeric form for human readability, but the data is actually transmitted in either binary, hexadecimal or ECS alphanumeric form, as appropriate for the data. Unless otherwise specified, alphanumeric fields shall be left-justified, with unused bytes filled with the BCS space character (hexadecimal 0x20).

All fields and subfields shall be defined at the byte boundaries (i.e., there are no half-bytes included in the structure). All bytes shall consist of 8 bits, with the most-significant bit transmitted first.

1.3.4 Mandatory, Conditional, And Optional Fields.

Each data field and subfield is identified by type as either Mandatory (M), Conditional (C), or Optional (O). Mandatory Fields are those which are essential to the format and must always be sent. Conditional Fields are those which are dependent on the presence or absence or the value of certain other fields and are sent only if they meet established conditions. Optional Fields are those which are not required but may be transmitted if they are available and if they provide added value or utility and are not constrained by communications or operational considerations. The “Existence Mask”, described in Paragraph 2.4.1, provides the capability to not send data when it is not needed (i.e., if it is Conditional or Optional). For Mandatory Fields for which no information is being provided, a “No Statement” value may be transmitted, where the No Statement value is defined in the Value Range column of the corresponding Segment Layout Table.

PART 2 – HEADER AND SEGMENT DESCRIPTIONS

2.0 General.

This section provides tables and descriptions of the GMTIF Packet and Segment Headers and the Mission, Dwell, HRR, Job Definition, Free Text, Test/Status, Processing History, and Platform Location Segments. The headers and segments described in Part 2 are required for the GMTI Format. Part 2 also includes reference paragraphs for Range-Doppler, Low Reflectivity Index (LRI), Group, Attached Target, and System-Specific Segments, which are identified as "Reserved – To Be Defined Later". With the exception of the Range-Doppler Segment, those segments are not detailed in this version of the document. A preliminary description of the Range-Doppler Segment is provided in the associated AEDP for STANAG 4607.

Recommended formats for Job Request and Job Acknowledge Segments, which are required only when a user requests sensor service, are described in Part 3. The Job Request and Job Acknowledge Segments are recommended and are not mandatory for this format.

2.1 Packet Header.

The Packet Header (Table 2-1) shall be sent at the beginning of each packet. It identifies the format version of the data contained in the packet, the size of the packet, and information pertaining to the platform, security, and the mission.

Table 2-1. Packet Header

Field	Type	Field Name		Bytes	Form	Value Range	Units
P1	M	Version ID		2	A	Per Para. 2.1.1	
P2	M	Packet Size		4	I32	32 to 4294967295	bytes
P3	M	Nationality		2	A	Alphanumeric	FIPS Pub 10-4
P4	M	Packet Security	Classification	1	E8	Per Para. 2.1.4	
P5	M		Class. System	2	A	Per Para. 2.1.5	
P6	M		Code	2	FL	Per Para. 2.1.6	
P7	M	Exercise Indicator		1	E8	Per Para. 2.1.10	
P8	M	Platform ID		10	A	Alphanumeric	(e.g., Tail No.)
P9	M	Mission ID		4	I32	Per Para. 2.1.9	
P10	M	Job ID		4	I32	0, 1 to 4294967295	

2.1.1 Version ID (P1) (M).

A two-character alphanumeric code indicating the version of STANAG 4607 to which the packet conforms. It shall be of the form "mn", where "m" indicates the edition number and "n" indicates the amendment number of that edition.

For example, a value of “10” indicates that it is edition 1 without any amendments. A value of “11” indicates that it is the edition 1 with amendment number 1 incorporated.

2.1.2 Packet Size (P2) (M).

Number of bytes in the entire packet, including this header. The minimum packet size shall be the number of bytes in the Packet Header, as shown in Table 2-1.

2.1.3 Nationality (P3) (M).

A digraph, in accordance with FIPS Publication 10-4, which identifies the nationality of the platform providing the GMTI data. NATO platforms providing GMTI data shall use the digraph XN.

2.1.4 Packet Security – Classification (P4) (M).

An enumeration table indicating the classification level of the packet. Allowable values are shown in Table 2-1.1.

Table 2-1.1. Packet Security Classification

VALUE	CLASSIFICATION
1	TOP SECRET
2	SECRET
3	CONFIDENTIAL
4	RESTRICTED
5	UNCLASSIFIED
6	NO CLASSIFICATION

2.1.5 Packet Security – Classification System (P5) (M).

A digraph indicating the national or multinational security system to which the security classification in field P4 conforms. Country codes for national security systems are in accordance with FIPS Publication 10-4. Example values are shown in Table 2-1.2. If this field is all BCS spaces (hexadecimal 0x20), it indicates that no Security Classification System applies to the file.

Table 2-1.2. Packet Classification Systems

CLASSIFICATION SYSTEM	DIGRAPH
Country Codes defined in FIPS Publication 10-4	BE, CA, DA, FR, GM, GR, IS, IT, LU, NL, NO, PO, SP, TR, GB, US
NATO Security System	XN
Additional codes	As registered with the Custodian

2.1.6 Packet Security – Code (P6) (M).

A two-byte flag field, defined in Table 2-1.3, that indicates additional control and/or handling instructions associated with the GMTI data. A value of 0 (hex 0x00) indicates there are no additional security codes that apply to the GMTI data. Each bit of the field, when set to a binary "1", indicates that the corresponding security code in Table 2-1.3 applies to the data. This field allows multiple security codes to be associated with the GMTI data. (NOTE: This table is representative, based on US security handling codes, and is not an exhaustive list of all allowable codes. Each nation shall be responsible for developing and publishing their own packet security handling codes as required.

Table 2-1.3. Packet Security Codes

VALUE (HEX)	CODEWORD
0x0000	NONE (NO-STATEMENT VALUE)
0x0001	NOCONTRACT
0x0002	ORCON
0x0004	PROPIN
0x0008	WNINTEL
0x0010	NATIONAL ONLY
0x0020	LIMDIS
0x0040	FOUO
0x0080	EFTO
0x0100	LIM OFF USE (UNCLAS)
0x0200	NONCOMPARTMENT
0x0400	SPECIAL CONTROL
0x0800	SPECIAL INTEL
0x1000	WARNING NOTICE – SECURITY CLASSIFICATION IS BASED ON THE FACT OF EXISTENCE AND AVAIL OF THIS DATA
0x2000	REL NATO (BEL, BGR, CAN, CZE, DNK, EST, FRA, DEU, GRC, HUN, ISL, ITA, LVA, LTU, LUX, NLD, NOR, POL, PRT, ROU, SVK, SVN, ESP, TUR, GBR, USA)
0x4000	REL 4-EYES (AUS, CAN, GBR, USA)
0x8000	REL 9-EYES (CAN, FRA, DEU, NLD, NOR, ESP, TUR, GBR, USA)

2.1.7 Exercise Indicator (P7) (M).

An enumeration table indicating whether the data contained in this packet is from a real-world military operation or from an exercise, and whether the data is real (originates from live-fly or other non-simulated operational sources), simulated (originates from target simulator sources), or synthesized (a mix of real and simulated data). Allowable values are shown in Table 2-1.4.

Table 2-1.4. Exercise Indicator

VALUE	DEFINITION
0	Operation, Real Data
1	Operation, Simulated Data
2	Operation, Synthesized Data
3-127	Reserved
128	Exercise, Real Data
129	Exercise, Simulated Data
130	Exercise, Synthesized Data
131-255	Reserved

2.1.8 Platform ID (P8) (M).

An alphanumeric field that identifies the platform. For aircraft the platform ID shall be the tail number. For a space-based platform the platform ID shall be the satellite name with an appropriate numerical designator. For other systems, an appropriate unique designator shall be used. Unused bytes shall be filled with the BCS space character (hex 0x20). In all cases, the platform ID is determined by the nation owning the platform, whose responsibility it is to ensure that all its platforms are uniquely identified within the set of platforms it owns.

2.1.9 Mission ID (P9) (M).

An integer field, assigned by the platform identified in Field P8, that uniquely identifies the mission for the platform.

2.1.10 Job ID (P10) (M).

A platform-assigned number identifying the specific request or task to which the packet pertains. The Job ID shall be unique within a mission. A Job ID of 0 (hex 0x00) indicates there is no reference to any specific request or task.

If the Job ID in the Packet Header is 0 (hex 0x00), then the packet can not contain Dwell, HRR, or Range-Doppler segments.

2.2 Segment Header.

The Segment Header (Table 2-2) shall be sent at the beginning of each segment transmitted within a packet. It identifies the type and size of the segment that follows.

Table 2-2. Segment Header

Field	Type	Field Name	Bytes	Form	Value Range	Units
S1	M	Segment Type	1	E8	1 = Mission Segment 2 = Dwell Segment 3 = HRR Segment 4 = Range-Doppler Segment 5 = Job Definition Segment 6 = Free Text Segment 7 = Low Reflectivity Index Segment 8 = Group Segment 9 = Attached Target Segment 10 = Test and Status Segment 11 = System-Specific Segment 12 = Processing History Segment 13 = Platform Location Segment 14-100 = Reserved for new Segments 101 = Job Request Segment 102 = Job Acknowledge Segment 103-127 = Reserved for future use 128-255 = Reserved for Extensions	
S2	M	Segment Size	4	I32	Refer to para. 2.2.2	

NOTE: Refer to the Registry of Controlled Extensions in the NATO Ground Moving Target Indicator (GMTI) Format Implementation Guide, AEDP-7, for additional segments which have been approved for use with STANAG 4607.

2.2.1 Segment Type (S1) (M).

An enumeration table indicating the type and content of the data segment which follows this header. The enumeration table for Segment types is shown in Table 2-2. Data segments corresponding to the values 4, 7, 8, 9, 11, 14-100, and 103-255 are reserved for future use.

2.2.2 Segment Size (S2) (M).

Number of bytes in this header and the data segment which follows this header, and not to exceed the maximum packet size as designated in field P2, Packet Size, of the Packet Header, minus the size of the Packet Header itself.

2.3 Mission Segment.

The Mission Segment (Table 2-3) provides information concerning the mission and shall be sent periodically at least once every two minutes. It includes information on the mission and flight plans, the type and configuration of the platform, and the reference time. Note that the Dwell Time (field D6) specified in any associated Dwell Segments is referenced to the Reference Time (fields M5-M7) in the Mission Segment, and will not be resolved as to the day of the mission until the Mission Segment is received from the transmitting platform.

Table 2-3. Mission Segment

Field	Type	Field Name		Bytes	Form	Value Range	Units
M1	M	Mission Plan		12	A	Alphanumeric	BCS Set
M2	M	Flight Plan		12	A	Alphanumeric	BCS Set
M3	M	Platform Type		1	E8	Per Para. 2.3.3	
M4	M	Platform Configuration		10	A	Alphanumeric	BCS Set
M5	M	Reference Time	Year	2	I16	e.g., 2002	
M6	M		Month	1	I8	1 to 12	
M7	M		Day	1	I8	1 to 31	

2.3.1 Mission Plan (M1) (M).

An alphanumeric field that identifies the mission, and which shall be unique for all the missions defined for that platform. For aircraft or land-based systems, the Mission Number from the Air Tasking Order (ATO) or an equivalent document shall be used. For space-based platforms, the mission identifier or a suitable designator such as “yymmhhnn”, where yy (year), mm (month), and hh (hour) indicate the time the collection mission began and nn is the identifying number of the satellite, shall be used. If there is no Mission Plan to be sent, or if there are unused bytes in the field, the field shall be filled with the BCS space character (hex 0x20).

2.3.2 Flight Plan (M2) (M).

An alphanumeric field that identifies the flight plan. This field provides a unique identification of the flight plan. If the flight plan is not available from the ATO or an equivalent source, a suitable unique identifier may be inserted in this field. If there is no Flight Plan to be sent, or if there are unused bytes in the field, the field shall be filled with the BCS space character (hex 0x20).

2.3.3 Platform Type (M3) (M).

An enumeration table that identifies the type of platform that originated the data. Current platform types are listed in Table 2-3.1. New platform types shall be registered with the Custodian.

Table 2-3.1. Platform Types

PLATFORM	VALUE
Unidentified	0
ACS	1
ARL-M	2
Sentinel *(was ASTOR)*	3
Rotary Wing Radar *(was CRESO)*	4
Global Hawk-Navy	5
HORIZON	6
E-8 (Joint STARS)	7
P-3C	8
Predator	9
RADARSAT2	10
U-2	11
E-10 *(was MC2A)*	12
UGS - Single	13
UGS - Cluster	14
Ground Based	15
UAV-Army	16
UAV-Marines	17
UAV-Navy	18
UAV-Air Force	19
Global Hawk- Air Force	20
Global Hawk-Australia	21
Global Hawk-Germany	22
Paul Revere	23
Mariner UAV	24
BAC-111	25
Coyote	26
King Air	27
LIMIT	28
NRL NP-3B	29
SOSTAR-X	30
WatchKeeper	31
Alliance Ground Surveillance (AGS) (A321)	32
Stryker	33
AGS (HALE UAV)	34
SIDM	35
Reaper	36
Warrior A	37
Warrior	38
Available for Future Use	39-254
Other	255

2.3.4 Platform Configuration (M4) (M).

An alphanumeric field indicating the particular variant of the platform. Identifies sensor complements, upgrades, or other identifying information. Examples would be a model number, software release number, clarifications of differences in platform types, or identification of the platform as a test article. A recommended default value is an identification of the software and/or hardware version. If there is no Platform Configuration to be sent, the fields shall be filled with the BCS space character (hex 0x20).

2.3.5 Reference Time – Year (M5) (M).

The year in which the mission originated. For airborne platforms, this shall be the takeoff time. For spaceborne platforms, this shall be an epoch time, which shall be selected suitable for the collection. For ground-based platforms, a time reference suitable for collection shall be selected.

2.3.6 Reference Time – Month (M6) (M).

The month of the year in which the mission originated. For airborne platforms, this shall be the takeoff time. For spaceborne platforms, this shall be an epoch time, which shall be selected suitable for the collection. For ground-based platforms, a time reference suitable for collection shall be selected.

2.3.7 Reference Time – Day (M7) (M).

The day of the month in which the mission originated, UTC. For airborne platforms, this shall be the day of takeoff. For satellite platforms, this shall be an epoch time, which shall be selected suitable for the collection. For ground-based platforms, a time reference suitable for collection shall be selected.

Note that the Dwell Time fields, D6 in the Dwell Segment and T4 in the Test and Status Segment, are obtained as the count in milliseconds from the time 00:00:00 UTC of this day. (Refer to Para. 5 of Annex B.) The maximum value of field D6 is equivalent to 49 days. Therefore, to prevent the time stamp in field D6 from being repeated, a new mission day must be provided every 49 days or more frequently.

2.4 Dwell Segment.

A Dwell Segment is a report on a grouping of zero or more target reports for which the sensor provides a single time, sensor position, reference position on the ground with simple estimates for the observed area at the reported time, and other pertinent data. A Dwell Segment may be associated with a radar dwell but need not be. The Dwell Segment (Table 2-4) presents data pertinent to MTI targets. Dwell Segments shall be sent for each logical grouping of target reports. A Dwell Segment shall be transmitted even if no targets are observed. A Dwell Segment may be sent only if the Job ID in the associated Packet Header is not equal to zero (hex 0x00).

Table 2-4. Dwell Segment

Field	Type	Field Name		Bytes	Form	Value Range	Units
D1	M	Existence Mask		8	FL64	Per Para. 2.4.1	
D2	M	Revisit Index		2	I16	0 to 65535	
D3	M	Dwell Index		2	I16	0 to 65535	
D4	M	Last Dwell of Revisit		1	FL8	0,1	Flag Bit
D5	M	Target Report Count		2	I16	0 to 65535	
D6	M	Dwell Time		4	I32	0 to 4 x (10^9)	milliseconds
D7	M	Sensor Position	Latitude	4	SA32	- 90 to +89.999999958	degrees
D8	M		Longitude	4	BA32	0 to +359.999999916	degrees
D9	M		Altitude	4	S32	-50000 to + 2 billion	centimeters
D10	C	Scale Factor	Lat Scale	4	SA32	Per Para. 2.4.10	degrees
D11	C		Long Scale	4	BA32	Per Para. 2.4.11	degrees
D12	O	Sensor Position Uncertainty (one standard deviation)	Along Track	4	I32	0 to 1,000,000	centimeters
D13	O		Cross Track	4	I32	0 to 1,000,000	centimeters
D14	O		Altitude	2	I16	0 to 65,535	centimeters
D15	C	Sensor Track		2	BA16	0 to 359.9945	degrees (CW from True North)
D16	C	Sensor Speed		4	I32	0 to 8000000	millimeters/sec
D17	C	Sensor Vertical Velocity		1	S8	-128 to +127	decimeters/sec
D18	O	Sensor Track Uncertainty		1	I8	0 to 45	degrees
D19	O	Sensor Speed Uncertainty		2	I16	0 to 65535	millimeters/sec
D20	O	Sensor Vertical Velocity Uncertainty		2	I16	0 to 65535	centimeters/sec
D21	C	Platform Orientation	Heading	2	BA16	0 to 359.9945	degrees (CW from True North)
D22	C		Pitch	2	SA16	-90 to +89.9973	degrees
D23	C		Roll (Bank Angle)	2	SA16	-90 to +89.9973	degrees
D24	M	Dwell Area	Center Latitude	4	SA32	- 90 to + 89.999989	degrees
D25	M		Center Longitude	4	BA32	0 to +359.999979	degrees
D26	M		Range Half Extent	2	B16	0 to 255.9928	kilometers
D27	M		Dwell Angle Half Extent	2	BA16	0 to 359.9945	degrees
D28	O	Sensor Orientation	Heading	2	BA16	0 to 359.9945	degrees
D29	O		Pitch	2	SA16	-90 to +89.9973	degrees
D30	O		Roll	2	SA16	-90 to +89.9973	degrees
D31	O	Minimum Detectable Velocity, MDV		1	I8	0 to 255	decimeters/sec
D32		< Target Reports >				Per Para. 2.4.32	

2.4.1 Existence Mask (D1) (M).

The Existence Mask, the first field of the Dwell Segment, is an encoded eight-byte field that immediately follows the Segment Header fields and precedes all other Dwell Segment fields. Each field of the Dwell Segment, with the exception of the Existence Mask itself, is represented by a reserved bit within the Existence Mask. Each bit of the Existence Mask indicates whether or not the corresponding field of the Dwell Segment is present in the data stream. The most-significant bit (bit 7) of the high-order byte (byte 7) corresponds to the first field (D2) following the Existence Mask of the Dwell Segment, where the high-order byte shall be transmitted first. Figure 2-1 illustrates the mapping of each Dwell Segment field to the corresponding bit position in the 8-byte Existence Mask. A binary level of “1” for a given bit indicates that the corresponding field of the Dwell Segment is present in the data stream and a binary level of “0” indicates that it is not present. Unused bits shall be filled with zeroes.

Byte No.	Bit No.	Field No.	Type	Value	Byte No.	Bit No.	Field No.	Type	Value
7	7	D2	M	1	3	7	D32.3	C	0,1
7	6	D3	M	1	3	6	D32.4	C	0,1
7	5	D4	M	1	3	5	D32.5	C	0,1
7	4	D5	M	1	3	4	D32.6	O	0,1
7	3	D6	M	1	3	3	D32.7	O	0,1
7	2	D7	M	1	3	2	D32.8	O	0,1
7	1	D8	M	1	3	1	D32.9	O	0,1
7	0	D9	M	1	3	0	D32.10	O	0,1
6	7	D10	C	0,1	2	7	D32.11	O	0,1
6	6	D11	C	0,1	2	6	D32.12	C	0,1
6	5	D12	O	0,1	2	5	D32.13	C	0,1
6	4	D13	O	0,1	2	4	D32.14	C	0,1
6	3	D14	O	0,1	2	3	D32.15	C	0,1
6	2	D15	C	0,1	2	2	D32.16	O	0,1
6	1	D16	C	0,1	2	1	D32.17	O	0,1
6	0	D17	C	0,1	2	0	Spare	N/A	0
5	7	D18	O	0,1	1	7	Spare	N/A	0
5	6	D19	O	0,1	1	6	Spare	N/A	0
5	5	D20	O	0,1	1	5	Spare	N/A	0
5	4	D21	C	0,1	1	4	Spare	N/A	0
5	3	D22	C	0,1	1	3	Spare	N/A	0
5	2	D23	C	0,1	1	2	Spare	N/A	0
5	1	D24	M	1	1	1	Spare	N/A	0
5	0	D25	M	1	1	0	Spare	N/A	0
4	7	D26	M	1	0	7	Spare	N/A	0
4	6	D27	M	1	0	6	Spare	N/A	0
4	5	D28	O	0,1	0	5	Spare	N/A	0
4	4	D29	O	0,1	0	4	Spare	N/A	0
4	3	D30	O	0,1	0	3	Spare	N/A	0
4	2	D31	O	0,1	0	2	Spare	N/A	0
4	1	D32.1	C	0,1	0	1	Spare	N/A	0
4	0	D32.2	C	0,1	0	0	Spare	N/A	0

Figure 2-1. Dwell Segment Existence Mask Mapping

As an example, an Existence Mask in which the first 2 bytes transmitted (bytes 7 and 6) have hexadecimal value 0xFF3F is interpreted to mean that fields D2 through D9 and D12 through D17 exist and are transmitted (as indicated by binary ones in those fields). Fields D10 and D11 (corresponding to Latitude and Longitude Scale Factors) do not exist (as indicated by binary zeroes) and are not transmitted. Figure 2-2 shows this example for bytes 7 and 6 of the Existence Mask.

Byte	Byte 7								Byte 6							
Hex	F				F				3				F			
Mask	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1
Field	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17
Xmit?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes

Figure 2-2. Example of Existence Mask

2.4.2 Revisit Index (D2) (M).

The sequential count of a revisit of the bounding area for a given job ID, where a Revisit Index of “0” indicates the first revisit.

2.4.3 Dwell Index (D3) (M).

The temporally sequential count of a dwell within the revisit of a particular bounding area for a given job ID. A dwell index of “0” indicates the first dwell of the revisit. (NOTE: Revisit counts are allowed to “wrap” when the allowable range of revisits is exceeded.)

2.4.4 Last Dwell of Revisit (D4) (M).

A flag to indicate that this is the last dwell of the revisit. The Last Dwell of Revisit flag set to “1” indicates there are no additional dwells within that revisit. (NOTE: A Dwell Index, field D3, of “0” and a Last Dwell of Revisit, field D4, of “1” indicates this is the first and only dwell. This allows the concept of a “dwell” to be used by systems that do not utilize multiple dwells or revisits of the radar beam.)

2.4.5 Target Report Count (D5) (M).

A count of the total number of targets reported during this dwell and sent in this Dwell Segment.

2.4.6 Dwell Time (D6) (M).

The elapsed time, expressed in milliseconds, from the midnight at the beginning of the day specified in the Reference Time fields of the Mission Segment to the temporal center of the dwell. In this manner, the Dwell Time corresponds to the day's UTC time converted to milliseconds, with the possible addition of multiples of 86400000 for multi-day missions.

2.4.7 Sensor Position – Latitude (D7) (M).

The North-South position of the sensor at the temporal center of the dwell, expressed as degrees North (positive) or South (negative) of the Equator.

2.4.8 Sensor Position – Longitude (D8) (M).

The East-West position of the sensor at the temporal center of the dwell, expressed as degrees East (positive) from the Prime Meridian.

2.4.9 Sensor Position – Altitude (D9) (M).

The altitude of the sensor at temporal center of the dwell, referenced to its position above the WGS 84 ellipsoid, expressed in centimeters.

2.4.10 Scale Factor – Latitude Scale (D10) (C).

A factor which modifies the value of the reported target latitude (Delta Latitude, field D32.4) when it is necessary to send the reduced bandwidth version of the Target Report. The Latitude Scale factor and Delta Latitude are used in conjunction with the Dwell Area Center Latitude (field D24) to recover the target latitude as follows:

Latitude = [(Delta Lat) x (Lat Scale)] + (Center Lat)

= [(D32.4) x (D10)] + (D24)

The Latitude Scale shall be chosen in accordance with the guidance given in the AEDP for STANAG 4607.

Field D10 is Conditional and is always sent with field D11. They are sent if and only if the optional difference fields Delta Latitude (D32.4) and Delta Longitude (D32.5) are sent in the Target Report.

2.4.11 Scale Factor – Longitude Scale (D11) (C).

A factor which modifies the value of the reported target longitude (Delta Longitude, field D32.5) when it is necessary to send the reduced bandwidth version of the Target Report. The Longitude Scale factor and Delta Longitude are used in conjunction with the Dwell Area Center Longitude (field D25) to recover the target latitude as follows:

Longitude = [(Delta Long) x (Long Scale)] + (Center Long)

= [(D32.5) x (D11)] + (D25)

The Longitude Scale shall be chosen in accordance with the guidance given in the AEDP for STANAG 4607.

Field D11 is Conditional and is always sent with field D10. They are sent if and only if the optional difference fields Delta Latitude (D32.4) and Delta Longitude (D32.5) are sent in the Target Report).

2.4.12 Sensor Position Uncertainty – Along Track (D12) (O).

Estimate of the standard deviation in the estimated horizontal sensor location at the time of the dwell, measured along the sensor track direction (field D15), expressed in centimeters.

Field D12 is Optional. It is always sent with fields D13 and D14.

2.4.13 Sensor Position Uncertainty – Cross-Track (D13) (O).

Estimate of the standard deviation in the estimated horizontal sensor location at the time of the dwell, measured orthogonal to the track direction (field D15), expressed in centimeters.

Field D13 is Optional. It is always sent with fields D12 and D14.

2.4.14 Sensor Position Uncertainty – Altitude (D14) (O).

Standard deviation of the sensor altitude estimate (field D11), expressed in centimeters.

Field D14 is Optional. It is always sent with fields D12 and D13

2.4.15 Sensor Track (D15) (C).

The ground track of the sensor at the time of the dwell, expressed as the angle in degrees (clockwise) from True North.

Field D15 is Conditional and is always sent with fields D16 and D17. They are sent only when the sensor system provides these parameters.

2.4.16 Sensor Speed (D16) (C).

The ground speed of the sensor at the time of the dwell, expressed as millimeters per second.

Field D16 is Conditional and is always sent with fields D15 and D17. They are sent only when the sensor system provides these parameters.

2.4.17 Sensor Vertical Velocity (D17) (C).

The velocity of the sensor in the vertical direction, expressed as decimeters per second.

Field D17 is Conditional and is always sent with fields D15 and D16. They are sent only when the sensor system provides these parameters.

2.4.18 Sensor Track Uncertainty (D18) (O).

The standard deviation of the estimate of the sensor track along the ground, expressed in degrees.

Field D18 is Optional. It is always sent with fields D19 and D20.

2.4.19 Sensor Speed Uncertainty (D19) (O).

The standard deviation of estimate of the sensor speed, expressed in millimeters per second.

Field D19 is Optional. It is always sent with fields D18 and D20.

2.4.20 Sensor Vertical Velocity Uncertainty (D20) (O).

The standard deviation of estimate of the sensor vertical velocity, expressed in centimeters per second.

Field D20 is Optional. It is always sent with fields D18 and D19.

2.4.21 Platform Orientation - Heading (D21) (C).

The heading of the platform at the time of the dwell, expressed as the angle in degrees (clockwise) from True North to the roll axis of the platform, where roll axis is defined in Figure 2-3.

Field D21 is Conditional and is always sent with fields D22 and D23. They are sent only when the platform provides these parameters.

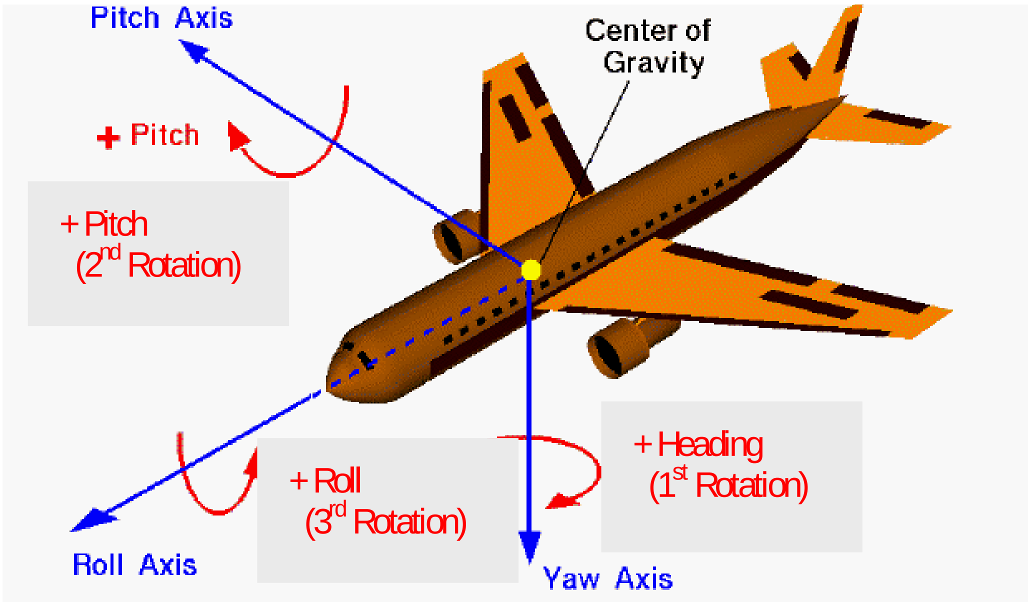

Figure 2-3. Platform Orientation Axes
(Note the order of rotation measurements must be adhered to: heading, then pitch, then roll.)

2.4.22 Platform Orientation - Pitch (D22) (C).

The pitch angle of the platform at the time of the dwell, expressed as the angle in degrees of the rotation of the platform about its pitch axis, as shown in Figure 2-3, where a positive angle is an upward attitude of the nose of the platform.

Field D22 is Conditional and is always sent with fields D21 and D23. They are sent only when the platform provides these parameters.

2.4.23 Platform Orientation - Roll (D23) (C).

The roll angle of the platform at the time of the dwell, expressed as the angle in degrees of the rotation of the platform about its roll axis, as shown in Figure 2-3, where a positive angle is the clockwise direction as viewed from the rear of the platform. (NOTE: The term “Platform Bank Angle” is synonymous with the term “Platform Roll Angle”.)

Field D23 is Conditional and is always sent with fields D21 and D22. They are sent only when the platform provides these parameters.

2.4.24 Dwell Area – Center Latitude (D24) (M).

The North-South position of the center of the dwell area, expressed as degrees North (positive) or South (negative) of the Equator.

2.4.25 Dwell Area – Center Longitude (D25) (M).

The East-West position of the center of the dwell area, expressed as degrees East (positive) of the Prime Meridian.

2.4.26 Dwell Area – Range Half Extent (D26) (M).

The distance on the earth surface, expressed in kilometers, from the near edge to the center of the dwell area.

2.4.27 Dwell Area – Dwell Angle Half Extent (D27) (M).

For dwell based radars, one-half of the 3-dB beamwidth, expressed in degrees as a 16-bit unsigned binary angle. For non-dwell based radars, the angle between the beginning of the dwell to the center of the dwell, as measured from the sensor's position.

2.4.28 Sensor Orientation – Heading (D28) (O).

The rotation of the sensor broadside face about the local vertical axis of the platform, expressed in degrees clockwise when viewed from above. This is the first of three successive rotations from a hypothetical initial position in which the sensor broadside (normal to the sensor face) is in its normal "rest" position (i.e., along the platform roll axis for forward-looking sensors or along the platform pitch axis for side-looking sensors) and the sensor face is nominally level (i.e., the lateral axis of the face is level, pointing along the roll or pitch axis as applicable, and the yaw axis points along the direction of the local vertical). In the case where the sensor is an electronically steerable array (ESA), 'Sensor Orientation - Heading' refers to the rotation of the radar beam about the local vertical axis of the platform, and is independent of any mechanical rotation of the sensor.

Field D28 is Optional. If at least one of fields D28, D29, or D30 is present, then any omitted field shall represent an angle of zero degrees.

2.4.29 Sensor Orientation – Pitch (D29) (O).

The rotation angle of the sensor normal about the lateral axis of the sensor broadside, which is pointing in the direction defined by the sensor orientation heading angle. It is expressed in degrees, where an angle above the horizontal is positive. This is the second of three successive rotations from the hypothetical initial position of the sensor, as described above. In the case where the sensor is an electronically steerable array (ESA), 'Sensor Orientation - Pitch' refers to the rotation of the radar beam about the lateral axis of the platform, and is independent of any mechanical rotation of the sensor.

Field D29 is Optional. If at least one of fields D28, D29, or D30 is present, then any omitted field shall represent an angle of zero degrees.

2.4.30 Sensor Orientation – Roll (D30) (O).

The rotation angle of the sensor about the transverse axis of the sensor broadside, which is pointing in the direction defined by the sensor orientation heading angle. It is expressed in degrees, where a clockwise rotation is positive, as seen from behind the face of the sensor. This is the third of three successive rotations from the hypothetical initial position of the sensor, as described above. In the case where the sensor is an electronically steerable array (ESA), 'Sensor Orientation - Roll' refers to the rotation of the radar beam about the transverse axis of the platform, and is independent of any mechanical rotation of the sensor.

Field D30 is Optional. If at least one of fields D28, D29, or D30 is present, then any omitted field shall represent an angle of zero degrees.

2.4.31 Minimum Detectable Velocity, MDV (D31) (O).

The minimum velocity component, along the line of sight, which can be detected by the sensor; expressed in decimeters per second.

Field D31 is Optional.

2.4.32 < Target Reports >.

Table 2-4.1 describes the format for the Target Reports. One Target Report shall be transmitted for each target observed within the dwell. Targets detected within a dwell may be split among multiple Dwell Segments. Targets detected within a dwell but detected by different radar modes or radar processors shall be reported in separate Dwell Segments (e.g., Endo-Clutter, Exo-Clutter, targets associated with HRR, etc.). Table 2-7.2 provides a list of radar modes.

Table 2-4.1. Target Report

Field	Type	Field Name		Bytes	Form	Value Range	Units
D32.1	C	MTI Report Index		2	I16	0 to 65535	none
D32.2	C	Target Location	Hi-Res Latitude	4	SA32	- 90 to +89.999999958	degrees
D32.3	C		Hi-Res Longitude	4	BA32	0 to +359.999999916	degrees
D32.4	C		Delta Lat	2	S16	- 32768 to + 32767	
D32.5	C		Delta Long	2	S16	- 32768 to + 32767	
D32.6	O		Geodetic Height	2	S16	-1000 to + 32767	meters
D32.7	O	Target Velocity Line-of-Sight Component (Radial Velocity)		2	S16	-32768 to +32767, where + means increasing range away from the sensor	centimeters/sec
D32.8	O	Target Wrap Velocity		2	I16	0 to 65535	centimeters/sec
D32.9	O	Target SNR		1	S8	-128 to +127	dB
D32.10	O	Target Classification		1	E8	Per Para. 2.4.32.10.	
D32.11	O	Target Class. Probability		1	I8	0 to 100	percent
D32.12	C	Target Measurement Uncertainty (one standard deviation)	Slant Range	2	I16	0 to 65535	centimeters
D32.13	C		Cross Range	2	I16	0 to 65535	decimeters
D32.14	C		Height	1	I8	0 to 255	meters
D32.15	C		Target Radial Velocity	2	I16	0 to 5000	centimeters/sec
D32.16	C	Truth Tag	Application	1	I8	0, 1 to 255	
D32.17	C		Entity	4	I32	0, 1 to 4294967295	

2.4.32.1 MTI Report Index (D32.1) (C).

The sequential count of this MTI report within the dwell.

Field D32.1 is Conditional and must be sent if an HRR report is provided for targets in this dwell.

2.4.32.2 Target Location – High-Resolution Latitude (D32.2) (C).

The North-South position of the reported detection, expressed as degrees North (positive) or South (negative) of the Equator.

Field D32.2 is Conditional and is always sent with field D32.3. They are sent only when the transmission bandwidth permits the use of 4 bytes each for target latitude and longitude. If fields D32.2 and D32.3 are sent, then fields D32.4 and D32.5 are not sent.

2.4.32.3 Target Location – High-Resolution Longitude (D32.3) (C).

The East-West position of the reported detection, expressed as degrees East (positive) from the Prime Meridian.

Field D32.3 is Conditional and is always sent with field D32.2. They are sent only when the transmission bandwidth permits the use of 4 bytes each for target latitude and longitude. If fields D32.2 and D32.3 are sent, then fields D32.4 and D32.5 are not sent.

2.4.32.4 Target Location – Delta Latitude (D32.4) (C).

The North-South position of the reported detection, expressed as degrees North (positive) or South (negative) from the Dwell Area Center Latitude (the Reference Point) sent in Field D24. This field shall be sent when it is necessary to send the reduced bandwidth version of the Target Report. Delta Latitude is used in conjunction with the Latitude Scale factor (field D10) and the Dwell Area Center Latitude (field D24) to recover the target latitude as follows:

Latitude = [(Delta Lat) x (Lat Scale)] + (Center Lat)

= [(D32.4) x (D10)] + (D24)

Field D32.4 is Conditional and is always sent with fields D32.5, D10, and D11. They shall be used when the transmission bandwidth and the number of targets do not permit the use of 4 bytes each for target latitude and longitude. If fields D32.4, D32.5, D10, and D11 are sent, then fields D32.2 and D32.3 are not sent.

2.4.32.5 Target Location – Delta Longitude (D32.5) (C).

The East-West position of the reported detection, expressed as degrees East (positive) from the Dwell Area Center Longitude (the Reference Point) sent in Field D25. This field is sent when it is necessary to send the reduced bandwidth version of the Target Report. Delta Longitude is used in conjunction with the Longitude Scale factor (field D11) and the Dwell Area Center Longitude (field D25) to recover the target latitude as follows:

Longitude = [(Delta Long) x (Long Scale)] + (Center Long)

= [(D32.5) x (D11)] + (D25)

Field D32.5 is Conditional and is always sent with fields D32.4, D10, and D11. They shall be used when the transmission bandwidth and the number of targets do not permit the use of 4 bytes each for target latitude and longitude. If fields D32.4, D32.5, D10, and D11 are sent, then fields D32.2 and D32.3 are not sent.

2.4.32.6 Target Location – Geodetic Height (D32.6) (O).

The height of the reported detection, referenced to its position above the WGS 84 ellipsoid, expressed in meters. This field reports the geodetic height used within the translation from the target's radar coordinates to the target's geodetic coordinates.

If this field is not sent, the target height shall be interpreted as being on the earth model described in the Job Definition Segment, fields J27 and J28. It may also be available from alternative local sources, such as the 10^o x 10^o geoid height data over the WGS84 ellipsoid, with DTED Level 0 terrain elevation data, which is available over the Internet.

Field D32.6 is Optional.

2.4.32.7 Target Velocity Line-Of-Sight Component (D32.7) (O).

The component of velocity for the reported detection, expressed in centimeters per second, corrected for platform motion, along the line of sight between the sensor and the reported detection, where the positive direction is away from the sensor. NOTE: Target Velocity Line-Of-Sight Component may also be known as Radial Velocity.

Field D32.7 is Optional. If field D32.7 is sent, then field D32.8 shall also be sent.

2.4.32.8 Target Wrap Velocity (D32.8) (O).

Half the velocity aliasing period. For most radars this is calculable as the effective PRF (i.e., the product of PRF's on CPI's for which the target was detected) multiplied by the effective sensor wavelength divided by four. The target wrap velocity permits trackers to un-wrap velocities for targets with line-of sight components large enough to exceed the first velocity period. When the target's wrap velocity is low compared to the target's expected line-of-sight velocity the tracker may consider adding multiples of twice the target wrap velocity to field D32.7.

Field D32.8 is Optional. If field D32.8 is sent, then field D32.7 shall also be sent.

2.4.32.9 Target SNR (D32.9) (O).

Estimated signal-to-noise ratio (SNR) of the target return, expressed in decibels.

Field D32.9 is Optional.

2.4.32.10 Target Classification (D32.10) (O).

An enumeration field denoting the classification of the target. Classification types shall include wheeled, non-wheeled (i.e., tracked), helicopter, low-slow flyer, rotating antenna, maritime, beacon, and unknown, for both live and simulated targets. If a target can not be classified, it shall be marked as “unknown”. The enumeration table for target classification is shown in Table 2-4.2.

Field D32.10 is Optional.

Table 2-4.2. Target Classification

VALUE	TARGET CLASSIFICATION
0	No Information, Live Target
1	Tracked Vehicle, Live Target
2	Wheeled Vehicle, Live Target
3	Rotary Wing Aircraft, Live Target
4	Fixed Wing Aircraft, Live Target
5	Stationary Rotator, Live Target
6	Maritime, Live Target
7	Beacon, Live Target
8	Amphibious, Live Target
9-125	Reserved
126	Other, Live Target
127	Unknown, Live Target
128	No Information, Simulated Target
129	Tracked Vehicle, Simulated Target
130	Wheeled Vehicle, Simulated Target
131	Rotary Wing Aircraft, Simulated Target
132	Fixed Wing Aircraft, Simulated Target
133	Stationary Rotator, Simulated Target
134	Maritime, Simulated Target
135	Beacon, Simulated Target
136	Amphibious, Simulated Target
137-253	Reserved
254	Other, Simulated Target
255	Unknown, Simulated Target

2.4.32.11 Target Classification Probability (D32.11) (O).

The estimated probability that the target classification appearing in field D32.10 is correctly classified.

Field D32.11 is Optional.

2.4.32.12 Target Measurement Uncertainty – Slant Range (D32.12) (C).

The standard deviation of the estimated slant range of the reported detection, expressed in centimeters.

Field D32.12 is Conditional. It is sent only if fields D12, D13, and D14 of the Dwell Segment are sent, and shall be sent with fields D32.13, D32.14, and D32.15, if they are available.

2.4.32.13 Target Measurement Uncertainty – Cross Range (D32.13) (C).

The standard deviation of the position estimate, in the cross-range direction, of the reported detection, expressed in decimeters.

Field D32.13 is Conditional. It is sent only if fields D12, D13, and D14 of the Dwell Segment are sent, and shall be sent with fields D32.12, D32.14, and D32.15, if they are available.

2.4.32.14 Target Measurement Uncertainty – Height (D32.14) (C).

The standard deviation of the estimated geodetic height reported in field D32.6, expressed in meters.

Field D34.14 is Conditional. It is sent only if fields D12, D13, and D14 of the Dwell Segment and D32.6 of the Target Report are sent, and shall be sent with fields D32.12, D32.13, and D32.15, if they are available.

2.4.32.15 Target Measurement Uncertainty – Target Radial Velocity (D32.15) (C).

The standard deviation of the measured line-of-sight velocity component reported in field D32.7, expressed in centimeters per second.

Field D32.15 is Conditional. It is sent only if fields D12, D13, and D14 of the Dwell Segment and D32.7 of the Target Report are sent, and shall be sent with fields D32.12, D32.13, and D32.14, if they are available.

2.4.32.16 Truth Tag – Application (D32.16) (C).

The Truth Tag – Application is the Application Field, truncated to 8 bits, from the Entity State Protocol Data Unit (PDU) used to generate the MTI Target. If the MTI Target is the result of more than one Entity State PDU, then the value of the target with the highest instantaneous radar return is passed in this field. A value of all zeros indicates that no information is available regarding the Entity State PDU that was used to generate the MTI Target being passed. For simulated data, the Truth Tag relates targets back to the truth data, which is represented using Distributed Interactive Simulation (DIS) Entity State PDUs.

Field D32.16 is Conditional and is sent only if the MTI Target in this Report is simulated. It is always sent with field D32.17.

2.4.32.17 Truth Tag – Entity (D32.17) (C).

The Truth Tag - Entity is the Entity Field from the Entity State PDU used to generate the MTI Target. It is passed as a 32-bit value, in the same format as the Entity State PDU Identity value. A value of all zeros indicates that no information is available regarding the Entity State PDU that was used to generate the MTI Target being passed. For simulated data, the Truth Tag relates targets back to the truth data, which is represented using DIS Entity State PDUs.

Field D32.17 is Conditional and is sent only if the MTI Target in this Report is simulated. It is always sent with field D32.16.

2.5 HRR Segment.

The HRR Segment (Table 2-5) provides data on High-Range Resolution (HRR) targets. It is referenced to the MTI Report Index field of the corresponding Target Report in the Dwell Segment and shall be sent each time an HRR dwell is processed.

Table 2-5. HRR Segment

Field	Type	Field Name	Bytes	Form	Value Range	Units
H1	M	Revisit Index.	2	I16	0 to 65535	
H2	M	Dwell Index.	2	I16	0 to 65535	
H3	M	Last Dwell of Revisit	1	FL8	0,1	Flag Bit
H4	M	MTI Report Index	2	I16	0 to 65535	
H5	M	Number of Target Scatterers	2	I16	1 to 65535	
H6	M	Mean Clutter Power relative to peak scatterer	1	I8	0 to 255 (Per para. 2.5.6)	-dB/4
H7	M	Detection Threshold Relative To peak scatterer	1	I8	0 to 255 (Per para. 2.5.7)	-dB/4
H8	M	Range resolution	1	I8	1 to 255 0 = No Statement	centimeters
H9	M	Range Bin Spacing	1	I8	1 to 255	centimeters
H10	M	Doppler Resolution	2	B16	.0078125 to 255 0 = No Statement	Hertz
H11	M	Doppler Bin Spacing	2	B16	.0078125 to 255	Hertz
H12	M	Compression Flag	1	E8	0 = No Compression, 1 = Threshold Decomposition (x10), 2-255 = Reserved	
H13	M	Range Weighting Function Type	1	E8	0 = No Statement, 1 = Taylor Weighting, 2 = Other	
H14	M	Doppler Weighting Function Type	1	E8	0 = No Statement, 1 = Taylor Weighting, 2 = Other	
H15	M	Maximum Pixel Power	1	I8	1 to 255 (Per para. 2.5.15) 0 = No Statement	-dB/2
H16		<HRR Scatterer Records>			Per Para. 2.5.16	

2.5.1 Revisit Index (H1) (M).

The sequential count of a revisit of the bounding area for a given job ID.

2.5.2 Dwell Index (H2) (M).

The sequential count of a dwell within the revisit of a particular bounding area for a given job ID. A dwell index of “0” indicates the first dwell of the revisit.

(NOTE: Revisit counts are allowed to “wrap” when the allowable range of revisits is exceeded.)

2.5.3 Last Dwell Of Revisit (H3) (M).

A flag to indicate, when set to “1”, that this is the last dwell of the revisit. A Dwell Index (field H3) of “0” with the Last Dwell of Revisit flag set to “1” indicates there are no other dwells within that revisit.

2.5.4 MTI Report Index (H4) (M).

The sequential index of the associated MTI Report, field D32.1 of the Dwell Segment, defined in Paragraph 2.4.32.1.

2.5.5 Number Of Target Scatterers (H5) (M).

Number of Range Doppler pixels that exceed target scatterer threshold and are reported in this segment.

2.5.6 Mean Clutter Power Relative To Peak Scatterer (H6) (M).

Mean power of non-target pixels (residual clutter power). Computed after range Doppler chip formation, and expressed as an uncalibrated power in quarter-decibels (dB/4). The value is calculated by: (a) converting the Mean Clutter Power Relative to Peak Scatterer to decibels (dB), with the maximum value constrained to 63.75 dB; (b) multiplying that value by 4; and (c) rounding to the nearest integer.

2.5.7 Detection Threshold Relative To Peak Scatterer (H7) (M).

Detection threshold used to isolate significant target scatterer pixels, expressed as power relative to clutter mean in quarter-decibels (dB/4). The value is calculated by: (a) converting the Detection Threshold Relative to Peak Scatterer to decibels (dB), with the maximum value constrained to 63.75 dB; (b) multiplying that value by 4; and (c) rounding to the nearest integer.

2.5.8 Range Resolution (H8) (M).

3dB range impulse response of the radar, expressed in centimeters.

2.5.9 Range Bin Spacing (H9) (M).

Range pixel spacing after over sampling, expressed in centimeters.

2.5.10 Doppler Resolution (H10) (M).

3dB Doppler resolution of the radar, expressed in Hertz.

2.5.11 Doppler Bin Spacing (H11) (M).

Doppler pixel spacing after over sampling, expressed in Hertz.

2.5.12 Compression Flag (H12) (M).

An enumeration table denoting the compression technique used.

2.5.13 Range Weighting Function Type (H13) (M).

An enumeration table indicating the spectral weighting used in the range compression process. The default processing value shall be 1, indicating Taylor weighting, with a sidelobe level of 40 dB and an NBAR parameter of 6.

2.5.14 Doppler Weighting Function Type (H14) (M).

An enumeration table indicating the spectral weighting used in the cross-range or Doppler compression process. The default processing value shall be 1, indicating Taylor weighting, with a sidelobe level of 40 dB and an NBAR parameter of 6.

2.5.15 Maximum Pixel Power (H15) (M).

Initial power of the peak scatterer, expressed in dB/2. The value is calculated by: (a) converting the Maximum Pixel Power to decibels (dB), with the maximum value constrained to 127.5 dB; (b) multiplying that value by 2; and (c) rounding to the nearest integer.

2.5.16 < HRR Scatterer Records >.

Table 2-5.1 describes the format for HRR Scatterer Records. A Scatterer Set is an array of Scatterer Records for each target pixel that exceeds the target detection threshold. A set of HRR Scatterer Records shall be transmitted for the associated MTI target and shall be sent for each HRR dwell processed.

Table 2-5.1 HRR Scatterer Record

Field	Type	Field Name	Bytes	Form	Value Range	Units
H16.1	M	Scatterer Magnitude	1	I8	0 to 255 (Per para. 2.5.16.1)	-dB/4
H16.2	M	Scatterer Phase	1	I8	0 to 255	Quantized rotation
H16.3	M	Range Index	1	I8	0 to 255	Bins
H16.4	M	Doppler Index	1	I8	0 to 255	Bins

2.5.16.1 Scatterer Magnitude (H16.1) (M).

Scatterer's power magnitude, quantized to 1 byte, normalized to peak scatterer, and expressed in quarter-decibels (dB/4). The value is calculated by: (a) converting the Scatterer Magnitude to decibels (dB), with the maximum value constrained to 63.75 dB; (b) multiplying that value by 4; and (c) rounding to the nearest integer.

2.5.16.2 Scatterer Phase (H16.2) (M).

Scatterer's complex phase in degrees, quantized to 1 byte, and expressed as a quantized rotation in units of 2*pi/256.

2.5.16.3 Range Index (H16.3) (M).

Scatterer's Range index relative to Range-Doppler chip, where increasing index equates to increasing range.

2.5.16.4 Doppler Index (H16.4) (M).

Scatterer's Doppler index relative to Range-Doppler chip, where increasing index equates to increasing Doppler.

2.6 Range-Doppler Segment (Reserved – Under Development).

(The Range-Doppler Segment is under development and is not included in the Data Format Document at this time. A preliminary description of the data format for a Range-Doppler Segment is included in the AEDP for STANAG 4607.)

2.7 Job Definition Segment.

The Job Definition Segment (Table 2-7) provides the means for the platform to pass information pertaining to the sensor job that will be performed and details of the location parameters (terrain elevation model and geoid model) used in the measurement. It includes a definition of the geographic area for sensor service, the Bounding Area, which is defined as a four-corner polygon, with the four points of the polygon chosen to define a convex quadrilateral.

The Bounding Area shall remain fixed for a given Job ID. The Job Definition Segment shall be sent before the first revisit of a job and shall be sent periodically at least once every thirty seconds thereafter. Note that precision location of a target will not be possible until the information contained in the Job Definition segment has been received from the transmitting platform.

Table 2-7. Job Definition Segment

Field	Type	Field Name		Bytes	Form	Value Range	Units
J1	M	Job ID		4	I32	1 to 4294967295	
J2	M	Sensor ID	Type	1	E8	Per para. 2.7.2	
J3	M		Model	6	A	Per Para. 2.7.3	
J4	M	Target Filtering Flag		1	FL8	Per para. 2.7.4	
J5	M	Priority (Radar Priority)		1	I8	1 to 99, 255 (1 is highest, 99 is lowest, and 255 indicates End of Job)	
J6	M	Bounding Area	Pt A Latitude	4	SA32	- 90 to + 89.999989	degrees
J7	M		Pt A Longitude	4	BA32	0 to +359.999979	degrees
J8	M		Pt B Latitude	4	SA32	- 90 to + 89.999989	degrees
J9	M		Pt B Longitude	4	BA32	0 to +359.999979	degrees
J10	M		Pt C Latitude	4	SA32	- 90 to + 89.999989	degrees
J11	M		Pt C Longitude	4	BA32	0 to +359.999979	degrees
J12	M		Pt D Latitude	4	SA32	- 90 to + 89.999989	degrees
J13	M		Pt D Longitude	4	BA32	0 to +359.999979	degrees
J14	M	Radar Mode		1	E8	Per para. 2.7.14	
J15	M	Nominal Revisit Interval		2	I16	0,1 to 65535	deciseconds
J16	M	Nominal Sensor Position Uncertainty	Along Track	2	I16	0 to 10000, 65535=No Statement	decimeters
J17	M		Cross Track	2	I16	0 to 10000, 65535=No Statement	decimeters
J18	M		Altitude	2	I16	0 to 20000, 65535=No Statement	decimeters
J19	M		Track Heading	1	I8	0 to 45, 255=No Statement	degrees
J20	M		Sensor Speed	2	I16	0 to 65534, 65535=No Statement	millimeters/sec
J21	M	Nominal Sensor Value	Slant Range Standard Deviation	2	I16	0 to 65534, 65535=No Statement	centimeters
J22	M		Cross Range Standard Deviation	2	BA16	0 to 179.9945, ≥180.0=No Statement	degrees
J23	M		Target Velocity Line-of-Sight Component Standard Deviation	2	I16	0 to 5000, 65535=No Statement	centimeters/sec
J24	M		MDV	1	I8	0 to 254, 255=No Statement	decimeters/sec
J25	M		Detection Probability	1	I8	0 to 100, 255=No Statement	Percent
J26	M		False Alarm Density	1	I8	0 to 254, 255=No Statement	negative dB
J27	M	Terrain Elevation Model Used		1	E8	Per para. 2.7.27	
J28	M	Geoid Model Used		1	E8	Per para. 2.7.28	

2.7.1 Job ID (J1) (M).

A platform assigned number identifying the specific request or task to which the dwell pertains.

2.7.2 Sensor ID – Type (J2) (M).

An enumeration table denoting the type of sensor or the platform. Current sensor types are listed in Table 2-7.1. A Sensor ID - Type value of "255" indicates that it is a No Statement and no sensor type is specified. New sensor types shall be registered with the Custodian.

Table 2-7.1. Sensor Types

SENSOR	VALUE
Unidentified	0
Other	1
HiSAR	2
ASTOR	3
Rotary Wing Radar *(was CRESO)*	4
Global Hawk Sensor	5
HORIZON	6
APY-3	7
APY-6	8
APY-8 (Lynx I)	9
RADARSAT2	10
ASARS-2A	11
TESAR	12
MP-RTIP	13
APG-77	14
APG-79	15
APG-81	16
APY-6v1	17
DPY-1 (Lynx II)	18
SIDM	19
LIMIT	20
TCAR (AGS A321)	21
LSRS Sensor	22
UGS Single Sensor	23
UGS Cluster Sensor	24
Available for Future Use	25-254
No Statement	255

2.7.3 Sensor ID – Model (J3) (M).

An alphanumeric field identifying the particular variant of the sensor type.

2.7.4 Target Filtering Flag (J4) (M).

A flag field indicating whether or not filtering has been applied to the targets detected within the dwell area and the type of filtering, if any, that has been applied. A Target Filtering Flag of zero (hex 0x00) indicates that no filtering has been applied to the targets.

If bit 0, the least significant bit, is set to a binary “one”, this indicates that area filtering within the intersection of the Dwell Area and the Bounding Area has been performed.

If bit 1 is set to a binary “one”, this indicates that Area Blanking has been applied. However, the format does not currently specify the area over which blanking has been applied.

If bit 2 is set to a binary “one”, this indicates that Sector Blanking has been applied. However, the format does not currently specify the sector over which blanking has been applied.

Bits number 3-7 shall be reserved for future growth.

2.7.5 Priority (Radar Priority) (J5) (M).

Specifies the priority of this tasking request relative to all other active tasking requests scheduled for execution on the specified platform. A value of 255 indicates the Job is ended.

2.7.6 Bounding Area – Point A Latitude (J6) (M).

The North-South position of the first corner (Point A) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator. The four corners (J6 through J13) of the bounding area, expressed as lat/long for each corner, are given in clockwise order (Points A, B, C, and D) and must form a convex quadrilateral.

2.7.7 Bounding Area – Point A Longitude (J7) (M).

The East-West position of the first corner (Point A) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

2.7.8 Bounding Area – Point B Latitude (J8) (M).

The North-South position of the second corner (Point B) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator.

2.7.9 Bounding Area – Point B Longitude (J9) (M).

The East-West position of the second corner (Point B) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

2.7.10 Bounding Area – Point C Latitude (J10) (M).

The North-South position of the third corner (Point C) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator.

2.7.11 Bounding Area – Point C Longitude (J11) (M).

The East-West position of the third corner (Point C) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

2.7.12 Bounding Area – Point D Latitude (J12) (M).

The North-South position of the fourth corner (Point D) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator.

2.7.13 Bounding Area – Point D Longitude (J13) (M).

The East-West position of the fourth corner (Point D) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

2.7.14 Radar Mode (J14) (M).

An enumeration table that identifies the mode in which the radar will operate for the given job ID. Radar operating modes are system-specific and shall be determined for each system. Table 2-7.2 provides a list of system-specific radar operating modes. Note that radar modes 0-5 are generic modes that will be used in non-platform-specific job requests. The remaining radar modes are a sampling of platform-specific modes. They are not comprehensive and shall be expanded as necessary.

Table 2-7.2. Radar Modes

RADAR MODE	SYSTEM	VALUE	RADAR MODE	SYSTEM	VALUE
Unspecified Mode	Generic	0	EMTI Augmented Spot	ASARS-2	54
MTI (Moving target Indicator)	Generic	1	EMTI Wide Area MTI (WAMTI)	ASARS-2	55
HRR (High Range Resolution)	Generic	2	Available for Future Use	Reserved	56-60
UHRR (Ultra High Range Resolution)	Generic	3	GMTI PPI Mode	TUAV	61
HUR (High Update Rate)	Generic	4	GMTI Expanded Mode	TUAV	62
FTI	Generic	5	Narrow Sector Search (NSS)	ARL-M	63
Available for Future Use	Reserved	6-10	Single Beam Scan (SBS)	ARL-M	64
Attack Control – SATC	Joint STARS	11	Wide Area (WA)	ARL-M	65
Attack Control	Joint STARS	12	Available for Future Use	Reserved	66-80
SATC	Joint STARS	13	GRCA	Reserved	81
Attack Planning - SATC	Joint STARS	14	RRCA	Reserved	82
Attack Planning	Joint STARS	15	Sector Search	Reserved	83
Medium Resolution Sector Search	Joint STARS	16	HORIZON Basic	HORIZON	84
Low Resolution Sector Search	Joint STARS	17	HORIZON High Sensitivity	HORIZON	85
Wide Area Search - GRCA	Joint STARS	18	HORIZON Burn Through	HORIZON	86
Wide Area Search - RRCA	Joint STARS	19	CRESO Acquisition	CRESO	87
Attack Planning – With Tracking	Joint STARS	20	CRESO Count	CRESO	88
Attack Control – With Tracking	Joint STARS	21	Available for Future Use	Reserved	89-93
Available for Future Use	Reserved	22-30	MTI EXO	ASTOR	94
Wide Area MTI (WAMTI)	ASARS-AIP	31	MTI ENDO/EXO	ASTOR	95
Coarse Resolution Search	ASARS-AIP	32	Available for Future Use	Reserved	96-99
Medium Resolution Search	ASARS-AIP	33	Test/Status Mode	Reserved	100
High Resolution Search	ASARS-AIP	34	MTI Spot Scan	Lynx I/II	101
Point Imaging	ASARS-AIP	35	MTI Arc Scan	Lynx I/II	102
Swath MTI (SMTI)	ASARS-AIP	36	HRR/MTI Spot Scan	Lynx I/II	103
Repetitive Point Imaging	ASARS-AIP	37	HRR/MTI Arc Scan	Lynx I/II	104
Monopulse Calibration	ASARS-AIP	38	Available for Future Use	Reserved	105-110
Available for Future Use	Reserved	39-50	GRCA	Global Hawk	111
Search	ASARS-2	51	RRCA	Global Hawk	112
EMTI Wide Frame Search	ASARS-2	52	GMTI-HRR	Global Hawk	113
EMTI Narrow Frame Search	ASARS-2	53	Available for Future Use	Reserved	114-255

2.7.15 Nominal Revisit Interval (J15) (M).

Specifies the nominal revisit interval for the job ID, expressed in deciseconds (tenths of seconds).

2.7.16 Nominal Sensor Position Uncertainty - Along Track (J16) (M).

Nominal estimate of the standard deviation in the estimated horizontal sensor location, expressed in decimeters. It is measured along the sensor track direction defined in field D15 of the Dwell segment. The No-Statement value is sent when the sensor is unable or unwilling to provide a value. (NOTE: The Nominal fields in the Job Definition Segment provide a means for reporting nominal standard deviations and uncertainty values, and are to be used when values are not received from the sensor. More precise values of these or related estimates may be reported in the 0appropriate fields in either the Dwell Segment or the Target Report Sub-Segment, when the sensor computes them and the communication bandwidth permits the more frequent reporting.)

2.7.17 Nominal Sensor Position Uncertainty – Cross Track (J17) (M).

Nominal estimate of the standard deviation in the estimated horizontal sensor location, measured orthogonal to the track direction, expressed in decimeters. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.18 Nominal Sensor Position Uncertainty – Altitude (J18) (M).

Nominal estimate of the standard deviation of the measured sensor altitude (field D11), expressed in decimeters. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.19 Nominal Sensor Position Uncertainty – Track Heading (J19) (M).

Nominal standard deviation of the estimate of sensor track heading, expressed in degrees. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.20 Nominal Sensor Position Uncertainty – Sensor Speed (J20) (M).

Nominal standard deviation of the estimate of sensor speed, expressed in millimeters per second. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.21 Nominal Sensor Value – Slant Range Standard Deviation (J21) (M).

Nominal standard deviation of the slant range of the reported detection, expressed in meters. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.22 Nominal Sensor Value — Cross Range Standard Deviation (J22) (M).

Nominal standard deviation of the measured cross angle to the reported detection, expressed in degrees as a 16-bit unsigned binary angle. A No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.23 Nominal Sensor Value — Target Velocity Line-of-Sight Component Standard Deviation (J23) (M).

Nominal standard deviation of the velocity line-of-sight component reported in field D32.7, expressed in centimeters per second. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.24 Nominal Sensor Value — MDV (J24) (M).

Nominal minimum velocity component along the line of sight, which can be detected by the sensor, expressed in decimeters per second. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.25 Nominal Sensor Value — Detection Probability (J25) (M).

Nominal probability that an unobscured ten square-meter target will be detected within the given area of surveillance, assuming the Swerling model appropriate for the particular radar target. The No-Statement value is sent when the sensor is unable or unwilling to provide a value.

2.7.26 Nominal Sensor Value —False Alarm Density (J26) (M).

The expected density of False Alarms (FA), expressed in decibels ($-10 \log_{10} d$, where d is in False Alarms per square meter). 0 represents 1 FA/m^2, and 60 represents 10^{-6} FA/m^2 (i.e. 1 FA/km^2).

2.7.27 Terrain Elevation Model Used (J27) (M).

An enumeration field indicating the terrain elevation model used for developing the target reports. The enumeration table for the terrain elevation model is shown in Table 2-7.3.

Table 2-7.3. Terrain Elevation Models

VALUE	TERRAIN ELEVATION MODEL
0	None Specified
1	DTED0 (Digital Terrain Elevation Data, Level 0)
2	DTED1 (Digital Terrain Elevation Data, Level 1)
3	DTED2 (Digital Terrain Elevation Data, Level 2)
4	DTED3 (Digital Terrain Elevation Data, Level 3)
5	DTED4 (Digital Terrain Elevation Data, Level 4)
6	DTED5 (Digital Terrain Elevation Data, Level 5)
7	SRTM1 (Shuttle Radar Topography Mission, Level 1)
8	SRTM2 (Shuttle Radar Topography Mission, Level 2)
9	DGM50 M745 (Digitales Gelandemodell 1:50 000)
10	DGM250 (Digitales Gelandemodell 1:250 000)
11	ITHD (Interferometric Terrain Data Height)
12	STHD (Stereometric Terrain Data Height)
13	SEDRIS (SEDRIS Reference Model, ISO/IEC 18026
14-255	Reserved

2.7.28 Geoid Model Used (J28) (M).

An enumeration field indicating the geoid model used for developing the target reports. The geoid model gives an estimate of mean sea level via a model for the difference between the earth's zero-altitude gravity potential and the WGS 84 ellipsoid. Note that no DTED earth model will be specified in Field J27 when the Geoid Model Used in field J28 is selected to be Flat Earth. The enumeration table for the terrain elevation model is shown in Table 2-7.4. Refer to Para. 4.0 of Annex B to STANAG 4607 for further details of Geoid Models and Coordinate Systems.

Table 2-7.4. Geoid Models

VALUE	GEOID MODEL
0	None Specified
1	EGM96 (Earth Gravitational Model, Version 1996)
2	GEO96 (Geoid Gravitational Model, Version 1996)
3	Flat Earth
4-255	Reserved

2.8 Free Text Segment.

The Free Text Segment (Table 2-8) provides a means of sending Basic Character Set (BCS) alphanumeric text messages. Refer to Appendix 1 for allowable text characters. The Free Text Segment shall be sent as required.

NOTE: It should be noted that fields F1 and F2 (originator and recipient ID, respectively) do not have any formal significance in STANAG 4607. Refer to AEDP-7, Annex H, for further discussion.

Table 2-8. Free Text Segment (Variable Length)

Field	Type	Field Name	Bytes	Form	Value Range	Units
F1	M	Originator ID	10	A	Alphanumeric	
F2	M	Recipient ID	10	A	Alphanumeric	
F3	M	Free Text	nn	A	nn=1 to 65515	

2.8.1 Originator ID (F1) (M).

Alphanumeric field that identifies the originator of the Free Text message.

2.8.2 Recipient ID (F2) (M).

Alphanumeric field that identifies the recipient for which the Free Text message is intended.

2.8.3 Free Text (F3) (M).

Alphanumeric field for the entry of free-text data.

2.9 Low Reflectivity Index (LRI) Segment (Reserved – To Be Defined Later).

[THIS PARAGRAPH IS RESERVED FOR FUTURE DEFINITION]

2.10 Group Segment (Reserved – To Be Defined Later).

[THIS PARAGRAPH IS RESERVED FOR FUTURE DEFINITION]

2.11 Attached Target Segment (Reserved – To Be Defined Later).

[THIS PARAGRAPH IS RESERVED FOR FUTURE DEFINITION]

2.12 Test and Status Segment.

The Test and Status Segment (Table 2-12) provides information pertaining to the health of the sensor. It is related to a particular job, revisit, and dwell of the sensor, and shall be sent as required or as requested in the Job Request Segment, paragraph 3.1.

Table 2-12. Test and Status Segment

Field	Type	Field Name	Bytes	Form	Value Range	Units
T1	M	Job ID	4	I32	0 to 4294967295	
T2	M	Revisit Index	2	I16	1 to 65535	
T3	M	Dwell Index	2	I16	1 to 65535	
T4	M	Dwell Time	4	I32	0 to 4 x (10^9)	milliseconds
T5	M	Hardware Status	1	FL	abcd efgh, where each flag bit indicates the status of a particular hardware parameter	Refer to para. 2.12.5
T6	M	Mode Status	1	FL	abcd efgh, where each flag bit indicates the status of a particular status parameter	Refer to para. 2.12.6

2.12.1 Job ID (T1) (M).

A platform assigned number identifying the specific request or task to which the dwell pertains.

2.12.2 Revisit Index (T2) (M).

The sequential count of a revisit of the bounding area for a given job ID.

2.12.3 Dwell Index (T3) (M).

The sequential count of a dwell within the revisit of a particular bounding area for a given job ID.

2.12.4 Dwell Time (T4) (M).

The elapsed time, expressed in milliseconds, from the reference time specified in the Mission Segment to the beginning of the dwell specified in this segment.

2.12.5 Hardware Status (T5) (M).

A one-byte flag, where each flag bit indicates the status of a particular hardware parameter, and where a binary 0 indicates pass status and a binary 1 indicates fail status of that parameter. Unused or spare bits shall be set to binary 0. Hardware status parameters are as follows:

BIT POSITION							
7							0
a	b	c	d	e	f	g	h

Where:

a = Antenna Status
b = RF Electronics Status
c = Processor Status
d = Datalink Status
e = Calibration Mode Status
f = Spare
g = Spare
h = Spare

2.12.6 Mode Status (T6) (M).

A one-byte flag, where each flag bit indicates the status of a particular sensor parameter, and where a binary 0 indicates the parameter is inside the operational limit tests and a binary 1 indicates the parameter is outside the operational limit tests. Unused or spare bits shall be set to binary 0. Mode status parameters are as follows:

BIT POSITION							
7							0
a	b	c	d	e	f	g	h

Where:

a = Range Limit Exceeded
b = Azimuth Limit Exceeded
c = Elevation Limit Exceeded
d = Temperature Limit Exceeded
e = Spare
f = Spare
g = Spare
h = Spare

2.13 System-Specific Segment (Reserved – To Be Defined Later).

[THIS PARAGRAPH IS RESERVED FOR FUTURE DEFINITION]

2.14 Processing History Segment.

The Processing History Segment (Table 2-14) provides information concerning changes or modifications made to the original sensor data. It references the Nationality, Platform, Mission, and Job ID values of the original radar job and describes subsequent processing operations performed on the data from that radar job. It provides notification that the original data values may have been altered and provides a record of one or more processing operations performed on the original radar data by one or more systems. If the processing performed by a system is based on data which has been previously processed or modified, the system shall be responsible for maintaining the previous processing history and for adding information pertaining to the current processing which it has applied. Within the Processing History Segment, the system providing the additional processing shall develop a new Processing Record to provide information pertaining to the processed data which it is sending. The Processing Record shall include Nationality, Platform, Mission, and Job ID information that identifies the processing system as the originator of the processed data. The systems shall also provide a record of the processing which has been performed and shall define a new radar job with which the modified data is associated. The Processing History Segment shall be transmitted every 3 minutes.

Table 2-14. Processing History Segment

Field	Type	Field Name	Bytes	Form	Value Range	Units
C1	M	Processing History Count	1	I8	001 to 255	
C2	M	Based on Nationality ID	2	A	Alphabetic (Per Para. 2.14.2)	FIPS Pub 10-4
C3	M	Based on Platform ID	10	A	Alphanumeric (Per Para. 2.14.3)	(e.g., Tail No.)
C4	M	Based on Mission ID	4	I32	0 to 4294967295 (Per Para. 2.14.4)	
C5	M	Based on Job ID	4	I32	1 to 4294967295 (Per Para. 2.14.5)	
C6	M	<Processing Records>			Per Para. 2.14.6	

2.14.1 Processing History Count (C1) (M).

A count of the number of processing records included in this segment.

2.14.2 Based On Nationality (C2) (M).

A reference to the Nationality for the original radar job, as defined in field P3 of the Packet Header, Table 2-1.

2.14.3 Based On Platform ID (C3) (M).

A reference to the Platform ID for the original radar job, as defined in field P8 of the Packet Header, Table 2-1.

2.14.4 Based On Mission ID (C4) (M).

A reference to the Mission ID for the original radar job, as defined in field P9 of the Packet Header, Table 2-1.

2.14.5 Based On Job ID (C5) (M).

A reference to the Job ID for the original radar job, as defined in field P10 of the Packet Header, Table 2-1.

2.14.6 Processing Records (C6) (M).

Table 2-14.1 describes the format for the Processing Records. One Processing Record shall be sent for each system that provides processing or modification of the radar data.

Table 2-14.1. Processing Records

Field	Type	Field Name	Bytes	Form	Value Range	Units
C6.1	M	Processing History Sequence Number	1	I8	001 to 255	
C6.2	M	Nationality ID of Modifying System	2	A	Alphabetic (Per Para. 2.14.6.2)	FIPS Pub 10-4
C6.3	M	Platform ID of Modifying System	10	A	Alphanumeric (Per Para. 2.14.6.3)	(e.g., Tail No.)
C6.4	M	Mission ID of Modifying System	4	I32	0 to 4294967295 (Per Para. 2.14.6.4)	
C6.5	M	Job ID of Modifying System	4	I32	1 to 4294967295 (Per Para. 2.14.6.5)	
C6.6	M	Processing Performed	2	FL	Per Para. 2.14.6.6	

2.14.6.1 Processing History Sequence Number (C6.1) (M).

The sequential count of this Processing Record within the Processing Segment.

2.14.6.2 Nationality Of Modifying System (C6.2) (M).

A reference to the Nationality for the modifying system job, as defined in field P3 of the Packet Header, Table 2-1.

2.14.6.3 Platform ID Of Modifying System (C6.3) (M).

A reference to the Platform ID for the modifying system job, as defined in field P8 of the Packet Header, Table 2-1.

2.14.6.4 Mission ID Of Modifying System (C6.4) (M).

A reference to the Mission ID for the modifying system job, as defined in field P9 of the Packet Header, Table 2-1.

2.14.6.5 Job ID Of Modifying System (C6.5) (M).

A reference to the Job ID for the modifying system job, as defined in field P10 of the Packet Header, Table 2-1.

2.14.6.6 Processing Performed (C6.6) (M).

A two-byte flag field, defined in Table 2-14.2, that indicates the additional processing performed on the radar data. A value of 0 (hex 0x00) indicates no additional processing has been performed. Each bit, when set to a binary “1”, indicates that the corresponding processing function described in Table 2-14.2 has been performed. The bit settings shall only represent the modifications done by the system identified in this processing record. If a system performs more than one processing operation, this shall be indicated by setting multiple bits in this flag, with one bit set for each processing operation performed.

Table 2-14.2. Processing Performed

VALUE (HEX)	PROCESSING PERFORMED	DESCRIPTION
0x0000	No Processing or Filtering	
0x0001	Area Filtering	Elimination of target reports that are outside an area of interest or to delete targets within an area of exclusion.
0x0002	Target Classification Filtering	Elimination of target reports based on reported target classification or Target Classification Uncertainty.
0x0004	LOS Velocity Filtering	Elimination of target reports based on reported target LOS Velocity, such as target velocity direction, elimination of high-speed targets, or elimination of low-speed targets.
0x0008	SNR Filtering	Elimination of target reports based on reported Target SNR.
0x0010	De-clutter Filtering	Elimination of target reports based on processing algorithms to reduce false target reports. This filtering may eliminate targets based on reported LOS Velocity, SNR and other data sources such as DFAD (coastal wave returns).
0x0020	Bandwidth Filtering	Elimination of Dwell Segment fields or Target Report fields for transmission bandwidth limitations, or receiving system exploitation.
0x0040	Revisit Filtering	Elimination of Dwell Segments with Target reports associated with an entire visit. This will effectively change the revisit rate of the radar service.
0x0080	Location Adjustment	Adjustment of all reported Target Latitude, Target Longitudes, and Target Heights, based on other data for some targets (e.g., beacons, Link16 PPLI Reports, survey data on fixed rotators, etc.).
0x0100	Geoid Adjustment	Adjustment of all reported Target Latitudes, Target Longitudes, and Target Heights based on the use of geoid elevation data.
0x0200	Location Registration	Adjustment of all reported Target Latitudes and Target Longitudes in order to register targets onto road networks or to register reported data to registered locations.
0x0400	Time Filtering	Elimination of dwells and targets that are outside a defined time window. This allows editing of a job or mission to provide a segment of a job or mission that shows some relevant event.
0x0800	Security Filtering	The elimination of certain fields to lower the classification level of the data or to enable release of the data to other nations
0x1000	Data Augmentation	The addition of data from a sensor receiving station to the data received from the sensor platform to merge the data with other data, such as mission planning or job definition data.
0x2000	Target Coordinate Conversion	Conversion of target coordinates from sensor range-azimuth into latitude-longitude coordinates. The Job Definition segment will specify the geoid (J27) and elevation (J28) models used during the coordinate conversion.
0x4000	Reserved	
0x8000	Reserved	

2.15 Platform Location Segment.

The Platform Location Segment (Table 2-15) provides information pertaining to the location of the sensor platform during periods when the sensor is not collecting data. It shall be sent as required during periods in which the sensor is not collecting data, such as enroute to an orbit location or during a turn.

Table 2-15. Platform Location Segment

Field	Type	Field Name		Bytes	Form	Value Range	Units
L1	M	Location Time		4	I32	0 to 4 x (10^9)	milliseconds
L2	M	Platform Position	Latitude	4	SA32	- 90 to +89.999999958	degrees
L3	M		Longitude	4	BA32	0 to +359.999999916	degrees
L4	M		Altitude	4	S32	-50000 to + 2 billion	centimeters
L5	M	Platform Track		2	BA16	0 to 359.9945	degrees (CW from True North)
L6	M	Platform Speed		4	I32	0 to 8000000	millimeters/sec
L7	M	Platform Vertical Velocity		1	S8	-128 to +127	decimeters/sec

2.15.1 Location Time (L1) (M).

The elapsed time, expressed in milliseconds, from midnight at the beginning of the day specified in the Reference Time fields of the Mission Segment to the time the report is prepared. In this manner, the Location Time corresponds to the day's UTC time converted to milliseconds, with the possible addition of multiples of 86400000 for multi-day missions.

2.15.2 Platform Position – Latitude (L2) (M).

The North-South position of the platform at the time the report is prepared, expressed as degrees North (positive) or South (negative) of the Equator.

2.15.3 Platform Position – Longitude (L3) (M).

The East-West position of the platform at the time the report is prepared, expressed as degrees East (positive) from the Prime Meridian.

2.15.4 Platform Position – Altitude (L4) (M).

The altitude of the platform at the time the report is prepared, referenced to its position above the WGS 84 ellipsoid, expressed in centimeters.

2.15.5 Platform Track (L5) (M).

The ground track of the platform at the time at the time the report is prepared, expressed as the angle in degrees (clockwise) from True North.

2.15.6 Platform Speed (L6) (M).

The ground speed of the platform at the time at the time the report is prepared, expressed as millimeters per second.

2.15.7 Platform Vertical Velocity (L7) (M).

The velocity of the platform in the vertical direction, expressed as decimeters per second.

PART 3 – JOB REQUEST AND ACKNOWLEDGMENT DESCRIPTIONS

3.0 General.

This section provides tables and descriptions of the GMTIF Job Request and Job Acknowledge Segments. These segments are recommended and are not mandatory for the format. If these segments are used, they shall be transmitted in conjunction with the Packet and Segment Headers described above in Part 2, paragraphs 2.1 and 2.2. Each table includes columns for field identification, field type (e.g., “M” for Mandatory) field name, the number of bytes and the format for each field, the value range for each field, and the unit of measure or comments (where appropriate).

3.1 Job Request Segment.

The Job Request Segment (Table 3-1) provides the means to pass tasking information, such as a Radar or Sensor Service Request (RSR or SSR) or a request for Test /Status of the sensor, to the platform. It shall be sent as required.

Table 3-1. Job Request Segment

Field	Type	Field Name		Bytes	Form	Value Range	Units
R1	M	Requestor ID		10	A	10 alphanumeric characters	
R2	M	Requestor Task ID		10	A	10 alphanumeric characters	
R3	M	Priority (Requestor Priority)		1	I8	0 to 99 (1 is highest, 99 is lowest, 0 is default priority)	
R4	M	Bounding Area	Pt A Latitude	4	SA32	- 90 to + 89.999989	degrees
R5	M		Pt A Longitude	4	BA32	0 to +359.999979	degrees
R6	M		Pt B Latitude	4	SA32	- 90 to + 89.999989	degrees
R7	M		Pt B Longitude	4	BA32	0 to +359.999979	degrees
R8	M		Pt C Latitude	4	SA32	- 90 to + 89.999989	degrees
R9	M		Pt C Longitude	4	BA32	0 to +359.999979	degrees
R10	M		Pt D Latitude	4	SA32	- 90 to + 89.999989	degrees
R11	M		Pt D Longitude	4	BA32	0 to +359.999979	degrees
R12	M	Radar Mode		1	E8	Per Para. 3.1.12	
R13	M	Radar Resolution	Range	2	I16	0, 1 to 65535 (0=Don't Care)	centimeters
R14	M		Cross-Range	2	I16	0, 1 to 65535 (0=Don't Care)	decimeters
R15	M	Earliest Start Time	Year	2	I16	2000 to 2099	
R16	M		Month	1	I8	1 to 12	
R17	M		Day	1	I8	1 to 31	
R18	M		Hour	1	I8	0 to 23	
R19	M		Minutes	1	I8	0 to 59	
R20	M		Seconds	1	I8	0 to 59	
R21	M		Allowed Delay	2	I16	0 to 65535	seconds
R22	M	Duration		2	I16	0,1 to 65535 (0 = continuous)	seconds
R23	M	Revisit Interval		2	I16	0, 1 to 65535 (0=default interval)	deciseconds
R24	M	Sensor ID	Type	1	E8	Per para. 3.1.24, 255=No Statement	
R25	M		Model	6	A	Per para. 3.1.25, "None"=No Statement	
R26	M	Request Type		1	FL	0 = initial request 1 = cancel the job	

3.1.1 Requestor ID (R1) (M).

An alphanumeric field that identifies the requestor of the sensor service.

3.1.2 Requestor Task ID (R2) (M).

An identifier for the tasking message sent by the requesting station.

3.1.3 Priority (Requestor Priority) (R3) (M).

Specifies the priority of the request relative to other requests originated by the requesting station.

3.1.4 Bounding Area – Point A Latitude (R4) (M).

The North-South position of the first corner (Point A) defining the requested area for service, expressed as degrees North (positive) or South (negative) of the Equator. The four corners (R4 through R11) of the bounding area, expressed as lat/long for each corner, are given in clockwise order and must form a convex quadrilateral.

3.1.5 Bounding Area – Point A Longitude (R5) (M).

The East-West position of the first corner (Point A) defining the requested area for service, expressed as degrees East (positive) of the Prime Meridian.

3.1.6 Bounding Area – Point B Latitude (R6) (M).

The North-South position of the second corner (Point B) defining the requested area for service, expressed as degrees North (positive) or South (negative) of the Equator.

3.1.7 Bounding Area – Point B Longitude (R7) (M).

The East-West position of the second corner (Point B) defining the requested area for service, expressed as degrees East (positive) of the Prime Meridian.

3.1.8 Bounding Area – Point C Latitude (R8) (M).

The North-South position of the third corner (Point C) defining the requested area for service, expressed as degrees North (positive) or South (negative) of the Equator.

3.1.9 Bounding Area – Point C Longitude (R9) (M).

The East-West position of the third corner (Point C) defining the requested area for service, expressed as degrees East (positive) of the Prime Meridian.

3.1.10 Bounding Area – Point D Latitude (R10) (M).

The North-South position of the fourth corner (Point D) defining the requested area for service, expressed as degrees North (positive) or South (negative) of the Equator.

3.1.11 Bounding Area – Point D Longitude (R11) (M).

The East-West position of the fourth corner (Point D) defining the requested area for service, expressed as degrees East (positive) of the Prime Meridian.

3.1.12 Radar Mode (R12) (M).

An enumeration table that identifies the radar mode requested by the requestor. Note that radar modes are system-specific and shall be determined for each system. Table 2-7.2 of Part 1 provides a list of system-specific radar operating modes. Note that radar modes 0-5 are generic modes that will be used in non-platform-specific job requests. The remaining radar modes are a sampling of platform-specific modes. They are not comprehensive and shall be expanded as necessary.

3.1.13 Radar Resolution – Range (R13) (M).

Specifies the radar range resolution requested by the requestor, expressed in centimeters.

3.1.14 Radar Resolution – Cross-Range (R14) (M).

Specifies the radar cross-range resolution requested by the requestor, expressed in decimeters (tenths of meters).

3.1.15 Earliest Start Time – Year (R15) (M).

Specifies the year for which the service is requested.

3.1.16 Earliest Start Time – Month (R16) (M).

Specifies the month of the year for which the service is requested.

3.1.17 Earliest Start Time – Day (R17) (M).

Specifies the day of the month for which the service is requested.

3.1.18 Earliest Start Time – Hour (R18) (M).

Specifies the hour of the day for which the service is requested.

3.1.19 Earliest Start Time – Minutes (R19) (M).

Specifies the minute of the hour for which the service is requested.

3.1.20 Earliest Start Time – Seconds (R20) (M).

Specifies the second of the minute for which the service is requested.

3.1.21 Earliest Start Time – Allowed Delay (R21) (M).

Specifies the maximum time from the requested start time after which the request is to be abandoned, expressed in seconds.

3.1.22 Duration (R22) (M).

Specifies the time duration for the radar job, measured from the actual start of the job, expressed in seconds.

3.1.23 Revisit Interval (R23) (M).

Specifies the revisit interval for the radar job, expressed in deciseconds (tenths of seconds).

3.1.24 Sensor ID – Type (R24) (M).

An enumeration table denoting the type of sensor or the platform. Sensor types are listed in Table 2-7.1 of Part 1. A Sensor ID - Type value of “255” indicates that it is a No Statement and no sensor type is specified.

3.1.25 Sensor ID – Model (R25) (M).

An alphanumeric field identifying the particular variant of the sensor type. A Sensor ID – Model value of “None” indicates that it is a No Statement and no sensor model is specified.

3.1.26 Request Type (R26) (M).

A flag field indicating that it is an initial request (flag = 0) or the desire of the requestor to cancel (flag = 1) the requested job.

3.2 Job Acknowledge Segment.

The Job Acknowledge Segment (Table 3-2) provides the means for the requestor to receive an acknowledgment from the platform concerning the status of their request. It shall be sent once to acknowledge the status of a particular job request.

Table 3-2. Job Acknowledge Segment

Field	Type	Field Name		Bytes	Form	Value Range	Units
A1	M	Job ID		4	I32	1 to 4294967295	
A2	M	Requestor ID		10	A	10 alphanumeric characters	
A3	M	Requestor Task ID		10	A	10 alphanumeric characters	
A4	M	Sensor ID	Type	1	E8	Per para. 3.2.4	
A5	M		Model	6	A		
A6	M	Priority (Radar Priority)		1	I8	1 to 99 (1 is highest, 99 is lowest)	
A7	M	Bounding Area	Pt A Latitude	4	SA32	- 90 to + 89.999989	degrees
A8	M		Pt A Longitude	4	BA32	0 to +359.999979	degrees
A9	M		Pt B Latitude	4	SA32	- 90 to + 89.999989	degrees
A10	M		Pt B Longitude	4	BA32	0 to +359.999979	degrees
A11	M		Pt C Latitude	4	SA32	- 90 to + 89.999989	degrees
A12	M		Pt C Longitude	4	BA32	0 to +359.999979	degrees
A13	M		Pt D Latitude	4	SA32	- 90 to + 89.999989	degrees
A14	M		Pt D Longitude	4	BA32	0 to +359.999979	degrees
A15	M	Radar Mode		1	E8	Per Para. 3.2.15	
A16	M	Duration		2	I16	0,1 to 65535 (0 = continuous)	seconds
A17	M	Revisit Interval		2	I16	0,1 to 65535 (0=default interval)	deciseconds
A18	M	Request Status		1	E8	0 = Request 1 = Approved 2 = Approved, with Modification 3 = Denied: Line of Sight 4 = Denied: Timeline 5 = Denied: Orbit 6 = Denied: Priority 7 = Denied: Area of Interest 8 = Denied: Illegal Request 9 = Denied: Function Inoperative 10 = Denied: Other	
A19	M	Radar Job Start Time	Year	2	I16	2000 to 2099	
A20	M		Month	1	I8	1 to 12	
A21	M		Day	1	I8	1 to 31	
A22	M		Hour	1	I8	0 to 23	
A23	M		Minutes	1	I8	0 to 59	
A24	M		Seconds	1	I8	0 to 60	
A25	M	Requestor Nationality ID		2	A	Alphanumeric	FIPS Pub 10-4

3.2.1 Job ID (A1) (M).

A platform assigned number identifying the specific request or task to which the dwell pertains. The Job ID shall be unique within a mission.

3.2.2 Requestor ID (A2) (M).

An alphanumeric field that identifies the requestor of the radar service.

3.2.3 Requestor Task ID (A3) (M).

An identifier for the tasking message sent by the requesting station. Correlates with the Job ID defined in paragraph 3.2.1.

3.2.4 Sensor ID – Type (A4) (M).

An enumeration table denoting the type of sensor or the platform providing the service. Sensor types are listed in Table 2-7.1 of Part 1.

3.2.5 Sensor ID – Model (A5) (M).

An alphanumeric field identifying the particular variant of the sensor type providing the service.

3.2.6 Priority (Radar Priority) (A6) (M).

Specifies the priority of this tasking request relative to all other active tasking requests scheduled for execution on the specified platform.

3.2.7 Bounding Area – Point A Latitude (A7) (M).

The North-South position of the first corner (Point A) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator. The four corners (A7 through A14) of the bounding area, expressed as lat/long for each corner, are given in clockwise order and must form a convex quadrilateral.

3.2.8 Bounding Area – Point A Longitude (A8) (M).

The East-West position of the first corner (Point A) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

3.2.9 Bounding Area – Point B Latitude (A9) (M).

The North-South position of the second corner (Point B) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator.

3.2.10 Bounding Area – Point B Longitude (A10) (M).

The East-West position of the second corner (Point B) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

3.2.11 Bounding Area – Point C Latitude (A11) (M).

The North-South position of the third corner (Point C) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator.

3.2.12 Bounding Area – Point C Longitude (A12) (M).

The East-West position of the third corner (Point C) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

3.2.13 Bounding Area – Point D Latitude (A13) (M).

The North-South position of the fourth corner (Point D) defining the area for sensor service, expressed as degrees North (positive) or South (negative) of the Equator.

3.2.14 Bounding Area – Point D Longitude (A14) (M).

The East-West position of the fourth corner (Point D) defining the area for sensor service, expressed as degrees East (positive) of the Prime Meridian.

3.2.15 Radar Mode (A15) (M).

An enumeration table that identifies the mode in which the radar will operate for the given job ID. Radar operating modes are system-specific and shall be determined for each system. Table 2-7.2 of Part 1 provides a list of system-specific radar operating modes. Note that radar modes 0-5 are generic modes that will be used in non-platform-specific job requests. The remaining radar modes are a sampling of platform-specific modes. They are not comprehensive and shall be expanded as necessary.

3.2.16 Duration (A16) (M).

Specifies the time duration for the radar job, measured from the actual start of the radar job, expressed in seconds.

3.2.17 Revisit Interval (A17) (M).

Specifies the revisit interval for the radar job, expressed in deciseconds (tenths of seconds).

3.2.18 Request Status (A18) (M).

An enumeration table specifying the reason for rejection (or acceptance) of the requested service. If the request is “Approved, With Modifications”, it shall be the responsibility of the requestor to examine the Job Acknowledge segment and determine the changes that were made to the request.

3.2.19 Radar Job Start Time – Year (A19) (M).

Specifies the year in which the radar job will start.

3.2.20 Radar Job Start Time – Month (A20) (M).

Specifies the month of the year in which the radar job will start.

3.2.21 Radar Job Start Time – Day (A21) (M).

Specifies the day of the month in which the radar job will start.

3.2.22 Radar Job Start Time – Hour (A22) (M).

Specifies the hour of the day in which the radar job will start.

3.2.23 Radar Job Start Time – Minutes (A23) (M).

Specifies the minute of the hour in which the radar job will start.

3.2.24 Radar Job Start Time – Seconds (A24) (M).

Specifies the second of the minute in which the radar job will start.

3.2.25 Requestor Nationality ID (A25) (M).

A digraph, in accordance with FIPS Pub 10-4, which identifies the nationality of the requestor of the radar job. NATO requestors shall use the digraph XN.

ALPHANUMERIC CHARACTER SET

The alphanumeric character set for the GMTI Format shall be the Basic Character Set (BCS) defined in Edition 1, Amendment 1 of STANAG 4545, *NATO Secondary Imagery Format (NSIF).* The BCS is a subset of the Extended Character Set (ECS).

The ECS is a set of 1-byte encoded characters, with valid character codes which range from 0x20 (Hexadecimal 20) to 0x7E, and from 0xA0 to 0xFF, as well as Line Feed (0x0A), Form Feed (0x0C), and Carriage Return (0x0D). The BCS is a subset of the ECS, with the most significant bit of the BCS characters set to 0. Valid BCS character codes range from 0x20 to 0x7E, plus Line Feed (0x0A), Form Feed (0x0C), and Carriage Return (0x0D).

Table A1-1 illustrates the ECS and its subsets. It shows the character, the name of the character, the decimal, hexadecimal, and binary codes for the character, and the applicable character set in which it appears (ECS, ECS-A, BCS, and/or BCS-A). As an interim measure, because of inconsistencies between standards at the present time, character codes ranging from 0xA0 to 0xFF should never be used. Therefore, the use of ECS characters in STANAG 4607 shall be restricted to the BCS Subset shown in the table.

Table A1-1. Extended Character Set (Sheet 1 of 4)

Char	Name	Dec	Hex	Binary	ECS	ECS-A	BCS	BCS-A
	LINE FEED	10	0A	0000 1010	X		X	
	FORM FEED	12	0C	0000 1100	X		X	
	CARRIAGE RETURN	13	0D	0000 1101	X		X	
	SPACE	32	20	0010 0000	X	X	X	X
!	EXCLAMATION MARK	33	21	0010 0001	X	X	X	X
"	QUOTATION MARK	34	22	0010 0010	X	X	X	X
#	NUMBER SIGN	35	23	0010 0011	X	X	X	X
$	DOLLAR SIGN	36	24	0010 0100	X	X	X	X
%	PERCENT SIGN	37	25	0010 0101	X	X	X	X
&	AMPERSAND	38	26	0010 0110	X	X	X	X
'	APOSTROPHE	39	27	0010 0111	X	X	X	X
(	LEFT PARENTHESIS	40	28	0010 1000	X	X	X	X
)	RIGHT PARENTHESIS	41	29	0010 1001	X	X	X	X
*	ASTERISK	42	2A	0010 1010	X	X	X	X
+	PLUS SIGN	43	2B	0010 1011	X	X	X	X
,	COMMA	44	2C	0010 1100	X	X	X	X
-	HYPHEN-MINUS	45	2D	0010 1101	X	X	X	X
.	FULL STOP	46	2E	0010 1110	X	X	X	X
/	SOLIDUS	47	2F	0010 1111	X	X	X	X
0	DIGIT ZERO	48	30	0011 0000	X	X	X	X
1	DIGIT ONE	49	31	0011 0001	X	X	X	X
2	DIGIT TWO	50	32	0011 0010	X	X	X	X
3	DIGIT THREE	51	33	0011 0011	X	X	X	X
4	DIGIT FOUR	52	34	0011 0100	X	X	X	X
5	DIGIT FIVE	53	35	0011 0101	X	X	X	X
6	DIGIT SIX	54	36	0011 0110	X	X	X	X
7	DIGIT SEVEN	55	37	0011 0111	X	X	X	X
8	DIGIT EIGHT	56	38	0011 1000	X	X	X	X
9	DIGIT NINE	57	39	0011 1001	X	X	X	X
:	COLON	58	3A	0011 1010	X	X	X	X
;	SEMICOLON	59	3B	0011 1011	X	X	X	X
<	LESS-THAN SIGN	60	3C	0011 1100	X	X	X	X
=	EQUALS SIGN	61	3D	0011 1101	X	X	X	X
>	GREATER-THAN SIGN	62	3E	0011 1110	X	X	X	X
?	QUESTION MARK	63	3F	0011 1111	X	X	X	X
@	COMMERCIAL AT	64	40	0100 0000	X	X	X	X
A	LATIN CAPITAL LTR A	65	41	0100 0001	X	X	X	X
B	LATIN CAPITAL LTR B	66	42	0100 0010	X	X	X	X
C	LATIN CAPITAL LTR C	67	43	0100 0011	X	X	X	X
D	LATIN CAPITAL LTR D	68	44	0100 0100	X	X	X	X
E	LATIN CAPITAL LTR E	69	45	0100 0101	X	X	X	X
F	LATIN CAPITAL LTR F	70	46	0100 0110	X	X	X	X
G	LATIN CAPITAL LTR G	71	47	0100 0111	X	X	X	X
H	LATIN CAPITAL LTR H	72	48	0100 1000	X	X	X	X
I	LATIN CAPITAL LTR I	73	49	0100 1001	X	X	X	X
J	LATIN CAPITAL LTR J	74	4A	0100 1010	X	X	X	X
K	LATIN CAPITAL LTR K	75	4B	0100 1011	X	X	X	X
L	LATIN CAPITAL LTR L	76	4C	0100 1100	X	X	X	X
M	LATIN CAPITAL LTR M	77	4D	0100 1101	X	X	X	X
N	LATIN CAPITAL LTR N	78	4E	0100 1110	X	X	X	X
O	LATIN CAPITAL LTR O	79	4F	0100 1111	X	X	X	X
P	LATIN CAPITAL LTR P	80	50	0101 0000	X	X	X	X
Q	LATIN CAPITAL LTR Q	81	51	0101 0001	X	X	X	X

Table A1-1. Extended Character Set (Sheet 2 of 4)

Char	Name	Dec	Hex	Binary	ECS	ECS-A	BCS	BCS-A
R	LATIN CAPITAL LTR R	82	52	0101 0010	X	X	X	X
S	LATIN CAPITAL LTR S	83	53	0101 0011	X	X	X	X
T	LATIN CAPITAL LTR T	84	54	0101 0100	X	X	X	X
U	LATIN CAPITAL LTR U	85	55	0101 0101	X	X	X	X
V	LATIN CAPITAL LTR V	86	56	0101 0110	X	X	X	X
W	LATIN CAPITAL LTR W	87	57	0101 0111	X	X	X	X
X	LATIN CAPITAL LTR X	88	58	0101 1000	X	X	X	X
Y	LATIN CAPITAL LTR Y	89	59	0101 1001	X	X	X	X
Z	LATIN CAPITAL LTR Z	90	5A	0101 1010	X	X	X	X
[	LEFT SQUARE BRACKET	91	5B	0101 1011	X	X	X	X
\	REVERSE SOLIDUS	92	5C	0101 1100	X	X	X	X
]	RIGHT SQUARE BRACKET	93	5D	0101 1101	X	X	X	X
^	CIRCUMFLEX ACCENT	94	5E	0101 1110	X	X	X	X
_	LOW LINE	95	5F	0101 1111	X	X	X	X
`	GRAVE ACCENT	96	60	0110 0000	X	X	X	X
a	LATIN SMALL LTR A	97	61	0110 0001	X	X	X	X
b	LATIN SMALL LTR B	98	62	0110 0010	X	X	X	X
c	LATIN SMALL LTR C	99	63	0110 0011	X	X	X	X
d	LATIN SMALL LTR D	100	64	0110 0100	X	X	X	X
e	LATIN SMALL LTR E	101	65	0110 0101	X	X	X	X
f	LATIN SMALL LTR F	102	66	0110 0110	X	X	X	X
g	LATIN SMALL LTR G	103	67	0110 0111	X	X	X	X
h	LATIN SMALL LTR H	104	68	0110 1000	X	X	X	X
I	LATIN SMALL LTR I	105	69	0110 1001	X	X	X	X
j	LATIN SMALL LTR J	106	6A	0110 1010	X	X	X	X
k	LATIN SMALL LTR K	107	6B	0110 1011	X	X	X	X
l	LATIN SMALL LTR L	108	6C	0110 1100	X	X	X	X
m	LATIN SMALL LTR M	109	6D	0110 1101	X	X	X	X
n	LATIN SMALL LTR N	110	6E	0110 1110	X	X	X	X
o	LATIN SMALL LTR O	111	6F	0110 1111	X	X	X	X
p	LATIN SMALL LTR P	112	70	0111 0000	X	X	X	X
q	LATIN SMALL LTR Q	113	71	0111 0001	X	X	X	X
r	LATIN SMALL LTR R	114	72	0111 0010	X	X	X	X
s	LATIN SMALL LTR S	115	73	0111 0011	X	X	X	X
t	LATIN SMALL LTR T	116	74	0111 0100	X	X	X	X
u	LATIN SMALL LTR U	117	75	0111 0101	X	X	X	X
v	LATIN SMALL LTR V	118	76	0111 0110	X	X	X	X
w	LATIN SMALL LTR W	119	77	0111 0111	X	X	X	X
x	LATIN SMALL LTR X	120	78	0111 1000	X	X	X	X
y	LATIN SMALL LTR Y	121	79	0111 1001	X	X	X	X
z	LATIN SMALL LTR Z	122	7A	0111 1010	X	X	X	X
{	LEFT CURLY BRACKET	123	7B	0111 1011	X	X	X	X
|	VERTICAL LINE	124	7C	0111 1100	X	X	X	X
}	RIGHT CURLY BRACKET	125	7D	0111 1101	X	X	X	X
~	TILDE	126	7E	0111 1110	X	X	X	X
	NO BREAK SPACE	160	A0	1010 0000	X			
¡	INVERTED EXCLAMATION MARK	161	A1	1010 0001	X			
¢	CENT SIGN	162	A2	1010 0010	X			
£	POUND SIGN	163	A3	1010 0011	X			
¤	CURRENCY SIGN	164	A4	1010 0100	X			
¥	YEN SIGN	165	A5	1010 0101	X			
¦	BROKEN BAR	166	A6	1010 0110	X			

Table A1-1. Extended Character Set (Sheet 3 of 4)

Char	Name	Dec	Hex	Binary	ECS	ECS-A	BCS	BCS-A
§	SECTION SIGN	167	A7	1010 0111	X			
¨	DIAERESIS	168	A8	1010 1000	X			
©	COPYRIGHT	169	A9	1010 1001	X			
ª	FEMININE ORDINAL INDICATOR	170	AA	1010 1010	X			
«	LEFT-POINTING DOUBLE ANGLE QUOTATION MARK	171	AB	1010 1011	X			
	NOT SIGN	172	AC	1010 1100	X			
-	SOFT HYPHEN	173	AD	1010 1101	X			
®	REGISTERED SIGN	174	AE	1010 1110	X			
¯	MACRON	175	AF	1010 1111	X			
°	DEGREE SIGN	176	B0	1011 0000	X			
±	PLUS-MINUS SIGN	177	B1	1011 0001	X			
²	SUPERSCRIPT TWO	178	B2	1011 0010	X			
³	SUPERSCRIPT THREE	179	B3	1011 0011	X			
´	ACUTE ACCENT	180	B4	1011 0100	X			
µ	MICRO SIGN	181	B5	1011 0101	X			
	PILCROW SIGN	182	B6	1011 0110	X			
·	MIDDLE DOT	183	B7	1011 0111	X			
¸	CEDILLA	184	B8	1011 1000	X			
¹	SUPERSCRIPT ONE	185	B9	1011 1001	X			
º	MASCULINE ORDINAL INDICATOR	186	BA	1011 1010	X			
»	RIGHT POINTING DOUBLE ANGLE QUOTATION MARK	187	BB	1011 1011	X			
¼	VULGAR FRACTION ONE QUARTER	188	BC	1011 1100	X			
½	VULGAR FRACTION ONE HALF	189	BD	1011 1101	X			
¾	VULGAR FRACTION THREE QUARTERS	190	BE	1011 1110	X			
¿	INVERTED QUESTION MARK	191	BF	1011 1111	X			
À	CAP A W/GRAVE	192	C0	1100 0000	X			
Á	CAP A W/ACUTE	193	C1	1100 0001	X			
Â	CAP A W/CIRCUMFLEX	194	C2	1100 0010	X			
Ã	CAP A W/TILDE	195	C3	1100 0011	X			
Ä	CAP A W/DIAERESIS	196	C4	1100 0100	X			
Å	CAP A WITH RING ABOVE	197	C5	1100 0101	X			
Æ	CAP LIGATURE AE	198	C6	1100 0110	X			
Ç	CAP C W/CEDILLA	199	C7	1100 0111	X			
È	CAP E W/GRAVE	200	C8	1100 1000	X			
É	CAP E W/ACUTE	201	C9	1100 1001	X			
Ê	CAP E W/CIRCUMFLEX	202	CA	1100 1010	X			
Ë	CAP E W/DIAERESIS	203	CB	1100 1011	X			
Ì	CAP I W/GRAVE	204	CC	1100 1100	X			
Í	CAP I W/ACUTE	205	CD	1100 1101	X			
Î	CAP I W/CIRCUMFLEX	206	CE	1100 1110	X			
Ï	CAP I W/DIAERESIS	207	CF	1100 1111	X			
Ð	CAP ETH (ICELANDIC)	208	D0	1101 0000	X			
Ñ	CAP N W/TILDE	209	D1	1101 0001	X			
Ò	CAP O W/GRAVE	210	D2	1101 0010	X			
Ó	CAP O W/ACUTE	211	D3	1101 0011	X			
Ô	CAP O W/CIRCUMFLEX	212	D4	1101 0100	X			
Õ	CAP O W/TILDE	213	D5	1101 0101	X			
Ö	CAP O W/DIAERESIS	214	D6	1101 0110	X			
×	MULTIPLICATION SIGN	215	D7	1101 0111	X			

Table A1-1. Extended Character Set (Sheet 4 of 4)

Char	Name	Dec	Hex	Binary	ECS	ECS-A	BCS	BCS-A
Ø	CAP O W/STROKE	216	D8	1101 1000	X			
Ù	CAP U W/GRAVE	217	D9	1101 1001	X			
Ú	CAP U W/ACUTE	218	DA	1101 1010	X			
Û	CAP U W/CIRCUMFLEX	219	DB	1101 1011	X			
Ü	CAP U W/DIAERESIS	220	DC	1101 1100	X			
Ý	CAP Y W/ACUTE	221	DD	1101 1101	X			
Þ	CAP THORN (ICELANDIC)	222	DE	1101 1110	X			
ß	CAP SHARP S (GERMAN)	223	DF	1101 1111	X			
à	SMALL A W/GRAVE	224	E0	1110 0000	X			
á	SMALL A W/ACUTE	225	E1	1110 0001	X			
â	SMALL A W/CIRCUMFLEX	226	E2	1110 0010	X			
ã	SMALL A W/TILDE	227	E3	1110 0011	X			
ä	SMALL A W/DIAERESIS	228	E4	1110 0100	X			
å	SMALL A W/RING ABOVE	229	E5	1110 0101	X			
æ	SMALL LIGATURE AE	230	E6	1110 0110	X			
ç	SMALL C W/CEDILLA	231	E7	1110 0111	X			
è	SMALL E W/GRAVE	232	E8	1110 1000	X			
é	SMALL E W/ACUTE	233	E9	1110 1001	X			
ê	SMALL E W/CIRCUMFLEX	234	EA	1110 1010	X			
ë	SMALL E W/DIAERESIS	235	EB	1110 1011	X			
ì	SMALL I W/GRAVE	236	EC	1110 1100	X			
í	SMALL I W/ACUTE	237	ED	1110 1101	X			
î	SMALL I W/CIRCUMFLEX	238	EE	1110 1110	X			
ï	SMALL I W/DIAERESIS	239	EF	1110 1111	X			
ð	SMALL ETH (ICLANDIC)	240	F0	1111 0000	X	X		
ñ	SMALL N W/TILDE	241	F1	1111 0001	X	X		
ò	SMALL O W/GRAVE	242	F2	1111 0010	X	X		
ó	SMALL O W/ACUTE	243	F3	1111 0011	X	X		
ô	SMALL O W/CIRCUMFLEX	244	F4	1111 0100	X	X		
õ	SMALL O W/TILDE	245	F5	1111 0101	X	X		
ö	SMALL O W/DIAERESIS	246	F6	1111 0110	X	X		
÷	DIVISION SIGN	247	F7	1111 0111	X	X		
ø	SMALL O W/STROKE	248	F8	1111 1000	X	X		
ù	SMALL U W/GRAVE	249	F9	1111 1001	X	X		
ú	SMALL U W/ACUTE	250	FA	1111 1010	X	X		
û	SMALL U W/CIRCUMFLEX	251	FB	1111 1011	X	X		
ü	SMALL U W/DIAERESIS	252	FC	1111 1100	X	X		
ý	SMALL Y W/ACUTE	253	FD	1111 1101	X	X		
þ	SMALL THORN (ICELANDIC)	254	FE	1111 1110	X	X		
ÿ	SMALL Y W/DIAERESIS	255	FF	1111 1111	X	X		

TABLE OF CONTENTS

TERMS AND DEFINITIONS

1.0 Acronyms.

The following acronyms are used for the purpose of this agreement.

A	Alphabetic (STANAG 4607 Data Convention)
AEDP	Allied Engineering Documentation Publication
AGL	Above Ground Level
AGS	Alliance Ground Surveillance
AIP	ASARS Improvement Program
AP	Allied Publication
APG	A Type of Radar Sensor
APY-3	Joint STARS Sensor
APY-6	P-3C Sensor
ARL-M	Airborne Reconnaissance Low – Multi-Mission; US Surveillance Platform
ASARS-2A	Advanced Synthetic Aperture Radar System Version 2A
ASTOR	Airborne Stand-off Radar; UK GMTI Surveillance Platform
B	Signed Binary Decimal (STANAG 4607 Data Convention)
BA	Binary Angle (STANAG 4607 Data Convention)
BCS	ISO Basic Character Set
CG	Center of Gravity
CPI	Coherent Processing Interval
CRESO	Complesso Radar Eliportato per la Sorveglianza; Italian GMTI Surveillance Platform
DB	Decibel, written as dB
DGM	Digitales Gelandemodell
DPY	A Type of Radar Sensor
DTED	Digital Terrain Elevation Data
E	Enumeration (STANAG 4607 Data Convention)
ESA	Electronically Steered Antenna
ECS	Extended Character Set
EGM96	Earth Gravitational Model 1996
ENDO/EXO	Operating Modes of the ASTOR Sensor
EMTI	Enhanced MTI
FIPS	Federal Information Processing Standard
FL	Flag (STANAG 4607 Data Convention)
FTI	Fixed Target Indication
GEO96	Geoid Gravitational Model 1996
GMTI	Ground Moving Target Indication/Indicator
GMTIF	Ground Moving Target Indicator Format (STANAG 4607)

GPS	Global Positioning System/Satellite
GRCA	Ground Referenced Coverage Area
HISAR	ARL-M Sensor
HORIZON	Helicoptere d'Observation Radar et d'Investigation sur Zone; French GMTI Helicopter
HRR	High Range Resolution
HUR	High Update Rate
I	Integer (STANAG 4607 Data Convention)
I & Q	In-phase and Quadrature
ID	Identification
ISAR	Inverse Synthetic Aperture Radar
ISO/IEC	International Organization for Standardization / International Electrotechnical Commission
ISR	Intelligence, Surveillance, and Reconnaissance
ITHD	Interferometric Terrain Data Height
ITU	International Telecommunication Union
JSTARS	Joint Surveillance Target Attack Radar System
LOS	Line of Sight
LRI	Low Reflectivity Index
LSB	Least Significant Bit
LSRS	Littoral Surveillance Reconnaissance System
MAS	Military Agency for Standardisation
MC2A	Multi-Sensor Command and Control Aircraft (now E-10)
MDV	Minimum Detectable Velocity
MIL-STD	Military Standard
MP-RTIP	Multi-Platform Radar Technology Improvement Program
MSB	Most Significant Bit
MSL	Mean Sea Level
MTI	Moving Target Indication/Indicator
N	Numeric (STANAG 4607 Data Convention)
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NC3A	NATO Consultation, Command, and Control Agency
NGA	National Geospatial-Intelligence Agency, formerly NIMA
NITF	National Imagery Transmission Format
NSIF	NATO Secondary Imagery Format (STANAG 4545)
NSS	Narrow Sector Search
PRF	Pulse Repetition Frequency
PPI	Plan Position Indicator
PPLI	Precise Participant Location and Identification
RADARSAT2	Radar Satellite Version 2; Canadian SAR/GMTI Surveillance Platform
RCS	Radar Cross Section
RRCA	Radar Referenced Coverage Area
RSR	Radar Service Request.
S	Signed Integer (STANAG 4607 Data Convention)

SA	Situation Awareness (Exploitation Class); Signed Binary Angle (STANAG 4607 Data Convention)
SATC	Small Area with Target Classification
SATCOM	Satellite Communications
SBS	Single Beam Scan
SEDRIS	Synthetic Environment Data Representation and Interchange Specification
SMTI	Surface Moving Target Indication; Swath Moving Target Indication
SNR	Signal to Noise Ratio
SRTM	Shuttle Reconnaissance Terrain Mapping
SS	Sector Search
SSR	Sensor Service Request
STANAG	Standardization Agreement (NATO)
STHD	Stereometric Terrain Data Height
TESAR	Predator UAV Sensor
TUAV	Tactical Unmanned Aerial Vehicle
UAV	Unmanned Aerial Vehicle
UGS	Unattended Ground Sensor
UHRR	Ultra-High-Range Resolution
USNO	United States Naval Observatory
UTC	Universal Time Coordinated
WA	Wide Area
WAMTI	Wide Area Moving Target Indication
WAS	Wide Area Surveillance
WGS-84	World Geodetic System 1984
XML	eXtensible Markup Language
0xXX	Hexadecimal representation where "XX" is the hexadecimal code; to distinguish hexadecimal field entries from decimal or BCS

2.0 General Terms And Definitions.

Area Of Coverage	The area on the ground covered within a planned amount of time, usually a scene, as a part of the Mission Plan.
Area Of Interest	A specific area on the ground on which to perform a specific process. The area of interest is within the area of coverage if the collection plan has been setup properly.
Basic Character Set	A subset of the International Standards Organization Extended Character Set as defined in ISO/IEC 4873 and ISO/IEC 10646-1:1993; Amendment 2:1996
Frame	1. A scene. 2. A set of beam positions across elevation bars that

	cover a given area of interest (AOI).
Ground MTI	Targets moving on the surface of the earth, to include terrestrial, littoral, and deep water areas, stationary rotators, and targets flying at low speeds close to the surface of the earth (i.e., low-slow flyers).
Scatterer	A scatterer is an individual reflecting element of a radar target, particularly for a complex or multi-faceted target. The aggregated returns from a set of scatterers result in non-coherent radar returns which can be processed to provide additional information on the target, such as target recognition for a radar operating in High Range Resolution mode. A scatterer is typically characterized by the magnitude and phase of its radar return.
Target Report	A target report contains the information generated from a single detection.
Track	Platform Heading

3.0 Radar System Terms And Definitions.

This paragraph defines the terms used in describing radar systems. Figure 3-1 illustrates a notional radar data structure and shows the relationships between radar pulses, coherent processing intervals, dwells, and revisits. Note that some radar systems use a concept wherein multiple dwells (with single or multiple revisits) are combined to constitute a radar coverage area and other systems, in comparison, use a concept wherein a single dwell (which may also be called a radar “scan” or “beam”) constitutes the radar coverage area. The terms are defined in the following paragraphs.

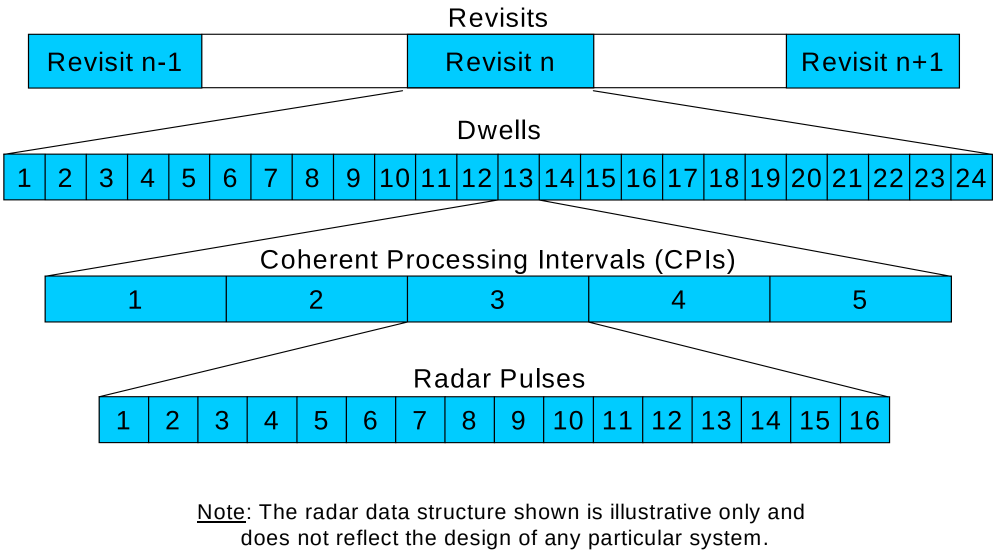

Figure 3-1. Notional Radar Data Structure

3.1 Radar Pulse.

Radar Pulses are the basic elements of energy transmitted and received by the radar system.

3.2 Coherent Processing Interval.

A Coherent Processing Interval (CPI) is made up of a train of radar pulses, all of which have the same characteristics so that they may be coherently combined to obtain processing gain and determine range, angle, Signal-to-Noise Ratio (SNR), and line-of-sight speed for the target.

3.3 Radar Dwell.

A radar dwell combines one or more related processing intervals collected at a representative radar mainlobe position and time, where “mainlobe” is defined as the central lobe of a directional antenna’s radiation pattern. Because of the ranging and velocity sensing properties of radar, multiple distinct detections may be developed in a single radar dwell.

Within the GMTI Format, a Dwell Segment is a report on a grouping of zero or more target reports for which the sensor provides a single time, sensor position, illuminated area of the ground, and other pertinent data. A dwell segment may be associated with a radar dwell but need not be.

3.4 Radar Revisit.

Revisit is the systematic repeat scanning of a given geographic area by a particular radar service or radar viewing geometry for a given Job ID. The concept of Revisit does not preclude a radar job consisting of a single visit (i.e., with no revisits of the area).

3.5 Radar Job.

A Radar Job is a tasking of the radar system to perform a particular operation, as defined in a radar or sensor tasking request which has been accepted by the radar management operator or the automated equivalent. Radar jobs are normally related to specific tasking requests.

3.6 Relationships Among Radar Jobs, Dwells, and Revisits.

Figure 3-2 illustrates the notional relationships among Radar Jobs, Dwells, and Revisits. The figure shows a representative 100 Km by 100 Km Wide Area Surveillance (WAS) area, arbitrarily identified as Radar Job No.12. This Radar Job consists of Dwells A, B, C, and D. The figure also shows a Sector-Search (SS) area, arbitrarily identified as Radar Job No. 40, which consists of dwells E, F, and G. As an example of the revisit count, assume that the revisit counter for the SS area is initialized to “zero”. Assume that dwell E begins the sequence and when that dwell is completed the revisit counter increments to “one”. The sequence then continues with dwells F and G. At the next completion of dwell E the revisit counter is again incremented by one. Table 3-1 details the Radar Job, Dwell, and Revisit relationships, and illustrates seven notional cases for which the radar management operator (or the automated equivalent) may schedule dwells. Examples are dedicated scans of the SS area, dedicated scans of the WAS area, “windshield-wiper” scans of the SS area, and “windshield-wiper” scans of both SS and WAS areas. Note that the figure and the table are for illustrative purposes only and are not to be interpreted as a specific implementation of radar service.

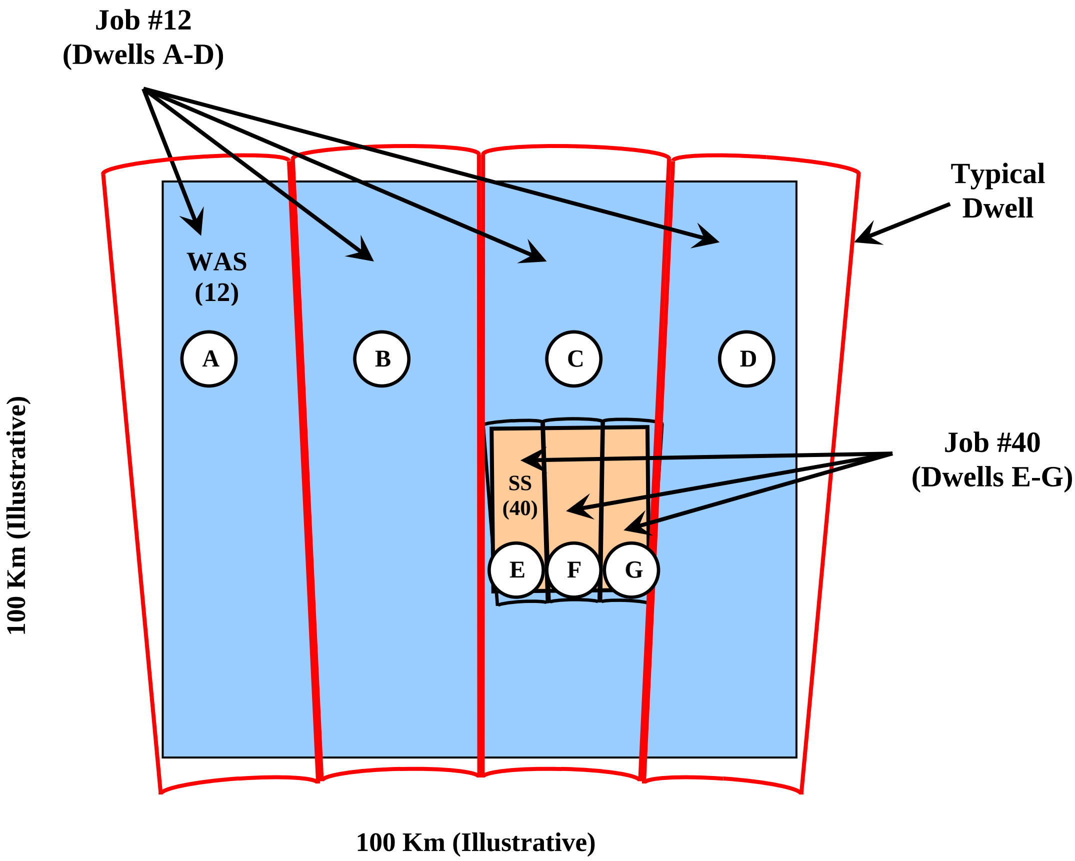

Figure 3-2. Notional Relationships Among Radar Jobs, Dwells, and Revisits

Table 3-1. Chart of Notional Job, Revisit, and Dwell Number Relationships

Case	Parameter	Job, Dwell, and Revisit Status											Comment
1.	Radar Job ID	40	40	40	40	40	40	40	40	40	40	40	Sector-Search (SS) dwell area.
	Dwell Sequence	E	F	G	E	F	G	E	F	G	E	F	
	Revisit Increment	0	0	0	1	1	1	2	2	2	3	3	
	Dwell No.	0	1	2	0	1	2	0	1	2	0	1	
2.	Radar Job ID	12	12	12	12	12	12	12	12	12	12	12	Wide-Area Surveillance (WAS) dwell area.
	Dwell Sequence	A	B	C	D	A	B	C	D	A	B	C	
	Revisit Increment	0	0	0	0	1	1	1	1	2	2	2	
	Dwell No.	0	1	2	3	0	1	2	3	0	1	2	
3.	Radar Job ID	12	12	40	40	40	12	40	40	12	12	12	Interleaved scan of WAS and SS dwell areas
	Dwell Sequence	A	B	E	F	G	C	E	F	D	A	B	
	Revisit Increment	0	0	0	0	0	0	1	1	0	1	1	
	Dwell No.	0	1	0	1	2	2	0	1	3	0	1	
4.	Radar Job ID	40	40	40	40	40	40	40	40	40	40	40	Windshield-wiper scan of SS dwell area.
	Dwell Sequence	E	F	G	G	F	E	E	F	G	G	F	
	Revisit Increment	0	0	0	1	1	1	2	2	2	3	3	
	Dwell No.	0	1	2	3	0	1	2	3	0	1	2	
5.	Radar Job ID	12	12	12	40	40	40	12	12	12	12	40	Windshield-wiper scan of WAS and SS dwell areas, with no-job processing.
	Dwell Sequence	A	B	C	E	F	G	D	D	G	F	E	
	Revisit Increment	0	0	0	0	0	0	0	1	1	1	1	
	Dwell No.	0	1	2	3	4	5	6	0	1	2	3	
6.	Radar Job ID	12	12	12	40	40	40	12	12	40	40	40	Windshield-wiper scan of WAS and SS dwell areas, with Batch job processing.
	Dwell Sequence	A	B	C	E	F	G	D	D	G	F	E	
	Revisit Increment	0	0	0	0	0	0	0	1	1	1	1	
	Dwell No.	0	1	2	0	1	2	3	0	0	1	2	
7.	Radar Job ID	12	12	12	40	40	40	12	12	12	12	40	Increments revisit to let exploiter know that detections may be confirmed from prior incremental value.
	Dwell Sequence	A	B	C	E	F	G	D	A	B	C	E	
	Revisit Increment	0	0	0	1	1	1	0	2	2	2	3	
	Dwell No.	0	1	2	0	1	2	0	1	2	0	1	

Figure 3-3 illustrates a notional scan of the WAS and SS dwell areas by a sensor platform moving in a specified orbit. The figure shows the platform locations at two points in time and illustrates how dwells and revisits can be assembled to cover the required dwell areas.

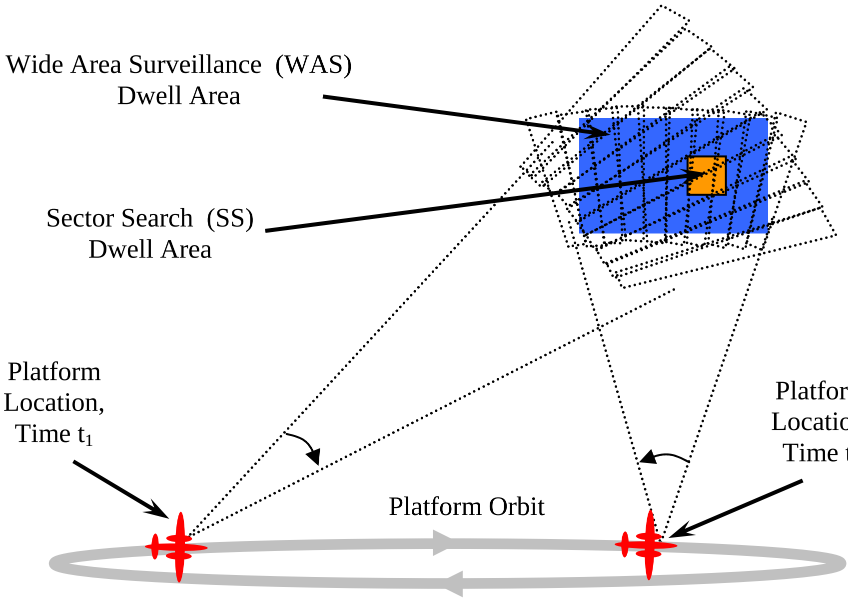

Figure 3-3. Notional Dwell Area Coverage by Orbiting Platform

For purposes of the GMTI Format, dwells and revisits are concepts that provide a means of resetting variables that keep count of events as those events are incremented. Note that each sensor type will use the dwell and revisit counters as best fits its needs. The basic objective is to ensure an index scheme that makes related sensor observations unique. Exploitation problems arise when exploiters who may be unfamiliar with how the sensor originally interpreted radar returns within its structured framework of events or why the sensor originally organized events as it did, especially under exceptional processing conditions, incorrectly reconstruct those events. As a result, two different exploiters may reach two opposing conclusions based on the same data.

In general, sensor systems of different designs will handle dwells in different ways. For example, in one case of sensor system the dwells are produced by discrete pointing of the antenna or by electronic steering of the radar beam. In another case of sensor system the dwells are produced as the antenna or electronic beam continuously "sweeps" across the area. Some such systems may process in distinct "arrays.", where an "array" is a collection of In-Phase and Quadrature (I and Q) components of a coherent video signal, also known as "raw" data. These arrays may use collected data that is associated with separate areas, as in the illustration. A few sensors may process arrays as in a "sliding window," i.e. coverage in which areas on the ground overlap. Usually, the sensor strives to remove duplicate detections before a report is generated, but the removal is not perfect. In yet another case of sensor system, the antenna is made to sweep across the entire azimuth, collecting all data at one time. In this case a single dwell segment may report all targets referenced to the mid-point time of the sweep. Such a sensor may artificially allocate consecutive sequential and congruent time increments by azimuth position during the sweep. This may cause multiple dwell segments to be reported with targets assigned by azimuth position to the dwell with the closest associated time.

Each radar dwell provides sufficient data to allow observations (target reports) to be inherently associated with time and position, and in a structured sequence with other dwells. Note that dwells may overlap such that a report from a given dwell may actually be the same object as that reported from a previous dwell. Depending on the sensor and exploitation system, the resolution of such conflicting reports will be provided either by radar processing or by human intervention, possibly facilitated by appropriate support tools. The concept of revisit is somewhat arbitrary, since it depends on the construction of the sensor, and the sensor manufacturer needs to stipulate how its sensor system is best used.

3.7 Radar Modes.

Moving Target Indicator (MTI) is a radar mode that provides information such as position, radial velocity, an indication of the target classification, and the size of moving targets. MTI provides a means of differentiating moving target radar returns from ground clutter.

High Range Resolution (HRR) is an MTI radar mode that results in very high range resolution of the scanned area, allowing determination of target parameters such as target length. HRR products are typically expressed as a Chip (a set of HRR radar returns associated in range and Doppler) or as an HRR Profile developed as a statistical representation of the range and Doppler returns. Range-Doppler chips may also be used for High-Range Resolution Inverse Synthetic Array Radar (ISAR) targets.

3.8 Signal-to-Noise Ratio.

Signal-to-Noise Ratio (SNR) is the ratio of the power (or energy) of a received signal to the power (or energy) of the accompanying noise. In practice, it is typically the ratio of signal-plus-noise power (or energy) to the accompanying noise power (or energy), designated as (S+N)/N. SNR provides a coarse indication of the relative size of the returned target and can be used to model detection credibility, measurement accuracy, or radar cross-section (see para. 3.9) for the particular sensor.

3.9 Radar Cross-Section.

Radar Cross-Section (RCS) is a factor, expressed in terms of area, which relates the radar energy reflected from a target (in the direction of the receiving radar's antenna) to the radar energy incident on the target. It takes into account the radar cross-sectional area of the target illuminated by the radar (which is not necessarily correlated with the target's physical cross-section), as well as the target's reflectivity and directivity.

3.10 Swerling Models.

The required SNR versus Detection Probability (P_d) for a range of False-Alarm Probabilities (P_{fa}) has been calculated for a number of these models and published as a standard set of curves known as the Swerling Models. STANAG 4607 allows target detection in terms of any of the four Swerling Case models, as shown in Table 3-2. Swerling Cases I and II assume a target made up of many independent scattering elements for a complex target such as an airplane, where the RCS is large in comparison to the wavelength. Cases III and IV assume a target made up of one large element plus many small independent elements for a simply shaped target. In addition, Cases I and III assume that the RCS fluctuates only from scan to scan. Cases II and IV also assume that the RCS fluctuates from pulse to pulse.

Table 3-2. Summary of Swerling Models

<table>
<tr><th rowspan="2">Swerling Case</th><th colspan="2">RCS Fluctuations</th><th rowspan="2">Scatterering Elements</th></tr>
<tr><th>Scan-to-Scan</th><th>Pulse-to-Pulse</th></tr>
<tr><td>I</td><td>X</td><td></td><td rowspan="2">Many Independent</td></tr>
<tr><td>II</td><td></td><td>X</td></tr>
<tr><td>III</td><td>X</td><td></td><td rowspan="2">One Main</td></tr>
<tr><td>IV</td><td></td><td>X</td></tr>
</table>

3.11 Radar Coverage Area.

The coverage area of the radar may be expressed with respect to either the ground or the radar. A Ground Referenced Coverage Area (GRCA) is a coverage area defined by four corners specified in latitude and longitude, and remains fixed in geographic location regardless of the radar platform position on its orbit path. A Radar Referenced Coverage Area (RRCA) is a coverage search area defined by minimum and maximum ranges and scan angles. It is a truncated segment of a circle centered at the radar platform, either moving with the radar platform, or centered on a fixed aim point in each dwell. The definition of RRCA in STANAG 4607 is implicit, since an RRCA may be considered either as a number of dwells of small areas (as defined in para. 3.3), or as a single dwell covering a larger area.

3.12 Dwell Area.

The Dwell Area is referenced to the latitude and longitude defining the center of the dwell area, the range half extent (the distance on the earth's surface from the near edge to the center of the dwell area), and the cross-range half extent (one-half of the 3dB beamwidth). Figure 3-4 illustrates the geometry of the dwell area.

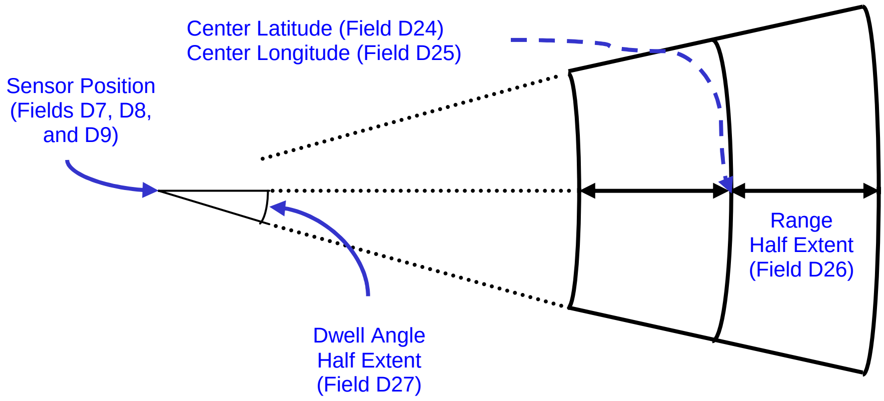

Figure 3-4. Geometry of the fields describing the Dwell Area

3.13 Bounding Area.

Bounding Area defines the ground surface area for sensor service and is reported for each radar job ID. It is also used in requesting radar jobs, where it is defined as the area requested for sensor service. The Bounding Area is a convex four-corner polygon (i.e., a quadrilateral), with the corners defined by four latitude/longitude locations. Figure 3-5 illustrates a hypothetical Bounding Area defined by the four points A, B, C, and D. In practice, the bounding area may resemble a square, a rectangle, or an irregular polygon, as illustrated. To avoid ambiguities, the four points are always given in a clockwise order, as shown in the figure.

Note that factors such as platform orbit locations, hardware limitations, or higher priority tasking of the sensor may affect the actual area scanned by a sensor. As a result, the scanned area may be either within or outside the specified Bounding Area. However, in all cases, the actual ground area seen by the sensor is reported as the Dwell Area (as defined in para. 3.12).

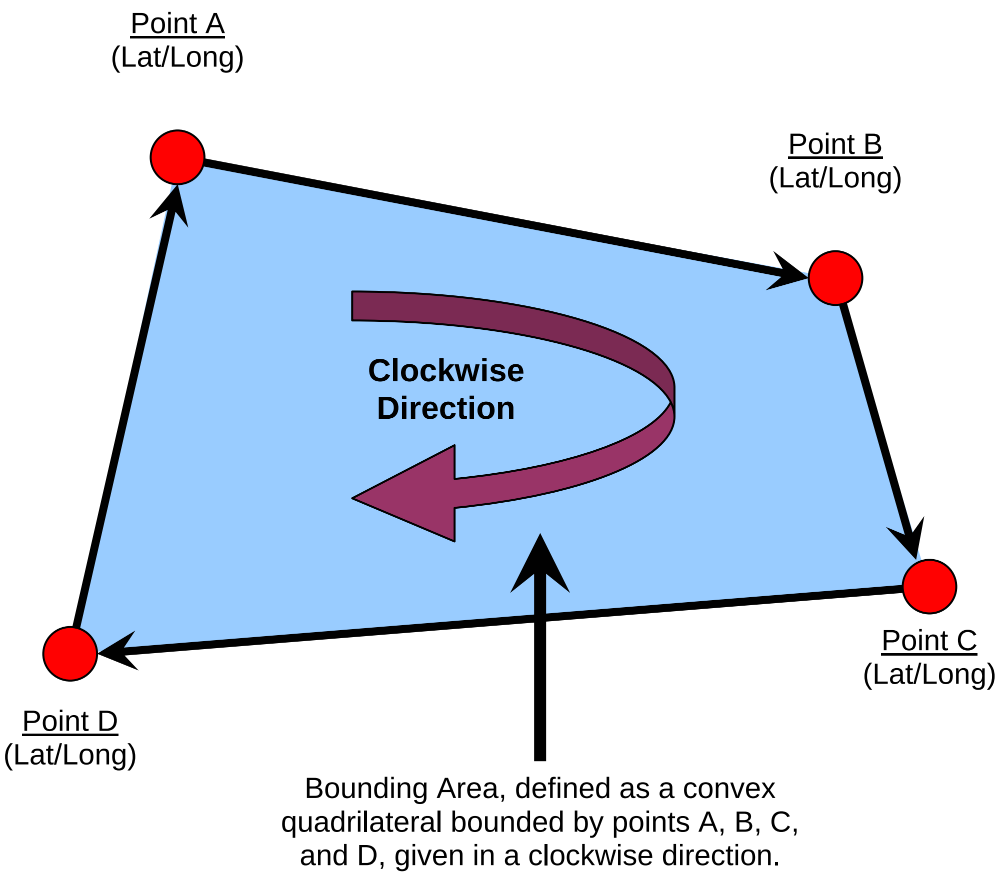

Figure 3-5. Geometry of the Bounding Area

3.14 Platform Orientation.

The orientation (or attitude) of the sensor platform is illustrated in Figure 3-6. The figure illustrates a fixed-wing platform, but can be interpolated for other types of platform, such as rotary-wing or satellite. The roll, pitch, and yaw axes shown in the figure are assumed to originate at the Center of Gravity (CG) of the platform. The Yaw Axis is defined to be perpendicular to the plane of the wings and is always 90 degrees from the Roll Axis, regardless of the platform attitude. The Pitch Axis is perpendicular to the Yaw Axis and lies in the plane of the wings. The Roll Axis is perpendicular to the other axes and lies in the fuselage of the platform pointing toward the nose.

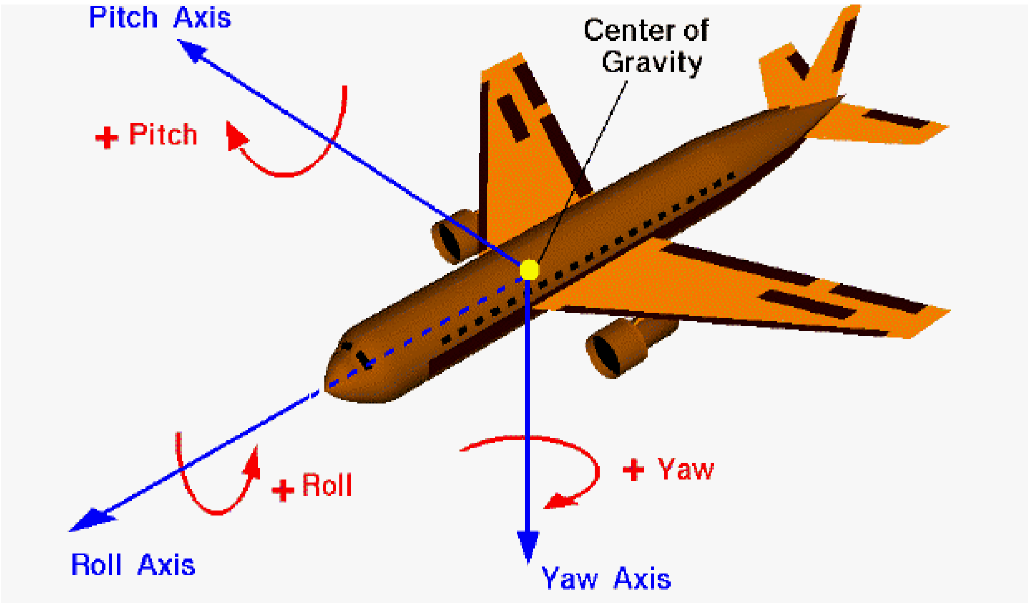

Figure 3-6. Geometry of the Platform Orientation

Platform Orientation angles are defined as follows:

Platform Heading: The angle from True North to the Roll Axis of the platform (i.e., rotation about the Yaw Axis), where 0 ≤ heading < 360 degrees.

Platform Pitch: The angle from horizontal to the Roll Axis of the platform (i.e., rotation about the Pitch Axis), where upward is positive and -90 ≤ pitch ≤ 90.

Platform Roll (or Bank): The angle between the platform Yaw Axis and the plane defined by the Roll Axis and the local vertical (i.e., rotation about the Roll Axis), where a clockwise rotation of the platform about its roll axis is positive and -90 ≤ roll < 90.

To place the platform in a specified attitude, start with the platform in level flight (i.e., with the roll and pitch axes horizontal) and pointed towards True North, then perform the following steps:

(a) Rotate the platform around its yaw axis by the specified heading angle. A positive angle specifies a clockwise rotation as seen from above, so that a heading of 90 degrees corresponds to pointing east and a heading of 180 degrees corresponds to pointing south.
(b) Rotate the platform around its (new) pitch axis by the specified pitch attitude angle. A positive angle corresponds to a nose-up attitude.
(c) Rotate the platform around its (new) roll axis by the specified bank attitude angle. A positive angle corresponds to clockwise as seen from the rear.

Note that the platform orientation system defined herein is the same as the aircraft reference system defined in a related standard, STANAG 7023, the Air Reconnaissance Primary Imagery Data Standard.

3.15 Sensor Orientation.

The three angles (heading, pitch, and roll) that describe the sensor orientation involve successive rotations of the sensor from a hypothetical initial reference position in which the sensor broadside (the “x” axis normal to the sensor face) is facing in its “normal” direction (i.e., along the platform pitch axis for side-looking sensors or along the platform roll axis for forward-looking sensors) and the sensor face is nominally level (i.e., the lateral “y” axis of the sensor face is level, pointing to starboard, and the third “z” axis points down along the direction of the local vertical.) Figure 3-7 illustrates the sensor orientation geometry. The "Sensor Orientation - Heading" field corresponds to the first rotation, expressed in degrees clockwise when viewed from above, of the broadside vector around the local vertical axis (the “z” axis). An angle of 0 degrees indicates the orientation of the sensor along its normal heading direction. The "Sensor Orientation – Pitch” field corresponds to the second rotation and indicates the rotation angle of the sensor normal about the lateral axis (the “y” axis) of the sensor. The "Sensor Orientation – Roll” field corresponds to the third rotation and indicates the rotation angle of the sensor about the transverse axis (the “x” axis) of the sensor.

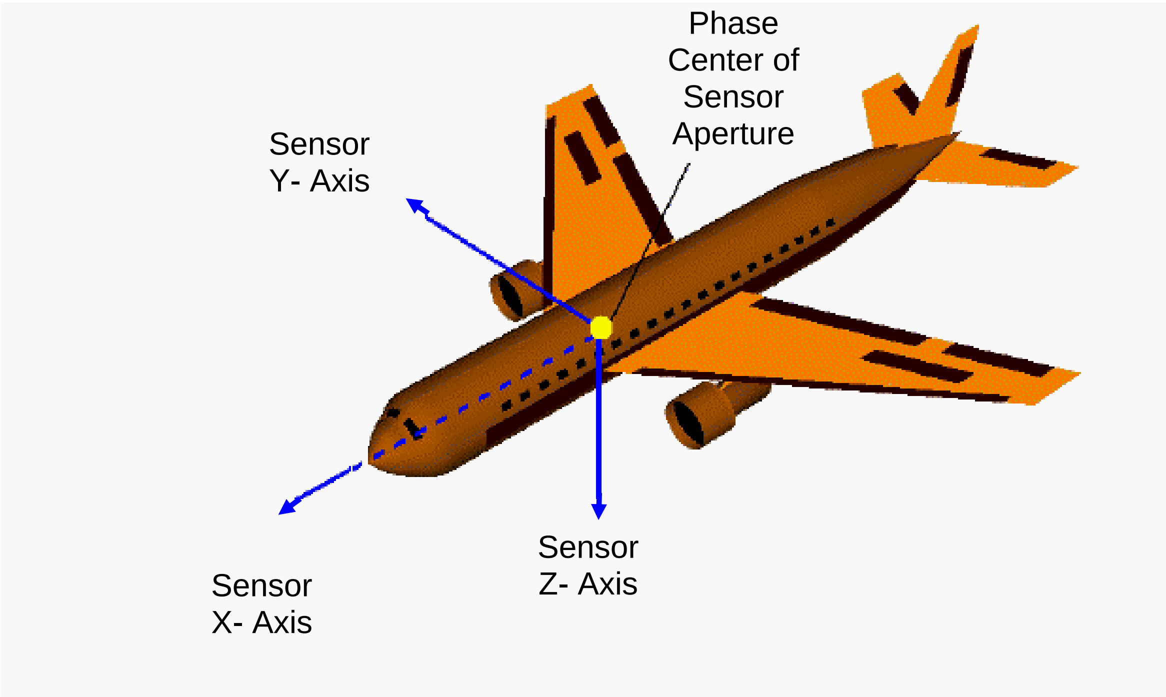

Figure 3-7. Geometry of the Sensor Orientation Rotation Directions

4.0 Coordinate Systems And Earth Model.

A geodetic coordinate system measures location by longitude in degrees from the Greenwich Meridian (the positive direction corresponds to the direction of the Earth's rotation); latitude as the planar angle formed between the perpendicular to the reference ellipsoid for the specified earth model and the equatorial plane (positive values occurring in the Northern hemisphere); and height in meters (positive or negative) from the reference ellipsoid to the point of interest. The fundamental earth reference system for the GMTI Format is the World Geodetic System 1984 (WGS-84), for which the origin is the earth's center of mass, the equatorial radius of the reference ellipsoid is 6378137 meters, and the flattening (the difference between the equatorial ellipsoid radius and polar ellipsoid radius, divided by the equatorial ellipsoid radius) is 1/298.257223563.

Note that a related document which also reports sensor/platform locations, STANAG 7023, the Air Reconnaissance Primary Imagery Data Standard, allows the use of other earth models in addition to WGS-84. STANAG 7023 allows the choice of altitude in meters above either (a) Mean Sea Level (MSL), (b) Above Ground Level (AGL), or (c) as the Global Positioning Satellite (GPS) altitude above the WGS-84 ellipsoid.

The convention adopted for STANAG 4607 is to report sensor, platform, and target locations in the Geodetic Coordinate System. This convention assumes the capability to calculate latitude/longitude/altitude parameters from basic radar range, azimuth, and elevation measurements.

The AEDP-7 Implementation Guide for STANAG 4607 provides tutorial information on other coordinate systems, including Earth-Centered Earth-Fixed, Topocentric, Sensor-Centered, and Flat Earth, which may be used with short-range sensors.

5.0 Time Standard.

The time standard specified for the GMTI Format is Universal Time Coordinated (UTC), also referred to as “UTC (USNO)”. The time of each dwell is specified as the elapsed time in milliseconds to the temporal center of the dwell from midnight at the beginning of the Reference Time for the mission. The Reference Time, which is passed in the mission segment (section 2.3), is defined as the year, month, and day in which the mission originated. For example, if the Reference Time (i.e., day) for the mission is 2002/08/24 (UTC), then a dwell centered on 8 hours 45 minutes and 35.2 seconds UTC of the next day (2002/08/25), would have a dwell time stamp of 117,935,200, since 117,935,200 = 35.2*1000 + 45*60*1000 + 8*60*60*1000 + 1*24*60*60*1000. The Dwell Time field is large enough to accommodate time stamps up to 49 days and 17 hours after midnight at the beginning of the Reference Time. Therefore, in principle, a mission could last as long as 49 days.

6.0 Data Conventions.

6.1. General Definitions and Conventions.

A "bit" refers to a single discrete binary element and may represent the value zero or one. A zero value may also be referred to as "CLEARED" or "FALSE" while a one value may be also be referred to as "SET" or "TRUE".

A "byte" refers to a data field containing 8 discrete binary elements (bits) numbered 0 through 7 with bit 7 representing the Most Significant Bit (MSB) and bit 0 representing the Least Significant Bit (LSB). A byte may represent the unsigned decimal value range of 0 through 255 (hexadecimal 0x00 through 0xFF), the signed decimal value range of negative 128 through positive127 (using two’s complement encoding), or a BCS character. Unless expressly stated the unsigned value is assumed.

All data will be passed in a “Big-Endian” manner, with the most-significant byte passed first.

6.2. Alphanumeric Definitions

Alphanumeric characters, identified in the segment data tables of Annex A as “A”, provide a means for the transmission of text, numbers, and symbols. Appendix 1 to Annex A of theis document, the Alphanumeric Character Set, defines the 8-bit Basic Character Set (BCS) allowed by the GMTI Format. The BCS is a subset of the Extended Character Set (ECS) defined in Appendix 1 to Annex A.

6.3. Integer (I8-I32) Definitions.

Integers I8-I32 are positive numbers with data field lengths of 8, 16, or 32 discrete binary elements (bits). The bits are numbered from 0 representing the least significant bit (LSB), to 7, 15, or 31, representing the most significant bit (MSB). An I8 integer represents the unsigned decimal value range of zero through 255 (hexadecimal 0x00 - 0xFF), an I16 represents the range zero through 65535 (hexadecimal 0x00 - 0xFFFF), and similarly for I32. Table 6-1 illustrates the Integer Data Formats.

Table 6-1. Integer Data Formats

I8	msb 7 6 5 4 3 2 1 0 lsb	8 bit integer
I16	msb 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 lsb	16 bit integer
I32	msb 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 lsb	32 bit integer

6.4 Signed Integer (S8-S64) Definitions.

Signed Integers S8-S64 are positive or negative numbers, depending on the value of the highest numbered bit (the “sign” bit), and use two’s complement encoding. Data field lengths are 8, 16, 32, or 64 bits, numbered from 0 representing the LSB to 6, 14, 30, or 62 representing the MSB, plus the sign bit. As an example, an S16 integer represents the signed decimal value range of -32768 through 32767 (hexadecimal 0xFFFF through 0x7FFF respectively), an S32 integer represents the signed decimal value of -2147483648 through 2147483647 (hexadecimal 0xFFFFFFFF through 0x7FFFFFFF respectively), and an S64 integer represents the signed decimal value of -9223372036854775808 through 9223372036854775807 (hexadecimal 0xFFFFFFFFFFFFFFFF through 0x7FFFFFFFFFFFFFFF respectively). For positive numbers the sign bit is 0, and the numbers follow the normal binary sequence. To negate a positive integer, complement all the bits in the word and then add 1 to the result. The same algorithm negates a negative integer. Table 6-2 illustrates the bit order of the Signed Integer Data Formats.

Table 6-2. Signed Integer Data Formats

S8

msb							lsb
s	6	5	4	3	2	1	0
8 bit two's c.integer							

S16

msb															lsb
s	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
16 bit two's complement integer															

S32

msb																															lsb
s	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
32 bit two's complement integer																															

S64

msb																															
s	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
64 bit two's complement integer																															

																															lsb
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
64 bit two's complement integer (continued)																															

S = Sign bit

6.5 Signed Binary Decimal (B16-B32) Definitions.

Signed Binary Decimals B16-B32 are signed binary decimals, with the first bit providing the sign, the next set of 8 bits providing the integer part, and the remaining bits providing the fractional part. Data field lengths are 16 or 32 bits, numbered from 0 to 14 or 30, plus the sign bit. The fraction parts are numbered from 0 representing the LSB to 6 or 22, representing the MSB. The integer parts are numbered from 7 (the LSB) to 14 (the MSB) or 23 to 30. As an example, B16 has a maximum value of 256-1/128, a minimum value of –256+1/128, and a smallest non-zero value of 0.0078125 (= 1/128 = 2^-7). The numbers are expressed in sign magnitude. Table 6-3 illustrates the Signed Binary Decimal Data Formats.

Table 6-3. Signed Binary Decimal Data Formats

		msb							lsb	msb						lsb
B16	s	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
		8 bit integer								7 bit fraction						

		msb							lsb	msb																						lsb
B32	s	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
		8 bit integer								23 bit fraction																						

S = Sign bit

6.6 Binary Angle (BA16-BA32) Definitions.

Positive angles designated as either BA16 or BA32 are encoded as unsigned integers of the corresponding number of bits, i.e., I16 or I32, and are converted to angles in accordance with the Binary Angle Measurement System: a 'one' in the most significant bit (msb) shall represent 180°, a 'one' in the next bit shall represent 90°, and so on; each subsequent bit having a conversion value of half of the conversion value of the previous bit. The least significant bit shall be determined by rounding. In algebraic terms, the floating point equivalent of a BA*n*-encoded-value is given by converting the value from an integer to a double-precision floating point value and then scaling it by multiplying by $360/2^n$. The scaling can be done with more care to precision by multiplying the converted integer first by 1.40625 (which is 45/32), then dividing by 2 to the n-8 power:

$$\text{angle} = \text{float}\left(\text{BA}n\text{ - encoded - value}\right) \times 1.40625 \times \frac{1}{2^{n-8}} \ .$$

Conversely, a positive floating point value may be converted to BA*n* by multiplying by (64.0 / 45.0 =1.42222222222...), then multiplying by 2 to the n-9 power, and rounding to the nearest binary integer.

As an example, the BA16-encoded value of 0101100100011100 equals an angle of 125.31006°. Table 6-4 illustrates the Binary Angle Data Formats.

Table 6-4. Binary Angle Formats
(For ranges 0° - 360°, e.g., for longitude and heading)

BA16 (msb → lsb)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
BA16	180	90	45	22.5	$\frac{45}{2^2}$	$\frac{45}{2^3}$	$\frac{45}{2^4}$	$\frac{45}{2^5}$	$\frac{45}{2^6}$	$\frac{45}{2^7}$	$\frac{45}{2^8}$	$\frac{45}{2^9}$	$\frac{45}{2^{10}}$	$\frac{45}{2^{11}}$	$\frac{45}{2^{12}}$	$\frac{45}{2^{13}}$

(16-bit unsigned integer, scaled by a factor of 360 / 2^{16})

BA32 (msb → lsb)

Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	. . .	3	2	1	0
BA32	180	90	45	22.5	$\frac{45}{2^2}$	$\frac{45}{2^3}$	$\frac{45}{2^4}$	$\frac{45}{2^5}$	$\frac{45}{2^6}$	$\frac{45}{2^7}$	$\frac{45}{2^8}$	$\frac{45}{2^9}$	$\frac{45}{2^{10}}$	$\frac{45}{2^{11}}$	$\frac{45}{2^{12}}$	$\frac{45}{2^{13}}$	$\frac{45}{2^{14}}$	$\frac{45}{2^{15}}$	$\frac{45}{2^{16}}$	. . .	$\frac{45}{2^{26}}$	$\frac{45}{2^{27}}$	$\frac{45}{2^{28}}$	$\frac{45}{2^{29}}$

(32-bit unsigned integer, scaled by a factor of 360 / 2^{32})

6.7 Signed Binary Angle (SA16-SA32) Definitions.

Angles that take on values in the range of ± 90° and designated as either SA16 or SA32 are encoded as signed two's-complement integers of the corresponding number of bits, i.e., S16 or S32. The integers are converted to angles in accordance with the following Signed Binary Angle Measurement System: the first bit is the sign bit (with 'one' indicating a negative number); a 'one' in the most significant bit (msb) shall represent 45° , a 'one' in the next bit shall represent 22.5°, and so on; each subsequent bit having a conversion value of half of the conversion value of the previous bit. The least significant bit shall determined by rounding. In algebraic terms, the floating point equivalent of a SA*n*-encoded-value is given by converting the value from an signed integer to a double-precision floating point value and then scaling by multiplying by $180/2^n$. The scaling can be done with more care to precision by multiplying the converted integer first by 1.40625 (which is 45/32), then dividing by 2 to the n-7 power:

angle = float (S*n*-encoded-value) x (1.40625) x ($1/2^{n-7}$).

Conversely, a floating point value may be converted to SA*n* by multiplying by (64.0 / 45.0 =1.42222222222...), then multiplying by 2 to the n-8 power, rounding to the nearest binary integer, and converting to two's complement form.

As an example, the angle of –34.873352° equals an SA16-encoded value of 1100111001100110.

Table 6-5 illustrates the bit order of the Signed Binary Angle Data Formats.

Table 6-5. Signed Binary Angle Formats, Bit Order
(For ranges ± 90°, e.g., for latitude, pitch, and roll)

SA16 (msb … lsb)

S	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
$(-1)^s$	45	22.5	$\frac{45}{2^2}$	$\frac{45}{2^3}$	$\frac{45}{2^4}$	$\frac{45}{2^5}$	$\frac{45}{2^6}$	$\frac{45}{2^7}$	$\frac{45}{2^8}$	$\frac{45}{2^9}$	$\frac{45}{2^{10}}$	$\frac{45}{2^{11}}$	$\frac{45}{2^{12}}$	$\frac{45}{2^{13}}$	$\frac{45}{2^{14}}$

(16-bit two's-complement integer, scaled by a factor of 180 / 2^{16})

SA32 (msb … lsb)

S	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	. . .	3	2	1	0
$(-1)^s$	45	22.5	$\frac{45}{2^2}$	$\frac{45}{2^3}$	$\frac{45}{2^4}$	$\frac{45}{2^5}$	$\frac{45}{2^6}$	$\frac{45}{2^7}$	$\frac{45}{2^8}$	$\frac{45}{2^9}$	$\frac{45}{2^{10}}$	$\frac{45}{2^{11}}$	$\frac{45}{2^{12}}$	$\frac{45}{2^{13}}$	$\frac{45}{2^{14}}$	$\frac{45}{2^{15}}$	$\frac{45}{2^{16}}$	$\frac{45}{2^{17}}$	. . .	$\frac{45}{2^{27}}$	$\frac{45}{2^{28}}$	$\frac{45}{2^{29}}$	$\frac{45}{2^{30}}$

S = Sign bit (32-bit two's-complement integer, scaled by a factor of 180 / 2^{32})

6.8 Enumeration Tables.

Enumeration tables, identified in the segment data tables as "En," where "n" is the size of the enumeration table in number of bits, provide lists of items, with each item assigned an identifying number (integer bit code) for entry into the data field.

6.9 Flag Field Definitions

Flags, identified in the segment data tables as "FL", identify the status of given parameters by setting a bit to either a "1", indicating that the parameter corresponding to that particular bit is "ON" or "TRUE", or a "0", indicating that the parameter is "OFF" or "FALSE".