EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

EUROCONTROL STANDARD DOCUMENT

FOR

Radar Data Exchange

Part 2b

Transmission of Monoradar Service Messages

SUR.ET1.ST05.2000-STD-02b-01

Edition	**:**	**1.0**
Edition Date	**:**	**November 1997**
Status	**:**	**Released Issue**
Class	**:**	**General Public**

EUROPEAN AIR TRAFFIC CONTROL HARMONISATION AND INTEGRATION PROGRAMME

DOCUMENT IDENTIFICATION SHEET

DOCUMENT DESCRIPTION

Document Title

Radar Data Exchange - Part 2b

Transmission of Monoradar

Service Messages

EWP DELIVERABLE REFERENCE NUMBER

PROGRAMME REFERENCE INDEX	**EDITION :** 1.0
SUR.ET1.ST05.2000-STD-02b-01	**EDITION DATE :** November 1997

Abstract

This document describes the application of ASTERIX to the transmission of monoradar service messages.

Keywords

Monoradar Data, ASTERIX, Service Messages, Target Reports, Data Item, Category 2, UAP

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DOCUMENT STATUS AND TYPE

STATUS		CATEGORY		CLASSIFICATION	
Working Draft	☐	Executive Task	☐	General Public	☑
Draft	☐	Specialist Task	☐	EATCHIP	☐
Proposed Issue	☐	Lower Layer Task	☑	Restricted	☐
Released Issue	☑				

ELECTRONIC BACKUP

INTERNAL REFERENCE NAME :

HOST SYSTEM	MEDIA	SOFTWARE(S)
Microsoft Windows	Type : Hard disk	
	Media Identification :	

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DOCUMENT APPROVAL

The following table identifies all management authorities who have successively approved the present issue of this document.

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DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document.

EDITION	DATE	REASON FOR CHANGE	SECTIONS PAGES AFFECTED
Proposed	May 1997	• New format and numbering to comply with the EATCHIP Document Configuration rules. • Document split into two separate parts to delineate between the two categories. • The “S” in SAC/SIC renamed System instead of Source, to allow for both source and destination codes.	ALL
1.0	November 1997	Adoption by the Eurocontrol Permanent Commission	

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FOREWORD

1 Responsible Body

This Standard has been developed and is maintained by the Surveillance Task Force on Radar Data Exchange (STFRDE) of the European Air Traffic Control Harmonisation and Integration Programme (EATCHIP).

2 EATCHIP Work Programme Document

This Standard is identified as deliverable 02 in the EATCHIP Work Programme Document (EWPD), Surveillance Domain, Executive Task 01, Specialist Task 05.

3 Approval of the Standard

3.1 This Standard is adopted in accordance with the procedures outlined in the Directives for Eurocontrol Standardisation, Ref 000 - 2 - 93.

3.2 This Standard becomes effective upon adoption by the Permanent Commission of Eurocontrol.

4 Technical Corrigenda and Amendments

This Standard is kept under review by the responsible body who, when changes or corrections are necessary, will prepare the required amendments or technical corrigenda. The procedure for the maintenance of this Standard is laid down in Annex H of the Directives for the Uniform Drafting and Presentation of Eurocontrol Standard Documents Ref 000 - 1 - 92.

5 Editorial Conventions

5.1 The format of this Standard complies with the Directives for the Uniform Drafting and Presentation of Eurocontrol Standard Documents.

5.2 The following practice has been adhered to in order to indicate at a glance the status of each statement:

- Normative Elements have been printed in light face roman text;
- *Recommended Elements* have been printed in light face italics, the status being indicated by the prefix **Recommendation.**

5.3 The following editorial practice has been followed in the writing of specifications:

- for Normative Elements the operative verb "shall" is used;
- for *Recommended Elements* the operative verb "should" is used.

5.4 Any information which is essential to the understanding of a particular indent will be integrated within the text as a note. It will not contain specifications and will be placed immediately after the indent to which it refers.

6 Relationship to Other Standard Documents

This Standard is related to the Eurocontrol Standard for Radar Surveillance in En-Route Airspace and Major Terminal Areas Ref 006 - 95.

7 Status of Annexes to This Document

There are no Annexes to this Part of the Standard Document.

8 Language Used

The original version of this Standard Document is in the English language.

1. INTRODUCTION

1.1 General

1.1.1 Purpose

The present Eurocontrol Standard concerns the transmission of radar related data between radar data sources (e.g. radar stations, Radar Data Processing (RDP) systems) and sinks (end user data processing systems) and describes the message structure for the exchange of radar related data between radar stations and centres and between Air Traffic Control (ATC) centres, to be used in the Eurocontrol area.

The transmission of radar data makes use of the message structure, known by the acronym **ASTERIX**, standing for **A**ll Purpose **ST**ructured **Eurocontrol R**adar **I**nformation E**X**change, devised by the Study Group on the Exchange of radar related data between processors of ATC systems, this group was a subgroup of the former Radar Systems Specialist Panel (RSSP), whose responsibilities have been taken over by the EATCHIP Surveillance Team as from April 1994. ASTERIX was approved by the former RSSP at their 15th Meeting held on 1/4 July 1986.

1.1.2 Notification of Differences

Eurocontrol Member States and other States making use of this Standard are required to notify the Agency of any differences between their National Standard for the exchange of radar data and this Eurocontrol Standard and any amendments thereto.

Further, States are invited to keep the Agency currently informed of any differences which may subsequently occur, or of the withdrawal of any differences previously notified.

A specific request for notification of differences will be sent to States immediately after the adoption of each amendment to this Standard.

Differences notified by States will be published as a supplement to this Standard.

1.1.3 Structure of The Eurocontrol Standard for Radar Data Exchange

This Eurocontrol Standard for Radar Data Exchange contains the following Parts:

Part 1: All Purpose Structured Eurocontrol Radar Information Exchange-ASTERIX

This Part contains the specifications and the conventions used in the framework of ASTERIX.

Part 2a: Transmission of Monoradar Target Reports

This Part describes the standard application of ASTERIX for the transmission of monoradar target reports (plots, tracks) from a radar station to one or more RDP system(s).

Part 2b: Transmission of Monoradar Service Messages

This Part describes the standard application of ASTERIX for the transmission of monoradar service messages from a radar station to one or more RDP system(s).

Part 3: Transmission of Monoradar Derived Weather Information
This Part describes the standard application of ASTERIX for the transmission of relatively simple meteorological images of precipitation areas of various intensity levels from a radar station to one or more RDP system(s).

NOTE - Other Parts will be added to this Eurocontrol Standard as new applications using the ASTERIX message structure are identified and deemed suitable to be standardised.

1.2 SCOPE

1.2.1 This document describes the message structure for the transmission of monoradar service messages, from a stand alone radar station (conventional Secondary Surveillance Radar (SSR), monopulse, Mode S, conventional primary radar or primary radar using Moving Target Detection (MTD) processing), to one or more RDP systems.

1.2.2 This Part of the Eurocontrol Standard specifies the message structure and contents of monoradar data from a stand alone radar station conforming to the ASTERIX Standard.

1.2.3 In the context of this Part of this Standard monoradar data covers radar service messages from the following types of radar:

- conventional SSR;
- monopulse SSR;
- Mode S radar
- conventional primary radar;
- primary radars using MTD processing.

1.2.4 Service messages are data out of Data Category 002.

1.2.5 This Part of the Eurocontrol Standard shall be effective from December 1997

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2. REFERENCES

2.1 General

The following Documents and Standards contain provisions which, through references in this text, constitute provisions of this Eurocontrol Standard Document.

At the time of publication of this Eurocontrol Standard Document, the editions indicated for the referenced documents and standards were valid.

Any revision of the referenced ICAO Documents shall be immediately taken into account to revise this Eurocontrol Standard Document.

Revisions of the other referenced documents shall not form part of the provisions of this Eurocontrol Standard Document until they are formally reviewed and incorporated into this Eurocontrol Standard Document.

In the case of a conflict between the requirements of this Eurocontrol Standard Document and the contents of the other referenced documents, this Eurocontrol Standard Document shall take precedence.

2.2 Reference Documents

1. Eurocontrol Standard 000-1-92. Directives for the Uniform Drafting and Presentation of Eurocontrol Standard Documents. 1992.
2. Eurocontrol Standard SUR.ET1.ST05.2000-STD-01-01. All Purpose Structured Eurocontrol Radar Information Exchange - ASTERIX.

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3. DEFINITIONS, ACRONYMS AND ABBREVIATIONS

3.1 Definitions

For the purposes of this Eurocontrol Standard Document, the following definitions shall apply:

3.1.1 Calculated Item: A piece of information (e.g. the position of a target) derived from the raw radar information through an intermediate processing such as transformation of coordinates, tracking, code conversion, etc.

3.1.2 Catalogue of Data Items: List of all the possible Data Items of each Data Category describing the Data Items by their reference, structure, size and units (where applicable).

3.1.3 Data Block: Unit of information seen by the application as a discrete entity by its contents. A Data Block contains one or more Record(s) containing data of the same category.

3.1.4 Data Category: Classification of the data in order to permit inter alia an easy identification.

3.1.5 Data Field: Physical implementation for the purpose of communication of a Data Item, it is associated with a unique Field Reference Number and is the smallest unit of transmitted information.

3.1.6 Data Item: The smallest unit of information in each Data Category.

3.1.7 Measured Item: A piece of information (e.g. the position of a target) directly derived from the radar information and transmitted without any intermediate processing.

3.1.8 Record: A collection of transmitted Data Fields of the same category preceeded by a Field Specification field, signalling the presence/absence of the various Data Fields

3.1.9 User Application Profile: The mechanism for assigning Data Items to Data Fields, and containing all necessary information which needs to be standardised for the successful encoding and decoding of the messages.

3.2 Acronyms and Abbreviations

For the purposes of this Eurocontrol Standard Document the following shall apply:

°	Degree (angle)
ASTERIX	**A**ll Purpose **ST**ructured **Eurocontrol R**adar **I**nformation E**X**change
ATC	Air Traffic Control
CAT	Data Category
dBm	The dBm is the unit of absolute power related to 1 milliwatt.
EATCHIP	European Air Traffic Control Harmonisation and Integration Programme
EWPD	EATCHIP Work Programme Document
f	Scaling factor
FL	Flight Level, unit of altitude (expressed in 100's of feet)
FRN	Field Reference Number
FSPEC	Field Specification
FX	Field Extension Indicator
ICAO	International Civil Aviation Organization
kt	knot = NM/hour, unit of speed
LEN	Length Indicator
LSB	Least Significant Bit
MSSR	Monopulse Secondary Surveillance Radar
MTD	Moving Target Detection
MTI	Moving Target Indicator
NM	Nautical Mile, unit of distance (6 080 feet)
PSR	Primary Surveillance Radar
RDP	Radar Data Processing (system)
REP	Field Repetition Indicator
RFS	Random Field Sequencing (organization of the Data Fields in a Record)
RS	Random Sequence Indicator
RSSP	Radar Systems Specialist Panel

s	second, unit of time
SAC	System Area Code
SIC	System Identification Code
SP	Special Purpose Indicator
SPI	Special Position Identification
SSR	Secondary Surveillance Radar
STFRDE	Surveillance Task Force on Radar Data Exchange
SURT	Surveillance Team (EATCHIP)
UAP	User Application Profile (see Definitions)
UTC	Coordinated Universal Time

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4. GENERAL PRINCIPLES

4.1 General

The transmission of monoradar information shall require the transmission of two types of messages:

- data messages or radar target reports containing plot or track information (not covered by this document);
- radar service messages used to signal status information of the radar station to the user systems.

4.2 Radar Service Messages

4.2.1 Types of Radar Service Messages

Three types of radar service messages have been identified:

- Sector Crossing Messages;
- North and South Marker Messages;
- Activation/Stop of Blind Zone Filtering Messages.

4.2.1.1 Sector Crossing Messages

4.2.1.1.1 The transmission of such messages shall be synchronised (possibly with some delay) with the antenna rotation.

4.2.1.1.2 Recommendations

1. Sector crossing messages should be time-stamped.
2. The time information should be the time at which the antenna has crossed the azimuth defining the beginning of the sector, and not the time of transmission of the message.

4.2.1.1.3 By convention, the sector 0 crossing message shall signal the crossing of the North azimuth. It may contain more information than other sector crossing messages.

4.2.1.2 North and South Marker Messages

4.2.1.2.1 When these messages are used, they shall signal, independently of the sector crossing messages and as quickly as possible, the crossing of the local geographical North (respectively South) azimuth by the antenna.

4.2.1.2.2 The North marker message shall not replace the sector 0 crossing message. The transmission of the sector 0 crossing messages can be delayed like other sector crossing messages.

4.2.1.3 Activation/Stop of Blind Zone Filtering Messages

These messages shall be sent to inform the user system(s) on the activation and the de-activation of geographical selective plots or tracks filtering processes.

4.2.2 User Application Profile and Data Block

4.2.2.1 A single UAP has been standardised and shall be used to transmit service messages from a radar station to user RDP systems.

4.2.2.2 Data Blocks containing radar service messages shall have the following layout:

CAT = 002	**LEN**	**FSPEC**	Items of the first record		**FSPEC**	Items of the last record

where:

- CAT = 002 is a one-octet field indicating that the Data Block contains service messages;
- LEN is a two-octet field indicating the total length in octets of the Data Block, including the CAT and LEN fields;
- FSPEC is the Field Specification.

4.3 Composition of Messages

4.3.1 Messages shall be composed of Data Items assembled in the order defined by the Field Reference Number (FRN) in the associated UAP.

4.3.2 Data Items shall be either compulsory or optional.

4.3.2.1 Compulsory items represent commonly used data required by any application, they shall be implemented;

4.3.2.2 Optional items represent more specific data and their implementation shall be negotiated between users.

4.3.3 Whether Data Items are compulsory or optional, they shall be either always transmitted or conditionally transmitted.

4.3.3.1 When compulsory, they shall always be transmitted in a Record with the corresponding FSPEC bits set to one;

4.3.3.2 When optional, they shall be present in a Record only if certain conditions are met (e.g. availability of the data). The corresponding FSPEC bits being set to one or to zero according to the presence or absence of the fields.

5. LAYOUT OF RADAR SERVICE MESSAGES

5.1 Standard Data Items

The standardised Data Items which shall be used for the transmission of radar service messages are defined in Table 4 and described in the following pages.

Table 4 - Standard Data Items of Category 002

Data Item Ref. No.	Description	System Units
I002/000	Message Type	N.A.
I002/010	Data Source Identifier	N.A.
I002/020	Sector Number	$360°/(2^8)$
I002/030	Time of Day	1/128 s
I002/041	Antenna Rotation Period	1/128 s
I002/050	Station Configuration Status	N.A.
I002/060	Station Processing Mode	N.A.
I002/070	Plot Count Values	N.A.
I002/080	Warning/Error Conditions	N.A.
I002/090	Collimation Error	Range: 1/128 NM Azimuth: $360°/(2^{16})$
I002/100	Dynamic Window - Type 1	RHO: 1/128 NM THETA: $360°/(2^{16})$

5.2 Description of Standard Data Items

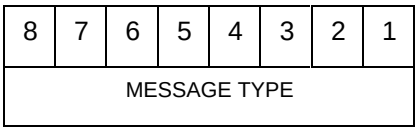
5.2.1 Data Item I002/000, Message Type

Definition: This Data Item allows for a more convenient handling of the messages at the receiver side by further defining the type of transaction.

Format: One-octet fixed length Data Item.

Structure:

Octet no. 1



bits-8/1 Message Type

NOTES

1. In application where transactions of various types are exchanged, the Message Type Data Item facilitates the proper message handling at the receiver side.
2. Message Type values 1-127 are reserved for common standard use, whereas the values 128-255 are application dependent.
3. The following set of Message Types are standardised for category 002 records:

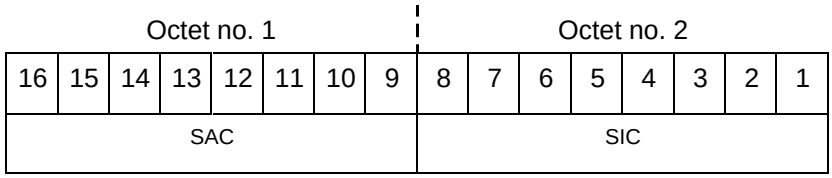
   - 001, North marker message;
   - 002, Sector crossing message;
   - 003, South marker message;
   - 008, Activation of blind zone filtering;
   - 009, Stop of blind zone filtering.

5.2.2 Data Item I002/010, Data Source Identifier

Definition: Identification of the radar station from which the data are received.

Format: Two-octet fixed length Data Item.

Structure:



bits-16/9 (SAC) System Area Code

bits-8/1 (SIC) System Identification Code

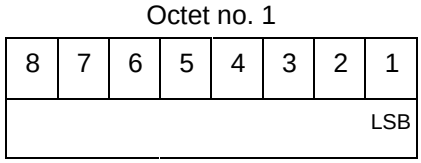
NOTES
1. The defined SACs are listed in Part 1, Table 2 [Ref. 2]
2. The defined SICs are listed in Part 1, Annex B [Ref. 2]

5.2.3 Data Item I002/020, Sector Number

Definition: Eight most significant bits of the antenna azimuth defining a particular azimuth sector.

Format: One-octet fixed length Data Item.

Structure:



bits-8/1 = Eight most significant bits of the antenna azimuth

bit-1 (LSB) = $360°/(2^8) = 1.41°$

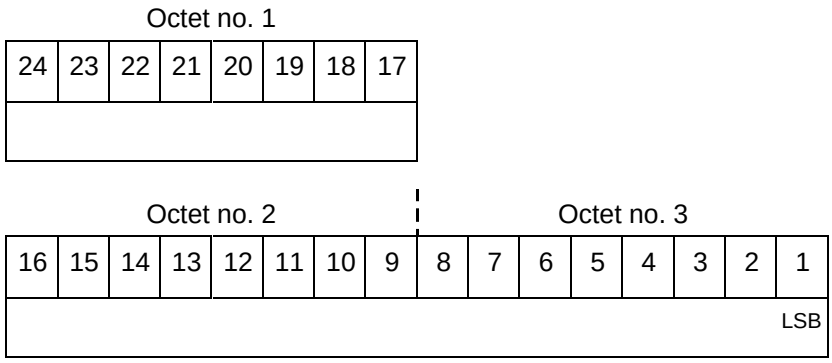
NOTE - The use of the antenna azimuth as sector number has the advantage of being independent of the number of sectors implemented.

5.2.4 Data Item I002/030, Time of Day

Definition: Absolute time stamping expressed as UTC time.

Format: Three-octet fixed length Data Item.

Structure:



bit-1 (LSB) = (2^{-7})s = 1/128 s

NOTES

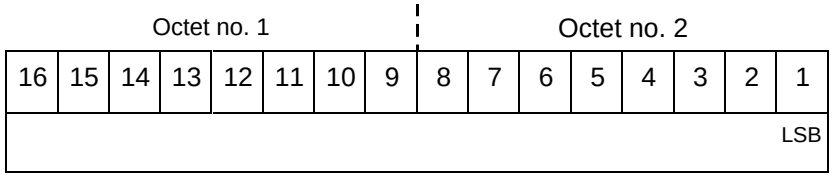
1. The time of day value is reset to zero each day at midnight.
2. For time management in radar transmission applications, refer to Part 1, paragraph 5.4 [Ref.2].
3. Data Item I002/030 can have various logical meanings. In a particular message, the logical meaning is implicit from its context (e.g. in a North marker message it represents the antenna North crossing time; in a sector message it represents the antenna sector crossing time).

5.2.5 Data Item I002/041, Antenna Rotation Speed

Definition: Antenna rotation period as measured between two consecutive North crossings or as averaged during a period of time.

Format: Two-octet fixed length Data Item.

Structure:



bit-1 (LSB) = (2^{-7}) s = 1/128 s

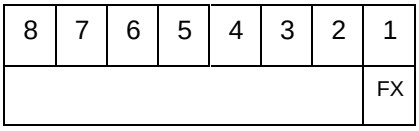
5.2.6 Data Item I002/050, Station Configuration Status

Definition: Information concerning the use and status of some vital hardware components of the radar system.

Format: Variable length Data Item comprising a first part of one-octet, followed by one-octet extents as necessary.

Structure of first part:

Octet no. 1



bit-1	(FX)	= 0	End of Data Item
		= 1	Extension into first extent

NOTE - Due to the diversity in hardware design and requirement of present and future radar stations, it is felt impractical to attempt to define the individual bits.

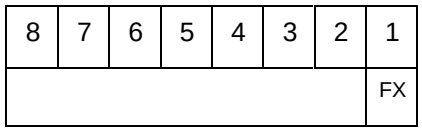
5.2.7 Data Item I002/060, Station Processing Mode

Definition: Details concerning the present status with respect to processing parameters and options.

Format: Variable length Data Item comprising a first part of one-octet, followed by one-octet extents as necessary.

Structure of First Part:

Octet no. 1



bit-1	(FX)	= 0	End of Data Item
		= 1	Extension into first extent

NOTES

1. Typical information conveyed within this Data Item includes inter alia type of polarisation in use, Moving Target Indicator (MTI) in use and/or definition of the range to which MTI is applied, presence of overload conditions and the type of load reduction measures in use.
2. Only the structure of this Data Item is defined, no attempt is made to standardise its contents, in order not to hamper any application or future development.

5.2.8 Data Item I002/070, Plot Count Values

Definition: Plot count values according to various plot categories, either for the last full antenna scan or for the last sector processed.

Format: Repetitive Data Item, starting with a one-octet Field Repetition Indicator (REP) followed by at least one plot counter of two-octet length.

Structure:

Octet no. 1

24	23	22	21	20	19	18	17
REP							

Octet no. 2 | Octet no. 3

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
A	IDENT					COUNTER									

bits-24/17 (REP) Repetition factor

bit-16(A) Aerial identification:

= 0 Counter for antenna 1;
= 1 Counter for antenna 2.

bits-15/11 (IDENT) Five-bit plot category identification code, as follows:

= 1 Sole primary plots;
= 2 Sole SSR plots;
= 3 Combined plots.

bits-10/1 (COUNTER) 10-bit counter value

5.2.9 Data Item I002/080, Warning/Error Conditions

Definition: Warning/error conditions affecting the functioning of the radar system itself.

Format: Variable length Data Item comprising a first part of one-octet, followed by one-octet extents as necessary.

Structure of First Part:

Octet no. 1

8	7	6	5	4	3	2	1
W/E Value							FX

bits-8/2 First warning/error condition value

bit-1 (FX) = 0 End of Data Item
= 1 Extension into next extent. (e.g. second W/E condition value)

NOTE - Warning/error condition values 1-63 are reserved for common Standard use, whereas the values 64-127 are application dependent.

5.2.10 Data Item I002/090, Collimation Error

Definition: Averaged difference in range and in azimuth for the primary target position with respect to the SSR target position as calculated by the radar station.

Format: Two-octet fixed length Data Item.

Structure:

Octet no. 1								Octet no. 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
RANGE ERROR							LSB	AZIMUTH ERROR							LSB

bit-9 (LSB) = 1/128 NM

bit-1 (LSB) = $360°/(2^{(16-f)})$

NOTES

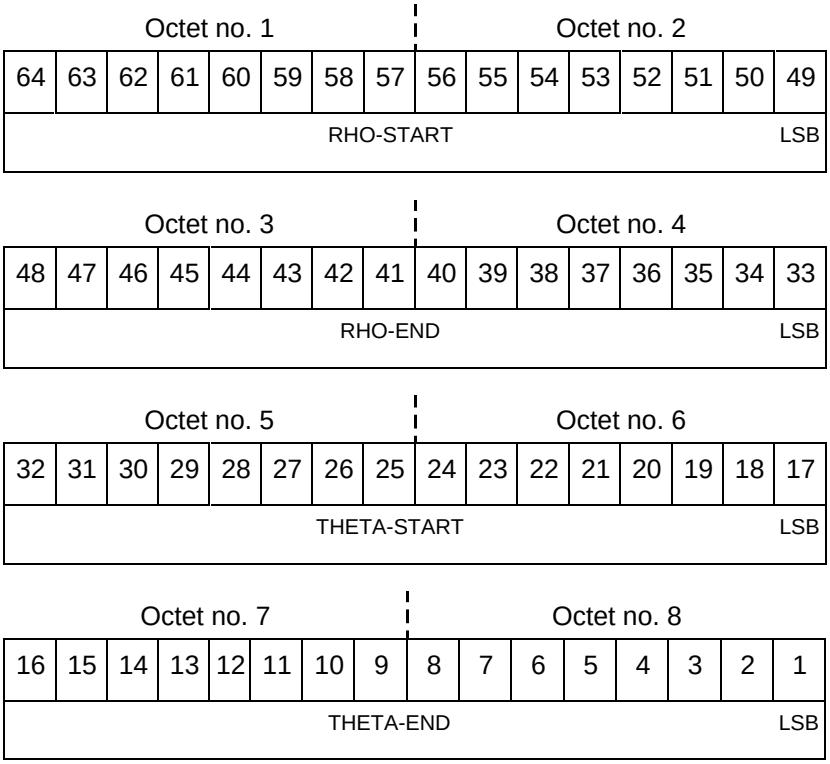
1. A default quantisation unit of 0.022° and a range between -2.8125° and +2.7905° is obtained for a value of f=2 .
2. Negative values are expressed in 2's complement form, bit-16 and bit-8 are set to 0 for positive values and 1 for negative values.

5.2.11 Data Item I002/100, Dynamic Window - Type 1

Definition: Signals the activation of a certain selective filtering function and in a polar coordinates system the respective geographical areas.

Format: Eight-octet fixed length Data Item.

Structure:



bit-49 (LSB) = 1/128 NM.
Max. range = 512 NM

bit-33 (LSB) = 1/128 NM.
Max. range = 512 NM

bit-17 (LSB) = $360°/(2^{16})$ = 0.005 5°

bit-1 (LSB) = $360°/(2^{16})$ =0.005 5°

NOTE - The logical meaning of the polar window is defined by its context, given by the Message Type (Data Item I002/000) in the record concerned.

5.3 Transmission of Radar Service Messages

5.3.1 Standard User Application Profile

5.3.1.1. The following standard UAP shown in Table 5 shall be used for the transmission of radar service messages:

Table 5 - Standard UAP for Radar Service Messages

FRN	Data Item	Information	Length in Octets
1	I002/010	Data Source Identifier	2
2	I002/000	Message Type	1
3	I002/020	Sector Number	1
4	I002/030	Time of Day	3
5	I002/041	Antenna Rotation Period	2
6	I002/050	Station Configuration Status	1+
7	I002/060	Station Processing Mode	1+
FX	-	Field Extension Indicator	-
8	I002/070	Plot Count Values	(1 + 2 x N)
9	I002/100	Dynamic Window - Type 1	8
10	I002/090	Collimation Error	2
11	I002/080	Warning/Error Conditions	1+
12	-	Spare	-
13	-	Reserved for SP Indicator	-
14	-	Reserved for RFS Indicator (RS-bit)	-
FX	-	Field Extension Indicator (set to 0)	-

where:

- the first column indicates the FRN associated to each Data Item used in the UAP;
- the fourth column gives the format and the length of each item, a stand-alone figure indicates the octet count of a fixed-length Data Item, 1+ indicates a variable-length Data Item comprising a first part of one-octet followed by n-octets extent as necessary.

5.3.1.2 The maximum length of the corresponding FSPEC is two octets.

5.3.2 Encoding Rules

5.3.2.1 The three types of service messages (i.e. sector crossing messages. North/South marker messages and blind zone filtering messages) shall be composed and transmitted according to the following rules.

5.3.2.2 Data Item I002/010 (Data Source Identifier) is compulsory and shall always be transmitted for each type of service messages.

5.3.2.3 Data Item I002/000 (Message Type) is compulsory and shall always be transmitted for each type of service messages. This allows the North/South marker messages, the blind zone filtering messages and the sector crossing messages to be distinguished.

5.3.2.4 Data Item I002/020 (Sector Number) is compulsory and allowed only within sector crossing messages and shall always be transmitted in those messages. This number refers to the sector which is about to begin and represents the eight most significant bits of the antenna azimuth defining the beginning of the sector.

NOTE - By convention, Sector 0 crossing message corresponds to the crossing of the North azimuth by the antenna.

5.3.2.5 Data Item I002/030 (Time of Day) is optional for each type of radar service messages. When used, it shall be transmitted when available. This allows the time-stamping of the radar service messages at the radar station site. The time information, coded in three-octets, is the time of an event (for instance the crossing of the azimuth defining the beginning of a sector by the antenna) expressed as the number of 1/128 s elapsed since last midnight. Since this time information is not the time of transmission of the message, it allows the reconstruction of the time of detection for each plot or track when Data Item I001/141 is not implemented, by interpolation with the azimuth of the target.

5.3.2.6 Data Item I002/041 (Antenna Rotation Period) is optional. When used, it shall be transmitted only in sector 0 crossing messages or in North marker messages. This item allows the transmission of the antenna rotation period as measured by the radar station between two consecutive North crossings, or a calculated antenna rotation speed as averaged during a period of time, or during a number of antenna rotation scans.

5.3.2.7 Data Item I002/050 (Station Configuration Status) is optional. When used, it shall be transmitted only for sector crossing messages or North/South marker messages if at least one bit of the field is set to a one and as soon as a change in the station status has occurred.

5.3.2.8 Data Item I002/060 (Station Processing Mode) is optional. When used, it shall be transmitted only for sector crossing messages or North/South marker messages if at least one bit of the field is set to a one and as soon as a change in the station processing mode has occurred.

5.3.2.9 Data Item I002/070 (Plot Count Values) is optional. When used, it shall be transmitted only in sector 0 crossing messages or North marker messages. This allows the transmission of plot count values according to various plot categories (e.g. primary, SSR, combined plots) and to different antennas as counted by the radar station between two North crossings.

5.3.2.10 Data Item I002/100 (Dynamic Window - Type 1) is compulsory only for blind zone filtering activation messages, and shall always be transmitted for that message type. This Data Item signals the activation of a geographical selective filtering process, and informs the user systems about the blinded geographical areas concerned, described in local polar coordinates.

5.3.2.11 Data Item I002/090 (Collimation Error) is optional. When used, it shall be transmitted only in sector 0 crossing messages or North marker messages. This allows the transmission of the averaged difference in range and azimuth for the primary target position with respect to the SSR target position as calculated by the radar station.

5.3.2.12 Data Item I002/080 (Warning/Error Conditions) is optional. When used, it shall be transmitted only for sector crossing messages or North/South marker messages if the value of the fields is different from zero (a zero value for this field means no warning nor error conditions) and as soon as a warning or an error has occurred.

5.3.2.13 General Notes for Encoding all Service Messages

1. Bit-12 of the FSPEC is a spare bit and is set to 0. It is reserved for future applications.
2. Bit-13 of the FSPEC is reserved for the SP Indicator. This allows the transmission of a variable length field not included in the UAP.
3. Bit-14 of the FSPEC is reserved for the RFS Indicator. This allows the transmission of standard Data Items in any order.
4. Non-standardised, specific information is transmitted using the SP field and not the RFS field.