

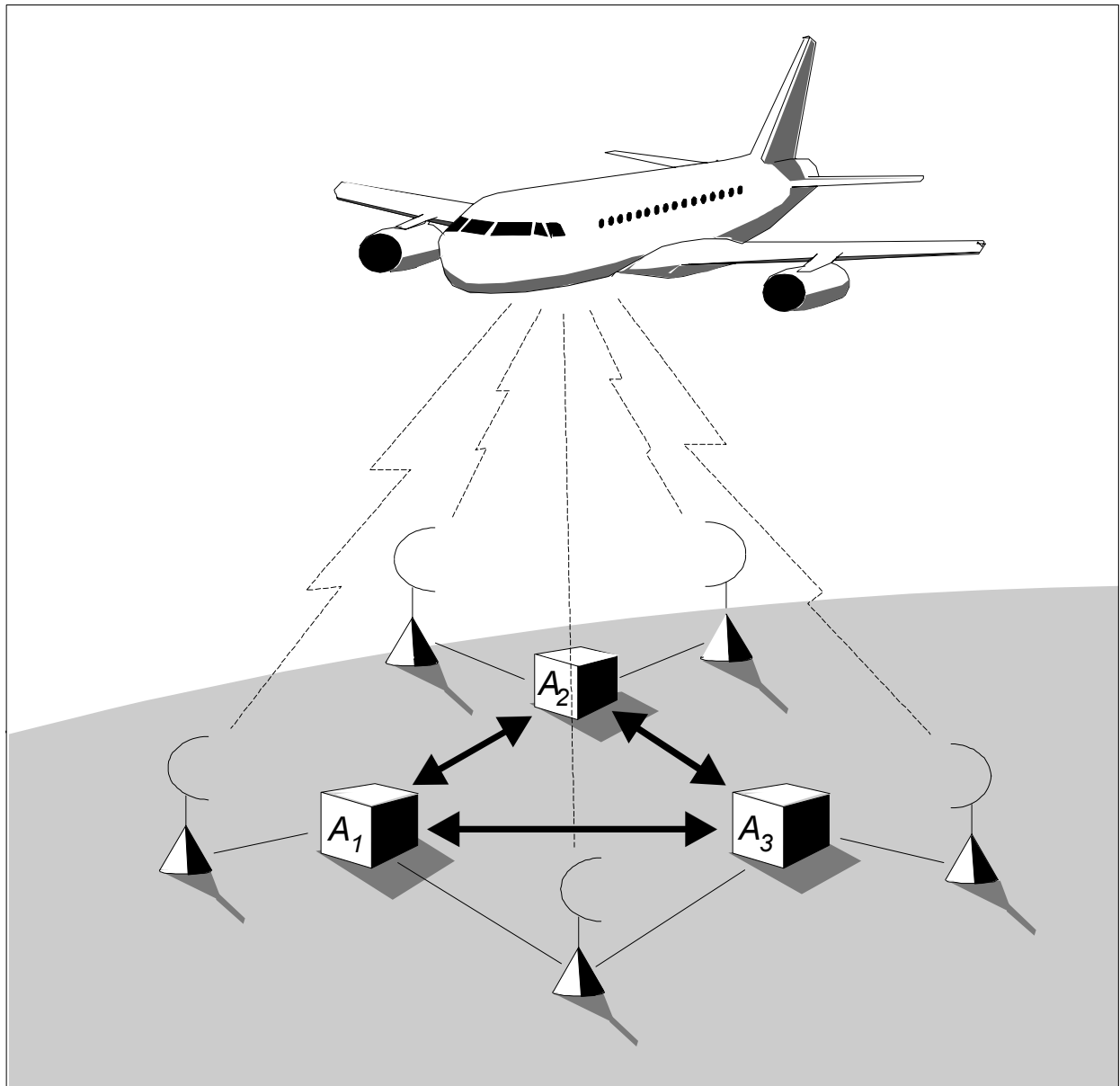
ARTAS

ATC suRveillance Tracker And Server

Interface Specification

Application of ASTERIX
(Version 6.1)

DISSUR/ARTASASTX.015 5 July 2000



Eurocontrol

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DOCUMENT CHANGE RECORD

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

EDITION	DATE	COMMENT	SECTIONS PAGES AFFECTED
2.5 ter	20 May 97	Reference for ARTAS V3	
2.6	13 Oct 97	Initial version for ARTAS V4	
2.7	27 May 98	Version for ARTAS V4 resulting from discussions with the industry	
2.7.1	10 Jul 98	Change coding of I252/230 to make it conform to ASTERIX standard rules	4.1
2.8	4 Feb 99	Initial version for ARTAS V5	
2.8.1	26 Feb 99	Updates following review. Split compound item I252/380 into several fixed length items.	5.1, 5.2, 5.4
2.8.2	30 Jul 99	Draft incorporating Elementary Surveillance for review	2.2
2.8.3	6 Aug 99	Version for Elementary Surveillance.	2.2, 5.2
6.0	10 Sept 99	Baseline for ARTAS V6 development. The document edition numbering convention has been changed. The first digit now refers to the ARTAS version to which the document applies, and the number after the fullstop identifies the version of this document for the ARTAS version. For example, 6.0 is the first ASTERIX spec for ARTAS V6, and 5.3 would be the fourth spec for ARTAS V5. The 5.x and 6.x series will be maintained in parallel.	5.2, 5.4
6.1	5 July 00	Minor changes, incorporating ACP 118,122, 123, 125 and 138.	See section 6.

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1 Introduction

This document is the Draft EUROCONTROL standard for the data exchange between ARTAS V6 and its Users, version 6.1.

Four categories of ASTERIX messages are defined, each one being related to a particular nature of information data-flows :

- i. CATEGORY 030 is related to the Exchange of Air Situation Pictures,
- ii. CATEGORY 031 is related to Sensor Information messages,
- iii. CATEGORY 032 is related to Information provided by Users to ARTAS.
- iv. CATEGORY 252 is related to the Session and Service Control messages,

Note: Throughout this document references to Mode C are used to represent both the Mode C information provided by secondary radars as well as Mode S altitude codes provided by Mode S stations, i.e. "Mode C" should be read as meaning "Mode C code or Mode S altitude code".

The typical data-flows in the ARTAS environment, outlining these categories of messages together with other relevant categories are represented in *Figure 1*.

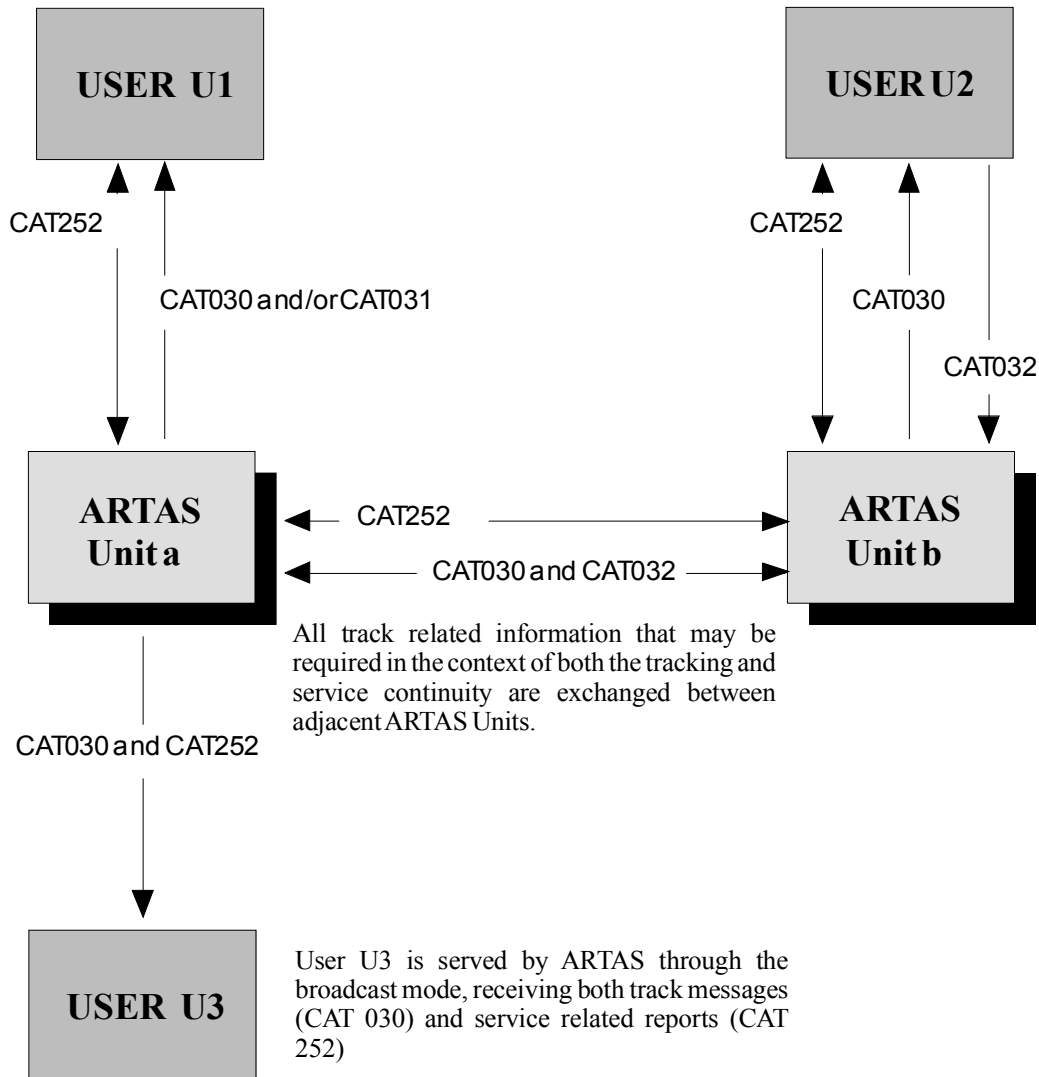
Note that the interface with the radars is not considered in this document. ARTAS will respect the standard defined with respect to the transmission of monoradar data over RADNET and RENAR.

The modifications from ASTERIX version V6.0 to V6.1 are summarised in *section 6*

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User U1 is a typical ARTAS user, setting the required service using CAT 252 data, receiving track information coded in CAT 030 and/or sensor information coded in CAT031.

User U2 is both an ARTAS User and a data provider for ARTAS (e.g. an FPPS). The connection and services are set using data of CAT 252, the track information is received in CAT 030 and data are provided to ARTAS using CAT 032 (e.g. the miniplans)



All track related information that may be required in the context of both the tracking and service continuity are exchanged between adjacent ARTAS Units.

User U3 is served by ARTAS through the broadcast mode, receiving both track messages (CAT 030) and service related reports (CAT 252)

- CAT 030 : air situation picture messages
- CAT 031 : sensor information messages
- CAT 032 : messages provided by users to ARTAS
- CAT 252 : session and service control messages

Figure 1 : Typical data-flows in the ARTAS environment

2 LAYOUT OF AIR SITUATION PICTURE MESSAGES

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The data CATEGORY 030 : Exchange of Air Situation Pictures defines all items that can be transmitted by ARTAS to its User(s) in the frame of any Track Information Service.

The exact subset of items provided to each User will depend on the Item Selection made during the service definition (see *section User Application Profile for ARTAS Users*).

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2.1 List of Data Items of CATEGORY 030

The data items which shall be used for the transmission of Air Situation Picture shall be that defined in *Table 1* and described in the following pages.

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Table 1 - Data Items of Category 030

Data Item Reference Number	Description	System Units
I030/010	SERVER IDENTIFICATION TAG	N.A.
I030/015	USER NUMBER	N.A.
I030/020	TIME OF MESSAGE	1/128 s
I030/030	SERVICE IDENTIFICATION	N.A.
I030/035	TYPE OF MESSAGE	N.A.
I030/040	TRACK NUMBER	N.A.
I030/050	ARTAS TRACK NUMBER	N.A.
I030/060	TRACK MODE 3/A	N.A.
I030/070	TIME OF LAST UPDATE	1/128 s
I030/080	ARTAS TRACK STATUS	N.A.
I030/090	ARTAS TRACK QUALITY	N.A.
I030/100	CALCULATED TRACK POSITION (CARTESIAN)	1/32 or 1/64 NM
I030/110	ESTIMATED ACCURACY OF TRACK POSITION (CARTESIAN)	1/32 or 1/64 NM
I030/120	TRACK MODE 2 CODE	N.A.
I030/130	CALCULATED TRACK ALTITUDE	1/4 FL
I030/135	ESTIMATED ACCURACY OF TRACK ALTITUDE	1/4 FL
I030/140	LAST MEASURED MODE C	1/4 FL
I030/150	MEASURED TRACK MODE C	1/4 FL
I030/160	CALCULATED TRACK FLIGHT LEVEL	1/4 FL
I030/165	ESTIMATED ACCURACY OF CALCULATED TRACK FLIGHT LEVEL	1/4 FL
I030/170	TRACK AGES	1/4 s
I030/180	CALCULATED TRACK VELOCITY (POLAR)	0.22 kt/0.0055 °
I030/181	CALCULATED TRACK VELOCITY (CARTESIAN)	0.22 kt
I030/190	ESTIMATED ACCURACY OF TRACK VELOCITY (POLAR)	0.22 kt/0.0055 °
I030/191	ESTIMATED ACCURACY OF TRACK VELOCITY (CARTESIAN)	0.22 kt
I030/200	MODE OF FLIGHT	N.A.
I030/210	MODE OF FLIGHT PROBABILITIES	N.A.
I030/220	CALCULATED RATE OF CLIMB/DESCENT	5.86 ft/min
I030/230	ESTIMATED ACCURACY OF RATE OF CLIMB/DESCENT	5.86 ft/min
I030/240	CALCULATED RATE OF TURN	1/4 °/s
I030/250	ESTIMATED ACCURACY OF RATE OF TURN	1/4 °/s
I030/260	RADAR IDENTIFICATION TAG	N.A.
I030/270	LOCAL TRACK NUMBER	N.A.
I030/290	PLOT AGES	1/4 s
I030/340	LAST MEASURED MODE 3/A	N.A.
I030/360	MEASURED POSITION	1/128 NM/0.0055°
I030/370	MEASURED 3-D HEIGHT	1/4 FL
I030/382	AIRCRAFT ADDRESS	N.A.
I030/384	AIRCRAFT IDENTIFICATION	N.A.
I030/386	COMMUNICATIONS CAPABILITY AND FLIGHT STATUS	N.A.
I030/390	FPPS IDENTIFICATION TAG	N.A.
I030/400	CALLSIGN	N.A.
I030/410	PLN NUMBER	N.A.
I030/420	FLIGHT CATEGORY	N.A.

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Data Item Reference Number	Description	System Units
I030/430	TYPE OF AIRCRAFT	N.A.
I030/435	CATEGORY OF TURBULENCE	N.A.
I030/440	DEPARTURE AIRPORT	N.A.
I030/450	DESTINATION AIRPORT	N.A.
I030/460	ALLOCATED SSR CODES	N.A.
I030/480	CURRENT CLEARED FLIGHT LEVEL	1/4 FL
I030/490	CURRENT CONTROL POSITION	N.A.
I030/RE	RESERVED EXPANSION DATA FIELD	N.A.

N.A. = Not Applicable

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2.2 Description of Data Items of CATEGORY 030

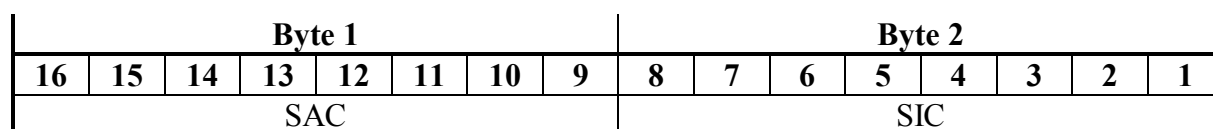
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I030/010 : SERVER IDENTIFICATION TAG

Definition : Identification of the Server of track information.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) :

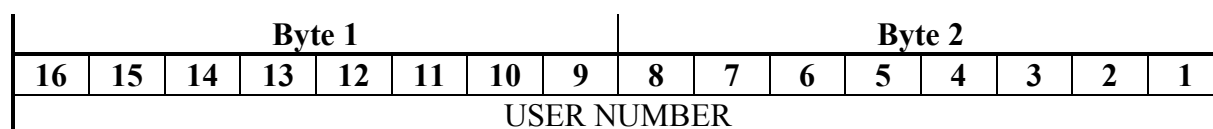
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I030/015 : USER NUMBER

Definition : Identification of the User of track information

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (USER NUMBER) User number (0 → 16#FFFF#)

Remark(s) : The User numbers are predefined in the User registration data base of the ARTAS Unit to which the User wants to connect.

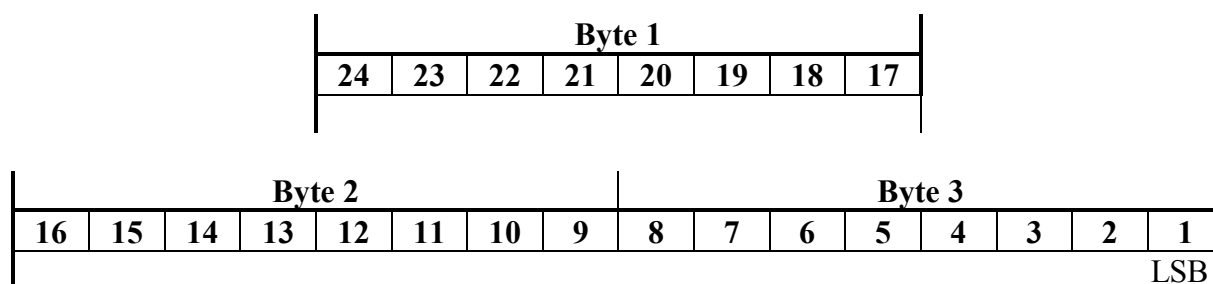
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I030/020 : TIME OF MESSAGE

Definition : Absolute time stamping of the message in the form of elapsed time since last midnight

Format : Three-byte fixed length data item.

Structure :



bit 1 (LSB) $(2E-7) s = 1/128 s$

Remark(s) : This is the time at which a message is filled and not the time at which the data-block containing the tracks is sent.

The time of the day value is reset to 0 at every midnight.

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I030/030 : SERVICE IDENTIFICATION

Definition : Identification of the service(s) to which a track message belongs.

Format : Variable length data item comprising a first part of one byte followed by a 1-byte extent as necessary.

Structure :

Byte 1							
16	15	14	13	12	11	10	9
sb					BS	C1	FX

Byte 2							
8	7	6	5	4	3	2	1
C2	C3	C4	C5	sb			

bits 16/12 (sb) = spare bits set to 0

BS, C1, C2, C3, C4 and C5 are used to indicate which user service(s) has (have) originated the track message :

- bit 11 **(BS)** = 1 Track selected by the Background service
- bit 10 **(C1)** = 1 Track selected by the Complementary service 1

- bit 9 **(FX)** Field extension

- bit 8 **(C2)** = 1 Track selected by the Complementary service 2
- bit 7 **(C3)** = 1 Track selected by the Complementary service 3
- bit 6 **(C4)** = 1 Track selected by the Complementary service 4
- bit 5 **(C5)** = 1 Track selected by the Complementary service 5

- bits 4/1 (sb) = spare bits set to 0

Remark(s) :

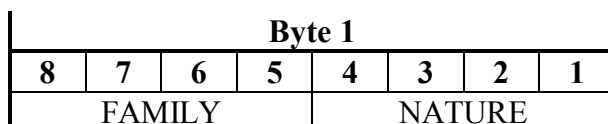
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I030/035 : TYPE OF MESSAGE

Definition : This data item allows for a more convenient handling of the message at the receiver side by further defining the type of transaction.

Format : One-byte fixed length data item.

Structure :



bits 8/5 (FAMILY) to which the message belongs (0 to 15),

bits 4/1 : (NATURE) of the message (within its FAMILY).

(FAMILY) = 0 ARTAS coordination messages

(NATURE) = 0000 track information message

 0001 slave track promotion message

Remark(s) : the Slave Track Promotion Messages are related to the inter-ARTAS cooperation and cannot be served to the *normal* track information Users.

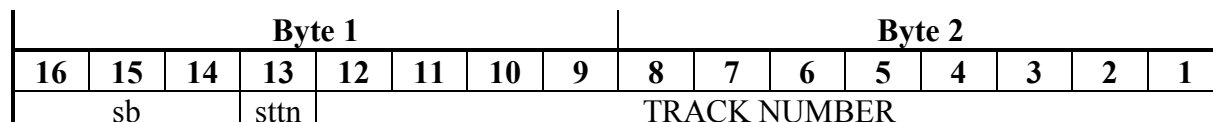
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I030/040 : TRACK NUMBER

Definition : Identification of an ARTAS track (track number)

Format : Two-byte fixed length data item

Structure :



bits 16/14 (sb) = spare bits set to 0

bit 13 (sttn) : track numbering indicator, value is changed when the track numbering is restarted.

bits 12/1 (TRACK NUMBER) : 0 to 4095

Remark(s) : Unlike the ARTAS track number I030/050, the track number does not change when a track enters or leaves an ARTAS Domain of Cooperation. It remains unchanged as long as the track exists.

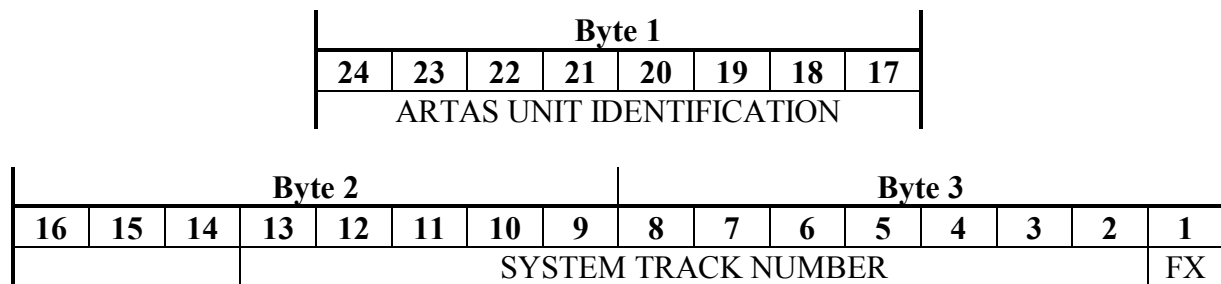
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I030/050 : ARTAS TRACK NUMBER

Definition : Identification of an ARTAS track

Format : Variable length data item comprising a first part of three bytes (Master Track Number), followed by up to 5 extents of three bytes (Slave Track Numbers).

Structure :



Each **Local Track Number** (i.e. either a **Master** or a **Slave** Track Number) is composed of the identification of the ARTAS UNIT processing the track together with the relevant SYSTEM TRACK NUMBER (i.e. the number of the track local to the ARTAS Unit in question). Each Local Track Number is unique.

bits 24/17 (ARTAS UNIT IDENTIFICATION) : 0 to 255

bits 13/2 (SYSTEM TRACK NUMBER) : 0 to 4095

bit 1 (FX) = 0 end of data item
1 extension into next extent

The MASTER TRACK NUMBER and the 5 possible extents (SLAVE TRACK NUMBER) are identically composed.

The longer ARTAS Track Numbers (identifying tracks simultaneously processed in 6 adjacent Units numbered a to f) will have the following form :

UNIT a IDENT	SYSTEM TRACK NUMBER IN UNIT a	1
UNIT b IDENT	SYSTEM TRACK NUMBER IN UNIT b	1
UNIT c IDENT	SYSTEM TRACK NUMBER IN UNIT c	1
UNIT d IDENT	SYSTEM TRACK NUMBER IN UNIT d	1
UNIT e IDENT	SYSTEM TRACK NUMBER IN UNIT e	1
UNIT f IDENT	SYSTEM TRACK NUMBER IN UNIT f	0

Remark(s) : The ARTAS UNIT IDENTIFICATION NUMBERS will be given as soon as the systems will be implemented.

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I030/060 : TRACK MODE 3/A

Definition : Mode 3/A identity associated to the track

Format : Two-byte fixed length data item.

Structure :

Byte 1								Byte 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
V	G	C	sb	OCT1			OCT2			OCT3			OCT4		

bit 16 (V) 0 Code validated
 1 Code non validated

bit 15 (G) 0 Default
 1 Garbled code

bit 14 (C) 0 No change of track Mode 3/A
 1 Track Mode 3/A has changed

bit 13 (sb) spare bit set to 0

bits 12/1 Mode 3/A Code under the form of 4 digits in octal representation :

bits 12/10 : OCT1 = 1st octal digit,
bits 9/7 : OCT2 = 2nd octal digit,
bits 6/4 : OCT3 = 3rd octal digit,
bits 3/1 : OCT4 = 4th octal digit,

Remark(s) : A change of track Mode 3/A (C = 1) is indicated during 30 seconds after the code has changed.

(V) and (G) are extracted from the last Mode 3/A that was used to update the track.

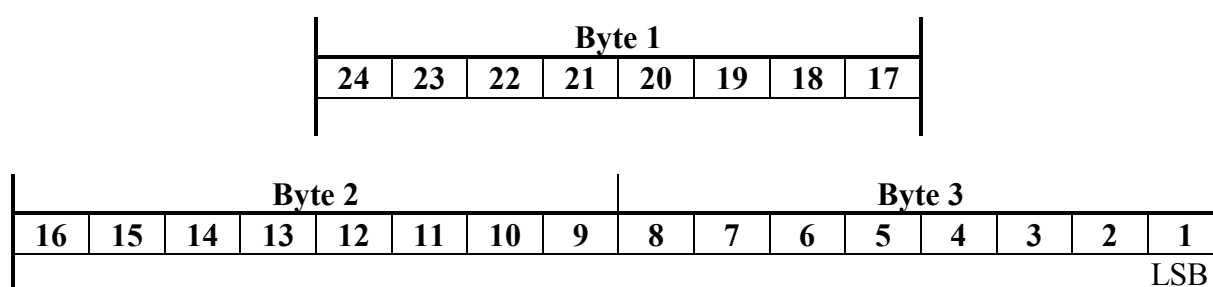
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I030/070 : TIME OF LAST UPDATE

Definition : Absolute time stamping of the information provided in the track message, in the form of elapsed time since last midnight.

Format : Three-byte fixed length data item.

Structure :



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

Remark(s) : In ARTAS, this is the time at which the track is extrapolated by the Server in case of periodical service. Otherwise, this is the update time of the track state vector by the Tracker.

The time of the day value is reset to 0 at every midnight.

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I030/080 : ARTAS TRACK STATUS

Definition : Status of an ARTAS track.

Format: Variable length data item comprising a first part of one byte, followed by 1-byte extents as necessary.

Structure:

Byte 1							
8	7	6	5	4	3	2	1
LIV	CNF	ADD	CST	TYPE			FX

- bit 8 (LIV) = 1 Simulated or test target track
 0 Live target

- bit 7 (CNF) = 1 Tentative track
 0 Confirmed track

- bit 6 (ADD) = 1 track updated using Aircraft Derived Data
 0 track not updated using Aircraft Derived Data

- bit 5 (CST) = 1 coasted track
 0 non-coasted track

- bits 4/2 (TYPE)= 000 both PR and SSR Multiradar track
 001 PR only Multiradar track
 010 SSR only Multiradar track
 011 not used
 100 combined (P+S) monoradar track
 101 PR monoradar track
 110 SSR monoradar track
 111 not used

- bit 1 (FX) = 0 end of data item
 1 extension into first extent

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structure of first extent :

Byte 2							
8	7	6	5	4	3	2	1
TRM	CRE	SLR		COR			FX

- bit 8 (TRM) =
- 0 default value
 - 1 track TERMINATED (i.e. last message transmitted for the track in question which is not continued anymore by the tracker).
- bit 7 (CRE) =
- 0 default value
 - 1 track CREATED (i.e. first message transmitted to the User for the track in question)
- bit 6/5 (SLR) =
- 0 slant range corrected track coordinates using tracked MODE C information.
 - 1 slant range corrected track coordinates using triangulated track height or height derived from coverage
 - 2 slant range correction using assumed height
 - 3 non slant range corrected track coordinates
- bits 4/2 (COR) =
- | | | |
|-----|--|---------------------------------------|
| 000 | confirmed flight plan to track correlation | |
| 001 | type 1 correlation | |
| 010 | type 2 correlation | |
| 011 | type 3 correlation | application dependent |
| 100 | type 4 correlation | |
| 101 | type 5 correlation | |
| 110 | type 6 correlation | |
| | 111 | track not correlated to a flight plan |
- bit 1 (FX) =
- 0 End of data item
 - 1 Extension into second extent

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structure of second extent :

Byte 3							
8	7	6	5	4	3	2	1
sb	sb	FOR	AMA	SPI	ME	TDC	FX

- | | | | | |
|---------|---------|---|--|--|
| bit 8/7 | (sb) | | Spare bits set to 0 | |
| bit 6 | (FOR) = | 0 | Default | |
| | | 1 | Formation flight : more than one aircraft may correspond to the track. | |
| bit 5 | (AMA) = | 0 | amalgamated track | |
| | | 1 | non amalgamated track | |
| bit 4 | (SPI) = | 0 | default value | |
| | | 1 | Special Position Indication in the last SSR plot that was used to update the track | |
| bit 3 | (ME) = | 0 | default | |
| | | 1 | Military Emergency | |
| bit 2 | (TDC) | 0 | Accurate estimation of the track Transponder Delay enabling correction of the plots associated to the track. | |
| | | 1 | Estimation of the track Transponder Delay not accurate enough to enable the plots correction. | |
| bit 1 | (FX) = | 0 | End of data item | |
| | | 1 | Extension into third extent | |

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structure of third extent :

Byte 4							
8	7	6	5	4	3	2	1
SF	sb						FX

bit 8 (SF) = 0 Track position coding precision = 1/64 NM,
1 Track position coding precision = 1/32 NM,

bits 7/2 (sb) = spare bits set to 0

bit 1 (FX) = 0 End of data item
1 Extension into fourth extent

Remark(s):

1. SLR (slant range correction, bits 6/5 of first extent) will not be set to 3 in ARTAS.
2. In ARTAS, COR is set to 001 (type 1 correlation) when either no flight plan is available from the preferred FPPS User or no preferred FPPS User has been specified but the track is correlated to flight plan(s) from other FPPS Users which do not provide a unique control position (i.e. either none of them provides a control position or they provide different values).

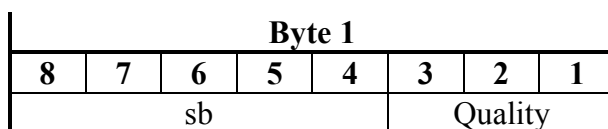
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I030/090 : ARTAS TRACK QUALITY

Definition : ARTAS track quality.

Format : One byte fixed length data item.

Structure :



bits 8/4 (sb) spare bits set to 0

bits 3/1 (Quality) ARTAS track quality = 0 (low quality) to 7 (high quality)

Remark(s) :

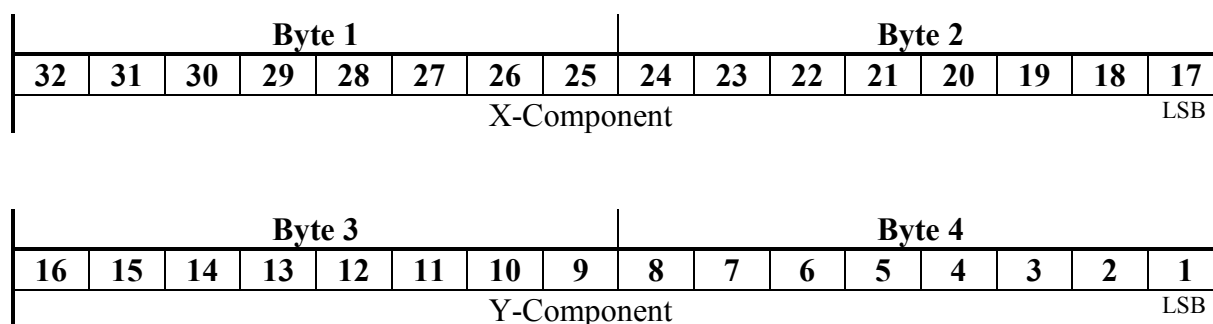
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I030/100 : CALCULATED TRACK POSITION (CARTESIAN)

Definition : Calculated position of an aircraft expressed in Cartesian coordinates.

Format : Four-byte fixed length data item.

Structure :



bits 17 and 1 (LSB) = 2^{-6+f} where f is the scaling factor applied, modifying the standard precision.

Maximum value = $(2^{9+f} - \text{LSB}) \text{ NM}$

Remark(s) : Basically, f=0, i.e. LSB = 1/64 NM and range = - 512 NM .. 511.984 NM

A scaling factor of f=1 is required for any User defining a Domain of Interest extending beyond a square of approximately 1024 NM X 1024 NM centred on the *Unit Centre Point* (i.e. the origin of the stereographic projection) of the ARTAS Unit to which it is connected. In this case, LSB will be 1/32 NM and the maximum coding range will be approximately 2048 NM (- 1024 NM .. 1023.968 NM). The scaling factor is defined in item I252/340.

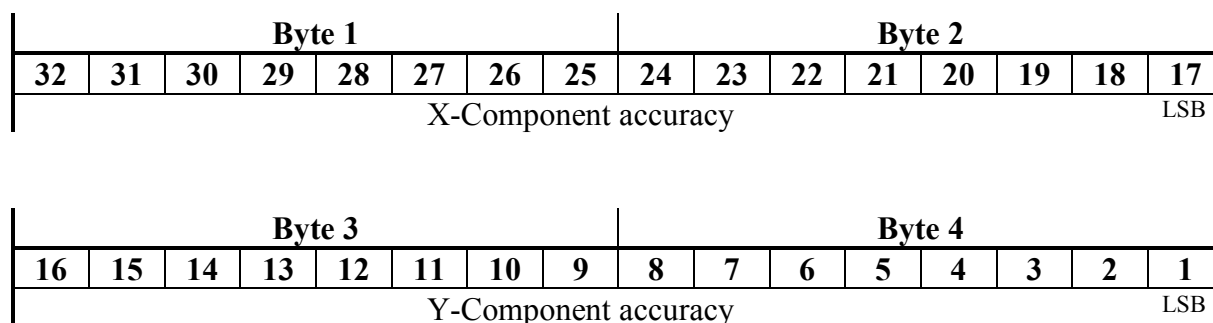
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I030/110 : ESTIMATED ACCURACY OF TRACK POSITION (CARTESIAN)

Definition : Estimated accuracy (i.e. standard deviation) of the calculated position of an aircraft expressed in Cartesian coordinates.

Format : Four-byte fixed length data item.

Structure :



bits 17 and 1 (LSB) = 2^{-6+f} where f is the scaling factor applied, modifying the standard precision.

Maximum value = $(2^{9+f} - \text{LSB}) \text{ NM}$

Remark(s) : Accuracy concerns both X and Y coordinate components.

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I030/120 : TRACK MODE 2 CODE

Definition : Mode 2 identification associated to the track

Format : Two-byte fixed length data item.

Structure :

Byte 1								Byte 2								
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
V	G	C	sb	OCT1				OCT2				OCT3			OCT4	

bit 16 (V) = 0 Code validated
1 Code non validated

bit 15 (G) = 0 Default
1 Garbled code

bit 14 (C) = 0 No change of track Mode 2
1 Track Mode 2 has changed

bit 13 (sb) = spare bit set to 0

bits 12/1 Mode 2 reply under the form of 4 digits in octal representation :

bits 12/10 : OCT1 = 1st octal digit,
bits 9/7 : OCT2 = 2nd octal digit,
bits 6/4 : OCT3 = 3rd octal digit,
bits 3/1 : OCT4 = 4th octal digit,

Remark(s) : a change of track Mode 2 (C = 1) is indicated during 30 seconds after the code has changed.

(V) and (G) are extracted from the last Mode 2 that was used to update the track.

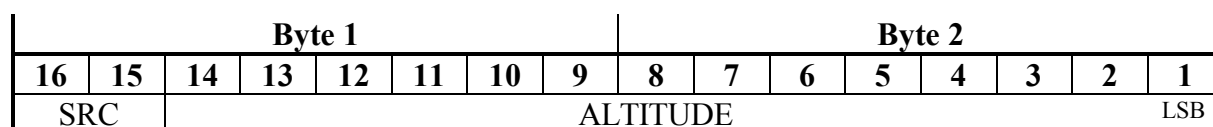
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I030/130 : CALCULATED TRACK ALTITUDE

Definition : Calculated altitude of an aircraft.

Format : Two-byte fixed length data item.

Structure :



bit 16/15 (SRC) =

0	3D height
1	Triangulated height
2	Height derived from coverage
3	Assumed height

bit 14/1 calculated track altitude

(LSB) =	25 feet
Vmin =	-1500 ft
Vmax =	150000 ft

Remark(s) : SRC indicates the source used to compute the altitude.

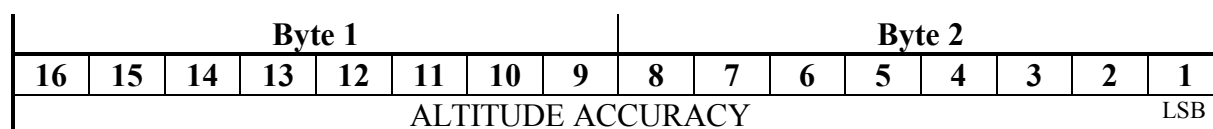
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I030/135 : ESTIMATED ACCURACY OF TRACK ALTITUDE

Definition : Estimated accuracy (i.e. standard deviation) of the calculated altitude of an aircraft.

Format : Two-byte fixed length data item.

Structure :



(LSB) = 25 ft

Remark(s) :

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I030/140 : LAST MEASURED MODE C

Definition : Mode C code of the last nearest neighbour plot containing a Mode C and used to update the track.

Format : Two-byte fixed length data item.

Structure :

Byte 1								Byte 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
VAL	GC	MODE C												LSB	

bit 16 (VAL) = Validity indicator of the Flight Level

- 0 valid Mode C code
- 1 invalid Mode C code

bit 15 (GC) = 0 default value
1 garbled information

bit 14/1 (MODE C)
(LSB) = 1/4 FL = 25 feet
Vmin = -12 FL = -1200 ft
Vmax = 1270 FL = 127000 ft

Remark(s) : 1: The VAL and GC indications are derived from the local track/plot message.

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I030/150 : MEASURED TRACK MODE C

Definition : Last validated and credible Mode C value used to update the track.

Format : Two-byte fixed length data item.

Structure :

Byte 1								Byte 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
sb		MODE C												LSB	

bits 16/15 (sb)= Spare bits set to 0

bits 16/1 (MODE C)
 (LSB) = 1/4 FL = 25 feet
 Vmin = -12 FL = -1200 ft
 Vmax = 1270 FL = 127000 ft

Remark(s) : There are tracker parameters that determine whether the validity and garbled indicators are considered in the determination of the last validated and credible Mode C.

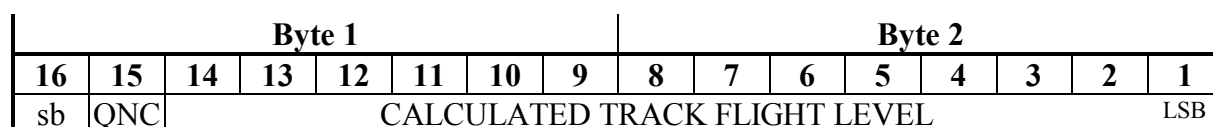
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I030/160 : CALCULATED TRACK FLIGHT LEVEL

Definition : Calculated Flight Level of the track (isobar).

Format : Two-byte fixed length data item.

Structure :



bit 16 (sb) = spare bit set to 0

bit 15 (QNC) = 0 FL calculated without QNH correction
 1 FL calculated with QNH correction

bit 14/1 (TRACK FLIGHT LEVEL)

(LSB) = 1/4 FL = 25 feet
 Vmin = -15 FL = -1500 ft
 Vmax = 1500 FL = 150000 ft

Remark(s) : the QNH is not processed in ARTAS : bit QNC is always 0.

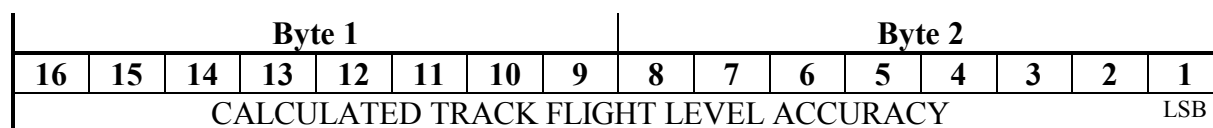
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I030/165 : ESTIMATED ACCURACY OF CALCULATED TRACK FLIGHT LEVEL

Definition : Estimated accuracy (i.e. standard deviation) of the calculated Flight Level of the track (isobar).

Format : Two-byte fixed length data item.

Structure :



bit 1 (LSB) = 1/4 FL = 25 feet

Remark(s) :

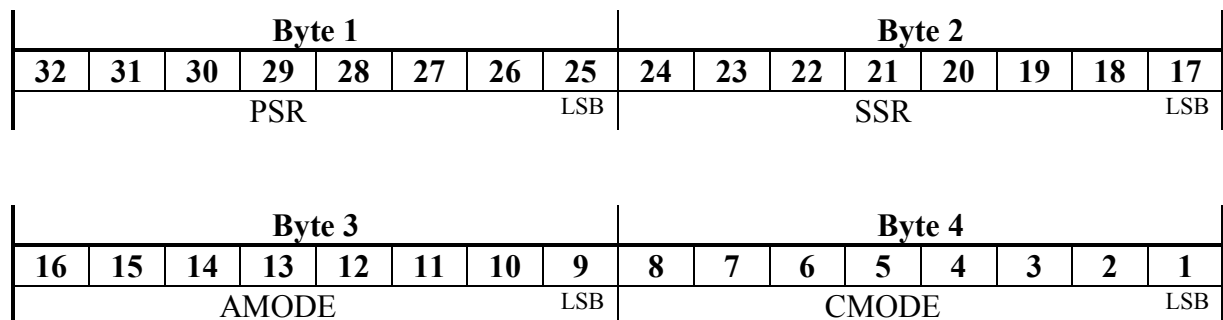
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I030/170 : TRACK AGES

Definition : A set of track related ages.

Format : Four-byte fixed length data item.

Structure :



bits 32/25 (PSR) Age of the last primary plot/local track used to update the track

bit 25 (LSB) = 1/4 s
 maximum value = 63.75 s

bits 24/17 (SSR) Age of the last secondary plot/local track used to update the track

bit 17 (LSB) = 1/4 s
 maximum value = 63.75 s

bits 16/9 (AMODE) Age of the last detection of the mode A contained in the track mode A item I030/060.

bit 9 (LSB) = 1/4 s
 maximum value = 63.75 s

bits 8/1 (CMODE) Age of the last valid and credible mode C used to update the track, contained in I030/150.

bit 1 (LSB) = 1/4 s
 maximum value = 63.75 s

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Remark(s) : The ages are counted from I030/070 TIME OF LAST UPDATE, using the following formula : $\text{age} = \text{I030/070} - \text{time}$.

If the computed age is greater than the maximum value or if the associated information has never been received, then the maximum value is returned.

If the computed age is negative, then 0 is returned.

The track mode A is contained in I030/060 TRACK MODE 3/A.

The last valid and credible mode C is contained in I030/150 MEASURED TRACK MODE C.

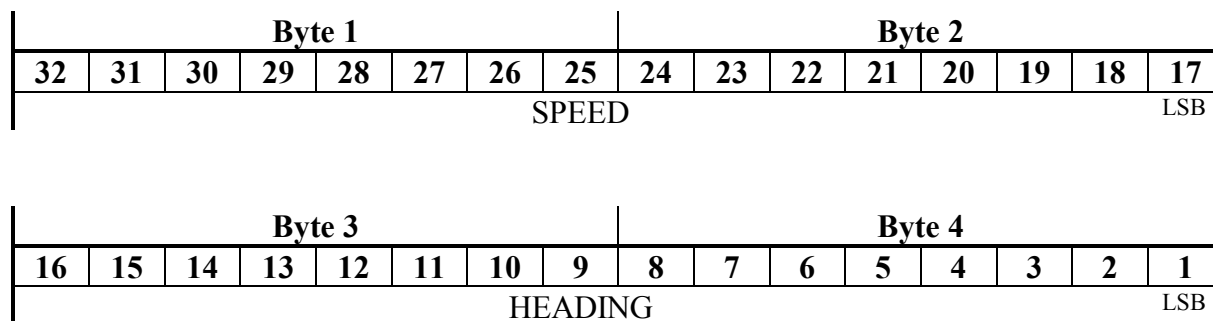
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I030/180 : CALCULATED TRACK VELOCITY (POLAR)

Definition : Calculated track velocity expressed in polar coordinates.

Format : Four-byte fixed length data item.

Structure :



(SPEED) :

bit 17 (LSB) = 2^{-14} NM/s \cong 0.22 kt

Maximum value = 2 NM/s = 7200 kt

(HEADING) :

bit 1 (LSB) = $360^\circ / 2^{16} = 0.0055^\circ$

Remark(s) :

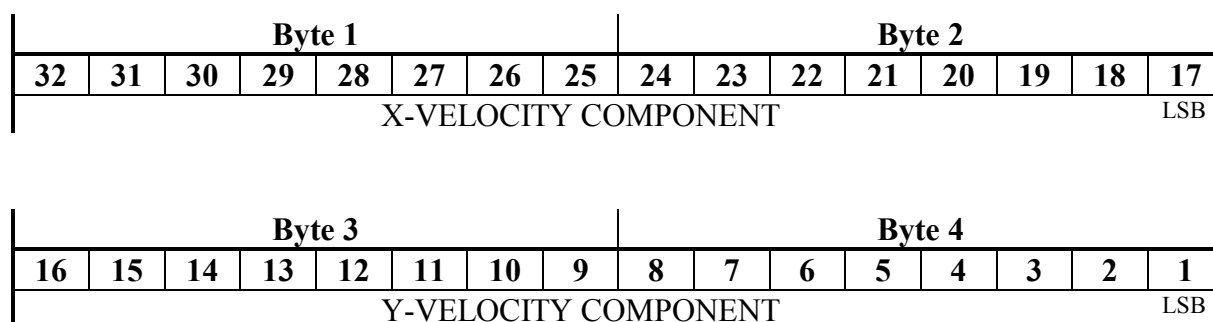
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I030/181 : CALCULATED TRACK VELOCITY (CARTESIAN)

Definition : Calculated track velocity expressed in Cartesian coordinates.

Format : Four-byte fixed length data item.

Structure :



(X/Y-VELOCITY COMPONENTS) :

bits 17 and 1 (LSB) 2^{-14} NM/s \cong 0.22 kt

Maximum value = 2 NM/s = 7200 kt

Remark(s) :

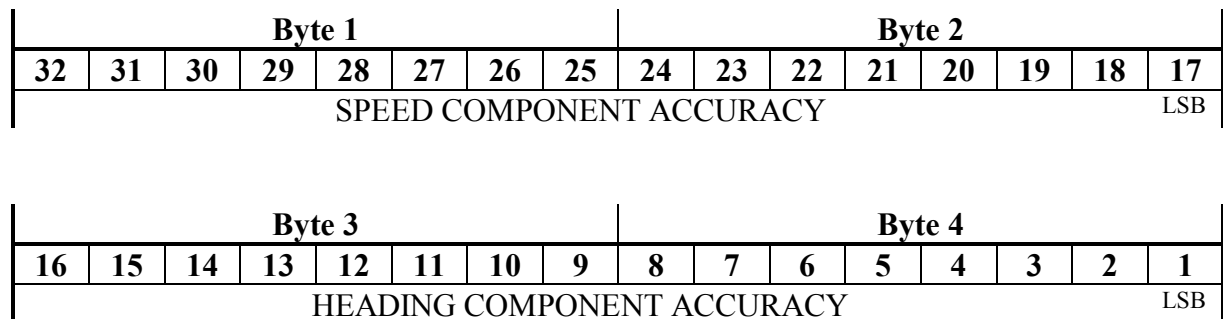
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I030/190 : ESTIMATED ACCURACY OF TRACK VELOCITY (POLAR)

Definition : Estimated accuracy (i.e. standard deviation) of the calculated track velocity expressed in polar coordinates.

Format : Four-byte fixed length data item.

Structure :



(SPEED COMPONENT ACCURACY) :

bit 17 (LSB) = 2^{-14} NM/s \cong 0.22 kt

(HEADING COMPONENT ACCURACY) :

bit 1 (LSB) = $360^\circ / 2^{16} \cong 0.0055^\circ$

Remark(s) :

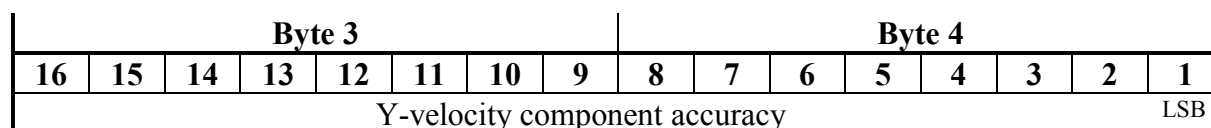
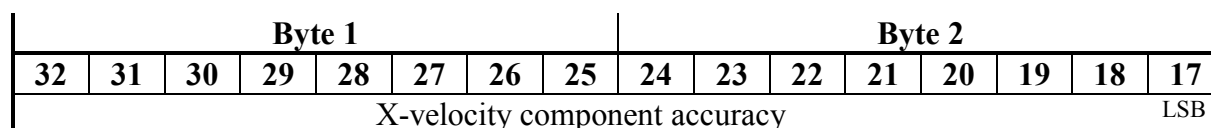
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I030/191 : ESTIMATED ACCURACY OF TRACK VELOCITY (CARTESIAN)

Definition : Estimated accuracy (i.e. standard deviation) of the calculated track velocity expressed in Cartesian coordinates.

Format : Four-byte fixed length data item.

Structure :



(V_X and V_Y VELOCITY COMPONENTS ACCURACY) :

bits 32 and 16 Sign bit set to 0 (accuracy is an absolute value).

bits 16 and 1 (LSB) = 2^{-14} NM/s \cong 0.22 kt

Remark(s) :

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I030/200 : MODE OF FLIGHT

Definition : Calculated Mode-of-Flight of an aircraft.

Format : One-byte fixed length data item.

Structure :

Byte 1							
8	7	6	5	4	3	2	1
TRANS		LONGI		VERTI		sb	

bits 8/7 (TRANS) : Transversal Acceleration :

- 00 Constant Course
- 01 Intentional Right Turn
- 10 Intentional Left Turn
- 11 Undetermined

bits 6/5 (LONGI) : Longitudinal Acceleration :

- 00 Constant Groundspeed
- 01 Intentionally Increasing Groundspeed
- 10 Intentionally Decreasing Groundspeed
- 11 Undetermined

bits 4/3 (VERTI) : Vertical Acceleration :

- 00 Level Flight
- 01 Climb
- 10 Descent
- 11 Undetermined

bits 2/1 (sb) : spare bits set to 0

Remark(s) :

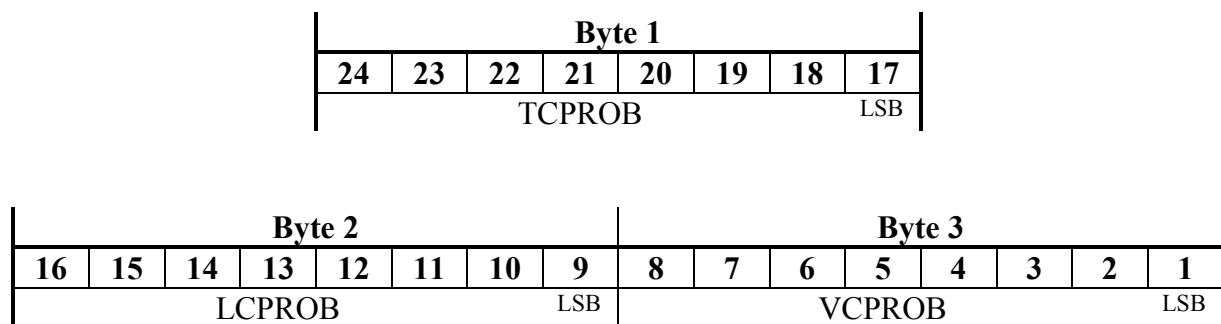
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I030/210 : MODE OF FLIGHT PROBABILITIES

Definition : Probabilities attached to the Transversal, longitudinal and Vertical components of a calculated Mode-of-Flight.

Format : Three-byte fixed length data item.

Structure :



The probabilities are expressed in percentage :

(TCPROB) : probability associated to the assessment of the Transversal Acceleration Mode-of-Flight Component.

(LCPROB) : probability associated to the assessment of the Longitudinal Acceleration Mode-of-Flight Component.

(VCPROB) : probability associated to the assessment of the Vertical Acceleration Mode-of-Flight Component.

bits 17, 9 and 1 : (LSB) : $1/2 \% = 0.5 \%$

Remark(s) :

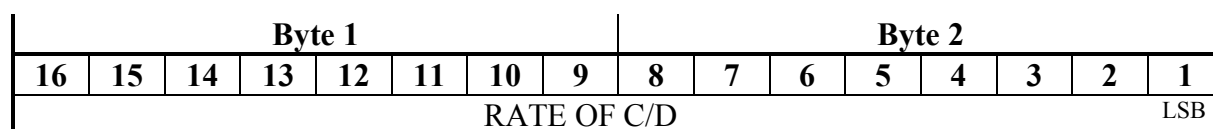
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I030/220 : CALCULATED RATE OF CLIMB/DESCENT

Definition : Calculated rate of Climb/Descent of an aircraft.

Format : Two-byte fixed length data item.

Structure :



bit 1 (LSB) = 2^{-10} FL/s \cong 5.86 feet/minute

Remark(s) :

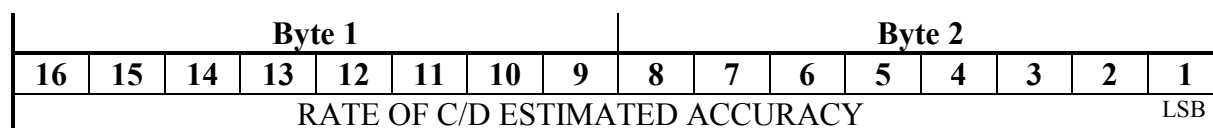
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I030/230 : ESTIMATED ACCURACY OF RATE OF CLIMB/DESCENT

Definition : Estimated accuracy (i.e. standard deviation) of the calculated rate of Climb/Descent of an aircraft.

Format : Two-byte fixed length data item.

Structure :



bit 1 (LSB) = 2^{-10} FL/s \cong 5.86 feet/minute

Remark(s) :

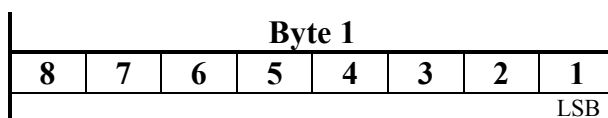
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I030/240 : CALCULATED RATE OF TURN

Definition : Calculated Rate of Turn expressed in degrees per second.

Format : One-byte fixed length data item.

Structure :



bit 1 (LSB) : $2^{-2} \text{ }^\circ/\text{s} = 1/4 \text{ }^\circ/\text{s}$

Maximum value = 32 $^\circ/\text{s}$

Remark(s) : A positive value represents a right turn, whereas a negative value represents a left turn.

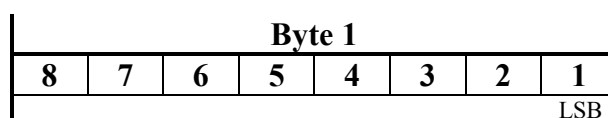
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I030/250 : ESTIMATED ACCURACY OF RATE OF TURN

Definition : Estimated accuracy (i.e. standard deviation) of a calculated Rate of Turn expressed in degrees per second.

Format : One-byte fixed length data item.

Structure :



bit 1 (LSB) : $2^{-2} \text{ }^\circ/\text{s} = 1/4 \text{ }^\circ/\text{s}$

Maximum value = 64 $^\circ/\text{s}$

Remark(s) :

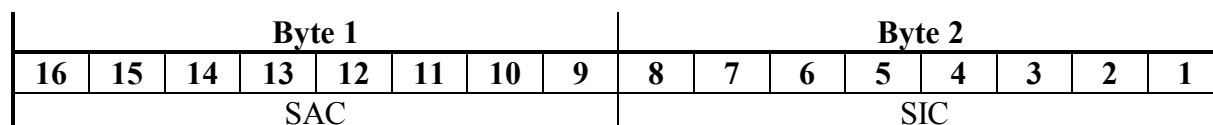
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I030/260 : RADAR IDENTIFICATION TAG

Definition : Identification of the radar station from which has been received the last plot/local track used to update an ARTAS track.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) :

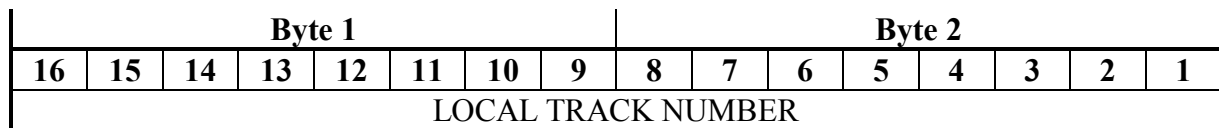
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I030/270 : LOCAL TRACK NUMBER

Definition : The local track number is an integer value representing a unique reference to a track record within a particular track file e.g. the *track data-base* of a radar local tracker.

Format : Two-byte fixed length data item.

Structure :



Maximum value = 65535

Remark(s) :

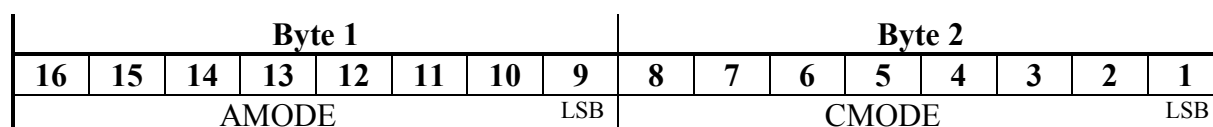
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I030/290 : PLOT AGES

Definition : A set of plot related ages.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (AMODE) Age of the last mode A used to update the track and contained in item I030/340.

bit 9 (LSB) = 1/4 s
 maximum value = 63.75 s

bits 8/1 (CMODE) Age of the last mode C used to update the track and contained in I030/140.

bit 1 (LSB) = 1/4 s
 maximum value = 63.75 s

Remark(s) : The ages are counted from I030/070 TIME OF LAST UPDATE, using the following formula : age = I030/070 - time.
 If the computed age is greater than the maximum value or if the associated information has never been received, then the maximum value is returned.
 If the computed age is negative, then 0 is returned.

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I030/340 : LAST MEASURED MODE 3/A

Definition : Mode 3/A of the last nearest neighbour plot containing a mode 3/A and used to update the track.

Format : Two-byte fixed length data item.

Structure :

Byte 1								Byte 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
V	G	L	sb	OCT1			OCT2			OCT3			OCT4		

bit 16 (V) = 0 Code validated
1 Code non validated

bit 15 (G) = 0 Default
1 Garbled code

bit 14 (L) = 0 MODE 3/A code as derived from the reply of the transponder,
1 Smoothed MODE 3/A code as provided by a local tracker.

bit 13 (sb) = spare bit set to 0

bits 12/1 Mode 3/A reply under the form of 4 digits in octal representation :

bits 12/10 : OCT1 = 1st octal digit,
bits 9/7 : OCT2 = 2nd octal digit,
bits 6/4 : OCT3 = 3rd octal digit,
bits 3/1 : OCT4 = 4th octal digit,

Remark(s) : Smoothed MODE 3/A data (L = 1) will be used in case of absence of MODE 3/A code information in the plot or in case of difference between plot and local track MODE 3/A code information.

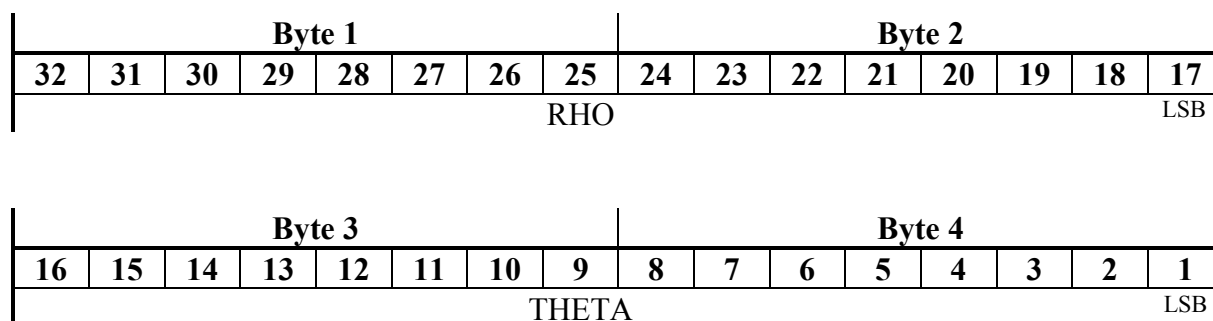
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I030/360 : MEASURED POSITION

Definition : Measured position of an aircraft in local polar coordinates (information provided in the last plot/local track used to update an ARTAS track).

Format : Four-byte fixed length data item.

Structure :



bits 32/17 (RHO) Measured distance :

bit 17 (LSB) = 1/128 NM

maximum value = 512 NM

bits 16/1 (THETA) measured azimuth :

bit 1 (LSB) = $360^\circ / 2^{16} \cong 0.0055^\circ$

Remark(s) : The measured position is :

- a. In case of a plot, the measured raw polar coordinates,
- b. In case of a local track, the measured raw polar coordinates of the plot associated to the track,
- c. In case of a local track without detection, the extrapolated polar coordinates.

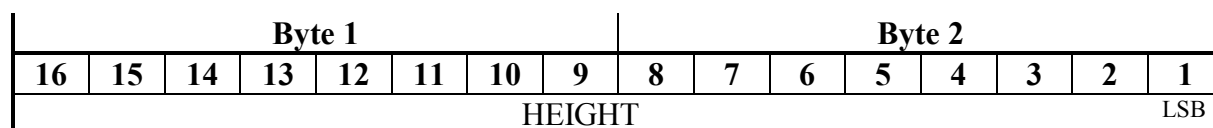
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I030/370 : MEASURED 3-D HEIGHT

Definition : Height of an aircraft measured by a 3-D Radar (Information provided in the last plot/local track used to update an ARTAS track).

Format : Two-byte fixed length data item.

Structure :



bit 1 (LSB) = 1/4 FL = 25 feet

Remark(s) :

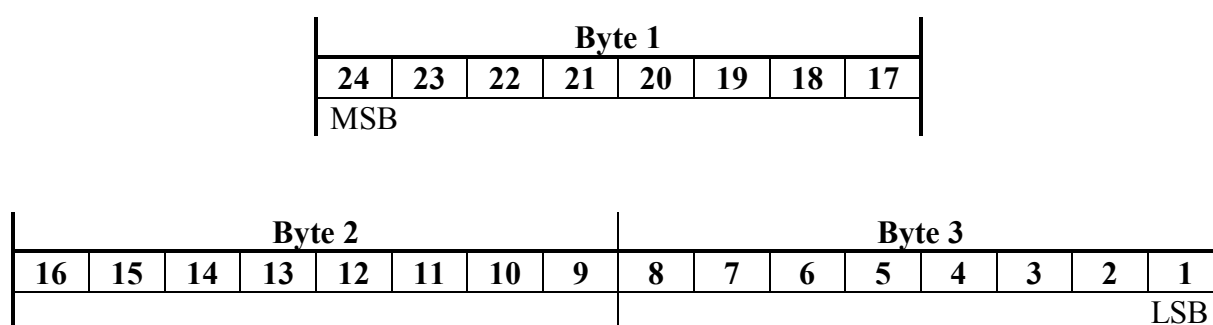
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I030/382 : AIRCRAFT ADDRESS

Definition : technical Mode-S address used for identification of an aircraft

Format : Three-byte fixed length data item

Structure :



bits 24/1 : 24 bits Mode-S address

Remark(s) :

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I030/384 : AIRCRAFT IDENTIFICATION

Definition : Aircraft Identification (in 8 characters) obtained from an aircraft equipped with a Mode S transponder.

Format : Six-byte fixed length data item.

Structure :

Byte 1								Byte 2							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Character 1						Character 2						Char 3/1			

Byte 3								Byte 4							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Char 3/2		Character 4						Character 5						Char 6/1	

Byte 5								Byte 6							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Char 6/2				Character 7						Character 8					

bits 48/1 characters 1-8 (coded on 6 bits each) defining aircraft identification when flight plan is available or the registration marking when no flight plan is available. See ICAO document Annex 10, Volume I, Part I, section 3.8.2.9 for the coding rules.

Remark(s) :

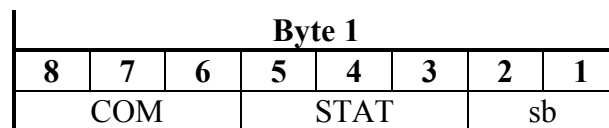
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I030/386 : COMMUNICATIONS CAPABILITY AND FLIGHT STATUS

Definition : Communications capability of the transponder and flight status.

Format : One-byte fixed length data item.

Structure :



bits 8/6 Communications capability of the transponder :

- | | | |
|---------|-----|--|
| (COM) = | 0 | no communications capability (surveillance only) |
| | 1 | Comm. A and Comm. B capability |
| | 2 | Comm. A, Comm. B and Uplink ELM |
| | 3 | Comm. A, Comm. B, Uplink ELM and Downlink ELM |
| | 4 | Level 5 Transponder capability. |
| | 5/7 | not assigned. |

bits 5/3 Flight status :

- | | | |
|----------|-----|---|
| (STAT) = | 0 | no alert, no SPI, aircraft airborne |
| | 1 | no alert, no SPI, aircraft on ground |
| | 2 | alert, no SPI, aircraft airborne |
| | 3 | alert, no SPI, aircraft on ground |
| | 4 | alert, SPI, aircraft on ground or airborne |
| | 5 | no alert, SPI, aircraft on ground or airborne |
| | 6/7 | not assigned |

bits 2/1 (sb) spare bits set to 0

Remark(s) :

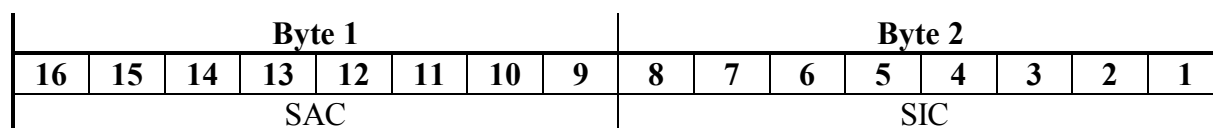
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I030/390 : FPPS IDENTIFICATION TAG

Definition : Identification of the Flight Plan Data Processing System from which Flight-Plan related information are preferred by the User.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) :

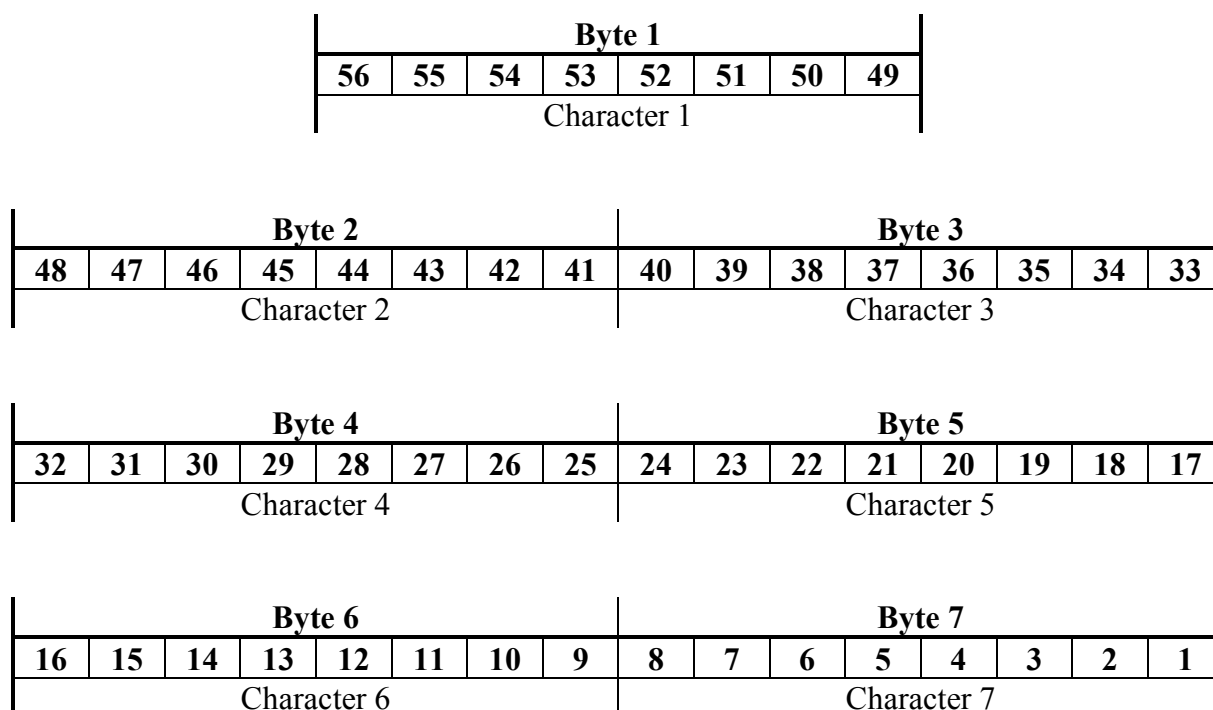
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I030/400 : CALLSIGN

Definition : Callsign (in 7 characters) of an aircraft (provided in the Minipln).

Format : Seven-byte fixed length data item.

Structure :



Each one of the seven bytes contains an ASCII Character.

The CALLSIGN is always left adjusted. It contains up to 7 upper-case alphanumeric characters, the remaining character positions (if any) are padded with space characters.

Remark(s) :

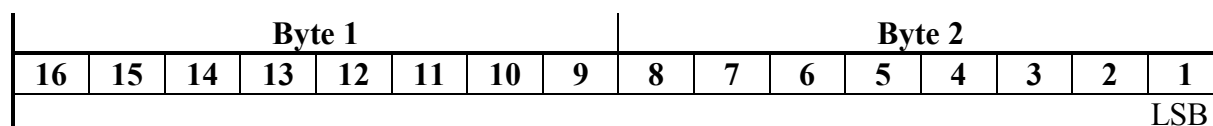
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I030/410 : PLN NUMBER

Definition : The PLN NUMBER is an integer value representing a unique reference to a Flight-plan record within a particular FPPS (Information provided in the minipln).

Format : Two-byte fixed length data item.

Structure :



Maximum value = 65535

Remark(s) :

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I030/420 : FLIGHT CATEGORY

Definition : Flight Category (information provided in the Minipln).

Format : One-byte fixed length data item.

Structure :

Byte 1							
8	7	6	5	4	3	2	1
OAT	GAT	FR1	FR2	SP3	SP2	SP1	sb

bits 8/7 (GAT/OAT)

00	Unknown
01	General Air Traffic
10	Operational Air Traffic
11	Not applicable

bits 6/5 (FR1/FR2)

00	Instrument Flight Rules
01	Visual Flight rules
10	Not applicable
11	Controlled Visual Flight Rules

bits 4/2 (SP3/SP2/SP1) These three bits allow for the definition of up to 7 sub-categories within the main categories.

bit 1 (sb) spare bits set to 0

Remark(s) :

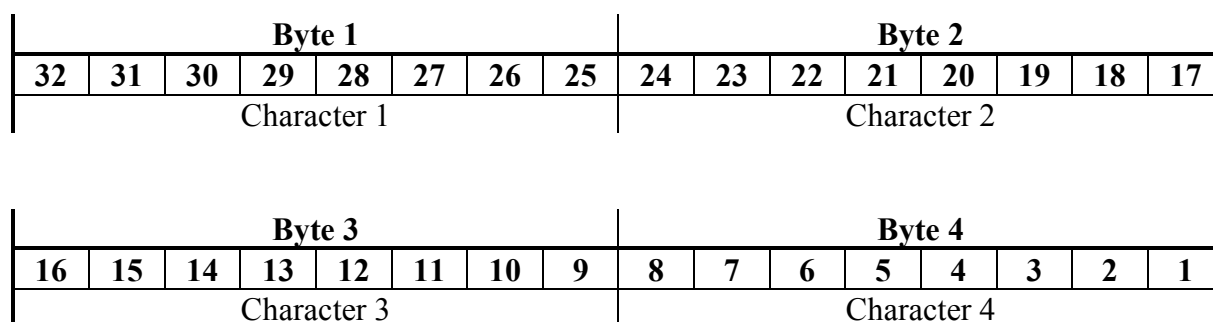
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I030/430 : TYPE OF AIRCRAFT

Definition : Type of Aircraft indicated in a Minipln.

Format : Four-byte fixed length data item.

Structure :



Each one of the four bytes composing the type of aircraft contains an ASCII Character (upper-case alphabetic characters with trailing spaces).

Remark(s) : The types of aircraft are defined in the ICAO Document 4444.

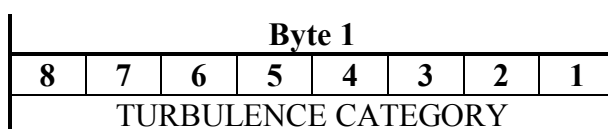
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I030/435 : CATEGORY OF TURBULENCE

Definition : Category of turbulence of an aircraft (information provided in the Minipln).

Format : 1-byte fixed length data item.

Structure :



bits 8/1 TURBULENCE CATEGORY is an ASCII character code which may have the following values :

1001100 =	L : Light
1001101 =	M : Medium
1001000 =	H : Heavy

Remark(s) :

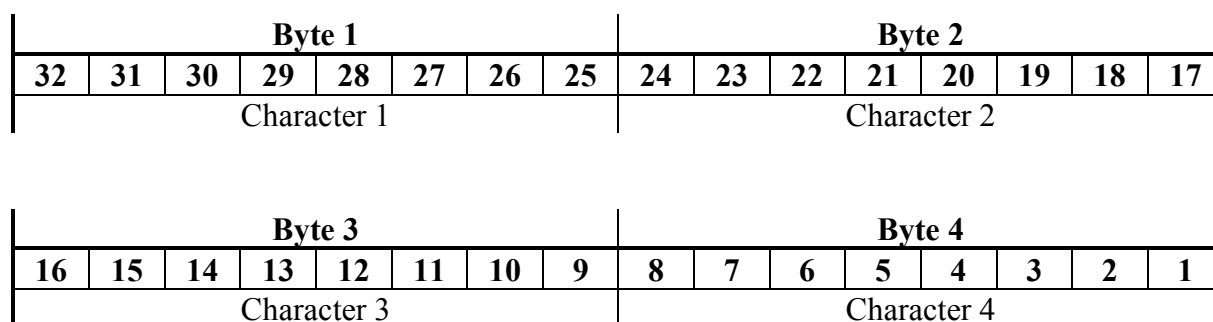
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I030/440 : DEPARTURE AIRPORT

Definition : Departure Airport indicated in a Minipln.

Format : Four-byte fixed length data item.

Structure :



Each one of the four bytes composing the name of an airport contains an ASCII Character (upper-case alphabetic).

Remark(s) : The Airport Names are indicated in the ICAO Location Indicators book.

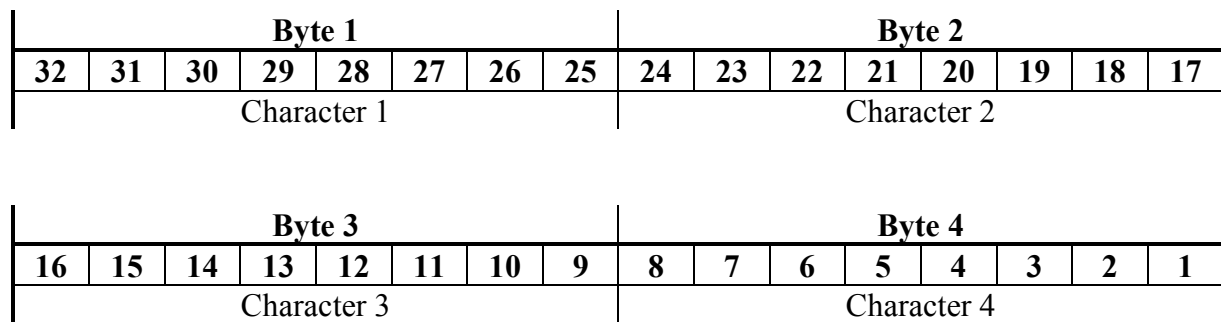
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I030/450 : DESTINATION AIRPORT

Definition : Destination Airport indicated in a Minipln.

Format : Four-byte fixed length data item.

Structure :



Each one of the four bytes composing the name of an airport contains an ASCII Character (upper-case alphabetic).

Remark(s) : the Airport Names are indicated in the ICAO Location Indicators book.

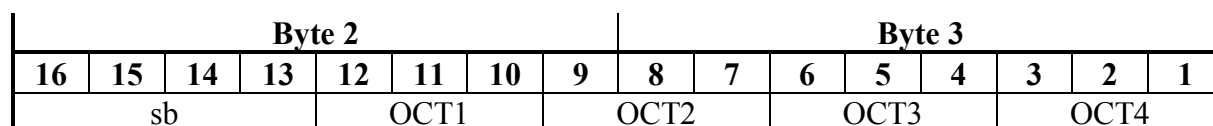
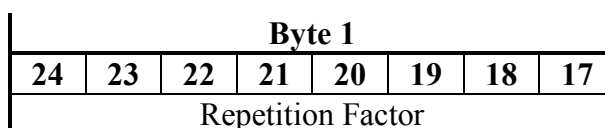
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I030/460 : ALLOCATED SSR CODES

Definition : List of successive SSR codes allocated to a flight (Information provided in the minipln).

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 2-byte (Mode A codes) as necessary.

Structure :



Repetition Factor = 1 to 5

bits 16/13 (sb) spare bits set to 0

bits 12/1 Mode 3/A Code under the form of 4 digits in octal representation :

- bits 12/10 : OCT1 = 1st octal digit,
- bits 9/7 : OCT2 = 2nd octal digit,
- bits 6/4 : OCT3 = 3rd octal digit,
- bits 3/1 : OCT4 = 4th octal digit,

Remark(s) :

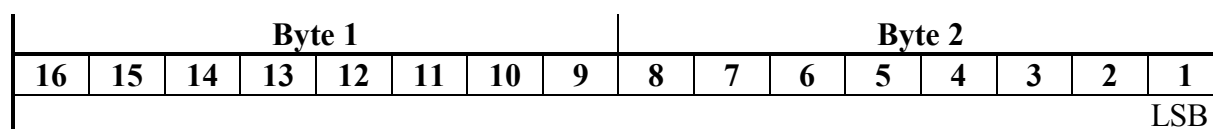
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I030/480 : CURRENT CLEARED FLIGHT LEVEL

Definition : Current Cleared Flight Level of an aircraft, provided by a FPPS.

Format : Two-byte fixed length data item.

Structure :



bit 1 (LSB) = 1/4 FL = 25 feet

Remark(s) :

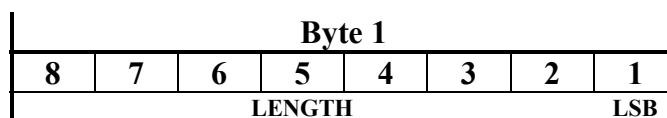
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I030/RE : RESERVED EXPANSION DATA FIELD

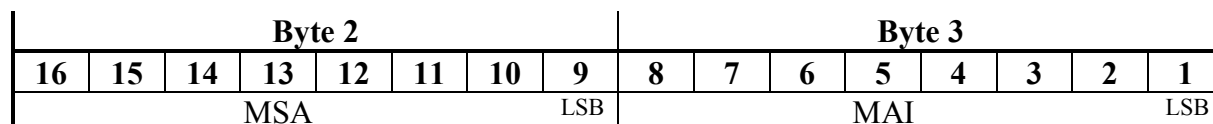
Definition : Field used to introduce intermediate changes for elementary surveillance.

Format : One byte length field, followed by a two byte fixed length data item.

Structure :



Bits 8/1 (LENGTH) Length of the Reserved Expansion Data Field in bytes including the length indicator.



bits 16/9 (MSA) Age of the last Mode S Address used to update the track.

bit 9 (LSB) = 1/4 s
 maximum value = 63.75 s

bits 8/1 (MAI) Age of the last Mode S Aircraft Identification used to update the track.

bit 1 (LSB) = 1/4 s
 maximum value = 63.75 s

Remark(s) : The age is counted from I030/070 TIME OF LAST UPDATE, using the following formula : age = I030/070 - time of last update (from item I030/382 for MSA and I030/384 for MAI).

If the computed age is greater than the maximum value or if the associated information has never been received, then the maximum value is returned.

If the computed age is negative, then 0 is returned.

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2.3 User Application Profile for ARTAS Users

As it is defined in the ARTAS specification, the so-called Item Selector associated to a given service is used to define the track information messages for the service in question, selecting out of the items composing an ARTAS track. These items are defined in CATEGORY 030 (Exchange of Air Situation Pictures).

The following User Application Profile shown in *Table 2* shall be used for the transmission of Air Situation Picture to the Users.

Table 2 - Track Information UAP

FRN	Data Item	Information	Length
1	I030/010	SERVER IDENTIFICATION TAG	2
2	I030/015	USER NUMBER	2
3	I030/030	SERVICE IDENTIFICATION	1+ (1x1)
4	I030/035	TYPE OF MESSAGE	1
5	I030/040	TRACK NUMBER	2
6	I030/070	TIME OF LAST UPDATE	3
7	I030/170	TRACK AGES	4
FX	-	<i>Field extension indicator</i>	-
8	I030/100	CALCULATED TRACK POSITION (CARTESIAN)	4
9	I030/180	CALCULATED TRACK VELOCITY (POLAR)	4
10	I030/181	CALCULATED TRACK VELOCITY (CARTESIAN)	4
11	I030/060	TRACK MODE 3/A	2
12	I030/150	MEASURED TRACK MODE C	2
13	I030/130	CALCULATED TRACK ALTITUDE	2
14	I030/160	CALCULATED TRACK FLIGHT LEVEL	2
FX	-	<i>Field extension indicator</i>	-
15	I030/080	ARTAS TRACK STATUS	0≤n≤3 1+(nx1)
16	I030/090	ARTAS TRACK QUALITY	1
17	I030/200	MODE OF FLIGHT	1
18	I030/220	CALCULATED RATE OF CLIMB/DESCENT	2
19	I030/240	CALCULATED RATE OF TURN	1
20	I030/290	PLOT AGES	2
21	I030/260	RADAR IDENTIFICATION TAG	2
FX	-	<i>Field extension indicator</i>	-

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FRN	Data Item	Information	Length
22	I030/360	MEASURED POSITION	4
23	I030/140	LAST MEASURED MODE C	2
24	I030/340	LAST MEASURED MODE 3/A	2
25	I030/RE	RESERVED EXPANSION DATA FIELD	3
26	I030/390	FPPS IDENTIFICATION TAG	2
27	I030/400	CALLSIGN	7
28	I030/410	PLN NUMBER	2
FX	-	<i>Field extension indicator</i>	-

29	I030/440	DEPARTURE AIRPORT	4
30	I030/450	DESTINATION AIRPORT	4
31	I030/435	CATEGORY OF TURBULENCE	1
32	I030/430	TYPE OF AIRCRAFT	4
33	I030/460	ALLOCATED SSR CODES	$1 \leq n \leq 5$
34	I030/480	CURRENT CLEARED FLIGHT LEVEL	2
35	I030/420	FLIGHT CATEGORY	1
FX	-	<i>Field extension indicator</i>	-

36	I030/490	CURRENT CONTROL POSITION	2
37	I030/020	TIME OF MESSAGE	3
38	I030/382	AIRCRAFT ADDRESS	3
39	I030/384	AIRCRAFT IDENTIFICATION	6
40	I030/386	COMMUNICATIONS CAPABILITY AND FLIGHT STATUS	1
41	I030/110	ESTIMATED ACCURACY OF TRACK POSITION (CARTESIAN)	4
42	I030/190	ESTIMATED ACCURACY OF TRACK VELOCITY (POLAR)	4
FX	-	<i>Field extension indicator</i>	-

43	I030/191	ESTIMATED ACCURACY OF TRACK VELOCITY (CARTESIAN)	4
44	I030/135	ESTIMATED ACCURACY OF TRACK ALTITUDE	2
45	I030/165	ESTIMATED ACCURACY OF CALCULATED TRACK FLIGHT LEVEL	2
46	I030/230	ESTIMATED ACCURACY OF RATE OF CLIMB/DESCENT	2
47	I030/250	ESTIMATED ACCURACY OF RATE OF TURN	1
48	I030/210	MODE OF FLIGHT PROBABILITIES	3
49	I030/120	TRACK MODE 2 CODE	2
FX	-	<i>Field extension indicator</i>	-

50	I030/050	ARTAS TRACK NUMBER	$0 \leq n \leq 5$
51	I030/270	LOCAL TRACK NUMBER	2
52	I030/370	MEASURED 3-D HEIGHT	2
53	-		-
54	-		-
55	-		-
56	-		-
FX	-	<i>Field extension indicator</i>	-

In the above table, the third column gives the format and the length of each Data Item.

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- . A stand-alone figure indicates the byte-count of a fixed length Data item,
- . j+(nxi) indicates a variable length Data item comprising a first part of j-bytes followed by an extension of up to n times i-bytes (n determined by the amount of information to be transmitted),
- . j+ alone indicates that the item has been designed as a variable length data item in anticipation of future possible extensions.

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2.4 Encoding recommendations

1. Data Item 030/010 (SERVER IDENTIFICATION TAG) will have to be transmitted to identify the data source in the frame of a broadcast service.
2. Data Item 030/030 (SERVICE IDENTIFICATION) may be transmitted with each track to identify which elementary services of a combined service is concerned.

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3 LAYOUT OF SENSOR INFORMATION MESSAGES

The data CATEGORY 031 : SENSOR INFORMATION MESSAGES contains information related to the surveillance sensors used by ARTAS.

The messages may either be transmitted in the point-to-point mode or the broadcast mode.

Up to now, only the PSR/SSR radars are concerned. The list of radars connected to the Tracker and the calculated systematic errors can be served to users for e.g. supervision or radar fall-back systems. The relevant User Application Profile for the *transmission of Sensor information* is defined in section 3.3

A possible extension of CATEGORY 031 could concern the transmission of e.g. Pd maps, accuracy maps, etc.

In the future, CATEGORY 031 will also possibly be extended to support the exchange of messages related to the sensor management functions in the context of Mode S and ADS (Automatic Dependent Surveillance)

The composition of messages provided to each User will depend on the Item Selection made during the service definition, using the *sensor information selector* (I252/360).

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3.1 List of Data Items of CATEGORY 031

The data items which shall be used for the transmission of sensor information messages shall be that defined in Table 3 and are described in the following pages.

Table 3 - Data Items of Category 031

Data Item Reference Number	Description	System Units
I031/010	SERVER IDENTIFICATION TAG	N.A.
I031/015	USER NUMBER	N.A.
I031/020	TIME OF MESSAGE	1/128 s
I031/030	SENSOR IDENTIFICATION TAG	N.A.
I031/040	SENSOR STATUS	N.A.
I031/050	TIME STAMPING BIAS	ms
I031/060	SSR RANGE GAIN AND BIAS	10⁻⁶, 1/128 NM
I031/070	SSR AZIMUTH BIAS	0.0055°
I031/080	PR RANGE GAIN AND BIAS	10⁻⁶, 1/128 NM
I031/090	PR AZIMUTH BIAS	0.0055°

N.A. = Not Applicable

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3.2 Description of Data Items of CATEGORY 031

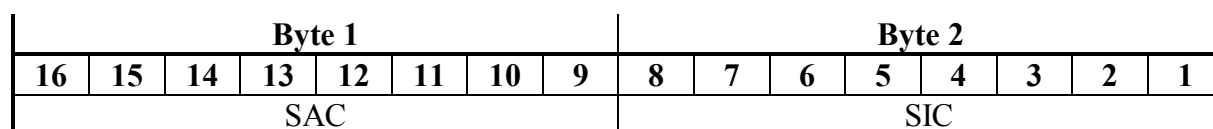
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I031/010 : SERVER IDENTIFICATION TAG

Definition : Identification of the Server of Sensor information

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) :

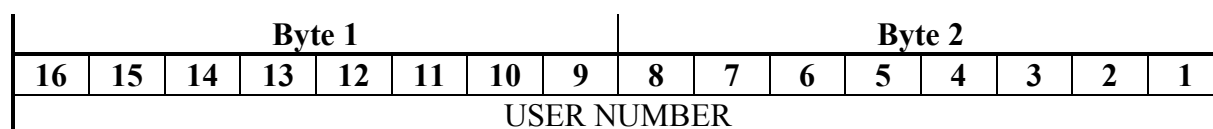
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I031/015 : USER NUMBER

Definition : Identification of the User of Sensor information

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (USER NUMBER) User number (0 → 16#FFFF#)

Remark(s) : The User numbers are predefined in the User registration data base of the ARTAS Unit to which the User wants to connect.

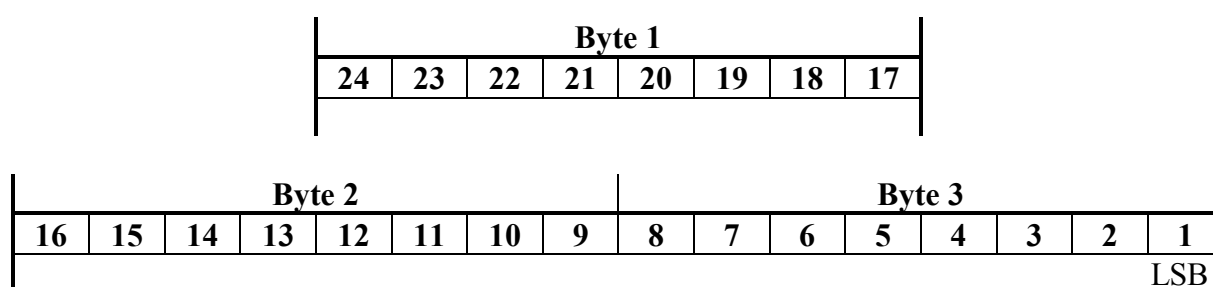
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I031/020 : TIME OF MESSAGE

Definition : Absolute time stamping of the message in the form of elapsed time since last midnight.

Format : Three-byte fixed length data item.

Structure :



bit 1 (LSB) $(2E-7) s = 1/128 s$

Remark(s) : This is the time at which a message is filled and not the time at which the data-block is sent.

The time of the day value is reset to 0 at every midnight.

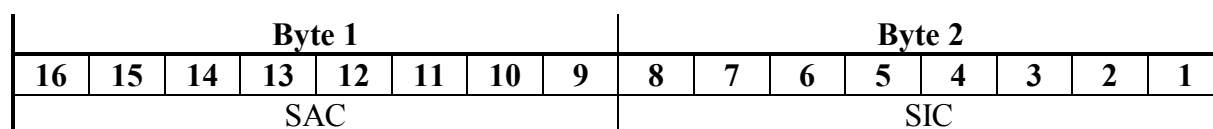
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I031/030 : SENSOR IDENTIFICATION TAG

Definition : Identification of the Sensor to which the provided information are related.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) :

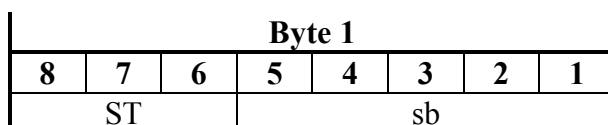
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I031/040 : SENSOR STATUS

Definition : Functioning status of the Sensor as monitored by ARTAS.

Format : One-byte fixed length data item.

Structure :



bits 8/6 (ST) Status of the radar
= 000 Operational
= 001 Degraded
= 010 Initialization
= 011 Initialization RMCDE
= 100 Not Connected

bits 5/1 (sb) Spare bits set to 0

Remark(s) :

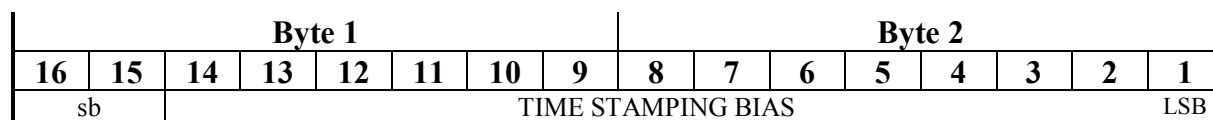
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I031/050 : TIME STAMPING BIAS

Definition : Plot Time stamping bias

Format : Two-byte fixed length data item.

Structure :



bits 16/15 spare bits set to 0
 bits 14/1 (TIME STAMPING BIAS) time stamping bias value
 bit 1 (LSB) = 1 ms
 Vmin = -5s
 Vmax = +5s

Remark(s) :

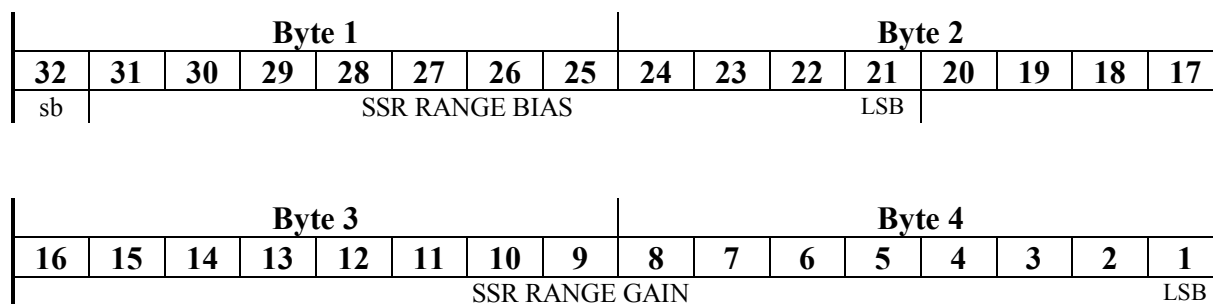
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I031/060 : SSR RANGE GAIN AND BIAS

Definition : SSR range gain and bias

Format : Four-byte fixed length data item.

Structure :



bit 32	(sb)	spare bit set to 0
bits 31/21	(SSR RANGE BIAS)	SSR range bias
bit 21	(LSB) =	1/128 NM
	Vmin =	-5.4 NM
	Vmax =	+5.4 NM

bits 20/1	(SSR RANGE GAIN)	SSR range gain
bit 1	(LSB) =	10 ⁻⁶
	Vmin =	- 0.5
	Vmax =	+ 0.5

Remark(s) :

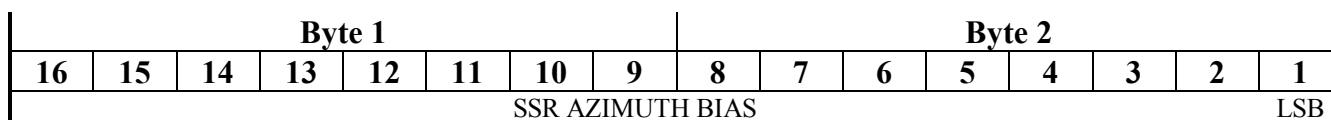
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I031/070 : SSR AZIMUTH BIAS

Definition : SSR azimuth bias

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (SSR AZIMUTH BIAS) SSR azimuth bias
 bit 1 (LSB) = $360^\circ / (2^{16}) \cong 0.0055^\circ$
 $V_{min} = -180^\circ$
 $V_{max} = +180^\circ - (360^\circ / 2^{16})$

Remark(s) :

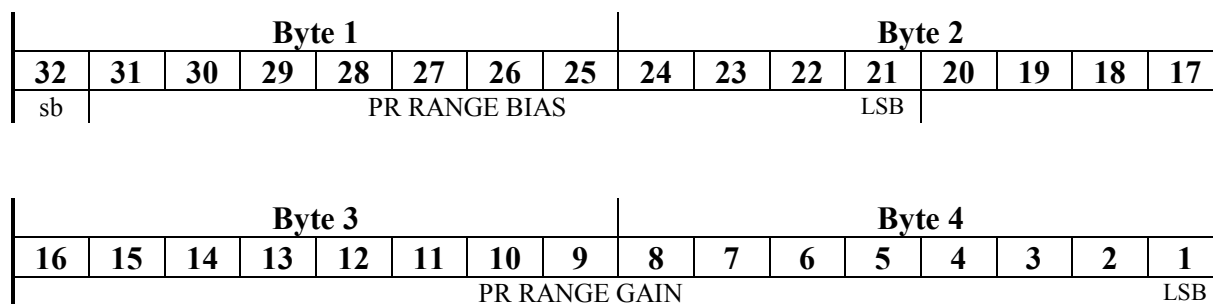
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I031/080 : PR RANGE GAIN AND BIAS

Definition : PR range gain and bias

Format : Four-byte fixed length data item.

Structure :



bit 32	(sb)	spare bit set to 0
bits 31/21	(PR RANGE BIAS)	PR range bias
bit 21	(LSB) =	1/128 NM
	Vmin =	-5.4 NM
	Vmax =	+5.4 NM

bits 20/1	(PR RANGE GAIN)	PR range gain
bit 1	(LSB) =	10 ⁻⁶
	Vmin =	- 0.5
	Vmax =	+ 0.5

Remark(s) :

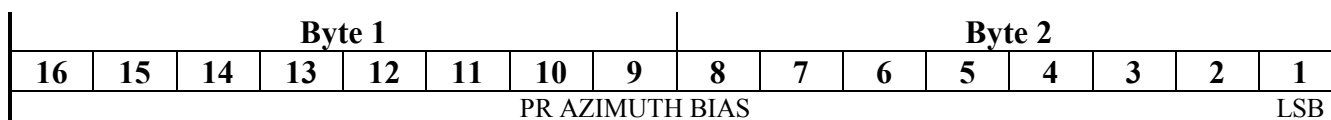
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I031/090 : PR AZIMUTH BIAS

Definition : PR azimuth bias

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (PR AZIMUTH BIAS) PR azimuth bias
 bit 1 (LSB) = $360^\circ / (2^{16}) \cong 0.0055^\circ$
 $V_{min} = -180^\circ$
 $V_{max} = +180^\circ - (360^\circ / 2^{16})$

Remark(s) :

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3.3 User Application Profile for the transmission of Sensor information

The following User Application Profile shown in *Table 4* shall be used for the transmission of Sensor information messages.

Table 4 - Sensor Information (CAT 031) UAP

FRN	Data Item	Information	Length
1	I031/010	SERVER IDENTIFICATION TAG	2
2	I031/015	USER NUMBER	2
3	I031/020	TIME OF MESSAGE	3
4	I031/030	SENSOR IDENTIFICATION TAG	2
5	I031/040	SENSOR STATUS	1
6	I031/050	TIME STAMPING BIAS	2
7	I031/060	SSR RANGE GAIN AND BIAS	4
FX	-	<i>Field extension indicator</i>	-
8	I031/070	SSR AZIMUTH BIAS	2
9	I031/080	PR RANGE GAIN AND BIAS	4
10	I031/090	PR AZIMUTH BIAS	2
11	-		
12	-		
13	-		
14	-		
FX	-	<i>Field extension indicator</i>	-

In the above table, the third column gives the format and the length of each Data Item.

- . A stand-alone figure indicates the byte-count of a fixed length Data item,
- . j+(nxi) indicates a variable length Data item comprising a first part of j-bytes followed by an extension of up to n times i-bytes (n determined by the amount of information to be transmitted),

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3.4 Encoding recommendations

1. Data Item 031/010 (SERVER IDENTIFICATION TAG) will have to be transmitted to identify the data source in the frame of a broadcast service.

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4 LAYOUT OF MESSAGES PROVIDED BY USERS TO ARTAS

The data CATEGORY 032 is used for the transmission of data from Users to ARTAS. Such information will be related to the so-called track *enrichment*, i.e. the addition of supplementary information to the ARTAS Radar Tracks.

The messages may only be sent to ARTAS in the point to point mode.

Up to now, only one type of system is concerned : the Flight Plan Data Processing System(s) that will provide ARTAS with the so-called Minipln(s), used for the track labelling.

In the future, examples of other data-sources of interest for the ARTAS community could be :

- . ADS (Automatic Dependent Surveillance) providing complementary surveillance information,
- . STCA (Short term Conflict Alert) or MSAW (Minimum Safe Altitude Warning) providing alerts,
- . Mode-S data-link providing e.g. aircraft panel derived information.

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4.1 List of Data Items of CATEGORY 032

The data items which shall be used for the transmission of information by users to ARTAS shall be that defined in *Table 5* and described in the following pages.

Table 5 - Data Items of Category 032

Data Item Reference Number	Description	System Units
I032/010	SERVER IDENTIFICATION TAG	N.A.
I032/015	USER NUMBER	N.A.
I032/018	DATA SOURCE IDENTIFICATION TAG	N.A.
I032/020	TIME OF MESSAGE	1/128 s
I032/035	TYPE OF MESSAGE	N.A.
I032/040	TRACK NUMBER	N.A.
I032/050	ARTAS TRACK NUMBER	N.A.
I032/060	TRACK MODE 3/A	N.A.
I032/400	CALLSIGN	N.A.
I032/410	PLN NUMBER	N.A.
I032/420	FLIGHT CATEGORY	N.A.
I032/430	TYPE OF AIRCRAFT	N.A.
I032/435	CATEGORY OF TURBULENCE	N.A.
I032/440	DEPARTURE AIRPORT	N.A.
I032/450	DESTINATION AIRPORT	N.A.
I032/460	ALLOCATED SSR CODES	N.A.
I032/480	CURRENT CLEARED FLIGHT LEVEL	1/4 FL
I032/490	CURRENT CONTROL POSITION	N.A.

N.A. = Not Applicable

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4.2 Description of Data Items of CATEGORY 032

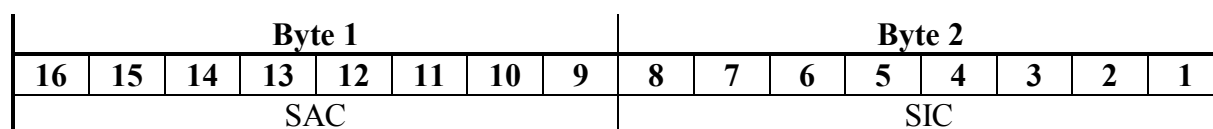
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I032/010 : SERVER IDENTIFICATION TAG

Definition : Identification of the Server of track information.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) : In the case of miniplan exchange between ARTAS units, the Server Identification Tag corresponds to the sender of the miniplan.

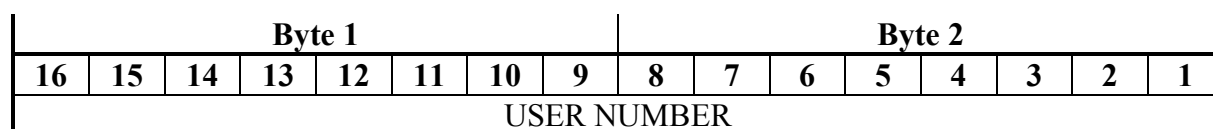
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I032/015 : USER NUMBER

Definition : Identification of the User of track information

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (USER NUMBER) User number (0 → 16#FFFF#)

Remark(s) : The User numbers are predefined in the User registration data base of the ARTAS Unit to which the User wants to connect.

In the case of miniplan exchange between ARTAS units, the User Number corresponds to the receiver of the miniplan.

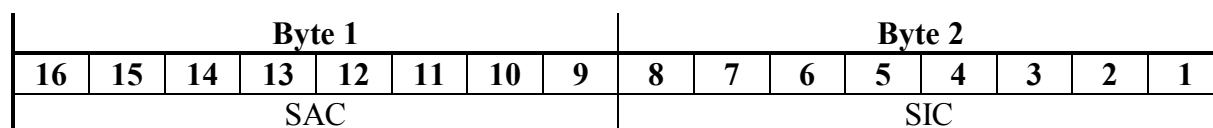
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I032/018 : DATA SOURCE IDENTIFICATION TAG

Definition : Identification of the data source (system) from which the information contained in the message was originated.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) : This item will be used if the system sending the minipln information (i.e. the system which is identified in **I032/015 : USER NUMBER**) is another system than the FPPS from which the minipln information has been received. This will be the case of e.g. an ARTAS unit forwarding minipln information to an adjacent unit.

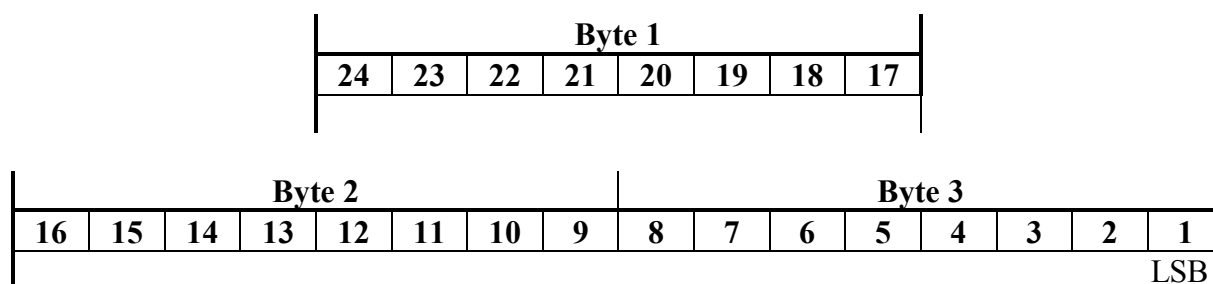
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I032/020 : TIME OF MESSAGE

Definition : Absolute time stamping of the message in the form of elapsed time since last midnight.

Format : Three-byte fixed length data item.

Structure :



bit 1 (LSB) $(2E-7) s = 1/128 s$

Remark(s) : This time is given at an application level (e.g. time at which a message is filled, or time at which a served track is extrapolated), and not at the communication level (i.e. not the time at which the data-block containing the tracks is sent).

The time of the day value is reset to 0 at every midnight.

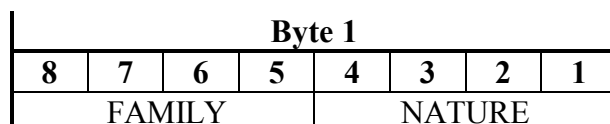
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I032/035 : TYPE OF MESSAGE

Definition : This data item allows for a more convenient handling of the message at the receiver side by further defining the type of transaction.

Format : One-byte fixed length data item.

Structure :



bits 8/5 (FAMILY) to which the message belongs (0 to 15),

bits 4/1 (NATURE) of the message (within its FAMILY) (0 to 15).

FAMILY = 1 : information sent by a FPPS :

- | | | |
|------------|---|--|
| (NATURE) = | 1 | Flight Plan to track initial correlation |
| | 2 | Minipln update |
| | 3 | End of correlation |
| | 4 | Minipln Cancellation |

Remark(s) : The composition of the messages are described by the UAP attached to each FAMILY.

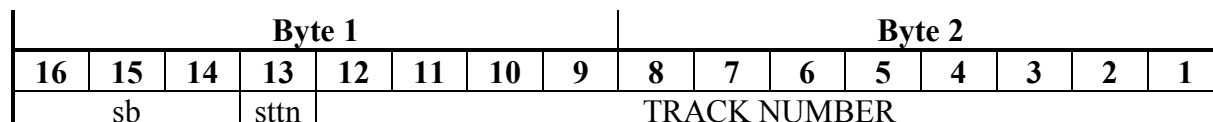
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I032/040 : TRACK NUMBER

Definition : Identification of an ARTAS track (track number)

Format : Two-byte fixed length data item

Structure :



bits 16/14 (sb) = spare bits set to 0

bit 13 (sttn) : track numbering indicator, value is changed when the track numbering is restarted.

bits 12/1 (TRACK NUMBER) : 0 to 4095

Remark(s) : Unlike the ARTAS track number I032/050, the track number does not change when a track enters or leaves an ARTAS Domain of Cooperation. It remains unchanged as long as the track exists.

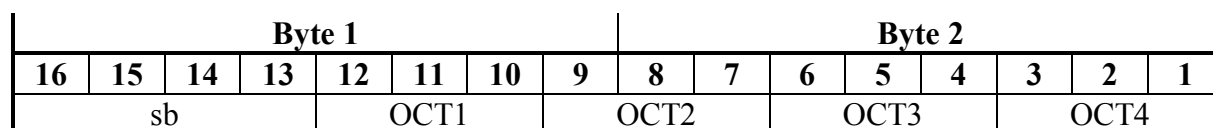
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I032/060 : TRACK MODE 3/A

Definition : Mode 3/A identity associated to the track

Format : Two-bytes fixed length data item.

Structure :



bit 16/13 (sb) spare bits set to 0

bits 12/1 Mode 3/A Code under the form of 4 digits in octal representation :

bits 12/10 : OCT1 = 1st octal digit,
bits 9/7 : OCT2 = 2nd octal digit,
bits 6/4 : OCT3 = 3rd octal digit,
bits 3/1 : OCT4 = 4th octal digit,

Remark(s) :

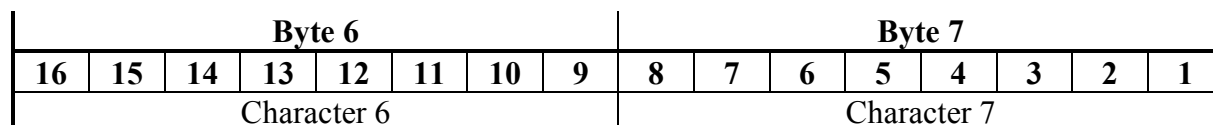
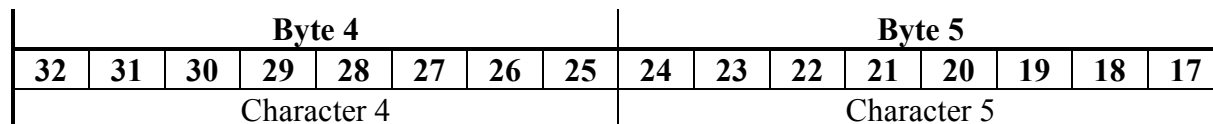
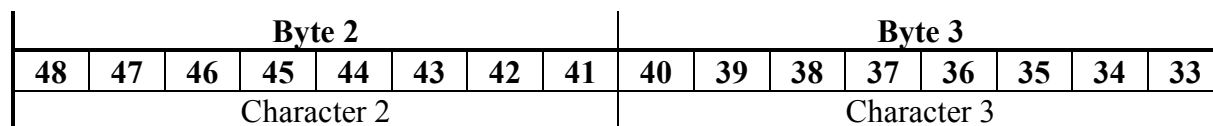
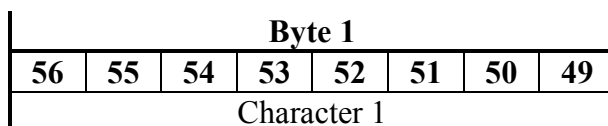
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I032/400 : CALLSIGN

Definition : Callsign (in 7 characters) of an aircraft (provided in the Minipln).

Format : Seven-bytes fixed length data item.

Structure :



Each one of the seven bytes contains an ASCII Character.

The CALLSIGN is always left adjusted. It contains up to 7 upper-case alphanumeric characters, the remaining character positions (if any) are padded with space characters.

Remark(s) :

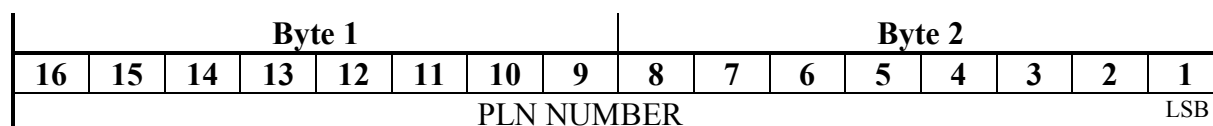
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I032/410 : PLN NUMBER

Definition : The PLN NUMBER is an integer value representing a unique reference to a Flight-plan record within a particular FPPS (Information provided in the minipln).

Format : Two-byte fixed length data item.

Structure :



Maximum value = 65535

Remark(s) :

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I032/420 : FLIGHT CATEGORY

Definition : Flight Category (information provided in the Minipln).

Format : One-byte fixed length data item.

Structure :

Byte 1							
8	7	6	5	4	3	2	1
OAT	GAT	FR1	FR2	SP3	SP2	SP1	sb

bits 8/7 (GAT/OAT)

00	Unknown
01	General Air Traffic
10	Operational Air Traffic
11	Not applicable

bits 6/5 (FR1/FR2)

00	Instrument Flight Rules
01	Visual Flight rules
10	Not applicable
11	Controlled Visual Flight Rules

bits 4/2 (SP3/SP2/SP1)

These three bits allow for the definition of up to 7 sub-categories within the main categories.

bit 1 (sb)

spare bits set to 0

Remark(s) :

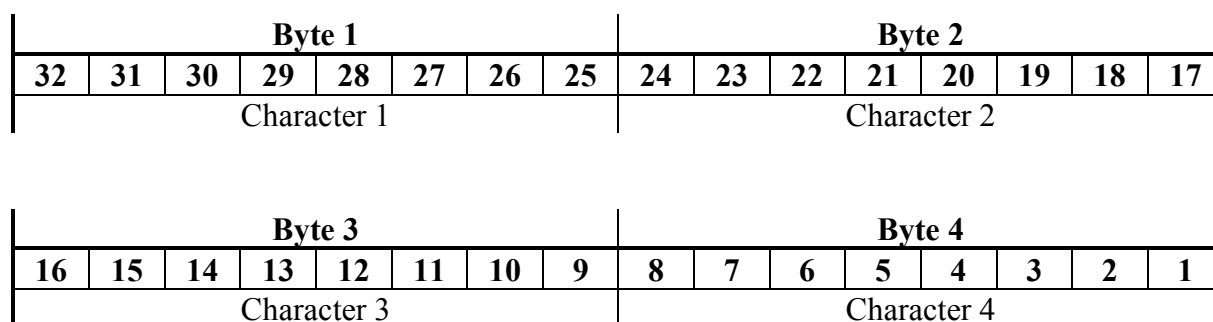
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I032/430 : TYPE OF AIRCRAFT

Definition : Type of Aircraft indicated in a Minipln.

Format : Four-byte fixed length data item.

Structure :



Each one of the four bytes composing the type of aircraft contains an ASCII Character (upper-case alphabetic characters with trailing spaces).

Remark(s) : The types of aircraft are defined in the ICAO Document 4444.

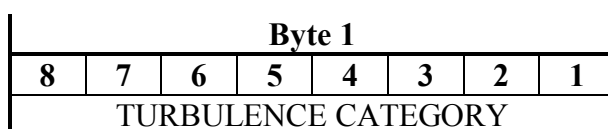
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I032/435 : CATEGORY OF TURBULENCE

Definition : Category of turbulence of an aircraft (information provided in the Minipln).

Format : 1-byte fixed length data item.

Structure :



bits 8/1 TURBULENCE CATEGORY is an ASCII character code which may have the following values :

- | | |
|-----------|------------|
| 1001100 = | L : light |
| 1001101 = | M : Medium |
| 1001000 = | H : Heavy |

Remark(s) :

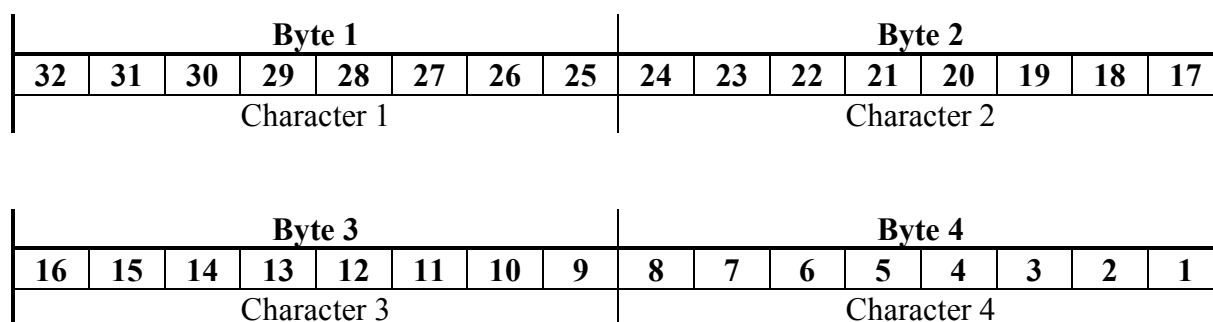
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I032/440 : DEPARTURE AIRPORT

Definition : Departure Airport indicated in a Minipln.

Format : Four-byte fixed length data item.

Structure :



Each one of the four bytes composing the name of an airport contains an ASCII Character (upper-case alphabetic).

Remark(s) : The Airport Names are indicated in the ICAO Location Indicators book.

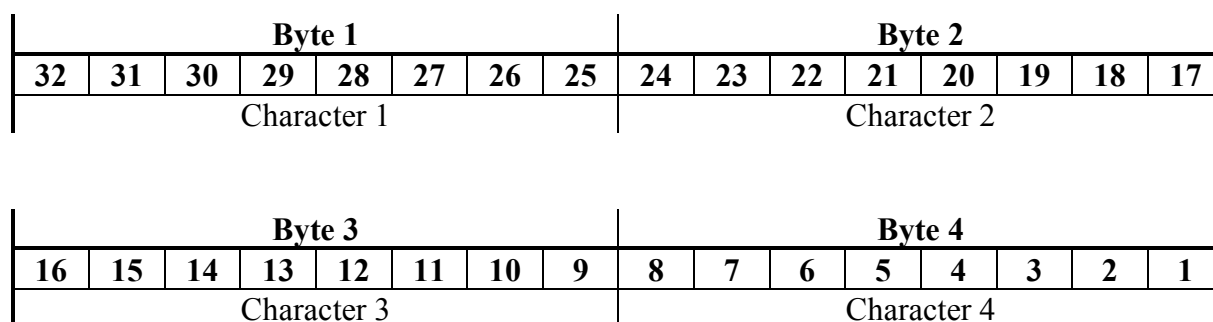
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I032/450 : DESTINATION AIRPORT

Definition : Destination Airport indicated in a Minipln.

Format : Four-byte fixed length data item.

Structure :



Each one of the four bytes composing the name of an airport contains an ASCII Character (upper-case alphabetic).

Remark(s) : the Airport Names are indicated in the ICAO Location Indicators book.

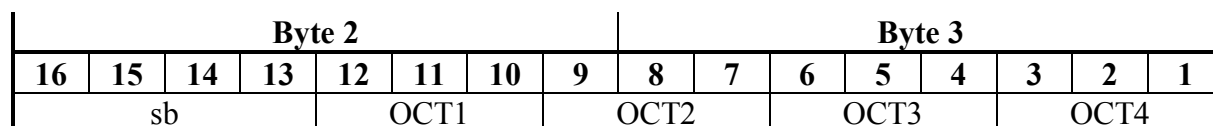
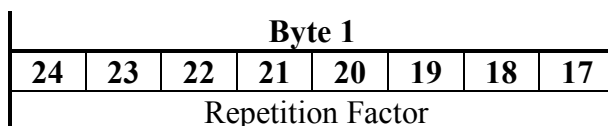
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I032/460 : ALLOCATED SSR CODES

Definition : List of successive SSR codes allocated to a flight (Information provided in the minipln).

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 2-byte (Mode A codes) as necessary.

Structure :



Repetition Factor = 1 to 5

bits 16/13 (sb) spare bits set to 0

bits 12/1 Mode 3/A Code under the form of 4 digits in octal representation :

- bits 12/10 : OCT1 = 1st octal digit,
- bits 9/7 : OCT2 = 2nd octal digit,
- bits 6/4 : OCT3 = 3rd octal digit,
- bits 3/1 : OCT4 = 4th octal digit,

Remark(s) :

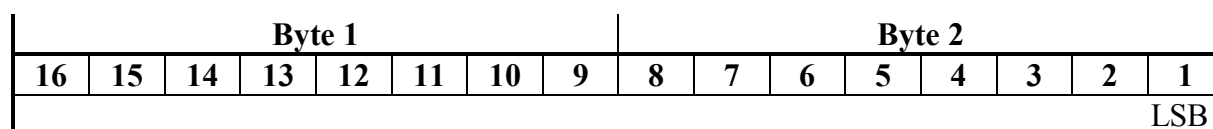
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I032/480 : CURRENT CLEARED FLIGHT LEVEL

Definition : Current Cleared Flight Level of an aircraft, provided by a FPPS.

Format : Two-bytes fixed length data item.

Structure :



bit 1 (LSB) = 1/4 FL = 25 feet

Remark(s) :

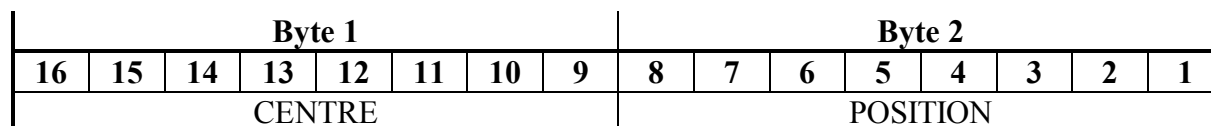
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I032/490 : CURRENT CONTROL POSITION

Definition : Identification of the Current Control Position in charge of an aircraft, as provided by a FPPS.

Format : Two-bytes fixed length data item.

Structure :



bits 16/9 (CENTRE) 8-bit group identification code (0 to 255)

bits 8/1 (POSITION) 8-bit Control Position identification code
(0 to 255)

Remark(s) : the centre and the control position identification codes have to be defined between communication partners.

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4.3 User Application Profile for the transmission of Miniplns

The following User Application Profile shown in *Table 6* shall be used for the transmission of miniplns from an FPPS to ARTAS and between adjacent ARTAS Units.

Table 6 - UAP for the transmission of miniplns

FRN	Data Item	Information	Length
1	I032/010	SERVER IDENTIFICATION TAG	2
2	I032/015	USER NUMBER	2
3	I032/018	DATA SOURCE IDENTIFICATION TAG	2
4	I032/035	TYPE OF MESSAGE	1
5	I032/020	TIME OF MESSAGE	3
6	I032/040	TRACK NUMBER	2
7	I032/050	ARTAS TRACK NUMBER	0≤n≤5
FX	-	<i>field extension indicator</i>	3+(nx3)
8	I032/060	TRACK MODE 3/A	2
9	I032/400	CALLSIGN	7
10	I032/410	PLN NUMBER	2
11	I032/420	FLIGHT CATEGORY	1
12	I032/440	DEPARTURE AIRPORT	4
13	I032/450	DESTINATION AIRPORT	4
14	I032/480	CURRENT CLEARED FLIGHT LEVEL	2
FX	-	<i>field extension indicator</i>	-
15	I032/490	CURRENT CONTROL POSITION	2
16	I032/430	TYPE OF AIRCRAFT	4
17	I032/435	CATEGORY OF TURBULENCE	1
18	I032/460	ALLOCATED SSR CODES	1≤n≤5
19	-		-
20	-		-
21	-		-
FX	-	<i>field extension indicator</i>	-

In the above table :

- the first column indicates the Field Reference Number (FRN) associated to each Data Items used in the UAP,
- the fourth column gives the format and the length of each Item. A stand-alone figure indicates the byte-count of a fixed length Data item. 1+(n*i) indicates a variable length Data item comprising a first part of 1-byte followed by an extension of up to n times i-bytes (n determined by the amount of information to be transmitted). j+ alone indicates that the item has been designed as a variable length data item in anticipation of possible future extensions.

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4.4 Encoding rules

1. Data Item I032/010 (SERVER IDENTIFICATION TAG) is compulsory.
2. Data Item I032/015 (USER NUMBER) is compulsory.
3. Data Item I032/018 (DATA SOURCE IDENTIFICATION TAG) is optional. It shall be transmitted if the server system identified in I032/015 is not the system from which the minipln information is originated.
4. Data Item I032/035 (TYPE OF MESSAGE) is compulsory, indicating one of the following values :
 - \$11 : Flight Plan to track Initial Correlation
 - \$12 : Minipln Update
 - \$13 : End of correlation
 - \$14 : Minipln cancellation
5. Data Item I032/020 (TIME OF MESSAGE). Time of message is compulsory.
6. Data Item I032/040 (TRACK NUMBER) is mandatory and shall always be transmitted in case of a FPPS User.
7. Data Item I032/050 (ARTAS TRACK NUMBER) is mandatory and shall always be transmitted in case of an adjacent unit User.
7. Data Item I032/060 (TRACK MODE 3/A) is mandatory and shall always be transmitted. An item with all bits set to 0 will be transmitted in case of a track without MODE 3/A.
8. Data Item I032/400 (CALLSIGN) is mandatory and shall always be transmitted.
9. The following data items are optional. Their implementation will depend on the availability of the corresponding information in the FPPS. Anyway, the items to be transmitted are a function of the applied type of message (e.g. transmitted at *Initial Correlation* or *Minipln Update*). The optional data items will not be used in case *End of Correlation*.

- Data Item I032/410 (PLN NUMBER)
- Data Item I032/420 (FLIGHT CATEGORY)
- Data Item I032/430 (TYPE OF AIRCRAFT)
- Data Item I032/435 (CATEGORY OF TURBULENCE)
- Data Item I032/440 (DEPARTURE AIRPORT)
- Data Item I032/450 (DESTINATION AIRPORT)
- Data Item I032/460 (ALLOCATED SSR CODES)
- Data Item I032/480 (CURRENT CLEARED FLIGHT LEVEL)
- Data Item I032/490 (CURRENT CONTROL POSITION)

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5 LAYOUT OF SESSION AND SERVICE CONTROL MESSAGES

This section defines the messages involved in the setting-up of connections between ARTAS and its Users and in the definition of Track Information Service to be provided by ARTAS. The relevant messages are composed with items from CATEGORY 252 : Service and Session Control.

It is recalled that a service is set up in two steps :

- i. The first step concerns the Connection to the Server, where the User indicates his identity and defines his geographical Domain of Interest.

In return, ARTAS sends back this User an acknowledgement message indicating whether the connection is accepted or not.

The UAP related to the composition of connection messages is provided in *section UAP for connection related messages*. The applicable encoding rules are provided in *section Encoding rules*.

- ii. The second step concerns the Definition of Service whereby the user will define :

- . Which tracks/sensor he is interested in (*Track/sensor selector*),
- . When these information shall be sent (*Transmission characteristics*),
- . Which data items shall compose the track/sensor information messages (*Item Selector*).

In return, ARTAS sends back an acknowledgement message indicating whether the defined service can be provided or not.

Once the service is accepted and starts to be provided, the User has the possibility :

- . to modify certain parameters in the defined service, sending appropriate service request updates,
- . to control the service execution, sending service control request(s).

The UAP for the composition of all service related messages is provided in *section UAP for service related messages*. The applicable encoding rules are provided in *section Encoding rules*.

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5.1 List of Data Items of CATEGORY 252

The data items which shall be used in the context of session and service control shall be that defined in *Table 7* and described in the following pages.

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Table 7 - Data Items of Category 252

Data Item Reference Number	Description	System Units
I252/010	SERVER IDENTIFICATION TAG	N.A.
I252/015	USER NUMBER	N.A.
I252/020	TIME OF MESSAGE	1/128 s
I252/035	TYPE OF MESSAGE	N.A.
I252/040	ACCESS KEY	N.A.
I252/045	ROLE AND VERSION	N.A.
I252/050	DEFAULT CONNECTION OPTIONS	N.A.
I252/060	GEOGRAPHICAL AREA	D/M/S
I252/070	LOWER LIMIT	1/4 FL
I252/080	UPPER LIMIT	1/4 FL
I252/090	PREFERRED FPPS IDENTIFICATION TAG	N.A.
I252/100	CONNECTION RELATED REPORT	N.A.
I252/110	SERVICE IDENTIFICATION	N.A.
I252/120	CALLSIGN SELECTOR	N.A.
I252/130	TRACK NUMBER SELECTOR	N.A.
I252/135	AIRCRAFT ADDRESS SELECTOR	N.A.
I252/137	AIRCRAFT IDENTIFICATION SELECTOR	N.A.
I252/140	CODE FAMILY SELECTOR	N.A.
I252/150	DEPARTURE AIRPORT SELECTOR	N.A.
I252/160	DESTINATION AIRPORT SELECTOR	N.A.
I252/170	AIRCRAFT TYPE SELECTOR	N.A.
I252/190	CURRENT CONTROL POSITION SELECTOR	N.A.
I252/200	TRACK/FLIGHT CATEGORIES SELECTOR	N.A.
I252/210	ITEM SELECTOR	N.A.
I252/220	CYCLICAL UPDATE CHARACTERISTICS	N.A.
I252/230	RADAR SYNCHRONISATION CHARACTERISTICS	N.A.
I252/240	DISCRETE PARAMETERS FLAGS	N.A.
I252/250	MOF PROBABILITY CRITERION	N.A.
I252/255	RATE OF CLIMB/DESCENT CRITERION	5.86 ft/min
I252/260	POSITION CRITERION	1/64 NM
I252/265	RATE OF TURN CRITERION	1/4 °/s
I252/270	HEADING CRITERION	0.022 °
I252/280	SPEED MODULE CRITERION	1 kt
I252/290	ALTITUDE CRITERION	1/4 FL
I252/300	FACTOR K	N.A.
I252/310	REFRESHMENT PERIOD	1 s
I252/320	MINIMAL PERIOD	1 s
I252/330	SERVICE RELATED REPORT	N.A.
I252/340	SCALING FACTOR	N.A.
I252/350	SENSOR SELECTOR	N.A.
I252/360	SENSOR ITEM SELECTOR	N.A.
I252/370	PERIODICAL CHARACTERISTICS OF SENSOR INFORMATION SERVICE	N.A.
I252/400	REFRESHMENT PERIOD OF SENSOR INFORMATION SERVICE	N.A.

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Data Item Reference Number	Description	System Units
I252/410	DISCRETE PARAMETERS OF SENSOR INFORMATION SERVICE	N.A.
I252/420	TIME STAMPING CRITERION OF SENSOR INFORMATION SERVICE	1 ms
I252/430	SSR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE	1/128 NM
I252/440	SSR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE	N.A.
I252/450	SSR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE	0.0055 °
I252/460	PR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE	1/128 NM
I252/470	PR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE	N.A.
I252/480	PR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE	0.0055 °

N.A. = Not Applicable

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5.2 Description of Data Items of CATEGORY 252

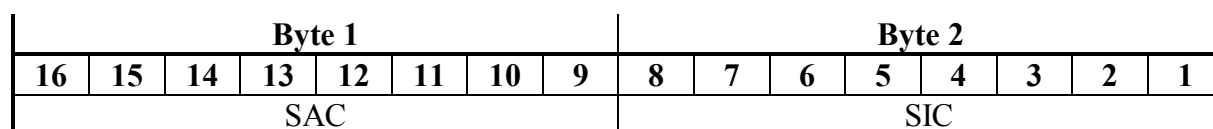
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I252/010 : SERVER IDENTIFICATION TAG

Definition : Identification of the Server of track/sensor information .

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) :

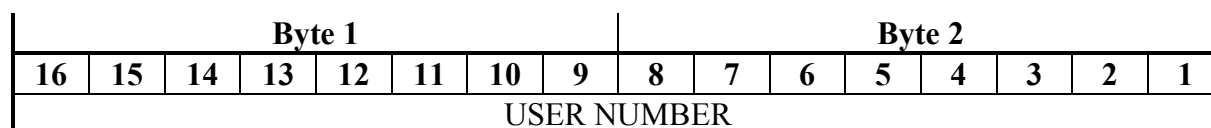
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I252/015 : USER NUMBER

Definition : Identification of the User of track/sensor information

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (USER NUMBER) User number (0 → 16#FFFF#)

Remark(s) : The User numbers are predefined in the User registration data base of the ARTAS Unit to which the User wants to connect.

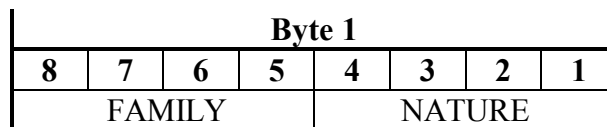
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I252/035 : TYPE OF MESSAGE

Definition : This data item allows for a more convenient handling of the message at the receiver side by further defining the type of transaction.

Format : One-byte fixed length data item.

Structure :



bits 8/5 (FAMILY) to which the message belongs (0 to 15),

bits 4/1 (NATURE) of the message (within its FAMILY) (0 to 15).

(FAMILY) = 1 : Connections :

- | | | |
|----------|---|---------------------------|
| (NATURE) | 1 | request for connection |
| | 2 | request for disconnection |
| | 3 | connection related report |

(FAMILY) = 2 : track information service definition :

- | | | |
|----------|---|--|
| (NATURE) | 1 | background service |
| | 2 | synchronised complementary service |
| | 3 | independent complementary Service |
| | 4 | Service Request Update : Stop Track/Item Transmission |
| | 5 | Service Request Update : Start Track/Item Transmission |
| | 6 | Service Control Request : Interruption |
| | 7 | Service Control Request : Restart |
| | 8 | Service Control Request : End of Service |

(FAMILY) = 3 : Server messages :

- | | | |
|----------|---|---|
| (NATURE) | 1 | Server Status Message |
| | 2 | Track Service Related Report |
| | 3 | Sensor information service related report |

(FAMILY) = 4 : sensor information service definition :

- | | | |
|----------|---|--|
| (NATURE) | 1 | service definition |
| | 2 | service control request : Interruption |
| | 3 | service control request : Restart |
| | 4 | service control request : End of Service |

Remark(s) : The composition of the messages are described by the UAP attached to each FAMILY.

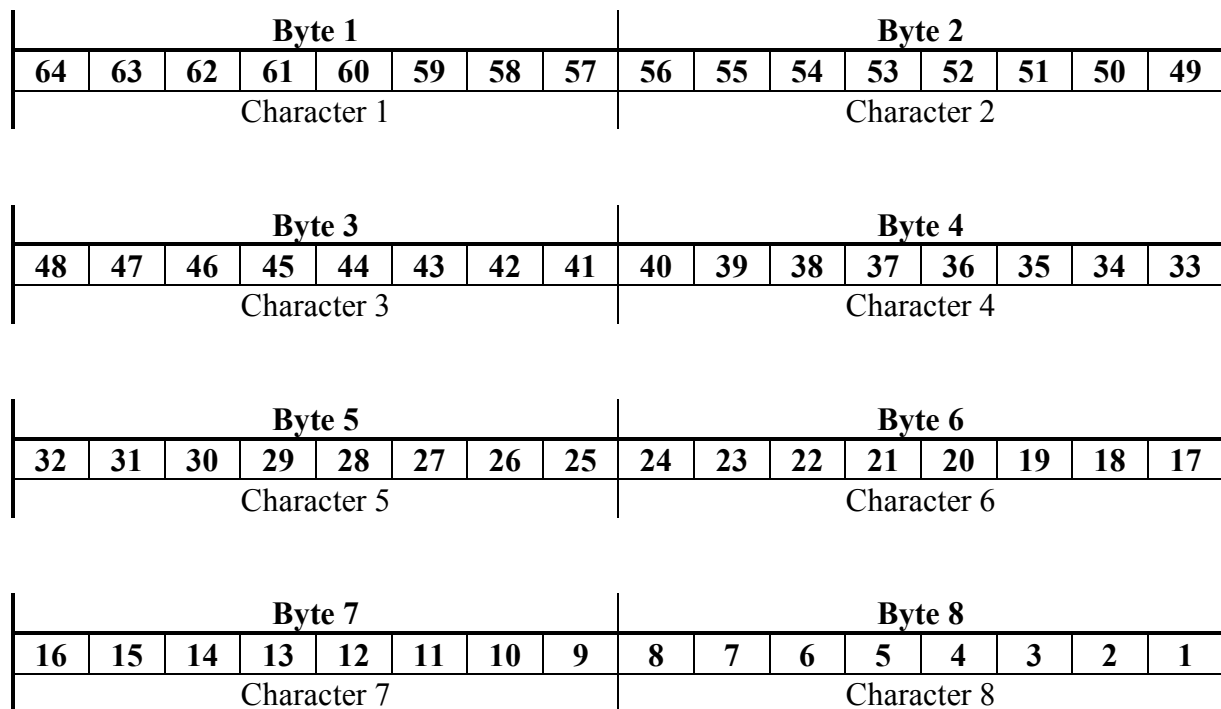
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I252/040 : ACCESS KEY

Definition : User password to be sent in the Connection Request.

Format : Eight-byte fixed length data item.

Structure :



Each one of the eight bytes contains an ASCII Character.

The (ACCESS KEY) is always left adjusted, the remaining character positions (if any) are padded with space characters.

Remark(s) :

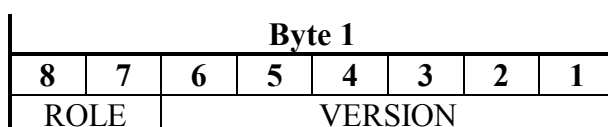
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I252/045 : ROLE AND VERSION

Definition : Identification of the **ROLE** of a system and of the **VERSION** of interface.

Format : One-byte fixed length data item.

Structure :



bits 8/7	(ROLE)		11	OPERATIONAL
			10	EVALUATION
			01	DEVELOPMENT

bits 6/1	(VERSION)	identification number of the version of system interface (from 0 to 63)
----------	-----------	---

Remark(s) :

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I252/050 : DEFAULT CONNECTION OPTIONS

Definition : This item is used to indicate that the default values of parameters required to set a connection are selected.

Format : 1-byte fixed length data item.

Structure :

Byte 1							
8	7	6	5	4	3	2	1
UDI		UPP	LOW	FPP	sb		

- | | | | |
|----------|---------|---|---|
| bits 8/7 | (UDI) = | 0 | the domain of interest shall be the default one in the ARTAS geographical database. |
| | | 1 | the domain of interest of the User shall be the Domain of interest of the ARTAS Unit to which this User is connected. |
| | | 2 | the domain of interest is specified in the connection request. |
| | | | |
| bit 6 | (UPP) = | 0 | No upper limitation of the domain of interest |
| | | 1 | an upper limit is specified in the request. |
| | | | |
| bit 5 | (LOW) = | 0 | No lower limitation of the Domain of Interest |
| | | 1 | A lower limit is specified in the request. |
| | | | |
| bit 4 | (FPP) = | 0 | Default option selected i.e. Flight plan related information to be provided with tracks shall be selected from the miniplans according to the following priority : <ul style="list-style-type: none"> · miniplan indicating the controller in charge (if unique) · last miniplan which was used to label the track (if any) · miniplan with the eldest correlation time. |
| | | 1 | A preferred FPPS is specified in the connection request. |
| | | | |
| bits 3/1 | (sb) | | spare bits set to 0 |

Remark(s) :

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I252/060 : GEOGRAPHICAL AREA

Definition : Definition of geographical area in the form of a sequence of geographical points.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of points, followed by series of 6-bytes (geographical points) as necessary.

Structure :

Byte 1							
56	55	54	53	52	51	50	49
Repetition Factor							

Byte 2								Byte 3							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
NS								sb							
Latitude (degree)								Latitude (minutes)							

Byte 4								Byte 5							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
sb															
Latitude (seconds)								Longitude (degrees)							

Byte 6								Byte 7							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
EW	sb							sb							
Longitude (minutes)								Longitude (seconds)							

bits 55/49 Repetition Factor (Number of points) : 3 to 50

bits 40, 39, 32, 31, 15, 8 and 7 : sb = spare bits set to 0

bit 48 (NS) = 0 North Latitude
1 South Latitude

bits 47/41 Latitude (degrees) : 0 to 90

bits 38/33 Latitude (minutes) : 0 to 59

bits 30/25 Latitude (seconds) : 0 to 59

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bit 16 (EW) = 0 East Longitude
 1 West Longitude

bits 24/17 Longitude (degrees) : 0 to 180
 bits 14/9 Longitude (minutes) : 0 to 59
 bits 6/1 Longitude (seconds) : 0 to 59

Remark(s) : Latitude and Longitude accuracy = 1 second \cong 30 m.

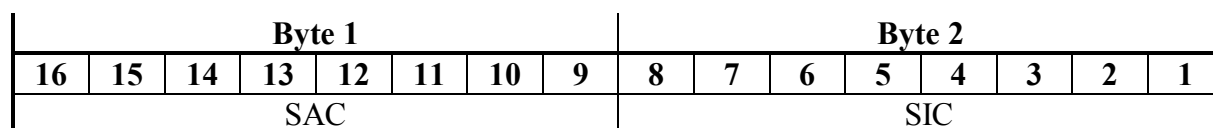
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I252/090 : PREFERRED FPPS IDENTIFICATION TAG

Definition : Identification of the Flight Plan Data Processing System from which Flight-Plan related information shall preferably be sent to the User.

Format : Two-byte fixed length data item.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Remark(s) :

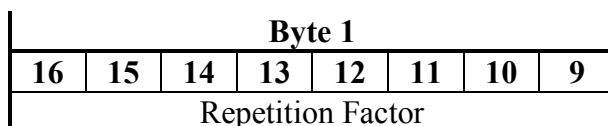
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I252/100 : CONNECTION RELATED REPORT

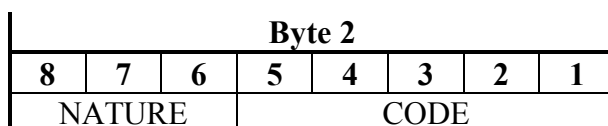
Definition : Report message sent by the Server to the User in relation to a connection.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 1-byte (Acknowledgement message) as necessary.

Structure :



extent(s) :



Byte 1 : **Repetition Factor** : 1 to 255 (The Repetition Factor will be > 1 when e.g. several errors have been detected within a connection Request).

extent(s) : **Report Message** :

bits 8/6 : (NATURE) of the message to which the Report refers (0 to 7).

bits 5/1 : Report (CODE) (0 to 31).

(NATURE) = 0 : Connection acknowledgement :

For NATURE = 0, CODE = 0.

- (NATURE) =
- 1 : Connection Status Message
 - 2 : Connection Refused Report
 - 3 : Error in default connection data
 - 4 : Disconnection acknowledgement
 - 5 : Disconnection Refused Report

[CONT'D]

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For NATURE = 4, CODE contains the value 0.

For NATURE = 1, 2, 3 or 5, CODE contains the following information :

(CODE) =

- 0 : Connection terminated on user request.
- 1 : Connection terminated due to server overload conditions.
- 2 : Connection terminated by the ARTAS operator.
- 3 : Connection terminated due to contingency.
- 4 : Server unable to accept the connection (Maximum number of Users already connected),
- 5 : Illegal connection identification
- 6 : Incorrect definition of geographical point(s) of the domain of interest,
- 7 : erroneous Upper/Lower Limit(s),
- 8 : crossing lines,
- 9 : point(s) defined outside the maximum domain of interest,
- 10 : number of points below the minimum value,
- 11 : number of points exceeding the maximum,
- 12 : Incorrect Scaling Factor,
- 13 : both specific values and default option have been specified for the same parameter,
- 14 : syntax error in the connection request (e.g. missing item(s)),
- 15 : incorrect role,
- 16 : incorrect interface version,
- 17 : incorrect access key,
- 18 : erroneous Upper/Lower Limits in the definition of the User maximum DoI,
- 19 : incorrect service identification
- 20 : level outside User maximum DoI
- 21 : connection disallowed by the ARTAS Operator,
- 22 : automatic disconnection due to the absence of active services,
- 23 : incorrect default connection options,
- 24 : not connected,
- 25 : crossing lines in the definition of the User maximum DoI,
- 26 : Default DoI outside the maximum Domain of Interest,
- 27 : ARTAS Unit DoI outside the maximum Domain of Interest,
- 28 : already connected.

Remark(s) : Only the following reports are sent to broadcast users: natures 1 or 4, and codes 1,2, or 3.

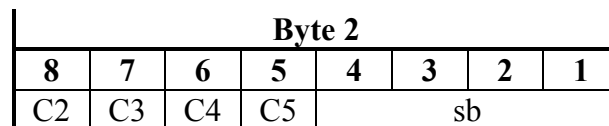
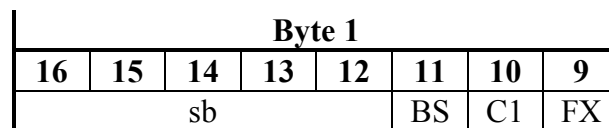
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I252/110 : SERVICE IDENTIFICATION

Definition : Identification of a service.

Format : Variable length data item comprising a first part of one byte followed by a 1-byte extent as necessary.

Structure :



bits 16/12 (sb) = spare bits set to 0

BS, C1, C2, C3, C4 and **C5** are used to identify one service, as follows :

- bit 11 (**BS**) = 1 Background service
- bit 10 (**C1**) = 1 Complementary service 1
- bit 9 (**FX**) Field extension
- bit 8 (**C2**) = 1 Complementary service 2
- bit 7 (**C3**) = 1 Complementary service 3
- bit 6 (**C4**) = 1 Complementary service 4
- bit 5 (**C5**) = 1 Complementary service 5

bits 4/1 (sb) = spare bits set to 0

Remark(s) : In the case of ARTAS :

- only one elementary service identification bit from BS, C1 .. C5 can be set at a time.

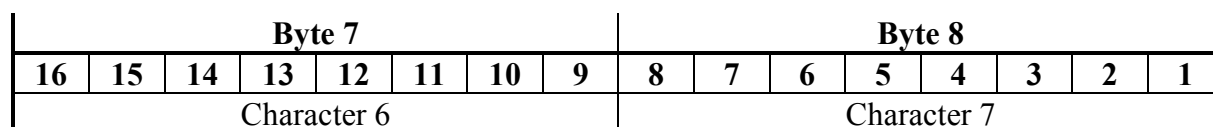
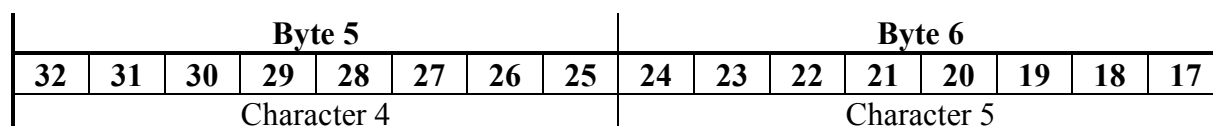
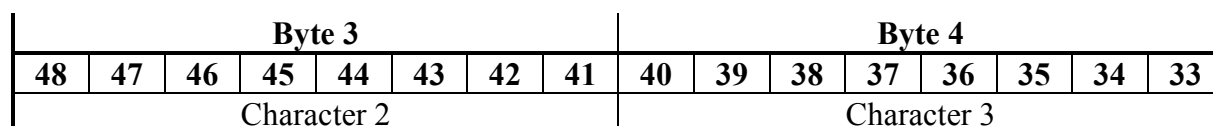
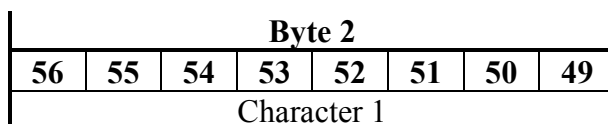
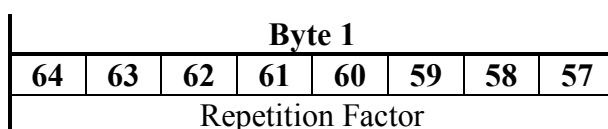
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I252/120 : CALLSIGN SELECTOR

Definition : List of aircraft Callsigns indicated as Track Selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 7-byte (Callsign) as necessary.

Structure :



Repetition Factor : 1 to 5

Each one of the seven bytes contains an ASCII character.

The Callsign is always left adjusted. It contains up to 7 upper-case alphanumeric characters, the remaining characters (if any) are padded with space characters.

Remark(s) :

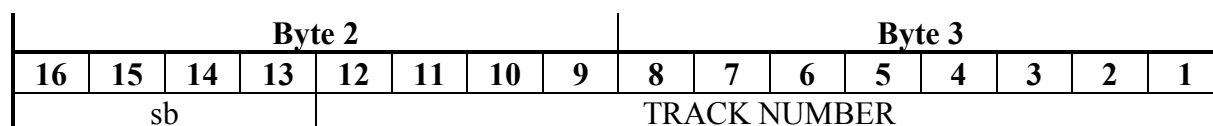
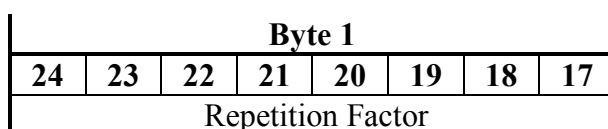
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I252/130 : TRACK NUMBER SELECTOR

Definition : List of Track numbers indicated as Track Selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by up to 5 series of 2-byte as necessary.

Structure :



Repetition Factor = 1 to 5

bits 16/13 (sb) = spare bits set to 0

bits 12/1 (TRACK NUMBER) : 0 to 4095

Remark(s) : The Track Number Selector contains track numbers (see I030/040).

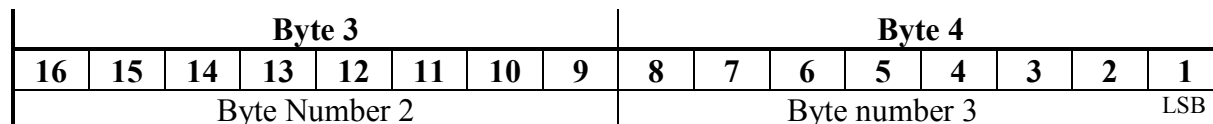
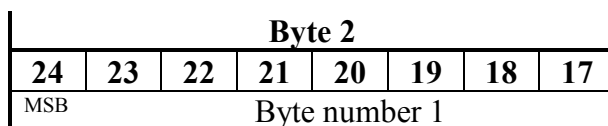
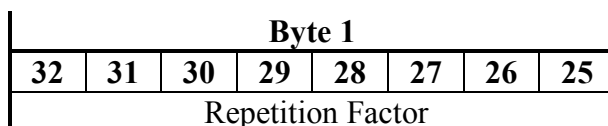
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I252/135 : AIRCRAFT ADDRESS SELECTOR

Definition : List of Mode S Aircraft Addresses indicated as Track Selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 3-bytes (24 bits Aircraft Address) as necessary.

Structure :



Repetition Factor = 1 to 5

bits 24/1 : 24 bits Mode-S address

Remark(s) :

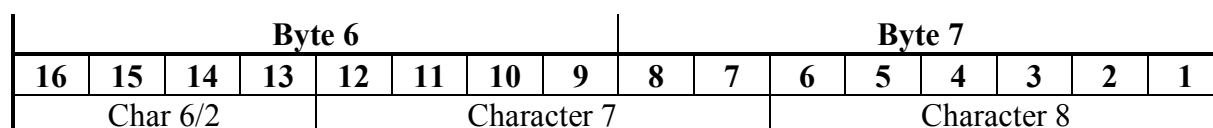
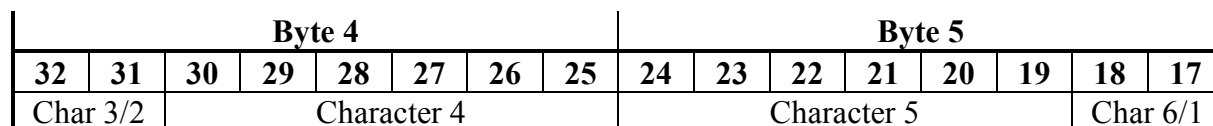
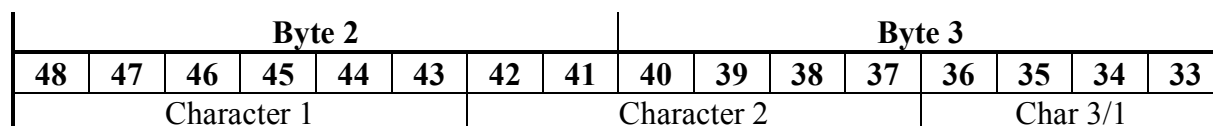
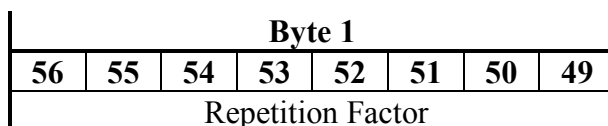
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I252/137 : AIRCRAFT IDENTIFICATION SELECTOR

Definition : List of Aircraft Identification Mode S items indicated as Track Selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 6-byte (Aircraft Identification) as necessary.

Structure :



Repetition Factor : 1 to 5

bits 48/1 characters 1-8 (coded on 6 bits each) defining aircraft identification when flight plan is available or the registration marking when no flight plan is available. See ICAO document Annex 10, Volume I, Part I, section 3.8.2.9 for the coding rules.

Remark(s) :

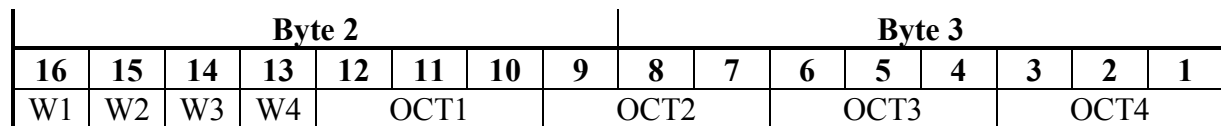
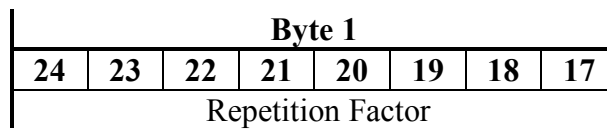
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I252/140 : CODE FAMILY SELECTOR

Definition : List of families of Mode 3/A replies indicated as track selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 2-byte (Mode 3/A Family) as necessary.

Structure :



Repetition Factor = 1 to 5

bits 16/13 **Wildcard Indicators :**

For each code digit (OCT1, OCT2, OCT3, OCT4), a Wildcard (respectively W1, W2, W3, W4) can be set to indicate that the track selection will have to be done whatever is the value of the digit in question.

(Wi) = 1 Wildcard is set,
 0 Wildcard not set.

In that case, a specific octal value is specified in the digit (OCTi) to which the Wildcard indicator (Wi) is attached.

bits 12/1 Mode 3/A Code under the form of 4 digits in octal representation :

bits 12/10 : OCT1 = 1st octal digit,
bits 9/7 : OCT2 = 2nd octal digit,
bits 6/4 : OCT3 = 3rd octal digit,
bits 3/1 : OCT4 = 4th octal digit,

Remark(s) :

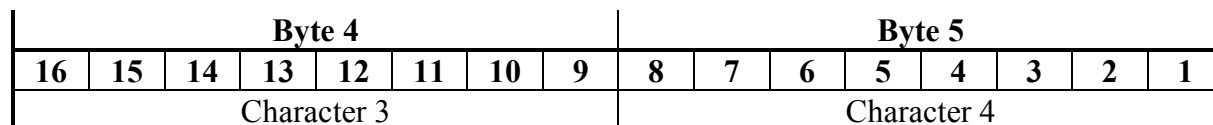
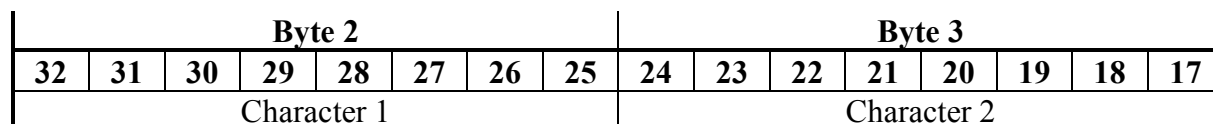
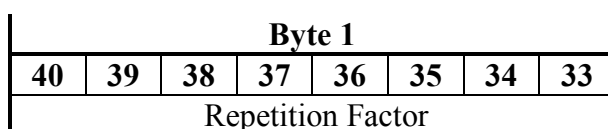
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I252/150 : DEPARTURE AIRPORT SELECTOR

Definition : List of Departure Airports indicated as Track Selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 4-byte (Airport) as necessary.

Structure :



Repetition Factor = 1 to 5

Each one of the four bytes composing the name of an airport contains an ASCII Character (upper-case alphabetic).

Remark(s) : the airport names are indicated in the ICAO location indicators book.

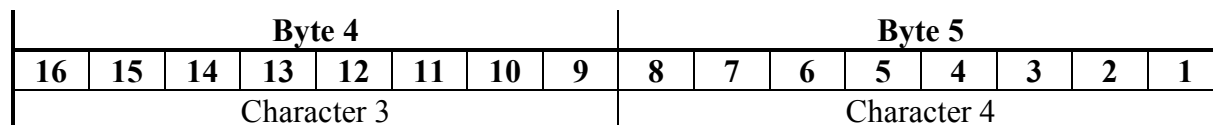
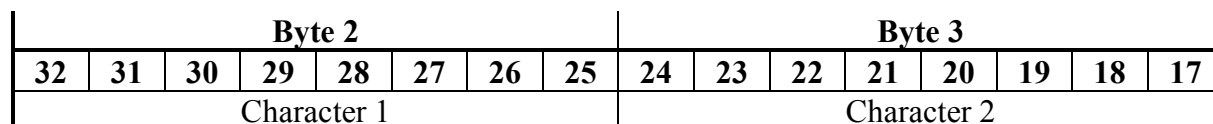
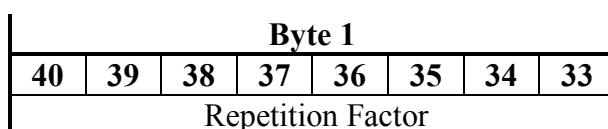
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I252/160 : DESTINATION AIRPORT SELECTOR

Definition : List of Destination Airports indicated as Track Selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 4-byte (Airport) as necessary.

Structure :



Repetition Factor = 1 to 5

Each one of the four bytes composing the name of an airport contains an ASCII Character (upper-case alphabetic).

Remark(s) : The airport names are indicated in the ICAO location indicators book.

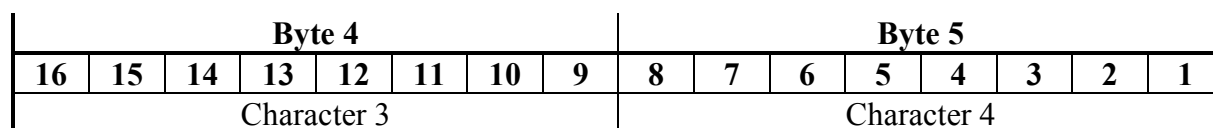
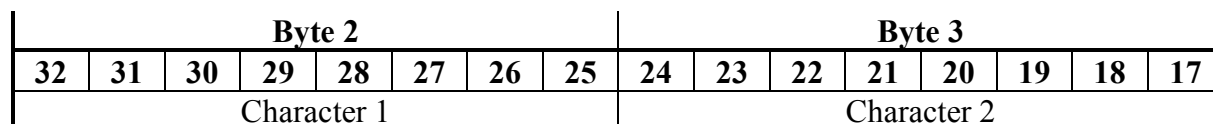
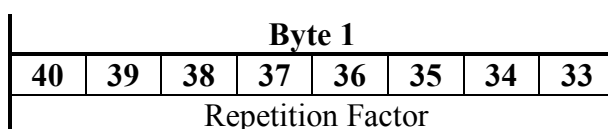
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I252/170 : AIRCRAFT TYPE SELECTOR

Definition : List of Aircraft Types indicated as Track Selection elements in a Service Request.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 4-byte (Aircraft Type) as necessary.

Structure :



Each one of the four bytes composing the type of aircraft contains an ASCII Character (upper-case alphanumeric characters with trailing spaces).

Repetition Factor = 1 to 5

Remark(s) : the types of aircraft are defined in ICAO Document 4444.

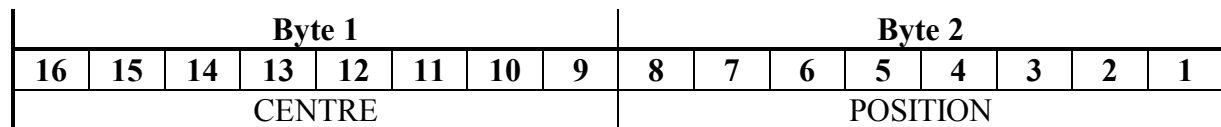
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I252/190 : CURRENT CONTROL POSITION SELECTOR

Definition : Identification of the Current Control Position to be used as track selector element in a Service Request.

Format : Two-bytes fixed length data item.

Structure :



bits 16/9 (CENTRE) 8-bit group identification code (0 to 255)

bits 8/1 (POSITION) 8-bit Control Position identification code (0 to 255)

Remark(s) : the centre and the control position identification codes have to be defined between communication partners.

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1252/200 : TRACK/FLIGHT CATEGORIES SELECTOR

Definition : This item defines which categories of tracks and/or flights shall be served.

Format : fixed length four-byte data item.

Structure :

Byte 1								Byte 2									
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17		
TYP		DETECT				VALTI		STCOR		TNT		SPI		ME		TRAF	
Byte 3								Byte 4									
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1		
FCAT			sb														

this item defines a number of track/flight selection categories which will be combined as follows :

((TYP and DETECT and VALTI and STCOR and TNT) or SPI or ME) and (TRAF or FCAT)

bits 32/31 (TYP)	0	1	2	tracks from live surveillance reports
				tracks from simulated surveillance reports
				tracks from both live and simulated surveillance reports

bits 30/26 (DETECT) is used to indicate from which type of surveillance report(s) the selected tracks shall be built.

bit 30	0	1	Combined radar reports
bit 29	0	1	SSR reports
bit 28	0	1	PR reports
bit 27	0	1	Mode S station reports
bit 26	0	1	ADS reports

bits 25/24 (VALTI)	0	1	2	Default. All tracks are selected.
				All tracks that have a calculated track flight level (I030/160) or a valid last measured Mode C (I030/140) are selected.
				All tracks having a calculated track altitude (I030/130) computed using assumed height are selected.

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bits 23/22 (STCOR)	0	default
	1	tracks correlated to Flight Plan(s) only
	2	tracks not correlated to Flight Plan(s) only
bit 21 (TNT)	0	tentative tracks shall be sent
	1	tentative tracks shall not be sent
bit 20 (SPI)	0	tracks with SPI flag shall be sent
	1	tracks with SPI flag shall not be sent
bit 19 (ME)	0	tracks with ME flag shall be sent
	1	tracks with ME flag shall not be sent
bits 18/17 (TRAF)	0	all traffic
	1	General Air Traffic,
	2	Operational Air Traffic
bit 16/14 (FCAT) is used to indicate which flight category(ies) shall be selected.		
bit 16	0	IFR selected
bit 15	0	VFR selected
bit 14	0	CVFR selected
bit 13/1 (sb) spare bits set to 0		

Remark(s) :

- the selected combined tracks (bit 30 = 0) will be those tracks with a TYPE = 0 and/or 4 in their ARTAS track status (item I030/080), the SSR tracks (bit 29 = 0) the tracks with a TYPE = 2 and/or 6, and the PR tracks (bit 28 = 0) the tracks with a TYPE = 1 and/or 5.
- bits 27 and 26 cannot yet be used.

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I252/210 : ITEM SELECTOR

Definition : The Item Selector is used to define the composition of the track information messages. The bits that compose the Item Selector point the items composing the *ARTAS Track Information UAP* (ATI/UAP).

Format : Variable length data item comprising a first part of two bytes, followed by 2-byte extents as necessary.

Structure :

Byte 1								Byte 2							
64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SVR	USR	SID	TYP	TRN	LTU	TRA	CTP	TVp	TVc	TMA	TMC	ALT	CTF	ATS	FX

Each bit set to 1 means that the corresponding item of the ATI/UAP is selected and has to be transmitted.

bit 64	(SVR)	Server Identification Tag (I030/010)
bit 63	(USR)	User Number (I030/015)
bit 62	(SID)	Service Identification (I030/030)
bit 61	(TYP)	Type of message (I030/035)
bit 60	(TRN)	Track Number (I030/040)
bit 59	(LTU)	Time of Last Update (I030/070)
bit 58	(TRA)	Track ages (I030/170)
bit 57	(CTP)	Calculated track position (I030/100)
bit 56	(TVp)	Calculated track velocity (polar) (I030/180)
bit 55	(TVc)	Calculated track velocity (cartesian) (I030/181)
bit 54	(TMA)	Track Mode 3/A (I030/060)
bit 53	(TMC)	Measured Track mode C (I030/150)
bit 52	(ALT)	Calculated track altitude (I030/130)
bit 51	(CTF)	Calculated track flight level (I030/160)
bit 50	(ATS)	ARTAS Track Status (I030/080)
bit 49	(FX)	Field extension

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Byte 3								Byte 4							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
ATQ	MOF	RCD	RTN	PLA	RSI	PPP	MTF	M3A	FDP	CAL	PLN	DEP	DST	TUR	FX

- | | | |
|--------|-------|---|
| bit 48 | (ATQ) | ARTAS Track Quality (I030/090) |
| bit 47 | (MOF) | Mode-of-Flight (I030/200) |
| bit 46 | (RCD) | Calculated rate of climb/descent (I030/220) |
| bit 45 | (RTN) | Calculated rate of turn (I030/240) |
| bit 44 | (PLA) | Plot ages (<i>local track/plot</i>) (I030/290) |
| bit 43 | (RSI) | Radar Identification tag (<i>local track/plot</i>) (I030/260) |
| bit 42 | (PPP) | Measured position (<i>local track/plot</i>) (I030/360) |
| bit 41 | (MTF) | Last measured mode C (<i>local track/plot</i>) (I030/140) |
| | | |
| bit 40 | (M3A) | Last measured Mode 3/A (<i>local track/plot</i>) (I030/340) |
| bit 39 | (FDP) | FPPS identification tag (<i>minipln</i>) (I030/390) |
| bit 38 | (CAL) | Callsign (<i>minipln</i>) (I030/400) |
| bit 37 | (PLN) | PLN Number (<i>minipln</i>) (I030/410) |
| bit 36 | (DEP) | Departure Airport (<i>minipln</i>) (I030/440) |
| bit 35 | (DST) | Destination Airport (<i>minipln</i>) (I030/450) |
| bit 34 | (TUR) | Category of turbulence (<i>minipln</i>) (I030/435) |
| bit 33 | (FX) | Field extension |

Byte 5								Byte 6							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
AFT	COD	CFL	FLI	CCP	LMT	MSA	MSI	CCF	TPa	Vap	Vac	ALA	FLa	CDa	FX

- | | | |
|--------|-------|---|
| bit 32 | (AFT) | Type of Aircraft (<i>minipln</i>) (I030/430) |
| bit 31 | (COD) | Allocated SSR Codes (<i>minipln</i>) (I030/460) |
| bit 30 | (CFL) | Current Cleared Flight Level (<i>minipln</i>) (I030/480) |
| bit 29 | (FLI) | Flight Category (<i>minipln</i>) (I030/420) |
| bit 28 | (CCP) | Current Control Position (<i>minipln</i>) (I030/490) |
| bit 27 | (LMT) | Time of message (I030/020) |
| bit 26 | (MSA) | aircraft address (<i>Mode S</i>) (I030/382) |
| bit 25 | (MSI) | aircraft identification (<i>Mode S</i>) (I030/384) |
| | | |
| bit 24 | (CCF) | Communication capability and flight status (<i>Mode S</i>) (I030/386) |
| bit 23 | (TPa) | Estimated accuracy of track position (I030/110) |
| bit 22 | (Vap) | Estimated accuracy of track velocity (polar) (I030/190) |
| bit 21 | (Vac) | Estimated accuracy of track velocity (cartesian) (I030/191) |
| bit 20 | (ALA) | Estimated accuracy of track altitude (I030/135) |
| bit 19 | (FLa) | Estimated accuracy of calculated track Flight Level (I030/165) |
| bit 18 | (CDa) | Estimated accuracy of rate of climb/descent (I030/230) |
| bit 17 | (FX) | Field extension |

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Byte 7							Byte 8								
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
TNa	MFp	TM2	ATN	LTN	3DH	REF					sb				FX

bit 16	(TNa)	Estimated accuracy of rate of turn (I030/250)
bit 15	(MFp)	Mode-of-Flight probabilities (I030/210)
bit 14	(TM2)	Track Mode 2 code (I030/120)
bit 13	(ATN)	ARTAS Track Number (I030/050)
bit 12	(LTN)	Local Track Number (<i>last track/plot</i>) (I030/270)
bit 11	(3DH)	Measured 3-D Height (<i>last track/plot</i>) (I030/370)
bit 10	(REF)	Reserved Expansion Data Field (I030/RE)
bits 9/2	(sb)	spare bits set to 0
bit 1	(FX)	Field extension

Remark(s) :

the bits in the item selector are arranged in the same order than the corresponding items of Category 030 are listed in *Table 2 - Track Information UAP* of the present document (section User Application Profile for ARTAS Users).

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I252/220 : CYCLICAL UPDATE CHARACTERISTICS

Definition : Definition of the Scanning Period, Update Period, Max Data Flow and Extra Delay (to be considered for the track extrapolation) in case of cyclical service.

Format : Five-byte fixed length data item.

Structure :

Byte 1							
40	39	38	37	36	35	34	33
sb	MSD	SCANNING PERIOD					

Byte 2							Byte 3								
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
BATCH PERIOD							UPDATE PERIOD								

Byte 4							Byte 5								
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
sb	EXTRA DELAY						sb	MAXFLOW							

bit 40 spare bit set to 0

bit 39 Directive for scanning the mosaic (from south-west corner to north-east corner) :

(MSD) = 0 scanning by column
 1 scanning by row

bits 38/33 (SCANNING PERIOD) i.e. time for scanning the mosaic :
range : from 6 to 32 batch periods,
and 3 sec <= SCANNING PERIOD <= 16 sec

bits 32/29 (BATCH PERIOD) i.e. time period between two consecutive batches :
range : from 1 to 15 steps of 100 ms,

bits 28/17 (UPDATE PERIOD) i.e. time period between the same batch of two consecutive scans :
range : from 6 to 3000 batch periods,
and SCANNING PERIOD <= UPDATE PERIOD <= 5 minutes

bits 16/15 spare bits set to 0

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bits 14/9 (DELAY) :

range : 0 to 35 steps of 100 ms (i.e. $0 \leq \text{DELAY} \leq 3.5$ seconds)

bit 8 spare bit set to 0

bits 7/1 (MAXFLOW) i.e. Maximum User input Data Flow :

range : 1 to 127 Kbytes/second

Remark(s) :

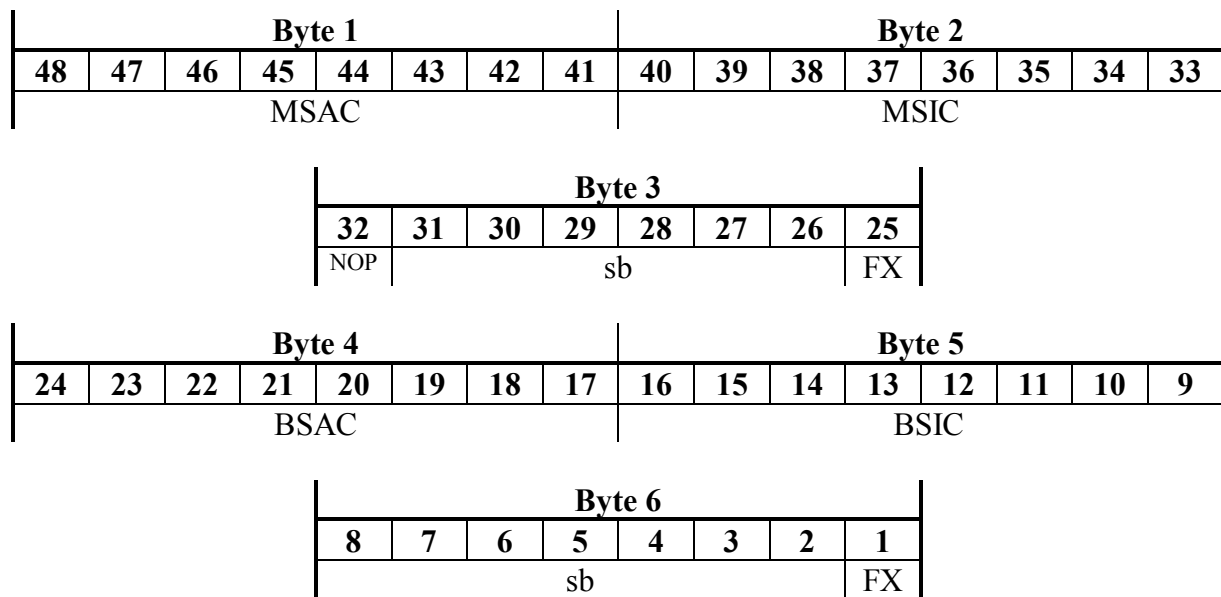
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1252/230 : RADAR SYNCHRONISATION CHARACTERISTICS

Definition : Transmission Characteristics for a service of the type radar synchronised.

Format : Variable length data item comprising a first part of three bytes, followed by three bytes as necessary.

Structure :



Main Radar Identification Tag :

bits 48/41 (MSAC) Source Area Code (0 → 255)
 bits 40/33 (MSIC) Source Identity Code (0 → 255)

bit 32 **(NOP)** : directive with respect to tracks falling in the radar range but which are not updated by plots from the reference radar :
 0 no information shall be sent,
 1 a track update shall be sent after the time-window for the plot-to-track association is passed without a plot has been associated.

bits 31/26 spare bits set to 0

bit 25 (FX) Field Extension

Backup Radar Identification Tag :

bits 24/17 (BSAC) Source Area Code (0 → 255)
 bits 16/9 (BSIC) Source Identity Code (0 → 255)

bits 8/2 spare bits set to 0

bit 1 (FX) Field Extension

Remark(s) : the (SIC) and (SAC) are defined in the ASTERIX standard.

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I252/240 : DISCRETE PARAMETERS FLAGS

Definition : This item contains a number of flags to indicate which category(ies) of discrete events shall be considered for triggering the track information transmission (aperiodical way of transmission).

Format : Two-byte variable length data item.

Structure :

Byte 1								Byte 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
TLF	TNB	TQY	PLN	M3A	MO2	COR	SPE	MOF	sb						FX

Set of selection flags meaning that, when set to 1, a track information update shall be sent at each occurrence of the discrete event.

- bit 16 (TLF) Track Life events (Birth, Death, no radar update)
- bit 15 (TNB) ARTAS Track Number changes (switch Master/Slave Track Number),
- bit 14 (TQY) Modifications of Track Quality,
- bit 13 (PLN) Modification of Flight Plan related information (i.e. in the Minipln),
- bit 12 (M3A) Change of Mode 3/A identity
- bit 11 (MO2) Change of Mode 2 identification
- bit 10 (COR) Flight-plan to Track correlation/end of correlation
- bit 9 (SPE) Special Mode 3/A transponding (7500, 7600 and 7700),
- bit 8 (MOF) Change of Mode-of-Flight.
- bits 7/2 spare bits set to 0
- bit 1 FX Extension field

Remark(s) :

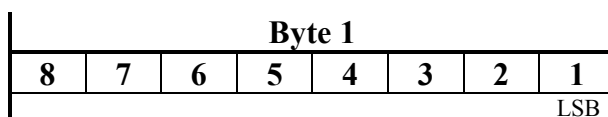
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I252/250 : MOF PROBABILITY CRITERION

Definition : Variation step of Mode-of-Flight Probabilities to trigger the transmission of track information updates (i.e. an update will be sent each time the variation between the current and the last transmitted MOF probability assessment for a given track exceeds the indicated threshold value).

Format : One-byte fixed length data item.

Structure :



The MOF Probability Criterion is expressed in percentage (%) :

bit 1 (LSB) = $(2E-2)\% = 0.25\%$

Maximum value : 64%

Remark(s) :

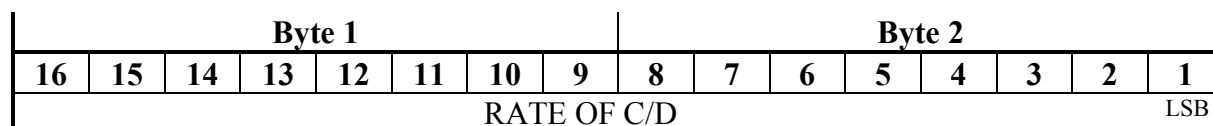
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I252/255 : RATE OF CLIMB/DESCENT CRITERION

Definition : Variation step of the calculated rate of climb/descent to trigger the transmission of track information updates (i.e. an update will be sent each time the variation between the current and the last transmitted assessment of the rate of climb/ descent for a given track exceeds the indicated threshold value).

Format : Two-bytes fixed length data item.

Structure :



bit 1 (LSB) $(2E-10)FL/s = 5.86 \text{ feet/minute}$

Remark(s) :

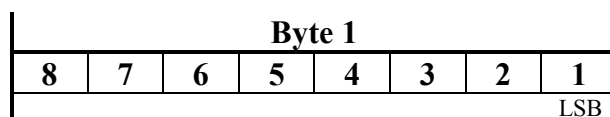
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I252/260 : POSITION CRITERION

Definition : Variation step of Track positional information to trigger the transmission of track updates. An update will be sent each time the variation between the current track position and the extrapolated position based on the previously sent information exceeds the indicated threshold.

Format : One-byte fixed length data item.

Structure :



The Position Criterion is expressed in Nautical Miles and applies on both X and Y coordinates.

bit 1 (LSB) $(2E-6)NM = 1/64 \text{ NM}$

Maximum value = 4 NM

Remark(s) :

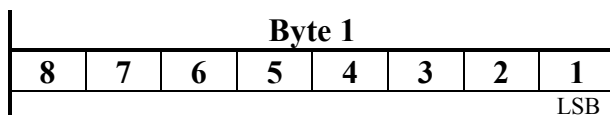
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I252/265 : RATE OF TURN CRITERION

Definition : Variation step of the calculated rate of turn to trigger the transmission of track information updates (i.e. an update will be sent each time the variation between the current and the last transmitted assessment of the rate of turn for a given track exceeds the indicated threshold value).

Format : One-byte fixed length data item.

Structure :



bit 1 (LSB) $(2E-2) \text{ }^\circ/\text{s} = 1/4 \text{ }^\circ/\text{s}$

Maximum value = 64 $^\circ/\text{s}$

Remark(s) :

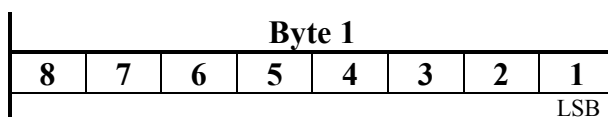
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I252/270 : HEADING CRITERION

Definition : Variation step of heading (i.e. Speed Vector) to trigger the transmission of track information updates (i.e. an update will be sent each time the variation between the current and the last transmitted Track Heading assessment for a given track exceeds the indicated threshold value).

Format : One-byte fixed length data item.

Structure :



The Heading Criterion is expressed in degrees.

bit 1 (LSB) $360^\circ/(2^8) = 0.02197^\circ$

Maximum value = 5.6°

Remark(s) :

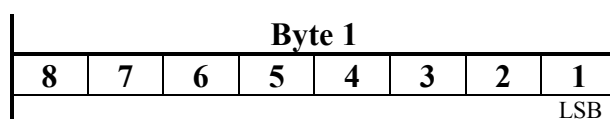
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I252/280 : SPEED MODULE CRITERION

Definition : Variation step of Speed Module to trigger the transmission of track information updates (i.e. an update will be sent each time the variation between the current and the last transmitted Speed Module assessment for a given track exceed the indicated threshold value).

Format : One-byte fixed length data item.

Structure :



The Speed Module Criterion is expressed in Knots.

bit 1 (LSB) = 1 kt

Maximum value = 255 kt

Remark(s) :

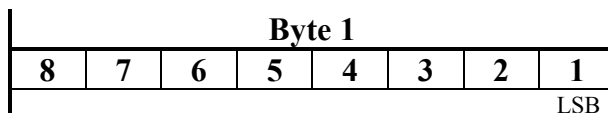
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I252/290 : ALTITUDE CRITERION

Definition : A threshold for triggering the transmission of a track. A track update will be sent each time the calculated track altitude or calculated track flight level has changed by more than the indicated amount since the last track update.

Format : One-byte fixed length data item.

Structure :



bit 1 (LSB) = 1/4 FL (25 feet)

Maximum value = FL 32

Remark(s) :

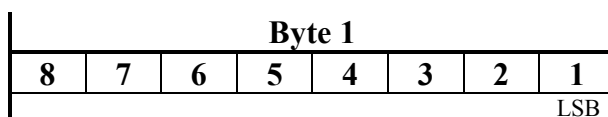
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I252/300 : FACTOR K

Definition : The so-called factor K is used to trigger the data transmission as a function of the internal accuracy by which the ARTAS Tracker has estimated the state vector elements. An update will be sent each time one of the state vector elements has varied from more than K time the standard deviation associated to this element.

Format : One-byte fixed length data item.

Structure :



bit 1 (LSB) = $(2E-3) = 1/8$

Maximum value $\cong 32$

Remark(s) :

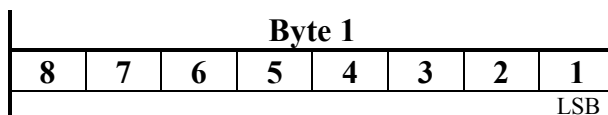
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I252/310 : REFRESHMENT PERIOD

Definition : In relation to a service applying the aperiodical mode of transmission, the Refreshment Period concerns the systematic transmission of track updates for those tracks for which no changes have been detected.

Format : One-byte fixed length data item.

Structure :



bit 1 (LSB) = 1 second

Maximum value = 255 seconds (4 mn 15 s)

Remark(s) :

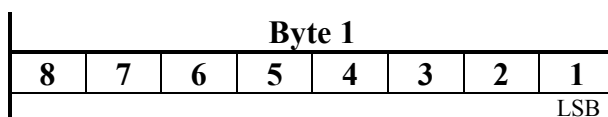
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I252/320 : MINIMAL PERIOD

Definition : In relation to a service applying the aperiodical mode of transmission, a Minimal Period shall be specified to avoid that too close transmission intervals are applied when highly manoeuvring aircraft are tracked.

Format : One-byte fixed length data item.

Structure :



bit 1 (LSB) = 1 second

Maximum value = 255 seconds (4 mn 15 s)

Remark(s) :

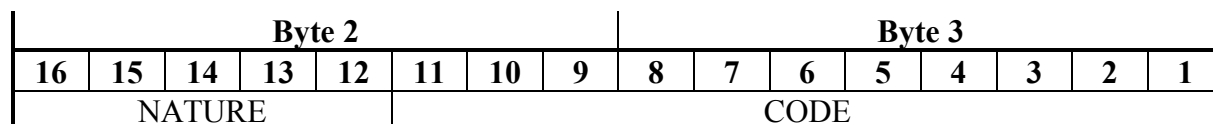
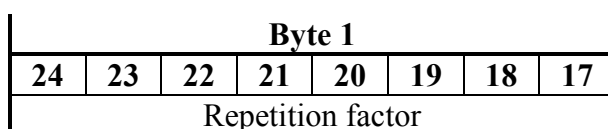
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I252/330 : SERVICE RELATED REPORT

Definition : Report message sent by the Server to the User in relation to a connection or a service.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of items, followed by series of 2-byte (Acknowledgement message) as necessary.

Structure :



Byte 1 **Repetition Factor** : 1 to 255 (The Repetition Factor may be > 1 when several errors have been detected within the same Service Request).

extent(s) **Report Message** :

bits 16/12 **(NATURE)** of the message to which the Report refers (0 to 31).

- (NATURE) =
- | | | |
|---|---|---|
| 0 | : | Server status message |
| 1 | : | Service initial request report |
| 2 | : | Service update request report : stop track/item transmission |
| 3 | : | Service update request report : start track/item transmission |
| 4 | : | Service control request report : interruption |
| 5 | : | Service control request report : restart |
| 6 | : | Service control request report : end of service |
| 7 | : | Error in default service |
| 8 | : | Service synchronisation report (periodical or radar synchronised service) |

[CONT'D]

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bits 11/1 Report (**CODE**) :

For NATURE = 0 to 7, CODE contains a report code, as listed below,

For NATURE = 8, CODE contains a batch or a sector number related to the execution of a service : 0 to N-1, N being either the number of batches or the number of sectors managed internally by ARTAS (16 or 32)

The following CODEs may be sent by ARTAS in case of a nature from 0 to 7.

- 1 = service degradation,
- 2 = service degradation ended,
- 3 = main radar out of service,
- 4 = service interrupted by the ARTAS operator,
- 5 = service interrupted due to contingency,
- 6 = ready for service restart after contingency,
- 7 = Request accepted,
- 8 = Server unable to accept the request (overload conditions),
- 9 = Service refused, the maximum number of simultaneous services per User being already reached for that User,
- 10 = Service Identification already existing,
- 11 = Incorrect Service Identification,
- 12 = Incorrect point(s) definition of in the geographical sub-area,
- 13 = Incorrect definition of Upper/Lower Limit(s) in the geographical sub-area,
- 14 = crossing lines in the geographical sub-area,
- 15 = point(s) defined outside the User Domain of Interest,
- 16 = number of points below the minimum value,
- 17 = number of points exceeding the maximum,
- 18 = Repetition Factor of Callsign Selector exceeding the maximum value,
- 19 = Incorrectly coded Callsign(s),
- 20 = Repetition Factor of Track Number Selector exceeding the maximum value,
- 21 = Incorrect Track Number(s),
- 22 = Repetition Factor of Aircraft Address Selector exceeding the maximum value,
- 23 = Repetition Factor of Aircraft Identification Selector exceeding the maximum value,
- 24 = Incorrect Aircraft Identification(s),
- 25 = Repetition Factor of Code Family Selector exceeding the maximum value,
- 26 = Repetition Factor of the Departure Airport Selector exceeding the maximum value,
- 27 = Incorrectly coded Departure Airport(s),
- 28 = Repetition Factor of the Destination Airport Selector exceeding the maximum value
- 29 = Incorrectly coded Destination Airport(s),
- 30 = Repetition Factor of Aircraft Type Selector exceeding the maximum value,
- 31 = Incorrectly coded Aircraft Type(s),
- 32 = Incorrectly coded Current Control Position,
- 33 = Wrong track/flight categories selector
- 34 = Mixed definition of periodical/apperiodical transmission characteristics,
- 35 = Update period below the minimum value,
- 36 = Update period over the maximum value,

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- 37 = scanning period below the minimum value,
- 38 = scanning period over the maximum value,
- 39 = Extra delay over the maximum value
- 40 = Max flow below the minimum value
- 41 = Max flow over the maximum value
- 42 = Unknown Main Radar Station,
- 43 = Background service not identified,
- 44 = More than one Background service have been identified.
- 45 = syntax error in the request (e.g. missing items).
- 46 = maximum number of simultaneous radar synchronised service is reached.
- 47 = Main radar outside the maximum user domain of interest,
- 48 = non existing referenced service,
- 49 = mixed definition of geographical and non-geographical track selection keys,
- 50 = number of exclusion areas exceeding the maximum,
- 51 = number of layers for an exclusion area exceeding the maximum,
- 52 = defined geographical area already excluded,
- 53 = Too many sub-domains,
- 54 = Too many sub-domain layers,
- 55 = Service already interrupted,
- 56 = Service already active.
- 57 = Service interrupted by the operator
- 58 = Service ended by the operator
- 59 = failure of user main radar
- 60 = Incorrectly coded Discrete Parameters Flags
- 61 = Incorrectly coded Item Selector
- 62 = Mixed definition of item and track selection keys
- 63 = Incorrect definition of the Upper/Lower limits in the update geographical area
- 64 = Crossing lines in the definition of the update geographical area,
- 65 = Service update no longer possible,
- 66 = No initial service,
- 67 = Not possible to restart complementary service while background is interrupted,
- 68 = Complementary service not defined,
- 69 = Illegal background state,
- 70 = Illegal background type,
- 71 = Illegal connection number,
- 72 = Illegal service type,
- 73 = User not connected,
- 74 = Service restarted by the ARTAS Operator,
- 75 = Refresh period less or equal than minimal period,
- 76 = Batch period below the minimum value,
- 77 = Update period less than scanning period,
- 78 = Main radar becoming operational,
- 79 = Main radar becoming degraded,
- 80 = Service continuity interrupted due to disconnection with adjacent Unit,
- 81 = Service continuity restarted,
- 82 = Radar synchronised subarea going beyond the ARTAS Unit DoI,
- 83 = Service synchronised on backup radar,
- 84 = Service synchronised on main radar,

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- 85 = Main and backup radars, if any, failed,
- 86 = Unknown backup radar.
- 87 = Incorrectly coded radar synchronisation characteristics
- 88 = Unknown Sensor(s)
- 89 = Refresh period out of bounds
- 90 = Time Stamping Bias change threshold out of bounds
- 91 = SSR Range Bias change threshold out of bounds
- 92 = SSR Range gain change threshold out of bounds
- 93 = PR Range Bias change threshold out of bounds
- 94 = PR Range gain change threshold out of bounds
- 95 = Repetition Factor of Sensor Selector exceeding the maximum value
- 96 = Sensor Service Not Defined

Remark(s) : Only the following reports are sent to broadcast users: nature 0 or 8, codes 1,2,3,4,5,6,58,59,74,78,79,80,81,83,84, or 85.

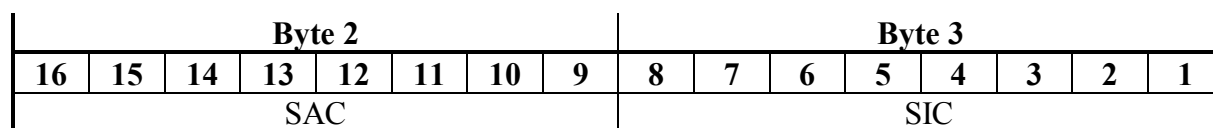
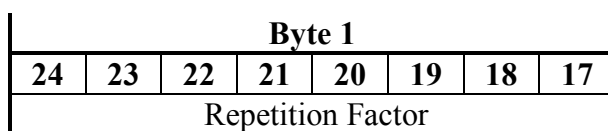
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I252/350 : SENSOR SELECTOR

Definition : List of Sensor SIC/SAC identifications for which Sensor information are to be provided.

Format : Repetitive data item, starting with a one-byte Repetition Factor indicating the number of selected sensors, followed by series of 2-byte (sensor identifications) as necessary.

Structure :



bits 16/9 (SAC) Source Area Code (0 → 255)

bits 8/1 (SIC) Source Identity Code (0 → 255)

Repetition Factor = 1 to 30

Remark(s) :

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I252/360 : SENSOR ITEM SELECTOR

Definition : This item is used to define the composition of the Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :

Byte 1								Byte 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SVR	USR	LMT	SIT	SST	TSB	SRB	SAB	PRB	PAB	sb					

Each bit set to 1 means that the corresponding item is selected.

- bit 16 (SVR) Server Identification Tag (I031/010)
- bit 15 (USR) User number (I031/015)
- bit 14 (LMT) Time of message (I031/020)
- bit 13 (SIT) Sensor Identification Tag (I031/030)
- bit 12 (SST) Sensor Status (I031/040)
- bit 11 (TSB) Time Stamping Bias (I031/050)
- bit 10 (SRB) SSR Range gain and Bias (I031/060)
- bit 9 (SAB) SSR Azimuth Bias (I031/070)
- bit 8 (PRB) PR Range gain and Bias (I031/080)
- bit 7 (PAB) PR Azimuth Bias (I031/090)
- bits 6/1 (sb) Spare bits set to 0

Remark(s) :

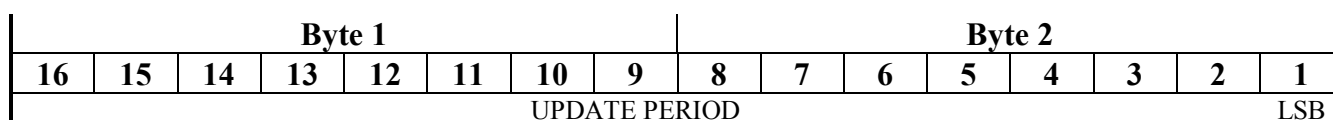
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I252/370 : PERIODICAL CHARACTERISTICS OF SENSOR INFORMATION SERVICE

Definition : Update period of a periodical service of Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (UPDATE PERIOD)

bit 1 (LSB) = 1s
range : from 4 to 3600 s

Remark(s) :

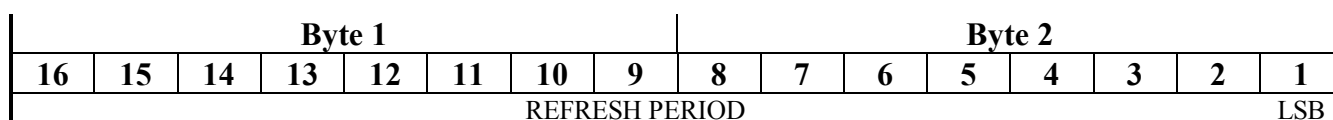
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I252/400 : REFRESHMENT PERIOD OF SENSOR INFORMATION SERVICE

Definition : Refreshment period of an aperiodical service of Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (REFRESH PERIOD) period of refresh when no change is detected.
 bit 1 (LSB) = 1s
 range : from 4 to 3600 s

Remark(s) :

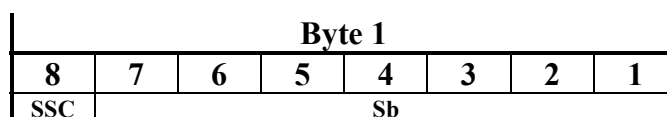
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I252/410 : DISCRETE PARAMETERS OF SENSOR INFORMATION SERVICE

Definition : Discrete parameters of an aperiodical service of Sensor Information messages. It defines which event(s) shall trigger a message to be sent.

Format : One-byte fixed length data item.

Structure :



bit 8 (SSC) Sensor Status Change
bits 7/1 (sb) spare bits set to 0

Remark(s) :

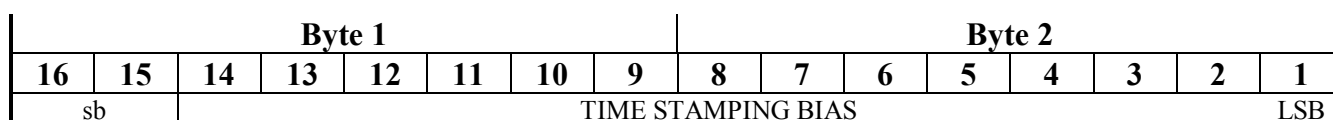
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I252/420 : TIME STAMPING CRITERION OF SENSOR INFORMATION SERVICE

Definition : Time stamping bias criterion of an aperiodical service of Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :



bits 16/15	(sb)	spare bits set to 0
bits 14/1	(TIME STAMPING BIAS)	variation threshold of the time stamping bias
bit 1	(LSB) =	1 ms
	Vmin =	0s
	Vmax =	10s

Remark(s) :

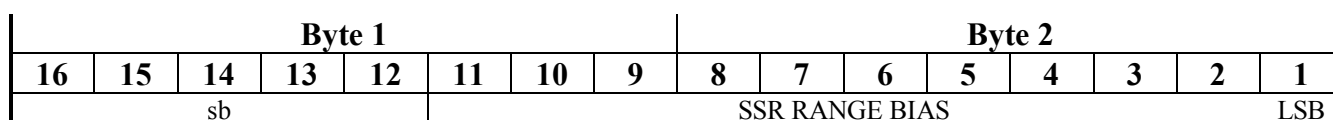
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I252/430 : SSR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE

Definition : SSR range bias criterion of an aperiodical service of Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :



bits 16/12	(sb)	spare bits set to 0
bits 16/1	(SSR RANGE BIAS)	variation threshold of the SSR range bias
bit 1	(LSB) =	1/128 NM
	Vmin =	0 NM
	Vmax =	+10.8 NM

Remark(s) :

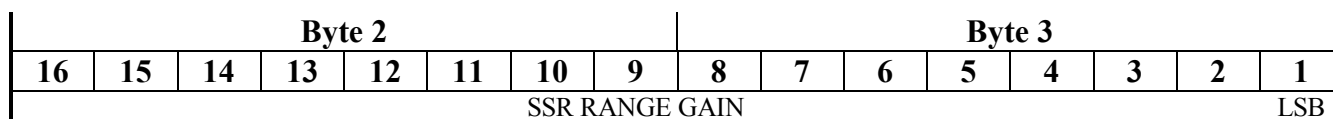
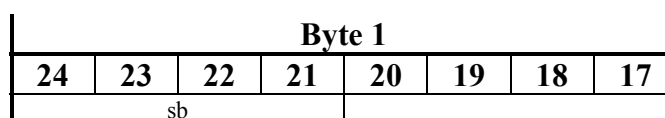
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I252/440 : SSR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE

Definition : SSR range gain criterion of an aperiodical service of Sensor Information messages.

Format : Three-byte fixed length data item.

Structure :



bits 24/21	(sb)	spare bits set to 0
bits 20/1	(SSR RANGE GAIN)	variation threshold of the SSR range gain
bit 1	(LSB) =	10^{-6}
	Vmin =	0
	Vmax =	1

Remark(s) :

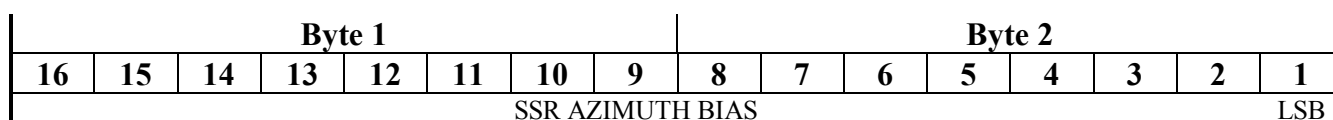
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I252/450 : SSR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE

Definition : SSR azimuth bias criterion of an aperiodical service of Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (SSR AZIMUTH BIAS) variation threshold of the SSR azimuth bias
 bit 1 (LSB) = $360^\circ / (2^{16}) \cong 0.0055^\circ$
 $V_{min} = -180^\circ$
 $V_{max} = +180^\circ - (360^\circ / 2^{16})$

Remark(s) :

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I252/460 : PR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE

Definition : Primary range bias criterion of an aperiodical service of Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :

Byte 1								Byte 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
sb				PR RANGE BIAS											LSB

bits 16/12	(sb)	spare bits set to 0
bits 16/1	(PR RANGE BIAS)	variation threshold of the PR range bias
bit 1	(LSB) =	1/128 NM
	Vmin =	0 NM
	Vmax =	+10.8 NM

Remark(s) :

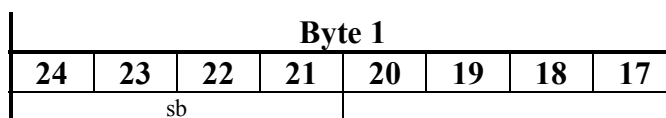
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I252/470 : PR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE

Definition : Primary range gain criterion of an aperiodical service of Sensor Information messages.

Format : Three-byte fixed length data item.

Structure :



bits 24/21	(sb)	spare bits set to 0
bits 20/1	(PR RANGE GAIN)	variation threshold of the PR range gain
bit 1	(LSB) =	10^{-6}
	Vmin =	0
	Vmax =	1

Remark(s) :

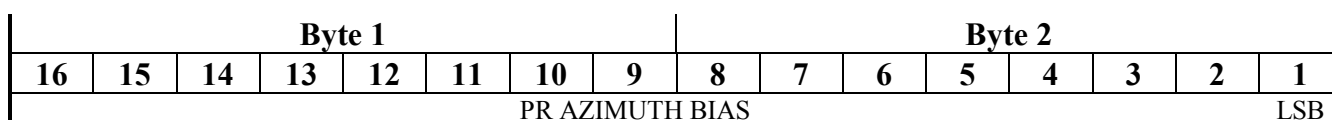
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I252/480 : PR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE

Definition : Primary azimuth bias criterion of an aperiodical service of Sensor Information messages.

Format : Two-byte fixed length data item.

Structure :



bits 16/1 (PR AZIMUTH BIAS) variation threshold of the PR azimuth bias
bit 1 (LSB) = $360^\circ / (2^{16}) \cong 0.0055^\circ$
Vmin = -180°
Vmax = $+180^\circ - (360^\circ / 2^{16})$

Remark(s) :

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5.3 Connection to ARTAS

5.3.1 UAP for connection related messages

The following User Application Profile shown in *Table 8* shall be used for the transmission of connection related messages.

Table 8 - UAP for the connection related messages

FRN	Data Item	Information	Length
1	I252/010	SERVER IDENTIFICATION TAG	2
2	I252/015	USER NUMBER	2
3	I252/020	TIME OF MESSAGE	3
4	I252/035	TYPE OF MESSAGE	1
5	I252/100	CONNECTION RELATED REPORT	$1 \leq n \leq 255$ 1+(nx1)
6	I252/040	ACCESS KEY	8
7	I252/045	ROLE AND VERSION	1
FX	-	<i>Field extension indicator</i>	-
8	I252/050	DEFAULT CONNECTION OPTIONS	1
9	I252/060	GEOGRAPHICAL AREA	$3 \leq n \leq 50$ 1+(nx6)
10	I252/070	LOWER LIMIT	2
11	I252/080	UPPER LIMIT	2
12	I252/090	PREFERRED FPPS IDENTIFICATION TAG	2
13	I252/340	SCALING FACTOR	1
14	-		-
FX	-	<i>Field extension indicator</i>	-

In the above table :

- the first column indicates the Field Reference Number (FRN) associated to each Data Items used in the UAP,
- the fourth column gives the format and the length of each Item, a stand-alone figure indicates the byte-count of a fixed length Data item, 1+(nxi) indicates a variable length Data item comprising a first part of 1-byte followed by an extension of up to n times i-bytes (n determined by the amount of information to be transmitted).

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5.3.2 Encoding rules

Data Item Reference Number	Description	Presence of items according to the type of message C = Compulsory O = Optional		
		11	12	13
I252/010	SERVER IDENTIFICATION TAG	C	C	C
I252/015	USER NUMBER	C	C	C
I252/020	TIME OF MESSAGE	C	C	C
I252/035	TYPE OF MESSAGE	C	C	C
I252/040	ACCESS KEY	C		
I252/045	ROLE AND VERSION	C		
I252/050	DEFAULT CONNECTION OPTIONS	O		
I252/060	GEOGRAPHICAL AREA	O		
I252/070	LOWER LIMIT	O		
I252/080	UPPER LIMIT	O		
I252/090	PREFERRED FPPS IDENTIFICATION TAG	O		
I252/100	CONNECTION RELATED REPORT			C
I252/340	SCALING FACTOR	O		

Message types :

\$11 = request for connection

\$12 = request for disconnection

\$13 = connection related report

In case of a request for connection, the following items are incompatible :

- I252/060 and UDI bit of I252/050 set to 0 or 1
- I252/070 and LOW bit of I252/050 set to 0
- I252/080 and UPP bit of I252/050 set to 0
- I252/090 and FPP bit of I252/050 set to 0

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5.4 Track and Sensor Information Service

5.4.1 UAP for service related messages

The following User Application Profile shown in *Table 9* shall be used for the transmission of service related messages.

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Table 9 - UAP for the service related messages

FRN	Data Item	Information	Length
1	I252/010	SERVER IDENTIFICATION TAG	2
2	I252/015	USER NUMBER	2
3	I252/020	TIME OF MESSAGE	3
4	I252/035	TYPE OF MESSAGE	1
5	I252/110	SERVICE IDENTIFICATION	1+ (1x1)
6	I252/330	SERVICE RELATED REPORT	1≤n≤255 1+(nx2)
7	I252/210	ITEM SELECTOR	0≤n≤3 2+(nx2)
FX	-	<i>Field extension indicator</i>	-
8	I252/220	CYCLICAL UPDATE CHARACTERISTICS	5
9	I252/200	TRACK/FLIGHT CATEGORIES SELECTOR	4
10	I252/130	TRACK NUMBER SELECTOR	1≤n≤5 1+(nx2)
11	I252/140	CODE FAMILY SELECTOR	1≤n≤5 1+(nx2)
12	I252/120	CALLSIGN SELECTOR	1≤n≤5 1+(nx7)
13	I252/150	DEPARTURE AIRPORT SELECTOR	1≤n≤5 1+(nx4)
14	I252/160	DESTINATION AIRPORT SELECTOR	1≤n≤5 1+(nx4)
FX	-	<i>Field extension indicator</i>	-
15	I252/060	GEOGRAPHICAL AREA	3≤n≤50 1+(nx6)
16	I252/170	AIRCRAFT TYPE SELECTOR	1≤n≤5 1+(nx4)
17	I252/190	CURRENT CONTROL POSITION SELECTOR	2
18	I252/230	RADAR SYNCHRONISATION CHARACTERISTICS	3+
19	I252/320	MINIMAL PERIOD	1
20	I252/310	REFRESHMENT PERIOD	1
21	I252/240	DISCRETE PARAMETERS FLAGS	2+
FX	-	<i>Field extension indicator</i>	-
22	I252/270	HEADING CRITERION	1
23	I252/280	SPEED MODULE CRITERION	1
24	I252/290	ALTITUDE CRITERION	1
25	I252/260	POSITION CRITERION	1
26	I252/250	MOF PROBABILITY CRITERION	1
27	I252/300	FACTOR K	1
28	I252/255	RATE OF CLIMB/DESCENT CRITERION	2
FX	-	<i>Field extension indicator</i>	-
29	I252/265	RATE OF TURN CRITERION	1
30	I252/070	LOWER LIMIT	2
31	I252/080	UPPER LIMIT	2
32	I252/135	AIRCRAFT ADDRESS SELECTOR	1≤n≤5 1+(nx3)
33	I252/137	AIRCRAFT IDENTIFICATION SELECTOR	1≤n≤5 1+(nx6)
34	I252/350	SENSOR SELECTOR	1≤n≤30 1+(nx2)
35	I252/360	SENSOR ITEM SELECTOR	2
FX	-	<i>Field extension indicator</i>	-

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36	I252/370	PERIODICAL CHARACTERISTICS OF SENSOR INFORMATION SERVICE	2
37	I252/400	REFRESHMENT PERIOD OF SENSOR INFORMATION SERVICE	2
38	I252/410	DISCRETE PARAMETERS OF SENSOR INFORMATION SERVICE	1
39	I252/420	TIME STAMPING CRITERION OF SENSOR INFORMATION SERVICE	2
40	I252/430	SSR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE	2
41	I252/440	SSR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE	3
42	I252/450	SSR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE	2
FX	-	<i>Field extension indicator</i>	-
43	I252/460	PR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE	2
44	I252/470	PR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE	3
45	I252/480	PR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE	2
46	-		-
47	-		-
48	-		-
49	-		-
FX	-	<i>Field extension indicator</i>	-

In the above table :

- . the first column indicates the Field Reference Number (FRN) associated to each Data Items used in the UAP,
- . the fourth column gives the format and the length of each Item. A stand-alone figure indicates the byte-count of a fixed length Data item. j+(nxi) indicates a variable length Data item comprising a first part of j-bytes followed by an extension of up to n times i-bytes (n determined by the amount of information to be transmitted). j+ alone indicates that the item has been designed as a variable length data item in anticipation of possible future extensions.

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Data Item Reference Number	Description	Presence of items according to the type of message														
		C = Compulsory O = Optional														
		21	22	23	24	25	26	27	28	31	32	33	41	42	43	44
1252/410	DISCRETE PARAMETERS OF SENSOR INFORMATION SERVICE												O			
1252/420	TIME STAMPING CRITERION OF SENSOR INFORMATION SERVICE												O			
1252/430	SSR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE												O			
1252/440	SSR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE												O			
1252/450	SSR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE												O			
1252/460	PR RANGE BIAS CRITERION OF SENSOR INFORMATION SERVICE												O			
1252/470	PR RANGE GAIN CRITERION OF SENSOR INFORMATION SERVICE												O			
1252/480	PR AZIMUTH BIAS CRITERION OF SENSOR INFORMATION SERVICE												O			

Message types :

- \$ 21 = Background Service Definition,
- \$ 22 = Synchronised Complementary Service Definition,
- \$ 23 = Independent Complementary Service Definition,
- \$ 24 = Service Update/Stop Track/Item transmission,
- \$ 25 = Service Update/Start Track/Item transmission,
- \$ 26 = Service Control/Interruption,
- \$ 27 = Service Control/Restart,
- \$ 28 = Service Control/End of Service,

- \$ 31 = Server Status Message,
- \$ 32 = Track Service Related Report,
- \$ 33 = Sensor Information Service Related Report,

- \$ 41 = Sensor Information Service definition request
- \$ 42 = Service Control Request = Interruption
- \$ 43 = Service Control Request = Restart
- \$ 44 = Service Control Request = End of Service

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I252/220 (cyclical transmission characteristics), I252/230 (radar synchronised transmission characteristics) and any subset of {I252/240, I252/250, I252/255, I252/260, I252/265, I252/270, I252/280, I252/290, I252/300, I252/310, I252/320} (a-periodical transmission characteristics) are mutually exclusive, in case of background/complementary service definition (message type 21, 22, 23).

Any subset of {I252/060, I252/070, I252/080} (geographical track selector), any subset of {I252/120, I252/130, I252/135, I252/137, I252/140, I252/150, I252/160, I252/170, I252/190, I252/200} (non geographical track selector) and I252/210 (item selector) are mutually exclusive in case of service update (message type 24 and 25).

I252/370 (periodical characteristics of sensor information service) and any subset of {I252/400, I252/410, I252/420, I252/430, I252/440, I252/450, I252/460, I252/470, I252/480} (aperiodical characteristics of sensor information service) are optional and mutually exclusive in case of sensor information service definition (message type 41).

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6 Summary of Modifications

The paragraphs below show the changes since version 6.0.

ACP 118:

- I030/386. The range of the COM subfield has been increased to 0..4 to be consistent with the POEMS category 48 definition of I048/230.

ACP 122:

- I030/130. The minimum and maximum values have been specified. .

ACP 123:

- I030/150. The remark has been changed to indicate that more than one parameter is used to determine whether the validity and garbled indicators are considered in the determination of the last validated and credible Mode C.
- I252/200. The first remark has been corrected to match the values of the track TYPE specified in item I030/080.
- Para 5.3.2. The name for item I252/015 has been corrected i.e. changed from USER IDENTIFICATION TAG to USER NUMBER.
- I252/450 and I252/480: Maximum and minimum values have been added.

ACP 125:

- I252/290 the definition of the item has been changed.
- I252/200 the description of the VALTI bits has been changed.

ACP 138:

- I252/100 and I252/330: a remark has been added to define which reports are sent to broadcast users.