# **EUROCONTROL** Specification for Surveillance Data Exchange

## ASTERIX Part 9 Category 062 SDPS Track Messages

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This document describes the application of ASTERIX to the transmission of System Track Data.								
	Keyv	vords						
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Contact F	Person(s)	Tel	Unit					
Alexander Engel		+32-2-729 3355	DECMA/STAN					

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## **DOCUMENT APPROVAL**

This document has been approved by the ASTERIX Maintenance Group (AMG).

For management approval of the complete set of ASTERIX documentation refer to Part 1.

## **DOCUMENT CHANGE RECORD**

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

EDITION	DATE	REASON FOR CHANGE	SECTIONS PAGES AFFECTED
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		Modification of UAP	
0.26	Oct. 2002	Re-integration of I062/180 Switch of number between I062/100 and I062/101	5.2.16 5.2.7 & 5.2.8
		Switch of number between I062/105 and I062/106	5.2.9 & 5.2.10
		Modification in 1062/110	5.2.11
		Modification in 1062/290 Creation of 1062/295	5.2.23 5.2.24
		Modification in 1062/380	5.2.27
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		Modification of I062/100 – Suppression of I062/101	5.2.7
		Modification of I062/105 – Suppression of I062/106	5.2.8
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		Re-organization of UAP	5.3
0.28	March 2003	Modification of title Creation of Items I062/101 and I062/106 Modification of I062/110	5.2.8, 5.2.10 5.2.11
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		<ul> <li>Splitting I062/380 IAS/Mach sub-fields into two separate sub-fields.</li> </ul>	5.2.26
		<ul> <li>Changing the range of I062/380 sub-field 5, and 16 to match Mode S BDS definitions.</li> </ul>	5.2.21 / 5.2.26
		<ul> <li>Adding additional subfields to item 380 and</li> </ul>	
		295 to explicitly include contents of Mode S BDS 4,0 (Selected Vertical Intention)	5.2.26
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		(101 and 106).	
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		match cat 48 encoding of STAT.	
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		match I021/165 encoding.	
0.30	Nov. 2003	<ul> <li>Addition of ICAO Annex 14 as reference document</li> <li>Modification of format of I062/350 and I062/360</li> <li>Correction of coding the extension indicator of primary subfield of I062/110</li> <li>Editorial modifications</li> </ul>	2.2 5.2.24 / 5.2.25 5.2.9
1.0P	March 2004	<ul> <li>Encoding rules defined for all the items</li> <li>Suppression of I062/350 and I062/360</li> <li>Note added in I062/245</li> <li>Suppression of subfields included in I062/380 and I062/295 to include BDS 4.0 data (information already present elsewhere)</li> <li>Two new subfields added in I062/390</li> <li>Modification of I062/060</li> <li>Modification of I062/080</li> </ul>	
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		5.2.6
	·	5.2.24
	•	5.2.6
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**Publications**EUROCONTROL Headquarters
96 Rue de la Fusée
B-1130 BRUSSELS

Tel: +32 (0)2 729 4715 Fax: +32 (0)2 729 5149
E-mail: publications@eurocontrol.int

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#### 1. INTRODUCTION

#### 1.1 Scope

- **1.1.1** This document describes the message structure for the transmission of System Track Data to a user.
- **1.1.2** This document defines the data out of Category 062.

#### 2. REFERENCES

#### 2.1 General

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

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

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

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

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

#### 2.2 Reference Documents

- EUROCONTROL Specification SPEC-0149, edition 2.4, 24 October 2016
   "EUROCONTROL Specification for Surveillance Data Exchange Part 1 All
   Purpose Structured EUROCONTROL Surveillance Information Exchange –
   ASTERIX".
- 2) ICAO Annex 10, Vol. IV
- 3) ICAO Document 4444
- 4) ICAO Annex 14

### 3. DEFINITIONS, ACRONYMS AND ABBREVIATIONS

#### 3.1 Definitions

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

3.1.1	Amalgamation:  Calculated Item:	Amalgamation is the process by which tracks from co- operating systems are merged to form an 'amalgamated' track. It is used to smooth any possible differences between the tracks to allow the same amalgamated track information to be served to the users of both systems. A piece of information (e.g. the position of a target) derived from raw information through an intermediate processing such as transformation of co-ordinates, tracking, code conversion, etc.
3.1.3	Catalogue of	List of all the possible Data Items of each Data Category
	Data Items:	describing the Data Items by their reference, structure, size and units (where applicable).
3.1.4	Data Block:	Unit of information seen by the application as a discrete entity by its contents. A Data Block contains one or more Record(s) containing data of the same category.
3.1.5	Data Category:	Classification of the data in order to permit inter alia an easy identification.
3.1.6	Data Field:	Physical implementation for the purpose of communication of a Data Item, it is associated with a unique Field Reference Number and is the smallest unit of transmitted information. The smallest unit of information in each Data Category.
3.1.7	Data Item:	A piece of information (e.g. the position of a target) directly
3.1.8	Measured Item:	derived from raw information and transmitted without any smoothing.
3.1.9	Record:	A collection of transmitted Data Fields of the same category preceded by a Field Specification field, signalling the presence/absence of the various Data Fields
3.1.10	State vector:	A vector describing the state of an object, e.g. position, speed, acceleration
3.1.11	Track:	Time sequence of state vectors of an object estimated by some real time filtering technique using surveillance data as input.
3.1.12	User Application	The mechanism for assigning Data Items to Data Fields, and containing all necessary information which needs to be standardised for the successful encoding and decoding of
	Profile:	the messages.

#### 3.2 Acronyms and Abbreviations

For the purposes of this EUROCONTROL Document, the following shall apply:

Degree (angle)

ADS-B Automatic Dependent Surveillance - Broadcast Advanced Surface Movement Ground Control System

ASTERIX All Purpose STructured EUROCONTROL suRveillance Information

**EX**change

**CAT** Data Category

**CWP** Controller Working Position

**EATM** European Air Traffic Management

**FCU** Flight Control Unit

**FL** Flight Level, unit of altitude (expressed in 100's of feet)

FMS Flight Management System
FPPS Flight Plan Processing System
FRN Field Reference Number
FSPEC Field Specification

**FX** Field Extension Indicator

GNSS Global Navigation Satellite System

ICAO International Civil Aviation Organization

**kt** knot = NM/hour, unit of speed

LEN Length Indicator
LSB Least Significant Bit

MCP Mode Control Panel

NM Nautical Mile, unit of distance (1852 metres)

**PSR** Primary Surveillance Radar

RDE-TF suRveillance Data Exchange Task Force

RE Reserved Expansion Indicator
REP Field Repetition Indicator

s second, unit of time SAC System Area Code

SDPS Surveillance Data Processing System

SIC System Identification Code
SP Special Purpose Indicator
SPI Special Position Identification
SSR Secondary Surveillance Radar

Surveillance Team (EATM) **SURT** 

User Application Profile (see Definitions ) Co-ordinated Universal Time **UAP** 

UTC

**VDL** VHF Data Link

**WGS-84** World Geodetic System 84

#### 4. GENERAL PRINCIPLES

#### 4.1 General

The transmission of System Track Data shall require the transmission of one type of message, i.e. target reports and flight plan data

#### 4.2 Time Management

The time-stamping shall comply with ICAO Annex 5.

#### 4.3 Projection Systems and Geographical Co-ordinates

#### 4.3.1 Measured Position

The *measured* position is transmitted bias-corrected.

#### 4.3.2 Calculated Position

When the exported calculated position is expressed in a 2D Cartesian co-ordinate system, a projection is performed on a plane tangential to the WGS-84 Ellipsoid at the location of the reference point. The Y-axis points to the geographical north at that position. The X-axis is perpendicular to the Y-axis and points to the east. The X, Y co-ordinates are calculated using a suitable projection technique for the final 3D to 2D conversion (e.g. a stereographical projection). It is slant range corrected, the source of altitude being indicated in I062/080 Track Status, Octet 1, bit 6 (MRH). In case this bit indicates "Geometric Altitude more reliable", the source of information for the calculation of the Geometric Altitude is indicated in I062/080 Track Status, Octet 1, bits-5/3 (SRC).

#### 4.4 Mandatory Items

The Encoding Rules are contained in Table 1 in chapter 5.1 and in each Data Item.

#### 4.5 Unused Bits in Data Items

Decoders of ASTERIX data shall never assume and rely on specific settings of spare or unused bits. However in order to improve the readability of binary dumps of ASTERIX records, it is recommended to set all spare bits to zero.

#### 4.6 User Application Profile and Data Blocks

A single User Application Profile (UAP) is defined and shall be used for System Track Data messages.

Data Blocks shall have the following layout.

CAT = 062	LEN	FSPEC	Items of the	FSPEC	Items	of	the
			first record		last re	cord	

where:

- Data Category (CAT) = 062, is a one-octet field indicating that the Data Block contains System Track Data;
- Length Indicator (LEN) is a two-octet field indicating the total length in octets
  of the Data Block, including the CAT and LEN fields;
- FSPEC is the Field Specification.

#### 4.7 Composition of messages

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

When sent, items shall always be transmitted in a Record with the corresponding FSPEC bits set to one.

#### 4.8 Implementation Dependent Data Items

To prevent ambiguities in interpretation, content and encoding of data items is defined as accurately as possible. There are, however, conditions which do not allow such strict definition and where there may be differences in the implementation depending on the system.

Such a data item will be marked as "implementation dependent" in a note. The exact meaning of the data item **shall** then be described in the Interface Control Document (ICD) of the respective system. In such a case the provisions of the ICD will reflect the actual implementation of the data item.

In this specification the following data items are marked as "implementation dependent":

1062/080 (Track Status), Fifth Extension, Bit-5 (SFC)

1062/340 (Measured Information)

#### 5. LAYOUT OF REPORTS

#### 5.1 Standard Data Items

The standardised Data Items which shall be used for the transmission of System Track Data are defined in Table 1 and described in the following pages. The column "Encoding rules" indicates what items are mandatory (M) or optional (O) in a record of ASTERIX Cat 062.

Table 1 - Data Items of Category 062

Data Item Reference Number 1062/010	Description	Resolution N.A.	Encoding Rules M
1062/015	Data Source Identifier	N.A. N.A.	•
	Service Identification		0
1062/040	Track Number	N.A.	M
1062/060	Track Mode 3/A Code	N.A.	0
1062/070	Time Of Track Information	1/128 s	M
1062/080	Track Status	N.A.	M
1062/100	Calculated Track Position (Cartesian)	0.5 m	0
1062/105	Calculated Track Position (WGS-84)	180/2 <sup>25</sup> °	0
1062/110	Mode 5 Data reports & Extended Mode 1 Code	N.A.	0
1062/120	Track Mode 2 Code	N.A.	0
1062/130	Calculated Track Geometric Altitude	6.25 ft	0
1062/135	Calculated Track Barometric Altitude	1/4 FL	0
1062/136	Measured Flight Level	1/4 FL	0
1062/185	Calculated Track Velocity (Cartesian)	0.25 m/s	0
1062/200	Mode Of Movement	N.A.	0
1062/210	Calculated Acceleration (Cartesian)	0.25 m/s <sup>2</sup>	0
1062/220	Calculated Rate Of Climb/Descent	6.25 ft/min	0
1062/245	Target Identification	N.A.	0
1062/270	Target Size & Orientation	Length/Width:1 m Orient.: 360°/128	0
1062/290	System Track Update Ages	N.A.	0
1062/295	Track Data Ages	N.A.	0
1062/300	Vehicle Fleet Identification	N.A.	0
1062/340	Measured Information	N.A.	0
1062/380	Aircraft Derived Data	N.A.	0
1062/390	Flight Plan Related Data	N.A.	0
1062/500	Estimated Accuracies	N.A.	0
1062/510	Composed Track Number	N.A.	0
NOTE: N.A. = Not App	plicable		

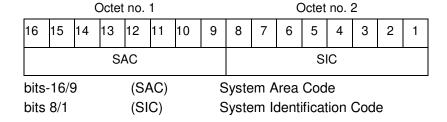
#### 5.2 Description of Standard Data Items

#### 5.2.1 Data Item I062/010, Data Source Identifier

**Definition:** Identification of the system sending the data

Format: Two-octet fixed length Data Item

Structure:



**NOTE** - The up-to-date list of SACs is published on the EUROCONTROL Web Site (http://www.eurocontrol.int/asterix).

#### **Encoding Rule:**

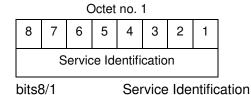
This Item shall be present in every ASTERIX record

#### 5.2.2 Data Item I062/015, Service Identification

**Definition:** Identification of the service provided to one or more users.

**Format:** One-Octet fixed length data item.

Structure:



NOTE - the service identification is allocated by the system

#### **Encoding Rule:**

This Item is optional

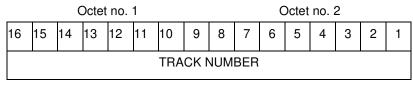
Octet no. 2

#### 5.2.3 Data Item I062/040, Track Number

**Definition:** Identification of a track

Format: Two-Octet fixed length data item

Structure:



bits 16/1

Track Number

#### **Encoding Rule:**

This Item shall be present in every ASTERIX record

#### 5.2.4 Data Item I062/060, Track Mode 3/A Code

**Definition:** Mode-3/A code converted into octal representation.

Octet no. 1

**Format :** Two-octet fixed length Data Item.

Structure:

							000011101.2								
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
٧	G	СН	0	A4	A2	A1	B4	B2	В1	C4	C2	C1	D4	D2	D1
bit 16 (V) = 0 Code validated = 1 Code not validated															
bit 1	bit 15 (G)					= 0 Default									
bit 1	bit 14 (CH)				=	<ul> <li>= 1 Garbled Code</li> <li>Change in Mode 3/A</li> <li>= 0 No Change</li> <li>= 1 Mode 3/A has changed</li> </ul>						ed			
bit-13						S	Spare bits set to 0								
bits-12/1						٨	Mode-3/A reply in octal								

representation

#### **Encoding Rule:**

This Item is optional

#### 5.2.5 Data Item 1062/070, Time Of Track Information

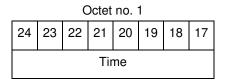
**Definition:** Absolute time stamping of the information provided in the track

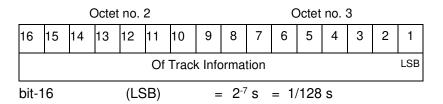
message, in the form of elapsed time since last midnight, expressed  $% \left( 1\right) =\left( 1\right) \left( 1\right)$ 

as UTC.

**Format :** Three-Octet fixed length data item.

Structure:





#### **NOTES**

- 1. This is the time of the track state vector.
- 2. The time is reset to zero at every midnight.

#### **Encoding Rule:**

This Item shall be present in every ASTERIX record

#### 5.2.6 Data Item I062/080, Track Status

**Definition:** Status of a track.

Format: Variable length data item comprising a first part of one Octet,

followed by 1-Octet extents as necessary.

#### Structure:

		Oct	et no	. 1						
8	7	6	6 5 4 3			2	1			
MON	SPI	MRH		SRC		CNF	FX			
bit 8			(MC	N)		=	0	Multisensor track Monosensor track		
bit 7			(SP	l)		=	0	default value		
					=	SPI present in the last report received from sensor capable of decoding this data				
bit 6			(MR	H)		M	ost	Reliable Height		
						=	0	Barometric altitude (Mode C) more reliable Geometric altitude		
								more reliable		
bits 5/	/3		(SR	C)		al <sup>-</sup> = = = =	000 000 000 010 010	I GNSS ) 3D radar I triangulation		
						=	100 101 110 111	I speed look-up table O default height		
bit 2			(CN	F) =		=	0 1	Confirmed track Tentative track		
bit 1			(FX)	=		=	0 1	end of data item extension into first extent		

#### **Encoding Rule:**

This Item shall be present in every ASTERIX record.

**NOTE -** I 062/080 (SRC) may be sent whether data item I062/130 is present or not.

- **NOTE -** If I062/080 (MRH) indicates "Barometric altitude (Mode C) more reliable", and a calculated altitude is transmitted, it shall be transmitted using data item I062/135 "Calculated Track Barometric Altitude".
- NOTE If I062/080 (MRH) indicates "Geometric altitude more reliable", and a calculated altitude is transmitted, it shall be transmitted using data item I062/130 "Calculated Track Geometric Altitude". In this case the source for I062/130 is indicated by I062/080 (SRC).
- **NOTE -** Data Items I062/130, I062/135, and I062/136 may be transmitted in parallel whenever the respective information is available. This is independent from the value transmitted on I062/080 (MRH).

#### **Structure of First Extent:**

		C	Octet	no.	1					
8	7	6	5	4	3	2	1			
SIM	TSE	TSB	FPC	AFF	STP	KOS	FX			
bit-8	3		(S	IM)		=	0	Actual track		
						=	1	Simulated track		
bit-7	7		(T	SE)		=	0	default value		
						=	1	last message transmitted to the user for the track		
bit-6	6		(T	SB)		=	0	default value		
						=	1	first message transmitted to the user for the track		
bit-5	oit-5 (FPC) =			=	0	Not flight-plan correlated				
						=	1	Flight plan correlated		
bit-4	t-4 (AFF)					=	0	default value		
					=	1	ADS-B data inconsistent with other surveillance information			
bit-3	}		(S	TP)		=	0	default value		
		, ,			=	1	Slave Track Promotion			
bit-2	<u> </u>		(K	(OS)	)	=	0	Complementary service used		
						=	1	Background service used		
bit-1			(F	(X) =	•	=	0	End of data item		
						=	1	Extension into next extent		

#### Structure of Second Extent:

		(	Octet	no.	1					
8	7	6	5	4	3	2	1			
AMA	MI	D4	ME	MI	М	D5	FX			
bit 8		(	(AMA	,	= 0 = 1		ama trac	k not resulting from algamation process k resulting from amalgamation cess		
bits	7/6	(	(MD4	,	= 1	0 1 0 1	Frie Unk	Mode 4 interrogation ndly target nown target <sup>-</sup> eply		
bit 5		(	(ME)		= 0 = 1		Milit repo	ault value ary Emergency present in the last ort received from a sensor able of decoding this data		
bit 4		(	(MI)		= 0 = 1		Milit	ault value ary Identification present in the last ort received from a sensor capable ecoding this data		
bits	3/2	(	(MD	,	= 0 = 0 = 1 = 1	1	No Mode 5 interrogation Friendly target Unknown target No reply			
bit 1		(	(FX)		= 0 = 1			of data item ension into next extent		

#### **Structure of Third Extent:**

		(	Octet	no.	1			
8	7	6	5	4	3	2	1	
CST	PSR	SSR	MDS	ADS	SUC	AAC	FX	
bit-8	3	(	CST	<u> </u>	= 0 = 1	A h	ighe	ult value of the last received track update is or than system dependent hold (coasting)
bit-	7	(	PSF	•	= 0 = 1	u	efau ge d pdat	ult value of the last received PSR track te is higher than system andent threshold
bit-6	6	(	SSF	•	= 0 = 1	Δ u	ge o	ult value of the last received SSR track te is higher than system andent threshold
bit-	5	(	MDS	,	= 0 = 1	A u	ge o	ult value of the last received Mode S track te is higher than system andent threshold
bit-4	4	(	ADS	,	= 0 = 1	<b>A</b> u	ge o	ult value of the last received ADS-B track te is higher than system ndent threshold
bit-	3	(	SUC	,	= 0 = 1	S	pec e de	ult value ial Used Code (Mode A codes to fined in the system to mark a with special interest)
bit-2	2	(	AAC	•	= 0 = 1	A d	ssig iscre	ult value ned Mode A Code Conflict (same ete Mode A Code assigned to er track)
bit-	1	(	FX)		= 0 = 1			of data item sion into next extent

#### **NOTES**

- 1. Track type and coasting can also be derived from I062/290 System Track Update Ages
- 2. If the system supports the technology, default value (0) means that the technology was used to produce the report
- 3. If the system does not support the technology, default value is meaningless.

#### **Structure of Fourth Extent:**

	Octet i	าด. 1						
8 7	6 5	4 3	2 1					
SDS	EMS	PFTF	PET FPLT FX					
bits-8/7	(SDS)	= 00 = 01 = 10	Combir Co-ope	erative only poperative only				
bits-6/4	(EMS)	= 0 = 1 = 2 = 3 = 4 = 5	No eme Genera Lifegua Minimu No com Unlawfe "Downe	nmunications ul interference ed" Aircraft				
bit-3	(PFT)	= 0 = 1	No indi Potenti	cation al False Track Indication				
bit-2	(FPLT)	) = 0 = 1	Default Track o	value created / updated with FPL data				
bit-1	(FX) =	= 0 = 1		data item ion into next extent				

- NOTE Bits 6/4 (EMS): other than subfield #11 of data item I062/380, these bits allow the SDPS to set the emergency indication as derived from other sources than ADS-B (e.g. based on the Mode 3/A code).
- NOTE Bit 3 (PFT): with this flag an SDPS can indicate that internal processing points to the track being potentially false. Details on the internal processing are system dependent. In order to improve security on targets provided by ADS-B numerous validation functions have been developed in the ADS-B ground domain. If any of these validation functions show a potentially spoofed target, the PFT bit will be used to convey this information to the CWP. If and how this information is processed and displayed on the CWP is a local matter and not subject to the category 062 specification.

**NOTE -** Bit 2 (FPLT): this bit - if set - indicates that the information contained in the target report has been updated by flight plan related data because no surveillance data was available for the target, or was created based on flight plan related data in areas with no surveillance.

#### **Structure of Fifth Extent:**

			Octet	no. 1				
8	7	6	5	4	3	2	1	
DUPT	DUPF	DUPM	SFC	IDD	IEC	0	FX	
bit-8		(DU	•	= 0 = 1		ault v licate		le 3/A Code
bit-7		(DU	,	= 0 = 1		ault v licate		nt Plan
bit-6		(DU	•	= 0 = 1	Dup	ault v olicate elatic	Fligh	nt Plan due to manual
bit-5		(SF	,	= 0 = 1			alue arget	
bit-4		(IDE	,	= 0 = 1			ation e Fligh	nt-ID
bit-3		(IEC	,	= 0 = 1				mergency Code
bit-2		Spa	re bit	, set t	o 0			
bit 1		(FX)		= 0 = 1				em next extent

#### **NOTES**

- 1. Bit 8 (DUPT) is set to 1 if the correlation between the target report and a flight plan is not possible because the Mode 3/A code stated in the flight plan exists more than once in the surveillance data.
- 2. Bit 7 (DUPF) is set to 1 when for a specific surveillance target more than one flight plan exists which makes correlation impossible.
- 3. Bit 6 (DUPM) is set to 1 if a target was correlated manually but also a regular flight plan exists.
- 4. All tracks for which bits 8, 7 or 6 are set to 1 are marked on the CWP.
- Bit 5 (SFC) is set to 1 when the SDPS considers the target to be on the Surface (the actual meaning is implementation dependent – please refer to chapter 4.8

above).

- 6. Bit 4 (IDD) is set to 1 when the Flight ID is present more than once in the surveillance area.
- 7. Bit 3 (IEC) is set to 1 when the comparison between various sources has revealed an inconsistency in the information contained about emergency codes.

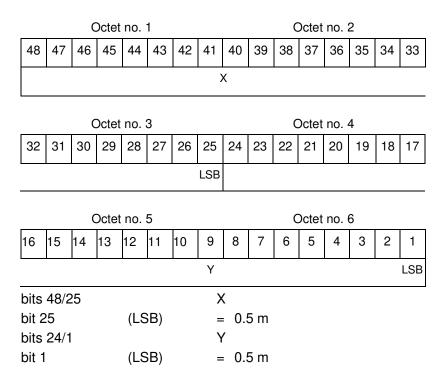
#### 5.2.7 Data Item I062/100, Calculated Track Position. (Cartesian)

**Definition:** Calculated position in Cartesian co-ordinates with a resolution of

0.5m, in two's complement form.

**Format :** Six-octet fixed length Data Item.

Structure:



#### **Encoding Rule:**

This Item is optional

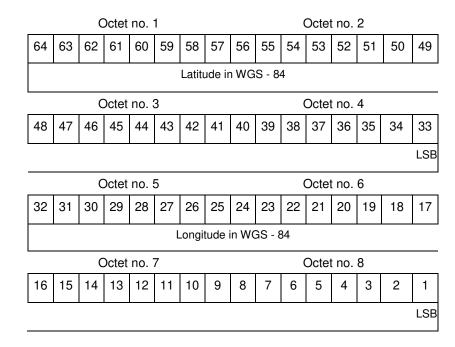
#### 5.2.8 Data Item 1062/105, Calculated Position In WGS-84 Co-ordinates

**Definition:** Calculated Position in WGS-84 Co-ordinates with a resolution of

180/2<sup>25</sup>. degrees

Format: Eight-octet fixed length Data Item

Structure:



bits-64/33	(Latitude) (LSB)	In WGS.84 in two's complement. Range -90 ≤ latitude ≤ 90 deg. = 180/2 <sup>25</sup> degrees
bits-32/1	(Longitude)	In WGS.84 in two's complement. Range -180 ≤ longitude < 180 deg.
	(LSB)	$= 180/2^{25} \text{ degrees}$

**NOTE** - The LSB provides a resolution at least better than 0.6m.

#### **Encoding Rule:**

This Item is optional

#### 5.2.9 Data Item I062/110, Mode 5 Data reports & Extended Mode 1 Code

**Definition:** Mode 5 Data reports & Extended Mode 1 Code

Format: Compound Data Item, comprising a primary subfield of one octet,

followed by the indicated subfields.

#### **Structure of Primary Subfield:**

Octet no. 1

8	7	6	5	4	3	2	1
SUM	PMN	POS	GA	EM1	TOS	XP	FX

bit-8	(SUM)	Subfield #1: Mode 5 Summary = 0 Absence of Subfield #1 = 1 Presence of Subfield #1
bit-7	(PMN)	Subfield #2: Mode 5 PIN/ National Origin/Mission Code  = 0 Absence of Subfield # 2  = 1 Presence of Subfield #2
bit-6	(POS)	Subfield #3: Mode 5 Reported Position = 0 Absence of Subfield #3 = 1 Presence of Subfield #3
bit-5	(GA)	Subfield #4: Mode 5 GNSS-derived Altitude = 0 Absence of Subfield #4 = 1 Presence of Subfield #4
bit-4	(EM1)	Subfield #5: Extended Mode 1 Code in Octal Representation = 0 Absence of Subfield #5 = 1 Presence of Subfield #5
bit-3	(TOS)	Subfield #6: Time Offset for POS and GA.  = 0 Absence of Subfield #6  = 1 Presence of Subfield #6
bit-2	(XP)	Subfield #: X Pulse Presence. = 0 Absence of Subfield #7 = 1 Presence of Subfield #7

bit-1 (FX) Extension Indicator = 0 no extension = 1 extension

#### **Encoding Rule:**

This Item is optional

# Structure of Subfield #1: Mode 5 Summary:

		(	Octet	no. 1				
8	7	6	5	4	3	2	1	
M5	ID	DA	M1	M2	М3	МС	Х	
bit-8			(	(M5)				de 5 interrogation i interrogation
bit-7			(	ID)				nenticated Mode 5 ID reply ticated Mode 5 ID reply
bit-6			(	DA)		or I Au Re	Report	nenticated Mode 5 Data reply ort ticated Mode 5 Data reply or (i.e any valid Mode 5 reply ner than ID)
bit-5			(	(M1)		Mc	ode 5	code not present or not from reply code from Mode 5 reply.
bit-4			(	(M2)		Mo	ode 5	code not present or not from reply code from Mode 5 reply.
bit-3			(	(M3)		Mc	ode 5	s code not present or not from reply scode from Mode 5 reply.
bit-2			(	MC)		fro	m M	C altitude not present or not ode 5 reply C altitude from Mode 5 reply
bit-1			(	(X)	Re = (	port X- <sub>I</sub> au red	pulse then ceive	e set to zero or no ticated Data reply or Report d. e set to one.

### **NOTES**

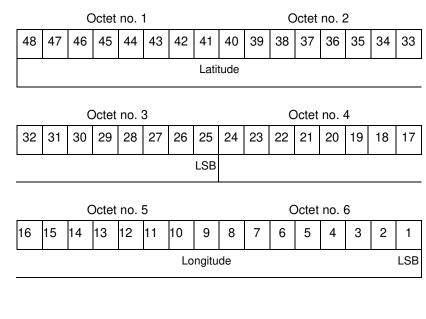
 The flags M2, M3, MC refer to the contents of data items I062/120, I062/060 and I062/135 respectively. The flag M1 refers to the contents of the Subfield

- #5 (Extended Mode 1 Code in Octal Representation).
- 2. If an authenticated Mode 5 reply is received with the Emergency bit set, then the Military Emergency bit (ME) in Data Item I062/080, Track Status, shall be set
- If an authenticated Mode 5 reply is received with the Identification of Position bit set, then the Special Position Identification bit (SPI) in Data Item I062/080, Track Status, shall be set.

# Structure of Subfield #2: Mode 5 PIN /National Origin/ Mission Code

		C	ctet	no.	1			Octet no. 2								
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	
0	0							PIN								
		0	ctet	no.	3					С	ctet	no.	4			
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
0	0	0			NAT			0	0			М	IS			
	-32/: -30/			, ,	pare IN)	<del>:</del> )		spare bits set to 0 PIN Code								
bits	-16/	14		(s <sub> </sub>	pare	e)		spare bits set to 0								
bits	bits-13/9							National Origin								
bits	bits-8/7 (spare							spa	re b	its s	et to	0 0				
bits-6/1 (M					IIS)			Mis	sion	Co	de					

# Structure of Subfield #3: Mode 5 Reported Position



bits-48/25	(Latitude) (LSB)	In WGS.84 in two's complement. Range -90 ≤ latitude ≤ 90 deg. = 180/2 <sup>23</sup> degrees
bits-24/1	(Longitude)	In WGS.84 in two's complement. Range -180 ≤ longitude < 180 deg.
	(LSB)	= 180/2 <sup>23</sup> degrees

NOTE - The resolution implied by the LSB is better than the resolution with which Mode 5 position reports are transmitted from aircraft transponders using currently defined formats.

# Structure of Subfield #4: Mode 5 GNSS-derived Altitude

		(	Octet	no.	1	Octet no. 2									
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
0	RES							GA							LSB
bit-1	16		(sp	are)		spa	are l	oit se	et to	0					
bit-1	5		(RE	ES)		Alt =0	itude GA	tion e (G, repo repo	A) is orted	repo	orted 00 f	d. t inc	rem	ents	rived ,
bits	-14/1	I	(GA	A)		ex		deri sed d.					_	-	ļ

### **NOTES**

- 1. GA is coded as a 14-bit two's complement binary number with an LSB of 25 ft. irrespective of the setting of RES.
- 2. The minimum value of GA that can be reported is -1000 ft.

# Structure of Subfield #5: Extended Mode 1 Code in Octal Representation

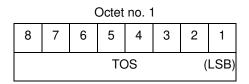
			Oct	et 1				Octet 2							
16	15	14	13	12	2 11 10 9 8 7 6 5 4 3										1
0	0	0	0				E:	xtend	ed M	lode	1 Coc	de			
				A4	A2	A1	В4	B2	B1	C4	C2	C1	D4	D2	D1

bit 16/13 Spare bits set to 0

bits-12/1 (EM1) Extended Mode 1 Code in octal representation

NOTE - If Subfield #1 is present, the M1 bit in Subfield #1 indicates whether the Extended Mode 1 Code is from a Mode 5 reply or a Mode 1 reply. If Subfield #1 is not present, the Extended Mode 1 Code is from a Mode 1 reply.

### Structure of Subfield #6: Time Offset for POS and GA



bits-8/1 (TOS)

Time Offset coded as a twos complement number with an LSB of 1/128 s. The time at which the Mode 5 Reported Position (Subfield #3) and Mode 5 GNSS-derived Altitude (Subfield #4) are valid is given by Time of Day (I048/140) plus Time Offset.

### Note:

TOS shall be assumed to be zero if Subfield #6 is not present.

# Structure of Subfield #7: X Pulse Presence

(	U	C	te	t	n	О		•
	$\overline{}$	•	·			v	•	

8	7	6	5	4	3	2	1
0	0	0	X5	XC	Х3	X2	X1

bits-8/6 spare bits set to zero

DI13-0/0	spare bits set to ze	10
bit-5	(X5)	X-pulse from Mode 5 Data reply or Report.
		<ul> <li>= 0 X-pulse set to zero or no authenticated Data reply or Report received.</li> </ul>
		= 1 X-pulse set to one (present).
bit-4	(XC)	X-pulse from Mode C reply
		= 0 X-pulse set to zero or no Mode C reply
		= 1 X-pulse set to one (present)
bit-3	(X3)	X-pulse from Mode 3/A reply
		= 0 X-pulse set to zero or no Mode 3/A reply
		= 1 X-pulse set to one (present)
bit-2	(X2)	X-pulse from Mode 2 reply
		= 0 X-pulse set to zero or no Mode 2 reply
		= 1 X-pulse set to one (present)
bit-1	(X1)	X-pulse from Mode 1 reply
		= 0 X-pulse set to zero or no Mode 1 reply
		= 1 X-pulse set to one (present)

# 5.2.10 Data Item 1062/120, Track Mode 2 Code

**Definition :** Mode 2 code associated to the track **Format :** Two-Octet fixed length data item.

Structure:

			(	Octet	no.	1			Octet no. 2								
16 15 14 13 12 11 10 9									8	7 6 5 4 3 2 1							
	0	0	0	0	A4	A2	A1	B4	B2	B1	C4	C2	C1	D4	D2	D1	

bits-16/13 Spare bits set to zero

bits-12/1 Mode-2 code in octal representation

# **Encoding Rule:**

### 5.2.11 Data Item 1062/130, Calculated Track Geometric Altitude

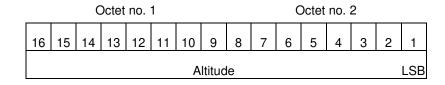
**Definition:** Vertical distance between the target and the projection of its position

on the earth's ellipsoid, as defined by WGS84, in two's complement

form.

**Format :** Two-Octet fixed length data item.

Structure:



bits- 16/1 Altitude
(LSB) = 6.25 ft
Vmin = -1500 ft
Vmax = 150000 ft

### **NOTES**

- 1. LSB is required to be less than 10 ft by ICAO
- 2. The source of altitude is identified in bits (SRC) of item I062/080 Track Status **Encoding Rule :**

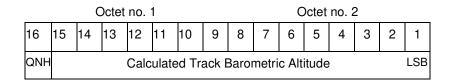
# 5.2.12 Data Item 1062/135, Calculated Track Barometric Altitude

**Definition:** Calculated Barometric Altitude of the track, in two's complement

form.

**Format :** Two-Octet fixed length data item.

Structure:



bit-16 (QNH) = 0 No QNH correction applied = 1 QNH correction applied

bits-15/1 Calculated Track Barometric Altitude

(LSB) = 1/4 FL = 25 ftVmin = -15 FL

Vmax = 1500 FL

**NOTE -** ICAO specifies a range between –10 FL and 1267 FL for Mode C

### **Encoding Rule:**

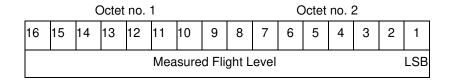
### 5.2.13 Data Item I062/136, Measured Flight Level

**Definition:** Last valid and credible flight level used to update the track, in two's

complement form.

**Structure:** Two-Octet fixed length data item.

Structure:



bits- 16/1 Measured Flight Level (LSB) = 1/4 FL

Vmin = -15 FLVmax = 1500 FL

#### **NOTES**

- 1. The criteria to determine the credibility of the flight level are Tracker dependent.
- 2. Credible means: within reasonable range of change with respect to the previous detection.
- 3. ICAO specifies a range between -10 FL and 1267 FL for Mode C
- 4. This item includes the barometric altitude received from ADS-B

## **Encoding Rule:**

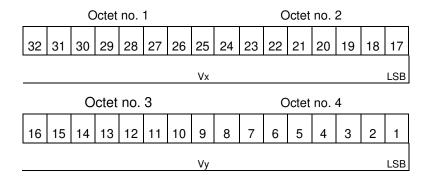
## 5.2.14 Data Item 1062/185, Calculated Track Velocity (Cartesian)

**Definition**: Calculated track velocity expressed in Cartesian co-ordinates,

in two's complement form.

**Format:** Four-octet fixed length Data Item.

Structure:



bits-32/17 Vx

(LSB) = 0.25 m/s

-8192m/s  $\leq Vx \leq 8191.75$ m/s

bits-16/1 Vy

(LSB) = 0.25 m/s

 $-8192 \text{m/s} \le \text{Vy} \le 8191.75 \text{m/s}$ 

**NOTE** - The y-axis points to the Geographical North at the location of the target.

### **Encoding Rule:**

# 5.2.15 Data Item 1062/200, Mode of Movement

**Definition:** Calculated Mode of Movement of a target.

**Format:** One-Octet fixed length data item.

Structure:

Octet no. 1											
8	7	6	5	4	3	2	1				
TRANS		LO	NG	VE	RT	ADF	0				

bits 8/7	(TRANS)	Transversal Acceleration = 00 Constant Course = 01 Right Turn = 10 Left Turn = 11 Undetermined
bits 6/5	(LONG)	Longitudinal Acceleration  = 00 Constant Groundspeed  = 01 Increasing Groundspeed  = 10 Decreasing Groundspeed  = 11 Undetermined
bits 4/3	(VERT)	Vertical Rate = 00 Level = 01 Climb = 10 Descent = 11 Undetermined
bit 2	(ADF)	Altitude Discrepancy Flag = 0 No altitude discrepancy
		= 1 Altitude discrepancy
bit 1		Spare bit set to zero

**NOTE:** The ADF, if set, indicates that a difference has been detected in the altitude information derived from radar as compared to other technologies (such as ADS-B).

### **Encoding Rule:**

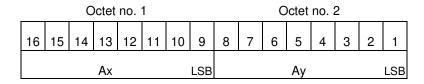
# 5.2.16 Data Item 1062/210, Calculated Acceleration (Cartesian)

**Definition:** Calculated Acceleration of the target expressed in Cartesian co-

ordinates, in two's complement form.

**Format:** Two-octet fixed length Data Item.

Structure:



bits-16/9 Ax

 $(LSB) = 0.25 \text{ m/s}^2$ 

bits-8/1 Ay

 $(LSB) = 0.25 \text{ m/s}^2$ 

### **NOTES**

- 1. The y-axis points to the Geographical North at the location of the target.
- 2. Maximum value means maximum value or above.

# **Encoding Rule:**

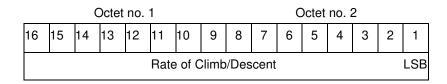
# 5.2.17 Data Item I062/220, Calculated Rate Of Climb/Descent

**Definition:** Calculated rate of Climb/Descent of an aircraft in two's complement

form.

**Format:** Two-Octet fixed length data item.

Structure:



bit 16/1 Rate of Climb/Descent (LSB) = 6.25 feet/minute

**NOTE** - A positive value indicates a climb, whereas a negative value indicates a descent.

# **Encoding Rule:**

# 5.2.18 Data Item I062/245, Target Identification

**Definition**: Target (aircraft or vehicle) identification in 8 characters.

**Format**: Seven-octet fixed length Data Item.

Structure:

	Octet no. 1												
56	55	54	53	52	51	50	49						
STI		0	0	0	0	0	0						

	Octet no. 2									Octet no. 3					
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
	Character 1							Cha	racte	er 2		(	Chara	acter	· 3

	Octet no. 4									Octet no. 5					
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
		Character 4							(	Chai	acte	er 5			

	Octet no. 6									Octet no. 7					
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	Char	racte	r 6	Character			er 7				Cha	racte	er 8		

bits-56/55	(STI)	= 00	Callsign or registration downlinked from target
		= 01	Callsign not downlinked from target
		= 10	Registration not downlinked from target
		= 11	Invalid

bits-54/49 Spare bits set to zero

bits-48/1 Characters 1-8 (coded on 6 bits each) defining

target identification

### **NOTES**

- 1. For coding, see section 3.1.2.9 of [Ref.3]
- 2. As the Callsign of the target can already be transmitted (in I062/380 Subfield #2 if downlinked from the aircraft or in I062/390 Subfield #2 if the target is correlated

to a flight plan), and in order to avoid confusion at end user's side, **this item** SHALL not be used.

# **Encoding Rule:**

### 5.2.19 Data Item I062/270, Target Size & Orientation

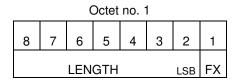
**Definition**: Target size defined as length and width of the detected target,

and orientation.

**Format**: Variable length Data Item comprising a first part of one octet,

followed by one-octet extents as necessary.

Structure of First Part:



bit-2 (LSB) = 1 m

bit-1 (FX) = 0 End of Data Item

= 1 Extension into first extent

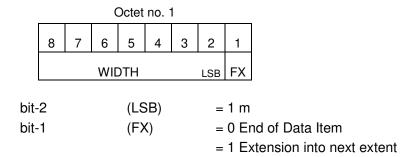
# Structure of First Extent:

bit-2 (LSB) =  $360^{\circ} / 128 = approx. 2.81^{\circ}$ bit-1 (FX) = 0 End of Data Item

= 1 Extension into next extent

# 1062/270, Target Size & Orientation

### Structure of Second Extent:



# **NOTES**

- 1. The orientation gives the direction which the target nose is pointing to, relative to the Geographical North.
- 2. When the length only is sent, the largest dimension is provided.

# **Encoding Rule:**

#### 5.2.20 Data Item I062/290, System Track Update Ages

Definition: Ages of the last plot/local track/target report update for each sensor

type.

16 | 15

Compound Data Item, comprising a primary subfield of up to two Format:

octets, followed by the indicated subfields.

12

## Structure of **Primary Subfield:**

Octet no. 1 13

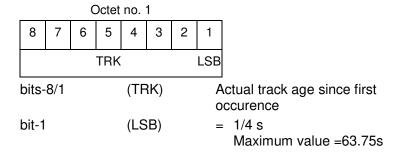
TRKPSRSSRMDSADS ES VDLFX Octet no. 2

UATLOP MLT 0 0 0 FX	
bit-16 (TRK) Subfield #1: Track age	
= 0 Absence of Subfield #1 = 1 Presence of Subfield #1	
bit-15 (PSR) Subfield #2: PSR age	
= 0 Absence of Subfield #2	
= 1 Presence of Subfield #2	
bit-14 (SSR) Subfield #3: SSR age = 0 Absence of Subfield #3	
= 1 Presence of Subfield #3	
bit-13 (MDS) Subfield #4: Mode S age	
= 0 Absence of Subfield #4 = 1 Presence of Subfield #4	
bit-12 (ADS) Subfield #5: ADS-C age	
= 0 Absence of Subfield #5	
= 1 Presence of Subfield #5	
bit-11 (ES) Subfield #6: ADS-B Extended Squitter a = 0 Absence of Subfield #6	.ge
= 1 Presence of Subfield #6	
bit-10 (VDL) Subfield #7: ADS-B VDL Mode 4 age	
= 0 Absence of Subfield #7 = 1 Presence of Subfield #7	
bit-9 FX Extension indicator	
= 0 no extension = 1 extension	
= 1 extension bit-8 (UAT) Subfield #8: ADS-B UAT age	
= 0 Absence of Subfield #8	

= 1 Presence of Subfield #8

bit-7	(LOP)	Subfield #9: Loop age
		= 0 Absence of Subfield #9
		= 1 Presence of Subfield #9
bit-6	(MLT)	Subfield #10: Multilateration age
		= 0 Absence of Subfield #10
		= 1 Presence of Subfield #10
bits-5/2	spare bits	set to zero
bit-1	FX	Extension indicator
		= 0 no extension
		= 1 extension

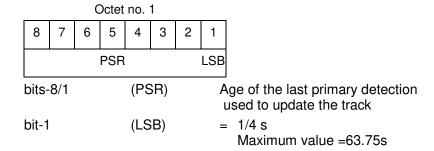
# Structure of Subfield # 1: Track Age



# Item I062/290, System Track Update Ages

# Structure of Subfield # 2:

### **PSR Age**



# Structure of Subfield # 3: SSR Age

# Octet no. 1 8 7 6 5 4 3 2 1 SSR LSB

bits-8/1 (SSR) Age of the last secondary detection used to update the track bit-1 (LSB) = 1/4 s
Maximum value = 63.75s

# Item I062/290, System Track Update Ages

# Structure of Subfield # 4:

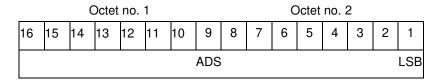
### Mode S Age

		C	Octet	no.	1		
8	7	6	5	4	3	2	1
MDS							LSB

bits-8/1 (MDS) Age of the last Mode S detection used to update the track
bit-1 (LSB) = 1/4 s
Maximum value = 63.75s

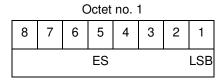
# Structure of Subfield # 5:

# ADS-C Age



bits-8/1 (ADS) Age of the last ADS-C report used to update the track
bit-1 (LSB) = 1/4 s
Max. value = 16383.75s
(> 4 hours)

# Item I062/290, System Track Update Ages Structure of Subfield # 6: ES Age



bits-8/1	(ES)	Age of the last 1090 Extended Squitter ADS-B report used to update the track
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

# Structure of Subfield # 7: VDL Age

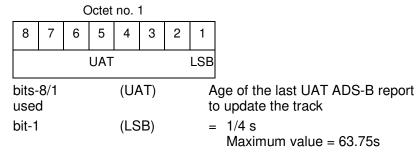


bits-8/1 (VDL)
Age of the last VDL Mode 4 ADS-B report used to update the track
bit-1 (LSB)
= 1/4 s
Maximum value = 63.75s

### Item I062/290, System Track Update Ages

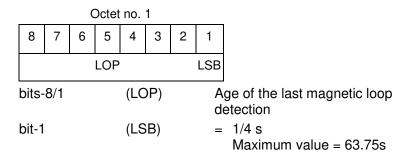
# Structure of Subfield # 8:

## **UAT Age**

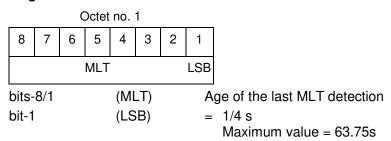


## Structure of Subfield # 9:

### Loop Age



# Structure of Subfield # 10: Multilateration Age



### **NOTES**

- 1. Except for Track Age, the ages are counted from Data Item I062/070, Time Of Track Information, using the following formula:
  - Age = Time of track information Time of last detection used to update the track
- 2. The time of last detection is derived from monosensor category time of day
- 3. If the data has never been received, then the corresponding subfield is not sent.
- 4. Maximum value means maximum value or above.

# **Encoding Rule:**

This Item is optional

# 5.2.21 Data Item I062/295, Track Data Ages

**Definition:** Ages of the data provided.

Format: Compound Data Item, comprising a primary subfield of up to five

octets, followed by the indicated subfields.

# Structure of Primary Subfield:

iciu.								
		C	Octet	no.	1			
40	39	38	37	36	35	34	33	
MFL	MD1	MD2	MDA	MD4	MD5	MHG	FX	
		C	Octet	no.	2			
32	31	30	29	28	27	26	25	
IAS	TAS	SAL	FSS	TID	СОМ	SAB	FX	
Octet no. 3								
24	23	22	21	20	19	18	17	
ACS	BVR	GVR	RAN	TAR	TAN	GSP	FX	
		C	Octet	no.	4			
16	15	14	13	12	11	10	9	
VUN	MET	EMC	POS	GAL	PUN	МВ	FX	
	Octet no. 5							
8	7	6	5	4	3	2	1	
IAR	MAC	BPS	0	0	0	0	FX	

bit-40	(MFL)	Subfield #1: Measured Flight Level age = 0 Absence of Subfield #1 = 1 Presence of Subfield #1
bit-39	(MD1)	Subfield #2: Mode 1 age = 0 Absence of Subfield #2 = 1 Presence of Subfield #2
bit-38	(MD2)	Subfield #3: Mode 2 age = 0 Absence of Subfield #3 = 1 Presence of Subfield #3

bit-37	(MDA)	Subfield #4: Mode 3/A age = 0 Absence of Subfield #4 = 1 Presence of Subfield #4
bit-36	(MD4)	Subfield #5: Mode 4 age = 0 Absence of Subfield #5 = 1 Presence of Subfield #5
bit-35	(MD5)	Subfield #6: Mode 5 age = 0 Absence of Subfield #6 = 1 Presence of Subfield #6
bit-34	(MHG)	Subfield #7: Magnetic Heading age = 0 Absence of Subfield #7 = 1 Presence of Subfield #7
bit-33	FX	Extension indicator = 0 no extension = 1 extension
bit-32	(IAS)	Subfield #8: Indicated Airspeed/Mach Nb age = 0 Absence of Subfield #8 = 1 Presence of Subfield #8
bit-31	(TAS)	Subfield #9: True Airspeed age = 0 Absence of Subfield #9 = 1 Presence of Subfield #9
bit-30	(SAL)	Subfield #10: Selected Altitude age = 0 Absence of Subfield #10 = 1 Presence of Subfield #10
bit-29	(FSS)	Subfield #11: Final State Selected Altitude age = 0 Absence of Subfield #11 = 1 Presence of Subfield #11
bit-28	(TID)	Subfield #12: Trajectory Intent Data age = 0 Absence of Subfield #12 = 1 Presence of Subfield #12
bit-27	(COM)	Subfield #13: Communications / ACAS Capability and Flight Status age = 0 Absence of Subfield #13 = 1 Presence of Subfield #13
bit-26	(SAB)	Subfield #14: Status Reported by ADS-B age = 0 Absence of Subfield #14 = 1 Presence of Subfield #14
bit-25	FX	Extension indicator = 0 no extension = 1 extension
bit-24	(ACS)	Subfield #15: ACAS Resolution Advisory Report age = 0 Absence of Subfield #15 = 1 Presence of Subfield #15

bit-23	(BVR)	Subfield #16: Barometric Vertical Rate age = 0 Absence of Subfield #16 = 1 Presence of Subfield #16
bit-22	(GVR)	Subfield #17: Geometric Vertical Rate age = 0 Absence of Subfield #17 = 1 Presence of Subfield #17
bit-21	(RAN)	Subfield #18: Roll Angle age = 0 Absence of Subfield #18 = 1 Presence of Subfield #18
bit-20	(TAR)	Subfield #19: Track Angle Rate age = 0 Absence of Subfield #19 = 1 Presence of Subfield #19
bit-19	(TAN)	Subfield #20: Track Angle age = 0 Absence of Subfield #20 = 1 Presence of Subfield #20
bit-18	(GSP)	Subfield #21: Ground Speed age = 0 Absence of Subfield #21 = 1 Presence of Subfield #21
bit-17	FX	Extension indicator = 0 no extension = 1 extension
bit-16	(VUN)	Subfield #22: Velocity Uncertainty age = 0 Absence of Subfield #22 = 1 Presence of Subfield #22
bit-15	(MET)	Subfield #23: Meteorological Data age = 0 Absence of Subfield #23 = 1 Presence of Subfield #23
bit-14	(EMC)	Subfield #24: Emitter Category age = 0 Absence of Subfield #24 = 1 Presence of Subfield #24
bit-13	(POS)	Subfield #25: Position Data age = 0 Absence of Subfield #25 = 1 Presence of Subfield #25
bit-12	(GAL)	Subfield #26: Geometric Altitude Data age = 0 Absence of Subfield #26 = 1 Presence of Subfield #26
bit-11	(PUN)	Subfield #27: Position Uncertainty Data age = 0 Absence of Subfield #27 = 1 Presence of Subfield #27
bit-10	(MB)	Subfield #28: Mode S MB Data age = 0 Absence of Subfield #28 = 1 Presence of Subfield #28

bit-9	FX	Extension indicator = 0 no extension = 1 extension
bit-8	(IAR)	Subfield #29: Indicated Airspeed Data age = 0 Absence of Subfield #29 = 1 Presence of Subfield #29
bit-7	(MAC)	Subfield #30: Mach Number Data age = 0 Absence of Subfield #30 = 1 Presence of Subfield #30
bit-6	(BPS)	Subfield #31: Barometric Pressure Setting Data age = 0 Absence of Subfield #31 = 1 Presence of Subfield #31
bit-5/2	spare bits s	et to zero
bit-1	FX	Extension indicator = 0 no extension = 1 extension

NOTE - Despite there are now two subfields (#29 and #30) reporting the ages of, respectively, the Indicated Airspeed track data and the Mach Number track data, the subfield #8 (and so its presence bit, bit-32) is kept free in order to prevent a full incompatibility with previous releases of ASTERIX Cat. 062 already implemented.

### Item I062/295, Track Data Ages

# Structure of Subfield # 1: Measured Flight Level Age

			(	Octet	no.	1			
	8	7	6	5	4	3	2	1	
	MFL L								
	bits-	8/1			(MI	FL)		N fr	age of the last valid and credible Mode C code or barometric altitude rom ADS-B used to update the rack (1062/136)
bit-1					(LS	B)		=	: 1/4 s Maximum value =63.75s

# Structure of Subfield # 2:

# Mode 1 Age

		C	Octet	no.	1			
8	7	6	5	4	3	2	1	
			MD1				LSB	
bits-	8/1			(MI	D1)		Ν	ge of the last valid and credible lode 1 code used to update the ack (1062/110)
bit-1 (LSB)				B)			1/4 s /laximum value = 63.75s	

### Structure of Subfield # 3:

# Mode 2 Age

		C	Octet	no.	1			
8	7	6	5	4	3	2	1	
MD2							LSB	
bits-8/1 (MD2)								Age of the last valid and credit Mode 2 code used to update to rack (1062/120)
bit-1			(LSB)					: 1/4 s //aximum value = 63.75s

# Structure of Subfield # 4:

# Mode 3/A Age

			C	Octet	no.	1						
	8	7	6	5	4	3	2	1				
	MDA LS											
	oits-	8/1			(MI	OA)		Λ	age of the last valid and credible Mode 3/A code used to update the rack (1062/060)			
bit-1					(LS	B)		= 1/4 s Maximum value = 63.75s				

### Structure of Subfield # 5:

# Mode 4 Age

			C	Octet	no.	1			
	8	7	6	5	4	3	2	1	
	MD4							LSB	
k	oits-	8/1			(MI	D4)		Ν	age of the last valid and credible Mode 4 code used to update the rack
bit-1					(LS	B)			: 1/4 s /laximum value = 63.75s

# Structure of Subfield # 6:

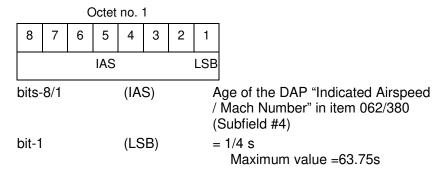
# Mode 5 Age

Octet no. 1 8 7 6 5 4 3 2 1 MD5 LSB (MD5) Age of the last valid and credible bits-8/1 Mode 5 code used to update the track (I062/110) bit-1 (LSB) = 1/4 sMaximum value = 63.75s

# Structure of Subfield # 7 Magnetic Heading Age

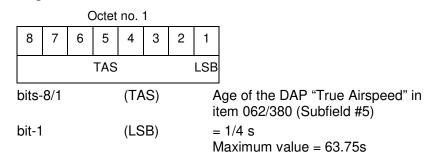
		(	Octet	no.	1			
8	7	6	5	4	3	2	1	
MHG							LSB	
bits-8/1 (MHG)								nge of the DAP "Magnetic Heading" nitem 062/380 (Subfield #3)
bit-1				(LS	8B)		=	: 1/4 s Maximum value =63.75s

# Structure of Subfield # 8 Indicated Airspeed / Mach Nb age

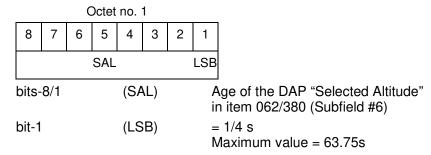


NOTE - Despite there are now two subfields (#29 and #30) reporting the ages of, respectively, the Indicated Airspeed track data and the Mach Number track data, this former subfield is kept free in order to prevent a full incompatibility with previous releases of ASTERIX Cat. 062 already implemented.

# Structure of Subfield # 9: True Airspeed Age



# Structure of Subfield # 10 Selected Altitude Age



# Structure of Subfield # 11: Final State Selected Altitude Age

		C	Octet	no.	1						
8	7	6	5	4	3	2	1				
FSS							LSB				
S							age of the DAP "Final State Selected Altitude" in item 062/380 Subfield #7)				
bit-1				(LS	B)		= 1/4 s Maximum value = 63.75s				

### Structure of Subfield # 12:

# **Trajectory Intent Age**

Octet no. 1 8 7 6 5 4 3 2 1 TID LSB Age of the DAP "Trajectory Intent" in item 062/380 (Subfield #8) bits-8/1 (TID) bit-1 (LSB) Maximum value = 63.75s

# Structure of Subfield # 13: Communication/ACAS

Capability and Flight Status Age

			(	Octet	no.	1			
	8 7 6 5 4 3 2								
	COM LS							LSB	
bits-8/1 (COM)					(CC	OM)		"	Age of the DAP Communication/ACAS Capability and Flight Status" in em 062/380 (Subfield #10)
	bit-1		(LSB)						: 1/4 s //aximum value = 63.75s

# Structure of Subfield # 14: Status Reported by ADS-B Age

Octet no. 1 8 7 6 5 4 3 2 1 LSB SAB Age of the DAP "Status Reported by ADS-B" in item 062/380 (Subfield #11) (SAB) bits-8/1 bit-1 = 1/4 s(LSB) Maximum value = 63.75s

# Structure of Subfield # 15: ACAS Resolution Advisory Report Age

		C	Octet	no.	1			
8	7	6	5	4	3	2	1	
			ACS				LSB	
bits-8/1 (ACS)							P	Age of the DAP "ACAS Resolution Advisory Report" in item 062/380 Subfield #12)
bit-1				(LS	B)			- 1/4 s ∕laximum value = 63.75s

# Structure of Subfield # 16: Barometric Vertical Rate Age

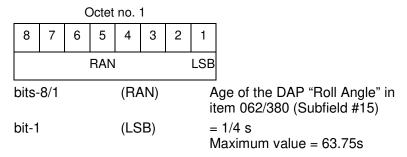
Octet no. 1 8 7 6 5 4 3 2 1 **BVR** LSB Age of the DAP "Barometric bits-8/1 (BVR) Vertical Rate" in item 062/380 (Subfield #13) bit-1 = 1/4 s(LSB) Maximum value = 63.75s

# Structure of Subfield # 17: Geometrical Vertical Rate Age

		C	Octet	no.	1			
8	7	6	5	4	3	2	1	
GVR LS							LSB	
bits-8/1 (GVR)							٧	Age of the DAP "Geometrical Vertical Rate" in item 062/380 Subfield #14)
bit-1			(LSB)					: 1/4 s //aximum value = 63.75s

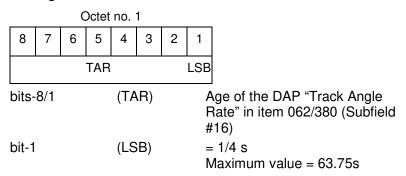
### Structure of Subfield # 18:

#### **Roll Angle Age**



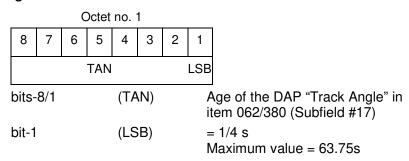
#### Structure of Subfield # 19:

### **Track Angle Rate Age**



# Structure of Subfield # 20:

# **Track Angle Age**

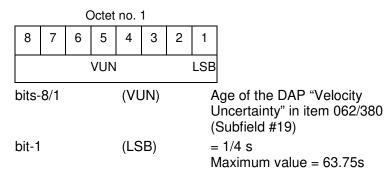


### Structure of Subfield # 21:

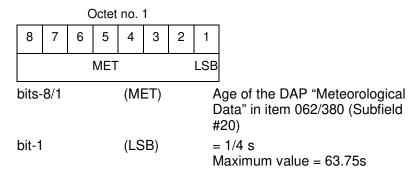
## **Ground Speed Age**

Octet no. 1 7 5 4 2 8 6 3 1 **GSP** LSB bits-8/1 (GSP) Age of the DAP "Ground Speed" in item 062/380 (Subfield #18) bit-1 (LSB) Maximum value = 63.75s

# Structure of Subfield # 22: Velocity Uncertainty Age



# Structure Subfield # 23: Meteorological Data Age



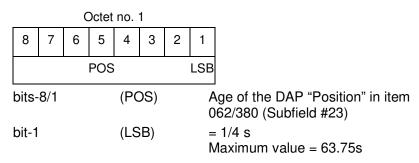
## Structure of Subfield # 24:

#### **Emitter Category Age**

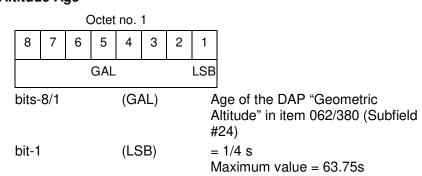
Octet no. 1 7 5 4 3 2 8 6 1 LSB **EMC** Age of the DAP "Emitter Category" bits-8/1 (EMC) in item 062/380 (Subfield #21) bit-1 (LSB) Maximum value = 63.75s

## Structure of Subfield # 25:

#### **Position Age**



# Structure of Subfield # 26: Geometric Altitude Age



# Structure of Subfield # 27: Position Uncertainty Age

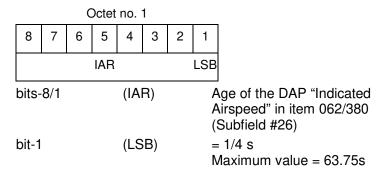
Octet no. 1 8 7 6 5 4 3 2 1 PUN LSB Age of the DAP "Position Uncertainty" in item 062/380 bits-8/1 (PUN) (Subfield #25) bit-1 (LSB) = 1/4 sMaximum value = 63.75s

# Structure of Subfield # 28: Mode S MB Data Age

	•							
		(	Octet	no.	1			
8	7	6	5	4	3	2	1	
			MB	•			LSB	
bits-8/1 (MB)					3)			- Age of the DAP "Mode S MB Data" n item 062/380 (Subfield #22)
bit-1			(LS	(LSB)			= 1/4 s Maximum value = 63.75s	

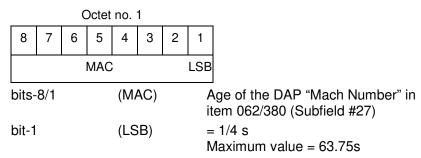
# Structure of Subfield # 29:

# **Indicated Airspeed Data Age**



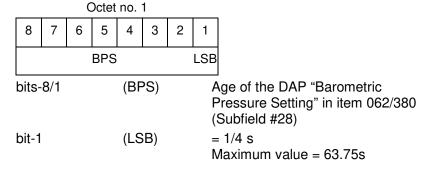
### Structure of Subfield # 30:

#### **Mach Number Data Age**



#### Structure of Subfield # 31:

# **Barometric Pressure Setting Data Age**



**NOTE -** In all the subfields, the age is the time delay since the value was measured

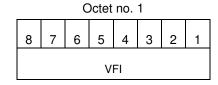
### **Encoding Rule:**

This Item is optional

# 5.2.22 Data Item I062/300, Vehicle Fleet Identification

**Definition**: Vehicle fleet identification number. **Format**: One octet fixed length Data Item.

Structure:



bits 8-1 (VFI) = 0 Unknown

= 1 ATC equipment maintenance

= 2 Airport maintenance

= 3 Fire

= 4 Bird scarer

= 5 Snow plough

= 6 Runway sweeper

= 7 Emergency

= 8 Police

= 9 Bus

= 10 Tug (push/tow)

= 11 Grass cutter

= 12 Fuel

= 13 Baggage

= 14 Catering

= 15 Aircraft maintenance

= 16 Flyco (follow me)

# **Encoding Rule:**

This Item is optional

### 5.2.23 Data Item 1062/340, Measured Information

**Definition:** All measured data related to the last report used to update the track. **Format:** Compound Data Item, comprising a primary subfield of one octet, followed by the indicated subfields.

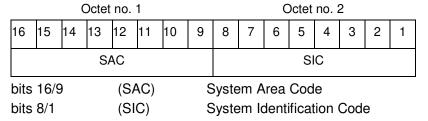
# Structure of Primary Subfield:

				(	Octet	no.	1			_	
		8	7	6	5	4	3	2	1		
		SID	POS	HEI	MDC	MDA	TYP	0	FX		
bit-8	(SID)		=	: 0	Al	oser	ice c	of S	ubfie	ification eld #1 eld #1	
bit-7	(POS	)		Subfield #2: Measured Position = 0 Absence of Subfield #2 = 1 Presence of Subfield #2							
bit-6	(HEI)			Subfield #3: Measured 3-D Height = 0 Absence of Subfield #3 = 1 Presence of Subfield #3							
bit-5	(MDC	;)	=	Subfi 0 1	Αl	oser	ice c	of S	ubfie	ed Mode C code eld #4 eld #4	
bit-4	(MDA	)	=	Subfield #5: Last Measured Mode 3/A cod = 0 Absence of Subfield #5 = 1 Presence of Subfield #5							
bit-3	(TYP)		=	: 0	Al	oser		of Si	ubfie	eld #6 eld #6	
bit-2 bit-1	(spare		xter	nsioi no	n ind	to ze licato ensi sion	or				

- NOTE The availability of the various data items differs depending on the surveillance technology used and is implementation dependent.
- NOTE The term "last report" may refer to the "latest used" or "latest measured". The actual meaning is implementation dependent and needs to be described in the ICD of the SDPS please refer to chapter 4.8 above.

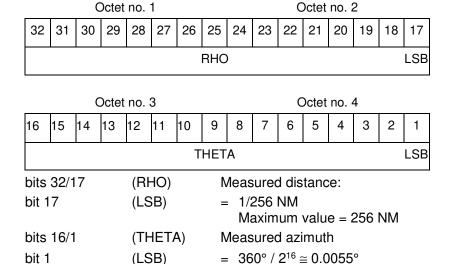
#### Data Item 1062/340, Measured Information

# Structure of Subfield # 1: Sensor Identification



**NOTE** - The up-to-date list of SACs is published on the EUROCONTROL Web Site (http://www.eurocontrol.int).

# Structure of Subfield # 2: Measured Position



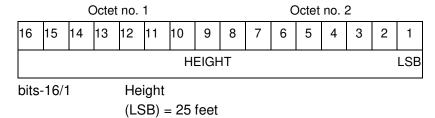
#### **NOTE** - The measured position is:

- 1. In case of a plot, the measured bias-corrected polar co-ordinates;
- 2. In case of a sensor local track, the measured bias-corrected polar co-ordinates of the plot associated to the track;
- 3. In case of a local track without detection, the extrapolated biascorrected polar co-ordinates.

# Data Item 1062/340, Measured Information

# Structure of Subfield # 3:

# **Measured 3-D Height**



# Structure of Subfield # 4: Last Measured Mode C Code

		(	Octe	t no.	1			Octet no. 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
٧	G		•		Las	st Me	asur	sured Mode C Code LSB							
bit-	oit-16 (V)							= 0 Code validated = 1 Code not validated							
bit-	bit-15 (G)					<ul><li>= 0 Default</li><li>= 1 Garbled code</li></ul>									
bit 1	bit 14/1 Last Measur complement (LSB) Vmin Vmax						t for =	m = 1/4 = -1:	4 FL		le, in	i two	o's		

# Data Item 1062/340, Measured Information

### Structure of Subfield # 5:

#### **Last Measured Mode 3/A Code**

		(	Octet	no.	1			Octet no. 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
٧	G	L	0	A4	A2	A1	B4	B2	B1	C4	C2	C1	D4	D2	D1
bit 1	bit 16 (V)							<ul><li>= 0 Code Validated</li><li>= 1 Code not Validated</li></ul>							
bit 1	t 15 (G)						_	<ul><li>= 0 Default</li><li>= 1 Garbled code</li></ul>							
bit 1	4		(L)				=	· 0	(	deriv	ed f	rom	ode the onde	reply	/
						=	<ul> <li>Smoothed MODE 3/A code as provided by a sensor local tracker.</li> </ul>								
bit 1	bit 13							Spare bit set to zero							
bits	bit 13 bits 12/1										•		the rese		

NOTE - 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 sensor local track MODE 3/A code information.

# Data Item I062/340, Measured Information Structure of Subfield # 6: Report Type

# Octet no. 1 6 5 4 3 2 1

0 0

SIM RAB TST

7

TYP

bits-8/6	(TYP)	= 000 = 001 = 010 = 011 = 100 = 101 = 110 = 111	No detection Single PSR detection Single SSR detection SSR + PSR detection Single ModeS All-Call Single ModeS Roll-Call ModeS All-Call + PSR ModeS Roll-Call + PSR
bit-5	(SIM)	= 0 = 1	Actual target report Simulated target report
bit-4	(RAB)	= 0 = 1	Report from target transponder Report from field monitor (fixed transponder)
bit-3	(TST)	= 0 = 1	Real target report Test target report
bits-2/1		Spare b	pits set to zero

# **Encoding Rule:**

This Item is optional

**Definition:** Data derived directly by the aircraft.

Format: Compound Data Item, comprising a primary subfield of up to four

octets, followed by the indicated subfields.

Structure of Primary Subfield:

	Octet no. 1									
32	31	30	29	28	27	26	25			
ADR	ID	MHG	IAS	TAS	SAL	FSS	FX			
Octet no. 2										
24	23	22	21	20	19	18	17			
TIS	TID	СОМ	SAB	ACS	BVR	GVR	FX			
	Octet no. 3									
16	15	14	13	12	11	10	9			
RAN	TAR	TAN	GSP	VUN	MET	EMC	FX			
		C	Octet	no.	4					
8	7	6	5	4	3	2	1			
POS	GAL	PUN	МВ	IAR	MAC	BPS	FX			

bit-32	(ADR)	Subfield #1: Target Address = 0 Absence of Subfield #1
	<b></b>	= 1 Presence of Subfield #1
bit-31	(ID)	Subfield #2: Target Identification = 0 Absence of Subfield #2 = 1 Presence of Subfield #2
bit-30	(MHG)	Subfield #3: Magnetic Heading = 0 Absence of Subfield #3 = 1 Presence of Subfield #3

bit-29	(IAS)	Subfield #4: Indicated Airspeed/
		Mach Number = 0 Absence of Subfield #4
		= 1 Presence of Subfield #4
bit-28	(TAS)	Subfield #5: True Airspeed
		= 0 Absence of Subfield #5 = 1 Presence of Subfield #5
h: 07	(CAL)	1 1 10001100 of Gabilola no
bit-27	(SAL)	Subfield #6: Selected Altitude = 0 Absence of Subfield #6
		= 1 Presence of Subfield #6
bit-26	(FSS)	Subfield #7: Final State Selected Altitude
	( )	= 0 Absence of Subfield #7
		= 1 Presence of Subfield #7
bit-25	FX	Extension indicator
		= 0 no extension = 1 extension
h:+ O4	(TIC)	
bit-24	(TIS)	Subfield #8: Trajectory Intent Status = 0 Absence of Subfield #8
		= 1 Presence of Subfield #8
bit-23	(TID)	Subfield #9: Trajectory Intent Data
		= 0 Absence of Subfield #9
		= 1 Presence of Subfield #9
bit-22	(COM)	Subfield #10: Communications / ACAS
		Capability and Flight Status = 0 Absence of Subfield #10
		= 1 Presence of Subfield #10
bit-21	(SAB)	Subfield #11: Status reported by ADS-B
	,	= 0 Absence of Subfield #11
		= 1 Presence of Subfield #11
bit-20	(ACS)	Subfield #12: ACAS Resolution Advisory Report
		= 0 Absence of Subfield #12 = 1 Presence of Subfield #12
bit-19	(BVR)	Subfield #13: Barometric Vertical Rate
DIL 13	(DVII)	= 0 Absence of Subfield #13
		= 1 Presence of Subfield #13
bit-18	(GVR)	Subfield #14: Geometric Vertical Rate
		= 0 Absence of Subfield #14
hi+ 17	EV	= 1 Presence of Subfield #14 Extension indicator
bit-17	FX	= 0 no extension
		= 1 extension
bit-16	(RAN)	Subfield #15: Roll Angle
		= 0 Absence of Subfield #15
		= 1 Presence of Subfield #15

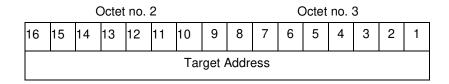
bit-15	(TAR)	Subfield #16: Track Angle Rate = 0 Absence of Subfield #16 = 1 Presence of Subfield #16
bit-14	(TAN)	Subfield #17: Track Angle = 0 Absence of Subfield #17 = 1 Presence of Subfield #17
bit-13	(GSP)	Subfield #18: Ground Speed = 0 Absence of Subfield #18 = 1 Presence of Subfield #18
bit-12	(VUN)	Subfield #19: Velocity Uncertainty = 0 Absence of Subfield #19 = 1 Presence of Subfield #19
bit-11	(MET)	Subfield #20: Meteorological Data = 0 Absence of Subfield #20 = 1 Presence of Subfield #20
bit-10	(EMC)	Subfield #21: Emitter Category = 0 Absence of Subfield #21 = 1 Presence of Subfield #21
bit-9	FX	Extension indicator = 0 no extension = 1 extension
bit-8	(POS)	Subfield #22: Position Data = 0 Absence of Subfield #22 = 1 Presence of Subfield #22
bit-7	(GAL)	Subfield #23: Geometric Altitude Data = 0 Absence of Subfield #23 = 1 Presence of Subfield #23
bit-6	(PUN)	Subfield #24: Position Uncertainty Data = 0 Absence of Subfield #24 = 1 Presence of Subfield #24
bit-5	(MB)	Subfield #25: Mode S MB Data = 0 Absence of Subfield #25 = 1 Presence of Subfield #25
bit-4	(IAR)	Subfield #26: Indicated Airspeed = 0 Absence of Subfield #26 = 1 Presence of Subfield #26
bit-3	(MAC)	Subfield #27: Mach Number = 0 Absence of Subfield #27 = 1 Presence of Subfield #27
bit-2	(BPS)	Subfield #28: Barometric Pressure Setting. = 0 Absence of Subfield #28 = 1 Presence of Subfield #28
bit-1	FX	Extension indicator = 0 no extension = 1 extension

NOTE - Despite there are now two subfields (#26 and #27) reporting, respectively, the Indicated Airspeed track data and the Mach Number track data, the former subfield #4 (and its presence bit, bit-37) is kept in order to prevent a full incompatibility with previous releases of ASTERIX Cat. 062 already implemented.

Data Item 1062/380, Aircraft Derived Data

# Structure of Subfield # 1: Target Address

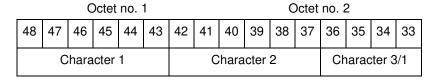
			Octet	no.	1		
24	23	22	21	20	19	18	17



bits 24/1 24 bits Target Address, A23 to A0

### Structure of Subfield # 2:

#### **Target Identification**



			Octet	no.	3					C	Octet	no.	4		
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Char 3/2 Character 4								С	hara	cter	5		Cha	r 6/1	

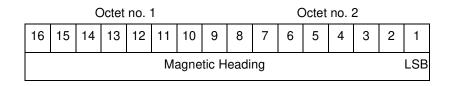
		(	Octet	no.	5					C	ctet	no. (	6		
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
CI	nara	cter 6	6/2	Chara	cter	7			С	hara	cter	8			

bits 48/1

Characters 1-8 (coded on 6 bits each) defining a target identification when flight plan is available or the registration marking when no flight plan is available.

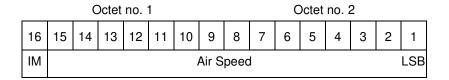
Coding rules are provided in [3] Section 3.1.2.9.1.2 and Table 3-9

# Structure of Subfield # 3: Magnetic Heading



bits-16/1 Magnetic Heading (LSB) = 
$$360^{\circ} / 2^{16} \cong 0.0055^{\circ}$$

# Structure of Subfield # 4: Indicated Airspeed / Mach No

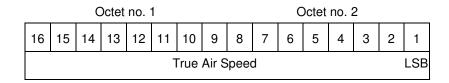


bit-16 (IM) = 0 Air Speed = IAS, LSB (Bit-1) = 
$$2^{-14}$$
 NM/s = 1 Air Speed = Mach, LSB (Bit-1) = 0.001 bits-15/1 Air Speed (IAS or Mach)

NOTE - Despite there are now two subfields (#26 and #27) reporting, respectively, the Indicated Airspeed track data and the Mach Number track data, this former subfield is kept free in order to prevent a full incompatibility with previous releases of ASTERIX Cat. 062 already implemented.

#### Structure of Subfield # 5:

# **True Airspeed**



bits-16/1 True Air Speed (LSB) = 1 knot 
$$0 \le \text{True Air Speed} \le 2046 \text{ knots}$$

### Structure of Subfield # 6:

#### **Selected Altitude**

Definition: The short-term vertical intent as described by either the FMS selected altitude, the Altitude Control Panel Selected Altitude (FCU/MCP), or the current aircraft altitude according to the aircraft's mode of flight.

		(	Octet	no.	1					C	Octet	no.	2		
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SAS	Soi	urce			I			Altit	ude						LSB
bit-1	16			(SA	AS)			: 0 N p	rovi	ded	•	•			led
bit-	15/1	4		(Sc	urce	e)	=	00		Unl	knov	vn			
							=	01		Air	craft	Altit	ude		
							=	: 10			U/M tude		Sele	cted	
							=	: 11		FM	S Se	elect	ed A	Altitu	de
bits	- 13/	′1		(Alt	itud	e)	L	Altitud SB= 1300	25ft			·			orm

### Structure of Subfield #7:

### **Final State Selected Altitude**

**Definition:** The vertical intent value that corresponds with the ATC cleared altitude, as derived from the Altitude Control Panel (FCU/MCP).

		(	Octet	no.	1					C	octet	no. 2	2		
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
MV	АН	AM		1				Altit	ude						LSB
bit-1	16			(M)	V)			0	-		activ		Э		
bit-1	15			(Al	H)		=				activ e	е			
bit-1	14			(Al	M)			0	-		activ	е			
bits	- 13/	1		(Al	titud	e)	L	SB=	25ft			·	leme		orm

# Structure of Subfield #8:

# **Trajectory Intent Status**

			(	Octet	no. 1				
	8	7	6	5	4	3	2	1	
	NAV	NVB	0	0	0	0	0	FX	
bit-	-8		(NA	AV)		= 0		•	ectory Intent Data is ilable for this aircraft
						= 1			ectory Intent Data is available for this aircraft
bit-	7		(NV	/B)		= 0		Traj valid	ectory Intent Data is d
						= 1		•	ectory Intent Data is valid
bits	s-6/2		Sp	are I	Bits s	set to	zer	0	
bit-	1		(FX	()		= 0 = 1			of Data Item  ension into next extent

### Structure of Subfield #9:

# **Trajectory Intent Data**

Format:

Repetitive Data Item starting with a one-octet Field Repetition Indicator (REP) followed by at least one Trajectory Intent Point comprising fifteen octets

		(	Octet	no.	1										
128	127	126	125	124	123	122	121								
			RI	ΞP											
		(	Octet	no.	2										
120	119	118	117	116	115	114	113								
TCA	NC		Т	CP n	umbe	er									
		C	Octet	no.	3					(	Octet	no.	4		
112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
						ŀ	Altitud	le							LSB
		(	Octet	no.	5					(	Octet	no.	6		
96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
Latitude in WGS - 84															
Octet no. 7 Octet no. 8															
80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
							LSB								
		(	Octet	no.	9					С	ctet	no. 1	0		
64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
					Lon	gitud	le in V	VGS	- 84						LSB
		О	ctet	no. 1	11					С	ctet	no. 1	2		
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
ı	Point	Турє	)	Т	D	TRA	TOA				T	ΟV			
		О	ctet	no. 1	13					С	ctet	no. 1	4		
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
							TOV	,							LSB
		О	ctet	no. 1	15					С	ctet	no. 1	6		
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
			•	-	•	•	TTR	•			•			•	LSB

Data Item I062/3			: Trajectory Intent Data
	bits-128/121 bit-120	(REP) (TCA)	Repetition Factor = 0 TCP number available = 1 TCP number not available
	bit-119	(NC)	= 0 TCP compliance = 1 TCP non-compliance
	bits-118/113 bits-112/97	(TCP Number) (Altitude)	Trajectory Change Point number Altitude in two's complement. LSB= 10ft
	bits-96/73	(Latitude)	-1500 ft ≤ altitude ≤ 150000 ft In WGS.84 in two's complement. -90 ≤ latitude ≤ 90 deg. LSB = $180/2^{23}$ deg. = approx.2.145767*10 <sup>-05</sup> deg.
	bits-72/49	(Longitude)	In WGS.84 in two's complement. -180 $\leq$ longitude $<$ 180 LSB = 180/2 <sup>23</sup> deg. = approx.2.145767*10 <sup>-05</sup> deg.
	bits-48/45	Point Type	<ul> <li>Unknown</li> <li>Fly by waypoint (LT)</li> <li>Fly over waypoint (LT)</li> <li>Hold pattern (LT)</li> <li>Procedure hold (LT)</li> <li>Procedure turn (LT)</li> <li>RF leg (LT)</li> <li>Top of climb (VT)</li> <li>Top of descent (VT)</li> <li>Start of level (VT)</li> <li>Cross-over altitude (VT)</li> <li>Transition altitude (VT)</li> </ul>
	bits-44/43	(TD)	= 00 N/A = 01 Turn right = 10 Turn left = 11 No turn
	bit-42	(TRA)	Turn Radius Availabilty = 0 TTR not available = 1 TTR available
	bit-41	(TOA)	<ul><li>= 0 TOV available</li><li>= 1 TOV not available</li></ul>
	bits-40/17	(TOV)	Time Over Point LSB = 1 second
	bits-16/1	(TTR)	TCP Turn radius LSB = $0.01 \text{ Nm}$ $0 \le \text{TTR} \le 655.35 \text{ Nm}$

### **NOTES**

- 1. NC is set to one when the aircraft will not fly the path described by the TCP data.
- 2. TCP numbers start from zero.
- 3. LT = Lateral Type
- 4. VT = Vertical Type
- 5. TOV gives the estimated time before reaching the point. It is defined as the absolute time from midnight.
- 6. TOV is meaningful only if TOA is set to 0

# Structure of Subfield # 10:

# Communications/ACAS Capability and Flight Status reported by Mode-S

		C	Octe	t no.	1		Ŭ				Octet	no.	2		
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	СОМ			STAT	-	0	0	SSC	ARC	AIC	B1A		B.	1B	
t	oits-1	3/11	(	(CO	T)	tra = = = = = = = = = = = = = = = = = = =	1 2 3 4 to 7 ght 0 1 2 3 4 5 6 7	nuniconde No c (surv Com capa Com Uplir Com ELM ELM Statu No a airbo Alert grou No a airbo Mo a airbo airb	er omm reilla m. A bility m. A	nunic nce ( and / ( ), Co _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	cation only decommon on mm which spond series airconnection of the control of the	nns co mm. . B a . B, lk El der aircr aircr craft t airt t airt	apal B and Uplin LM capa aft aft	oility nk ability	у
k	oit-10	)/9		Spar	e bit	set	to z	ero							
k	oit-8			(SS	C)	Sp = =		fic se 0 No 1 Ye	0	e ca	pabi	lity			
k	oit-7			(AR	C)	Al: = =	tituc	le re <sub>l</sub> 0 10	oorti 00 ft	resc	apak olution ution	n			
k	oit-6			(AIC	;)	Ai: = =		ft ide 0 No 1 Ye	0	catio	n ca	pab	ility		

bit 5 (B1A) BDS 1,0 bit 16 bits 4/1 (B1B) BDS 1,0 bits 37/40

# Structure of Subfield # 11:

# Status reported by ADS-B

		(	Octet	no.	1					C	Octet	no.	2		
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
A	AC.	N	IN		C	GBS	0	0	0	0	0	0		STAT	
bits	-16/1	15 (	AC)		01 = 10 =		AS r	ot o			al				
bits	10 = ACAS operational 11 = invalid bits-14/13 (MN) 00 = unknown 01 = Multiple navigational aids not operating 10 = Multiple navigational aids operating 11 = invalid bits-12/11 (DC) 00 = unknown														
bits	-12/1	I1 (	DC)		01 = 10 =	unk Diff No inva	erer diffe	ntial				1			
bit-	10	(GE	3S)	= C = 1	u	rans nkno rans	wn						et or		
bits	-9/4	5	spar	e bit		t to z	-								
bits	-3/1	=	0   1 ( 2	No e Gen Life	emer eral guar	Statu geno eme d / m	cy erger redic	•							

= 6 "Downed" Aircraft= 7 Unknown

No communications Unlawful interference

#### Structure of Subfield # 12:

### **ACAS Resolution Advisory Report**

**Definition:** Currently active Resolution Advisory (RA), if any, generated by the

ACAS associated with the transponder transmitting the report and

threat identity data.

**Format :** Seven-octet fixed length Data Item.

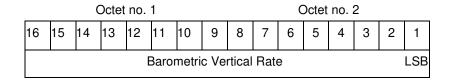
		(	Octet	no. 1	1					(	Octet	no. 2	2		
56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
		(	Octet	no. 3	3					(	Octet	no. 4	4		
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
		(	Octet	no. 5	5					(	Octet	no. 6	6		
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
			Oct	et 7											
8	7	6	5	4	3	2	1								
		•	•	•											
b	its-5	6/1		(1)	ИВ С	Oata)				essa mes					

Register 3,0

**NOTE -** Refer to ICAO Draft SARPs for ACAS for detailed explanations.

### Structure of Subfield # 13:

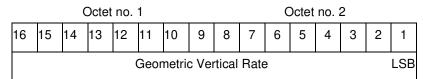
#### **Barometric Vertical Rate**



bits-16/1 Barometric Vertical Rate in two's complement form

(LSB) = 6.25 feet/minute

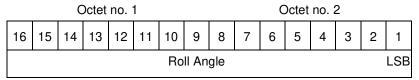
# Structure of Subfield # 14: Geometric Vertical Rate



bits-16/1 Geometric Vertical Rate in two's complement form

(LSB) = 6.25 feet/minute

# Structure of Subfield # 15: Roll Angle



bits-16/1 Roll Angle in two's complement form

(LSB) = 
$$0.01$$
 degree  
-180  $\leq$  Roll Angle  $\leq$  180

# Structure of Subfield # 16: Track Angle Rate

		C	Octet	no.	1					C	Octet	no. 2	2		
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
7	Π	0	0	0	0	0	0		R	ate c	f Tui	rn		LSB	0
bits	-16/1	15(T	Ί)		Tu	rn In	dica	00 01 10	) = N = L ) = R = S	eft light		able			
bits-	-14/9	9			spa	are b	oits s	et to	zer	0					
bits-	-8/2				(LS	SB) =	= <b>2</b> -2	°/s =	two' = 1/4 of Tu	-°/s	•	eme <sup>e</sup> /s	nt fo	rm	

spare bit set to zero

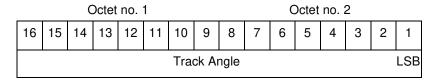
#### **NOTES**

- 1. A positive value represents a right turn, whereas a negative value represents a left turn.
- 2. Value 15 means 15°/s or above.

bit 1

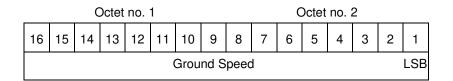
#### Structure of Subfield # 17:

### **Track Angle**



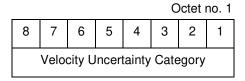
bits-16/1 Track Angle (LSB) =  $360^{\circ} / 2^{16} = \text{approx. } 0.0055^{\circ}$ 

# Structure of Subfield # 18: Ground Speed



bits-16/1 Ground Speed in two's complement form referenced to WGS84  $(LSB) = 2^{-14} \text{ NM/s} \cong 0.22 \text{ kt}$   $-2 \text{ NM/s} \leq \text{Ground Speed} < 2 \text{ NM/s}$ 

# Structure of Subfield # 19: Velocity Uncertainty



NOTE - Velocity uncertainty category of the least accurate velocity component

# Data Item 1062/380, Aircraft Derived Data Structure of Subfield # 20: Met Data

Octet no. 1																			
64	63	62	61	60	59	58	57												
WS	WD	TMP	TRB	0	0	0	0												
	•	(	Octet	no. 2	2				(	Octet	no. 3	3							
56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41				
	Wind Speed LSB																		
Octet no. 4								Octet no. 5											
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25				
Wind Direction LSB																			
Octet no. 6									Octet no. 7										
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9				
					•	Ter	ature LSB												
		(	Octet	no. 8	3														
8	7	6	5	4	3	2	1												
		٦	Γurbu	lence	Э														
								1											
bit-64				(WS)			= 0 = 1	Not valid Wind Speed Valid Wind Speed											
bit-63				(WD)			= 0	Not valid Wind Direction											
bit-62				(TMP)			= 1 = 0	Valid Wind Direction  Not valid Temperature											
				,			= 1	Valid Temperature											
bit-61 (T					(TRB)			Not valid Turbulence Valid Turbulence											
bits-60/57 (spare)						= 1 Valid Turbulence Spare Bits set to zero													
bits-56/41								Wind Speed											
							(LSB) = 1 knot												
bits-40/25							0 ≤ Wind Speed ≤ 300 Wind Direction												
							(LSB) = 1 degree												
bits-24/9						<ul><li>1 ≤ Wind Direction ≤ 360</li><li>Temperature in degrees celsius</li></ul>													
DIL3- <b>∠¬</b> / J							1			٠ ي									

(LSB) =  $0.25 \, ^{\circ}\text{C}$ -100  $^{\circ}\text{C} \leq \text{Temperature} \leq 100 \, ^{\circ}\text{C}$ 

bits-8/1

Turbulence Integer between 0 and 15 inclusive

Data Item 1062/380, Aircraft Derived Data

# Structure of Subfield # 21: Emitter Category

# Octet no. 1 8 7 6 5 4 3 2 1 ECAT

bits-8/1 (ECAT)

1 = light aircraft ≤ 7000 kg

2 = reserved

3 = 7000 kg < medium aircraft < 136000 kg

4 = reserved

 $5 = 136000 \text{ kg} \le \text{heavy aircraft}$ 

6 = highly manoeuvrable (5g acceleration capability) and high speed (>400 knots cruise)

7 to 9 = reserved

10 = rotocraft

11 = glider / sailplane

12 = lighter-than-air

13 = unmanned aerial vehicle

14 = space / transatmospheric vehicle

15 = ultralight / handglider / paraglider

16 = parachutist / skydiver

17 to 19 = reserved

20 = surface emergency vehicle

21 = surface service vehicle

22 = fixed ground or tethered obstruction

23 to 24 = reserved

Octet no. 2

# Data Item 1062/380, Aircraft Derived Data

# Structure of Subfield # 22:

Octet no. 1

### **Position**

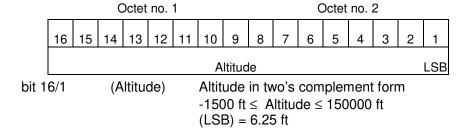
	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33				
	Latitude in WGS - 84																			
			(	Octet	no.	3			Octet no. 4											
32 31 30 29 28 27 26 2								25	24	23	22	21	20	19	18	17				
								LSB												
			C	Octet	no.	5			Octet no. 6											
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1				
	151 6	15	14	13	12	11	10													
	Longitude i									in WGS - 84 LSB										
bits-48/25 (Latitude)							F L	In WGS.84 in two's complement form. Range $-90 \le$ latitude $\le 90$ deg. LSB = $180/2^{23}$ degrees = $2.145767 * 10^{-05}$ degrees.												
									This corresponds to a resolution of at least 2.4 meters											
	bits-	<b>-24</b> /1	I		(Longitude)					In WGS.84 in two's complement form. Range -180 $\leq$ longitude $<$ 180 deg. LSB = $180/2^{23}$ degrees = $2.145767 * 10^{-05}$ degrees. This corresponds to a resolution of at least 2.4 meters.										
٥,	acitiva langituda indicatas East. Pacitiva latituda indicatas North																			

**NOTE -** Positive longitude indicates East. Positive latitude indicates North.

# Data Item 1062/380, Aircraft Derived Data

# Structure of Subfield # 23:

### **Geometric Altitude**



NOTE - LSB is required to be less than 10 ft by ICAO

# Structure of Subfield # 24: Position Uncertainty

	Octet no. 1											
Ī	8	7	6	5	4	3	2	1				
	0	0	0	0	PUN							

bits-8/5 Spare bits set to zero bits-4/1 (PUN) Position Uncertainty

Data Item 1062/380, Aircraft Derived Data

### Structure of Subfield # 25:

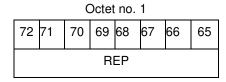
### **MODE S MB DATA**

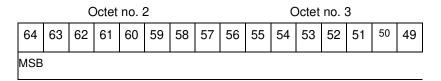
Format: Repetitive starting with an one-octet Field Repetition Indicator

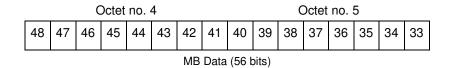
(REP) followed by at least one BDS report comprising one seven

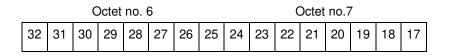
octet BDS register and one octet BDS code.

#### Structure:









		(	Octet	no.	8		Octet no. 9								
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
		•	•		•	•	LSB	BDS 1					BD	S 2	

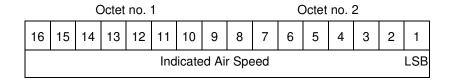
bits 72/65	(REP)	Repetition factor
bits 64/9	(MB data)	56 bit message conveying Mode S B message data
bits 8/5	(BDS1)	Comm B data Buffer Store 1 Address
bits 4/1	(BDS2)	Comm B data Buffer Store 2 Address

**NOTE -** Only DAPs that cannot be encoded into other subfields of this item should be sent using subfield #25

### Data Item 1062/380, Aircraft Derived Data

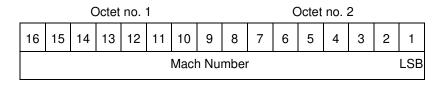
### Structure of Subfield # 26:

### **Indicated Airspeed**



bit 16/1 0 Kt  $\leq$  Indicated Airspeed  $\leq$  1100 Kt (LSB) = 1 Kt

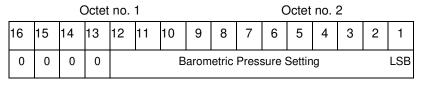
# Structure of Subfield # 27 Mach Number



bit 16/1  $0 \le Mach \ Number \le 4.096$  (LSB) = Mach 0.008

### Structure of Subfield # 28:

# **Barometric Pressure Setting (derived from Mode S BDS 4,0)**



 $\begin{array}{lll} \text{bit-16/13} & \text{Spare bits set to 0.} \\ \text{bits- 12/1} & \text{(BPS)} & \text{LSB=0.1mb} \end{array}$ 

 $-0mb \leq BPS \leq 409.5 mb$ 

**NOTE** - BPS is the barometric pressure setting of the aircraft minus 800 mb.

### **Encoding Rule:**

This Item is optional

# 5.2.25 Data Item I062/390, Flight Plan Related Data

Definition: All flight plan related information, provided by ground-based

systems.

Format: Compound Data Item, comprising a primary subfield of up to three

octets, followed by the indicated subfields.

# Structure of Primary Subfield:

Octet no. 1											
24	23	22	21	20	19	18	17				
TAG	CSN	IFI	FCT	TAC	WTC	DEP	FX				

	Octet no. 2												
16	15	14	13	12	11	10	9						
DST	RDS	CFL	CTL	TOD	AST	STS	FX						

Octet no. 3											
8	7	6	5	4	3	2	1				
STD	STA	PEM	PEC	0	0	0	FX				

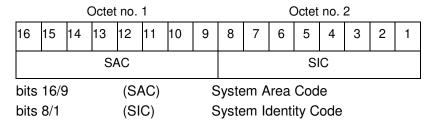
bit-24	(TAG)	Subfield #1: FPPS Identification Tag = 0 Absence of Subfield #1 = 1 Presence of Subfield #1
bit-23	(CSN)	Subfield #2: Callsign = 0 Absence of Subfield #2 = 1 Presence of Subfield #2
bit-22	(IFI)	Subfield #3: IFPS_FLIGHT_ID = 0 Absence of Subfield #3 = 1 Presence of Subfield #3
bit-21	(FCT)	Subfield #4: Flight Category = 0 Absence of Subfield #4 = 1 Presence of Subfield #4
bit-20	(TAC)	Subfield #5: Type of Aircraft = 0 Absence of Subfield #5 = 1 Presence of Subfield #5
bit-19	(WTC)	Subfield #6: Wake Turbulence Category = 0 Absence of Subfield #6 = 1 Presence of Subfield #6

Data Item I062/390,	Flight Plan Relate	ed Data
bit-18	(DEP)	Subfield #7: Departure Airport  = 0 Absence of Subfield #7  = 1 Presence of Subfield #7
bit-17	FX	Extension indicator = 0 no extension = 1 extension
bit-16	(DST)	Subfield #8: Destination Airport  = 0 Absence of Subfield #8  = 1 Presence of Subfield #8
bit-15	(RDS)	Subfield #9: Runway Designation = 0 Absence of Subfield #9 = 1 Presence of Subfield #9
bit-14	(CFL)	Subfield #10: Current Cleared Flight Level = 0 Absence of Subfield #10 = 1 Presence of Subfield #10
bit-13	(CTL)	Subfield #11: Current Control Position = 0 Absence of Subfield #11 = 1 Presence of Subfield #11
bit-12	(TOD)	Subfield #12: Time of Departure / Arrival = 0 Absence of Subfield #12 = 1 Presence of Subfield #12
bit-11	(AST)	Subfield #13: Aircraft Stand = 0 Absence of Subfield #13 = 1 Presence of Subfield #13
bit-10	(STS)	Subfield #14: Stand Status = 0 Absence of Subfield #14 = 1 Presence of Subfield #14
bit-9	FX	Extension indicator = 0 no extension = 1 extension
bit-8	(STD)	Subfield #15: Standard Instrument Departure = 0 Absence of Subfield #15 = 1 Presence of Subfield #15
bit-7	(STA)	Subfield #16: STandard Instrument ARrival = 0 Absence of Subfield #16 = 1 Presence of Subfield #16
bit-6	(PEM)	Subfield #17: Pre-emergency Mode 3/A code = 0 Absence of Subfield #17 = 1 Presence of Subfield #17
bit-5	(PEC)	Subfield #18: Pre-emergency Callsign = 0 Absence of Subfield #18 = 1 Presence of Subfield #18
bits-4/2	2	Spare bits set to zero

bit-1 FX Extension indicator
= 0 no extension
= 1 extension

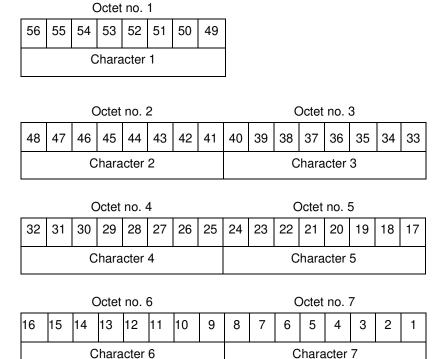
Data Item 1062/390, Flight Plan Related Data

# Structure of Subfield # 1: FPPS Identification Tag



**NOTE** - The up-to-date list of SACs is published on the EUROCONTROL Web Site (<a href="http://www.eurocontrol.int">http://www.eurocontrol.int</a>).

# Data Item I062/390, Flight Plan Related Data Structure of Subfield # 2: Callsign



**NOTE -** Each one of the seven Octets contains an ASCII Character. The Callsign is always left adjusted. It contains up to seven upper-case alphanumeric characters, the remaining character positions (if any) are padded with space characters.

# Data Item 1062/390, Flight Plan Related Data

# Structure of Subfield # 3: IFPS\_FLIGHT\_ID

		(	Octet	no.	1		Octet no. 2								
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
TYP 0 0 0							NBR	l							

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

bits-32/31 (TYP) = 00 Plan Number

= 01 Unit 1 internal flight number
= 10 Unit 2 internal flight number
= 11 Unit 3 internal flight number

bits-30/28 spare bits set to zero

bits-27/1 (NBR) Number from 0 to 99 999 999

# Data Item 1062/390, Flight Plan Related Data

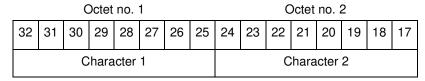
# Structure of Subfield # 4: Flight Category

$\sim$	-+	<b>~</b> +	nο	4
( )	CI	ρт	nn	- 1

8	7	6	5	4	3	2	1		
GAT/	OAT	FR1/FR2		RV	SM	HPR	0		
bits bits				`	AT/C	DAT)		00 01 10 11 00 01 10	Unknown General Air Traffic Operational Air Traffic Not applicable Instrument Flight Rules Visual Flight rules Not applicable Controlled Visual Flight Rules
bits 4/3				(RV	/SM	)		00 01 10 11	Unknown Approved Exempt Not Approved
bit 2				(HF	PR)		=	0 1	Normal Priority Flight High Priority Flight
bit 1				Spa	are l	oit se	et to z	zero	

# Data Item I062/390, Flight Plan Related Data

# Structure of Subfield # 5: Type of Aircraft

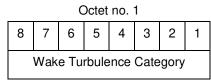


	Octet no. 3										C	Octet	no.	4						
1	6	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1				
Character 3								Character 3						4						

### **NOTES**

- 1. Each one of the four Octets composing the type of an aircraft contains an ASCII Character (upper-case alphanumeric characters with trailing spaces).
- 2. The types of aircraft are defined in [Ref.4]

# Structure of Subfield # 6: Wake Turbulence Category



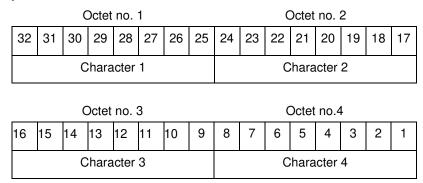
bits 8/1 Wake Turbulence Category is an ASCII character code which should be one of the following values:

L = Light
M = Medium
H = Heavy

J = "Super"

### Data Item 1062/390, Flight Plan Related Data

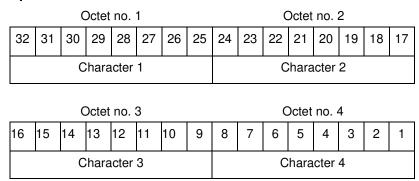
# Structure of Subfield # 7: Departure Airport



# **NOTES**

- 1. Each one of the four Octets composing the name of an airport contains an ASCII Character (upper case alphabetic).
- 2. The Airport Names are indicated in the ICAO Location Indicators book.

# Structure of Subfield # 8 Destination Airport

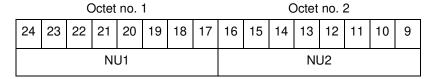


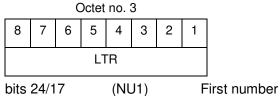
#### **NOTES**

- 1. Each one of the four Octets composing the name of an airport contains an ASCII Character (upper case alphabetic).
- 2. The Airport Names are indicated in the ICAO Location Indicators book.

# Data Item I062/390, Flight Plan Related Data

# Structure of Subfield # 9: Runway Designation





bits 16/9 (NU2) Second number bits 8/1 (LTR) Letter

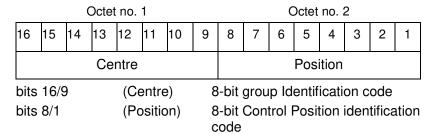
### **NOTES**

- 1. NU1, NU2 and LTR each contain an ASCII character
- 2. For details refer to.[5] Section 5

# Structure of Subfield # 10: Current Cleared Flight Level

# Data Item 1062/390, Flight Plan Related Data

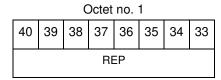
# Structure of Subfield # 11: Current Control Position

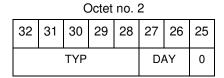


**NOTE** - The centre and the control position identification codes have to be defined between communication partners.

# Data Item I062/390, Flight Plan Related Data

# Structure of Subfield # 12: Time of Departure / Arrival





	Octet no. 3										C	Octet	no.	4		9			
	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9			
	0	0	0	HOR			LSB	0	0	MIN					LSB				
,	Octet no. 5																		

8	7	6	5	4	3	2	1						
AVS	0			LSB									

bits-40/33 (REP) Repetition Factor

bits-32/28 (TYP) = 0 Scheduled off-block time

= 1 Estimated off-block time

= 2 Estimated take-off time

= 3 Actual off-block time

= 4 Predicted time at runway hold

= 5 Actual time at runway hold

= 6 Actual line-up time

= 7 Actual take-off time

= 8 Estimated time of arrival

= 9 Predicted landing time

= 10 Actual landing time

= 11 Actual time off runway

= 12 Predicted time to gate

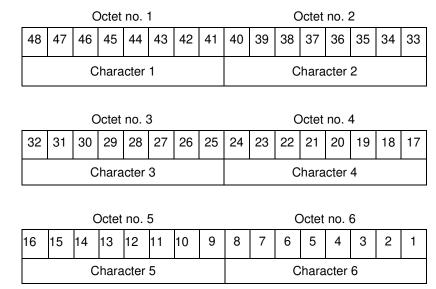
= 13 Actual on-block time

```
bits-27/26
            (DAY) = 00 Today
                    = 01 Yesterday
                    = 10 Tomorrow
                    = 11 Invalid
            spare bits set to zero
bits-25/22
bits-21/17
            (HOR) Hours, from 0 to 23
bits-16/15
            spare bits set to zero
bits-14/9
            (MIN)
                    Minutes, from 0 to 59
bit-8
            (AVS)
                           Seconds available
                           Seconds not available
                    = 1
bit-7
            spare bits set to zero
bits-6/1
            (SEC) Seconds, from 0 to 59
```

**NOTE** - Estimated times are derived from flight plan systems. Predicted times are derived by the fusion system, based on surveillance data. For definitions, see [Ref.4]

# Data Item I062/390, Flight Plan Related Data

# Structure of Subfield # 13: Aircraft Stand



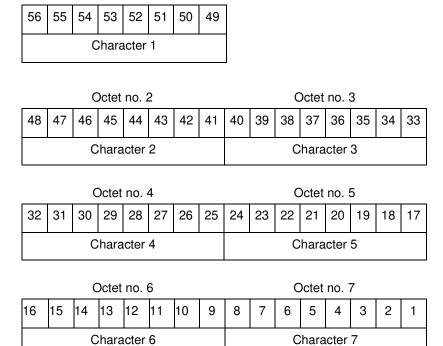
**NOTE** - Each one of the six Octets contains an ASCII Character. The Aircraft Stand identification is always left adjusted. It contains up to six uppercase alphanumeric characters, the remaining character positions (if any) are padded with space characters.

# Data Item 1062/390, Flight Plan Related Data

# Structure of Subfield # 14: Stand Status

		(	octet	no.	1					
8	7	6	5	4	3	2	1			
EMP		A۱	/L	0	0	0	0			
bits-	8/7		(EN	ИP)	=	01		upied nown		
bits-	6/5		(AV	'L)	=	00 01 10 11	Available Not availab Unknown Invalid			

# Data Item I062/390, Flight Plan Related Data Structure of Subfield # 15: Standard Instrument Departure



Octet no. 1

**NOTE** - Each one of the seven Octets contains an ASCII Character. The SID is always left adjusted. It contains up to seven alphanumeric characters, the remaining character positions (if any) are padded with space characters.

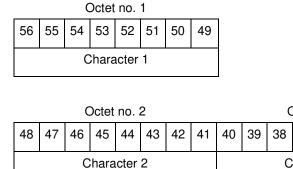
Octet no. 3

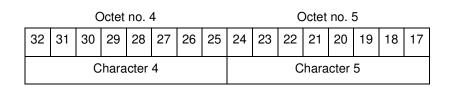
Character 3

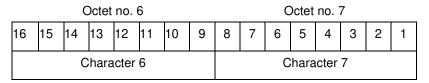
34

33

# Data Item I062/390, Flight Plan Related Data Structure of Subfield # 16: Standard Instrument Arrival







**NOTE** - Each one of the seven Octets contains an ASCII Character. The STAR is always left adjusted. It contains up to seven alphanumeric characters, the remaining character positions (if any) are padded with space characters.

# **Encoding Rule:**

This Item is optional

Data Item 1062/390, Flight Plan Related Data

# Structure of Subfield # 17:

# **Pre-Emergency Mode 3/A**

Octet no. 1										C	Octet	no.	2		T 4				
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1				
0	0	0	VA	A4	A2	A1	B4	B2	B1	C4	C2	C1	D4	D2	D1				

bits-16/13 Spare bits set to 0

bit-13 (VA) Validity

= 0 No valid Mode 3/A available= 1 Valid Mode 3/A available

bits-12/1 Mode-3/A reply in octal

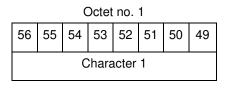
representation

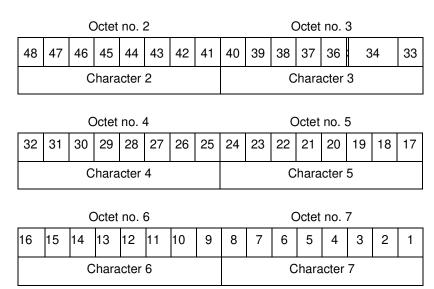
### **NOTES**

1. This subfield is used only when the aircraft is transmitting an emergency Mode 3/A code

2. If VA = 0, the content of bits 12/1 is meaningless

Data Item I062/390, Flight Plan Related Data
Structure of Subfield # 18:
Pre-Emergency Callsign





# **NOTES**

- Each one of the seven Octets contains an ASCII Character. The Callsign is always left adjusted. It contains up to seven upper-case alphanumeric characters, the remaining character positions (if any) are padded with space characters
- 2. This subfield is used only when an emergency Mode 3/A is associated with the track (I062/390 Subfield #17)

**Definition:** Overview of all important accuracies

15 14 13 12 11 10

16

Format: Compound Data Item, comprising a primary subfield of up to two

9

AA FX

octets, followed by the indicated subfields.

Octet no. 1

Octet no. 2

APC COV APW AGA ABA ATV

Structure of

**Primary Subfield:** 

		8 7 6 5 4 3 2 1
		ARC 0 0 0 0 0 FX
bit 16	(APC)	Subfield #1: Estimated Accuracy Of Track Position (Cartesian) = 0 Absence of subfield #1 = 1 Presence of subfield #1
bit 15	(COV)	Subfield #2: XY Covariance = 0 Absence of subfield #2 = 1 Presence of subfield #2
bit 14	(APW)	Subfield #3: Estimated Accuracy Of Track Position (WGS-84) = 0 Absence of subfield #3 = 1 Presence of subfield #3
bit 13	(AGA)	Subfield #4: Estimated Accuracy Of Calculated Track Geometric Altitude  = 0 Absence of subfield #4 = 1 Presence of subfield #4
bit 12	(ABA)	Subfield #5: Estimated Accuracy Of Calculated Track Barometric Altitude  0 Absence of subfield #5 1 Presence of subfield #5
bit 11	(ATV)	Subfield #6: Estimated Accuracy Of Track Velocity (Cartesian) = 0 Absence of subfield #6 = 1 Presence of subfield #6
bit 10	(AA)	Subfield #7: Estimated Accuracy Of Acceleration (Cartesian) = 0 Absence of subfield #7 = 1 Presence of subfield #7
bit 9	(FX)	<ul><li>0 no extension</li><li>1 extension</li></ul>

bits 8 (ARC) Subfield #8: Estimated Accuracy Of Rate Of Climb/Descent = 0 Absence of subfield #8

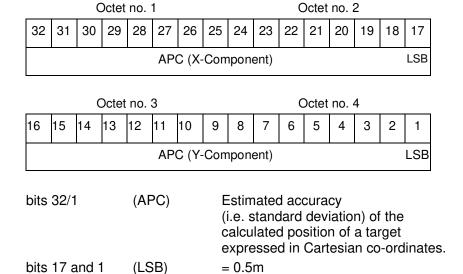
= 1 Presence of subfield #8

bits 7/2 Spare bits set to 0 bit 1 (FX) = 0 no extension

= 1 extension

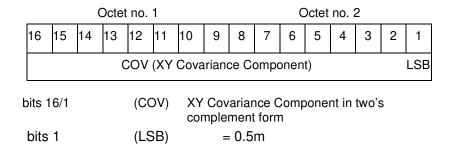
### Structure of Subfield # 1:

# **Estimated Accuracy Of Track Position (Cartesian)**



**NOTE** - Maximum value means maximum value or above.

# Structure of Subfield # 2: XY covariance component

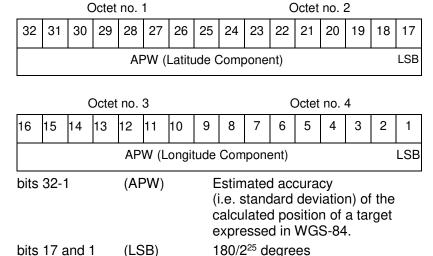


#### Notes:

- 1. XY covariance component = sign  $\{Cov(X,Y)\}$  \* sqrt  $\{abs [Cov(X,Y)]\}$
- 2. The maximum value for the (unsigned) XY covariance component is 16.383 km.

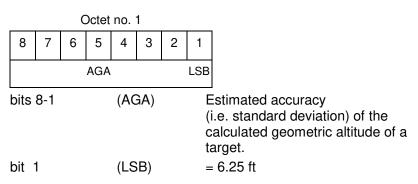
### Structure of Subfield #3:

# **Estimated Accuracy Of Track Position (WGS-84)**



**NOTE** - Maximum value means maximum value or above.

# Structure of Subfield #4: Estimated Accuracy Of Calculated Track Geometric Altitude



**NOTE** - Maximum value means maximum value or above.

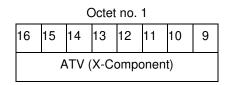
### Structure of Subfield #5:

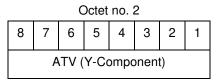
# **Estimated Accuracy Of Calculated Track Barometric Altitude**

	-	C	Octet	no.	1			
8	7	6	5	4	3	2	1	
			ABA		l		LSB	
bits	8-1			(AE	BA)		( C	Estimated accuracy i.e. standard deviation) of the alculated barometric altitude he track.
bit 1				(LS	3B) =	=	1	/4 FL

**NOTE** - Maximum value means maximum value or above.

# Structure of Subfield #6: Estimated Accuracy Of Track Velocity (Cartesian)





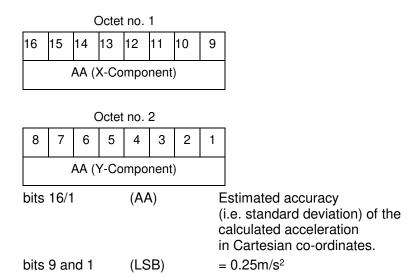
bits 16/1 (ATV) Estimated accuracy (i.e. standard deviation) of the calculated track velocity in Cartesian co-ordinates.

bits 9 and 1 (LSB) = 0.25m/s

**NOTE** - Maximum value means maximum value or above.

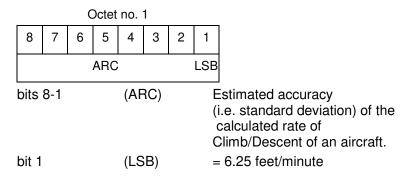
### Structure of Subfield #7:

# **Estimated Accuracy Of Acceleration (Cartesian)**



**NOTE** - Maximum value means maximum value or above.

# Structure of Subfield #8: Estimated Accuracy Of Rate Of Climb/Descent



**NOTE** - Maximum value means maximum value or above.

Encoding Rule: This Item is optional

# 5.2.27 Data Item 1062/510, Composed Track Number

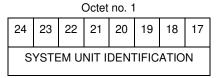
**Definition:** Identification of a system track

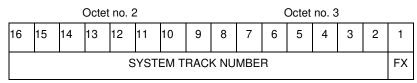
**Structure:** Extendible data item, comprising a first part of three octets (Master

Track Number), followed by three-octet extents (Slave Tracks

Numbers).

### Structure of First Part:





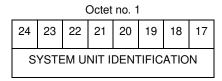
bits 24/17 (SYSTEM UNIT IDENTIFICATION)

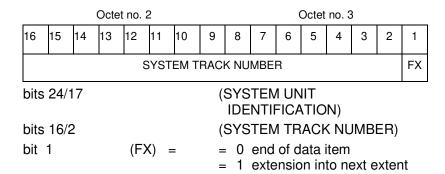
bits 16/2 (SYSTEM TRACK NUMBER)

bit 1 (FX) = 0 end of data item

= 1 extension into next extent

### Structure of next Extents:





**NOTE** - The composed track number is used by co-operating units to uniquely identify a track. It consists of the unit identifier and system track number for each unit involved in the co-operation. The first unit identification identifies the unit that is responsible for the track amalgamation.

# **Encoding Rule:**

This Item is optional

# 5.3 Transmission of Service Prediction Report Messages

The following User Application Profile shall be used for the transmission of System Track Data.

# **Table 2 – Track Information UAP**

FRN	Data Item	Information	Length
1	1062/010	Data Source Identifier	2
2	-	Spare	-
3	1062/015	Service Identification	1
4	1062/070	Time Of Track Information	3
5	1062/105	Calculated Track Position (WGS-84)	8
6	1062/100	Calculated Track Position (Cartesian)	6
7	1062/185	Calculated Track Velocity (Cartesian)	4
FX	-	Field extension indicator	-
8	1062/210	Calculated Acceleration (Cartesian)	2
9	1062/060	Track Mode 3/A Code	2
10	1062/245	Target Identification	7
11	1062/380	Aircraft Derived Data	1+
12	1062/040	Track Number	2
13	1062/080	Track Status	1+
14	1062/290	System Track Update Ages	1+
FX	-	Field extension indicator	-
15	1062/200	Mode of Movement	1
16	1062/295	Track Data Ages	1+
17	1062/136	Measured Flight Level	2
18	1062/130	Calculated Track Geometric Altitude	2
19	1062/135	Calculated Track Barometric Altitude	2
20	1062/220	Calculated Rate Of Climb/Descent	2
21	1062/390	Flight Plan Related Data	1+
FX	-	Field extension indicator	-
22	1062/270	Target Size & Orientation	1+
23	1062/300	Vehicle Fleet Identification	1
24	1062/110	Mode 5 Data reports & Extended Mode 1 Code	1+
25	1062/120	Track Mode 2 Code	2
26	1062/510	Composed Track Number	3+
27	1062/500	Estimated Accuracies	1+
28	1062/340	Measured Information	1+
FX	-	Field extension indicator	-
29	-	Spare	

FRN	Data Item	Information	Length
30	-	Spare	-
31	-	Spare	-
32	-	Spare	-
33	-	Spare	-
34	RE	Reserved Expansion Field	1+
35	SP	Reserved For Special Purpose Indicator	1+
FX	-	Field extension indicator	-

**NOTE -** The Field Reference Number #2 is kept free in order to prevent a full incompatibility with previous releases of ASTERIX Cat. 062 already implemented.

### In the above table

- the first column indicates the Field Reference Number (FRN) associated to each Data Item used in the UAP;
- the fourth column gives the format and the length of each item, a stand-alone figure indicates the octet-count of a fixed-length Data Item, 1+ indicates a variable-length Data Item comprising a first part of 1 octet followed by noctets extents as necessary.