EUROCONTROL Specification for Surveillance Data Exchange ASTERIX

Part 9 Category 62
SDPS Track Messages

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ASTERIX Part 9 Category 062
SDPS Track Messages

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Abstract

This document describes the application of ASTERIX to the transmission of System Track Data.

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Data Category	Data Field	Data Item	ARTAS
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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

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0.27	Dec. 2002	Modification of I062/290 Modification of I062/295 Modification of I062/380 Modification of I062/100 – Suppression of I062/101 Modification of I062/105 – Suppression of I062/106 Suppression of I062/180 Re-organization of UAP •	5.2.20 5.2.21 5.2.24 5.2.7 5.2.8 5.3
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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

1) 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:**	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.
3.1.2	**Calculated Item:**	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 Data Items:**	List of all the possible Data Items of each Data Category describing the Data Items by their reference, structure, size and units (where applicable).
3.1.4	**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.
3.1.7	**Data Item:**	The smallest unit of information in each Data Category.
3.1.8	**Measured Item:**	A piece of information (e.g. the position of a target) directly 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 Profile:**	The mechanism for assigning Data Items to Data Fields, and containing all necessary information which needs to be standardised for the successful encoding and decoding of the messages.

3.2 Acronyms and Abbreviations

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

° Degree (angle)

ADS-B Automatic Dependent Surveillance - Broadcast
A-SMGCS Advanced Surface Movement Ground Control System
ASTERIX **A**ll Purpose **ST**ructured **EUROCONTROL** su**R**veillance **I**nformation E**X**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 su**R**veillance **D**ata **E**xchange **T**ask **F**orce
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

SURT	Surveillance Team (EATM)
UAP	User Application Profile (see Definitions)
UTC	Co-ordinated Universal Time
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 first record		**FSPEC**	Items of the last record

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”:

I062/080 (Track Status), Fifth Extension, Bit-5 (SFC)

I062/340 (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	Description	Resolution	Encoding Rules
I062/010	Data Source Identifier	N.A.	M
I062/015	Service Identification	N.A.	O
I062/040	Track Number	N.A.	M
I062/060	Track Mode 3/A Code	N.A.	O
I062/070	Time Of Track Information	1/128 s	M
I062/080	Track Status	N.A.	M
I062/100	Calculated Track Position (Cartesian)	0.5 m	O
I062/105	Calculated Track Position (WGS-84)	$180/2^{25}$ °	O
I062/110	Mode 5 Data reports & Extended Mode 1 Code	N.A.	O
I062/120	Track Mode 2 Code	N.A.	O
I062/130	Calculated Track Geometric Altitude	6.25 ft	O
I062/135	Calculated Track Barometric Altitude	1/4 FL	O
I062/136	Measured Flight Level	1/4 FL	O
I062/185	Calculated Track Velocity (Cartesian)	0.25 m/s	O
I062/200	Mode Of Movement	N.A.	O
I062/210	Calculated Acceleration (Cartesian)	0.25 m/s^2	O
I062/220	Calculated Rate Of Climb/Descent	6.25 ft/min	O
I062/245	Target Identification	N.A.	O
I062/270	Target Size & Orientation	Length/Width:1 m Orient.: 360°/128	O
I062/290	System Track Update Ages	N.A.	O
I062/295	Track Data Ages	N.A.	O
I062/300	Vehicle Fleet Identification	N.A.	O
I062/340	Measured Information	N.A.	O
I062/380	Aircraft Derived Data	N.A.	O
I062/390	Flight Plan Related Data	N.A.	O
I062/500	Estimated Accuracies	N.A.	O
I062/510	Composed Track Number	N.A.	O

NOTE: N.A. = Not Applicable

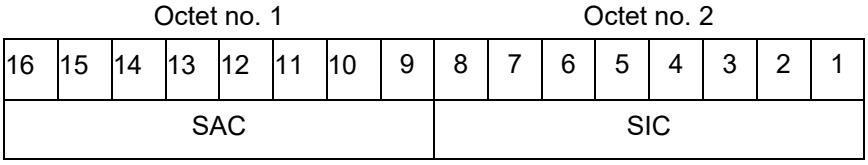
5.2 Description of Standard Data Items

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:



bits-16/9 (SAC) System Area Code
bits 8/1 (SIC) System Identification Code

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

Encoding Rule :

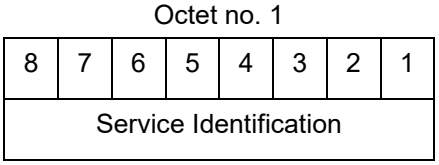
This Item shall be present in every ASTERIX record

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:



bits8/1 Service Identification

NOTE - the service identification is allocated by the system

Encoding Rule :

This Item is optional

5.2.3 Data Item I062/040, Track Number

Definition : Identification of a 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
TRACK NUMBER															

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.

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
V	G	CH	0	A4	A2	A1	B4	B2	B1	C4	C2	C1	D4	D2	D1

bit 16	(V)	= 0 Code validated = 1 Code not validated
bit 15	(G)	= 0 Default = 1 Garbled Code
bit 14	(CH)	Change in Mode 3/A = 0 No Change = 1 Mode 3/A has changed
bit-13		Spare bits set to 0
bits-12/1		Mode-3/A reply in octal representation

Encoding Rule :

This Item is optional

5.2.5 Data Item I062/070, 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 as UTC.

Format : Three-Octet fixed length data item.

Structure:

Octet no. 1

24	23	22	21	20	19	18	17
Time							

Octet no. 2 Octet no. 3

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Of Track Information															LSB

bit-16 (LSB) = 2^{-7} s = 1/128 s

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:

Octet no. 1

8	7	6	5	4	3	2	1
MON	SPI	MRH	SRC			CNF	FX

bit 8 (MON)
= 0 Multisensor track
= 1 Monosensor track

bit 7 (SPI)
= 0 default value
= 1 SPI present in the last report received from a sensor capable of decoding this data

bit 6 (MRH) Most Reliable Height
= 0 Barometric altitude (Mode C) more reliable
= 1 Geometric altitude more reliable

bits 5/3 (SRC) Source of calculated track altitude for I062/130
= 000 no source
= 001 GNSS
= 010 3D radar
= 011 triangulation
= 100 height from coverage
= 101 speed look-up table
= 110 default height
= 111 multilateration

bit 2 (CNF) =
= 0 Confirmed track
= 1 Tentative track

bit 1 (FX) =
= 0 end of data item
= 1 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).

I062/080 Track Status

Structure of First Extent:

Octet no. 1

8	7	6	5	4	3	2	1
SIM	TSE	TSB	FPC	AFF	STP	KOS	FX

bit-8	(SIM)	= 0	Actual track
		= 1	Simulated track
bit-7	(TSE)	= 0	default value
		= 1	last message transmitted to the user for the track
bit-6	(TSB)	= 0	default value
		= 1	first message transmitted to the user for the track
bit-5	(FPC)	= 0	Not flight-plan correlated
		= 1	Flight plan correlated
bit-4	(AFF)	= 0	default value
		= 1	ADS-B data inconsistent with other surveillance information
bit-3	(STP)	= 0	default value
		= 1	Slave Track Promotion
bit-2	(KOS)	= 0	Complementary service used
		= 1	Background service used
bit-1	(FX) =	= 0	End of data item
		= 1	Extension into next extent

I062/080 Track Status

Structure of Second Extent:

Octet no. 1

8	7	6	5	4	3	2	1
AMA	MD4		ME	MI	MD5		FX

bit 8	(AMA)	= 0	track not resulting from amalgamation process
		= 1	track resulting from amalgamation process
bits 7/6	(MD4)	= 00	No Mode 4 interrogation
		= 01	Friendly target
		= 10	Unknown target
		= 11	No reply
bit 5	(ME)	= 0	default value
		= 1	Military Emergency present in the last report received from a sensor capable of decoding this data
bit 4	(MI)	= 0	default value
		= 1	Military Identification present in the last report received from a sensor capable of decoding this data
bits 3/2	(MD5)	= 00	No Mode 5 interrogation
		= 01	Friendly target
		= 10	Unknown target
		= 11	No reply
bit 1	(FX)	= 0	End of data item
		= 1	Extension into next extent

I062/080 Track Status

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 (CST) = 0 Default value
= 1 Age of the last received track update is higher than system dependent threshold (coasting)

bit-7 (PSR) = 0 Default value
= 1 Age of the last received PSR track update is higher than system dependent threshold

bit-6 (SSR) = 0 Default value
= 1 Age of the last received SSR track update is higher than system dependent threshold

bit-5 (MDS) = 0 Default value
= 1 Age of the last received Mode S track update is higher than system dependent threshold

bit-4 (ADS) = 0 Default value
= 1 Age of the last received ADS-B track update is higher than system dependent threshold

bit-3 (SUC) = 0 Default value
= 1 Special Used Code (Mode A codes to be defined in the system to mark a track with special interest)

bit-2 (AAC) = 0 Default value
= 1 Assigned Mode A Code Conflict (same discrete Mode A Code assigned to another track)

bit-1 (FX) = = 0 End of data item
= 1 Extension 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.

I062/080 Track Status

Structure of Fourth Extent:

Octet no. 1

8	7	6	5	4	3	2	1
SDS		EMS			PFT	FPLT	FX

bits-8/7 (SDS) Surveillance Data Status
- = 00 Combined
- = 01 Co-operative only
- = 10 Non-Cooperative only
- = 11 Not defined

bits-6/4 (EMS) Emergency Status Indication
- = 0 No emergency
- = 1 General emergency
- = 2 Lifeguard / medical
- = 3 Minimum fuel
- = 4 No communications
- = 5 Unlawful interference
- = 6 “Downed” Aircraft
- = 7 Undefined

bit-3 (PFT)
- = 0 No indication
- = 1 Potential False Track Indication

bit-2 (FPLT)
- = 0 Default value
- = 1 Track created / updated with FPL data

bit-1 (FX) =
- = 0 End of data item
- = 1 Extension 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.

I062/080 Track Status

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 (DUPT) = 0 Default value
= 1 Duplicate Mode 3/A Code

bit-7 (DUPF) = 0 Default value
= 1 Duplicate Flight Plan

bit-6 (DUPM) = 0 Default value
= 1 Duplicate Flight Plan due to manual correlation

bit-5 (SFC) = 0 Default value
= 1 Surface target

bit-4 (IDD) = 0 No indication
= 1 Duplicate Flight-ID

bit-3 (IEC) = 0 Default value
= 1 Inconsistent Emergency Code

bit-2 Spare bit, set to 0

bit 1 (FX) = = 0 End of data item
= 1 Extension into 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.
5. 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).

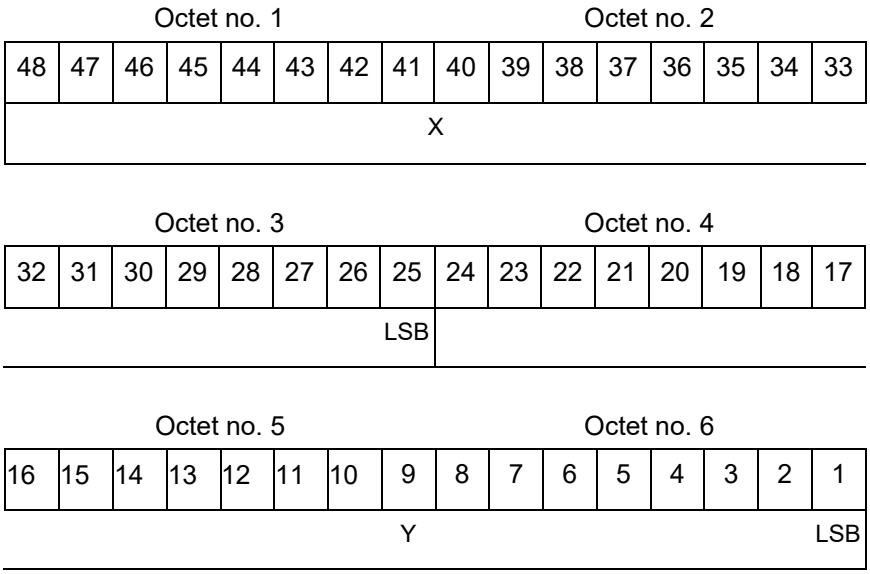
6. Bit 4 (IDD) is set to 1 when the Flight ID is present more than once in the surveillance area.
7. Bit 3 (IEC) is set to 1 when the comparison between various sources has revealed an inconsistency in the information contained about emergency codes.

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:



bits 48/25		X
bit 25	(LSB)	= 0.5 m
bits 24/1		Y
bit 1	(LSB)	= 0.5 m

Encoding Rule :

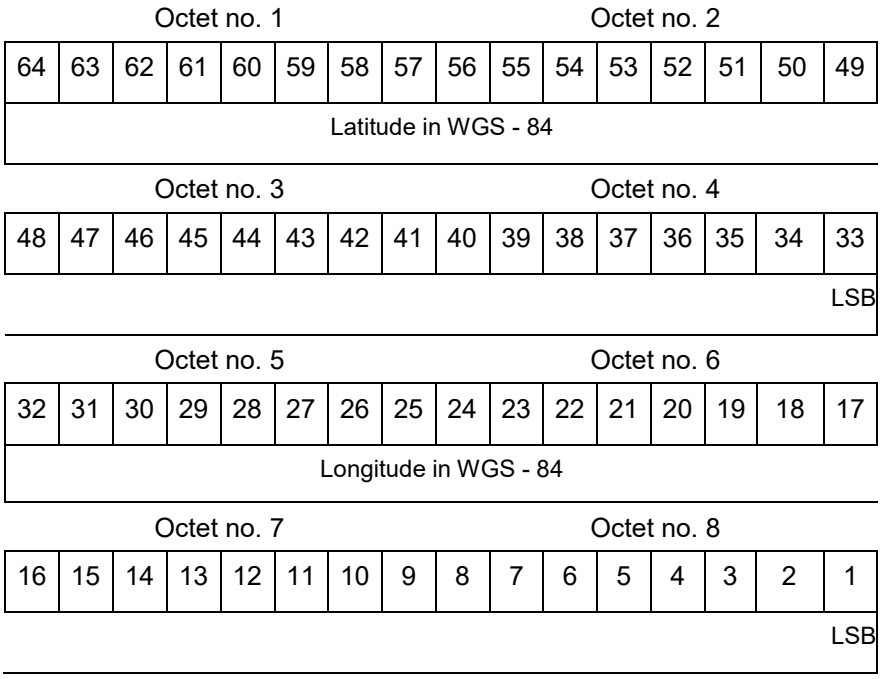
This Item is optional

5.2.8 Data Item I062/105, Calculated Position In WGS-84 Co-ordinates

Definition : Calculated Position in WGS-84 Co-ordinates with a resolution of $180/2^{25}$. degrees

Format : Eight-octet fixed length Data Item

Structure:



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

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

Structure of Subfield #1*:*
Mode 5 Summary:

Octet no. 1

8	7	6	5	4	3	2	1
M5	ID	DA	M1	M2	M3	MC	X

bit-8 (M5) = 0 No Mode 5 interrogation
= 1 Mode 5 interrogation

bit-7 (ID) = 0 No authenticated Mode 5 ID reply
= 1 Authenticated Mode 5 ID reply

bit-6 (DA) = 0 No authenticated Mode 5 Data reply or Report
= 1 Authenticated Mode 5 Data reply or Report (i.e any valid Mode 5 reply type other than ID)

bit-5 (M1) = 0 Mode 1 code not present or not from Mode 5 reply
= 1 Mode 1 code from Mode 5 reply.

bit-4 (M2) = 0 Mode 2 code not present or not from Mode 5 reply
= 1 Mode 2 code from Mode 5 reply.

bit-3 (M3) = 0 Mode 3 code not present or not from Mode 5 reply
= 1 Mode 3 code from Mode 5 reply.

bit-2 (MC) = 0 Mode C altitude not present or not from Mode 5 reply
= 1 Mode C altitude from Mode 5 reply

bit-1 (X) X-pulse from Mode 5 Data reply or Report.
= 0 X-pulse set to zero or no authenticated Data reply or Report received.
= 1 X-pulse set to one.

NOTES

1. 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.
3. 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.

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

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

Octet no. 1 Octet no. 2

32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
0	0	PIN													

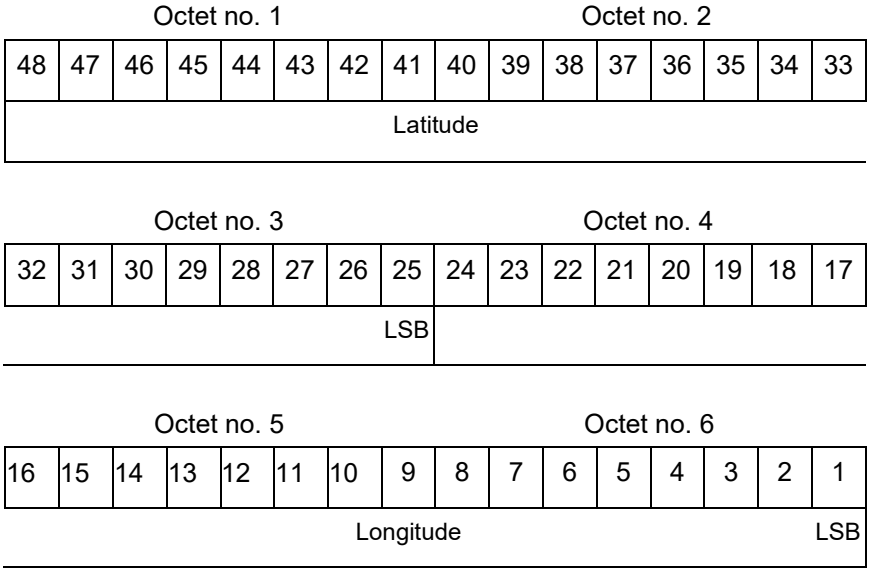
Octet no. 3 Octet no. 4

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
0	0	0	NAT					0	0	MIS					

bits-32/31	(spare)	spare bits set to 0
bits-30/17	(PIN)	PIN Code
bits-16/14	(spare)	spare bits set to 0
bits-13/9	(NAT)	National Origin
bits-8/7	(spare)	spare bits set to 0
bits-6/1	(MIS)	Mission Code

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

Structure of Subfield #3*:*
Mode 5 Reported Position



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

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

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-16 (spare) spare bit set to 0

bit-15 (RES) Resolution with which the GNSS-derived Altitude (GA) is reported.
=0 GA reported in 100 ft increments,
=1 GA reported in 25 ft increments.

bits-14/1 (GA) GNSS-derived Altitude of target, expressed as height above WGS 84 ellipsoid.

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.

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

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

	Octet 1								Octet 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
0	0	0	0	Extended Mode 1 Code											
				A4	A2	A1	B4	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.

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

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

Octet no. 1

8	7	6	5	4	3	2	1
TOS							(LSB)

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.

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

Structure of Subfield #7:
X Pulse Presence

Octet no. 1

8	7	6	5	4	3	2	1
0	0	0	X5	XC	X3	X2	X1

bits-8/6 spare bits set to zero

bit-5 (X5) X-pulse from Mode 5 Data reply or Report.
= 0 X-pulse set to zero or no authenticated Data reply or Report received.
= 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 I062/120, 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 :

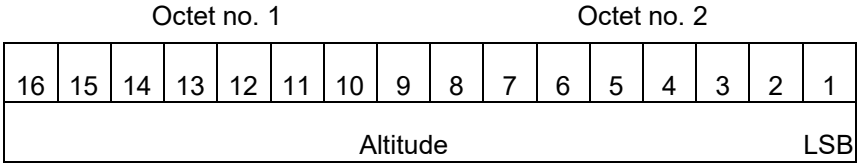
This Item is optional

5.2.11 Data Item I062/130, 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 :

This Item is optional

5.2.12 Data Item I062/135, Calculated Track Barometric Altitude

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

Format : Two-Octet fixed length data item.

Structure:

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

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

bits-15/1 Calculated Track Barometric Altitude
(LSB) = 1/4 FL = 25 ft
Vmin = -15 FL
Vmax = 1500 FL

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

Encoding Rule :

This Item is optional

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:

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

bits- 16/1 Measured Flight Level

(LSB)	= 1/4 FL
Vmin	= -15 FL
Vmax	= 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 :

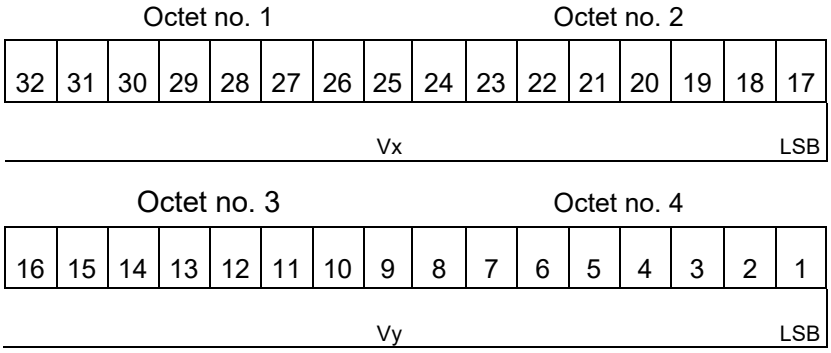
This Item is optional

5.2.14 Data Item I062/185, 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
$-8192\text{m/s} \leq Vx \leq 8191.75\text{m/s}$

bits-16/1 Vy
(LSB) = 0.25 m/s
$-8192\text{m/s} \leq Vy \leq 8191.75\text{m/s}$

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

Encoding Rule :

This Item is optional

5.2.15 Data Item I062/200, 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		LONG		VERT		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 :

This Item is optional

5.2.16 Data Item I062/210, 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:

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

bits-16/9 Ax
(LSB) = 0.25 m/s^2

bits-8/1 Ay
(LSB) = 0.25 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 :

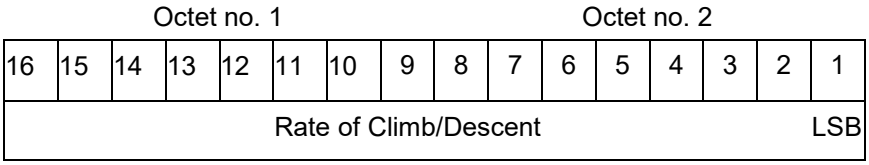
This Item is optional

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 :

This Item is optional

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						Character 2						Character 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						Character 5							

Octet no. 6 Octet no. 7

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

This Item is optional

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:

Octet no. 1

8	7	6	5	4	3	2	1
LENGTH						LSB	FX

bit-2 (LSB) = 1 m
bit-1 (FX) = 0 End of Data Item
= 1 Extension into first extent

Structure of First Extent:

Octet no. 1

8	7	6	5	4	3	2	1
ORIENTATION						LSB	FX

bit-2 (LSB) = 360° / 128 = approx. 2.81°
bit-1 (FX) = 0 End of Data Item
= 1 Extension into next extent

I062/270, Target Size & Orientation

Structure of Second Extent:

Octet no. 1

8	7	6	5	4	3	2	1
WIDTH						LSB	FX

bit-2 (LSB) = 1 m
bit-1 (FX) = 0 End of Data Item
= 1 Extension into next 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 :

This Item is optional

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.

Format : Compound Data Item, comprising a primary subfield of up to two octets, followed by the indicated subfields.

Structure of Primary Subfield:

Octet no. 1

16	15	14	13	12	11	10	9
TRK	PSR	SSR	MDS	ADS	ES	VDL	FX

Octet no. 2

8	7	6	5	4	3	2	1
UAT	LOP	MLT	0	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 age
= 0 Absence of Subfield #6
= 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

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

Octet no. 1

8	7	6	5	4	3	2	1
TRK							LSB

bits-8/1	(TRK)	Actual track age since first occurence
bit-1	(LSB)	= 1/4 s Maximum value =63.75s

Item I062/290, System Track Update Ages

Structure of Subfield # 2:

PSR Age

Octet no. 1

8	7	6	5	4	3	2	1
PSR							LSB

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

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

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

Octet no. 1 Octet no. 2

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
ADS															LSB

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

Octet no. 1

8	7	6	5	4	3	2	1
ES							LSB

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

Octet no. 1

8	7	6	5	4	3	2	1
VDL							LSB

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

Octet no. 1

8	7	6	5	4	3	2	1
UAT							LSB

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

Structure of Subfield # 9:

Loop Age

Octet no. 1

8	7	6	5	4	3	2	1
LOP							LSB

bits-8/1	(LOP)	Age of the last magnetic loop detection
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 10:

Multilateration Age

Octet no. 1

8	7	6	5	4	3	2	1
MLT							LSB

bits-8/1	(MLT)	Age of the last MLT detection
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

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:

Octet no. 1

40	39	38	37	36	35	34	33
MFL	MD1	MD2	MDA	MD4	MD5	MHG	FX

Octet no. 2

32	31	30	29	28	27	26	25
IAS	TAS	SAL	FSS	TID	COM	SAB	FX

Octet no. 3

24	23	22	21	20	19	18	17
ACS	BVR	GVR	RAN	TAR	TAN	GSP	FX

Octet no. 4

16	15	14	13	12	11	10	9
VUN	MET	EMC	POS	GAL	PUN	MB	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 set 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							LSB

bits-8/1	(MFL)	Age of the last valid and credible Mode C code or barometric altitude from ADS-B used to update the track (I062/136)
bit-1	(LSB)	= 1/4 s Maximum value =63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 2:

Mode 1 Age

Octet no. 1

8	7	6	5	4	3	2	1
MD1							LSB

bits-8/1	(MD1)	Age of the last valid and credible Mode 1 code used to update the track (I062/110)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 3:

Mode 2 Age

Octet no. 1

8	7	6	5	4	3	2	1
MD2							LSB

bits-8/1	(MD2)	Age of the last valid and credible Mode 2 code used to update the track (I062/120)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 4:

Mode 3/A Age

Octet no. 1

8	7	6	5	4	3	2	1
MDA							LSB

bits-8/1	(MDA)	Age of the last valid and credible Mode 3/A code used to update the track (I062/060)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 5:

Mode 4 Age

Octet no. 1

8	7	6	5	4	3	2	1
MD4							LSB

bits-8/1	(MD4)	Age of the last valid and credible Mode 4 code used to update the track
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 6:

Mode 5 Age

Octet no. 1

8	7	6	5	4	3	2	1
MD5							LSB

bits-8/1	(MD5)	Age of the last valid and credible Mode 5 code used to update the track (I062/110)
bit-1	(LSB)	= 1/4 s Maximum 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)	Age of the DAP “Magnetic Heading” in item 062/380 (Subfield #3)
bit-1	(LSB)	= 1/4 s Maximum value =63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 8

Indicated Airspeed / Mach Nb age

Octet no. 1

8	7	6	5	4	3	2	1
IAS							LSB

bits-8/1	(IAS)	Age of the DAP “Indicated Airspeed / Mach Number” in item 062/380 (Subfield #4)
bit-1	(LSB)	= 1/4 s Maximum value =63.75s

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

Octet no. 1

8	7	6	5	4	3	2	1
TAS							LSB

bits-8/1	(TAS)	Age of the DAP “True Airspeed” in item 062/380 (Subfield #5)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 10

Selected Altitude Age

Octet no. 1

8	7	6	5	4	3	2	1
SAL							LSB

bits-8/1	(SAL)	Age of the DAP “Selected Altitude” in item 062/380 (Subfield #6)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 11:

Final State Selected Altitude Age

Octet no. 1

8	7	6	5	4	3	2	1
FSS							LSB

bits-8/1	(FSS)	Age of the DAP “Final State Selected Altitude” in item 062/380 (Subfield #7)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 12:

Trajectory Intent Age

Octet no. 1

8	7	6	5	4	3	2	1
TID							LSB

bits-8/1	(TID)	Age of the DAP “Trajectory Intent” in item 062/380 (Subfield #8)
bit-1	(LSB)	= 1/4 s 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	1
COM							LSB

bits-8/1	(COM)	Age of the DAP “Communication/ACAS Capability and Flight Status” in item 062/380 (Subfield #10)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 14:

Status Reported by ADS-B Age

Octet no. 1

8	7	6	5	4	3	2	1
SAB							LSB

bits-8/1	(SAB)	Age of the DAP “Status Reported by ADS-B” in item 062/380 (Subfield #11)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 15:

ACAS Resolution Advisory Report Age

Octet no. 1

8	7	6	5	4	3	2	1
ACS							LSB

bits-8/1	(ACS)	Age of the DAP “ACAS Resolution Advisory Report” in item 062/380 (Subfield #12)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 16:

Barometric Vertical Rate Age

Octet no. 1

8	7	6	5	4	3	2	1
BVR							LSB

bits-8/1	(BVR)	Age of the DAP “Barometric Vertical Rate” in item 062/380 (Subfield #13)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 17:

Geometrical Vertical Rate Age

Octet no. 1

8	7	6	5	4	3	2	1
GVR							LSB

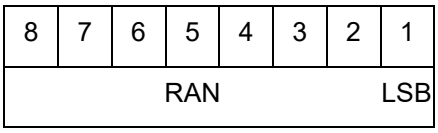
bits-8/1	(GVR)	Age of the DAP “Geometrical Vertical Rate” in item 062/380 (Subfield #14)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 18:

Roll Angle Age

Octet no. 1

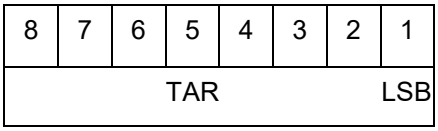


bits-8/1	(RAN)	Age of the DAP “Roll Angle” in item 062/380 (Subfield #15)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 19:

Track Angle Rate Age

Octet no. 1

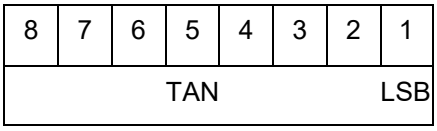


bits-8/1	(TAR)	Age of the DAP “Track Angle Rate” in item 062/380 (Subfield #16)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 20:

Track Angle Age

Octet no. 1



bits-8/1	(TAN)	Age of the DAP “Track Angle” in item 062/380 (Subfield #17)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 21:

Ground Speed Age

Octet no. 1

8	7	6	5	4	3	2	1
GSP							LSB

bits-8/1	(GSP)	Age of the DAP “Ground Speed” in item 062/380 (Subfield #18)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 22:

Velocity Uncertainty Age

Octet no. 1

8	7	6	5	4	3	2	1
VUN							LSB

bits-8/1	(VUN)	Age of the DAP “Velocity Uncertainty” in item 062/380 (Subfield #19)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure Subfield # 23:

Meteorological Data Age

Octet no. 1

8	7	6	5	4	3	2	1
MET							LSB

bits-8/1	(MET)	Age of the DAP “Meteorological Data” in item 062/380 (Subfield #20)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 24:

Emitter Category Age

Octet no. 1

8	7	6	5	4	3	2	1
EMC							LSB

bits-8/1	(EMC)	Age of the DAP “Emitter Category” in item 062/380 (Subfield #21)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 25:

Position Age

Octet no. 1

8	7	6	5	4	3	2	1
POS							LSB

bits-8/1	(POS)	Age of the DAP “Position” in item 062/380 (Subfield #23)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 26:

Geometric Altitude Age

Octet no. 1

8	7	6	5	4	3	2	1
GAL							LSB

bits-8/1	(GAL)	Age of the DAP “Geometric Altitude” in item 062/380 (Subfield #24)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 27:

Position Uncertainty Age

Octet no. 1

8	7	6	5	4	3	2	1
PUN							LSB

bits-8/1	(PUN)	Age of the DAP “Position Uncertainty” in item 062/380 (Subfield #25)
bit-1	(LSB)	= 1/4 s Maximum 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)	Age of the DAP “Mode S MB Data” in item 062/380 (Subfield #22)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Item I062/295, Track Data Ages

Structure of Subfield # 29:

Indicated Airspeed Data Age

Octet no. 1

8	7	6	5	4	3	2	1
IAR							LSB

bits-8/1	(IAR)	Age of the DAP “Indicated Airspeed” in item 062/380 (Subfield #26)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 30:

Mach Number Data Age

Octet no. 1

8	7	6	5	4	3	2	1
MAC							LSB

bits-8/1	(MAC)	Age of the DAP “Mach Number” in item 062/380 (Subfield #27)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

Structure of Subfield # 31:

Barometric Pressure Setting Data Age

Octet no. 1

8	7	6	5	4	3	2	1
BPS							LSB

bits-8/1	(BPS)	Age of the DAP “Barometric Pressure Setting” in item 062/380 (Subfield #28)
bit-1	(LSB)	= 1/4 s Maximum value = 63.75s

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:

Octet no. 1

8	7	6	5	4	3	2	1
VFI							

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 I062/340, 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) Subfield #1: Sensor Identification
= 0 Absence of Subfield #1
= 1 Presence of Subfield #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) Subfield #4: Last Measured Mode C code
= 0 Absence of Subfield #4
= 1 Presence of Subfield #4

bit-4 (MDA) Subfield #5: Last Measured Mode 3/A code
= 0 Absence of Subfield #5
= 1 Presence of Subfield #5

bit-3 (TYP) Subfield #6: Report Type
= 0 Absence of Subfield #6
= 1 Presence of Subfield #6

bit-2 (spare) Spare bit set to zero

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

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 I062/340, Measured Information

Structure of Subfield # 1:
Sensor Identification

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

bits 16/9	(SAC)	System Area Code
bits 8/1	(SIC)	System Identification Code

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

Octet no. 1								Octet no. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
RHO															LSB

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

bits 32/17	(RHO)	Measured distance:
bit 17	(LSB)	= 1/256 NM Maximum value = 256 NM
bits 16/1	(THETA)	Measured azimuth
bit 1	(LSB)	= $360° / 2^{16} \cong 0.0055°$

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 bias-corrected polar co-ordinates.

Data Item I062/340, Measured Information

Structure of Subfield # 3:

Measured 3-D Height in Two's Complement

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

bits-16/1 Height
(LSB) = 25 feet

NOTE - The reference level for this height information is the same as the reference level applied by the sensor system providing this information.

Structure of Subfield # 4:

Last Measured Mode C Code

	Octet no. 1								Octet no. 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
V	G	Last Measured Mode C Code													LSB

bit-16 (V) = 0 Code validated
= 1 Code not validated

bit-15 (G) = 0 Default
= 1 Garbled code

bit 14/1 Last Measured Mode C Code, in two's complement form
(LSB) = 1/4 FL
Vmin = -12 FL
Vmax = 1270 FL

Data Item I062/340, 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
V	G	L	0	A4	A2	A1	B4	B2	B1	C4	C2	C1	D4	D2	D1

bit 16	(V)	= 0	Code Validated
		= 1	Code not Validated
bit 15	(G)	= 0	Default
		= 1	Garbled code
bit 14	(L)	= 0	MODE 3/A code as derived from the reply of the transponder,
		= 1	Smoothed MODE 3/A code as provided by a sensor local tracker.
bit 13			Spare bit set to zero
bits 12/1			Mode 3/A reply under the form of 4 digits in octal representation

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

8	7	6	5	4	3	2	1
TYP			SIM	RAB	TST	0	0

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

Encoding Rule :

This Item is optional

5.2.24 Data Item I062/380, Aircraft Derived Data

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	COM	SAB	ACS	BVR	GVR	FX

Octet no. 3

16	15	14	13	12	11	10	9
RAN	TAR	TAN	GSP	VUN	MET	EMC	FX

Octet no. 4

8	7	6	5	4	3	2	1
POS	GAL	PUN	MB	IAR	MAC	BPS	FX

bit-32 (ADR) Subfield #1: Target Address
= 0 Absence of Subfield #1
= 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
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
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 = 0 Absence of Subfield #13 = 1 Presence of Subfield #13
bit-18	(GVR)	Subfield #14: Geometric Vertical Rate = 0 Absence of Subfield #14 = 1 Presence of Subfield #14
bit-17	FX	Extension indicator = 0 no extension = 1 extension
bit-16	(RAN)	Subfield #15: Roll Angle = 0 Absence of Subfield #15 = 1 Presence of Subfield #15

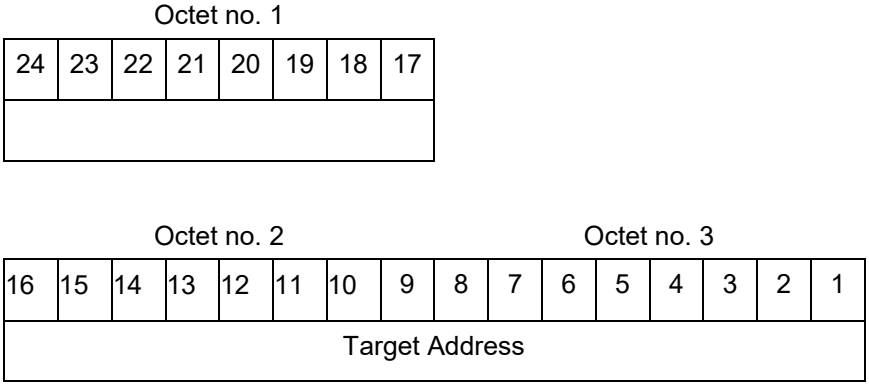
bit-15	(TAR)	Subfield #16: Track Angle Rate = 0 Absence of Subfield #16 = 1 Presence of Subfield #16
bit-14	(TAN)	Subfield #17: Track Angle = 0 Absence of Subfield #17 = 1 Presence of Subfield #17
bit-13	(GSP)	Subfield #18: Ground Speed = 0 Absence of Subfield #18 = 1 Presence of Subfield #18
bit-12	(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 I062/380, Aircraft Derived Data

Structure of Subfield # 1:

Target Address



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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 2:

Target Identification

Octet no. 1						Octet no. 2									
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Character 1						Character 2						Character 3/1			

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

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

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

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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 4:

Indicated Airspeed / Mach No

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

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

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

bits-16/1 True Air Speed

(LSB) = 1 knot

$0 \leq$ True Air Speed $\leq$ 2046 knots

Data Item I062/380, Aircraft Derived Data

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

bit-16	(SAS)	= 0	No source information provided
		= 1	Source Information provided
bit-15/14	(Source)	= 00	Unknown
		= 01	Aircraft Altitude
		= 10	FCU/MCP Selected Altitude
		= 11	FMS Selected Altitude
bits- 13/1	(Altitude)	Altitude in two’s complement form LSB=25ft -1300ft ≤ Altitude ≤ 100000ft	

Data Item I062/380, Aircraft Derived Data

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

bit-16 (MV) Manage Vertical Mode
= 0 Not active
= 1 Active

bit-15 (AH) Altitude Hold
= 0 Not active
= 1 Active

bit-14 (AM) Approach Mode
= 0 Not active
= 1 Active

bits- 13/1 (Altitude) Altitude in two's complement form
LSB=25ft
-1300ft $\leq$ Altitude $\leq$ 100000ft

Data Item I062/380, Aircraft Derived Data

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

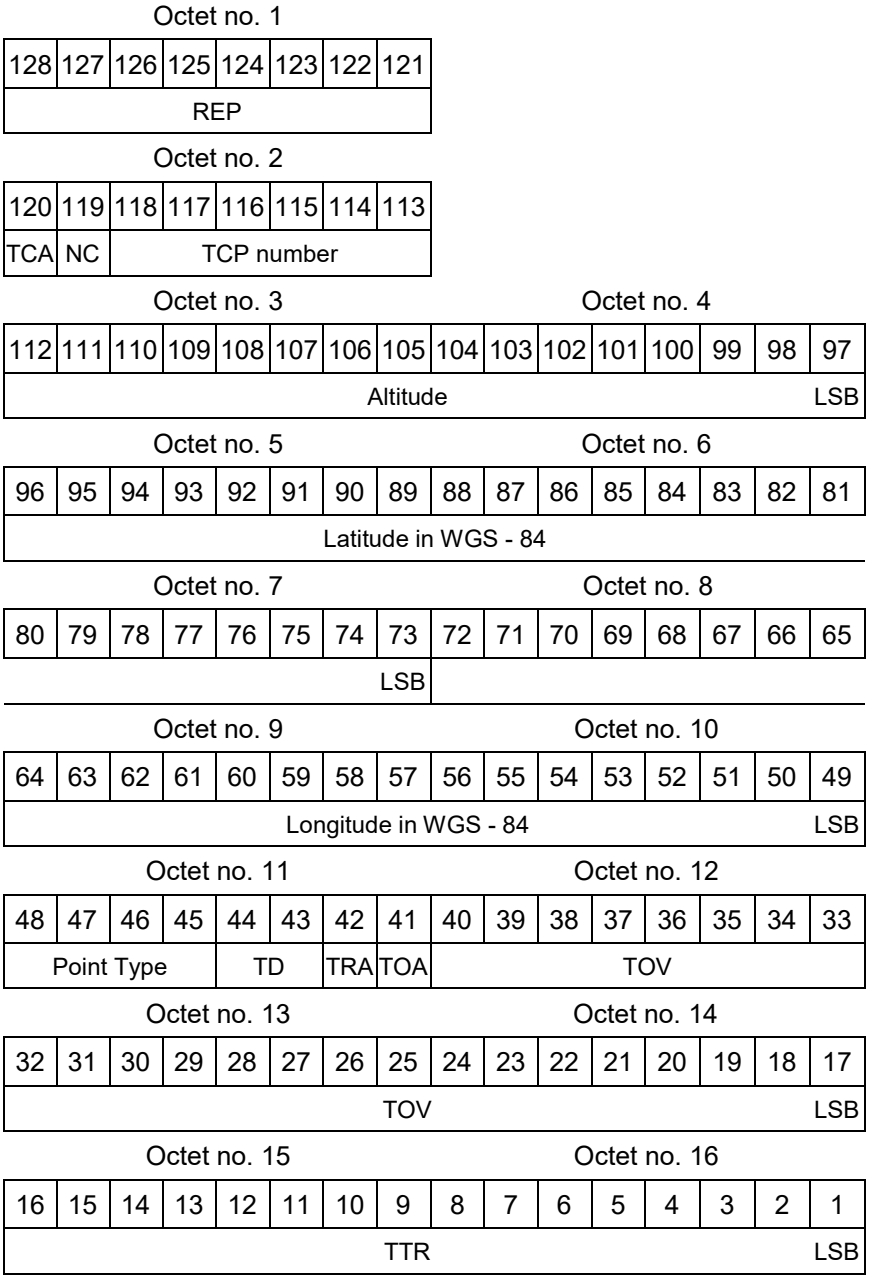
bit-8	(NAV)	= 0	Trajectory Intent Data is available for this aircraft
		= 1	Trajectory Intent Data is not available for this aircraft
bit-7	(NVB)	= 0	Trajectory Intent Data is valid
		= 1	Trajectory Intent Data is not valid
bits-6/2	Spare Bits set to zero		
bit-1	(FX)	= 0	End of Data Item
		= 1	Extension into next extent

Data Item I062/380, Aircraft Derived Data

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



Data Item I062/380, Aircraft Derived Data, Subfield #9: Trajectory Intent Data

bits-128/121	(REP)	Repetition Factor
bit-120	(TCA)	= 0 TCP number available = 1 TCP number not available
bit-119	(NC)	= 0 TCP compliance = 1 TCP non-compliance
bits-118/113	(TCP Number)	Trajectory Change Point number
bits-112/97	(Altitude)	Altitude in two's complement. LSB= 10ft -1500 ft ≤ altitude ≤ 150000 ft
bits-96/73	(Latitude)	In WGS.84 in two's complement. -90 ≤ latitude ≤ 90 deg. LSB = $180/2^{23}$ deg. = approx.$2.145767*10^{-05}$ deg.
bits-72/49	(Longitude)	In WGS.84 in two's complement. -180 ≤ longitude < 180 LSB = $180/2^{23}$ deg. = approx.$2.145767*10^{-05}$ deg.
bits-48/45	Point Type	= 0 Unknown = 1 Fly by waypoint (LT) = 2 Fly over waypoint (LT) = 3 Hold pattern (LT) = 4 Procedure hold (LT) = 5 Procedure turn (LT) = 6 RF leg (LT) = 7 Top of climb (VT) = 8 Top of descent (VT) = 9 Start of level (VT) = 10 Cross-over altitude (VT) = 11 Transition altitude (VT)
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)	= 0 TOV available = 1 TOV not available
bits-40/17	(TOV)	Time Over Point LSB = 1 second
bits-16/1	(TTR)	TCP Turn radius LSB = 0.01 Nm 0 ≤ TTR ≤ 655.35 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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 10:

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

Octet no. 1									Octet no. 2						
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
COM			STAT			0	0	SSC	ARC	AIC	B1A	B1B			

bits-16/14 (COM) Communications capability of the transponder
- = 0 No communications capability (surveillance only)
- = 1 Comm. A and Comm. B capability
- = 2 Comm. A, Comm. B and Uplink ELM
- = 3 Comm. A, Comm. B, Uplink ELM and Downlink ELM
- = 4 Level 5 Transponder capability

5 to 7 Not assigned

bits-13/11 (STAT) Flight Status
- = 0 No alert, no SPI, aircraft airborne
- = 1 No alert, no SPI, aircraft on ground
- = 2 Alert, no SPI, aircraft airborne
- = 3 Alert, no SPI, aircraft on ground
- = 4 Alert, SPI, aircraft airborne or on ground
- = 5 No alert, SPI, aircraft airborne or on ground
- = 6 Not defined
- = 7 Unknown or not yet extracted

bit-10/9 Spare bit set to zero

bit-8 (SSC) Specific service capability
- = 0 No
- = 1 Yes

bit-7 (ARC) Altitude reporting capability
- = 0 100 ft resolution
- = 1 25 ft resolution

bit-6 (AIC) Aircraft identification capability
- = 0 No
- = 1 Yes

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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 11:

Status reported by ADS-B

Octet no. 1									Octet no. 2						
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
AC		MN		DC		GBS	0	0	0	0	0	0	STAT		

bits-16/15 (AC) 00 = unknown
01 = ACAS not operational
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
01 = Differential correction
10 = No differential correction
11 = invalid

bit-10 (GBS) = 0 Transponder Ground Bit not set or unknown
= 1 Transponder Ground Bit set

bits-9/4 spare bits set to zero

bits-3/1 (STAT) Flight Status
= 0 No emergency
= 1 General emergency
= 2 Lifeguard / medical
= 3 Minimum fuel
= 4 No communications
= 5 Unlawful interference
= 6 “Downed” Aircraft
= 7 Unknown

Data Item I062/380, Aircraft Derived Data

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

56	55	54	53	52	51	50	49

Octet no. 2

48	47	46	45	44	43	42	41

Octet no. 3

40	39	38	37	36	35	34	33

Octet no. 4

32	31	30	29	28	27	26	25

Octet no. 5

24	23	22	21	20	19	18	17

Octet no. 6

16	15	14	13	12	11	10	9

Octet 7

8	7	6	5	4	3	2	1

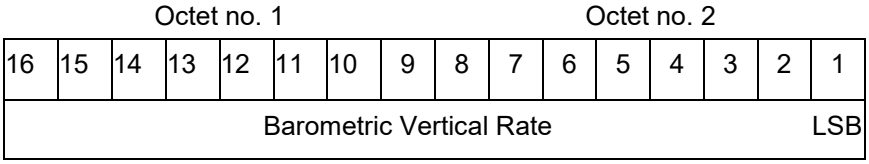
bits-56/1 (MB Data) 56-bit message conveying Mode S Comm B message data of BDS Register 3,0

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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 13:

Barometric Vertical Rate

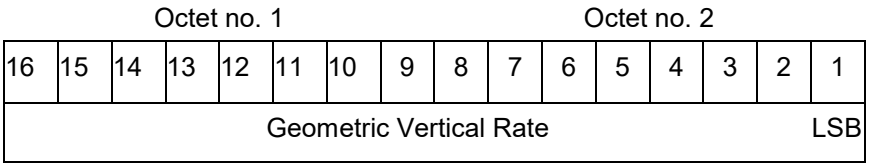


bits-16/1 Barometric Vertical Rate in two's complement form

(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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 15:

Roll Angle

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

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

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

Structure of Subfield # 16:

Track Angle Rate

Octet no. 1								Octet no. 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
TI		0	0	0	0	0	0	Rate of Turn						LSB	0

bits-16/15 (TI) Turn Indicator
00 = Not available
01 = Left
10 = Right
11 = Straight

bits-14/9 spare bits set to zero

bits-8/2 Rate of Turn in two's complement form
(LSB) = 2^{-2} °/s = 1/4 °/s
-15 °/s $\leq$ Rate of Turn $\leq$ 15 °/s

bit 1 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.

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 17:
Track Angle

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

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

Structure of Subfield # 18:
Ground Speed

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

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

Structure of Subfield # 19:
Velocity Uncertainty

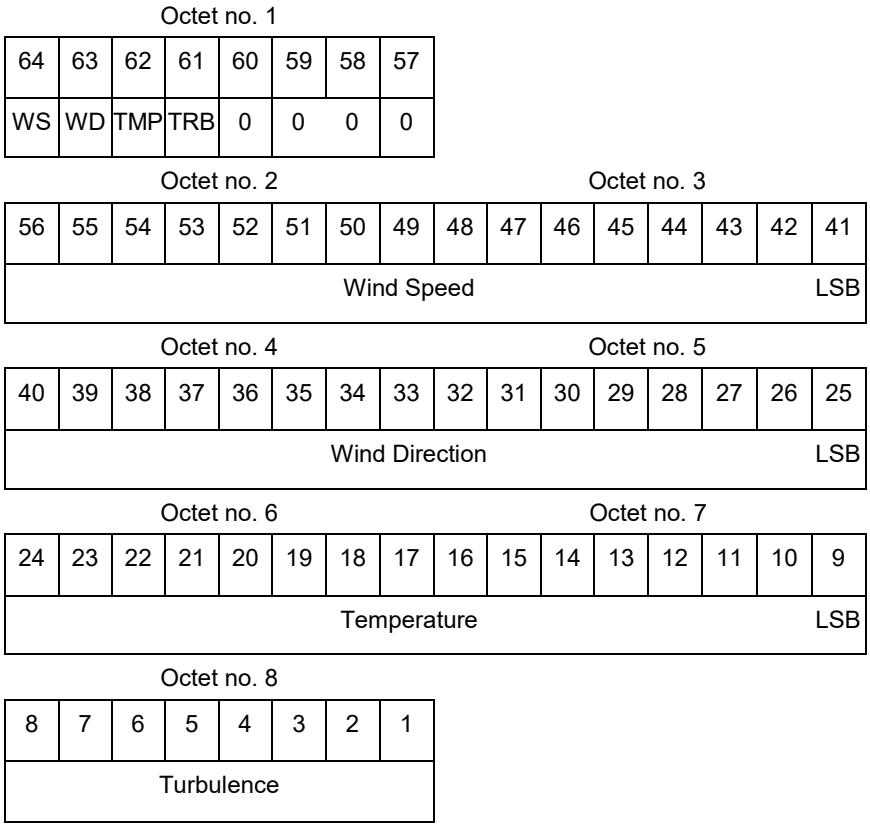
Octet no. 1							
8	7	6	5	4	3	2	1
Velocity Uncertainty Category							

NOTE - Velocity uncertainty category of the least accurate velocity component

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 20:

Met Data



bit-64	(WS)	= 0 Not valid Wind Speed = 1 Valid Wind Speed
bit-63	(WD)	= 0 Not valid Wind Direction = 1 Valid Wind Direction
bit-62	(TMP)	= 0 Not valid Temperature = 1 Valid Temperature
bit-61	(TRB)	= 0 Not valid Turbulence = 1 Valid Turbulence
bits-60/57	(spare)	Spare Bits set to zero
bits-56/41		Wind Speed (LSB) = 1 knot $0 \leq$ Wind Speed ≤ 300
bits-40/25		Wind Direction (LSB) = 1 degree $1 \leq$ Wind Direction ≤ 360
bits-24/9		Temperature in degrees celsius

(LSB) = 0.25 °C
-100 °C ≤ Temperature ≤ 100 °C

bits-8/1 Turbulence
Integer between 0 and 15 inclusive

Data Item I062/380, 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 kg ≤ 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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 22:

Position

Octet no. 1								Octet no. 2							
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	25	24	23	22	21	20	19	18	17
							LSB								
Octet no. 5								Octet no. 6							
16 151 6	15 15	14 14	13 13	12 12	11 11	10 10	9	8	7	6	5	4	3	2	1
Longitude in WGS - 84															LSB

bits-48/25	(Latitude)	In WGS.84 in two's complement form. Range -90 ≤ latitude ≤ 90 deg. LSB = $180/2^{23}$ degrees = $2.145767 * 10^{-05}$ degrees. This corresponds to a resolution of at least 2.4 meters
bits-24/1	(Longitude)	In WGS.84 in two's complement form. Range -180 ≤ longitude < 180 deg. LSB = $180/2^{23}$ degrees = $2.145767 * 10^{-05}$ degrees. This corresponds to a resolution of at least 2.4 meters.

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

Data Item I062/380, Aircraft Derived Data

Structure of Subfield # 23:

Geometric Altitude

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

bit 16/1 (Altitude) Altitude in two's complement form
-1500 ft ≤ Altitude ≤ 150000 ft
(LSB) = 6.25 ft

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

Structure of Subfield # 24:

Position Uncertainty

Octet no. 1							
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

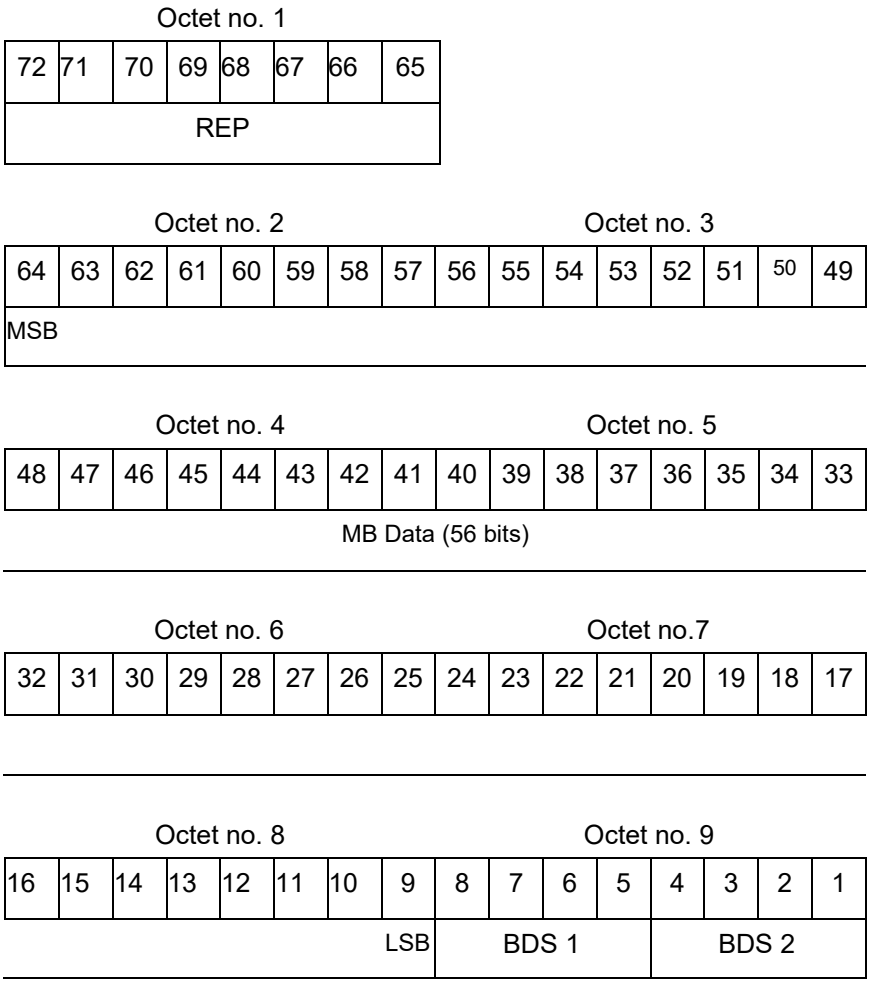
Data Item I062/380, Aircraft Derived Data

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:



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 I062/380, Aircraft Derived Data

Structure of Subfield # 26:

Indicated Airspeed

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

bit 16/1 0 Kt ≤ Indicated Airspeed ≤ 1100 Kt
(LSB) = 1 Kt

Structure of Subfield # 27

Mach Number

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

bit 16/1 0 ≤ Mach Number ≤ 4.096
(LSB) = Mach 0.008

Structure of Subfield # 28:
Barometric Pressure Setting

	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	Barometric Pressure Setting											LSB

bit-16/13 Spare bits set to 0.
bits- 12/1 (BPS) LSB=0.1mb

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

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

NOTE - As of Edition 1.19 the note “(derived from Mode S BDS 4,0)” has been removed to allow transmission of BPS received via ADS-B.

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
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		Spare bits set to zero
bit-1	FX	Extension indicator = 0 no extension = 1 extension

Data Item I062/390, Flight Plan Related Data

Structure of Subfield # 1:

FPPS Identification Tag

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

bits 16/9	(SAC)	System Area Code
bits 8/1	(SIC)	System Identity Code

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

Data Item I062/390, Flight Plan Related Data

Structure of Subfield # 2:

Callsign

Octet no. 1

56	55	54	53	52	51	50	49
Character 1							

Octet no. 2								Octet no. 3							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Character 2								Character 3							

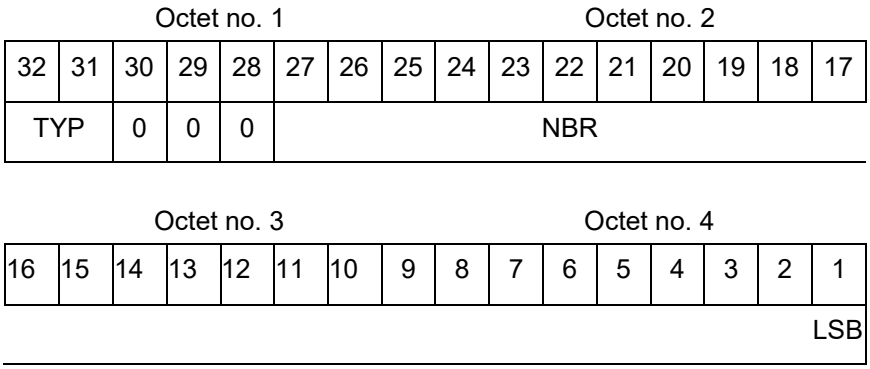
Octet no. 4								Octet no. 5							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Character 4								Character 5							

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

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 I062/390, Flight Plan Related Data

Structure of Subfield # 3:
IFPS_FLIGHT_ID



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 I062/390, Flight Plan Related Data

Structure of Subfield # 4:
Flight Category

Octet no. 1

8	7	6	5	4	3	2	1
GAT/OAT		FR1/FR2		RVSM		HPR	0

bits 8/7	(GAT/OAT)	= 00	Unknown
		= 01	General Air Traffic
		= 10	Operational Air Traffic
		= 11	Not applicable
bits 6/5	(FR1/FR2)	= 00	Instrument Flight Rules
		= 01	Visual Flight rules
		= 10	Not applicable
		= 11	Controlled Visual Flight Rules
bits 4/3	(RVSM)	= 00	Unknown
		= 01	Approved
		= 10	Exempt
		= 11	Not Approved
bit 2	(HPR)	= 0	Normal Priority Flight
		= 1	High Priority Flight
bit 1	Spare bit set to zero		

Data Item I062/390, Flight Plan Related Data

Structure of Subfield # 5:
Type of Aircraft

Octet no. 1								Octet no. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Character 1								Character 2							

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

Octet no. 1							
8	7	6	5	4	3	2	1
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 I062/390, Flight Plan Related Data

Structure of Subfield # 7:
Departure Airport

Octet no. 1								Octet no. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Character 1								Character 2							

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

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

Octet no. 1								Octet no. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Character 1								Character 2							

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

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

Octet no. 1								Octet no. 2							
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
NU1								NU2							

Octet no. 3							
8	7	6	5	4	3	2	1
LTR							

bits 24/17	(NU1)	First number
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

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

bits 16/1	(CFL)	
	LSB = 1/4 FL	
	Range: 0 ≤ CFL ≤ 1500FL	

Data Item I062/390, Flight Plan Related Data

Structure of Subfield # 11:
Current Control Position

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

bits 16/9 (Centre) 8-bit group Identification code

bits 8/1 (Position) 8-bit Control Position identification code

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. 1

40	39	38	37	36	35	34	33
REP							

Octet no. 2

32	31	30	29	28	27	26	25
TYP					DAY		0

Octet no. 3 Octet no. 4

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	SEC					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
bits-25/22	spare bits set to zero	
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)	= 0 Seconds available = 1 Seconds not available
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

Octet no. 1								Octet no. 2							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Character 1								Character 2							

Octet no. 3								Octet no. 4							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Character 3								Character 4							

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

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

Data Item I062/390, Flight Plan Related Data

Structure of Subfield # 14:
Stand Status

Octet no. 1

8	7	6	5	4	3	2	1
EMP		AVL		0	0	0	0

bits-8/7 (EMP) = 00 Empty
= 01 Occupied
= 10 Unknown
= 11 Invalid

bits-6/5 (AVL) = 00 Available
= 01 Not available
= 10 Unknown
= 11 Invalid

Data Item I062/390, Flight Plan Related Data

Structure of Subfield # 15:

Standard Instrument Departure

Octet no. 1

56	55	54	53	52	51	50	49
Character 1							

Octet no. 2								Octet no. 3							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Character 2								Character 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								Character 5							

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

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.

Data Item I062/390, Flight Plan Related Data

Structure of Subfield # 16:

Standard Instrument Arrival

Octet no. 1

56	55	54	53	52	51	50	49
Character 1							

Octet no. 2								Octet no. 3							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Character 2								Character 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								Character 5							

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

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 I062/390, Flight Plan Related Data

Structure of Subfield # 17:

Pre-Emergency Mode 3/A

	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	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

Octet no. 1

56	55	54	53	52	51	50	49
Character 1							

Octet no. 2 Octet no. 3

48	47	46	45	44	43	42	41	40	39	38	37	36	34	33
Character 2								Character 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								Character 5							

Octet no. 6 Octet no. 7

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

NOTES

1. 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)

5.2.26 Data Item I062/500, Estimated Accuracies

Definition : Overview of all important accuracies

Format : Compound Data Item, comprising a primary subfield of up to two octets, followed by the indicated subfields.

Structure of Primary Subfield:

Octet no. 1

16	15	14	13	12	11	10	9
APC	COV	APW	AGA	ABA	ATV	AA	FX

Octet no. 2

8	7	6	5	4	3	2	1
ARC	0	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) = 0 no extension
= 1 extension

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

Data Item I062/500, Estimated Accuracies

Structure of Subfield # 1:
Estimated Accuracy Of Track Position (Cartesian)

Octet no. 1								Octet no. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
APC (X-Component)															LSB

Octet no. 3								Octet no. 4							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
APC (Y-Component)															LSB

bits 32/1	(APC)	Estimated accuracy (i.e. standard deviation) of the calculated position of a target expressed in Cartesian co-ordinates.
bits 17 and 1	(LSB)	= 0.5m

NOTE - Maximum value means maximum value or above.

Structure of Subfield # 2:
XY covariance component

Octet no. 1								Octet no. 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
COV (XY Covariance Component)															LSB

bits 16/1	(COV)	XY Covariance Component in two's complement form
bits 1	(LSB)	= 0.5m

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.

Data Item I062/500, Estimated Accuracies

Structure of Subfield #3:
Estimated Accuracy Of Track Position (WGS-84)

Octet no. 1 Octet no. 2

32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
APW (Latitude Component)															LSB

Octet no. 3 Octet no. 4

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
APW (Longitude Component)															LSB

bits 32-1	(APW)	Estimated accuracy (i.e. standard deviation) of the calculated position of a target expressed in WGS-84.
bits 17 and 1	(LSB)	$180/2^{25}$ degrees

NOTE - Maximum value means maximum value or above.

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

Octet no. 1

8	7	6	5	4	3	2	1
AGA							LSB

bits 8-1	(AGA)	Estimated accuracy (i.e. standard deviation) of the calculated geometric altitude of a target.
bit 1	(LSB)	= 6.25 ft

NOTE - Maximum value means maximum value or above.

Data Item I062/500, Estimated Accuracies

Structure of Subfield #5:
Estimated Accuracy Of Calculated Track Barometric Altitude

Octet no. 1

8	7	6	5	4	3	2	1
ABA							LSB

bits 8-1	(ABA)	Estimated accuracy (i.e. standard deviation) of the calculated barometric altitude of the track.
bit 1	(LSB) =	1/4 FL

NOTE - Maximum value means maximum value or above.

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

Octet no. 1

16	15	14	13	12	11	10	9
ATV (X-Component)							

Octet no. 2

8	7	6	5	4	3	2	1
ATV (Y-Component)							

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.

Data Item I062/500, Estimated Accuracies

Structure of Subfield #7:
Estimated Accuracy Of Acceleration (Cartesian)

Octet no. 1

16	15	14	13	12	11	10	9
AA (X-Component)							

Octet no. 2

8	7	6	5	4	3	2	1
AA (Y-Component)							

bits 16/1	(AA)	Estimated accuracy (i.e. standard deviation) of the calculated acceleration in Cartesian co-ordinates.
bits 9 and 1	(LSB)	= 0.25m/s^2

NOTE - Maximum value means maximum value or above.

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

Octet no. 1

8	7	6	5	4	3	2	1
ARC							LSB

bits 8-1	(ARC)	Estimated accuracy (i.e. standard deviation) of the calculated rate of Climb/Descent of an aircraft.
bit 1	(LSB)	= 6.25 feet/minute

NOTE - Maximum value means maximum value or above.

Encoding Rule : This Item is optional

5.2.27 Data Item I062/510, 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:

Octet no. 1

24	23	22	21	20	19	18	17
SYSTEM UNIT IDENTIFICATION							

Octet no. 2 Octet no. 3

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SYSTEM TRACK NUMBER															FX

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:

Octet no. 1

24	23	22	21	20	19	18	17
SYSTEM UNIT IDENTIFICATION							

Octet no. 2 Octet no. 3

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SYSTEM TRACK NUMBER															FX

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

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	**I062/010**	Data Source Identifier	**2**
2	**-**	Spare	**-**
3	**I062/015**	Service Identification	**1**
4	**I062/070**	Time Of Track Information	**3**
5	**I062/105**	Calculated Track Position (WGS-84)	**8**
6	**I062/100**	Calculated Track Position (Cartesian)	**6**
7	**I062/185**	Calculated Track Velocity (Cartesian)	**4**
FX	**-**	Field extension indicator	**-**
8	**I062/210**	Calculated Acceleration (Cartesian)	**2**
9	**I062/060**	Track Mode 3/A Code	**2**
10	**I062/245**	Target Identification	**7**
11	**I062/380**	Aircraft Derived Data	**1+**
12	**I062/040**	Track Number	**2**
13	**I062/080**	Track Status	**1+**
14	**I062/290**	System Track Update Ages	**1+**
FX	**-**	Field extension indicator	**-**
15	**I062/200**	Mode of Movement	**1**
16	**I062/295**	Track Data Ages	**1+**
17	**I062/136**	Measured Flight Level	**2**
18	**I062/130**	Calculated Track Geometric Altitude	**2**
19	**I062/135**	Calculated Track Barometric Altitude	**2**
20	**I062/220**	Calculated Rate Of Climb/Descent	**2**
21	**I062/390**	Flight Plan Related Data	**1+**
FX	**-**	Field extension indicator	**-**
22	**I062/270**	Target Size & Orientation	**1+**
23	**I062/300**	Vehicle Fleet Identification	**1**
24	**I062/110**	Mode 5 Data reports & Extended Mode 1 Code	**1+**
25	**I062/120**	Track Mode 2 Code	**2**
26	**I062/510**	Composed Track Number	**3+**

FRN	Data Item	Information	Length
27	**I062/500**	Estimated Accuracies	**1+**
28	**I062/340**	Measured Information	**1+**
FX	**-**	Field extension indicator	**-**
29	**-**	Spare	
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 n-octets extents as necessary.

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