EUROCONTROL Specification for Surveillance Data Exchange

ASTERIX Part 9 Category 062 SDPS Track Reports Appendix A: Reserved Expansion Field

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Abstract

This document specifies the contents of the Reserved Expansion Field for ASTERIX Category 062 reports used for the transmission of SDPS Track Reports.

Keywords

Data Exchange	Messages	SAC	SIC
Data Category	Data Field	Data Block	Data Item
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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 please refer to Part 1.

DOCUMENT CHANGE RECORD

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

EDITION	DATE	REASON FOR CHANGE	SECTIONS PAGES AFFECTED
1.0	October 2007	Creation	All
1.1	April 2010	Calculated Track Velocity in System Coordinates	2.5
1.2	August 2011	Data item “Supplementary Track Status” added	2.6
1.3	February 2023	Migration to new Template Note added to Items Indicator LNAV Mode added to Supplementary Track Status ADS-B Version 3 Data added to the REF	All 2.2 2.6 2.7
1.4	June 2025	Editorial updates Added I062/REF/STS/ATP Added I062/REF/STS/DAD Added I062/REF/STS/DUP Added I062/REF/STS/CSX Added I062/REF/STS/TLI Added I062/REF/STS/TAI Added I062/REF/STS/NADECAT Added I062/REF/MOI Added I062/REF/MTI Added I062/REF/GEN62	Multiple 2.6 2.6 2.6 2.6 2.6 2.6 2.6 2.8 2.9 2.10

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TABLE OF CONTENTS

DOCUMENT CHARACTERISTICS ii

DOCUMENT APPROVAL iii

DOCUMENT CHANGE RECORD iv

1. INTRODUCTION 2
1.1 Scope 2

2. DESCRIPTION OF THE CONTENT OF RESERVED EXPANSION FIELD 3
2.1 Length Indicator 3
2.2 Items indicator 4
2.3 Contributing Sensors With Local Tracknumbers 6
2.4 Contributing Sensors No Local Tracknumbers 8
2.5 Calculated Track Velocity Relative to System Reference Point 10
2.6 Supplementary Track Status 11
2.7 ADS-B Version 3 Data 16
2.8 Miscellaneous Operational Items 23
2.9 Miscellaneous Technical Items 54
2.10 Generic Category 062 Data 69

EXECUTIVE SUMMARY

The Reserved Expansion Field of category 062 enables an SDPS to indicate to subsequent systems which sensors were actually used to update the system track.

It also allows transmitting the Calculated Track Velocity relative to the position of the System Reference Point.

In data item STS (Supplementary Track Status) additional information qualifying the track can be submitted.

Category 021 Edition 2.6 or later contains a partial implementation of ADS-B Version 3 elements. Some of those elements have been implemented.

The Data Items I062/REF/MOI and I062/REF/MTI implement various additional data used for operational or technical purposes.

In line with an AMG decision, I062/REF/GEN62 permits an extension of the Reserved Expansion Field even if all bits in the Item Indicator have been allocated. The implementation of additional subitems is the responsibility of the AMG and **shall** be coordinated prior to implementation.

1. INTRODUCTION

1.1 Scope

This document describes the way to encode information in the Reserved Expansion Field of SDPS Track Messages from ASTERIX Cat 062.

2. DESCRIPTION OF THE CONTENT OF RESERVED EXPANSION FIELD

2.1 Length Indicator

Definition : This field indicates the total length in octets of the Reserved Expansion Field (including the REF length itself)

Format : One-octet fixed length Data Item

Structure:

Octet no. 1

8	7	6	5	4	3	2	1
LEN							

bits 8-1	(LEN)	Length of REF in octets, including the Length Indicator itself.

Encoding Rule : This item shall be present in every REF

2.2 Items indicator

Definition : This field indicates what are the items encoded in the REF
Format : One-octet fixed length Data Item
Structure:

Octet no. 1

8	7	6	5	4	3	2	1
CST	CSN	TVS	STS	V3	MOI	MTI	GEN62

bit 8	(CST)	= 0	“Contributing Sensors with local tracknumber” data item is not present in the REF
		= 1	“Contributing Sensors with local tracknumber” data item is present in the REF
bit 7	(CSN)	= 0	“Contributing Sensors No local tracknumber” data item is not present in the REF
		= 1	“Contributing Sensors No local tracknumber” data item is present in the REF
bit 6	(TVS)	= 0	“Calculated Track Velocity relative to System Reference Point” data item is not present in the REF
		= 1	“Calculated Track Velocity relative to System Reference Point” data item is present in the REF
bit 5	(STS)	= 0	“Supplementary Track Status” data item is not present in the REF
		= 1	“Supplementary Track Status” data item is present in the REF
bit 4	(V3)	= 0	“ADS-B Version 3 Data” data item is not present in the REF
		= 1	“ADS-B Version 3 Data” data item is present in the REF

bit 3	(MOI)	= 0	“Miscellaneous Operational Items” data item is not present in the REF
		= 1	“Miscellaneous Operational Items” data item is present in the REF
bit 2	(MTI)	= 0	“Miscellaneous Technical Items” data item is not present in the REF
		= 1	“Miscellaneous Technical Items” data item is present in the REF
bit 1	(GEN62)	= 0	“Generic Category 062” data item is not present in the REF
		= 1	“Generic Category 062” data item is present in the REF

NOTE - The allocation of additional items is the responsibility of the AMG and **shall** be coordinated in advance!

NOTE - The inclusion of I062/REF/GEN62 follows a decision of AMG #18 to increase flexibility in the REF for the addition of information even when all bits of the Items Indicator are allocated. Adding additional Sub-Items to Data Item I062/REF/GEN62 is the responsibility of the AMG and **shall** be coordinated prior to implementation.

Encoding Rule : This item shall be present in every REF

2.3 Contributing Sensors With Local Tracknumbers

Definition: List of Sensors contributing to the system track and providing a local track-number

Format: Repetitive data item comprising a one-octet repetition factor followed by at least one five-octet subitem

Octet no. 1

48	47	46	45	44	43	42	41
REP							

Octet no. 2 Octet no. 3

40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
SAC								SIC							

Octet no. 4

24	23	22	21	20	19	18	17
0	0	0	0	TYP			

Octet no. 5 Octet no. 6

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

bits 48/41	(REP)	Repetition factor
bits 40/25	(SAC/SIC)	SAC and SIC of the sensor contributing to the track in the current update cycle.
bits 24/21	(Spare)	Spare bits, set to 0
bits 20/17	(TYP)	=0000: No detection =0001: Single PSR detection =0010: Single SSR detection =0011: SSR+PSR detection =0100: Single Mode S All-Call =0101: Single Mode S Roll-Call =0110: Mode S All-Call + PSR =0111: Mode S Roll-Call + PSR =1000: ADS-B =1001: WAM =1010-1111 Reserved for future use

bits 16/1	local Track Number allocated by the sensor denominated by SAC/SIC

NOTE - The item I062/REF/MOI/INPS provides a more comprehensive alternative in characterizing the input to the SDPS, in particular allowing also input from another SDPS (track-to-track fusion).

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

Encoding Rule: This item is optional

2.4 Contributing Sensors No Local Tracknumbers

Definition: List of Sensors contributing to the system track and not providing a local track-number

Format: Repetitive data item comprising a one-octet repetition factor followed by at least one three-octet subitem

Octet no. 1

32	31	30	29	28	27	26	25
REP							

Octet no. 2 Octet no. 3

24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
SAC								SIC							

Octet no. 4

8	7	6	5	4	3	2	1
0	0	0	0	TYP			

bits 32/25	(REP)	Repetition factor
bits 24/9	(SAC/SIC)	SAC and SIC of the sensor contributing to the track in the current update cycle.
bits 8/5	(Spare)	Spare bits, set to 0
bits 4/1	(TYP)	=0000: No detection =0001: Single PSR detection =0010: Single SSR detection =0011: SSR+PSR detection =0100: Single Mode S All-Call =0101: Single Mode S Roll-Call =0110: Mode S All-Call + PSR =0111: Mode S Roll-Call + PSR =1000: ADS-B =1001: WAM =1010-1111 Reserved for future use

NOTE - The item I062/REF/MOI/INPS provides a more comprehensive alternative in characterizing the input to the SDPS, in particular allowing also input from another SDPS (track-to-track fusion).

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

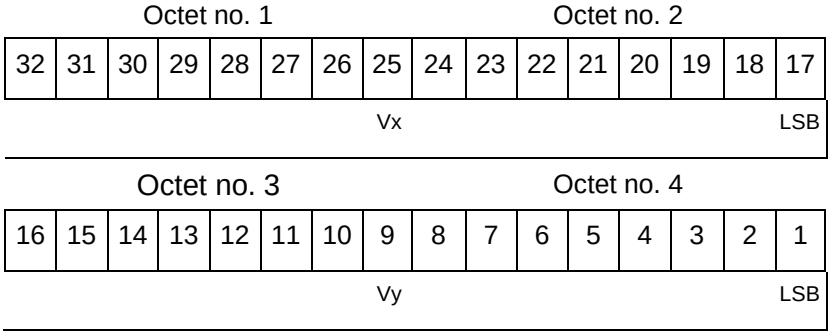
Encoding Rule: This item is optional

2.5 Calculated Track Velocity Relative to System Reference Point

Definition: Calculated track velocity expressed in Cartesian co-ordinates relative to the system reference point, in two's complement form.

Format: Four-octet fixed length Data Item.

Structure:



bits-32/17 Vx
(LSB) = 0.25 m/s
-8192m/s ≤ Vx ≤ 8191.75m/s

bits-16/1 Vy
(LSB) = 0.25 m/s
-8192m/s ≤ Vy ≤ 8191.75m/s

NOTE - The y-axis points to the Geographical North at the system reference point as available in the Reserved Expansion Field of category 065.

Encoding Rule : This Item is optional

2.6 Supplementary Track Status

Definition: Track status information to be transmitted in addition to the information available in data item I062/080 (Track Status).

Format: Variable length data item comprising a first part of one Octet, followed by one-octet extensions as necessary.

Structure: Primary Subitem

Octet no. 1

8	7	6	5	4	3	2	1
FDR	LNAV		ATP				FX

bit 8	(FDR)	Flight Data Retained = 0 Flight plan data from active FDPS = 1 Flight plan data retained from no longer active FDPS
bits 7/6	(LNAV)	Lateral Navigation Mode (see Note)
bit 7	(LNAV#EP)	LNAV Element Populated = 0 LNAV not populated = 1 LNAV populated
bit 6	(LNAV#VAL)	LNAV Mode = 0 LNAV Mode Engaged = 1 LNAV Mode not Engaged
bits 5/2	(ATP)	24-Bit Address Type
bit 5	(ATP#EP)	ATP Element Populated = 0 ATP not populated = 1 ATP populated
bits 4/2	(ATP#VAL)	ATP Mode = 0 24-Bit ICAO address = 1 24-Bit Non-ICAO address = 2 Surface vehicle address = 3 Anonymous address = 4 Fixed ADS-B Beacon = 5-7 Reserved for future use

bit 1	(FX)	= 0	End of data item
		= 1	Extension of data item into next octet

NOTE - The information of the Lateral Navigation Mode LNAV complements the already existing Navigation Modes in Data Item I062/380/SI#7.

I062/REF/STS Supplementary Track Status
Structure of First Extension:

Octet no. 1

8	7	6	5	4	3	2	1
DAD		DUP			CSX		FX

bits 8/7	(DAD)	Service wide Duplicate Address Status detected by the SDPS (see Note)
bit 8	(DAD#EP)	DAD Element Populated
		= 0 DAD not populated
		= 1 DAD populated
bit 7	(DAD#VAL)	DAD Value
		= 0 duplicate address not present
		= 1 duplicate address present
bits 6/4	(DUP)	Duplicate Address condition detected by a sensor (see Note)
bit 6	(DUP#EP)	DUP Element Populated
		= 0 DUP not populated
		= 1 DUP populated
bits 5/4	(DUP#VAL)	DUP Value
		= 0 Duplicate Address Condition - Resolved
		= 1 Duplicate Address Condition – Partly Resolved
		= 2 Duplicate Address Condition – Not Resolved
		= 3 Reserved for future use
bits 3/2	(CSX)	Extended Coasting Status (see Note)
bit 3	(CSX#EP)	CSX Element Populated
		= 0 CSX not populated
		= 1 CSX populated
bit 2	(CSX#VAL)	CSX Value
		= 0 no extended coasting
		= 1 extended coasting

bit 1 (FX) = 0 End of data item
= 1 Extension of data item into next octet

NOTE - I062/REF/STS/DAD indicates a service wide duplicate address status detected by the SDPS. This means that the SDPS provides CAT062 reports with different track ID with the same 24-bit address for the type of address as defined in I062/REF/STS/ATP.

NOTE - I062/REF/STS/DUP indicates the duplicate address condition as provided by a sensor. The meaning of DUP#VAL is implementation dependent and needs to be described in the sensor ICD.

NOTE - I062/REF/STS/CSX indicates if the track is in the extended coasting phase or not. Extended Coasting is a coast phase with special properties following the normal coast phase. During the extended coasting I062/080/CST **shall** be set to one. Extended Coasting is implementation dependent and **shall** be described in the ICD.

I062/REF/STS Supplementary Track Status
Structure of Second Extension:

Octet no. 1

8	7	6	5	4	3	2	1
TLI		TAI		0	0	0	FX

bits 8/7	(TLI)	Transition Level Indication
bit 8	(TLI#EP)	TLI Element Populated = 0 TLI not populated = 1 TLI populated
bit 7	(TLI#VAL)	TLI Value = 0 at or above transition level = 1 below transition level
bits 6/5	(TAI)	Transition Altitude Indication
bit 6	(TAI#EP)	TAI Element Populated = 0 TAI not populated = 1 TAI populated
bit 5	(TAI#VAL)	TAI Value = 0 above transition altitude = 1 at or below transition altitude
bits 4/2	(Spare)	Spare bits, set to 0
bit 1	(FX)	= 0 End of data item = 1 Extension of data item into next octet

Encoding Rule : This data item is optional

2.7 ADS-B Version 3 Data

Definition: Information transmitted by aircraft equipped with an ADS-B Version 3 System (See Note 1) as defined in EUROCAE/RTCA documents ED-102B/DO-260C [ref. 5/6]. The ASTERIX implementation of this data has been defined in the Category 021 Specification Edition 2.6 (or later) and the Category 021 Reserved Expansion Field Edition 1.5 (or later).

Format: Compound data item comprising of a primary subitem of one octet, followed by the indicated subitems.

Structure of Primary Subitem of Compound Data Item*:*

Octet no. 1

8	7	6	5	4	3	2	1
PS3	AS	UAS	CASS	0	0	0	FX

bit-8	(PS3)	Subitem #1: Priority Status ADS-B Version 3 =0 Absence of Subitem #1 =1 Presence of Subitem #1
bit-7	(AS)	Subitem #2: Aircraft Status =0 Absence of Subitem #2 =1 Presence of Subitem #2
bit-6	(UAS)	Subitem #3: UAS/RPAS Status =0 Absence of Subitem #3 =1 Presence of Subitem #3
bit-5	(CASS)	Subitem #4: Collision Avoidance System Status =0 Absence of Subitem #4 =1 Presence of Subitem #4
Bits-4/2	(Spare)	Spare bits, set to “0”
bit-1	(FX)	= 0 End of Primary Subitem = 1 Extension into next octet

Encoding Rule : This data item is optional

Structure of Subitem #1: PS3
Priority Status ADS-B Version 3:

Octet no. 1

8	7	6	5	4	3	2	1
PS3				0	0	0	0

bits-8/5 (PS3) Priority Status for Version 3 ADS-B systems

bit-8 (PS3#EP) Priority Status for Version 3 ADS-B Systems Populated (see Note 2)

= 0 PS3 Element not populated

= 1 PS3 Element populated

bits-7/5 (PS3#VAL) Priority Status for Version 3 ADS-B Systems

(see Note 3)

= 0 No emergency / not reported

= 1 General emergency

= 2 UAS/RPAS - Lost Link

= 3 Minimum fuel

= 4 No communications

= 5 Unlawful interference

= 6 Aircraft in Distress Automatic Activation

= 7 Aircraft in Distress Manual Activation

bits-4/1 (Spare) Spare Bits, set to 0

NOTES 1: The ADS-B Version Number is contained in Data Item I062/380/SI#11/VN.

NOTES 2: Since in this edition of the REF I062/REF/PS3 is the only Element in this Item, the Element Populated Bit strictly would not be necessary. However, if in a future edition use is made of the Spare Bits, the Element Populated Bit becomes important.

NOTES 3: For ADS-B Version 3 systems as defined in ED-102B/DO-260C (Ref. [5] as defined in the core Specification of Category 062) the values have been re-defined. I062/REF/PS3 is to be used exclusively for Version 3 ADS-B systems as defined in I062/380/SI#11/VN. For ADS-B systems with a version number

below 3, the PS **shall** be encoded in Data Item I062/380/SI#11/STAT.
However, since values have been re-defined in ADS-B Version 3, mapping is required to ensure that information is not lost in systems not yet capable to decode this Edition of Category 062. This mapping **shall** be done according to the following table:

ADS-B Version 3 (PS3)	**ADS-Version < 3 (I062/380 - STAT)**
0 (No Emergency/not reported)	0 (No Emergency/not reported)
1 (General emergency)	1 (General emergency)
2 (UAS/RPAS Lost Link)	4 (No communication)
3 (Minimum fuel)	3 (Minimum fuel)
4 (No communication)	4 (No communication)
5 (Unlawful interference)	5 (Unlawful interference)
6 (Aircraft in distress - automatic activation)	1 (General emergency)
7 (Aircraft in distress – manual activation)	1 (General emergency)

Structure of Subitem #2: AS
Aircraft Status:

Octet no. 1

24	23	22	21	20	19	18	17
RCE			RRL		TPW		

Octet no. 2 Octet no. 3

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
TSI			RE				TAO			LSB	0	0	0	0	0

bits-24/22 (RCE) Reduced Capability Equipment
bit-24 (RCE#EP) Element Populated Bit
= 0 Element not populated
= 1 Element populated
bits-23/22 (RCE#VAL) Value
= 0 Not RCE
= 1 TABS (see Note 1)
= 2 Reserved for future use
= 3 Other RCE

bits-21/20 (RRL) Reply Rate Limiting
bit-21 (RRL#EP) Element Populated Bit
= 0 Element not populated
= 1 Element populated
bit-20 (RRL#VAL) Value
= 0 Reply Rate Limiting is not active
= 1 Reply Rate Limiting is active

bits-19/17 (TPW) Transmit Power
bit-19 (TPW#EP) Element Populated Bit
= 0 Element not populated
= 1 Element populated
bits-18/17 (TPW#VAL) Value (see Note 2)
= 0 Unavailable, Unknown, or less than 70 W
= 1 70 W
= 2 125 W
= 3 200W

bits-16/14	(TSI)	Transponder Side Indication
bit-16	(TSI#EP)	Element Populated Bit
		= 0 Element not populated
		= 1 Element populated
bits-15/14	(TSI#VAL)	Value
		= 0 Unknown
		= 1 Transponder #1 (left/pilot side or single)
		= 2 Transponder #2 (right/co-pilot side)
		= 3 Transponder #3 (auxiliary or Back-up)
bits-13/6	(TAO)	Transponder Antenna Offset
bit-13	(TAO#EP)	Element Populated Bit
		= 0 Element not populated
		= 1 Element populated
bit-12	(RE)	Range Exceeded (see Note 3)
		= 0 Value in defined range
		= 1 Value exceeds defined range
bits-11/6	(TAO#VAL)	Value (see Note 4)
bits-5/1	(Spare)	Spare bits, set to 0

NOTES 1: TABS is the “Traffic Awareness Beacon System” as defined by ETSO-C199 / TSO-C199.

NOTES 2; TPW contains the nearest minimum transmit power (in Watts) at the antenna port. The nearest minimum setting in this field would be rounded down from the actual design value. For example, if the avionics is designed to transmit at 100W out of the antenna port, the encoded value in this field would be for 70W (decimal 1).

NOTES 3: Bit-12 **shall** be set to 1 when the aircraft transmits the maximum encodable value (i.e. 31 representing a TAO greater than 58m). In this case TAO#VAL **shall** be set to the maximum encodable TAO (i.e. 58m).

NOTES 4: The TAO is measured along the longitudinal axis of the aircraft from the forward end.

Structure of Subitem #3: UAS
UAS/RPAS Status:

Octet no. 1

8	7	6	5	4	3	2	1
MUO		DAA			RWC		0

bits-8/7	(MUO)	Manned / Unmanned Operation
bit-8	(MUO#EP)	Element Populated Bit
		= 0 Element not populated
		= 1 Element populated
bit-7	(MUO#VAL)	Value
		= 0 Manned Operation
		= 1 Unmanned Operation
bits-6/4	(DAA)	Detect and Avoid Capabilities
bit-6	(DAA#EP)	Element Populated Bit
		= 0 Element not populated
		= 1 Element populated
bits-5/4	(DAA#VAL)	Value
		= 0 No RWC Capability
		= 1 RWC/RA/OCM Capability
		= 2 RWC/OCM Capability
		= 3 Invalid ASTERIX Value
bits-3/2	(RWC)	Remain Well Clear Corrective Alert
bit-3	(RWC#EP)	Element Populated Bit
		= 0 Element not populated
		= 1 Element populated
bit-2	(RWC#VAL)	Value
		= 0 RWC Corrective Alert not active
		= 1 RWC Corrective Alert active
bit-1	(Spare)	Spare Bit, set to 0

Structure of Subitem #4: CASS
Collision Avoidance System Status:

Octet no. 1

8	7	6	5	4	3	2	1
SVH			CATC				0

bits-8/6	(SVH)	Sense Vertical & Horizontal
bit-8	(SVH#EP)	Element Populated Bit
		= 0 Element not populated
		= 1 Element populated
bits-7/6	(SVH#VAL)	Value
		= 0 Vertical Only
		= 1 Horizontal Only
		= 2 Blended
		= 3 Vertical Only or Horizontal Only per intruder
bits-5/2	(CATC)	CAS Type & Capability (see Note 2)
bit-5	(CATC#EP)	Element Populated Bit
		= 0 Element not populated
		= 1 Element populated
bits-4/2	(CATC#VAL)	Value
		= 0 Active CAS (TCAS II) or no CAS
		= 1 Active CAS (not TCAS II)
		= 2 Active CAS (not TCAS II) with OCM transmit capability
		= 3 Active CAS of Junior Status
		= 4 Passive CAS with 1030 TCAS Resolution Message receive capability
		= 5 Passive CAS with only OCM receive capability
		= 6 Reserved for future use
		= 7 Reserved for future use
bit-1	(Spare)	Spare Bit, set to 0

2.8 Miscellaneous Operational Items

Definition: Miscellaneous items intended for operational purposes.

Format : Explicit Length Data Item consisting of a one octet Length Indicator followed by a Compound data item consisting of a primary subitem of variable length, followed by the corresponding sub-items.

Length Indicator

Octet no. 1

8	7	6	5	4	3	2	1
LEN							

bits-8/1 (LEN) Length of the Data Item in octets including the Length Indicator itself.

Structure of Primary Subitem:

Octet no. 1

32	31	30	29	28	27	26	25
ATAD	ATID	AD TNH	AD MNH	AD TNT	AD MNT	ASEP MIN	FX

Octet no. 2

24	23	22	21	20	19	18	17
AM5I	AM5 L2S	ABDS	MPID	LS	LSQI	DTNH	FX

Octet no. 3

16	15	14	13	12	11	10	9
DMNH	DTNT	DMNT	TBP	ALT QCMFL	CTBA	INPS	FX

Octet no. 4

8	7	6	5	4	3	2	1
FPV HR	SCT	SCSM	TCAT	0	0	0	FX

bit-32	(ATAD)	Subitem #1: Age of Target Address = 0 Absence of Subitem #1 = 1 Presence of Subitem #1
bit-31	(ATID)	Subitem #2: Age of Target Identification = 0 Absence of Subitem #2 = 1 Presence of Subitem #2
bit-30	(ADTNH)	Subitem #3: Age of Downlinked True North Heading =0 Absence of Subitem #3 =1 Presence of Subitem #3
bit-29	(ADMNH)	Subitem #4: Age of Downlinked Magnetic North Heading =0 Absence of Subitem #4 =1 Presence of Subitem #4
bit-28	(ADTNT)	Subitem #5: Age of Downlinked True North Track Angle =0 Absence of Subitem #5 =1 Presence of Subitem #5
bit-27	(ADMNT)	Subitem #6: Age of Downlinked Magnetic North Track Angle =0 Absence of Subitem #6 =1 Presence of Subitem #6
bit-26	(ASEPMIN)	Subitem #7: Age of the System Calculated Separation Minimum =0 Absence of Subitem #7 =1 Presence of Subitem #7
bit-25	(FX)	Extension indicator = 0 End of data item = 1 Extension into next extension
bit-24	(AM5I)	Subitem #8: Age of Mode 5 Interrogation =0 Absence of Subitem #8 =1 Presence of Subitem #8

bit-23	(AM5L2S)	Subitem #9: Age of Mode 5 Level 2 Squitter =0 Absence of Subitem #9 =1 Presence of Subitem #9
bit-22	(ABDS)	Subitem #10: Age of BDS Register Data =0 Absence of Subitem #10 =1 Presence of Subitem #10
bit-21	(MPID)	Subitem #11: Movement Plan ID =0 Absence of Subitem #11 =1 Presence of Subitem #11
bit-20	(LS)	Subitem #12: Leading Source =0 Absence of Subitem #12 =1 Presence of Subitem #12
bit-19	(LSQI)	Subitem #13: Leading Source Quality Indication =0 Absence of Subitem #13 =1 Presence of Subitem #13
bit-18	(DTNH)	Subitem #14: Downlinked True North Heading =0 Absence of Subitem #14 =1 Presence of Subitem #14
bit-17	(FX)	Extension indicator = 0 End of data item = 1 Extension into next extension
bit-16	(DMNH)	Subitem #15: Downlinked Magnetic North Heading =0 Absence of Subitem #15 =1 Presence of Subitem #15
bit-15	(DTNT)	Subitem #16: Downlinked True North Track Angle =0 Absence of Subitem #16 =1 Presence of Subitem #16

bit-14	(DMNT)	Subitem #17: Downlinked magnetic North Track Angle =0 Absence of Subitem #17 =1 Presence of Subitem #17
bit-13	(TBP)	Subitem #18: Tracker Barometric Pressure =0 Absence of Subitem #18 =1 Presence of Subitem #18
bit-12	(ALTQCMFL)	Subitem #19: Altitude from QNH Corrected Measured Flight Level =0 Absence of Subitem #19 =1 Presence of Subitem #19
bit-11	(CTBA)	Subitem #20: Calculated Track Barometric Altitude =0 Absence of Subitem #20 =1 Presence of Subitem #20
bit-10	(INPS)	Subitem #21: Input to SDPS with Service ID and Local Track Number =0 Absence of Subitem #21 =1 Presence of Subitem #21
bit-9	(FX)	Extension indicator = 0 End of data item = 1 Extension into next extension
bit-8	(FPVHR)	Subitem #22: Fractional Part of Velocity (High Resolution) =0 Absence of Subitem #22 =1 Presence of Subitem #22
bit-7	(SCT)	Subitem #23: SUC Correlation Text =0 Absence of Subitem #23 =1 Presence of Subitem #23
bit-6	(SCSM)	Subitem #24: System Calculated Separation Minimum =0 Absence of Subitem #24 =1 Presence of Subitem #24

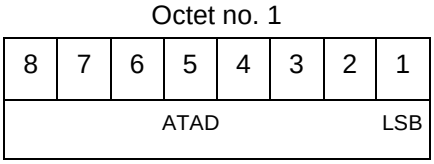
bit-5	(TCAT)	Subitem #25: Target Category =0 Absence of Subitem #25 =1 Presence of Subitem #25
bits-4/2	(Spare)	Spare Bits, set to 0
bit-1	(FX)	Extension indicator = 0 End of data item = 1 Extension into next extension

Structure of Subitem #1: ATAD
Age of Target Address

Definition: Age of Target Address (I062/380/SI#1) or Expired Target Address (I062/REF/MTI/EXADDR).

Format: One-octet fixed length Data Item.

Structure:



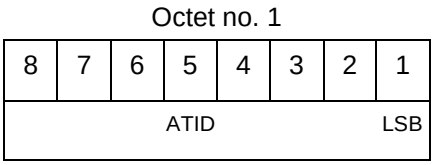
bits-8/1	(ATAD)	Age of Target Address (I062/380/SI#1) or Expired Target Address (I062/REF/MTI/EXADDR)
bit-1	(LSB)	= 1/4 s

Structure of Subitem #2: ATID
Age of Target Identification

Definition: Age of Target Identification (I062/380/SI#2) or Expired Target Identification (I062/REF/MTI/EXTID).

Format: One-octet fixed length Data Item.

Structure:



bits-8/1	(ATID)	Age of Target Identification (I062/380/SI#2) or Expired Target Identification (I062/REF/MTI/EXTID)
bit-1	(LSB)	= 1/4 s

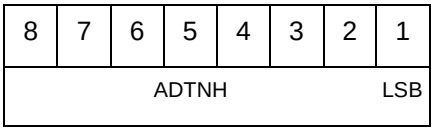
Structure of Subitem #3: ADTNH
Age of Downlinked True North Heading

Definition: Age of downlinked True North heading.

Format: One-octet fixed length Data Item.

Structure:

Octet no. 1



bits-8/1	(ADTNH)	Age of Downlinked True North Heading (I062/REF/MOI/SI#14)
bit-1	(LSB)	= 1/4 s

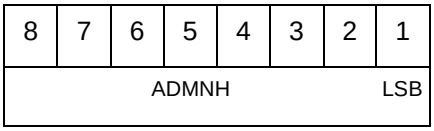
Structure of Subitem #4: ADMNH
Age of Downlinked Magnetic North Heading

Definition: Age of downlinked Magnetic North heading.

Format: One-octet fixed length Data Item.

Structure:

Octet no. 1



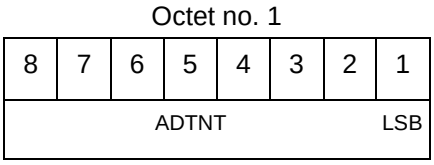
bits-8/1	(ADMNH)	Age of Downlinked Magnetic North Heading (I062/REF/MOI/SI#15)
bit-1	(LSB)	= 1/4 s

Structure of Subitem #5: ADTNT
Age of Downlinked True North Track Angle

Definition: Age of downlinked True North Track Angle.

Format: One-octet fixed length Data Item.

Structure:



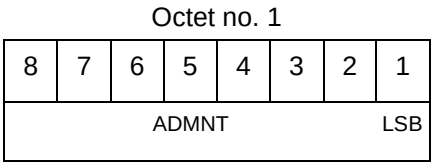
bits-8/1	(ADTNT)	Age of Downlinked True North Track Angle (I062/REF/MOI/SI#16)
bit-1	(LSB)	= 1/4 s

Structure of Subitem #6: ADMNT
Age of Downlinked Magnetic North Track Angle

Definition: Age of downlinked Magnetic North Track Angle.

Format: One-octet fixed length Data Item.

Structure:



bits-8/1	(ADMNT)	Age of Downlinked Magnetic North Track Angle (I062/REF/MOI/SI#17)
bit-1	(LSB)	= 1/4 s

Structure of Subitem #7: ASEPMIN
Age of the System Calculated Separation Minimum

Definition: Age of the System Calculated Separation Minimum.

Format: One-octet fixed length Data Item.

Structure:

Octet no. 1

8	7	6	5	4	3	2	1
ASEPMIN							LSB

bits-8/1	(ASEPMIN)	Age of System Calculated Separation Minimum (I062/REF/MOI/SI#24)
bit-1	(LSB)	= 1/4 s

NOTE - The calculation of the System Calculated Separation Minimum and its age is implementation dependent and shall be described in the system ICD.

Structure of Subitem 8: AM5I
Age of Mode 5 Interrogation

Definition: Age of Mode 5 Interrogation.

Format: One-octet fixed length Data Item.

Structure:

Octet no. 1

8	7	6	5	4	3	2	1
AM5I							LSB

bits-8/1	(AM5I)	Age of Mode 5 Interrogation
bit-1	(LSB)	= 1/4 s

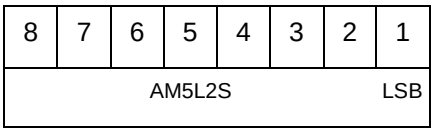
Structure of Subitem #9: AM5L2S
Age of Mode 5 Level 2 Squitter

Definition: Age of Mode5 Level 2 Squitter.

Format: One-octet fixed length Data Item.

Structure:

Octet no. 1



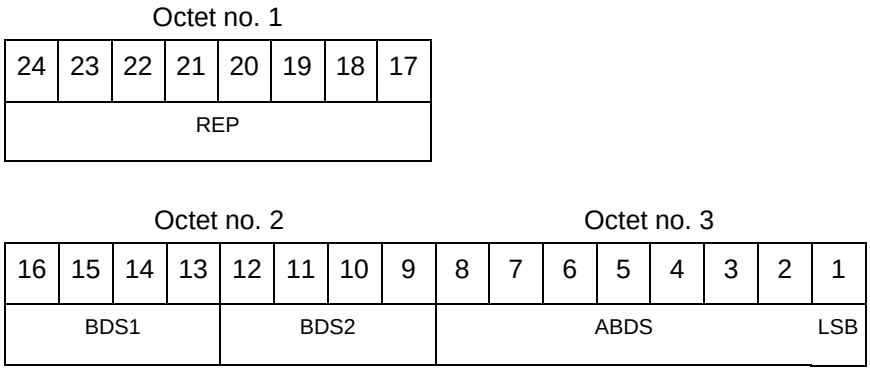
bits-8/1	(AM5L2S)	Age of Mode 5 Level 2 Squitter
bit-1	(LSB)	= 1/4 s

Structure of Subitem #10: ABDS
BDS Register Data Age

Definition: Age of indicated BDS Register Data.

Format: Repetitive data item comprising of a one-octet repetition factor followed by at least one two-octet subitem.

Structure:



bits-24/17	(REP)	Repetition factor
bits-16/13	(BDS1)	Comm B Data Buffer Store 1 Address
bits-12/9	(BDS2)	Comm B Data Buffer Store 2 Address
bits-8/1	(ABDS)	Age of BDS Register Data (I062/380/SI#25)
bit-1	(LSB)	= 1/4 s

NOTE - This subitem is a generalized version of I062/295/SI#28, which enables the provision of the ages of multiple BDS registers. It **shall** only be used if I062/380/SI#25 contains data from more than one BDS Register. For reasons of backwards compatibility, in this case, I062/295/SI#28 **shall** be populated with the age of the latest received BDS Register.

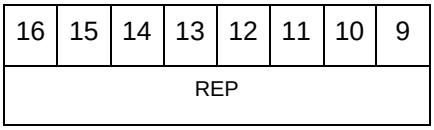
Structure of Subitem #11: MPID
Movement Plan ID

Definition: Alphanumeric ID for Movement Plan Identification.

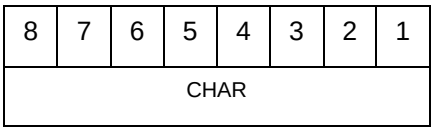
Format: Repetitive data item comprised of a one-octet repetition factor followed by at least one one-octet subitem.

Structure:

Octet no. 1



Octet no. 2



bits-16/9	(REP)	Repetition factor
bits-8/1	(CHAR)	ASCII character

NOTE - The term Movement Plan is a generalization of the term Flight Plan, which includes e.g. tow movements and certain vehicle movements.

NOTE - The Movement Plan Alphanumeric ID is implementation dependent and shall be described in the system ICD.

NOTE - The Movement Plan Alphanumeric ID consists of letters, numbers and other symbols as available in ASCII.

Structure of Subitem #12: LS
Leading Source

Definition: Identification of the current Leading Source triggering the track output generation in case of a source driven update mode. Leading source may be a sensor or a tracker.

Format: Four-octet fixed length Data Item.

Structure:

Octet no. 1

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

Octet no. 2

Octet no. 3

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

Octet no. 4

bits-32/25	(LSSAC)	System Area Code of the leading source
bits-24/17	(LSSIC)	System Identification Code of the leading source
bits-16/8	(LSSID)	Service Identification of the leading source
bit-16	(LSSID#EP)	LSSID Element Populated Bit = 0 Element not populated = 1 Element populated
bits-15/8	(LSSID#VAL)	Value of LSSID
bits-7/1	(Spare)	Spare bits, set to 0

NOTE - LSSAC and LSSIC **shall** be populated with the SAC and SIC of that leading source e.g. sensor or tracker.

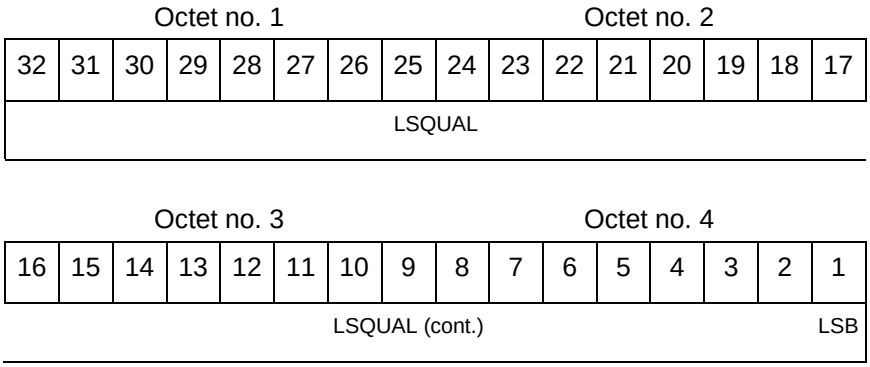
NOTE - The up-to-date list of SACs is published on the EUROCONTROL Web Site (http://www.eurocontrol.int).

Structure of Subitem #13: LSQI
Leading Source Quality Indication

Definition: Quality indication of the current Leading Source triggering the track output generation for a source driven update mode given by a scan time scaled position accuracy ($\sigma_x \times \sigma_y$).

Format: Four-octet fixed length Data Item.

Structure:



bits-32/1	(LSQUAL)	Leading Source Quality Indication
bit-1	LSB	= 1 m^2s

NOTE - For track-to-track fusion with the input track determined to be leading source, the leading source quality indication dedicated to the input track is given by the leading source quality indication of the leading source of the input track.

Structure of Subitem #14: DTNH
Downlinked True North Heading

Definition: True North Heading as downlinked by the aircraft.

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	DTNH												LSB

bits-16/14	(Spare)	Spare bits, set to 0
bits-13/1	(DTNH)	Downlinked True North Heading
bit-1	(LSB)	= 360 / 2^{13} ° (approx. 0.044°)

Structure of Subitem #15: DMNH
Downlinked Magnetic North Heading

Definition: Magnetic North Heading as downlinked by the aircraft.

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	DMNH												LSB

bits-16/14	(Spare)	Spare bits, set to 0
bits-13/1	(DMNH)	Downlinked Magnetic North Heading
bit-1	(LSB)	= 360 / 2^{13} ° (approx. 0.044°)

Structure of Subitem #16: DTNT
Downlinked True North Track Angle

Definition: True North Track Angle as downlinked by the aircraft.

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	DTNT												LSB

bits-16/14	(Spare)	Spare bits, set to 0
bits-13/1	(DTNT)	Downlinked True North Track Angle
bit-1	(LSB)	= 360 / 2^{13} ° (approx. 0.044°)

Structure of Subitem #17: DMNT
Downlinked Magnetic North Track Angle

Definition: Magnetic North Track Angle as downlinked by the aircraft.

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	DMNT												LSB

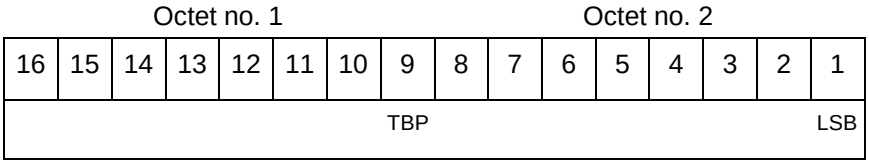
bits-16/14	(Spare)	Spare bits, set to 0
bits-13/1	(DMNT)	Downlinked Magnetic North Track Angle
bit-1	(LSB)	= 360 / 2^{13} ° (approx. 0.044°)

Structure of Subitem #18: TBP
Tracker Barometric Pressure

Definition: Barometric Pressure used by the tracker for this track.

Format: Two-octet fixed length Data Item.

Structure:



bits-16/1	(TBP)	Barometric pressure used by the tracker for this track
bit-1	(LSB)	= 0.05 hPa

NOTE - The tracker may use the barometric pressure e.g. to enhance the slant range correction.

NOTE - This is not the barometric pressure setting (BPS) reported by the aircraft.

Structure of Subitem #19: ALTQCMFL
Altitude from QNH Corrected Measured Flight Level

Definition : Altitude from QNH Corrected last valid and credible flight level used to update the track.

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
ALTQCMFL															LSB

bits-16/1	(ALTQCMFL)	Altitude from QNH Corrected Measured Flight Level, in two's complement
bit-1	(LSB)	= 25 ft

NOTES

1. This is the QNH Corrected value of I062/136.
2. The age of this item is provided by I062/295/SI#1, Measured Flight Level age.
3. The rounding of the altitude from QNH corrected measured flight level is system dependent and **shall** be described in the ICD.

Structure of Subitem #20: CTBA
Calculated Track Barometric Altitude

Definition : Calculated Barometric Altitude of 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
	QNH	CTBA														LSB

bit-16	(QNH)	= 0 No QNH correction applied = 1 QNH correction applied
bits-15/1	(CTBA)	Calculated Track Barometric Altitude, in two's complement form.
bit-1	(LSB)	= 1/4 FL = 25 ft -1500 ft ≤ QCTBA ≤ 150000 ft

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

NOTE - I062/135 enables the provision of either QNH corrected or non-QNH-corrected Calculated Track Barometric Altitude. If needed, the other variant can be provided in this item.

NOTE - If this item is provided, then I062/135 **shall** also be provided.

Structure of Subitem #21: INPS
Input to SDPS with Service ID and Local Track Number

Definition: Input contributing to the system track and potentially providing a local track-number. Input source may be a sensor or a tracker.

Format: Repetitive data item comprising a one-octet repetition factor followed by at least one 8-octets subitem.

Structure:

Octet no. 1

72	71	70	69	68	67	66	65
REP							

Octet no. 2 Octet no. 3

64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SAC								SIC							

Octet no. 4 Octet no. 5

48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SID									TIDN			IDN			

Octet no. 6 Octet no. 7

32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
IDN (cont.)												AINP			

Octet no. 8 Octet no. 9

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
AINP (cont.)				LSB	SSS	INCS	SSR	MDS	ADS	MLT	0	0	0	0	0

bits-72/65 (REP) Repetition factor

bits-64/57	(SAC)	System Area Code of the input contributing to the track in the current update cycle
bits-56/49	(SIC)	System Identification Code of the input contributing to the track in the current update cycle
bits-48/40	(SID)	Service Identification of the input contributing to the track in the current update cycle
bit-48	(SID#EP)	SID Element Populated Bit = 0 Element not populated = 1 Element populated
bits-47/40	(SID#VAL)	Value of SID
bits-39/37	(TIDN)	Type of Identification number = 0 Information not available = 1 Local track number = 2 Address Type & Address Extension Number = 3-7 reserved
bits-36/21	(IDN)	Identification Number

For TIDN = 0:

bits-36/21	(Spare)	Spare Bits, set to 0

For TIDN = 1:

bits-36/21	(LTN)	Local Track Number as used by the input source

For TIDN = 2:

bits-36/33	(ATP)	Address Type (see Note below)
bit-36	(ATP#EP)	Element Populated Bit = 0 Element not populated = 1 Element populated
bits-35/33	(ATP#VAL)	Address Type Values = 0 24-Bit ICAO address = 1 24-BIT Non-ICAO address = 2 Surface vehicle address = 3 Anonymous address

= 4 Fixed ADS-B Beacon
= 5-7 Reserved for future use

bits-32/29	(AEN)	Address Extension Number (see Note below)
bits-28/21	(Spare)	Spare Bits, set to 0
bits-20/12	(AINP)	Age of Input (see Note below)
bit-20	(AINP#EP)	AINP Element Populated Bit = 0 Element not populated = 1 Element populated
bits-19/12	(AINP#VAL)	Value of AINP
bit-12	(LSB)	0.25s
bit-11	(SSS)	SDPS Support Status of Input (see Note below) = 0 sensor measurement = 1 tracked data
bit-10	(INCS)	Independent Non-Cooperative support status of input (see Note below) = 0 no INCS support = 1 has INCS support
bit-9	(SSR)	SSR support status of input = 0 no SSR support = 1 has SSR support
bit-8	(MDS)	Mode-S radar support status of input (see Note below) = 0 no Mode-S radar support = 1 has Mode-S radar support
bit-7	(ADS)	ADS-B support status of input (see Note below) = 0 no ADS-B support = 1 has ADS-B support

bit-6	(MLT)	MLAT support status of input = 0 no MLAT support = 1 has MLAT support
bits-5/1	(Spare)	Spare bits, set to 0

NOTE - The items I062/REF/CST and I062/REF/CSN are not suited for track-to-track fusion since a track can be supported by radar and MLAT and ADS-B. The supporting technology of these items allow only a statement whether an input is supported by radar or MLAT or ADS-B.

NOTE - This item is a generalized version of I062/REF/CST and I062/REF/CSN.

NOTE - I062/REF/MOI/INPS/SSS indicates whether the contributing source to a track is a sensor measurement or tracked data.

NOTE - I062/REF/MOI/INPS/INCS, Independent non-cooperative surveillance, is the generalization of primary surveillance radar (PSR) e.g. multi static primary surveillance radar (MSPSR).

NOTE - I062/REF/MOI/INPS/MDS includes Mode 5 interrogation.

NOTE - I062/REF/MOI/INPS/ADS subsumes all types of ADS-B link technologies including Mode 5 Level 2 Squitter.

NOTE - The values of the address type ATP (as part of I062/REF/MOI/INPS/IDN for TIDN = 2) are technology dependent. How to populate them **shall** be described in the ICD of the system generating the input reports to the SDPS.

NOTE - The address extension number AEN (as part of I062/REF/MOI/INPS/IDN for TIDN = 2) is a unique supplement to the 24-bit address of the same address type, which stays unchanged over the lifetime of a track.

NOTE - The Age of Input I062/REF/MOI/INPS/AINP is age from the time the source system determined the data.

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

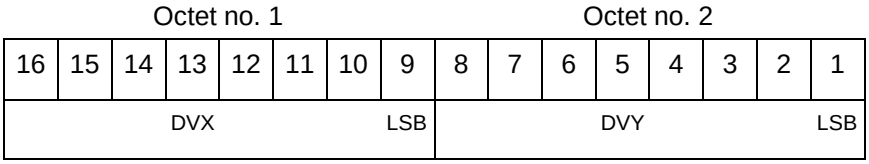
Structure of Subitem #22: FPVHR

Fractional Part of Velocity (High Resolution)

Definition: Fractional Part of Cartesian Velocity (High Resolution).

Format: Two-octet fixed length Data Item.

Structure:



bits-16/9	(DVX)	Fractional part of velocity in x direction, in two's complement.
bit-9	(LSB)	= $1/2^{10}$ m/s
bits-8/1	(DVY)	Fractional part of velocity in y direction, in two's complement.
bit-1	(LSB)	= $1/2^{10}$ m/s

NOTE - For gate-to-gate tracking the velocity resolution of I062/185, Calculated Track Velocity (Cartesian), of 0.25 m/s is not sufficient for all applications addressing the ground segment especially for slow moving targets.

NOTE - If this item is used, I062/185 **shall** be provided.

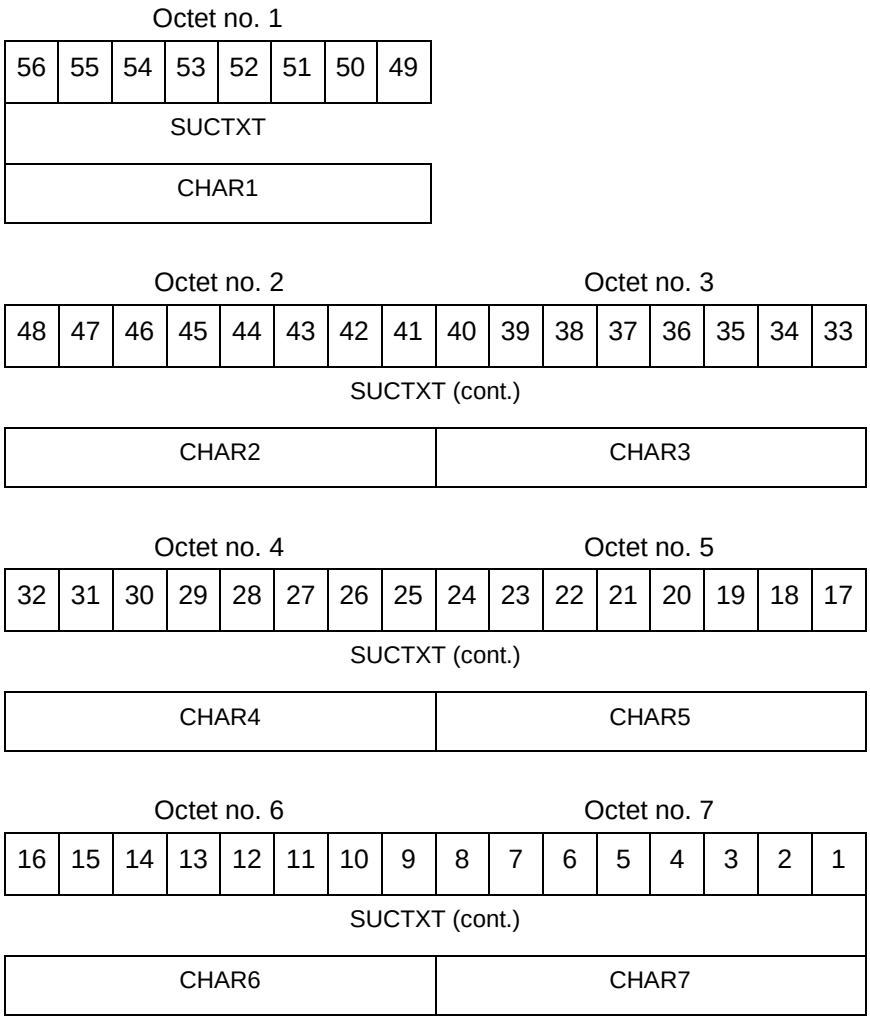
NOTE - To derive the high resolution of the calculated track velocity, DVX and DVY have to be added to the corresponding velocity values of I062/185.

Structure of Subitem #23: SCT
SUC Correlation Text

Definition: Text to be displayed to the controller in case of a special use code (SUC).

Format: Seven-octet fixed length Data Item.

Structure:



bits-56/1 (SUCTXT) SUC correlation text consisting of 7 ASCII characters.

NOTE - The SUC correlation text is always left adjusted. It contains up to seven alphanumeric characters, the remaining character positions

(if any) are padded with space characters.

NOTE - An SUC indication in CAT062 is provided by I062/080/SUC.

NOTE - The SUC correlation text can be mapped from I032/REF/SCT to I062/REF/MOI/SCT in the target report.

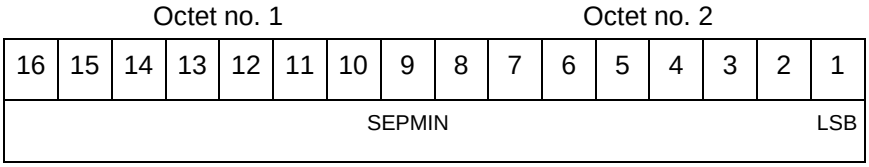
NOTE - An SSR code may be used as SUC globally or on a local basis.

Structure of Subitem #24: SCSM
System Calculated Separation Minimum

Definition: Separation Minimum applicable for this track determined within the surveillance data processing chain.

Format: Two-octet fixed length Data Item.

Structure:



bits-16/1	(SEPMIN)	System Calculated Separation Minimum
bit-1	(LSB)	= 0.1 NM

NOTE - The determination of the system calculated separation minimum is system dependent and **shall** be described in the ICD e.g. surveillance criteria might be in scope and weather conditions might be out of scope.

NOTE - Especially for an ADS-B supported target the separation may be applied per target depending on the downlinked quality indicators as well as potentially the accuracy of conducted validation.

Structure of Subitem #25: TCAT
Target Category

Definition: Category of the target.

Format: Variable length data item comprising a first part of two Octets, followed by two-Octet extensions as necessary

Structure:

Octet no. 1								Octet no. 2							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
TYP				WGT				PLT		0	0	0	0	0	FX

bits-16/13 (TYP) Target type

- = 0 Information not available
- = 1 powered fixed / variable-sweep wing
- = 2 rotocraft
- = 3 glider / sailplane
- = 4 lighter-than-air
- = 5 ultralight / handglider / paraglider
- = 6 parachutist / skydiver
- = 7 surface vehicle
- = 8-15 Reserved for future use

bits-12/9 (WGT) Target weight

- = 0 Information not available
- = 1 light aircraft ≤ 7000 kg
- = 2 7000 kg < medium aircraft < 136000 kg
- = 3 136000 kg ≤ heavy aircraft
- = 4-15 Reserved for future use

bits-8/7 (PLT) Pilot status

- = 0 Information not available
- = 1 on-board piloted
- = 2 remotely piloted
- = 3 autonomous

bits-6/2	(Spare)	Spare bits, set to 0	
bit-1	(FX)	= 0	End of data item
		= 1	Extension of data item into next octet

NOTE - While I062/380/SI#21 conveys information about the Emitter Category as provided by the aircraft, I062/REF/MOI/TCAT allows to transmit the target category as derived by different means.

NOTE - For targets identified as surface vehicle (TYP = 7), I062/300 allows providing an actual type of vehicle.

Encoding Rule : This data item is optional

2.9 Miscellaneous Technical Items

Definition: Miscellaneous items for the addition of information to Category 062 mainly intended for technical purposes.

Format : Explicit Length Data Item consisting of a one octet Length Indicator followed by a Compound data item consisting of a primary subitem of variable length, followed by the corresponding sub-items.

Length Indicator

Octet no. 1

8	7	6	5	4	3	2	1
LEN							

bits-8/1 (LEN) Length of the Data Item in octets including the Length Indicator itself.

Structure of Primary Subitem:

Octet no. 1

16	15	14	13	12	11	10	9
DATE	TENTU	IPMC	IMP	IST	TTT	EXM3A	FX

Octet no. 2

8	7	6	5	4	3	2	1
EXADDR	EXTID	0	0	0	0	0	FX

bit-16 (DATE) Subitem #1: Date of Track Information
= 0 Absence of Subitem #1
= 1 Presence of Subitem #1

bit-15 (TENTU) Subitem #2: Time to Expected Next Track Update
= 0 Absence of Subitem #2
= 1 Presence of Subitem #2

bit-14	(IPMC)	Subitem #3: Inverse Point Scale Factor and Meridian Convergence = 0 Absence of Subitem #3 = 1 Presence of Subitem #3
bit-13	(IMP)	Subitem #4: IMM Model Probability = 0 Absence of Subitem #4 = 1 Presence of Subitem #4
bit-12	(IST)	Subitem #5: IMM State = 0 Absence of Subitem #5 = 1 Presence of Subitem #5
bit-11	(TTT)	Subitem #6: Time of Track Termination = 0 Absence of Subitem #6 = 1 Presence of Subitem #6
bit-10	(EXM3A)	Subitem #7: Expired Mode 3/A Code = 0 Absence of Subitem #7 = 1 Presence of Subitem #7
bit-9	(FX)	Extension indicator = 0 End of data item = 1 Extension into next Extension
bit-8	(EXADDR)	Subitem #8: Expired Target Address = 0 Absence of Subitem #8 = 1 Presence of Subitem #8
bit-7	(EXTID)	Subitem #9: Expired Target Identification = 0 Absence of Subitem #9 = 1 Presence of Subitem #9
bits-6/2	(Spare)	Spare Bits, set to 0
bit-1	(FX)	Extension indicator = 0 End of data item = 1 Extension into next Extension

Structure of Subitem #1: DATE
Date of Track Information

Definition: Current date of the track information in the form YYYYMMDD.

Format: Four-octet fixed length Data Item.

Structure:

Octet no. 1								Octet no. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Y1				Y2				Y3				Y4			

Octet no. 3								Octet no. 4							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
M1				M2				D1				D2			

bits-32/29	(Y1)	First digit of year
bits-28/25	(Y2)	Second digit of year
bits-24/21	(Y3)	Third digit of year
bits-20/17	(Y4)	Fourth digit of year
bits-16/13	(M1)	First digit of month
bits-12/9	(M2)	Second digit of month
bits-8/5	(D1)	First digit of day
bits-4/1	(D2)	Second digit of day

Structure of Subitem #2: TENTU
Time to Expected Next Track Update

Definition: Time to expected next track update relative to the track information provided in I062/070.

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
TENTU															LSB

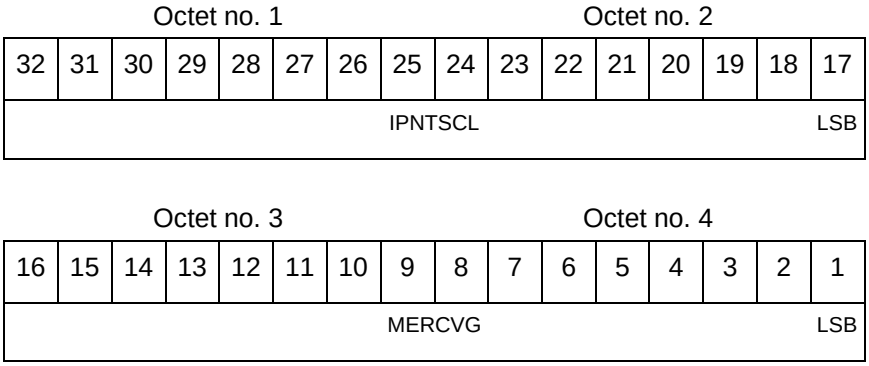
bits-16/1	(TENTU)	Time to expected next track update
bit-1	(LSB)	= 1/128 s

Structure of Subitem #3: IPMC
Inverse Point Scale Factor and Meridian Convergence

Definition: Inverse Point scale factor and meridian convergence of the stereographic projection for the target position.

Format: Four-octet fixed length Data Item.

Structure:



bits-32/17	(IPNTSCL)	Inverse Point Scale Factor
bit-17	(LSB)	$= 1/2^{15}$
bits-16/1	(MERCVG)	Meridian Convergence, in two's complement
bit-1	(LSB)	$= 180/2^{15}$

NOTE - The Inverse Point Scale Factor is the quotient of the length of the unprojected vector and the length of a projected vector. The antipodal point is given by an inverse Point Scale factor of 0.

NOTE - The Meridian Convergence is the angle with respect to geographic North of a projected vector minus the angle with respect to geographic North of the unprojected vector mapped to the range [-180, 180[.

NOTE - Point scale factor and meridian convergence is applied to compute the track velocity vector relative to system reference point (I062/REF/TVS) from the local Cartesian velocity vector(I062/185).

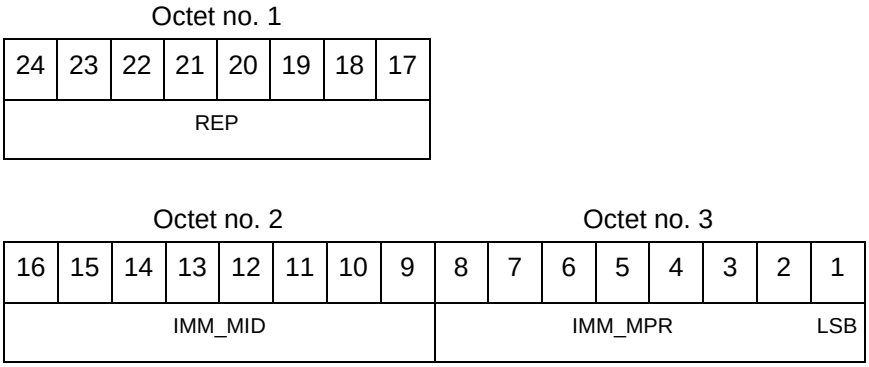
NOTE - They can also be used to convert the local Cartesian acceleration (I062/210) to the projected acceleration on the system plane.

Structure of Subitem #4: IMP
IMM Model Probability

Definition: Interacting Multiple Model (IMM) model identification and probability.

Format: Repetitive data item comprising a one-octet repetition factor followed by at least one two-octets subitem.

Structure:



bits-24/17	(REP)	Repetition factor
bits-16/9	(IMM_MID)	IMM model identification
bits-8/1	(IMM_MPR)	IMM model probability
bit-1	(LSB)	= 0.5 per cent

NOTE - A single motion model is not optimal to describe the behaviour of an aircraft, which moves usually for extended duration in a straight line followed by turn manoeuvres. The Interacting Multiple Model (IMM) estimator provides a framework to handle the interaction of different models in a calculation efficient manner.

NOTE - This is a generic item and not fully standardized since the specific IMM implementation remains system specific and the meaning of a specific model ID may be different.

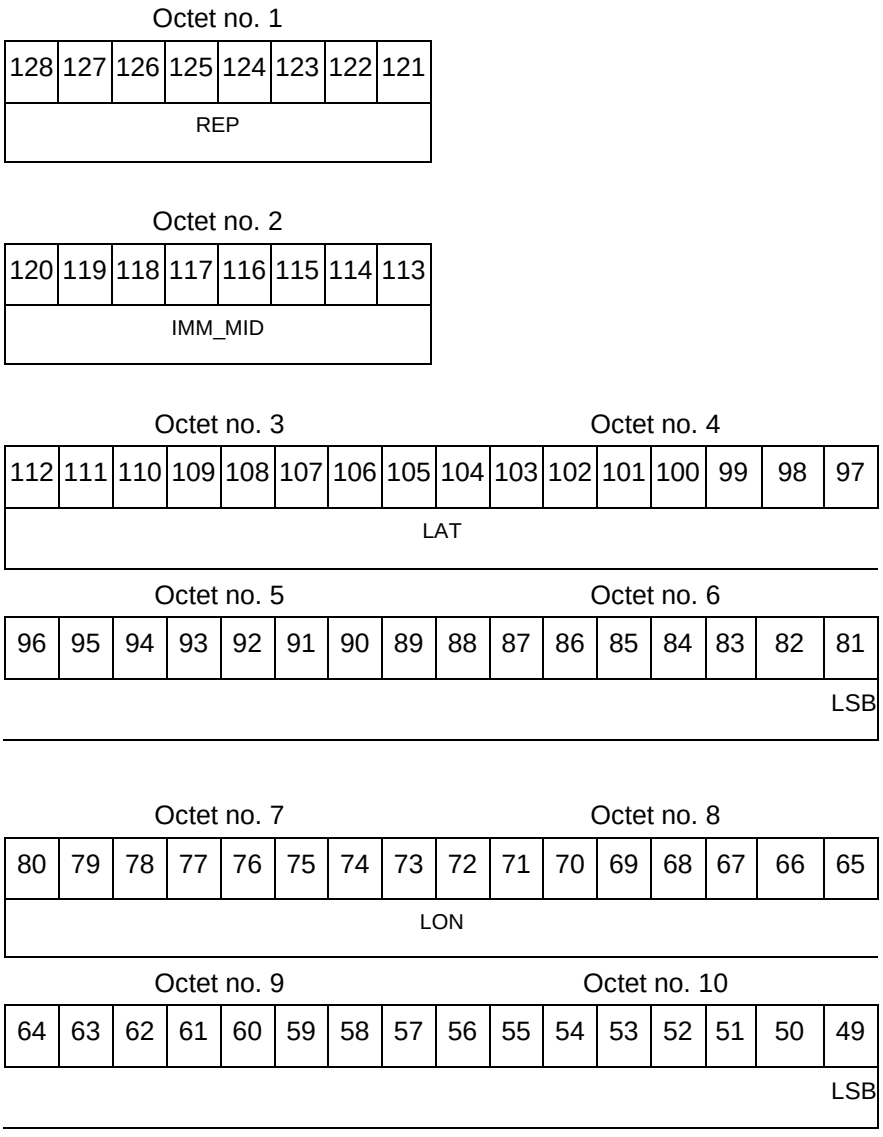
NOTE - The main use case for this item is to support the performance evaluation of the SDPS and/or the tuning of the IMM.

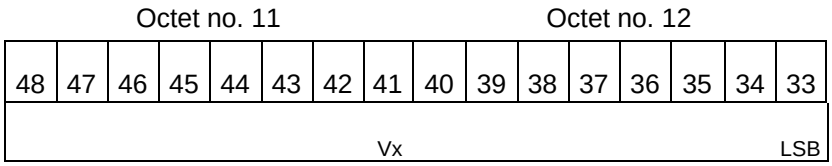
Structure of Subitem #5: IST
IMM State

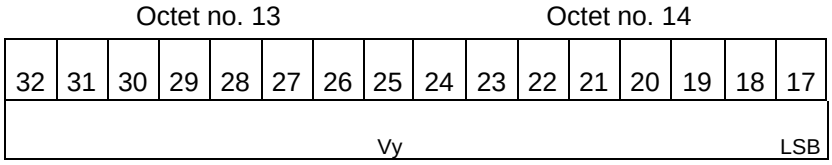
Definition: Interacting Multiple Model (IMM) model identification and state consisting of position in WG-84, velocity vector and acceleration vector.

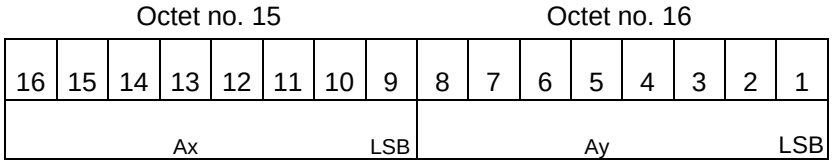
Format: Repetitive data item comprising a one-octet repetition factor followed by at least one 15-octets subitem.

Structure:









bits-128/121	(REP)	Repetition factor
bits-120/113	(IMM_MID)	IMM model identification
bits-112/81	(LAT)	Latitude in WGS-84, in two's complement. Range -90 ≤ latitude ≤ 90 deg.
	(LSB)	= $180/2^{31}$ degrees
bits-80/49	(Longitude)	Longitude in WGS-84, in two's complement. Range -180 ≤ longitude < 180 deg.
	(LSB)	= $180/2^{31}$ degrees
bits-32/17	Vx	Velocity in X direction, in two's complement. -8192m/s ≤ Vx ≤ 8191.75m/s
	(LSB)	= 0.25 m/s
bits-16/1	Vy	Velocity in Y direction, in two's complement.
	(LSB)	= 0.25 m/s

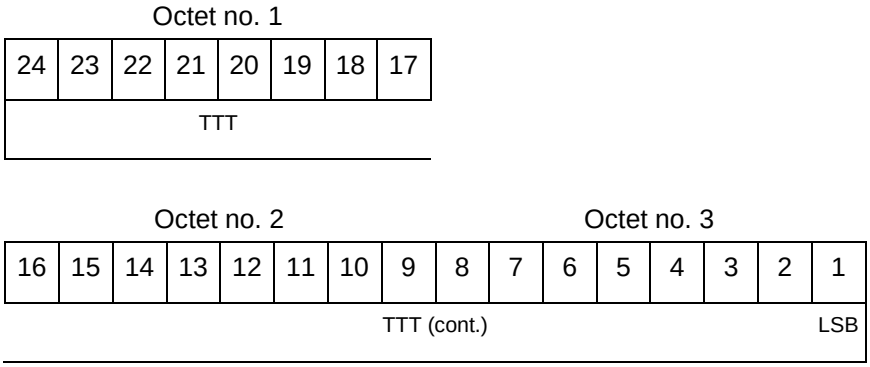
bits-16/9	Ax (LSB)	Acceleration in X direction, in two’s complement. = 0.25 m/s^2
bits-8/1	Ay (LSB)	Acceleration in X direction, in two’s complement. = 0.25 m/s^2

Structure of Subitem #6: TTT
Time of Track Termination

Definition: Currently scheduled time of track termination if no more input data is received for updating this track. The time of track termination is an absolute time stamp in the form of elapsed time since last midnight, expressed as UTC.

Format: Three-octet fixed length Data Item.

Structure:



bits-24/1	(TTT)	Time of Track Termination
bit-1	(LSB)	= 1/128 s

NOTE - The track service end message containing the I062/080/TSE set to 1 (last message transmitted to the user for the track) is provided by an SDPS in a single message. To address the case that the TSE message is lost e.g. due to a UDP connection, each surveillance data consumer needs a timeout mechanism to address tracks for which no termination message is received. The provision of the time of track termination supports a proper setting of the applicable timeout.

NOTE - Usually, a plot updating a track either has no impact or prolongs the time of track termination. In case of ADS-B when for a static target beginning to move the position squitter period changes from 5s to 0.5s, the time of track termination may be reduced. The time of track termination provides a means for analysis on the proper handling of

such circumstances.

NOTE - The time of track termination can be used for synchronization of the track store of a slave tracker with the master tracker, where only the master tracker is allowed to schedule the time of track termination within the slave. Thus, the time of track termination ensures that the slave tracker terminates all tracks, which are no longer supported by the master tracker.

Structure of Subitem #7: EXM3A
Expired Mode 3/A Code

Definition: This item provides the expired Mode 3/A Code after I062/060, Track Mode 3/A Code, has been removed from 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	EXM3A											
				A4	A2	A1	B4	B2	B1	C4	C2	C1	D4	D2	D1

bit-16/13 (Spare) Spare bits, set to 0

bits-12/1 (EXM3A) Expired Mode 3/A

NOTE - The term "expired" means that the age of the data is above a system dependent threshold for operational applications, but the data is still required for internal purposes.

NOTE - A potential use case for this item is that for track-to-track fusion, the expired information of the input track can be preserved.

NOTE - This item **shall** only be present after I062/060 has been removed from the target report.

NOTE - The period for how long this item is included is implementation dependent and **shall** be described in the system ICD.

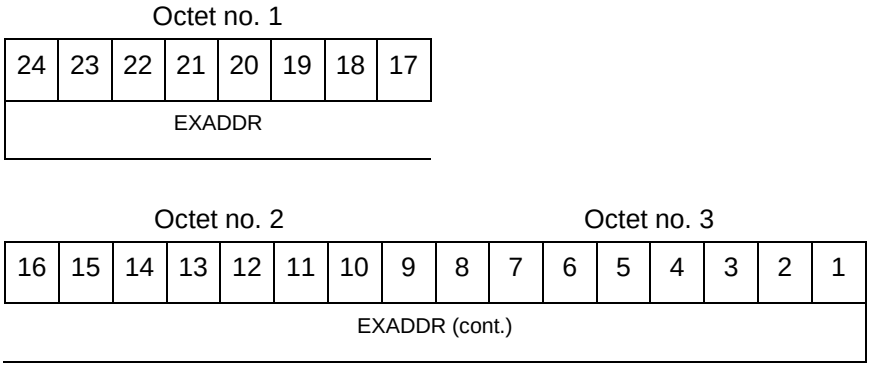
NOTE - The age of this item is given by I062/295/MDA, identical as for the non-expired case.

Structure of Subitem #8: EXADDR
Expired Target Address

Definition: This item provides the expired Target Address after I062/380/SI#1, Target Address, has been removed from the track.

Format: Three-octet fixed length Data Item.

Structure:



bits-24/17 (EXADDR) Expired 24-bit target address

NOTE - The term "expired" means that the age of the data is above a system dependent threshold for operational applications, but the data is still required for internal purposes.

NOTE - A potential use case for this item is that for track-to-track fusion, the expired information of the input track can be preserved.

NOTE - This item **shall** only be present after I062/380/SI#1 has been removed from the target report.

NOTE - The period for how long this item is included is implementation dependent and **shall** be described in the system ICD.

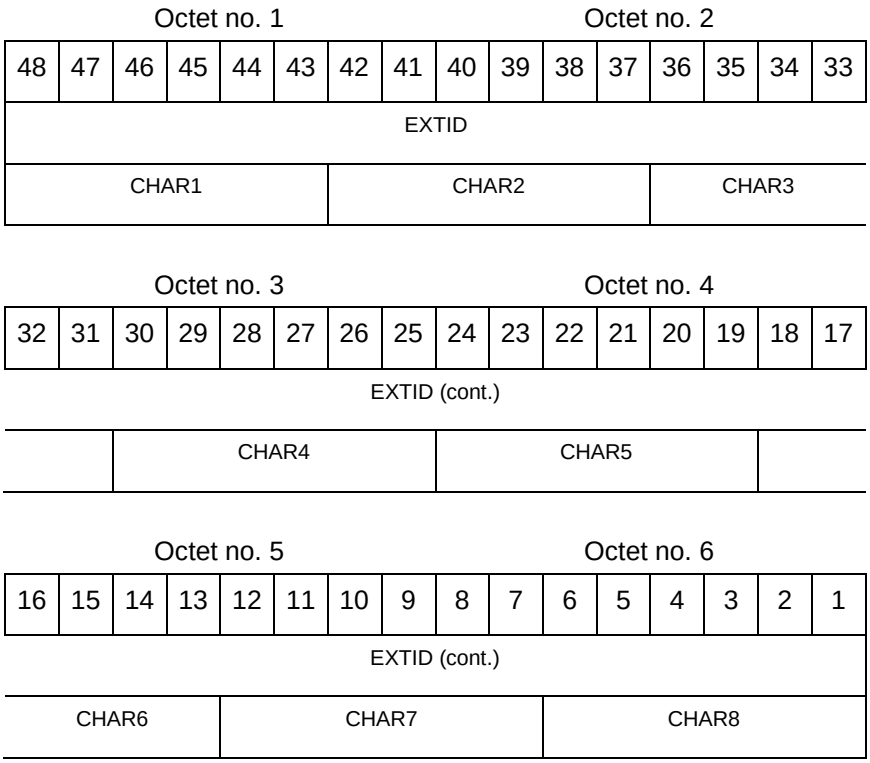
NOTE - The age of this item is given by I062/REF/MOI/ATAD, identical as for the non-expired case.

Structure of Subitem #9: EXTID
Expired Target Identification

Definition: This item provides the expired Target Identification after I062/380/SI#2, Target Identification, has been removed from the track.

Format: Six-octet fixed length Data Item.

Structure:



bits-48/1 (EXTID) Expired target identification

NOTE - The term "expired" means that the age of the data is above a system dependent threshold for operational applications, but the data is still required for internal purposes.

NOTE - A potential use case for this item is that for track-to-track fusion, the expired information of the input track can be preserved.

NOTE - This item **shall** only be present after I062/380/SI#2 has been removed from the target report.

NOTE - The period for how long this item is included is implementation dependent and **shall** be described in the system ICD.

NOTE - The age of this item is given by I062/REF/MOI/ATID, identical as for the non-expired case.

Encoding Rule : This data item is optional

2.10 Generic Category 062 Data

Definition: Placeholder for the addition of information to Category 062 even if all bits of the Item Indicator are allocated.

Format: Compound Data Item comprising a primary subitem of variable length, followed by the indicated subitems.

Structure of Primary Subitem of Compound Data Item*:*

Octet no. 1

8	7	6	5	4	3	2	1
0	0	0	0	0	0	0	FX

bits-8/2	(SPARE)	Spare Bits, set to 0
bit-1	(FX)	Extension indicator = 0 End of data item = 1 Extension into next Extension

NOTE - For this version of the specification no Sub-Items have been defined for this Item.

NOTE - The definition of additional subitems to I062/REF/GEN62 is the responsibility of the AMG and **shall** be agreed upon prior to implementation.

Encoding Rule : This data item is optional

Encoding Rule for the REF:

The Reserved Expansion Field is optional.

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