Asterix category 017 - Mode S Surveillance Coordination Function Messages

category: 017

edition: 1.3

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Preamble

Surveillance data exchange.

Description of standard data items

I017/000 - Message Type

definition: Definition of the type of message in the Surveillance Coordination Network (SCN) environment

Element
bit size: 8
Values:

- **0:** Network information
- **10:** Track data
- **20:** Track data request
- **21:** Track data stop
- **22:** Cancel track data request
- **23:** Track data stop acknowledgement
- **30:** New Node / Change-over Initial or intermediate message segment
- **31:** New Node / Change-over Final or only message segment
- **32:** New Node / Change-over Initial or intermediate message segment reply
- **33:** New Node / Change-over Final or only message segment reply
- **110:** Move node to new cluster state;
- **111:** Move node to new cluster state acknowledgement

NOTE:

- Message types 30 to 33 are specific to POEMS stations.

I017/010 - Data Source Identifier

definition: Identification of the source node for the SCN data

Group

I017/010/SAC - System Area Code

Element
bit size: 8
Raw Content

I017/010/SIC - System Identification Code

Element
bit size: 8
Raw Content

NOTE:

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

I017/012 - Data Destination Identifier

definition: Identification of the destination node for the SCN data.

Group

I017/012/SAC - System Area Code

Element
bit size: 8
Raw Content

I017/012/SIC - System Identification Code

Element
bit size: 8
Raw Content

NOTE:

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

I017/045 - Calculated Position in WGS-84 Coordinates

definition: Calculated Position in WGS-84 Coordinates.

Group

I017/045/LAT - Latitude

Element
bit size: 24
Signed quantity
LSB = $180/2^25$ ° ≈ $5.36441802978515625e-6$ °
unit: "°"
>= -90.0
<= 90.0

I017/045/LON - Longitude

Element
bit size: 24
Signed quantity
LSB = $180/2^25$ ° ≈ $5.36441802978515625e-6$ °
unit: "°"
>= -180.0
< 180.0

NOTE:

- See Annex A for calculation details

I017/050 - Flight Level in Binary Representation

definition: Flight Level of the Aircraft

Group

I017/050/V

Element
bit size: 1
Values:

0: Code validated

1: Code not validated

I017/050/G

Element
bit size: 1
Values:

0: Default
1: Garbled code / Error correction applied

I017/050/ALT - Altitude

Element
bit size: 14
Unsigned quantity
LSB = $1/2^2$ FL ≈ 0.25 FL
unit: "FL"

NOTES:

1. The value shall be within the range described by ICAO Annex 10
2. Bit-15 (G) is set to one when an error correction has been attempted
3. In case of a track miss (coasted position) the flight level sent will be either he predicted flight level from the vertical tracking or the last measured flight level, if no vertical tracking is performed. Bit 7 (FLT) of I017/240 (Track Status) indicates whether vertical tracking was performed or not.

I017/070 - Mode 3/A Code in Octal Representation

definition: Mode 3/A code converted into octal representation.

Group

I017/070/V

Element
bit size: 1
Values:

0: Code validated
1: Code not validated

I017/070/G

Element
bit size: 1
Values:

0: Default
1: Garbled code

I017/070/L

Element
bit size: 1
Values:

0: Mode-3/A code derived from the reply of the transponder
1: Smoothed Mode-3/A code not extracted during the last scan

Spare bits: 1

I017/070/MODE3A - Mode 3/A Reply in Octal Representation

Element
bit size: 12
Octal string (3-bits per char)

NOTES:

1. Bit 15 is set to one when an error correction has been attempted
2. The data could be used to correlate tracks with non unique Mode S addresses

I017/140 - Time of Day

definition: Absolute time stamping expressed as Coordinated Universal Time (UTC) time.

Element
bit size: 24
Unsigned quantity
LSB = $1/2^7$ s ≈ $7.8125e-3$ s
unit: ”s”
< 86400.0

NOTE:

- The time of day is reset to zero each day at midnight

I017/200 - Track Velocity in Polar Co-ordinates

definition: Calculated track velocity expressed in polar co-ordinates. The heading is the heading with respect to the geographical north at the aircraft position. For clarification see annex A, paragraph5.

Group

I017/200/GSP - Calculated Groundspeed

Element
bit size: 16
Unsigned quantity
LSB = $1/2^14$ NM/s ≈ $6.103515625e-5$ NM/s
unit: ”NM/s”

I017/200/HDG - Calculated Heading

Element
bit size: 16
Unsigned quantity
LSB = $360/2^16$ ° ≈ $5.4931640625e-3$ °
unit: ”°”

I017/210 - Mode S Address List

definition: Repetitive Data Item starting with a one-octet Repetition Factor followed by at least one Mode S Address of 3-octets length.

Repetitive

Regular, 1 byte(s) REP field size.

Element
bit size: 24
Raw Content

NOTE:

- This data item shall be sent even if there is no Mode S Address. In this case it is reduced in length to one octet only (REP =0) with all bits set to zero.

I017/220 - Aircraft Address

definition: Aircraft address (24-bits Mode S address) assigned uniquely to each aircraft.

Element
bit size: 24
Raw Content

I017/221 - Duplicate Address Reference Number (DRN)

definition: A number uniquely identifying the aircraft in case the Mode-S Address is not unique.

Element
bit size: 16
Raw Content

NOTE:

1. The DRN shall be added to the Track Data message, if the radar node, which is sending the Track Data messages, detects two or more aircraft with the same mode-S address in its coverage. How the numbers are generated is determined by the sending station.
2. The radar node receiving the Track Data Messages containing a DRN shall add this DRN in the corresponding ”Cancellation of Track Data” message.
3. The DRN is used to associate the ”Cancellation of Track Data” message with the corresponding ”Track Data” messages.
4. The cluster controller node will not use the DRN in the track data message, because there is no cancellation.

I017/230 - Transponder Capability

definition: Communications capability of the transponder received in the All-Call reply when the aircraft is initially acquired.

Group

I017/230/CA - Communications Capability of the Transponder

Element
bit size: 3
Values:

- **0:** No communications capability (surveillance only), no ability to set CA code 7 either airborne or on the ground
- **1:** Reserved
- **2:** Reserved
- **3:** Reserved
- **4:** At Least Comm. A and Comm. B capability and the ability to set CA code 7 and on the ground
- **5:** At Least Comm. A and Comm. B capability and the ability to set CA code 7 and airborne
- **6:** At Least Comm. A and Comm. B capability and the ability to set CA code 7 and either airborne or on the ground
- **7:** Signifies the DR field is not equal to 0 or the FS field equals 2, 3, 4 or 5 and either airborne or on the ground SI/II-capabilities of the Transponder

I017/230/SI - SI/II-capabilities of the Transponder

Element
bit size: 1
Values:

- **0:** Transponder SI capable
- **1:** Transponder not SI capable

Spare bits: 4

I017/240 - Track Status

definition: Status of the track position

Group

I017/240/CST - Track Coasted

Element
bit size: 1
Values:
- **0:** Measured position
- **1:** No measured position (coasted)

I017/240/FLT - Flight Level Tracking

Element
bit size: 1
Values:
- **0:** Last Measured Flight Level
- **1:** Predicted Flight Level

Spare bits: 6

NOTE:

- This item shall not be sent when CST and FLT equal zero.

I017/350 - Cluster Station/Node List

definition: List of stations/nodes stored in the known network topology maintained by NMP. The topology to be reported is as defined in the SCN ICD.

Repetitive

Regular, 1 byte(s) REP field size.

Group

I017/350/SAC - System Area Code

Element
bit size: 8
Raw Content

I017/350/SIC - System Identification Code

Element
bit size: 8
Raw Content

NOTE:

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

I017/360 - Cluster Controller Command State

definition: Defines the current mode and state in which a cluster station, the radar node taking part in the cluster, should be operating.

Element
bit size: 8
Raw Content

NOTE:

- The Cluster Controller will use this field to select the state in which a cluster station should be operating and the cluster station will use this field to indicate to the cluster controller the adopted state.

I017/SP - Special Purpose Field

definition: Special Purpose Field

Explicit (SpecialPurpose)

User Application Profile

- 1: `I017/010` - Data Source Identifier
- 2: `I017/012` - Data Destination Identifier
- 3: `I017/000` - Message Type
- 4: `I017/350` - Cluster Station/Node List
- 5: `I017/220` - Aircraft Address
- 6: `I017/221` - Duplicate Address Reference Number (DRN)
- 7: `I017/140` - Time of Day
- (FX) - Field extension indicator
- 8: `I017/045` - Calculated Position in WGS-84 Coordinates
- 9: `I017/070` - Mode 3/A Code in Octal Representation
- 10: `I017/050` - Flight Level in Binary Representation
- 11: `I017/200` - Track Velocity in Polar Co-ordinates
- 12: `I017/230` - Transponder Capability
- 13: `I017/240` - Track Status
- 14: `I017/210` - Mode S Address List
- (FX) - Field extension indicator
- 15: `I017/360` - Cluster Controller Command State
- *Spare*
- *Spare*
- *Spare*
- *Spare*
- *Spare*
- 21: `I017/SP` - Special Purpose Field
- (FX) - Field extension indicator