Asterix expansion 021 - ADS-B Target Reports Expansion

category: 021

edition: 1.4

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FSPEC byte size: 1

Items

BPS - Barometric Pressure Setting

definition: Barometric Pressure Setting

Group

Spare bits: 4

BPS/BPS - Barometric Pressure Setting

Element
bit size: 12
Unsigned quantity
LSB = $1/10$ hPa ≈ 0.1 hPa
unit: ”hPa”
>= 0.0
<= 409.5

Notes:

- BPS is the barometric pressure setting of the aircraft minus 800 hPa
- A value of ”0” indicates that in the aircraft a value of 800 hPa or less has been selected.
- A value of ”409.5” indicates that in the aircraft a value of 1209.5 hPa or more has been selected.

SH - Selected Heading

definition: Selected Heading

Group

Spare bits: 4

SH/HDR - Horizontal Reference Direction

Element
bit size: 1
Values:

- **0:** True North
- **1:** Magnetic North

SH/STAT - Selected Heading Status

Element
bit size: 1
Values:

- **0:** Data is either unavailable or invalid
- **1:** Data is available and valid

SH/SH - Selected Heading

Element
bit size: 10
Unsigned quantity
LSB = $45/2^6$ ° ≈ 0.703125 °
unit: ”°”

On many aircraft, the ADS-B Transmitting Subsystem receives Selected Heading from a Mode Control Panel / Flight Control Unit (MCP / FCU). Users of this data are cautioned that the Selected Heading value transmitted by the ADS-B Transmitting Subsystem does not necessarily reflect the true intention of the airplane during certain flight modes (e.g., during LNAV mode).

NAV - Navigation Mode

definition: Navigation Mode Settings

Group

NAV/AP - Autopilot

Element
bit size: 1
Values:

0: Autopilot not engaged
1: Autopilot engaged

NAV/VN - Vertical Navigation

Element
bit size: 1
Values:

0: Vertical Navigation not active
1: Vertical Navigation active

NAV/AH - Altitude Hold

Element
bit size: 1
Values:

0: Altitude Hold not engaged
1: Altitude Hold engaged

NAV/AM - Approach Mode

Element
bit size: 1
Values:

0: Approach Mode not active
1: Approach Mode active

Spare bits: 4

This data-item should only be transmitted if an ADS-B indication has been received that the mode bits have been ”actively populated”.by the avionics (1090 ES version 2 (as defined in I021/210) BDS 6,2, subtype 1, bit 47: ”Status of MCP / FCU Mode Bits”)

GAO - GPS Antenna Offset

definition: GPS Antenna Offset

Element
bit size: 8
Raw Content

The value of this field is copied from the respective bits 33-40 of version 2 (as defined in I021/210) of 1090 ES BDS register 6,5 (Aircraft Operational Status)

SGV - Surface Ground Vector

definition: Ground Speed and Track Angle elements of the Surface Ground Vector.
Extended

SGV/STP

Element
bit size: 1
Values:

0: Aircraft has not stopped
1: Aircraft has stopped

SGV/HTS

Element
bit size: 1
Values:

0: Heading/Ground Track data is not valid
1: Heading/Ground Track data is valid

SGV/HTT

Element
bit size: 1
Values:

0: Heading data provided
1: Ground Track provided

SGV/HRD

Element
bit size: 1
Values:

0: True North
1: Magnetic North

SGV/GSS - Ground Speed

Element
bit size: 11
Unsigned quantity
LSB = $1/2^3$ kt ≈ 0.125 kt
unit: ”kt”

(FX) - extension bit

SGV/HGT - Heading/Ground Track Information

Element
bit size: 7
Unsigned quantity
LSB = $45/2^4$ ° ≈ 2.8125 °
unit: ”°”

(FX) - extension bit

STA - Aircraft Status

definition: This item contains flags to convey information on the status of a target.
Extended

STA/ES

Element
bit size: 1
Values:

0: Target is not 1090 ES IN capable
1: Target is 1090 ES IN capable

STA/UAT

Element
bit size: 1
Values:

0: Target is not UAT IN capable
1: Target is UAT IN capable

Spare bits: 5
(FX) - extension bit

TNH - True North Heading

definition: True North Heading (Element of Air Vector).

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

Magnetic Heading is defined in I021/152.

MES - Military Extended Squitter

definition: Contents of Extended Squitters transmitted by Military Aircraft
Compound

MES/SUM - Mode 5 Summary

Group

MES/SUM/M5

Element
bit size: 1
Values:

0: No Mode 5 interrogation
1: Mode 5 interrogation

MES/SUM/ID

Element
bit size: 1
Values:

0: No authenticated Mode 5 ID reply/report
1: Authenticated Mode 5 ID reply/report

MES/SUM/DA

Element
bit size: 1
Values:

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)

MES/SUM/M1

Element
bit size: 1
Values:

0: Mode 1 code not present or not from Mode 5 reply/report

1: Mode 1 code from Mode 5 reply/report

MES/SUM/M2

Element
bit size: 1
Values:

0: Mode 2 code not present or not from Mode 5 reply/report
1: Mode 2 code from Mode 5 reply/report

MES/SUM/M3

Element
bit size: 1
Values:

0: Mode 3 code not present or not from Mode 5 reply/report
1: Mode 3 code from Mode 5 reply/report

MES/SUM/MC

Element
bit size: 1
Values:

0: Flightlevel not present or not from Mode 5 reply/report
1: Flightlevel from Mode 5 reply/report

MES/SUM/PO

Element
bit size: 1
Values:

0: Position not from Mode 5 report (ADS-B report)
1: Position from Mode 5 report

Notes:

1. The flag M2 refers to the contents of Subfield #6 below, M3, MC refer to the contents of data items I021/070 and I021/145 respectively. The flag M1 refers to the contents of Subfield #3 below (Extended Mode 1 Code in Octal Representation).
2. If a Mode 5 reply/report is received with the Emergency bit set, then the Military Emergency bit (ME) in Data Item I021/200, Target Status, shall be set.
3. If a Mode 5 reply/report is received with the Identification of Position bit set, then the Special Position Identification bit (SPI) in Data Item I021/200, Target Status, shall be set.
4. If a Mode 5 report (ID or Data) is received and fullfill the autentication criteria the corresponding authentication bit shall be set.

MES/PNO - Mode 5 PIN / National Origin

Group

Spare bits: 2

MES/PNO/PIN - PIN Code

Element
bit size: 14
Raw Content

Spare bits: 5

MES/PNO/NO - National Origin Code

Element
bit size: 11
Raw Content

MES/EM1 - Extended Mode 1 Code in Octal Representation

Group

MES/EM1/V

Element
bit size: 1
Values:

0: Code validated
1: Code not validated

Spare bits: 1

MES/EM1/L

Element
bit size: 1
Values:

0: Mode 1 code as derived from the report of the transponder
1: Smoothed Mode 1 code as provided by a local tracker

Spare bits: 1

MES/EM1/EM1 - Extended Mode 1 Code in Octal Representation

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

Notes:

- 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.
- If Subfield #3 is not present the Mode 1 Code was not reported or all Code Bits were equal to 0.
- The valid bit is set if the Code was only reported once for that target.

MES/XP - X Pulse Presence

Group

Spare bits: 2

MES/XP/XP - X-pulse from Mode 5 PIN Reply/report

Element
bit size: 1
Values:

0: X-Pulse not present
1: X-pulse present

MES/XP/X5 - X-pulse from Mode 5 Data Reply or Report

Element
bit size: 1
Values:

0: X-pulse set to zero or no authenticated Data reply or Report received
1: X-pulse set to one (present)

MES/XP/XC - X-pulse from Mode C Reply

Element
bit size: 1
Values:

0: X-pulse set to zero or no Mode C reply
1: X-pulse set to one (present)

MES/XP/X3 - X-pulse from Mode 3/A Reply

Element
bit size: 1
Values:

0: X-pulse set to zero or no Mode 3/A reply
1: X-pulse set to one (present)

MES/XP/X2 - X-pulse from Mode 2 Reply

Element
bit size: 1
Values:

0: 0 X-pulse set to zero or no Mode 2 reply
1: X-pulse set to one (present)

MES/XP/X1 - X-pulse from Mode 1 Reply

Element
bit size: 1
Values:

0: X-pulse set to zero or no Mode 1 reply
1: X-pulse set to one (present)

Within Mode 5 reports, the X-Pulse can be set for the following cases:
1. In a combined Mode 1 and Mode 2 report: in this case the X5 bit and the X2 bit shall be set;
2. In a combined Mode 3 and Mode C report: in this case the X5 bit and the X3 bit shall be set;
3. In a Mode 5 PIN data report: in this case the X5 bit and the XP bit shall be set. The X1 bit and the XC bit are meaningless as in Mode 1 and Mode C replies/reports the X Pulse is not defined. They are kept for compatibility reasons.

MES/FOM - Figure of Merit

Group

Spare bits: 3

MES/FOM/FOM - Figure of Merit

Element
bit size: 5
Raw Content

MES/M2 - Mode 2 Code in Octal Representation

Group

MES/M2/V

Element
bit size: 1
Values:

0: Code validated
1: Code not validated

Spare bits: 1

MES/M2/L

Element
bit size: 1
Values:

0: Mode-2 code as derived from the reply of the transponder
1: Smoothed Mode-2 code as provided by a local tracker

Spare bits: 1

MES/M2/MODE2 - Mode 2 Code in Octal Representation

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

If Subfield 6 is not present the Mode 2 Code was no reported or all Code Bits were equal to 0.

Notes:

- The Reserved Expansion Field is optional. When used to transmit MES, it shall be sent when the targets are represented by Mode 5 Level 2 reports.
- The information contained in this data item is specific to 1090MHz Extended Squitter messages transmitted by military aircraft (Mode 5 Level 2 squitter).