# Asterix category 020 - Multilateration Target Reports

**category**: 020

**edition**: 1.11

**date**: 2025-07-02

## Preamble

Surveillance data exchange.

## Description of standard data items

### I020/010 - Data Source Identifier

definition: Identification of the system from which the data are received

Group

#### I020/010/SAC - System Area Code

Element
bit size: 8
Raw Content

#### I020/010/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).

### I020/020 - Target Report Descriptor

definition: Type and characteristics of the data as transmitted by a system.

Extended

#### I020/020/SSR

Element
bit size: 1
Values:
  **0:** Non-Mode S 1090MHz multilateration
  **1:** No Non-Mode S 1090MHz multilat

#### I020/020/MS

Element
bit size: 1
Values:
  **0:** Mode-S 1090 MHz multilateration
  **1:** No Mode-S 1090 MHz multilateration

#### I020/020/HF

Element
bit size: 1
Values:
  **0:** HF multilateration

**1:** No HF multilateration

**I020/020/VDL4**

Element
bit size: 1
Values:

**0:** VDL Mode 4 multilateration
**1:** No VDL Mode 4 multilateration

**I020/020/UAT**

Element
bit size: 1
Values:

**0:** UAT multilateration
**1:** No UAT multilateration

**I020/020/DME**

Element
bit size: 1
Values:

**0:** DME/TACAN multilateration
**1:** No DME/TACAN multilateration

**I020/020/OT**

Element
bit size: 1
Values:

**0:** Other Technology Multilateration
**1:** No Other Technology Multilateration

*(FX) - extension bit*

**I020/020/RAB**

Element
bit size: 1
Values:

**0:** Report from target transponder
**1:** Report from field monitor (element transponder)

**I020/020/SPI**

Element
bit size: 1
Values:

**0:** Absence of SPI
**1:** Special Position Identification

**I020/020/CHN**

Element
bit size: 1
Values:

**0:** Chain 1
**1:** Chain 2

**I020/020/GBS**

Element
bit size: 1
Values:

**0:** Transponder Ground bit not set
**1:** Transponder Ground bit set

**I020/020/CRT**

Element
bit size: 1
Values:

**0:** No Corrupted reply in multilateration
**1:** Corrupted replies in multilateration

### I020/020/SIM

Element
bit size: 1
Values:

**0:** Actual target report
**1:** Simulated target report

### I020/020/TST

Element
bit size: 1
Values:

**0:** Default
**1:** Test Target

*(FX) - extension bit*

### I020/020/CF

Element
bit size: 2
Values:

**0:** Target with 24-bit ICAO address
**1:** Target with a non-ICAO 24-bit address
**2:** Non-ADS-B Message
**3:** Information not available

Spare bits: 5

*(FX) - extension bit*

**Notes:**

- The CF-indication (Bits 8/7) is related to the CF value received in the DF-18 format of the ADS-B 1090 MHz Extended Squitter as described in the EUROCAE ED-102B/RTCA DO-260C (Table 2-7) document. This field provides information on the type of address provided (ICAO versus non-ICAO).
- CF=0 denotes an ADS-B Message with the target carrying a 24-bit ICAO address (DF-18 with CF = 0).
- CF=1 denotes an ADS-B Message with the target carrying another kind of address for the transmitting ADS-B participant: a self-assigned "anonymous" address, a ground vehicle address, or a surface obstruction address (DF-18 with CF = 1).
- CF=2 denotes a Non-ADS-B Message received from the ADS-B system. Further details are available in EUROCAE ED-102B/RTCA DO-260C (Table 2-7) (DF-18 with CF > 1).
- CF=3 indicates that information is not available, set for targets not providing DF-18 messages.
- Population of this element requires the Multilateration system to be capable of decoding ADS-B 1090 MHz Extended Squitter messages received from the aircraft. Multilateration systems not capable of decoding ADS-B 1090 MHz Extended Squitter messages shall encode CF=3.

### I020/030 - Warning/Error Conditions

definition: Warning/error conditions detected by a system for the target report involved.

Repetitive

With FX extension bit.

Element
bit size: 7
Values:

- **0:** Not defined; never used
- **1:** Multipath Reply (Reflection)
- **3:** Split plot
- **10:** Phantom SSR plot
- **11:** Non-Matching Mode-3/A Code
- **12:** Mode C code / Mode S altitude code abnormal value compared to the track
- **15:** Transponder anomaly detected
- **16:** Duplicated or Illegal Mode S Aircraft Address
- **17:** Mode S error correction applied
- **18:** Undecodable Mode C code / Mode S altitude code

Notes:

1. It has to be stressed that a series of one or more W/E conditions can be reported per target report.
2. Data conveyed in this item are of secondary importance, and can generally also be derived from the processing of mandatory items.
3. Definitions can be found in SUR.ET1.ST03.1000-STD-01-01 Radar Sensor Performance Analysis.
4. The coding of Warning/Errors is kept consistent with category 048.

## I020/041 - Position In WGS-84 Coordinates

definition: Position of a target in WGS-84 Coordinates.

Group

### I020/041/LAT - Latitude

Element
bit size: 32
Signed quantity
LSB = $180/2^25$ ° ≈ $5.36441802978515625e-6$ °
unit: "°"
>= $-90.0$
<= $90.0$

### I020/041/LON - Longitude

Element
bit size: 32
Signed quantity
LSB = $180/2^25$ ° ≈ $5.36441802978515625e-6$ °
unit: "°"
>= $-180.0$
< $180.0$

## I020/042 - Position in Cartesian Coordinates

definition: Calculated position in Cartesian Coordinates, in two's complement representation.

Group

### I020/042/X - X-coordinate

Element
bit size: 24
Signed quantity
LSB = $1/2$ m $\approx$ 0.5 m
unit: "m"
>= $-4194300.0$
<= $4194300.0$

### I020/042/Y - Y-coordinate

Element
bit size: 24
Signed quantity
LSB = $1/2$ m $\approx$ 0.5 m
unit: "m"
>= $-4194300.0$
<= $4194300.0$

## I020/050 - Mode-2 Code in Octal Representation

definition: Mode-2 code converted into octal representation.

Group

### I020/050/V - Validated

Element
bit size: 1
Values:
   **0:** Code validated
   **1:** Code not validated

### I020/050/G - Garbled

Element
bit size: 1
Values:
   **0:** Default
   **1:** Garbled code

### I020/050/L

Element
bit size: 1
Values:
   **0:** Mode-2 code derived from the reply of the transponder
   **1:** Smoothed Mode-2 code as provided by a local tracker n

Spare bits: 1

### I020/050/MODE2 - Mode-2 Reply in Octal Representation

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

## I020/055 - Mode-1 Code in Octal Representation

definition: Mode-1 code converted into octal representation.

Group

### I020/055/V - Validated

Element
bit size: 1
Values:
   **0:** Code validated

**1:** Code not validated

### I020/055/G - Garbled

Element
bit size: 1
Values:

**0:** Default
**1:** Garbled code

### I020/055/L

Element
bit size: 1
Values:

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

### I020/055/MODE1 - Mode-1 Code in Octal Representation

Element
bit size: 5
Raw Content

## I020/070 - Mode-3/A Code in Octal Representation

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

Group

### I020/070/V - Validated

Element
bit size: 1
Values:

**0:** Code validated
**1:** Code not validated

### I020/070/G - Garbled

Element
bit size: 1
Values:

**0:** Default
**1:** Garbled code

### I020/070/L

Element
bit size: 1
Values:

**0:** Mode-3/A code derived from the reply of the transponder
**1:** Mode-3/A code not extracted during the last update period

Spare bits: 1

### I020/070/MODE3A - Mode-3/A Reply in Octal Representation

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

Notes:

1. Bit 15 (G) is set to one when an error correction has been attempted.
2. Bit 16 (V) is normally set to zero, but can exceptionally be set to one to indicate a non-validated Mode-3/A code (e.g. alert condition detected, but new Mode-3/A code not successfully extracted).

### I020/090 - Flight Level in Binary Representation

definition: Flight Level (Mode S Altitude) converted into binary two's complement representation.

Group

#### I020/090/V - Validated

Element
bit size: 1
Values:
  **0:** Code validated
  **1:** Code not validated

#### I020/090/G - Garbled

Element
bit size: 1
Values:
  **0:** Default
  **1:** Garbled code

#### I020/090/FL - Flight Level

Element
bit size: 14
Signed quantity
LSB = $1/2^2$ FL $\approx$ 0.25 FL
unit: "FL"

Notes:

1. When Mode C code / Mode S altitude code is present but not decodable, the "Undecodable Mode C code / Mode S altitude code" Warning/Error should be sent in I020/030.
2. When local tracking is applied and the received Mode S altitude code corresponds to an abnormal value (i.e: the difference in altitude between the current and the previous plot exceeds a predefined system threshold), the "Mode C code / Mode S altitude code abnormal value compared to the track" Warning/Error should be sent in I020/030.
3. The value shall be within the range described by ICAO Annex 10
4. For Mode S, bit 15 (G) is set to one when an error correction has been attempted.

### I020/100 - Mode C Code

definition: Mode-C height in Gray notation as received from the transponder together with the confidence level for each reply bit as provided by a MSSR/Mode-S station.

Group

#### I020/100/V - Validated

Element
bit size: 1
Values:
  **0:** Code validated
  **1:** Code not validated

#### I020/100/G - Garbled

Element
bit size: 1
Values:
  **0:** Default

**1:** Garbled code

Spare bits: 2

**I020/100/MODEC - Mode-C Reply in Gray Notation**

> Element
> bit size: 12
> Raw Content

Spare bits: 4

**I020/100/QC1 - Quality Pulse C1**

> Element
> bit size: 1
> Values:
>> **0:** High quality pulse C1
>> **1:** Low quality pulse C1

**I020/100/QA1 - Quality Pulse A1**

> Element
> bit size: 1
> Values:
>> **0:** High quality pulse A1
>> **1:** Low quality pulse A1

**I020/100/QC2 - Quality Pulse C2**

> Element
> bit size: 1
> Values:
>> **0:** High quality pulse C2
>> **1:** Low quality pulse C2

**I020/100/QA2 - Quality Pulse A2**

> Element
> bit size: 1
> Values:
>> **0:** High quality pulse A2
>> **1:** Low quality pulse A2

**I020/100/QC4 - Quality Pulse C4**

> Element
> bit size: 1
> Values:
>> **0:** High quality pulse C4
>> **1:** Low quality pulse C4

**I020/100/QA4 - Quality Pulse A4**

> Element
> bit size: 1
> Values:
>> **0:** High quality pulse A4
>> **1:** Low quality pulse A4

**I020/100/QB1 - Quality Pulse B1**

> Element
> bit size: 1
> Values:
>> **0:** High quality pulse B1
>> **1:** Low quality pulse B1

**I020/100/QD1 - Quality Pulse D1**

> Element
> bit size: 1
> Values:

**0:** High quality pulse D1
**1:** Low quality pulse D1

### I020/100/QB2 - Quality Pulse B2

Element
bit size: 1
Values:

**0:** High quality pulse B2
**1:** Low quality pulse B2

### I020/100/QD2 - Quality Pulse D2

Element
bit size: 1
Values:

**0:** High quality pulse B2
**1:** Low quality pulse B2

### I020/100/QB4 - Quality Pulse B4

Element
bit size: 1
Values:

**0:** High quality pulse B4
**1:** Low quality pulse B4

### I020/100/QD4 - Quality Pulse D4

Element
bit size: 1
Values:

**0:** High quality pulse D4
**1:** Low quality pulse D4

Notes:

1. For Mode S, bit 31 (G) is set to one when an error correction has been attempted.
2. For Mode S, D1 is also designated as Q, and is used to denote either 25ft or 100ft reporting.

### I020/105 - Geometric Height (WGS-84)

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.

Element
bit size: 16
Signed quantity
LSB = $25/2^2$ ft $\approx$ 6.25 ft
unit: "ft"
>= $-204800.0$
<= $204800.0$

### I020/110 - Measured Height (Local Cartesian Coordinates)

definition: Height above local 2D co-ordinate system in reference to the MLT System Reference Point as defined in item I019/610, in two's complement form, based on a direct measurement not related to barometric pressure.

Element
bit size: 16
Signed quantity
LSB = $25/2^2$ ft $\approx$ 6.25 ft
unit: "ft"
>= $-204800.0$
<= $204800.0$

## I020/140 - Time of Day

definition: Absolute time stamping expressed as UTC.

Element
bit size: 24
Unsigned quantity
LSB = $1/2^7$ s $\approx 7.8125e-3$ s
unit: "s"

## I020/161 - Track Number

definition: An integer value representing a unique reference to a track record within a particular track file.

Group

Spare bits: 4

### I020/161/TRN - Track Number

Element
bit size: 12
Raw Content

## I020/170 - Track Status

definition: Status of a track.

Extended

### I020/170/CNF

Element
bit size: 1
Values:
  **0:** Confirmed track
  **1:** Track in initiation phase

### I020/170/TRE

Element
bit size: 1
Values:
  **0:** Default
  **1:** Last report for a track

### I020/170/CST

Element
bit size: 1
Values:
  **0:** Not Coasted
  **1:** Coasted

### I020/170/CDM

Element
bit size: 2
Values:

>    **0:** Maintaining
>    **1:** Climbing
>    **2:** Descending
>    **3:** Invalid

### I020/170/MAH

Element
bit size: 1
Values:

>    **0:** Default
>    **1:** Horizontal manoeuvre

### I020/170/STH

Element
bit size: 1
Values:

>    **0:** Measured position
>    **1:** Smoothed position

*(FX) - extension bit*

### I020/170/GHO

Element
bit size: 1
Values:

>    **0:** Default
>    **1:** Ghost track

Spare bits: 6

*(FX) - extension bit*

Notes:

1. Bit-8 (GHO) is used to signal that the track is suspected to have been generated by a fake target.

## I020/202 - Calculated Track Velocity in Cartesian Coordinates

definition: Calculated track velocity expressed in Cartesian Coordinates, in two's complement representation.

Group

### I020/202/VX

Element
bit size: 16
Signed quantity
LSB = $1/2^2$ m/s ≈ 0.25 m/s
unit: "m/s"
>= $-8192.0$
<= $8192.0$

### I020/202/VY

Element
bit size: 16
Signed quantity
LSB = $1/2^2$ m/s ≈ 0.25 m/s
unit: "m/s"
>= $-8192.0$
<= $8192.0$

**I020/210 - Calculated Acceleration**

definition: Calculated Acceleration of the target, in two's complement form.
Group

    **I020/210/AX**

        Element
        bit size: 8
        Signed quantity
        LSB = $1/2^2$ m/s² ≈ 0.25 m/s²
        unit: "m/s²"
        >= $-31.0$
        <= 31.0

    **I020/210/AY**

        Element
        bit size: 8
        Signed quantity
        LSB = $1/2^2$ m/s² ≈ 0.25 m/s²
        unit: "m/s²"
        >= $-31.0$
        <= 31.0

  **Notes:**
    1. Maximum value means "maximum value or above"

**I020/220 - Target Address**

definition: Target address (24-bit address) assigned to each Target.

    Element
    bit size: 24
    Raw Content

Note:

    The type of address (ICAO or non-ICAO address, type of message) is defined
    by the CF-indication in Data Item I020/020, second extension, bits 8/7.

**I020/230 - Communications/ACAS Capability and Flight Status**

definition: Communications capability of the transponder, capability of the on-board
ACAS equipment and flight status.
Group

    **I020/230/COM - Communications Capability of the Transponder**

        Element
        bit size: 3
        Values:

            **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:** Not assigned
            **6:** Not assigned
            **7:** Not assigned

    **I020/230/STAT - Flight Status**

Element
bit size: 3
Values:

> **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 assigned
> **7:** Information not yet extracted

### I020/230/CASEVN - CAS Extended Version Number

Element
bit size: 2
Values:

> **0:** Non-extended version
> **1:** ACAS Xa Version 1
> **2:** ACAS Xu Version 1
> **3:** Reserved for future use

### I020/230/MSSC - Mode-S Specific Service Capability

Element
bit size: 1
Values:

> **0:** No
> **1:** Yes

### I020/230/ARC - Altitude Reporting Capability

Element
bit size: 1
Values:

> **0:** 100 ft resolution
> **1:** 25 ft resolution

### I020/230/AIC - Aircraft Identification Capability

Element
bit size: 1
Values:

> **0:** No
> **1:** Yes

### I020/230/B1A - BDS 1,0 Bit 16

Element
bit size: 1
Raw Content

### I020/230/B1B - BDS 1,0 Bits 37/40

Element
bit size: 4
Raw Content

**Notes:**

- (applicable to bits-10/9 (CASEVN)): if bits-2/1 (of the B1B field) are set to '11', bits-10/9 contain information about the Extended Version Number of the CAS. If bits-2/1 (of the B1B field) contain a value different from '11', bits-10/9 are set to zero.
- (applicable to bit-5 (B1A)): this is a copy of bit 16 of BDS register 1,0. If set to '1', bit-5 indicates that the interface between the CAS and the Transponder is operational. If set to '0', bit-5 indicates that the CAS has failed or is in standby.

- (applicable to bits 4/1 (B1B)): this is a copy of bits 37 to 40 of BDS register 1,0.
bit-4 (bit 37 of BDS Register 1,0): If set to '1' indicates Hybrid Surveillance Capability. If set to '0' indicates no Hybrid Surveillance Capability.
bit-3: (bit 38 of BDS Register 1,0): If set to '1' indicates the capability of the CAS to generate TAs and RAs. If set to '0' indicates the capability of the CAS to generate TAs only.
bits-2/1: (bits 40 and 39 of BDS Register 1,0) indicate the CAS Version Number:
00 = RTCA DO-185 01 = RTCA DO-185A 10 = EUROCAE ED-143/RTCA DO-185B 11 = CAS Extended Version Number (see bits-10/9)

## I020/245 - Target Identification

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

Group

### I020/245/STI

Element
bit size: 2
Values:

- **0:** Callsign or registration not downlinked from transponder
- **1:** Registration downlinked from transponder
- **2:** Callsign downlinked from transponder
- **3:** Not defined

Spare bits: 6

### I020/245/CHR - Characters 1-8 (coded on 6 Bits Each) Defining Target Identification

Element
bit size: 48
ICAO string (6-bits per char)

Notes:

1. See ICAO document Annex 10, Volume IV, section 3.1.2.9 for the coding rules.

## I020/250 - BDS Register Data

definition: Mode S Comm B data as extracted from the aircraft transponder.

Repetitive

Regular, 1 byte(s) REP field size.

Group

### I020/250/BDSDATA - 56-bit Message Conveying BDS Register Data

Element
bit size: 56
Raw Content

### I020/250/BDS1 - BDS Register Address 1

Element
bit size: 4
Raw Content

### I020/250/BDS2 - BDS Register Address 2

Element
bit size: 4
Raw Content

Notes:

    1. For the transmission of BDS Register 2,0, Data Item I020/245 is used.
    2. For the transmission of BDS Register 3,0, Data Item I020/260 is used. In case of ACAS Xu (as defined in [4]), the Resolution Advisory consists of two parts (BDS Register 3,0 and BDS Register 3,1). BDS Register 3,1 will be transmitted using Data Item I020/250. For the detailed definition of BDS Register 3,0 and 3,1 please refer to [2] Tables B-3-48a and B-3-49.

**I020/260 - 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.

Element
bit size: 56
Raw Content

**Notes:**

    1. Refer to ICAO Draft SARPs for ACAS for detailed explanations.
    2. In case of ACAS Xu, the Resolution Advisory consists of two parts (BDS Register 3,0 and BDS Register 3,1). The contents of BDS Register 3,1 will be transmitted using item 250.

**I020/300 - Vehicle Fleet Identification**

definition: Vehicle fleet identification number.

Element
bit size: 8
Values:

    **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)

**I020/310 - Pre-programmed Message**

definition: Number related to a pre-programmed message that can be transmitted by a vehicle.

Group

**I020/310/TRB**

Element
bit size: 1
Values:

**0:** Default
**1:** In Trouble

### I020/310/MSG

Element
bit size: 7
Values:

**1:** Towing aircraft
**2:** FOLLOW-ME operation
**3:** Runway check
**4:** Emergency operation (fire, medical...)
**5:** Work in progress (maintenance, birds scarer, sweepers...)

## I020/400 - Contributing Devices

definition: Overview of Receiver Units, which have contributed to the Target Detection.

Repetitive

Regular, 1 byte(s) REP field size.

Group

### I020/400/BIT1 - TU1/RU1 Contribution

Element
bit size: 1
Values:

**0:** TU1/RU1 has NOT contributed to the target detection
**1:** TU1/RU1 has contributed to the target detection

### I020/400/BIT2 - TU2/RU2 Contribution

Element
bit size: 1
Values:

**0:** TU2/RU2 has NOT contributed to the target detection
**1:** TU2/RU2 has contributed to the target detection

### I020/400/BIT3 - TU3/RU3 Contribution

Element
bit size: 1
Values:

**0:** TU3/RU3 has NOT contributed to the target detection
**1:** TU3/RU3 has contributed to the target detection

### I020/400/BIT4 - TU4/RU4 Contribution

Element
bit size: 1
Values:

**0:** TU4/RU4 has NOT contributed to the target detection
**1:** TU4/RU4 has contributed to the target detection

### I020/400/BIT5 - TU5/RU5 Contribution

Element
bit size: 1
Values:

**0:** TU5/RU5 has NOT contributed to the target detection
**1:** TU5/RU5 has contributed to the target detection

### I020/400/BIT6 - TU6/RU6 Contribution

Element
bit size: 1
Values:

**0:** TU6/RU6 has NOT contributed to the target detection
**1:** TU6/RU6 has contributed to the target detection

### I020/400/BIT7 - TU7/RU7 Contribution

Element
bit size: 1
Values:

**0:** TU7/RU7 has NOT contributed to the target detection
**1:** TU7/RU7 has contributed to the target detection

### I020/400/BIT8 - TU8/RU8 Contribution

Element
bit size: 1
Values:

**0:** TU8/RU8 has NOT contributed to the target detection
**1:** TU8/RU8 has contributed to the target detection

Note:

In case of more than 8 devices connected to the system, the numbering of the field "RUx Contribution" follows the standard ASTERIX rule: bits are numbered from right to left. The example below shows the case of a maximum of 16 devices with devices 1, 7 and 14 contributing to the target:
<TODO: add table>

## I020/500 - Position Accuracy

definition: Standard Deviation of Position
Compound

### I020/500/DOP - DOP of Position

Group

#### I020/500/DOP/X - DOP (X-Component)

Element
bit size: 16
Unsigned quantity
LSB $= 1/2^2 \approx 0.25$
unit: ""

#### I020/500/DOP/Y - DOP (Y-Component)

Element
bit size: 16
Unsigned quantity
LSB $= 1/2^2 \approx 0.25$
unit: ""

#### I020/500/DOP/XY - DOP (Correlation XY)

Element
bit size: 16
Unsigned quantity
LSB $= 1/2^2 \approx 0.25$
unit: ""

### I020/500/SDP - Standard Deviation of Position

Group

#### I020/500/SDP/X - SDP (X-Component)

Element
bit size: 16
Unsigned quantity
LSB = $1/2^2$ m ≈ 0.25 m
unit: "m"

### I020/500/SDP/Y - SDP (Y-Component)

Element
bit size: 16
Unsigned quantity
LSB = $1/2^2$ m ≈ 0.25 m
unit: "m"

### I020/500/SDP/XY - SDP (Correlation XY)

Element
bit size: 16
Unsigned quantity
LSB = $1/2^2$ ≈ 0.25
unit: ""

### I020/500/SDH - Standard Deviation of Geometric Height (WGS 84)

Element
bit size: 16
Unsigned quantity
LSB = $1/2$ m ≈ 0.5 m
unit: "m"

Note:

1. There is now a new Item for the Position Accuracy defined in the Reserved Expansion Field (REF), more complete (includes a Standard Deviation of Position in WGS-84) and is based on a different calculation method (covariance instead of correlation). It is recommended to use the new definition. Nevertheless, Item I020/500 is kept in order to prevent a full incompatibility with previous releases of ASTERIX Cat. 020 already implemented.

## I020/RE - Reserved Expansion Field

definition: Expansion
Explicit (ReservedExpansion)

## I020/SP - Special Purpose Field

definition: Special Purpose Field
Explicit (SpecialPurpose)

# User Application Profile

- 1: I020/010 - Data Source Identifier
- 2: I020/020 - Target Report Descriptor
- 3: I020/140 - Time of Day
- 4: I020/041 - Position In WGS-84 Coordinates
- 5: I020/042 - Position in Cartesian Coordinates
- 6: I020/161 - Track Number
- 7: I020/170 - Track Status
- (FX) - Field extension indicator
- 8: I020/070 - Mode-3/A Code in Octal Representation
- 9: I020/202 - Calculated Track Velocity in Cartesian Coordinates
- 10: I020/090 - Flight Level in Binary Representation
- 11: I020/100 - Mode C Code

- 12: `I020/220` - Target Address
- 13: `I020/245` - Target Identification
- 14: `I020/110` - Measured Height (Local Cartesian Coordinates)
- (FX) - Field extension indicator
- 15: `I020/105` - Geometric Height (WGS-84)
- 16: `I020/210` - Calculated Acceleration
- 17: `I020/300` - Vehicle Fleet Identification
- 18: `I020/310` - Pre-programmed Message
- 19: `I020/500` - Position Accuracy
- 20: `I020/400` - Contributing Devices
- 21: `I020/250` - BDS Register Data
- (FX) - Field extension indicator
- 22: `I020/230` - Communications/ACAS Capability and Flight Status
- 23: `I020/260` - ACAS Resolution Advisory Report
- 24: `I020/030` - Warning/Error Conditions
- 25: `I020/055` - Mode-1 Code in Octal Representation
- 26: `I020/050` - Mode-2 Code in Octal Representation
- 27: `I020/RE` - Reserved Expansion Field
- 28: `I020/SP` - Special Purpose Field
- (FX) - Field extension indicator