Asterix category 025 - CNS/ATM Ground System Status Reports

category: 025

edition: 1.5

date: 2021-07-01

Preamble

Surveillance data exchange.

Description of standard data items

I025/000 - Report Type

definition: This Data Item allows for a more convenient handling of the reports at the receiver side by further defining the type of transaction.

Group

I025/000/RTYP - Report Type

Element
bit size: 7
Raw Content

I025/000/RG - Report Generation

Element
bit size: 1
Values:

0: Periodic Report
1: Event Driven Report

Notes:

1. In applications where transactions of various types are exchanged, the Report Type Data Item facilitates the proper report handling at the receiver side.
2. All Report Type values are reserved for common standard use.
3. **The following set of Report Types are standardised for Category 025 records:**

   - 001 Service and System Status report (see 4.5.1.1. above)
   - 002 Component Status report (see 4.5.1.2. above)
   - 003 Service Statistics report (see 4.5.1.3. above)
4. The list of items present for the three report types is defined in the following table. M stands for mandatory, O for optional, X for never present.
   :

Item	001	002	003
I025/000	M	M	M
I025/010	M	M	M
I025/015	M	X	M
I025/020	O	X	O
I025/070	M	M	M
I025/100	O	X	X
I025/105	O	X	X
I025/120	O	M	X
I025/140	X	X	M

```
I025/200    O                    O            O
I025/600    O (See Note)         O            X
I025/610    O (See Note)         O            X
```

5. With Edition 1.3 of this specification the Encoding Rules for Data Item I025/600 and I025/610 in Message Type 001 have been changed from "Mandatory" to "Optional". Before changing the data source such that the encoding of these Data Items is changed from "included" to "not included" it needs to be ensured that downstream systems do not apply "Mandatory Item Checks". Otherwise this may lead to suppression of the Category 025 Record by the receiving system.

I025/010 - Data Source Identifier

definition: Identification of the Ground System from which the data is received.

Group

I025/010/SAC - System Area Code

Element
bit size: 8
Raw Content

I025/010/SIC - System Identification Code

Element
bit size: 8
Raw Content

Notes:

1. The up-to-date list of SACs is published on the EUROCONTROL Web Site (http://www.eurocontrol.int/asterix).
2. The SICs are allocated by the national authority responsible for the surveillance infrastructure.

I025/015 - Service Identification

definition: Identifies the service being reported.

Element
bit size: 8
Raw Content

Note:
- The service identification is allocated by the system.

I025/020 - Service Designator

definition: Designator of the service being reported.

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

Notes:

1. bits-48/1 Service Designator. Characters 1-8 (coded on 6 Bits each) defining the text readable designator for each Service. Each character of the service designator is encoded as defined below (see ICAO Annex 10, Volume IV, page 3-77, table 3-9): :

b4	b3	b2	b1	b6=0 b5=0	b6=0 b5=1	b6=1 b5=0	b6=1 b5=1
0	0	0	0		P	SP	0
0	0	0	1	A	Q		1
0	0	1	0	B	R		2
0	0	1	1	C	S		3
0	1	0	0	D	T		4
0	1	0	1	E	U		5
0	1	1	0	F	V		6
0	1	1	1	G	W		7
1	0	0	0	H	X		8
1	0	0	1	I	Y		9
1	0	1	0	J	Z		
1	0	1	1	K			
1	1	0	0	L			
1	1	0	1	M			
1	1	1	0	N			
1	1	1	1	O			

SP 1 = SPACE code For each character the following bit numbering convention shall be observed:

b6 b5 b4 b3 b2 b1

2. Assignments of Service designators to specific services/systems and interpretation of these fields are implementation dependent.
3. Examples of Service Designators are "1090ADSB", "WAM", "1090TISB", etc.
4. Multiple Service Type Designators may be used to describe a single service where applicable

I025/070 - Time of Day

definition: Absolute time stamping expressed as UTC time.

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

Note:
- The time of day value is reset to zero each day at midnight.

I025/100 - System and Service Status

definition: Information concerning the status of the Service Volume.
Extended

I025/100/NOGO

Element
bit size: 1
Values:
- **0:** Data is released for operational use
- **1:** Data must not be used operationally

I025/100/OPS

Element
bit size: 2
Values:

0: Operational
1: Operational but in Standby
2: Maintenance
3: Reserved for future use

I025/100/SSTAT

Element
bit size: 4
Values:

0: Running
1: Failed
2: Degraded
3: Undefined
4: Reserved for future use
5: Reserved for future use
6: Reserved for future use
7: Reserved for future use
8: Reserved for future use
9: Reserved for future use
10: Reserved for future use
11: Reserved for future use
12: Reserved for future use
13: Reserved for future use
14: Reserved for future use
15: Reserved for future use

(FX) - extension bit

Spare bits: 1

I025/100/SYSTAT

Element
bit size: 3
Values:

0: Running / OK
1: Failed
2: Degraded
3: Undefined
4: Reserved for future use
5: Reserved for future use
6: Reserved for future use
7: Reserved for future use

I025/100/SESTAT

Element
bit size: 3
Values:

0: OK
1: Failed
2: Degraded
3: Undefined
4: Reserved for future use
5: Reserved for future use
6: Reserved for future use
7: Reserved for future use

(FX) - extension bit

Notes:

1. Bit 8 (NOGO), when set to "1" indicates that the data transmitted by the system/service is not released for operational use. This indication is independent from the status of the system itself or that of the service. It just indicates that the system or service volume output must not be used

4

for operational services but may be used for, e.g. test and validation purposes. The indication GO/NO-GO indicates a mode of the system rather than a status. Usually this bit will be set by operator input.

2. Bit 7/6 (OPS), when set to "1" indicates that the service is running but not operationally used (e.g. for a standby system in a redundant configuration).

3. Bits 5/2 (SSTAT): This information informs about the state of the overall service volume status. The actual implementation of this field is service dependent and should be described in the system/service specification. However, it is expected that – as far as this information is available – a mapping is performed between the states of individual components as reported in data item I025/120. As an example, if one component fails but the system is still operational (at least partially), the service status should change to "Degraded".

4. To bit 7 (ERR): This bit set to "1" indicates that the range of the target is beyond the maximum range in data item I048/040.In this case – and this case only - the ERR Data Item in the Reserved Expansion Field shall provide the range value of the Measured Position in Polar Coordinates.

5. This octet allows to separate reporting of the system and the service status as in particular in distributed systems it is possible that the degraded system state may not have an impact on the service state. For reasons of backwards compatibility (for systems that are not yet capable to decode the first extension), the system and service status shall be propagated to the field SSTAT in the primary part of I025/100, bits 5/2 according to the following table: :

```
SeSTAT   SySTAT   SSTAT

0        0        0
0        1        1
0        2        2
0        3        1
1        0        1
1        1        1
1        2        1
1        3        1
2        0        2
2        1        1
2        2        2
2        3        1
3        0        1
3        1        1
3        2        1
3        3        1
```

The value of 3 'Undefined' is assumed to represent that the status cannot be determined. This inherently indicates a failure in system monitoring. Therefore, a value of 3 'Undefined' is equivalent to 1 'Failed', leading to rejection of data and prompting maintenance/operator investigation to occur.

The population of SSTAT is determined to be the worst-case combination of SeSTAT and SySTAT, taking into account Note 1, where the hierarchy of best to worst case is as follows: Running, Degraded, Failed.

I025/105 - System and Service Error Codes

definition: Error Status of the System and the Service.

Repetitive

Regular, 1 byte(s) REP field size.

Element

bit size: 8
Values:

0: No error detected (shall not be sent)
1: Error Code Undefined
2: Time Source Invalid
3: Time Source Coasting
4: Track ID numbering has restarted
5: Data Processor Overload
6: Ground Interface Data Communications Overload
7: System stopped by operator
8: CBIT failed
9: Test Target Failure
10: Reserved for allocation by the AMG
11: Reserved for allocation by the AMG
12: Reserved for allocation by the AMG
13: Reserved for allocation by the AMG
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253: Reserved for allocation by system manufacturers
254: Reserved for allocation by system manufacturers
255: Reserved for allocation by system manufacturers

Notes:

1. The Warning & Error codes contain information about the reason why the System and Service State (SSTAT in item I025/100) is different from "running".
2. A time source is considered as valid when either externally synchronised or running on a local oscillator within the required accuracy of UTC.
3. A value of 4 indicates that the allocation of Track-IDs was re-started.
4. Multiple error codes can be transmitted within the same ASTERIX record.
5. Error codes in the range 0 to 31 shall be allocated centrally by the AMG. Error codes in the range from 32 to 255 are available for specification by the system manufacturers. They are not standardised and shall be described in the Interface Control Document (ICD) of the respective system.

I025/120 - Component Status

definition: Indications of status of various system components and, when applicable, error codes.

Repetitive

Regular, 1 byte(s) REP field size.

Group

I025/120/CID - Component ID

Element
bit size: 16
Raw Content

I025/120/ERRC - Error Code

Element
bit size: 6
Values:

0: No Error Detected
1: Error Code Undefined
2: Reserved for allocation by the AMG
3: Reserved for allocation by the AMG
4: Reserved for allocation by the AMG
5: Reserved for allocation by the AMG
6: Reserved for allocation by the AMG
7: Reserved for allocation by the AMG
8: Reserved for allocation by the AMG
9: Reserved for allocation by the AMG
10: Reserved for allocation by the AMG
11: Reserved for allocation by the AMG

12: Reserved for allocation by the AMG
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63: Reserved for allocation by system manufacturers

I025/120/CS - Component State/Mode

Element
bit size: 2
Values:

0: Running
1: Failed
2: Maintenance
3: Reserved

Note:
- Error codes in the range 2 to 15 shall be allocated centrally by the AMG. Error codes in the range from 16 to 63 are available for specification by the system manufacturers. They are not standardised and shall be described in the Interface Control Document (ICD) of the respective system.

I025/140 - Service Statistics

definition: Statistics concerning the service. Provides counts of various message types that have been received since the report was last sent.

Repetitive

Regular, 1 byte(s) REP field size.

Group

I025/140/TYPE - Type of Report Counter

Element
bit size: 8
Values:

0: Number of unknown messages received
1: Number of too old messages received
2: Number of failed message conversions
3: Total Number of messages received
4: Total number of messages transmitted
5: Reserved for AMG
6: Reserved for AMG
7: Reserved for AMG
8: Reserved for AMG
9: Reserved for AMG
10: Reserved for AMG
11: Reserved for AMG
12: Reserved for AMG
13: Reserved for AMG
14: Reserved for AMG
15: Reserved for AMG
16: Reserved for AMG
17: Reserved for AMG
18: Reserved for AMG
19: Reserved for AMG
20: Implementation specific
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255: Implementation specific

I025/140/REF - Reference from which the Messages Are Counted

Element
bit size: 1
Values:

0: From UTC midnight
1: From the previous report

Spare bits: 7

I025/140/COUNT - Counter Value

Element
bit size: 32
Unsigned integer

Note:

- There is no special significance attributed to the numbering of the TYPE field. However the range from 0 to 19 is intended to cover generic messages which may be applicable to many types of service.

I025/200 - Message Identification

definition: Identification of a unique message.

Element
bit size: 24
Unsigned integer

Notes:

1. The Message Identification Number is to be used to uniquely identify each message. If messages are being sent on redundant links then this number shall be identical for the same message on each link. This will allow the receiver to easily identify and discard duplicate messages.
2. It is not required that Message Identification Numbers be assigned in ascending order by time of message transmission.

I025/600 - Position of the System Reference Point

definition: Position of the reference point in WGS-84 Coordinates.

Group

I025/600/LAT - Latitude

Element
bit size: 32
Signed quantity
LSB = $180/2^32$ ° $\approx 4.1909515857696533203125e - 8$ °
unit: "°"
>= -90.0
< 90.0

I025/600/LON - Longitude

Element
bit size: 32
Signed quantity
LSB = $180/2^32$ ° $\approx 4.1909515857696533203125e - 8$ °
unit: "°"
>= -180.0
< 180.0

Notes:

- Positive longitude indicates East. Positive latitude indicates North.

I025/610 - Height of the System Reference Point

definition: Height of the system reference point in two's complement form. The height shall use mean sea level as the zero reference level.

Element
bit size: 16
Signed quantity
LSB = $1/2^2$ m ≈ 0.25 m
unit: "m"
>= -8192.0
<= 8191.75

Notes:

- Item I025/610 shall only be sent together with item I025/600 "Position of the System Reference Point".

I025/SP - Special Purpose Field

definition: Special Purpose Field

Explicit (SpecialPurpose)

User Application Profile

- 1: I025/010 - Data Source Identifier
- 2: I025/000 - Report Type
- 3: I025/200 - Message Identification
- 4: I025/015 - Service Identification
- 5: I025/020 - Service Designator
- 6: I025/070 - Time of Day
- 7: I025/100 - System and Service Status
- (FX) - Field extension indicator
- 8: I025/105 - System and Service Error Codes
- 9: I025/120 - Component Status
- 10: I025/140 - Service Statistics
- 11: I025/SP - Special Purpose Field
- 12: I025/600 - Position of the System Reference Point
- 13: I025/610 - Height of the System Reference Point
- *Spare*
- (FX) - Field extension indicator