EUROCAE WG 49

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Working Paper WG49N11-18
Appendix A : Aircraft Register Format

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Introduce all the aircraft register formats in an appendix ~~A~~B of ED 73C

A.2. DATA FORMATS FOR TRANSPONDER REGISTERS

A.2.1 REGISTER ALLOCATION

Applications shall use the allocated register numbers as shown in the table below:

Transponder register No.	*Assignment*	*Maximum update interval*
00_{16}	Not valid	N/A
01_{16}	Unassigned	N/A
02_{16}	Linked Comm-B, segment 2	N/A
03_{16}	Linked Comm-B, segment 3	N/A
04_{16}	Linked Comm-B, segment 4	N/A
05_{16}	Extended squitter airborne position	0.2s
06_{16}	Extended squitter surface position	0.2s (see A.2.3.3.1 and A.2.3.3.2)
07_{16}	Extended squitter status	1.0s
08_{16}	Extended squitter identification and type	15.0s
09_{16}	Extended squitter airborne velocity	1.3s
$0A_{16}$	Extended squitter event-driven information	variable
$0B_{16}$	Air/air information 1 (aircraft state)	1.3s
$0C_{16}$	Air/air information 2 (aircraft intent)	1.3s
$0D_{16}$-$0E_{16}$	Reserved for air/air state information	To be determined
$0F_{16}$	Reserved for ACAS	To be determined
10_{16}	Data link capability report	≤4.0s (see A.2.1.2)
11_{16}-16_{16}	Reserved for extension to datalink capability reports	5.0s
17_{16}	Common usage GICB capability report	5.0s
18_{16}-$1F_{16}$	Mode S specific services capability reports	5.0s
20_{16}	Aircraft identification	5.0s
21_{16}	Aircraft and airline registration markings	15.0s
22_{16}	Antenna positions	15.0s
23_{16}	Reserved for antenna position	15.0s
24_{16}	Reserved for aircraft parameters	15.0s
25_{16}	Aircraft type	15.0s
26_{16}-$2F_{16}$	Unassigned	N/A
30_{16}	ACAS active resolution advisory	[Ref 2, 4.3.8.4.2.2.]
31_{16}-$3F_{16}$	Unassigned	N/A
40_{16}	Selected vertical intention	1.0s
41_{16}	Next waypoint identifier	1.0s
42_{16}	Next waypoint position	1.0s
43_{16}	Next waypoint information	0.5s
44_{16}	Meteorological routine air report	1.0s
45_{16}	Meteorological hazard report	1.0s
46_{16}	Reserved for flight management system Mode 1	To be determined
47_{16}	Reserved for flight management system Mode 2	To be determined
48_{16}	VHF channel report	5.0s
49_{16}-$4F_{16}$	Unassigned	N/A
50_{16}	Track and turn report	1.3s
51_{16}	Position report coarse	1.3s
52_{16}	Position report fine	1.3s
53_{16}	Air-referenced state vector	1.3s
54_{16}	Waypoint 1	5.0s

Transponder register No.	*Assignment*	*Maximum update interval*
55_{16}	Waypoint 2	5.0s
56_{16}	Waypoint 3	5.0s
57_{16}-$5E_{16}$	Unassigned	N/A
$5F_{16}$	Quasi-static parameter monitoring	0.5s
60_{16}	Heading and speed report	1.3s
61_{16}	Extended squitter emergency/priority status	1.0s
62_{16}	Reserved for target state and status information	N/A
63_{16}	Reserved for extended squitter	N/A
64_{16}	Reserved for extended squitter	N/A
65_{16}	Extended squitter aircraft operational status	1.7 s
66_{16}-$6F_{16}$	Reserved for extended squitter	N/A
70_{16}-75_{16}	Reserved for future aircraft downlink parameters	N/A
76_{16}-$E0_{16}$	Unassigned	N/A
$E1_{16}$-$E2_{16}$	Reserved for Mode S BITE	N/A
$E3_{16}$	Transponder type/part number	15 s
$E4_{16}$	Transponder software revision number	15 s
$E5_{16}$	ACAS unit part number	15 s
$E6_{16}$	ACAS unit software revision number	15 s
$E7_{16}$-$F0_{16}$	Unassigned	N/A
$F1_{16}$	Military applications	15 s
$F2_{16}$	Military applications	15 s
$F3_{16}$-FF_{16}	Unassigned	N/A

Note. — The term " minimum update rate" is used in the document. The minimum update rate is obtained when data is loaded in one register field once every maximum update interval.

A.2.1.1 The details of the data to be entered into the assigned registers shall be as defined in this appendix. The above table specifies the minimum update rates at which the appropriate transponder register(s) shall be reloaded with valid data. Any valid data shall be reloaded into the relevant register field as soon as it becomes available at the Mode S specific services entity (SSE) interface regardless of the update rate. If data are not available for a time no greater than twice the specified maximum update interval or 2 seconds (whichever is the greater), the status bit (if specified for that field) shall indicate that the data in that field are invalid and the field shall be zeroed.

Note.— Implementation guidelines on the loading and clearing of fields of transponder registers is provided in Appendix C.

A.2.1.2 The register number shall be equivalent to the Comm-B data selector (BDS) value used to address that register, (see 3.1.2.6.11.2.1 of Annex 10, Volume IV). The data link capability report (register number 10_{16}) shall be updated within one second of the data changing and at least every four seconds thereafter.

A.2.2 GENERAL CONVENTIONS ON DATA FORMATS

A.2.2.1 VALIDITY OF DATA

The bit patterns contained in the 56-bit transponder registers (other than registers accessed by BDS codes 0,2; 0,3; 0,4; 1,0; 1,7 to 1,C; 2,0 and 3,0) shall be considered as valid application data only if:

1) the Mode S specific services capability bit is set in register number 10_{16}. This is indicated by bit 25 being set to “ONE”, and

2) the GICB service corresponding to the application is shown as “supported” by the corresponding bit in the GICB capability report register numbers 17_{16} to $1C_{16}$ being set to “ONE”; and

Note 1.— The intent of the capability bits in register number 17_{16} is to indicate that useful data are contained in the corresponding transponder register. For this reason, each bit for a register is cleared if data becomes unavailable (A.2.5.4.1) and set again when data insertion into the register resumes.

Note 2.— A bit set in register numbers 18_{16} to $1C_{16}$ indicates that the application using this register has been installed on the aircraft. These bits are not cleared to reflect the real-time loss of an application, as is done for register number 17_{16} (A.2.5.4.2).

3) the data value is valid at the time of extraction. This is indicated by a data field status bit (if specified for that field). When this status bit is set to “ONE” the data field(s) which follow, up to the next status bit, are valid. When this status bit is set to “ZERO”, the data field(s) are invalid.

A.2.2.2 REPRESENTATION OF NUMERICAL DATA

Numerical data shall be represented as follows:

1) Numerical data shall be represented as binary numerals. When the value is signed, 2s complement representation shall be used, and the bit following the status bit shall be the sign bit.

2) Unless otherwise specified, whenever more bits of resolution are available from the data source than in the data field into which that data are to be loaded, the data shall be rounded to the nearest value that can be encoded in that data field.

Note.— Unless otherwise specified, it is accepted that the data source may have less bits of resolution than the data field.

3) When the data source provides data with a higher or lower range than the data field, the data shall be truncated to the respective maximum or minimum value that can be encoded in the data field.

4) Where ARINC 429 data are used, the ARINC 429 status bits 30 and 31 shall be replaced with a single status bit, for which the value is VALID or INVALID as follows:

a) If bits 30 and 31 represent “Failure Warning, No Computed Data” then the status bit shall be set to “INVALID”.

b) If bits 30 and 31 represent “Functional Test” then the status bit shall be set to “INVALID”.

c) If bits 30 and 31 represent “Normal Operation,” “plus sign,” or “minus sign,” then the status bit shall be set to “VALID” provided that the data are being updated at the required rate (A.2.1.1).

d) If the data are not being updated at the required rate (A.2.1.1), then the status bit shall be set to “INVALID”.

5) In all cases where a status bit is specified in the data field it shall be set to “ONE” to indicate VALID and to “ZERO” to indicate INVALID.

Note.— This facilitates partial loading of the registers.

6) When specified in the field, the switch bit shall indicate which of two alternative data types is being used to update the parameter in the transponder register.

7) Bit numbering in the MB field shall be as specified in Annex 10, Volume IV (3.1.2.3.1.3).

) Registers containing data intended for broadcast Comm-B shall have the broadcast identifier located in the eight most significant bits of the MB field.

A.2.2.2.1 **Recommendation**.— *When multiple data sources are available, the one with the highest resolution should be selected.*

Note 1.— Tables are numbered Table A.2-X where "X" is the decimal equivalent of the BDS code that is used to access the register to which the format applies.

Note 2.— By default values indicated in the range of the different fields of registers have been rounded to the nearest integer value or represented as a fraction.

A.2.2.3 RESERVED FIELDS

Unless specified in this document, these bit fields shall be reserved for future allocation by ICAO.

Table A-2-11. BDS code 0,B – Air/air state information 1 (aircraft state)

MB FIELD

1	STATUS
2	MSB = 1 024 knots
3	
4	
5	TRUE AIR SPEED
6	
7	
8	Range = [0, 2 047] knots
9	
10	
11	
12	LSB = 1.0 knot
13	SWITCH (0 = Magnetic heading, 1 = True heading)
14	STATUS
15	SIGN
16	MSB = 90 degrees
17	
18	HEADING
19	
20	
21	Range = [-180, +180] degrees
22	
23	
24	LSB = 360/1 024 degrees
25	STATUS
26	SIGN
27	MSB = 90 degrees
28	
29	
30	
31	TRUE TRACK ANGLE
32	
33	
34	
35	
36	Range = [-180, +180] degrees
37	
38	
39	
40	LSB = 360/32 768 degrees
41	STATUS
42	MSB = 1 024 knots
43	
44	
45	
46	GROUND SPEED
47	
48	
49	
50	
51	Range = [0, 2 048] knots
52	
53	
54	
55	LSB = 1/8 knot
56	RESERVED

PURPOSE: To report threat aircraft state information in order to improve the ability of ACAS to evaluate the threat and select a resolution maneuver.

Note. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-12. BDS code 0,C – Air/air state information 2 (aircraft intent)

MB FIELD

1	STATUS
2	MSB = 32 768 feet
3	
4	
5	
6	LEVEL OFF ALTITUDE
7	
8	Range = [0, 65 520] feet
9	
10	
11	
12	
13	LSB = 16 feet
14	STATUS
15	SIGN
16	MSB = 90 degrees
17	
18	
19	NEXT COURSE (TRUE GROUND TRACK)
20	
21	Range = [-180, +180] degrees
22	
23	
24	LSB = 360/1 024 degrees
25	STATUS
26	MSB = 128 seconds
27	
28	TIME TO NEXT WAYPOINT
29	All ONEs = time exceeds 255 seconds
30	
31	
32	Range = [0, 256] seconds
33	
34	LSB = 0.5 seconds
35	STATUS
36	SIGN
37	MSB = 8 192 ft/min
38	
39	VERTICAL VELOCITY (UP IS POSITIVE)
40	
41	Range = [-16 384, +16 320] ft/min
42	
43	
44	LSB = 64 ft/min
45	STATUS
46	SIGN
47	MSB = 45 degrees
48	
49	ROLL ANGLE
50	
51	Range = [-90, +89] degrees
52	
53	LSB = 45/64 degrees
54	
55	RESERVED
56	

PURPOSE: To report threat aircraft state information in order to improve the ability of ACAS to evaluate the threat and select a resolution maneuver.

Note. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-16. BDS code 1,0 – Data link capability report

MB FIELD

1	MSB
2	
3	
4	BDS Code 1,0
5	
6	
7	
8	LSB
9	Continuation flag (see 9)
10	
11	
12	RESERVED
13	
14	
15	
16	Reserved for ACAS
17	MSB
18	
19	
20	Mode S subnetwork version number (see 12)
21	
22	
23	LSB
24	Transponder enhanced protocol indicator (see 4)
25	Mode S specific services capability (see 2)
26	MSB
27	Uplink ELM average throughput capability (see 13)
28	LSB
29	Downlink ELM: throughput capability of downlink ELM
30	containing the maximum number of ELM segments that the
31	transponder can deliver in response to a single requesting
32	interrogation (UF = 24). (see 14)
33	Aircraft identification capability (see 11)
34	Squitter capability subfield (SCS) (see 5)
35	Surveillance identifier code (SIC) (see 6)
36	Common usage GICB capability report (see 7)
37	
38	RESERVED FOR ACAS
39	
40	
41	MSB
42	
43	
44	
45	
46	
47	Bit array indicating the support status of DTE
48	Sub-addresses 0 to 15 (see 3 and 8)
49	
50	
51	
52	
53	
54	
55	
56	LSB

PURPOSE: To report the data link capability of the Mode S transponder/data link installation.

The coding of this register shall conform to:

1) Annex 10 Volume IV, §3.1.2.6.10.2.

2) When bit 25 is set to 1, it shall indicate that at least one Mode S specific service (other than GICB services related to registers 02_{16}, 03_{16}, 04_{16}, 10_{16}, 17_{16} to $1C_{16}$, 20_{16} and 30_{16}) is supported and the particular capability reports shall be checked.

   Note. – Registers accessed by BDS Codes 0,2; 0,3; 0,4; 1,0; 1,7 to 1,C; 2,0 and 3,0 do not affect the setting of bit 25.

3) Starting from the MSB, each subsequent bit position shall represent the DTE subaddress in the range from 0 to 15.

4) The enhanced protocol indicator shall denote a Level 5 transponder when set to 1, and a Level 2 to 4 transponder when set to 0.

5) The squitter capability subfield (SCS) shall be set to 1 if both registers 05_{16} and 06_{16} have been updated within the last ten, plus or minus one, seconds. Otherwise, it shall be set to 0.

   Note. – Registers 05_{16} and 06_{16} are used for the extended squitter Airborne and surface position reports, respectively.

6) The surveillance identifier code (SIC) bit shall be interpreted as follows:
   0 = no surveillance identifier code capability
   1 = surveillance identifier code capability

7) Bit 36 shall be toggled each time the common usage GICB capability report (register 17_{16}) changes. To avoid the generation of too many broadcast capability report changes, register 17_{16} shall be sampled at approximately one minute intervals to check for changes.

8) The current status of the on-board DTE shall be periodically reported to the GDLP by on-board sources. Since a change in this field results in a broadcast of the capability report, status inputs shall be sampled at approximately one minute intervals.

9) In order to determine the extent of any continuation of the data link capability report (into those registers reserved for this purpose: register 11_{16} to register 16_{16}), bit 9 shall be reserved as a continuation flag to indicate if the subsequent register shall be extracted. For example: upon detection of bit 9 = 1 in register 10_{16}, then register 11_{16} shall be extracted. If bit 9 = 1, in register 11_{16}, then register 12_{16} shall be extracted, and so on (up to register 16_{16}). Note that if bit 9 = 1 in register 16_{16}, then this shall be considered as an error condition.

(Requirements are continued on the next page)

Table A-2-16. BDS code 1,0 – Data link capability report (Concluded)

10) The Mode S transponder may update bits 1-8, 16, 33, 35 and 37-40 independent of the ADLP. These bits are provided by the transponder when the data link capability report is broadcast as a result of a transponder detected change in capability reported by the ADLP (§3.1.2 of Annex 10 Volume IV).

11) Bit 33 indicates the availability of Aircraft Identification data. It shall be set by the transponder if the data comes to the transponder through a separate interface and not through the ADLP.

12) The Mode S subnetwork version number shall be coded as follows:

Version Number	**Year of Annex 10 amendment**	**Edition of this document**
0	Mode S subnetwork not available	
1	1996	---
2	1998	---
3	2002	---
4	2007	Edition 1
5 - 127	Unassigned	

Note.– RTCA/DO-181D, EUROCAE ED-73C and ED-101A are consistent with ICAO Doc 9871, Edition 1.

13) Uplink ELM average throughput capability shall be coded as follows:

0 = No UELM Capability
1 = 16 UELM segments in 1 second
2 = 16 UELM segments in 500 ms
3 = 16 UELM segments in 250 ms
4 = 16 UELM segments in 125 ms
5 = 16 UELM segments in 60 ms
6 = 16 UELM segments in 30 ms
7 = Unassigned

14) Downlink ELM throughput capability shall be coded as follows:

0 = No DELM Capability
1 = One 4 segment DELM every second
2 = One 8 segment DELM every second
3 = One 16 segment DELM every second
4 = One 16 segment DELM every 500 ms
5 = One 16 segment DELM every 250 ms
6 = One 16 segment DELM every 125 ms
7-15 = Unassigned

Table A-2-23. BDS code 1,7 – Common usage GICB capability report

MB FIELD

1	0,5 Extended squitter sirborne position
2	0,6 Extended squitter surface position
3	0,7 Extended squitter status
4	0,8 Extended squitter type and identification
5	0,9 Extended squitter airborne velocity information
6	0,A Extended squitter event-driven information
7	2,0 Aircraft identification
8	2,l Aircraft registration number
9	4,0 Selected vertical intention
10	4,l Next waypoint identifier
11	4,2 Next waypoint position
12	4,3 Next waypoint information
13	4,4 Meteorological routine report
14	4,5 Meteorological hazard report
15	4.8 VHF channel report
16	5,0 Track and turn report
17	5,1 Position coarse
18	5,2 Position fine
19	5,3 Air-referenced state vector
20	5,4 Waypoint 1
21	5,5 Waypoint 2
22	5,6 Waypoint 3
23	5,F Quasi-static parameter monitoring
24	6,0 Heading and speed report
25	Reserved for aircraft capability
26	Reserved for aircraft capability
27	E,1 Reserved for Mode S BITE (Built In Test Equipment)
28	E,2 Reserved for Mode S BITE (Built In Test Equipment)
29	F,1 Military applications
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	RESERVED
43	
44	
45	
46	
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	

PURPOSE: To indicate common usage GICB services currently Supported.

1) Each bit position shall indicate that the associated register is available in the aircraft installation when set to 1.

2) All registers shall be constantly monitored at a rate consistent with their individual required update rate and the corresponding capability bit shall be set to 1 only when valid data is being input to that register at the required rate or above.

3) The capability bit shall be set to a 1 if at least one field in the register is receiving valid data at the required rate with the status bits for all fields not receiving valid data at the required rate set to ZERO (0).

4) Registers 18_{16} to $1C_{16}$ shall be independent of register 17_{16}.

Table A-2-24 . BDS code 1,8 – Mode S specific services
GICB capability report (1 of 5)

MB FIELD

1	BDS 3,8
2	BDS 3,7
3	BDS 3,6
4	BDS 3,5
5	BDS 3,4
6	BDS 3,3
7	BDS 3,2
8	BDS 3,1
9	BDS 3,0
10	BDS 2,F
11	BDS 2,E
12	BDS 2,D
13	BDS 2,C
14	BDS 2,B
15	BDS 2,A
16	BDS 2,9
17	BDS 2,8
18	BDS 2,7
19	BDS 2,6
20	BDS 2,5
21	BDS 2,4
22	BDS 2,3
23	BDS 2,2
24	BDS 2,1
25	BDS 2,0
26	BDS 1,F
27	BDS 1,E
28	BDS 1,D
29	BDS 1,C
30	BDS 1,B
31	BDS 1,A
32	BDS 1,9
33	BDS 1,8
34	BDS 1,7
35	BDS 1,6
36	BDS 1,5
37	BDS 1,4
38	BDS 1,3
39	BDS 1,2
40	BDS 1,1
41	BDS 1,0
42	BDS 0,F
43	BDS 0,E
44	BDS 0,D
45	BDS 0,C
46	BDS 0,B
47	BDS 0,A
48	BDS 0,9
49	BDS 0,8
50	BDS 0,7
51	BDS 0,6
52	BDS 0,5
53	BDS 0,4
54	BDS 0,3
55	BDS 0,2
56	BDS 0,1

P**URPOSE:** To indicate GICB services that are installed.

Each bit position shall indicate that the GICB service that it represents has been implemented in the aircraft installation when set to 1.

Starting from the LSB, each bit position shall represent the register number, in accordance with the following table:

BDS Code	Capability installed for register
BDS 1,8	01_{16} to 38_{16}
BDS 1,9	39_{16} to 70_{16}
BDS 1,A	71_{16} to $A8_{16}$
BDS 1,B	$A9_{16}$ to $E0_{16}$
BDS 1,C	$E1_{16}$ to FF_{16}

The 25 most significant bits of register $1C_{16}$ shall not be used.

Table A-2-25. BDS code 1,9 – Mode S specific services
GICB capability report (2 of 5)

MB FIELD

1	BDS 7,0
2	BDS 6,F
3	BDS 6,E
4	BDS 6,D
5	BDS 6,C
6	BDS 6,B
7	BDS 6,A
8	BDS 6,9
9	BDS 6,8
10	BDS 6,7
11	BDS 6,6
12	BDS 6,5
13	BDS 6,4
14	BDS 6,3
15	BDS 6,2
16	BDS 6,1
17	BDS 6,0
18	BDS 5,F
19	BDS 5,E
20	BDS 5,D
21	BDS 5,C
22	BDS 5,B
23	BDS 5,A
24	BDS 5,9
25	BDS 5,8
26	BDS 5,7
27	BDS 5,6
28	BDS 5,5
29	BDS 5,4
30	BDS 5,3
31	BDS 5,2
32	BDS 5,1
33	BDS 5,0
34	BDS 4,F
35	BDS 4,E
36	BDS 4,D
37	BDS 4,C
38	BDS 4,B
39	BDS 4,A
40	BDS 4,9
41	BDS 4,8
42	BDS 4,7
43	BDS 4,6
44	BDS 4,5
45	BDS 4,4
46	BDS 4,3
47	BDS 4,2
48	BDS 4,1
49	BDS 4,0
50	BDS 3,F
51	BDS 3,E
52	BDS 3,D
53	BDS 3,C
54	BDS 3,B
55	BDS 3,A
56	BDS 3,9

P**URPOSE:** To indicate GICB services that are installed.

Each bit position shall indicate that the GICB service that it represents has been implemented in the aircraft installation when set to 1.

Table A-2-26. BDS code 1,A – Mode S specific services
GICB capability report (3 of 5)

MB FIELD

1	BDS A,8
2	BDS A,7
3	BDS A,6
4	BDS A,5
5	BDS A,4
6	BDS A,3
7	BDS A,2
8	BDS A,1
9	BDS A,0
10	BDS 9,F
11	BDS 9,E
12	BDS 9,D
13	BDS 9,C
14	BDS 9,B
15	BDS 9,A
16	BDS 9,9
17	BDS 9,8
18	BDS 9,7
19	BDS 9,6
20	BDS 9,5
21	BDS 9,4
22	BDS 9,3
23	BDS 9,2
24	BDS 9,1
25	BDS 9,0
26	BDS 8,F
27	BDS 8,E
28	BDS 8,D
29	BDS 8,C
30	BDS 8,B
31	BDS 8,A
32	BDS 8,9
33	BDS 8,8
34	BDS 8,7
35	BDS 8,6
36	BDS 8,5
37	BDS 8,4
38	BDS 8,3
39	BDS 8,2
40	BDS 8,1
41	BDS 8,0
42	BDS 7,F
43	BDS 7,E
44	BDS 7,D
45	BDS 7,C
46	BDS 7,B
47	BDS 7,A
48	BDS 7,9
49	BDS 7,8
50	BDS 7,7
51	BDS 7,6
52	BDS 7,5
53	BDS 7,4
54	BDS 7,3
55	BDS 7,2
56	BDS 7,1

P**URPOSE:** To indicate GICB services that are installed.

Each bit position shall indicate that the GICB service that it represents has been implemented in the aircraft installation when set to 1.

Table A-2-27. BDS code 1,B – Mode S specific services
GICB capability report (4 of 5)

MB FIELD

1	BDS E,0
2	BDS D,F
3	BDS D,E
4	BDS D,D
5	BDS D,C
6	BDS D,B
7	BDS D,A
8	BDS D,9
9	BDS D,8
10	BDS D,7
11	BDS D,6
12	BDS D,5
13	BDS D,4
14	BDS D,3
15	BDS D,2
16	BDS D,1
17	BDS D,0
18	BDS C,F
19	BDS C,E
20	BDS C,D
21	BDS C,C
22	BDS C,B
23	BDS C,A
24	BDS C,9
25	BDS C,8
26	BDS C,7
27	BDS C,6
28	BDS C,5
29	BDS C,4
30	BDS C,3
31	BDS C,2
32	BDS C,1
33	BDS C,0
34	BDS B,F
35	BDS B,E
36	BDS B,D
37	BDS B,C
38	BDS B,B
39	BDS B,A
40	BDS B,9
41	BDS B,8
42	BDS B,7
43	BDS B,6
44	BDS B,5
45	BDS B,4
46	BDS B,3
47	BDS B,2
48	BDS B,1
49	BDS B,0
50	BDS A,F
51	BDS A,E
52	BDS A,D
53	BDS A,C
54	BDS A,B
55	BDS A,A
56	BDS A,9

P**URPOSE:** To indicate GICB services that are installed.

Each bit position shall indicate that the GICB service that it represents has been implemented in the aircraft installation when set to 1.

Table A-2-28. BDS code 1,C – Mode S specific services
GICB capability report (5 of 5)

MB FIELD

1 2 3 4 5 6 7 8	
9 10 11 12 13 14 15 16	RESERVED
17 18 19 20 21 22 23 24	
25	
26	BDS F,F
27	BDS F,E
28	BDS F,D
29	BDS F,C
30	BDS F,B
31	BDS F,A
32	BDS F,9
33	BDS F,8
34	BDS F,7
35	BDS F,6
36	BDS F,5
37	BDS F,4
38	BDS F,3
39	BDS F,2
40	BDS F,1
41	BDS F,0
42	BDS E,F
43	BDS E,E
44	BDS E,D
45	BDS E,C
46	BDS E,B
47	BDS E,A
48	BDS E,9
49	BDS E,8
50	BDS E,7
51	BDS E,6
52	BDS E,5
53	BDS E,4
54	BDS E,3
55	BDS E,2
56	BDS E,1

P**URPOSE:** To indicate GICB services that are installed.

Each bit position shall indicate that the GICB service that it represents has been implemented in the aircraft installation when set to 1.

Table A-2-29. BDS code 1,D – Mode S specific services
MSP capability report (1 of 3)

MB FIELD

1	Uplink MSP Channel 1
2	Uplink MSP Channel 2
3	Uplink MSP Channel 3
4	Uplink MSP Channel 4
5	Uplink MSP Channel 5
6	Uplink MSP Channel 6
7	Uplink MSP Channel 7
8	Uplink MSP Channel 8
9	Uplink MSP Channel 9
10	Uplink MSP Channel 10
11	Uplink MSP Channel 11
12	Uplink MSP Channel 12
13	Uplink MSP Channel 13
14	Uplink MSP Channel 14
15	Uplink MSP Channel 15
16	Uplink MSP Channel 16
17	Uplink MSP Channel 17
18	Uplink MSP Channel 18
19	Uplink MSP Channel 19
20	Uplink MSP Channel 20
21	Uplink MSP Channel 21
22	Uplink MSP Channel 22
23	Uplink MSP Channel 23
24	Uplink MSP Channel 24
25	Uplink MSP Channel 25
26	Uplink MSP Channel 26
27	Uplink MSP Channel 27
28	Uplink MSP Channel 28
29	Downlink MSP Channel 1
30	Downlink MSP Channel 2
31	Downlink MSP Channel 3
32	Downlink MSP Channel 4
33	Downlink MSP Channel 5
34	Downlink MSP Channel 6
35	Downlink MSP Channel 7
36	Downlink MSP Channel 8
37	Downlink MSP Channel 9
38	Downlink MSP Channel 10
39	Downlink MSP Channel 11
40	Downlink MSP Channel 12
41	Downlink MSP Channel 13
42	Downlink MSP Channel 14
43	Downlink MSP Channel 15
44	Downlink MSP Channel 16
45	Downlink MSP Channel 17
46	Downlink MSP Channel 18
47	Downlink MSP Channel 19
48	Downlink MSP Channel 20
49	Downlink MSP Channel 21
50	Downlink MSP Channel 22
51	Downlink MSP Channel 23
52	Downlink MSP Channel 24
53	Downlink MSP Channel 25
54	Downlink MSP Channel 26
55	Downlink MSP Channel 27
56	Downlink MSP Channel 28

PURPOSE: To indicate MSP services that are installed and require a service.

Each bit shall indicate that the MSP it represents requires service when set to 1.

Starting from the MSB, each bit position shall represent the MSP channel number for both uplink and downlink channel fields, in accordance with the following table:

BDS code	MSP channels
BDS 1,D	1 to 28 up and down
BDS 1,E	29 to 56 up and down
BDS 1,F	57 to 63 up and down

1) In register $1F_{16}$ the least significant bits of both uplink and downlink channel fields shall not be used.

2) The conditions for setting the capability bits shall be as defined in the specification of the corresponding service, see section §A.3.

Table A-2-30. BDS code 1,E – Mode S specific services
MSP capability report (2 of 3)

MB FIELD

1	Uplink MSP Channel 29
2	Uplink MSP Channel 30
3	Uplink MSP Channel 31
4	Uplink MSP Channel 32
5	Uplink MSP Channel 33
6	Uplink MSP Channel 34
7	Uplink MSP Channel 35
8	Uplink MSP Channel 36
9	Uplink MSP Channel 37
10	Uplink MSP Channel 38
11	Uplink MSP Channel 39
12	Uplink MSP Channel 40
13	Uplink MSP Channel 41
14	Uplink MSP Channel 42
15	Uplink MSP Channel 43
16	Uplink MSP Channel 44
17	Uplink MSP Channel 45
18	Uplink MSP Channel 46
19	Uplink MSP Channel 47
20	Uplink MSP Channel 48
21	Uplink MSP Channel 49
22	Uplink MSP Channel 50
23	Uplink MSP Channel 51
24	Uplink MSP Channel 52
25	Uplink MSP Channel 53
26	Uplink MSP Channel 54
27	Uplink MSP Channel 55
28	Uplink MSP Channel 56
29	Downlink MSP Channel 29
30	Downlink MSP Channel 30
31	Downlink MSP Channel 31
32	Downlink MSP Channel 32
33	Downlink MSP Channel 33
34	Downlink MSP Channel 34
35	Downlink MSP Channel 35
36	Downlink MSP Channel 36
37	Downlink MSP Channel 37
38	Downlink MSP Channel 38
39	Downlink MSP Channel 39
40	Downlink MSP Channel 40
41	Downlink MSP Channel 41
42	Downlink MSP Channel 42
43	Downlink MSP Channel 43
44	Downlink MSP Channel 44
45	Downlink MSP Channel 45
46	Downlink MSP Channel 46
47	Downlink MSP Channel 47
48	Downlink MSP Channel 48
49	Downlink MSP Channel 49
50	Downlink MSP Channel 50
51	Downlink MSP Channel 51
52	Downlink MSP Channel 52
53	Downlink MSP Channel 53
54	Downlink MSP Channel 54
55	Downlink MSP Channel 55
56	Downlink MSP Channel 56

PURPOSE: To indicate MSP services that are installed and require a service.

Each bit shall indicate that the MSP it represents requires service when set to 1.

1) The conditions for setting the capability bits shall be as defined in the specification of the corresponding service, see section §A.3.

Table A-2-31. BDS code 1,F – Mode S specific services
MSP capability report (3 of 3)

MB FIELD

1	Uplink MSP Channel 57
2	Uplink MSP Channel 58
3	Uplink MSP Channel 59
4	Uplink MSP Channel 60
5	Uplink MSP Channel 61
6	Uplink MSP Channel 62
7	Uplink MSP Channel 63
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	RESERVED
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	Downlink MSP Channel 57
30	Downlink MSP Channel 58
31	Downlink MSP Channel 59
32	Downlink MSP Channel 60
33	Downlink MSP Channel 61
34	Downlink MSP Channel 62
35	Downlink MSP Channel 63
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	RESERVED
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	

PURPOSE: To indicate MSP services that are installed and require a service.

Each bit shall indicate that the MSP it represents requires service when set to 1.

1) In register $1F_{16}$ the least significant bits of both uplink and downlink channel fields shall not be used.

2) The conditions for setting the capability bits shall be as defined in the specification of the corresponding service, see section §A.3.

Table A-2-32. BDS code 2,0 – Aircraft identification

MB FIELD

1	MSB
2	
3	
4	BDS Code 2,0
5	
6	
7	
8	LSB
9	MSB
10	
11	CHARACTER 1
12	
13	
14	LSB
15	MSB
16	
17	CHARACTER 2
18	
19	
20	LSB
21	MSB
22	
23	CHARACTER 3
24	
25	
26	LSB
27	MSB
28	
29	
30	CHARACTER 4
31	
32	LSB
33	MSB
34	
35	
36	CHARACTER 5
37	
38	LSB
39	MSB
40	
41	
42	CHARACTER 6
43	
44	LSB
45	MSB
46	
47	
48	CHARACTER 7
49	
50	LSB
51	MSB
52	
53	
54	CHARACTER 8
55	
56	LSB

PURPOSE: To report aircraft identification to the ground.

1) Annex 10, Volume IV, §3.1.2.9.

2) The character coding to be used shall be identical to that defined in Table 3-7 of Chapter 3, Annex 10, Volume IV..

3) This data may be input to the transponder from sources other than the Mode S ADLP.

4) Characters 1 – 8 of this format shall be used by the extended squitter application.

5) Capability to support this register shall be indicated by setting bit 33 in register 10_{16} and the relevant bits in registers 17_{16} and 18_{16}.

6) The aircraft identification shall be that employed in the flight plan. When no flight plan is available, the registration marking of the aircraft shall be used.

Table A-2-33. BDS code 2,1 –Aircraft and airline registration markings

MB FIELD

1	STATUS	
2	MSB	
3		
4	CHARACTER 1	
5		
6		
7	LSB	
8	MSB	
9		
10	CHARACTER 2	
11		
12		
13	LSB	
14	MSB	
15		
16	CHARACTER 3	
17		
18		
19	LSB	
20	MSB	
21		
22	CHARACTER 4	AIRCRAFT
23		REGISTRATION
24		NUMBER
25	LSB	
26	MSB	
27		
28	CHARACTER 5	
29		
30		
31	LSB	
32	MSB	
33		
34	CHARACTER 6	
35		
36		
37	LSB	
38	MSB	
39		
40	CHARACTER 7	
41		
42		
43	LSB	
44	STATUS	
45	MSB	
46		
47	CHARACTER 1	
48		
49		
50	LSB	ICAO AIRLINE
51	MSB	REGISTRATION
52		MARKING
53	CHARACTER 2	
54		
55		
56	LSB	

PURPOSE: To permit ground systems to identify the aircraft without the necessity of compiling and maintaining continuously updated data banks.

The character coding shall be as defined in Table 3-7 of Chapter 3, Annex 10, Volume IV.

Table A-2-34. BDS code 2,2 – Antenna positions

MB FIELD

1	MSB	
2	ANTENNA TYPE	
3	LSB	
4	MSB = 32 meters	
5		
6	X POSITION	
7	Range = [1, 63]	ANTENNA 1
8		
9	LSB = 1 meter	
10	MSB = 16 meters	
11		
12	Z POSITION	
13	Range = [1, 31]	
14	LSB = 1 meter	
15	MSB	
16	ANTENNA TYPE	
17	LSB	
18	MSB = 32 meters	
19		
20	X POSITION	
21	Range = [1, 63]	ANTENNA 2
22		
23	LSB = 1 meter	
24	MSB = 16 meters	
25		
26	Z POSITION	
27	Range = [1, 31]	
28	LSB = 1 meter	
29	MSB	
30	ANTENNA TYPE	
31	LSB	
32	MSB = 32 meters	
33		
34	X POSITION	
35	Range = [1, 63]	ANTENNA 3
36		
37	LSB = 1 meter	
38	MSB = 16 meters	
39		
40	Z POSITION	
41	Range = [1, 31]	
42	LSB = 1 meter	
43	MSB	
44	ANTENNA TYPE	
45	LSB	
46	MSB = 32 meters	
47		
48	X POSITION	
49	Range = [1, 63]	ANTENNA 4
50		
51	LSB = 1 meter	
52	MSB = 16 meters	
53		
54	Z POSITION	
55	Range = [1, 31]	
56	LSB = 1 meter	

PURPOSE: To provide information on the position of Mode S and GNSS antennas on the aircraft in order to make very accurate measurements of aircraft position possible.

1) The antenna type field shall be interpreted as follows:

   0 = Invalid
   1 = Mode S bottom antenna
   2 = Mode S top antenna
   3 = GNSS antenna
   4 to 7 = Reserved

2) The X position field shall be the distance in meters along the aircraft center line measured from the nose of the aircraft. The field shall be interpreted as invalid if the value is ZERO (0) and the value of 63 shall mean that the antenna position is 63 meters or more from the nose.

3) The Z position field shall be the distance in meters of the antenna from the ground, measured with the aircraft unloaded and on the ground. The field shall be interpreted as invalid if the value is ZERO (0), and the value of 31 shall mean that the antenna position is 31 meters or more from the ground.

Table A-2-37. BDS code 2,5 –Aircraft type

MB FIELD

1	MSB	
2		
3	AIRCRAFT TYPE	
4		
5		
6	LSB	
7	MSB	
8	NUMBER OF ENGINES	
9	LSB	
10	MSB	
11		
12	ENGINE TYPE	
13		
14		
15	LSB	
16	MSB	
17		
18	CHARACTER 1	
19		
20		
21	LSB	
22	MSB	
23		
24	CHARACTER 2	
25		
26		
27	LSB	
28	MSB	
29		
30	CHARACTER 3	MODEL
31		DESIGNATION
32		
33	LSB	
34	MSB	
35		
36	CHARACTER 4	
37		
38		
39	LSB	
40	MSB	
41		
42	CHARACTER 5	
43		
44		
45	LSB	
46	MSB	
47		
48	WAKE TURBULENCE	
49	CATEGORY	
50		
51	LSB	
52		
53		
54	RESERVED	
55		
56		

PURPOSE: To provide information on aircraft type.

1) Subfield coding

The coding shall be as in ICAO Doc 8643 – *Aircraft Type Designators*. All the subfields that contain characters shall be encoded using the 6-bit subset of IA-5 as specified in Table 3-7 of Annex 10, Volume IV.

2) Model designation

Coding shall consist of four characters as specified in ICAO Doc 8643. The fifth character shall be reserved for future expansion and shall contain all ZEROs until it is specified. 2222 in the first four characters shall mean that the designator is not specified.

3) Number of engines

This subfield shall be encoded as a binary number where number 7 means 7 or more engines.

Table A-2-48. BDS code 3,0 – ACAS active resolution advisory

MB FIELD

1	MSB	
2		
3		
4	BDS Code 3,0	
5		
6		
7		
8	LSB	
9	MSB	
10		
11		
12		
13		
14		
15	ACTIVE RESOLUTION ADVISORIES	
16		
17		
18		
19		
20		
21		
22	LSB	
23	MSB	
24	RACs RECORD	
25		
26	LSB	
27	RA TERMINATED	
28	MULTIPLE THREAT ENCOUNTER	
29	MSB THREAT-TYPE INDICATOR	
30	LSB	
31	MSB	
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43	THREAT IDENTITY DATA	
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56	LSB	

PURPOSE: To report resolution advisories (RAs) generated by ACAS equipment.

The coding of this register shall conform to:

1) Annex 10, Volume IV, §4.3.8.4.2.2.

2) Bit 27 shall mean RA terminated when set to 1.

Table A-2-64. BDS code 4,0 – Selected vertical intention

MB FIELD

1	STATUS	
2	MSB = 32 768 feet	
3		
4		
5	MCP/FCU SELECTED ALTITUDE	
6		
7	Range = [0, 65 520] feet	
8		
9		
10		
11		
12		
13	LSB = 16 feet	
14	STATUS	
15	MSB = 32 768 feet	
16		
17		
18	FMS SELECTED ALTITUDE	
19		
20	Range = [0, 65 520] feet	
21		
22		
23		
24		
25		
26	LSB = 16 feet	
27	STATUS	
28	MSB = 204.8 mb	
29		
30		
31		
32	BAROMETRIC PRESSURE SETTING	
33	MINUS 800 mb	
34		
35	Range = [0, 410] mb	
36		
37		
38		
39	LSB = 0.1 mb	
40		
41		
42		
43		
44	RESERVED	
45		
46		
47		
48	STATUS OF MCP/FCU MODE BITS	
49	VNAV MODE	
50	ALT HOLD MODE	MCP/FCU Mode bits
51	APPROACH MODE	
52	RESERVED	
53		
54	STATUS OF TARGET ALT SOURCE BITS	
55	MSB TARGET ALT SOURCE	
56	LSB	

PURPOSE: To provide ready access to information about the aircraft's current vertical intentions, in order to improve the effectiveness of conflict probes and to provide additional tactical information to controllers.

1) Target altitude shall be the short-term intent value, at which the aircraft will level off (or has leveled off) at the end of the current maneuver. The data source that the aircraft is currently using to determine the target altitude shall be indicated in the altitude source bits (54 to 56) as detailed below.

   Note. – This information which represents the real "aircraft intent," when available, represented by the altitude control panel selected altitude, the flight management system selected altitude, or the current aircraft altitude according to the aircraft's mode of flight (the intent may not be available at all when the pilot is flying the aircraft).

2) The data entered into bits 1 to 13 shall be derived from the mode control panel/flight control unit or equivalent equipment. Alerting devices may be used to provide data if it is not available from "control" equipment. The associated mode bits for this field (48 to 51) shall be as detailed below.

3) The data entered into bits 14 to 26 shall de derived from the flight management system or equivalent equipment managing the vertical profile of the aircraft.

4) The current barometric pressure setting shall be calculated from the value contained in the field (bits 28 to 39) plus 800 mb.

   When the barometric pressure setting is less than 800 mb or greater than 1 209.5 mb, the status bit for this field (bit 27) shall be set to indicate invalid data.

5) Bits 48 to 56 shall indicate the status of the values provided in bits 1 to 26 as follows:

   Bit 48 shall indicate whether the mode bits (49, 50 and 51) are already being populated:

   0 = No mode information provided
   1 = Mode information deliberately provided

   Bits 49, 50 and 51:

   0 = Not active
   1 = Active

   Bit 54 shall indicate whether the target altitude source bits (55 and 56) are actively being populated:

   0 = No source information provided
   1 = Source information deliberately provided

   Bits 55 and 56 shall indicate target altitude source:

   00 = Unknown
   01 = Aircraft altitude
   10 = FCU/MCP selected altitude
   11 = FMS selected altitude

Table A-2-65. BDS code 4,1 – Next waypoint details

MB FIELD

1	STATUS
2	MSB
3	
4	CHARACTER 1
5	
6	
7	LSB
8	MSB
9	
10	CHARACTER 2
11	
12	
13	LSB
14	MSB
15	
16	CHARACTER 3
17	
18	
19	LSB
20	MSB
21	
22	CHARACTER 4
23	
24	
25	LSB
26	MSB
27	
28	CHARACTER 5
29	
30	
31	LSB
32	MSB
33	
34	CHARACTER 6
35	
36	
37	LSB
38	MSB
39	
40	CHARACTER 7
41	
42	
43	LSB
44	MSB
45	
46	CHARACTER 8
47	
48	
49	LSB
50	MSB
51	
52	CHARACTER 9
53	
54	
55	LSB
56	RESERVED

PURPOSE: To provide ready access to details about the next waypoint on an aircraft's route, without the need to establish a data link dialogue with the flight management system. This will assist with short and medium term tactical control.

1) Each character shall be encoded as specified in Annex 10, Volume IV, §3.1.2.9.1.2.

Table A-2-66. BDS code 4,2 – Next waypoint details

MB FIELD

1	STATUS
2	SIGN
3	MSB = 90 degrees
4	
5	
6	
7	
8	
9	WAYPOINT LATITUDE
10	
11	Range = [-180, +180] degrees
12	
13	
14	
15	
16	
17	
18	
19	
20	LSB = 90/131 072 degrees
21	STATUS
22	SIGN
23	MSB = 90 degrees
24	
25	
26	
27	
28	
29	
30	WAYPOINT LONGITUDE
31	
32	Range = [-180, +180] degrees
33	
34	
35	
36	
37	
38	
39	
40	LSB = 90/131 072 degrees
41	STATUS
42	SIGN
43	MSB = 65 536 feet
44	
45	
46	
47	WAYPOINT CROSSING
48	ALTITUDE
49	
50	Range = [-131 072, +131 064] feet
51	
52	
53	
54	
55	
56	LSB = 8 feet

PURPOSE: To provide ready access to details about the next waypoint on an aircraft's route, without the need to establish a data link dialogue with the flight management system. This will assist with short and medium term tactical control.

Note. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-67. BDS code 4,3 – Next waypoint details

MB FIELD

1	STATUS
2	SIGN
3	MSB = 90 degrees
4	
5	
6	BEARING TO WAYPOINT
7	
8	Range = [-180, +180] degrees
9	
10	
11	
12	LSB = 360/2 048 degrees
13	STATUS
14	MSB = 204.8 minutes
15	
16	
17	
18	TIME TO GO
19	
20	Range = [0, 410] minutes
21	
22	
23	
24	
25	LSB = 0.1 minutes
26	STATUS
27	MSB = 3 276.8 NM
28	
29	
30	
31	
32	
33	DISTANCE TO GO
34	
35	Range = [0, 6 554] NM
36	
37	
38	
39	
40	
41	
42	LSB = 0.1 NM
43	
44	
45	
46	
47	
48	
49	
50	RESERVED
51	
52	
53	
54	
55	
56	

PURPOSE: To provide ready access to details about the next waypoint on an aircraft's route, without the need to establish a data link dialogue with the flight management system. This will assist with short and medium term tactical control.

1) The bearing to waypoint is the bearing from the current aircraft heading position to the waypoint position referenced to true north.

Note. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-68. BDS code 4,4 – Meteorological routine air report

MB FIELD

1	MSB
2	FOM/SOURCE
3	
4	LSB
5	STATUS (wind speed and direction)
6	MSB = 256 knots
7	
8	
9	WIND SPEED
10	
11	Range = [0, 512] knots
12	
13	
14	LSB = 1 knot
15	MSB = 180 degrees
16	
17	
18	WIND DIRECTION (True)
19	
20	Range = [0, 360] degrees
21	
22	
23	LSB = 360/512 degrees
24	SIGN
25	MSB = 64ºC
26	
27	
28	
29	STATIC AIR TEMPERATURE
30	
31	Range = [-128, +128]
32	
33	
34	LSB = 0.25º
35	STATUS
36	MSB = 1 024 hPa
37	
38	
39	
40	AVERAGE STATIC PRESSURE
41	
42	Range = [0, 2 048]
43	
44	
45	
46	LSB = 1 hPa
47	STATUS
48	MSB TURBULENCE (see 1)
49	LSB
50	STATUS
51	MSB = 100 %
52	
53	HUMIDITY
54	Range = [0, 100] %
55	
56	LSB = 100/64 %

PURPOSE: To allow meteorological data to be collected by ground systems.

FOM/SOURCE coding:

The decimal value of the binary coded (figure of merit) FOM/SOURCE parameter shall be interpreted as follows:

0 = Invalid
1 = INS
2 = GNSS
3 = DME/DME
4 = VOR/DME
5 to 15 = Reserved

1) The interpretation of the two bits assigned to TURBULENCE shall be as shown in the table for register 45_{16}.

Note 1. – The average static pressure is not a requirement of Annex 3.

Note 2. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Note 3. – The requirement for the range of wind speeds in Annex 3 is from 0 to 250 knots.

Note 4. – The requirement for the range of static air temperature in Annex 3 is from -80º C to +60º C.

Table A-2-69. BDS code 4,5 – Meteorological hazard report

MB FIELD

1	STATUS	
2	MSB	TURBULENCE
3	LSB	
4	STATUS	
5	MSB	WIND SHEAR
6	LSB	
7	STATUS	
8	MSB	MICROBURST
9	LSB	
10	STATUS	
11	MSB	ICING
12	LSB	
13	STATUS	
14	MSB	WAKE VORTEX
15	LSB	
16	STATUS	
17	SIGN	
18	MSB = 64 º C	
19		
20	STATIC AIR TEMPERATURE	
21		
22	Range = [-128, +128] º C	
23		
24		
25		
26	LSB = 0.25 º C	
27	STATUS	
28	MSB = 1 024 hPa	
29		
30		
31		
32	AVERAGE STATIC PRESSURE	
33		
34	Range = [0, 2 048] hPa	
35		
36		
37		
38	LSB = 1 hPa	
39	STATUS	
40	MSB = 32 768 feet	
41		
42		
43		
44	RADIO HEIGHT	
45		
46	Range = [0, 65 528] feet	
47		
48		
49		
50		
51	LSB = 16 feet	
52		
53		
54	RESERVED	
55		
56		

PURPOSE: To provide reports on the severity of meteorological hazards, in particular for low flight.

Hazard coding:

The interpretation of the two bits assigned to each hazard shall be as defined in the table below:

Bit 1	**Bit 2**	
0	0	NIL
0	1	LIGHT
1	0	MODERATE
1	1	SEVERE

The definition of the terms LIGHT, MODERATE and SEVERE shall be those defined in the PANS-ATM (Doc 4444), where applicable.

Note 1. – The requirement for the range of static air temperature in Annex 3 is from -80º C to +60º C.

Note 2. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-72. BDS code 4,8 – VHF channel report

MB FIELD

1	MSB	
2		
3		
4		
5		
6		
7		
8	VHF 1	
9		
10		
11		
12		
13		
14		
15	LSB	
16	STATUS	
17	MSB	VHF 1
18	LSB	AUDIO STATUS
19	MSB	
20		
21		
22		
23		
24		
25		
26	VHF 2	
27		
28		
29		
30		
31		
32		
33	LSB	
34	STATUS	
35	MSB	VHF 2
36	LSB	AUDIO STATUS
37	MSB	
38		
39		
40		
41		
42		
43	VHF 3	
44		
45		
46		
47		
48		
49		
50		
51	LSB	
52	STATUS	
53	MSB	VHF 3
54	LSB	AUDIO STATUS
55	MSB	121.5 MHz
56	LSB	AUDIO STATUS

PURPOSE: To allow the ATC system to monitor the settings of the VHF communications channel and to determine the manner in which each channel is being monitored by the aircrew.

Channel report coding:
Each VHF communications channel shall be determined form the 15-bit positive binary number, N in kHz, according to the formula:

Channel (MHz) = Base + N x 0.001 (MHz)

where: Base = 118.000 MHz

Notes. –

1) The use of binary to define the channel improves the coding efficiency.

2) This coding is compatible with analogue channels on 25 kHz, 8.33 kHz channel spacing and VDL as described below.

3) VDL has a full four bits allocated such that the active status of each of its four multiplex channels can be ascertained.

25 kHz	**VDL: Mode 3**	**Analogue**
Bit		
16	Status	Status
15 (LSB)	MSB (12 800 kHz)	MSB (12 800 kHz)
…	Range 118.000 to 143.575 136.975 (military use)	Range 118.000 to 143.575 136.975 (military use)
6	LSB (25 kHz)	LSB (25 kHz)
5	4 x channel active flags	Unused
4		Unused
3		Unused
2		8.33 indicator = 0
1 (MSB)	VDL indicator = 1	VDL indicator = 0

8.33 kHz	**Analogue**
Bit	
16	Status
15 (LSB)	MSB (17 066 kHz)
…	Range 118.000 to 152.112 136.975 (military use)
4	LSB (17 066/2 048 kHz)
3	Unused
2	8.33 indicator = 1
1 (MSB)	VDL indicator = 0

Audio status coding:
Each pair of audio status bits shall be used to describe the aircrew monitoring of that audio channel according to the following table:

Bit 1 (MSB)	**Bit 2 (LSB)**	
0	0	UNKNOWN
0	1	NOBODY
1	0	HEADPHONES ONLY
1	1	LOUDSPEAKER

Table A-2-80. BDS code 5,0 – Track and turn report

MB FIELD

1	STATUS
2	SIGN 1 = Left Wing Down
3	MSB = 45 degrees
4	
5	
6	ROLL ANGLE
7	
8	Range = [-90, + 90] degrees
9	
10	
11	LSB = 45/256 degrees
12	STATUS
13	SIGN 1 = West (e.g., 315 = -45 degrees)
14	MSB = 90 degrees
15	
16	
17	TRUE TRACK ANGLE
18	
19	Range = [-180, +180] degrees
20	
21	
22	
23	LSB = 90/512 degrees
24	STATUS
25	MSB = 1 024 knots
26	
27	
28	GROUND SPEED
29	
30	Range = [0, 2 046] knots
31	
32	
33	
34	LSB = 1 024/512 knots
35	STATUS
36	SIGN 1 = Minus
37	MSB = 8 degrees/second
38	
39	
40	TRACK ANGLE RATE
41	Range = [-16, +16] degrees/second
42	
43	
44	
45	LSB = 8/256 degrees/second
46	STATUS
47	MSB = 1 024 knots
48	
49	
50	TRUE AIRSPEED
51	
52	Range = [0, 2 046] knots
53	
54	
55	
56	LSB = 2 knots

PURPOSE: To provide track and turn data to the ground systems.

1) If the value of the parameter from any source exceeds the range allowable in the register definition, the maximum allowable value in the correct positive or negative sense shall be used instead.

   Note 1. – This requires active intervention by the GFM.

2) The data entered into the register shall, whenever possible, be derived from the sources that are controlling the aircraft.

3) If any parameter is not available on the aircraft, all bits corresponding to that parameter shall be actively set to ZERO by the GFM.

4) The LSB of all fields shall be obtained by rounding.

   Note 2. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-81. BDS code 5,1 – Position report coarse

MB FIELD

1	STATUS (see 1)
2	SIGN
3	MSB = 90 degrees
4	
5	
6	
7	
8	
9	LATITUDE
10	
11	Range = [-180, +180] degrees
12	(see 2)
13	
14	
15	
16	
17	
18	
19	
20	
21	LSB = 360/1 048 576 degrees
22	SIGN
23	MSB = 90 degrees
24	
25	
26	
27	
28	LONGITUDE
29	
30	Range = [-180, +180] degrees
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	LSB = 360/1 048 576 degrees
42	SIGN
43	MSB = 65 536 feet
44	
45	
46	
47	PRESSURE
48	ALTITUDE
49	
50	Range = [-1 000, +126 752] feet
51	
52	
53	
54	
55	
56	LSB = 8 feet

PURPOSE: To provide a three-dimensional report of aircraft position.

1) The single status bit (bit 1) shall be set to ZERO (0) if any of the three parameters is invalid. This bit shall be identical to the status bit in register 52_{16}.

2) The required valid range for latitude is +90 degrees to -90 degrees, but the parameter shall be coded with an MSB of 90 degrees to allow the use of the same coding algorithm as for longitude.

3) The source of the information in this register shall be the same as that indicated in the FOM/SOURCE field of register 52_{16}.

Note. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-82. BDS code 5,2 – Position report fine

MB FIELD

1	STATUS (see 1)
2	MSB
3	FOM/SOURCE
4	
5	LSB
6	MSB = 90/128 degrees
7	
8	
9	
10	
11	
12	
13	LATITUDE FINE
14	
15	Range = [0, 180/128] degrees
16	
17	
18	
19	
20	
21	
22	
23	LSB = 90/16 777 216 degrees
24	MSB = 90/128 degrees
25	
26	
27	
28	
29	
30	
31	LONGITUDE FINE
32	
33	Range = [0, 180/128] degrees
34	
35	
36	
37	
38	
39	
40	
41	LSB = 90/16 777 216 degrees
42	SIGN
43	MSB = 65 536 feet
44	
45	
46	
47	PRESSURE ALTITUDE
48	OR
49	GNSS HEIGHT (HAE)
50	
51	(as specified by FOM / SOURCE coding)
52	
53	Range = [-1 000, +126 752] feet
54	
55	
56	LSB = 8 feet

PURPOSE: To provide a high-precision three-dimensional report on aircraft position when used in conjunction with register 51_{16}. information on the source of the data is included.

FOM/SOURCE Coding:
The decimal value of the binary-coded (Figure of Merit) FOM / SOURCE parameter shall be interpreted as follows:

0 = Loss of navigational capability
1 = FOM 20 (e.g., INS data) pressure altitude
2 = FOM 5 (e.g., VOR/DME) pressure altitude
3 = FOM 1 (e.g., DME/DME or GNSS) pressure altitude
4 = FOM 0.5 (e.g., DME/DME or GNSS) pressure altitude
5 = FOM 0.3 (e.g., DME/DME or GNSS) pressure altitude
6 = FOM 0.3/125 (e.g., DME/DME or GNSS) pressure altitude
7 = FOM 0.03/50 (ILS, MLS or differential GNSS) pressure altitude
8 = FOM 0.02/40 (ILS, MLS or differential GNSS) pressure altitude
9 = FOM 0.01/15 (ILS, MLS or differential GNSS) pressure altitude
10 = FOM 0.003 (ILS, MLS or differential GNSS) pressure altitude
11 = FOM 1 (e.g., DME/DME or GNSS) GNSS height
12 = FOM 0.3/125 (e.g., DME/DME or GNSS) GNSS height
13 = FOM 0.03/50 (ILS, MLS or differential GNSS) GNSS height
14 = FOM 0.02/40 (ILS, MLS or differential GNSS) GNSS height
15 = FOM 0.01/15 (ILS, MLS or differential GNSS) GNSS height

Note 1. – When GNSS is the source, then the FOM is encoded by the HFOM parameter. When RNP FMS is the source the FOM is encoded by the ANP.

1) The single status bit (bit 1) shall be set to ZERO (0) if any of the three parameters are invalid and is identical to the status bit in register 51_{16}.

2) The LATITUDE (fine) and LONGITUDE (fine) parameters are in 2's complement coding so they shall be interpreted in conjunction with the corresponding parameters in register 51_{16}.

3) When GNSS height is contained in bits 42 to 56, the pressure altitude can be obtained from register 51_{16}.

Note 2. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Note 3. – The Figure of Merit selected is the smallest number that encompasses the HFOM or the ANP.

Table A-2-83. BDS code 5,3 – Air-referenced state vector

MB FIELD

1	STATUS
2	SIGN
3	MSB = 90 degrees
4	
5	
6	MAGNETIC HEADING
7	
8	Range = [-180, +180] degrees
9	
10	
11	
12	LSB = 90/512 degrees
13	STATUS
14	MSB = 512 knots
15	
16	
17	INDICATED AIRSPEED (IAS)
18	
19	Range = [0, 1 023] knots
20	
21	
22	
23	LSB = 1 knot
24	STATUS
25	MSB = MACH 2.048
26	
27	
28	MACH NUMBER
29	
30	Range = [0, 4.096] MACH
31	
32	
33	LSB = MACH 0.008
34	STATUS
35	MSB = 1 024 knots
36	
37	
38	
39	
40	TRUE AIRSPEED
41	
42	Range = [0, 2 048] knots
43	
44	
45	
46	LSB = 0.5 knots
47	STATUS
48	SIGN
49	MSB = 8 192 feet/minute
50	
51	ALTITUDE RATE
52	
53	Range = [-16 384, +16 320] feet/minute
54	
55	
56	LSB = 64 feet/minute

PURPOSE: To provide the ATC system with current measured values of magnetic heading. IAS/MACH, altitude rate and TAS.

Note. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-84 to A-2-86. BDS codes 5,4 to 5,6 – Waypoints 1, 2 and 3

MB FIELD

1	STATUS (see 1)
2	MSB
3	
4	CHARACTER 1
5	
6	
7	LSB
8	MSB
9	
10	CHARACTER 2
11	
12	
13	LSB
14	MSB
15	
16	CHARACTER 3
17	
18	
19	LSB
20	MSB
21	
22	CHARACTER 4
23	
24	
25	LSB
26	MSB
27	
28	CHARACTER 5
29	
30	
31	LSB
32	MSB = 30 minutes
33	
34	ESTIMATED TIME OF ARRIVAL
35	(NORMAL FLIGHT)
36	
37	Range = [0, 60] minutes
38	
39	
40	LSB = 60/512 minutes
41	MSB = 320 FL
42	
43	ESTIMATED FLIGHT LEVEL
44	(NORMAL FLIGHT)
45	Range = [0, 630] FL
46	LSB = 10 FL
47	MSB = 30 minutes
48	
49	TIME TO GO
50	(DIRECT ROUTE)
51	
52	Range = [0, 60] minutes
53	
54	
55	LSB = 60/512 minutes
56	RESERVED

PURPOSE: To provide information on the next three waypoints,
register 54_{16} contains information on the next waypoint,
register 55_{16} contains information on the next waypoint plus one, and
register 56_{16} contains information on the next waypoint plus two.

1) The single status bit shall be set to ZERO (0) if any of the parameters are invalid.

2) The actual time or flight level shall be calculated from the trajectory scheduled in the FMS.

Note. – Mode detail on the next waypoint is given in register 41_{16} to 43_{16}.

3) When the waypoint identity has only three characters, two leading ZERO characters shall be added (e.g., CDN becomes 00CDN).

4) Estimated time is in minutes and all ones shall be used to indicate that the waypoint referred to is one hour or more away.

Table A-2-95. BDS code 5,F – Quasi-static parameter monitoring

MB FIELD

1	MSB	MCP/FCU SELECTED ALTITUDE
2	LSB	
3	RESERVED	
4		
5	RESERVED	
6		
7	RESERVED	
8		
9	RESERVED	
10		
11	RESERVED	
12		
13	MSB	NEXT WAYPOINT
14	LSB	
15	RESERVED	
16		
17	MSB	FMS VERTICAL MODE
18	LSB	
19	MSB	VHF CHANNEL REPORT
20	LSB	
21	MSB	METEOROLOGICAL HAZARDS
22	LSB	
23	MSB	FMS SELECTED ALTITUDE
24	LSB	
25	MSB	BAROMETRIC PRESSURE
26	LSB	SETTING MINUS 800 mb
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41	RESERVED	
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		

PURPOSE: To permit the monitoring of changes in parameters that do not normally change very frequently, i.e., those expected to be stable for 5 minutes or more by accessing a single register.

Parameter Monitor Coding:

1) The changing of each parameter shall be monitored by 2 bits. The value 00 shall indicate that no valid data are available on this parameter. The decimal value for this 2-bit field shall be cycled through 1, 2 and 3, each step indicating a change in the monitored parameter.

2) The meteorological hazards subfield shall report changes to turbulence, wind shear, wake vortex, icing and microburst, as in register number 45_{16}.

3) The next waypoint subfield shall report change to data contained in registers 41_{16}, 42_{16} and 43_{16}.

4) The FMS vertical mode shall report change to bits 48 to 51 in register 40_{16}.

Table A-2-96. BDS code 6,0 – Heading and speed report

MB FIELD

1	STATUS
2	SIGN 1=West (e.g., 315 = -45 degrees)
3	MSB = 90 degrees
4	
5	
6	MAGNETIC HEADING
7	
8	Range = [-180, +180] degrees
9	
10	
11	
12	LSB = 90/512 degrees
13	STATUS
14	MSB = 512 knots
15	
16	
17	INDICATED AIRSPEED
18	
19	Range = [0, 1023] knots
20	
21	
22	
23	LSB = 1 knot
24	STATUS
25	MSB = 2.048 MACH
26	
27	
28	MACH
29	
30	Range = [0, 4.092] MACH
31	
32	
33	
34	LSB = 2.048/512 MACH
35	STATUS
36	SIGN 1 = Below
37	MSB = 8 192 feet/minute
38	
39	
40	BAROMETRIC ALTITUDE RATE
41	
42	Range = [-16 384, +16 352] feet/minute
43	
44	
45	LSB = 8 192/256 = 32 feet/minute
46	STATUS
47	SIGN 1 = Below
48	MSB = 8 192 feet/minute
49	
50	
51	INERTIAL VERTICAL VELOCITY
52	
53	Range = [-16 384, +16 352] feet/minute
54	
55	
56	LSB = 8 192/256 = 32 feet/minute

PURPOSE: To provide heading and speed data to ground systems.

1) If the value of a parameter from any source exceeds the range allowable in the register definition, the maximum allowable value in the correct positive or negative sense shall be used instead.

   Note 1. – This requires active intervention by the GFM.

2) The data entered into the register shall whenever possible be derived from the sources that are controlling the aircraft.

3) The LSB of all fields shall be obtained by rounding.

4) When barometric altitude rate is integrated and smoothed with inertial vertical velocity (baro-inertial information), it shall be transmitted in the Inertial Vertical Velocity field.

   Note 2. – Barometric Altitude Rate contains values solely derived from barometric measurement. The Barometric Altitude Rate is usually very unsteady and may suffer from barometric instrument inertia.

   Note 3. – The Inertial Vertical Velocity is also providing information on vertical movement of the aircraft but it comes from equipments (IRS, AHRS) using different sources used for navigation. The information is a more filtered and smooth parameter.

   Note 4. – Two's complement coding is used for all signed fields as specified in §A.2.2.2.

Table A-2-97. BDS code 6,1 – Extended squitter emergency/priority status

MB FIELD

1	MSB
2	
3	FORMAT TYPE CODE = 28
4	
5	LSB
6	MSB
7	SUBTYPE CODE = 1
8	LSB
9	MSB
10	EMERGENCY STATE
11	LSB
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	RESERVED
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	

PURPOSE: To provide additional information on aircraft status.

Subtype shall be coded as follows:

0 = No information
1 = Emergency/priority status
2 to 7 = Reserved

Emergency state shall be coded as follows:

Value	Meaning
0	No emergency
1	General emergency
2	Lifeguard/Medical
3	Minimum fuel
4	No communications
5	Unlawful interference
6	Reserved
7	Reserved

1) Message delivery shall be accomplished once per 0.8 seconds using the event-driven protocol.

2) Termination of emergency state shall be detected by coding in the surveillance status field of the airborne position message.

3) Emergency State value 1 shall be set when Mode A code 7700 is provided to the transponder.

4) Emergency State value 4 shall be set when Mode A code 7600 is provided to the transponder.

5) Emergency State value 5 shall be set when Mode A code 7500 is provided to the transponder.

Table A-2-101. BDS code 6,5 – Extended squitter aircraft operational status

MB FIELD

1	MSB	
2		
3	FORMAT TYPE CODE = 31	
4		
5	LSB	
6	MSB	
7	SUBTYPE CODE = 0	
8	LSB	
9	MSB	
10	EN-ROUTE OPERATIONAL	
11	CAPABILITIES (CC-4)	
12	LSB	(specified in §A.2.3.11.3)
13	MSB	
14	TERMINAL AREA OPERATIONAL	
15	CAPABILITIES (CC-3)	
16	LSB	(specified in §A.2.3.11.4)
17	MSB	
18	APPROACH/LANDING OPERATIONAL	
19	CAPABILITIES (CC-2)	
20	LSB	(specified in §A.2.3.11.5)
21	MSB	
22	SURFACE OPERATONAL	
23	CAPABILITIES (CC-1)	
24	LSB	(specified in §A.2.3.11.6)
25	MSB	
26	EN-ROUTE OPERATIONAL CAPABILITY	
27	STATUS (OM-4)	
28	LSB	(specified in §A.2.3.11.7)
29	MSB	
30	TERMINAL AREA OPERATIONAL CAPABILITY	
31	STATUS (OM-3)	
32	LSB	(specified in §A.2.3.11.8)
33	MSB	
34	APPROACH/LANDING OPERATIONAL CAPABILITY	
35	STATUS (OM-2)	
36	LSB	(specified in §A.2.3.11.9)
37	MSB	
38	SURFACE OPERATONAL CAPABILITY	
39	STATUS (OM-1)	
40	LSB	(specified in §A.2.3.11.10)
41		
42		
43		
44		
45		
46		
47		
48	RESERVED	
49		
50		
51		
52		
53		
54		
55		
56		

PURPOSE: To provide the capability class and current operational mode of ATC-related applications on board the aircraft.

1) Message delivery shall be accomplished using the event-driven protocol.

Table A-2-227. BDS code E,3 – Transponder type / part number

MB FIELD

1	STATUS	
2	MSB	FORMAT TYPE
3	LSB	
4	MSB	MSB
5	P/N	
6	Digit 1	CHARACTER 1
7	LSB	
8	MSB	
9	P/N	LSB
10	Digit 2	MSB
11	LSB	
12	MSB	CHARACTER 2
13	P/N	
14	Digit 3	
15	LSB	LSB
16	MSB	MSB
17	P/N	
18	Digit 4	CHARACTER 3
19	LSB	
20	MSB	
21	P/N	LSB
22	Digit 5	MSB
23	LSB	
24	MSB	CHARACTER 4
25	P/N	
26	Digit 6	
27	LSB	LSB
28	MSB	MSB
29	P/N	
30	Digit 7	CHARACTER 5
31	LSB	
32	MSB	
33	P/N	LSB
34	Digit 8	MSB
35	LSB	
36	MSB	CHARACTER 6
37	P/N	
38	Digit 9	
39	LSB	LSB
40	MSB	MSB
41	P/N	
42	Digit 10	CHARACTER 7
43	LSB	
44	MSB	
45	P/N	LSB
46	Digit 11	MSB
47	LSB	
48	MSB	CHARACTER 8
49	P/N	
50	Digit 12	
51	LSB	LSB
52		
53		
54	RESERVED	RESERVED
55		
56		

PURPOSE: To provide Mode S transponder part number or type as defined by the supplier.

FORMAT TYPE CODING:

Bit 2	Bit 3	
0	0	= Part number (P/N) coding
0	1	= Character coding
1	0	= Reserved
1	1	= Reserved

1) When available it is recommended to use the part number. P/N Digits are BCD encoded. Digit 1 is the first left digit of the part number.

2) If the part number is not available, the first 8 characters of the commercial name can be used with the format type "01."

3) If format type "01" is used, the coding of character 1 to 8 shall be as defined in Table 3-7 of Chapter 3, Annex 10, Volume IV.. Character 1 is the first left character of the transponder type.

4) For operational reasons, some military installations may not implement this format.

Table A-2-228. BDS code E,4 – Transponder software revision number

MB FIELD

1	STATUS		
2	MSB	FORMAT TYPE	
3	LSB		
4	MSB		MSB
5	P/N		
6	Digit 1		CHARACTER 1
7	LSB		
8	MSB		
9	P/N		LSB
10	Digit 2		MSB
11	LSB		
12	MSB		CHARACTER 2
13	P/N		
14	Digit 3		
15	LSB		LSB
16	MSB		MSB
17	P/N		
18	Digit 4		CHARACTER 3
19	LSB		
20	MSB		
21	P/N		LSB
22	Digit 5		MSB
23	LSB		
24	MSB		CHARACTER 4
25	P/N		
26	Digit 6		
27	LSB		LSB
28	MSB		MSB
29	P/N		
30	Digit 7		CHARACTER 5
31	LSB		
32	MSB		
33	P/N		LSB
34	Digit 8		MSB
35	LSB		
36	MSB		CHARACTER 6
37	P/N		
38	Digit 9		
39	LSB		LSB
40	MSB		MSB
41	P/N		
42	Digit 10		CHARACTER 7
43	LSB		
44	MSB		
45	P/N		LSB
46	Digit 11		MSB
47	LSB		
48	MSB		CHARACTER 8
49	P/N		
50	Digit 12		
51	LSB		LSB
52			
53			
54	RESERVED		RESERVED
55			
56			

PURPOSE: To provide Mode S transponder software revision number as defined by the supplier.

FORMAT TYPE CODING:

Bit 2	Bit 3	
0	0	= Part number (P/N) coding
0	1	= Character coding
1	0	= Reserved
1	1	= Reserved

1) When a part number is allocated to the software revision, it is recommended to use the format type “00.” In this case, P/N Digits are BCD encoded. Digit 1 is the first left digit of the part number.

2) If format type “01” is used, the coding of character 1 to 8 shall be as defined in Table 3-7 of Chapter 3, Annex 10, Volume IV. Character 1 is the first left character of the software revision number.

3) For operational reasons, some military installations may not implement this format.

Table A-2-229. BDS code E,5 – ACAS unit part number

MB FIELD

1	STATUS	
2	MSB	FORMAT TYPE
3	LSB	
4	MSB	MSB
5	P/N	
6	Digit 1	CHARACTER 1
7	LSB	
8	MSB	
9	P/N	LSB
10	Digit 2	MSB
11	LSB	
12	MSB	CHARACTER 2
13	P/N	
14	Digit 3	
15	LSB	LSB
16	MSB	MSB
17	P/N	
18	Digit 4	CHARACTER 3
19	LSB	
20	MSB	
21	P/N	LSB
22	Digit 5	MSB
23	LSB	
24	MSB	CHARACTER 4
25	P/N	
26	Digit 6	
27	LSB	LSB
28	MSB	MSB
29	P/N	
30	Digit 7	CHARACTER 5
31	LSB	
32	MSB	
33	P/N	LSB
34	Digit 8	MSB
35	LSB	
36	MSB	CHARACTER 6
37	P/N	
38	Digit 9	
39	LSB	LSB
40	MSB	MSB
41	P/N	
42	Digit 10	CHARACTER 7
43	LSB	
44	MSB	
45	P/N	LSB
46	Digit 11	MSB
47	LSB	
48	MSB	CHARACTER 8
49	P/N	
50	Digit 12	
51	LSB	LSB
52		
53		
54	RESERVED	RESERVED
55		
56		

PURPOSE: To provide ACAS unit part number or type as defined by the supplier.

FORMAT TYPE CODING:

Bit 2	Bit 3	
0	0	= Part number (P/N) coding
0	1	= Character coding
1	0	= Reserved
1	1	= Reserved

1) When available it is recommended to use the part number. P/N Digits are BCD encoded. Digit 1 is the first left digit of the part number.

2) If the part number is not available, the first 8 characters of the commercial name can be used with the format type "01."

3) If format type "01" is used, the coding of character 1 to 8 shall be as defined in Table 3-7 of Chapter 3, Annex 10, Volume IV. Character 1 is the first left character of the ACAS unit type.

4) For operational reasons, some military installations may not implement this format.

Table A-2-230. BDS code E,6 – ACAS unit software revision

MB FIELD

1	STATUS	
2	MSB	FORMAT TYPE
3	LSB	
4	MSB	MSB
5	P/N	
6	Digit 1	CHARACTER 1
7	LSB	
8	MSB	
9	P/N	LSB
10	Digit 2	MSB
11	LSB	
12	MSB	CHARACTER 2
13	P/N	
14	Digit 3	
15	LSB	LSB
16	MSB	MSB
17	P/N	
18	Digit 4	CHARACTER 3
19	LSB	
20	MSB	
21	P/N	LSB
22	Digit 5	MSB
23	LSB	
24	MSB	CHARACTER 4
25	P/N	
26	Digit 6	
27	LSB	LSB
28	MSB	MSB
29	P/N	
30	Digit 7	CHARACTER 5
31	LSB	
32	MSB	
33	P/N	LSB
34	Digit 8	MSB
35	LSB	
36	MSB	CHARACTER 6
37	P/N	
38	Digit 9	
39	LSB	LSB
40	MSB	MSB
41	P/N	
42	Digit 10	CHARACTER 7
43	LSB	
44	MSB	
45	P/N	LSB
46	Digit 11	MSB
47	LSB	
48	MSB	CHARACTER 8
49	P/N	
50	Digit 12	
51	LSB	LSB
52		
53		
54	RESERVED	RESERVED
55		
56		

PURPOSE: To provide ACAS unit software revision number as defined by the supplier.

FORMAT TYPE CODING:

Bit 2	Bit 3	
0	0	= Part number (P/N) coding
0	1	= Character coding
1	0	= Reserved
1	1	= Reserved

1) When available it is recommended to use the part number. P/N Digits are BCD encoded. Digit 1 is the first left digit of the part number.

2) If format type “01” is used, the coding of character 1 to 8 shall be as defined in Table 3-7 of Chapter 3, Annex 10, Volume IV. Character 1 is the first left character of the ACAS unit software revision.

3) For operational reasons, some military installations may not implement this format.

Table A-2-241. BDS code F,1 – Military applications

MB FIELD

1	STATUS	
2	Character Field (see 1)	
3	C1	
4	A1	
5	C2	
6	A2	
7	C4	
8	A4	MODE 1 CODE
9	X	
10	B1	
11	D1	
12	B2	
13	D2	
14	B4	
15	D4	
16	STATUS	
17	C1	
18	A1	
19	C2	
20	A2	
21	C4	
22	A4	MODE 2 CODE
23	X	
24	B1	
25	D1	
26	B2	
27	D2	
28	B4	
29	D4	
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42	RESERVED	
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		

PURPOSE: To provide data in support of military applications.

1) The character field shall be used to indicate whether 2 characters or 4 characters are used in the Mode 1 code. The logic shall be as follows:

   0 = 2 octal codes
   (A1 – A4 and B1 – B4)

   1 = 4 octal codes
   (A1 – A4, B1 – B4, C1 – C4 and D1 – D4)

2) The status fields shall be used to indicate whether the data are available or unavailable. The logic shall be as follows:

   0 = Unavailable
   1 = Available

Table A-2-242. BDS code F,2 – Military applications

MB FIELD

1	MSB	
2		
3	AF=2, TYPE CODE = 1	
4		
5	LSB	
6	STATUS	
7	CHARACTER FIELD (see 1)	
8	C1	
9	A1	
10	C2	
11	A2	
12	C4	
13	A4	
14	X	MODE 1 CODE
15	B1	
16	D1	
17	B2	
18	D2	
19	B4	
20	D4	
21	STATUS	
22	C1	
23	A1	
24	C2	
25	A2	
26	C4	
27	A4	
28	X	MODE 2 CODE
29	B1	
30	D1	
31	B2	
32	D2	
33	B4	
34	D4	
35	STATUS	
36	C1	
37	A1	
38	C2	
39	A2	
40	C4	
41	A4	
42	X	MODE A CODE
43	B1	
44	D1	
45	B2	
46	D2	
47	B4	
48	D4	
49		
50		
51		
52	RESERVED	
53		
54		
55		
56		

PURPOSE: This register is used for military applications involving DF=19. Its purpose is to provide data in support of military applications.

'TYPE CODE' shall be encoded as follows:

0 = Unassigned
1 = Mode code information
2-31 = Unassigned

1) The character field shall be used to indicate whether 2 characters or 4 characters are used in the Mode 1 code. The logic shall be as follows:

0 = 2 octal codes
(A1 – A4 and B1 – B4)

1 = 4 octal codes
(A1 – A4, B1 – B4, C1 – C4 and D1 – D4)

2) The status fields shall be used to indicate whether the data are available or unavailable. The logic shall be as follows:

0 = Unavailable
1 = Available

DF = 19 Application Field (AF) shall be encoded as follows:

0 = Reserved for civil extended squitter formats
1 = Reserved for formation flight
2 = Reserved for military applications
3-7 = Reserved