

ARINC 424 NDB

**Draft 1 of Supplement 23
Discussion/Proposal**

**Location Gdansk, Poland
October 9-11, 2018**

ADDITION OF SECOND MAXIMUM ALTITUDE TO ER RECORD

V.1

Martin Zillig, Lufthansa Systems FlightNav

SUMMARY
This proposal addresses the missing possibility to code directional maximum altitudes in airways.

1.0 INTRODUCTION/ BACK GROUND

There are airways that are published with different MEAs and MAAs, one reason could be that an airway is published with one identifier for both airways levels, High and Low. Sometimes, the lower part is only one-way directional while the high level is both ways, or the other way around.

While the lower part can be coded today by using the two Minimum Altitude Fields, there is no direct way of achieving this coding in ER records, as there is only one Maximum field.

Therefore, I would like to propose to add a second maximum altitude field and apply the same rules to populate them.

Source example:

1	2	3	4	5	6
L 749 (continued) ▲ ABSOM 545104N 0542439E	065°/245° 42.9	<u>FL280</u> FL070 1010 M	RNAV5 (GNSS)	↓ ↑	
		<u>FL530</u> FL290		↓	
△ OKAMO 545549N 0550352E	065°/246° 43.1	<u>FL280</u> FL070 1010 M		↓ ↑	
		<u>FL530</u> FL290		↓	
△ INPON 550023N 0554330E	066°/246° 50.6	<u>FL280</u> FL070 950 M		↓ ↑	
		<u>FL530</u> FL290		↓	
△ IPROK					

2.0 DISCUSSION and or ACTION

Please review the following changes to 424 to allow coding of directional MAA/Upper Limits, as well as the change to the name of Attachment 4 (removal of "minimum").

3.0 Changes as depicted (Track Changes is Helpful)

4.1.6.1 Enroute Airways Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 13	Blank (Spacing) (7)	
14 thru 18	Route Identifier (5)	5.8
19	Reserved (1)	Note 1
20 thru 25	Blank (Spacing) (6)	
26 thru 29	Sequence Number (4)	5.12
30 thru 34	Fix Identifier (5)	5.13
35 thru 36	ICAO Code (2)	5.14
37	Section Code (1)	5.4
38	Subsection (1)	5.5
39	Continuation Record No. (1)	5.16
40 thru 43	Waypoint Description Code (4)	5.17
44	Boundary Code (1)	5.18
45	Route Type (1)	5.7
46	Level (1)	5.19
47	Direction Restriction (1)	5.115
48 thru 49	Cruise Table Indicator (2)	5.134
50	EU Indicator (1)	5.164
51 thru 54	Recommended NAVAID (4)	5.23
55 thru 56	ICAO Code (2)	5.14
57 thru 59	RNP (3)	5.211
60 thru 62	Blank (Spacing) (3)	
63 thru 66	Theta (4)	5.24
67 thru 70	Rho (4)	5.25
71 thru 74	Outbound Magnetic Course (4)	5.26
75 thru 78	Route Distance From (4)	5.27
79 thru 82	Inbound Magnetic Course (4)	5.28
83	Blank (Spacing) (1)	
84 thru 88	Minimum Altitude (5)	5.30
89 thru 93	Minimum Altitude (5)	5.30
94 thru 98	Maximum Altitude (5)	5.127
99 thru 101	Fix Radius Transition Indicator (3)	5.254
102 thru 104	Vertical Scale Factor (3)	5.293
105 thru 107	RVSM Minimum Level (3)	5.294
108 thru 110	VSF RVSM Maximum Level (3)	5.295
111 thru 114	Reserved (4)	
115 thru 120	Blank (Spacing) (6)	
116 thru 120	Maximum Altitude (5)	5.127
121	Route Qualifier 1 (1)	5.7 Note 2
122	Route Qualifier 2 (1)	5.7 Note 2
123	Route Qualifier 3 (1)	5.7 Note 2
124 thru 128	File Record No (5)	5.31
129 thru 132	Cycle Date (4)	5.32

5.127 Maximum Altitude (MAX ALT)

Definition/Description: The Maximum Altitude field is used to indicate the Maximum Altitude Allowed (MAA) **or upper limit if no MAA is provided.**

Source/Content: When used on Enroute Airway Records, the **first** Maximum Altitude **contains the MAA or upper limit if the altitude is the same for both directions of flight and the second Maximum Altitude will be blank. If the airway segment has directional MAAs, the first Maximum Altitude field will contain the value for the direction of flight in which the airway is coded and the second Maximum Altitude field will contain the value for the opposite route coding.**~~will be derived from official government publications describing a maximum allowable flight altitude, or the upper limit of the airway when no MAA is provided,~~ **The Maximum Altitude is** expressed in feet or flight level. **The first Maximum Altitude field may contain the alpha characters UNLTD when the MAA/Upper Limit is unknown or not established.**

When used on Holding Pattern Records, the Maximum Altitude will be a value provided in source documentation that restricts the use of the Holding, expressed in feet or flight level. In all other cases, the field will be left blank.

When used on Preferred Route Records, the Maximum Altitude will be the maximum flight altitude at which the preferred route is established or the upper limit of the airspace in which the route is published.

Used On:	Enroute Airway, Holding Pattern, and Preferred Route records	
Length:	5 characters	
Character Type:	Alpha/numeric	
Examples:	All numeric:	17999, 08000
	Alpha/numeric:	FL100, FL450
	All alpha:	UNLTD (for unlimited)

ATTACHMENT 4 AIRWAY ~~MINIMUM~~ ALTITUDES AND REQUIRED NAVIGATION PERFORMANCE (RNP)

Airway Minimum Altitude Coding

- A. An ARINC 424 database may contain three levels of Enroute Airways. These are High, Low and Both Level routes. The following descriptions apply:
1. High Altitude Airways, Airway Level code of H, shall contain:
 - a. Routes that exist only in the upper airspace as officially designated by the appropriate authority.
 - b. b.Routes that are officially designated as Upper or High even though the structure in which they exist has not been officially established as Upper Airspace.
 - c. c.Routes that, by virtue of the assigned MEA or MFA, must be charted as high level routes.
 2. Both Altitude Airways. Airway Level code of B shall contain:
 - a. Routes that are not specifically defined into either the upper or lower airspace in a structure that does recognize these airspace divisions, for example the Control Routes in the USA and CAN coverages.
 - b. Routes that exist without a level designator that are in a structure that does recognize the division of Upper and Lower Airspace.
 - c. Routes that exist in a structure that has Upper and Lower Airspace when such routes have a MEA or MFA assigned lower than the upper limit of Lower Airspace and a MAA above the upper limit of Lower Airspace.
 3. Low Altitude Airways. Airway Level code of L shall contain:
 - a. Routes that exist only the lower airspace as officially established by the appropriate authority.
 - b. Routes that, by virtue of the published MAA, must be charted in lower airspace only.
 4. Enroute Airway Sequencing.
Airways changing from one level to another level will be sequenced in order as any airway in the same level. The Airway Level Code is not used to sort airways in an ARINC 424 database.

When an airway changes from Airway Level Code B to two separate airways that are coded as L and H, the point of change will carry the B in the level field.

- B. High Altitude Airways.
The altitude information shown on High Level records will be established with the following criteria:
1. The altitude information included for High Altitude Airways will be derived from official government source. The values entered for Minimum Altitude will be published MEAs (Minimum Enroute Altitude) or MFAs (Minimum Flight Altitude). If neither of those two values are available through source documentation, the lower limit of the designated upper airspace will be entered.
 2. There are two Minimum Altitude fields. The second of these is only used when an Enroute Airway has been published with Directional MEAs or Directional MFAs. Directional information is considered to exist when the

difference in altitude in opposing flight directions is higher than would be indicated by normal separation standards.

3. For Enroute Airways published with non-standard separation or blocked altitudes, the first Minimum Altitude field will contain the lowest altitude available. The non-standard separation and/or blocked altitude information will be available in the Cruise Table referenced in the Enroute Airway Record.
4. The Maximum Altitude fields will contain the highest useable altitude for the Enroute Airway Segment. This will be equal to the Upper Limit of the Designated Upper Airspace unless a lower altitude, a MAA or Maximum Authorized Altitude, has been published in the official government source.

There are two Maximum Altitude fields. The second of these is only used when an Enroute Airway has been published with Directional MAAs or Directional Upper Limits. Directional information is considered to exist when the difference in altitude in opposing flight directions is greater than would be indicated by normal separation standards.

C. Low Level and Both Level Airways.

The altitude information shown on Both Level and Low Level records will be established with the following criteria:

1. The altitude information included for Both Altitude and Low Altitude Airways will be derived from official government source. The values entered for Minimum Altitude will be published MEAs (Minimum Enroute Altitude) or MFAs (Minimum Flight Altitude) when such are available. If neither of those two values are available through source documentation, a code indicating one of the following two conditions will be used:
 - NESTB - MEA/MFA not established in source documentation. Used when the source does not establish minimum altitudes as a general rule. Also used when source documentation does provide minimum altitude information as a general rule and has explicitly not established a value for a specific route segment or segments.
 - UNKNN - MEA/MFA Minimum Altitude was unknown at the time the database was produced but the source documentation does provide MEA or MFA as a general rule. The database supplier expects that future source documentation will provide some minimum altitude information.
2. There are two Minimum Altitude fields. The second of these is only used when an Enroute Airway has been published with Directional MEAs or Directional MFAs. Directional information is considered to exist when the difference in altitude in opposing flight directions is higher than would be indicated by normal separation standards. Directional altitudes will not be provided for NESTB and UNKNN.
3. For Enroute Airways published with non-standard separation or blocked altitudes, the first Minimum Altitude field will contain the lowest altitude available. The non-standard separation and/or blocked altitude information will be available in the Cruise Table referenced in the Enroute Airway Record.
4. The Maximum Altitude field will contain the highest useable altitude for the Enroute Airway Segment. This will be equal to the highest available

Flight Level in the Designated Airspace in which the route is available (Low Altitude Structure or Both Altitude Structure) unless a lower altitude, a MAA or Maximum Authorized Altitude, has been published in the official government source.

There are two Maximum Altitude fields. The second of these is only used when an Enroute Airway has been published with Directional MAAs or Directional Upper Limits. Directional information is considered to exist when the difference in altitude in opposing flight directions is greater than would be indicated by normal separation standards.