**ARINC 424 NDB**

**Draft 2 of Supplement 24**

**Proposal**

**Location Atlanta, Georgia**

**April 16-18, 2024**

Adding Landing Minima Continuation Record

**V.1**

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| **SUMMARY** |
| Landing Minima Data was introduced in the XML with 424-23. There is interest to receive landing minima in the ARINC 424 text format as well. This working paper addresses this request and defines a continuation record for the PF and HF Records. |

# INTRODUCTION/ BACKGROUND

Until 424-20, there used to be Decision Height and Minimum Descent Height data included in a continuation record, and fields 5.170, 5.171 and 5.242 were used to define the values. With 424-20, this concept was removed from ARINC 424 specification.

Recently, the concept of including landing minima information was added back into 424, but only in the XML version. However, there is a request to include this data in the text format as well.

As already mentioned during previous meetings, landing minima is quite a complex topic, and is heavily influenced by flight operation details. Specifically, landing minima specifications are not included in flight procedure design guidance material and are not solely driven by navigation capability, but to a large degree driven by airport or heliport installations, like lights and light details and marking, secondary power equipment including switch-over time, as well as aircraft certification and flight crew certification, training, and currency.

Different regulators around the world have specified different rules for landing minima. The most known are EASA and the FAA, however many other countries regulators have defined their own set of rules, e.g., Canada and Australia. ICAO, as the international standardization body, included All Weather Operation rules in Annex 6, upon which all these regional and local rules are based, with a few deviations.

Nevertheless, at least certain parts of the landing minima can be included in the legacy 424 format.

# ACTION

I would like to propose adding the vertical component of the landing minima, specifically the DH and MDH back into the ARINC 424 text export. Therefore, I kindly ask the group to review the proposal, and let me know if some details they would like to have included are missing.

# Changes as depicted (Track Changes is Helpful)

**4.1.9.4 Airport SID/STAR/Approach Landing Minima Continuation Records**

These continuation records will be provided for the first primary record of the final approach only. There might be multiple such continuation records, e.g., one each for the LPV, LNAV/VNAV, LNAV and Circling minima for an RNP approach. Not all approaches may have such a continuation record.

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| **Column** | **Field Name (Length)** | **Reference** |
| 1 thru 38 | Fields as on Primary Records |  |
| 39  | Continuation Record Number (1) | 5.16 |
| 40  | Application Type (1)* M – Landing Minima
 | 5.91 |
| 41 | Landing Minima Category (1) | 5.242 |
| 42 thru 44 | RNP (3) | 5.211 |
| 45  | Minima Height Type (1) | 5.171 |
| 46 thru 49 | CAT H Minima Height (4) | 5.170 |
| 50 thru 53  | CAT A Minima Height (4) | 5.170 |
| 54 thru 57 | CAT B Minima Height (4) | 5.170 |
| 58 thru 61  | CAT C Minima Height (4) | 5.170 |
| 62 thru 65  | CAT D Minima Height (4) | 5.170 |
| 66 thru 69  | CAT DL Minima Height (4) | 5.170 |
| 70 thru 73 | CAT E Minima Height (4) | 5.170 |
| 74 thru 108  | Blank (Spacing) (35) |  |
| 109 | QNH/Altimeter Setting Source (1) | 5.xxx |
| 110 thru 112 | Missed Approach Climb Gradient (3) | 5.xxx |
| 113 thru 116 | Remote Airport/Heliport Identifier (4) | 5.6 |
| 117 thru 118 | Remote ICAO Code (2) | 5.14 |
| 119  | Route Qualifier 1 (1) Note 1 | 5.7 |
| 120  | Route Qualifier 2 (1) Note 1 | 5.7 |
| 121 | Route Qualifier 3 (1) Note 1 | 5.7 |
| 122 thru 123  | Blank (Spacing) (2) |  |
| 124 thru 128  | File Record Number (5) | 5.31 |
| 129 thru 132  | Cycle Date (4) | 5.32 |

Note 1: Columns 119 and 121 (Approach Route Qualifier 1, 2 and 3) are required to match the Continuation Record to the Primary Record. This non-standard sorting sequence was selected to preserve the Primary Record for SID/STAR/Approach Records as much as possible as these new fields were introduced in Supplement 14.

**4.2.3.4 Heliport SID/STAR/Approach Landing Minima Continuation Records**

These continuation records will be provided for the first primary record of the final approach only. There might be multiple such continuation records, e.g., one each for the LPV, LNAV/VNAV, LNAV and Circling minima for an RNP approach. Not all approaches may have such a continuation record.

|  |  |  |
| --- | --- | --- |
| **Column** | **Field Name (Length)** | **Reference** |
| 1 thru 38 | Fields as on Primary Records |  |
| 39  | Continuation Record Number (1) | 5.16 |
| 40  | Application Type (1)* M – Landing Minima
 | 5.91 |
| 41 | Landing Minima Category (1) | 5.242 |
| 42 thru 44 | RNP (3) | 5.211 |
| 45 | Minima Height Type (1) | 5.171 |
| 46 thru 49 | CAT H Minima Height (4) | 5.170 |
| 50 thru 108  | Blank (Spacing) (59) |  |
| 109 | QNH/Altimeter Setting Source (1) | 5.xxx |
| 110 thru 112 | Missed Approach Climb Gradient (3) | 5.xxx |
| 113 thru 116 | Remote Airport/Heliport Identifier (4) | 5.6 |
| 117 thru 118 | Remote ICAO Code (2) | 5.14 |
| 119  | Route Qualifier 1 (1) Note 1 | 5.7 |
| 120  | Route Qualifier 2 (1) Note 1 | 5.7 |
| 121 | Route Qualifier 3 (1) Note 1 | 5.7 |
| 122 thru 123  | Blank (Spacing) (2) |  |
| 124 thru 128  | File Record Number (5) | 5.31 |
| 129 thru 132  | Cycle Date (4) | 5.32 |

Note 1: Columns 119 and 121 (Approach Route Qualifier 1, 2 and 3) are required to match the Continuation Record to the Primary Record. This non-standard sorting sequence was selected to preserve the Primary Record for SID/STAR/Approach Records as much as possible as these new fields were introduced in Supplement 14.

**5.91 Continuation Record Application Type (APPL)**

Definition/Description: This field indicates specific application of this continuation record.

Source/Content: The field will contain one of the following type codes:

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| **Field Content** | **Description** |
| A | A standard ARINC 424 Continuation containing Notes or other formatted data not covered by a define Continuation  |
| C | Controlling Agency Continuation  |
| E | Primary Record Extension  |
| F | Additional Sectorization Continuation  |
| L | VHF Navaid/TACAN Only Navaid Limitation Continuation  |
| M | Landing Minima Continuation Record |
| N | Sector Narrative Continuation  |
| P | Flight Planning Application Continuation  |
| S | Simulation Application Continuation  |
| T | Time of Operations Continuation, formatted time data  |
| U | Time of Operations Continuation Narrative time data  |
| W | Airport or Heliport Procedure Data Continuation  |
| X | Airport or Heliport SID/STAR/Approach Name Continuation  |

**5.170 Minima Height**

Definition/Description: The Minima Height field is used to specify the vertical component of the landing minima. It is used in combination with 5.171 Minima Height Type and specifies either the Decision Height (DH) or Minimum Descent Height (MDH). The Decision Height is a specified height in the precision approach or approach with vertical guidance at which a missed approach must be initiated if the required visual reference to continue the approach has not been established. The Minimum Descent Height is a specified height in a non-precision approach or circling approach below which descent must not be made without the required visual reference. The DH or MDH is always based on an Obstacle Clearance Height (OCH).

Source/Content: DH and MDH values are obtained from official government publications or derived from the published OCH by the data house. The Minima Height fields will contain a numeric value expressed in feet with a resolution of one foot. The Minima Height value, when added to the touchdown zone, runway end, threshold, or aerodrome elevation, will give the Decision Altitude or Minimum Descent Altitude in feet above mean sea level. The Minima Height will only be filled for those aircraft categories authorized for the approach. The fields will only contain barometric height values, Radio Altimeter values will not be coded. A landing minimum allowing the use of “no DH” will be coded as 0000.

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| Used On: | Airport and Heliport Approach Landing Minima Continuation Records. |
| Length: | 4 characters |
| Character Type: | Numeric |
| Examples: | 0050, 0200, 0250, 0362, 1800 |

**5.171 Minima Height Type**

Definition/Description: The Minima Height Type is used to specify if the values coded in 5.170 Minima Height are a Decision Height (DH) or Minimum Descent Height (MDH).

Source/Content: The field is derived from official government publications based on the landing minima and if the approach operation for this landing minima is 2D or 3D. The field contains a value from the table below and will be blank when the Minima Height fields for all categories are blank.

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| **Field Content** | **Description** |
| D | The Minima Height represent a Decision Height (DH) |
| M | The Minima Height represent a Minimum Descent Height (MDH) |

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| Used On: | Airport and Heliport Approach Landing Minima Continuation Records. |
| Length: | 4 characters |
| Character Type: | Numeric |

**5.242 Landing Minima Category**

Definition/Description: Many approach procedures support multiple lines of minima depending on the navigational and operational capabilities of the aircraft, the flight crew, or the installations. Such approaches will have multiple sets of weather minimums associated with it. This field identifies the Landing Minima Categories for which these minimums apply.

Source Content: The field will contain a coded category from the following table:

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| --- | --- |
| **Field Content** | **Description** |
| 1 | CAT 1 minima |
| S | SA CAT 1 minima |
| 2 | CAT 2 minima |
| T | SA CAT 2 minima |
| 3 | CAT 3 minima |
| A | CAT 3A minima |
| B | CAT 3B minima |
| W | With Glide Slope minima |
| X | Without Glide Slope minima |
| Z | LPV minima |
| Y | LP minima |
| V | LNAV/VNAV minima |
| L | LNAV minima |
| R | For RNP based minima, e.g., RNP AR Approaches, the RNP value applicable to the minima is encoded into the RNP field |
| D | Minima requires identification of Step-Down Fix(es), either with the use of DME or a second navaid |
| N | Minima does not require identification of Step-Down Fix(es) |
| (blank) | Not falling in any other category |
| C | Circle-To-Land minima |

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| Used On: | Airport and Heliport Approach Landing Minima Continuation Records |
| Length: | 1 character |
| Character Type: | Alpha/numeric |

**5.xxx QNH/Altimeter Setting Source**

Definition/Description: This field is used to specify requirements for QNH settings for the landing minima defined in the Minima Height fields.

Source Content: The field will contain one of the following values:

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| --- | --- |
| **Field Content** | **Description** |
| Blank | Minima Height applies when the QNH is obtained from the airport of intended landing. |
| A | Minima Height applies when the QNH is obtained from an area QNH. |
| F | Minima Height applies when the QNH is obtained from a forecast QNH. |
| R | Minima Height applies when the QNH is obtained from a remote airport or heliport. If the remote airport/heliport is specified in official government source, it will be coded in the Remote Airport/Heliport Identifier field. |

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| Used On: | Airport and Heliport Approach Landing Minima Continuation Records. |
| Length: | 1 character |
| Character Type: | Alpha |

**5.xxx Missed Approach Climb Gradient**

Definition/Description: This field is used to specify the Missed Approach Climb Gradient for the landing minima defined in the Minima Height fields. It defines the required minimum climb gradient in percent during the go-around procedure, when the go-around is initiated at the Decision Height, or at the Missed Approach Point from the Minimum Descent Altitude which ensures a safe minimum obstacle clearance until reaching a certain altitude or the end of the missed approach procedure.

Source Content: The Missed Approach Climb Gradient is obtained from official government source and is entered field contains the climb gradient in percent and tenths with the decimal point suppressed.

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| Used On: | Airport and Heliport Approach Landing Minima Continuation Records. |
| Length: | 3 characters |
| Character Type: | Numeric |
| Examples: | 025 (2.5%), 047 (4.7%), 123 (12.3%) |