ANP Database Version 2.0
28 December 2012

1. Release overview

1.1 - Weight-to-trip length relationship and maximum engine thrust updates

Review of the ANP noise and performance database has shown that certain aircraft have grown in maximum allowable takeoff weight, operating range and engine thrust since the development of their original data. This second release of the ANP database updates twenty-one aircraft types to better reflect the current "in-service" fleet. The ANP **737300**, **7373B2**, **737400**, **737500**, **737700**, **747400**, **757PW**, **757RR, 777200, A30062**, **A310**, **A319**, **A320**, **A32023**, **A32123**, **A330**, **A33034**, **A340**, **MD81**, **MD82** and **MD83** aircraft have been updated to reflect growth in maximum allowable takeoff weight and/or operating range, resulting in updated weight-to-trip length ratios, along with maximum engine thrust.

Appendix A provides an overview of the guidelines FAA and EUROCONTROL have been developing to harmonize weight-to-trip length data development across manufacturers.

1.2 - Departure procedure updates

The ANP database contains a set of departure procedures. These procedures include a set of default procedures, which, for historical reasons, have been labelled as **STANDARD**. In addition, the database also includes two sets of noise abatement departure procedures corresponding to the guidance set out in ICAO Doc. 8168: Procedures for Air Navigation Services Operations, PANS-OPS.

Historically the PANS-OPS guidance defined two specific departure procedures called ICAO-A and ICAO-B. The ICAO PAN-OPS guidance has since been updated to provide more flexibility in defining noise abatement departure procedures, resulting in the definition of two families of procedures, called NADP-1 and NADP-2. The NADP-1 family of procedures is designed to reduce noise close-in to an aerodrome, whereas the NADP-2 family is designed to reduce noise more distant from an aerodrome. ICAO no longer uses the old designations ICAO-A and B; however, these each represent a single example of procedure that conforms to the ICAO NADP-1 and NADP-2 guidance respectively. These are provided in the ANP database, labelled as **ICAO_A** and **ICAO_B** procedures.

In this second release of the ANP database, the default procedures – originally labelled as **STANDARD** – have been renamed into **DEFAULT**.

The **DEFAULT** procedure of several existing aircraft (**737300**, **7373B2**, **737400**, **737500**, **747400**, **757PW**, **757RR**, **777200**, **MD81**, **MD82** and **MD83**) has been modified to standardise power cutback to climb power at 1,000 feet AFE. The updated procedure initiates acceleration at 1,000 feet AFE as before, and so may be considered to be part of the NADP-2 family, although being now distinct from the provided **ICAO_B** procedure. It should be noted that this update may lead to a reduction in noise contour areas. As the previously labelled **STANDARD** procedure for these aircraft was identical to the **ICAO_B** procedure, users may select the **ICAO_B** procedure to be consistent with previous studies.

A more detailed description of the ANP **DEFAULT**, **ICAO_A** and **ICAO_B** procedures is provided in *Appendix B*.

1.3 - Approach procedure label update

The ANP database contains default approach procedures, which, for historical reasons, have been labelled as **STANDARD.** In this second release of the ANP database, these default approach procedures have been renamed into **DEFAULT**.

1.4 - New approach procedural-step profiles in replacement of existing fixed-point profiles

New default approach <u>procedural-step</u> profile data (labelled as **DEFAULT**) for nine existing Airbus aircraft (**A300-622R, A310-304, A319-131, A320-211, A320-232, A321-232, A330-301, A330-343,** and **A340-211**) were added to the ANP database, replacing their previously available **STANDARD** approach <u>fixed-point</u> profiles. Supporting aerodynamic data (for approach flap settings) and new approach-specific engine coefficients (for idle thrust rating) were also added to the database. The switch from fixed-point to procedural data allows the calculated flight paths to reflect non-standard weather conditions when appropriate and provides more flexibility for users who wish to develop user-defined approach profiles for these aircraft.

1.5 - Updated reverse thrust assumption in standard approach procedures

Previously the ANP database assumed a reverse thrust level of 60% of the maximum static thrust. Statistical analysis of Flight Data Recorder (FDR) data has shown that actual reverse thrust levels are considerably lower and differ according to the size of the aircraft. As a step forward, it has been agreed to adopt a reverse thrust level of 40% for single-aisle aircraft and 10% for twin-aisle aircraft. This update will reduce the contribution of reverse thrust noise, which primarily affects noise exposure in the immediate vicinity of an airport. Note that the NPD data are derived from normal operation of the engine, i.e. without thrust reverser in operation and thus may not reflect reverse thrust noise emissions. Research is on-going on how to better model reverse thrust noise.

1.6 - New aircraft entries

The following aircraft types have been added to the ANP database:

- Airbus A340-642/Trent 556

- Airbus A380-841/Trent 970

- Airbus A380-861/GP7270

- Bombardier CRJ705/900ER

- Bombardier CRJ705/900LR

- Cessna 182H/O-470-R

- Cessna 208/PT6A-114

- Cessna 510/PW615F

- Cessna Citation CJ4 525C/FJ44-4A

- Cessna Citation Encore 560/PW535A

- Cessna Citation Ultra 560/JT15D-5D

- Cessna Citation Excel 560/PW545A

- Cessna Citation Sovereign 680/PW306C

- Dornier 228-202/TPE 331-5

- Dornier 328-100/PW119C

- Eclipse 500/PW610F

- Piper PA28-161/O-320-D3G

- Piper PA30/IO-320-B1A

- Piper PA31-350/TIO-5

- Piper PA42/PT6A-41

- Raytheon Beech 1900D/PT6A67

2.   Updated ANP datasets

2.1 - B737-300/CFM56-3B-1 Update

Data for the Boeing 737-300 with CFM56-3B-1 engines has been updated. The existing ANP identifier is **737300** and the noise identifier is **CFM563** (this noise identifier is also used by the **7373B2**, **737400** and **737500**). This aircraft reflects new weight-to-stage length guidelines that are increased from previous assumptions.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which have stage lengths 1 through 4. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust.

The engine jet coefficients for MaxTakeoff and MaxClimb ratings have been re-generated from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The aerodynamic coefficients associated to some departure flap settings (in the Aerodynamic coefficients table) have been updated using up-to-date reference performance data.

NPD data for this aircraft has been updated. The updated data increases the number of available thrust levels from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves. The new data set includes also previously unavailable LAmax and PNLTM curves.

2.2 - B737-300/CFM56-3B-2 Update

Data for the Boeing 737-300 with CFM56-3B-2 engines has been updated. The existing ANP identifier is **7373B2** and the noise identifier is **CFM563** (this noise identifier is also used by the **737300**, **737400** and **737500**). This aircraft reflects a growth in maximum allowable takeoff weight from 139,000 to 139,500 lbs and new weight-to-stage length guidelines that are increased from previous assumptions.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which have stage lengths 1 through 4 and M, with M being the maximum takeoff weight. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust.

The engine jet coefficients for MaxTakeoff and MaxClimb ratings have been re-processed from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The aerodynamic coefficients associated to departure flap settings have also been updated (in the *Aerodynamic coefficients* table) using up-to-date reference performance data. This includes data for new flap Ids.

NPD data for this aircraft has been updated. The updated data increases the number of available thrust levels from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves. The new data set includes also previously unavailable LAmax and PNLTM curves.

2.3 - B737-400/CFM56-3C-1 Update

Data for the Boeing 737-400 with CFM56-3C-1 engines has been updated. The existing ANP identifier is **737400** and the noise identifier is **CFM563** (this noise identifier is also used by the **737300**, **7373B2** and **737500**). This aircraft reflects new weight-to-stage length guidelines that are increased from previous assumptions.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which have stage lengths 1 through 4 and M, with M being the maximum takeoff weight. The set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust.

The engine jet coefficients for MaxTakeoff and MaxClimb ratings have been re-generated from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

NPD data for this aircraft has been updated. The updated data increases the number of available thrust levels from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves. The new data set includes also previously unavailable LAmax and PNLTM curves.

2.4 - B737-500/CFM56-3C-1 Update

Data for the Boeing 737-500 with CFM56-3C-1 engines has been updated. The existing ANP identifier is **737500** and the noise identifier is **CFM563** (this noise identifier is also used by the **737300**, **7373B2** and **737400**). The engine type has been updated to CFM56-

3C-1. This aircraft reflects a reduction in maximum allowable takeoff weight from 138,500 to 133,500 lbs and new weight-to-stage length guidelines that are increased from previous assumptions.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which have stage lengths 1 through 5 and M, with M being the maximum takeoff weight. The set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust.

The engine jet coefficients for MaxTakeoff and MaxClimb ratings have been re-processed from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The aerodynamic coefficients associated to some departure flap settings (in the Aerodynamic coefficients table) have been updated using up-to-date reference performance data.

NPD data for this aircraft has been updated. The updated data increases the number of available thrust levels from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves. The new data set includes also previously unavailable LAmax and PNLTM curves.

2.5 - B737-700/CFM56-7B24 Update

Data for the Boeing 737-700 with CFM56-7B24 engines has been updated. The existing ANP identifier is **737700** and the noise identifier is **CF567B**. This aircraft reflects a growth in maximum allowable landing weight from 128,000 to 129,200 lbs and, for departure procedures, new weight-to-stage length guidelines that are increased from previous assumptions.

There are three sets of procedural departure profiles: **ICAO_A**, **ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which have stage lengths 1 through 6, with 6 being the maximum takeoff weight. Some steps of the above procedural profiles have been updated to reflect the increased weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust.

The engine jet coefficients associated to the MaxClimb thrust rating have been revised, on the basis of up-to-date reference data.

The aerodynamic coefficients associated to departure flap settings of this aircraft (in the Aerodynamic coefficients table) have also been updated using up-to-date reference performance data. This includes data for new flap setting identifiers.

2.6 - B737-800/CFM56-7B26 Update

The maximum static thrust value for the **737800** (in the *Aircraft* table) has been changed from 27,300 lb to 26,300 pounds, to make it consistent with noise certification entries (FAA's Advisory Circular AC36-1H).

2.7 - B747-400/PW4056 Update

Data for the Boeing 747-400 with PW4056 engines has been updated. The existing ANP identifier is **747400** and the noise identifier is **PW4056**. This aircraft reflects a slight growth in maximum takeoff weight from 870,000 to 875,000 lbs and a growth in maximum landing weight from 630,000 to 652,000 lbs. The number of stage/trip lengths for which default weights are provided (in the Default Weights table) has been extended to 9 (instead of 7, previously)[1] with stage length 9 representing the maximum takeoff weight. While individual stage weights (e.g. associated to each stage length) have been reduced, the new set of operating weight-to-trip length ratios provide the capability to model the 747400 over its entire operating range, including the maximum allowable takeoff weight.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 9 mentioned above. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, accounts for new flap setting identifiers (see also below) and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 10% of maximum static thrust.

The engine jet coefficients for MaxTakeoff and MaxClimb ratings have been re-processed from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The departure flap identifiers and their associated aerodynamic coefficients (in the Aerodynamic coefficients table) have also been modified, to comply with up-to-date reference performance data.

Noise-Power-Distance (NPD) data has been updated to include maximum level metrics (e.g. PNLTM and LAmax).

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[1] based on survey data showing that this aircraft had many operations in excess of the trip length upper limit given in the previous dataset

2.8 - B757-200/PW2037 Update

Data for the Boeing 757-200 with PW2037 engines has been updated. The existing ANP identifier is **757PW** and the noise identifier is **PW2037**. This aircraft reflects a growth in maximum allowable takeoff weight from 240,000 to 255,000 lbs and a growth in maximum landing weight from 198,000 to 210,000 lbs. New weight-to-stage length rules have been applied to this aircraft, which are increased from previous assumptions. In particular, the number of stage lengths for which default weights are provided (in the *Default Weights* table) has been extended from 6 to 7, with 7 representing the maximum takeoff weight.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 7 mentioned above. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft AFE (before accelerating), accounts for new flap setting identifiers (see also below) and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust.

The engine jet coefficients for MaxTakeoff and MaxClimb ratings have been re-generated from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The aerodynamic coefficients associated to departure flap settings of this aircraft (in the *Aerodynamic coefficients* table) have also been updated using up-to-date reference performance data. This includes data for new flap setting identifiers.

2.9 - B757-200/RB211-535E4 Update

Data for the Boeing 757-200 with RB211-535E4 engines has been updated. The existing ANP identifier is **757RR** and the noise identifier is **RR535E**. This aircraft reflects a growth in maximum allowable takeoff weight from 220,000 to 255,000 lbs and a growth in maximum landing weight from 198,000 to 210,000 lbs. New weight-to-stage length rules have been applied to this aircraft, which are increased from previous assumptions. In particular, the number of stage lengths for which default weights are provided (in the Default Weights table) has been extended from 5 to 7, with 7 representing the maximum takeoff weight.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 7 mentioned above. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft AFE (before accelerating), accounts for new flap setting identifiers (see also below) and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** procedural approach profile of this aircraft (previously labelled as **STANDARD**) has been updated to reflect a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust.

The engine jet coefficients for MaxTakeoff and MaxClimb ratings have been re-generated from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The aerodynamic coefficients associated to departure flap settings of this aircraft (in the Aerodynamic coefficients table) have also been updated using up-to-date reference performance data. This includes data for new flap setting identifiers.

The Departure Noise-Power-Distance (NPD) data of this aircraft has been adjusted for the four available noise metrics. This update has consisted in normalizing these NPDs to an ICAO_Atmosphere. The tabulated engine power setting values, for which the updated noise levels are provided, have also slightly changed.

2.10 - B777-200/GE90-90B Update

Data for the Boeing 777-200 with GE90-90B engines has been updated. The ANP aircraft identifier is **777200** and its noise identifier (previously **GE9076**) has been updated to **GE90**. This aircraft reflects a growth in maximum takeoff weight from 535,000 to 656,000 lbs and available engine thrust from 77,000 to 90,000 lbs. New weight-to-stage length rules have been applied to this aircraft, which are increased from previous assumptions. In particular, the number of stage lengths for which default weights are provided (in the Default Weights table) has been extended from 7 to 9, with 9 representing the maximum takeoff weight.

There are three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 9 mentioned above. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft AFE (before accelerating), accounts for new flap setting identifiers (see also below) and reflects the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps).

The **DEFAULT** approach fixed-point profile (previously labelled as **STANDARD**) has been modified from a 1,500 ft level flight segment to a 3,000 ft level flight segment to make it consistent with other ANP submissions and reflects a growth in maximum landing weight from 445,000 to 470,000 lbs[2]. This updated fixed-point approach profile reflects also a decrease in the initial reverse thrust power setting from 60% to 10% of maximum static thrust.

The existing jet thrust coefficients for MaxTakeoff and MaxClimb ratings have been re-processed (in particular to reflect the increased available engine thrust) and new high temperature jet thrust coefficients have been added for modelling aircraft performance above engine break point temperatures (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

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[2] The STANDARD approach fixed-point profile is provided for a landing weight which is 90% of the maximum landing weight (MLW)

The departure flap identifiers and their associated aerodynamic coefficients (in the Aerodynamic coefficients table) have also been changed, to comply with up-to-date reference performance data.

The NPDs of this aircraft have been updated, both for approach and departures. The updated data increases the number of tabulated power settings, for which noise levels are provided, from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves, in order to avoid large NPD interpolations/extrapolations.

2.11 - A300-622R/PW4158 Update

Data for the Airbus A300-622R with PW4158 engines has been updated. The ANP identifier of this aircraft, which was originally **A30062**, has been changed to **A300-622R.** Its noise identifier remains **PW4158**. This aircraft reflects a growth in maximum allowable takeoff weight from 375,900 to 378,533 lbs and new weight-to-stage length rules that have changed from earlier assumptions and are described in **Appendix A**.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which have stage lengths 1 through 6, with stage length 6 representing the maximum takeoff weight. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps), and to account for updated flap identifiers (see also below). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 10% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap settings. It should be noted that the departure flap identifiers for this aircraft have also been updated, therefore any user-defined procedural profiles defined using the old standard flap identifiers will need to be updated by the user.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

2.12 - A310-304/CF6-80C2A2 Update

Data for the Airbus A310-304 with CF6-80C2A2 engines has been updated. The ANP identifier of this aircraft, which was originally **A310**, has been changed to **A310-304.** Its noise identifier remains **A310**. This aircraft reflects a growth in maximum allowable takeoff weight from 330,700 to 346,126 lbs and new weight-to-stage length rules that have changed from earlier assumptions and are described in **Appendix A**.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which have stage lengths 1 through 6, with stage length 6 representing the maximum takeoff weight. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps), and to account for updated flap identifiers (see also below). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 10% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap settings. It should be noted that the departure flap identifiers for this aircraft have also been updated; therefore any user-defined procedural profiles defined using the old standard flap identifiers will need to be updated by the user.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

2.13 - A319-131/V2522-A5 Update

Data for the Airbus A319-131 with V2522-A5 engines has been updated. The ANP identifier of this aircraft, which was originally **A319**, has been changed to **A319-131.** Its noise identifier remains **V2522A**. This aircraft reflects a growth in maximum allowable takeoff weight from 141,100 to 166,449 lbs and a growth in maximum landing weight from 134,500 to 137,789 lbs. The number of stage lengths for which default weights are provided (in the *Default Weights* table) has been extended from 4 to 5, with stage length 5

representing the maximum takeoff weight. While some individual stage length weights have been reduced, the new set of operating weight-to-trip length ratios provide the capability to model the **A319-131** over its entire operating range, including the maximum allowable takeoff weight.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 5 mentioned above. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (in particular, revision of the rate-of-climb and speed values associated to the acceleration steps of stage length 1 to 4 procedures). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 40% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap settings.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

2.14 - Airbus A320-211/CFM56-5A1 Update

Data for the Airbus A320-211 with CFM56-5A1 engines has been updated. The ANP identifier of this aircraft, which was originally **A320**, has been changed to **A320-211**. Its noise identifier remains **CFM565**. This aircraft reflects a growth in maximum allowable takeoff weight from 162,000 to 169,756 lbs and new weight-to-stage length rules that have changed from earlier assumptions and are described in **Appendix A**.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which have stage lengths 1 through 5, with stage length 5 representing the maximum takeoff weight. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps). It should be noted that the set of **DEFAULT** procedures is identical to

the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 40% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap identifiers.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt. This update increases also the number of available tabulated power settings from 3 to 4.

2.15 - A320-232/V2527-A5 Update

Data for the Airbus A320-232 with V2527-A5 engines has been updated. The ANP identifier of this aircraft, which was originally **A32023**, has been changed to **A320-232**. Its noise identifier remains **V2527A**. This aircraft reflects a growth in maximum allowable takeoff weight from 162,000 to 169,756 lbs and a growth in maximum landing weight from 142,200 to 145,505 lbs. New weight-to-stage length rules have been applied to this aircraft, which have changed from previous assumptions and are described in **Appendix A**.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which have stage lengths 1 through 5, with stage length 5 representing the maximum takeoff weight. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from

60% (as assumed in the original fixed-point profile) to 40% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap identifiers.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

2.16 - A321-232/IAE V2530-A5 Update

Data for the Airbus A321-232 with IAE V2530-A5 engines has been updated. The ANP identifier of this aircraft, which was originally **A32123**, has been changed to **A321-232**. Its noise identifier remains **V2530**. This aircraft reflects new weight-to-stage length rules that have changed from earlier assumptions and are described in **Appendix A**.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which have stage lengths 1 through 5, with stage length 5 representing the maximum takeoff weight. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 40% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap settings.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

2.17 - A330-301/CF6-80 E1A2 Update

Data for the Airbus A330-301 with CF6-80 E1A2 engines has been updated. The ANP identifier of this aircraft, which was originally **A330**, has been changed to **A330-301**. Its noise identifier remains **CF680E**. This aircraft reflects a growth in maximum allowable takeoff weight from 467,400 to 478,400 lbs and maximum available engine thrust from 64,900 to 67,500 lbs. The number of stage lengths for which default weights are provided (in the *Default Weights* table) has been extended from 6 to 7, with stage length 7 representing the maximum takeoff weight. While some individual stage length weights have been reduced, the new set of operating weight-to-trip length ratios provide the capability to model the **A330-301** over its entire operating range, including the maximum allowable takeoff weight.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 7 mentioned above. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (in particular, revision of the rate-of-climb and speed values associated to the acceleration steps for stage length 1 to 6 procedures). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 10% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap settings.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

2.18 - A330-343/RR TRENT 772B Update

Data for the Airbus A330-343 with RR TRENT 772B engines has been updated. The ANP identifier of this aircraft, which was originally **A33034**, has been changed to **A330-343**. Its noise identifier remains **TRENT7**. This aircraft reflects a growth in maximum allowable takeoff weight from 507,100 to 513,677 lbs and a growth in maximum landing weight from 407,850 to 412,264 lbs. The number of stage lengths for which default weights are provided (in the *Default Weights* table) has been extended from 6 to 7, with stage length 7 representing the maximum takeoff weight. While some individual stage length weights have been reduced, the new set of operating weight-to-trip length ratios provide the capability to model the **A330-343** over its entire operating range, including the maximum allowable takeoff weight.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 7 mentioned above. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (in particular, revision of the rate-of-climb and speed values associated to the acceleration steps for stage length 1 to 6 procedures). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 10% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has also been updated for this aircraft, with the inclusion of data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap settings.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

2.19 - A340-211/CFM 56-5C2 Update

Data for the Airbus A340-211 with CFM 56-5C2 engines has been updated. The ANP identifier of this aircraft, which was originally **A340**, has been changed to **A340-211**. Its noise identifier remains **CF565C**. This aircraft reflects a growth in maximum allowable takeoff weight from 566,500 to 573,200 lbs. The number of stage lengths for which default weights are provided (in the *Default Weights* table) has been reduced from 8 to 7, with stage length 7 representing the updated maximum takeoff weight. While the individual weights associated to stage lengths 1 to 6 have been reduced, the new set of operating weight-to-trip length ratios provide the capability to model the **A340-211** over its entire operating range, including the maximum allowable takeoff weight.

There are three updated sets of procedural departure profiles: **ICAO_A, ICAO_B** and **DEFAULT** (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 7 mentioned above. These procedural departure profiles have been updated to reflect the new weight-to-stage length assumptions (revision of the rate-of-climb and speed values associated to the acceleration steps), and to account for updated flap identifiers (see also below). It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft (as it was between the **STANDARD** and **ICAO_B** procedures in the first release of the ANP database).

The single **DEFAULT** approach profile (previously labelled as **STANDARD**) is now provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This new procedural approach profile reflects also a decrease in the initial reverse thrust power setting from 60% (as assumed in the original fixed-point profile) to 10% of maximum static thrust. The original **STANDARD** fixed-point profile has been removed from the *Default fixed-point profiles* table.

The engine coefficients (in the *Jet engine coefficients* table) for MaxTakeoff, MaxClimb, MaxTkoffHiTemp and MaxClimbHiTemp power ratings have been reprocessed from up-to-date manufacturer reference data. The *Jet engine coefficients* table provides also data for a new IdleApproach power rating, which enables to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types).

The *Aerodynamic coefficients* table has been updated for this aircraft, with the inclusion of new data for approach-specific flap settings (required to calculate fixed-point profile parameters associated to specific approach procedural steps), and updated data for the existing departure flap settings. It should be noted that some of the departure flap identifiers for this aircraft have also been renamed; therefore any user-defined procedural profiles defined using the old standard flap identifiers will need to be updated by the user. Previously available approach-specific flap coefficients[3] have been removed from the table.

Departure NPD data for this aircraft has been updated to comply with updated noise data development guidelines. In this update, the NPD data at the 10 tabulated distances capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level at a reference speed of 160 kt.

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[3] These previously available coefficients were not used, as the STANDARD approach procedure was originally defined in the form of a fixed-point profile.

2.20 - MD-81/JT8D-217 Update

Data for the MD-81 with JT8D-217 engines has been updated. The existing ANP identifier is **MD81** and its noise identifier **2JT8D2** (this noise identifier is also used by the **MD82** and **MD83**). The maximum allowable takeoff weight remains unchanged; however the departure profiles now use new weight-to-stage length rules. The number of stage lengths for which default weights are provided (in the *Default Weights* table) has been increased from 3 to 4, with stage length 4 representing the maximum takeoff weight. This new set of operating weight-to-trip length ratios provides a better coverage of the entire operating range of the **MD81**, including the maximum allowable takeoff weight.

There are now three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 4 previously mentioned. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, reflects the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps) and accounts for new flap setting identifiers (see also below).

The single **DEFAULT** approach procedure (previously labelled as **STANDARD**) is now provided in the form of a fixed-point profile (in the *Default fixed-point profiles* table), which reflects a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This updated approach profile reflects also a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust. The original **STANDARD** approach procedural profile has been removed from the *Default approach procedural steps* table.

The engine jet coefficients (in the *Jet engine coefficients* table) for MaxTakeoff and MaxClimb ratings have been re-processed from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The *Aerodynamic coefficients* table includes aerodynamic data for new departure flap setting identifiers (used in the new **ICAO_A**, **ICAO_B** and updated **DEFAULT** procedures). The previously available data for approach flap settings has been removed, as the **DEFAULT** approach procedure is now provided in the form of a fixed-point profile.

Noise-Power-Distance data for this aircraft has been updated. Though similar, the updated data increases the number of available thrust levels from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves. The new data set includes also previously unavailable LAmax and PNLTM curves.

2.21 - MD-82/JT8D-217A Update

Data for the MD-82 with JT8D-217A engines has been updated. The existing ANP identifier is **MD82** and its noise identifier **2JT8D2** (this noise identifier is also used by the **MD81** and **MD83**). The maximum allowable takeoff weight remains unchanged; however the departure profiles now use new weight-to-stage length rules. The number of stage lengths for which default weights are provided (in the *Default Weights* table) has been increased from 4 to 5, with stage length 5 representing the maximum takeoff weight This new set of operating weight-to-trip length ratios provides a better coverage of the entire operating range of the **MD82**, including the maximum allowable takeoff weight.

There are now three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 5 previously mentioned. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, reflects the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps) and accounts for new flap setting identifiers (see also below).

The single **DEFAULT** approach procedure (previously labelled as **STANDARD**) is now provided in the form of a fixed-point profile (in the *Default fixed-point profiles* table), which reflects a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This updated approach profile reflects also a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust. The original **STANDARD** approach procedural profile has been removed from the *Default approach procedural steps* table.

The engine jet coefficients (in the *Jet engine coefficients* table) for MaxTakeoff and MaxClimb ratings have been re-processed from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The *Aerodynamic coefficients* table includes aerodynamic data for new departure flap setting identifiers (used in the new **ICAO_A**, **ICAO_B** and updated **DEFAULT** procedures). The previously available data for approach flap settings has been removed, as the **DEFAULT** approach procedure is now provided in the form of a fixed-point profile.

Noise-Power-Distance data for this aircraft has been updated. Though similar, the updated data increases the number of available thrust levels from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves. The new data set includes also previously unavailable LAmax and PNLTM curves.

2.22 - MD-83/JT8D-219 Update

Data for the MD-83 with JT8D-219 engines has been updated. The existing ANP identifier is **MD83** and its noise identifier **2JT8D2** (this noise identifier is also used by the **MD81** and **MD82**). The maximum allowable takeoff weight remains unchanged; however the departure profiles now use new weight-to-stage length rules. The number of stage lengths for which default weights are provided (in the *Default Weights* table) has been increased from 4 to 5, with stage length 5 representing the maximum takeoff weight This new set of operating weight-to-trip length ratios provides a better coverage of the entire operating range of the **MD83**, including the maximum allowable takeoff weight.

There are now three sets of procedural departure profiles: **ICAO_A** and **ICAO_B** procedures (which were not available in the previous release of the ANP database) and an updated set of **DEFAULT** procedures (previously labelled as **STANDARD**), all of which for the stage lengths 1 through 5 mentioned above. The updated set of **DEFAULT** departure procedures includes an engine power cutback at 1,000 ft Above Field Elevation (AFE) before accelerating, reflects the new weight-to-stage length assumptions (e.g. revision of the rate-of-climb and speed values associated to the acceleration steps) and accounts for new flap setting identifiers (see also below).

The single **DEFAULT** approach procedure (previously labelled as **STANDARD**) is now provided in the form of a fixed-point profile (in the *Default fixed-point profiles* table), which

reflects a level segment at an altitude of 3,000 feet AFE (flown with Idle thrust rating), followed with a standard 3-degree descent on the ILS part. This updated approach profile reflects also a decrease in the initial reverse thrust power setting from 60% to 40% of maximum static thrust. The original **STANDARD** approach procedural profile has been removed from the *Default approach procedural steps* table.

The engine jet coefficients (in the *Jet engine coefficients* table) for MaxTakeoff and MaxClimb ratings have been re-processed from up-to-date reference data. This aircraft includes also new sets of jet coefficients for modelling aircraft performance above engine break point temperatures. (MaxClimbHiTemp and MaxTkoffHiTemp ratings).

The *Aerodynamic coefficients* table includes aerodynamic data for new departure flap setting identifiers (used in the new **ICAO_A**, **ICAO_B** and updated **DEFAULT** procedures). The previously available data for approach flap settings has been removed, as the **DEFAULT** approach procedure is now provided in the form of a fixed-point profile.

Noise-Power-Distance data for this aircraft has been updated. Though similar, the updated data increases the number of available thrust levels from 2 to 4 for approach NPD curves and from 4 to 6 for departure NPD curves. The new data set includes also previously unavailable LAmax and PNLTM curves.

2.23 - Procedural approach profiles with updated initial reverse thrust settings

The **DEFAULT** procedural approach profiles (previously labelled as **STANDARD**) of the following <u>turboprop</u> and <u>single-aisle jet</u> aircraft have been updated to reflect an initial reverse thrust setting of 40% (of Maximum Static Thrust) on the decelerate steps (after landing):

737, **707320**, **717200**, **727100**, **707QN**, **720B**, **727D15**, **727D17**, **727EM1**, **727EM2**, **727Q15**, **727Q7**, **727Q9**, **727QF**, **737D17**, **737N17**, **737N9**, **737QN**, **A300**, **BAC111**, **BAE146**, **BAE300**, **CIT3**, **CL600**, **CL601**, **CNA500**, **CNA55B**, **CNA750**, **DC850**, **DC860**, **DC870**, **DC8QN**, **DC910**, **DC930**, **DC93LW**, **DC950**, **DC95HW**, **DC9Q7**, **DC9Q9**, **EMB120**, **EMB145**, **EMB14L**, **F10062**, **F10065**, **F28MK2**, **F28MK4**, **FAL20**, **GII**, **GIIB**, **GIV**, **GV**, **IA1125**, **LEAR25**, **LEAR35**, **MD9025**, **MD9028** and **MU3001**.

The **DEFAULT** procedural approach profiles (previously labelled as **STANDARD**) of the following <u>twin-aisle</u> aircraft have been updated to reflect an initial reverse thrust setting of 10% (of Maximum Static Thrust) on the decelerate steps (after landing):

747200, **767300**, **74710Q**, **74720A**, **74720B**, **747SP**, **767CF6**, **767JT9**, **DC1010**, **DC1030**, **DC1040**, **L1011** and **L10115**.

2.24 - Fixed-point approach profiles with updated initial reverse thrust settings

The **DEFAULT** fixed-point approach profiles (previously labelled as **STANDARD**) of the following <u>single-aisle jet</u> aircraft have been updated to reflect an initial reverse thrust setting of 40% (of Maximum Static Thrust) on the decelerate steps (after landing):

707, **720**, **707120**, **727200**, **737800**, **757300**, **DC820** and **SABR80**.

The **DEFAULT** fixed-point approach profiles (previously labelled as **STANDARD**) of the following twin-aisle aircraft have been updated to reflect an initial reverse thrust setting of 10% (of Maximum Static Thrust) on the decelerate steps (after landing):

747100, **767400**, **777300**, **MD11GE** and **MD11PW**

3. Error Corrections

Weight category assignments have been corrected for two aircraft in the *Aircraft* table. The weight category assignment for the **CNA55B** aircraft has been changed from 'Small' to 'Large'. The weight category assignment for the **767400** aircraft has been changed from 'Large' to 'Heavy'.

The **DEFAULT** fixed-point approach profiles (previously labelled as **STANDARD**) for the **737800** and **757300** have been corrected (in the *Default fixed-point profiles* table). There was indeed, in each profile, a thrust transition segment having a length of 0 ft, which could cause potential noise calculation problems. It has been changed to 100 ft in each profile.

Duplicate thrust rating identifiers and their associated jet coefficient data for the **GIIB** and **GIV** aircraft have been removed from the *Jet engine coefficients* table.

Data for Spectral Class **110**, a departure class applicable to the **DC3**, **DC6**, **DO228**, **HS748A** and **SF340** aircraft, have been updated to fix an error. The level at 6300 Hz was changed from 62.3 to 51.4 dB and the level at 8000 Hz was changed from 55.4 to 40.4 dB.

4.   New aircraft entries

4.1 - Airbus A340-642/Trent 556

Data for the Airbus A340-642 with Trent556 engines were added to the ANP database. The aircraft identifier is **A340-642** and the noise identifier is **TRENT5**.

There are three sets of procedural departure profiles: **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 7 with 7 corresponding to the maximum takeoff weight. It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft.

This aircraft has a single **DEFAULT** approach profile provided in the form of procedural steps (in the *Default approach procedural steps* table), which includes a level segment at an altitude of 3,000 feet Above Field Elevation (AFE), followed with a standard 3-degree descent on the ILS part.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff, MaxClimb and IdleApproach power ratings. The IdleApproach coefficients are required to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types in the **DEFAULT** procedural approach profile). This aircraft includes also sets of "HiTemp" jet coefficients for modelling aircraft performance above engine break point temperatures.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. Approach and departure NPD datasets include each four tabulated CNT values

The NPD data capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level, at a reference speed of 160 kt. The approach NPD dataset captures a single airframe noise state, corresponding to a common landing aerodynamic configuration with landing gear down[4].

4.2 - Airbus A380-841/Trent 970

Data for the Airbus A380-841 with Trent970 engines were added to the ANP database. The aircraft identifier is **A380-841** and the noise identifier is **TRENT9**.

There are three sets of procedural departure profiles: **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 8 with 8 being the maximum takeoff weight. It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft.

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[4] For Airbus aircraft, this landing configuration is known as "Conf 3" and refers to a specific flap and slat state that is commonly used for landing.

This aircraft has a single **DEFAULT** approach profile provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE, followed with a standard 3-degree descent on the ILS part.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff, MaxClimb and IdleApproach power ratings. The IdleApproach coefficients are required to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types in the **DEFAULT** procedural approach profile). This aircraft includes also sets of "HiTemp" jet coefficients for modelling aircraft performance above engine break point temperatures.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. Approach and departure NPD datasets include each four tabulated CNT values.

The NPD data capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level, at a reference speed of 160 kt. The approach NPD dataset captures a single airframe noise state, corresponding to a common landing aerodynamic configuration with landing gear down[5].

4.3 - Airbus A380-861/GP7270

Data for the Airbus A380-861 with GP7270 engines were added to the ANP database. The aircraft identifier is **A380-861** and the noise identifier is **GP7270**.

There are three sets of procedural departure profiles: **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 8 with 8 being the maximum takeoff weight. It should be noted that the set of **DEFAULT** procedures is identical to the set of **ICAO_B** procedures for this aircraft.

This aircraft has a single **DEFAULT** approach profile provided in the form of procedural steps (in the *Default approach procedural steps* table), which include a level segment at an altitude of 3,000 feet AFE, followed with a standard 3-degree descent on the ILS part.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff, MaxClimb and IdleApproach power ratings. The IdleApproach coefficients are required to calculate the corrected net thrust associated to approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types in the **DEFAULT** procedural approach profile). This aircraft includes also sets of "HiTemp" jet coefficients for modelling aircraft performance above engine break point temperatures.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. Approach and departure NPD datasets include each four tabulated CNT values.

The NPD data capture the noise source state of the aircraft flying at an altitude of 1,000ft above sea level, at a reference speed of 160 kt. The approach NPD dataset captures a single airframe noise state, corresponding to a common landing aerodynamic configuration with landing gear down[5].

4.4 - Bombardier CRJ705/900ER

Data for the Bombardier CRJ705/900ER (CL-600-2D15/CL-600-2D24 series – Extended Range version) with CF34-8C5 engines were added to the ANP database. The aircraft identifier is **CRJ9-ER** and the noise identifier is **CF348C5** (**CRJ9-ER**'s noise data are shared with the **CRJ9-LR)**.

There are three sets of procedural departure profiles: **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 5 with 5 being the maximum takeoff weight.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff, MaxClimb and IdleApproach power ratings. The IdleApproach coefficients enable to calculate the corrected net thrust for user-defined approach procedural profiles including procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types). This aircraft includes also sets of "HiTemp"coefficients for modelling aircraft performance above engine break point temperatures, and a set of "General" jet coefficients enabling to calculate corrected net thrust from engine rotational speed N1.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for two tabulated power settings over each of the approach and departure aircraft states.

4.5 - Bombardier CRJ705/900LR

Data for the Bombardier CRJ705/900LR (CL-600-2D15/CL-600-2D24 series – Long Range version) with CF34-8C5 engines were added to the ANP database. The aircraft identifier is **CRJ9-LR** and the noise identifier is **CF348C5** (**CRJ9-LR**'s noise data are shared with the **CRJ9-ER)**.

There are three sets of procedural departure profiles: **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 5 with 5 being the maximum takeoff weight.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff, MaxClimb and IdleApproach power ratings. The IdleApproach coefficients enable to calculate the corrected net thrust for user-defined approach procedural profiles including

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[5] For Airbus aircraft, this landing configuration is known as "Conf 3" and refers to a specific flap and slat state that is commonly used for landing.

procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types). This aircraft includes also sets of "HiTemp"coefficients for modelling aircraft performance above engine break point temperatures, and a set of "General" jet coefficients enabling to calculate corrected net thrust from engine rotational speed N1.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for two tabulated power settings over each of the approach and departure aircraft states.

4.6 - Cessna 182H/O-470-R

Data for the Cessna 182H with a Continental O-470-R engine were added to the ANP database. The aircraft identifier is **CNA182** and the noise identifier is **O470R**.

A single **DEFAULT** stage length 1 procedural departure profile (corresponding to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine (propeller-type) coefficients are provided in the *Propeller engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT). NPD data is provided for two tabulated power settings over each of the approach and departure aircraft states.

4.7 - Cessna 208/PT6A-114

Data for the Cessna 208 with a PT6A-114 engine were added to the ANP database. The aircraft identifier is **CNA208** and the noise identifier is **PT6A114**.

A single **DEFAULT** stage length 1 procedural departure profile (corresponding to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT). NPD data is provided for two tabulated power settings over the departure aircraft state, and three tabulated power settings over the approach aircraft state.

4.8 - Cessna 510/PW615F

Data for the Cessna Mustang Model 510 Very Light Jet (VLJ) with PW615F engines were added to the ANP database. The aircraft identifier is **CNA510** and the noise identifier is **PW615F**.

There are two sets of procedural departure profiles: **FLAPS_0** and **FLAPS_15**, both being limited to stage length 1, which corresponds to the maximum takeoff weight. The **DEFAULT** departure procedure is identical to the **FLAPS_15** procedure.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table, for MaxTakeoff and MaxClimb power ratings. The table provides also a set of "General" jet coefficients for this aircraft, enabling to calculate corrected net thrust from engine rotational speed N1.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for two tabulated power settings for approach aircraft state, and four tabulated power settings for departure state.

4.9 - Cessna Citation CJ4 525C/FJ44-4A

Data for the Cessna Citation CJ4 525C with Williams FJ44 turbofan engines were added to the ANP database. The aircraft identifier is **CNA525C** and the noise identifier is **FJ44-4**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. Approach and departure NPD datasets include respectively two and four tabulated CNT values.

This aircraft is assigned two new spectral classes for approach and departure aircraft states, respectively labelled **235** and **136** (data for these new spectral classes are provided in the *Spectral class* table).

4.10 - Cessna Citation Encore 560/PW535A

Data for the Cessna Citation Ultra Encore 560 with Pratt & Whitney PW535A turbofan engines were added to the ANP database. The aircraft identifier is **CNA560E** and the noise identifier is **2PW535**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. Approach and departure NPD datasets include respectively two and four tabulated CNT values.

This aircraft is assigned two new spectral classes for approach and departure aircraft states, respectively labelled **238** and **138** (data for these new spectral classes are provided in the *Spectral class* table).

4.11 - Cessna Citation Ultra 560/JT15D-5D

Data for the Cessna Citation Ultra 560 with Pratt & Whitney JT15D-5D turbofan engines were added to the ANP database. The aircraft identifier is **CNA560U** and the noise identifier is **2J155D**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. Approach and departure NPD datasets include respectively two and three tabulated CNT values.

This aircraft is assigned a new spectral class for approach aircraft state, which is labelled **237** (data for this new spectral class is provided in the *Spectral class* table).

4.12 - Cessna Citation Excel 560/PW545A

Data for the Cessna Citation Excel 560 with Pratt & Whitney PW545A turbofan engines were added to the ANP database. The aircraft identifier is **CNA560XL** and the noise identifier is **PW545A**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. Approach and departure NPD datasets include respectively two and five tabulated CNT values.

This aircraft is assigned two new spectral classes for approach and departure aircraft states, respectively labelled **238** and **137** (data for these new spectral classes are provided in the *Spectral class* table).

4.13 - Cessna Citation Sovereign 680/PW306C

Data for the Cessna Citation Sovereign 680 with Pratt & Whitney PW306C turbofan engines were added to the ANP database. The aircraft identifier is **CNA680** and the noise identifier is **PW306C**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The Noise Power Distance (NPD) data of this aircraft is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LAmax and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per

engine. Approach and departure NPD datasets include respectively two and three tabulated CNT values.

This aircraft is assigned two new spectral classes for approach and departure aircraft states, respectively labelled **236** and **136** (data for these new spectral classes are provided in the *Spectral class* table).

4.14 - Dornier 228-202/TPE 331-5

Data for the Dornier 228-202 with TPE 331-5 engines were added to the ANP database. The aircraft identifier is **DO228** and the noise identifier is **TPE331-5**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for three tabulated power settings over each of the approach and departure aircraft states.

4.15 - Dornier 328-100/PW119C

Data for the Dornier 328-100 with PW119C engines were added to the ANP database. The aircraft identifier is **DO328** and the noise identifier is **PW119C**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for two tabulated power settings over each of the approach and departure aircraft states**.**

4.16 - Eclipse 500/PW610F

Data for the Eclipse 500 Very Light Jet (VLJ) with PW610F engines were added to the ANP database. The aircraft identifier is **ECLIPSE500** and the noise identifier is **PW610F**.

There are two sets of procedural departure profiles: **HI_ALT** and **DEFAULT**, both of which have stage lengths 1 through 3, with 3 corresponding to the maximum takeoff weight. The **HI_ALT** profiles are intended for use in lieu of the **DEFAULT** profiles when modelling departure operations of this aircraft at airports with ground elevations greater than 5,000 feet above Mean Seal Level.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff, MaxClimb and ReduceClimb power ratings (the ReduceClimb power rating being used above 6,000ft in the **DEFAULT** procedure, and above 400ft in the **HI_ALT** procedure). This aircraft includes also sets of "HiTemp" coefficients for modelling aircraft performance above engine break point temperatures.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for seven tabulated power settings for approach aircraft state, and six tabulated power settings for departure state.

4.17 - Piper PA28-161/O-320-D3G

Data for the Piper PA28-161 Warrior were added to the ANP database. The aircraft identifier is **PA28** and the noise identifier is **O320D3**.

The **DEFAULT** approach and departure profiles are both fixed-point profiles (provided in the *Default fixed-point profiles* table). The engine power parameter in these fixed-point profiles is the engine RPM, to ensure compatibility with the noise-related power parameter in the NPD data (see below).

The noise-related power parameter in the NPD data of this aircraft is the engine RPM because research demonstrated that engine RPM provided the best correlation between aircraft state and aircraft noise source. NPD data is provided for three different RPM settings over each of the approach and departure aircraft states.

4.18 - Piper PA30/IO-320-B1A

Data for the Piper PA30 Twin Comanche were added to the ANP database. The aircraft identifier is **PA30** and the noise identifier is **IO320B**.

The **DEFAULT** approach and departure profiles are both procedural profiles (provided respectively in the *Default approach procedural steps* table and the *Default departure procedural steps* table). The **DEFAULT** departure profile is provided for a single stage length 1, which corresponds to the maximum takeoff weight.

The required engine coefficients are provided in the *Propeller engine coefficients* table, for MaxTakeoff and MaxClimb power ratings.

Aerodynamic data is provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for two tabulated power settings for approach aircraft state, and three tabulated power settings for departure state.

4.19 - Piper PA31-350/TIO-5

Data for the Piper PA31 Navajo were added to the ANP database. The aircraft identifier is **PA31** and the noise identifier is **TIO542**.

The **DEFAULT** approach and departure profiles are both fixed-point profiles (provided in the *Default fixed-point profiles* table). The engine power parameter in these fixed-point profiles is the engine RPM, to ensure compatibility with the noise-related power parameter in the NPD data (see below).

The noise-related power parameter in the NPD data of this aircraft is the engine RPM. NPD data is provided for two tabulated RPM settings for approach aircraft state, and three tabulated RPM settings for departure state.

4.20 - Piper PA42/PT6A-41

Data for the Piper PA42 Cheyenne with PT6A-41 engines were added to the ANP database. The aircraft identifier is **PA42** and the noise identifier is **PT6A41**.

A single **DEFAULT** stage length 1 procedural departure profile (which corresponds to the maximum takeoff weight) is provided in the *Default departure procedural steps* table.

The single **DEFAULT** procedural approach profile (provided in the *Default approach procedural steps* table) is a standard 3-degree descent from 6,000ft to touchdown.

Engine coefficients are provided in the *Jet engine coefficients* table for MaxTakeoff and MaxClimb power ratings.

Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for two tabulated power settings for approach aircraft state, and two tabulated power settings for departure state.

4.21 - Raytheon Beech 1900D/PT6A67

Data for the Raytheon Beech 1900D were added to the ANP database. The aircraft identifier is **1900D** and the noise identifier is **PT6A67**.

The **DEFAULT** approach and departure profiles are both procedural profiles. The **DEFAULT** procedural departure profile is provided for two stage lengths, stage length 2 corresponding to the maximum takeoff weight.

The required engine coefficients are provided in the *Jet engine coefficients* table, for MaxTakeoff and MaxClimb power ratings. Aerodynamic performance coefficients are provided in the *Aerodynamic coefficients* table, for both approach and departure flap settings.

The noise-related power parameter in the NPD data of this aircraft is the Corrected Net Thrust (CNT) per engine. NPD data is provided for two tabulated power settings for approach aircraft state, and four tabulated power settings for departure state. Measurements undertaken to derive the data showed that due to high frequency noise components in cruise condition, this aircraft has higher sound levels in cruise than at takeoff. This effect is reflected in the departure NPD curves by an increase of the sound levels associated to the shortest tabulated distances (where high frequencies components remain significant), when tabulated power settings decrease. The departure NPD data includes therefore two additional departure NPD curves (corresponding to the lowest and highest power settings), which have identical sound levels to those of the following (or preceding) tabulated power settings, in order to eliminate possible problems when extrapolating outside the measured NPD range.

APPENDIX A – Weight-to-Trip Length Guidelines

The ANP database provides default departure procedures for specific ranges spanning normal operating range of the aircraft. This is achieved through the provision of different default takeoff weights, corresponding to different trip lengths of the aircraft. In this way, users may interpolate to other weights provided they have justification or other data to do so. In the absence of more detailed data, users will resort to default weights corresponding to the trip length of the aircraft.

The following paragraphs and tables correspond to the ANP guidelines, which FAA and EUROCONTROL have been developing to harmonize weight-to-trip length data development across manufacturers:

Takeoff weights are provided so as to increase with an increase in mission trip length. Weight assumptions should use industry planning assumptions for load factor, average passenger weight, excess cargo beyond passenger weight, and fuel required to complete mission trip length. Weights should be developed for the trip length ranges using the default mission planning rules below:

Stage Length number	Trip length (nmi)	Representative Range (nmi)	Weight (lb)
1	0-500	350	lb
2	500-1000	850	lb
3	1000-1500	1350	lb
4	1500-2500	2200	lb
5	2500-3500	3200	lb
6	3500-4500	4200	lb
7	4500-5500	5200	lb
8	5500-6500	6200	lb
9	>6500		lb

Table A-1: Default Departure Takeoff Weights

The following guidance has been established to provide common mission planning rules for determining default weights to the stage lengths given in table A-1.

Parameter	Planning Rule
Representative Range	Min Range + 0.70*(Max Range – Min Range)
Load Factor	65% Total Payload
Fuel Load	Fuel Required for Representative Range + ATA Domestic up to 3000 nm and International Reserves for trip length > 3000 nm. As an example, typical domestics reserves include 5% contingency fuel, 200 nm alternate landing with 30 minutes of holding.
Cargo	No additional cargo over and above the assumed payload percentage

Table A-2: Guidance for Determining Departure Takeoff Weights

Not all nine trip lengths will be required for every aircraft as not all aircraft will be able to fly the higher trip length ranges. In addition to providing data for the trip length ranges for which an aircraft is able to fly, weights and procedures can be developed for the aircraft maximum takeoff weight as well. If relevant, a lower bound weight may also be provided that would be more representative of operations that would occur at weights below trip lengths of 350 nautical miles, using the mission planning rules above.

APPENDIX B – ANP Departure Procedures Description

This Appendix describes in more details the three different departure procedures available in the ANP database. The **ICAO_A** procedure is designed to reduce noise close-in to an aerodrome, whereas the **ICAO_B** procedure is designed to reduce noise more distant from an aerodrome. The **DEFAULT** procedure (previously labelled **STANDARD**) has been updated to reflect that many aircraft no longer require take-off power to be maintained whilst accelerating, therefore thrust cutback and initial acceleration occur simultaneously.

More information on the effects of noise abatement departures on noise, NOx emissions and fuel burn is provided in ICAO Circular 317.

DEFAULT	ICAO_A	ICAO_B
1) Takeoff at Full power 2) <u>Cutback to climb power around 1,000 feet AFE and pitch-over to accelerate</u> 3) Accelerate to clean configuration 4) Climb to 3,000 feet AFE 5) Accelerate to 250 knots 6) Continued climb to 10,000 feet AFE	1) Takeoff at Full Power 2) Climb to 1,500 feet AFE at full power, maintaining V2 speed 3) Cutback to Climb Power at 1,500 feet 4) Climb to 3,000 feet AFE at climb power, maintaining V2 speed 5) Accelerate to clean configuration 6) Accelerate to 250 knots 7) Continued climb to 10,000 feet AFE	1) Takeoff at Full Power 2) Climb to 1,000 feet and pitch-over to accelerate 3) <u>Maintaining full power, accelerate to clean configuration</u> 4) Cutback to climb power 5) Climb to 3,000 feet AFE 6) Accelerate to 250 knots 7) Continued climb to 10,000 feet AFE

Table B-1: ANP Departure Procedural Steps Description