ANP database version 2.1
Release notes – 02/08/2016

1. Release overview

This new release of the ANP database features both new aircraft dataset entries and updates of data from the previous version.

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

- Boeing 747-8F Freighter / GEnx-2B67
- Boeing 777-300ER / GE90-115B-EIS
- Boeing 787-8 Dreamliner / T1000-C/01 Family Plan Cert
- Embraer ERJ-170-100 / GE CF34-8E
- Embraer ERJ-170-200 / GE CF34-8E
- Embraer ERJ-190-100 / GE CF34-10E
- Embraer ERJ-190-200 / GE CF34-10E
- Lockheed C-130 Hercules / T56-A-15
- Lockheed C-130E Hercules / T56-A-7

Updates of existing ANP data (and table format) are listed below:

- Updated format of the *Default departure procedural steps* table
- Provision of missing LA_{max} and/or PNLTM information for specific NPD identifiers
- Duplication of aerodynamic data in arrival and departure operating modes for specific flap identifiers in the *Aerodynamic coefficients* table
- Updated noise and performance data for the Dornier 328-100
- Operating mode corrections in the Aerodynamic coefficients table
- Aircraft owner category corrections
- Engine type description correction for the Douglas DC-8-60
- Data normalization of the Spectral Class 236
- Rounding error correction on jet engine coefficients

2. New aircraft entries

2.1 - Boeing 747-8F Freighter / GEnx-2B67

Data for the Boeing 747-8F Freighter with GEnx-2B67 engines were added to the ANP database. The aircraft identifier is **7478** and the noise identifier is **GENX67**.

This aircraft includes three sets of departure procedural steps profiles (in the *Default departure procedural steps* table): **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 9 with 9 corresponding to the maximum takeoff weight. The acceleration segments of these profiles feature a new parameter labelled "**Accel Percentage (%)**", which specifies the amount of thrust (in %) dedicated to the acceleration of the aircraft, whereas the rest is used for climbing. This parameter is provided in replacement of the usual Rate-of-Climb (ROC) parameter. Further details on how to account for this new parameter in the calculation of vertical fixed-point profiles from the procedural step definition may be found in Section 3.1 - .

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 the approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types) in the **DEFAULT** approach procedural 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 "F_10" flap identifier is available in both approach and departure modes.

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, LA_{max} and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. The approach NPD data subset is provided for four tabulated CNT values, whereas the departure one is provided for six tabulated CNT values.

The existing **205** and **107** spectral classes (in the *Spectral classes* table) are assigned to this aircraft, respectively for the approach and departure modes. Even though the approach spectral class **205** was originally established to represent 2-engine turbofan aircraft, its spectral shape may be applied to other aircraft. A detailed analysis found that approach spectral class **205** is the most representative of the actual spectra of this 4-engine turbofan aircraft during approach phases.

2.2 - Boeing 777-300ER / GE90-115B-EIS

Data for the Boeing 777-300ER with GE90-115B-EIS engines were added to the ANP database. The aircraft identifier is **7773ER** and its noise identifier is **GE9015**.

This aircraft includes three sets of departure procedural steps profiles (in the *Default departure procedural steps* table): **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 9 with 9 corresponding to the maximum takeoff weight. The acceleration segments of

these profiles feature a new parameter labelled "**Accel Percentage (%)**", which specifies the amount of thrust (in %) dedicated to the acceleration of the aircraft, whereas the rest is used for climbing. This parameter is provided in replacement of the usual Rate-of-Climb (ROC) parameter. Further details on how to account for this new parameter in the calculation of vertical fixed-point profiles from the procedural step definition may be found in Section 3.1 - .

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 the approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types) in the **DEFAULT** approach procedural 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, LA_{max} and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. The approach NPD data subset is provided for four tabulated CNT values, whereas the departure one is provided for six tabulated CNT values.

The existing **204** and **107** spectral classes (in the *Spectral classes* table) are assigned to this aircraft, respectively for the approach and departure modes. Even though the departure spectral class **107** was originally established to represent 4-engine turbofan aircraft, its spectral shape may be applied to other aircraft. A detailed analysis found that departure spectral class **107** is the most representative of the actual spectra of this 2-engine turbofan aircraft during departure phases.

2.3 - Boeing 787-8 / Trent 1000-C/01

Data for the Boeing 787-8 with Trent 1000-C/01 engines were added to the ANP database. The aircraft identifier is **7878R** and its noise identifier is **T1KBFP**.

This aircraft includes three sets of departure procedural steps profiles (in the *Default departure procedural steps* table): **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 9 with 9 corresponding to the maximum takeoff weight. The acceleration segments of these profiles feature a new parameter labelled "**Accel Percentage (%)**", which specifies the amount of thrust (in %) dedicated to the acceleration of the aircraft, whereas the rest is used for climbing. This parameter is provided in replacement of the usual Rate-of-Climb (ROC) parameter. Further details on how to account for this new parameter in the calculation of vertical fixed-point profiles from the procedural step definition may be found in Section 3.1 - .

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 the approach procedural steps flown with Idle thrust rating ("Descend-Idle" and "Level-Idle" step types) in the **DEFAULT** approach procedural 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, LA_{max} and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. The approach NPD data subset is provided for four tabulated CNT values, whereas the departure one is provided for six tabulated CNT values.

The existing **205** and **103** spectral classes (in the *Spectral classes* table) are assigned to this aircraft, respectively for the approach and departure modes.

2.4 - Embraer ERJ-170-100 and ERJ-170-200 / GE CF34-8E

Data for the Embraer ERJ-170-100 and ERJ-170-200 with GE CF34-8E engines were added to the ANP database. Their aircraft identifiers are respectively **EMB170** and **EMB175**, and they share the same **CF348E** noise identifier. The main differences between these two aircraft are their operating and maximum weights.

Both aircraft include three sets of departure procedural steps profiles (in the *Default departure procedural steps* table): **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 3. The associated takeoff weights are provided in the *Default weights* table.

Both aircraft have a single **DEFAULT** approach profile provided in the form of procedural steps (in the *Default approach procedural steps* table) representing a continuous 3-degree descent from 6,000ft Above Field Elevation (AFE) down to the runway touchdown point.

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 the approach procedural steps flown with Idle thrust rating ("Descend-Idle" step type) in the **DEFAULT** approach procedural profile.

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

The Noise Power Distance (NPD) data is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LA_{max} and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. The approach NPD data subset is provided for two tabulated CNT values, whereas the departure one is provided for three tabulated CNT values.

The existing **216** and **113** spectral classes (in the *Spectral classes* table) are assigned to both aircraft, respectively for the approach and departure modes.

2.5 - Embraer ERJ-190-100 and ERJ-190-200 / GE CF34-10E

Data for the Embraer ERJ-190-100 and ERJ-190-200 with GE CF34-10E engines were added to the ANP database. Their aircraft identifiers are respectively **EMB190** and **EMB195**, and they share the same **CF3410E** noise identifier. The main differences between these two aircraft are their operating and maximum weights.

Both aircraft include three sets of departure procedural steps profiles (in the *Default departure procedural steps* table): **ICAO_A**, **ICAO_B** and **DEFAULT**, all of which have stage lengths 1 through 4. The associated takeoff weights are provided in the *Default weights* table.

Both aircraft have a single **DEFAULT** approach profile provided in the form of procedural steps (in the *Default approach procedural steps* table) representing a continuous 3-degree descent from 6,000ft Above Field Elevation (AFE) down to the runway touchdown point.

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 the approach procedural steps flown with Idle thrust rating ("Descend-Idle" step type) in the **DEFAULT** approach procedural profile.

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

The Noise Power Distance (NPD) data is provided for both approach and departure aircraft states, and for four noise metrics (SEL, EPNL, LA_{max} and PNLTM). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine. The approach NPD data subset is provided for two tabulated CNT values, whereas the departure one is provided for three tabulated CNT values.

The existing **205** and **105** spectral classes (in the *Spectral classes* table) are assigned to both aircraft, respectively for the approach and departure modes.

2.6 - Lockheed C-130 Hercules / T56-A-15

Data for the Lockheed C-130 Hercules with Allison T56-A-15 turboprop engines were added to the ANP database. The aircraft identifier is **C130** and its noise identifier is **T56A15**.

This aircraft includes a single set of **DEFAULT** departure procedural steps profiles (in the *Default departure procedural steps* table), provided for stage lengths 1 and 2 with 2 corresponding to the maximum takeoff weight.

This aircraft has a single **DEFAULT** approach profile provided in the form of procedural steps (in the *Default approach procedural steps* table) representing a continuous 3-degree descent from 6,000ft Above Field Elevation (AFE) down to the runway touchdown point.

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 "ZERO" flap identifier is available in both approach and departure modes.

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, LA_{max} and PNLTM). It should

be noted that the PNLTM data has been derived from the EPNL data, using an empirical equation developed by the US DOT Volpe Center within the context of the US FAA's Integrated Noise Model (INM) (see Section 3.2 for further information). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine, defined as a percentage of the Maximum Sea Level Static Thrust (provided in the *Aircraft* table). The approach and the departure NPD data subsets are both provided for two tabulated CNT% values.

For the departure mode, this aircraft uses the existing **112** spectral class. For the approach mode, it uses a new **234** spectral class, which has been added to the *Spectral classes* table.

2.7 - Lockheed C-130E Hercules / T56-A-7

Data for the Lockheed C-130E Hercules with Allison T56-A-7 turboprop engines were added to the ANP database. The aircraft identifier is **C130E** and its noise identifier is **T56A7**.

This aircraft includes a single set of **DEFAULT** departure procedural steps profiles (in the *Default departure procedural steps* table), provided for stage lengths 1 and 2 with 2 corresponding to the maximum takeoff weight.

This aircraft has a single **DEFAULT** approach profile provided in the form of procedural steps (in the *Default approach procedural steps* table) representing a continuous 3-degree descent from 6,000ft Above Field Elevation (AFE) down to the runway touchdown point.

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 "ZERO" flap identifier is available in both approach and departure modes.

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, LA_{max} and PNLTM). It should be noted that the PNLTM data has been derived from the EPNL data, using an empirical equation developed by the US DOT Volpe Center within the context of the US FAA's Integrated Noise Model (INM) (see Section 3.2 for further information). The noise-related power parameter in the NPD data is the Corrected Net Thrust (CNT) per engine, defined as a percentage of the Maximum Sea Level Static Thrust (provided in the *Aircraft* table). The approach and the departure NPD data subsets are both provided for two tabulated CNT% values.

This aircraft uses the existing **214** and **112** spectral classes (available in the *Spectral classes* table, respectively for the approach and departure modes).

3. Updated ANP data and table format

3.1 - Updated format of the *Default departure procedural steps* table

The *Default departure procedural steps* table includes a new parameter labelled "**Accel Percentage (%)**", which specifies – for *acceleration* type segments – the amount of available thrust (in percent) dedicated to the acceleration of the aircraft, whereas the rest is used for continuing to climb (example: a value of 55 indicates that 55% of the available thrust is used for accelerating, whereas the remaining 45% is used for climbing).

This new parameter – when being provided – replaces the usual Rate of Climb values, pre-calculated by the manufacturers as a function of the aircraft default takeoff weight[1], engine power setting and aircraft aerodynamic configuration, on the basis of an implicitly assumed energy share factor.

The direct provision of this energy share factor information in *acceleration* steps provides in particular more flexibility in the calculation of vertical profiles from the procedural step definition, especially for modellers wishing to use aircraft takeoff weights which are different from the ANP default weights.

When an *acceleration* segment is defined using this new input "**Accel Percentage (%)**" parameter, the climb gradient **G**, normally calculated as a function of the input Rate of Climb values (see Appendix B of ECAC Doc. 29 3rd Edition or Appendix C of ICAO Doc 9911), should be calculated as follows:

$$G = \frac{a_{max}}{g} \times \left(1 - \frac{Accelerate\_Percent}{100}\right)$$

where

a_{max} is the maximum acceleration in level flight (ft/s^2) - see the above references,

g is the gravitational acceleration (ft/s^2)

The rest of the calculation method for acceleration segments – as described in the ECAC and ICAO guidance documents – remains unchanged.

In this new release of the ANP database, the "**Accel Percentage (%)**" information is provided for the three new Boeing aircraft entries (**7478**, **7773ER** and **7878R**).

[1] The ANP database includes a *Default weights* table, which provides aircraft-specific takeoff weights associated to different stage/trip lengths.

3.2 - Provision of missing NPD data for LA_{max} and PNLTM metrics

In version 2.0 of the ANP database, NPD data for maximum noise level metrics – LA_{max} and/or PNLTM – were not available for several NPD identifiers. This new release of the ANP database provides the missing data, in order to fully support the computation of noise contours for both maximum (LA_{max} and PNTLM-based) and exposure (SEL and EPNL-based) noise metrics[2].

This new information is derived from the SEL and EPNL data already available for those NPD identifiers, using empirical equations developed by the US DOT Volpe Center within the context of the US FAA's Integrated Noise Model (INM). Equations (1) and (2) below were established through linear regression analyses of relationships between maximum and exposure noise levels in NPD datasets for which both level types were available.

$$LA_{max}(d_i) = SEL(d_i) - 7.19 - 7.73 \times log10\left(\frac{d_i}{1000}\right) \quad (1)$$

$$PNLTM(d_i) = EPNL(d_i) + 1.12 - 9.34 \times log10\left(\frac{d_i}{1000}\right) \quad (2)$$

Where:

d_i (with i = 1 to 10) is the i^{th} member of the list of tabulated NPD distances (in feet).

Table 1 below provides the list of NPD identifiers for which LA_{max} and/or PNLTM NPD data have been added, using the regression formula provided above.

NPD_ID	LA_{max} added	PNLTM added
2CF680	x	x
2CF68D	x	x
3JT8E5	x	x
3JT8E7	x	x
JT9D7Q	x	x
PT6A50	x	x
PW120	x	x
PW2037	x	x
PW4460	x	x
RB183	x	x
RB183P	x	x
TAY620	x	x
TAY650	x	x
CT75		x
2CF650		x
2JT8D		x
2JT8DQ		x
2JT8DW		x

[2] Maximum level-based NPD data is also required for the calculation of exposure noise levels, as part of the finite segment correction Δ_F calculation method, which is described in ICAO Doc 9911 and ECAC Doc.29 guidance documents.

NPD_ID	LA_{max} added	PNLTM added
2JT8QW		x
2R2800		x
3JT8D		x
3JT8DQ		x
4R2800		x
501D13		x
AL502L		x
AL502R		x
CF34		x
CF66D		x
CF700		x
CFM562		x
CJ610		x
JT15D1		x
JT15D5		x
JT3D		x
JT3DQ		x
JT4A		x
JT9DBD		x
JT9DFL		x
OLY593		x
PT6A27		x
PT6A45		x
RB2112		x
RDA532		x
T56A15		x
T56A7		x
TF7312		x
TF7313		x
TPE331		x
TSIO52		x
V2525		x

Table 1: List of NPD identifiers with LAmax and/or PNLTM data added

3.3 - Duplication of Flap Identifiers used for both arrival and departure procedures in the *Aerodynamic coefficients* table

In the *Aerodynamic coefficients* table of the ANP v2.0 release, several flap identifiers - assigned to a specific operating mode (either arrival - 'A' - or departure - 'D' -) – were actually used in both the *Default approach procedural steps* and the *Default departure procedural steps* tables. For clarity purpose (in particular from a software implementation standpoint), these flap Identifiers, along with their associated aerodynamic coefficients, have been duplicated in both modes.

It should be noted that in the case of Flap identifiers originally labelled as departure-specific (Op_type = 'D'), their duplicated version for use with arrival procedures (i.e. Op_type = 'A') does not replicate the rolling distance (B) nor the speed (C) coefficients, provided that these flap settings are not used in the final approach and landing steps of the *default approach procedural steps* table.

Table 2 provides the list of aircraft-specific flap identifiers originally labelled for use in approach mode, which have been duplicated in the departure mode as well.

Table 3 provides the list of aircraft-specific flap identifiers originally labelled for departure mode, which have been duplicated for the approach mode as well.

ACFT_ID	FLAP_ID
CRJ9-ER	ZERO
CRJ9-LR	ZERO

Table 2: Approach Flap_IDs duplicated in Departure mode

ACFT_ID	FLAP_ID
737	ZERO, 5
707320	ZERO, 14
727100	ZERO, 5
737300	ZERO, 5
737400	ZERO, 5
737500	ZERO, 5
737700	T_ZERO, T_5
747200	ZERO, 10
747400	5, 10
767300	ZERO, 5
707QN	ZERO, 14
720B	ZERO, 20
727D15	ZERO, 5
727D17	ZERO, 5
727EM1	ZERO, 5
727EM2	ZERO, 5
727Q15	ZERO, 5
727Q7	ZERO, 5

727Q9	ZERO, 5
7373B2	ZERO, 5
737D17	ZERO, 5
737N17	ZERO, 5
737N9	ZERO, 5
737QN	ZERO, 5
74710Q	ZERO, 10
74720A	ZERO, 10
74720B	ZERO, 10
747SP	ZERO, 10
757PW	ZERO, 5
757RR	ZERO, 5
767CF6	1, 5
767JT9	ZERO, 5
A300B4-203	ZERO, 1
BAC111	ZERO, INT1
BAE146	ZERO, 18
BAE300	ZERO, 18
BEC58P	ZERO, TO
CIT3	ZERO, 10
CL600	ZERO, 10
CL601	ZERO, 10
CNA441	ZERO, TO
CNA500	ZERO, 1
CNA510	ZERO_C
CNA525C	ZERO_C
CNA55B	ZERO_C
CNA560E	ZERO
CNA560U	ZERO, 7
CNA560XL	ZERO
CNA680	ZERO
CNA750	ZERO
CONCRD	CL1, ZERO
CVR580	ZERO, INTR
DC1010	ZERO, INT
DC1030	ZERO, INT2
DC1040	ZERO, 5
DC3	ZERO, TO
DC6	ZERO, TO
DC850	ZERO, INT
DC860	ZERO, INT
DC870	ZERO, INT
DC8QN	ZERO, INT
DC910	ZERO, 5
DC930	ZERO, 5
DC93LW	ZERO, 5

DC950	ZERO, 5
DC95HW	ZERO, 5
DC9Q7	ZERO, 5
DC9Q9	ZERO, 5
DHC6	ZERO, INTR
DHC6QP	ZERO, INTR
DHC7	ZERO, 10
DHC8	ZERO, 5
DHC830	ZERO, 10
EMB120	ZERO, 15
EMB145	ZERO
EMB14L	ZERO
F10062	TO, INT2
F10065	TO, INT2
F28MK2	ZERO, INT2
F28MK4	ZERO, INT2
FAL20	ZERO, INTR
HS748A	ZERO, INTR
IA1125	ZERO, INTR
L1011	ZERO, 10
L10115	ZERO, 10
L188	ZERO, INTR
LEAR25	ZERO, 10
LEAR35	ZERO, 10
MU3001	ZERO, 1
SD330	ZERO, INTR
SF340	ZERO, 5

Table 3: Departure Flap_IDs duplicated in Approach mode

3.4 - Updated noise and performance data for the Dornier 328-100

The data for the Dornier 328-100 (**DO328** aircraft identifier and **PW119C** noise identifier) were updated to resolve a noise extrapolation issue that could occur when modelling departures. With the ANP v2.0 release, modelling departures of this aircraft under certain circumstances could indeed result in unrealistically high noise levels.

To resolve this issue, the jet thrust coefficients of this aircraft were updated for the "MaxTakeoff" rating (in the *Jet engine coefficients* table). Additionally, the updated departure NPD data subset of this aircraft is "capped" at the highest tabulated CNT value (4,300lb), through the inclusion of an additional NPD curve at 4,301lb, which has identical sound levels to those of the NPD curve at 4,300lb. This eliminates possible problems when extrapolating departure NPD data outside the measured NPD range.

4. Error corrections

4.1 - Operating mode corrections in the *Aerodynamic coefficients* table

In the *Aerodynamic coefficients* table of the ANP v2.0 release, several flap identifiers were assigned to the wrong operating mode (Op_type). Table 4 below provides the list of these flap identifiers and the corrections applied to these.

ACFT_ID	FLAP_ID	Op_type in ANP v2.0	Corrected Op_type in ANP v2.1	Other corrections
EMB14L	D-45	D	**A**	Speed coefficient “C” replaced with speed coefficient “D”
GII	L-20-D	D	**A**	
GII	L-39-D	D	**A**	Speed coefficient “C” replaced with speed coefficient “D”
GIIB	L-20-D	D	**A**	
GIIB	L-39-D	D	**A**	Speed coefficient “C” replaced with speed coefficient “D”
GIV	L-20-D	D	**A**	
GV	L-0-U	D	**A**	
CNA182	ZERO-A	D	**A**	

Table 4: Flap_IDs with operating mode correction

4.2 - Aircraft owner category corrections

In the *Aircraft* table of the ANP v2.0 release, The Owner Category was incorrectly labelled for five aircraft. The corrections are presented in Table 5 below:

ACFT_ID	Description	Owner Category in ANP v2.0	Corrected Owner Category in ANP v2.1
CRJ9-ER	Bombardier CL-600-2D15 / CL-600-2D24 / CF34-8C5	General Aviation	**Commercial**
CRJ9-LR	Bombardier CL-600-2D15 / CL-600-2D24 / CF34-8C5	General Aviation	**Commercial**
DO228	Dornier 228-202 / TPE 311-5	General Aviation	**Commercial**
DO328	Dornier 328-100 / PW119C	General Aviation	**Commercial**
ECLIPSE500	Eclipse 500 / PW610F	Commercial	**General Aviation**

Table 5: Owner Category correction

4.3 - Engine type description correction for the Douglas DC-8-60

There was an error in the engine name description of the Douglas DC-8-60 (**DC8QN** aircraft identifier). The correct engine name is JT3D-7QN (instead of JT8D-7QN in the previous release).

4.4 - Data normalization of the Spectral Class 236

The spectral class data of the Spectral Class **236** identifier has been corrected so that to reflect a normalized value of 70dB at 1000Hz. This correction has however no impact on the re-calculation of the NPD data for non-reference atmospheric conditions.

4.5 - Rounding error correction on jet engine coefficients

In the *Jet engine coefficients* table of the ANP v2.0 release, certain coefficients were rounded to several decimal places. Although this had a marginal effect on the calculated thrust profiles, these errors have been corrected in the ANP v2.1 release, which now provides these coefficients with their full precision.