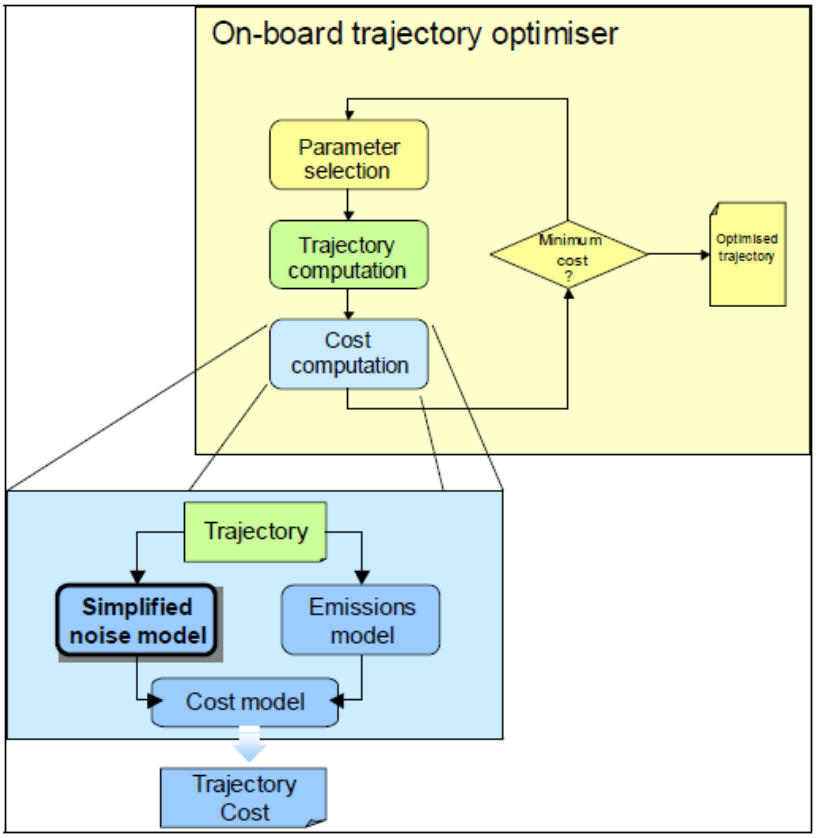


Figure 1 – General overview of the trajectory optimiser

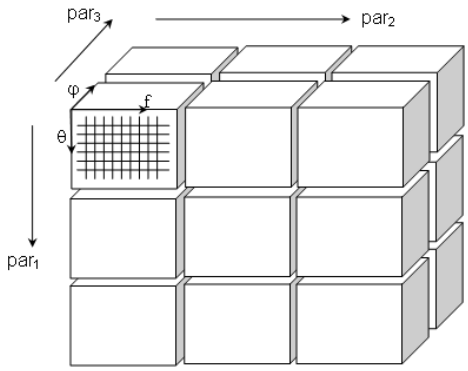


Figure 2 – Generic multidimensional look-up table

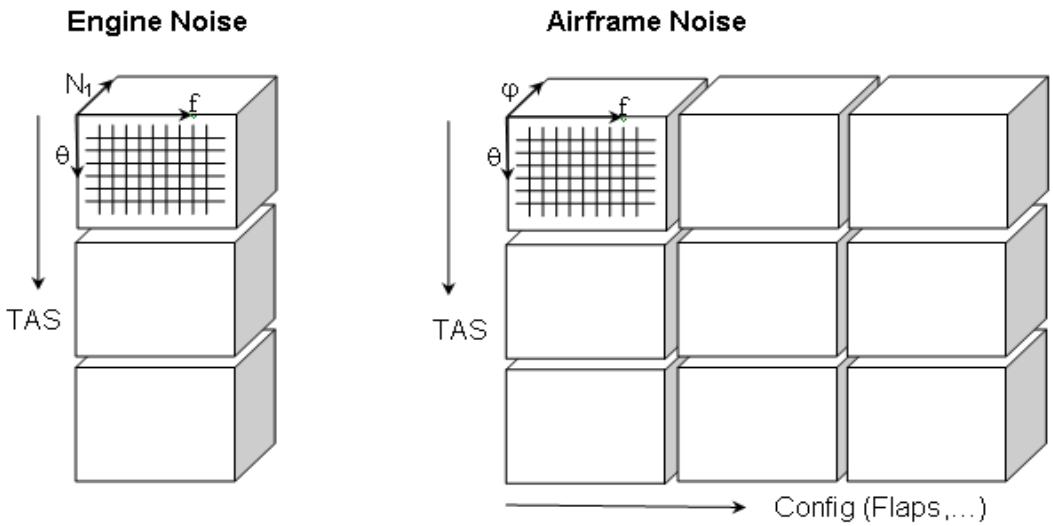
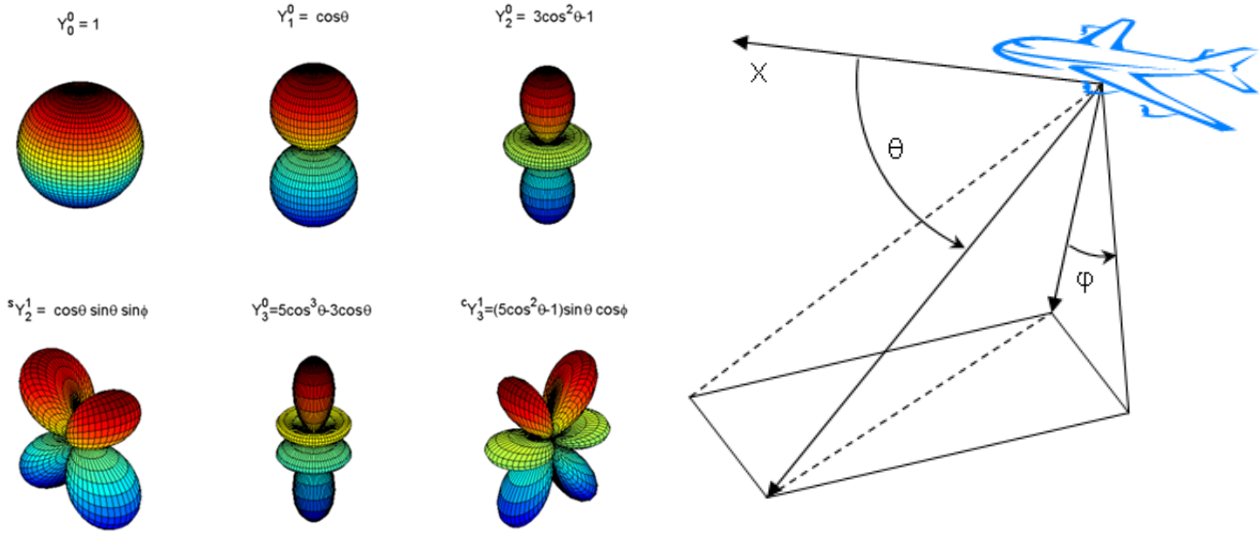


Figure 3 – Example of look-up tables for engine and airframe noise



$$SPL_k(\theta,\varphi) = \sum_{l=0}^{n} \sum_{m=0}^{+l} c_{lmk} P_l^m(cos\theta) sin^m\theta cos(l\varphi)$$

Figure 4 – Source noise description by means of spherical harmonics

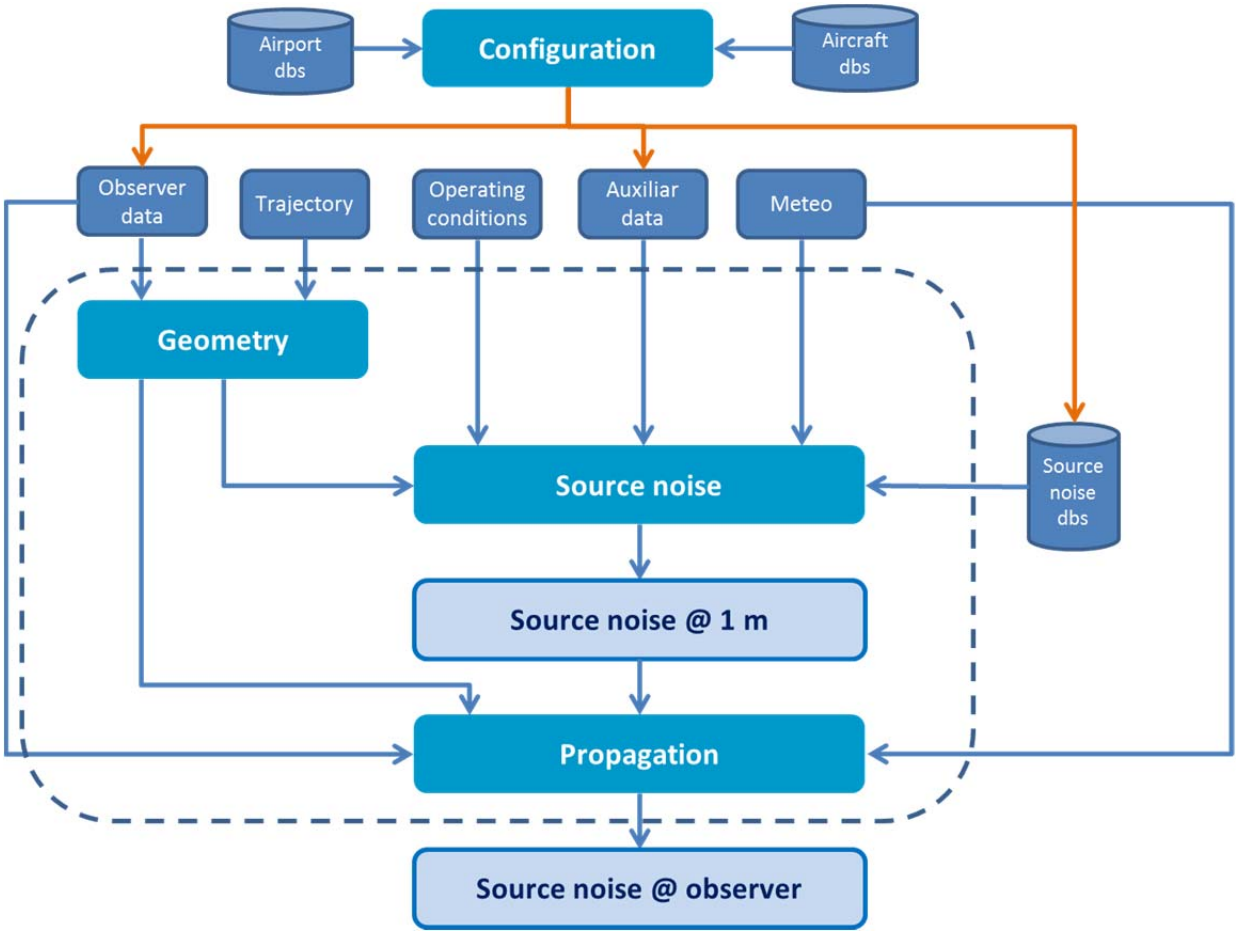


Figure 5 – High level design of the model

Cessna Citation					
Test case n°	**Power**	**Speed**	**Flightpath**	**Source**	**Comment**
T1.1	TO (constant)	Constant	0 to 15 kft	GAD	Homogeneous atmosphere
T1.2	TO (constant)	Constant	0 to 15 kft	GAD	Layered atmosphere
T1.3	TO (constant)	Constant	0 to 15 kft	GAD	GRID Layered atmosphere
T1.4	TO (constant)	Constant	0 to 15 kft	GAD	Homogeneous atmosphere
T1.5	TO (constant)	Constant	0 to 15 kft	SH	Homogeneous atmosphere

A320-214/CFM56-5B4P					
Test case n°	**Power**	**Speed**	**Flightpath**	**Source**	**Comment**
T2.1	Typical Take-off profile			GAD	Layered atm
T2.2	Typical Approach profile			GAD	Layered atm

A330-201/CF6-80E1A2					
Test case n°	**Power**	**Speed**	**Flightpath**	**Source**	**Comment**
T3.1	Typical Take-off profile			GAD	Layered atm
T3.2	Typical Take-off profile			GAD	Layered atm
T3.3	Typical Approach profile			GAD	Layered atm

NPD simulation					
Test case n°	**Power**	**Speed**	**Flightpath**	**Source**	**Aircraft**
T4.1	Approach (same as those defined in NPD)	160 kts	Level flight at 400 ft	GAD	A320-214/CFM56-5B4P
T4.2	Take-off (same as those defined in NPD)	160 kts	Level flight at 1000 ft	GAD	A320-214/CFM56-5B4P
T4.3	Approach (same as those defined in NPD)	160 kts	Level flight at 400 ft	GAD	A330-201/CF6-80E1A2
T4.4	Take-off (same as those defined in NPD)	160 kts	Level flight at 1000 ft	GAD	A330-201/CF6-80E1A2

Turn					
Test case n°	**Power**	**Speed**	**Flightpath**	**Source**	**Aircraft**
T5.1	Typical Take-off profile			GAD	A320-214/CFM56-5B4P

ATR 42-500					
Test case n°	**Power**	**Speed**	**Flightpath**	**Source**	**Comment**
T6.1	Typical Approach profile			GAD	Homogeneous atm
T6.2	Typical Take-off profile			GAD	Homogeneous atm

Diffraction (P2)					
Test case n°	**Power**	**Speed**	**Flightpath**	**Source**	**Aircraft**
T7.1	TO (constant)	Constant	0 to 15 kft	GAD	Cessna Citation

Note: GAD = Generic Acoustic Datafile (the Anotec format of a look-up table)

Table 1. Reference test cases

Mic#1	Armonea	Soprano	Δ
LAMAX	69.35	69.34	0.01
SELA	81.58	81.60	-0.02
PNLTM	80.77	80.75	0.02
EPNL	81.93	81.97	-0.04

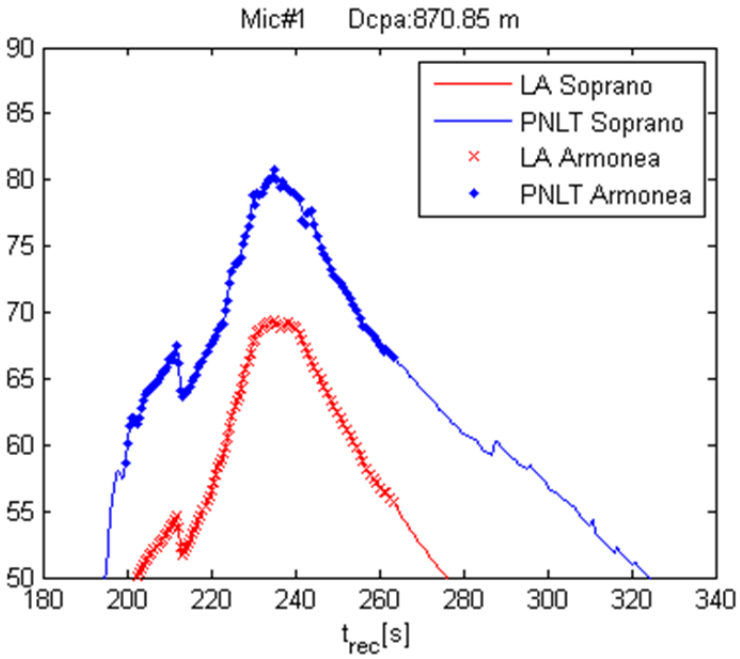


Figure 6 – Example of a comparison of ARMONEA and SOPRANO results