SURVEY ON BACKGROUND INFORMATION OF AIRCRAFT NOISE CALCULATION METHODOLOGIES AND PRACTICES IN NORDIC COUNTRIES
N-ALM Noise sub-group meeting, 15 Nov 2007, Helsinki (date of the table:28 Jan 2008, assembled by Finavia)

1. Country	Norway	Denmark	Sweden	Finland
2. Name and contact information	Kåre H. Liasjø / OSL Norway, +47 64 81 27 48 Kare.Helge.liasjo@osl.no	Peer Borglund / CPH Peer.borglund@cph.dk	Marie Hankanen/ LFV Group marie.hankanen@lfv.se	Satu Routama/ Finavia satu.routama@finavia.fi
3. Noise calculation method for main airports. Define the main airports.	Methods: NORTIM and GMTIM. Main airports require EU noise reports: Oslo Airport, Gardermoen (GMTIM) Bergen Airport, Flesland (NORTIM) Stavanger Airport Sola (NORTIM) Trondheim Airport Værnes (NORTIM)	Noise from airports (Støj fra flyvepladser). Guidance material from the Danish Environmental Protection Agency 5/94. Reference: Air Traffic Noise Calculations – Nordic Guidelines. Nord 1993:38. Second edition of ECAC Doc. 29 (1997) Main airports: Copenhagen, Kastrup (EKCH) Billund (EKBI) Roskilde (EKRK)	Interim method INM6.1 till Doc 29R compliant INM7 comes available Main airports: Stockholm-Arlanda, Gothenburg-Landvetter	Doc 29 3rd edition END report of main airport: Helsinki-Vantaa
3.1 Name and version of the s/w program	NORTIM 3.3 GMTIM 2.0 REGTIM 3.2	Dansim, INM 6, other software fulfilling the mini test in the Guidance material from the Danish EPA	INM6.1	INM 7.0
3.2 Method for calculation of lateral attenuation	Modified, based on SAE AIR 1751 because ECAC Doc.29R lateral attenuation is wrong (can comply with Doc29R, if necessary)	According to SAE AIR 1751	According to SAE AIR 1751	According to SAE AIR 5662
3.3 Is terrain height included?	Yes (=topography)	If requested	No	No

1. Country	Norway	Denmark	Sweden	Finland
3.4 Is variations in ground impedance included?	Yes	Generally no, but major water surfaces are considered to be fully reflective	No	No
3.5 Is flight track information (in historic surveys) based on monitoring?	GMTIM use radar tracks. For other airports where NORTIM or REGTIM is used, flight tracks are modelled from AIP-published procedures and aircraft performance.	Generally no, but it is allowed to do this.	Yes.	Yes.
3.6 Are dispersions defined automatically/manually?	NORTIM and REGTIM has automatic track dispersion according to ECAC Doc.29. GMTIM uses radar tracks for all flights, therefore further dispersion is not relevant.	Defined according to Noise from airports (Støj fra flyvepladser) or by studies at actual airport. Guidance material from the Danish Environmental Agency 5/94. In respect of general aviation the use of flight sectors are possible in stead of strictly defined tracks. LDEN: Dispersion is included relative to nominal tracks. LMAX: No dispersion is included relative to nominal tracks.	Dispersion around the median tracks is defined manually, based on information from the flight track monitoring system (GEMS).	Dispersion around the median tracks is defined manually, based on information from the flight track monitoring system (GEMS). Several median tracks for same SID/STAR used, if necessary.
3.7 Source of a/c noise data?	INM and HNM databases, + INM substitutions Adjusted data for MD80 and B73NG families based on measurements at OSL. We have measured NPD for some helicopters (Lynx, S92,	INM and HNM databases, Nordic noise and performance database (hosted by CAA-Sweden) Database covering propeller aircraft with MTOM<5700 kg included in the Guidance material from the Danish	INM database + substitutions (some from INM, some from measurement experiences)	For large aircraft: INM database, adjusted linearily for a few a/c types

1. Country	Norway	Denmark	Sweden	Finland
	B412).	Environmental Agency 5/94. Measured data (DELTA)		
3.8 Is the noise data adjusted in any way according to atmospheric attenuation?	Yes, impedance due to air pressure, as INM.	Yes, as INM.	No	No
3.9 Is the noise data adjusted in any way according to perception height?	Yes, adjustments for 4 m receiver height.	Generally no, but possible	No	No
3.10 Source of a/c profile data (speed, height, power setting). How are the power settings calculated/determined?	NORTIM and REGTIM uses INM database. GMTIM uses speed and height from radar, but power settings according to best fit to INM standard profiles for different weights (stage lengths).	INM database and the Nordic noise and performance database. Information received from operator or manufacture.	INM database. Power settings according to INM standard profiles for different weights (stage lengths).	In most cases INM database. Power settings according to INM standard profiles for different weights (stage lengths). In some cases profile (=weight) is chosen based on measured noise to achieve adherence. However, methodology is developed to use profiles from radar to fit with INM procedure steps. Used for the most significant aircraft types only.
3.11 Calculated noise metrics	EFN, MFN_{day}, MFN_{night}, L_{eq}, L_{DEN}, L_{DN}, L_D, L_E, L_N, $L_{max\text{-}night}$, TA, NA, and Noise Zones according to Norwegian regulations.	L_{DEN}, $L_{max,night\ (22:00 – 07:00)}$ for departure, arrivals and taxiing.	L_{DEN}, L_{max} ,FBN	L_{DEN}, L_D, L_N L_{max} ,only if requested
3.12 How often are the contours updated?	According to regulations, every 4 to 8 year, or more often if needed.	When nescessary, according to decision by the environmental authorities	Every 3 month Arlanda + Gothenburg when needed	Helsinki-Vantaa: Annually
4. Which organization carries out the surveys for main airports – list contact persons	Every airport is responsible, work is expected to be done at OSL. Contact person Kåre H. Liasjø	Every airport is responsible.	LFV Aviation Acoustics: Marie Hankanen, Mikael Liljergren, Mathieu Boué and Andreas Setterhall CAA, Lars Ehnbom	Finavia Finland, Satu Routama, Tuomo Leskelä, Mikko Viinikainen

1. Country	Norway	Denmark	Sweden	Finland
5. Noise calculation methods for other airports. Define "other".	Noise around regional airports is calculated by REGTIM, a simplified version of NORTIM. All other airports are calculated by NORTIM. Other airports are Avinor-managed airports, with yearly traffic less than 50000 movements.	Calculation methods and applied software used by the different consultants do not differ depending on the size of the airport/airfield. Other airports: All airports/airfields (EKCH and EKBI excepted) open to public service (see AIP Denmark, and VFG Denmark). Private airfields, heliports, and helipads. Note: Military air bases are subject to environmental regulation, and thus included too.	Methods and applied software shall be the same. All the other LFV-managed airports, except Stockholm-Arlanda Airport and Gothenburg Landvetter.	Methods and applied software are similar. All the other Finavia-managed airports, except Helsinki-Vantaa Airport.
5.1 Define if any answers for 3.1. – 3.11 are different	Flight track information is based on AIP information and aircraft performance. Comparable aircraft are grouped by performance and noise	3.7: Defined according to Noise from airports (Støj fra flyvepladser). Guidance material from the Danish Environmental Agency 5/94. In respect of general aviation grouping into four noise classes (4) are possible in stead of calculations based on specific types. 3.10: Take-off and landing profiles are tabulated for most of the types on the Danish national register in Noise from airports (Støj fra flyvepladser). Guidance material from the Danish Environmental Agency 5/94.	The same	In some airports where general aviation has large number of operations, a/c are categorized according to Danish methodology (4 groups) S/w called Winradar is soon available to get flight tracks from radar at minor airports (others than Helsinki-Vantaa)

1. Country	**Norway**	**Denmark**	**Sweden**	**Finland**
5.2 How often are contours updated?	According to regulations, every 4 to 8 year	When nescessary, according to decision by the environmental authorities	Every 5 y / when needed	When needed
6. Which organization carries out the surveys for airports – list contact persons	CAA Norway has the responsibility to carry out surveys for all civil airports. In practice this will be done at OSL Kåre H. Liasjø	DELTA, Birger Plovsing COWI, Søren Rasmussen Grontmij | Carl Bro, Morten Hell	LFV Aviation Acoustics: Marie Hankanen, Mikael Liljergren, Mathieu Boué and Andreas Setterhall SCAA Lars Ehnbom	Finavia Finland, Satu Routama, Tuomo Leskelä, Mikko Viinikainen
7. Last update	*Kåre H. Liasjø 30.4. 2009.*	*Peer Borglund 6.5.2009*	*Marie Hankanen 18.11.2008*	*Satu Routama 13.11.2008*