

Notes from ROADMAP FOR CNOSSOS-EU, DG ENV - DG JRC Workshop on AIRCRAFT NOISE 19-20th January 2010

These draft notes are intended for N-ALM meeting 21 January 2010.

Nordic participation

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Summary:

Environmental authorities and the environmental scientific community were not dominant (represented?) in the meeting. The dialogue between the EC and ECAC doc 29 developers was constructive. Airmod group represented by Darren Rhodes defended cost effective solutions to defined acoustical problems. The background is that ECAC Doc 29 exists and that the commission have resources to improve and rename ECAC Doc 29 to good practice guidelines (GPG). The principal question is: Should we use data provided manufacturers or should we measure noise on ground independent from manufacturers in the same way we do for rail and road?

Background:

END requirements

Noise prediction of air traffic is required under the EU Directive on the assessment and management of environmental noise (2002/49/EC), shortly the END. This noise prediction concerns the yearly average traffic and meteorological data on a particular airport and assesses the noise level at 4 meters height at the façade of dwellings in the vicinity of the given airport. Incident noise levels shall be assessed.

For the purpose of noise mapping, the harmonized noise indicators L_{den} and L_{night} are to be used. These indicators reflect yearly average equivalent levels. Corresponding time periods are to be defined by the member states, using 12 hours daytime, 4 hours evening time and 8 hours night time.

For the purpose of strategic noise mapping, aircraft noise is restricted to the noise produced by aircraft approaching or leaving the airport under concern. Ground operations are not excluded. At the distance where L_{den} and L_{night} levels fall under 50 dB / 45 dB, it is no longer considered to be subject of assessment.

European Commission in order to match the objectives of the END and in the context of the preparation of common noise assessment methods in EU (CNOSSOS-EU) tries to take benefit from the best existing noise assessment methods and knowledge world-wide.

The way forward

New good practice guidelines (GPG) will be prepared (feb 2010 –sept 2010) final 31 Jan 2011.

Open source code for use in step 2 mapping (CNOSSOS EU software) will be provided by COM 28 feb 2011

Users will need an EU certification when performing the noise mapping. Processes for that will be preented by the Commission.

The user friendliness, helpdesk and database validation was discussed. The meeting expressed som doubts about the timescedule and costs for the project. US spend 2 mill dollars a year for maintaining INM. EC seems prepared to spend enough money/resources on noise models.

It is no longer a matter of choice between ECAC doc 29 rd ed on the one hand and the AzB on the other hand. EC intend to develop a new method, database and computer program based on agreed principles. In practise ECAC Doc 29 with the ANP will probably be the basis for the CNOSSOS-EU method.

The Cnossos-eu method is os owned by ec. Ec is responsible for developments including software implementation. An agreement with icao, dg tren env jrc and ms easa, eea is required.

Contours presentend with END does not have any other MS legal status.

The question concerning noise data was discussed.

It is clear that a tool taking account of 1/3 octave band data is not possible.

One spectrum is not describing the aircraft noise emission. NPD is based on 1/3 oct spectra and difficulties taken in count. Speed and power settings can not be taken into account using spectra.

Spectra is changing along the flight path. Doc 29 appedix D presents an optional way to adjust NPD data for noise calculation of a non reference condition. Eurocontrol has developed a system that validate and verify the adjustment of the NPD data for non reference condition based on different spectral classes. The process results in delta values for atmosphere for correcting NPD data. Detailed spectra is needed for an integrated analysis as a basis for a total correction of atmospheric attenuation requires a different system of cooperation with manufacturers. You can not only request spectral data. You need to address the question how to receive spectral data before you change current system in the international level.

Measurements and validation is an important question for the EC.

Vol 3 of Doc 29 is under development. Vol 3 is attempting to address this lack of guidance on the validation process. It is not attempting to validate vol 2

Differences between measurements and prediction of aircraft noise do occur. One facor is the mismatch between aircraft type variant in database and in reality. It is difficult to identify statistical differences.

There is a need to be able to make local adjustments to database.

Technical conclusions

Technical principles will be published in CNOSSOS-EU good practice Guide (GPG). The table below is

Item	ECAC Doc 29 3 rd Ed.	AzB	Proposed amendments to be published in GPG
Input data aircraft	very detailed	not detailed (groups of aircrafts)	See also validation against measurements below Possible improvements are: More detailed aircraft data(multiple configuration NPDs), data for additional aircrafts, methods to address 2 nd order effects to be included. A rubust validation process of ANP data should be formalized at the ICAO level. There is a clear need of validation and impartial checking on real site data (see remarks in the database section of this

			memo)
Light aircrafts and helicopters	Light aircraft data included in the ANP database	Included	It will be checked if the light aircrafts in Din 45684 can complement the ANP with EU types of light aircrafts. For other missing aircraft identify appropriate substitution rules in the CNOSSOS-EU guidelines.
At ground operations	no	included	the END does not exclude at ground operations. If MS wishes, for industrial noise could be used using AzB as source basis
Directivity of aircraft	included	included	No need for modification, Doc 29 accepted.
Receiver position	1.2 m	4.0 m	4.0 m is the required position in END for the three other sources. The existing evidence shows that in general the difference between 1.2 m and 4.0 m is well below 1 dB for soft grounds and angles of incidence above 15 degrees. Over reflecting ground and for lower angles of incidence, there is no clear evaluation at the moment of the difference. Even if the difference is small, the number of affected people may vary significantly (can reach thousands of people). The method will explicitly state that the height of the assessment point has an influence but for time being the existing values at 1.2 meters will be accepted.
Ground reflection	included in lateral attenuation (max 10.86 dB)	included	The existing evidence shows that in general the difference exists between different ground types because of the change in the absorption factors, and measurements confirm that it can be up to 2-3 dB in the overall (A) weighted level. It is also recognised that at the moment more evidence is needed to propose a correction, and that correction is suggested to be avoided because of the increase in the calculation times, because of the difficulty to gather input values and because of the impact that a fragmented noise contour

			<p>may have on the communication to the public.</p> <p>The method will state that the ground absorption factor have an influence but for the time being and in the transition time the correction methodology described in the NORTIM software manual could be used but the conditions when these shall be appropriately used will be specified in the guidelines to the method and implemented in software. (optionally i GPG le kommentar)</p> <p>This item will also be suggested for further investigation and other alternative approaches will be eventually considered.</p>
Lateral attenuation	Yes, and includes ground effect	Yes	None
Obstacles screening/reflection	no	no	<p>It is recognised that there is an effect.</p> <p>Sometimes this can be positive or negative.</p> <p>The inclusion of obstacles and screening/reflections would result in much longer calculation time due to a much finer grid and more input data and therefore impractical to consider. 'Therefore it is suggested not to consider these screening and reflection effects in COSSOS-EU.</p>
Meteorological correction	average modification	no	<p>Real meteorological correction is suggested to be considered for a detailed version of CNOSSOS-EU</p> <p>It is suggested the adaption of the ANP database to local meteorological conditions be made mandatory</p>
Full 1/3 octave band method	NO, but see Annex D in the method where a correction procedure is described	Octave band spectra used	<p>To explain in CNOSSOS why the method is full 1/3 oct band method though it is expressed only through in overall A-weighted levels</p> <p>to use the text in Annex D of</p>

			<p>ECAC doc29 3rd edition as part of CNOSSOS-EU to account for the effects fo atmospherical conditions on the changing of propagation</p> <p>To explain in the GPG of CNOSSOS-EU how to attribute correctly the average year conditions with the specific local atmospherical conditions.</p>
Possibility to include evaluation of noise reduction measures	Wide	Limited	It is suggested the annexes of ECAC Doc29 3 rd edition to be “upgraded” into the main text.
Horizontal tracks	Suggested and allowed the possibility to model the thrust settings based on aircraft performance	Foreseen (in a limited way) only for lateral dispersion	<p>The horizontal track dispersion shall be addressed in the method.</p> <p>Radars are used for horizontal dispersion mainly.</p> <p>The technique to be used to separate and obtain the subtracks will be defined in the method, specifying that the radar tracks has primarely to be used.</p> <p>There is existing knowledge on the inaccuracy introduced by the assumptions on the standard tracks dispersion.</p> <p>Appropriate guidance will be provided by experts of the AIRMOD group on the use of limited subtracks dividsion to be introducesd in the CNOSSOS-EU.</p>
Vertical profile			Vertical dispersion is addressed in database,
Validation against measurements	<p>ECAC Doc 29 3rd edition is drafting vol 3 which aims at describing “good practice guide” to tackle with local specificities. It will help in defining how the validation can be made.</p> <p>Comparison between prediction and measurements show fairly good agreement, but due to the important consequencys of</p>	The method is mainly based on real operational conditions	<p>EC is concerned about assessing noise in real site and supports the definition of accurate guidelines that can allow for validation of predictions in inhabited areas.</p> <p>More comparisons between measurements and calculations should be produced and published.</p>

	<p>discrepancies of a few dB on noise contours there is room for improvements in the future.</p> <p>All critical aspects were validated when producing vol 2.</p>		
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