

**EUROPEAN COMMISSION  
DG RESEARCH**

**SIXTH FRAMEWORK PROGRAMME  
PRIORITY 6  
SUSTAINABLE DEVELOPMENT, GLOBAL CHANGE & ECOSYSTEMS  
INTEGRATED PROJECT – CONTRACT N. 516288**



**Sub-project A 'Annoyance'**

Deliverable A.D3: **month 15**

“Provision of various noise scenarios”

Report to partners: Guidelines concerning priorities of noise abatement

Deliverable no.	e.g. A.D3
Dissemination level	e.g. Partners and Public
Work Package	e.g. WP A.1 Simulation and Evaluation. Guidelines for Noise Reduction A1.3: Guidelines for the individual (source-oriented) reduction of noise of single vehicles.
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Status (F: final, D: draft)	
File Name	
Project Start Date and Duration	



## **SP-A 'Annoyance'**

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### **Deliverables, milestones**

**A.D3:** Report: Provision of various noise scenarios, month 15

5 experimental studies were planned

Study 1: significance of the amount of heavy vehicles, even and clustered traffic

Study 2: significance of the emergence of heavy vehicles

Study 3: annoyance due to noise from a truck, a bus and a tram

Study 4: significance of bus and trams within complex scenarios

Study 5: significance of speed perception

Studies 1-5 are completed at UAM with a focus on annoyance caused by 10 min scenarios, Studies 1, 2 and 4 will be performed at IfADo with a focus on annoyance and performance during 2-h scenarios.

Overall 10 different scenarios were foreseen and meanwhile completed (see description of sound files).

SP-A intends to perform 5 experimental studies for which 10 complex noise scenarios were created by SINTEF and evaluated by IfADo and UAM. After an iterative process these scenarios are available. Three 10-minute sequences were created for each scenario. Thus 2-hour sequences (used at IfADo) will be designed by linking randomly the three versions of each scenario.

### **Description of sound files for traffic noise experiments**

Each file consists of an 'active' sequence of 10 minutes, preceded by a 1 min calibration tone. The level of the calibration tone (1 kHz sine wave) is always equal to the  $L_{Aeq}$  of the active sequence.

Each sequence consists of recordings of pass-bys of 120 vehicles. The mixture of heavy and light vehicles is varied. The amount of heavy vehicles amounts, according to the aim of the studies 0 %, 20 % and 40 %.

The level of the single pass-by recordings have been adjusted and 'normalized' so that each category (light or heavy) have the same maximum level ( $L_{Amax, fast}$ ).

In one set of experiments we want to check if the annoyance depends on the 'exposure pattern'. The files named 'Even....' have the vehicles evenly distributed for the whole period, that is on average one vehicle every 5 seconds. The time interval between the maximum level of each event varies between 2 and 8 seconds ( $5 \pm 3$ ).

The files named 'lumped....' have ten clusters of vehicles, one cluster per minute, consisting of 12 vehicles each.

The level ( $L_{Amax}$ ) of each event is adjusted within a range of  $\pm 3$  dB, and the average difference between the level of a light and a heavy vehicle is 8 dB.

Each file has a background noise consisting of a large number of pass-bys of light vehicles (almost constant noise level) The level ( $L_{Aeq}$ ) of the background noise is 15 dB below the level of the 120 primary vehicles.

The sound sequences are based on outdoor recordings. After the editing they have been filtered so that the sound appears as if heard indoors.

One can assume that two sets of files, for instance 'Even-20-x' and 'Lumped-20-x' consist of identical vehicle fleets, and it is only the time pattern that varies.

The ratio between the maximum level ( $L_{Amax, fast}$ ) and the equivalent level of these sequences is about 9-10 dB. (This ratio will be presented in a statistical way in the report from the experiment).

There are also a set of sound files named 'Light-heavy....'. These files also have recordings of 120 vehicles each, evenly spaced in a 10 minute sequence. The maximum level of each event has been adjusted so that the ratio between the maximum level and the  $L_{Aeq}$  for the whole sequence is either 7 dB, 10 dB or 14 dB.(This ratio will be presented in a statistical manner in the final report).

There are three sets of sequences at each  $L_{Amax}$ -to- $L_{Aeq}$  ratio. These sets contain an identical fleet of vehicles, but the order of appearance is varied.

Using files without heavy vehicles, 2 other scenarios will be created by adding either the sounds from busses or trams.

**A.MS2:** Transfer of noise scenarios to task A1.3, month 15 completed