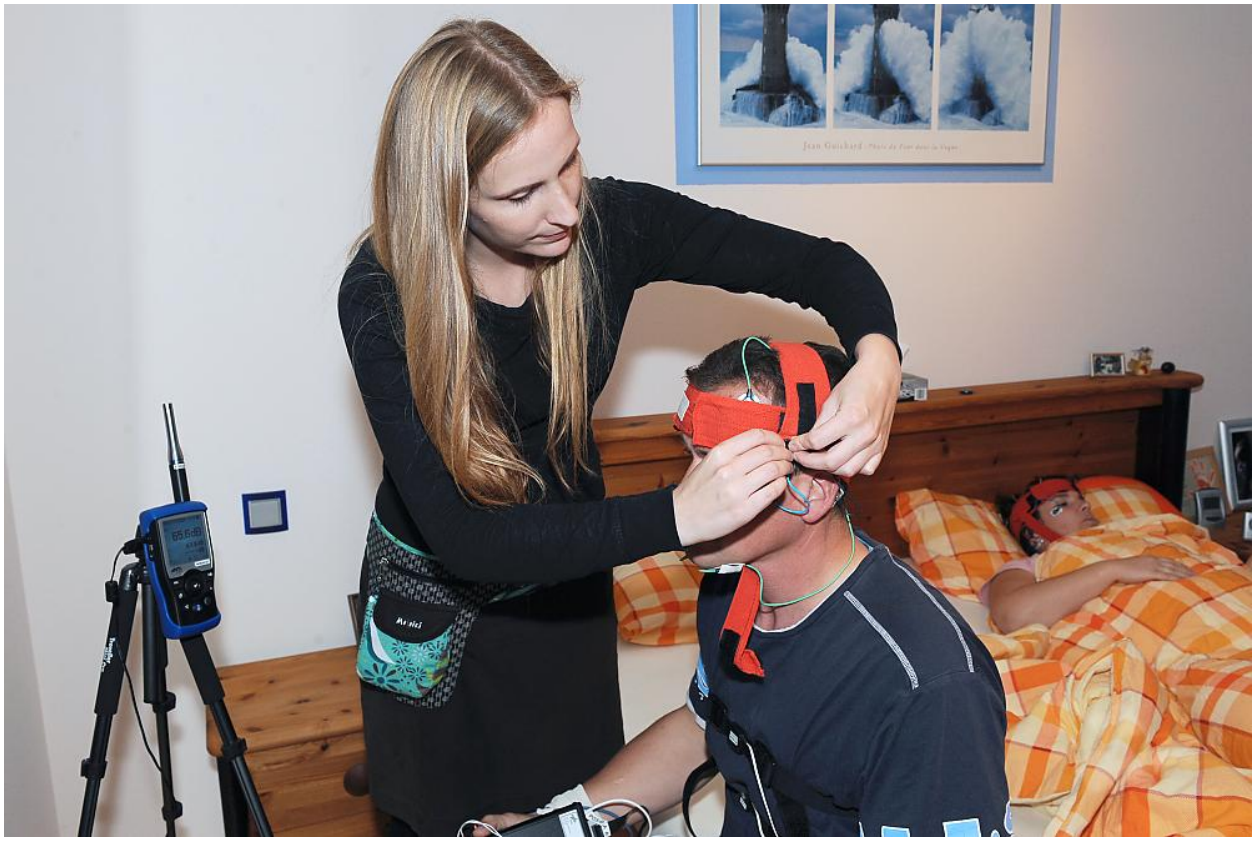
NORAH
Lärmwirkungsstudie

Method and questions of the sleep study



How severely do take-offs and landings of aircraft during the night disturb people's sleep? When and how often are residents around airports who actually have healthy sleeping habits woken up additionally by overflights? Dr. Uwe Müller from the German Aerospace Centre (DLR) in Cologne and his team searched for answers to these questions in the region around Frankfurt Airport. Alongside Germany's largest airport, the region also offers another special feature: since October 2011 Frankfurt Airport is subject to a curfew on scheduled flights between 11 pm and 5 am. Also, in the same month the new North-West runway began operations. The NORAH team was thus able to examine whether the residents slept any differently after these changes in the noise levels.

Noise as a participation criterion

learn more (https://www.laermstudie.de/en/results/results-of-the-sleep-study/methods-and-questions/noise-as-a-participation-criterion/)

Precise sleep measurement

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The sleep measurements of all the participants formed the core of the study. Just like in a sleep lab, in 2011 and 2012 the NORAH team "wired" the men and women in the evening before going to bed

with several electrodes on head and body. This allowed them to record various physical signals while the people were sleeping. At the same time a sound level meter registered all noises that reached the ears of the sleepers during the night. The data allowed the scientists to analyze precisely how deeply the participants were sleeping, and when and how they reacted to overflights of planes.

Three measurement phases

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The first measurements took place in the summer of 2011, i.e. before the introduction of the curfew on night flights between 11 pm and 5 am, and the opening of the North-West runway. There were further measurement phases in the summers of 2012 and 2013. For three to four nights in a row the NORAH team recorded the sleep of each participant.

Questionnaires surveyed the personal sleep perception

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In addition to the sleep measurements, the scientists also asked the participants to assess their own sleep after each measurement night – for example whether they felt tired and sleepy in the morning. The respondents also provided information on, among other things, their noise sensitivity and their attitude towards air traffic.

Search for a new method of sleep measurement

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The study participants slept in their own beds during the measurements. For the investigations in 2011 and 2012 they wore ten electrodes on the head and two on the body. Because this type of investigation – sleep researchers refer to “polysomnography” – is very complex, the NORAH team developed a simpler method for 2013. The scientists had already begun the preliminary work for such a method back in 2008. The new “vegetative-motor” method only needs two electrodes and is easier to evaluate. This is why more people could take part in the third year of the investigation than in the previous years. The new method, however, does not measure the same things as polysomnography, but only registers changes in the heartbeat and body movements.

The special feature of the NORAH Sleep Study

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In the area of sleep research, NORAH goes further than many other studies: most investigations up to now had to make do with questionnaires. Only a few noise impact studies before NORAH worked with polysomnographic methods on the residents on site – including a study carried out around Cologne/Bonn Airport in the years 2001 and 2002. Its results were used for the Frankfurt Night Flight Index. One of the tasks of NORAH was to examine whether the results of this older study could be transferred to the Frankfurt region. No study anywhere in the world before the NORAH Sleep Study carried out polysomnographic investigations on such a large number of participants in their own homes.

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Do you have any questions?

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