ANIMA proposals for new approaches for noise management

ANIMA hybrid workshop: New Approaches to Mitigate Aviation Noise Impact

22 June, 09:00 - 15:30, Vienna International Airport

June 22 2021

Dirk Schreckenberg   ZEUS GmbH,
Centre for Applied, Psychology,
Environmental, and Social Research
D - Hagen, Germany

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Aviation Noise Impact Management
through Novel Approaches

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Sound and Noise

ANIMA approach

Tools for understanding annoyance and spatial variations

Shaping air traffic and people's quality of life in airport regions

Conclusions

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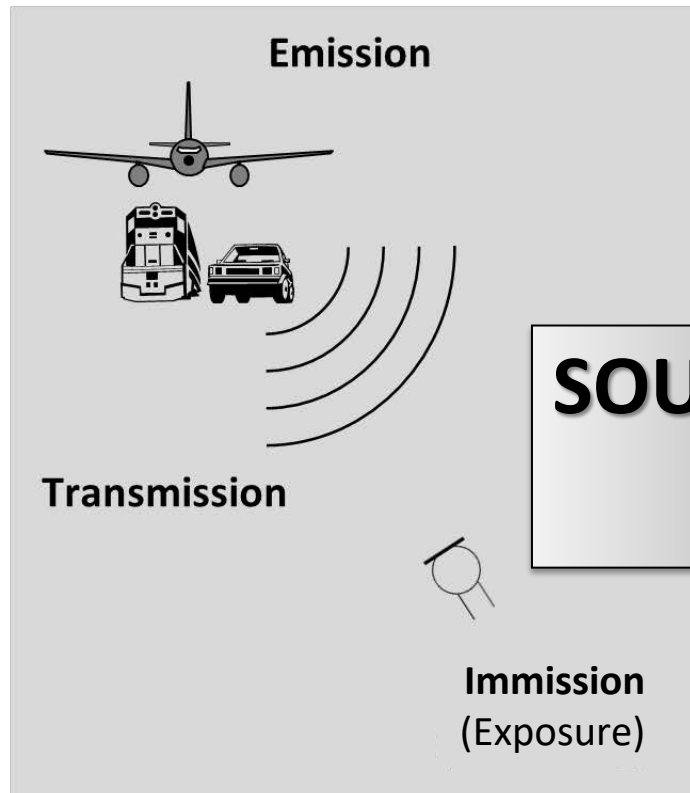through Novel Approaches

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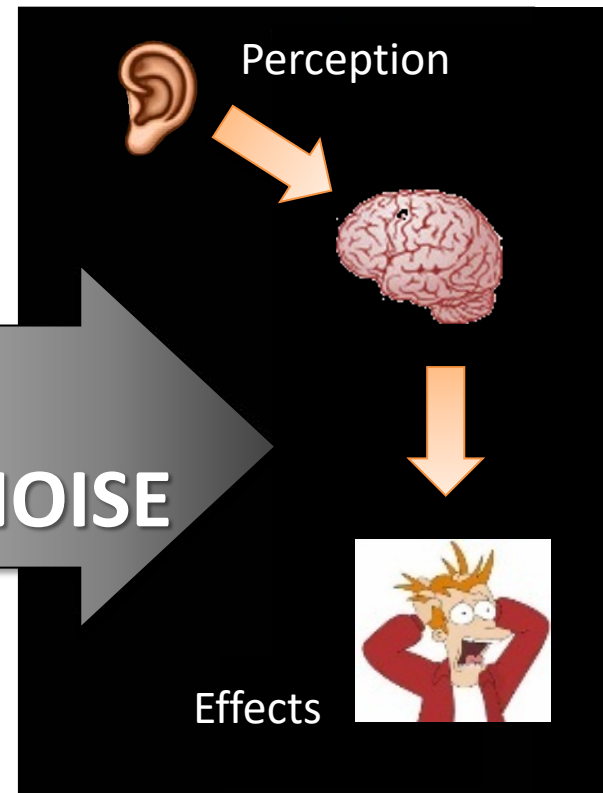Shaping air traffic and people's quality of life in airport regions

Conclusions

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Sound and Noise

Physics / acoustics

Human sciences

Emission

Transmission

Immission
(Exposure)

Perception

SOUND

NOISE

Effects

Source: Ullrich Isermann. Bewertung von Fluglärm (Aircraft noise assessment). Göttingen: DLR e.V., Institut für Aerodynamik und Strömungstechnik. 20 November 2012

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ANIMA – What is it about?

- Not on aircraft sound, but on
  noise and its effects on people

- That is, ANIMA is research
  - on PEOPLE living in an airport region and
  - on the interaction between
    - people, their residential quality of life and
    - the local aviation and the aircraft noise

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ANIMA approach

- The idea:

  - Minimising the adverse EFFECTS of aircraft noise and improving resident's QUALITY OF LIFE is the aim

  - Minimising sound exposure is a means to the end
    - via sound level reduction at the source
    - via land-use planning and management
    - via operational noise abatement procedures
    - via operating restrictions

  - Identifying further means to the end
    - Addressing non-acoustic factors of noise responses

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Does ANIMA propose a
5th pillar of the Balanced Approach?

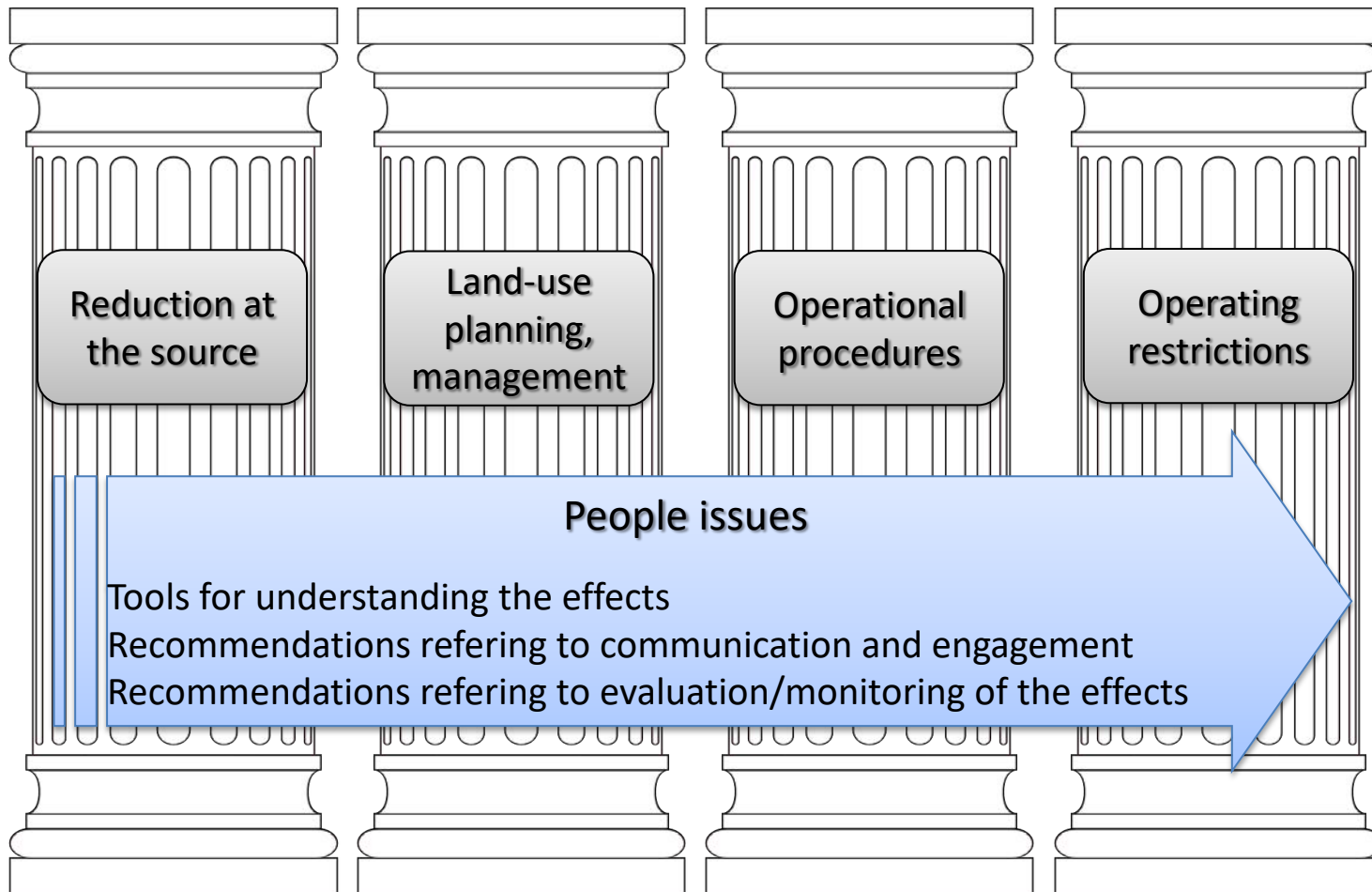| Reduction at the source	Land-use planning, management	Operational procedures	Operating restrictions	People issues ?

30-Jun-21 ANIMA
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [769627]

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Does ANIMA propose a
5th pillar of the Balanced Approach? No

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| Reduction at the source | Land-use planning, management | Operational procedures | Operating restrictions | People issues ✗ |

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Instead: Consider people issues across the 4 pillars of the Balanced Approach

| Reduction at the source | Land-use planning, management | Operational procedures | Operating restrictions |

People issues

Tools for understanding the effects
Recommendations refering to communication and engagement
Recommendations refering to evaluation/monitoring of the effects

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Proposed new approaches of aircraft noise management

- Understanding the effects
  - of aircraft noise
  - of airport's & aviation authorities' wider activities

- Considering these impacts when shaping local air traffic

- Engaging communities in shaping changes

- Evaluating the procedure and the outcomes

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Virtual reality tool

The experiemental study testing the VR tool has shown

- that for involving the communities in terms of a good communication the **virtual reality tool** has found to be **very valuable**,

- that **people are able to perceive difference** in aircraft noise **less than 3 dB(A),**

- that the tool can be used to introduce the **sound of new aircrafts** (e.g. bold aircraft)

- the visualization of clouds could be improved but the **audio visual realism** is already **very good**

- Enables understanding of the **interaction of visual and aural stimuli** to human perception

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Dynamic maps …

- … can **improve aircraft noise management** by providing:

  1. more accurate **calculation of the actual exposure of the population** to noise

  2. better **temporal & spatial visualisation** of the population noise exposure

  3. improved **communication with the residents** using transparent reporting about the airport noise impact to the general public.

- … can be **incorporated into a decision support tool** that could help to reduce noise exposure.

  - Achieved by **optimising** the distribution of aircraft on **arrival and departure routes**,

  - considering **spatial and temporal variations** in the number of inhabitants in the settlements around the airport.
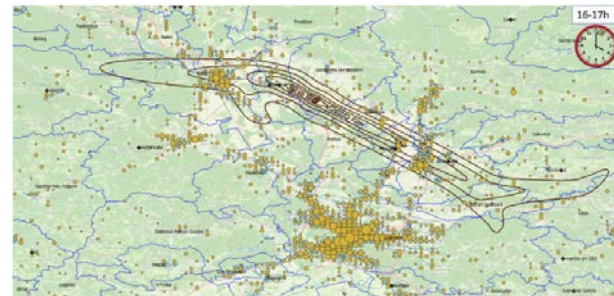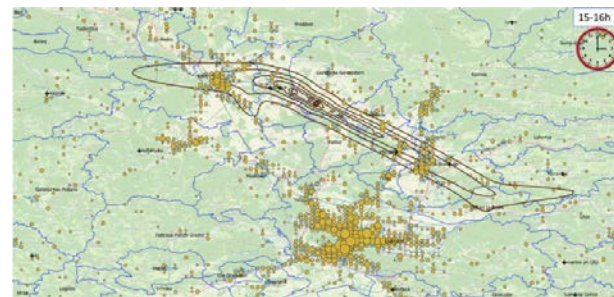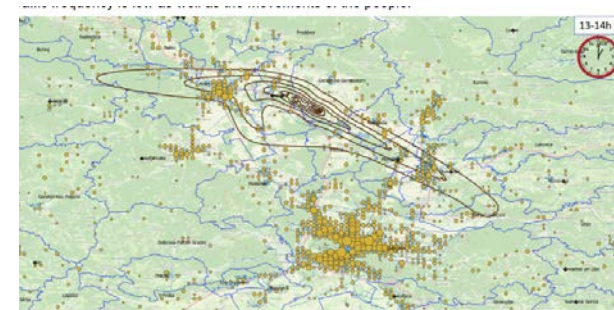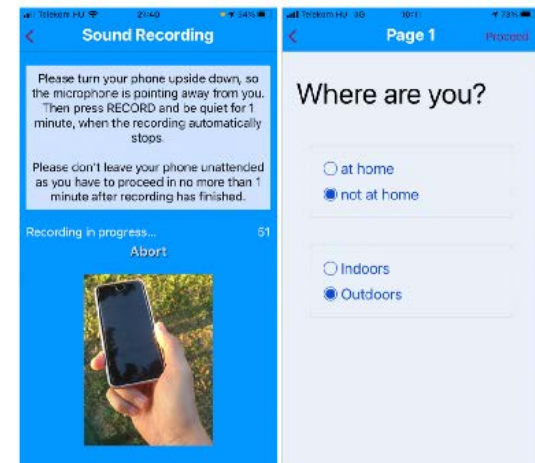

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Assessing people's soundscape perception

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- Using **widely used mobile devices** for
  - **getting in contact** with airport residents
  - **collecting decentralised information** (big data)
    - on people's **perception** of the environment in the airport region, their **activities** and **location**

- The data could also be used as **input data for the dynamic maps**

- The mobile app provides information
  - about ,**quality of life-related points of interest**',
  - about the **impact of sound and vision** on daily activities and, thus,
  - about where and when to implement **noise interventions**

- The data could be **incorporated in decision tools**.

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Monitoring media, including social media

- Re-analysis of German NORAH data has shown:

Frequency of **media reports** reflecting the **discourse about local aviation activities can have a stronger effect on annoyance** then the individual sound levels.   E.g. at Frankfurt media reports about …

- change in flightpath configuration in 2011
- implementation of night flight ban (in particular in areas of low exposure)
- sound insulation program in 2012

➔ Monitoring media reports about aviation activities systematically

- Also, don't forget the **social media**

➔ In ANIMA a tool for the automatic content analysis
   of millions of twitter news has been applied.

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Shaping air traffic and people's quality of life in airport regions

Quality of life interventions

- Aircraft noise management:

  - **more than minimising sound levels & adverse effects**

  - awareness of airport activities in residents'
    quality of life and considerations to improve it

  - framing communication about activities positively

- Move beyond acoustic management to **appreciate both
  the potential positive and negative impacts** of airports
  on surrounding communities

- **Engaging communities** in shaping aviation development
  and changes (interventions) in the airport region
  in an inclusive way

- **Getting consensus within the organisation** of the airport operator

- **Monitoring / evaluating** of responses to
  and acceptability of interventions

avoid
failure

approach
success

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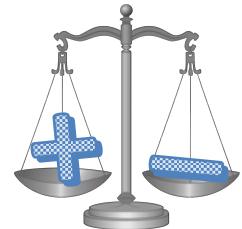
Effective engagement

Effective engagement should enable
affected communities to influence/determine:

- Desirable **outcomes**

- **Metrics used** to track change
  relevant to desirable outcomes

- **Acceptability of forecast**
  outcomes from models/trials

- Extent to which implementation has
  achieved the **change in metrics** associated
  with achievement of desirable outcomes
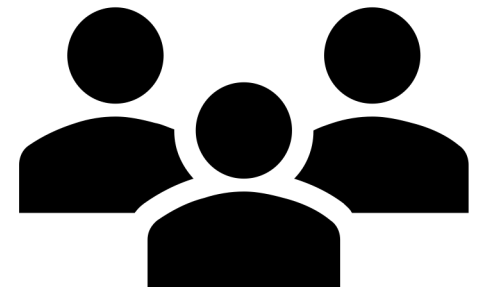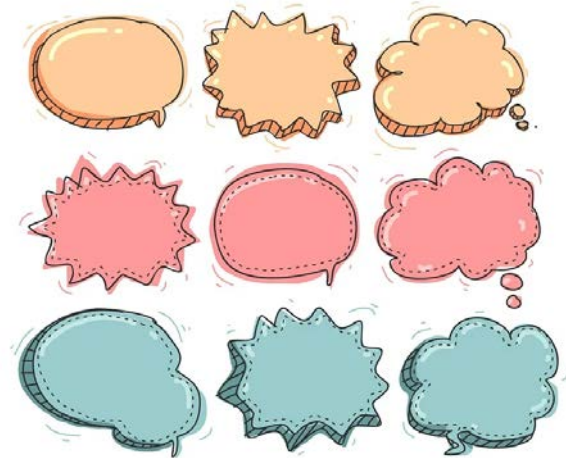
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Conclusions

- Aircraft noise management …
  - is the management of human – environment relationship as related to aviation
  - should base on a long-term vision and address noise holistically.
  - should consider acoustic and non-acoustic factors relevant for minimising adverse noise effects and improvinging resident's quality of life.
- A successful noise management needs acceptance by the communities and for this needs a 'service philosophy' seeking on matching with the needs of people.
- In this sense, a good starting point would be considering people issues across all four 'classical' pillars of the Balanced Approach and effectively engaging communities shaping changes in the airport region.
- ANIMA has developed tools for understanding resident's needs, perceptions and activities and provides recommendations of how to make aircraft noise issues or more broader the local aviation policy understandable to people.

Drawing: Mordillo; photo: R. Guski

Thank you for your attention

Contact: Dirk Schreckenberg
               schreckenberg@zeusgmbh.de
               Phone: +49 2331 47 87 194

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