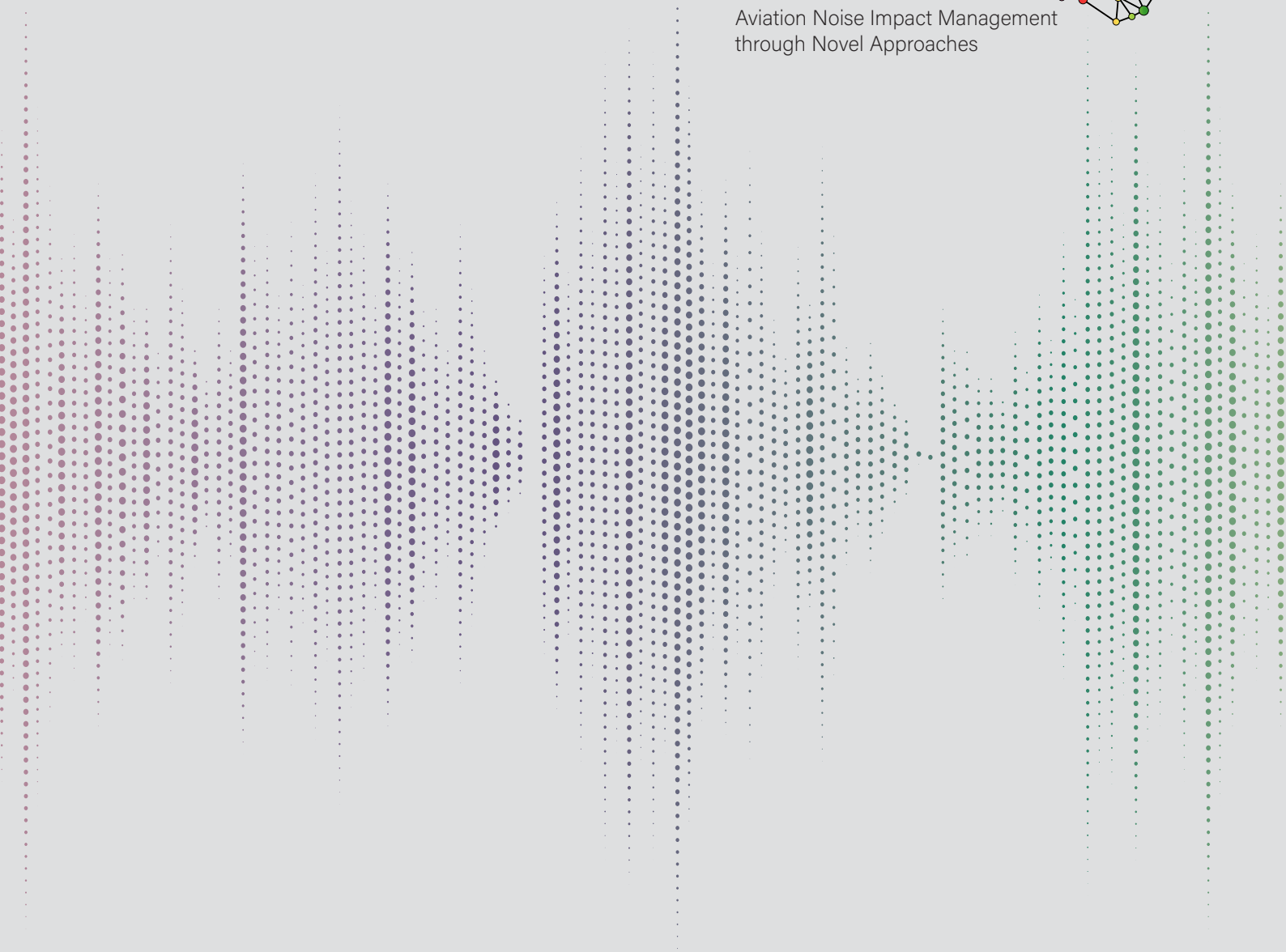

ANIMA

Aviation Noise Impact Management
through Novel Approaches

Transparent noise management and community engagement in the Ljubljana airport area

ANIMA Project Workshop in Kranj, Slovenia | 12 December 2019

Printed on recycled paper

The texts published in this document are opinions and visions of guest speakers that cannot be considered as official ANIMA statements. ANIMA Project and all the partners involved find it necessary and useful to have a dialogue with stakeholders of all kinds of backgrounds that are involved in this topic. All speakers have been given the opportunity to check their contribution before publishing.

Any queries related to the ANIMA project can be directed to Ms Alexandra Covrig, Senior Projects Officer, at Airport Regions Council (ARC) via alexandra.covrig@airportregions.org

For further information about ANIMA, take a look at www.anima-project.eu

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Introductory remarks

Janez Černe, Deputy Mayor of Kranj

Welcome words

There is an airport close to us, where airplanes take off and land every day. Therefore, it is necessary to organise such workshops and activities, where we ask each other – do we hear each other, or is it just the aircraft noise that we hear? What is the quality of life in our region?

The change in human environment is one of the key issues of our time. Currently, we are learning how to understand and deal with the reaction to noise of others. Citizens in the municipality of Kranj and around face more or less the same situation – noise annoyance and disturbance every day, which has to be further studied and analysed.

We do understand the role of the airport, and we understand the role of air traffic. We only have one wish – that there is an equal quality of life according to the criteria for both people living near the airport and those living in other places in Slovenia. The cohabitation with the airport, the planes and aircraft noise regulation is important and must be respected – they all have to learn to live along each other.

I wish you a great workshop and insightful discussions.

Marius Nicolescu, Secretary General*, Airport Regions Council

Transparent communication grow healthy relationships

On 12 December 2019, the ANIMA project organised a workshop on transparent noise management and community engagement in airport areas in Kranj, near Ljubljana.

Just a few kilometres away from Ljubljana airport, one can better understand the impact an airport has on the citizens in its vicinity. Therefore, this workshop wanted to explore the relationship between the airport stakeholders and the local authorities and communities. It is crucial to understand that it does all start with transparent communication.

Transparent communication sounds easy when one hears the phrase. Yet, we are wired in such a way that we do not always want to tell the truth when it makes us look bad. We know so many examples of "no comment", yet, in the relationship between an airport and the neighbouring communities, transparent communication needs to become the normal practice.

By communicating honestly, openly, and authentically you become credible, more often heard, and considered more trustworthy.

What is essential to remember for both airports and local authorities in this ever evolving and complicated relationship is that:

Clear, honest communication builds trust

and

Without trust, relationships cannot grow.

This is the basis for the event today.

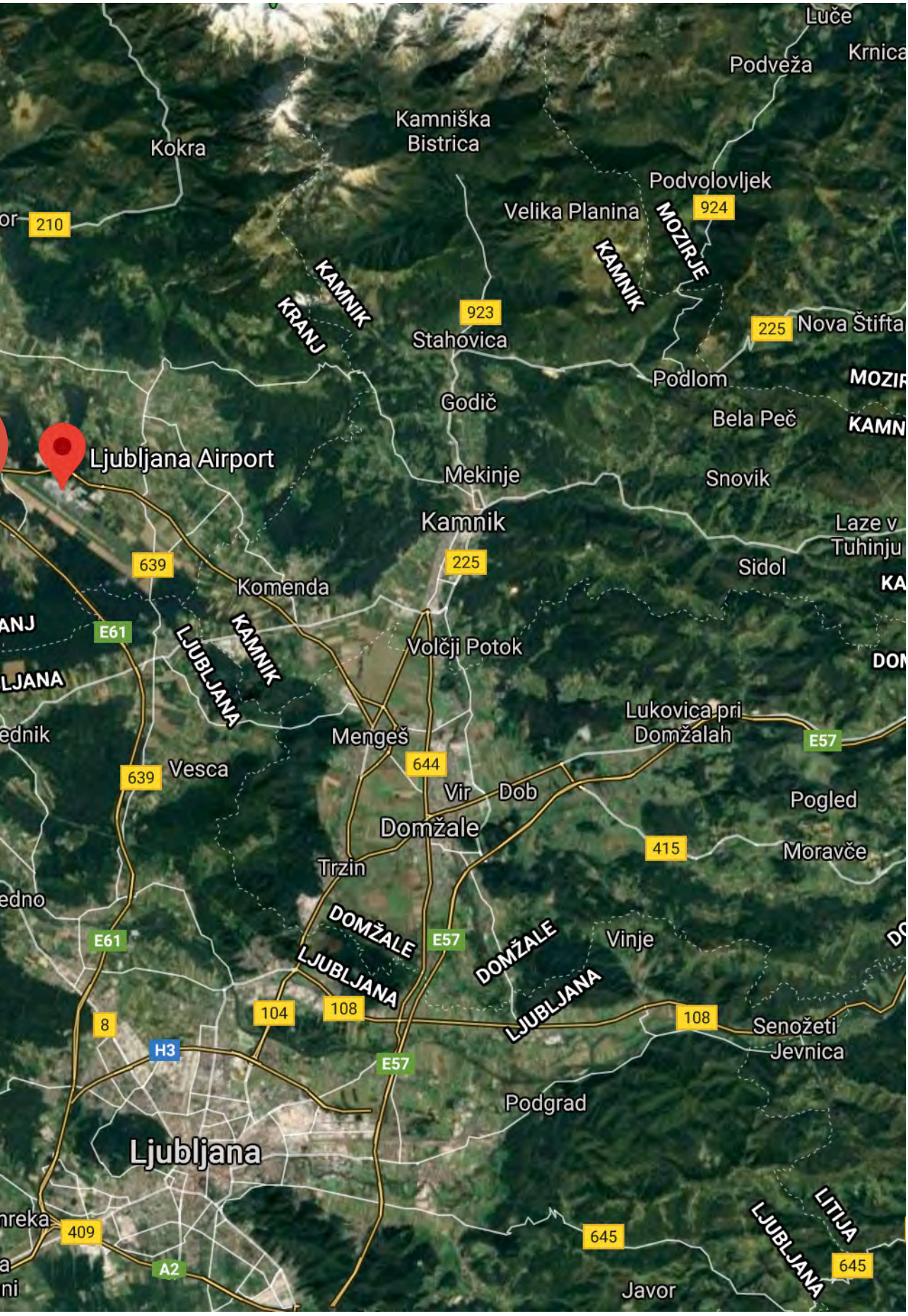
We will begin with a few keynote speeches, the first one looking at explaining ANIMA as a project in more detail. Second, we will look at a method through which communication and collaboration can be enhanced and enshrined into a process that lasts long term. We will afterwards learn about noise annoyance indicators, what contributes to noise annoyance and what can be done about it. Last but not least, we will look at what does effective communication, and community engagement entail.

These first interlocutors will provide some context and useful elements for the two panel discussions which will follow, where we will zoom in on the specific issues surrounding operation and noise management at Ljubljana airport.

This event would not have been possible without the support of the City of Kranj and our co-organisers, the National Institute of Public Health in Slovenia, and especially Sonja Jeram. It would not have been possible neither, without the moral and financial support of the European Union.

* Marius Nicolescu was the Secretary General of ARC from 2018 to July 2020.

The area around Ljubljana airport


Luče
Krnica
Podveža
Kamniška Bistrica
Kokra
Podvolovljek
924
Velika Planina
MOZIRJE
KAMNIK
210
KAMNIK
KRANJ
923
Stahovica
225
Nova Štifta
Podlom
Godič
Bela Peč
Ljubljana Airport
Mekinje
Snovik
Kamnik
Laze v Tuhinju
639
225
Sidol
Komenda
E61
KAMNIK
LJUBLJANA
Volčji Potok
Lukovica pri Domžalah
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Mengeš
644
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Jevnica
E57
Podgrad
Ljubljana
409
645
LITIJA
LJUBLJANA
645
A2
Javor

Laurent Leylekian, ANIMA Coordinator, ONERA (the French Aerospace Lab)

ANIMA project at a glance

General overview

I will start by focusing on the local situation and afterwards briefly present the ANIMA Project.

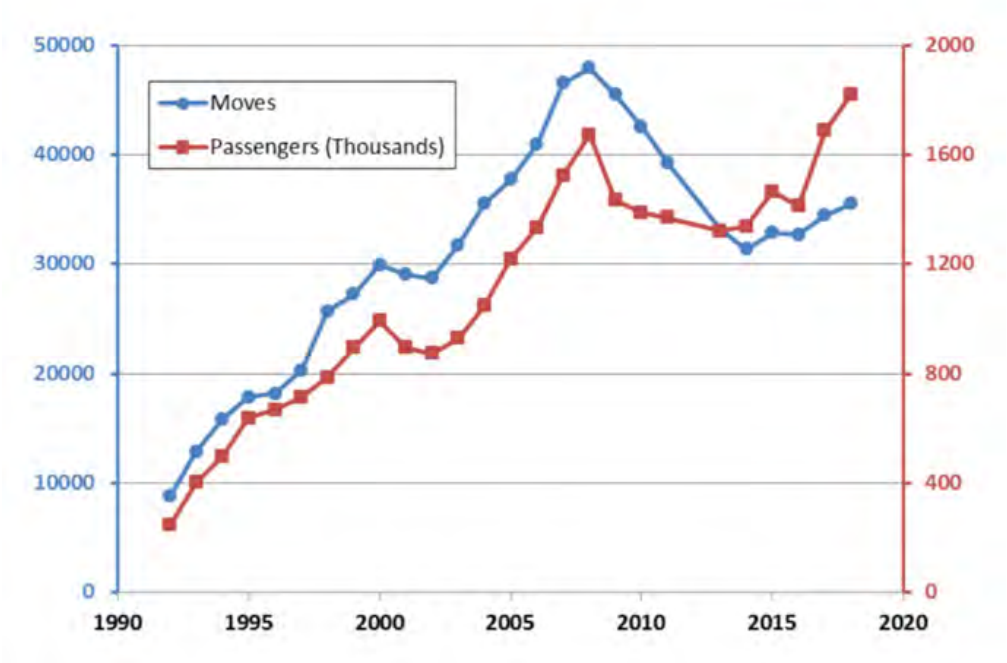
What is the unique scene in the Ljubljana area? People would say that it is a small airport – which means it has under 50.000 movements per year, considering the recovering traffic after the economic crisis in 2008. The airport is home to nearly two million passengers a year. There is no significant change in the density of the population around the airport in the municipality of Kranj – it is almost the same as ten years ago. Though economic and social conditions are not perfect, they are fair, meaning that theoretically, there should be no enormous problems with aviation noise around Kranj.

The situation from a legal standpoint is that there is no aviation noise issue around Ljubljana airport. The aviation noise is not considered a problem because Ljubljana airport does not fall under the category submitted to the Environmental Noise Directive (2002/49/EC) of over 50.000 movements per year, and the airport is supposedly too small.

Aviation noise from the communities' perspective

However, from the public standpoint, people and residents in the Kranj region and around are worried about increasing aviation noise. From their point of view, the noise annoyance of the public is disregarded and ignored. Even more, some noisy aviation activities are not considered as "aviation noise" and are done at the expense of the health of people living around. One example of these activities is the training of pilots.

The Slovenian Civil Aviation says that since the airport is below the threshold of the Environmental Noise Directive (END), it cannot impose regulations on noise such as strategic noise maps and action plans. So, all the "ingredients" of the problem are, in fact, surrounding Kranj.



Passengers and movements in Ljubljana airport

Beyond the fact that there is no mandatory airport noise regulation concerning the END, other issues are troublesome as well. The table below shows the monthly average of noise in various areas where it was measured. On average, the data is not too bad, but the people who suffer from noise annoyance do not have any respite.

Some areas are too noisy at certain moments/hours, and, in those areas, there should have never been houses and residents. This means that issues such as land use planning and encroachment are poorly considered. There is a need to enlarge the scope from mere technical data to human dialogue seeking a consensus because there is no solution to this problem and finding consensus is the best way to tackle it.

Measuring terminal	Noise indicators [dB(A)] - monthly average												Limit values [dB(A)]			
	January				February				March				*Decree on limit values for environment noise indicators*			
	L_D	L_E	L_N	L_{DEN}	L_D	L_E	L_N	L_{DEN}	L_D	L_E	L_N	L_{DEN}	L_D	L_E	L_N	L_{DEN}
1 Šenčur I.	55	53	36	54	55	53	40	55	56	52	38	55	58	53	48	58
2 Lokarje	48	49	40	50	49	50	39	50	49	50	40	51	58	53	48	58
3 Kranj	53	50	35	52	53	48	39	52	53	51	36	53	58	53	48	58
4 Šenčur II.	53	52	37	53	54	50	38	53	54	50	37	53	58	53	48	58

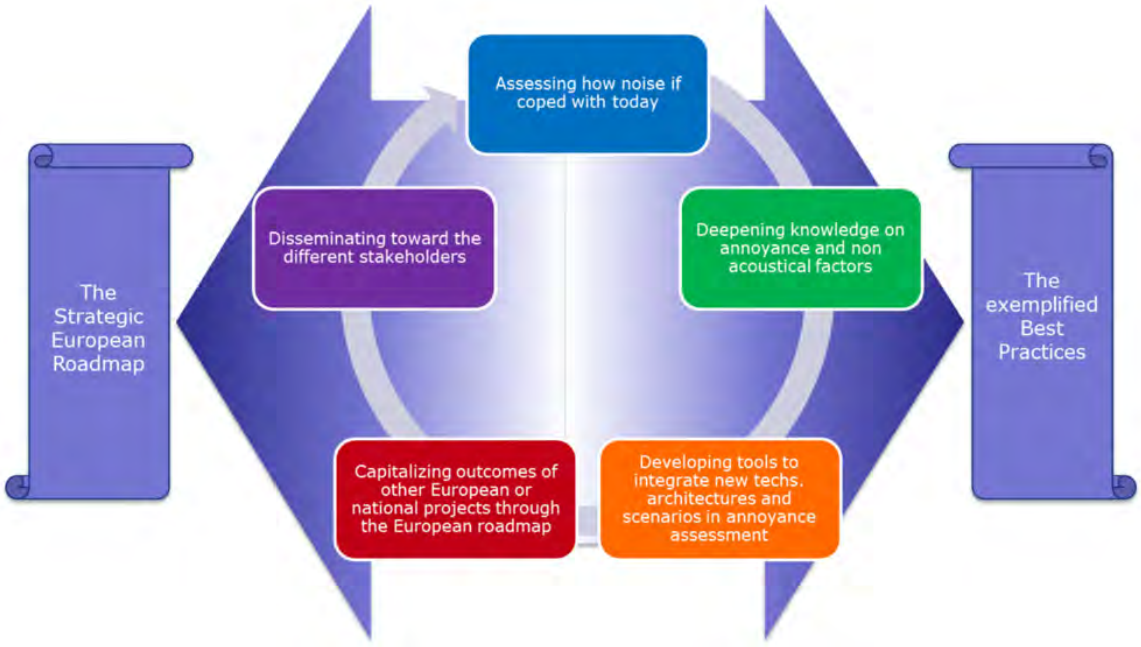
Monthly average of noise in various terminals

What is the ANIMA Project?

ANIMA (Aviation Noise Impact Management through Novel Approaches) is a people-oriented research project. It aims at identifying and diffusing best practices to lower the noise annoyance endured by communities around airports. The project also makes an effort to understand better the non-acoustical factors which influence noise annoyance, but as well to improve the quality of life of communities surrounding airports.

ANIMA is financially supported by the European Union's Horizon 2020 research and innovation programme. It is a 48-month long project with a total budget of over €7.5 million. Currently, we are halfway through the ANIMA project. Twenty-two partners from 11 countries are involved, including airports.

The main aim of the project is to develop new methodologies, approaches and tools to manage and mitigate the impact of aviation noise while taking into account the growing air traffic demand. ANIMA is not seeking to reduce the sound of aircraft itself – many other projects are dealing with these aspects. We are seeking to mitigate and manage the annoyance of aircraft noise on the people through various strategies and to further investigate the question – what is annoyance? Noise is not the sole responsible for annoyance – many non-acoustical factors lead to it. Some people will notice noise around them, and it will annoy them, but others, given the same conditions, will not be annoyed.



Understanding the rationale of ANIMA

Examples of ANIMA key findings

We know now that reducing noise does not always lead to reducing annoyance. **The key factors are:**

- **Communities' engagement** – communication should be underpinned by a fair "common language" that is made comprehensible to all so that decision-making processes are inclusive, transparent and allow the validity of claims to be challenged.

- **Noise metrics** – first establish precise and detailed objectives in terms of what kind of consensus is being sought and then select noise metrics that can best meet those objectives.

- **Night noise** – the correlation between additional noise-induced awakening and increased health risks after long-term exposure to aircraft noise remains an open question. Therefore, making more stringent limits of a night noise protection zone than the current limits must be accompanied by a social debate which determines the risks that are tolerated by the society.

- **Health impact** – the World Health Organization (WHO) review and the one carried out since then in ANIMA, highlight the importance of addressing annoyance and sleep disturbance as the most critical outcomes. It may be assumed that other possible health impacts are caused by these two.

- **Empowerment** – if a fair, inclusive and transparent decision-making process is set up with all stakeholders, including neighbouring communities, then authorities and airports must be ready to accept and endorse consensus reached through such a process.

- **Regulation** – it is recommended to start implementing the Environmental Noise Directive on a voluntary basis – far before reaching the threshold of 50,000 movements per year.

Best Practice Portal

ANIMA Project has carried out an extensive series of interim results to feed overarching outcomes. These interim results lead to recommendations, which are mostly openly accessible and can be found through the ANIMA website anima-project.eu. Using this wide set of knowledge, we are building a so-called “Best Practice Portal”, where we will guide the stakeholders through a dynamic process to help them to implement the best practice according to their needs.

In 2020, the first version of the best practice portal will be publicly available. In the future, versions translated into other languages will be available as well. We expect the feedback from communities on possible enrichment of the portal, since they are the ones that will be most in need of this knowledge. Airports are also invited to give their comments: small airports in need of knowledge about the usefulness of the portal content and large experienced airports to share their data and knowledge about the annoyance factors of the neighbouring communities.

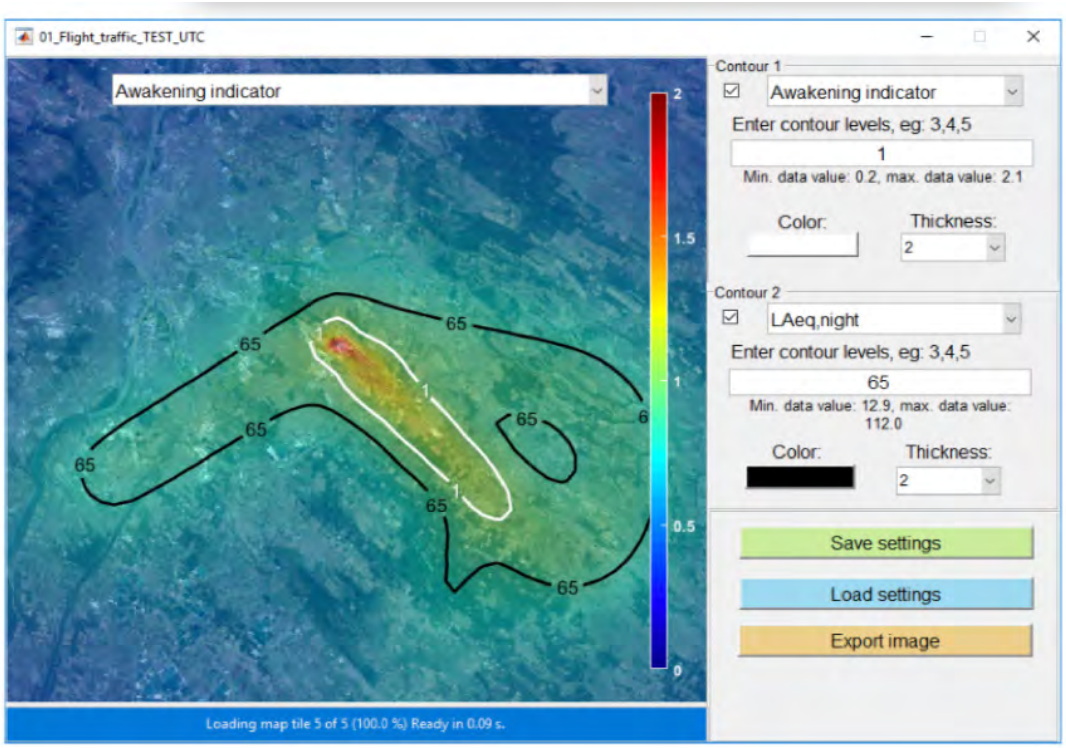
Other tools of ANIMA

The Noise Management Toolset

The Noise Management Toolset aims at heightening the proficiency of its users on how modifying air traffic scenarios impacts annoyance of neighbouring communities. It is therefore not focused on aircraft noise, but on providing annoyance descriptors around airports with given traffic and scenarios. This tool is capable of taking into account changes in flight management (time slots, type of aircraft, night bans, etc) as well as possible future low-noise aircraft. It will gain from being enriched by airports local experience, for instance with airports own descriptors for noise-annoyance relationship. Airports are therefore invited to share and contribute for their own benefit.

ANIMA app

The ANIMA app is a complementary tool that is precisely dedicated to refining our knowledge on annoyance and factors which modify it. Noise maps are already produced by everyone, so we would like to do something else – i.e. to shift from noise maps to discovering annoyance indicators. In this regard, we are therefore developing a mobile application, in which localized users may answer some questions at the moment when experiencing noise annoyance: is the user at school or at work, is the user indoor or outdoor. This gives us more insights about profiles of annoyed persons and helps us to find out statistical information on factors that are key for annoyance beyond noise.



Noise Management Toolset – annoyance map

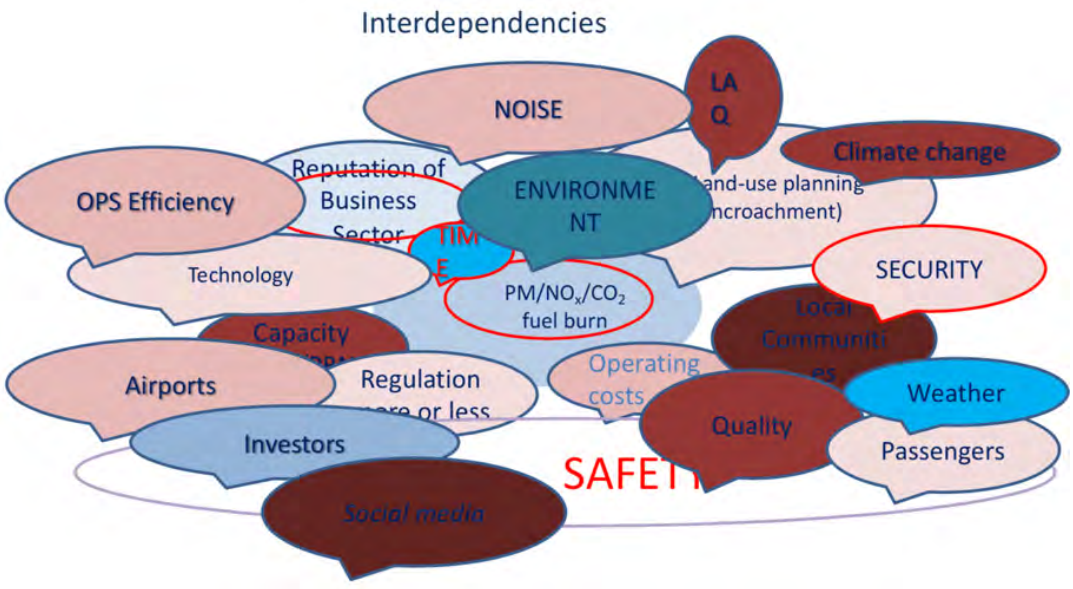
Sharon Mahony, Aviation Environmental Analyst, EUROCONTROL

Collaborative Environmental Management (CEM)

EUROCONTROL is a pan-European, civil-military organisation dedicated to supporting European aviation. EUROCONTROL supports Member States and the stakeholders (including air navigation service providers, civil and military airspace users, airports and aircraft/ equipment manufacturers) in a joint effort to make aviation in Europe safer, more efficient and cost-effective and with a minimal environmental impact.

Noise is an environmental matter.

If we want to talk about noise issues at the airport, we have to consider the many interdependencies that an airport is facing. Noise effects people in different ways. Airports need to collaborate internally together with its key operational stakeholders to address the operational and technical issues involved. Outcomes resulting in joint collaborative actions and planning can contribute to a transparent and robust dialogue with the local people. The issues mentioned in the graph below influence what is happening in the airport, depending on its specific locality concerning noise, air quality, etc.



Interdependencies at the airport

EUROCONTROL has developed Collaborative Environmental Management (CEM)* – a working arrangement at an airport that supports and benefits core operational stakeholders' common awareness and understanding of the interdependencies and constraints facing each other's business.

This, in turn, can facilitate the assessment of environmental issues affecting the airport, airlines and ANSPs and identify common operational solutions, on which they can then collaborate in joint planning and implementation. Noise is an environment and operational issue which impacts people and affects their quality of life.

* https://www.eurocontrol.int/initiative/collaborative-environmental-management

Benefits of CEM

- Manages Reputational Risk;
- Facilitates awareness and understanding of operational interdependencies and business constraints.

It is essential that the airport, the airlines and the air traffic controllers are involved in the discussions. They can have an impact on how noise is produced and contribute to its management locally at and around an airport. Depending on local circumstances, the outcomes of such meetings can contribute to transparent communication channels with stakeholders such as local authorities and to robust community engagement. Each airport decides on what these actions should be.

One of the benefits of CEM is that it can manage reputational risk. Having a facilitative platform such as CEM contributing to joint actions can contribute to improving noise management at and around airports. Best practise at one airport can be shared with others and contribute to improving the quality of life.

Voluntary in status, the CEM Specification can be adapted to specific local requirements at any airport. Both ACI and CANSO have recommend CEM as the best practise for managing noise impacts at and around airports.

Other benefits are:

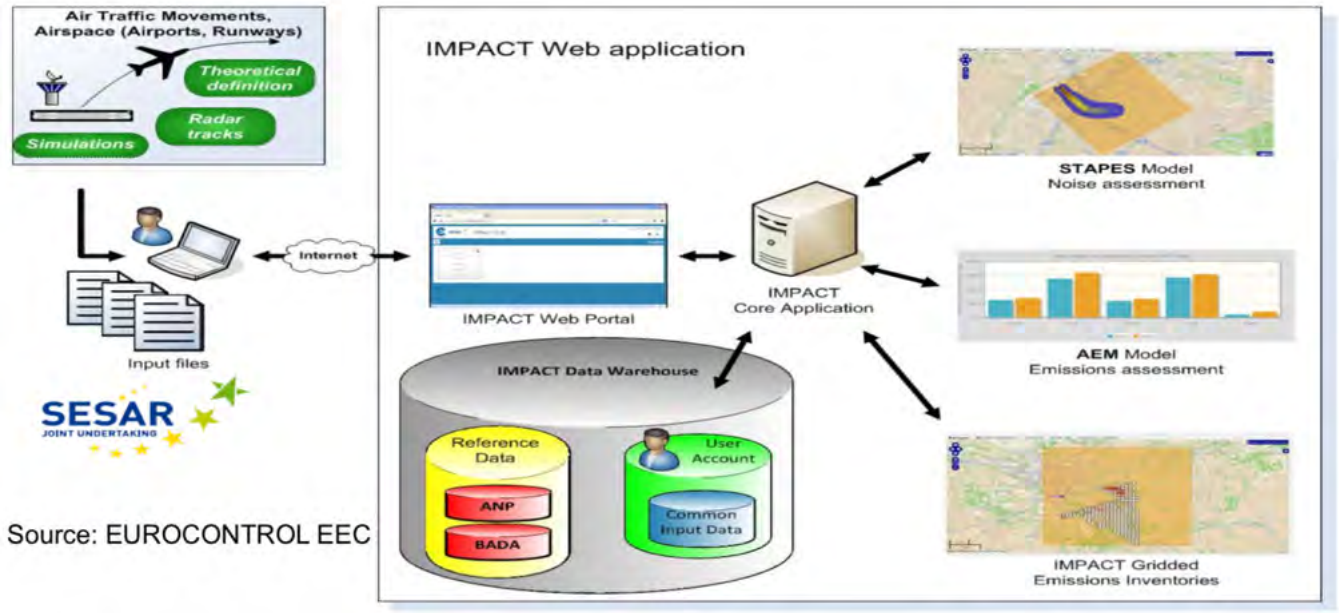
- CEM is a platform to look at long term challenges and develop a shared environmental vision and a strategy to implement it;
- CEM is a catalyst to enable the sustainable growth of the airport and benefit the surrounding communities;
- CEM facilities robust and transparent local community dialogue and engagement.

Finally, CEM outcomes can benefit the surrounding communities by facilitating actions to maintain current operations and potential sustainable growth of the airport. If a region has a noise problem at an airport, it is essential that stakeholders initiate a dialogue identifying interdependencies and priorities. Noise nuisance does not go away and as such must be addressed.

CEM implementation tools

IMPACT applies international modelling best practices:

- Noise: compliant with the latest ECAC Doc.29 editions;
- Emissions: compliant with ICAO Doc.9889, SAE AIR5715;
- An ICAO/CAEP-approved environmental assessment tool.



IMPACT Web application

Recommendations

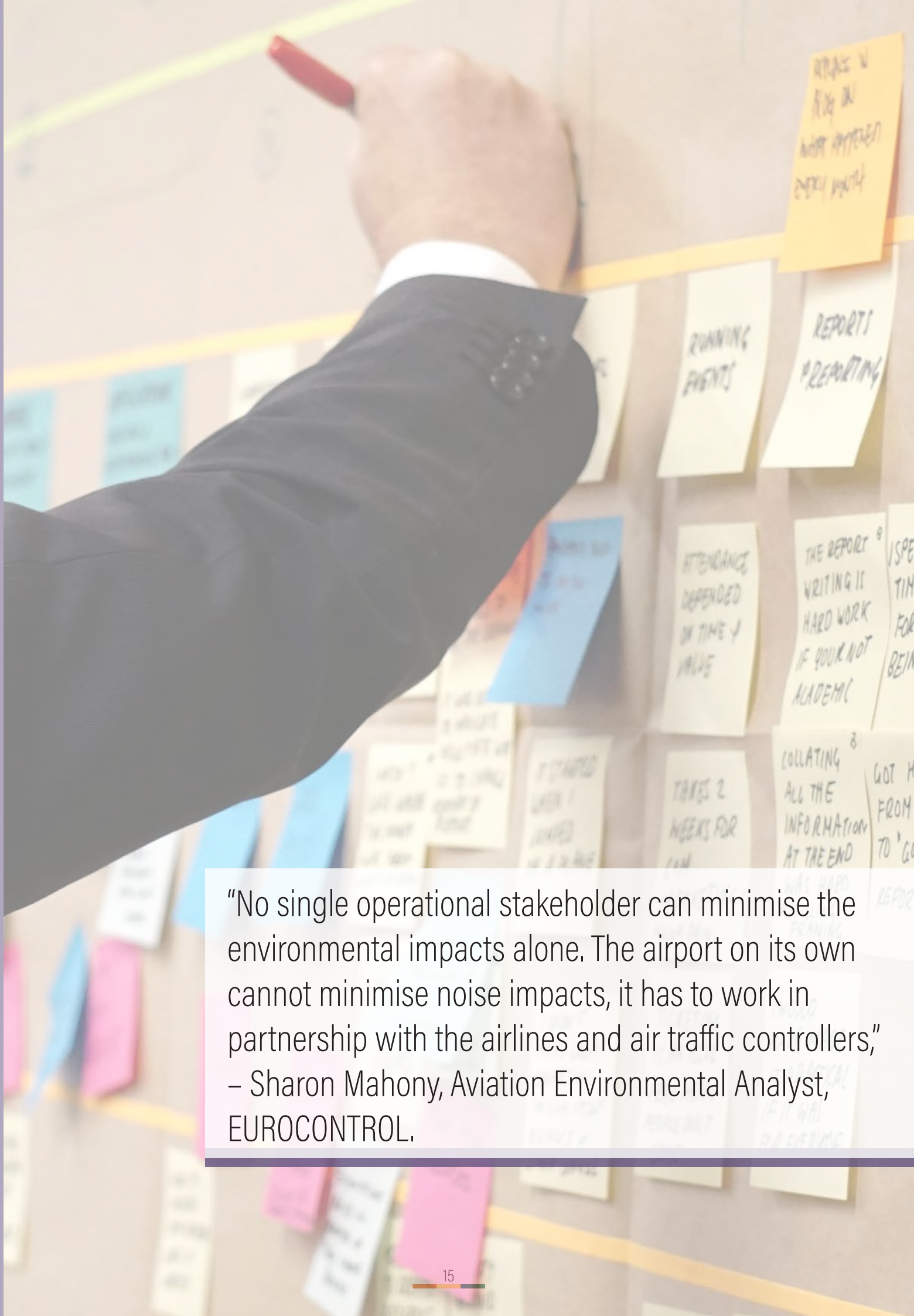
Ideally, the airport should identify existing CEM type working arrangements for dealing with environmental impacts, one of which is noise. Alternatively, a new CEM working arrangement can be implemented. It is recommended to identify environmental impacts and risks as well as sharing expertise to allow for understanding of interdependencies. Priorities must be clearly highlighted and gain the support of senior management of the airport. Change is an important part of the process and needs managing carefully.

Conclusions

No single operational stakeholder can minimise the environmental impacts alone. The airport on its own cannot minimise noise impacts, it has to work in partnership with the airlines and air traffic controllers. If there are issues with the local communities and noise, a robust and transparent communication channel needs developing, that includes all the stakeholders involved.

Minimising environmental impacts is essential in order for the airport to maintain current operations and enable potential sustainable growth.

Finally, collaboration and communication are key to success. The environmental policy Ljubljana airport proposes addresses environmental improvement and stakeholder engagement. For that, engagement and communication with the local community are one of the keys to successful outcomes.



"No single operational stakeholder can minimise the environmental impacts alone. The airport on its own cannot minimise noise impacts, it has to work in partnership with the airlines and air traffic controllers," – Sharon Mahony, Aviation Environmental Analyst, EUROCONTROL.

Dirk Schreckenberg, Senior Researcher, ZEUS (Centre for Applied Psychology, Social and Environmental Research)

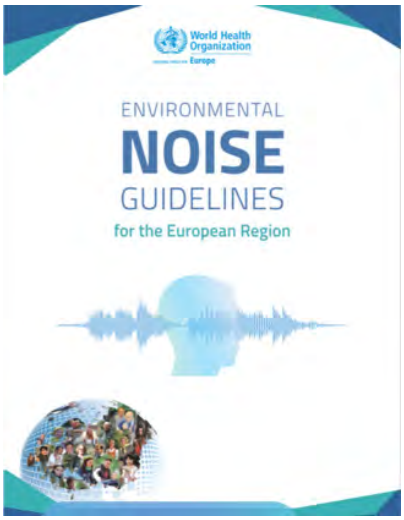
Noise annoyance indicators

When we talk about noise, we talk about human beings. Sound can be measured at many levels of its transmission, which includes emission point or receiver point. However, when we talk about noise, which generally is unwanted sound, instead of talking about actual decibels, we should talk about perception by human beings, both the physiological and psychological processes. This is when psychology comes into the picture.

Effects of noise

In general, noise can affect the auditory system, which is responsible for the sense of hearing. This is not a problem with environmental noise, but with occupational noise. Aircraft noise effects are mainly non-auditory effects – stress-related events outside the hearing system.

In October 2018 the World Health Organisation (WHO) published the Environmental Noise Guidelines and listed five critical outcomes of environmental noise and aircraft noise as part of the environmental noise category. The outcomes mentioned are annoyance, sleep disturbance, cardiovascular diseases, cognitive impairment, hearing impairment & tinnitus (the main symptom of tinnitus is hearing a noise, such as ringing or buzzing, that is not caused by an outside source).



WHO Environmental Noise Guidelines

It is important that WHO recognises noise annoyance as a health issue. As stated in WHO's Constitution – "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*". However, the WHO guidelines say that physical health does not present a complete picture of general health. Therefore, annoyance and sleep disturbance due to noise are regarded as health outcomes.

What is annoyance?

Actually, annoyance does not have one single definition. Some say it is a feeling, opinion or perception to the sound. In 1999 experts were asked to define annoyance and their answers contained three main features. **Annoyance includes**:

- An often-repeated disturbance combined with behavioural responses in order to minimise disturbances;
- An emotional/attitudinal response (anger about the exposure, fear, and negative evaluation of the noise source);
- Perceived capacity to cope with noise (perceived control) – the distressful insight that one cannot do much against this unwanted situation.

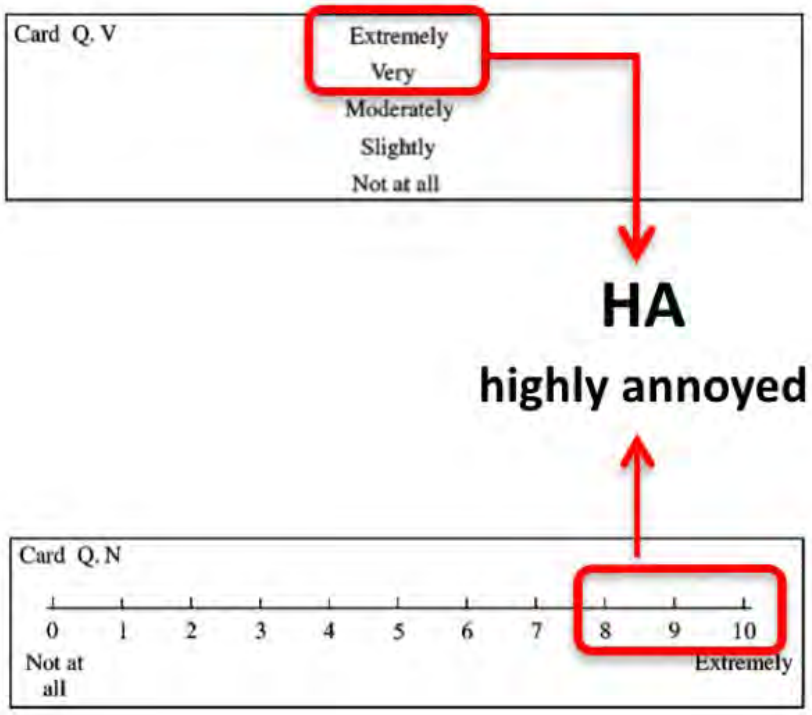
Noise annoyance is compared to psychological stress response. Environmental stress means that one has an environmental stressor such as noise, which exceeds the natural regulatory capacity of human beings, in particular in situations that are unpredictable or uncontrollable. When the sound is perceived as noise, i.e. as harmful, disturbing and unwanted it becomes an environmental stressor. At that moment, when the capacity to cope, which depends individually on every person, is too low to cope with the noise, stress occurs. Our own capacity to cope depends on our psychological/physiological resources, predictability and perceived control, social support of others (for instance, support from authorities).

* WHO, 1946

Quantification of annoyance

Most of the time we talk about reducing the sound, but we should also think about ways of how to increase people's capacity to cope with unwanted noise. Can annoyance be quantified? It can and it is.

There is a standard recommendation called ISO/TS15666, which is created for assessing annoyance. It is done with two kinds of questions, one of which has a five-point (1-5) verbal scale and a person is asked to evaluate his noise annoyance during the last 12 months. In the second question, the person is asked to evaluate his annoyance in 11-point numerical scale (0-10) by a particular noise. Both scales complement each other and are used for statistical analysis purposes. The exposure-response relationship for noise annoyance is often expressed in terms of the number or percentage of people highly annoyed (%HA) per unit of sound levels. For this, judgements on the upper categories of the annoyance rating scales are used to identify the highly annoyed people



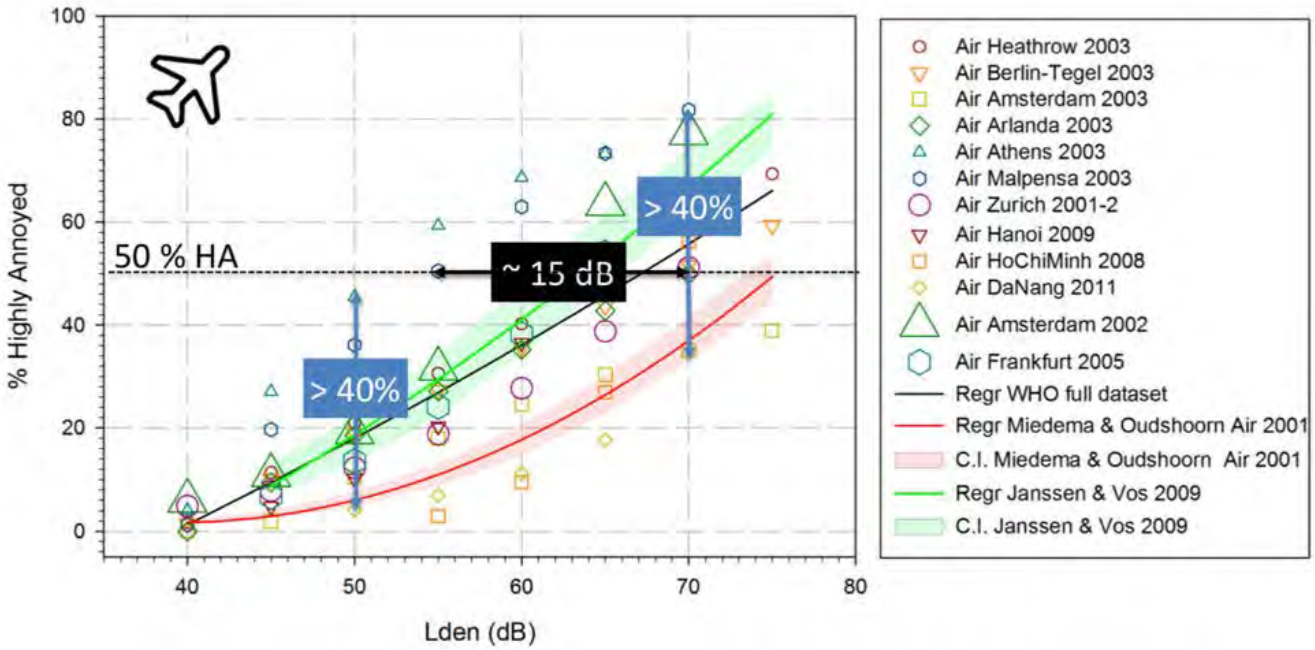
The rating scales for assessing noise annoyance

The graph on the next page* shows the spread in annoyance judgements. The black line demonstrates WHO general data about aircraft noise annoyance. However, it is visible that every airport has its own annoyance data that is different from other airports, even if the sound in decibels is reported as the same. Therefore, annoyance does not only depend on the sound, but on other factors as well.

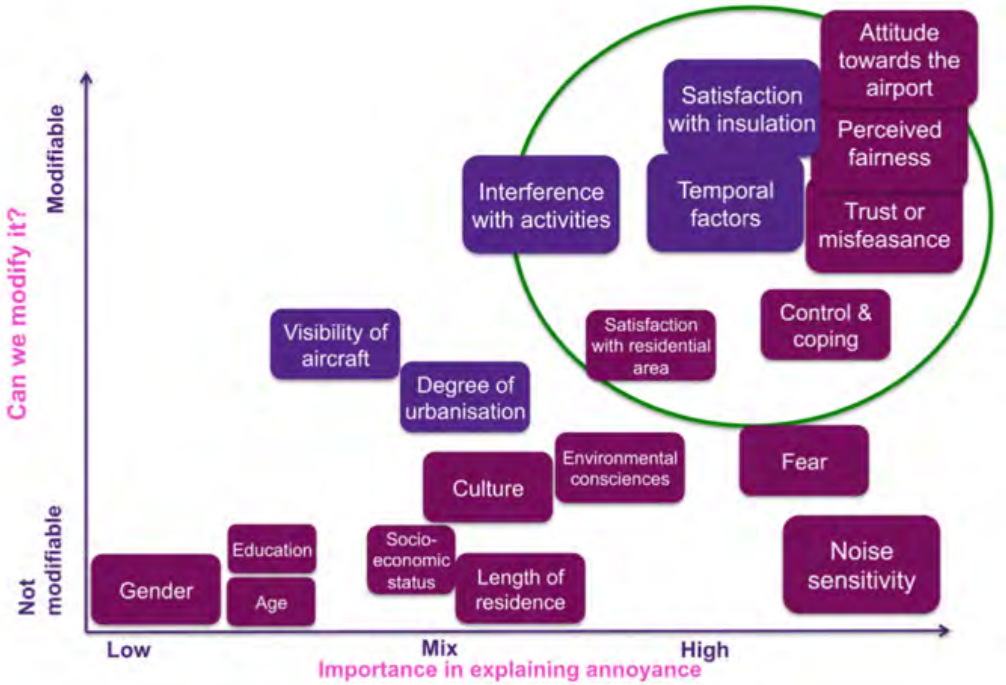
Statistical analysis shows that noise annoyance can be predicted by average sound levels up to one third. Another third is predicted by the context, such as personal factors (age, sensitivity) and social factors (attitudes, trust in authorities), situative factors (sound isolation of your building, green areas around you). The last third is unknown. It is assumed that it is partly made up of uncertainties in measurement (measurement error) and partly of other acoustical features, for instance the number of events, psycho-acoustic sound features such as sharpness or roughness of the sound – these things do not add up to the average sound level calculation.

Non-acoustical factors can be ordered by generalising to what extent they are contributing to annoyance and whether or not they are modifiable. The graph in the next page shows that noise sensitivity is, in fact, very important for explaining noise annoyance, but it cannot be modified. Whereas, satisfaction with insulation is very important for noise annoyance and can also be modified. So, the good news is that it is possible to work with non-acoustical factors. Moreover, it is strongly recommended in addition to operational and acoustical measures to reduce the aircraft sound. These factors can be addressed through communication and community engagement.

* Source: Anderson Acoustics



The spread in noise annoyance judgements



Modification and importance of non-acoustical factors

Graeme Heyes, Research Fellow, Manchester Metropolitan University

ANIMA outcomes: Best practices for communication and community engagement

Annoyance is best seen as a specifically noise-induced outcome that is used to estimate the adverse impact of noise on human health. As we know by now, noise levels explain only one third of the actual noise annoyance, so even by making sure that there is as little noise as possible it is not possible to completely eliminate the annoyance.

Annoyance and non-acoustic factors

The industry needs to look to expand the focus of the noise management beyond the level of noise exposure. Vader (2007) identified 31 non-acoustic factors (NAFs), which are able to influence noise impact, and categorised them by their strength as an indicator by the extent to which they could be modified by an airport. **Seven NAFs were identified as being modifiable by industry stakeholders as well as playing a strong role in the response to noise. These are**:

- Attitude towards the source (an airport employee will have a more positive approach towards the aircraft noise than an environmental activist, etc.);
- Choice in insulation;
- Choice in compensation;
- Influence, voice (the opportunity to exert influence);
- Perceived control;
- Recognition of concern;
- Trust.

All of the NAFs can be influenced by airport-community dialogues and the engagement of local people. This means that whilst airports need to continue to manage down noise exposure, they can also play an active role in addressing NAFs. Airports are essentially in a negotiation with communities for a what is called a "license to operate", where the airport needs to justify its place in the community, despite its local environmental impacts, due to the socio-economic benefits it delivers to those communities (for instance economic development, employment, and tourism).

Changing perspectives

Traditionally dialogues between experts and non-experts would be a one-way process where scientific facts, using hard data and numbers are used to understand the world. The aviation industry is a great example of this, where airports are data-driven and have traditionally used noise level metrics to describe what the noise situation is like in an area.

This model has more recently been replaced by a 'Dialogue Model' of communication, which embraces two-way dialogues that include community members, and that encourages dialogue and discussion among communities and expert voices. Doing so enables qualitative information to be taken into account in decision making process which can provide a much richer picture of what, for example, it might be like to live near an airport than what numbers alone may be able to achieve. This has the potential to better inform on airport planning by understanding what communities want from noise management, for instance which are the preferable flight paths, operating hours and so on.

Such two-way dialogues also have the potential to enhance the relationship between residents and the airport, and so better address the Non-Acoustic Factors now known to play a key role in noise annoyance.

Best practice research in how such dialogues take place shows that the communication between the airport and community must be meaningful, consistent and comprehensive. There has to be a genuine two-way dialogue, with an understanding that both airports and residents have something valuable to bring to the table. Communicating after decisions have been made or without proper consideration is better than no communication but has the potential to leave people disinterested or untrusting of the information they are given.

Competence and fairness are very important ingredients of this communication. When fairness is present in the dialogue, people feel like they are being listened to, spoken to honestly and treated fairly. Competence gives people the ability to understand given information so they could understand why noise exists and what the airport is doing to reduce the annoyance. This can help to drive mutual empathy between different parties and residents may gain more trust in the efforts of the airport to try to improve the noise environment. It is also important to use simple language and relevant metrics which would be understandable to most people and to ensure that hierarchies of expertise are levelled so that all parties have an opportunity to speak, and to be listened to.

Vienna Airport: case study

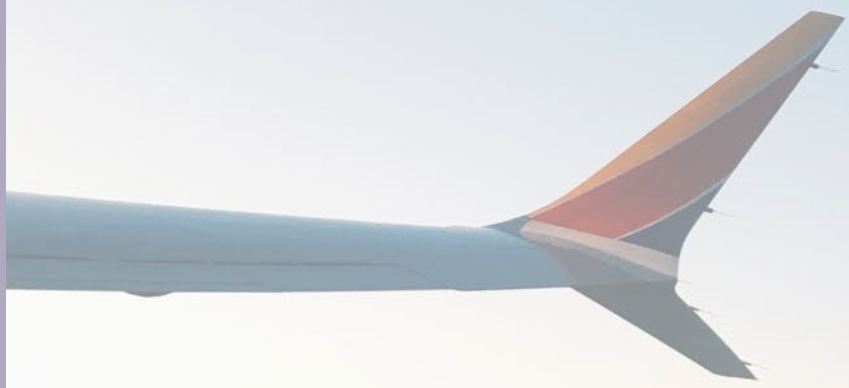
An example of good practice is The Dialogue Forum of Vienna Airport, created in response to objections to building a third runway. It was developed through a mediation process to bring together all the aviation stakeholders, local authorities and local communities under one roof where they could discuss noise issues.

The forum is independently led and is based on agreed vision and mission statement in which the communities acknowledged the importance of the airport to the local region for jobs and local economy. Data, which was discussed in the forum, was provided by a dedicated person from National Air Space provider in person, who also answered the questions of the people. Moreover, there was no data overload – instead of 200-page annual reports, they were reduced to 30-page summary in order to ensure that only relevant information is given. The example of Dialogue Forum shows that just by using two-way dialogue and communicating in simple language with competence and fairness, the airports can get community approvals to their suggested changes.

Conclusion

Although every airport and every community are different and face their own challenges, the key thing is to listen, speak and engage with communities to find out what their specific communication needs and wants are and to work to satisfy them.

Operation management at Ljubljana airport



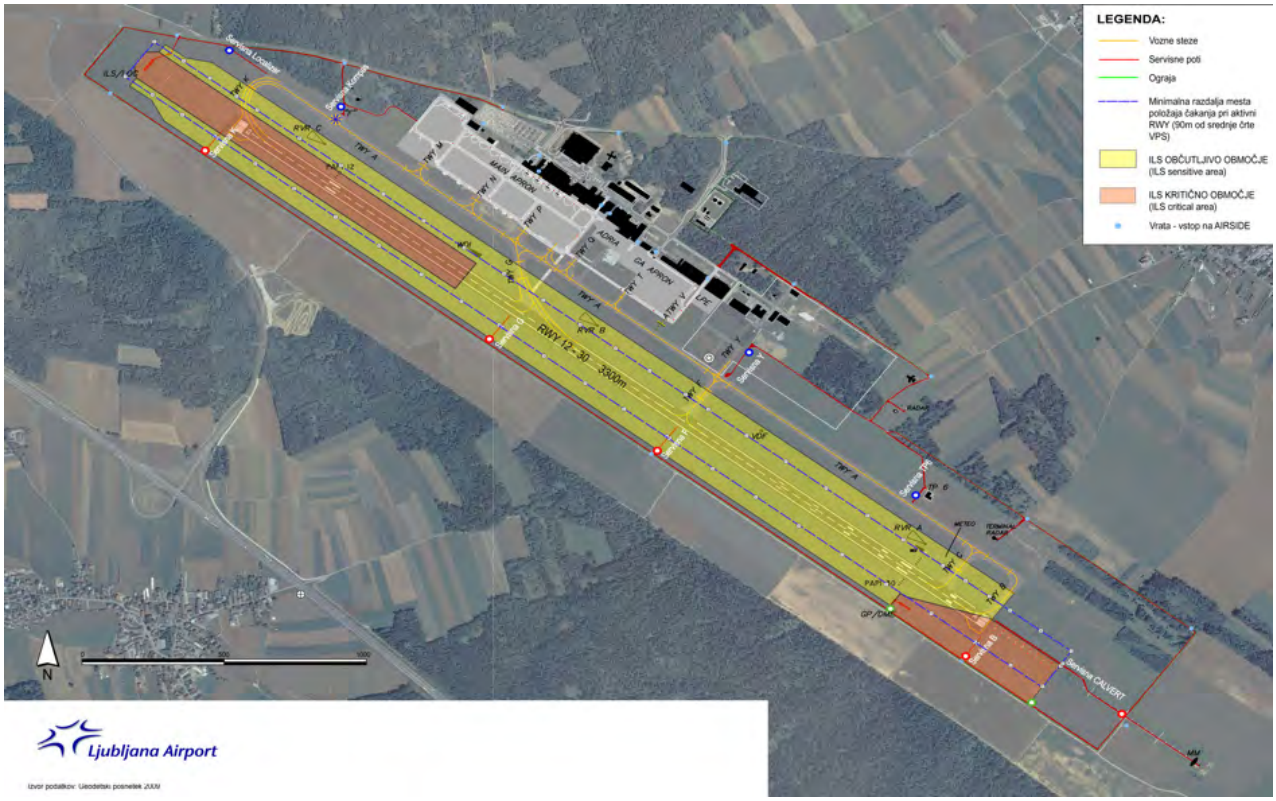
Matjaž Romšek, Head of Airport Coordination and Supervision, Fraport Slovenija

Operations at Ljubljana airport

Overview

In the last three years, Ljubljana airport had around 30.000 movements per year, maximum 35.000 operations in 2018, including training flights. As night flights are not permitted, this means that approximately 95 flights (departure and landing operations) took place from 6h to 23h every day.

The main type of commercial aircraft used during this period was a narrow-body aircraft A320/321/B737. It is important to note that narrow-body aircraft are less noisy, thus generate less annoyance to the communities living around the airport. There were a few movements of wide-body aircraft (A330/B777), which included approximately 15-20 operations per year.



The runway of Ljubljana airport

Aeronautical Information Publication

Aeronautical Information Publication (AIP)* is a manual where one can find all the technical information about an airport. It contains aeronautical information of a lasting character essential to air navigation and is designed to be a manual containing thorough details of regulations, procedures and other information which is vital for flying aircraft in Slovenia.

The structure and contents of Aeronautical Information Publication are standardised by international agreement through ICAO (Annex 15). Usually, AIPs have three parts – GEN (general), ENR (en route) and AD (aerodromes). The document contains many charts, most of which are in the AD section, where details and statistics of all public airfields are published.

Aerodrome geographical and administrative data

LJLJ AD 2.3 OPERATIONAL HOURS

1	*AD Administration*	H24; refer to LJLJ AD 2.20 1 Local flying restriction
2	*Customs and immigration*	H24
3	*Health and sanitation*	H24
4	*AIS Briefing Office*	H24 [1)]
5	*ATS Reporting Office (ARO)*	H24
6	*MET Briefing Office*	H24
7	*ATS*	H24
8	*Fuelling*	As AD Administration [2)]
9	*Handling*	As AD Administration [2)]
10	*Security*	As AD Administration
11	*De-icing*	As AD Administration [2)]
12	*Remarks*	1) Centralised ARO (ARO SLOVENIA) is responsible for AIS Briefing (Preflight Information Bulletin); Phone: +386 4 2040 420; Fax: +386 4 2023 851 URL: http://fpl-sloveniacontrol.ead-it.com 2) Reduced capacity between 22:00 - 05:00 (21:00 - 04:00)

Operational hours at Ljubljana airport

* https://www.sloveniacontrol.si/acrobat/aip/Operations/2020-03-26-AIRAC/html/eAIP/LJ-GEN-3.1-en-GB.html

Ljubljana airport and the information regarding protection for residents

1. The airport provides geographical and administrative data and operational hours;

2. The airport's operational capacity has been reduced between 23:00 to 06:00 local time (from 22:00 to 05:00 in the summer period) to reduce noise annoyance of the communities around the airport. Only a few technical exceptions exist, including rescue aircraft and medical flights. For other flights, delayed departures must be authorised by the airport operators. More detailed information about these approached can be found in the first chapter of AIP – "Local Flying Restrictions"*;

3. More restrictions on the request of the Civil Initiative of Šenčur region concerning the use of head of the runway number were implemented: between 22:00 to 00:00 departures can be made mainly in the direction of Vodice. During the night (from 00:00 to 06:0) departures can be made only in the direction of Vodice.

4. Between 22:00 to 05:00 (21:00 to 04:00) Ljubljana/ Brnik (LJLJ) can be alternate only for aircraft that are in compliance with rescue and firefighting category CAT 3 (H3), ICAO Annex 14. For aircraft returning to the aerodrome of departure LJLJ due to weather, mechanical, radio failure, forced landing or emergency landing, LJLJ can be alternate if request for returning is announced until 22:15 (21:15). For delayed departures and departures from 22:00 to 05:00 (21:00 to 04:00) with prior approval from Airport Operator LJLJ can be alternate if request for returning is announced within 15 minutes after take-off.

* https://www.sloveniacontrol.si/acrobat/aip/Operations/2020-03-26-AIRAC/html/eAIP/LJ-AD-2.LJLJ-en-GB.html

Jure Novak, ASM Expert for route design, Slovenia Control (KZPS)

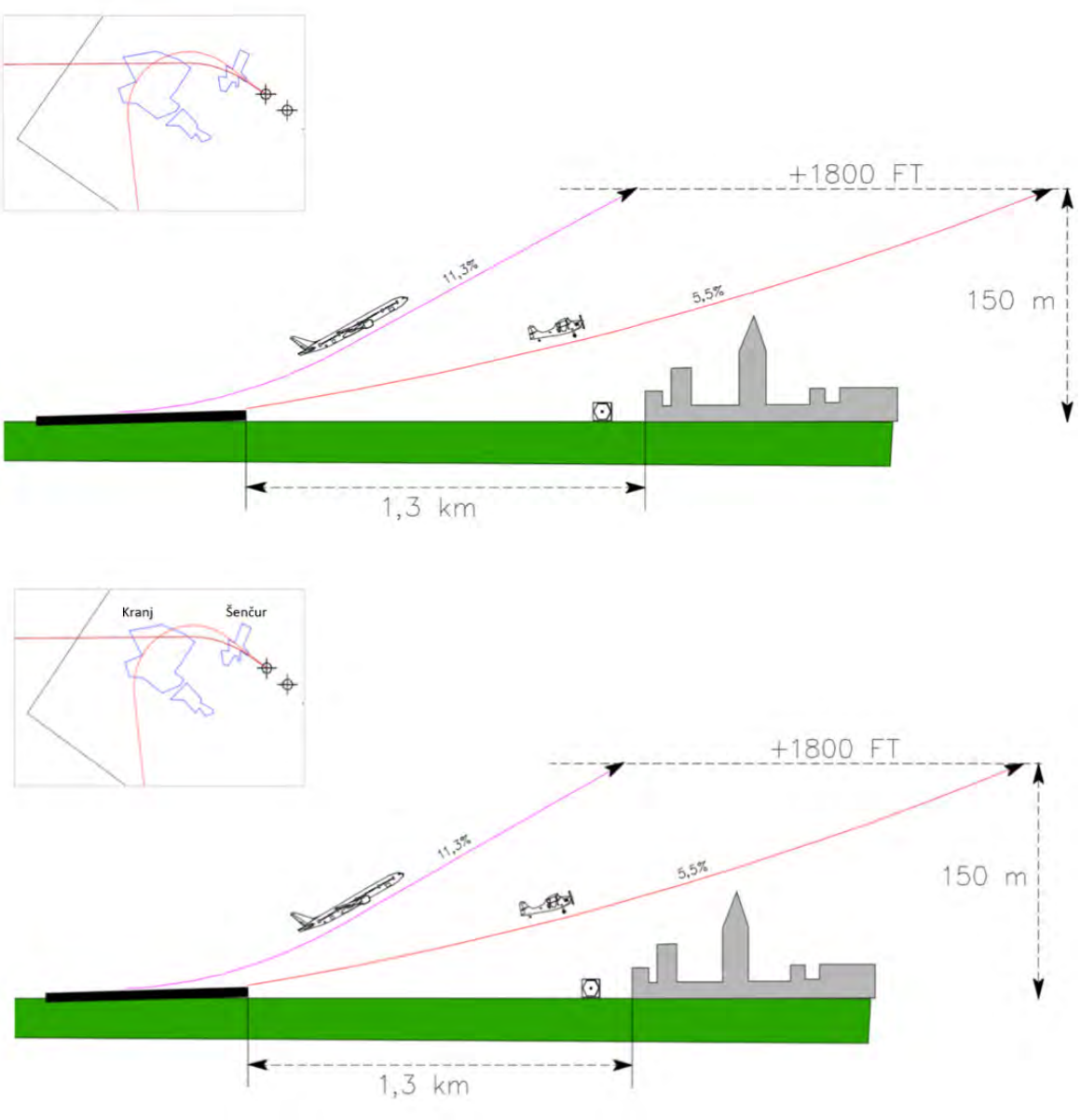
Design of instrument procedures

Slovenia Control (KZPS) is in charge of airspace management, building “bridges and roads” in the air – designing and redesigning the routes and the volume of the airspace depending on the air traffic.

The core of managing the airspace is the design of flight procedures – departures and arrivals. Every single part of air travel has to be designed and evaluated using specific documents. KZPS also interacts with stakeholders and develops operational documents supported by the EU and Slovenian law.

Flight procedure design

Aircraft operators and airspace users have two standard departures from which they can choose. In the example of Šenčur and Kranj, both departures are above the Municipality of Šenčur. Theoretically, the aircraft operator can choose which departure will be executed, but there is no turn allowed before the height of 1.800 FT above the runway. Since the aircraft and weather behave differently, the reality is different – so turns are executed in different ways.

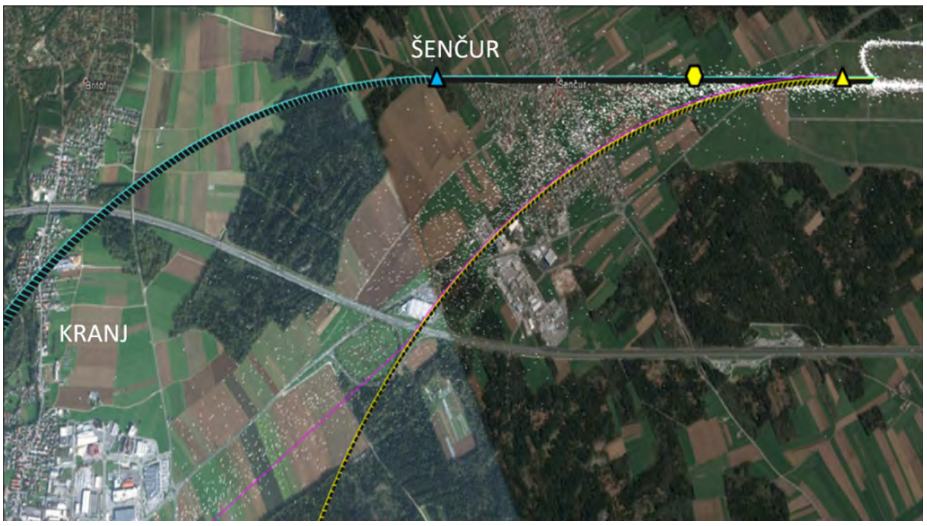


Departure example: Šenčur & Kranj

Nowadays, almost all aircraft have an excellent performance and can reach 1.800 FT very soon after their take-off, so they make a left turn immediately after reaching the end of the runway. Because of the technologic advancement, the practice is starting to differ from the theory and with that comes the difference in expected noise dispersion (blue line) and actual noise dispersion (yellow line).

The arrivals procedure, similarly to the departure procedure, is quite detailed. Arriving aircraft align with the runway at an altitude of approximately 4.000 FT above mean sea level. At this point, all aircraft are 2.953 FT above the living area. The image below shows all aircraft coming towards the runway from every direction – noise dispersion is very dense.

Aircraft are flying so differently because their trips are impacted by weather, autopilot type, safety policy in the cockpits, aircraft systems that are programmed differently and other factors.

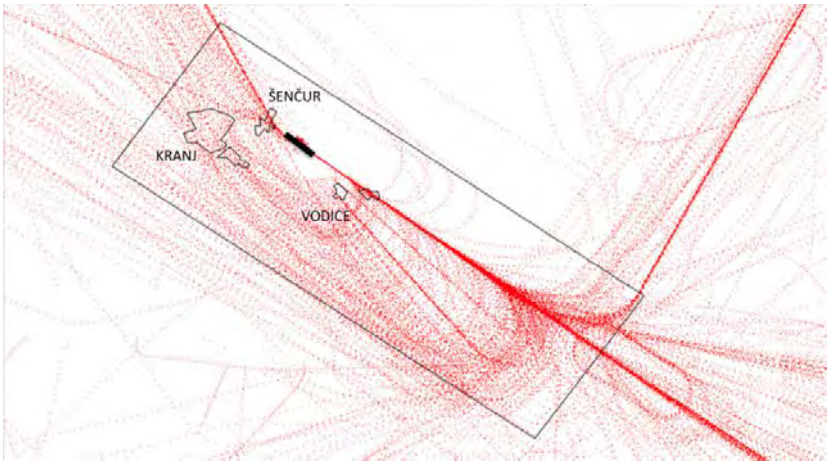


Expected noise dispersion (blue line) and actual noise dispersion (yellow line)

Steps towards noise mitigation

The KZPS has already implemented Continuous Descent (CDO) and Continuous Climb (CCO) operations. Collaboration has to be made between the local communities, the state and airspace users.

Noise abatement procedures should be implemented through collaboration between air navigation service providers, airport operators, aircraft operators and aviation authorities. Therefore, in every case, there must be a different procedure that specifically fits that particular situation.



Aircraft arrival trajectory to Ljubljana airport

"Noise abatement procedures should be implemented through collaboration between air navigation service providers, airport operators, aircraft operators and aviation authorities. Therefore, in every case, there must be a different procedure that specifically fits that particular situation," – Jure Novak, ASM Expert for route design, Slovenia Control (KZPS).

Andreja Kikec Trajković, Aviation inspector, Head of ATM/ANS Division, Civil Aviation Agency (CAA SI)

Flight procedures and noise management

Legal background

According to the Aviation Act (Official Gazette, Nr. 81/10, 46/16, 47/19) Article 116 paragraph 2:

„For each aerodrome and airfield, the methods, procedures and other conditions for safe take-offs and landings of aircraft shall be defined. The method and procedures for safe take-offs and landings of aircraft for an aerodrome where air navigation services are organised shall be determined by the provider of those services, and for other aerodromes and airfields, by the aerodrome or airfield operator."

According to Regulation (EU) 130/2014, provision ADR. OR.C.005 Aerodrome operator shall ensure, inter alia, that the design and maintenance of the flight procedures, is in accordance with the applicable requirements.

As far as the regulation of flight procedures is concerned, two approaches are possible: one in which approval is required for each individual flight procedure and the other way is to set the requirements and oversee the functioning of the system. Slovenia has chosen the latter.

In 2017, CAA of Slovenia, within its regulatory powers, has adopted certification specifications for the design and implementation of instrument flight procedures and other conditions for the take-off and landing of aircraft. This certification set out the requirements for the procedures and the requirements for organisations, which are developing and determining these procedures.

Requirements for the organisations are related to their management system, quality assurance, resources, staff qualification requirements, organisation manual, handling of information, record keeping and more. Moreover, the organisation has to follow best practices and newly adopted documents to avoid changing their legislation too often. Requirements for procedures – every procedure, depending on their type, has to comply with the provisions of various ICAO documents and manuals, listed in Article 5 of Certification Specifications.

In case that the individual flight procedure complies with the requirements stemming from the before mentioned documents of Article 5, no special approval is required. In case of deviations, however, the organisation is required to perform an analysis and justify the deviation and obtain the approval of the CAA. Currently, all the procedures in Ljubljana airport are in line and compliant with the requirements, thus no special approvals have been needed.

Certification Specification goes hand in hand with the in 2018 introduced Airspace Change process, since the change of flight procedures, introduction of new procedures is also considered as a change.

The purpose of the design and transformation of the airspace of the Republic of Slovenia is to achieve efficient, flexible and dynamic airspace for all users. A change in airspace means also a change in the system of operation of air traffic management / air navigation service providers. Procedures for the introduction of changes in airspace require compliance with the requirements of national law, International Civil Aviation Organization (ICAO) standards and European Union law.

In order to ensure adequate and effective oversight of the procedure design organizations, the requirements for the inspector supervising this field are, of course, also laid down. Several documents from governmental level to CAA level set out the requirements for these inspectors with PANS –OPS authorisation.

These documents are:

- Aviation Act;
- Rules on qualifications of aviation inspectors and inspectors;
- Programme of professional training of officials of the Civil Aviation Agency of the Republic of Slovenia;
- Compliance Monitoring and Safety Management System Manual (chapter: authorisations).

Balanced Approach to aircraft noise management

In 2010, ICAO Assembly adopted the Balanced Approach (BA), which stated how to manage the noise in international airports. **EU Regulation 598/2014 incorporated the Balanced Approach for two reasons**:

1. To understand how to tackle the noise issue;

2. To avoid the extorsion of competition.

It could be said that this regulation does not apply to Slovenia because Ljubljana airport does not have 50 thousand movements a year, but some of the elements of the Balanced Approach are already implemented at the airport.

The Balanced Approach encompasses four main pillars:

- Reduction of noise at source (a reference to the noise certification of ICAO);

- Land-use planning and management (a reference to the local authorities);

- Noise abatement operational procedures (avoiding or mitigating noise in over-populated areas);

- Operating restrictions on aircraft– limiting certain operations (only after consideration of the benefits to be gained from other elements).

To implement these elements, different stakeholders, depending on the measure implemented, have to be involved as it demands the responsibilities of various sectors.

Currently, Ljubljana airport is involved in noise abatement procedures and night flying restrictions, two measures related with the 3rd BA pillar, Also, only the aircraft that are fully certified in accordance with ICAO Annex 16, Volume I, Chapter 3 are allowed unless the Civil Aviation Agency of Slovenia grants them justified permission.

Marko Čehovin, City Municipality of Kranj

Engagement of the municipalities surrounding Ljubljana airport concerning the aircraft noise

The city of Kranj is just 10 kilometers away from Ljubljana airport and is highly affected by aircraft noise. It is also the third-largest municipality of Slovenia.

Background information

In 2013, the unilateral change of aircraft routes took place. It is a case of degradation of the environment with aircraft noise, in which the state ignored the public interest and only accepted arguments from one side. Close communication between Civil Aviation Agency of Slovenia, Slovenia Control and ADRIA Airways (the former Slovenian national air carrier) was noted. It was claimed that ADRIA Airways would save around 800 thousand euros annually because of the change in aircraft route which was directly over the city of Kranj. Once this change was accepted, it led to aviation noise annoyance of the community. The complaints of the people were totally ignored by the designated state institutions, namely the Slovenian Civil Aviation Agency (CAA) and the Ministry of Infrastructure.

Before this unilateral change of aircraft route in 2013, air route plans had avoided densely populated areas. This particular change has been implemented without any consultation with the local communities and municipalities. What is more, the public was not even informed about this change.

The picture below shows how the aircraft takes the route above densely populated area of Kranj (pink line) and the possible solution to it – changing the route (blue line).

Flying Route GIMIX 1Z Jet (pink line) and possible solution (blue line)

Call of mayors

In May 2019, seven mayors of all the surrounding municipalities signed the Call of mayors – to express that municipalities (Kranj, Šenčur, Vodice, Škofja Loka, Cerklje, Mengeš, Komenda) are interested in noise reduction of aircraft overflights taking off or landing at Ljubljana airport. This call has been sent to all relevant state and private institutions, namely the Ministry of Infrastructure, the Civil Aviation Agency (CAA), the Ministry of the Environment and Spatial Planning, the Ministry of Defence, the Ministry of Interior, Fraport Slovenia, Slovenia Control, all members of the Parliament and members of the Government from the region.

The demands were:

1. To abolish the air routes established in 2013 and use of take-off and landing routes to avoid densely populated areas;

2. To establish noise abatement by strictly applying aircraft landing and take-off procedures for all air carriers and flying at adequate attitude;

3. To provide all relevant documentation connected to the new departure procedure from 2013;

4. To verify the suitability of the selected noise measuring points;

5. To adopt the legislation allowing compensation for the most burdened municipalities and the exercise of continuous monitoring of proper usage of flight procedures.

On top of these demands, mayors expressed their support for the further development of the airport as everyone recognised the economic benefits it brings.

Conclusions

Even though the mayors held several meetings with various stakeholders concerning the matter of aviation noise annoyance, unfortunately, there is still no significant progress. ADRIA Airways has declared bankruptcy in 2019.

However, this does not mean that this problematic route has been abolished. After 2014, the formal procedure that is needed to abolish the aircraft route became quite complicated. Noise abatement procedures are not implemented by law and are left to the “good will” of aviation companies and the Civil Aviation Agency of Slovenia is not performing an active role in this matter. The given reason for this is that the airport has less than 50.000 movements per year.

We have not been able to fully reconstruct who is actually responsible for the new route in 2013 – all relevant players have avoided responsibility. Also, we have identified that the legislation that is necessary for the noise compensations is not implemented. Moreover, current aircraft noise measurement is totally inadequate – only average daily levels are measured, but not noise peaks, which are the most problematic.

Noise management at Ljubljana Airport – opinion of local communities

Tone Kvasič, Head of Environmental Section, Ministry of Environment and Spatial Planning, Slovenia

Legislation and airport noise

The Slovenian Ministry of the Environment and Spatial Planning oversees and formulates policies regarding environment and spatial planning, construction and housing.

Regarding the noise issue, the national legislation on environmental noise in Slovenia is governed by the following:

- Environmental Protection Act (O.J. nu. 49/06)*;
- Decree on the assessment and management of environmental noise (O.J. nu. 121/04)**;
- Decree on limit values for environmental noise indicators (O.J. nu. 43/18)***;
- Rules on initial measurements and operational monitoring of noise sources and on conditions for their implementation (O.J. nu. 105/08)****.

Important legislation acts, covering environmental noise at EU level:

- Directive 2002/49/EC related to the assessment and management of environmental noise;
    - Determination of exposure of environmental noise through noise mapping;
    - Ensuring that information on environmental noise and its effect is made available to the public;
    - Adoption of action plans based on noise mapping, with an opportunity to prevent and reduce environmental noise where necessary.
- Directive (EU) 2015/996 related to establishing common noise assessment methods;
    - Define common approach to determine the exposure to environmental noise through noise mapping;
    - Result are noise indicators L_{DEN} and L_{NIGHT}.

In Slovenia, according to the Environmental Impact Assessment regulation, an airport with a runway longer than 2.100 meters has to operate according to the environmental permit, containing the description of a noise source, noise limit values, noise mitigation measures and noise monitoring.

According to the Decree on limit values for environmental noise indicators, the airport operator has to apply for a modification of environmental permit upon every significant change in the operation regulation. Noise indicator limit values were presented for the major airports (more than 50.000 civil aircraft operations per year) and non-major airports (less than 50.000 civil aircraft operations per year). Indicators, such as L_{DAY}, $L_{EVENING}$, L_{NIGHT} and L_{DEN} are used for limiting values in four different noise protection zones.

* http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO1545
** http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED2682
*** http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED7531
**** https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2008-01-4490?sop=2008-01-4490

Nearby Ljubljana airport, most people live in the third noise protection zone. **Limit values for non-major airports and for third noise protection zone are:**

- L_{DAY} 58 dBA;
- $L_{EVENING}$ 53 dBA;
- L_{NIGHT} 48 dBA;
- L_{DEN} 58 dBA.

For major airports the related limits are:

- L_{DAY} 65 dBA;
- $L_{EVENING}$ 60 dBA;
- L_{NIGHT} 55 dBA;
- L_{DEN} 65 dBA.

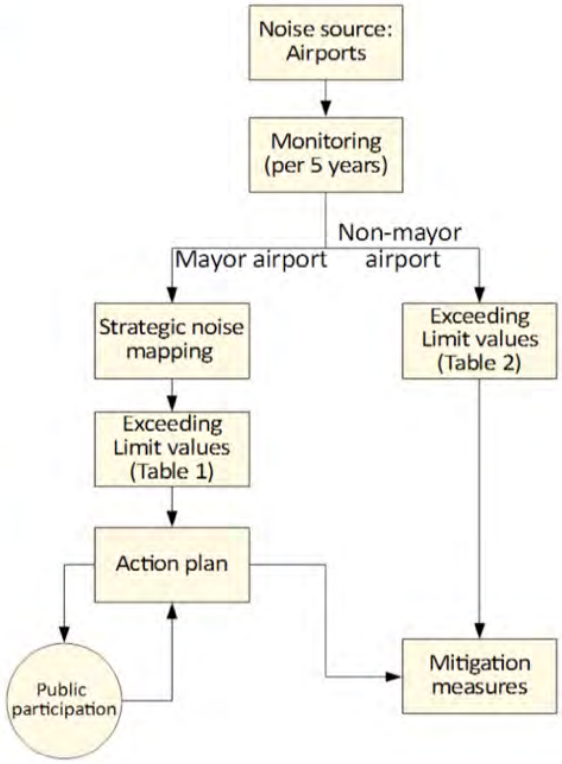
Table 1: Limit values for mayor airport*

Noise protection zone	Lday (dBA)	Levening (dBA)	Lnight (dBA)	Ldvn (dBA)
IV. zone	70	65	60	70
III. zone	65	60	55	65
II. zone	60	55	50	60
I. zone	55	50	45	55

*50.000 civil aircraft movements per calendar year

Table 2: Limit values for non-mayor airport

Noise protection zone	Lday (dBA)	Levening (dBA)	Lnight (dBA)	Ldvn (dBA)
IV. zone	73	68	63	73
III. zone	58	53	48	58
II. zone	52	47	42	52
I. zone	47	42	37	47



Noise limit values

Primož Primožič, Environmental Expert, Fraport Slovenija

Noise issues at Ljubljana airport

Environmental protection is a significant principle of the Fraport Slovenija corporate philosophy. The main goal of its environmental management system is to ensure environmental stewardship by improving environmental protection efforts and prevention or minimisation of negative impacts on the environment.

As the main airport in Slovenia, Fraport Slovenija impacts the environment in various ways. Therefore, it has a special responsibility which it takes seriously and this is proven by the integration of Environmental management system in the strategic management of the company and fulfilment of requirements for ISO 14001 Certificate, received in 2015.

Overview of noise monitoring in Ljubljana airport

As an operator of Ljubljana Airport, Fraport Slovenija has been intensely working on the issues of air noise and its impact on the surrounding inhabitants for a decade. The primary sources of noise on the territory of the airport are aviation operations (take-offs and landings) on the runway. Passenger, air cargo traffic and general aviation are considered as the main sources of noise at the airport. Other sources of noise (the ones coming from road traffic, field-work and other extraordinary events) are not taken into consideration when assessing the airport's environmental impact.

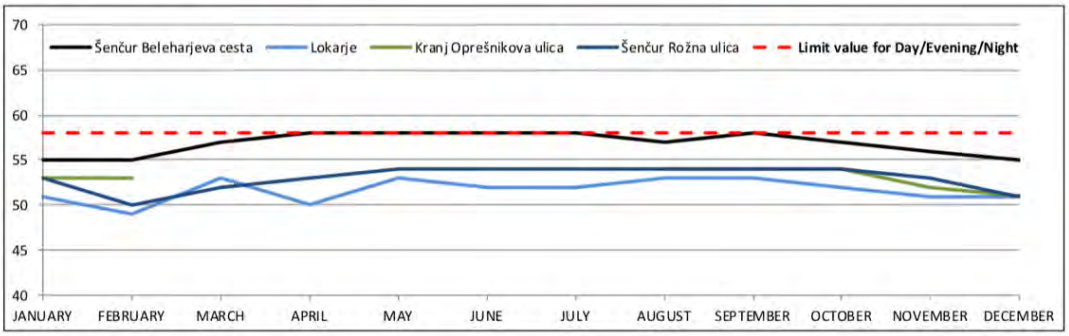
From December 2008 until the end of March 2019 the airport performed continuous noise monitoring in the most noise-exposed areas. We observed that the state was not very interested in noise monitoring of the airport. Since it was costly for the airport to continuously monitor aviation noise, in 2019 Fraport Slovenija decided to continue instead with yearly occasional noise monitoring in the busiest period for flying in Slovenia – summer. At this time, the company continues to monitor the noise levels during the day, evening and night during one month of summer.

Evening noise is the most problematic, because Slovenian Adria Airways had late evening return flights to Slovenia. This problem is currently solved because the airline went bankrupt, and other airlines currently fly at earlier hours.

Every year Fraport Slovenija produces noise maps for the area around the airport. Noise maps are produced for the average noise of the whole year and show noise burden in bands of 5dB or individual isophones. It shows the course of noise level limits in relation to the indicators provided by the legislation. The basis for creating a sound propagation model is the data about the annual number of operations at the airport and the data on the distribution of individual operations in terms of the direction and the type of activity (take-off/landing).

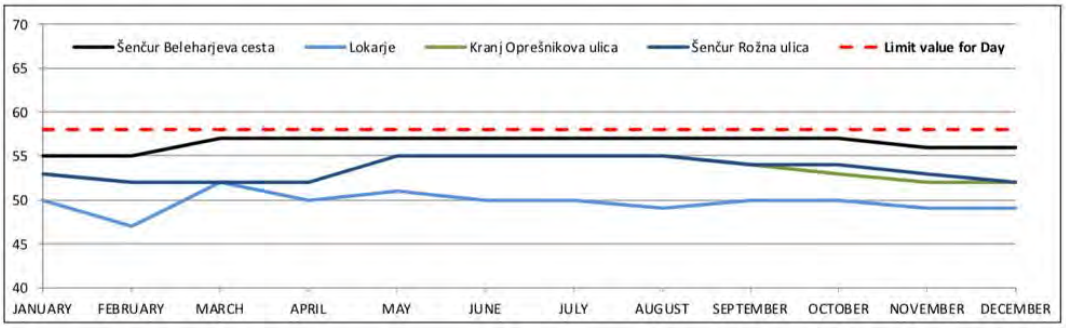
According to the decree regulating environment noise assessment, Ljubljana airport belongs to smaller airports. For those airports the requirements of noise pollution are a bit stricter than for bigger airports with over 50,000 operations of air traffic annually.

Limits: L_{DEN} = 58 dB(A)



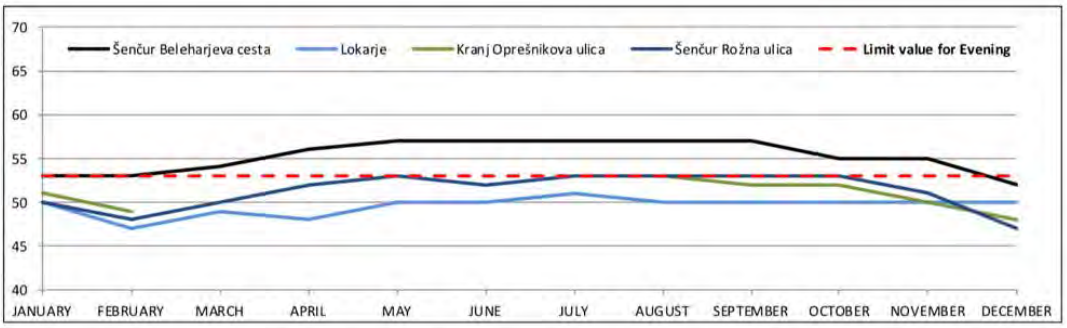
Day/evening/night results of noise monitoring (2018)

Limits: L_{Day} = 58 dB(A), Day 06:00 – 18:00



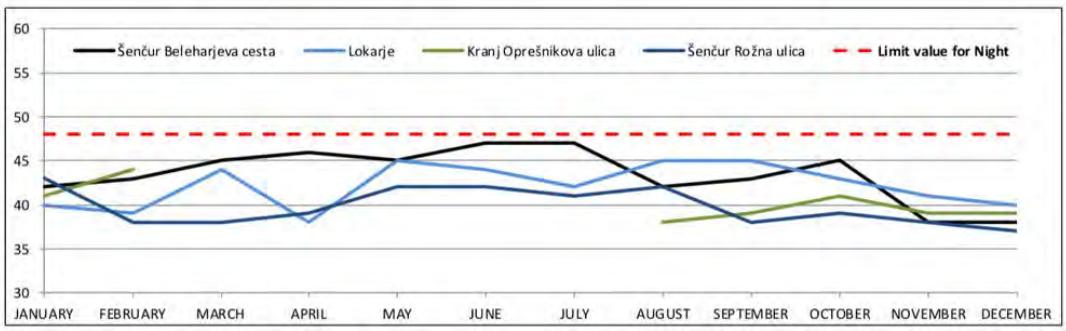
Day indicator

Limits: $L_{Evening}$ = 53 dB(A), Evening 18:00 – 22:00



Evening indicator

Limits: L_{Night} = 48 dB(A), Night 22:00 – 06:00



Night indicator

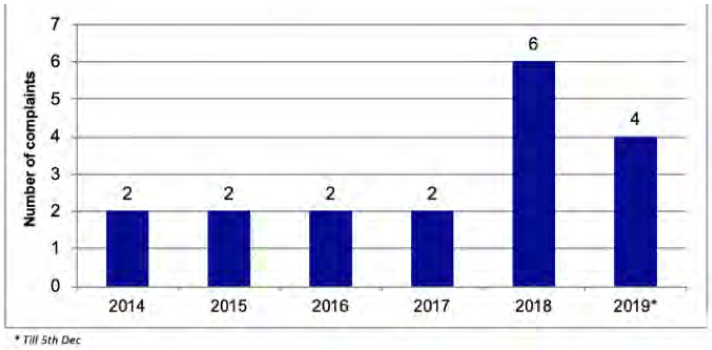
	Day/Evening/Night indicator	Day indicator	Evening indicator	Night indicator
Šenčur	57 dB	57 dB	56 dB	43 dB
Vodice	49 dB	53 dB	50 dB	45 dB

Preliminary results (summer 2019).
Evening indicator for Šenčur overreaches the noise limit because in the summer 2019 Adria Airways were still operating.

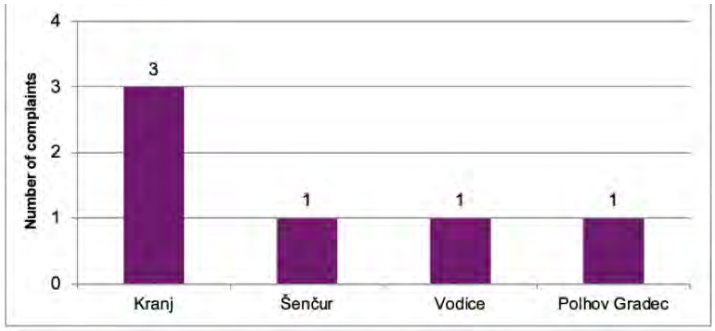
Overview of noise complaints at Ljubljana airport

Residents usually make a complaint about the noise by either filling out the complaint form on the airport's website or sending a direct e-mail. Over the last two years, most of the complaints came from residents of the city of Kranj. The analysis shows that on a yearly basis the airport is receiving a relatively small number of complaints.

Usually, the complaints are investigated with the help of air traffic controllers or other stakeholders.



Number of total complaints (2014-2019)



Number of complaints by region (2018)

Adopted measures at Ljubljana airport

There are three measures adopted at Ljubljana airport for dealing with noise annoyance of the population:

1. Night flying restriction (limiting the flying of noisy aircraft between 22:00-00:00 and not permitting the flying of noisy aircraft between 00:00–06:00)*;

2. Vegetation noise barrier (growing trees in the noisiest places would reduce the horizontal/ground aviation noise by 1-2dB when the trees are full-grown);

3. Airport Environmental Partnership (collaborative decision-making group made of all relevant stakeholders, established to develop standard noise policy. The outcomes of the partnership should lead to less noise above populated areas in the vicinity of the airport). The first meeting of the partnership took place in June 2019 (a second meeting was postponed due to COVID-19 outbreak in 2020).

Potential improvements at the airport

1. The airport should have more significance (as one of the decision-makers) in procedures of confirming new routes (corridors) and should be more involved in these discussions;

2. The airport should be more involved in spatial planning around the airport;

3. To introduce noise tax (tariffs) for noisier aircraft (this measure might be difficult to introduce because of risking the competitiveness of the airport);

4. To define noise protection areas based on strategic noise maps.

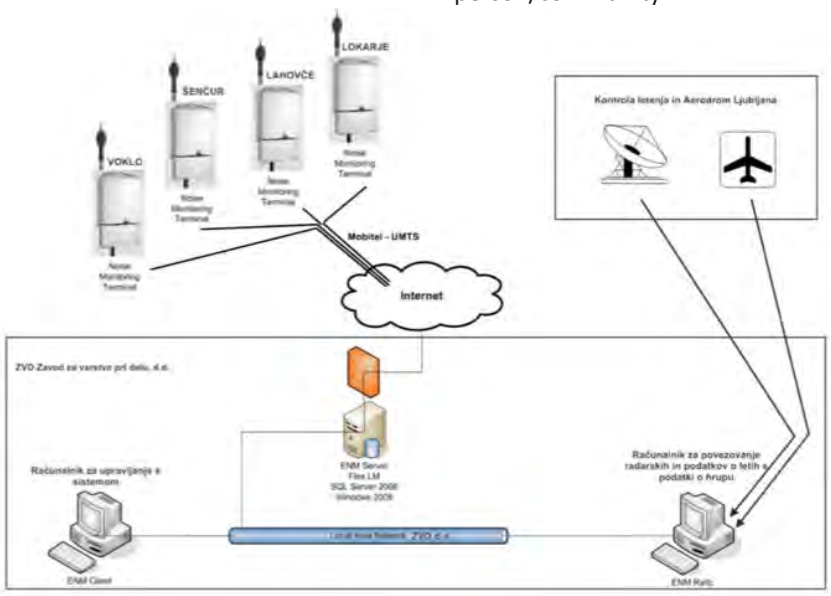
* In this case, noisy aircraft mainly refers to widebodies. As it was mentioned before, wide-body aircraft in Ljubljana are A330 and B777, adding up to around 15-20 operations per year and always during the day period.

Luka Čurovič, Assistant, Institute of Occupational Safety (ZVD) and Faculty of Mechanical Engineering, Slovenia

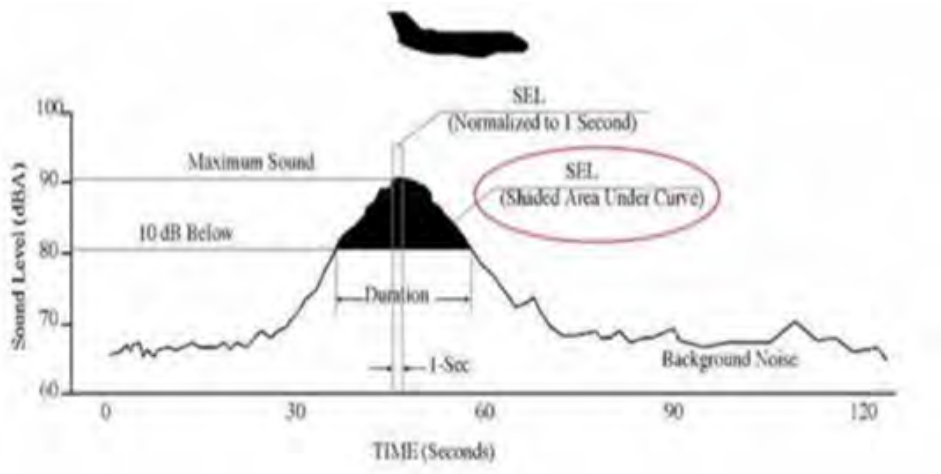
Airport noise monitoring

Four noise monitoring terminals/stations started working in 2008 around Ljubljana airport and are placed in the municipalities that surround the airport. Noise measurements need to be performed continuously and the data is sent to the server, which is located in the Institute of Occupational Safety.

Aircraft noise is a result of many different kinds of noise coming together – total noise, residual noise, specific noise and background noise. In reality, before people start hearing the actual aircraft noise, they first hear background noise. After the plane flies over them, they are left again with background noise surrounding them. To take this noise event altogether, the total average measurement would be made of less decibels than when measuring only the loudest period – when the actual aircraft is above the person/community.



How noise measurement equipment works



SEL calculation
Grampella, Mattia. "Framework definition to assess airport noise and aircraft emissions of pollutant based on mathematical models." (2012).

Noise contour generation process.
ECAC. CEAC Doc 29 4th Edition, European Civil Aviation Conference, December 2016

Environmental noise calculation

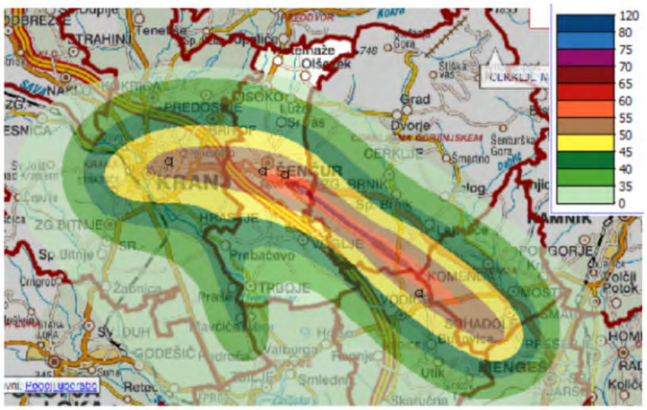
Required input data for the computational noise calculation model:

- Airport data (location, elevation, wind, air temperature);
- Runway data (reference point, length, gradient, start-off, roll-off, landing);
- Flight paths – ground track, flight profile, lateral dispersion;
- Segmentation – a set of straight-line segments with known noise-related characteristics of the aircraft (speed, engine power parameters, directivity, weight);
- Topography.

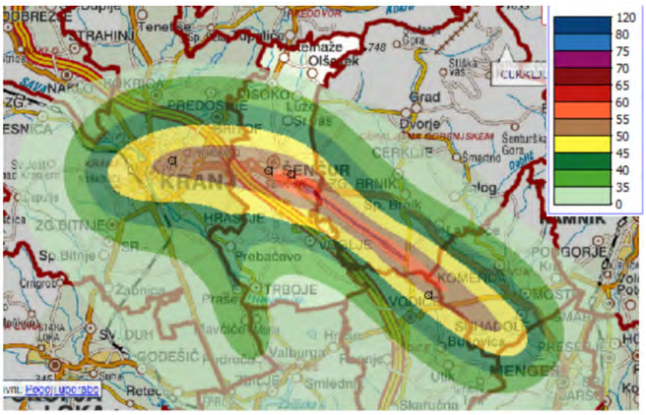
Using this data and dividing aircraft into different types of noise levels, noise maps (2018) were obtained.

Conclusions

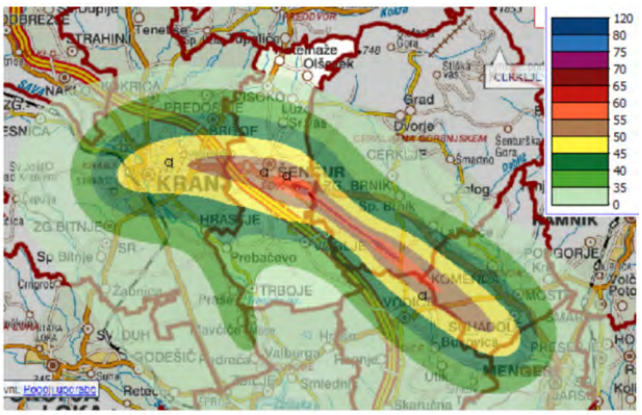
People are usually complaining about night-time annoyance, which leads to sleep disturbance. However, the noise map shows that during nights almost all the area around the airport and its municipalities is green. Because of this reason, noise maps are not the best way to study noise annoyance, since it involves not only the noise itself but also the lack of trust in the government and relevant stakeholders. Noise indicators which are based on average noise levels do not explain aviation noise annoyance. Also, noise indicators do not take into account low frequencies and vibrations, which might also annoy people from the areas that are most affected by aviation noise.



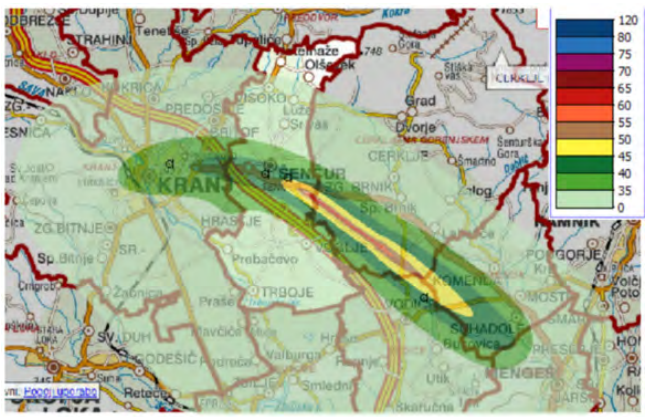
Noise map for L_{DEN}



Noise map for L_{DAY}



Noise map for $L_{EVENING}$



Noise map for L_{NIGHT}

"Noise maps are not the best way to study noise annoyance, since it involves not only the noise itself but also the lack of trust in the government and relevant stakeholders," – Luka Čurović, Assistant, Institute of Occupational Safety (ZVD) and Faculty of Mechanical Engineering, Slovenia.

Nika Rovšek, Undersecretary, Ministry of Infrastructure, Directorate of Aviation and Maritime Transport, Slovenia

Land use planning around the airport

The Slovenian Ministry of Infrastructure maintain, plan, regulate, and improve the field of air, transport and airport infrastructure. Ministry is responsible for transport policies and infrastructure. Ministry formulates policies, participate in the preparation of spatial planning documents to achieve safety and reducing risks in civil aviation, continuous development of aviation infrastructure and the infrastructure of navigation air transport services.

The Slovenian Ministry of Infrastructure is responsible for preparing the spatial implementation plans for Slovenian airports and provide development and conservation needs relating to the space for municipal spatial planning documents. General objectives of the airport are to improve mobility, accessibility, traffic safety and protection as well as reduced environmental burdens were exposed.

The Spatial Implementation Plan for Ljubljana Jože Pučnik Airport

Ljubljana airport is the main Slovenian international airport. It was opened in 1963. Because of its continuous traffic growth, the Spatial Implementation Plan will be prepared to rearrange the landside and airside of the airport.

The Spatial Implementation Plan for the Ljubljana airport will be prepared with a comprehensive environmental impact assessment. The purpose of the comprehensive environmental impact assessment is to provide a high level of environmental protection and contribute to the inclusion of environmental aspects in the Plans. The authors of the Environmental Report will be included in drafting the Plan already in the initial phase of the document's preparation.

The placement and orientation of runways at an aerodrome should, where possible, minimise the noise-related interference in areas approved for residential use. If possible, it should also minimise the noise annoyance of the other noise-sensitive areas close to the aerodrome.

For the Ljubljana airport development ground transport accessibility should be improved. The Spatial Implementation Plan will be prepared for reconstruction of the runway, new taxiways, reconstructions of the aprons, cargo terminals, parking areas and integration of transport systems. The availability of land for airport expansion and its consequences to the environment will be carefully discussed. Aircraft noise in the vicinity of the airport will be an issue to address. The potential degree of noise disturbance needs to be assessed in terms which will indicate the relationship between the level and duration of the noise exposure and human reaction.

The area around Ljubljana airport

Key takeaways from the discussions

The ANIMA event was also an opportunity for the stakeholders related to the operations of Ljubljana airport to discuss their activities and to incorporate more actors than before. After each panel, much needed debate and Q&A sessions took place, involving all the parties present. **The main questions asked in the discussion were:**

- The role that introducing more legal indicators would have on the understanding of noise annoyance and sleep disturbance of people living in surrounding communities;
- The need for evaluating noise with a finer granularity, through specific analysis of events and characteristics, to overcome average noise levels that could be irrelevant for annoyance purpose;
- The way to assess the effectiveness and the real gain of interventions against noise before the start of their implementation process;
- The dispersion of the flight path and how relevant it would be to concentrate the tracks;
- The need for a more detailed identification of real annoyance of people before establishing new procedures or interventions – in order to make sure to gain public acceptance, and solve the actual problem, rather than present a solution to a non-existing one.

The main takeaway of this ANIMA event is that when it comes down to noise management, prevention and proactivity are key. If legislation is not yet available at the degree of needed protection, initiatives to increase the quality of life must still be taken at the national, regional and municipal level. In this regard, the key step is to set up a dialogue forum gathering all the parties to be sure to address question of interest for them (what) and in the relevant way (how).

However, the level of awareness is often not the same among stakeholders, hence the importance of working collaboratively towards common noise policy which benefits all parties. Better awareness and knowledge on different noise sources and indicators would support the understanding of the impact that noise has on human health and well-being.

This event has restarted a much-needed dialogue around Ljubljana airport, and the ANIMA project expects to continue fostering similar initiative in other locations.

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