Airport Environmental Noise and Monitoring Management

International Experiences: The Case of Vienna

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This presentation gives an overview of the activities, which are carried out by Vienna International Airport in the field of environmental noise and monitoring management. Vienna Airport itself had 186.782 movements of scheduled and non scheduled traffic in the year 2002 (+ 0,7 % compared to 2001) and counted 11,97 Mio. passengers (+ 1,0 % compared to 2001). The share of transfer passengers is with 4,2 Mio. rather high and has the highest rate of increase (+ 11,2 %) compared to the other figures.

Airport Noise Monitoring Management

Basis of the aircraft noise management is an airport noise monitoring system, which has been installed in 1990. Today it consists of 13 fixed and two mobile noise monitoring terminals. The radar and flight information data are provided by Austro Control. Due to the fact, that a law against aircraft noise does not exist in Austria, everything in this field is done on a voluntary basis.

The purpose of this system is various:

- Data are used to prove the adherance to the minimum noise procedures in close cooperation with air traffic control and airlines
- Based on statistical evaluations of flight tracks and noise data investigations are carried out in order to improve the noise climate around the airport (e.g. modification of SID – descriptions, etc.)
- In the context of noise complaints exact data about the reason are available
- The system delivers the input data for calculating noise zones
- In case somebody wants to settle down in an area, where he could be affected by aircraft noise, information can be given about the current situation.
- The knowledge of the distribution of the flight tracks and the resulting noise zones is also valueable for the purpose of land use planning in the vicinity of the airport.

Development of Noise Immission

Since the construction of the second runway, which went into operation in October 1977, Vienna Airport is obliged to calculate a noise zone each year with an equivalent sound level of 66 dB(A) based on the six month with the most traffic. Since that time the area of this zone has been reduced by 70 % from 34 km² down to 9,7 km² despite an increase of air traffic by nearly 200 %. The reason for this can be seen in the modernization of the fleets, the phasing out of louder and the substitution with newer much more quiet aircraft.

This improvement can also be shown by the measured average maximum noise levels, which decreased by more than 4 dB(A) at departure measuring points within the last seven years. For approach points there is only a slight improvement of up to 2 dB(A), but this is a topic, which is still under investigation and where we can expect more reduction in the future.

Complaints

All the success in aircraft noise abatement could lead to the assumption that the annoyance of the people has been reduced too. But unfortunately this is not true. Up to 1998 we had only few complaints, the number of calls laid in the range

between 400 to 600 per year. In the year 1999 we had to close one runway for 5 months during the summer period due to construction of new high speed exits and a parallel taxiway. As a consequence all arrivals took place over the town of Vienna during south eastly winds. This was rather unusual, because up to this time this arrival route had been the one with the fewest movements of all four runway directions.
This lead to an increase of complaints by 400 % from 373 in 1998 to 1.578 in 1999. We expected that after reopening the runway the situation would become as it was before, but again this was not true. The amount remained on a high level of about 1.200 calls per year. Once you have raised the attention to aircraft noise people will always perceive it.
One main reason for complaints is the number of overflights along the arrival routes. People tend to state that aircraft are flying too low at first and only at a second stage that they would be too loud. We also experienced that the farther away from the airport people live the more they are complaining. Other reasons for complaints were the deviations from prescribed departure routes, which are normally advices from ATC given due to capacity problems.

In order to prove the adherance of departures to the minimum noise routes we check each single flight track every day. In the case of violation we ask ATC if there has been any advice from the controller. If there were no advice we contact the airline and ask for a statement of the pilot in command to justify his deviation. So we actively come in contact with the airlines in order to improve the quality of adherance. Nevertheless it has to be said, that we observe only a very small amount of violations. E.g. in the year 2002 there were only 181 cases, from which 108 were related to ATC-instructions. So we talk about overal 0,1% deviations related to the total movements.

Investigations

Based on this complaints we tried to investigate some possibilities for improvements together with ATC and the home carrier, the Austrian Airlines Group.

One question was, what would happen when the glide angle is increased by 0,5° to 3,5°. We made a measuring campaigne during which the ATC asked pilots to fly a glide angle of 3.5° according to a non-precision approach procedure, which is published in the AIP. We compared the altitude profiles with calculated glide angles and found out, that this approach is flown in very different ways. Some aircraft were above and some beyond the 3.5° slope. Looking at the individual measured maximum noise levels we saw no real tendency in the different values. When summing up the difference between normal and increased glide path we got 0 dB.

We also analysed the altitudes for radar vectored approaches. The question was, if the altitude of the aircraft is lower for radar vectored approaches in the same region than in the case of an ILS-approach. With the help of gate-analyses we came to the result that there were mainly the same altitudes within or outside a certain corridor.

A main issue is the evaluation of navigation by waypoints. Some examples show that great improvements can be reached, if waypoints are used to define arrival or departure routes taking into account the residential areas around an airport. This whole topic is very promising for the future and we expect further improvements especially for curved approaches, where populated areas in the more remote approach-areas can be avoided.

Consultation Process

It was helpful to have results from these investigations, which can now be used in our consultation process. We started this consultation process two and a half year ago with all stakeholdes, politicians, NGO's, green initiatives, mayors of the surrounding communities, all in all 60 people within this process, aiming at an agreement on the future development of the airport and it's region including the discussion about a third runway, which we will need in the year 2012 in case air traffic will increase according to the latest forecast. This third runway should be situated parallel to one of the existing ones to increase capacity for arrivals.

In order to increase the credibility in our data, which should be the one we are working with when we develop different scenarios, we agreed on the following working program :

- Additional measurements close to fixed NMT's to prove the accuracy of measured values
- Comparison of data from mobile units at remote sites with fixed NMT's to prove location
- Additional measurements at sites with no fixed NMT's
- Observation of flights by members of the consultation group and correlation with relevant flight data
Comparison of measured data with calculated values to prove the accuracy of the noise model
- Comparison from calculated noise zones based on theoretical corridors with those resulting from actual flight tracks

After all that measurements and calculations our system has been acknowledged by all participants of the consultation process. Now we can work with data and results on a reliable basis. We are now using this system for :

- Evaluations of possibilities to improve the existing noise situation
- Investigations of different future scenarios with and without a third runway
- Calculation and evaluation of noise data and establishing predictions
- Determination of noise limits, calculation of relevant noise zones as basis for insulation schemes

We are still in the process and standing just before the first agreement concerning the existing noise situation. In the second part we will try to reach agreement also on the future development as well as on the expansion of the airport.

Summary and Outlook

As a conclusion it can be stated that a close cooperation between the stakeholders in aviation is absolutely necessary to be able to solve the noise problems today and in the future. For further improvements it is necessary to have a database available, with which the success can be proven. It is also essential to talk to communities, politicians, parties, etc. long before the expansion of the airport really happens in order to give them the opportunity to discuss the plans and to come to an agreement with the airport. One provision in this context is that you follow an open and active information policy.

What will the future bring ? I think the changes in air navigation from beacon to waypoints enable many possibilities of reducing aircraft noise in densely populated areas. Reduction of the noise at source, improved flight procedures like continous descent approach with improved low drag low power procedure or curved approaches, together with appropriate land use planning will contribute for further reduction of the aircraft noise impact.