



Aerodrom Ljubljana

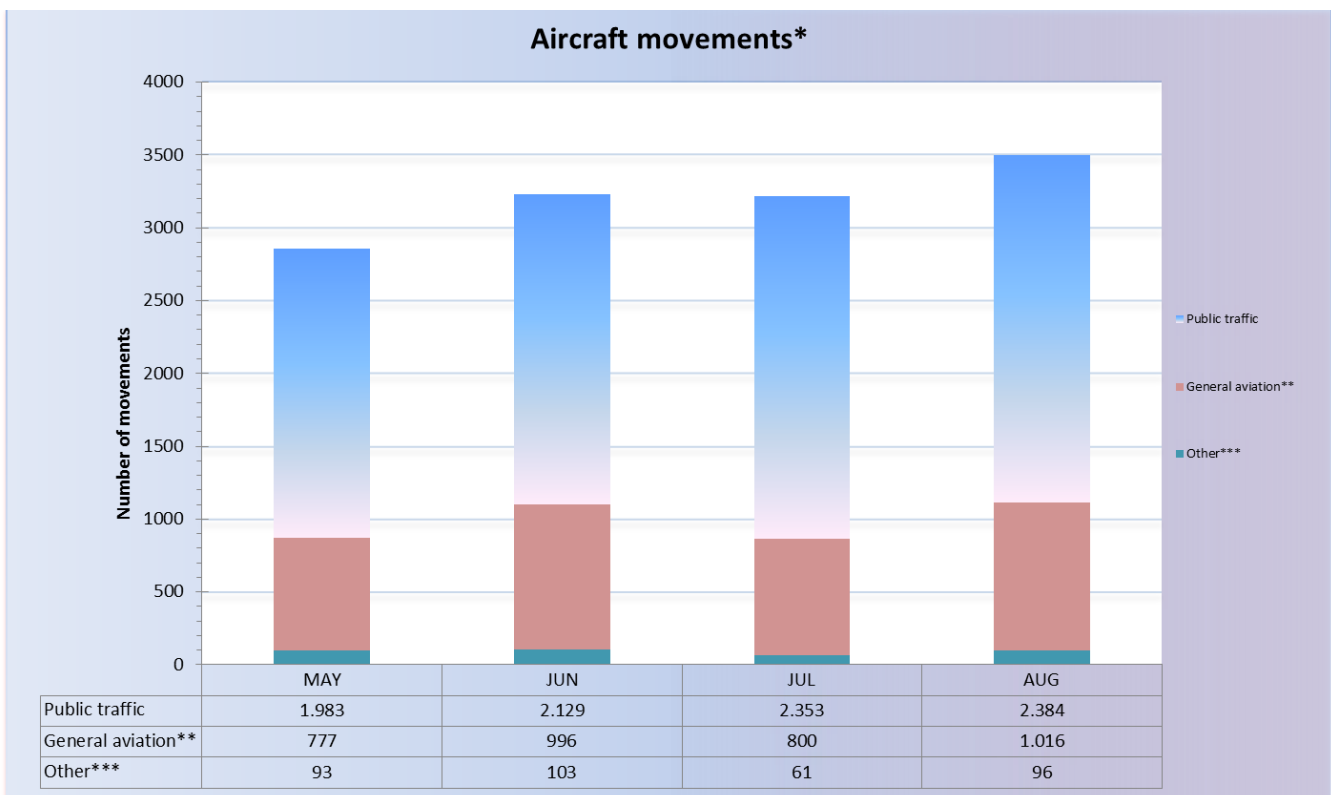
REPORT ON NOISE MEASUREMENTS

for the period MAY - AUGUST 2016

1. TRAFFIC FIGURES - aircraft movements

Information on aircraft movements in the second four months show a slight decline, compared to the same time period last year. There were 12.791 aircraft movements, which is 0,9% less compared to the same time period last year. The data are:

- 2.853 aircraft movements in May, which is 0,1% more compared to the same time period last year,
- 3.228 aircraft movements in June, which is 3,1% less compared to the same time period last year,
- 3.214 aircraft movements in July, which is 6,0% less compared to the same time period last year,
- 3.496 aircraft movements in August, which is 5,6% more compared to the same time period last year.



* landing or takeoff of aircraft

** commercial, business and private aircrafts and helicopters which have a maximum of 19 seats and do not exceed the weight of 44 tons

***school, position or technical flights (without passengers)

Source: Aerodrom Ljubljana, d.o.o.

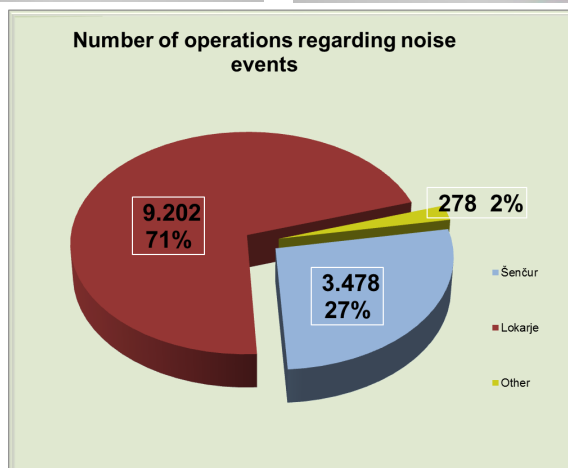
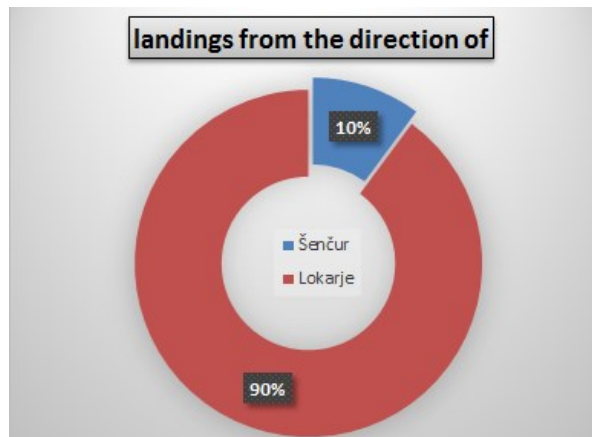
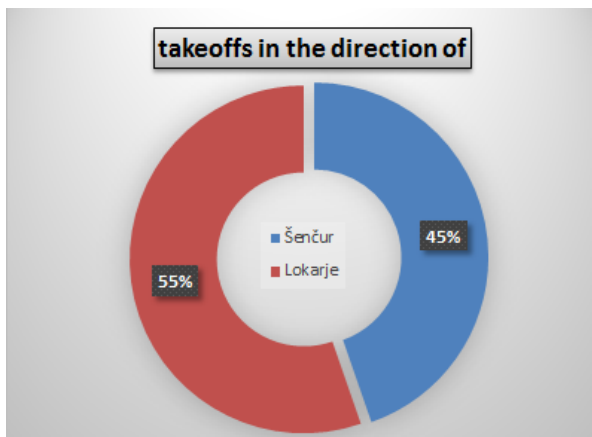
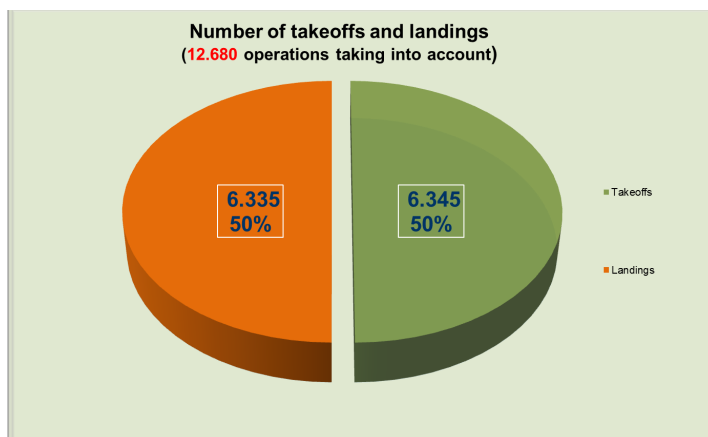
2. NOISE POLLUTION SOURCE DATA - measuring terminals' data

Measuring terminals have taken 12.680 operations* (6.345 takeoffs and 6.335 landings) into account. Overflights of school aircraft flights and most of military and police helicopter flights are not included in this number.

The share of takeoffs in the direction of Šenčur was 45% and the share of landings from the direction of Šenčur was 10%; also in the direction of Lokarje 55% and from the direction of Lokarje 90%.

Including the overflights, the measuring terminals have taken 12.958 operations into account, of which 3.478 (27%) operations are the takeoffs and landings in/from the direction of Šenčur and 9.202 (71%) operations are the takeoffs and landings in/from the direction of Lokarje. The number of other events, related to overflights of school aircraft flights and military and police helicopter flights, is 278 (2%).

* Note: 0.9% of operations is not included due to uncertainty of data – the impact on the result of noise is negligible < 0,04 dB(A)



Source: ZVD Institute of Occupational Safety d.o.o.

3. MEASUREMENT RESULTS - noise indicators

The following environment noise indicators were calculated in second four months of this year, based on the measured noise data of individual events, associated with air traffic (takeoffs, landings, overflights of aircrafts):

| Measuring terminal | Noise indicators [dB(A)] - monthly average | | | | | | | | | | | | | | | | Limit values [dB(A)] | | | |
|--------------------|--|----------------|----------------|------------------|----------------|----------------|----------------|------------------|----------------|----------------|----------------|------------------|----------------|----------------|----------------|------------------|---|----------------|----------------|------------------|
| | May | | | | June | | | | July | | | | August | | | | 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} | L _D | L _E | L _N | L _{DEN} |
| 1 Šenčur I. | 56 | 54 | 45 | 56 | 56 | 54 | 47 | 57 | 56 | 54 | 46 | 57 | 56 | 55 | 48 | 58 | 58 | 53 | 48 | 58 |
| 2 Lokarje | 54 | 53 | 48 | 56 | 53 | 54 | 48 | 57 | 53 | 53 | 47 | 56 | 53 | 54 | 48 | 56 | 58 | 53 | 48 | 58 |
| 3 Kranj | 52 | 50 | 43 | 53 | 52 | 51 | 45 | 54 | 52 | 52 | 44 | 54 | 53 | 53 | 44 | 55 | 58 | 53 | 48 | 58 |
| 4 Šenčur II. | 55 | 53 | 45 | 56 | 55 | 54 | 46 | 56 | 55 | 53 | 46 | 56 | 55 | 54 | 46 | 56 | 58 | 53 | 48 | 58 |

Source: ZVD Institute of Occupational Safety d.o.o.

The table shows the daily calculated noise indicators:

- **Indicator L_d** in dB(A) shows the daily noise load, due to the air traffic. The day time lasts between 6⁰⁰ and 18⁰⁰. Depending on the number of noise events at each measuring point, we determined the average hourly noise load, on the basis of data on noise levels in dB (A) and the duration of the events t(s), which was sent to us as measurement data, by the measuring terminal. We use this hourly noise load for determining individual noise indicator.
- **Indicator L_e** in dB(A) shows noise load, similar to the L_d indicator, but at evening time that lasts between 18⁰⁰ and 22⁰⁰. This is the time period when people are more susceptible to the disturbance. Therefore, 5 dB (A) is added during this time period.
- **Indicator L_n** in dB(A) describes the night time that lasts between 22⁰⁰ and 06⁰⁰. It is assumed that the population, around the airport (or other noise sources), is resting during this time period. Disturbances during this time period may have a profound impact on health and relaxation. Therefore, 10 dB (A) is added during this time period.
- **Indicator L_{den}** in dB(A) represents the total daily noise load.

Regarding the seriousness of the excess, we marked the excessive noise indicators with a green highlighted print, for excesses up to 3 dB (A), with a blue highlighted print for excesses between 3 and 6 dB (A) and with a red highlighted print for excesses over 6 dB (A). A research on the noise pollution source is carried out for all the red and blue markings.

NOTE: average noise values are determined in accordance with the requirements of the Decree on limit values for environment noise indicators (OG RS No. 105/2005, 34/2008, 109/2009 in 62/2010). Calculations are based on measured noise levels sent from different measuring terminals. They measure total noise and overflight noise of each aircraft. Weather conditions have a partial impact on results, which we are trying to eliminate as far as possible. The wind and thermal inversion still have a partial impact on the measuring results. Based on the SIST ISO 1996-2 standard, data have the uncertainty of about 3 dB (A), since it is not possible to completely exclude the effects of weather conditions (rain, wind, thermal inversion). This means that the actual result varies within -3 and +3 dB (A) of the written.

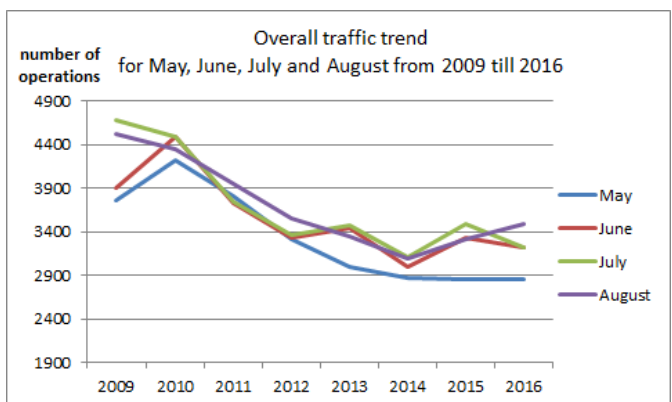
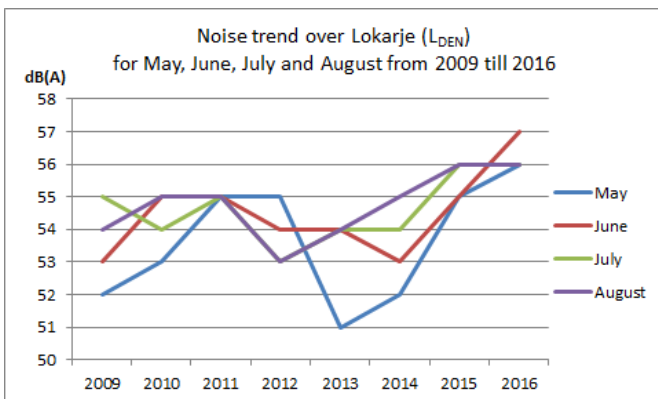
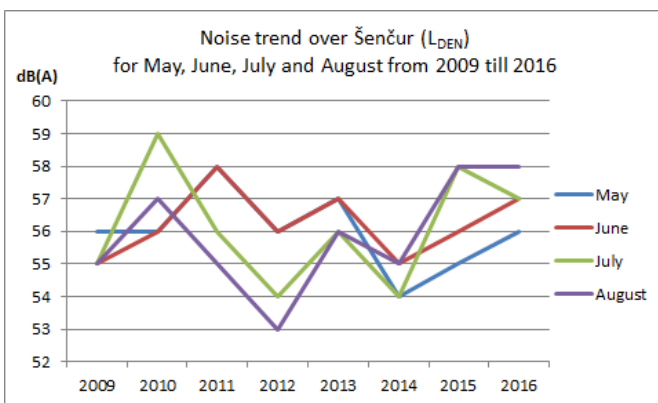
4. ANALYSIS - the loudest aircrafts and noise trend

The following events, in conjunction with takeoffs and landings, were the loudest in the second four months of this year:

| Šenčur I. overflight measurements | | | |
|-----------------------------------|--------------------------------|---|--------------------------------------|
| Aircraft type | arrival (ARR) depart. (DEP) | Date and time of the event | Current noise level EPNL in dB(A) |
| Airbus 319 | ARR | 25.6.2016 23:48 duration of the event 17 seconds | 102 |
| Boeing 737-400 | DEP | 27.7.2016 9:32 duration of the event 17 seconds | 102 |
| Airbus 319 | ARR | 25.6.2016 23:49 duration of the event 18 seconds | 100 |
| Airbus 319 | DEP | 29.7.2016 7:17 duration of the event 19 seconds | 99 |
| Airbus 319 | DEP | 10.8.2016 19:18 duration of the event 20 seconds | 99 |
| Boeing 737-800 | ARR | 13.7.2016 10:52 duration of the event 19 seconds | 99 |
| Fokker F-100 | DEP | 26.7.2016 18:53 duration of the event 23 seconds | 99 |
| Boeing 737-800 | DEP | 10.8.2016 11:33 duration of the event 26 seconds | 99 |
| Airbus 319 | DEP | 29.7.2016 12:17 duration of the event 16 seconds | 99 |
| Canadair RJ-900 | ARR | 10.7.2016 11:15 duration of the event 12 seconds | 99 |

| Lokarje overflight measurements | | | |
|---------------------------------|--------------------------------|---|--------------------------------------|
| Aircraft type | arrival (ARR) depart. (DEP) | Date and time of the event | Current noise level EPNL in dB(A) |
| Iljušin 76 | DEP | 30.7.2016 23:30 duration of the event 43 seconds | 106 |
| Alenia ATR 72 | ARR | 1.7.2016 8:52 duration of the event 23 seconds | 99 |
| Canadair RJ-900 | ARR | 30.6.2016 11:41 duration of the event 22 seconds | 97 |
| Canadair RJ-700 | DEP | 25.8.2016 17:44 duration of the event 23 seconds | 95 |
| Locheed C-130 | DEP | 9.7.2016 14:12 duration of the event 25 seconds | 94 |
| Alenia ATR 72 | ARR | 1.7.2016 8:53 duration of the event 18 seconds | 94 |
| Boeing 757-200 | DEP | 30.7.2016 22:18 duration of the event 14 seconds | 94 |
| Boeing 737-800 | DEP | 9.8.2016 23:47 duration of the event 26 seconds | 93 |
| Airbus 319 | DEP | 9.7.2016 10:06 duration of the event 14 seconds | 93 |
| Iljušin Il 96 | DEP | 25.7.2016 14:26 duration of the event 19 seconds | 93 |

The trend of noise changes over Šenčur and Lokarje from 2009 to 2016:



Source: ZVD Institute of Occupational Safety d.o.o.
Aerodrom Ljubljana, d.o.o.