

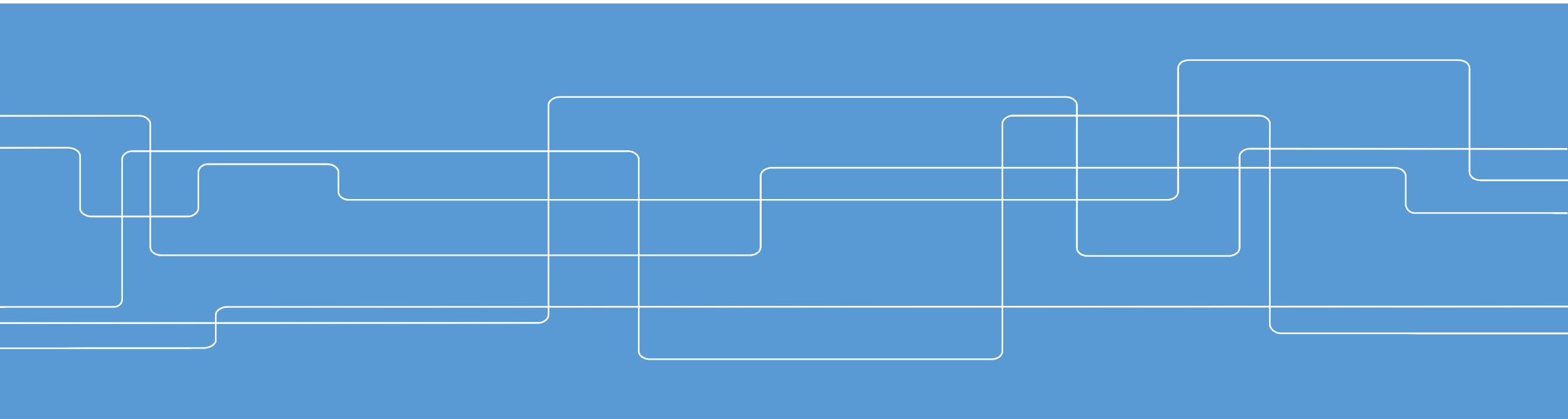


ULLA-

Acoustic Measurements around Arlanda



CSA
Centre for
Sustainable
Aviation



Project overview

- *Overall purpose:*
- Study the acoustic emission and sound quality for approaching aircraft
- PhD student Anders Johansson
- Supervisors Assoc prof Leping Feng and Assoc prof Karl Bolin

Presentation content

- Project overview
- Key problems
- Method used
- Results so far
- Conclusions
- Future
- Questions

Key problems



➤ How much do differences in flight operational behaviour for landing aircraft and the weather situation affects the noise level on ground?

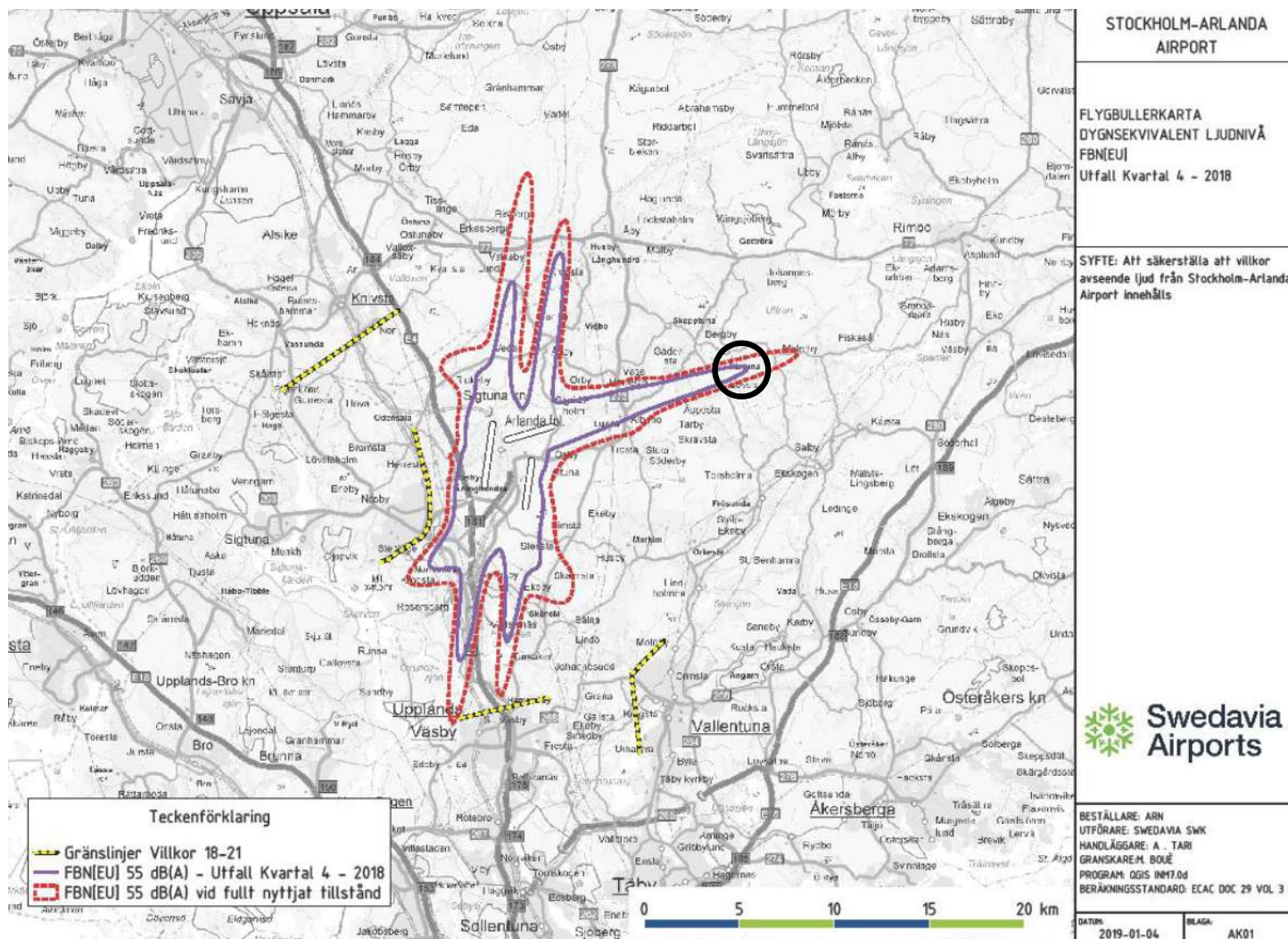


➤ Is there a relationship between flight operational behaviour and sound quality?

Methods used

- Measure the noise level on the ground over a large area beneath the approach path and measure for a long period of time.
- Correlate weather- and aircraft-data with measurements and analyze
- Perform listening tests

Arlanda airport, 250 000 movements per year

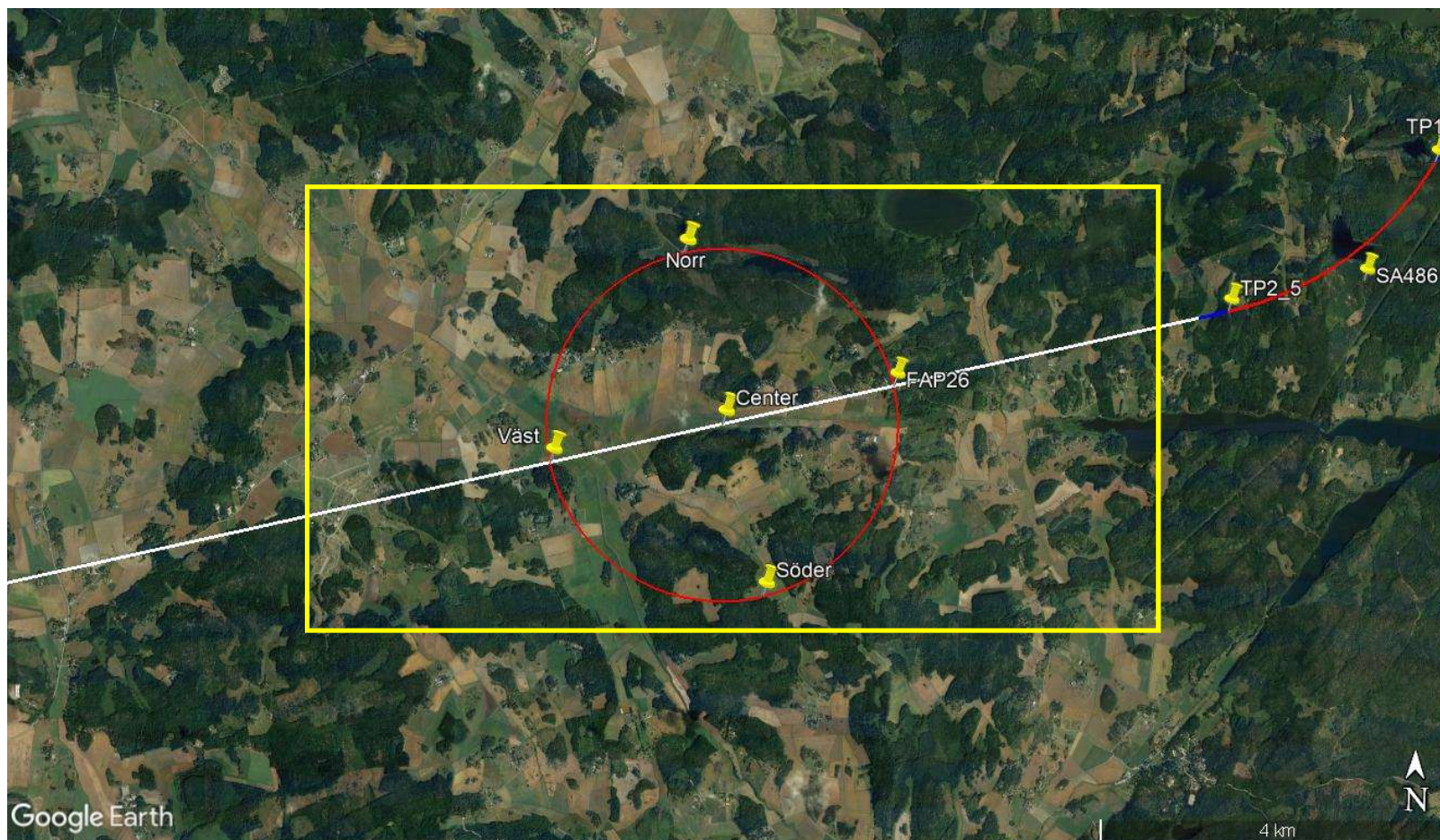


Sound level meter

- Commercial equipment 200 000 SEK per piece
- Production of sound level meters with requirements:
 - ✓ • Correct acoustic levels
 - ✓ • Weather resilience
 - ✓ • Triggering for aircraft movement
 - ✓ • Wireless communication
 - ✓ • Self-supporting electric power system

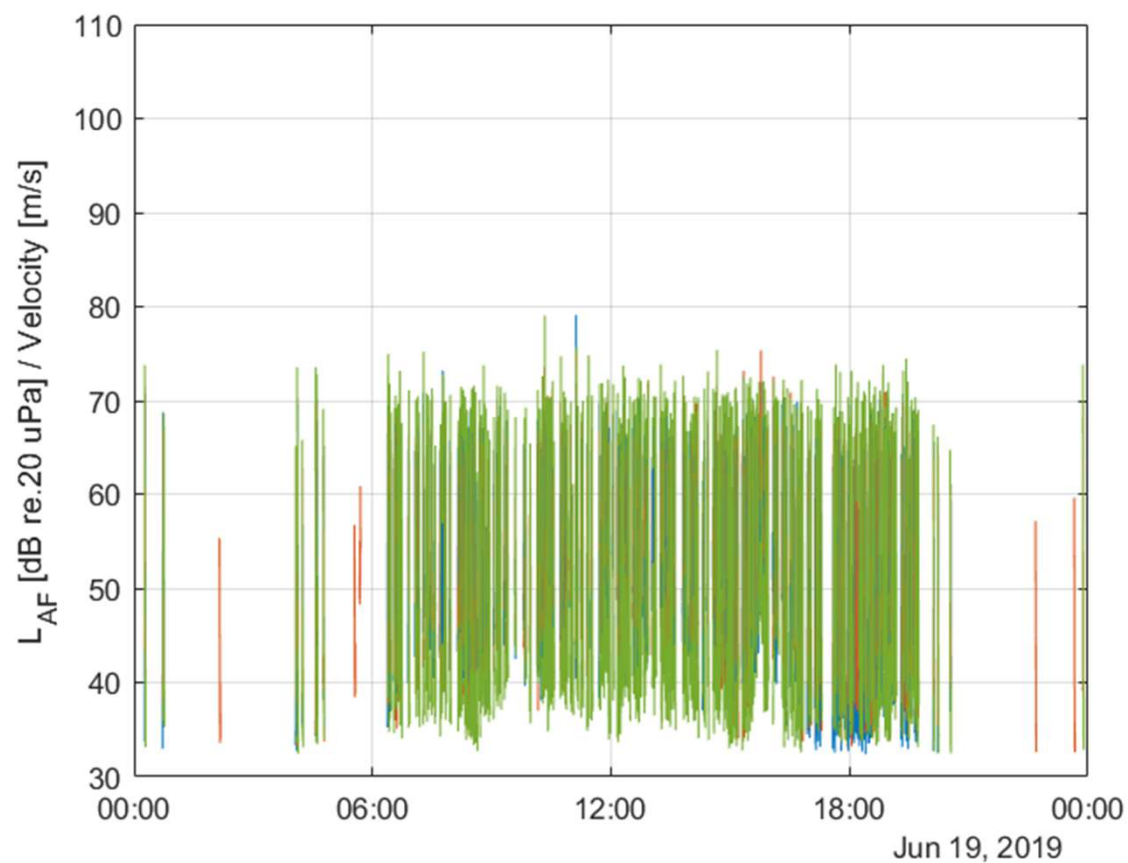


Measurement locations: east of RW 26

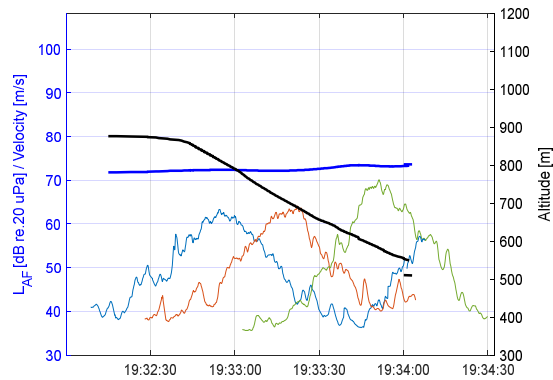


Yellow square is the triggering zone for the openSky Network ADS-B Flight data

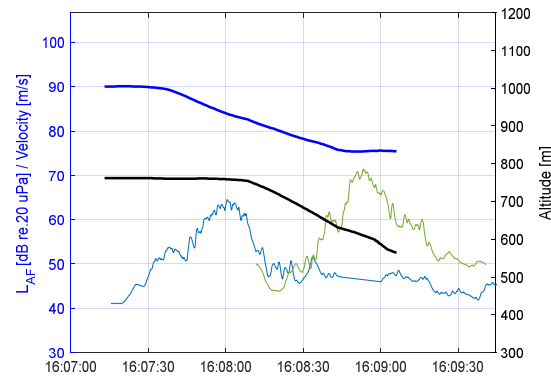
One day of passby measurements



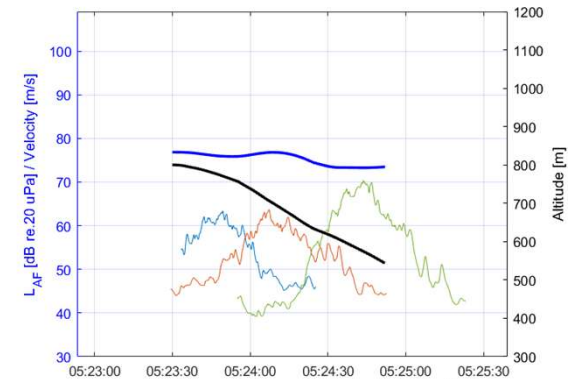
Two passby's performed by the same individual aircraft during the same day



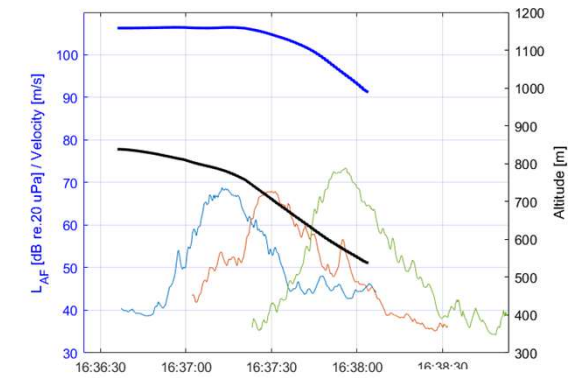
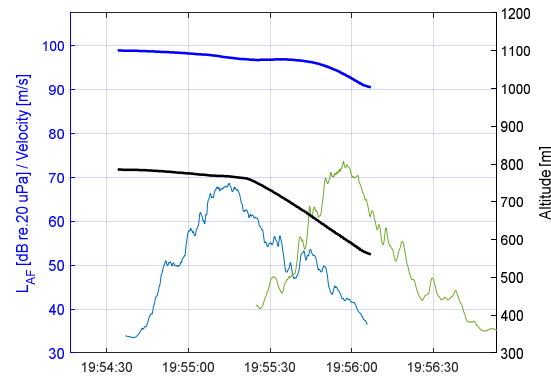
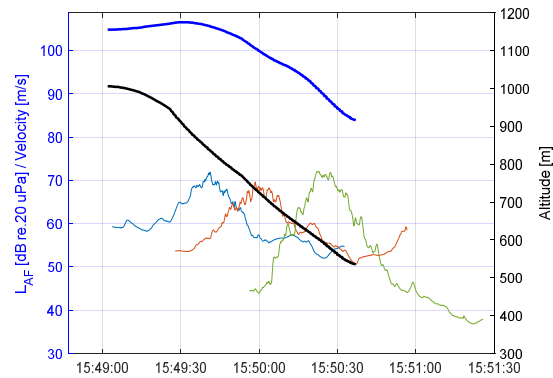
A321



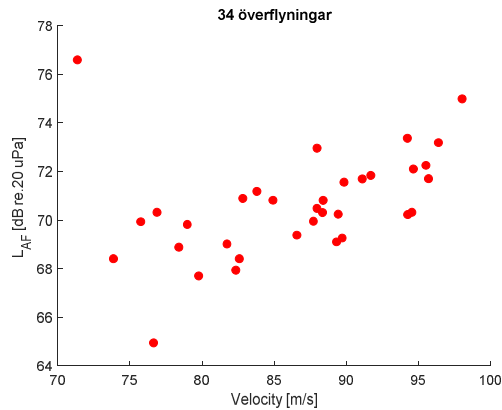
A320



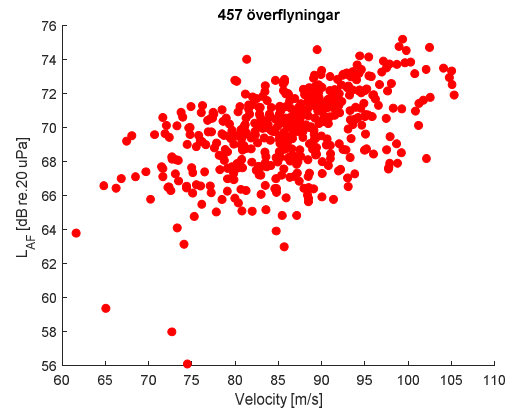
B737



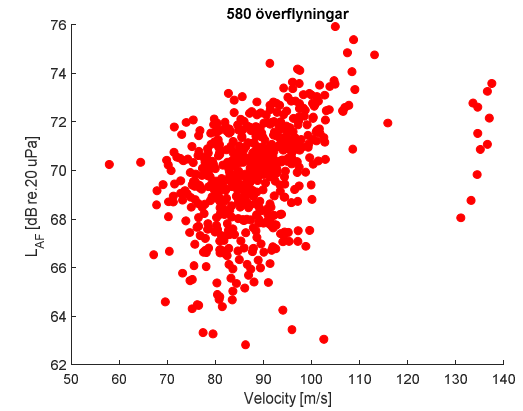
Altitude and Velocity vs L_{Amax} , one months (June) air-traffic at RW26



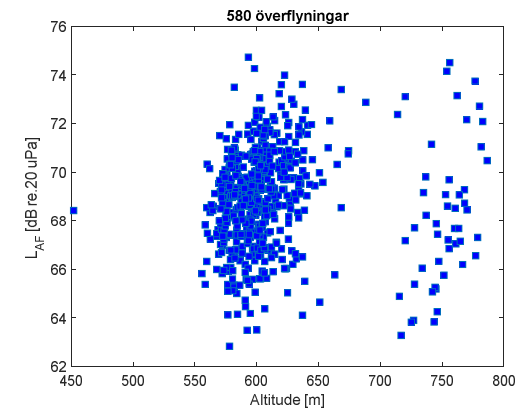
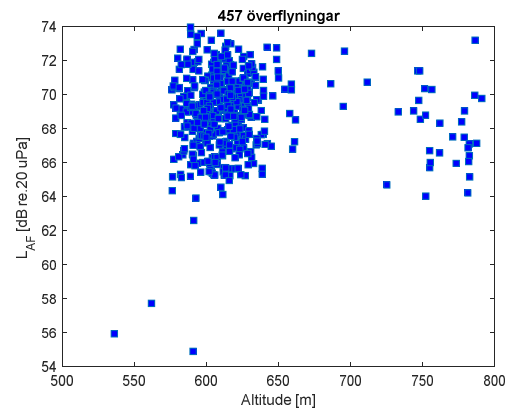
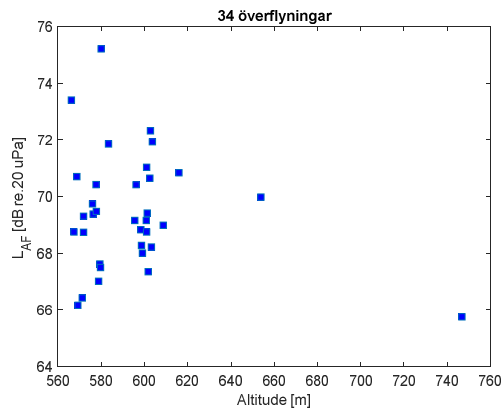
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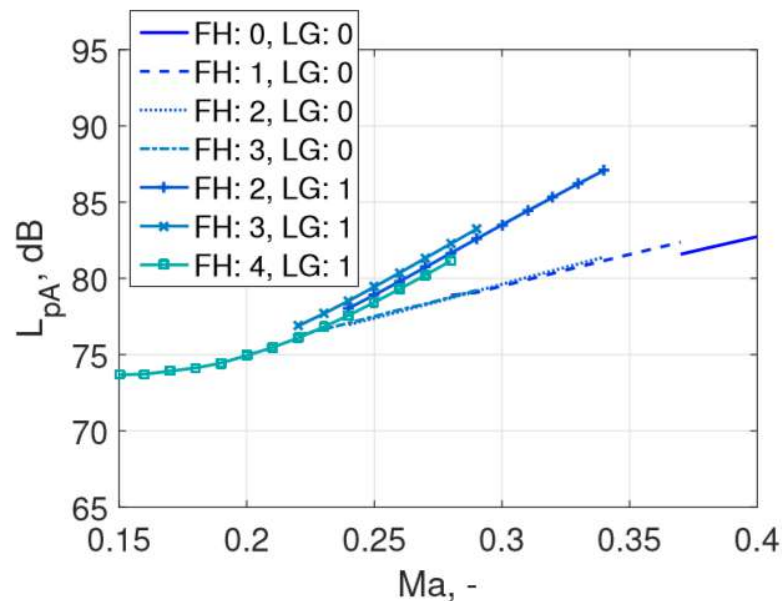
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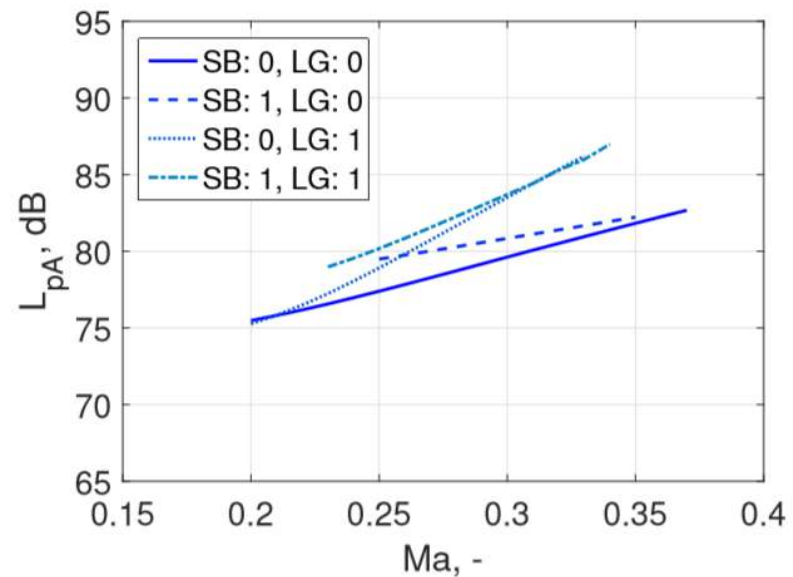
B737



Higher speed more noise



(b) Level at receiver ($d=304.8$ m)



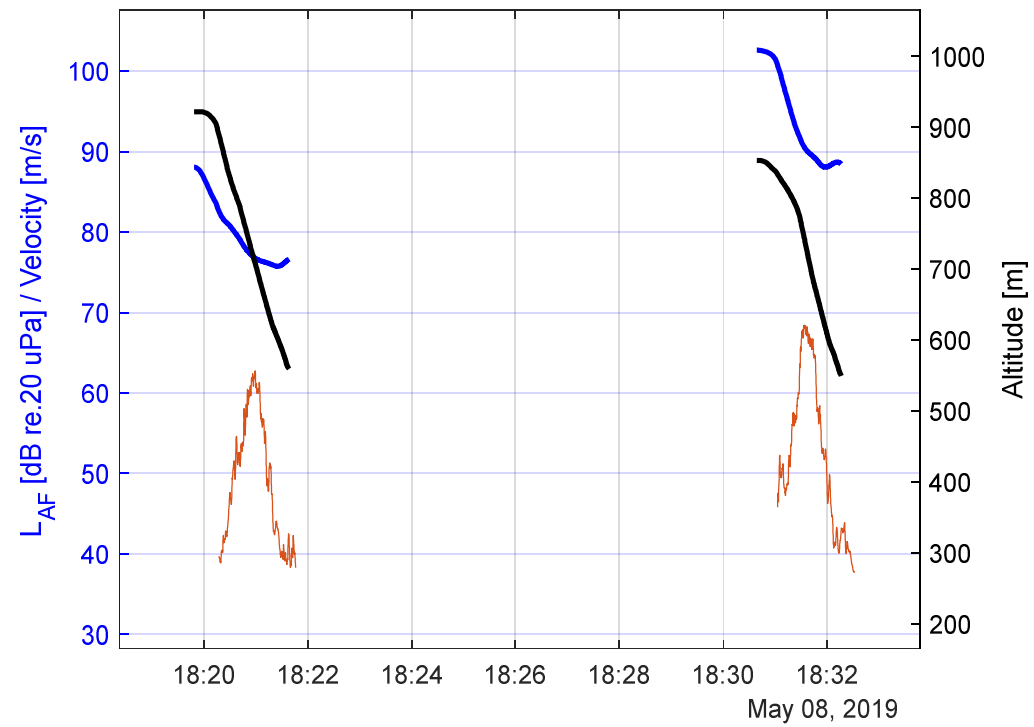
(b) Level at receiver ($d=304.8$ m)

Figures from: C. Zellmann. Dr. Thesis "Development of an Aircraft Noise Emission Model Accounting for Flight Parameters"

Future work

- Extend the measurement area, longer trajectories
- Collect more detailed data about the flight configuration
- Initiate listening tests

Listening Test



Thank You!

Questions?