Enabling Environmentally Friendly Approach Profiles
DYNCAT

Dynamic Configuration Adjustment in the TMA

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Agenda

- Observations & Motivation
- Technical Background
- Project Concept and Methodology
- Expected Results

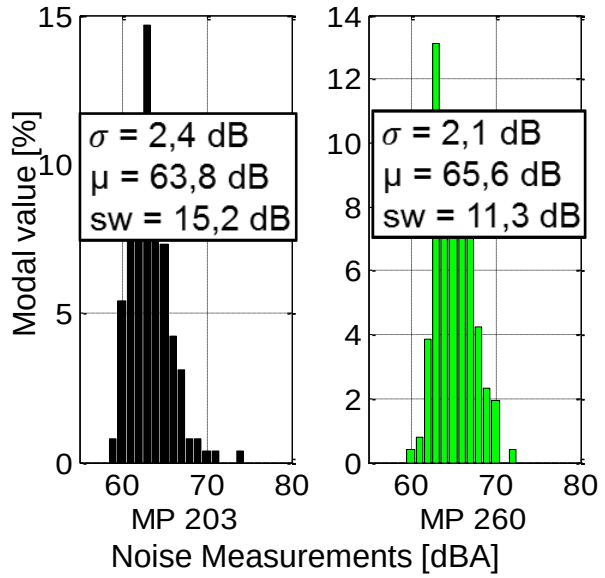
This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 893568

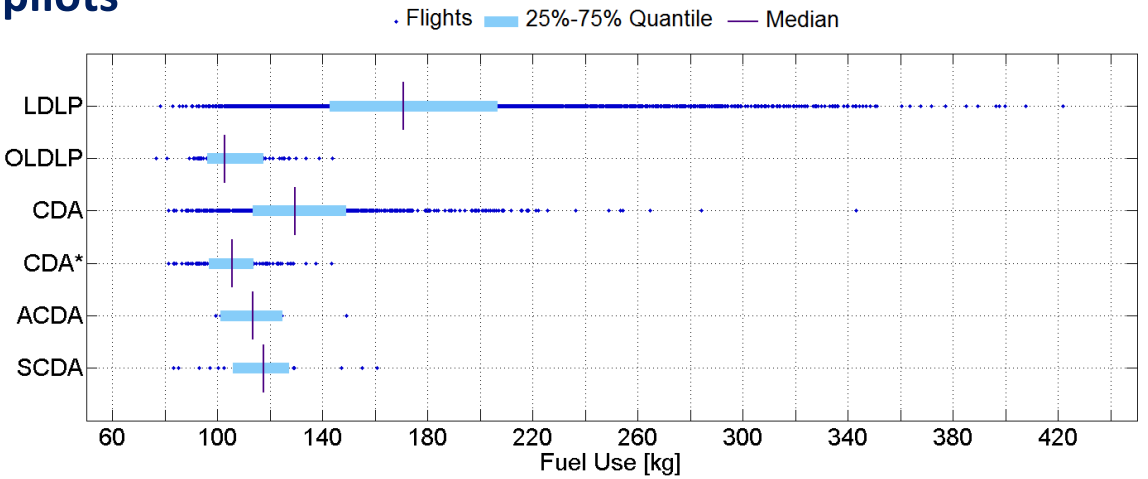
Observations & Motivation

- The noise generated by airplanes in approach significantly exceeds in practice the levels that could be reached *while flying exactly the same 3D-trajectory*.
- Optimal energy management by changes of speed, altitude, and with wind effects proves to be challenging for a pilot and with the current indications in the cockpit
  - **Often conservative strategies are adopted by the pilots**
    - **Safe but loud…**
    - **Limited energy awareness**
    - **Increased fuel consumption**

What is the reason for such huge variations?
What were the differences between these approaches?

- The environmental conditions and the requirements of air traffic control make every approach unique





Fuel consumption from 30 NM to 1000 ft Gate

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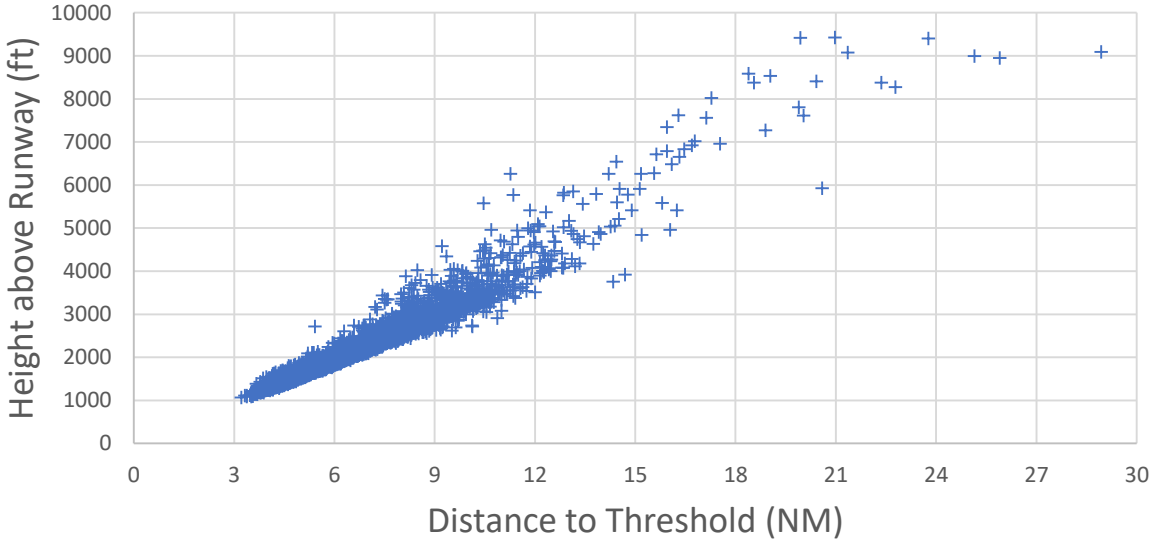
Observations & Motivation

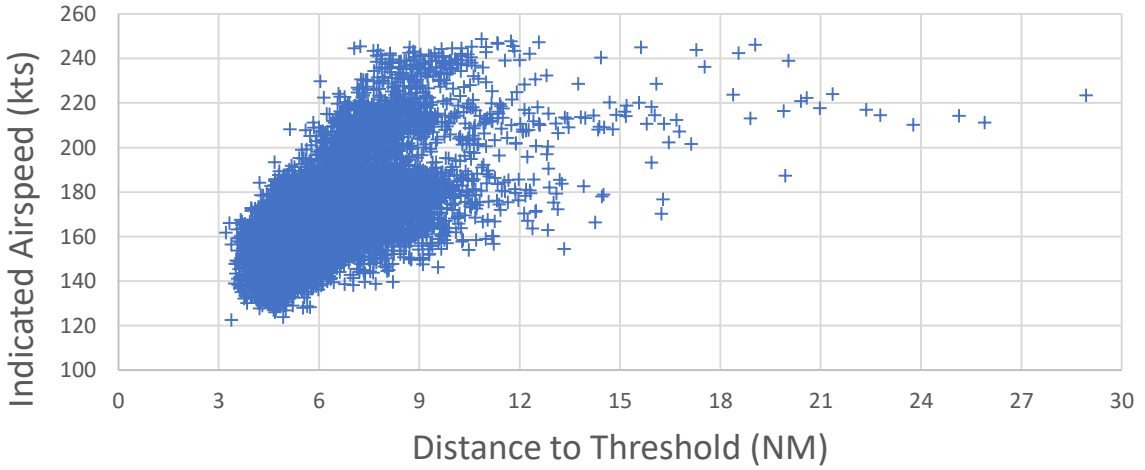
Analysis of current daily operations

Flight Data: Position of landing gear extension and related speed

Example: Zurich RWY 14 ‚Extending landing gear‘ (lever, A320)

- About 12794 approaches evaluated: landing gear extension from 30 NM and 10000 ft
- 7% at 8 NM or more from the runway threshold
- Significant variation of
  - **Speed management**
  - **Landing gear extension**





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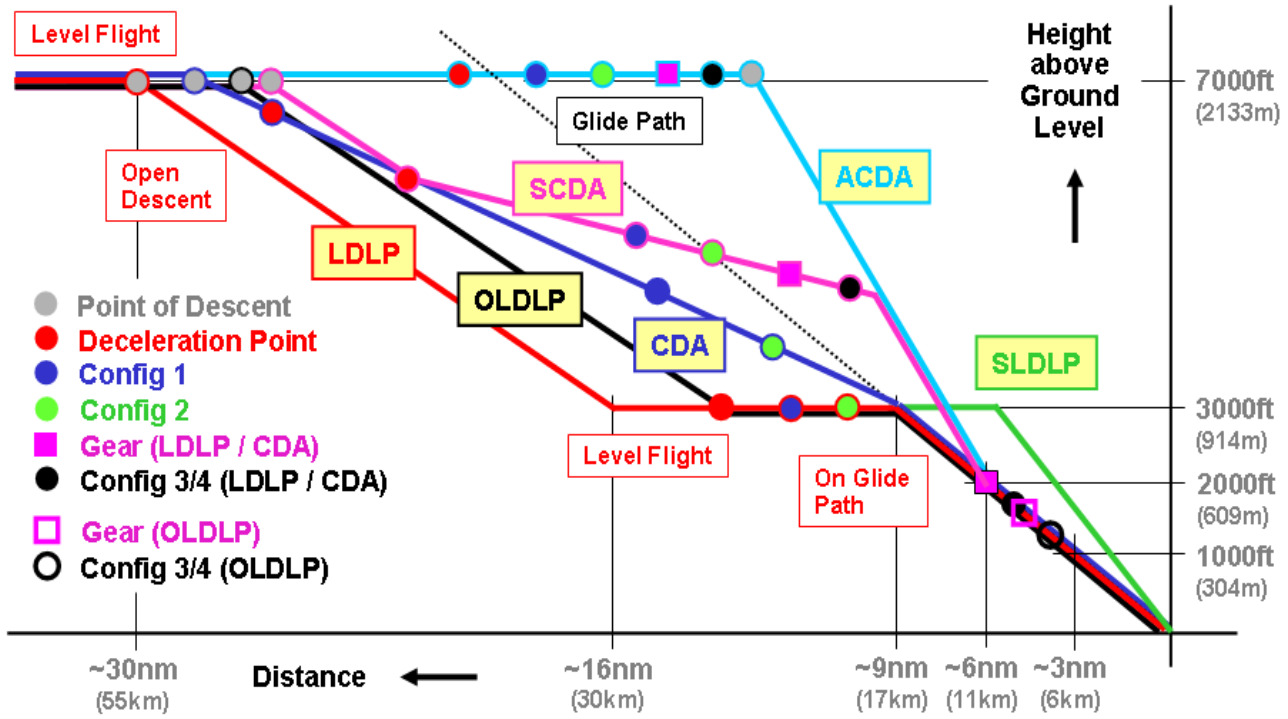
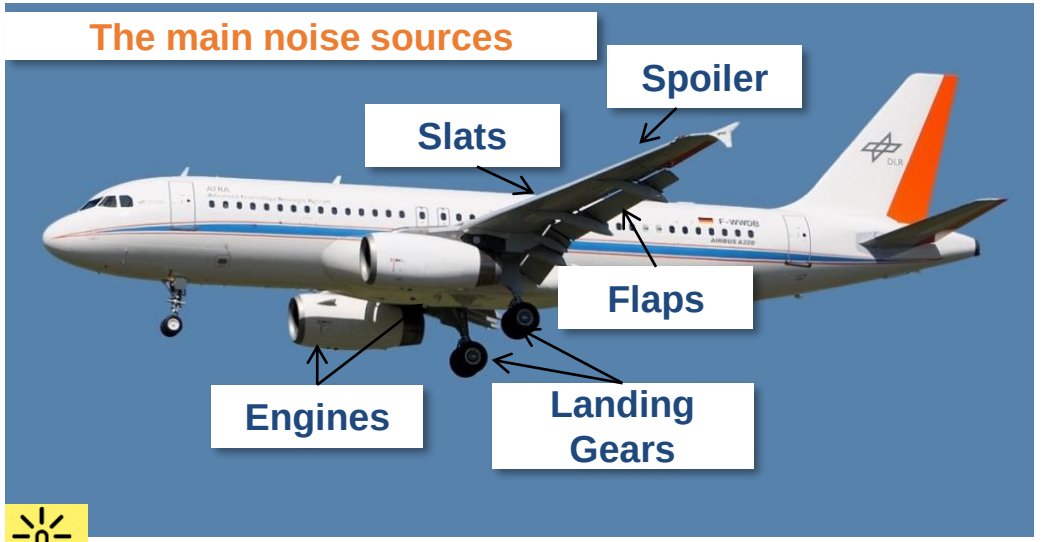
Background

Approach Procedures

Continuous Descent Approach (CDA)
Advanced Continuous Descent Approach (ACDA)
Segmented Continuous Descent Approach (SCDA)

Low Drag Low Power (LDLP)
Optimized LDLP (OLDLP)
Steep LDLP (SLDLP)





- *The pilot also intervenes indirectly in speed management during approaches supported by autopilots.*
- *The speed setpoints are determined automatically, but are dependent on the currently selected flap configuration, which is still determined by the pilot himself.*
- *Landing gears are also controlled manually by the pilots.*

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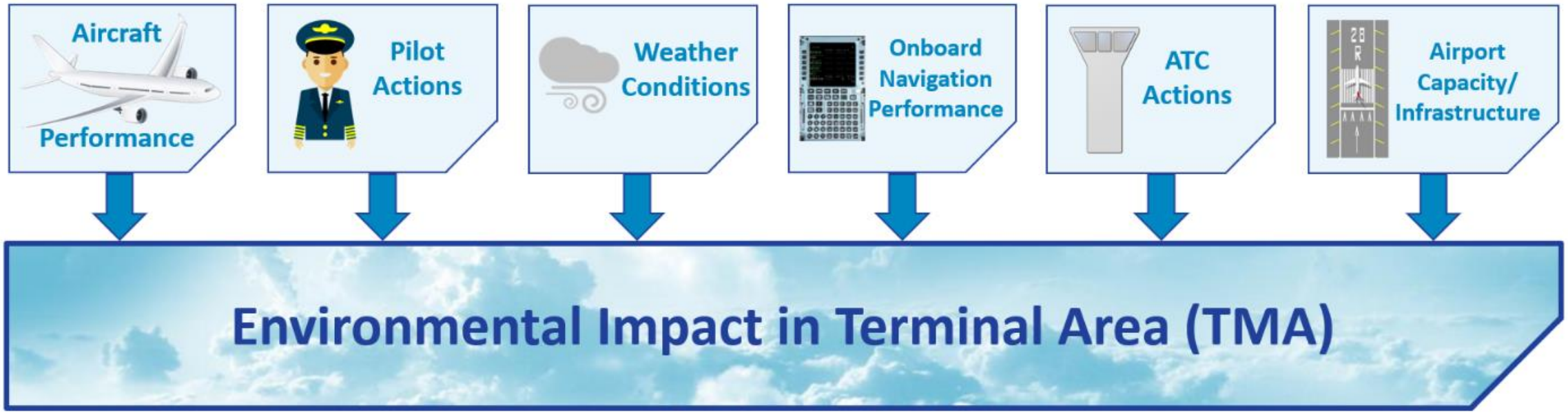
Background

Air Traffic Operation

What are the main impact drivers of the current air traffic operations on the environment in the TMA?



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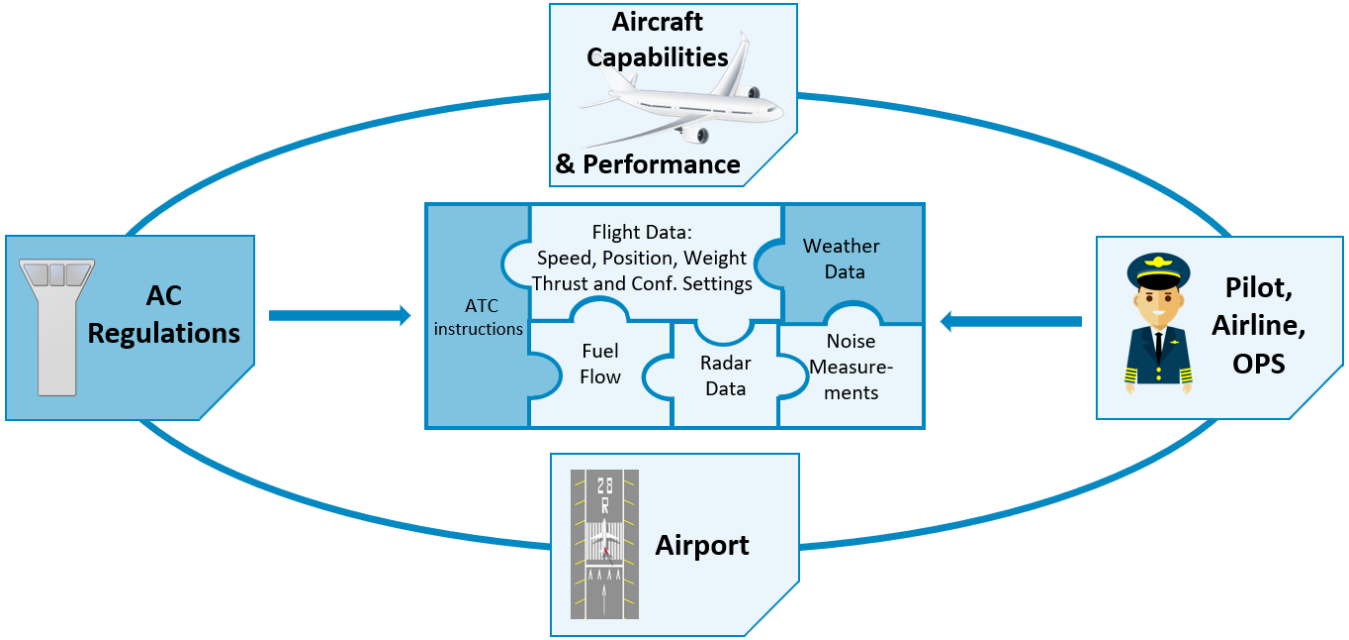
DYNCAT Concept and Methodology

Visualize and measure the influence of ATC

with *input from practitioners (pilots, ATCos) and authorities* throughout the project



analysis of combined real-world data from all relevant sources

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definition of operational concept

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prototyping of DYNCAT algorithms into FMS demonstrator on industrial test bench

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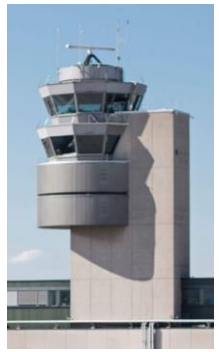
evaluation / quantification



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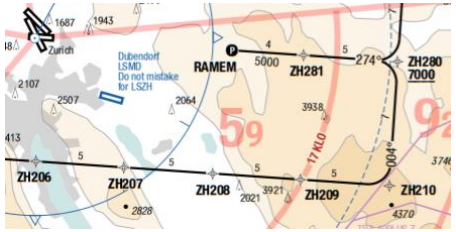
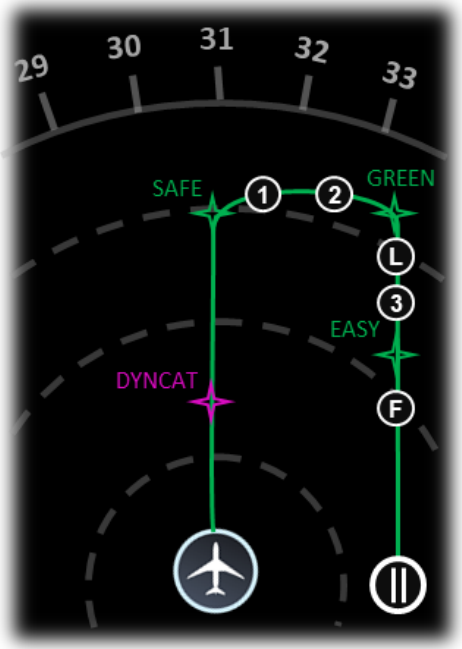
Expected Results



In this project, pilots, air traffic control and industry are working intensively with the research facilities to present a global picture:

- a series of **categorized and prioritized recommendations and solutions** in form of a **catalogue of measures.**
  - **see the impact e.g. of speed restrictions and what measures ATM can take to minimize negative influences.**
  - **suggestions and recommendations for innovative operational changes to ATM aiming at reducing the environmental impact from aviation**
  - **definition of requirements aimed at developing 4D trajectories that are optimised to take account of environmental considerations**
  - **suggestions for improvement for pilot training**
  - **recommendations for flight procedure designer and authorities**
  - **recommendations for equipment and aircraft manufacturers**



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Thanks for your attention !

Questions ?

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Further information about the DYNCAT project on the SESAR website: https://www.sesarju.eu/projects/dyncat
Additional technical information: https://www.dyncat.eu and https://www.skylab.swiss/dynamic-configuration-adjustment-in-the-tma-dyncat/