OptiClimb: Fuel Savings through Machine Learning models

Data Science in Aviation Workshop
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Data science can offer a way to make use of black box data to identify causes through correlations.

Collateral:
The Data can also be used to improve operational efficiency.
BIG DATA SOLUTIONS FOR SAFETY AND EFFICIENCY OF AVIATION OPERATIONS

- Flight Data
- Weather Data
- Radar Data

Fuel Savings in Climb Phase: 5-10%

Airport Analytics for Safety & Efficiency

Opti Climb: More savings, less CO₂

Airside Watch: Radar data at work
**FUEL EFFICIENCY ENVIRONMENT**

**OPTI CLIMB** is the only solution focusing on the **climb phase**.

[Diagram showing flight planning stages: Flight Planning → Taxi → Take-Off → Climb → Cruise → Descent → Landing. OPTI CLIMB highlighted in green.]
TAIL NUMBER SPECIFIC PERFORMANCE MODELS

Historical QAR Data for each aircraft

MACHINE LEARNING PERFORMANCE MODEL

Engine Power Percentage Profiles
OPTIMIZATION OF EACH CLIMB

Reach the same point in ground distance at the same time with a more efficient trajectory

- Fuel consumption
- Climb time
- Ground distance
- T° and wind gradients every 1000 ft

Flight Plan
(Tail number, TOW, TOC, cruise Mach, ...)

CLIMB PROFILE OPTIMISATION

OPTI CLIMB
(More savings, less CO2)
OPTI CLIMB IN SUMMARY

**FMS**
- aircraft centric

1. OEM performance model per type
2. ECON Climb Speed

**OPTI CLIMB**
- connected aircraft

- Historical QAR Data for each aircraft
- Flight Plan for each flight
- Accurate 4D Weather

**MACHINE LEARNING PERFORMANCE MODEL**

**CLIMB PROFILE OPTIMISATION**

5-10% FUEL SAVINGS IN CLIMB PHASE
ECOFLYING THE AIRCRAFT

Fuel flow without OptiClimb

Flight with OptiClimb

Flight without OptiClimb

Cruise Level

FL120

M.76

FL120

IAS 300 KTS

IAS 247 KTS

3 OptiClimb Speeds vs. 1 ECON Climb Speed

During cockpit preparation

SPD REST: 247 / FL120

TGT SPD: 300 / 0.76
THE SINGLE MOST EFFICIENT FUEL SAVING INITIATIVE

- Reserve Fuel: 12,8%
- Idle Reverse: 5.6%
- Reduced Altitude Acceleration: 16,7%
- Constant Descent: 15,2%
- Engine out taxi in: 1.7%

- 48% fuel savings

- 76kg fuel savings per climb
- 1,5M$ annual savings
- 7040t CO₂ annual footprint reduction
OPTI CLIMB TEST & CUSTOMERS

- 3 customers
- 28 test airlines worldwide
- LCC & Legacy airlines
- Total fleet of over 1000 aircraft
- Multiple aircraft types:
  - 737NG
  - A320 Family
  - A330
  - 747-8
  - CRJs
  - Ejets
Thank you for your attention!

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