OTP Evolution and Technology Leaps for Delay Cost Improvement
SITA OTP STUDY

• 3\textsuperscript{RD} Annual On Time Performance Analysis

• Global Study for Cost Estimation of Delays

• 180 airlines, 27 million of flights

• Direct Cost from Delays (Day of Operations)
ON TIME PERFORMANCE
OTP STUDY APPROACH

- PUBLICLY SOURCED DATA
- COMPLETENESS VERSUS PRECISION
- TACTICAL COST OF DELAY (INCLUDES REACTIVE COST)
- DIFFERENTIATION BETWEEN TIME WHEN DELAY OCCURS: AT-GATE | DURING TAXI | EN-ROUTE
- COST PROXIES TAILORED PER REGIONS
- FOCUS ON AIRLINE PRODUCTIVITY AND OTP COMPETITIVENESS
- FORECASTING – CAUSAL INFERENCE AND TIME SERIES MODELLING
REGIONAL OTP RESULTS 2016

OTP 80.9%
• 11M Flights
• $12B Total Cost of Delay
54min Average Delay Time
$5,586 per delayed flight

OTP 72.1%
• 2M Flights
• $1.6B Total Cost of Delay
46min Average Delay Time
$2,790 per delayed flight

OTP 78.9%
• 6M Flights
• $5B Total Cost of Delay
44min Average Delay Time
$3,981 per delayed flight

OTP 72.8%
• 7M Flights
• $7B Total Cost of Delay
59min Average Delay Time
$3,527 per delayed flight
HISTORICAL OTP OVERVIEW

On Time Performance (%)

Delay Duration (min)
GLOBAL AIRLINES COMPETITIVENESS

**OTP Effectiveness** – ability of an airline to increase the output level without increasing the average level of waste from the production process

**OTP Efficiency** – ability of an airline to increase the output level without decreasing the average level of quality of the final product
GLOBAL AIRLINES COMPETITIVENESS

Effectiveness

Efficiency

2014

2015

2016

Limited Effectiveness

High Effectiveness

Limited Efficiency

High Efficiency

8%

17%

12%

20%

11%

14%

45%

29%

38%

29%

46%

28%
DELAY COST FORECAST

5 years evolution:
- 80% flight growth
- 3K average monthly flights
- 2p.p OTP improvement
- 7min delay duration increase
- 27% Cost of Delay Increase

5 years evolution:
- 14% flight growth
- 25K average monthly flights
- 3p.p OTP improvement
- 2min delay duration improvement
- 8% Cost of Delay Savings

5 years evolution:
- 80% flight growth
- 3K average monthly flights
- 2p.p OTP improvement
- 7min delay duration increase
- 27% Cost of Delay Increase

5 years evolution:
- 14% flight growth
- 25K average monthly flights
- 3p.p OTP improvement
- 2min delay duration improvement
- 8% Cost of Delay Savings

5 years evolution:
- 30% flight growth
- 120K average monthly flights
- 10p.p OTP decline
- 9min delay duration increase
- 21% Cost of Delay Increase

5 years evolution:
- 12% flight growth
- 30K average monthly flights
- 4p.p OTP decline
- 3min delay duration decline
- 7% Cost of Delay Savings
THE WAY FORWARD

Production Function

Q = f(I)

Increasing Marginal Returns
Diminishing Marginal Returns
Diminishing Total Returns

TECHNOLOGY
FROM REACTIVE TO PROACTIVE DISRUPTION MANAGEMENT

Enterprise Planning
- Route structure
- Fleet
- Bases
- Facilities
- Crew

Network Planning
- Schedule
- Fleet assignments
- Pricing Policies
- Product Offerings

Sales & Commercial
- Pricing
- Yield management
- Restrictions
- Profitability

Operations Planning
- Resource allocation
- Tail assignments
- Crew assignments

Day of Operations
- Execute the plan!

Data Lake

Proactive Disruption Management
- OTP / Delay Improvement
- Cost Improvement

Flight Delay Prediction enabler for both OTP / Delay Improvement and Cost Improvement

BI & Optimisation
- Fleet
- Schedule
- Pricing
- Rostering

Predictive Analytics
- Customer Behaviour
- Customer Demand
- Flight Delay Prediction

>18 months  12 months  6 months  1 month  <1 week  Today

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USER STORIES

“As an OCC manager, I want to know as soon as an aircraft tail number is assigned to a flight if and when it may experience a significant delay that may require me to do an aircraft swap”

“As an HCC manager, I want to know at least a day in advance if I may need to re-accommodate pax with missed connections, or take very early action to stand them by on alternative flights”

“As an OCC manager, I want to know at least a day in advance of any non-normal activity so I can optimally assign and deploy my staff”

“As a reservations manager, I want to know as early as possible when we may have many disrupted pax to handle so I can block book hotels at discounted rate”

“As an OCC manager of a European airline, I want to know as early as possible when a flight may be more than 4 hours delayed (EU 261) so I can take pre-emptive action”

The answer: “Proactive Disruption Management”
Objectives:

• **Detection**: Relay information about possible disruptions to ATI stakeholders and to prediction algorithms

• **Prediction**: Warn ATI stakeholders about flight delays up to 72 hours in advance

• **Proactive Disruption Management**: Provide different options to manage delays more effectively, improve customer satisfaction and reduce costs
PREDICTION PLATFORM

Encouraging early results from Prediction Platform

Scheduled
Actuals
SITA predictions
FROM THE LAB TO THE OPS ROOM

• Delay predictions are possible!
• Requires
  • Data – more is better, both in breadth and scope
  • Domain expertise – understand data in context
  • Data Science – Selection and tuning of learning algorithm
  • Engineering – Develop a workable and integrated platform

• Contributing factors:
  • Data quality and accuracy: Significant impact
  • Delay duration: Significant impact
  • Time-to-departure: Small impact, even up to 72 hours ahead

• Business Challenges
  • Managing the shift from reactive to proactive disruption management
  • Integration with existing airline systems and processes
Thank You!

GORAN.ISAKOVSKI@SITA.AERO | FRASER.MCGIBBON@SITA.AERO