Exploring Opportunities Of Bi-Directional Connectivity - From Mobile Devices To The Flight Deck

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Agenda

• Introduction
• Technological Background
• Proposed solutions
• Business potential
• Conclusion
Introduction
Flight Deck Connectivity
Technological Background
Implementation trend towards modular systems.
Door-2-Door concept demonstrator

1) Basic Integration

The mobile device is used to convey information, which have been provided up to now in paper form.

2) Integration with Avionics

But in order to support pilot workflows better and enhance usability, it is necessary to integrate further with avionics: READ & WRITE!
Possible Retrofit Connections
Possible Retrofit Connections
Business Potential
Many Small Opportunities Can Add Up To Significant Savings

Accurate measurement of small operational changes required
The Power of Small Changes

Example Short Haul Flight

$12,550  $12,092

Example Fuel Inefficiencies ($/flight)

- $ 67: Extra 30 minutes APU run
- $ 26: Dual engine taxi-out (8 mins)
- $ 28: CG 2% off optimum
- $ 93: Fly 2000’ below optimum (1.5 hrs)
- $140: Suboptimal descent
- $ 47: Extra 2,000 lbs arrival fuel
- $ 6: Dual engine taxi-in
- $407 Total + 1,124 kg's CO₂

Fuel saving can double your profit per flight!
Fuel Dashboard Results

Current Customer Results (August 2014)

Identified Savings Potential (% of Fuel)

- 4.5% Average
- 7.0% Max
- 2.8% Min

Customer Results
- 11 airlines
- ~600 aircraft
- ~485,000 flights
- ~$7.7B fuel spend

Significant potential identified; Customers typically achieve 1% to 3%
Strong Value Proposition

Narrow-Body Example

737-800 at $8M / year fuel spend
3,200 FH's / year (9 hours / day; 4 – 5 flights/day)
750 gal fuel / FH; $3.50 / gal

Identified Potential

<table>
<thead>
<tr>
<th>Avg.</th>
<th>Value / Tail</th>
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<tbody>
<tr>
<td>4.5%</td>
<td>$360,000</td>
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Airline Fuel Program

<table>
<thead>
<tr>
<th>Resources / expertise</th>
<th>25%</th>
<th>50%</th>
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<tbody>
<tr>
<td>Change management</td>
<td>$90,000</td>
<td>$180,000</td>
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Achievable Savings \(^{(1)}\)

**Fuel Dashboard offers significant return on investment**

100 narrow-body airline could save $9M to $18M+ per year; Widebodies more

Notes: (1) Percentage of Identified Potential; typical range, net of implementation costs (1% to 2%)
Conclusion
More powerful results thanks to bi-directional connection

- Real-time decisions about **weather** or **aircraft maintenance**
  - Being informed real-time, dispatchers and pilots can make safer decisions, e.g. in case of an approaching storm;
  - Operating at optimum speeds, altitudes and trajectories (Jeppesen’s Wind Updates) and avoiding, that inaccurate, limited or outdated weather data prevent that;
  - Conversion of unscheduled to scheduled maintenance by more complete awareness through in-flight health monitoring.
- Communication costs and available bandwidth.
THANK YOU!

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Reduce fuel consumption
Optimize crew utilization
Increase asset availability
Leverage real-time information
Minimize disruption impact
Improve operator efficiency