Air Cargo Operations and the Economy

- Global Air Cargo increased 20.6% in 2010; North America 21.8%.

- The value of U.S. exports transported by air reached an all-time high of $393B in 2010, accounting for 31% of total U.S. export value.

- By 2014, the largest international Air Cargo markets will be the USA, Hong Kong, Germany, and Japan.

- International volume is expected to grow 8.2% compounded annually until 2014.

Source: IATA
UPS Impact to the Economy

- 400,600 employees world-wide
- UPS moves 6% of the US National GDP
- Every 40 additional packages creates a job
International Air Hub Operations
Late from Domestic Hub = Intl Delays
Weather Delay Impact to Air Cargo Customer Service

- Every minute delay into an Air Cargo Hub causes the sort to run that amount late, and thus causing the outbound launch to run late.

- A Diversion causes service failures for the packages on board.

- Any additional block time added to a flight causes later deliveries on the road.

- A shorter taxi-in or taxi-out can be the difference in making an Early AM (8:30AM), Next Day (10:30AM), or International Express (Intl Next Day) service commitment.
Weather Delay Impact to Cargo Customer Service

• Weather impacts all aspects of the Air Cargo Operation.
  – UPS Meteorology Department is focused on the operation and time critical nature of service commitments.

• Service recovery is critical to the success of our operation.

• Canceling flights is not an option.
  – Our service commitments are guaranteed. If we do not meet the service commitment the delivery is free.

• Satisfied customers = Growth in Business = Employment = Efficient Competitive Economy
# How Taxi Time Effects Cost

- Every Additional Minute to Taxi Time Equates to:

<table>
<thead>
<tr>
<th>A/C Type</th>
<th>Gal/Min</th>
<th>Avg. Origin Fuel</th>
<th>$ Cost per Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>B757</td>
<td>6.4</td>
<td>$3.05</td>
<td>$19.52</td>
</tr>
<tr>
<td>B767</td>
<td>7.2</td>
<td>$3.03</td>
<td>$21.82</td>
</tr>
<tr>
<td>A300</td>
<td>9</td>
<td>$3.05</td>
<td>$27.45</td>
</tr>
<tr>
<td>MD11</td>
<td>16.4</td>
<td>$3.01</td>
<td>$49.36</td>
</tr>
<tr>
<td>B747-4</td>
<td>21.3</td>
<td>$2.88</td>
<td>$61.34</td>
</tr>
</tbody>
</table>

Average Per Minute Taxi Cost UPS Fleet = $35.90
117 SDF Flights X $35.90 = $4200.03/Minute
$4200.03 X 4 Nights Full Launch = $16,800.12
$16,800.12 X 52 Weeks = $873,606.24/Year
How Flight Time Effects Cost

• Every Additional Minute to Flight Time Equates to:

<table>
<thead>
<tr>
<th>A/C Type</th>
<th>Gal/Min</th>
<th>Avg. Origin Fuel $</th>
<th>Cost per Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>B757</td>
<td>18</td>
<td>$3.05</td>
<td>$54.90</td>
</tr>
<tr>
<td>B767</td>
<td>26</td>
<td>$3.03</td>
<td>$78.78</td>
</tr>
<tr>
<td>A300</td>
<td>29</td>
<td>$3.05</td>
<td>$88.45</td>
</tr>
<tr>
<td>MD11</td>
<td>40</td>
<td>$3.01</td>
<td>$120.40</td>
</tr>
<tr>
<td>B747-4</td>
<td>48</td>
<td>$2.88</td>
<td>$138.24</td>
</tr>
</tbody>
</table>

Average Per Minute Cost UPS Fleet = $96.15

117 Flights X $96.15 = $11,249.55/Minute

$11,249.55 X 4 Nights Full Launch = $44,998.20

$44,998.20 X 52 Weeks = $2,339,906.40/Year
How Arrival Delays at SDF Hub Affect Costs

- **Cost Per Minute Late Arrival into SDF Hub = $711.96**
  
  (Cost is for Hub Workers Only does not include Power Consumption, Support Staff, Downstream Impact)

$711.96 Per Minute Late Per Flight

1 Flight 15 Minutes Late = $10,679.40
Summary: Costs Per Minute for Weather Delays

- For Every Taxi Minute = $35.90
- For Every Minute Enroute = $96.15
- For Every Minute Into SDF Hub = $711.96
Quantify Costs/Benefits of Weather Forecast Decisions

• Relatively easy to quantify number of minutes late due to weather
• Hard part is quantifying AVOIDABLE weather delays
• With new forecast tools, takes time to gain confidence in tool and then to make effective operational changes.
• Costs of Doing Nothing vs. Taking Action
Decision Threshold Determined by Costs/Benefits

Example 1: Deicing SDF Departure fleet for Frost

- Costs $50,000 to pretreat entire fleet
- Getting caught by surprise Costs 100 departures 15 minutes delay each. Down line costs $1 Million +
- Breakeven Cost/Benefits Ratio 20:1 or 5%
- Operational Decisions made at only 10% Risk of Frost
Decision Threshold Determined by Costs/Benefits

Example 2: Spreading out Hub Arrivals due to Severe Adverse Weather during Arrivals (T-storms/Winter Storm)

- Direct Costs $1 Million
- Potentially Avoids $2 Million Costs and/or 100,000 Service Failures (10% of Volume)
- Successful Forecast must be accurate within 30 minutes 6-10 hours in advance, at 65%+ Confidence Level
Avoidable Weather Delays

• Large, Complex Networks must be flexible.
• Forecast must meet the needs of the users/decisionmakers.
• Users/decisionmakers must have confidence in the forecasts. 2 or 3 consecutive busts will stifle proactive weather decisions.
• Large, Complex Networks constantly change.