Public Metric -- Assumptions

- Improving safety requires robust data
  - From our front line employees (ATSAP + Partnership for Safety)

- Risk analysis will be transformed with the introduction of electronic detection and analysis (TARP, PDARS, etc.)

- Public metric must express risk
  - Implemented standardized risk analysis program jointly developed by FAA and EUROCONTROL; assesses risk equally across contributing factors, e.g., controller, pilot, avionics
Analyzing Losses of Standard Separation

1000 feet

5 miles

5 miles

1000 feet

66%
### Risk Assessment Results

<table>
<thead>
<tr>
<th>Increasing Likelihood</th>
<th>Increasing Severity</th>
<th>Risk Analysis Event (RAE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>High Risk</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Medium Risk</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Low Risk</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>0.42%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.85%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3.81%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>7.2%</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>17%</td>
</tr>
</tbody>
</table>

Actual results of the 236 events reviewed thus far this year, using the ATO SMS risk matrix and risk assessment program jointly developed by FAA & EUROCONTROL.

Detailed analyses are triggered by a loss of separation greater than 34% of standard separation.

**Serious Loss Event =** High Risk Matrix Event (Red)

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Safety Performance Metric
October, 2010
System Risk Event Rate (SRER) Calculation

\[
\frac{\text{Serious Loss Events}}{\text{Total Number of LoSS Events} \times 1,000}
\]

The ATO ensures that aircraft flying within the national airspace system maintain required separation. When a loss of separation does occur, we will limit the rate of the most serious losses to 20 or fewer for every thousand (.02) losses of standard separation within the system.
FY10 System Risk Event Rate (SRER)

(Preliminary Data – 45 days processing time required)

SRER Calculation: (Serious Loss) / (Number of LoSS Events)*1,000
In Development – Radar Based

PDARS
(Performance Data Analysis and Reporting System)
Criteria for ERC Intercept

– PDARS identified landing runway
– Aircraft within 20 nm of airport
– Aircraft radar tracking data crosses ERC
– At intercept, course of the aircraft must be within 80° of the ERC
– No Helo’s
– If an aircraft does not cross the ERC, the first point where aircraft was 1215 ft (.2nm) away from ERC is labeled as its intercept point
Turns to Final Metrics

- Maximum Overshoot after Intercept of ERC
- ERC Intercept location relative to FAF and Gate
- Angle of ERC Intercept
- Speed at Intercept
- Altitude at Intercept
Summary of Turn to Final Events for ATL

For A80 on 8/23/2010

<table>
<thead>
<tr>
<th>Airport</th>
<th>Arrival Count</th>
<th>No</th>
<th>Max OverShoot after Intercept</th>
<th>Location of Intercept</th>
<th>Angle at Intercept</th>
<th>Speed at Intercept</th>
<th>Altitude at Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>1400</td>
<td>2</td>
<td>754 463 93 78</td>
<td>Int Outside</td>
<td>Gats</td>
<td>31°0'0&quot;</td>
<td>710</td>
</tr>
</tbody>
</table>

Bin reflects all flights. Flights shown landing 26R.
Summary of Turn to Final Events for ATL

For A80 on 8/29/2010

<table>
<thead>
<tr>
<th>Location of Intercept</th>
<th>Max Overshoot after Intercept</th>
<th>Angle at Intercept</th>
<th>Speed at Intercept</th>
<th>Altitude at Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int, Outside, Gate</td>
<td>0-200</td>
<td>201-500</td>
<td>501-800</td>
<td>&gt;800</td>
</tr>
<tr>
<td>ATL</td>
<td>1400</td>
<td>2</td>
<td>764</td>
<td>463</td>
</tr>
</tbody>
</table>

1nm gate

Intercept Markers

Federal Aviation Administration

Safety Performance Metric
October 2010
### Summary of Turn to Final Events for ATL

For A80 on 8/23/2010

<table>
<thead>
<tr>
<th>Max Overshoot after Intercept</th>
<th>Location of Intercept</th>
<th>Angle at Intercept</th>
<th>Speed at Intercept</th>
<th>Altitude at Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>Arrival Count</td>
<td>No In</td>
<td>0-200</td>
<td>201-600</td>
</tr>
<tr>
<td>ATL</td>
<td>1400</td>
<td>2</td>
<td>754</td>
<td>463</td>
</tr>
</tbody>
</table>

- **All flights from 31°-60° bin**

- **ATL**
### Summary of Turn to Final Events for ATL

**For A80 on 8/23/2010**

<table>
<thead>
<tr>
<th>Airport</th>
<th>Arrival Count</th>
<th>Max OverShoot after Intercept</th>
<th>Location of Intercept</th>
<th>Angle at Intercept</th>
<th>Speed at Intercept</th>
<th>Altitude at Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>1400</td>
<td>2 764 463 93 78 799 196 403</td>
<td>Int Outside Int Between Int Inside</td>
<td>0°-20° 21°-30° 31°-60°</td>
<td>0-18° 181-21° &gt;21°</td>
<td>Below At Above</td>
</tr>
</tbody>
</table>

*All flights from >60° bin*
### Summary of Turn to Final Events for ATL

#### For A80 on 6/23/2010

<table>
<thead>
<tr>
<th>Airport</th>
<th>Arrival Count</th>
<th>Max OverShoot after Intercept</th>
<th>Location of Intercept</th>
<th>Angle at Intercept</th>
<th>Speed at Intercept</th>
<th>Altitude at Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>1400</td>
<td>2</td>
<td>0-200</td>
<td>201-500</td>
<td>501-800</td>
<td>&gt;800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Int Outside Gate</td>
<td>78</td>
<td>739</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Int Between Gate/FIA</td>
<td>196</td>
<td>403</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Int Inside FIA</td>
<td>193</td>
<td>403</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Speed at Intercept</td>
<td>1280</td>
<td>72</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Altitude at Intercept</td>
<td>418</td>
<td>710</td>
<td>272</td>
</tr>
</tbody>
</table>

#### Safety Performance Metric

October 2010

**80.56% of aircraft intercepting 31° or more overshoot by more than 800’**

**3.38% of aircraft intercepting 30° or less overshoot by more than 800’**
Summary of Turn to Final Events for ATL

For A80 on 8/23/2010

<table>
<thead>
<tr>
<th>Airport</th>
<th>Arrival Count</th>
<th>Max overshoot after intercept</th>
<th>Location of intercept</th>
<th>Angle at intercept</th>
<th>Speed at intercept</th>
<th>Altitude at intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>1400</td>
<td>2</td>
<td>93</td>
<td>35</td>
<td>710</td>
<td>945</td>
</tr>
</tbody>
</table>

31% of aircraft intercepting >210 overshot by 501’ or greater

Green = 0-180
Blue = 181-210
Red = > 210
Summary of Turn to Final Events for ATL

<table>
<thead>
<tr>
<th>Max Overshoot after Intercept</th>
<th>Location of Intercept</th>
<th>Angle at Intercept</th>
<th>Speed at Intercept</th>
<th>Altitude at Intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>Arrival</td>
<td>Count</td>
<td>No.</td>
<td>Arrival</td>
</tr>
<tr>
<td>ATL</td>
<td>1400</td>
<td>2</td>
<td>754</td>
<td>463</td>
</tr>
</tbody>
</table>

3.6% of aircraft intercepting 0-180 overshoot by 501’ or greater

Green = 0-180
Blue = 181-210
Red = > 210
Safety Performance Metric
October 2010
Analyzing Class B Excursions
Review of Activities

- Examining available data to define Class B Safety reporting criteria
PHL 5/7/09
379 Excursions
335 Aircraft
50.76%
Safety Performance Metric
October 2010
Integrated Metrics

ASIAS

(Aviation Safety Information and Sharing)
Landscape of Potential Safety Issues Needing Coordination

- Traffic Alert and Collision Avoidance System (TCAS) – High rate of Resolution Advisories (RAs)

- Terrain Awareness and Warning System (TAWS) – High rate of alerts
TAWS Alert Mitigation Strategy

• Near Term:
  – Use of RNAV/RNP and other procedures to reduce unnecessary terrain alerts and to provide better separation from terrain
  – Evaluate Minimum Vectoring Altitude (MVA) in relation to terrain and traffic flows in high-terrain airports

• Longer term:
  – Having GPS + Software Version 218 or greater reduces unwarranted warnings when the aircraft is not in imminent danger
  – Increases the effectiveness of EGPWS alerting during approach phase
TCAS Mitigation Strategy

• **Near Term**
  – airspace and procedural strategies to reduce/eliminate TCAS RAs

• **Longer term**
  – TCAS/NexCAS design should incorporate ASIAS TCAS RA results