Safety Impact Assessment of the End-Around Taxiway at the Dallas/Fort Worth International Airport Using ASDE-X Data

Presented by:
Dr. Stephen Mattingly – Associate Professor, Transportation
Antonio Massidda – Faculty Research Associate
DFW

EAT Motivation

EAT Objectives/Performance Measures

Data Analysis

Conclusions
Background

The DFW International Airport
Operations at DFW

Early 2000: over 800,000 operations

Hub for American Airlines and Delta Airlines
Runway Safety

Runway Incursions  Runway Collisions

Runway Safety Initiatives
(Including Call to Action Results)

If You Cross the Line
You’ve Crossed the Line!
The End-Around Taxiway

Conceived in the early 2000s

Cooperation with NASA

Goals:
Reduce Runway Incursions

Improve Efficiency of Operations
The End-Around Taxiway

17L and 17C Arrivals

Use allowed during South Flow Only

Latest SOP
April 2011
Research Motivation

How well has the EAT achieved its goals?
The data analysis of runway incursions at DFW before and after EAT and RWSL shows a significant reduction. The table compares the number of incursions in different categories:

**Before**
- **Type**: Pilot Deviation
- **Category**:
  - 17R/35L
  - 17C/35C
- **A**: 0, 0
- **B**: 0, 0
- **C**: 1, 0
- **D**: 2, 2
- **Totals**: 3, 2

**After**
- **Type**: Pilot Deviation
- **Category**:
  - 17R/35L
  - 17C/35C
- **A**: 0, 0
- **B**: 0, 0
- **C**: 3, 0
- **D**: 0, 0
- **Totals**: 3, 0

This shows a reduction of **40% Runway Incursions**.
Research Methodology

Data source: ASDE-X database

Operations Considered:
RWY 17L Arrivals Crossing RWY 17C

Simple Random Sample

Before EAT  After EAT

Validation with random days
Runway 17L Arrivals Crossing 17C

**Before the EAT** (April to Nov. 2008)

<table>
<thead>
<tr>
<th>17L Arrivals Crossing 17C</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>0%</td>
</tr>
<tr>
<td>Z</td>
<td>14%</td>
</tr>
<tr>
<td>EJ</td>
<td>5%</td>
</tr>
<tr>
<td>EL</td>
<td>46%</td>
</tr>
<tr>
<td>B</td>
<td>24%</td>
</tr>
<tr>
<td>ER</td>
<td>11%</td>
</tr>
</tbody>
</table>

**After the EAT** (April to Nov. 2011)

<table>
<thead>
<tr>
<th>17L Arrivals Crossing 17C</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>2%</td>
</tr>
<tr>
<td>Z</td>
<td>12%</td>
</tr>
<tr>
<td>EJ</td>
<td>1%</td>
</tr>
<tr>
<td>EL</td>
<td>2%</td>
</tr>
<tr>
<td>B</td>
<td>1%</td>
</tr>
<tr>
<td>ER</td>
<td>31%</td>
</tr>
<tr>
<td>ES (EAT)</td>
<td>51%</td>
</tr>
</tbody>
</table>
## Runway 17L Arrivals Crossing 17C

### Before/After EAT

<table>
<thead>
<tr>
<th>RWY 17C Taxiways</th>
<th>Observed Crossings / EAT Use After EAT</th>
<th>Expected Crossings / EAT Use After EAT</th>
<th>Chi Square</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RWY CROSSING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>97</td>
<td>330</td>
<td>164</td>
</tr>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LAHSO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>152</td>
<td>174</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EAT</strong></td>
<td>ES</td>
<td>8 E-05 ≈ 0</td>
<td>≈ 800,000,000</td>
</tr>
<tr>
<td>Total</td>
<td>504</td>
<td>504</td>
<td>≈ 800,000,000</td>
</tr>
</tbody>
</table>

\[
\alpha = 0.05 \quad \text{d.o.f.} = 1 \quad \chi^2_{0.05,1} = 7.882
\]
DFW EAT Achievements:

- Contributed to 40% Reduction RI
- Runway Crossing Reduction
- Estimated Usage 51%
- Changed Runway 17C Crossing Distribution
Future Research

• **17R Crossings analysis**

• **Comparison of usage during atypical operating conditions (runway closures, weather, etc.)**

• **Environmental and Economic Analyses**