Boeing GLS Autoland Demonstration at Juneau
Juneau GLS Demonstration

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Biography:

• Boeing Flight Test Engineer since 1997
• Associate Technical Fellow (ATF) and FAA Flight Test Analyst AR for Automatic Controls and Sensors
• Flight Test GLS/GBAS SME
• Lead for flight test development and FAA certification of GLS for Boeing airplanes since 2001
• Graduate of the University of Washington’s School of Aeronautical and Astronautical Engineering
Agenda

• Juneau Test Team

• Why Juneau?

• Juneau Test Planning

• Juneau Video

• Results
Juneau Test Team

Boeing 737 Project Pilot
Qantas Technical Pilot
Alaska Technical Pilot
FAA Pilot
Why Juneau?

ILS GUIDANCE NOT POSSIBLE DUE TO GEOGRAPHIC LIMITATIONS

APPROACH MINIMUMS:
  - 336 FT FOR RUNWAY 26
  - 1800 FT FOR RUNWAY 08

NEAREST ALTERNATE IS ANCHORAGE (500 NM AWAY, SEATTLE 800 NM AWAY)

GLS IDEALLY SUITED FOR THIS PROBLEM

ANALYSIS OF THE GEOGRAPHY AND 737NG CAPABILITIES INDICATED THAT WE COULD COMPLETE GLS AUTOLANDS
Approach to Runway 26 down the Gastineau Channel

Seriously?
Why Juneau?

Approach End of Runway 08 (Pedersen Hill)
GLS Approach Definition

Threshold and / or Displaced Threshold Coordinates (WGS84)
Provides Horizontal Data

TCH = Threshold Crossing Height

G/S angle

Provides Vertical Data
## Approach Definitions

**Runway 08**

<table>
<thead>
<tr>
<th>G/S Angle</th>
<th>Threshold Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00</td>
<td>None</td>
</tr>
<tr>
<td>4.00</td>
<td>1000’</td>
</tr>
<tr>
<td>3.50</td>
<td>1000’</td>
</tr>
<tr>
<td>3.50</td>
<td>2000’</td>
</tr>
<tr>
<td>4.00</td>
<td>Pond</td>
</tr>
</tbody>
</table>

**Runway 26**

<table>
<thead>
<tr>
<th>G/S angle</th>
<th>Threshold Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50</td>
<td>None</td>
</tr>
<tr>
<td>3.50</td>
<td>1000’</td>
</tr>
<tr>
<td>3.00</td>
<td>2000’</td>
</tr>
</tbody>
</table>
Runway 08 BJNU:
4 deg G/S  1000’ Displaced Threshold

Problem #1: MISS Pedersen Hill!

Elevations enhanced x3
Runway 26 GJNU:
3 deg G/S  2000’ Displaced Threshold

Problem #1: Turn the corner
Problem #2: Time to FLARE Engage
While you’re at it – miss the mountains!

Elevations enhanced x3
30 June 2008
First Autolands Completed at Juneau, Alaska
JUNEAU GLS AUTOLANDS

ALASKA AIRLINES
QANTAS AIRLINES
THE BOEING COMPANY
JUNEAU GLS AUTOLANDS

ALASKA AIRLINES
QANTAS AIRLINES
THE BOEING COMPANY
Summary

- GLS guidance does enable autolands at Juneau

- Currently 737NG, 737 MAX, 747-8, 787, and KC-46 are GLS Capable

- Boeing has installed 2 SLS-4000 GBAS stations for testing:
  - Moses Lake, Washington
  - Charleston, South Carolina

- Publically available GBAS stations:
  - Newark, New Jersey
  - Houston, Texas

- Planned installations:
  - Seattle/Tacoma (2018)
  - San Francisco (~2020)