Delta Air Lines’ Efforts in Noise Reduction
ANE Symposium

Kallie Glover
Performance Engineer
Delta Air Lines
Outline

• Noise Reduction Efforts
  • Fleet Technology

• Flight Operations
  ➢ Airport Initiatives
  ➢ Community and Committee Involvement

• Sustainability in Air Travel
Fleet Technology

- New Features Considered
  - Fuel Savings
  - Maintenance Expense/Reliability
    - Noise Level
- Incoming Fleets
  - A220
    - Stage 4 (Upgraded to Stage 5 in 2020)
    - PW1521GA
  - A330-900
    - Stage 5
    - Trent 7000-72
  - A350
    - Stage 5
    - Trent XWB-84
MD-88 LGA-ATL RWY 13 Departure

- MD-88
  - 149 seats
  - EIS: 13Feb87
  - JT8D-219
  - SEL

- Sound Exposure Level Comparison
- Single flight departure from RWY 13
- LGA 5 Departure with Flushing Climb/ turn West or Southwest tracks
A320 LGA-DEN RWY 13 Departure

- A320
  - 160 seats
  - EIS: 1Aug90
  - CFM56-5-A3
  - SEL

- Sound Exposure Level Comparison
- Single flight departure from RWY 13
- LGA 5 Departure with Flushing Climb/ turn West or Southwest tracks
A220 LGA-DEN RWY 13 Departure

- A220-100
  - 109 seats
  - EIS: 20Oct18
  - PW1521GA
  - SEL
    - 75 dB
    - 80 dB
    - 85 dB
    - 90 dB

- Sound Exposure Level Comparison
- Single flight departure from RWY 13
- LGA 5 Departure with Flushing Climb/ turn West or Southwest tracks
**Population Impact**

- Fleet specific number of residents surrounding LGA within 65-90 dB contours

<table>
<thead>
<tr>
<th>Contour (dB)</th>
<th>MD88 158 seats</th>
<th>A320 157 seats</th>
<th>ERJ-175 76 seats</th>
<th>B717 110 seats</th>
<th>B757 168-199 seats</th>
<th>A220-100 109 seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>4,042,934</td>
<td>2,345,385</td>
<td>1,745,121</td>
<td>1,631,556</td>
<td>1,155,393</td>
<td>1,113,044</td>
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<tr>
<td>75</td>
<td>1,649,970</td>
<td>692,820</td>
<td>500,040</td>
<td>352,080</td>
<td>269,237</td>
<td>109,610</td>
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<tr>
<td>85</td>
<td>358,560</td>
<td>73,980</td>
<td>47,250</td>
<td>5,670</td>
<td>4,897</td>
<td>4,396</td>
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<tr>
<td>95</td>
<td>1,035</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</table>

- MD88 – A320 comparison
  - 2,940,314 residents surrounding LGA experience a reduction in noise
- B717 – A220 comparison
  - 762,256 residents surrounding LGA experience a reduction in noise
## SNA A220 Qualification

<table>
<thead>
<tr>
<th>NMS</th>
<th>Limits</th>
<th>A220 Noise Readings</th>
<th>Margins</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class A (dB SENEL)</td>
<td>Class E (dB SENEL)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/2</td>
<td>9/3</td>
<td>9/4</td>
</tr>
<tr>
<td></td>
<td>(dB)</td>
<td>(dB)</td>
<td>(dB)</td>
</tr>
<tr>
<td>1S</td>
<td>102.5</td>
<td>94.1</td>
<td>85.5</td>
</tr>
<tr>
<td>2S</td>
<td>101.8</td>
<td>93.5</td>
<td>86.4</td>
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<tr>
<td>3S</td>
<td>101.1</td>
<td>90.3</td>
<td>85.7</td>
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<tr>
<td>4S</td>
<td>94.8</td>
<td>86.6</td>
<td>80.4</td>
</tr>
<tr>
<td>5S</td>
<td>95.3</td>
<td>87.2</td>
<td>-</td>
</tr>
<tr>
<td>6S</td>
<td>96.8</td>
<td>87.2</td>
<td>80.5</td>
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<tr>
<td>7S</td>
<td>93.7</td>
<td>86.6</td>
<td>-</td>
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</tbody>
</table>

### A220-100 Class E Testing – September 2019

<table>
<thead>
<tr>
<th>Carrier</th>
<th>AC Type</th>
<th>Class</th>
<th>Weight # Days</th>
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</thead>
<tbody>
<tr>
<td>DL</td>
<td>B712</td>
<td>E</td>
<td>107,778 Parameter 277 Count</td>
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<td></td>
<td></td>
<td></td>
<td>92.3 92.5 88.4 80.1 78.7 81.7 78.9</td>
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</table>

### SNA Noise and Capacity Reports: July 2019 – September 2019

<table>
<thead>
<tr>
<th>Carrier</th>
<th>AC Type</th>
<th>Class</th>
<th>Weight # Days</th>
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</thead>
<tbody>
<tr>
<td>DL</td>
<td>A220</td>
<td>E</td>
<td>116,835 Parameter 268 Count</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>87.9 87.9 86.3 81.0 80.1 80.9 78.0</td>
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</tbody>
</table>

### SNA Noise and Capacity Reports: October 2019 – December 2019

### Noise Reduction with the A220:

<table>
<thead>
<tr>
<th></th>
<th>1S</th>
<th>2S</th>
<th>3S</th>
<th>4S</th>
<th>5S</th>
<th>6S</th>
<th>7S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>4.4</td>
<td>4.6</td>
<td>2.1</td>
<td>-0.9</td>
<td>-0.4</td>
<td>0.8</td>
<td>0.9</td>
</tr>
</tbody>
</table>
A220 Benefits

- Pratt & Whitney GTF technology engines
  - PW1521GA
  - Geared turbofan
  - 12 to 1 bypass ratio
  - Lower engine weight
  - Better fuel efficiency
  - Lower emissions
  - Smaller noise footprint
- Currently operating as regular aircraft at 24 Delta stations
- 95 ordered
- 30 delivered to date

Letter of appreciation for A220 operation in SNA

November 12, 2019
Mr. Joe Espoito
Senior Vice President, Network Planning
Delta Air Lines, Inc.
Dept. 501
P. O. Box 20706
Atlanta, GA 30320-6001

Via e-mail to: joe.espoito@deltacomm

RE: Delta Air Lines’ use of quiet, efficient A220-100s at John Wayne Airport

Dear Mr. Espoito:

I am writing on behalf of the City of Newport Beach (City) to express our appreciation for Delta Air Lines investment in fleet modernization and its recent decision to fly A220-100 aircraft for its five daily nonstops between John Wayne Airport (JWA) and Salt Lake City.

A large section of our community is located directly under the JWA departure corridor and as such, the City has long sought solutions to mitigate the noise and air quality impacts associated with aircraft overflights. While our efforts have been productive, we recognize the great benefits we have and will come from improved aircraft technology.

At JWA, the A220-100 replaced Delta’s B717-200 aircraft, and our community immediately realized the benefits of the A220’s higher climb rate and quieter engine technology. To demonstrate, during its first flights here, the A220-100 measured five to eight decibels lower than acceptable noise limits at some JWA noise monitoring stations. These results were cause to celebrate in Newport Beach and we have shared this good news with our community on multiple occasions and will continue to do so.

Sincerely,
Diane Brooks Dixon
Mayor

cc: Newport Beach City Council, Supervisor Michelle Steel, Orange County Board of Supervisors, Barry Randhawa, Director, John Wayne Airport

DELTA AIR LINES, INC.
Flight Operations

- Company Page – Communication to the Crews
  - Curfew Restrictions
  - Noise Abatement Departure Procedures
  - SAN - LOC or RNAV Rwy 27 Approach
    - Note to prevent missed approaches
  - BOS – Flight Track Monitoring System notice
- Airport Initiatives
  - FLL Technical Committee
  - SAN ANAC Meetings
  - SNA Airline Roundtable Discussions
  - Quarterly Noise Reports
  - Fly Quiet Program
- Continuous Pilot Education

SAN and BOS Company Pages
Sustainability in Air Travel

• Committing $1 billion over the next 10 years toward a journey to mitigate all emissions from our global business

• Starting March 1, 2020
  • Carbon reduction
  • Carbon removal
  • Stakeholder engagement

• Greenhouse gas emissions capped at 2012 levels

• Fleet renewal with aircraft 25% more fuel efficient than the aircraft they are replacing