The Impact of the Pandemic on U.S. Airspace System Performance

Michael Ball, Vivek Sivalingam
University of Maryland
Mark Hansen, Vanessa Li
University of California, Berkeley
Number Weekly Scheduled Commercial Flights (ASPM Data / US Domestic):
Air Taxi Weekly Flight Counts (ASPM Data / US Domestic):
Air Cargo Weekly Flight Counts (ASPM Data / US Domestic):
How many airport pairs lost service?

Have service ➔ 6+ flights per week
No Service ➔ < 3 flights per week

Lost Service
Count: 1118 City Pairs
%: 25

Flights that lost service in Apr-July 2020

<table>
<thead>
<tr>
<th>FREQ 2019 (weekly)</th>
<th>6-12</th>
<th>12-18</th>
<th>18-24</th>
<th>24-30</th>
<th>30-36</th>
<th>36-42</th>
<th>42-48</th>
<th>48-54</th>
<th>54-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>536</td>
<td>247</td>
<td>198</td>
<td>83</td>
<td>26</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>%</td>
<td>52</td>
<td>31</td>
<td>29</td>
<td>19</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Examples:

- PAIR: BOS-DAL 2019 FREQ: 7
- PAIR: DAL-OKC 2019 FREQ: 21
- PAIR: PIT-IAH 2019 FREQ: 34
- PAIR: OGG-SFO 2019 FREQ: 46
- PAIR: LGA-RIC 2019 FREQ: 56

- PAIR: IAD-SH 2019 FREQ: 7
- PAIR: SFO-BWI 2019 FREQ: 20
- PAIR: ELM-DTW 2019 FREQ: 33
- PAIR: LGA-GSO 2019 FREQ: 46
- PAIR: LAX-SAT 2019 FREQ: 60
Fraction of weekly traffic by day-of-week:

Pre-Pandemic

April --- July

Fri
Thu
Mon
Sun
Wed
Sat
Tue
Commercial Flight Delay Metrics:

\[ A'x = \% \text{ flights w arrival delay} \geq x \; ; \; D'x = \% \text{ flights w arrival delay} \geq x \]
Breaking Down Performance: Total Effective Flight Time

<table>
<thead>
<tr>
<th>Schedule Departure (Sched Dep)</th>
<th>Pushback</th>
<th>Wheels-Off</th>
<th>Airborne Time</th>
<th>Wheels-On</th>
<th>Gate Arrival</th>
</tr>
</thead>
</table>

- **Gate Delay**
- **Taxi-Out Time**
- **Airborne Time**
- **Taxi-In Time**

![Total Effective Flight Time Graph]

The graph shows the total effective flight time for the weeks 3/31 to 7/28, with data for both 2019 Week and 2020 Week.
Total Effective Flight Time vs Demand

Weekly Operations, Air Carrier + Air Taxi

Minutes

weekly departures
Breaking Down Flight Time: Gate Delay, Taxi-in, Taxi-out and Airborne

**taxi-in time**

**taxi-out time**

**gate delay**

**airborne time**
# Drill-Down on Airborne Time

## Comparison of Airborne Time: April-July 2019 vs April-July 2020

<table>
<thead>
<tr>
<th>A-Time Range 2019 (Min)</th>
<th>0-50</th>
<th>50-100</th>
<th>100-150</th>
<th>150-200</th>
<th>200-250</th>
<th>250-300</th>
<th>300-350</th>
<th>350-400</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Time Reduction in 2020 (Min)</td>
<td>0.51</td>
<td>1.16</td>
<td>1.63</td>
<td>1.58</td>
<td>1.97</td>
<td>4.89</td>
<td>3.16</td>
<td>6.61</td>
</tr>
<tr>
<td>%</td>
<td>1.33%</td>
<td>1.57%</td>
<td>1.30%</td>
<td>0.92%</td>
<td>0.89%</td>
<td>1.76%</td>
<td>0.99%</td>
<td>1.83%</td>
</tr>
</tbody>
</table>
Final Thoughts

• Flight operations are down significantly with small communities more adversely impacted (as expected) – demand is recovering slowly

• The unprecedented low level of operations provides an opportunity to better understand how the system reacts to changes in demand

• A deeper dive ways could reveal ways to adjust system structure and management to improve operations as demand returns