2022 AQMP Mobile Source Working Group Meeting #2 – Aircraft

April 6, 2021

Cleaning The Air That We Breathe...

Draft Aircraft Emissions Inventory and Potential Control Strategies
Draft Aircraft Emissions Inventory for South Coast AQMD

- Airports covered
  - Commercial (7), General Aviation (31), Military (3)
- Years covered
  - 2018 base year; 2023, 2031, and 2037 forecast years
- Emission calculation methodology
  - Aircraft operations (airports, FAA’s databases)
  - FAA’s AEDT tool; EPA’s average emission factors; FAA survey data
- Draft inventory released April 2, 2021

2018 aircraft operations by major category

- Air Carrier 27%
- GA 67%
- Air Taxi 5%
- Military 1%

Total = 3,422,479 operations
Aircraft operations by major aircraft type and commercial airport

Air Carrier

Air Taxi

General Aviation

Military

Aircraft operations by major aircraft type and commercial airport (cont’d)
Taxi times and mixing heights for commercial airports

<table>
<thead>
<tr>
<th>Airport</th>
<th>Taxi time (min)</th>
<th>Mixing height (feet)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>LAX (2018)</td>
<td>12.18</td>
<td>19.24</td>
</tr>
<tr>
<td>LAX (2023)</td>
<td>13.26</td>
<td>21.01</td>
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<tr>
<td>LAX (2031)</td>
<td>15.76</td>
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<tr>
<td>LAX (2037)</td>
<td>17.91</td>
<td>28.97</td>
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<tr>
<td>LGB</td>
<td>4.39</td>
<td>13.17</td>
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<tr>
<td>SNA</td>
<td>5.75</td>
<td>9.63</td>
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<tr>
<td>BUR (pre-terminal)¹</td>
<td>1.25</td>
<td>4.67</td>
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<tr>
<td>BUR (post-terminal)²</td>
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<td>2.97</td>
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<tr>
<td>PSP</td>
<td>5</td>
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<tr>
<td>ONT</td>
<td>3.5</td>
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<tr>
<td>SBD</td>
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</tbody>
</table>

¹Pre-terminal replacement taxi times used for 2018 and 2023
²Post-terminal replacement taxi times used for 2031 and 2037

2018 aircraft emissions by major category

**NOx Emissions**
- Air Carrier: 90%
- GA: 3%
- Military: 4%
- Air Taxi: 3%

Total = 6,307 tons per year

**VOC Emissions**
- Air Carrier: 6%
- Military: 17%
- GA: 73%
- Air Taxi: 4%

Total = 1,307 tons per year
2018 aircraft emissions by airport type

**NOx Emissions**
- GA 2%
- Military 4%
- Commercial 94%

Total = 6,307 tons per year

**VOC Emissions**
- Commercial 24%
- Military 7%
- GA 69%

Total = 1,307 tons per year

**Aircraft emissions for commercial airports (NOx)**

- 2018
- 2023
- 2031
- 2037

**Airports**
- Bob Hope Airport
- John Wayne Airport
- Long Beach Airport
- Los Angeles International Airport
- Ontario International Airport
- Palm Springs International Airport
- San Bernardino International Airport

**NOx emissions (tpy)**
Aircraft emissions at Los Angeles International Airport

Aircraft emissions at Bob Hope Airport
Aircraft emissions at John Wayne Airport

Aircraft emissions at Long Beach Airport
Aircraft emissions at Ontario International Airport

- For VOC and NOx emissions, the graph shows a consistent increase from 2018 to 2037.

Aircraft emissions at Palm Springs International Airport

- Similarly, the graph for VOC and NOx emissions exhibits a steady rise from 2018 to 2037.
Aircraft emissions at San Bernardino Airport

Comparison of NOx emissions with 2016 AQMP
Growing contribution of aircraft emissions

- Focus on forecast years: 2023, 2031, 2037
- Distinction between passenger and cargo aircraft
- FAA’s new Terminal Area Forecast (TAF) that will include the effects of COVID-19 on civil aviation (expected to be publicly available mid-to-late April at www.faa.gov)
  - Expected to result in lower forecasted aircraft operations
- Latest forecast of aircraft models/engines
  - Reflecting retirement of older aircraft
  - Increased use of newer aircraft
- Operational improvements not reflected in draft inventory

Potential updates to aircraft emissions inventory
Potential aircraft control strategies

- New aircraft engine and auxiliary power unit (APU) standards (EPA/ICAO)
- Operational improvements
  - De-rated take-off
  - Single engine taxiing
  - Reduced APU usage/Zero-emission APU
- Routing aircraft with cleanest aircraft models/engines
- Promoting zero-emission aviation
- Others?

Next Steps

- Update draft aircraft emissions inventory
  - FAA’s updated forecast (2023, 2031, 2037)
  - Updated aircraft models/engines forecast based on inputs from airports and airlines
  - Draft report available for review
    - Comments Due May 14, 2021
- Evaluate potential control strategies
  - Pursue potential future engine standards through EPA/ICAO
  - Work with airports, airlines, and stakeholders to evaluate potential strategies
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