AIR TRAFFIC
BY THE NUMBERS

May 2022

Federal Aviation Administration
FAA Contributors to ATO By the Numbers

- Air Traffic Organization (ATO)
  - AJR - System Operations
    - AJR-G Performance Analysis
    - AJR-B Flight Service
  - AJI - Safety and Technical Training Services
    - AJI-3 Policy and Performance
  - AJM – Program Management Organization
    - AJM-33 Aviation Weather & Aero Services
  - AJT – Air Traffic Services

- Non-ATO
  - AOC – Office of Communications
  - ABP-230 – Data Analysis and Reporting Services Branch
  - APO – Aviation Policy & Plans
  - AST – Office of Commercial Space Transportation
  - AVS – Aviation Safety

Data Sources

<table>
<thead>
<tr>
<th>Database Name</th>
<th>Owned/Managed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation System Performance Metrics (ASPM)</td>
<td>AJR-G</td>
</tr>
<tr>
<td>Operations Systems Network (OPSNET)</td>
<td>AJR-G (archive), AJM and AJW</td>
</tr>
<tr>
<td>National Traffic Management Log (NTML)</td>
<td>AJR-G (archive), AJM and AJW</td>
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<td>Traffic Flight Management System (TFMS)</td>
<td>AJR-G (archive), AJM and AJW</td>
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<td>National Offload Program (NOP)</td>
<td>AJR-G (archive) and AIT</td>
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<td>APO</td>
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<td>Runway Incursion Data</td>
<td>AVS</td>
</tr>
<tr>
<td>BTS T-100 Market and Segment Data</td>
<td>Bureau of Transportation Statistics</td>
</tr>
</tbody>
</table>
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Introduction

*Air Traffic By the Numbers*, or the *ATO Fact Book*, is a source book containing annual U.S. airport and air traffic control operations and performance data from the Federal Aviation Administration (FAA). It also includes information on air passenger travelers, runway incursions, commercial space launch activity, the economic impact of aviation, and so on.

The *Fact Book*, first published by the Office of Performance Analysis, Air Traffic Organization (ATO) of the FAA in 2017, is updated annually, with data now current up until FY2021. This document represents the sixth edition of *Air Traffic By the Numbers*; five previous editions appeared in August 2017, November 2018, June 2019, August 2020, and October 2021.

The storyline behind this year’s *Fact Book* continues to be the negative impact of the current COVID-19 pandemic on the volume of air traffic. This impact began in March 2020 and extended through the rest of FY2020 and FY2021. Since the pandemic continues beyond FY2021, its influence will affect next year’s FY2022 *Fact Book* numbers as well.

Organization of the *ATO Fact Book* is unchanged from last year. Section 1 includes some overall aviation-related statistics. NAS demand and efficiency measures appear in Section 2. New delay, diversion, go-around, and cancellation information follow in Section 3. Section 4 includes the latest data on various traffic management initiatives (TMI). Updated safety metric results are reported in Section 5. Other ATO Topics of interest, such as flight service and commercial space, are available in Section 6.

Below are selected results for FY2021.

- The number of air traffic controllers decreased by 2.8 percent, to 13,850 (in Section 1).
- The number of pilot certificates increased by 4.2 percent in CY2021 to 720,603; and remote (or drone) pilot certificates increased by 23.4 percent, to 254,587 (Section 1).
- The number of passengers flown by air carriers increased by 4.1 percent, to 597.9 million (Section 1). This was far less than the pre-pandemic (FY2019) level of 1,057.6 million passengers.
- IFR flights in the U.S. rose by 6.2 percent, to 13 million (Section 1). Before the pandemic, IFR flights numbered 16.4 million (FY2019).
- Core 30 airport operations rose by 2.3 percent, to 9.5 million; operations handled by stand-alone TRACONS rose by 4.4 percent, to 16.4 million, while operations handled by centers rose by 6.2 percent, to 34.1 million (Section 2). Before the pandemic, airport, TRACON, and center operations were higher; at 13.2 million, 20.3 million, and 43.7 million, respectively.

Work on this publication benefited from the contributions from many offices and individuals throughout the Air Traffic Organization and the Federal Aviation Administration. As always, we thank everyone who participated in this effort.

System Events and Analysis Group (AJR-G3)
Office of Performance Analysis
System Operations Services
Air Traffic Organization
Federal Aviation Administration
U.S. Department of Transportation

May 2022
Air Traffic Organization Leadership

www.faa.gov/about/office_org/headquarters_offices/ato/leadership
### Section 1. FAA Air Traffic Management System Overview for FY2021

#### ATO Program and Financing

<table>
<thead>
<tr>
<th>Operations Budget Estimate (in $billions) (FY2021)</th>
<th>$8.2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flights Handled</strong></td>
<td></td>
</tr>
<tr>
<td>Scheduled</td>
<td>7,014,671</td>
</tr>
<tr>
<td>Unscheduled</td>
<td>6,013,972</td>
</tr>
<tr>
<td><strong>Airspace (in millions of sq mi)</strong></td>
<td></td>
</tr>
<tr>
<td>Oceanic</td>
<td>24.1</td>
</tr>
<tr>
<td>Domestic</td>
<td>5.3</td>
</tr>
<tr>
<td><strong>Airports</strong></td>
<td></td>
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<tr>
<td>Public Airports</td>
<td>5,184</td>
</tr>
<tr>
<td>Private Airports</td>
<td>14,539</td>
</tr>
<tr>
<td><strong>Federal Air Traffic Control Facilities</strong></td>
<td></td>
</tr>
<tr>
<td>Stand-Alone ATC Tower Facilities</td>
<td>139</td>
</tr>
<tr>
<td>Stand-Alone TRACON Facilities</td>
<td>25</td>
</tr>
<tr>
<td>Combined ATC Tower/TRACON Facilities*</td>
<td>124</td>
</tr>
<tr>
<td>Centers and Combined Control Facilities</td>
<td></td>
</tr>
<tr>
<td>ARTCC</td>
<td>21</td>
</tr>
<tr>
<td>CCFs</td>
<td>4</td>
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<tr>
<td><strong>Contract Air Traffic Control Towers</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>260</td>
</tr>
<tr>
<td><strong>NAVAIDS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12,948</td>
</tr>
<tr>
<td><strong>Alaska Weather Cameras</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>235</td>
</tr>
<tr>
<td><strong>Controllers</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13,850</td>
</tr>
<tr>
<td><strong>GA Aircraft (CY2020)</strong></td>
<td></td>
</tr>
<tr>
<td>Fixed Wing</td>
<td>161,600</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>9,700</td>
</tr>
<tr>
<td>Experimental/Lightcraft/Other</td>
<td>32,800</td>
</tr>
<tr>
<td><strong>GA Flight Hours (CY2020)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22,492,000</td>
</tr>
</tbody>
</table>

*Combined ATC Towers and TRACONs are located within the same building.

**Includes two new contract towers introduced during FY2022.

Sources:

**ATO Program and Financing**: U.S. Dept. of Transportation, Budget Estimates: FY2022, Federal Aviation Administration, p. 2.


**Airspace**: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G).


**ATC Towers, TRACONs, and En Route Centers & CCFs**: Federal Aviation Administration, Air Traffic Organization, Air Traffic Services (AJT).


**Controllers**: Federal Aviation Administration, Office of Finance and Management, Data Analysis and Reporting Services Branch (ABP-230), Air Traffic Controller and Academy Movement Report - September FY2021, October 7, 2021.

Class B Airspaces (Airspace around Busiest US Airports)

Note: Airspaces accurately represented for coverage area
**Air Traffic Controllers**

As of the end of FY2021, the FAA air traffic controller total was 13,850, a decrease from 14,242 at the end of FY2020.

<table>
<thead>
<tr>
<th></th>
<th>FY2020</th>
<th>FY2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academy Graduate (AG)</td>
<td>873</td>
<td>917</td>
</tr>
<tr>
<td>Developmental (D1)</td>
<td>213</td>
<td>196</td>
</tr>
<tr>
<td>Developmental (D2)</td>
<td>645</td>
<td>534</td>
</tr>
<tr>
<td>Developmental (D3)</td>
<td>522</td>
<td>457</td>
</tr>
<tr>
<td>Certified Professional (CPC)</td>
<td>10,268</td>
<td>10,580</td>
</tr>
<tr>
<td>Certified Professional in training (CPCIT)</td>
<td>1,309</td>
<td>1,031</td>
</tr>
<tr>
<td>Controllers</td>
<td>13,830</td>
<td>13,715</td>
</tr>
<tr>
<td>Academy</td>
<td>412</td>
<td>135</td>
</tr>
<tr>
<td>Total HeadCount</td>
<td>14,242</td>
<td>13,850</td>
</tr>
</tbody>
</table>

Among Core 30 airports, Miami (MIA), Charlotte (CLT), and Philadelphia (PHL) reported large headcounts because these are combined ATCT TRACONs. PHL had the highest net gain of controllers at three, while DEN and BOS had the highest net loss at six. (See, Appendix I for explanations of the Core 30 airport and Center codes.)

Pilot Certificates

The table below shows the number of pilot certificates held by age group (upper panel below) and by year (lower panel). The upper panel illustrates that student, commercial, and remote (or drone) pilots tend to be younger, while airline transport pilots tend to be older. The lower panel informs us that the number of total active pilot certificates held in the U.S. increased by 4.2 percent, from 691,689 in CY2020 to 720,603 in CY2021, mainly due to an increase in student pilot certificates from 222,629 to 250,197. Further, the number of remote pilot certifications (which began in August 2016) increased by 23.4 percent, from 206,322 in 2020 to 254,587 in 2021. (Note, the pilot total does not include flight instructors and remote pilots.)

Estimated Active Pilot Certificates Held by Category and Age Group of Holder, as of December 31, 2021

<table>
<thead>
<tr>
<th>By Age Group</th>
<th>Total</th>
<th>Student</th>
<th>Sport</th>
<th>Recreational</th>
<th>Private 1/</th>
<th>Commercial 1/</th>
<th>Airline Transport 1/</th>
<th>Certified Flight Instructor 2/</th>
<th>Remote Pilot 2/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>720,603</td>
<td>250,197</td>
<td>6,801</td>
<td>86</td>
<td>173,606</td>
<td>119,827</td>
<td>170,086</td>
<td>121,270</td>
<td>254,587</td>
</tr>
<tr>
<td>14-15</td>
<td>552</td>
<td>552</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>16-19</td>
<td>24,568</td>
<td>18,615</td>
<td>10</td>
<td>1</td>
<td>5,613</td>
<td>329</td>
<td>0</td>
<td>117</td>
<td>2,977</td>
</tr>
<tr>
<td>20-24</td>
<td>75,925</td>
<td>41,178</td>
<td>82</td>
<td>3</td>
<td>19,161</td>
<td>14,481</td>
<td>1,020</td>
<td>7,264</td>
<td>16,120</td>
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<tr>
<td>25-29</td>
<td>89,307</td>
<td>49,116</td>
<td>152</td>
<td>4</td>
<td>14,152</td>
<td>19,366</td>
<td>6,517</td>
<td>11,828</td>
<td>31,449</td>
</tr>
<tr>
<td>30-34</td>
<td>76,933</td>
<td>49,116</td>
<td>254</td>
<td>6</td>
<td>13,230</td>
<td>12,961</td>
<td>10,814</td>
<td>13,933</td>
<td>35,646</td>
</tr>
<tr>
<td>35-39</td>
<td>69,460</td>
<td>50,746</td>
<td>314</td>
<td>3</td>
<td>13,102</td>
<td>19,366</td>
<td>6,517</td>
<td>11,828</td>
<td>35,646</td>
</tr>
<tr>
<td>40-44</td>
<td>60,499</td>
<td>40,740</td>
<td>319</td>
<td>1</td>
<td>12,217</td>
<td>8,262</td>
<td>18,960</td>
<td>12,772</td>
<td>30,444</td>
</tr>
<tr>
<td>45-49</td>
<td>50,597</td>
<td>31,375</td>
<td>373</td>
<td>6</td>
<td>10,703</td>
<td>6,493</td>
<td>19,647</td>
<td>11,828</td>
<td>25,365</td>
</tr>
<tr>
<td>50-54</td>
<td>56,118</td>
<td>41,754</td>
<td>520</td>
<td>5</td>
<td>13,181</td>
<td>7,357</td>
<td>23,301</td>
<td>11,664</td>
<td>23,302</td>
</tr>
<tr>
<td>55-59</td>
<td>59,212</td>
<td>49,753</td>
<td>799</td>
<td>5</td>
<td>15,512</td>
<td>7,829</td>
<td>25,314</td>
<td>10,639</td>
<td>19,293</td>
</tr>
<tr>
<td>60-64</td>
<td>56,972</td>
<td>47,335</td>
<td>1,050</td>
<td>13</td>
<td>17,927</td>
<td>8,096</td>
<td>22,551</td>
<td>9,328</td>
<td>16,120</td>
</tr>
<tr>
<td>65-69</td>
<td>43,117</td>
<td>38,402</td>
<td>1,091</td>
<td>19</td>
<td>16,941</td>
<td>8,082</td>
<td>12,182</td>
<td>7,928</td>
<td>10,232</td>
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<tr>
<td>70-74</td>
<td>28,915</td>
<td>2,862</td>
<td>883</td>
<td>13</td>
<td>11,814</td>
<td>6,904</td>
<td>6,439</td>
<td>6,109</td>
<td>5,360</td>
</tr>
<tr>
<td>75-79</td>
<td>17,718</td>
<td>1,314</td>
<td>578</td>
<td>4</td>
<td>6,567</td>
<td>5,259</td>
<td>3,996</td>
<td>3,999</td>
<td>2,133</td>
</tr>
<tr>
<td>80 &amp; over</td>
<td>10,710</td>
<td>582</td>
<td>376</td>
<td>3</td>
<td>3,486</td>
<td>3,779</td>
<td>2,484</td>
<td>2,241</td>
<td>681</td>
</tr>
</tbody>
</table>

1/ Includes pilots with an airplane and/or a helicopter and/or a glider and/or a gyroplane certificate. Pilots with multiple ratings are reported under highest rating. For example a pilot with a private helicopter and commercial airplane certificates are reported in the commercial category.

2/ Not included in total active pilots.

N/Ap Not applicable.

Commercial Flight and Available Seat Mile (ASM) Trends

This far, the COVID-19 pandemic affected FY2020 and FY2021 commercial air passenger travel. In FY2021, the number of scheduled commercial flights and number of passengers only partly recovered to pre-pandemic levels; the number of flights rose by 1.9 percent to 8.1 million and the number of passengers rose by 4.1 percent to 597.9 million. Revenue passenger miles (RPMs) and available seat miles (ASMs) fell by 13.5 and 6.7 percent, to 0.67 and 1.05 trillion, respectively. Load factor, the percentage of available seat miles flown by paying commercial passengers, fell from 69.2 to 64.1 percent. The table below shows passenger statistics for the three most recent fiscal years.

![Trends in Commercial Flights and Available Seat Miles (ASMs), FY2009-FY2021](image)

Source: U.S. Dept. of Transportation, Bureau of Transportation Statistics, T100 Segment Data, March 17, 2022.

<table>
<thead>
<tr>
<th></th>
<th>FY 2019</th>
<th>FY 2020</th>
<th>FY 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly Passengers</td>
<td>1,057,645,399</td>
<td>574,412,723</td>
<td>597,945,147</td>
</tr>
<tr>
<td>Average Daily Passengers</td>
<td>2,897,659</td>
<td>1,569,434</td>
<td>1,638,206</td>
</tr>
<tr>
<td>Revenue Passenger Miles (trillions)</td>
<td>1.57</td>
<td>0.78</td>
<td>0.67</td>
</tr>
<tr>
<td>Available Seat Miles (trillions)</td>
<td>1.88</td>
<td>1.13</td>
<td>1.05</td>
</tr>
<tr>
<td>Passenger Load Factor (%)</td>
<td>83.36%</td>
<td>69.19%</td>
<td>64.15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CY2015*</th>
<th>CY2016*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation in US generates # jobs</td>
<td>10,710,000</td>
<td>10,857,000</td>
</tr>
<tr>
<td>Earnings of (billions)</td>
<td>$481.90</td>
<td>$488.20</td>
</tr>
<tr>
<td>Aviation contributes annually (trillions)</td>
<td>$1.75</td>
<td>$1.77</td>
</tr>
<tr>
<td>Constitutes % of GDP</td>
<td>5.3%</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

Sources:
- **Passenger Statistics**: U.S. Dept. of Transportation, Bureau of Transportation Statistics, T100 Segment Data, March 17, 2022.
- **Economic Impact of Civil Aviation**: Federal Aviation Administration, Office of Aviation Policy and Plans, Forecast and Performance Analysis Division (APO-100), Economic Impact of Civil Aviation on the U.S. Economy, January 2020.
  https://www.faa.gov/about/plans_reports/media/2020_jan_economic_impact_report.pdf
**Instrument Flight Rule (IFR) and Visual Flight Rule (VFR)* Flights across the NAS**

Office of Performance Analysis (AJR-G) data show the number of IFR flights rose by 6.2 percent to 13 million, and the number of VFR flights rose by 8.2 percent to 11.3 million in FY2021. In FY2019, prior to the COVID pandemic, IFR flights numbered 16.4 million, while VFR flights numbered 11.3 million.

Total numbers of fiscal year annual IFR and VFR flights also appear in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>IFR Flights</th>
<th>VFR Flights</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2005</td>
<td>18,645,898</td>
<td>13,795,861</td>
</tr>
<tr>
<td>FY2006</td>
<td>18,066,360</td>
<td>13,378,426</td>
</tr>
<tr>
<td>FY2007</td>
<td>17,970,314</td>
<td>13,448,515</td>
</tr>
<tr>
<td>FY2008</td>
<td>17,908,487</td>
<td>12,812,585</td>
</tr>
<tr>
<td>FY2009</td>
<td>16,428,893</td>
<td>11,480,136</td>
</tr>
<tr>
<td>FY2010</td>
<td>16,522,406</td>
<td>10,815,975</td>
</tr>
<tr>
<td>FY2011</td>
<td>15,992,536</td>
<td>10,581,301</td>
</tr>
<tr>
<td>FY2012</td>
<td>15,760,241</td>
<td>10,714,777</td>
</tr>
<tr>
<td>FY2013</td>
<td>15,576,396</td>
<td>10,574,201</td>
</tr>
<tr>
<td>FY2014</td>
<td>15,546,452</td>
<td>10,506,576</td>
</tr>
<tr>
<td>FY2015</td>
<td>15,782,675</td>
<td>10,455,324</td>
</tr>
<tr>
<td>FY2016</td>
<td>15,724,478</td>
<td>10,416,280</td>
</tr>
<tr>
<td>FY2017</td>
<td>15,800,679</td>
<td>10,415,828</td>
</tr>
<tr>
<td>FY2018</td>
<td>16,122,488</td>
<td>10,843,622</td>
</tr>
<tr>
<td>FY2019</td>
<td>16,416,056</td>
<td>11,287,366</td>
</tr>
<tr>
<td>FY2020</td>
<td>12,270,055</td>
<td>10,478,603</td>
</tr>
<tr>
<td>FY2021</td>
<td>13,028,643</td>
<td>11,342,324</td>
</tr>
</tbody>
</table>

Section 2. Demand and Efficiency in the NAS

The NAS is composed of 521 airport towers (263 Federal and 260 contract towers), 149 terminal radar control (TRACON) facilities (25 stand-alone and 124 combined ATCT), and 25 control centers (21 air route traffic control centers (ARTCC) and 4 combined control facilities (CCF)).

TRACONs handle descending flights received from a center or ascending flights received from an ATC tower (see figure below). Of the 149 TRACONs in the NAS, 124 of them are combined such that the TRACON exists in the same location as the ATC tower. Such facilities include the Miami, Charlotte, and El Paso towers.

Centers handle all en route flights operating on Instrument Flight Rule (IFR) flight plans. Centers receive flights from or hand off flights to other centers throughout the flight’s en route phase of operation. They also receive flights or hand off flights to TRACONs when flights enter or exit the en route phase of operation.

This report reveals the demand observed at some of the busiest facilities, represented by the Core 30 airport towers, the 25 stand-alone TRACONs, and all 25 centers (which include 4 CCFs). Efficiency is also reported based on the following metrics:

- **Number of Flights at Any Given Minute**
- **Average Hourly Capacity**
- **Average Daily Capacity**
Core 30 Airport Operations

Airport operations are the sum of the number of airport arrivals and departures. Airport traffic controllers handle such operations. Each flight has a departure and arrival, meaning each flight roughly consists of two airport operations. In FY2021, Core 30 airport operation numbers rose by 2.3 percent, from 9.3 million in FY2020 to 9.5 million (table below). During the three years before the pandemic (FY2017-FY2019), Core 30 airport operations averaged 13 million; therefore operations remain below this pre-pandemic level. Across all 521 airports that operate Federal towers, operations rose by 7.4 percent, from 44.4 to 47.7 million. Before the pandemic (FY2017-FY2019), operations averaged 51.8 million.

Also shown below are airport operations for each Core 30 airport. In FY2021, Atlanta (ATL), Chicago O’Hare (ORD), and Dallas-Fort Worth (DFW) had the highest number of operations; ATL and DFW operations rose by 8.3 and 11 percent, respectively, while ORD operations fell by 3.3 percent. Operations did not return to pre-pandemic levels at any of the Core 30 airports. (See, Appendix I for explanations of the Core 30 airport codes.)

### Total Core 30 Airport Operations

<table>
<thead>
<tr>
<th>FY17-19Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>13,014,040</td>
<td>9,327,422</td>
<td>9,544,243</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

*Ranked by FY21 operations.

Stand-Alone Terminal Radar Control (TRACON) Facilities

TRACON operations are IFR and VFR itinerant operations passed to and from area airports, other TRACONs, or centers, including overflights through TRACON airspace. In FY2021, among the 25 stand-alone TRACONs, operations rose by 4.4 percent to 16.4 million in FY2021. Before the pandemic (FY2017-FY2019), stand-alone operations averaged 19.9 million, meaning operations remain below pre-pandemic levels (table below). Across all 149 TRACONs, in FY2021, operations rose by 7.2 percent, from 31.3 to 33.5 million; before the pandemic, these operations averaged 38.5 million.

Below are operation counts for each of the 25 stand-alone TRACONs for the pandemic years FY2020 and FY2021 and the pre-pandemic annual average (FY2017-FY2019). In FY2021, Southern California (SCT), Northern California (NCT), and New York (N90) had the highest number of operations with more than 1.2 million each. Operations at SCT rose, while N90 fell; operations at NCT remained about the same. Operations recovered to FY2017-FY2019 pre-pandemic levels at Salt Lake City (S56), Anchorage (A11), Omaha (R90), and Tucson (U90) (graph and table below). (See, Appendix I for explanations of the TRACON facility codes.)

<table>
<thead>
<tr>
<th>TRACON</th>
<th>Rank*</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
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<tr>
<td>A11</td>
<td>18</td>
<td>275,585</td>
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<td>4.4%</td>
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<td>C90</td>
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<tr>
<td>D01</td>
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<td>885,750</td>
<td>730,400</td>
<td>840,243</td>
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<tr>
<td>D10</td>
<td>4</td>
<td>1,247,768</td>
<td>1,097,424</td>
<td>1,175,788</td>
<td></td>
</tr>
<tr>
<td>D21</td>
<td>16</td>
<td>530,295</td>
<td>396,458</td>
<td>417,218</td>
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</tr>
<tr>
<td>F11</td>
<td>12</td>
<td>730,043</td>
<td>623,047</td>
<td>592,316</td>
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<tr>
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<td>951,472</td>
<td>771,209</td>
<td>836,841</td>
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<td>L30</td>
<td>14</td>
<td>602,603</td>
<td>426,421</td>
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<td>M03</td>
<td>19</td>
<td>301,072</td>
<td>280,901</td>
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<td>526,313</td>
<td>377,139</td>
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<tr>
<td>N90</td>
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<td>1,953,783</td>
<td>1,259,869</td>
<td>1,214,509</td>
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</tr>
</tbody>
</table>

*Ranked by FY2021 operations.

Air Route Traffic Control Centers (ARTCC) and Combined Control Facilities (CCF)

Air route traffic control centers (ARTCC) or en route operations are the number of IFR and VFR itinerant operations passing from a TRACON to a center, or from one center to another center, or from a center to a TRACON. It includes U.S. overflights and oceanic traffic through center air space that do not arrive at or depart from U.S. territory. In FY2021, en route operation numbers for the 21 ARTCC and 4 CCFs (combined control facilities) rose by 6.2 percent, from 32.1 to 34.1 million; however, operations have yet to recover to the FY2017-FY2019 pre-pandemic average levels of 44.1 million (table below).

Also shown below are operation counts for FY2020 and FY2021 and the pre-pandemic average for FY2017-FY2019 by center. In FY2021, the Atlanta (ZTL), Jacksonville (ZIX), and Miami (ZMA) centers reported the highest number of operations among the centers, each with more than 1.9 million. Other than Joshua Tree (JCF), center operations at each center did not recover to pre-pandemic average levels (graph and table below). (See, Appendix I for explanations of the ARTCC and CCF codes.)

<table>
<thead>
<tr>
<th>Center</th>
<th>Rank*</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
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<td>HCF</td>
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<td>466,374</td>
<td>308,811</td>
<td>360,312</td>
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<tr>
<td>JCF</td>
<td>23</td>
<td>87,067</td>
<td>202,926</td>
<td>187,619</td>
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</tr>
<tr>
<td>ZAB</td>
<td>15</td>
<td>1,609,158</td>
<td>1,293,774</td>
<td>1,462,863</td>
<td></td>
</tr>
<tr>
<td>ZAN</td>
<td>21</td>
<td>611,191</td>
<td>485,113</td>
<td>529,551</td>
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<tr>
<td>ZAU</td>
<td>8</td>
<td>2,421,304</td>
<td>1,708,664</td>
<td>1,705,425</td>
<td></td>
</tr>
<tr>
<td>ZBW</td>
<td>20</td>
<td>1,574,246</td>
<td>1,001,726</td>
<td>895,499</td>
<td></td>
</tr>
<tr>
<td>ZDC</td>
<td>9</td>
<td>2,509,288</td>
<td>1,739,401</td>
<td>1,704,591</td>
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</tr>
<tr>
<td>ZDV</td>
<td>10</td>
<td>1,874,490</td>
<td>1,501,039</td>
<td>1,678,040</td>
<td></td>
</tr>
<tr>
<td>ZFW</td>
<td>4</td>
<td>2,301,123</td>
<td>1,753,078</td>
<td>1,940,351</td>
<td></td>
</tr>
<tr>
<td>ZHU</td>
<td>6</td>
<td>2,271,141</td>
<td>1,610,420</td>
<td>1,839,184</td>
<td></td>
</tr>
<tr>
<td>ZID</td>
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<td>2,092,253</td>
<td>1,573,605</td>
<td>1,645,185</td>
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<tr>
<td>ZIX</td>
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<td>2,452,192</td>
<td>1,820,539</td>
<td>2,173,040</td>
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<tr>
<td>ZKC</td>
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<td>1,800,362</td>
<td>1,390,474</td>
<td>1,501,894</td>
<td></td>
</tr>
</tbody>
</table>

*Ranked by FY2021 operations.

Traffic flow management system (TFMS) flight data were used to determine the number of flights en route every minute of the day and by U.S. time zone on July 29, 2021. Peak operational times in the NAS range between 1500 GMT and 2200 GMT. During peak operational times in the NAS on that day, there were approximately 5,300 flights en route in the NAS every minute.

The figure below shows the average number of flights en route per minute and flights under air traffic control by time zone. The Eastern Time zone has the largest share of flights in the NAS on average and, in this analysis, also includes flights under air traffic control from Puerto Rico and Bermuda. The Pacific Time Zone category includes all west coast air traffic as well as oceanic operations controlled by Oakland center (ZOA), including Hawaii and Guam.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), April 5, 2022.
**Average Hourly Capacity (Called Rate) at Core 30 Airports**

In general, airport capacity is determined by its runways and surrounding airspace. For the purpose of this report, capacity is represented by an airport’s called rates for reportable hours. In FY2021, average hourly capacity across all Core 30 airports was 3,611 (table below). Note, airport capacity is not determined by circumstances such as the pandemic.

In FY2021, data for each of Core 30 airport shows that the highest average hourly called rates were at Atlanta (ATL) and Chicago O’Hare (ORD). Each had an average called rate of over 200 operations per hour. The highest increases occurred at Detroit (DTW) (up 12.1 percent) and Orlando (MCO) (up 8.1 percent). (See, Appendix I for explanations of the Core 30 airport codes.)

<table>
<thead>
<tr>
<th>Airport</th>
<th>Rank*</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>1</td>
<td>229</td>
<td>219</td>
<td>229</td>
</tr>
<tr>
<td>BOS</td>
<td>25</td>
<td>81</td>
<td>74</td>
<td>72</td>
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<tr>
<td>BWI</td>
<td>28</td>
<td>69</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>CLT</td>
<td>8</td>
<td>151</td>
<td>151</td>
<td>151</td>
</tr>
<tr>
<td>DCA</td>
<td>29</td>
<td>67</td>
<td>67</td>
<td>68</td>
</tr>
<tr>
<td>DEN</td>
<td>3</td>
<td>209</td>
<td>188</td>
<td>188</td>
</tr>
<tr>
<td>DFW</td>
<td>7</td>
<td>176</td>
<td>162</td>
<td>169</td>
</tr>
<tr>
<td>DTW</td>
<td>5</td>
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<td>156</td>
<td>174</td>
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<tr>
<td>EWR</td>
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<td>76</td>
<td>74</td>
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<td>FLL</td>
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<td>97</td>
</tr>
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<td>HNL</td>
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<td>112</td>
<td>111</td>
<td>113</td>
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<tr>
<td>IAD</td>
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<td>124</td>
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<td>163</td>
<td>172</td>
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<td>JFK</td>
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<tr>
<td>LAS</td>
<td>20</td>
<td>97</td>
<td>86</td>
<td>92</td>
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</tbody>
</table>

*Ranked by FY2021 call rates.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 5, 2022.
Average Daily Capacity (ADC) - Based on Called Rates at Core 30 Airports

In general, airport capacity is determined by its runways and surrounding airspace. For the purposes of this report, capacity is represented by the airport’s called rates for reportable hours. Average daily capacity (ADC) is the ATO’s official tracking method for determining an airport’s capacity during a day. In FY2021, capacity across all Core 30 airports was 59,705 (table below). Airport capacity is not determined by circumstances such as the pandemic.

In FY2021, data for the Core 30 airports show that the highest ADCs were found at Memphis (MEM), Atlanta (ATL), Chicago (ORD) and Denver (DEN); each with an average of over 3,000 operations per day. Note, ADC is larger for Memphis (MEM) than all other airports because all 24 hours are reportable there. (See, Appendix I for explanations of the Core 30 airport codes.)

<table>
<thead>
<tr>
<th>Airport</th>
<th>Rank*</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
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<td>ATL</td>
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<td>3,498</td>
<td>3,662</td>
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<td>BOS</td>
<td>25</td>
<td>1,381</td>
<td>1,265</td>
<td>1,222</td>
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<td>2,419</td>
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<td>DCA</td>
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<td>1,076</td>
<td>1,081</td>
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<td>3,013</td>
<td>3,003</td>
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<td>DFW</td>
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<table>
<thead>
<tr>
<th>Airport</th>
<th>Rank*</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
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<td>3,556</td>
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<td>2,081</td>
<td>2,078</td>
<td></td>
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<td>MSP</td>
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<td>2,302</td>
<td>2,188</td>
<td>2,171</td>
<td></td>
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<td>ORD</td>
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<td>810</td>
<td>812</td>
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<td>17</td>
<td>1,910</td>
<td>1,837</td>
<td>1,863</td>
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</tr>
</tbody>
</table>

* Ranked by FY2021 daily capacity.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 5, 2021.
Section 3. NAS Delay, Diversions, Go-Arounds, and Cancellations

Only flights departing from or arriving at their destination at least 15 minutes late are counted as a NAS system delay. The charts that appear below are based on OPSNET numbers, ATO’s official source for delay data. Many factors contribute to delay, with weather being the most frequently cited reason. Delay imposes stress on the NAS, air traffic controllers, passengers, and the economy.

Diversions occur when a flight is rerouted to a different airport than its original destination. This usually occurs due to convective weather. Other less frequent reasons for diversions are medical emergencies, security, issues with the aircraft, or issues with passengers or crewmembers.

Go-Arounds occur when an aircraft is on approach to the runway but suddenly aborts the landing. This occurs if there is a sudden shift in the wind, an obstruction on the runway, or possibly, the aircraft inadvertently overshooting the runway. Go-arounds result in the aircraft returning to the landing queue to attempt another landing.

Cancellations can occur for numerous reasons due to weather, extensive delays in the system, equipment issues, etc. Air carriers cancel their own flights in response to these issues. Since the three-hour tarmac rule was imposed after 2010, more flights have been cancelled. This increase in cancellations means reductions in the number of recorded delays. During FY2020, the sudden decrease in the demand for air transportation due to the COVID-19 pandemic led to flight cancellations by airlines.
Counts of NAS Delay at Core 30 Airports

During FY2021, OPSNET data show that the number of Core 30 airport departure delays of at least 15 minutes fell significantly, by 38.7 percent to 70,305. Since FY2017-FY2019, before the pandemic began, Core 30 airport departure delays fell by 75.1 percent from 281,899 (table below).

The graph and table below show, in FY2021, delays were highest at Dallas (DFW), Denver (DEN), and Chicago O’Hare (ORD), each with 5,000 or more delays. Together these three airports accounted for slightly over one-half of all Core 30 airport delays. All but four airports show decreases in delays during the pandemic (Dallas-Fort Worth (DFW), Denver (DEN), Orlando (MCO), and Tampa (TPA)). (See, Appendix I for explanations of the Core 30 airport codes.)

<table>
<thead>
<tr>
<th>Airport</th>
<th>Rank*</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
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<td>6,645</td>
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<td>1,805</td>
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<td>13,473</td>
<td>5,036</td>
<td>185</td>
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<td>25</td>
<td>585</td>
<td>193</td>
<td>233</td>
<td></td>
</tr>
<tr>
<td>CLT</td>
<td>4</td>
<td>5,118</td>
<td>3,730</td>
<td>4,951</td>
<td></td>
</tr>
<tr>
<td>DCA</td>
<td>22</td>
<td>5,422</td>
<td>2,268</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td>DEN</td>
<td>2</td>
<td>4,178</td>
<td>2,640</td>
<td>8,075</td>
<td></td>
</tr>
<tr>
<td>DFW</td>
<td>1</td>
<td>10,245</td>
<td>8,854</td>
<td>19,767</td>
<td></td>
</tr>
<tr>
<td>DTW</td>
<td>21</td>
<td>1,539</td>
<td>599</td>
<td>398</td>
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</tr>
<tr>
<td>EWR</td>
<td>6</td>
<td>44,129</td>
<td>20,681</td>
<td>3,192</td>
<td></td>
</tr>
<tr>
<td>FLL</td>
<td>16</td>
<td>1,943</td>
<td>526</td>
<td>787</td>
<td></td>
</tr>
<tr>
<td>HNL</td>
<td>30</td>
<td>38</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>IAD</td>
<td>15</td>
<td>1,127</td>
<td>400</td>
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<tr>
<td>IAH</td>
<td>9</td>
<td>4,774</td>
<td>2,473</td>
<td>2,334</td>
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</tr>
<tr>
<td>JFK</td>
<td>18</td>
<td>17,849</td>
<td>2,972</td>
<td>649</td>
<td></td>
</tr>
<tr>
<td>LAS</td>
<td>5</td>
<td>5,683</td>
<td>4,118</td>
<td>4,051</td>
<td></td>
</tr>
</tbody>
</table>

*Ranked by number of FY2021 delays.

Delays by Category

The two charts below show the sources of delays at Core 30 airports by type of delay.

Note: System impact delays are delays assigned to causal facilities in OPSNET and are composed of delays due to TMIs, departure delays, and airborne delays. System impact delays are also the basis for delays by class and delays by cause in OPSNET. (http://aspmhelp.faa.gov/index.php/OPSNET_Reports:_Definitions_of_Variables)


Total Cost of Delay

The total cost of flight delays is the sum of costs to airlines, passengers, lost demand, and indirect costs. FAA Office of Aviation Policy and Plans (APO) estimates for 2019 show the cost of delayed flights rose by 9.3 percent, from $30.2 to $33.0 billion, an increase of $2.8 billion. Most of this rise was due to an increase in the impact of delays to passengers, from $16.4 to $18.1 billion, a $1.7 billion difference. Between 2012 and 2019, the total cost of delays rose from $19.2 to $33.0 billion, an increase of $13.8 billion. The cost of delays to passengers accounted for $8.4 billion of this increase.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Airlines¹</td>
<td>5.7</td>
<td>6.0</td>
<td>5.8</td>
<td>5.8</td>
<td>5.6</td>
<td>6.4</td>
<td>7.7</td>
<td>8.3</td>
</tr>
<tr>
<td>Passengers²</td>
<td>9.7</td>
<td>11.0</td>
<td>10.5</td>
<td>13.3</td>
<td>13.3</td>
<td>14.8</td>
<td>16.4</td>
<td>18.1</td>
</tr>
<tr>
<td>Lost Demand³</td>
<td>1.3</td>
<td>1.4</td>
<td>1.4</td>
<td>1.8</td>
<td>1.8</td>
<td>2.0</td>
<td>2.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Indirect⁴</td>
<td>2.5</td>
<td>2.7</td>
<td>2.6</td>
<td>3.1</td>
<td>3.0</td>
<td>3.4</td>
<td>3.9</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>19.2</td>
<td>21.1</td>
<td>20.3</td>
<td>24.0</td>
<td>23.7</td>
<td>26.6</td>
<td>30.2</td>
<td>33.0</td>
</tr>
</tbody>
</table>

*Estimates for CY2020 are not yet available.

Notes:
1. **Airlines** (cost of delay to airlines): Increased expenses for crew, fuel, maintenance, etc.
2. **Passengers** (cost of delay to passengers): Time lost due to schedule buffer, delayed flights, flight cancellations, and missed connections.
3. **Lost Demand** (cost of passenger decisions to avoid future air travel): Estimated welfare loss incurred by passengers who avoid future air travel as the result of delays.
4. **Indirect** (indirect cost of delay): Other business sectors depend on air travel for transportation. Air travel delays impact these sectors by increasing costs in terms of dollars and time.

Source: Federal Aviation Administration, Office of Aviation Policy and Plans, Forecast and Performance Analysis Division (APO-100), July 8, 2020.
Diversions at Core 30 Airports

The airports reported below are the original intended destinations for the diverted aircraft. Increases in the number of diversions can indicate capacity issues at the airport due to weather, construction, or volume. Over all Core 30 airports, the number of diversions rose by 13.7 percent in FY2021; however, since before the start of the pandemic, Core 30 airport diversions fell by 39.1 percent from 17,779 (table below).

Airports with the highest increases in diversions were JFK (with 97.7 percent), Newark (EWR) (86.2 percent), and Denver (DEN) (79.9 percent). Airports with the highest decreases were Washington National (DCA) (-50.2 percent), Salt Lake City (SLC) (-26 percent), and Atlanta (ATL) (-23.3 percent). All but two airports show decreases in diversions since before the pandemic (Honolulu (HNL) and Tampa (TPA)) (graph and table below). (See, Appendix I for explanations of the Core 30 airport codes.)

<table>
<thead>
<tr>
<th>Core 30 Total Diversions</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17,779</td>
<td>9,534</td>
<td>10,844</td>
<td>13.7%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Airports</th>
<th>FY17-19</th>
<th>FY20</th>
<th>FY21</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>Rank*</td>
<td>Avg</td>
<td>FY20</td>
</tr>
<tr>
<td>BOS</td>
<td>9</td>
<td>1,025</td>
<td>553</td>
</tr>
<tr>
<td>BWI</td>
<td>23</td>
<td>454</td>
<td>232</td>
</tr>
<tr>
<td>CLT</td>
<td>24</td>
<td>331</td>
<td>188</td>
</tr>
<tr>
<td>DCA</td>
<td>29</td>
<td>778</td>
<td>492</td>
</tr>
<tr>
<td>DEN</td>
<td>2</td>
<td>507</td>
<td>279</td>
</tr>
<tr>
<td>DFW</td>
<td>1</td>
<td>1,404</td>
<td>1,049</td>
</tr>
<tr>
<td>DTW</td>
<td>28</td>
<td>344</td>
<td>143</td>
</tr>
<tr>
<td>EWR</td>
<td>4</td>
<td>874</td>
<td>268</td>
</tr>
<tr>
<td>FLL</td>
<td>8</td>
<td>562</td>
<td>343</td>
</tr>
<tr>
<td>HNL</td>
<td>30</td>
<td>85</td>
<td>97</td>
</tr>
<tr>
<td>IAD</td>
<td>16</td>
<td>415</td>
<td>275</td>
</tr>
<tr>
<td>IAH</td>
<td>7</td>
<td>819</td>
<td>377</td>
</tr>
<tr>
<td>JFK</td>
<td>14</td>
<td>618</td>
<td>176</td>
</tr>
<tr>
<td>LAS</td>
<td>18</td>
<td>488</td>
<td>338</td>
</tr>
</tbody>
</table>

*Ranked by number of FY2021 diversions.

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 16, 2022.
Go-Arounds at Core 30 Airports

Go-arounds as a percent of arrival operations at each Core 30 airport (except Honolulu) appear below. In FY2021, go-arounds at each Core 30 airport, did not exceed 0.6 percent. Average go-arounds as a percent of arrivals across all Core 30 airports fell slightly, to about 0.3 percent (tables and graph below). This occurred mainly due to a decline in go-arounds relative to a small increase in arrival operations. (The estimates presented here are based on ASPM and CountOps data.) (See, Appendix I for explanations of the Core 30 airport codes.)

### Core 30 Go Arounds As Percent of Arrivals

<table>
<thead>
<tr>
<th></th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>0.2%</td>
<td>0.2%</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>BOS</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>BWI</td>
<td>0.4%</td>
<td>0.5%</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>CLT</td>
<td>0.3%</td>
<td>0.5%</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>DCA</td>
<td>0.6%</td>
<td>0.6%</td>
<td>0.6%</td>
<td></td>
</tr>
<tr>
<td>DEN</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>DFW</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>DTW</td>
<td>0.4%</td>
<td>0.7%</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>EWR</td>
<td>0.3%</td>
<td>0.5%</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>FLL</td>
<td>0.3%</td>
<td>0.6%</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>IAD</td>
<td>0.2%</td>
<td>0.5%</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>IAH</td>
<td>0.2%</td>
<td>0.3%</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>JFK</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.2%</td>
<td></td>
</tr>
<tr>
<td>LAS</td>
<td>0.3%</td>
<td>0.4%</td>
<td>0.1%</td>
<td></td>
</tr>
<tr>
<td>LAX</td>
<td>0.3%</td>
<td>0.2%</td>
<td>0.1%</td>
<td></td>
</tr>
</tbody>
</table>

* FY2020 and FY2021 data for Salt Lake City (SLC) are not yet available.

Sources: Go-arounds: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), April 6, 2022; Arrivals: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), CountOps, April 6, 2022.
Cancellations at Core 30 Airports

During FY2021, flight departure cancellations at Core 30 airports fell by 69.4 percent. Cancellations fell at every airport, except Memphis (MEM) (table below). A year earlier cancellations almost doubled, increasing by 96.5 percent, rising at every airport. Cancellations may be due to weather, system delays, equipment issues, or other reasons, such as the March 2020 unforeseen precipitous fall in air travel and high flight cancellation levels due to the COVID-19 pandemic.

During FY2021, the airports with the highest number of cancellations were Dallas-Fort Worth (DFW), Denver (DEN), and Chicago O’Hare (ORD); each with over 5,000 cancellations. Five airports show increases in cancellations since before the pandemic (Dallas-Fort Worth (DFW), Denver (DEN), Memphis (MEM), Honolulu (HNL), and Salt Lake City (SLC)) (table and graph below). (See, Appendix I for explanations of the Core 30 airport codes.)

<table>
<thead>
<tr>
<th>Airport</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>4,153</td>
<td>12,459</td>
<td>2,173</td>
</tr>
<tr>
<td>BOS</td>
<td>4,667</td>
<td>5,773</td>
<td>1,273</td>
</tr>
<tr>
<td>BWI</td>
<td>2,674</td>
<td>5,128</td>
<td>1,888</td>
</tr>
<tr>
<td>CLT</td>
<td>5,597</td>
<td>12,652</td>
<td>2,324</td>
</tr>
<tr>
<td>DCA</td>
<td>4,160</td>
<td>5,751</td>
<td>1,034</td>
</tr>
<tr>
<td>DEN</td>
<td>3,551</td>
<td>13,169</td>
<td>5,456</td>
</tr>
<tr>
<td>DFW</td>
<td>6,856</td>
<td>15,207</td>
<td>8,697</td>
</tr>
<tr>
<td>DTW</td>
<td>2,294</td>
<td>4,885</td>
<td>1,018</td>
</tr>
<tr>
<td>EWR</td>
<td>6,578</td>
<td>6,416</td>
<td>3,733</td>
</tr>
<tr>
<td>FLL</td>
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<td>1,486</td>
</tr>
<tr>
<td>HNL</td>
<td>384</td>
<td>1,532</td>
<td>800</td>
</tr>
<tr>
<td>IAD</td>
<td>1,927</td>
<td>3,601</td>
<td>1,420</td>
</tr>
<tr>
<td>IAH</td>
<td>3,863</td>
<td>6,633</td>
<td>3,666</td>
</tr>
<tr>
<td>JFK</td>
<td>4,134</td>
<td>4,904</td>
<td>1,485</td>
</tr>
<tr>
<td>LAS</td>
<td>1,771</td>
<td>9,605</td>
<td>1,550</td>
</tr>
</tbody>
</table>

Source: Federal Aviation Administration, Air Traffic Organization, Office of Performance Analysis (AJR-G), Aviation System Performance Metrics (ASPM), March 16, 2022.
Section 4. Traffic Management Initiatives

Traffic Management Initiatives (TMIs) are programs and tools that ATC may use to manage air traffic. These initiatives can take a number of forms, depending on the need and situation. Some TMIs are used to manage excess demand or a lowered acceptance rate at a particular airport. Other TMIs are used to manage traffic issues in the en route environment usually caused by convective weather. The TMIs reported in this report include:

- **Ground Delay Programs (GDP)**
- **Ground stops (GS)**
- **Airspace Flow Programs (AFP)**
- **Holdings**
Ground Delay Programs at Core 30 Airports

A ground delay program (GDP) is a TMI where aircraft are delayed at their departure airport in order to reconcile demand with capacity at their arrival airport. GDPs are airport-specific, therefore, each GDP is reported for a particular airport. During FY2021, GDPs decreased by 25.5 percent across all Core 30 airports, from 427 to 318. Before the pandemic (FY2017-2019), the average number of GDPs was 1,190 (table below).

In FY2021, Dallas-Fort Worth (DFW), Denver (DEN), Chicago O’Hare (ORD), and Newark (EWR) had the highest number of GDPs. Together, these three airports accounted for 53 percent of all GDPs at Core 30 airports. Since before the pandemic (FY2017-2019), GDPs rose at Dallas-Fort Worth (DFW), Denver (DEN), Charlotte (CLT), Orlando (MCO), Tampa (TPA), and Salt Lake City (SLC) (graph and table below). (See, Appendix I for explanations of the Core 30 airport codes.)

<table>
<thead>
<tr>
<th>Total Core 30 GDPs</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,190</td>
<td>427</td>
<td>318</td>
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<td>-25.5%</td>
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</table>

<table>
<thead>
<tr>
<th>Airport</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>17</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>BOS</td>
<td>84</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>BWI</td>
<td>6</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CLT</td>
<td>7</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>DCA</td>
<td>21</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>DEN</td>
<td>19</td>
<td>11</td>
<td>57</td>
</tr>
<tr>
<td>DFW</td>
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<td>22</td>
<td>72</td>
</tr>
<tr>
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<td>1</td>
<td>0</td>
</tr>
<tr>
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<td>26</td>
</tr>
<tr>
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<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>HNL</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IAD</td>
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<td>3</td>
<td>6</td>
</tr>
<tr>
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<td>8</td>
<td>16</td>
</tr>
<tr>
<td>JFK</td>
<td>97</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>LAS</td>
<td>16</td>
<td>16</td>
<td>13</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Airport</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAX</td>
<td>57</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>LGA</td>
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</tr>
<tr>
<td>MCO</td>
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</tr>
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</tr>
<tr>
<td>MEM</td>
<td>10</td>
<td>5</td>
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<tr>
<td>MSP</td>
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<td>4</td>
<td>4</td>
</tr>
<tr>
<td>ORD</td>
<td>66</td>
<td>19</td>
<td>39</td>
</tr>
<tr>
<td>PHL</td>
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<td>21</td>
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</tr>
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<td>2</td>
<td>3</td>
</tr>
<tr>
<td>SAN</td>
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<td>0</td>
<td>0</td>
</tr>
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<td>SEA</td>
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</tr>
<tr>
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<td>61</td>
<td>9</td>
</tr>
<tr>
<td>SLC</td>
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<td>3</td>
<td>0</td>
</tr>
<tr>
<td>TPA</td>
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<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Ground Stops at Core 30 Airports

Ground stops are the most restrictive form of TMI because they hold all aircraft, within the scope of the ground stop, at their departure airports until conditions at the destination airport allow for their arrival. Ground stops only affect arrivals to a specific airport (not departures) and, like GDPs, are airport-specific. During FY2021, the number of ground stops increased by 23.9 percent across all Core 30 airports, from 758 to 939. Before the pandemic (FY2017-2019), the average number of ground stops was 1,716 (table below).

FY2021, Dallas Fort-Worth (DFW), Denver (DEN), and Chicago O’Hare (ORD) had the highest number of ground stops. Since before the pandemic (FY2017-2019), ground stops rose at Dallas-Fort Worth (DFW), Denver (DEN), Charlotte (CLT), Orlando (MCO), and Tampa (TPA) (graph and table below). (See, Appendix I for explanations of the Core 30 airport codes.)

<table>
<thead>
<tr>
<th>Total Core 30 Ground Stops</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,716</td>
<td>758</td>
<td>939</td>
<td></td>
<td>23.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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**Airspace Flow Programs by Center**

Imagine a line drawn in space in association with a constraint, usually convective weather. Under an airspace flow program, any flights filed that crosses the line (usually only in one direction) are assigned an expected departure clearance time (EDCT), to ensure that it arrives at the line, or “boundary,” at a time when it can be accommodated. In FY2021, there were 79 airspace flow programs (AFP) imposed by air traffic managers versus 30 in FY2020, an increase of 163.3 percent. The main reasons for the 79 AFPs in FY2021 were weather conditions and traffic volume. Before the pandemic (FY2017-2019), the average number of AFPs was 140 (table below).

In FY2021, AFPs mainly affected Jacksonville (ZIX) and Miami (ZMA). Together, these centers accounted for 56 of the 79 AFPs. Since before the pandemic (FY2017-2019), the largest increase in AFPs occurred at Jacksonville (ZIX) (graph and table below). (These estimates are based on National Traffic Management Log (NTML) data.) (See, Appendix I for explanations of the ARTCC and CCF codes.)

![Graph showing Airspace Flow Programs by ARTCC and CCF]

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* Data for CCF JCF are not available.

Holdings by Center

A holding occurs when an aircraft is deliberately delayed en route by flying in a repeating rotational pattern. They are typically implemented when there is traffic congestion or convective weather at the destination airport or an adjacent facility. During FY2021, there were 21,860 holdings, rising 26.1 percent from FY2020. Before the pandemic (FY2017-2019), the average number of holdings was far higher at 37,166 (table below).

During FY2021, OPSNET data shows among Air Route Traffic Control Centers (ARTCC), the highest numbers of airborne holdings occurred in DC (ZDC), Denver (ZDV), Fort Worth (ZFW), and Miami (ZMA). Holdings slightly surpassed pre-pandemic levels at three Centers (Denver (ZDV), Fort Worth (ZFW), and San Juan (ZSU)) (graph and table below). (See, Appendix I for explanations of the ARTCC and combined control facility (CCF) codes.)

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Section 5. Safety Metrics

The U.S. national airspace system is the safest air transportation system in the world. This report presents metrics used to measure the safety of the NAS:

- Runway Incursions
- Incursions by Type
- Loss of Standard Separation Count
Runway Incursions at Core 30 Airports

A runway incursion is any occurrence involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft. Across all Core 30 airports, the number of runway incursions rose from 233 in FY2020 to 259 in FY2021. Before the pandemic (FY2017-2019), the average annual number of runway incursions was higher, at 391 (table below).

In FY2021, the highest numbers of runway incursions occurred at Atlanta (ATL) and Dallas-Fort Worth (DFW). The number of runway incursions exceeded pre-pandemic levels at seven airports, most notably at Dallas-Fort Worth (DFW) and Houston (IAH) (graph and table below). Incursions by airport and by type appear on the next page. (See, Appendix I for explanations of the Core 30 airport codes.)

![Runway Incursions Graph](image)

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*Honolulu is coded as HNL or HCF in the source data.

**Incursions by Type at Core 30 Airports, FY2021**

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<tr>
<td>SAN</td>
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<td>2</td>
<td>2</td>
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<td>0</td>
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<td>SEA</td>
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<td>0</td>
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<td>1</td>
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<td>0</td>
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<td>3</td>
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<td>SLC</td>
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<td>0</td>
<td>9</td>
<td>3</td>
<td>0</td>
<td>12</td>
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<tr>
<td>TPA</td>
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<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

**Category A** - A serious incident in which a collision was narrowly avoided.

**Category B** - An incident in which separation decreases and there is a significant potential for collision, which may result in a time critical corrective/evasive response to avoid a collision.

**Category C** - An incident characterized by ample time and/or distance to avoid a collision.

**Category D** - An incident that meets the definition of a runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft of aircraft but with no immediate safety consequences.

**Category E** - An incident in which insufficient or conflicting evidence of the event precludes assigning another category.

**Loss of Standard Separation Count, by Center**

Standard separation is a specified separation minima between airborne aircraft in controlled airspace. Breaches of such minima are based on airborne loss event data. Losses of standard separation are reported by Air Route Traffic Control Center (ARTCC). Across all centers, the number of losses of standard separation fell from 845 in FY2020 to 726 in FY2021. Before the pandemic (FY2017-2019), the average annual number of losses of standard separation was higher at 1,221 (table below). This means losses of standard separation remain below pre-pandemic levels.

In FY2021, the centers with the highest losses of standard of separation were Atlanta (ZTL), Jacksonville (ZJX), and Salt Lake City (ZLC). The number of losses of standard of separation exceeded pre-pandemic levels at only one CCF, Joshua Tree (JCF) (graph and table below). (See, Appendix I for explanations of the ARTCC and combined control facilities (CCF).)

<table>
<thead>
<tr>
<th>Center</th>
<th>FY17-19 Avg</th>
<th>FY20</th>
<th>FY21</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCF</td>
<td>24</td>
<td>12</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>JCF</td>
<td>2</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>ZAB</td>
<td>57</td>
<td>55</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>ZAN</td>
<td>13</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>ZAU</td>
<td>37</td>
<td>29</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>ZBW</td>
<td>31</td>
<td>14</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>ZDC</td>
<td>80</td>
<td>41</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>ZDV</td>
<td>64</td>
<td>54</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>ZFW</td>
<td>74</td>
<td>50</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>ZHU</td>
<td>48</td>
<td>31</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>ZID</td>
<td>59</td>
<td>21</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>ZJX</td>
<td>91</td>
<td>50</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>ZKC</td>
<td>33</td>
<td>24</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Section 6. Other ATO Topics

There are a variety of other aspects of the NAS which are of special interest. This report presents the following:

Flight Service Stations

Commercial Space Launch Activity
Flight Service Stations

Flight services are delivered nationwide through certified professional controllers in Alaska and the contiguous United States, Hawaii, Puerto Rico. Services include preflight weather briefings, flight planning, inflight advisory services, search and rescue (SAR), and processing notices to air missions (NOTAMs). Self-briefing and other automated services are provided through an online web portal. Web services include interactive graphical capabilities to view a wide range of weather and aeronautical information, flight planning, activating and closing flight plans, and more. Pilots may also access automated voice services to receive current and forecast conditions at specific airports, and receive updates for adverse conditions, including TFRs.

Flight Service also delivers the FAA Weather Camera Program. This program features an expanding network of nearly 300 camera sites in Alaska, Colorado, and Montana (other sites, including Hawaii, coming soon) and over 175 sites hosted by NAV Canada, Canada’s civil air navigation service provider. The weather cameras website provides pilots with additional information for improved situational awareness and decision-making. On the website, pilots can see current images at specific locations, compare the images to clear day views, or playback a loop of past images to establish weather trends. The website also delivers a variety of safety of flight information including adverse conditions, current and forecast conditions, pilot reports, and aeronautical information.

<table>
<thead>
<tr>
<th>ALASKA FSS</th>
<th>Barrow FSS (BRW)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cold Bay FSS (CDB)</td>
</tr>
<tr>
<td></td>
<td>Deadhorse FSS (SCC)</td>
</tr>
<tr>
<td></td>
<td>Dillingham FSS (DLG)</td>
</tr>
<tr>
<td></td>
<td>Fairbanks FSS (FAI)</td>
</tr>
<tr>
<td></td>
<td>Homer FSS (HOM)</td>
</tr>
<tr>
<td></td>
<td>Iliamna FSS (ILI)</td>
</tr>
<tr>
<td></td>
<td>Juneau FSS (JNU)</td>
</tr>
<tr>
<td></td>
<td>Kenai FSS (ENA)</td>
</tr>
<tr>
<td></td>
<td>Ketchikan FSS (KTN)</td>
</tr>
<tr>
<td></td>
<td>Kotzebue FSS (OTZ)</td>
</tr>
<tr>
<td></td>
<td>McGrath FSS (MCG)</td>
</tr>
<tr>
<td></td>
<td>Nome FSS (OME)</td>
</tr>
<tr>
<td></td>
<td>Northway FSS (ORT)</td>
</tr>
<tr>
<td></td>
<td>Palmer FSS (PAQ)</td>
</tr>
<tr>
<td></td>
<td>Sitka FSS (SIT)</td>
</tr>
<tr>
<td></td>
<td>Talkeetna FSS (TKA)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FEDERAL CONTRACT FSS</th>
<th>Leidos FCFSS Washington Hub (DCA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Leidos FCFSS Fort Worth Hub (FTW)</td>
</tr>
</tbody>
</table>
### FAA Flight Services

#### FAA Facilities – Alaska Flight Service

<table>
<thead>
<tr>
<th>Year</th>
<th>Pilot Briefs</th>
<th>Flight Plans Filed</th>
<th>Preflight Calls</th>
<th>Aircraft Contacts</th>
<th>Airport Advisories</th>
<th>NOTAMs Issued</th>
<th>Total SAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2017</td>
<td>94,553</td>
<td>194,641</td>
<td>52,504</td>
<td>485,847</td>
<td>305,915</td>
<td>135,226</td>
<td>3,662</td>
</tr>
<tr>
<td>FY 2018</td>
<td>89,592</td>
<td>210,626</td>
<td>52,200</td>
<td>521,048</td>
<td>325,140</td>
<td>158,003</td>
<td>4,869</td>
</tr>
<tr>
<td>FY 2019</td>
<td>92,070</td>
<td>209,024</td>
<td>52,980</td>
<td>542,550</td>
<td>327,130</td>
<td>166,848</td>
<td>6,924</td>
</tr>
<tr>
<td>FY 2020</td>
<td>71,570</td>
<td>141,492</td>
<td>39,031</td>
<td>400,181</td>
<td>243,844</td>
<td>166,954</td>
<td>3,021</td>
</tr>
<tr>
<td>FY 2021</td>
<td>67,999</td>
<td>151,946</td>
<td>37,339</td>
<td>445,942</td>
<td>280,499</td>
<td>180,364</td>
<td>3,099</td>
</tr>
</tbody>
</table>

#### Federal Contract Flight Services

<table>
<thead>
<tr>
<th>Year</th>
<th>Pilot Briefs</th>
<th>Flight Plans Filed</th>
<th>Preflight Calls</th>
<th>Inflight Contacts</th>
<th>Flight Data Calls</th>
<th>NOTAMs Issued</th>
<th>Total SAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2017</td>
<td>829,909</td>
<td>515,868</td>
<td>1,344,640</td>
<td>314,363</td>
<td>175,203</td>
<td>216,997</td>
<td>8,145</td>
</tr>
<tr>
<td>FY 2018</td>
<td>797,746</td>
<td>462,207</td>
<td>1,255,510</td>
<td>286,392</td>
<td>178,110</td>
<td>216,249</td>
<td>9,337</td>
</tr>
<tr>
<td>FY 2019</td>
<td>747,731</td>
<td>387,694</td>
<td>1,158,005</td>
<td>257,701</td>
<td>166,546</td>
<td>200,192</td>
<td>9,728</td>
</tr>
<tr>
<td>FY 2020</td>
<td>541,004</td>
<td>195,635</td>
<td>782,145</td>
<td>175,361</td>
<td>121,118</td>
<td>179,612</td>
<td>13,195</td>
</tr>
<tr>
<td>FY 2021</td>
<td>483,675</td>
<td>168,094</td>
<td>660,369</td>
<td>186,628</td>
<td>125,186</td>
<td>190,118</td>
<td>33,769</td>
</tr>
</tbody>
</table>

#### Web Services/DUATs

<table>
<thead>
<tr>
<th>Year</th>
<th>Pilot Briefs*</th>
<th>Flight Plans Filed</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2017</td>
<td>29,079,619</td>
<td>2,592,214</td>
</tr>
<tr>
<td>FY 2018</td>
<td>26,349,042</td>
<td>2,229,961</td>
</tr>
<tr>
<td>FY 2019</td>
<td>18,946,978</td>
<td>1,690,246</td>
</tr>
<tr>
<td>FY 2020</td>
<td>17,290,280</td>
<td>1,272,098</td>
</tr>
<tr>
<td>FY 2021</td>
<td>15,550,689</td>
<td>1,328,714</td>
</tr>
</tbody>
</table>

* Represents the number of hits to contract web services including DUATs (DUATs decommissioned May, 2018).

#### United States NOTAM Office (USNOF)

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2017</td>
<td>1,455,238</td>
<td>760,015</td>
</tr>
<tr>
<td>FY 2018</td>
<td>1,569,386</td>
<td>874,091</td>
</tr>
<tr>
<td>FY 2019</td>
<td>1,670,499</td>
<td>969,951</td>
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<tr>
<td>FY 2020</td>
<td>1,474,047</td>
<td>873,025</td>
</tr>
<tr>
<td>FY 2021</td>
<td>1,620,681</td>
<td>953,125</td>
</tr>
</tbody>
</table>

Sources: FAA, Air Traffic Organization, Flight Service (AJR-B), Email communication, March 29 and April 8, 2022; FAA, Air Traffic Organization, U.S. NOTAM Office (AJV-A370), Calculations based on email communication, March 9, 2022.
**Commercial Space Launch Activity**

In CY2021, the FAA licensed 54 U.S. orbital commercial space launches. These launches were carried out by the following companies: SpaceX, 32 launches; Blue Origin, 6; Rocket Lab, 6 (from New Zealand); Virgin, 4; Orbital, 3 (part of Northrup Grumman Innovation Systems as of 2018); Astra, 2; and Firefly, 1. A graph showing annual numbers of commercial launches, by company, appears below.

Note: A commercial launch is a launch that is internationally competed (i.e., available in principle to international launch providers) or whose primary payload is commercial in nature. FAA-licensed launches carrying captive government (NASA and DOD) or industry payloads are counted here. Data for 2018-2021 include launch failures and successes, and subspace and suborbital launches.


**U.S. Spaceports**

U.S. commercial space launches are carried out from FAA-licensed spaceports located throughout the country. At present, there are 13 active FAA-licensed commercial spaceports. For a map of these locations, and to learn more about U.S. spaceports, please consult the FAA Office of Spaceports web page at: https://www.faa.gov/about/office_org/headquarters_offices/ast/programs/office_spaceports
## Appendix I. Facility Codes

### Core 30 Airports
(Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2).)

<table>
<thead>
<tr>
<th>Code</th>
<th>Airport</th>
<th>Code</th>
<th>Airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>Hartsfield-Jackson Atlanta International</td>
<td>LAX</td>
<td>Los Angeles International</td>
</tr>
<tr>
<td>BOS</td>
<td>Boston Logan International</td>
<td>LGA</td>
<td>New York LaGuardia</td>
</tr>
<tr>
<td>BWI</td>
<td>Baltimore/Washington International</td>
<td>MCO</td>
<td>Orlando International</td>
</tr>
<tr>
<td>CLT</td>
<td>Charlotte Douglas International</td>
<td>MDW</td>
<td>Chicago Midway</td>
</tr>
<tr>
<td>DCA</td>
<td>Ronald Reagan Washington National</td>
<td>MEM</td>
<td>Memphis International</td>
</tr>
<tr>
<td>DEN</td>
<td>Denver International</td>
<td>MIA</td>
<td>Miami International</td>
</tr>
<tr>
<td>DFW</td>
<td>Dallas-Fort Worth Washington International</td>
<td>MSP</td>
<td>Minneapolis/St. Paul International</td>
</tr>
<tr>
<td>DTW</td>
<td>Detroit Metropolitan Wayne County</td>
<td>ORD</td>
<td>Chicago O’Hare International</td>
</tr>
<tr>
<td>EWR</td>
<td>Newark Liberty International</td>
<td>PHL</td>
<td>Philadelphia International</td>
</tr>
<tr>
<td>FLL</td>
<td>Fort Lauderdale/Hollywood International</td>
<td>PHX</td>
<td>Phoenix Sky Harbor International</td>
</tr>
<tr>
<td>HNL</td>
<td>Honolulu International</td>
<td>SAN</td>
<td>San Diego International</td>
</tr>
<tr>
<td>IAD</td>
<td>Washington Dulles International</td>
<td>SEA</td>
<td>Seattle/Tacoma International</td>
</tr>
<tr>
<td>IAH</td>
<td>George Bush Houston Intercontinental</td>
<td>SFO</td>
<td>San Francisco International</td>
</tr>
<tr>
<td>JFK</td>
<td>New York John F. Kennedy International</td>
<td>SLC</td>
<td>Salt Lake City International</td>
</tr>
<tr>
<td>LAS</td>
<td>Las Vegas McCarran International</td>
<td>TPA</td>
<td>Tampa International</td>
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### Stand-Alone Terminal Radar Control (TRACON) Facilities*

<table>
<thead>
<tr>
<th>LocID</th>
<th>TRACON</th>
<th>LocID</th>
<th>TRACON</th>
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<tbody>
<tr>
<td>A11</td>
<td>Anchorage TRACON</td>
<td>NCT</td>
<td>Northern California TRACON</td>
</tr>
<tr>
<td>A80</td>
<td>Atlanta TRACON</td>
<td>P31</td>
<td>Pensacola TRACON</td>
</tr>
<tr>
<td>A90</td>
<td>Boston TRACON</td>
<td>P50</td>
<td>Phoenix TRACON</td>
</tr>
<tr>
<td>C90</td>
<td>Chicago TRACON</td>
<td>P80</td>
<td>Portland TRACON</td>
</tr>
<tr>
<td>D01</td>
<td>Denver TRACON</td>
<td>PCT</td>
<td>Potomac TRACON</td>
</tr>
<tr>
<td>D10</td>
<td>Dallas-Fort Worth TRACON</td>
<td>R90</td>
<td>Omaha TRACON</td>
</tr>
<tr>
<td>D21</td>
<td>Detroit TRACON</td>
<td>S46</td>
<td>Seattle TRACON</td>
</tr>
<tr>
<td>F11</td>
<td>Central Florida TRACON</td>
<td>S56</td>
<td>Salt Lake City TRACON</td>
</tr>
<tr>
<td>I90</td>
<td>Houston TRACON</td>
<td>SCT</td>
<td>Southern California TRACON</td>
</tr>
<tr>
<td>L30</td>
<td>Las Vegas TRACON</td>
<td>T75</td>
<td>St Louis TRACON</td>
</tr>
<tr>
<td>M03</td>
<td>Memphis TRACON</td>
<td>U90</td>
<td>Tucson TRACON</td>
</tr>
<tr>
<td>M98</td>
<td>Minneapolis TRACON</td>
<td>Y90</td>
<td>Yankee TRACON</td>
</tr>
<tr>
<td>N90</td>
<td>New York TRACON</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Cape Cod (K90) merged with Boston TRACON (A90); Meridian (NMM) is now a military, not a civilian TRACON.

### Air Route Traffic Control Centers (ARTCC) and Combined Control Facilities (CCF)

<table>
<thead>
<tr>
<th>LocID</th>
<th>Center</th>
<th>LocID</th>
<th>Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCF</td>
<td>Honolulu Tree Control Facility</td>
<td>ZLA</td>
<td>Los Angeles CA ARTCC</td>
</tr>
<tr>
<td>JCF</td>
<td>Joshua Tree Control Facility</td>
<td>ZLC</td>
<td>Salt Lake City UT ARTCC</td>
</tr>
<tr>
<td>ZAB</td>
<td>Albuquerque NM ARTCC</td>
<td>ZMA</td>
<td>Miami FL ARTCC</td>
</tr>
<tr>
<td>ZAN</td>
<td>Anchorage AK ARTCC</td>
<td>ZME</td>
<td>Memphis TN ARTCC</td>
</tr>
<tr>
<td>ZAU</td>
<td>Chicago IL ARTCC</td>
<td>ZMP</td>
<td>Minneapolis MN ARTCC</td>
</tr>
<tr>
<td>ZBW</td>
<td>Nashua NH ARTCC (Boston)</td>
<td>ZNY</td>
<td>New York NY ARTCC</td>
</tr>
<tr>
<td>ZDC</td>
<td>Leesburg VA ARTCC (DC)</td>
<td>ZOA</td>
<td>Oakland CA ARTCC</td>
</tr>
<tr>
<td>ZDV</td>
<td>Denver CO ARTCC</td>
<td>ZOB</td>
<td>Cleveland OH ARTCC</td>
</tr>
<tr>
<td>ZFW</td>
<td>Fort Worth TX ARTCC</td>
<td>ZSE</td>
<td>Seattle WA ARTCC</td>
</tr>
<tr>
<td>ZHU</td>
<td>Houston TX ARTCC</td>
<td>ZSU</td>
<td>San Juan PR Control Facility</td>
</tr>
<tr>
<td>ZID</td>
<td>Indianapolis IN ARTCC</td>
<td>ZTL</td>
<td>Atlanta GA ARTCC</td>
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<td>ZJX</td>
<td>Jacksonville FL ARTCC</td>
<td>ZUA</td>
<td>Guam Control Facility</td>
</tr>
<tr>
<td>ZKC</td>
<td>Kansas City KS ARTCC</td>
<td>-</td>
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</table>

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Appendix II. Other FAA Airport Lists

In addition to the Core 30 airports, FAA also uses several other airport lists, including ASPM 77, OEP 35, and OPSNET 45 airports and 34 Select TRACONs.

**ASPM 77 Airports**

This is an FAA list of 77 airports, including the Core 30, OEP 35, and other airports. The ASPM (Aviation System Performance Metrics) data includes flights to and from the 77 ASPM airports and all flights by ASPM carriers, as well as flights by those carriers to international and domestic non-ASPM airports. (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2).) (See Appendix I for the list of Core 30 airports. For OEP 35 airports, see the OEP 35 airport list on the next page.)

<table>
<thead>
<tr>
<th>Code</th>
<th>Airport</th>
<th>Code</th>
<th>Airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABQ</td>
<td>Albuquerque International Sunport</td>
<td>MEM</td>
<td>Memphis International</td>
</tr>
<tr>
<td>ANC</td>
<td>Ted Stevens Anchorage International</td>
<td>MHT</td>
<td>Manchester</td>
</tr>
<tr>
<td>ATL</td>
<td>Hartsfield-Jackson Atlanta International</td>
<td>MIA</td>
<td>Miami International</td>
</tr>
<tr>
<td>AUS</td>
<td>Austin-Bergstrom International</td>
<td>MKE</td>
<td>Milwaukee General Mitchell International</td>
</tr>
<tr>
<td>BDL</td>
<td>Bradley International</td>
<td>MSP</td>
<td>Minneapolis/St. Paul International</td>
</tr>
<tr>
<td>BHM</td>
<td>Birmingham International</td>
<td>MSY</td>
<td>Louis Armstrong New Orleans International</td>
</tr>
<tr>
<td>BNA</td>
<td>Nashville International</td>
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</tr>
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<td>Kahului</td>
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<td>OMA</td>
<td>Omaha Eppley Airfield</td>
</tr>
<tr>
<td>BUR</td>
<td>Bob Hope (Burbank/Glendale/Pasadena)</td>
<td>ONT</td>
<td>Ontario International</td>
</tr>
<tr>
<td>BWI</td>
<td>Baltimore/Washington International</td>
<td>ORD</td>
<td>Chicago O’Hare International</td>
</tr>
<tr>
<td>CLE</td>
<td>Cleveland Hopkins International</td>
<td>OXR</td>
<td>Oxnard</td>
</tr>
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<td>PBI</td>
<td>Palm Beach International</td>
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<tr>
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<tr>
<td>DAL</td>
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<tr>
<td>DAY</td>
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<td>PHX</td>
<td>Phoenix Sky Harbor International</td>
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<tr>
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<td>Pittsburgh International</td>
</tr>
<tr>
<td>DEN</td>
<td>Denver International</td>
<td>PSP</td>
<td>Palm Springs International</td>
</tr>
<tr>
<td>DFW</td>
<td>Dallas/Fort Worth International</td>
<td>PVD</td>
<td>Providence Francis Green State</td>
</tr>
<tr>
<td>DTW</td>
<td>Detroit Metropolitan Wayne County</td>
<td>RDU</td>
<td>Raleigh/Durham International</td>
</tr>
<tr>
<td>EWR</td>
<td>Newark Liberty International</td>
<td>RFD</td>
<td>Greater Rockford</td>
</tr>
<tr>
<td>FLL</td>
<td>Fort Lauderdale/Hollywood International</td>
<td>RSW</td>
<td>Southwest Florida International</td>
</tr>
<tr>
<td>GYY</td>
<td>Gary Chicago International</td>
<td>SAN</td>
<td>San Diego International</td>
</tr>
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<td>San Antonio International</td>
</tr>
<tr>
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<td>SDF</td>
<td>Louisville International</td>
</tr>
<tr>
<td>HPN</td>
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<td>SEA</td>
<td>Seattle/Tacoma International</td>
</tr>
<tr>
<td>IAD</td>
<td>Washington Dulles International</td>
<td>SFO</td>
<td>San Francisco International</td>
</tr>
<tr>
<td>IAH</td>
<td>George Bush Houston Intercontinental</td>
<td>SJC</td>
<td>Norman Mineta San Jose International</td>
</tr>
<tr>
<td>IND</td>
<td>Indianapolis International</td>
<td>SJU</td>
<td>San Juan Luis Munoz International</td>
</tr>
<tr>
<td>ISP</td>
<td>Long Island Mac Arthur</td>
<td>SLC</td>
<td>Salt Lake City International</td>
</tr>
<tr>
<td>JAX</td>
<td>Jacksonville International</td>
<td>SMF</td>
<td>Sacramento International Airport</td>
</tr>
<tr>
<td>JFK</td>
<td>New York John F. Kennedy International</td>
<td>SNA</td>
<td>John Wayne Airport-Orange County</td>
</tr>
<tr>
<td>LAS</td>
<td>Las Vegas McCarran International</td>
<td>STL</td>
<td>Lambert Saint Louis International</td>
</tr>
<tr>
<td>LAX</td>
<td>Los Angeles International</td>
<td>SWF</td>
<td>Stewart International</td>
</tr>
<tr>
<td>LGA</td>
<td>New York LaGuardia</td>
<td>TEB</td>
<td>Teterboro</td>
</tr>
<tr>
<td>LGB</td>
<td>Long Beach</td>
<td>TPA</td>
<td>Tampa International</td>
</tr>
<tr>
<td>MCI</td>
<td>Kansas City International</td>
<td>TUS</td>
<td>Tucson International</td>
</tr>
<tr>
<td>MCO</td>
<td>Orlando International</td>
<td>VNY</td>
<td>Van Nuys</td>
</tr>
<tr>
<td>MDW</td>
<td>Chicago Midway</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
OEP 35 Airports
This is an FAA list of 35 commercial U.S. airports with significant air traffic. These airports serve major metropolitan areas and some also serve as hubs for airline operations. The OEP 35 (Operational Evolution Partnership) is made up of the Core 30, plus five other airports. In 2005, this list was replaced by the Core 30 list. (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2).)
https://aspm.faa.gov/aspmhelp/index/OEP_35.html.) (See, Appendix I for the list of Core 30 airports.)

<table>
<thead>
<tr>
<th>Code</th>
<th>Airport</th>
<th>Code</th>
<th>Airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATL</td>
<td>Hartsfield-Jackson Atlanta International</td>
<td>LGA</td>
<td>New York LaGuardia</td>
</tr>
<tr>
<td>BOS</td>
<td>Boston Logan International</td>
<td>MCO</td>
<td>Orlando International</td>
</tr>
<tr>
<td>BWI</td>
<td>Baltimore/Washington International</td>
<td>MDW</td>
<td>Chicago Midway</td>
</tr>
<tr>
<td>CLE</td>
<td>Cleveland Hopkins International</td>
<td>MEM</td>
<td>Memphis International</td>
</tr>
<tr>
<td>CLT</td>
<td>Charlotte Douglas International</td>
<td>MIA</td>
<td>Miami International</td>
</tr>
<tr>
<td>CVG</td>
<td>Cincinnati/Northern Kentucky International</td>
<td>MSP</td>
<td>Minneapolis/St Paul International</td>
</tr>
<tr>
<td>DCA</td>
<td>Ronald Reagan Washington National</td>
<td>ORD</td>
<td>Chicago O’Hare International</td>
</tr>
<tr>
<td>DEN</td>
<td>Denver International</td>
<td>PDX</td>
<td>Portland International</td>
</tr>
<tr>
<td>DFW</td>
<td>Dallas/Fort Worth International</td>
<td>PHL</td>
<td>Philadelphia International</td>
</tr>
<tr>
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<td>Detroit Metropolitan Wayne County</td>
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<td>Phoenix Sky Harbor International</td>
</tr>
<tr>
<td>EWR</td>
<td>Newark Liberty International</td>
<td>PIT</td>
<td>Pittsburgh International</td>
</tr>
<tr>
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<td>Fort Lauderdale/Hollywood International</td>
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<td>San Diego International</td>
</tr>
<tr>
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<td>Honolulu International</td>
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<td>Washington Dulles International</td>
<td>SFO</td>
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</tr>
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<td>George Bush Houston Intercontinental</td>
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<td>Salt Lake City International</td>
</tr>
<tr>
<td>JFK</td>
<td>New York John F Kennedy International</td>
<td>STL</td>
<td>Lambert Saint Louis International</td>
</tr>
<tr>
<td>LAS</td>
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<td>Tampa International</td>
</tr>
<tr>
<td>LAX</td>
<td>Los Angeles International</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OPSNET 45 Airports
The FAA list of OPSNET 45 airports appear below. In the late 1990s, these were airports that contributed to 75 percent of NAS delays and that each had 500 or more operations per day. (Note, by FY2019, the number of OPSNET 45 airports with at least 500 operations per day fell to 36 airports.)

<table>
<thead>
<tr>
<th>Code</th>
<th>Airport</th>
<th>Code</th>
<th>Airport</th>
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<tbody>
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<td>Orlando International</td>
</tr>
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<td>Memphis International</td>
</tr>
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<td>Miami International</td>
</tr>
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<td>Minneapolis/St Paul International</td>
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<td>Cleveland Hopkins International</td>
<td>MSY</td>
<td>Louis Armstrong New Orleans International</td>
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<td>Oakland International</td>
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<tr>
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<td>Chicago O’Hare International</td>
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</tr>
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<td>Denver International</td>
<td>PDX</td>
<td>Portland International</td>
</tr>
<tr>
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<td>Dallas/Fort Worth International</td>
<td>PHL</td>
<td>Philadelphia International</td>
</tr>
<tr>
<td>DFW</td>
<td>Detroit Metropolitan Wayne County</td>
<td>PHX</td>
<td>Phoenix Sky Harbor International</td>
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<tr>
<td>EWR</td>
<td>Newark Liberty International</td>
<td>PIT</td>
<td>Pittsburgh International</td>
</tr>
<tr>
<td>FLL</td>
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<td>RDU</td>
<td>Raleigh/Durham International</td>
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<td>Houston Hobby</td>
<td>SAN</td>
<td>San Diego International</td>
</tr>
<tr>
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<td>Washington Dulles International</td>
<td>SEA</td>
<td>Seattle/Tacoma International</td>
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<tr>
<td>IAH</td>
<td>George Bush Houston Intercontinental</td>
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<td>San Francisco International</td>
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<td>MCI</td>
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### 34 Select TRACONs

The 34 Select are the TRACONs support the OPSNET 45 airports. (See, above for the list of OPSNET 45 airports.) (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2). [https://aspm.faa.gov/aspmhelp/index/34_Select.html](https://aspm.faa.gov/aspmhelp/index/34_Select.html))

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</tr>
<tr>
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</tr>
<tr>
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<td>PBI</td>
<td>Palm Beach International</td>
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<td>Potomac TRACON</td>
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## Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>34 Select TRACONs</td>
<td>The 34 Select are the TRACONs support the OPSNET 45 airports. (See, Appendix II for the lists of 34 Select TRACONs and OPSNET 45 airports.)</td>
</tr>
<tr>
<td>AAR</td>
<td>See, Airport Arrival Rate (AAR).</td>
</tr>
<tr>
<td>ADC</td>
<td>See, Average Daily Capacity (ADC).</td>
</tr>
<tr>
<td>ADR</td>
<td>See, Airport Departure Rate (ADR).</td>
</tr>
<tr>
<td>AFP</td>
<td>See, Airspace Flow Programs (AFP).</td>
</tr>
<tr>
<td>Airport Arrival Rate (AAR)</td>
<td>The number of arriving aircraft which an airport or airspace can accept from an ARTCC per hour.</td>
</tr>
<tr>
<td>Airport Departure Rate (ADR)</td>
<td>The number of aircraft that can depart an airport and the airspace can accept per hour.</td>
</tr>
<tr>
<td>Airport Operations</td>
<td>See, Operations.</td>
</tr>
<tr>
<td>Airspace Flow Programs (AFP)</td>
<td>Airspace flow programs (AFPs) manage demand-capacity imbalances through the issuance of estimated departure clearance times (EDCT) to flights traversing a flow constrained area (FCA). An AFP might be used, for example, to reduce the rate of flights through a center when that center has reduced en route capacity due to severe weather, replacing mile-in-trail (MIT) restrictions for a required reroute, managing airport arrival fix demand or controlling multiple airports within a terminal area.</td>
</tr>
<tr>
<td>Air Route Traffic Control Center (ARTCC)</td>
<td>A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft. Also known as en route or centers, there are 21 ARTCCs in the continental U.S. A list of the 21 ARTCCs appears in Appendix I.</td>
</tr>
<tr>
<td>Air Traffic Control (ATC)</td>
<td>A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.</td>
</tr>
<tr>
<td>Air Traffic Control Tower (ATCT)</td>
<td>A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar).</td>
</tr>
<tr>
<td>Army Radar Approach Control (ARAC)</td>
<td>An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Army airports. Currently, the U.S. does not operate any ARACs.</td>
</tr>
<tr>
<td>ASM</td>
<td>See, Available Seat Miles (ASM).</td>
</tr>
<tr>
<td>ASPM</td>
<td>See, Aviation System Performance Metrics (ASPM).</td>
</tr>
<tr>
<td>ASPM 77 Airports</td>
<td>The ASPM 77 is an FAA list of 77 airports, including the Core 30, OEP 35, and other airports. The ASPM (Aviation System Performance Metrics) data includes flights to and from the 77 ASPM airports and all flights by ASPM carriers, as well as flights by those carriers to international and domestic non-ASPM airports. (See, Appendix II for the list of ASPM 77 airports.) (See, Appendix I for the list of Core 30 airports and Appendix II for the list of OEP 35 airports.)</td>
</tr>
<tr>
<td>ATC</td>
<td>See, Air Traffic Control.</td>
</tr>
<tr>
<td>ATCT</td>
<td>See, Air Traffic Control Tower.</td>
</tr>
<tr>
<td>Available Seat Miles (ASM)</td>
<td>The aircraft miles flown in each inter-airport segment, multiplied by the number of seats available for fare paying passenger use on that segment. Available seat miles are computed by summation of the products of the number of miles on each interairport segment, multiplied by the number of available seats on that segment.</td>
</tr>
<tr>
<td><strong>Average Daily Capacity (ADC)</strong></td>
<td>Average daily capacity is calculated as the sum of the airport departure rates (ADR) and the capacity airport arrival rates (AAR), divided by the number of days in the period under consideration.</td>
</tr>
<tr>
<td><strong>Average Hourly Capacity (Called Rate)</strong></td>
<td>See, Called Rate.</td>
</tr>
<tr>
<td><strong>Aviation System Performance Metrics (ASPM)</strong></td>
<td>Aviation system performance metrics (ASPM) data includes flights to and from 77 ASPM airports (including the Core 30 and OEP 35 airports) and all flights by ASPM carriers, as well as flights by those carriers to international and domestic non-ASPM airports. All IFR and some VFR flights are included. View this data on the OPSNET website. ASPM flight records fall into two groupings: (1) Efficiency flights are intended to capture all traffic handled by controllers at the ASPM airports and include flights with complete records and flights for which accurate estimates are possible due to only a few pieces of missing data; and, (2) ASPM flights exclude general aviation and military traffic, as well as local (non-itinerant) traffic and records for international flights missing data on the non-U.S. portion of the flight. ASPM contains key event times including actual, scheduled as well as the airline reported gate and runway times. It also synthesizes key times from the traffic flow management system (TFMS) and flight level information from the national traffic management log (NTML).</td>
</tr>
<tr>
<td><strong>Called Rate</strong></td>
<td>The hourly throughput that an airport’s runways are able to sustain during periods of high demand. Called rates include all arrival and departure traffic that an airport can support. The called rate, or average hourly capacity, is the sum of the average arrival rate (AAR) and the average departure rate (ADR).</td>
</tr>
<tr>
<td><strong>Cancellations</strong></td>
<td>The set of cancelled departures as determined by a combination of scheduled flights not flown and TFMS flight plans that were cancelled and not re-filed for ASPM carriers and all other carriers reporting schedule data; and ASQP flight cancellations.</td>
</tr>
<tr>
<td><strong>CCF</strong></td>
<td>See, Combined Control Facility (CCF).</td>
</tr>
<tr>
<td><strong>Center</strong></td>
<td>Also known as air route traffic control center (ARTCC) or en Route. See, Air Route Traffic Control Center (ARTCC).</td>
</tr>
<tr>
<td><strong>Center Operations</strong></td>
<td>See, Operations.</td>
</tr>
<tr>
<td><strong>CERAP</strong></td>
<td>See, Combined En Route Radar Approach Control (CERAP).</td>
</tr>
<tr>
<td><strong>Class B Airspaces</strong></td>
<td>Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation’s busiest airports in terms of IFR operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace.</td>
</tr>
<tr>
<td><strong>Combined ATCT TRACONs</strong></td>
<td>See, Terminal Radar Control Facility (TRACON).</td>
</tr>
<tr>
<td><strong>Combined Control Facility (CCF)</strong></td>
<td>An air traffic control facility that provides approach control services for one or more airports as well as en route air traffic control (center control) for a large area of airspace. Some may provide tower services along with approach control and en route services. The U.S. has four CCFs. A list of the 4 CCFs appears in Appendix I.</td>
</tr>
<tr>
<td><strong>Combined En Route Radar Approach Control (CERAP)</strong></td>
<td>An air traffic control facility that combines the functions of an ARTCC with a TRACON facility.</td>
</tr>
<tr>
<td><strong>Core 30 Airports</strong></td>
<td>The 30 airports with the highest number of operations. A list of the Core 30 Airports appears in Appendix I.</td>
</tr>
<tr>
<td><strong>Delays</strong></td>
<td>See, OPSNET Delays.</td>
</tr>
<tr>
<td><strong>Diversions</strong></td>
<td>Gate return/air return and en route diversion are considered a diversion. However, a planned stop for fuel, known before departure from the gate, where the flight has been dispatched to is not.</td>
</tr>
<tr>
<td><strong>Direct User Access Terminal Service (DUATS)</strong></td>
<td>DUATS, or direct user access terminal service is a weather information and flight plan processing service contracted by FAA for use by United States civil pilots and other authorized users. The DUAT Service is a telephone- and Internet-based system which allows the pilot to use a personal computer for access to a Federal Aviation Administration (FAA) database to obtain weather and aeronautical information and to file, amend, and cancel domestic IFR and VFR flight plans.</td>
</tr>
<tr>
<td><strong>DUATS</strong></td>
<td>See, Direct User Access Terminal Service (DUATS).</td>
</tr>
<tr>
<td><strong>EDCT</strong></td>
<td>See, Expected Departure Clearance Time (EDCT).</td>
</tr>
<tr>
<td><strong>En Route</strong></td>
<td>Also known as Air Route Traffic Control Center (ARTCC) or, simply, Center. See, Air Route Traffic Control Center (ARTCC).</td>
</tr>
<tr>
<td><strong>En Route Operations</strong></td>
<td>See, Operations.</td>
</tr>
<tr>
<td><strong>Expected Departure Clearance Time (EDCT)</strong></td>
<td>The runway release time assigned to an aircraft in a traffic management program. See also, Ground Delay Programs (GDP).</td>
</tr>
<tr>
<td><strong>FCA</strong></td>
<td>See, Flow Constrained Area (FCA).</td>
</tr>
<tr>
<td><strong>Flight</strong></td>
<td>The period from the start of the takeoff roll to the first landing.</td>
</tr>
<tr>
<td><strong>Flight Service Station (FSS)</strong></td>
<td>A flight service station (FSS) is an air traffic facility that provides information and services to aircraft pilots before, during, and after flights, but unlike air traffic control (ATC), is not responsible for giving instructions or clearances or providing separation.</td>
</tr>
<tr>
<td><strong>Flow Constrained Area (FCA)</strong></td>
<td>A defined region of airspace, a time interval, or other characteristic used to identify flights subject to a constraint. This constraint may be due to convective weather, military exercises, or other reasons.</td>
</tr>
<tr>
<td><strong>FSS</strong></td>
<td>See, Flight Service Station (FSS).</td>
</tr>
<tr>
<td><strong>GDP</strong></td>
<td>See, Ground Delay Programs (GDP).</td>
</tr>
<tr>
<td><strong>Go Around</strong></td>
<td>A go around (sometimes called overshoot) is an aborted landing of an aircraft that is on final approach.</td>
</tr>
<tr>
<td><strong>Ground Delay Programs (GDP)</strong></td>
<td>Ground delay programs are implemented to control air traffic volume to airports where the projected traffic demand is expected to exceed the airport's acceptance rate for a lengthy period of time. Lengthy periods of demand exceeding acceptance rate are normally a result of the airport's acceptance rate being reduced for some reason. The most common reason for a reduction in acceptance rate is adverse weather such as low ceilings and visibility. How it works: Flights that are destined to the affected airport are issued expected departure clearance times (EDCT) at their point of departure. Flights that have been issued EDCTs are not permitted to depart until their expected departure clearance time. These EDCTs are calculated in such a way as to meter the rate that traffic arrives at the affected airport; ensuring that demand is equal to acceptance rate. The length of delays that result from the implementation of a ground delay program depends upon two factors: how much greater than the acceptance rate the original demand was, and for what length of time the original demand was expected to exceed the acceptance rate.</td>
</tr>
</tbody>
</table>
| Ground Stops (GS) | Ground stops are implemented for a number of reasons. The most common reasons are:  
- To control air traffic volume to airports when the projected traffic demand is expected to exceed the airport's acceptance rate for a short period of time.  
- To temporarily stop traffic allowing for the implementation of a longer-term solution, such as a ground delay program.  
- The affected airport's acceptance rate has been reduced to zero.  
How it works:  
- Flights that are destined to the affected airport are held at their departure point for the duration of the ground stop. |
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<tr>
<td>Holdings</td>
<td>Holding (or flying a hold) is a maneuver designed to delay an aircraft already in flight while keeping it within a specified airspace.</td>
</tr>
<tr>
<td>IFR Flights</td>
<td>Instrument Flight Rules. A set of rules governing the conduct of flight under instrument meteorological conditions.</td>
</tr>
<tr>
<td>Level-Offs</td>
<td>Level-offs are tracked from the top-of-descent (TOD) point or 200 nautical miles (NM) from the airport, whichever is closer. A trajectory segment is considered as a level-off if the change in altitude of position reports is less than or equal to 200 feet and the segment is at least 50 seconds in duration. The metric is calculated as the sum of the count of level-offs for each flight within a scope (i.e. non-military instrument flight rules (IFR) operations arriving into Core 30 airports), divided by the total number of flights within the scope. The metric is derived from flight position reports from the National Offload Program (NOP).</td>
</tr>
<tr>
<td>Load Factor</td>
<td>The summation of the number of passenger miles (RPM), divided by the summation of the number of available seat miles (ASM), on revenue paying commercial flights. This quotient is expressed as a percentage. See also, available seat miles (ASM) and revenue passenger miles (RPM).</td>
</tr>
<tr>
<td>Loss of Separation Events</td>
<td>A defined loss of separation between airborne aircraft occurs whenever specified separation minima in controlled airspace are breached. Minimum separation standards for airspace are specified by air traffic service (ATS) authorities, based on International Civil Aviation Organization (ICAO) standards.</td>
</tr>
<tr>
<td>Miles-in-Trail (MIT)</td>
<td>A specified distance between aircraft (in nautical miles), normally, in the same stratum associated with the same destination or route of flight.</td>
</tr>
<tr>
<td>National Airspace System (NAS)</td>
<td>The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. This includes system components jointly shared with the military.</td>
</tr>
<tr>
<td>Notices to Airmen (NOTAM)</td>
<td>A NOTAM is a notice containing information essential to personnel concerned with flight operations, but not known far enough in advance to be publicized by other means. It states the abnormal status of a component of the national airspace system (NAS) – not the normal status.</td>
</tr>
<tr>
<td>OEP 35 Airports</td>
<td>This is an FAA list of 35 commercial U.S. airports with significant air traffic. These airports serve major metropolitan areas and some also serve as hubs for airline operations. The OEP 35 (Operational Evolution Partnership) is made up of the Core 30, plus five other airports (Cincinnati, Cleveland, Pittsburgh, Portland, and St Louis). In 2005, this list was replaced by the Core 30 list. (Source: System Data and Infrastructure Group, Office of Performance Analysis, Systems Operations Services, Air Traffic Organization, FAA (AJR-G2). <a href="https://aspm.faa.gov/aspmhelp/index/OEP_35.html">https://aspm.faa.gov/aspmhelp/index/OEP_35.html</a>.) (See, Appendix I for the list of Core 30 airports and Appendix II for the list of OEP 35 airports.)</td>
</tr>
</tbody>
</table>
| Operations | • Airport operations: The number of arrivals and departures from the airport at which the airport traffic control tower is located.  
• Tower operations: Airport operations, plus airport tower overflights.  
• TRACON operations: The number of operations passed to and from area airports or centers, including overflights through TRACON airspace.  
• En route or center operations: The number of operations passing to and from a TRACON to a center, or from one center to another center, or from a center to a TRACON. It includes U.S. overflights and oceanic traffic through center air space that do not arrive at or depart from U.S. territory. |
<table>
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<tr>
<th>Operational Network (OPSNET)</th>
<th>OPSNET is the official source of national airspace system (NAS) air traffic operations and delay data. This data are used to analyze the performance of the FAA's air traffic control facilities. Reportable delay includes information such as the constrained facility, the reason for delay (weather, equipment, runways, volume, etc.), and the traffic management initiative (TMI) employed in delaying the aircraft.</th>
</tr>
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<tbody>
<tr>
<td>OPSNET 45 Airports</td>
<td>The FAA list of OPSNET 45 airports appear below. In the late 1990s, these were 45 airports that contributed to 75 percent of NAS delays and had 500 or more operations per day. (Note, by FY2019, the number of OPSNET 45 airports with at least 500 operations per day fell to 36 airports.) (See, Appendix II for the list of OPSNET 45 airports.)</td>
</tr>
</tbody>
</table>
| OPSNET Delays | Delays to instrument flight rules (IFR) traffic of 15 minutes or more, which result from the ATC system detaining an aircraft at the gate, short of the runway, on the runway, on a taxiway, or in a holding configuration anywhere en route, must be reported. The IFR controlling facility must ensure delay reports are received and entered into OPSNET. These OPSNET delays are caused by the application of initiatives by the traffic flow management (TFM) in response to weather conditions, increased traffic volume, runway conditions, equipment outages, and other causes. Below are descriptions of the categories of delay causes resulting in a reportable delay:  
- **Weather**: The presence of adverse weather conditions affecting operations. This includes wind, rain, snow/ice, low cloud ceilings, low visibility, and tornado/hurricane/thunderstorm.  
- **Volume**: Delays must only be reported as volume when the airport is in its optimum configuration and no impacting conditions have been reported when the delays were incurred.  
- **Runway/Taxiway**: Reductions in facility capacity due to runway/taxiway closure or configuration changes.  
- **Equipment**: An equipment failure or outage causing reduced capacity.  
- **Other**: All impacting conditions that are not otherwise attributed to weather, equipment, runway/taxiway, or volume, such as airshow, aircraft emergency, bomb threat, external radio frequency interference, military operations, nonradar procedures, etc.  
Non-reportable delays are delays incurred by IFR traffic, but which should not be reported in OPSNET. |
| Overflights |  
- **Terminal overflight**: A terminal IFR flight that originates outside the TRACON’s/RAPCON’s/Radar ATCT’s area and passes through the area without landing.  
- **En route overflight**: An en route IFR flight that originates outside the ARTCC’s area and passes through the area without landing. |
<p>| Radar Approach Control (RAPCON) | An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Air Force airports. Currently, the U.S. does not operate any RAPCONs. |
| Radar ATC Facility (RATCF) | An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. Service is provided to both civilian and U.S. Navy airports. Currently, the U.S. does not operate any RATCFs. |
| RAPCON | See, Radar Approach Control (RAPCON). |
| RATCF | See, Radar ATC Facility (RATCF). |
| Revenue Passenger Miles (RPM) | One revenue passenger (fare paying passenger) transported one mile. Revenue passenger miles are computed by summation of the products of the revenue aircraft miles on each interairport segment, multiplied by the number of revenue passengers carried on that segment. |
| Runway Incursions | A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft. |
| Stand-Alone TRACON | See, Terminal Radar Control Facility (TRACON). |
| Terminal Radar Control Facility (TRACON) | An FAA air traffic control facility using radar and air/ground communications to provide approach control services to aircraft arriving, departing, or transiting the airspace controlled by the facility. A TRACON located in an air traffic control tower is a combined TRACON. A TRACON that does not share a facility is a stand-alone TRACON. The U.S. has 149 civilian TRACONs. There are 124 TRACONs in shared facilities and 25 stand-alone TRACONs. A list of the 25 stand-alone TRACONs appears in Appendix I. |</p>
<table>
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<tr>
<th><strong>Top-of-Descent (TOD)</strong></th>
<th>Top-of-Descent is the transition from the cruise phase of a flight to the descent phase, the point at which the planned descent to final approach altitude is initiated.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tower Operations</strong></td>
<td>See, Operations.</td>
</tr>
<tr>
<td><strong>TRACON</strong></td>
<td>See, Terminal Radar Control Facility (TRACON).</td>
</tr>
<tr>
<td><strong>TRACON Operations</strong></td>
<td>See, Operations.</td>
</tr>
<tr>
<td><strong>Traffic Flow Management System (TFMS)</strong></td>
<td>TFMS is a data exchange system for supporting the management and monitoring of national air traffic flow. TFMS processes all available data sources such as flight plan messages, flight plan amendment messages, and departure and arrival messages. TFMS is restricted to the subset of flights that fly under instrument flight rules (IFR) and are captured by the FAA’s en-route computers. Formerly known as the enhanced traffic management system (ETMS).</td>
</tr>
<tr>
<td><strong>VFR</strong></td>
<td>See, Visual Flight Rules (VFR).</td>
</tr>
<tr>
<td><strong>VFR flights</strong></td>
<td>Flights operated under visual flight rules.</td>
</tr>
<tr>
<td><strong>Visual Flight Rules (VFR)</strong></td>
<td>Visual flight rules are rules that govern the procedures for conducting flights under visual conditions. The term &quot;VFR&quot; is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.</td>
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</tbody>
</table>
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