Report Introduction:
This report provides interactive information about interagency Department of Interior (DOI) and United States Forest Service (USFS) Unmanned Aircraft Systems (UAS) program activities for Fiscal Year 2021 (FY21) and historical (FY 2017 - FY 2021) fiscal years.

Information is organized into three sections:
- Section 1: FY21 Flight Use Summary
- Section 2: Remote Pilots and UAS Training
- Section 3: UAS Fleet Aircraft

Who This Report is For:
This report is primarily composed for Bureau/Agency employees interested in the UAS program.

Report Access:
Access to the report may need to be granted. To share this report with others, please contact Rich Thurau richard.thurau@ios.doi.gov.

Bureau Acronyms and Definitions:
This report covers all DOI bureaus involved with the UAS program and the U.S. Department of Agriculture Forest Service*. Bureau acronyms are as follows:

AVSO - Appraisal and Valuation Services Office
BIA - Bureau of Indian Affairs
BLM - Bureau of Land Management
BOEM - Bureau of Ocean Energy Management
FWS - United States Fish and Wildlife Service
NPS - National Park Service
OSMRE - Office of Surface Mining Reclamation and Enforcement
USBR - United States Bureau of Reclamation
USFS - USDA Forest Service
USGS - United States Geological Survey
Other - Non-DOI / USDA Forest Service assets are reported to include other federal agencies, state cooperators, and contractors.

* USDA Forest Service data may not be reported in entirety.

Using Power BI Reports
All graphics and text in this Power BI are interactive. For example, consider the slide #6, "Monthly FY21 and Flight Use". Two visuals break down flights by month; (a) flights by bureau, and (b) flights by primary flight use.

Bureau specific information can be extracted from this chart in two ways:
1. Hovering over a value in a visual will display specific numbers associated with that portion of the graphic.
2. By clicking on a value in the graphic or legend, ALL data visuals are filtered by the clicked value.

Use the control key to select multiple criteria and visuals for multi-layered statistics.

An Example:
By clicking on "BLM" in the Monthly FY21 chart, both visuals on the page will display information specific to BLM (e.g., monthly flights by the BLM by specific primary flight use category).

Investing time in examining this report can yield extensive details about the UAS program flights.
Section 1: Fiscal Year 2021 Flight Use Summary

**Section 1: FY21 Flight Use Introduction**

The total number of flights in FY21 increased by 1,047 (~22%) to 4,668 (3,621 in FY20; see bar chart below). Should this increasing trend continue, we expect more than 5,500 flights in FY22 (white bar), just under half of the program’s biggest year in 2019, prior to the implementation of Secretarial Order 3379.

Flight use (pie chart right) was dominated by interagency fire (58%) and training (33%; 91% combined), with all flights conducted for fire, emergency response or readiness training.

This section reports programmatic flights by flight use, operational control and geography.

**UAS Program Annual Flight Count**

- **FY21 Flights by Primary Flight Use Category**
  - Interagency Fire: 4,668 (58%)
  - Training and Proficiency: 1,546 (33%)
  - Mapping: 197 (4%)
  - Reconnaissance (non-fire): 42 (1%)
  - Landscape Monitoring: 197 (4%)
  - Maintenance and Inspection: 1,546 (33%)
  - Search and Rescue: 197 (4%)
  - Law Enforcement: 197 (4%)
  - Wildlife Survey: 197 (4%)

Interagency fire operations dominated FY21 flight use as UAS expands its utility providing real-time intelligence and expanding the firefighter’s toolbox (Dixie Fire, August 2021).

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
FY21 Flights by Operational Control

- Remote Pilot Bureau: 972 (21%)
- USFS: 1,618 (35%)
- BLM: 521 (11%)
- USGS: 2,722 (58%)
- NPS: 964 (21%)
- FWS: 341 (8%)
- USBR: 53 (1%)
- OAS: 303 (6%)
- BIA: 104 (2%)
- Other: 42 (1%)
- OSMRE: 44 (1%)

FY21 Flights by Primary Flight Use Category

- Interagency Fire: 2,722 (58%)
- Training and Proficiency: 1,546 (33%)
- Mapping: 197 (4%)
- Reconnaissance (non-fire): 42 (1%)
- Landscape Monitoring: 42 (1%)
- Maintenance and Inspection: 42 (1%)
- Search and Rescue: 42 (1%)
- Law Enforcement: 42 (1%)
- Wildlife Survey: 42 (1%)

U.S. States and Territories With FY21 UAS Flights

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
### FY21 Flights by Operational Control

#### State Flight Count

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<thead>
<tr>
<th>State</th>
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<td>OR</td>
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<td>CO</td>
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#### FY21 Flights by Primary Flight Use Category

<table>
<thead>
<tr>
<th>Primary Flight Use</th>
<th>Flight Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interagency Fire</td>
<td>1,618 (35%)</td>
</tr>
<tr>
<td>Training and Proficiency</td>
<td>972 (21%)</td>
</tr>
<tr>
<td>Mapping</td>
<td>964 (21%)</td>
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<td>Wildlife Survey</td>
<td></td>
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</tbody>
</table>

* States with 50 or more flights represented as an area box. States with at least one but less than 50 flights are listed in the table.

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
FY21 Flights by Month and Bureau or Primary Flight Use

**FY21 Monthly Flight Count by Controlling Bureau**

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<thead>
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<td>OAS</td>
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<tr>
<td>OSMRE</td>
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<tr>
<td>Other</td>
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<td>USFS</td>
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<td>USGS</td>
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**FY21 Monthly Flight Count by Primary Flight Use**

<table>
<thead>
<tr>
<th>Bureau</th>
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<td>Maintenance</td>
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<td>Training and Support</td>
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</table>

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
FY21 Flights by Month and Remote Pilot Bureau With Primary Flight Use

**FY21 Flights by Primary Flight Use Category**

- **Interagency Fire**
- **Training and Proficiency**
- **Mapping**
- **Reconnaissance (non-fire)**
- **Landscape Monitoring**
- **Maintenance and Inspection**
- **Search and Rescue**
- **Law Enforcement**
- **Wildlife Survey**

**FY21 Monthly Flight Count by Controlling Bureau**

<table>
<thead>
<tr>
<th>Bureau</th>
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<td>Other</td>
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<tr>
<td>USGS</td>
<td>4,668</td>
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</tbody>
</table>

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
FY21 (left) vs. FY20 (right) Flights by Operation Control and Primary Flight Use

**FY21 Flights by Operational Control**
- Remote Pilot Bureau: 1,618 (35%)
- USFS: 521 (7%)
- BLM: 4,668 (11%)
- USGS: 964 (21%)
- OAS: 972 (21%)

**FY20 Flights by Operational Control**
- Remote Pilot Bureau: 1,095 (32%)
- USFS: 41,556 (41%)
- BLM: 3,418 (10%)
- USGS: 654 (19%)
- OAS: 755 (22%)

**FY21 Flights by Primary Flight Use**
- Interagency Fire: 42 (4%)
- Training and Proficiency: 1,546 (33%)
- Mapping: 2,722 (58%)
- Landscape Monitoring: 1,734 (51%)
- Maintenance and Inspection: 925 (27%)
- Law Enforcement: 382 (11%)
- Wildlife Survey: 112 (4%)

**FY20 Flights by Primary Flight Use**
- Interagency Fire: 139 (3%)
- Training and Proficiency: 925 (27%)
- Mapping: 1,734 (51%)
- Landscape Monitoring: 925 (27%)
- Maintenance and Inspection: 382 (11%)
- Law Enforcement: 100 (3%)
- Wildlife Survey: 112 (3%)

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
FY21 (left) and FY20 (right) Monthly Flights by Bureau and Primary Flight Use

**FY21 Monthly Flight Count by Controlling Bureau**

<table>
<thead>
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<td>564</td>
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**FY20 Monthly Flight Count by Controlling Bureau**

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<td>29</td>
<td>142</td>
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**FY21 Monthly Flight Count by Primary Flight Use**

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<th>Maintenance</th>
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<th>Search and...</th>
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<td>October</td>
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**FY20 Monthly Flight Count by Primary Flight Use**

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<th>Training and...</th>
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<tbody>
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<td>381</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>November</td>
<td>11</td>
<td>29</td>
<td>142</td>
<td>161</td>
<td>110</td>
<td></td>
<td>296</td>
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Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
Quarterly and Annual UAS Flights By Bureau
Fiscal Years 2017-2021

Flight Count by Quarter and Bureau Operational Control

<table>
<thead>
<tr>
<th>Bureau</th>
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<th>FWS</th>
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<tr>
<td>21-3</td>
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<td>21-4</td>
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* Program grounding occurred at the end of Nov. 2019. No recorded flights in December.

Annual Flight Totals

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<th>Fiscal Year</th>
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<tbody>
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<td>2017</td>
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<tr>
<td>2019</td>
</tr>
<tr>
<td>2020</td>
</tr>
<tr>
<td>2021</td>
</tr>
</tbody>
</table>

Program grounding occurred at the end of Nov. 2019. No recorded flights in December.

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
Section 2: Remote Pilots and Training

Section 2: Remote Pilots
Remote pilots are at the core of how work is done within the UAS program. Interior and Forest Service remote pilots maintain qualifications through UAS operations and training. Compliant remote pilots possess the basic requirements to operate UAS for training, readiness, or active missions. There are currently 326 compliant remote pilots across DOI and Forest Service (pie chart right).

FY21 Training and Qualifications
Additional training in the classroom, online, and in the field maintain and enhance remote pilot qualifications specific to aircraft, Extended and Beyond Visual Line of Sight (EVLOS/BVLOS) operations, as well as fireline and instructor qualifications.

What's in this Section?
This section breaks down the current qualifications and training of the program’s remote pilots as well as FY21 flights.

FY21 Remote Pilots Trained in A-450

Current Compliant Remote Pilots by Bureau/Agency

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
IAT Compliant Remote Pilot Locations

All Trained Remote Pilots by Bureau/Agency

<table>
<thead>
<tr>
<th>Bureau / Agency Remote Pilots</th>
<th>Compliant</th>
<th>Non-Compliant</th>
<th>Bureau Total</th>
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<td>BLM</td>
<td>85</td>
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<td>USGS</td>
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<tr>
<td>Contractor</td>
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</tbody>
</table>

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.

NPS remote pilot Britta Schroeder prepares for an emergency wildlife monitoring flight in Denali National Park, AK (photo credit: Lauren Hurst).
Current Remote Pilot Qualifications

Current Compliant and Fire Qualified Remote Pilots (UASP)

- **BLM**: 18 (17%)
- **USFS**: 5 (5%)
- **NPS**: 2 (2%)
- **FWS**: 2 (2%)
- **OAS**: 4 (4%)
- **Contractor**: 4 (4%)

Total: 35 (100%)

Aerial Ignition Qualification

- **USFS**: 13 (13%)
- **BLM**: 10 (10%)
- **NPS**: 7 (7%)
- **FWS**: 4 (4%)
- **Contractor**: 2 (2%)
- **OAS**: 2 (2%)

Total: 30 (30%)

Beyond Visual Line of Site Qualification

- **USGS**: 39 (39%)
- **USFS**: 32 (32%)
- **BLM**: 28 (28%)
- **NPS**: 16 (16%)
- **FWS**: 8 (8%)
- **OAS**: 6 (6%)
- **Contractor**: 2 (2%)
- **OSMRE**: 1 (1%)

Total: 191 (100%)

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
Since Secretarial Order 3379, flight use within the program has been driven by bureaus poised for emergency response. The Bureau of Land Management (BLM) and U.S. Forest Service (USFS) make up the majority of pilots operating for Interagency fire, while the U.S. Geological Survey (USGS) maintains readiness and response for hurricanes, floods, oil spills and other natural and man-made disasters.

Jay Murgoitio has provided this Storymap illustrating some of FY21’s UAS operations with the BLM.
Section 3: Aircraft

A majority of flights in FY21 were completed using the DJI Matrice 600 Pro (a.k.a. M600; 65%) - pie chart below left. The scarcity of available aircraft in meeting UAS mission needs is illustrated by comparing aircraft ownership (pie chart right), dominated by the legacy 3DR Solo (ownership 55%, usage 9%), while the M600 represents just 10% of available DOI aircraft.

* Because aircraft restrictions differ between executive Departments (Agriculture vs. Interior), fleet information on this page is limited to DOI.

Cybersecurity and a New Generation of Aircraft
Both DOI and the USFS continue exploring opportunities for new aircraft in the wake of Executive Order on Protecting the United States from Certain UAS and Interior Secretarial Order 3379. The future remains unclear as both departments explore options for the selection of aircraft that are within budget and capable of supporting the next generation of UAS operations. The Defense Innovation Unit Blue Drone 1.0 website lists some of the aircraft currently available.

In This Section
This section reports on UAS flights by bureau and primary use. Bureau information is presented by remote pilot bureau at the time of flight.

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
FY 21 Flight Count by Aircraft and Bureau

- DJI M600: 1,502 flights, 126 minutes
- Parrot Anafi: 187 flights, 204 minutes
- DJI Mavic Pro: 140 flights, 187 minutes
- 3DR Solo: 295 flights
- Parrot Anafi Thermal: 103 flights
- FireFly: 30 flights
- Other Evaluation Aircraft: 4,649 flights

Total flights: 58,431

Remote Pilot Bureau
- BIA
- BLM
- FWS
- NPS
- OAS
- OSMRE
- Other
- USBR
- USFS
- USGS

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
Primary flight use categories are changing in FY2022 to better describe the UAS program objectives.

<table>
<thead>
<tr>
<th>Primary Flight Use</th>
<th>Flight Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interagency Fire</td>
<td>2,722</td>
</tr>
<tr>
<td>Training and Proficiency</td>
<td>1,546</td>
</tr>
<tr>
<td>Mapping</td>
<td>197</td>
</tr>
<tr>
<td>Reconnaissance (non-fire)</td>
<td>105</td>
</tr>
<tr>
<td>Landscape Monitoring</td>
<td>42</td>
</tr>
<tr>
<td>Maintenance and Inspection</td>
<td>23</td>
</tr>
<tr>
<td>Search and Rescue</td>
<td>17</td>
</tr>
<tr>
<td>Law Enforcement</td>
<td>9</td>
</tr>
<tr>
<td>Wildlife Survey</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total flights</strong></td>
<td><strong>4,668</strong></td>
</tr>
</tbody>
</table>

**FY21 Flights by Flight Use and Aircraft**

- **Interagency Fire**: 2,566 flights, 4,668 flight count, 58,431 flight time (mins.)
- **Training and Proficiency**: 332 flights, 404 flight count, 311 flight time (mins.)
- **Mapping**: 424 flights, 424 flight count, 424 flight time (mins.)
- **Reconnaissance (non-fire)**: 105 flights, 105 flight count, 105 flight time (mins.)
- **Landscape Monitoring**: 42 flights, 42 flight count, 42 flight time (mins.)
- **Maintenance and Inspection**: 23 flights, 23 flight count, 23 flight time (mins.)
- **Search and Rescue**: 17 flights, 17 flight count, 17 flight time (mins.)
- **Law Enforcement**: 9 flights, 9 flight count, 9 flight time (mins.)
- **Wildlife Survey**: 7 flights, 7 flight count, 7 flight time (mins.)

**Aircraft**:
- 3DR Solo
- Autel EVO
- DJI M600
- DJI Mavic Pro
- FireFly
- Other Evaluation Aircraft
- Parrot Anafi
- Parrot Anafi Thermal

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
Annual Flights by Aircraft
Fiscal Years 2018-221

**FY21 DOI Flight Count by Aircraft**

- **Aircraft Name**
  - DJI M600
  - Parrot Anafi
  - DJI Mavic Pro
  - 3DR Solo
  - Parrot Anafi Thermal
  - FireFly

- **Flight Count**
  - 393 (9%)
  - 443 (10%)
  - 565 (13%)

- **Flight Time (mins.)**
  - 2,848 (65%)

**FY19 DOI Flight Count by Aircraft**

- **Aircraft Name**
  - 3DR Solo
  - DJI M600
  - Parrot Anafi
  - DJI Mavic Pro
  - FireFly
  - Other

- **Flight Count**
  - 1,576 (13%)
  - 1,076 (10%)
  - 715 (7%)

- **Flight Time (mins.)**
  - 8,277 (81%)

**FY20 DOI Flight Count by Aircraft**

- **Aircraft Name**
  - 3DR Solo
  - DJI M600
  - Parrot Anafi
  - DJI Mavic Pro
  - FireFly
  - Other

- **Flight Count**
  - 765 (8%)
  - 421 (13%)
  - 48 (1%)

- **Flight Time (mins.)**
  - 8,277 (81%)

**FY18 DOI Flight Count by Aircraft**

- **Aircraft Name**
  - 3DR Solo
  - DJI M600
  - Parrot Anafi
  - DJI Mavic Pro
  - FireFly
  - Other

- **Flight Count**
  - 800 (8%)
  - 765 (8%)
  - 252 (3%)

- **Flight Time (mins.)**
  - 8,277 (81%)

Prepared by U.S. Dept. of the Interior, Office of Aviation Services, UAS Division.
Total Flights by Controlling Bureau, Primary Flight Use and Aircraft
Fiscal Years 2017-2021

Flight Count
34,700
378,638

Flight Time (mins.)
2,092 (6%)
2,129 (6%)
2.8... (...)
In Closing

2022 Outlook

Flight count is used in this report to represent the UAS effectiveness as a tool to accomplish the respective objectives of bureau/agency employees. The most effective time periods since the program's inception have occurred when aircraft became affordable and capable of informing the diverse needs of the remote pilot corps.

The “Blue Drone” requirements currently being defined in the government’s top offices thus far appear to substantially increase cost without providing additional capabilities. Coupled with an aging and currently irreplaceable fleet FY2022 numbers are likely to remain stable or decline for most bureaus.

FREEFLY’s Alta-X has emerged as a potential next generation DJI M600 replacement, seen here with the expanded Ignis payload (photo credit: S. Stroud).

Acknowledgements

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For questions comments and support, please contact Richard Thurau or Brad Koeckeritz (OAS).

richard_thurau@ios.doi.gov, bradley_koeckeritz@ios.doi.gov

The FlightWave Edge fixed wing UAS may become available as a mapping platform for DOI’s program in FY2022 (photo credits: L. Brady, R. Thurau).