

Tactical **Fire** Remote Sensing Advisory Committee

– Spring 2019 Meeting

Department of the Interior UAS Program Update



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**U.S. Dept. of the Interior
Office of Aviation Services
Unmanned Aerial Services Division**

DOI's UAS Program Briefing:

- DOI's UAS Program Summary
- How has remote sensing and fire shaped DOI's UAS program (Past)?
- What's "HOT" with DOI UAS today (Present)?
- What's "cooking" (Future)?



Key Points for Today's Briefing



DOI is comprised of nine bureaus with varying levels of involvement with the UAS Program.

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Ocean Energy Management
- Bureau of Reclamation
- Bureau of Safety and Environmental Enforcement
- National Park Service
- Office of Surface Mining Reclamation and Enforcement
- U.S. Fish and Wildlife Service
- U.S. Geological Survey

DOI Structure: Who We Are



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DOI Structure: Who We Are



2009 - 2015 "Hand-me down era"

~30



- Raven,
- T-Hawk,
- Superbat



2016 - 2017 "The 'Solo' Generation"

~200



- Falcon
- 3DR Solo

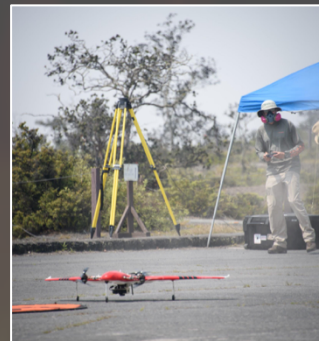


2018 + "Next Gen UAS"

400+



- Firefly
- Commercial
- Contracting



UAS Program Evolution





	Total 2u Entries	Total Flights	Non- Incident Flights	*Incident Flights	Flight Hours	**Total Remote Pilots Reporting	States Flown In	Aircraft Types Flown	Calendar Days Flown
FY 2017	1,617	4,976	1,388	229	803	435	33	3	204
FY 2018	4,313	10,342	2,551	1,762	1,785	527	42	8	312
Increase	2,696	5,366	1,163	1,533	982	92	9	5	108
Percent Increase	166.7%	107.8 %	83.8%	669.4%	122.4%	21.1%	27.3%	166.7%	52.9%

* Incident flights include support for fire, hurricanes and the Kilauea volcano eruption.
 ** Total remote pilots reporting includes non-DOI cooperators conducting DOI flights.

**U.S. Department of the Interior
Unmanned Aircraft Systems (UAS) Program
2018 Use Report**

Drones for Good

2018 DOI UAS Program - *Metrics That Matter*

- **Largest** domestic U.S. program: **531 UAS**, **>359** FAA certified & DOI trained operators.
- **~19,000** flights, **>30** mission applications.
- **Expanded** FAA-granted BVLOS authorities.
- **Leader** in domestic sUAS testing.
- **First** to ID commercial drone manufacturer cybersecurity issue, first to address.
- **\$14.8M** in estimated operations savings.
- **1/7th** the time, **1/10th** the cost RoT reinforced.
- **First-ever** UAS aerial ignition capability.
- **>55** favorable news articles.
- **Zero** complaints from public.
- **Zero** accidents.
- **Zero** additional OAS funding / personnel required.
- **Two** national level awards.
- Leadership recognized by **Congress¹** "in piloting and demonstrating the potential for unmanned aerial systems to assist in wildland fire suppression."
- **22²** separate Federal, State, Local agencies/governments have reached out to OAS for sUAS program development support.

¹NOAA, NASA, DHS, CBP, ID F&G, CO DPS, AK DoF, USFS, LAFD, Chicago, OR DoF, WA DNR, USACE, NSF, USDA, GSA, USDOT, ID DoL, USCG, DC, CalFire

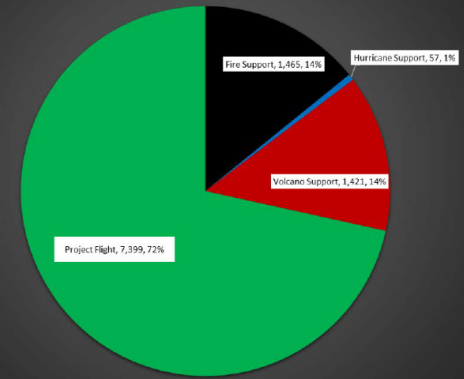
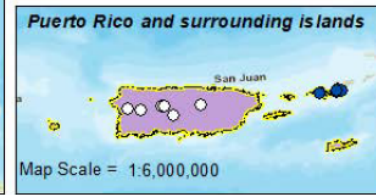
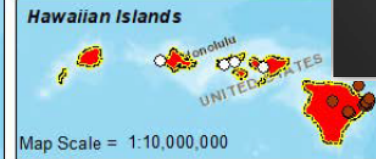
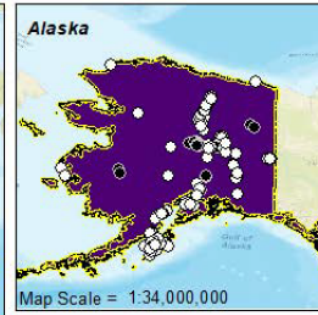
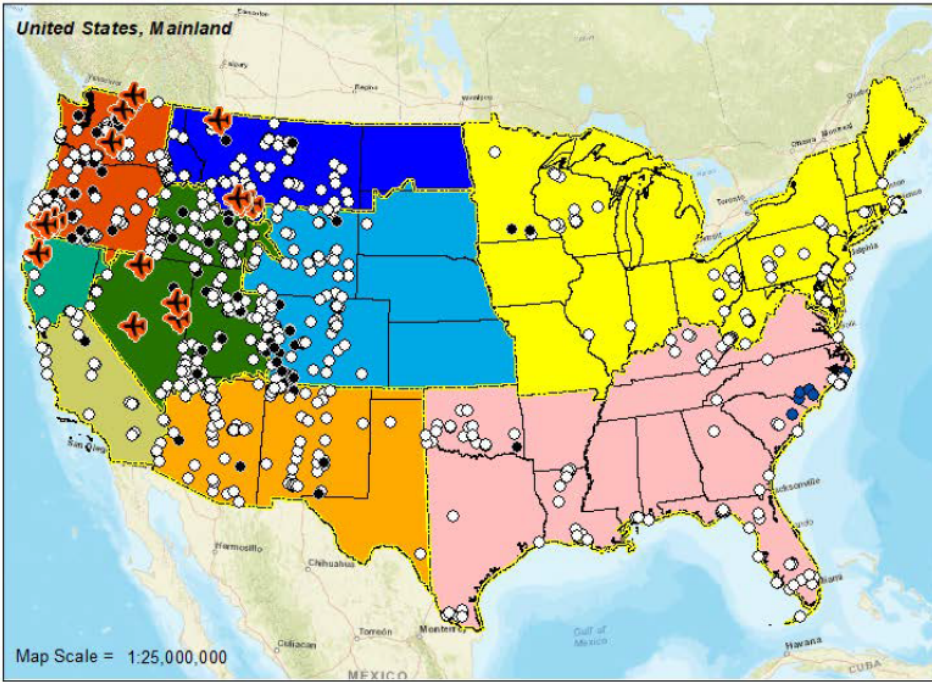
Mark L. Bathrick 2018

FY 2018 UAS Program Summary



U.S. Department of the Interior Unmanned Aircraft Systems FY18 Project Locations by Project Type, and Geographic Area Coordination Center (GACC).

DOI Fiscal Year 2018 Flight Count and Percent by Incident / Project



GACC	FY 2018 DOI UAS Flights by Bureau and GACC											FY18 GACC Totals (FY18)										
	BIA	MIN	USAP	ORCA	TRIP	DES	SONNE	USFS	USGS	Other												
Alaska	0	0%	405	41%	0	0%	205	21%	118	12%	0	0%	0	0%	143	15%	154	12%	988	10%		
Eastern	0	0%	5	1%	0	0%	86	17%	40	8%	19	4%	106	21%	0	0%	239	48%	0	0%	495	5%
Get at Basin	16	1%	982	55%	370	21%	196	11%	19	1%	61	3%	0	0%	17	1%	111	6%	0	0%	1,772	17%
Great Basin	0	0%	41	3%	0	0%	48	3%	0	0%	318	22%	0	0%	0	0%	1,087	72%	0	0%	1,474	14%
Northern California	0	0%	2	5%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	42	96%	0	0%	44	0%
Northern Rockies	8	1%	440	69%	16	3%	11	2%	0	0%	1	0%	1	0%	1	0%	156	24%	8	1%	641	6%
Northeast	10	1%	828	56%	41	3%	83	6%	8	1%	242	16%	0	0%	0	0%	149	10%	119	8%	1,480	14%
Pacific Northwest	0	0%	848	54%	112	9%	17	1%	24	2%	39	3%	0	0%	0	0%	351	30%	0	0%	1,191	12%
Southern	13	2%	55	6%	53	6%	302	34%	36	4%	30	3%	13	2%	48	5%	334	38%	0	0%	884	9%
Southern NE	0	0%	0	0%	0	0%	0	0%	11	19%	0	0%	0	0%	0	0%	47	81%	0	0%	58	1%
Southern California	0	0%	6	2%	27	9%	0	0%	20	6%	5	2%	0	0%	0	0%	261	82%	0	0%	319	3%
Southeast	13	1%	480	50%	162	17%	11	1%	170	18%	7	1%	0	0%	12	1%	115	12%	0	0%	970	9%
Other - OUS	0	0%	0	0%	0	0%	26	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	26	0%
Bureau Totals (FY18)	60	1%	3,895	38%	781	8%	985	10%	446	4%	722	7%	119	1%	78	1%	3,015	29%	241	2%	10,342	

Map Legend

Project Locations

- Fire
- Volcano
- Hurricane
- All Other Flights

- CWN Fire

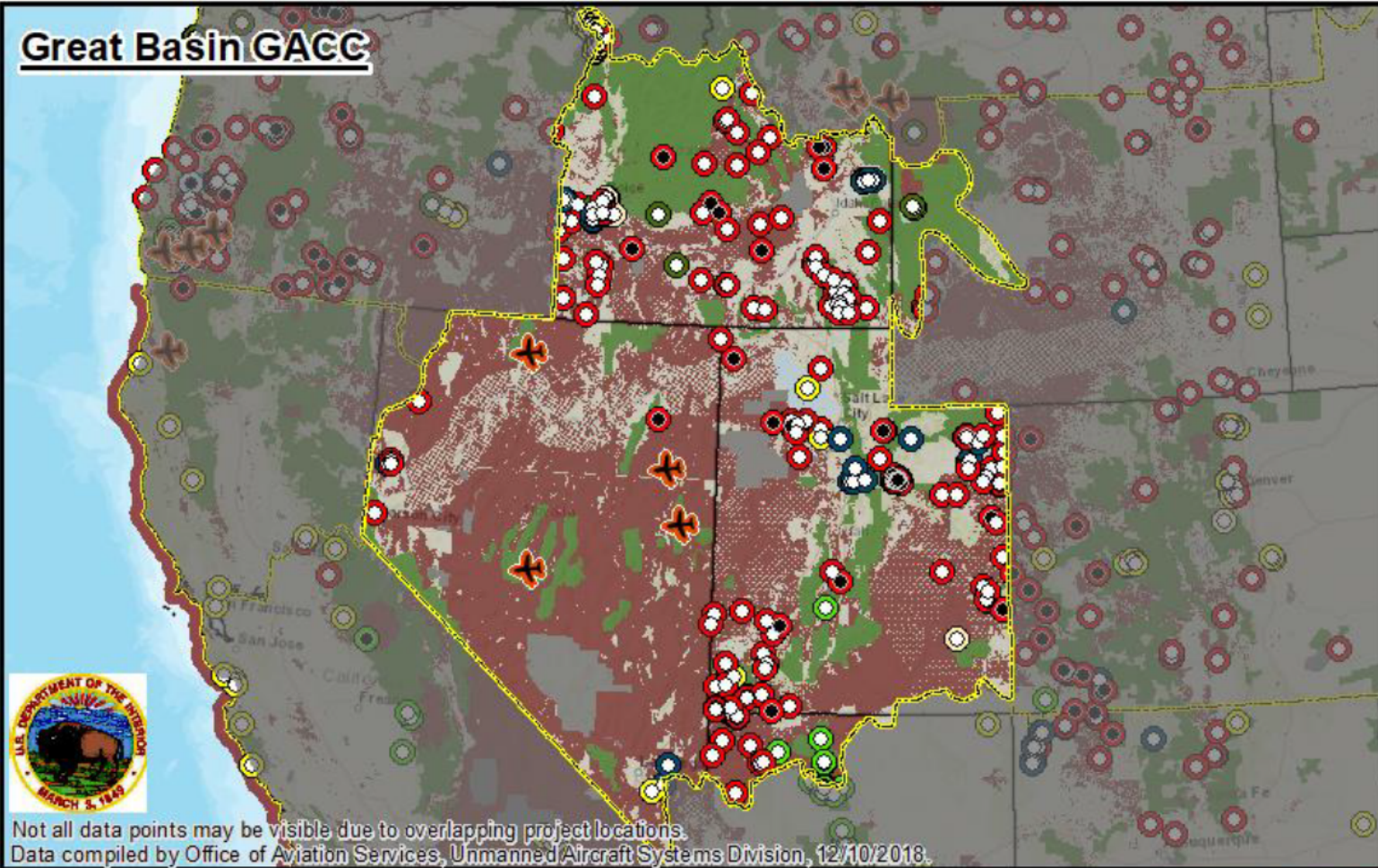
- GACC Boundaries



FY 2018 UAS Program Summary



Great Basin GACC



Map Legend

Project Locations

- Controlling Agency (Dot Outline Color)

Yellow	USGS	Green	NPS
Red	BLM	Brown	OSM RE
White	OAS	Light Green	USFS
Dark Green	FWS	Orange	BIA
Blue	BOR	Light Blue	Other

- Project Type (Dot Center Color)

- Black dot: Fire
- Brown dot: Volcano
- Blue dot: Hurricane
- White dot: All Other Flights

- CWN Fire

Map Layers

- GACC Boundaries

- Surface Ownership

Red	DOI
Green	FS
Grey	Other Gov.

Main Map Scale

1:9,000,000



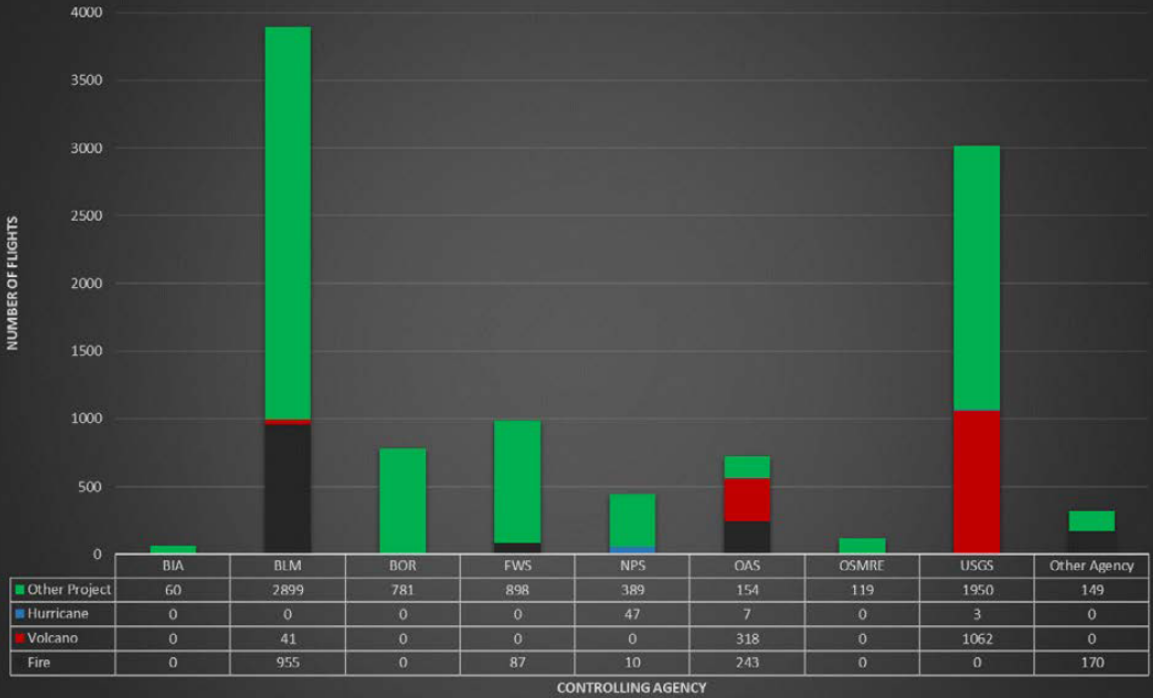
Not all data points may be visible due to overlapping project locations.
 Data compiled by Office of Aviation Services, Unmanned Aircraft Systems Division, 12/10/2018.

FY 2018 UAS Program Summary

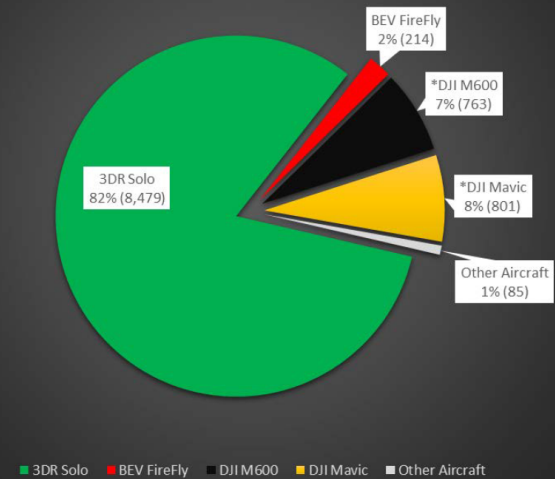


FY 2018 UAS Program Summary

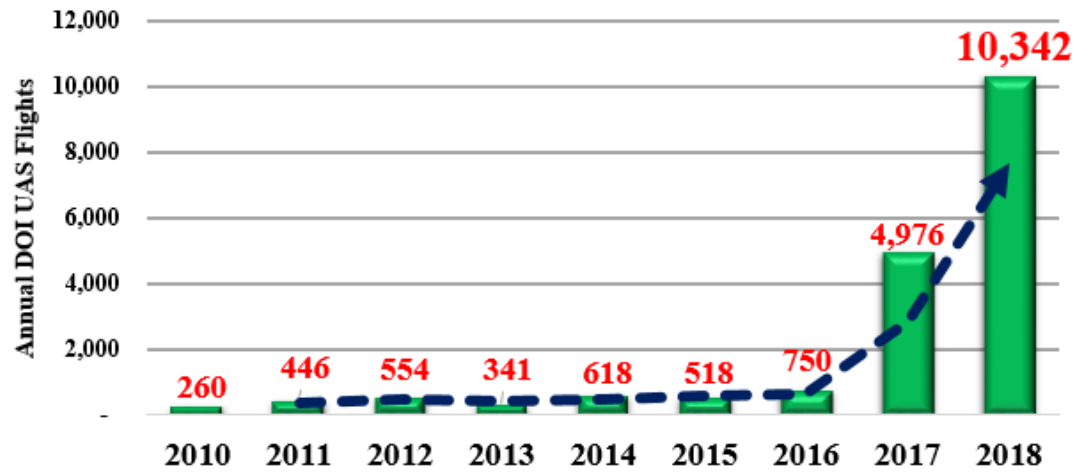
Fiscal Year 2018 Number of Flights by Bureau and Incident / Project



Aircraft Use by Type (Percent of FY18 Total flights)



DOI Annual UAS Flight Activity



Inertia / Trajectory

Major Developments for DOI and Tactical Fire

1. Current Thermal Capabilities for sUAS S.A.
2. Ignis Plastic Sphere Dispenser (PSD)
3. Call When Needed UAS Contract.
4. BVLOS.
5. S-373 and Advanced UAS Training.



DOI UAS and **Fire** Today



FLIR Pro Vue R (3DR Solo) & DJI XT2 (M600)

- 640x512 pixel sensor
- 7.5 – 13.5 micrometers
- Uncooled



Thermal UAS Payloads



U.S. Department of the Interior
Using Drones to Manage Wildfires




A Drone Is an Unmanned Aircraft System (UAS) Piloted from the Ground

<p>3DR Solo Quadcopter 10" x 18" Best for small-scale mapping and real-time situation assessment</p>			<p>Hybrid VTOL Fixed-Wing COMING SOON Best for longer endurance mapping/reconnaissance flights</p>
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THE SCAN EAGLE



Advances in 2018





2018 – DOI Fields First-Ever UAS Aerial Ignition Capability

- Improved safety.
- First-ever night aerial ignition capability.
- Able to monitor drops, ignition, and burn effectiveness with accompanying infrared sensor.

The Ignis payload and the M600



The Ignis payload and the M600



The Insitu Scan Eagle (above left) was one of four CWN awarded aircraft to fly in support of interagency wildfire operations in the summer of 2018. Overall, 86 flights were conducted on 16 different fires for more than 382 flight hours. Infrared sensors effectively identify “hot spots” (above right) with accurate geolocation data that is quickly relayed to firefighters on the ground (photo credit, Insitu (left) National Interagency Fire Center (right)).



	<u>Total Incident Flights</u>	<u>Number of Fires Supported</u>	<u>Total Flight Hours</u>	<u>States Flown In</u>	<u>Aircraft Types Flown</u>	<u>Total Months Flown</u>
FY 2018 CWN	86	16	382	6	4	4

- [Silent Falcon Video, 2018 \(1:34\)](#)
- [Taylor Creek Spot Fire animation video \(5 min\)](#)
- [New CWN Vendors for 2019 fire season.](#)

Call When Needed



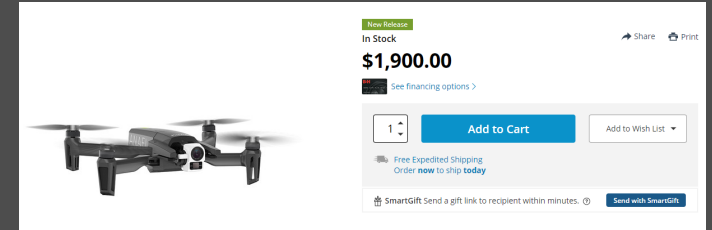
- More pilots, more aircraft, more missions.

- Training courses continue to be at capacity
- [S-373 Training Available](#)
- DJI Evaluation period terminating, opening the gates for acquisition
- Additional CWN Vendors

- Tethered M600 testing

- Constant S.A.
- Repeater possibility

- Additional (5) Ignis units available in 2019



What's Next?





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