2020

Aviation Annual Report

Aviation Annual Report

U.S. Forest Service

1/1/2021

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Executive Summary

This report summarizes US Forest Service aviation business data to characterize annual aviation use and costs for contract and Agency-owned aircraft. Data summaries are presented to generate a picture of annual use at the Agency management scale, and analysis methods are standardized to facilitate observation of trends in future annual reports. Summaries are presented by calendar year (January 1 – December 31) to capture fire seasons and contracting cycles more thoroughly.

Data presented herein are from Incident Business System (IBS) obtained via the FAMWEB Data Warehouse. Additionally, some summaries are provided by Agency aviation program specialists, contract specialists, or Regional Aviation Officers.

2020 was an extremely demanding fire year. Consequently, Forest Service Agency-owned and contracted aircraft flew 83,324 hours in 2020, which was above the 5-year average and any of the previous recent years of record.

Table 1 summarizes the Agency fleet, showing both the number of aircraft awarded a contract line item and those available to the Agency for use from other sources. These numbers are not reflective of the actual number of aircraft utilized though because a Call When Needed (CWN) aircraft may not have been available at the time of a resource order and some Exclusive Use aircraft are also awarded CWN contracts.

Report Disclaimer

Incident Business System (IBS) archived aircraft use and costs data are stored in the FAMWEB Data Warehouse. This information tracks aviation use for the Forest Service, and summaries provided in this report are only as accurate as the archived data. Summaries provided may represent both fire and non-fire flight missions (e.g., wildlife tracking or forest health survey flights).

Not all aircraft utilized by the Agency are billed through ABS (e.g., military aircraft with MAFFS units). Missing data and data entry errors may persist in the archived data and subsequent analyses. ABS is an Agency invoicing tool and was not designed for historical analyses. The Forest Service updates ABS data as payments are processed.

Inconsistences, omissions, or obvious data errors may be manually corrected prior to completion of the annual analyses; these corrections will be noted.

Summary totals may not align precisely with itemized values due to rounding practices.

Table 1 – CY 2020 Forest Service Aircraft Fleet Summary

	Number of Aircraft
Helicopters	
Exclusive Use (EXU)	102
Call When Needed (CWN)	520
Agency Owned	3
Airtankers	
Next Generation – EXU	13
Next Generation – CWN	22
MAFFS	8
Multi-Engine Water Scoopers	
Call When Needed (CWN)	4
Fixed-Wing	
Aerial Supervision Module/ Leadplane (Lease)	15
Light Fixed-Wing ATGS (EXU)	22
Light Fixed-Wing ATGS (CWN)	75[1]
Smokejumper Aircraft (EXU)	5
Smokejumper Aircraft (CWN)	1
Large Transport (EXU)	2
Other Regional Light Fixed-Wing (CWN)	61[1]
Fixed-Wing (Agency Owned)	21

[1] Value is approximated based on 2018 report numbers. CWN light fixed-wing aircraft that may be utilized for ATGS missions as needed are managed under Regional contracts for various non-fire missions.

Aviation Utilization and Cost Information

The Forest Service provides aircraft for both fire and non-fire missions. Although the Agency owns a limited number of aircraft, contract aircraft account for most of the aviation assets available for mission-related work. In 2020, 458 contracted aircraft and 24 Agency-owned aircraft were utilized to meet Agency missions.[2]

This report categorizes aircraft into four groups: fixed-wing, helicopter, airtanker, and scooper. The data summaries include both Agency-owned and contract aircraft, unless otherwise noted. The fixed-wing category includes the National Interagency Fire Center large transport jet, smokejumper aircraft, leadplanes, air attack, and all other fixed-wing aircraft not operating for the sole purpose of delivering a fire suppressant. The helicopter category includes all rotor-wing aircraft, regardless of flight missions. Unless otherwise noted, the airtanker category includes all flights and charges associated with any fixed-wing aircraft delivering a fire chemical suppressant to a fire (i.e., Single Engine Airtanker (SEAT), Large Airtanker (LAT), and Very Large Airtanker (VLAT)). Finally, scoopers are water scooping fixed-wing aircraft used in fire suppression.

2020 At-A-Glance

Aviation Use

Agency and contract aircraft flew 83,324 hours in calendar year 2020 (Figure 1), which was above both the previous 5 years of record and the 5-year average (CY 2016-2020 average is 70,074 hours). In 2020, surge aircraft were used for the first time to supplement the Exclusive Use fleet and provide additional capability during the COVID-19 pandemic. 61 airtankers, water scoopers, helicopters and aerial supervision aircraft were contracted using modified agreements guaranteeing 90-day Mandatory Availability Periods (MAPs). The high fire activity and COVID-19 pandemic resulted in 97.5 percent of the 83,324 annual flight hours being in support of fire, with only 1.9 percent for resource missions (non-fire) and 0.6 percent for prescribed fire. For the year, aircraft activity peaked in August and September, with 51% of all annual flight hours; however, there was sustained heavy flight time from June to October, with monthly totals exceeding 10,000 hours (Figure 2).

[2] Values reflect the actual number of unique aircraft that operated and may not align with fleet size values due to contract processes (e.g., aircraft swaps, multiple contract awards).

Figure 1 – CY 2016-2020 Total Agency Flight Time

Calendar Year	Flight Hours
2016	65,071
2017	83,184
2018	76,230
2019	42,570
2020	83,324
5-Year Average	**70,074**

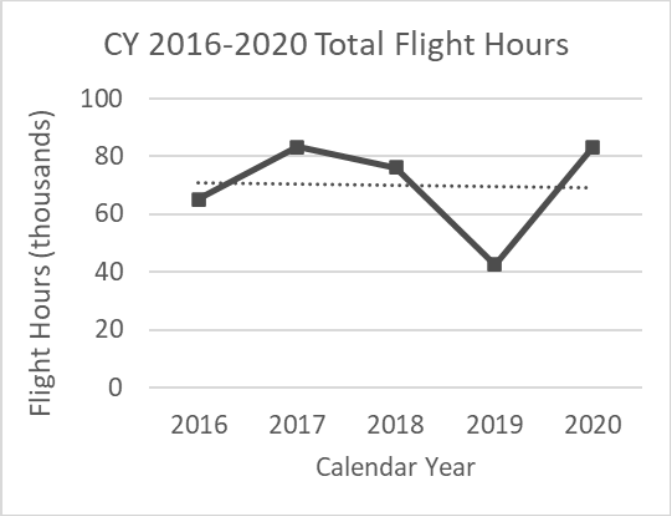
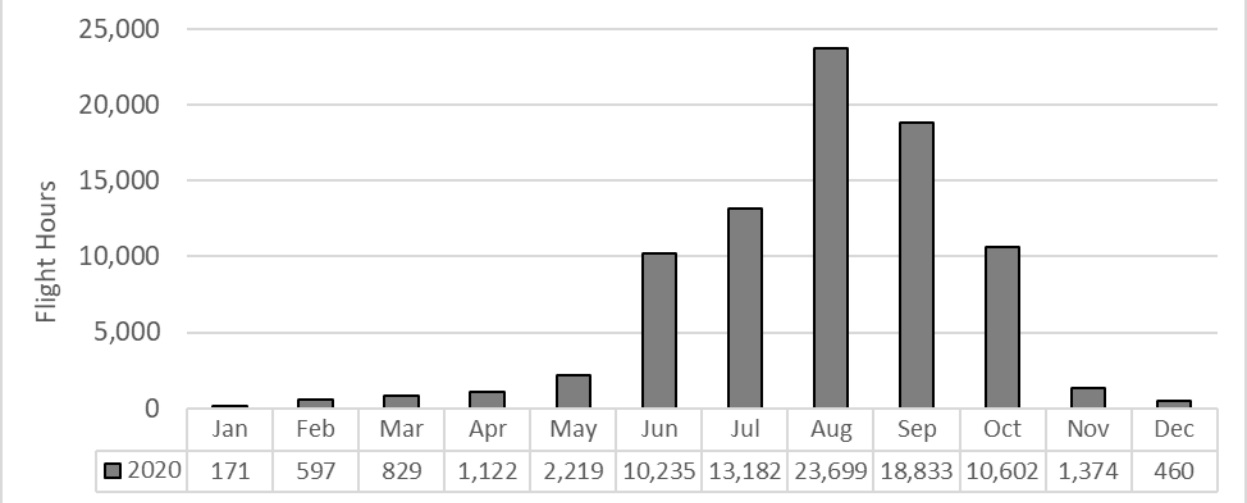


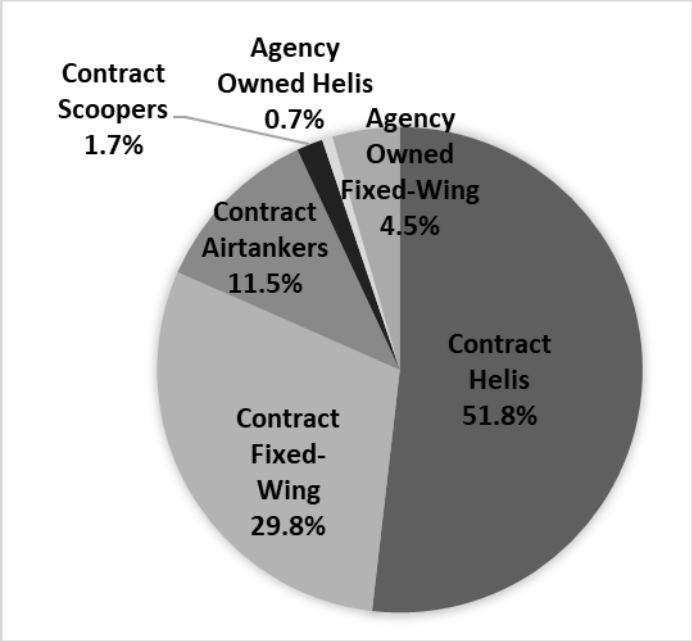
Figure 2 – CY 2020 Total Agency Flight Time by Month



Flight time for contract aircraft represented 94.8% of the annual total; Agency flight hours accounted for the remaining 5.2% (Figure 3). Examination of the distribution of use by aircraft type and ownership demonstrates that contract helicopters (51.8%) and contract fixed-wing (29.8%) represented the largest proportion of use (Figure 3).

Figure 3 – CY 2020 Total Agency Flight Time by Aircraft and Contract Type

Aircraft Type	Flight Hours
Contract Helicopters	42,667
Contract Fixed-Wing	24,504
Contract Airtankers	9,449
Contract Scoopers	1,432
Agency Owned Helicopters	581
Agency Owned Fixed-Wing	3,691
Total	**82,324**



Flight hours in support of Agency missions accounted for the bulk of flight time (70.9%), with 13.6% of flight hours attributed to Department of Interior missions, 15.4% to non-Federal missions, and <1% for missions related to other or unknown jurisdictions (Table 2). For USFS Regions, Region 5 had more than double the flight hours of any other Region.

Table 2 – CY 2020 Total Agency Flight Time by Region/Agency[3]

Region/Agency	Flight Hours	Percent of Total Flight Hours
FS: Region 1	4,169	5.0%
FS: Region 2	8,495	10.2%
FS: Region 3	8,315	10.0%
FS: Region 4	7,083	8.5%
FS: Region 5	20,550	24.7%
FS: Region 6	4,603	5.5%
FS: Region 8	1,317	1.6%
FS: Region 9	1,132	1.4%
FS: Region 10	384	0.5%
FS: Region 13 (WO)	2,839	3.4%
FS: Region Other (Research Stations, CIO, etc.)	223	0.3%
FS Total	**59,110**	**70.9%**
BIA	2,976	3.6%
BLM	7,537	9.0%
FWS	72	0.1%
NPS	721	0.9%
DOI Total	**11,306**	**13.6%**
Non-Fed Fire (State)	**12,800**	**15.4%**
Other	**108**	**<1%**
Grand Total	**8,315**	**100%**

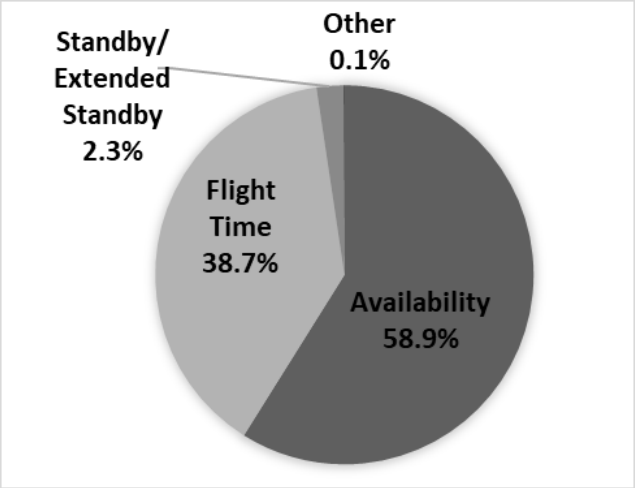
[3] Region/Agency derived from Incident Finance Job Codes from ABS data.

Aviation Costs

In CY 2020, Agency expenditures for contract aircraft totaled $739.4 million. More than half of all charges went to availability pay codes (58.9%). 38.7% went to flight time costs; remaining expenses were attributed to standby/ extended standby (2.3%) and other pay codes (0.1%; Figure 4).

Figure 4 – CY 2020 Aviation Contract Costs by Pay Code Description

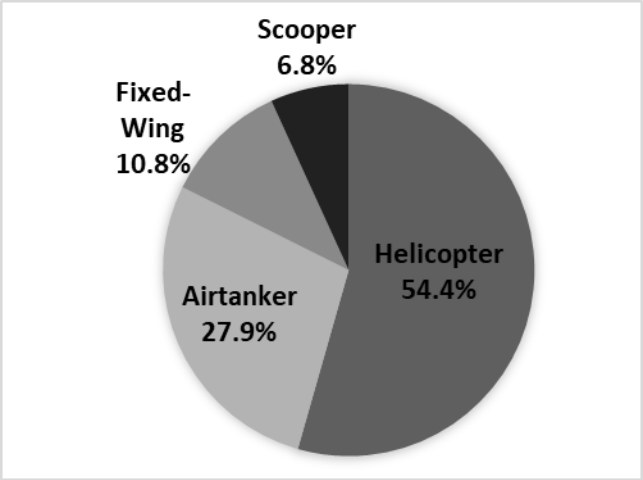
Pay Code Description	Total Costs
Availability	$435,656,533
Flight Time	$286,226,895
Standby/Extended Standby	$17,017,234
Other	$518,306
Total	**$739,418,967**



Helicopters represented the bulk of expenditures at $402.4 million, or 54.4% of total. Airtanker costs were roughly a quarter of total ($206.6 million, 27.9%), followed by fixed-wing ($79.9 million, 10.8%) and scoopers ($50.5 million, 6.8%; Figure 5).

Figure 5 – CY 2020 Aviation Contract Costs by Aircraft Type

Aircraft Type	Total Costs
Helicopter	$402,415,026
Airtanker	$206,590,262
Fixed-Wing	$79,883,168
Scooper	$50,530,511
Total	**$739,418,967**



Fixed-Wing Aircraft

In 2020, the Forest Service issued EXU contracts for 202 fixed-wing aircraft to support various missions for smokejumper, leadplane, air attack, and transportation of firefighters. Approximately 138 additional fixed-wing aircraft were available for use on CWN contracts (Table 3).

Table 3 – CY 2020 Contract Fixed-Wing Fleet Summary

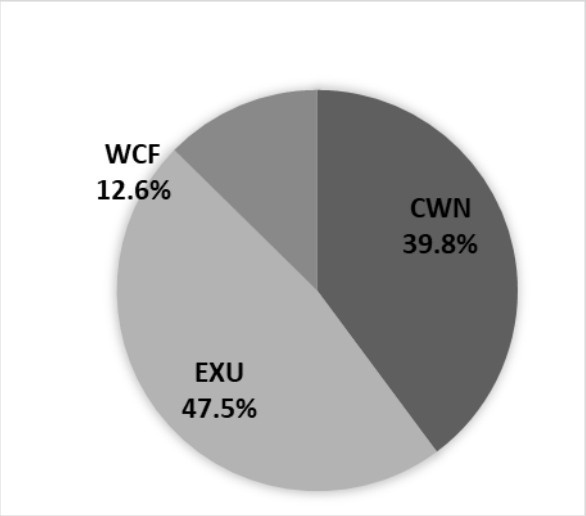
Aircraft Category	EXU Aircraft	CWN Aircraft
Smokejumper Aircraft	5	1
Aerial Supervision Modules/ Leadplanes	15	0
Light Fixed-Wing	22	75[4]
Transport Jet	1	1
Other Regional Light Fixed-Wing	0	61[4]
Total	**43**	**138**

In addition to the contract aircraft, the Forest owns and operates 21 light-fixed-wing aircraft utilized for smokejumper, leadplane, and other natural resource management missions, such as Forest Health Protection. In 2020, fixed-wing aircraft flew 29,195 hours, which accounts for 35.5% of the annual total flight time. Almost half of the fixed-wing flight time is from Exclusive Use (EXU) aircraft (47.5%), 39.8% is from Call When Needed (CWN) planes, and 12.6% is from Agency owned (WCF) fixed-wing aircraft (Figure 6).

[4] Value is approximated based on 2018 report numbers. CWN light fixed-wing aircraft that may be utilized for ATGS missions as needed are managed under Regional contracts for various non-fire missions.

Figure 6 – CY 2020 Total Fixed-Wing Flight Time by Contract Type

Contract Type	Flight Hours
Call When Needed (CWN)	11,630
Exclusive Use (EXU)	13,874
Agency Owned (WCF)	3,691
Total	29,195



More than half of all fixed-wing flight time (54.4%) was spent supporting air attack missions in 2020. Infrared flight time (2,678 hours; 9.2%), lead plane (2,102 hours; 7.2%), and lead plane (ASM) (1,915; 6.6%) were the next highest mission codes billed for the year in ABS (Table 4).

Table 4 – CY 2020 Total Fixed-Wing Flight Time by Mission Code Description

Mission Code Description	Flight Hours	Percent of Total
Air Attack	15,888	54.4%
Infrared Imagery, fire suppression	2,678	9.2%
Lead Plane	2,102	7.2%
Lead Plane (Aerial Supervision Module)	1,915	6.6%
Detection (Flights for detecting wildfires)	1,529	5.2%
Smokejumper Operations	1,308	4.5%
Ferry	718	2.5%
Pilot Training	715	2.5%
Other	2,341	8.0%
Total	**29,635**	**100%**

Fixed-wing expenditures were $85.2 million in 2020 (Table 5). 2020 annual flight totals and related costs exceeded values for any of the previous four years or the 5-year averages.

Table 5 – CY 2016-2020 Total Fixed-Wing Costs by Pay Code Description

Calendar Year	Flight Hours	Availability Costs (Millions USD)	Flight and Other Costs (Millions USD)	Total Costs (Millions USD)
2016	22,774	$20.1	$40.2	$60.3
2017	27,078	$21.2	$46.3	$67.7
2018	24,522	$24.0	$45.6	$69.6
2019	17,827	$25.7	$26.0	$51.8
2020	29,195	$32.7	$52.5	$85.2
5-year average	**24,279**	**$24.7**	**$42.1**	**$66.9**

Smokejumper Program

2020 was a notable year for the National Smokejumper program including impacts of the pandemic on training and assignment numbers; however, smokejumpers utilized their sewing skills to produce over 5,000 face masks for person use and health care workers. With a delayed training schedule and social distancing guidelines in place, the smokejumper bases were able to train new smokejumper candidates and transition more employees on the Ram-Air parachute. Out of the 294 smokejumpers in the program, 232 smokejumpers utilize the Ram-Air parachute (78% of the program). The pandemic increased the utilization of the Joint Precision Air Drop (JPAD) program for delivering critical supplies to numerous remote spike camps. Smokejumpers utilized 14 aircraft to staff 194 fires by parachute, made 1,130 fire jumps, and spent 11,496 days on fire assignments, including prescribed fire; in addition, the program delivered 73,993 pounds of para cargo (Table 6).

Table 6 – CY 2020 Smokejumper Program Summary

Smokejumper Base	Region	Aircraft Make Model/ Vendor	SMJs Per Base	Fires Staffed by SMJs	Fire Jumps	Days on Fires (including Rx)
Missoula	R1	(2) Sherpa SD3-60/USFS (1) DHC-6 Twin Otter/Leading Edge	69	41	288	2,233
West Yellowstone	R1	(1) Dornier 228/Bighorn	27	10	50	942
Grangeville	R1	(1) DHC-6 Twin Otter/Leading Edge	27	16	79	1,140
McCall	R4	(2) DHC-6 Twin Otter/USFS (1) Sherpa SD3-60/USFS	59	59	353	2,202
Redding	R5	(1) Sherpa SD3-60/USFS (1) Dornier 228/Bighorn (1) CASA 212/Bighorn CWN	35	29	140	1,171
North Cascades	R6	(2) Sherpa SD3-60/USFS	45	28	165	2,442
Redmond	R6	(1) CASA 212/Bighorn	28	11	55	1,366
		14 Aircraft	**290**	**194**	**1,130**	**11,496**

Helicopters

The Agency awarded 102 EXU and 520 CWN contracts in 2020 (Table 7)[5]. Of these, the Agency utilized 284 contracted helicopters on fire and natural resource management missions. The actual number of aircraft in operation differs from Table 7 values due to dual contract awards (both EXU and CWN for a single aircraft), vendor aircraft substitutions, or CWN aircraft unavailability.

Table 7 – CY 2020 Contract Helicopter Fleet Summary

Helicopter Category	EXU Aircraft	CWN Aircraft[6]	Total
Type 1	28	185	213
Type 2	34	91	125
Type 3	40	244[7]	284
Total	**102**	**520**	**622**

[5] April 2020 was the end of a contract cycle for EXU T1 helicopters and the next contract cycle was not yet awarded. The Agency bridged the gap with CWN and modified CWN contracts through the end of the year; thus, CWN numbers appear artificially inflated in 2020 CY reports.

[6] These totals represent the number of aircraft awarded a line item on the CWN contract and are not representative of the number of aircraft that had orders for operational missions. Some of the T3 helicopters are double counted since they are awarded both EXU and CWN contracts.

[7] This number represents the total aircraft awarded a line item. 80 T3 CWN helicopters operated for the FS in 2020.

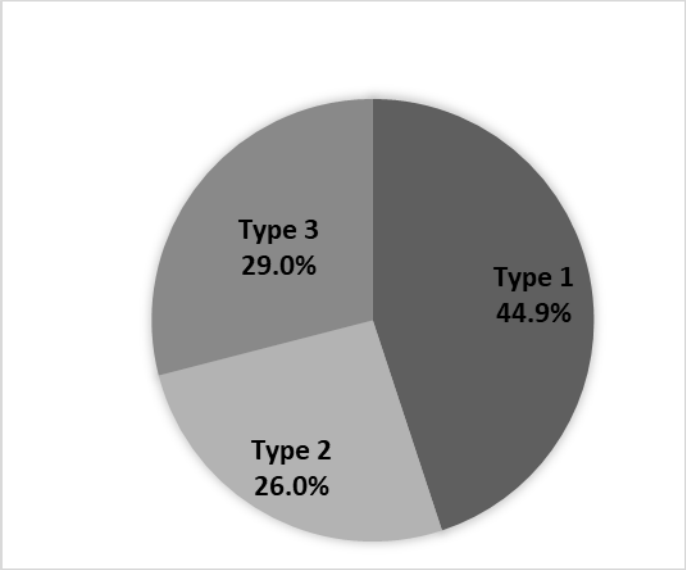
In total, there were 43,248 flight hours for helicopters in 2020. For chemical and water delivery missions, approximately 3.4 million gallons of retardant and 119.4 million gallons of water were delivered (Table 8).

Table 8 – CY 2020 Helicopter Use Summary by Contract and Helicopter Type

Helicopter Type	Flight Hours	All Liquids (gallons)	Water (gallons)	Retardant (gallons)	Unknown Liquid (gallons)
Exclusive Use Helicopters					
Type 1	141	908,100	908,100	0	0
Type 2	7,940	8,285,123	7,895,098	4,842	385,183
Type 3	7,346	2,595,145	2,528,267	0	66,878
EXU Subtotal	**15,426**	**11,788,368**	**11,331,465**	**4,842**	**452,061**
Call When Needed Helicopters					
Type 1	19,293	106,609,425	102,528,757	3,345,043	735,625
Type 2	3,325	5,048,758	5,022,130	1,589	25,039
Type 3	4,623	612,978	572,194	33,600	7,184
CWN Subtotal	**27,241**	**112,271,161**	**108,123,081**	**3,380,232**	**767,848**
Agency Owned Helicopters					
Type 3	581	65	65	0	0
Owned Subtotal	**581**	**65**	**65**	**0**	**0**
Total	**43,248**	**124,059,595**	**119,454,612**	**3,385,074**	**1,219,909**

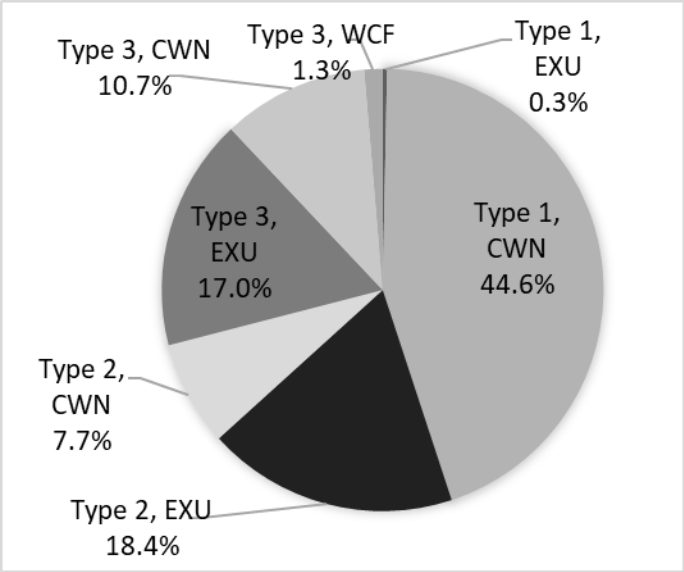
Total flight time was proportionally dominated by T1 helicopter use (44.9%).

Figure 7 – CY 2020 Total Helicopter Flight Hours by Type



In 2020, most aircraft use by flight time for all helicopter types was attributed to CWN aircraft (63.0%; Figure 8); however, CWN proportional use was higher in 2020 than in previous years because of the 42 additional surge capacity helicopters contracted for service in response to the COVID-19 pandemic, 36 of which were T1 or T2 helicopters. Additionally, there were 28 T1 helicopters that operated under a modified CWN contract versus a traditional EXU contract due to extended contract negotiations; analysis of patterns of use relative to contract type will not be comparable to prior or subsequent years given these differences.

Figure 8 – CY 2020 Total Helicopter Flight Hours by Helicopter and Contract Type



Helicopter expenditures were $402.4 million in CY 2020, significantly above the 5-year average of $335.5 million (Table 9). 62.4% of costs were attributed to availability charges in 2020.

Table 9 – CY 2016-2020 Contract Helicopter Use and Costs Summary

Calendar Year	Flight Hours	Availability Costs (Millions USD)	Flight and Other Costs (Millions USD)	Total Costs (Millions USD)
2016	34,371	$173.6	$208.4	$382.0
2017	43,981	$200.2	$144.5	$344.7
2018	39,892	$198.0	$141.0	$339.0
2019	20,588	$145.2	$64.3	$209.5
2020	42,667	$251.0	$151.4	$402.4
5-yr avg.	36,300	$193.6	$141.9	$335.5

For T1 helicopters, costs followed a similar pattern. Total expenditures ($272.3 million) were higher in 2020, compared to the 5-year average ($203.9 million) or any of the previous 5-year totals (Table 10). $163.1 million, or 59.9% of T1 costs were attributed to availability in 2020.

Table 10 – CY 2016-2020 Contract Type 1 Helicopter Use and Costs Summary

Calendar Year	Flight Hours	Availability Costs (Millions USD)	Flight and Other Costs (Millions USD)	Total Costs (Millions USD)
2016	13,168	$107.5	$70.6	$178.2
2017	15,981	$126.7	$90.9	$217.7
2018	15,914	$131.9	$93.8	$225.6
2019	5,397	$89.9	$35.6	$125.6
2020	19,434	$163.1	$109.2	$272.3
5-yr avg.	13,979	$123.8	$80.0	$203.9

T2 helicopter expenditures ($80.2) were just below the 5-year average, but this average number is skewed by a very high total for CY 2016 ($165.6). 68.1% of T1 costs were associated with availability (Table 11).

Table 11 – CY 2016-2020 Contract Type 2 Helicopter Use and Costs Summary

Calendar Year	Flight Hours	Availability Costs (Millions USD)	Flight and Other Costs (Millions USD)	Total Costs (Millions USD)
2016	10,061	$44.5	$121.1	$165.6
2017	13,429	$46.0	$31.3	$77.4
2018	10,198	$39.5	$25.3	$64.8
2019	5,690	$34.2	$14.3	$48.5
2020	11,264	$54.6	$25.6	$80.2
5-yr avg.	10,128	$43.8	$43.5	$87.3

2020 T3 helicopter costs ($49.9 million) were above the 5-year average ($44.3 million) and any of the previous 5 years of record. $33.3 million, or 66.6% of these costs were availability charges (Table 12).

Table 12 – CY 2016-2020 Contract Type 3 Helicopter Use and Costs Summary

Calendar Year	Flight Hours	Availability Costs (Millions USD)	Flight and Other Costs (Millions USD)	Total Costs (Millions USD)
2016	11,142	$21.5	$16.7	$38.2
2017	14,572	$27.0	$22.2	$49.2
2018	13,780	$26.7	$21.9	$48.5
2019	9,501	$21.1	$14.4	$35.5
2020	11,969	$33.3	$16.6	$49.9
5-yr avg.	12,193	$25.9	$18.4	$44.3

Rappel Program

In 2020, the USFS Rappel Program had 15 aircraft across 12 bases in 4 Regions, staffed by 273 rappellers. Rappellers supported 125 IA fires by rappel and 182 IA fires in a helitack. Additionally, 127 large fires were supported by rappel crews. Aircraft on rappel missions flew 3,172 flight hours in 2019 (Table 13).

Table 13 – CY 2020 Rappel Program Use Summary

Base	Region	Aircraft	Rappellers	Fires (Rappel)	Fires (Helitack)	Large Fires Supported	Flight Time
Gallatin	R1	33HX	15	2	18	15	207
Libby	R1	37HX	15	0	1	7	140
Lucky Peak	R4	262HQ	16	3	16	12	254
Salmon 1	R4	933CH	20	5	9	8	148
Salmon 2	R4	205LM	20	9	11	16	346
Price Valley 1	R4	669H	14	3	9	10	312
Price Valley 2	R4	679H	15	7	18	4	154
Scott Valley	R5	502HQ	16	2	22	6	256
Trimmer	R5	C-FHQB	16	7	26	8	298
La Grande 1	R6	223HT	16	14	17	3	134
La Grande 2	R6	404HA	20	14	3	5	141
Wenatchee	R6	205RH	22	6	9	17	261
John Day	R6	689H	25	34	12	2	184
Siskiyou	R6	28HX	21	11	4	8	156
Central OR	R6	205DY	22	8	7	6	181
			273	**125**	**182**	**127**	**3,172**
				307 IA Fires Staffed			

Short-haul Program

In 2020 the Short-haul Program consisted of 69 crew members assigned to five different aircraft, located at six bases in four different regions. The program logged 965 flight hours for the year. Short-haul crews performed 551 proficiency short-hauls, 14 operational extractions (in cooperation with the National Park Service) and responded to 88 IA fires and 44 large fires (Table 14).

Table 14 – CY 2020 Short-haul Program Summary[8]

Base	Region	Aircraft	Crew Size	Proficiency Short-hauls	Operational extractions	Initial Attack Fires	Large Fire Support	Flight Hours
Tucson Helibase	R3	N401HQ[9]	9	19	0	11	8	98.2
Helena Av. Center	R1	N401HQ[9]	12	45	0	7	8	120.6
Teton Helibase #1	R4	N35HX	12	175	14[10] (All NPS)	23	0	174.8
Teton Helibase #2	R4	N38HX	12	106	0	11	5	183.8
McCall/ Krassel	R4	N353SH	14	159	0	29	11	211.0
Wenatchee Air base	R6	N353JR	10	47	0	7	12	177.0
TOTALS			69	551	14[10] (All NPS)	88	44	965.4

[8] Previous short-haul annual data are not summarized in this FAM annual report.
[9] Tucson and Helena share a contract.
[10] Tetons also support Grand Teton National Park.

Airtankers

In 2020, the Forest Service had 38 airtankers available under Exclusive Use and Call When Needed contracts, including 13 EXU VLATs and LATs, 25 CWN VLATs and LATs, and 4 CWN multi-engine water scoopers (Table 15). Up to 8 MAFFS units were available for surge capacity needs.

Table 15 – CY 2020 Airtanker Fleet Summary

Aircraft Category	EXU Aircraft	CWN Aircraft
Large and Very Large Airtankers	13	22
MAFFS	0	8

Contract airtankers logged 8,574 flight hours in 2020, over twice as many hours as in 2019 (3,310) and 10.3% of the Agency's total calendar year use flight time billed in ABS. Contract airtankers also delivered approximately 33.9 million gallons of retardant, with 71.8% of total delivered by LATs and 28.2% by VLATs (Table 16).

Table 16 – CY 2020 Airtanker Use Summary by Aircraft and Contract Type

Airtanker Type	Flight Hours	Retardant (gallons)
Exclusive Use		
VLAT	857	5,538,281
LAT	3,768	12,632,713
EXU Subtotal	**4,625**	**18,170,994**
Call When Needed		
VLAT	535	4,042,116
LAT	3,415	11,706,065
CWN Subtotal	**3,950**	**15,748,181**
Total Airtanker Use	**8,574**	**33,919,175**

In 2020, 46.4% of use by flight time was in support of Forest Service fires (derived from ABS job codes). The remaining 53.6% of use on non-Agency fires went to state and local cooperators (31.2%) and the Department of Interior (22.1%; Table 17).

Table 17 – CY 2020 Airtanker Flight Time by Region/Agency[11] (LAT/VLAT)

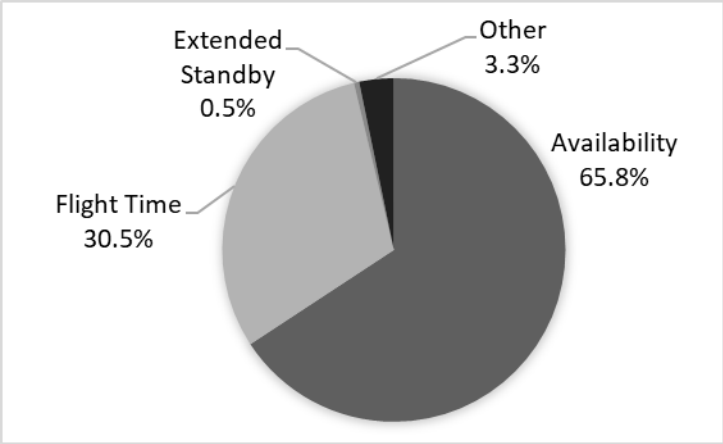
Region/Agency	Flight Hours	Percent of Flight Hours
FS: Region 1	177	1.9%
FS: Region 2	850	9.0%
FS: Region 3	1,032	10.9%
FS: Region 4	503	5.3%
FS: Region 5	1,616	17.1%
FS: Region 6	143	1.5%
FS: Region 8	20	0.2%
FS: Region 9	3	0.0%
FS: Region 10	0	0.0%
FS: Region 13 (WO)	44	0.5%
FS Total	**4,389**	**46.4%**
BIA	396	4.2%
BLM	1,633	17.3%
FWS	6	0.1%
NPS	52	0.6%
DOI Total	**2,087**	**22.1%**
Non-Fed Fire (State)	**2,949**	**31.2%**
Other	**24**	**0.3%**
Grand Total	**9,449**	**100.0%**

Contract LAT/VLAT expenditures were $206.6 million in CY 2020. Availability charges totaled $123.1 million (65.8%), and flight time costs were $81.7 million (30.5%). Standby and other expenses accounted for the remaining costs ($1.8 million, 3.8%; Figure 9). All LAT/VLAT expenditures (not including scoopers) represented 27.9% of total Agency aircraft expenditures billed in ABS.

[11] Region/Agency derived from Incident Finance Job Codes from ABS data.

Figure 9 – CY 2020 Contract LAT/VLAT Costs by Pay Code Description

Pay Code	Total Costs
Availability	$123,114,127
Flight Time	$81,684,986
Extended Standby	$1,318,980
Other	$472,170
Total	**$206,590,262**



For EXU airtankers, RJ85 aircraft flew the most in 2020 (1,763 hours), followed by BAE 146 aircraft (1,271 hours), DC-10 aircraft (943 hours), and MD-87 aircraft (813 hours). RJ85 aircraft also had the highest availability cost ($26.0 million). DC-10 aircraft delivered the most retardant (5.5 million gallons; Table 18).

Table 18 – CY 2020 EXU Contract LAT/VLAT Use Summary by Aircraft Model

Aircraft Model	Flight Hours	Retardant (gallons)	Availability Costs
BAe-146	1,271	3,671,707	$19,209,387
RJ85	1,763	4,809,485	$25,984,953
DC-10	943	5,538,281	$10,833,155
MD-87	813	2,581,080	$12,419,150
EC-130Q	379	1,566,514	$4,115,847
B-737	327	Unknown	Unknown
Total	**5,172**	**18,170,994**	**$72,832,102**

Tables 18-21 summarize historical airtanker use by year, aircraft type, and contract category. These summarizes do not include Modular Airborne Fire Fighting Systems (MAFFS) or cooperator airtanker use data. Compared to the five prior years, 2020 EXU LAT total flight time (4,229 hours) and retardant gallons delivered (12.6 million gallons) were near average (Table 19). EXU VLATs had similar patterns, although both total flight time (943 hours) and retardant gallons (5.5 million gallons) were above the 5-year average values (Table 20).

Table 19 – CY 2016-2020 EXU LAT Use Summary

Calendar Year	Flight Hours	Retardant (gallons)
2016	3,842	13,413,889
2017	6,156	25,711,954
2018	4,021	12,976,364
2019	2,273	7,081,902
2020	4,229	12,632,713
5-yr average	**4,104**	**14,363,364**

Table 20 – CY 2016-2020 EXU VLAT Use Summary

Calendar Year	Flight Hours	Retardant (gallons)
2016	484	4,698,349
2017	673	6,670,145
2018	678	5,178,692
2019	491	3,768,052
2020	943	5,538,281
5-yr average	**654**	**5,170,704**

CWN airtankers were used extensively in 2020. LAT flight time (3,707 hours) were six times higher than 2019 totals and three times the 5-year average (Table 21). Retardant totals also increased dramatically, nearly three times the 5-year average (11.7 million gallons; Table 22). CWN VLATs demonstrated similar patterns with heavy utilization (570 hours) and gallons delivered (4.0 million gallons; Table 21).

Table 21 – CY 2016-2020 CWN LAT Use Summary

Calendar Year	Flight Hours	Retardant (gallons)
2016	414	1,662,021
2017	395	1,658,126
2018	1,196	4,194,568
2019	608	2,047,461
2020	3,707	11,706,065
5-yr average	**1,264**	**4,253,648**

Table 22 – CY 2016-2020 CWN VLAT Use Summary

Calendar Year	Flight Hours	Retardant (gallons)
2016	52	595,995
2017	199	1,991,424
2018	291	1,970,183
2019	55	316,319
2020	570	4,042,116
5-yr average	**233**	**1,783,207**

MAFFS

The Forest Service utilizes military C-130 aircraft with a Modular Airborne Fire Fighting System (MAFFS) to support surge capacity mission needs. The totals represented in the summary tables shown are not included elsewhere in this report because MAFFS aircraft do not report their flight hours into ABS for payment. In 2020, MAFFS saw heavy surge capacity use to meet increased demand for airtankers. There were 606 hours of annual flight time for fire support to deliver 1.4 million gallons of retardant, at a cost of $12.6 million (Table 23). Including certification flights, total program costs in 2020 were $13.2 million (Table 25).

Table 23 – CY 2016-2020 MAFFS Summary of Activation on Fires

Calendar Year	Flight Hours	Retardant (gallons)	Total Costs
2016	144	411,774	$2,416,374
2017	95	Unavailable	$4,031,517
2018	Unavailable	Unavailable	$2,034,281
2019	0	0	0
2020	606	1,389,327	$12,583,233
5-Year Average	**Unavailable**	**Unavailable**	**$4,213,081**

Table 24 – CY 2016-2020 MAFFS Total Use Summary (Including Certification and Activation on Fires)

Calendar Year	Flight Hours	Total Costs
2016	216	$5,661,562
2017	252	$6,373,360
2018	Unavailable	$3,971,495
2019	88	$960,953
2020	667	$13,211,450
5-Year Average	**Unavailable**	**$6,035,764**

Table 25 – CY 2016-2020 MAFFS Costs by Charge Category

Calendar Year	Certification Costs	Fire Activation Costs	Total Costs
2016	$3,245,188	$2,416,374	$5,661,562
2017	$2,341,843	$4,031,517	$6,373,360
2018	$1,937,214	$2,034,281	$3,971,495
2019	$960,953	0	$960,953
2020	$628,217	$12,583,233	$13,211,450
5-Year Average	$2,121,300	$4,213,081	$6,035,764

Water Scoopers

The Forest Service contracted four multi-engine water scoopers on a CWN contract in 2020. The aircraft flew 1,432 hours, more than twice the total scooper hours from 2019. Total costs in ABS were $50.5 million, and the aircraft delivered 6.3 million gallons of water. $28.8 million, or 57.0% of total costs were attributed to aircraft availability charges (Table 26).

Table 26 – CY 2016-2020 Scooper Use Summary

Calendar Year	Flight Hours	Water Delivered (gallons)	Availability Costs (Millions USD)	Flight and Other Costs (Millions USD)	Total Costs (Millions USD)
2016	1,168	6,089,600	$25.8	$15.6	$41.4
2017	1,676	7,841,107	$30.5	$23.3	$53.8
2018	1,609	8,795,257	$27.8	$23.0	$50.8
2019	679	3,292,206	$12.5	$9.9	$22.5
2020	1,432	6,253,548	$28.8	$21.7	$50.5
5-yr avg.	1,313	6,454,344	$25.1	$18.7	$43.8

Unmanned Aircraft Systems (UAS) Program

In 2020 the UAS Program finalized and approved several keystone documents required to support programmatic growth and development, including “Small Unmanned Aircraft Systems (UAS) Business Case,” “Unmanned Aircraft Systems Programmatic Risk Assessment,” and “USFS Standards for UAS Operations.” These foundational documents will allow the program to acquire UAS, assign personnel, and expand the delivery of UAS services to the Agency. Even with limited staff and fleet numbers, the UAS Program accomplished significant flight activity in 2020, including 979 flights, over 240 hours, in 16 states, using small, short endurance Type 3 and 4 platforms. The primary documented uses were for aerial ignition, infrared imagery/fire suppression, and training/proficiency missions. In addition, Bureau of Land Management CWN UAS, which are larger, longer endurance platforms with increased payload capacity, were utilized on ~70 flights and 300 hours of flight time in 2020.

Agency-Owned Aircraft Summary

The Forest Service owned and operated 24 aircraft in 2020. Agency aircraft accounted for 4,272 (5.1%) of the 83,324 total flight hours billed in ABS in 2020 (Table 27).

Table 27 – CY 2020 Agency Aircraft Use Summary by Aircraft Make and Model

Registration #	Make	Model	Flight Hours
N106Z	BELL	206A	8
N107Z	BELL	209 COBRA	270
N109Z	BELL	209 COBRA	303
N106FS	DEHAVILLAND	DHC-2 BEAVER	50
N191Z	DEHAVILLAND	DHC-2 BEAVER	136
N192Z	DEHAVILLAND	DHC-2 BEAVER	120
N193Z	DEHAVILLAND	DHC-2 BEAVER	117
N114Z	SHORT	SD3-60 SHERPA	222
N145Z	SHORT BROS	SD3-60 SHERPA	155
N148Z	SHORT BROS	SD3-60 SHERPA	146
N161Z	SHORT BROS	SD3-60 SHERPA	72
N162Z	SHORT BROS	SD3-60 SHERPA	190
N163Z	SHORT BROS	SD3-60 SHERPA	146
N179Z	SHORT BROS	C-23A SHERPA	25
N142Z	SHORT BROS	SD3-60 SHERPA	99
N141Z	DEHAVILLAND	DHC-6-300	181
N143Z	DEHAVILLAND	DHC-6-300	200
N144Z	CESSNA	CITATION I 500	1
N111Z	CESSNA	206 STATIONAIR-6	84
N125Z	QUEST	KODIAK 100	145
N160Z	QUEST	KODIAK 100	202
N147Z	BEECH	B200GT	403
N149Z	BEECH	KING AIR 200	827
N182Z	BEECH	KING AIR 200	170
Total			**4,272**

5-year Aviation Summary Trends and Averages

2020 total flight time was up for all aircraft types, well above 2019's low demand year and the 5-year average values (Table 28). These numbers reflect the high fire season demands in 2020.

Table 28 – CY 2016-2020 Flight Hours by Aircraft Type

Calendar Year	Fixed-Wing	Helicopter	Airtanker	Scooper	Total
2016	22,774	34,416	5,110	1,168	67,702
2017	30,382	44,375	6,750	1,676	83,184
2018	27,768	40,589	6,264	1,609	76,230
2019	17,827	20,579	3,485	679	42,570
2020	29,195	43,248	9,449	1,432	83,324
5-Yr Avg.	**25,589**	**36,641**	**6,212**	**1,313**	**70,602**

In 2020, passenger totals from all aircraft were near the 5-year average, and total cargo in pounds was well above the 5-year average. There are no discernable trends in either category from the past five years (Table 29).

Table 29 – CY 2016-2020 Passenger and Cargo Summary (All Aircraft)

Calendar Year	Flight Hours	# of Passengers	Cargo Weight (lbs.)
2016	67,702	75,422	10,711,562
2017	83,184	86,175	12,707,407
2018	76,230	79,926	16,308,212
2019	42,570	72,295	12,814,010
2020	83,324	77,444	20,645,311
5-Yr Avg.	**70,602**	**78,252**	**14,637,300**

Total retardant delivery at 37.5 million gallons was well above the 5-year average of 27.1 million gallons. There is no discernible trend in retardant delivery totals from the last five years (Table 30).

Table 30 – CY 2016-2020 Total Retardant Delivered (All Aircraft)

Calendar Year	Retardant (gallons)
2016	23,554,633
2017	33,515,515
2018	27,282,194
2019	13,515,907
2020	37,521,892
Five-Year Average	**27,078,028**

Total costs in 2020 ($746.4 million) were almost twice the total costs in 2019 ($397.5 million); however, the fire year demands were extremely different between these two years. 2020 represented exceptional challenges, and subsequently, demand was extremely high and related expenditures were well above average (Table 31).

Table 31 – CY 2016-2019 Total Contract Aviation Costs[12]

Calendar Year	Availability Costs (Millions USD)	Flight and Other Costs (Millions USD)	Total Costs (Millions USD)
2016	$293.8	$197.1	$490.9
2017	$349.2	$270.7	$619.9
2018	$344.9	$262.1	$607.0
2019	$264.3	$133.3	$397.5
2020	$435.7	$310.8	$746.4
5-Yr Avg.	**$337.6**	**$234.8**	**$572.4**

[12] Total contract cost is derived from ABS. Total availability cost includes non-availability.