

# SOLE SOURCE

## JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION

The following document is prepared in accordance with FAR 6.303 and 6.302-3 Industrial mobilization; engineering, developmental, or research capability; or expert services.

### 1) Identification of the agency and the contracting activity:

USDA Forest Service, Incident Support Branch

### 2) Nature and/or description of action being approved:

A sole source contract with Neptune Aviation to provide two next generation large airtankers under a 4-year contract with five one-year options in order to maintain Neptune Aviation as a supplier available to the Forest Service to support national firefighting efforts in case of a national emergency or to achieve industrial mobilization.

### 3) A description of supplies of services required to meet the agency's needs (including the estimated value):

Neptune Aviation will provide two next generation (NextGen) turbine powered large airtankers with 3,000 (minimum) gallon retardant dispensing capacity to perform wildland firefighting services. The contract will be for a base term of 4 years with 5 one-year options (potential 9 years total). The Government will pursue a four year multi-year contract with five one year options (total of 9 years) in an attempt to lower cost to the Government and to facilitate the ability of Neptune to obtain sufficient capital to adequately finance operations under the contract. The cost estimate for these services, including option years, is \$141,774,740.00. See Attachment A.

### 4) An identification of the statutory authority permitting other than full and open competition:

This procurement is eligible for other than full and open competition in accordance with 41 U.S.C. 3304(a)(3)(A); FAR 6.302-3(b)(1)(i),(ii),(iii),(vi).

### 5) A demonstration that the nature of the acquisition requires the use of the authority cited:

#### Number of Large Airtankers Needed and Available to the Forest Service

Under the *National Response Framework* (2d Ed. May 2013) issued by the Federal Emergency Management Agency, the Forest Service has coordinator responsibility for firefighting, including its suppression and preparedness efforts related to wildland firefighting. Large airtankers are a key resource in the wildland fire suppression effort. Not having enough of these key resources could have serious consequences on not only the Forest Service's own efforts to fulfill its firefighting mission, but also on nationwide efforts to prepare for and respond to large-scale fire emergencies.

To effectively fulfill its wildland fire suppression mission, the Forest Service needs available for its exclusive use each fire season between 18 and 28 large airtankers (LATs). This stated need is based upon the US Forest Service Large Airtanker Modernization Strategy analysis which was published on Feb 10, 2012. That documentation is provided at Attachment B. The designated number of 18-28 large airtankers was recommended to meet the Forest Service needs to adequately respond to wildfire suppression efforts (especially initial attack capabilities).

There currently are two contract vehicles in place to satisfy this need: The Legacy LAT contract (9 LATs) and the Next Generation (NextGen) LAT contract (7 LATs). Neptune Aviation supplies the Forest Service with 8 of the 9 total Legacy airtankers, which represents 88 percent of the Legacy fleet. Given this

percentage, as well as their reliable performance over the last 10 years, Neptune Aviation is a critical supplier of this vital resource for the Forest Service.

The current fleet of large airtankers (P2-V's) operating under the Legacy contract is old, with an average age of more than 50 years. Most of the remaining P-2V airtankers face retirement by 2021. With rising age, the cost of maintaining the Legacy airtankers is rapidly increasing, as are the risks associated with using them. These Legacy LATs are much more susceptible to going out of service due to their age, maintenance history and heavy workload. To maintain mission safety and effectiveness, the Forest Service and Department of the Interior have concluded that the airtanker fleet needs to be replaced with safer aircraft. These replacements should be a newer, faster and more cost-effective mix of next generation large airtankers better suited to the complex wildland fire environment of the 21st century.

The NextGen contract awarded in Spring of 2013 will ultimately make available seven LATs available to the Forest Service that meet the Agencies' need for newer, faster, larger and more cost-effective airtankers. Two of the seven recently awarded airtankers are currently operating under their NextGen contracts. The remaining five have missed their contractual start dates. In September, the Forest Service issued cure notices to four NextGen contractors that failed to obtain the certifications necessary to operate their airtankers by the dates required in their contracts. Responses to the cure notices indicate that NextGen airtankers may be available by April 2014 (one aircraft), May 2014 (two aircraft) and June 2014 (five aircraft). However, such availability remains uncertain, and default terminations of those contracts remain a possibility. In addition, although each NextGen contract allows for a bilateral modification to add more aircraft after the contract's base year, the future availability of those aircraft is unknown and is not the subject of an option clause.

With only 11 large airtankers currently available to the Forest Service out of the 18-28 needed, it is vital that the Forest Service pursue any available avenues to obtain the services of as many large airtankers from experienced and reputable contractors.

#### Effects of Contracting with Neptune on the Industrial Base of Large Airtankers

Adding two modern large airtankers from Neptune to the Forest Service fleet would double the number of NextGen aircraft currently available to the FS (from 2 to 4), and increase from 7 to 9 the number of NextGen LATs that may be available in 2014, provided that the contractors now in default are able to bring their aircraft into compliance.

If all of our current contracted exclusive use large airtankers (9 Legacy, 7 Next Gen) were available and operational in 2014 the addition of the two NextGen airtankers from Neptune would bring the agency's total number of exclusive use large airtankers to 18, the minimum number of LATs identified by the Forest Service to meet wildland fire support needs, absent any Congressional action. Without these assets, the Forest Service would be below the minimum number of LATs desired, which could hinder the agency's ability to meet wildland fire suppression needs.

#### Consideration of Alternative Resources

In considering whether a sole source contract to Neptune Aviation is justifiable, the Forest Service has taken into account resources other than exclusive-use LATs that are available or may become available. Those resources are:

- 8 MAFFS
- Call-When-Needed Type 1 & 2 Helicopters
- Single Engine Airtankers

The following additional support may be available to the USFS if not committed to other agencies:

- 6 Canadian Convair 580s
- 3 State of Alaska Convair 580s

Mobile Airborne Fire Fighting System (MAFFS) – Our partnership with the DOD gives us access to 8 MAFFS units when additional resources are needed. With the reduced number of airtankers at the Forest Service's disposal in the last few years due to accidents, failure to perform, etc. the MAFFS units have been relied upon to cover a heavier burden than originally planned. The extra stress and burden on these systems, along with inconsistent maintenance, has made these units vulnerable to damage. In 2012 one MAFFS unit was destroyed in a fatal crash, thus there are only 8 units currently available with no backup system.

T1 & 2 Helicopters – These are an effective initial / extended attack resource but lack the speed and mobility of large airtankers. Helicopters are most effective when used in direct attack tactics, while airtankers are necessary for building retardant lines supported by ground personnel and equipment. There are 32 T1 and 40 (33 FS, 7 DOI) T2 Exclusive Use Contract (EU) helicopters that are strategically positioned nationally as necessary. Although there are 249 helicopters on Call-When-Needed (CWN) contracts, they are often unavailable due to work in private industry such as off-shore oil and logging projects and therefore cannot be counted on as firefighting resources.

Single Engine Airtankers (SEATS) – There are a total of 12 EU and 69 CWN aircraft on contract. These are strategically positioned nationally as necessary and provide a significant contribution particularly in lighter fuel types. SEATs, with retardant capacity at between 400 gallons for some of the lower performance platforms to up to about 800 gallons for an 802T, simply don't have the ability to replace large airtankers. SEATS are smaller, slower, and less capable of longer, high coverage level retardant drops. The lighter SEAT loads are not effective when penetrating dense conifer forests found at the higher altitudes most typical of Forest Service terrain.

VLAT – A new CWN contract was awarded on June 14, 2013 and started performance on July 1, 2013. The VLAT contract gave the FS access to 2 VLATs. Only one of the awarded VLATs is currently available to fly. The second VLAT requires heavy duty maintenance before it can become operational. The Forest Service expects to have access to both VLATs for the 2014 fire season. The FS has maintained access to at least 1-2 VLATs through CWN contracts since 2009.

Convair 580s – In the recent past the Forest Service has been able to utilize Convair 580's from both Canada and Alaska to supplement our need for airtanker resources. However, there are vulnerabilities associated with the Convair 580s from Alaska and Canada, as the fire conditions and activity in those areas can often parallel the activity occurring in the Northwest, Northern Rockies and parts of the Great Basin. There is no guarantee that any of these assets will be available when and if they are needed as they are not under Forest Service control.

### **Conclusion**

Pursuant to FAR 6.302-3(b)(i),(ii),(iii) and (vi), the use of the industrial mobilization exception to the requirement to use full and open competition is appropriate when it is necessary to—(i) "Keep vital facilities or suppliers in business or make them available in the event of a national emergency"; (ii) "prevent the loss of a supplier's ability and employees' skills"; (iii) maintain an acceptable balance of sources; and (vi) provide for an adequate industrial base by dividing the supply "among two or more contractors". The Forest Service has determined that based on all of the above reasons, it has become necessary to invoke this authority with respect to Neptune Aviation, whose resources and equipment must be available to provide key services if the Forest Service is to successfully fulfill its mission.

Critical to this justification are the following facts:

1. The Forest Service considers Neptune to be a vital supplier of airtankers.
2. Neptune currently has available and ready to operate two airtankers that meet the specifications of the NextGen contract.
3. The Forest Service is not confident that five of the seven contracted NextGen airtankers will be available to fight fires in 2014.

4. Even assuming all seven NextGen airtankers are available to fight fires in 2014, the Forest Service still will have only 16 LATs, which is two LATs fewer than the minimum needed to fulfill its firefighting mission.
5. 9 of the 16 potential LATs for 2014 are older and riskier to operate than newer NextGen airtankers.
6. In 2017, the number of LATs under contract to the Forest Service will decrease from 16 to 7, with the expiration of the Legacy contracts, unless additional NextGen airtankers are procured from the current NextGen contractors.
7. Only two of the five NextGen contractors are now in compliance with the contract and providing operational airtankers.

**6) A description of the efforts made to ensure that offers are solicited from as many sources as is practical, including whether a CBD notice was or will be publicized as required in Subpart 5.2 and, if not, which exception under 5.202 applies:**

Efforts to solicit responses from as many sources as possible were not accomplished due to the following exception: FAR 5.202(10) – The proposed action is made under conditions described in FAR 6.302-3.

**7) A determination by the Contracting Officer that the anticipated cost to the Government will be fair and reasonable:**

The estimated amount of the contract for two Next Generation Large Airtankers is anticipated to cost around \$142M over 9 years. The Availability and Flight rates under the new contract with Neptune Aviation will be comparable to rates recently competitively awarded for similar aircraft services. A separate fair and reasonable determination will be accomplished by the contracting officer.

**8) A description of the market survey conducted (Sec. 7.101) and the results or a statement of the reasons a market survey was not conducted.**

The market for large airtankers has been monitored and surveyed consistently over the last two years while the FS has been soliciting for 15 aircraft under the Legacy Large Airtanker and Next Generation Large Airtanker solicitations. Under both solicitations there were six large airtankers that were rejected for a contract award (excluding Neptune). One of those aircraft failed to meet necessary requirements and is not certified by the FAA. Two of the aircraft are currently under contract with the Forest Service as VLATs. The remaining three aircraft were offered by vendors that did receive NextGen awards but have been unable to perform and are at risk of termination if they continue to not perform. Therefore, we are aware of no additional large airtankers now on the market that could compete for this proposed sole source award that aren't already under contract with the Forest Service. It is extremely expensive to bring a large airtanker into service, evident from the lack of certified and compliant aircraft on the market right now. There are no certified LATs currently available that aren't already under contract with the Forest Service. Aircraft capable of meeting these standards and requirements are not readily available and would take a considerable amount of time to be developed and operationally ready for service.

**9) Other factors supporting the use of other than full and open competition:**

Maintaining the capability for a fleet of 18 and 28 large airtankers is critical to national emergency response and homeland security. Under the *National Response Framework* (2d Ed. May 2013) (Framework) issued by the Federal Emergency Management Agency (FEMA), the Forest Service has been assigned coordinator responsibility for firefighting, under Emergency Support Function (ESF) #4. See Framework, at 32. As stated in the Framework, "The Federal ESFs are the primary, but not exclusive, Federal coordinating structures for building, sustaining, and delivering the response core capabilities. The ESFs are vital structures for responding to Stafford Act incidents<sup>1</sup>; however, they may also be used for other incidents." Framework, at 31.

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<sup>1</sup> A "Stafford incident" means an incident that may trigger a Presidential declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. § 5121 *et seq.*, stating that the incident is of such severity that a response to it is beyond a state's capabilities and requires Federal assistance. See Framework, at 28. The definition of "major disaster" for which a Stafford Act declaration may be issued includes "regardless of cause, any

**10) Listings of any sources, if any, that expressed, in writing, an interest in the acquisition:**

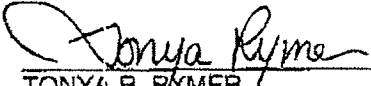
None

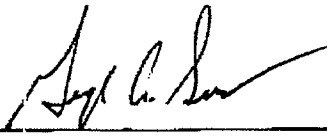
**11) Statement of the actions, if any, the agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the services required:**


Given the nature of the items being procured – former military and civilian aircraft modified specifically to dispense fire retardant – it is extremely difficult to mitigate the barriers to competition because of the specialized aircraft and conversion requirements. Any barriers to competition really are barriers to private investment; due to the large expense associated with modifying aircraft and especially making them safe and maintaining them for their new purpose as firefighting aircraft. The stresses firefighting aircraft endure can exceed even those that military aircraft are subjected to in their military roles. In a Safety Recommendation dated April 23, 2004, the National Transportation Safety Board (NTSB) recognized that aerial firefighting is an “inherently high-risk operation,” but “the risk of in-flight structural failure” is not unavoidable, *provided that* the increased risk is properly addressed through maintenance programs. NTSB Safety Recommendation, A-04-29 through 33, at 6. However, the maintenance programs needed for these airtankers are expensive. The NTSB noted that the military often surpluses its planes to avoid the high cost of keeping them safe to fly, *id.* at 7, and the cost of maintaining those same surplus aircraft for the firefighting mission is even higher, given the stress of the operational environment. The US Forest Service increased the maintenance requirements for aircraft used as airtankers under contract by requiring the aircraft to be maintained under an approved Structural Integrity Program (SIP). The increased maintenance standard has led to significant increases in costs to the operators in developing SIPs and maintaining aircraft under the SIP. These higher costs of operations have been passed on to the Government because these particular aircraft are so specialized that there is no other work for the aircraft other than that of the airtanker role. Contractors have proved unwilling to make that investment themselves, which has led to the limited number of airtankers now available to the Forest Service. The amount of time, expertise and money it takes to convert aircraft (military surplus or commercial) into the highly specialized firefighting role is a barrier that cannot be easily overcome without drastically reducing safety standards and requirements. To lower these barriers to competition (*i.e.*, the barriers to entering the airtanker market) would be to decrease the safety of the firefighting fleet, which the agency is unwilling to do. The Government here will pursue a four-year multi-year contract with five one year options (total of 9 years) in an attempt to lower cost to the Government and to facilitate the ability of the contractor to obtain sufficient capital to adequately finance operations under the contract.

**12) Certification**

The justification is accurate and complete.

Approved by:  Date: 12/9/13  
TONYA R. RYMER  
Contracting Officer, Incident Support Branch, Branch  
Chief

Approved by:  Date: 12/9/13  
GEORGE A. SEARS  
Director, Acquisition Management  
Head of the Contracting Activity

Approved by:  Date: 12/09/13  
GREGORY PARHAM  
USDA - Assistant Secretary for Administration

Attachment A - Calculation of Estimated Total Cost  
Attachment B - Large Airtanker Modernization Strategy

NEXT GENERATION LARGE AIRTANKERS JOFOC – ATTACHMENT A

CALCULATION OF TOTAL ESTIMATED COST  
AG-024B-S-13-9019

MAP Price	MAP Days	Total MAP Cost	Flight Price	Reduced Flight Rate	Flight Hours	Reduced Flight Hours	Fuel Cost	Gallons Burned per Hour	Total Flight Cost	Total Reduced Flight Cost	Total Fuel Cost	
\$27,388.00	160	\$ 4,382,080.00	\$ 8,432.00	\$ 4,637.00	160	90	\$ 6.15	720	\$ 1,349,120.00	\$ 417,330.00	\$ 1,107,000.00	
\$28,758.00	160	\$ 4,601,280.00	\$ 8,854.00	\$ 4,869.00	160	90	\$ 6.15	720	\$ 1,416,640.00	\$ 438,210.00	\$ 1,107,000.00	
\$30,196.00	160	\$ 4,831,360.00	\$ 9,297.00	\$ 5,113.00	160	90	\$ 6.15	720	\$ 1,487,520.00	\$ 460,170.00	\$ 1,107,000.00	
\$31,706.00	160	\$ 5,072,960.00	\$ 9,761.00	\$ 5,368.00	160	90	\$ 6.15	720	\$ 1,561,760.00	\$ 483,120.00	\$ 1,107,000.00	
\$26,926.00	160	\$ 4,308,160.00	\$10,249.00	\$ 5,636.00	160	90	\$ 6.15	720	\$ 1,639,840.00	\$ 507,240.00	\$ 1,107,000.00	
\$27,247.00	160	\$ 4,359,520.00	\$10,761.00	\$ 5,921.00	160	90	\$ 6.15	720	\$ 1,721,760.00	\$ 532,890.00	\$ 1,107,000.00	
\$28,109.00	160	\$ 4,497,440.00	\$11,299.00	\$ 6,214.00	160	90	\$ 6.15	720	\$ 1,807,840.00	\$ 559,260.00	\$ 1,107,000.00	
\$28,903.00	160	\$ 4,624,480.00	\$11,863.00	\$ 6,524.00	160	90	\$ 6.15	720	\$ 1,898,080.00	\$ 587,160.00	\$ 1,107,000.00	
\$29,770.00	160	\$ 4,763,200.00	\$12,487.00	\$ 6,867.00	160	90	\$ 6.15	720	\$ 1,997,920.00	\$ 618,030.00	\$ 1,107,000.00	Total Cost Per Aircraft
		\$41,440,480.00							\$14,880,480.00	\$ 4,603,410.00	\$ 9,963,000.00	\$ 70,887,370.00
											Total Estimate Cost	\$ 141,774,740.00

**USDA Forest Service**

**LARGE AIRTANKER  
MODERNIZATION STRATEGY**

**FINAL**



## Executive Summary

Wildfires affect millions of acres in the United States annually and hundreds of homes and businesses are destroyed by wildfires each year - the challenge of wildland fire management is growing. From 2000 to 2008, at least 10 States had fires of record-breaking size; in 2011, the Wallow Fire, at more than half a million acres, broke the record set in Arizona just 9 years earlier. Across the Nation, almost 70,000 communities are at risk from wildfires.

With the changing climate, fire seasons will likely become longer and more severe. This has already started to occur with the Western fire season now, on average, 78 days longer than in the mid-1980s<sup>1</sup>. The trend for the number of acres burned annually by wildfire indicates a doubling of acres burned since 1960 (see Chart 1.). Cumulative drought, extensive insect kill in western forests, and regional shifts of population into the wildland urban interface have resulted in an increased level of wildfire activity that is expected to continue into the future.<sup>2</sup> In response to this wildfire activity, the Forest Service's airtanker fleet has flown an average of 4,500 flight hours, dropping almost 20 million gallons of retardant annually in the last ten years. Individual airtankers have flown an average of 210 hours annually to meet initial attack and fire response requirements. The changes in the fire season and increased pressure from additional populated areas will result in more demand for firefighting response from the Federal government. However, although fire activity has increased, the Forest Service's airtanker fleet has been reduced as a result of airworthiness issues - from 43 airtankers in 2000 to 11 airtankers in 2011. In order to meet the continued demand for wildfire response in 2011, the Forest Service has had to employ more than 40 additional heavy and medium helicopters, Single Engine Airtankers, Modular Airborne Firefighting Systems, and cooperator aircraft.

While airtankers are only one part of a multi-faceted interagency wildfire response effort, they are important to the Federal, state, and local wildland firefighting missions of protecting communities and natural resources from wildfires and to successfully managing wildfires in this country. Airtankers are used to deliver fire retardant to wildfires, thereby reducing fire intensity and rate of spread until ground personnel can reach the fire. Airtankers play a key role in successful initial attack, which is one of the most difficult and critical components of wildfire management. Successful initial attack of new and emerging fires that qualify for suppression is a critical part of keeping unwanted wildfires small and less costly.

The current fleet of large airtankers is old, with an average age of more than 50 years, and ten of the remaining eleven P-2V airtankers face retirement by 2021. With rising age, the cost of maintaining large airtankers is rapidly increasing, as are the risks associated with using them. To maintain mission safety and effectiveness, the Forest Service and Department of the Interior (Agencies) have concluded that the airtanker fleet needs to be replaced with safer aircraft. These replacements should be a newer, faster and more cost-effective mix of next-generation large airtankers better suited to the complex wildland fire environment of the 21st century. The Nation needs to invest in the right mix of aircraft for aerial firefighting. Our joint strategy for ensuring that the nation is equipped with a viable fleet of large airtankers is explored in this document.

<sup>1</sup> Westerling et.al. *Science*, Vol. 18 August 2006

<sup>2</sup> 2009 Quadrennial Fire Review, January 2009 ([http://www.iafc.org/files/wild\\_QFR2009Report.pdf](http://www.iafc.org/files/wild_QFR2009Report.pdf)).

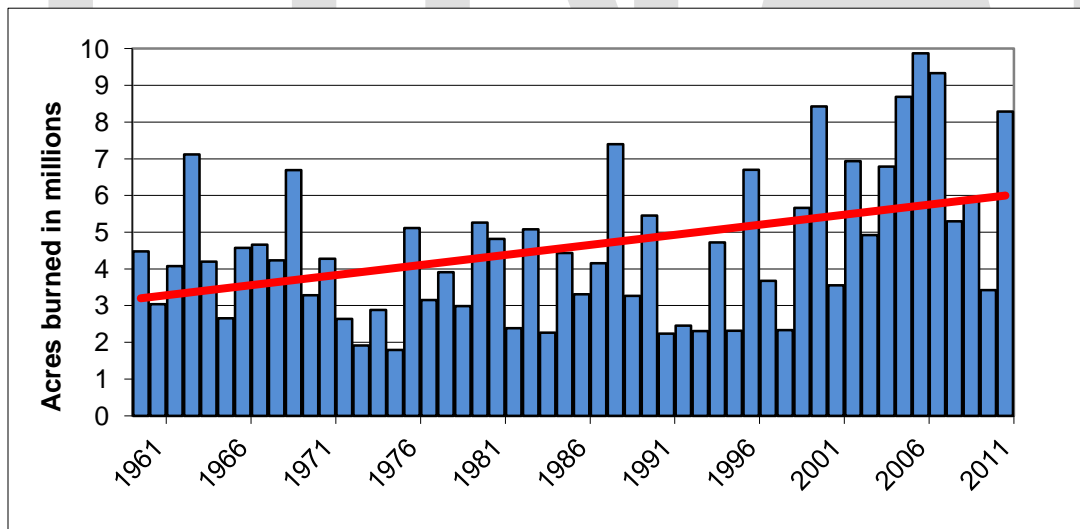
This strategy analyzes the options for next generation large airtankers. Recommendations in this strategy include:

- The Forest Service and the Department of the Interior should replace existing (legacy) large airtankers with a core fleet of next-generation large airtankers (Type 1, >3000 gallon capacity and Type 2, 1800-2999 gallon capacity). Continued work is ongoing to determine the optimum number of aircraft to meet the wildfire response need, but studies have shown that it is likely that between 18 and 28<sup>3</sup> aircraft are needed.
- For large airtankers operated by private companies there is a need to explore additional acquisition models, such as different contracting instruments and leasing, which could provide more flexibility for private industry and reduce contract costs to the Federal government.
- The Federal wildland firefighting aircraft fleet should be a mix of Type 1, Type 2, Type 3 (800 to 1,799 gallons) and Type 4 (<799 gallons) airtankers, water scoopers, Very Large Airtankers (>8000 gallons) and heavy (Type 1) helicopters.

**Background**

Wildfires affect millions of acres in the United States annually and hundreds of homes and businesses are destroyed by catastrophic wildfires each year. On average, wildfires burn more than 7 million acres in the U.S. annually, with almost 1.5 million acres burning on National Forests and over 500,000 acres burning on Department of the Interior lands. The trend for the number of acres burned annually by wildfire indicates a doubling of acres burned since 1960.

**Chart 1 – Total Wildfire Acres Burned – All US Lands, 1960-2011**



A large number of communities across the country are at risk from wildfires – almost 70,000. The cost of wildfire suppression and restoration amounts to billions of dollars each year and the challenge of managing wildfires continues to grow more complex due to a changing climate, hazardous fuels build-

<sup>3</sup> The requirements for large airtankers have been derived from the National Interagency Aviation Council Phase III Report, December 7, 2007 and the Interagency National Study of Large Airtankers to Support Initial Attack and Large Fire Suppression, Phase 2, November 1996.

up, and an expanding wildland-urban interface. The current drought cycle is expected to last for another twenty years<sup>4</sup>, which will contribute to a scarcity of water in ecosystems, continued problems with insects, and dryer vegetation which will make fuels more flammable and lead to more extreme fire behavior. For example, from 2000 to 2008, at least 10 States had fires of record-breaking size. In 2011, the Wallow Fire in Arizona burned more than half a million acres, breaking the record for the largest wildfire in Arizona set just nine years earlier. With shorter winters and warmer, drier summers, the amount of fire on the landscape will increase and likely escalate in the future and fire management efforts must be prepared to cope with a wildfire season that affects 10-12 million acres annually by the end of the decade<sup>5</sup>. These challenges will demand more flexible and agile firefighting response from the Federal government – requiring different capabilities within Federal fire management agencies.

Fire management is central to meeting the Forest Service and Department of the Interior missions of protecting and conserving natural resources and cultural heritage, restoring ecological health, and protecting communities. The Forest Service manages wildland fires on or threatening the 193 million acres of National Forest System lands and 20 million acres of non-federal lands under fire protection agreements. The Department of the Interior manages over 500 million acres of public land. The Agencies work in concert with their interagency wildland firefighting partners at the Federal, state and local levels to respond to fires on non-federal system lands across the country. Since the 1950s, fixed wing airtankers have contributed to this effort as a key part of the Nation's aerial firefighting force.

The Agencies have long agreed on the principles that serve as the basis for the acquisition and management of aviation resources for fire operations. Aviation resources are one of a number of tools available to accomplish fire-related land management objectives and they seldom work independently from ground-based resources. Aviation use must be prioritized based on management objectives and the probability of success. Also, risk management is a necessary requirement for the use of any aviation resource. In addition, the effect of aviation resources on a fire is directly proportional to both speed at which the resource can initially engage the fire and the effective retardant capacity of the aircraft.

### **Airtanker Use and Need**

Initial attack of new and emerging fires is one of the most difficult and critical components of wildfire management. Initial attack success is a critical part of keeping wildfires small and less costly. A 1.5% drop in initial attack success rate is estimated to represent approximately 150 fires that could escape initial attack, which would cost the Forest Service an additional \$300 million to \$450 million to suppress<sup>6</sup>. The ability to successfully suppress unwanted fires during initial attack has become increasingly more complex due to the increased forest and rangeland vegetation available to burn; the continued growth of the wildland urban interface; the rapid expansion of insect and disease infestations across landscapes; and persistent higher temperatures and drought due to climate change.

Airtankers play a key role in suppressing wildfires. Airtankers deliver fire retardant to wildfires, thereby reducing fire intensity and rate of spread until ground personnel can reach the fire or in support of ground personnel already on the fire. The reduced intensity and rate of spread can allow more effective

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<sup>4</sup> 2009 Quadrennial Fire Review, January 2009.

<sup>5</sup> *Id.*

<sup>6</sup> USDA Office of Inspector General Audit 08601-53-SF.

use of hand crews and engines. As fires increase in intensity or as fire spread rates increase they become more difficult to control and costly to extinguish. Accessibility of terrain or the location of a wildfire can delay the deployment of ground forces. Consequently, aerial delivery of fire retardants to slow the growth of wildfires is often the only available method of containment until ground-based firefighters can establish control lines. As the fire grows, airtankers also respond to spot fires that pop up; slow fire growth along fire edges; and concentrate protection around key assets. The effectiveness of different airtanker types is often dependant on the fuels being treated. It can take a large quantity of retardant to penetrate dense forest canopies and large airtankers are more capable of being effective in thick forest canopies and areas with dense brush. The larger load capacity also allows large airtankers to split their loads to provide critically needed support on different parts of a fire without delay.

**The Current Airtanker Fleet is Unsustainable**

The existing large airtanker fleet is old. The average age of the aircraft still in service is more than 50 years. Based on contractor information, ten of the remaining eleven P-2V airtankers face retirement by 2021 (Table 1 – Estimated Operational Service Life Remaining for the Lockheed P-2V, below). As these aircraft age, it becomes increasingly difficult for them to meet safety and airworthiness requirements. The cost of maintaining airtankers is rapidly increasing, as are the risks associated with using them. Since 2007, contract costs for daily airtanker availability have more than doubled—from just over \$15 million in 2007 to \$33 million in 2010.

**Table 1— Estimated Operational Service Life Remaining for the Lockheed P-2V**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>P-2Vs</b>	11	11	11	10	10	10	9	9	7	4	1	1	1	1	1	1	1	1	1	1

Historically, the Agencies based the selection of aircraft used for airtankers on the availability and low cost of acquisition rather than on firefighting airworthiness requirements. Six airtanker accidents since 1980, caused by in-flight structural failures, motivated the Agencies to pursue this strategic planning process to secure a safe and reliable large airtanker fleet. Following the 2002 fatal airtanker crashes caused by in-flight structural failures, the Agencies were required to assure the airworthiness of airtankers. Maintenance and inspection programs applicable to the airtanker mission were developed for the P-2V and P-3 aircraft. Beginning in 2008, the Forest Service, the sole Federal contractor for large airtankers on behalf of all the agencies, began requiring vendors supplying Type 1 and Type 2 airtankers to develop and implement a comprehensive maintenance and inspection program approved by the FAA. Due to the age of the current fleet, these requirements are costly to comply with. The increase in airtanker availability costs in the last few years is directly attributable to maintaining the airworthiness and safety of 50 year old aircraft for the firefighting mission.

The rapidly aging fleet will not be able to comply with these airworthiness and safety requirements indefinitely. The number of contracted airtankers has been reduced from over 40 ten years ago to 19 on the current (2008-2012) contract because some previous airtankers could not meet airworthiness requirements. With the recent termination of one of the airtanker services contracts, there are currently

only 12<sup>7</sup> airtankers on Forest Service contract. The current fleet consists of eleven Type 2 P-2V airtankers and one BAe-146, operated by two different contractors<sup>8</sup>. Surge capacity is available, when circumstances allow, through additional call-when-needed helicopters, cooperator airtankers (domestic and foreign), call-when-needed Very Large Airtankers and through the Department of Defense's (DoD) eight Modular Airborne Fire Fighting Systems (MAFFS) on Lockheed Martin C130H/J aircraft. However, relying on an aging, diminishing airtanker fleet and other aircraft for surge capacity when needed is not a sustainable path for the future.

### **Analysis and Options**

The Forest Service and the Department of the Interior have concluded that the large airtanker fleet must be replaced with newer, faster, more cost-effective airtankers<sup>9</sup>. The interagency National Study of Large Airtankers to Support Initial Attack and Large Fire Suppression (NATS 2) made recommendations regarding optimum airtanker numbers, sizes, and performance criteria by location, specifically focusing on airtanker size and performance in relation to economic efficiency and suppression effectiveness and stated the future airtanker should be 3000-5000 gallons in capacity and be turbine powered. The National Interagency Aviation Council (NIAC) report (Phase III- 2007) included acquisition costs, retardant tanks and program costs and noted the C-130J as an option for the large airtanker program. Large airtanker requirements should include turbine power, 250-350 knot cruise speed and a minimum capacity of 2000<sup>10</sup> gallons. The large airtanker program in the NIAC report proposed government acquisition of 25 new C-130Js as the high cost option.

Large airtankers are only one part of a multi-faceted aerial firefighting fleet, and are not the only aircraft critical to aerial firefighting support. For example, water scoopers and heavy helicopters are very effective in locations where fires are in close proximity to water sources adequate to safely allow access. Single Engine Airtankers are very effective in lighter fuel types such as grass and brush, but the 500-800 gallon capacity generally cannot penetrate the closed timber canopy common to most forested landscapes but can reload from temporary forward operating bases. A mixture of next-generation large (Type 1 and Type 2) airtankers, water scoopers, SEATs, Very Large Airtankers (VLATs) and heavy helicopters, is necessary to continue to provide effective aerial support for managing wildfires.

The section below will focus only on the next-generation large airtanker portion of the aerial firefighting fleet.

### **Next Generation Large Airtanker Options**

Ideally, next-generation large airtankers should be designed for the maneuver load impacts of the airtanker mission. Large airtankers should be turbine (turbo- prop or turbo-fan) powered (because of the much greater reliability, less maintenance and increased fuel economy of turbine engines over older

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<sup>7</sup> On September 29, 2011 a Neptune Aviation BAe-146 was added to the existing airtanker contract through December 20, 2011 and mobilized to Texas. This airtanker will be evaluated during the 2011 and 2012 fire seasons.

<sup>8</sup> In July 2011, the Forest Service terminated the contract with the contractor operating P-3 aircraft for failure to implement a continued airworthiness program, and those aircraft are not currently available to support Federal wildland firefighting.

<sup>9</sup> The requirements for large airtankers have been derived from the National Interagency Aviation Council Phase III Report, December 7, 2007 and the Interagency National Study of Large Airtankers to Support Initial Attack and Large Fire Suppression, Phase 2, November 1996.

<sup>10</sup> NIAC uses various airtanker capacity including 3000-5000 gallons and 4000-5000 gallons.

reciprocating aircraft engines), and should be able to cruise at a speed at or greater than 300 knots - or 345 mph - to allow for quick response at long distances. Minimum capacity should be at least 2000 gallons of retardant, 3000 gallons or more would be preferred. For the specific aerial firefighting missions in dense forests, the need for canopy penetration is particularly acute and larger loads and higher speeds are preferred.

Like other firefighting aircraft, next generation large airtankers must meet Forest Service contract Structural Integrity Program (Continued Airworthiness Program) requirements<sup>11</sup> which contain the baseline airworthiness standards of 14 CFR wherever practicable and may use additional 14 CFR evaluations, processes and inspections not originally required of an aircraft during original FAA certification to assure airworthiness while operating in the airtanker mission. Requirements include but are not limited to: certificated by the FAA in the standard or restricted category; supported by the original equipment manufacturer (OEM); have an FAA-approved maintenance and inspection program designed for an airtanker; and have FAA approval of all modifications and alterations to the aircraft which change the configuration to the firefighting role.

In addition, next generation large airtankers must also meet the requirements of the Interagency Airtanker Board (IAB), established under the auspices of the National Wildfire Coordinating Group (NWCG) and National Interagency Aviation Council, with members that include NWCG agencies and organizations. The IAB inspects retardant tanks and gating systems installed on proposed airtankers, which are evaluated in terms of aircraft operating requirements; tank performance criteria; airtanker configuration limitations and restrictions; and weight, balance, and center-of-gravity analysis. Actual retardant drop evaluation includes a static evaluation demonstrating target flow rates and a drop test evaluation over a standardized grid. Retardant systems that pass the tests are subject to a 1-year interim approval. Final retardant delivery system approval is based on field review and evaluation.

Only two aircraft have been specifically built in North America for the firefighting mission; a water scooper (Bombardier CL-215/415) and a Single Engine Airtanker (AT-802 and other variants). No large airtanker has been built for the specific purpose of firefighting. However, there are large aircraft that were designed for missions that are similar to the maneuver load impact of the airtanker mission. There are also several modern commercial passenger transport aircraft that have been proposed to be reengineered and rebuilt for the firefighting mission. All aircraft would require additional inspection and maintenance programs to safely function as airtankers. To-date, only one next generation aircraft (BAe-146) has been approved and contracted by the Forest Service for the demanding airtanker mission.

**Current and Potential large airtankers include<sup>12</sup>:**

- C-130J (Lockheed Martin). This is a current production aircraft. This aircraft has a speed of 380 mph; carries 4,000 gallons of retardant; has 4 turbo-prop engines; is supported by the original manufacturer; is designed for combat purposes with maneuver load impacts similar to the

<sup>11</sup> Complete airworthiness requirements for airtankers including foreign aircraft are available in the USDA – Forest Service, *Special Mission Airworthiness Assurance Guide*, November 5, 2010.

<sup>12</sup> VLATs, SEATs and water scoopers are not included in this list of potential large airtankers. The VLAT and SEAT are specialized airtankers because of performance, capacity, and operational limitations; they do not constitute the core aerial firefighting resource. Water scoopers are not considered airtankers, but more comparable to heavy helicopters.

wildland firefighting airtanker environment; and can meet agency and FAA airworthiness and safety requirements. The C-130J is a multi-role aircraft capable of performing other missions such as firefighter transport, smokejumper deployment and cargo delivery. The C-130 has been in use as an airtanker in the MAFFS program since 1973. The C-130J is the latest variant used for MAFFS in use since 2009.

- BaE-146 (British Aerospace). This aircraft is no longer in production and would only be available as previously-used. This aircraft has a speed of 380 mph; carries 3,000 gallons of retardant; has 4 turbo- fan engines; is supported by the original manufacturer; and was designed for commercial passenger transport, a mission that is not comparable to the maneuver load impacts of an airtanker in the wildland firefighting environment. It has been evaluated for the airtanker mission and one variant recently passed the required retardant drop tests to perform as an airtanker; and has met agency and FAA airworthiness and safety requirements. It has been approved by the Forest Service as an airtanker. The BAe-146 will not be capable of multi-role missions. One BAe-146 airtanker (T-40) is currently on the existing airtanker contract.
- MD-87 (Boeing). This aircraft is no longer in production and would only be available as previously-used. This aircraft has a speed of 380 mph; carries approximately 4,000 gallons of retardant; has 2 turbo fan engines; and was designed for commercial passenger transport, a mission that is not comparable to the maneuver load impacts of an airtanker in the wildland firefighting environment. Original manufacturer support for this aircraft has not yet been obtained. This aircraft has not gone through the required testing, evaluation and application phase for the airtanker mission, but it would be expected to meet agency and FAA airworthiness and safety requirements. The MD-87 will not be capable of multi-role missions.
- B-737 (Boeing). Early series (737-100 through 500) are not in production and would therefore only be available as previously-used. These aircraft have a speed of 380 mph; carry approximately 4,000 gallons of retardant; have 2 turbo fan engines; and were designed for commercial passenger transport, a mission that is not comparable to the maneuver load impacts of an airtanker in the wildland firefighting environment. Original manufacturer support for this aircraft has not yet been obtained. These aircraft have not gone through the required testing, evaluation and application phase for the role of an airtanker in the wildland firefighting environment, but it would be expected to meet agency and FAA airworthiness and safety requirements. The B-737 will not be capable of multi-role missions.
- Q400 (Bombardier). This aircraft is currently in production and can either be acquired as new or used. Two multi-role versions (Q400 MR) are currently operating in France. The MR variant is capable of operating as an airtanker or hauling cargo and passengers. An airtanker only version is also available. The aircraft has a speed of 380 mph, carries 2,600 gallons of retardant, meets Inter-Agency Airtanker Board (IAB) delivery system requirements, has 2 turbo-prop engines, and is supported by the original manufacturer. The Q400 was designed for commercial passenger transport; a mission that is not comparable to the maneuver load impacts of an airtanker in the wildland firefighting environment. These aircraft have not gone through the

required testing, evaluation and application phase for the role of an airtanker in the wildland firefighting environment, but it would be expected to meet agency and FAA airworthiness and safety requirements.

- P-3 Orion (Lockheed). This is a legacy airtanker and is not in production. This used military aircraft was obtained by private vendors from the Forest Service. This aircraft has a speed of 290 mph; carries 2,550 gallons of retardant; has 4 turbo-prop engines; and was designed for a military mission that is not comparable to the maneuver load impacts of an airtanker in the wildland firefighting environment. These aircraft are 50 years old. This aircraft is supported by the original manufacturer, has met agency drop standards and has an FAA type certificate. However, there are currently no P-3s under Forest Service contract due to a contract termination that was the result of failed implementation of a continued airworthiness maintenance program. The P-3 was not capable of multi-role missions.
- P-2V Neptune (Lockheed). This is a legacy airtanker and is not in production. This used military aircraft was obtained by private vendors from the Forest Service. This aircraft has a speed of 230 mph; carries 2,082 gallons of retardant; has 2 radial reciprocating engines and 2 jet assist engines; and was designed for a military mission that is not comparable to the maneuver load impacts of an airtanker in the wildland firefighting environment. These aircraft are 60 years old. This aircraft is not supported by the original manufacturer in the airtanker role. These airtankers have FAA type certificates. This aircraft has met agency and FAA airworthiness and safety requirements. The P-2V is not capable of multi-role missions.
- Convair CV-580 (Convair). This is a legacy airtanker and is not in production, but is in operation in Canada, contracted by the State of Alaska and used through cooperator agreements in the US. It has two turbo-prop engines, a speed of 290 mph, carries 2,000 gallons and is equipped with constant flow retardant tanks. These aircraft are 50 years old. The CV-580 was designed for commercial passenger transport; a mission that is not comparable to the maneuver load impacts of an airtanker in the wildland firefighting environment. These aircraft are approved by Transport Canada (FAA equivalent in Canada) for the airtanker mission. The CV-580 is not capable of multi-role missions.

Based on the options above, the Forest Service and Department of the Interior believe the best immediate option for next generation airtankers is contracted passenger transport category aircraft, such as the BAE-146, Q400 and/or similar aircraft. Legacy airtankers such as the P-2V will continue to be contracted and eventually transitioned out of service as approved next generation large airtankers become available. As we learn more about the operation of these passenger transport category aircraft, and potentially other aircraft in the coming years, the mix of aircraft might change over time. Long term, the Agencies will continue to explore the costs and benefits of leased and/or government owned aircraft like the C-130J.

#### **Additional Considerations**

The Agencies believe the number of next-generation large airtankers needed in today's wildland firefighting environment is between 18 and 28. If surge capacity is required during difficult fire years,



additional large airtankers could be available through cooperator agreements and through the MAFFS program. Additional large helicopters and Very Large Airtankers could be available through call-when-needed contracts. Private industry has been, and will continue to be, a key source of airtankers for the Federal wildland firefighting effort. Currently all of the airtankers under contract to the Federal government are owned and operated by private industry, (this model is referred to as “contractor owned/contractor operated”).

Unfortunately there are only two vendors<sup>13</sup> currently contracting with the Forest Service for airtankers. If contracting authority for this purpose were to be extended from five years to ten years, additional incentive might be provided to existing and potential private vendors to invest in next-generation aircraft. However, this would likely not be sufficient for private vendors to acquire the most expensive of the above aircraft options.

Dependency upon a few vendors and a few aircraft makes/models, combined with the economic difficulty for new vendors to enter the market or current vendors to upgrade their fleets, demonstrates the vulnerability of the current situation and suggests the need to explore a full range of acquisition options. The Agencies commit to reviewing current acquisition methodologies to determine how best to incentivize contractors to provide the best available technology. In the current fiscal environment, acquiring government leased or owned large airtankers presents a significant challenge.

### **Cost Considerations**

The availability (fixed) costs and flight use (variable) costs associated with contractor owned and government owned aircraft contrast due to the ownership and operations model. A contractor will recoup their initial acquisition investment, conversion costs and profit margin over the life of the contract (currently 5 years). A new government owned aircraft is paid for up front, is capitalized over a 20 year life span, and retains some residual value at the end of the 20 years. Further, fixed and variable costs reflect only the cost of operation and ownership.

Based on Air Force, aviation industry and Forest Service estimates, the C-130J flight cost is approximately \$6,660 per flight hour and \$13,740 per day for availability costs (2011 dollars), per day availability includes costs not associated with actual flight, such as pilots, facilities, depreciation, replacement costs, overhead and training. Successful transition to a multi-role operation would require additional pilot staffing, changes in concept of operations and close coordination to enable airtanker operations and other missions. However, ownership results in full year fixed costs comparable to the contractor model that incorporates ownership in the availability for the term of the contract.

The BAe-146 large airtanker cost is \$9,983 per flight hour and \$19,646 per day for availability costs. These costs are from the current contract for an 84 day Mandatory Availability Period (MAP). Other BAe-146's were proposed in a recent Request for Information (RFI). Daily availability was estimated at \$20,000 - \$22,000 per day. Flight costs were estimated at \$10,000 per hour.

The MD-87 airtanker proposed in the RFI did not include any cost estimates. Actual contract costs will be forthcoming in the RFP for next generation airtankers, which closes on January 31, 2012.

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<sup>13</sup> One additional vendor has a Call- When- Needed contract to provide up to 2 Very Large Airtankers.

Several companies proposed Bombardier Q400 airtankers in the RFI. Daily availability was estimated at \$28,000 per day and flight costs were estimated at \$8,000 per hour.

The current contracted P-2V large airtankers cost is \$5,800 per flight hour and \$9,400 per day for availability costs. The availability costs have increased over 40% since 2007.

A new C-130J would cost about \$79 million to purchase. Included in any acquisition option for the C-130J would be a next generation retardant delivery system that can be rolled on and off the aircraft to take advantage of the 4,000-gallon payload. The next generation contractor owned aircraft (BAe-146, MD-87 and Q400) are estimated to cost approximately \$7 million to purchase. Estimates to convert the commercial transport aircraft into an airtanker are \$1- 4 million per aircraft based on the tank system and the aircraft. These used aircraft have a limited service life, which would be based on the previous use and annual airtanker use. Airtanker use is considered to be approximately 4 times more demanding than the designed use as a commercial transport aircraft.

**Table 2 - Current and Potential Airtanker Information**

Model	Speed (mph) <sup>a</sup>	Load (gal)	Sorties <sup>b</sup>	Estimated Retardant Delivered in 6 hrs (gal)
<b>Next-generation aircraft</b>				
C-130J (Lockheed Martin)	380	4,000	7	28,000
BAe-146 (British Aerospace)	380	3,000	7	21,000
Q400 (Bombardier)	380	2,600	7	18,200
<b>Legacy aircraft</b>				
P-3 (Lockheed Martin)	290	2,550	6	15,300
P-2V (Lockheed Martin)	230	2,082	5	10,400

a. Cruise speed for a 200-mile round trip.

b. The number of initial-attack missions of 100 miles possible within 6 hours, based on cruise speed and reload/taxi times.

**Solutions**

The Forest Service, in partnership with the Department of the Interior, is already moving forward to contract for next generation aircraft. The recent RFI gauged interest in next generation large airtankers that could carry more than 3,000 gallons, were turbine powered and could fly faster than 300 knots. It drew an overwhelming response from industry. A dozen vendors responded with a dozen different aircraft alternatives. Aircraft proposed included the BAe-146, Boeing MD-87 and Bombardier Q400. There is interest and ability by a wide range of sources to provide aircraft to meet Federal next generation large airtanker requirements.

The Request for Proposals (RFP) has been posted and will be open until January 31, 2012. This solicitation was specifically designed to allow new and existing contractors flexibility to enter into the

next generation large airtanker business with time to develop airtankers, reducing financial risk and a stepped approach to contract awards.

There is a need to explore different acquisition models that would provide more flexibility in the acquisition of next-generation aircraft, as well as reduce costs to the Agencies. The Administration will work with Congress to explore these alternatives.

Even with this RFP moving forward, it will take time to transition from the current legacy airtankers to next generation airtankers. During the transition, the Agencies will need to rely on existing contract aircraft (current LATs, helicopters, SEATs, and VLATs), cooperator aircraft and DoD C-130 MAFFS.

### **Conclusions**

Providing large airtankers is important to the Federal, state, and local wildland firefighting mission of protecting communities and natural resources from wildfires. As fire seasons become longer and more severe, the need for having multiple and flexible methods of fighting wildfires will only grow. The nation needs to invest in a modernized fleet with a mix of aircraft for aerial firefighting. We must replace our aging fleet with newer, faster, more efficient and cost-effective large airtankers better suited to today's complex wildland fire environment.

A core fleet of next-generation large airtankers will be needed, comprised of a mix of aircraft makes/models and provided by a variety of sources, to meet the firefighting challenges of the future. This process is a long-term effort where the interagency firefighting community will continue to learn and adjust accordingly. The appropriate mix of tools for wildland firefighting will continually be analyzed, including ground and air resources. The Agencies must maintain flexibility to bring on new resources as they become available and modify resource needs as necessary to maintain the effectiveness of our firefighting operations. These efforts will ensure that Federal, state and local wildland firefighting agencies are able to continue to effectively carry out the wildland firefighting mission into the 21<sup>st</sup> century.