



# AIRTANKERS, AN HISTORIC OVERVIEW



Text and photo collection : Tom Janney

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**A**erial firefighting in the State of California can trace its root back as far as the 1919, when the US Government provided aircraft for patrolling the wildland areas of the State and in 1921, a "Pony Blimp" was used on an experimental basis in conjunction with The US Government and the LA County Fire Department. Nationwide, since 1916, various methods and ideas for spotting and aerial firefighting were tried over the years, including wax paper filled sacks of water, detonating water filled bombs and wooden – water filled barrels kicked out of the aircraft. As technology advanced, both in fire control and aviation, most of these methods were dropped by 1948 for various safety reasons or lack of effect.

In 1953, several major fires in Southern California brought the need to re-explore better methods of control and management. At this point, every fire agency in the area volunteered assistance in organizing a series of projects to test out a number of unconventional methods and ideas. As fighting these fires had also become a serious problem for civil defense, the Federal Civil Defense Administration applied sponsorship and six branches of the Department of Defense gave assistance in various ways. With this teamwork of resources, an ambitious and highly successful one-year exploratory project, known as Operation Firestop, combining field and laboratory tests, was carried out.

By 1956, aerial firefighting had become a reality. While it was demonstrated that aircraft were a valuable tactical resource for crews on the ground, it was also shown that the aircraft had many limitations as well. By the end of the 1950s various aircraft, mostly WW2 and Korean War surplus airframes, had found a new life as aerial firefighters

in the State of California.

In this 4 part series, I will highlight the aircraft and the important advances in aerial firefighting in the State of California from the 1950s thru the 1980s. In this brief look back at our history, let's remember the machines, the men and those who gave the ultimate sacrifice to make the California Department of Forestry and Fire Protection a world class organization.

## Boeing PT-17 Stearman



The Boeing PT-17 Stearman was one of the very first aircraft used in California for aerial firefighting purposes. Willows Air Service was also the first contractor for the California Division of Forestry.



Along with his Stearmans, Cod Jensen fielded a fleet of Navy built N3Ns from his Willows facility as well.



### Grumman TBF-1 Avenger

Hollywood flying legend Paul Mantz installed a plywood tank in a Grumman TBF for the Firestop series of testing at Camp Pendleton. The tank doors were released using electric bomb shackles. Pictured here at Ontario International Airport in 1957, Stan Reaver and Dick Munsell taxi in from a testing session.



The Grumman TBM proved to be the initial workhorse for California. Built to withstand the punishments of war, it fit into the airtanker role easily. By 1958, a metal tank had replaced the wooden one and Paul Mantz's TBF was the first Grumman Avenger to make a drop on an actual fire near Lake Elsinore in 1958. Sadly, this aircraft

and crew were lost when the load did not release in 1959.



### Consolidated PB4Y-2 Privateer

Another product from the Consolidated line would be the PB4Y-2. Testing and late introduction into the world of firefighting, the 4Y would have to wait a few years to see widespread use and in 1959, Avery Aviation tanked the first Privateer.



### Consolidated PB4Y-2 Privateer

Aside from the aircraft being used, advances in chemical retardants was taking place as well. It was clear that through early testing, that plain water – while good, was not sufficient for the task at hand. Water drops needed to be executed perfectly to be effective and the wind more often than not made this impossible.

The 1950s saw the introduction of sodium calcium borate mixed with the water. It was discovered that the borate solutions were sterilizing the soil and causing chemical burns to those on the ground who came into contact with it. Another mix used was bentonite, but this was abandoned shortly due to the excessive weight worsened by the inability of most of the aircraft of the day to successfully carry the load. What bentonite loads that were carried, were small and generally ineffective on larger fires.

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## The sixties...



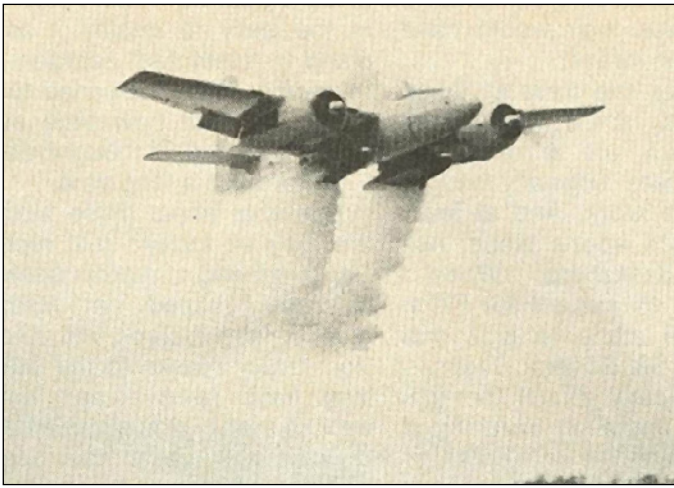
Continuing with my four part series of aerial firefighting in the State of California, in this installment we'll take a look at the 1960s. This decade saw some of the most dramatic changes in variety of aircraft, tactics and chemical used in fire control. Unfortunately, this decade also saw the loss of many good planes and pilots. Aerial firefighting is an art form, choreographed with many physical variables and limitations. It was during these formative years that we all learned "The Dance". Our dancing partners varied in size and weight, and if we were lucky - we learned from our mistakes. Tactics evolved to make the dance safer and more effective. Improvements were made along the way to make our dancing partners more friendly, but make no mistake, this was still dangerous work in a volatile environment with constant change. The 60s defined an entire generation and aerial firefighting in California was not left out of these winds of change. While this is not all encompassing, I've tried to stick with the major points, which this writer finds a challenge as so many things were happening during these years. With that said, let's take a look back to the years that saw an industry grow up and start to come of age.

In late 1959, many airframes were undergoing modification for eventual use as a tanker platform and in 1960 the available aircraft started to grow. Notable among these were the Grumman F7F, North American B-25 and AJ-1, Douglas A-26, Consolidated PB4Y-2 and the huge Martin JRM-3 Mars. While the Mars was a

Canadian project, paid for by six lumber companies, who would later be known as Forest Industries Flying Tankers Ltd., I have included it here as an historical note, as it represented not only the largest tanker of the time but it would eventually see use in California in future years.



In 1960, the J. M. Jackson Company purchased three North American AJ-1s from the US Navy's Litchfield Park Arizona storage yard and flew them to Long Beach California for conversion. In June of that year, the first airframe was tested over a fire in June, followed by a second test in August. Eventually, two of the three aircraft would see service and use throughout Southern California. With a tank capacity of 2,000 gallons and a cruise speed of 230 knots, the AJ-1s were a valuable resource on incidents that required tankers to come from an extended range.



In the late 50s, George Kreitzberg experimented with a dual tank Grumman F7F-3, utilizing two 500 gallon fuel type drop tanks, one mounted under each wing. Proving the concept, by the early 60s, several operators were making use of this airframe, however the tank system saw the biggest change moving from wing mounted tanks to a single fuselage mounted tank in both 800 gallon and 1,000 gallon capacity. By 1963, there were ten F7F airframes being used throughout the Western States, with seven of these calling California home.



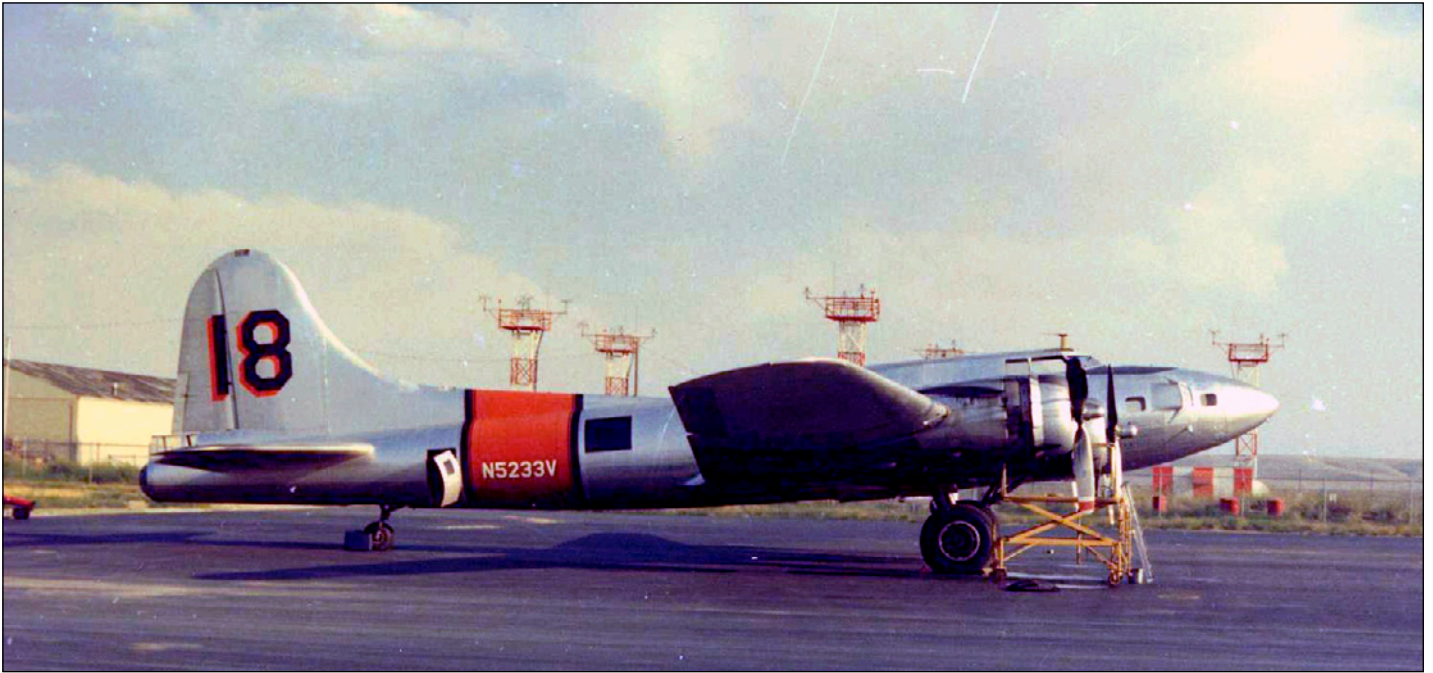
The Douglas A-26 saw it's first conversion in 1959 by Aero Atlas in Red Bluff Ca. By the mid 60s, somewhere between 50 and 60 A/B-26s were being used, some of them in California for a short time. The aircraft exhibited a 1,200 mile range coupled with a good airspeed and an initial 1,200 gallon capacity. By the late 60s and early 70s, a majority of the A-26s had either found their way to Canada, other non-tanker ownership or the scrap yards.



The North American B-25 started seeing conversion in 1959 and by 1960, there were sixteen B-25 tanker operators in the State of California. Most carried 1,000 gallon tanks either belly mounted or fitted internally in the bomb bay. Early success varied with each operator, however, in July of 1960 there were four fatal crashes within days of each other involving the B-25. Subsequently, the B-25 was banned from use in the State of California. Testing was conducted at Edwards Air Force Base in 1963 to determine the cause of certain flight control issues which resulted in the limited use of the B-25 elsewhere around the Country and Canada. The last B-25 tanker was retired from service in 1992, in Alberta Canada.



Having broken ground on the tanker industry in the 50s, the new decade saw a multitude of Grumman TBMs flying fires throughout the State. Companies like Hemet Valley Flying Service, Sis-Q, Cal-Nat and many other smaller operators had aircraft spread out from border to border as the TBM was proving to be a reliable workhorse in the industry and would serve well into the 70s.



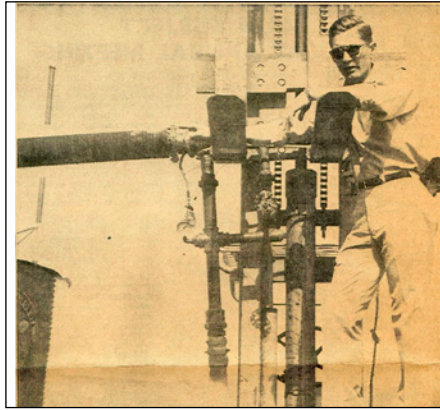
Starting in 1960, the Boeing B-17 entered the second war in its career. Most having been surplused by the late 50s, the 4 engine supercharged airframe proved to be a power hitter in the tanker world. By 1962, B-17s were in wide use in California and around the Nation. Aero Union and TBM Inc. stabled a number of these and were a common fixture around the State until the mid 70s. On average, a B-17 would carry 1,600 gallons of retardant although most were rated for 1,800 gallons. Considering the B-17 was built for war time punishment, the airframe proved to be one of the most stable and structurally sound tankers at the time.



With experimentation in the 50s, the 1960s saw the widespread use of the Consolidated PB4Y both in the US and in Canada. Even though it was a slow aircraft compared to several other tankers, its low speed and 1,500 gallon capacity contributed to its accuracy as a tanker. Being an amphibious aircraft, several of these had the capability of scooping water directly out of lakes to refill the tanks but more often than not, they remained land based.



Just as the 1960s ushered in a new era of aerial firefighting, changes in the technology and methods changed as well. Where we once saw Sodium Calcium Borate and Bentonite loaded into the aircraft thru openings on the top side of the aircraft and mixed with water during the tank filling process, newer retardant solutions were created that allowed it's mix with water prior to loading the aircraft. Phos-Chek retardant was a product that became available in 1962 which consisted of ammonium poly-phosphate, diammonium phosphate, diammonium sulfate, monoammonium phosphate, attapulgus clay, guar gum (or a derivative of guar gum), and trade secret performance additives. Throughout the 60s, Phos-Chek was manufactured in several different formulations with varying proportions of these ingredients.



included new items called eductors and Hamp mixers. The ability to pre-mix the retardant and store it allowed for easier loading for the

ground personnel and faster turn around times during fires.

*As the decade came to a close, aerial firefighting in the State of California had secured it's place in history. Old aircraft had found new leases on life, the CDF had new tools to use and a network of air attack bases was in place from the Oregon border to the Mexican border. Along with the changes came new tactics, new policies, and more efficient ways of getting things done. We had indeed learned to dance.*



With this new retardant, new mixing and storage facilities were created as needed. Bulk storage was now provided via silos, mixing



## The seventies...



*In part three of four, we leave the 60's behind with memories, lessons learned and venture ahead into the 1970s. This decade brought some dramatic changes in aircraft, attitudes and organization. While the goal has always been the same, the way we achieved it was changing. The State of California was recognized as a leader in aerial firefighting technology, culminating in many visits by foreign Governments and Dignitaries from around the World. With a "Can Do" attitude, the CDF showed the World how to fight fire from the air – effectively, safely, and in a timely manner. While not exclusive to the CDF, we indeed were years ahead on the learning curve in this industry. Aside from CDF's own talent, the many private contractors of these times were all contributors in so many ways to the success of CDF's air attack program. I would be remiss not to mention a few of them here for credit well deserved, such as Hemet Valley Flying Service, Sis-Q, Aero Union, San Joaquin Helicopters and TBM Inc. These contractors, along with many more around the Nation, all created an industry that was equaled by none.*

The 1970s ushered in the use of new aircraft and the retirement of others. Some went to sale for scrap or auction, with many fine examples fortunately being restored and currently flown. I doubt the general public knows that they would have never seen many of these historical flying machines if it were not for the aerial firefighting industry giving them a second life. This is my personal Thank You to everyone who allowed these wonderful ladies to still be with us today.



The Consolidated PB4Y-2 had seen initial conversion in 1961 by Avery Aviation, but there were several contractors that flew them throughout the 1960s, among those, Rosenbalm, Hillcrest, Winairco and Flight Enterprises. Their use was sporadic and most were underutilized when available. In 1969, a new company had formed from the purchase of several tankers and the joining forces of others. This new company, Hawkins & Powers made excellent use of the 4Y and fielded a majority of the airframe types during the 1970s. Other users included T & G, and Air Tankers Inc. In later years, structural issues would force the PB4Y-2 into retirement.





In 1953, a prototype Douglas DC-7 conducting testing at Palm Springs airport elected to dump 1,300 gallons of water ballast over the runway, creating a 200 foot wide and nearly a mile long stretch of completely washed asphalt. The Douglas company representatives that were on hand saw the viability of using their aircraft as tankers and solicited the Los Angeles County Fire Department for further testing. In December of that same year, testing was completed at Rosamond Dry Lake, with the USFS, CDF, LA County and LA City in attendance. With testing concluded, although with favorable results, the Douglas airframes were passed over due to the cost of the new airframes. Later on in the 70s, as the DC-4, DC-6 and DC-7 aircraft along with their military variants became more affordable, many of these saw the conversion to tankers and proved to be excellent platforms.



In the latter years of the 60s and into the early years of the 70s, the Fairchild C-119 was finding its way out of the US military inventories and into storage. Early on, the airframe was eyed as to its use as a tanker. By March 1970, the various airframe models received STCs for retardant tanks and the addition of a jet pod located on top of the fuselage. Hawkins & Powers and Aero Union were the initial users of this aircraft, with Hemet Valley Flying Service eventually picking up Aero Union's fleet of the "Dollar Nineteen". The addition of

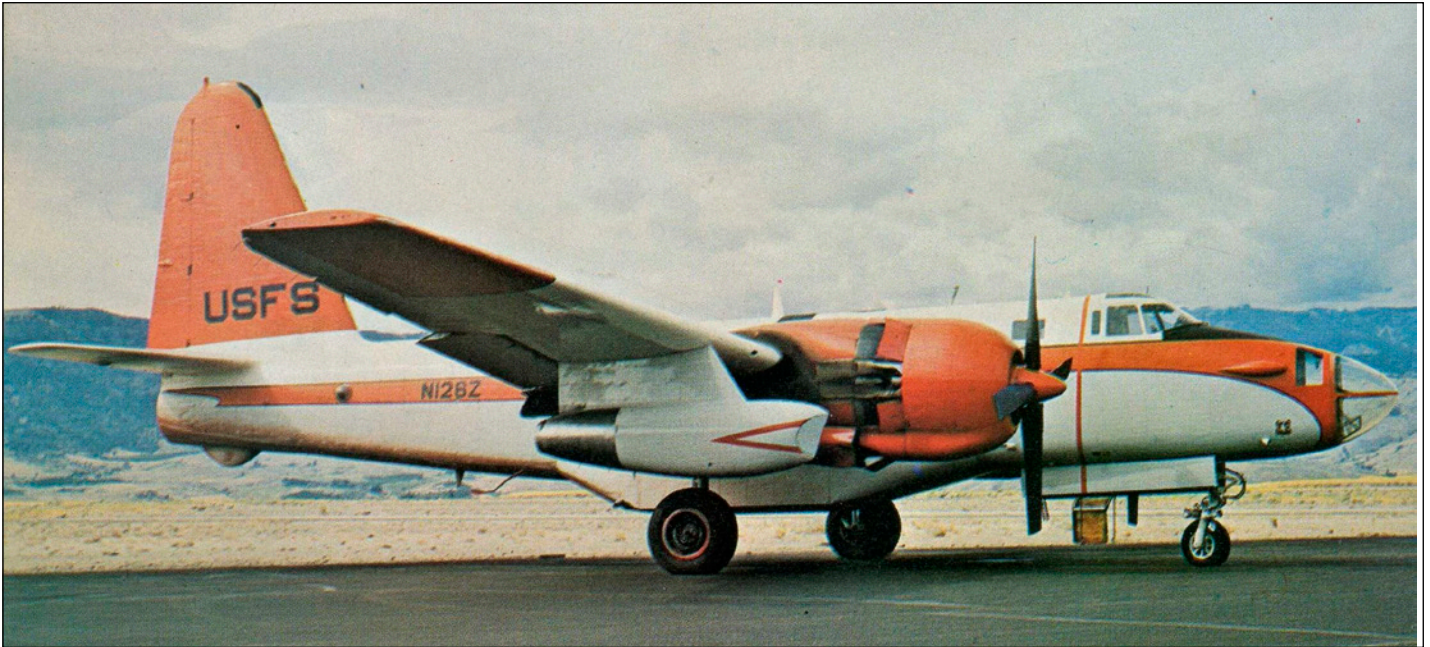
**an historic overview.**

the Westinghouse J34 turbojet engine added 3,500 Lbs of center line thrust to its capabilities. The J34, while being a jet engine, ran very well on 100LL AvGas. As a note, this is also the same jet engine that was hung on the Lockheed P2V Neptune. Soldiering throughout the 70s and into the 80s, the airframe would see permanent grounding by 1987 due to structural issues.



In 1970, there were growing concerns about single engined tankers, mainly the Grumman TBM. Crash history for the TBM was growing, while future maintainability and parts resources were growing slim. The CDF was looking for a replacement for the contract aircraft that had been serving the State for the last 20 plus years and the twin engined Grumman S-2A was evaluated and chosen as the replacement. The S-2A was already being used in Canada for aerial firefighting, thus with shared engineering data, Hemet Valley Flying Service built two prototypes that were placed into service by the beginning of the 1973 fire season. 1973 also saw the loss of three more TBMs and three F7F tankers in 1974, which quickly brought the S-2 program into full swing. Having settled on a tank design and system, Aero Union, Sis-Q and TBM Inc., joined Hemet Valley in conversions of the airframes. By the end of the 1974 fire season, 12 S-2As were in service Statewide, with another five coming from Bay Aviation Services in 1975. The move to the S-2 also signified the beginning of a State managed fleet of tankers, although maintenance and flight crews were still provided by the various contractors.





Another new airframe that saw introduction in the 70s, was the Lockheed P2 Neptune. In 1969, the USFS contracted Rosenbalm Aviation in Medford OR to build the prototype 3,000 gallon tank. By the early 70s, the USFS and Johnson Flying Service (which was to become Evergreen International) had several P2s active and fighting fire, but it wouldn't be until the 1980s that the P2 would see wider use and more aircraft added to the National roster.



Along with the S-2 program, CDF also started getting away from contract aircraft used for AIRCO duties. The normally leased aircraft had a difficult time keeping up with these new S-2 tankers, thus, something faster was needed. In 1974, twenty Cessna O-2 airframes were sent from military storage in crates and the process of reassembling them took place. By 1976, the new State managed AIRCO fleet was ready to go. Like the S-2, the Cessna O-2 provided the operational safety of twin engine plus increased airspeed. An added bonus was the fact that these aircraft were former military observation platforms and came equipped with extra window panels in the right side door and overhead windows, which provided excellent visibility for the Air Attack Officer.





Helicopter use in California can be traced back to the mid 50s, with 1,000 feet of hose being laid on the Sterling Fire in San Bernardino on July 5, 1956. Thru the 60s, the US Forest Service was developing Helitack crews while the CDF maintained several contract helicopters for various duties. In 1978, the CDF initialized it's own Helitack crews in an evaluation program that would set the stage for future development of the program. In (then) Region 6, a Bell 205-A1 based out of Ryan Air Attack Base and an additional airship based out of Monte Vista Ca. were utilized in this capacity with favorable results. Cross training with the USFS Helitack crews from Heaps Peak, Keenwild, Ramona, Rose Valley and Chantry Flats were also conducted.

*Just as things in the aerial firefighting industry were changing at a rapid pace, the 70s also saw the introduction*

*of new fire retardant chemicals, plus better logistical planning and infrastructure for air attack bases. The CDF family as an agency was changing as well. The 70s saw the separation of the Division of Forestry from the Department of Conservation, renamed to the Department of Forestry and a State wide change in patch and badge designs. After a disastrous start to the decade, the Firescope program was resurrected and again put to task, culminating in the State wide implementation of the Incident Command System. By the end of this decade, an entire new fleet of aircraft had been in service, new programs were taking hold and a new look to the organization was in place.*



## The eighties...



In the last of this four part series, we have a look back at 1980s. Once again, many changes were ahead for the CDF air program as well as the private contractors. The decade brought with it the loss of more aircraft and many fine pilots and we would see the permanent grounding of several airframes. These years would also see the beginnings to introduce turbine powered aircraft into the industry with the addition of several new platforms. Some of the changes during the 80s were not without controversy and would thrust several contractors and the US Forest Service into a drawn out legal battle that would last into the 90s. While it's hard to image some of the founding business' going by the wayside, let's take a final look at who we were, what we did, and why we did it.



With the S-2 program well entrenched, several modifications were made during these years, most notably – the switch to a higher visibility paint scheme. The original CDF green (Detco U3083) seemed to become camouflage against the Northern California landscape after a bit of weathering and age. Overall white was chosen and thru the years, various combinations and attributes have been used.



In late 1987, there were plans laid to bring the Lockheed C-130A into the industry to replace the recently grounded Fairchild C-119s. Structural and component failures had forced the grounding of these after the loss of several aircraft. The C-130 seemed an ideal platform, however, the speculated history and acquisition of the airframes provided a short window of use for this type. Eventually, after the loss of two separate aircraft from two separate contractors, this called an end to their use in the civilian market. However, they are still used today by Air Force Reserve Units from several States in the MAFFS2 configuration.





After several years of testing and trials during the 1970's, in late 1981 the CDF obtained 12 Bell UH-1F helicopters from the USAF. While not quite having the capabilities of the larger UH-1D/H models, the F model set the pace for what was to become the CDF Helitack program. By 1989, the F models were being readied for replacement and the larger, more powerful UH-1H was being acquired.

During this decade, we watched as many of the old familiar tankers were sold, scrapped or otherwise put out to pasture. Other airframes would continue to fight the good fight, such as the Douglas DC series, the Consolidated PB4Y-2s and the P2V Neptune and waiting on the very near horizon would be the introduction of the Lockheed P-3 Orion. Compared to the last few decades, the 1980s seemed a bit slower in terms of advancement. The industry had found it's groove and was settling into it. Things were being fine tuned continuously and safer ways to accomplish the mission were being implemented. Ours is an industry like no other and to have been a part of that is a great honor. Let us never forget those we have lost over the years, as lessons learned from their loss has made us stronger and safer.

With that, I end this historical look into our past and wish every one of you a safe flight always and good seasons ahead.



*Tom Stein - Janney*