Vol.5 No. 4
July 2010

Touch & Go

Society for Aviation History

PO Box 7081, San Carlos CA 94070 · www.sfahistory.org

2010 Special Summer Edition

President's Message:

Cha…cha…cha…CHANGES.

Welcome to our expanded Summer Newsletter for 2010. Thanks to all who contributed to the issue and to editor Rick Pisio for putting it together.

Approaching summer, the board of directors has made a couple of changes that you should be aware of.

First, the society is now accepting PayPal for lunch reservations, dues renewals, and small cash donations. If you're not familiar with the service, PayPal is a respected, safe, and secure way to send money from either your checking account or your credit card, and the recipient does not see or have access to any of your financial information (including credit card numbers). This also enables us to easily give refunds.

Using the PayPal system is easy. Go to our website's Educational Meetings page, find the next meeting write-up, select your entrée choice, add it to your shopping cart, select your guests' entrees, and then check out using PayPal.

And although we have not announced that we're now accepting PayPal, seven of our members (myself included) used the system to pay for the June luncheon. The board of directors thought it might be an added convenience, and know those who use the system will find it easy. Thanks to Roger Cain and Betty Veronico for a couple of long nights getting this set up.

Society Phone

For nearly the last decade the society has maintained a phone number where members could call about dues, meetings, and membership questions. As technology changes the world we live in, coupled with the fact that everyone on the board is working during the day, a landline has essentially become obsolete. In addition, we are paying nearly $400 per month for the privilege of having a phone that we receive maybe two incoming calls per month. That said, the board of directors has elected to discontinue phone service.

Don't panic. To the right of this column you'll see the newsletter's shaded masthead. This gives the phone number of every board member so you can call anyone you need should you have a question.

Regarding upcoming SAH Educational Programs, should you need to add a person, change a meal, request a vegetarian meal, or anything else, please call or email the program director, me, at: nickver@sbcglobal.net • cell 650/483-6902

Note that it may take 24 hours for me to get back to you depending upon my work and work travel schedule. Please be patient; your question will be addressed.

Have a bitchin' Summer!

With our successful June meeting behind us, the society takes a summer break for vacations. Our next board meeting will be in September, and our next educational program, featuring member Andy Melomet, will be in October.

— Nick Veronico

Blue Skies and Tailwinds

Earl Holmquist (SAH 20)

Donations

The society often receives donations from its members for the SAH library or for use as door/trivia prizes. Within the past few months, the following members have contributed: Joseph Noto (SAH 159), Bill Stubkjaer (SAH 27), Tom Johnson (SAH 135), Julia McClennon (SAH 196)Robert Nishimura (SAH 124)

Society for Aviation History

PO Box 7081
San Carlos CA 94070
www.sfahistory.org

Board of Directors Meetings and Society Documents

As a member you are welcome to attend the society's Board of Directors meetings - check the calendar of events for meeting dates and times. Minutes from those meetings are available upon written request to the society's post office box. By-laws are posted on the website. Hard copies are available to members in good standing upon written request. Reproduction costs will be borne by the requesting member. A binder of current society documents are brought to each general meeting for member review.

Table of Contents:

Remember to bring a friend to our meetings!

On the Cover: Bell Model 209 Firewatch helicopter in flight over the Grass Valley Air Attack Base in Nevada County California. Photographed July, 2005 by Rick Pisio

Thank you veterans!

The Real Story Behind the Spirit of St. Louis

The Society for Aviation History held its June 2010 General Meeting on Saturday June 5th at Francesco's Restaurant in Oakland. Our guest speaker for this meeting was Chris Mahoney, PhD, the grandson of Benjamin F. "Frank" Mahoney the co-founder of Ryan Airlines and the company's sole owner when it built the *Spirit of St. Louis*.

President Nick Veronico called the meeting to order and introduced the members of the Board, who were present, to the members and guests. Robert Miller, a new SAH member, was introduced and welcomed to the group. President Veronico then announced that PayPal is now available for paying dues, paying for meetings and for making donations to the Society. The PayPal link is located on the membership application page of the SAH website.

Our President had further announcements before the meeting broke for lunch. The Society phone number will be disconnected as of July 1st. If members need to contact members the Board, their numbers are listed in the newsletter. It was announced that there would be a "Mothball Fleet" tour on July 24th. The cost is $38 each and there are 32 seats available. Checks may be sent to the SAH for the tour. It also was mentioned that the SAH now has a Facebook page up and running. Additionally, the Society is in need of a video camera to record our meetings.

After lunch Bill Stubkjaer presented his usual challenging trivia contest. This one was titled "T. Claude's Other Company" which was about aircraft produced by the Ryan Aeronautical Co. The high score went to Robert Nishamura (SAH 124) and Rick Pisio (SAH 146) who both got 13 of 14 correct! Next we had the drawing for door prizes put together by Lee Scales and Ron Strong.

Before President Nick Veronico introduced our guest speaker he asked for a moment of silence in memory of long-time member Earl Holmquist (SAH 20) who passed away on May 2nd. Earl grew up in Oakland and was a neighbor of Bill Larkins who "corrupted" him into being an avid aviation photographer. He served in the USAF, was a member of the Air Force Reserve, and worked at United Airlines. Our next general meeting will be in October at a location to be announced. Andy Melomet will do a presentation on an aviation film from the 1930's.

The guest speaker was Chris Mahoney, PhD, the grandson of B. F. "Frank" Mahoney. For many years people have been told and it has been written, that T. Claude Ryan was involved in the building the *Spirit of St. Louis*. This is mainly because he started the company that built it, and that the company still carried his name. But also it is because Ryan never tried to correct this misperception and in fact worked very hard to perpetuate it.

On April 18, 1925, Benjamin Franklin Mahoney purchased a half interest in the Ryan Flying Company from its founder T. Claude Ryan for $7,500. In 1925 Ryan was giving flying lessons and taking passengers for site seeing rides in the San Diego area. In addition, the Ryan Flying Co. was converting war surplus Standard J-1 trainers into four passenger site-seeing and charter aircraft. Ryan brought in Hawley Bowlus, who he had known from the Army, from the San Fernando Valley to do these conversions.

B. F. Mahoney was already a successful businessman when still in his early twenties. Most of his fortune had been made as a bond salesman and he knew how to raise capital. Mahoney had taken flying lessons from Claude Ryan and he saw that there were more possibilities in aviation if you could just raise the capital.

After Frank Mahoney bought his half ownership of the Ryan Flying Company, he talked Ryan into starting an airline making scheduled trips between San Diego and Los Angeles. Together Ryan and Mahoney founded the Los Angeles San Diego Air Line that came into being on March 1, 1925. This was the first "year-round" scheduled passenger airline in the world. The airline lasted eighteen months and had a "perfect" safety record.

Claude Ryan and Frank Mahoney were very different. Ryan was a very conservative "penny pinching", micro-managing businessman, whereas Frank Mahoney was quite literally a gambler. By September of 1926 they were not losing money but they were not making it either. They shut the airline down that September because passenger traffic had begun to decline and concentrated on building and selling airplanes. On November 29, 1926 B. F.

Mahoney bought Ryan's share of the business for $25,000 and a completed M-2.

Mahoney kept Ryan on as general manager and was planning on keeping him in that position until the end of January 1927. Apparently they were like "oil and water" when it came to running a business and by the end of December, Frank Mahoney had had enough and had all the locks changed at the Ryan plant. Ryan then acquired the U.S. sales rights for the Siemens-Halske radial engine and had one installed in his M-2. By the end January he was running his flight school and selling engines and was completely out of Ryan Airlines.

Chris Mahoney, PhD, and grandson of B.F. Frank Mahoney tells the story of the Ryan Aircraft and the Spirit

B. F. "Frank" Mahoney was now the sole owner of Ryan Airlines. Mahoney realized that although Hawley Bowlus was a great "backyard" engineer, he needed a trained engineer and designer for his company. Donald Douglas recommended Donald Hall, who he did not think too much of, and Hall started working part-time at Ryan. By the end of January, Hall had become the full-time chief engineer and designer for Ryan Airlines.

On February 8, 1927 Charles Lindbergh's St. Louis backers sent a telegram to Ryan Airlines asking if they could build an airplane for the New York to Paris flight. C. T. Ryan would later claim that he was the one who got the telegram and after consulting with Hall sent a reply that it could be built in 90 days. Lindbergh, after being rejected by several other companies, sent another telegram asking if the aircraft could be constructed in sixty days. Reportedly Mahoney wired back that it could be built in the time frame that Lindbergh wanted. Charles Lindbergh arrived in San Diego on February 23rd and after meeting with Mahoney, Bowlus, Edwards, and especially Donald Hall, recommended to his St. Louis backers that Ryan Airlines build the *Spirit.* The people at Ryan lived up to their commitment and completed the *Sprit of St. Louis* by the end of April 1927.

Frank Mahoney continued to help and support Charles Lindbergh after his company completed and delivered the Ryan NYP, as the *Spirit* was officially known. Mahoney was with Lindbergh in New York City the evening before he left for Paris and, along with A.J. Edwards, sailed to Europe to assist Charles Lindbergh in his business dealings. When Lindbergh was set to sail back to the U.S. with the *Spirit of St. Louis* on the cruiser USS *Memphis,* he requested that Frank Mahoney accompany him.

T. Claude Ryan was not involved in any way in the building of the *Spirit of St. Louis* and this ate at him for the rest of his life. He even had a publicist who tried to perpetuate the myth that he was involved. In 1953, when Lindbergh published his Pulitzer Prize winning book *The Spirit of St. Louis,* he did not mention Ryan at all. Charles Lindbergh did however send a leather bound autographed copy to Donald Hall.

B.F. "Frank" Mahoney renamed Ryan Airlines as B. F. Mahoney Aircraft and in September of 1927 he sold the company to a group in St. Louis, which included some of the *Spirit* backers, for one million dollars. They later renamed the company Mahoney-Ryan Aircraft. This later became Detroit Aircraft, which folded after the "Great Crash." Frank Mahoney was also financially damaged in the **"**Great Crash" and passed away in 1950 in New York. Donald Hall, who Chris Mahoney feels was probably the real hero in building the *Sprit of St. Louis,* designed and built his own airplane called the Hall X-1, and later worked at Consolidated on the design of the B-24. After World War 2, Hall went to work for the Navy at North Island and retired from there in 1963. Donald Hall remained friends with Charles Lindbergh and they frequently corresponded. Hall passed away in 1968 in San Diego.

After Chris Mahoney took questions from the members and guests attending the meeting, the meeting was adjourned. See you in October! ✈

Report by Rick Turner (SAH 008)

Thank you veterans!

Lieutenant Commander Edward Henry "Butch" O'Hare

First U.S. Navy Ace, Medal of Honor Recipient

Gela DePutter (SAH 114)

Edward Henry "Butch" O'Hare was born on March 13, 1914 in St. Louis, Missouri to Edgar Joseph (E.J.) and Selma O'Hare. After Butch's parents divorced in 1927, Butch and his two sisters stayed with his mother in St. Louis, while E.J. moved to Chicago. It was there in Chicago that E.J., a lawyer, developed a working relationship with Al Capone in the dog racing business. Later, E.J. worked with the Department of Treasury, as an inside informant, to help convict Al Capone for tax evasion. In 1939, E.J. was gunned down while driving his car, presumably by Al Capone's gunman.

Butch was a good student growing up, but had an affinity for cake, sweet rolls, tarts and doughnuts. His pudginess lead to laziness, and his parents decided to take action when, at age 13, Butch asked to borrow the car to drive one block to the bakery. It was then that E.J. and Selma decided to send Butch away to military school.

From September 1927 to 1932, Butch attended the Western Military Academy in Alton, Illinois. Here he discovered his inner discipline. He continued to excel in traditional studies and participated in other formal training offered at the academy. He was particularly interested in training in marksmanship. He became extremely proficient with the pistol, rifle and shotgun. Butch also played football, where he learned to think under pressure and to seek weaknesses that could be exploited. He also began to understand the essentials of leadership, communication and teamwork. During breaks from school, E.J. arranged a few flying lessons for Butch, where he learned some of the basics of flying. These skills would soon serve Butch well during WWII.

On graduation day, members of Butch's family shared in the festivities with other cadets and their families. One young cadet who attended the event (he was a year behind O'Hare), was Paul Tibbets. Tibbets would later pilot the B-29 "Enola Gay" over Hiroshima, ushering in the dawn of the atomic age.

Lieutenant Commander Edward "Butch" O'Hare Air Group Six Commander/USS Enterprise CV-6) in the cockpit of a Grumman F6F-3 "Hellcat" in 1943.

After strong encouragement from his family, Butch applied to the Naval Academy. He did not pass the entrance test the first time (mathematics was his failing), so he headed off to attend Cochran-Bryan, the Annapolis Preparatory School in September 1932. Butch successfully passed the Naval Academy exam in February 1933. His long awaited appointment to the Naval Academy came on July 24, 1933.

Graduating the Naval Academy in June 1937, O'Hare was appointed an Ensign, serving two years on the USS New Mexico. He started flight training at NAS Pensacola in Florida in late June 1939. His training included learning the basics on N3N-1 and NS-1 biplane trainers, and later on the SNJ trainer. His advanced training included aerobatics and aerial gunnery on the F4B-4A. O'Hare also flew the Grumman F3F-1 and the Brewster F2A-1 Buffalo. In May 1940, once aviation training was finished, O'Hare was assigned to the USS Saratoga's Fighting Squadron Three (VF-3).

Executive Officer of VF-3, Lieutenant John Thach, recognizing O'Hare's exceptional flying abilities, decided to mentor the talented pilot. Thach was responsible for developing the "Beam Defense Position" which became know as the "Thach Weave" maneuver. This aerial combat tactic would prove successful against the Japanese Zero.

On a personal note, during July of 1941, while ferrying aircraft to and from the East Coast for his squadron, Butch met his future wife Rita while both were visiting a mutual friend in the hospital. Butch proposed to Rita that very day, apologizing for not being able to court her in a conventional manner. They were married at St. Mary's Catholic Church in Phoenix six weeks later.

Fighting Squadron Three (VF-3), March 5, 1942. Sitting: Morgan, Vorse, Lovelace, Thach, Gayler, O'Hare, Rowell. Standing, l to r: Mason, Clark, Sellstrom, Eder, Johnson, Lackey, Haynes, Stanley, Peterson, Dufilho, Lemmon. VF-3 poses for a picture in front of a Grumman F4F-3 Wildcat on the USS Lexington, while refueling in the New Hebrides.

USS Lexington (CV-2). After the Japanese torpedoed the USS Saratoga, Butch and his VF-3 squadron were transferred to the USS Lexington. It was from this carrier that Butch flew his F4F-3 Wildcat and single handedly shot down 5 Japanese Bombers. He received the Medal of Honor for this heroic feat.

On January 11, 1942, while patrolling southwest of Hawaii, a torpedo hit the USS Saratoga's port side, compliments of the Imperial Japanese submarine I-6. The attack flooded 3 firerooms and killed 6 sailors. The engineering team quickly corrected the list to port and the USS Saratoga then limped back to Pearl Harbor. After temporary repairs, she sailed to Bremerton, WA, for a complete refit. The VF-3 squadron then transferred to the USS Lexington on January 31, 1942.

On February 20, 1942, Lt. O'Hare and his wingman, Duff Dufilho, were the sole fighters in the air, when a second wave of Japanese bombers attacked the USS Lexington. Butch shot down 5 of them and disabled one, saving his ship. On February 23, Captain Sherman submitted a recommendation for a Navy Cross for

Thank you veterans!

LT Edward Butch O'Hare in a Grumman F4F-3 Wildcat. Note the 5 "Japanese Kill Flag Decals" which were earned on February 20, 1942 when Butch shot down 5 Japanese Bombers.

O'Hare. Ultimately, when all details had been documented, it was determined that Lt. O'Hare should receive the Navy's highest award - the Medal of Honor. Butch, a reluctant hero, did not want a medal. He felt that any other officer in the squadron could have done the same thing. On April 21, 1942, Butch and his wife met with President Roosevelt and naval officials in a brief meeting in his office. The first ceremony was to promote Butch to temporary rank of Lieutenant Commander. This was quite a surprise to Butch, since just a few months before, had received a temporary promotion to Lieutenant. The second, and most important ceremony, was to present Butch with the Medal of Honor for his "gallant and courageous action and extremely skillful marksmanship that saved his carrier from serious damage". After the presentations, President Roosevelt asked Butch what he would like to have incorporated into a new Navy fighter plane. Butch requested that he would like a plane that could climb faster. In his recent experience, the Japanese Zero Fighter had a considerable advantage over the F4F Wildcat in climbing ability. This request ultimately influenced Grumman's decision to put a 2,000-hp Pratt and Whitney R-2800-10 engine in the F6F Hellcat.

After receiving the Medal of Honor, Butch traveled to Bethpage, NY, to visit the Grumman Aircraft plant to watch production of the F4F and to talk to plant officials. He then went back to Washington to promote the sale of war bonds. On April 25, 1942, Butch returned to St. Louis to participate in a parade where, as a representative of the Navy, presented the city with the Naval "E" pennant for excellence for exceeding the city's goal for raising funds for the Navy Relief Society.

O'Hare returned to Pearl Harbor in June

LCDR Thatch (in F-1) and LT O'Hare (in F-13) F4F-1A Wildcats photographed in April of 1942. Lieutenant Commander Thatch and Lieutenant O'Hare flew two of the VF-3 F4Fs accompanied by a photography plane for motion and still publicity pictures that would become famous all over the world.

1942 and relieved Lt. Cmd. Thach of VF-3 command. Soon after, he relocated to Maui to instruct pilots in combat tactics. O'Hare would not see combat duty until later in 1943.

In August 1943, Butch informed VF-6 (squadrons were renumbered to complement their Air Group) that they were reassigned to the USS Independence, a light carrier (converted from a light cruiser).

VF-6 experienced their first combat mission on Marcus Island on August 31, 1943. For Butch's contributions, he received the Distinguished Flying Cross (and later would receive a Gold Star in lieu of a second Distinguished Flying Cross for his actions in subsequent missions near Wake Island).

On September 17, 1943, Butch received orders to take over as CO Air Group 6 (CAG-6) and was soon to embark on the USS Enterprise. No longer just a leader of fighters, he now oversaw the training and operational deployment of three diverse squadrons and one hundred pilots.

The USS Enterprise's next operation was to participate in the first American amphibious assault on the Central Pacific route that led directly to Japan. This led to the advance into the Gilbert Islands.

The Japanese began executing massed torpedo strikes at night. The only defense the USS Enterprise had was to create its own night defenders. O'Hare determined that the TBF-1C Avenger was the most suitable for night interception work because of their greater endurance and superior radar installation. A pair of F6F Hellcats would accompany each TBF to increase the firepower of the night fighters.

Butch O'Hare's final action took place on the night of November 26, 1943 while he was leading the U.S. Navy's first-ever nighttime fighter attack launched from an aircraft carrier. During this encounter with a group of Japanese torpedo bombers, O'Hare's F6F Hellcat was shot down; his aircraft was never found. There has been considerable debate as to what actually happened to Butch. It has been widely believed that Butch was shot down by friendly fire. Another explanation was that Butch took evasive action towards the friendly fire and his Hellcat's wingtip touched a wave and dipped into the ocean. The last explanation, and the one that is supported by many years later, after interviewing all witnesses and reviewing all accounts, was that a Japanese bomber shot O'Hare down. We shall never truly know what happened on that fateful rendezvous. O'Hare received the Navy Cross posthumously for this final act of heroism.

President Roosevelt (seated), Frank Knox, Secretary of the Navy (behind FDR), Admiral Ernest King, Butch O'Hare and his wife Rita. On April 21, 1942, President Roosevelt presented the Medal of Honor to Butch O'Hare for his conspicuous gallantry in aerial combat, at grave risk of his life above and beyond the call of duty, as Section Leader and Pilot of Squadron Three on February 20, 1942.

Lieutenant Commander Edward Henry "Butch" O'Hare was an unpretentious, humble man who never sought recognition for his contributions. He is considered by many to be one of the greatest heroes in naval aviation history.

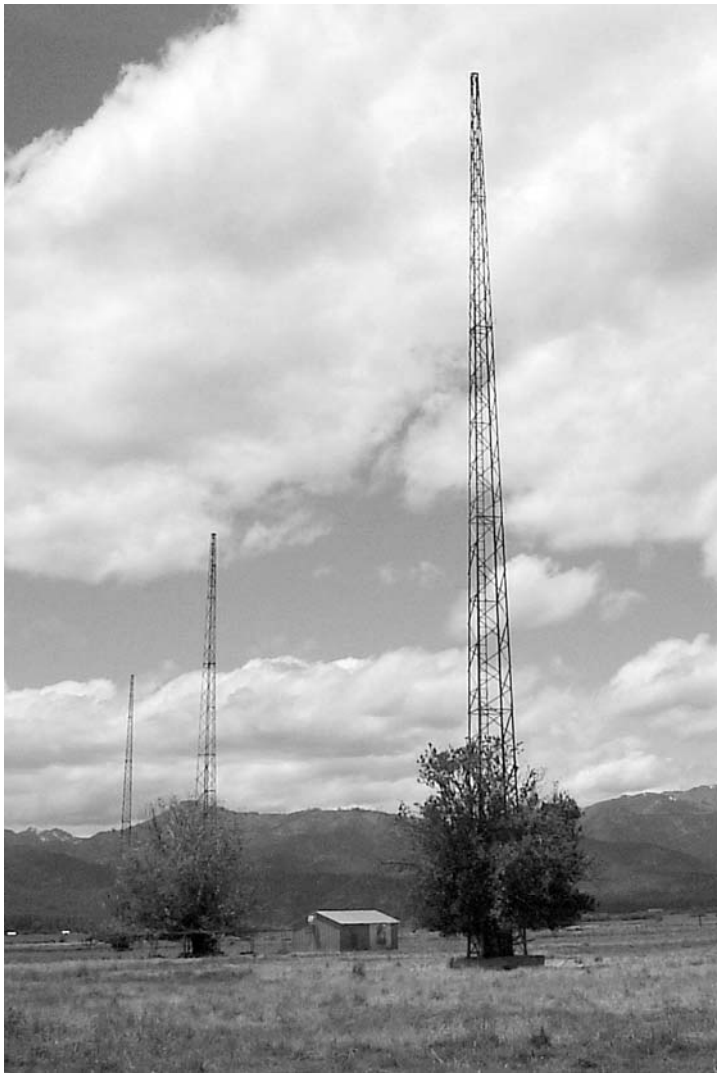
On September 19, 1949, as a tribute to Butch O'Hare, Chicago's Orchard Place Airport was renamed in his honor. The airport displays a Grumman F4F-3 Wildcat aircraft replicating the one that was flown by O'Hare. Air Classics Museum, IL, restored the aircraft in 2001 to look like the one that was flown by O'Hare. The Wildcat is exhibited in Terminal Two at the west end of the ticketing lobby to honor O'Hare International Airport's namesake. ✈

Thank you veterans!

Low-Frequency Radio Ranges

By Tom Johnson (SAH 135)

The article I wrote for the July, 2009 *Touch & Go*, "Airway Light Beacon Archaeology," explained my interest in finding the remnants of the beacons that guided pilots at night from the late 1920s into the 1950s. During that same period, pilots were guided in instrument flight, and in daytime visual flight, by the Four-Course, Low-Frequency Radio Range. The beacons and radio ranges were the navigation aids (or navaids) that were indispensable in enabling the airplane to evolve from being a marginal, fair-weather, daytime-only supplement to America's transportation system to becoming a major, all-weather transportation provider in the course of 20 years.



The central building and three towers of the Fort Jones, CA Low-Frequency Range still stand in Northern California's Siskiyou County .

The first experiments in using radio for both air navigation and two-way communication were conducted by the U.S. Air Mail Service in 1919 and 1920 but were soon discontinued. The establishment of the Aeronautics Branch in the Department of Commerce in 1926 brought renewed efforts in radio communication and navigation. The first seven two-way communication stations, developed by the National Bureau of Standards, were installed by October, 1928. That system expanded to 68 stations, spaced approximately 200 miles apart, by mid-1933.

The Low-Frequency Radio Range (LFR), also known as the Four-Course Radio Range, the A-N Radio Range, or the Adcock Radio Range, was developed in the late 1920s after some unsatisfactory experiments with navigation by both ground-based and airborne radio direction finding. One account attributes development of the LFR to radio engineers of the National Bureau of Standards, borrowing from European systems with improvements contributed by the U.S. Army Signal Corps.[1]

Another account states: "Late in the fall of 1926, the Ford Motor Company was engaged in ferrying air freight between its Chicago and Dearborn airports. The first of the famous Ford Tri-Motor planes was placed on this run early in 1927, and it was in this year that a young Ford radio engineer named Eugene S. Donovan patented the first four-course, loop-type, low-frequency radio range. Two of the radio ranges were installed by the Ford Co., one at their Chicago Lansing Airport and one at the Dearborn Ford Airport. Both proved quite successful in improving the bad weather reliability of the cargo flights. The following year, after intensive and exhaustive tests, the Federal government began installing a vast chain of LF/MF ranges crisscrossing the nation to provide radio highways of the air. For each installation patent permission was given, without royalties, by the Ford Motor Co. so that these ranges could be installed in the public welfare."[2]

Foundation slab of central building of the Oakland, California Low-Frequency Range.

Irrespective of how the LFR was developed, it was soon considered "indispensable" to the development of aviation. Some who considered Ford the developer of the radio range proclaimed it to be a more significant contribution to aviation than Ford's famous Tri-motor airplane.

The four-course radio range used two loop antenna systems to transmit two overlapping figure-eight patterns. One pattern transmitted a Morse code letter A (• –) and the other, with the pattern oriented at approximately right angles to the first, the code letter N (– •). The timing of the code transmissions was such that when the two transmissions were received with equal strength, where the two directionally transmitted patterns overlapped equally, the interlocking A and N code tones produced a steady tone. These four areas, each about three-degrees wide, defined the four courses or "beams" of the station. Transmission frequencies were in the 200 to 410 kHz range with some military LFR's operating as high as 536kHz. A complete description of the LFR and how it works, with sample audio recordings, may be found in the online *Wikipedia* article titled "Low-frequency radio range." Another article about the LFR and a new high-frequency re-creation of a LFR in Tennessee may be found in Barry Schiff's "Proficient Pilot" column on page 30 of the June, 2010 issue of *AOPA Pilot* magazine. The article is available to all at the AOPA.org website. Search for "Play it by ear" then click on "AOPA Online: Proficient Pilot."

The beams of the Low-Frequency Radio Ranges defined the airways of the 1930s to 1950s, designated Red or Green for east-west routes (airway Green 3 extended east from Oakland to Newark, NJ) and Amber or Blue for north-south airways. At their peak, in the mid to late-1940s there were more than 440 LFR sites in the 48 states, Alaska and Hawaii. By August 1960, installation of the VHF omnidirectional radio range, or VOR, had reduced the number of LFR sites to 258. Some LFRs were converted to non-directional (radio) beacons or NDB's using the one central antenna tower of the previous LFR. The last remaining LFRs were shut down in the 1970s.

Searching for vestiges or remains of the low-frequency radio ranges, I determined the first task of an "LFR archeologist" is to find where the ranges had been located. The best sources of approximate locations are aeronautical charts of the 1930s to the 1950s. Many of these charts, especially from the World War II years, are available on eBay because so many were produced for pilot training. Another good source, given to me by an instructor at Utah State University in 1961, is the August 1944 issue of the *Army Air Forces Radio Facility Charts* booklet that includes the latitudes and longitudes of all LFR stations.

From the chart's approximate positions it is often possible to determine an exact position using a National Geodetic Survey online search tool to

Thank you veterans!

Central building of the Bozeman, Montana Low-Frequency Range.

find possible survey marks. This process found precise survey marks still on record for 10 of California's 35 LFR sites. An online search of topographic maps located eight additional LFRs, six on the large-scale (1:24,000) maps. Searching the area on *Google Earth* and *Bing Maps* aerial photos has sometimes, when structures have be undisturbed, been the only means of exactly locating an LFR site. This is possible since, unlike the case with airway beacons, most LFR installations covered a 600-by-600 foot or eight-plus acre site. On the site there were typically five approximately 120-foot tall antenna towers, mounted on concrete bases, plus a central building housing the transmitter and a standby engine/generator set. One tower was at the center of the site near the building with the other four towers at the edges of the square area.

The next, and potentially most-exciting, step has been to search the aerial photos to see if any features of the LFR still remain today. In the greater Bay Area, ranges were located at near the Hamilton, Moffett, Oakland, and San Francisco airfields. At Hamilton, the range was later converted to a non-directional radio beacon and the central building and center antenna tower are still standing. Aerial photos (search lat/lon: 38 05.50, -122 30.48) also clearly show the bases of the four outlying antenna towers. The Oakland site, west of Doolittle Drive and north of the north field or original airport, has not been reused and the concrete foundation slab of the central building can be seen in aerial photos. Exploration at the site, on the ground, revealed electrical junction boxes, partially buried wiring extending to an outlying antenna tower site and broken red glass from obstruction light covers. It was impossible to determine exact locations of the San Francisco and Moffett sites and, in any event, the areas appear to have been reused or built over.

Features of seven other California LFR sites are still visible from the air! The most intact site, which is possibly the most-undisturbed in the nation is

Antenna tower base of the Wendover, Utah, Low-Frequency Range on the salt flats.

Antenna tower base and central building of the Whitehall, Montana, Low-Frequency Range. Note the line of cable support posts.

near Fort Jones, about 31 miles WNW of Mount Shasta and 31 miles south of the Oregon state line. The aerial photo shows the central building and four of the five antenna towers still standing. After driving by on a trip to Seattle, I made contact with people in the local Scott Valley Pilot's Association to arrange a visit to the LFR site. They were very hospitable and arranged with the property owners for a visit to the site in exchange for my speaking about airway beacons and low-frequency ranges at their monthly barbecue. The ranch owner related that when the CAA had leased the site in the 1930s his father had signed an agreement that the government would remove all structures when they were no longer used. When the range was shut down in 1965, however, the FAA offered a new agreement that, in exchange for a small payment, the government could simply walk away. Hence, we have a unique piece of aviation history in far Northern California!

Another case of "walking away" appears to be at the Whitmore LFR site, in a very rural area about 18 miles east of Redding, California. This range was commissioned in 1944 and, apparently due to the efforts to conserve steel during World War II, used wood utility poles for antenna towers. A number of the pole-to-pole antenna wires were still in place when I visited the site 64 years later!

Another northern-California LFR commissioned during 1944 served the Alturas Army Airfield. The Google Earth/Maps view (search lat/lon**:** 41 34**.**688**,** -120 42**.**922) clearly shows the Alturas central-building (or its slab), the five antenna-tower bases and even the supports for the cables from the central building to the towers! At Red Bluff, as at other locations, the central antenna tower is currently used by a non-directional radio beacon with the concrete bases of the four outlying antenna towers still in place in an open field. At some similar installations, such as Miles City, Montana, today's radio beacon still operates on the same frequency as the 1940's range station!

Driving to Montana in 2008 to explore airway beacons and discuss their current use in the state with Montana Aeronautics Division people in Helena, I was able to explore seven LFR sites in Montana, Idaho, and Nevada. Five sites had red brick central buildings with glass-block windows, a 1930s architectural fad. The site at Whitehall, Montana, had interesting wood-post cable supports between the central building and each of the five antenna-tower bases. At Bozeman, the red-brick central building is easily accessible on the property of today's airport.

On a 2009 trip to Utah, I explored the LFR sites at Fairfield, Plymouth, Salt Lake City, and Wendover. At Wendover, I thought I would be able to walk about 100 feet across the salt flats to the base of an antenna tower but, on the first step, I sank ankle-deep into the "slush" beneath the surface! In the summer of 2010 I hope to visit seven sites in California, Oregon, Washington, and Wyoming. ✈

Notes:

[1] Komons, Nick A. Bonfires to Beacons**:** Federal Civil Aviation Policy under the Air Commerce Act, 1926-1938. Washington, D.C.: Smithsonian Institution Press, 1989 (page 155)

[2] Pilots' Radio Handbook, C.A.A. Technical Manual No. 102. Washington, D.C. U.S. Government Printing Office, March, 1954 (page 44)

Thank you veterans!

2010 Planes of Fame Airshow

By Roger Cain (SAH 2)

If you're a fan of the ex-military aircraft known today as warbirds, the largest show on the west coast took place on the third weekend in May in southern California. The County of San Bernardino and the Planes of Fame Air Museum once again held their annual air show at the Chino Airport during the weekend of May 15-16. The theme this year was "A Salute to the Greatest Generation" in honor of the men and women that served for the United States and its Allies during World War II.

Arriving prior to the show on Friday is a good time to take a look at the Planes Of Fame (POF) Air Museum's aircraft collection, and watch the aircraft land as they arrive for the weekends show. Weather was excellent this year compared to the Lobster-cooking temperatures of past years, and Friday evening following our visit to the Chino Airport, eight Society for Aviation History members met for dinner. Joined by another dozen of our friends at Graziano's Pizza and Italian Restaurant, one person had set his watch, and at the appropriate time, we were able to sneak out of the restaurant and watch the International Space Station pass overhead.

Saturday morning, the gates were already open when we arrived around 8 am, and parking went smoothly, although we found ourselves parked at the extreme furthest point away from the shuttles. This year the hot ramp where the air show warbirds are parked was open for visitors to wander around and to look at, allowing photographers to catch their favorite aircraft, before the show started up. Static display aircraft shared the spectator area and included some very rare planes such as the POF museum's Bell P-59A Airacomet, Rudy Frasca's new-built Flug Werk (Focke-Wulf) FW 190A, and a recently restored, civilian-owned A-4 Skyhawk. Fund raising for a replica Fokker DR.1 Triplane sitting in tatters that was previously used in numerous movies such as The Blue Max and Aces High, was also on display, waiting patiently for its turn at restoration. Vendors had all kinds of aviation memorabilia and toys for sale, and there were plenty of food stands set up, so lines weren't too long.

The show opened with a panel discussion from several World War II veterans, followed by the National Anthem and a missing man formation of four P-51 Mustangs in honor of double-ace Walker "Bud" Mahurin, who had passed away just a few days earlier. North American P-51 Mustangs appeared to be the theme aircraft this year, with an amazing lineup of 18 on the ramp, parked side-by-side all the way down the display line.

The opening of the show consisted of ten P-51 Mustangs making a mass formation pass straight overhead, followed by what seemed like an endless racetrack pattern of individual Mus-

tangs around the crowds in the display area. Three of those Mustangs were of the rarer types which included the POF's P-51A *Miss Virginia*, Tom Friedkin's P-51B *Princess Elizabeth*, and his newly restored A-36 Apache.

The show continued with Margie Stivers on the wings of Hartley Folstad's Boeing Stearman in a wing walking show named the "Silver Wings." The next civilian act was flown by Rob Harrison in his yellow Zlin 50LX he calls the Tumbling Bear.

Back to the warbirds, the Navy aircraft flybys started the themes, which included an SBD Dauntless, a TBM-3E Avenger, two F6F Hellcats, an F8F Bearcat, a pair of Corsairs, and an A-1 Skyraider. These were joined by a T-28 Trojan in French Fennec markings, a British Fairy Firefly, and the museum's authentic Mitsubishi A6M-5 Zero.

Rudy Frasca's Flug Werk FW 190A remained on static display due to an over-heating problem with the R-2800 engine.

One of the most unique aircraft in the museum's collection took to the air next, the Northrop N9MB Flying Wing flown by Ron Hackworth, making some very photographic passes. Powered by two Franklin eight-cylinder, 300-horsepower engines, this was the first show the N9MB has flown in, following a major engine fire several years ago that required a lengthy restoration of the plane. Next up after the Flying Wing had landed were the faster aerobatic passes of Clay Lacy in a Learjet Model 24 that he's owned for more than 40 years, complete with a smoke system. Aircraft representing the Army Air Corps took to the air following a brief intermission that gave the air show pilots a chance to eat some lunch. These included a pair of P-40 Warhawks, several P-51 Mustangs, Jack Croul's silver P-38 Lightning, and

Taking to the air just a couple days before the show, Tom Friedkin's newly restored A-36 Apache, yet to receive a paint scheme.

Thank you veterans!

Left: *This future restoration project Fokker DR.1 Triplane flew in numerous movies such as the* Blue Max, Von Richtofen, *and* Zeppelin.

Right: *In 2009 the Horsemen flew at the show with three F8F Bearcats, this year they flew a tight formation flight with three P-51 Mustangs.*

Below: *Clay Lacy who has almost 50,000 hours of flying time in his log books takes his Learjet through a roll.*

Thank you veterans!

replica Spitfire powered by a Merlin engine. These were joined by the B-25 Mitchells *Pacific Princess* owned by Tony Ritzman and Carl Scholl of Aero Traders, and Rod Lewis' newly restored B-25 painted as a Lend-Lease Russian marked aircraft.

After the Army aircraft were recovered, a trio of three Mustangs was launched, putting on an impressive show of aerobatic formation flying as "The Horsemen". This precision flight demonstration consisted of rolls and loops, flown by Ed Shipley, Jim Beasley, and Dan Friedkin.

Unlimited Reno style air racing was represented by several aircraft that included the 2009 Gold winner Steve Hinton, Jr., flying the highly modified P-51 Mustang *Strega*, followed by the Sanders Sea Furies, *Dreadnaught* and *Argonaut*, an F8F Bearcat, and a Yak-3 that started life as a Yak-11. The passes were fast, but obviously they had to

Continued on page 47

Above: *A gathering of the Greatest Generation panel speakers, in front of Mark Peterson's P-51D named HELL-ER BUST. (Paul Schwafel photo)*

Right: *SAH members, L to R, Dan Morgan, Paul Schwafel, Mike Shreeve, Lou DePropris, Roger Cain, Ron Strong, Lee Scales, and Anthony Taylor. (Lou DePropris Photo)*

Thank you veterans!

Air to Air Through the Lens of Roger Cain (SAH 2)

Eric Presten is seen here flying his replica 1909 Bleriot XI over the marshes surrounding Schellville Airport. This plane was built with wing warping controls, and the absence of ailerons is visible here. Power comes from a Rotec R2800 radial engine, with a cruise speed of about 55 miles an hour.

Thank you veterans!

Air to Air with Roger Cain (cont)

Right: David Meeks bases his 1941 Interstate S-1-A Cadet (NC34939) at Sonoma Skypark. The S-1-A was the predecessor of the Interstate L-6 and was built exclusively for the Civilian Pilot Training Program during WWII.

Above: Jerry Anderson is now the proud owner of this 1930's Kadiak Speedster that was raced in the 1932 National Air Races in Cleveland, OH. Through the years the Kadiak has seen many modifications, and currently flies with a Lycoming O-320 engine.

Right: On its inaugural flight into the San Francisco Bay Area, Airship Ventures Zeppelin NXT airship flies over San Francisco International Airport. Based in one of the big hangars at Moffett Field, it is flown by British pilot Katherine Board. As the side of this airship makes a good billboard, you can see a variety of services advertised on it.

Above: Pacific Coast Air Museum member Bill Greene takes a ride with Greg Poe near Point Reyes, in Poe's Ethanol-powered Fagen MX-2 aerobatic airplane. This plane was in Santa Rosa for the annual Wings Over Wine Country air show that is held in August.

Thank you veterans!

Air to Air with Roger Cain (cont)

Above: Once a pole plane in Bolivia, this is Don Carter's 1938 Curtiss-Wright CW-19R wearing the markings of the Bolivian Air Force. The 19R was built as a military trainer, but Curtiss-Wright only received a few orders for them due to their high price, and of 20 built, this is only flying example left.

Right: Stu Eberhardt flies the Collings Foundations North American TP-51C Mustang just south of Stockton during the WWII Bomber Crew Fantasy Camp that is hosted annually at the Stockton Field Museum.

Above: Jim Goolsby and Fred Lewis fly the Collings Foundation's B-24J Liberator as Stu Eberhardt flies the CF's North American TP-51C Mustang during a bombing run over Oakdale CA. Note in this picture that the bomb bay doors are open, and that the belly turret is in down position. The event known as WWII Bomber Crew Fantasy Camp was put on by member Taigh Ramey (SAH 148).

Right: Paul Whitaker's 1951 Cessna L-19A was a recent complete ground up restoration. Previously a Mississippi Civil Air Patrol airplane, N300VH remained in a hangar for 27 years before Paul picked it up and fully restored it in Texas.

Thank you veterans!

Air to Air with Roger Cain (cont)

Flying over the Sonoma hills, George Perez makes a late afternoon flight with his North American P-51D Mustang. Not a regular at air shows, you can usually catch a glimpse of it at the Schellville Airport on weekends.

Thank you veterans!

Air to Air with Roger Cain (cont)

Above: A trio of Boeing PT "Stearman" Kaydets flying over Sonoma and owned by Vintage Aircraft Company. The lead plane is a Boeing PT-27 which was given to the Royal Canadian Air Force under Lend-Lease program during WWII, while the two behind it are PT-17's.

Left: Andy Smith flies Brad Buchanan's 1975 Varga 2150A Kachina over the Sonoma hills. Often mistaken as a Beech T-34 and wearing military paint schemes, the Varga is slightly smaller, and was not used by the U.S. military services.

Above: Eric and Debbie Presten fly their 1949 Piper PA-16 Clipper over the town of Quincy, on a pair of 1948 Federal Aircraft Works skis. Unlike the traditional type of snow skis that require removing the wheels and brakes, these simply clamp-on, making for a quick conversion from pavement or field to

Right: Bernie Vasquez flying his modified clipped-wing 1946 Taylorcraft BC-12D, powered by a 160 horsepower Continental O-320 engine over Woodland.

Thank you veterans!

Was the U.S. Army Air Corps Prepared for World War II?

By Norm Jukes (SAH 3)

Note: This article will only address the U.S. Army Air Corps (USAAC) airpower element of warfare due to space limitations. Land and sea warfare elements are absolutely critical to the total war preparedness and execution but their significant roles are far beyond the scope of this short article. I will just say that nearly identical plans and policies also applied to these important air power assets.

I believe today most people would say that the U.S. was poorly prepared for war that was soon to occur on two major fronts: Europe with Germany and its Axis supporting nations of Austria and Italy and against Japan in the Pacific.

I take exception to this belief. I think the United States was actually pretty well prepared to fight in both regions of the world on December 8 the day war was declared by President Roosevelt and ratified by Congress. Following is why I take this position some 69 years later.

Geographical/Political conditions existing prior to December 7, 1941.

A little geography and political situation refresher is in order at the beginning to put us back in time to the late 1930s is necessary. Both factors are extremely important in judging this subject objectively. We therefore must put ourselves back in this time period and totally erase any knowledge on events that occurred after the surprise Japanese attack on military installations on the Hawaiian Island of Oahu on December 7, 1941. We have just read our January 2, 1937 daily paper and listened to Edward R. Morrow on our radio and there was not any mention of war threats to the United States. Remember at this point December 7, 1941 has not yet occurred.

This article will therefore describe what preparations the U.S. Government, civilian and as well as the military establishments, made and carried out before the attack on December 7, 1941 and if they were adequate to meet our eventual entry into WWII. What were the critical decisions made or not made by our government and military leaders before this attack?

I have chosen 1937, almost five years before December 7, 1941 attack, as my starting point.

Geographical Factors at this time.

The U.S. had two vast oceans, one to our East (Atlantic) and one to the West (Pacific) that have historically protected us against foreign attack on the United States. The Atlantic Ocean put us about 3,000 miles away from Germany and its Axis allies on the East coast. Japan was separated by about 7,000 miles from the U.S west coast by the vast Pacific Ocean. These two large bodies of water really offered us a great deal of protection from attack by Germany and Japan even though both these countries had developed very large modern military ground, naval and air power forces in this time period. In Europe, fighting had started in September 1, 1939 with Germany's invasion of Poland with a very powerful and modern land, air and sea forces. Poland and Germany shared a common land border making this attack logistically quite easy. German victory was swift and decisive. In Washington our government was also very cognizant of Japan's aggressive military actions of invading China in July 1937 and French Indo-China and Korea soon afterwards.

Another factor is our government power base, both politically and military rests in Washington D.C., thus political and military leaders by nature were probably more orientated to the conditions in Europe. Our heritage was mostly from European origins and the only other world war (e.g., WWI) in 1916-1918 was solely on European soil. The WWI experience was also still very fresh in everyone's mind during this period. U.S. soil was never attacked in WWI. The large Atlantic Ocean made air attack on U.S. soil impossible. On the Pacific Ocean side in WWI, Japan remained peaceful and neutral.

Geographically, the U.S. was also very fortunately in the 1937 time frame that our two neighbors that we shared long land borders with, Canada to the North and Mexico to the South were our allies. Central American countries further south were our allies or neutral. The same held true much further south, with South Ameri

can countries although a couple had some minor economic and sympathetic ties to Germany, but as they were 5,000 miles away from U.S. soil this factor was insignificant.

I think based on these facts; it is realistic with the world that existed in 1937, that our civilian and military leaders felt these factors did shield the U.S from direct attack on our soil of any significance, by either Germany or Japan. Germany first would need to have taken England, Greenland, Iceland and the Azores to establish air bases closer to US soil. Germany had also set their further aggression plans to their East by invading the Union of Soviet Socialist Republics (USSR) on June 22, 1941. Germany was obviously planning to take this action for several years. Taking on the USSR was a massive undertaking. This is further evidence, I believe, that Germany did not have a real plans about attacking US soil, at least for years.

As 1937 approached, our becoming engaged in a war in Europe to support our allies was becoming a possibility based on our entering WWI in Europe during WW1 for this purpose. As 1940 approached, Washington also became very concerned about the possibility of Japan's intentions to expand their empire because of their ongoing military conquests in China, South East Asia and eastern Pacific island nations and thought they may be planning military moves towards the U.S., Pacific Territories of Guam, Hawaii and the Philippines. A Pacific region war perhaps was looming in the near future. The Roosevelt administration began militarily reenforcing the Philippines (a U.S. protectorate country at this time) and the territory of Hawaiian Islands, military forces, including air power. This also included establishing an air and sea presence on the Pacific Islands on Midway, Guam and Wake Island that were under U.S. control.

War Clouds on the Horizon in 1937?

Lets now get down to some specifics on USAAC airpower and what preparations were underway prior to the Japanese air attack on Pearl Harbor and other military installations on the island of Oahu, Hawaii on December 7, 1941 and the possibility of our entering into the war already underway in Europe.

In 1937, USAAC had about 500 aircraft, which was a very small number and also they could not be characterized as modern as measured by German and Japanese standards. The exception was the USAAC emerging Boeing B-17 long range bomber that made its first flight on July 28, 1935 which had a significant technological edge over any bombers that either Germany or Japan had on December 7, 1941. The B-17 had greater range and bomb carrying capabilities than any bomber that either Germany or Japan was flying or designing. Neither Germany nor Japan possessed any four engine long range bombers comparable to the B-17 as of December 7, 1941. Germany did possess a few four engine military aircraft but they were more for reconnaissance and maritime patrol rather than for land bombing.

General U.S. Political and Military Policies 1937 to December 1941.

President Franklin Delano Roosevelt was starting his second term as President of the United States. We were in a "Great Depression" at the time. It had been 20 years since the end of WWI and as already noted, the U.S. was fortunate to have very secure borders and two very large oceans to separate us for the military actions which might be expected to occur in this time period. The world was at peace for the most part although there was the Spanish Civil War in Europe and Japans invasion in China had just started. There were though concerns about Germany in Europe specifically and to some degree with Japan in the Pacific.

Was our civilian leadership and military establishment concerned about these aggressions? The answer, I believe was, "Yes." The Roosevelt administration was beginning to build up our airpower element in 1937. In 1936, the USAAC had only 360 planes of which only 165 were considered modern. In

Thank you veterans!

1937 it was planned to go to 980 war planes. Roosevelt said in a 1938 address to Congress said that there was a growing war menace in Europe. In 1939 he told Congress that our preparedness for possible war was "utterly inadequate. In 1940, President Roosevelt announced in a national radio address on May 16, 1940 to the Nation we needed to build 50,000 military airplanes. General Arnold was elated and said USAAC achieved its "Magna Charta."

Industrial Manufacturing Base

Wars are fought using weapons. This even includes Cave Men as they devised and made "clubs"!

In World War I, the U.S had not developed any significant war fighting planes and therefore no industrial base had been established to design and make them in quantities. We produced only training and observation war planes, except for a very few Thomas Morse armed scout planes.

In 1937, we had many very good aircraft companies designing and building war planes, civilian airliners and general aviation aircraft. We were a world leader with these products. The Douglas DC-3 airliner, for example, was in great demand and sold very well around the world. Lockheed's twin-tailed airliner series like the Lockheed 10, 12, 14 and 18 were very advanced and sold around the world. Boeing's twin engine 247 airliners the same. Boeing had also designed and produced a four engine 307 Stratoliners which

U.S. A.A.C. Aircraft in Development Prior to Dec. 7, 1941

Long Range Four Engine Heavy Bombers

Designation	MFR	Design Start	First Contract	First Flight
XB-15	Boeing	August 1934	April 1934	October 1937
B-17	Boeing	August 1934	September 1934	July 1935
XB-19	Douglas	July 1935	October 1938	June 1941
B-24	Consolidated	1938	March 1939	December 1939
B-29	Boeing	March 1938	August 1940	September 1942

Medium Twin Engine Bombers

Designation	MFR	Design Start	First Contract	First Flight
B-23	Douglas	1938	June 1938	July 1939
B-25	North American	1939	September 1939	August 1939
B-26	Martin Model	March 1939	November 1939	11/25/1940

Fighters

Designation	MFR	Design Start	First Contract	First Flight
P-38	Lockheed	March 1937	June 1937	January 1939
P-39	Bell Aircraft	1937	October 1937	April 1938
P-40	Curtiss Wright	1938	July 1937	October 1938
P-47	Republic	August 1939	November 1939	May 1941
P-51	North American	April 1940	April 1940	October 1940

Transport Aircraft

Designation	MFR	Design Start	First Contract	First Flight
C-47 (series)	Douglas	1935	1940	12/17/1935 (DC-3)

was a very modern pressurized airliner. In general, theUS manufactures were number one in the world in my opinion. American engine manufacturers like Allison, Curtiss Wright, Continental and Pratt & Whitney were world class.

What though was just becoming apparent in 1937 was that while our aircraft, engine and component manufacturers were the best in world at designing and testing new military and civilian aircraft, they were somewhat inefficient in mass production capabilities. This was particularly so for aircraft manufacturing. There was too much hand-manufacturing and hand custom fitting of parts and sub-assemblies needed during the aircraft assembly process. This slowed down the production process considerably.

There fortunately was a solution to this significant short-coming. It was the U.S. giant automotive industry. It started with Henry Ford developing mass production assembly-line techniques for the 1912-1928 Ford's Model T automobile and later the Model A in 1929. These cars were produced in mass quantities, at low costs and with high quality. All other U.S. auto manufactures quickly adopted these mass production/assembly techniques.

An aircraft is made up of thousands of components and parts as are automobiles. They all have to fit together, work together and be completely interchangeable. The same practices are also required for the total supplier chain base, from rivets, nuts, bolts, ailerons, rudders, elevators, flaps, landing gears, etc. in order to adapt to mass production process. High production rates also require even higher manufacturing standards. It is said that each B-24 bomber consisted of 1,225,000 parts and components (flight control surfaces, landing gears, propellers, pumps, actuators, valves, generators, relays, radios, wiring connectors, etc). This figure does not include rivets, nuts, bolts, and washers. They all have to fit together not only a few times but for thousands of times. Ford, using the auto mass production process, built a gigantic new manufacturing and assembly plant, complete with manufacturing equipment and tooling, in Willow Run Michigan incorporating the latest automotive production capabilities to build the Consolidated Aircraft B-24 bomber under license. It was dedicated on June 16, 1941. ***It was able to produce a complete four engine heavy B-24 bomber every 55 minutes!***

The same aircraft before Ford entered aircraft production would have taken three months or more to build. It built 8,685 B-24s at this plant alone.

I think this was a brilliant move by the Roosevelt Administration, when in May 1940, they convinced Henry Ford that the aircraft manufacturing process needed to adopt the automobile mass assembly practices as war-clouds were on the horizon in Europe and Far Pacific. Henry Ford was fundamentally against the U.S becoming involved in other nation's wars like in WWI. He was an "isolationist" but also a "patriot." In 1940 he succumbed as an act of patriotism and assigned his number mass-production genius, Charles Sorenson, to work with the Government and aircraft industry to improve their capabilities of quality mass-producing military aircraft then in design and flight testing phases. Charles Sorenson and his small team immediately visited a number of aircraft manufacturers and found serious short-comings in their production lines. He said the aircraft manufacturers were building their aircraft like Ford was building cars in 1906! The Roosevelt administration was putting immense pressure on these companies to significantly increase their production rates. In the case of Consolidated for the B-24, they initially resisted Ford's help and they only wanted Ford to produce sub-assemblies. Ford and Sorenson said: "*we'll make the complete airplane or nothing at all*". Ford won. The happiest person about this revolutionary manufacturing process was USAAC Commander Gen H. H. (Hap) Arnold.

In 1938 President Roosevelt announced that he wanted U.S. Aircraft manufactures to increase their production rate incrementally. On May 16, 1940, he publically, asked for an astonishing 50,000 war planes a year. The major military plane makers like Bell, Boeing, Consolidated, Curtiss, Douglas, Lockheed, Republic, etc. were rapidly incorporating these mass production techniques under the guidance of the auto industry and they would soon be ready to produce 50, 000 airplanes.

Sampling of other aircraft manufactures plant expansions prior to 12/7/1941:

Boeing started significantly expanding their production plants in Seattle and Wichita by January 1938. At the Seattle plant, employment count was 1,755 and by August 1940 it was up to 8,724 and expanding further. Boeing also adopted many of Ford's manufacturing processes.

Convair built very large new plant in Ft.

Worth, TX to build B-24s in 1940.

Martin: Built a new very large 1,225,326 square feet aircraft manufacturing plant in Omaha, NB in 1940 to build B-26 bombers. It had also doubled the size of their original plant in Baltimore, MD/ Middle River in 1940. Martin now had a total plant capacity of 28,600,000 square feet.

North American Aviation: 1) Significantly expanded their Englewood, CA plant. 2) Started construction on 9/28/1940 of new 1,000,000 square foot plant in Dallas, TX. 3) Started construction of a large new plant on 12/7/1940 at Kansas City, KS.

This is just a very short abbreviate story of the making of the "Arsenal of Democracy"

Foreign sales.

In the U.S. during 1930 to 1939s U.S, aircraft manufacturers with full Government support was selling war planes to overseas countries as they were not yet at war. In 1939 when war broke out in Europe, the Neutrality Law on the books then prevented sales of military equipment to warring countries. Congress and the President quickly changed the Neutrality Act in 1939 to allow sales of military equipment to overseas governments.

Military Personnel

Military personnel have to be recruited and trained to operate and maintain all these aircraft and as well as all the very important interface organizations such as supply, food service, medical, etc.

To this end, the Roosevelt administration instituted the draft of all suitable males between ages of 18-35 in 1940. This was more formally known as the Selective Service Act.

In June of 1941, Jackie Cochran convinced General Arnold women could ferry U.S built military airplanes across the Atlantic to England which was already at at war. She made her first ferry flight in June 1941. This eventually evolved into the Women's Airforce Service Pilots (WASP) organization.

Civilian Pilot Training Program (CPTP)

This program was initially set up in late 1930's to teach American youth the fundamentals of flying and was funded and promoted by the new Civil Aeronautics Authority . Congressional legislation was passed on June 27, 1939 and it was immediately signed by President Roosevelt that established a quota of 11,000 students. Thirteen colleges and universities signed up for this program. By the end 9,350 men and women were enrolled in this program. The number of colleges and universities quickly expanded to 435 nation-wide. It eventually trained more than 98,000 pilots. This program provided a core of trained pilots for eventual military service. Aviation cadets entering military were required to complete three stages ground school, primary and intermediate flying training.

Locally, the Boeing School of Aeronautics in association with United Air Lines at Oakland and Tracy airports was teaching pilots, mechanics and operation personnel for military service. (See Bill Larkin's article in *Touch & Go* Vol 4 No. 4).

A CPTP program was started at San Francisco's Mills Field (now SFO) in 1940 and our own SAH member Bill Larkin, graduated from this program.

Aircraft Mechanics and Other Special Fields

Planes require mechanics to keep them in safe flyable condition. In 1939, the USAAC was training about mechanics per 1,500 per year in military and civilian schools. By March of 1941, this was increased to over 9,000 per month.

USAAC Airfields

Beginning around 1939 the USAAC began building new airfields throughout the country. They ranged from fairly small training airfields to full Army airfields. In 1938, the USAAC had only 17 major bases. Significant expansion was then started and by the end of 1941, the number of major bases had grown to114 in the Continental US.

Conclusion

I now rest my case. I think America, from an USAAC/USAAF standpoint, was pretty well prepared aircraft wise and as well from the total overall infrastructure standpoint on December 7, 1941. Just as important, we had all the major factors in place to immediately expand them even more to support what we needed to have after December 7, 1941 to win WWII along with our allies.

A Challenge

I suspect that other SAH members may have a very different view point. If so, how about doing a counter-point article for the 2011 expanded summer newsletter edition? ✈

Madera Gathering of Warbirds

Report & Photos by Rick Pisio (SAH 134)

On May 22 and 23, Madera played host to the "First Annual Return of the Gathering of Warbirds." The 2010 show featured the United States Air Force A-10 West Demonstration Team as well as the Navy's VFA-122 Super Hornet Demonstration Team. In addition to the military presence in the skies their were warbird performances by Greg Colyer in the Lockheed T-33, John Colver in his SNJ *War Dog*, and Dan Vance in his P-51 Mustang *Speedball Alice*.

The aerobatic performances included Bill Cornick in his green Pitts biplane, Spencer Suderman in the "Meteor Pitts," a 1946 Taylorcraft flown by Frank Donnelly, Doug Jardine in the Sukhoi 25MX, Carl Liepold in the Yak 55M, and the Silver Wings Wing Walking Team of Margie Stivers and Harley Folstad.

There were a number of warbirds on the ramp and in the skies including four B-25 Mitchell bombers. The fighters were represented as well with four Mustangs, one Sea Fury, P-40 Warhawk, T-28 Trojan, and a Yak-11. ✈

Above Left: Warbirds line the Madera ramp.

Above Right: The Arizona Wing of the Commemorative Air Force's B-25 Mitchell *Made in the Shade* in flight during the warbird flybys.

Left: Korey Wells stands atop of the wing of the Sanders Aircraft Technologies Hawker Sea Fury *Argonaut* while waiting for the warbird flights.

Thank you veterans!

Aircraft of the United States Forest Service

By Bill Larkins (SAH 11) & Rick Turner (SAH 8)

The United States Department of Agriculture Forest Service use and ownership of aircraft covers a 91-year period with much of its history taking place in California and the San Francisco Bay area. The first use of Army Air Service DeHavilland DH-4s for aerial patrol led to a fleet of planes over the years to a current Cessna Citation jet.

In 1919, the District Forester in California requested help from the Army to provide air patrols to spot forest fires. This new operation was under the command of Major H. H. Arnold at Crissy Field in San Francisco. The use of 12 planes flying daily discovered 550 fires from Mt. Lassen to the Mexican border and was such a success that the request was repeated for 1920. Unfortunately, just as today, funds were not available for any area other than California. However, fires in Oregon became so disastrous that by the end of the year 1,301 aerial patrols had been flown in two states. Sixteen million square miles were patrolled by 37 aircraft to once again prove the value of aerial spotting of forest fires.

Pilots today should take notice of the "safety record" of this period when there was "only" one forced landing for every 200 flying hours over forests and mountain terrain. Add to that fact that the lack of appropriations caused a suspension of flying for three weeks in the midst of the 1921 Fire Season due to the shortage of gasoline. However, the success of the operations led to the private timber companies investigating the possibility of using aircraft for such work. This has been the contribution of the Forest Service over the years - to develop new techniques and systems to be adopted by private operators. This kind of

Aero Commander 500B (N176Z) was fitted with a mapping camera in the floor of the cabin when it was photographed at Oakland in October 1967.

One of the lesser known aircraft obtained by the Forest Service was this North American AJ-2 (Navy 130418). It was photographed here in the NAS Alameda storage area in August 1960. By 1962 it had been changed to N100Z and in 1965 sold to Leo Demers in Madras, Oregon, as airtanker N68667.

leadership in research and development was continued with the use of Smokejumpers starting in 1939, and the early postwar testing of air tankers leading to the approval for types such as the TBM (N102Z), S-2 (N118Z), P2V (N126Z), P-3 (N102Z), etc.

Duck Air Services at Oakland Airport pioneered early parachuting of supplies in conjunction with Forest Service research. As the Forest Service began to contract with private operators before the war, Duck flew missions dropping supplies with four of their planes including their Stinson A trimotor in 1939. The Forest Service took delivery of its first plane in 1939. It was a new Stinson SR-10FM Reliant (NC2166) with the USFS Insignia on the nose and it operated from Oakland Airport for Region 5. In 1946, the Region 5 office at 700 Market Street in San Francisco had a pair of two-place Piper J4A's for transportation.

Early research in the possibility of fighting fires from the air began in the 1930s, but the first real development was the receipt of ex-Navy TBM Avengers in 1956 (although Paul Mantz had already tested a tanked TBM for this purpose two years earlier.) One of the least known Forest Service experiments was with an AAF B-29 in 1947 dropping eight tanks with proximity fuses, as well as tests with P-47Ns dropping wing tanks. Today the system has advanced to Forest Service lead planes and contractor operated airtankers.

Over the years the Forest Service has received, for the most part, "hand me down" aircraft from other departments and agencies of the U.S. government. One exception is when they purchased several brand new Cessna 180s in the mid 1950s. Also, the Beechcraft Model 58 Barons that they acquired as airtanker lead and general liaison aircraft, probably were brand new.

Thank you veterans!

This 1919 photo of an Army Air Service DeHavilland DH-4B shows the first proud use of the Forest Service name on an airplane. The USFS insignia is under the rear cockpit and the large letters U. S. FOREST FIRE PATROL are on the rear of the fuselage. (USFS Photo)

The Forest Service had at least three Curtiss C-46s. This photo of N155Z, at Concord in July 1962, shows the beautiful paint job applied after they had obtained the plain metal surplus aircraft. It was C-46A AAF 41-12306.

Thank you veterans!

One of the current Forest Service types used to drop smokejumpers is the Short Brothers SD3-30 Sherpa. This photo taken at Willows, in August 2005, shows N175Z taking off to make a demonstration drop for a Forest Service anniversary celebration.

The Beech T-34Bs, obtained as surplus aircraft from the Navy, were the primary type used as Lead Planes in fire fighting. In the early years they continued their Navy all-yellow primary trainer colors, but in 1966 they began to be repainted in bright colors as shown in this photo at Medford, Oregon. N115Z has a white top and red bottom with black trim.

Carrying the USFS insignia on an aircraft did not necessarily mean that the Forest Service owned it as can be seen by this July 1947 photo of the Rocky Mountain Ranger *used in the fire fighting bomb dropping experiments at Great Falls, Montana. The Project Leader was J. S. Barrows of the Northern Rocky Mountain Region. (USFS Photo)*

In the early years following World War II the Forest Service received surplus aircraft from the Army Air Force such as the UC-64A Noorduyn Norseman. In the early 1950s they received a C-47 from their parent organization the U.S. Department of Agriculture and a Lockheed Lodestar from the Bureau of Reclamation. In 1954 the Forest Service recieved several Beechcraft Model 18 Twin Beeches from the CAA. All of these were done as inter-agency transfers.

In 1956, the Navy transferred eight TBM-3U aircraft to the Forest Service for use in airtanker, "borate bomber," development. All of these aircraft were obtained fresh from overhaul at NAS Norfolk, Virginia. Later in the 1950s, the Navy gave the Forest Service several Beechcraft T-34B Mentors, and at least one North American T-28B, to use as tanker lead aircraft. Again, these airplanes came fresh from overhaul. In 1958, the Air Force gave the Forest Service several Beechcraft C-45Hs to replace the Twin Beeches that they had earlier received from the CAA. These aircraft came from the Air Force storage facility at Davis-Monthan AFB and were typical "surplus" airplanes for the most part. In 1960, the Forest Service received three Curtiss C-46s from the Air Force,

and again these came from Davis-Monthan.

From time to time the military has loaned aircraft to the Forest Service on both a "short-term" and a "long-term" basis. In 1959 the Navy loaned them a Douglas R4D-6S (C-47D) that became N151Z. It was transferred to the Forest Service in 1966. Today the USDA still receives surplus aircraft from the military; such as the new tanker lead helicopter the Huey Cobra N109Z and the Short Brothers Sherpa N175Z.

In the 1960s the Forest Service began the use of Infrared sensing devices on aircraft to spot fires using King Airs and the Citation as an example. Today the USFS owns and operates 44 aircraft and contracts for over 800 fixed wing aircraft and helicopters. In addition to the better known use of air tankers their aircraft are used for personnel transport, research, forest rehabilitation, law enforcement support and aerial photography. ✈

All photos by Bill Larkins unless otherwise noted.

The following list is the result of extensive research to identify the types of planes that have been owned or operated by the Forest Service: Most of these planes used a registration in the 100Z-199Z Block assigned by the FAA starting in 1956.

Aero Commander 500-B
Beech Bonanza
Beech 18
Beech T-34B
Beech 50
Beech 58P
Beech 65
Beech E90
Beech 95
Beech King Air
Bell 47G
Bell 204
Bell 206
Bell 209
Bell OH-58A
Bell H-1
Cessna 180
Cessna 182
Cessna 185
Cessna 195
Cessna U206
Cessna 210
Cessna 305
Cessna L-19
Cessna 337
Cessna O-1A
Cessna 550
Cessna Citation
Cessna U-3
Curtiss C-46
DeHavilland DH-4B
DeHavilland Beaver
DeHavilland Twin Otter
Douglas DC-3
Douglas Super DC-3
Douglas C-54.
Grumman TBM
Grumman S2F
Hiller UH-12
Lockheed P2V
Lockheed P-3
Noorduyn Norseman
North American AJ
North American Navion
North American OV-10
North American T-28
Piper J-4
Piper PA-18
Piper PA-24
Piper PA-28
Piper PA-31
Piper PA-32
Rockwell Shrike
Rockwell Sabreliner
Short SD3 Sherpa
Stearman 75
Stinson Reliant
Swearingen SA-226
Williams 205

Thank you veterans!

Pima Air and Space Museum

Report and Photos by Paul Schwafel (SAH 34)

There is a saying in real estate that the three most important things are location, location, and location. This seems to be true with regard to aviation museums as well, for better or worse. The best example is perhaps the USS Midway Museum, on the bustling waterfront in the popular vacation destination of San Diego. You can't miss it. Its dominating presence invites you. Sadly, there are museums whose location works against them, and many of these museums stagnate or are forced to close due to low visibility and low visitor turnout.

Pima Air and Space Museum, in Tucson, Arizona is like the perfect storm with a positive spin. Located on 200 acres adjacent to Davis-Monthan Air Force Base and the AMARG "boneyard", weather and soil conditions are ideal for the preservation of aircraft. "New" aircraft types can easily be pulled from the boneyard to be put on display. The number of year-round local resident retirees provides an abundance of volunteers, many of whom are ex-military. Visitors flock by the thousands during the winter months, when the "snowbirds" descend on Southern Arizona with the museum welcoming 150,000 visitors annually.

From meager beginnings in 1976 with 75 badly weathered airplanes, the Arizona Aerospace Foundation has created the largest non-government funded aviation museum in the United States, second only to the vast Smithsonian Air and Space holdings. The facilities at Pima have been expanded over the years to provide environmentally secure indoor display of some of the most valued aircraft and artifacts.

In addition to the four hangars that house display aircraft, there is an authentic World War II barracks, the 390th Memorial Museum (a "museum within a museum") dedicated to the 390th Bombardment Group, and a space gallery and a restoration hangar. A 20,000 square foot expansion of hangar 1 was begun in the fall of 2009, and will become the focal point of the museum with a restaurant and fea

ture displays. The outdoor displays cover a vast area, and frequent tram tours allow everyone to be able to see the over 150 outside aircraft without raising blisters.

The list of rare aircraft at Pima is impressive. In addition to a comprehensive collection of military aircraft dating from World War II to the present, there are unique surviving examples of the Martin PBM-5 Mariner and Budd RB-1 Conestoga (partial). Aircraft on display unique to the United States include an Avro Shackleton AEW Mk.2, Fairey Gannet AEW.3, and Bristol Mk.4 Blenheim.

The current jewel of the Pima Museum is the last B-36J produced by Convair. The 230 foot wingspan ten-engine strategic bomber returned to its birthplace of Ft. Worth, Texas on February 12th, 1959. It was displayed for years at the Greater Southwest International Airport, and subsequently moved to the Southwest Aerospace Museum at Carswell AFB. After the closure of Carswell, the survival of the airplane was in doubt. In 2005, the Air Force reasserted possession of the airplane and transferred custody to the Pima museum, which had the means to transport, restore and reassemble the aircraft to its former glory. It wears the markings of its last operator, the 95th Bomb Wing at Biggs AFB, Texas.

Each visit to the Pima Air and Space Museum offers a look at what's new and improved. With the success of this museum, that trend will no doubt continue in the years ahead. ✈

Above: This Fairey Gannet was on display for many years at the New England Air Museum in Connecticut before being moved to Pima. Powered by an Armstrong Siddeley Double Mamba 102 turbo shaft engine, it served with the Royal Navy until the retirement of the British conventional aircraft carriers in 1978.

Opposite Top: One of the four intact B-36 survivors sits on display in the vast Pima display area. The others are on display at the National Museum of the United States Air Force in Dayton, Ohio, at the Strategic Air and Space Museum in Ashland, Nebraska, and the Castle Air Museum in Atwater, California.

Left: Few of the 519 McDonnell F3H (later F-3) Demons built survive today. Originally a failure, the design was modified and re-engined to produce a viable all-weather fighter for the U.S. Navy, serving until the development of the hugely successful F4H (F-4) Phantom II, also built by McDonnell.

Right: This amphibious Sikorsky JRS-1 (S-43) represents between the wars aircraft development. Twenty three of the 15-passenger 1935 design served the armed services throughout World War II. Pima's example is actually an S-43 painted as a U.S. Marine Corps JRS-1 of squadron VMJ-2, and is one of three survivors of the type.

Left: This Douglas B-18 Bolo bomber now resides in the spacious Hangar 1 South. The B-18 was based on the commercial DC-2, and was obsolete by the time the United States entered the World War II. Many were modified with submarine detection gear and served in that role until replaced by more modern equipment.

Above: The newly restored B-36J is displayed with a generous open space around it so that it may be photographed in its entirety without having to use a fish-eye type lens. In contrast to many aviation museums, Pima allows the touching of most aircraft on display.

Below: The Columbia XJL-1 was an unsuccessful attempt to develop a replacement for the Grumman J2F Duck biplane amphibian. It was, in fact, a Grumman design that was turned over to Columbia in order to allow Grumman to concentrate on its wartime production commitments.

Thank you veterans!

Right: The Grumman Guardian (AF) was a carrier based anti-submarine system, with one variant serving as the "hunter", and one serving as the "killer". Only a few survived the scrapper's torch, and several became borate bombers with Aero Union, based in Chico, CA. The Guardian on display resides next to several other fire-fighting aircraft at Pima.

Left: The Hawker Hunter Mk. 58 is the export version that was supplied to the Swiss Air Force. The Swiss used the Hunter from 1958 to 1994. The Hunter served in the air forces of 21 countries in addition to England.

Right: Suspended from the ceiling in Hangar 1 North is a McCulloch Super J-2 Gyrocopter. Slightly over 100 of these 2-place aircraft were produced during the early 1970s.

Above: The Avro Shackleton was a development of the post-war Avro Lincoln, which was evolved from the World War II Lancaster. The AEW Mk.2 version was equipped with radars taken from retired Fairy Gannet airframes. With the failure of the Hawker-Siddeley Nimrod AEW aircraft, the Shackleton soldiered on until replaced in 1991 by the Boeing E-34 Sentry AWACS.

Below: The Boeing EB-47E shows the classic lines which became the effective prototype for all modern commercial airliners. Although underpowered with its primitive General Electric J-47 engines, it was still capable of speeds exceeding 600 miles per hour.

Thank you veterans!

Society for Aviation History Mothball Fleet Tour

Saturday July 24, 2010

Martinez, CA Pier

Meet: 10:30 AM

Departs: 11:00 AM

Two hour tour

Light snack on board.

Costs: $38.00 per person. Limited to 38 passengers.

Send check and names to the SAH P.O. Box.

For questions and availability contact: Norm Jukes 650-344-8810, e-mail: NJukes@aol.com or Vallarie Kilkenny Jukes 707-746-5499

SAH Taped Meetings on DVD
** Now Available **

As an added benefit of membership, the Society for Aviation History is now offering its members the opportunity to borrow DVD copies of meetings they may have missed, or want to see again. Essentially, a disk can be borrowed at one meeting and returned at the next.

To make things as uncomplicated as possible for our out of town members, we'll send a disk that does not need to be returned for a fee of $10.

To get a list of the meetings we have on tape, or request a loan, please call Gela DePutter at 408/578-1513. Leave your name and phone number (with area code).

One Million Free Aircraft Photos

By Bill Larkins (SAH 11)

One phenomenon of the new Internet Age is the growing number of free websites. Many are run by a private individual as a contribution to aviation history, such as (vp.navy.com), while others are commercial operations such as Flickr that are supported by their advertising and print sales.. Anyone can open a free Group to post their photos for restricted audiences or for the world to see. I started one to see how it would work and have now posted 2,000 photos to various groups as well as some that I started.

Their amazing collection of groups covering aircraft and aviation offers enough photos to keep one occupied all winter. These are some examples of the larger totals of photos but there are specialized groups with a small number of images. There are a lot of excellent photos but there are also many poor ones. So you have to just dive in and test the waters. Here are some sample groups that can be accessed by going online to http://www.flickr.com/groups and entering the name in the search box.

Airbus (28,871)
Aircraft (114, 962)
Aircraft Landings (6,841)
Airplanes and Airports (148,447)
Airplanes: Classic Airliners (19,146)
Airplanes: Turboprops (Airline) (6,480)
Antique & Vintage Aircraft (17,951)
Aviation Photography Group (24,501)
B-17 Flying Fortress (4,114)
Biplanes (3,209)
Boeing (61,590)
Boeing 747 (16,385)
Cargo Aircraft (11,256)
Douglas DC-3 DC4 (2,035)
Encyclopedia of World Aircraft (3,318)
Military Aviation Photography (63,172)
Military Aeronautics (25,805)
Naval Aviation (9,964)
Pima Air & Space Museum (2,652)
Preserved Aircraft (20,563)
Seaplanes (2,854)
(SFO) San Francisco International Airport (1,519)
Southwest Airlines (10,036)
The Aviation Museum (32,224)
US Air National Guard (3,561)
USAF (5,384)

Chino from page 17

keep them within the allowances of the FAA at the show.

The Korean Air War was represented by Greg Colyer's T-33 Shooting Star (Sunday included the museum's T-33), a T-6 Texan, and an F-86 Sabre chasing around a MiG-15 painted in North Korean Air Force markings.

The Viper West Coast Demonstration Team put up an F-16CJ Fighting Falcon from the 388th Fighter Wing at Hill AFB, Utah, as a demonstration of air superiority and power. The plane was put through a number of high-G force maneuvers, and afterwards joined up with two P-38 Lightnings and a P-51D Mustang for a U.S. Air Force Heritage Flight. Brian Sanders took up his Sea Fury *Argonaut* afterwards for an aerobatic display using a unique smoke generator system on the planes wing tips to visually demonstrate the effects of wing tip vortices.

Nearing the end of the show was the always exciting mass flight of WWII aircraft put up in the air at one time. Leading the group was the B-17G Flying Fortress *Fuddy Duddy*, with planes at different altitudes making single and formation passes, which included both P-38 Lightnings, thirteen P-51 Mustangs, and a P-47 Thunderbolt. The show closed with the impressive C-17 Globemaster III flown by the March ARB demonstration team flying low and showing off the planes full potential for maneuverability.

Hanging around the airport after the air show ends allows for a closer look at the aircraft on display, and to let the general air show crowd to leave, making for light traffic on the two lane road leaving the airport. ✈

Thank you veterans!

Calendar of Local Events for 2010

July 26-Aug 1, 2010 Air Venture Oshkosh • Wittman Airport, Wisconsin. The largest of all aviation events.

Aug 7-8, Thunder Over Michigan • Willow Run Airport, MI. Heavy bombers and one of the country's premier warbird displays.

Aug 21-22, Wings Over Wine Country Airshow • Sonoma County Airport, Santa Rosa, CA.

Sept 3-5, Watsonville Fly-in and Air Show • Watsonville Airport, Watsonville, CA.

Sept. 10, SAH Board Meeting • Morgan residence, Cupertino • Membership welcome • Call Society for info.

Sept. 11-12, California Capital Airshow • Mather Airport, CA • F-22 Raptor and P-38 Lightnings.

Sept. 15-19, 47th National Championship Air Races • Stead Field, Reno, Nevada • Air Racing, Air Racing and more Air Racing.

Sept. 24-26, Clear Lake Splash In • Clear Lake, CA.

Oct. 2, SAH General Meeting • See *Touch & Go* newsletter Vol. 5, No. 5 for details. Third Annual canned food drive.

Oct 7-12, San Francisco Fleet Week • San Francisco Bay, CA. Featuring the U.S. Navy Blue Angels and Parade of Ships.

Nov. 5, SAH Board Meeting • DePutter residence, San Jose • Membership welcome • Call Society for info.

Dec. 4, SAH Holiday Meeting • See *Touch & Go* newsletter Vol. 5, No. 6 for details. Fifth Annual toy drive.

Please visit our website,for additional calendar items and Society documents, information, great photos, and more: **www.sfahistory.org**

Become a member of the

Society for Aviation History

Membership Application

SAH

Annual Dues are Twenty Five Dollars ($25.00) for January 1 through December 31. Send check or money order — payable to: *Society for Aviation History* or pay online via PayPal.

Name _____ Telephone 1-_____-_____-_____

Address _____ Apt. No. _____

City _____ State _____ Zip Code _____

E-mail Address _____

○ Renewal ○ New, Referred by _____

Aviation Interests: _____

Please mail completed application and check to: Society for Aviation History, P.O. Box 7081, San Carlos, CA 94070

○ Gift membership, certificate will be sent. From _____ Reason (i.e. Christmas, Birthday) _____

New Members Only:

First and last name you wish on your badge _____

First and last name you wish on your associate's badge _____

Thank you veterans!