

Hiller Aviation Museum

WHERE INSPIRATION TAKES FLIGHT



Vertical Challenge "Monsters of the sky"

Who ever said you had to have air planes to have an air show? That myth is annually put to rest at the "Vertical Challenge" Helicopter Air Show at the Hiller Aviation Museum at the San

Carlos Airport, CA. Thousands of visitors were on hand to see what VTOL (Vertical Take Off & Landing) aircraft have to offer and nobody left disappointed. Fifty helicopters were on dis-

play and doing things only helicopters can do, from giving rides, rescue demos, water drops, to just hovering around. There were choppers everywhere!

See **CHOPPERS**, page 5

5 Year Anniversary and Centennial of Flight Gala Celebration

Join the friends and supporters of the Hiller Aviation Institute and Museum at a black tie dinner to mark our first five years of successful operation and to celebrate the first 100 years of flight.

Tickets are \$150 per person and include an open bar reception, dinner and a talk by famed aviator Dick Rutan who will recount his exploits on the frontier of aviation. Half of the proceeds from each tax-deductible ticket will benefit the Hiller Aviation Institute and Museum's Endowment Fund. Tables of 10 are \$1,500. Corporate and individual sponsorships are still available. Please reserve by Friday, September 19th. Call soon, tickets are limited. To receive your invitation or for more information about the event, contact the Development Office at (650) 654-0200, Ext. 203.

100 days to 100 years

The first manned powered flight over the windswept sands of the Outer Banks of Kitty Hawk, North Carolina, in 1903, not only immortalized the Wright brothers but redefined the boundaries of man's scientific capability. As the Wrights' Flyer rose off the sand, then dipped and turned erratically before suddenly gathering height and distance, it was the culmination of a centuries old quest by the world's leading philosophers, scientists and engineers to turn man's dream of flight into a reality. From the mythological flight of Icarus and Daedalus, to Leonardo da Vinci's early

depictions of flying machines; from the Montgolfier brothers' balloons to Sir George Cayley's kites and fixed wing machines; man's reach for the sky has been an audacious mix of perseverance, inspiration and genius.

With the centennial of flight now upon us, the clock has officially (and literally) started on Hiller Museum's commemoration of the Wright brothers' first flight achievement: "100 Days to 100 Years".

"100 Days to 100 Years" is a series of activities and programs

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The spy plane with no pilot

Unmanned Aerial Vehicles (UAVs) have become a key instrument for



the military of many nations and, since they are unmanned, the pilots are on the ground at a remote location. In fact, the location can be very remote - up to hundreds of miles. UAVs are used for both surveillance and tactical warfare. A recent instance of the latter was in the news - a General Atomics Aeronautical Systems, Inc. Predator B was employed to track and destroy a group of terrorists in Yemen while the pilot was on the ground in Djibouti. Such missions save expensive (up to \$50 million) fighter jets by using the \$4 million Predator B and they avoid risk to pilots. Another UAV, the Northrop Grumman Global Hawk, recently flew from Edwards Air Force Base, California, to the Royal Australian Air Force Base in Edinburgh, South Australia, a distance of over 8,000 miles in 23:20 hours.

UAVs have become so popular with the military that over 50 organizations are flying, researching or developing such products - many by companies not known for designing and producing aircraft. As expected, the major aircraft companies are involved: Boeing, Lockheed and Northrop Grumman. But, consider the following company names: Aurora Flight Sciences, Chapy Corporation and Orion Aviation—all working on such products, and there are 20 to 30 more "unknowns".

In the past UAVs have been placed in five or more categories; however, a more recent movement is to define them as

Local, Regional and Endurance. The size, weight and capability within these categories vary widely from small, light weight (a few pounds) to the 100,000 pound behemoths. Not all will be successful or will be placed into service. However the military certainly has a large group to use in making its selection.

Among past efforts to develop the type, the Hiller Aviation Museum has two examples on exhibit that span the range of size and endurance. These are the spectacular Boeing Condor and the miniature MLB Trochoid. The Condor with its 200-foot wingspan and the Trochoid with a blended body about eight inches across are certainly the extremes in the range for size. And for endurance, the spread is equally dramatic. The Condor had a design goal of 150 hours and the Trochoid about 20 minutes. In weight the two are even further separated - 20,000 pounds for the Condor and only 12 ounces for the Trochoid.

The Boeing Condor is from the mid '80s, having first flown on October 9, 1988 for 1 hour and 33 minutes (the video at the Hiller Museum is of this flight). It flew seven more times including the last flight of 58:11 hours. All flights originated and ended at Moses Lake, Washington, using the 13,600 foot runway at Lawson Air Force Base. Boeing has used this facility (now Moses Lake airport) for a wide variety of test flights including the 747 airliner. Japan Air Lines used it for pilot training. The Condor project is reported to have been initiated by Boeing but was subsequently funded up to an estimated \$300 million by the Defense Advanced Research Projects Agency

(DARPA). One estimate places the aircraft cost at \$40 million.

The unique aircraft was designed for electronic surveillance at high altitudes and extended durations. However it is known that it only flew over Eastern Washington State. Considering the location of all flights, it is unlikely the electronics installed was used for anything other than evaluation. Information is not available regarding which US Government agencies participated in the testing activities other than DARPA. DARPA provided the "payload" but it was classified so it is not known what was included. Though the primary structural parts of the Condor are a carbon fiber laminate, a few sections are Kevlar to allow radio frequency signal penetration by the electronics.

Though the Condor has an ungainly appearance it did achieve some measure of success by reaching a record altitude of 67,028 feet, powered only by two 175-horsepower, six cylinder engines. The engines were boosted with two stages of exhaust-driven superchargers. To save weight, a "dolly" and two outrigger wing mounted wheels were used for takeoff but remained on the ground. For landing, there was a tandem positioned nose wheel and skid lowered from the fuselage. In order to achieve the performance specifications the aircraft had to be very, very light with very long, thin wings (even an engine starter was eliminated). To maintain structural integrity the fuel load was distributed across the length of the wings. It was subsequently determined that the wing design precluded air speed

See CONDOR, page 6

Volunteer Focus

You get a chance to meet the most interesting people here!

This is a GREAT reason to volunteer at the Hiller Museum. It's the reason

Marion McDowell gives, speaking of everybody else that is, but she, too, has an interesting story to tell.

It was a dream of Stanley Hiller, Jr. to set the museum up as an educational institute. Marion's dedication

as the Director of Education contributes to the fulfillment of this dream. She coordinates the outreach program to all schools in eight counties (San Mateo, Santa Clara, San Francisco, Santa Cruz, Marin, Contra Costa, Napa,

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MARION

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and Alameda). This is done under a program called Science Education Community Outreach Program, better known as SECOP.

This program provides funds for travel and free museum entry to classrooms and chaperones. It also allows the children to share their new knowledge by giving them free passes for their entire family to use. The program started out small. But demand increased, and more funding was required. Applied Materials provided the first grant, and suggested the family passes in order to build community. The SECOP program is kept going on grants from various charitable individuals and foundations.

In the three years since its start, SECOP has hosted over 22,000 students and chaperones. Eleven groups actually flew in from Washington State! Of course, they had to pay their own transportation!

Many local people already know Marion through her 36-year career with the Sequoia High School District. She is retired from her last position as the Deputy Superintendent of Schools. Marion was raised in Arizona, where her father worked for the railroad. In the 1940's, after graduating from University of Arizona, she embarked, alone, on a 3-



day train ride across the country to Washington, DC. She walked all over the city, applying for jobs. She got her first job working for the National Geographic Society doing editorial and indexing of magazines.

Marion completed her MBA in Public Personnel Management at George Washington University. While in DC, she met her husband, Duane. After the birth of their son, John, they moved to South Dakota. Marion and Duane have enjoyed 47 years of marriage.

Marion has volunteered more time than anybody to the museum (over 3,600 hours). She did this in just over 3 years! In addition to her dedication to the museum, Marion keeps very busy with the San Mateo County Civil Grand Jury, and as a Board

member for Casa de Redwood (low income senior housing), and the Sunny View Foundation (a senior retirement community). She and her husband also attend many lectures and seminars.

When Marion became involved with the Hiller Museum, she knew nothing about aviation. Yet she has played an invaluable role in its success, and has been a key player in allowing over 22,000 people to learn about the fascinating world of aviation.

If your school is interested in bringing its classes to the Hiller Museum, call Marion at 650-654-0200, x 216

INTERESTED IN VOLUNTEERING? Call volunteer director Mr. North West at 650-654-0200, x 219 or sign up on-line at www.hiller.org.

ACTIVIES

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mark the 100th anniversary of the Wright brothers' achievement. The centerpiece of this celebration will be the Exhibit of the Wings of History's replica 1903 Wright Flyer — an accurate reproduction of the original — October 25 through November 16, 2003.

Other planned activities and programs include:

September 1 – Reno Day
Come see the planes and meet the pilots of the 40th Reno Air Races, the fastest motor sport in the world! 10am-2pm

September 6 – Speaker Elgen Long

Mr. Long will share his experience of flying over the North and South Poles– 11am

September 16 – AOPA Town Meeting
Come listen to AOPA President Phil Boyer discuss the state of General Aviation. 7:30pm

September 20 – Young Eagles Kids ages 8-17 receive a FREE airplane ride. 11am-1pm

September 27 – Hiller Museum Gala Event Celebrating the museum's 5th anniversary and 100 years of Flight. Featuring guest speaker Dick Rutan. Call (650) 654-0200 x203 for more info

September 28 – "The Macon, the end of an era"
In conjunction with Pacific Aerial Survey, a photo exhibit featuring the USS Macon will be unveiled.

Sept.28 1911 replica Vin Fiz will fly at 10am

October 4 – "Flying Hookers for the Macon"
Book signing Thom Hook. 11am - 1pm

October 18 - Young Eagles Kids ages 8-17 receive a FREE airplane ride. 11am-1pm

October 25 – Opening of the replica 1903 "Wright Flyer" exhibit. On temporary loan through November 16 from the Wings of History Museum.

October 26 – Radio Disney's Planes and Pumpkins party
Bring the kids and celebrate Halloween. 1pm-3pm

November 6 – NASA/Ames Gala Event
NASA celebrates the Centennial.

November 11 – Veteran's day
Special appreciation for our senior members, cookies and tea. 2pm
Veterans, free admission

November 15 – Young Eagles Kids ages 8-17 receive a FREE airplane ride. 11am-1pm

December 6 – Santa Arrives by Helicopter

Join the San Carlos Chamber by welcoming Santa Claus as he arrives in a helicopter. 10am-12pm

December 13 – Plane Parade
Airplanes in Downtown San Carlos

Come see for yourself. 9:30am

December 17 – Celebration of 100 years of Flight!



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(schedule subject to change)

President's perspective

Time flies when you are having fun! That old cliché has extra meaning this year for avia-



tion in general and especially for the Hiller Aviation Museum. In the continuum of history the one hundred years that have passed since Wilbur and Orville Wright first made history at Kitty Hawk seems like a blink of the eye. Think of the major advance-

ments that have occurred in that time. The world has moved from short term powered flight of one man to regular travel by hundreds on one airliner, recreational fliers, vertical flight, space travel, and the list goes on.

And can it be five years have passed since the opening of the Hiller? While I might be fairly new here, many of you, our members, have been involved since the day we opened. No doubt you have seen many changes through the years. We invite you to see even more activities this fall. The staff has

put together a variety of exhibits, speakers and events to mark the Centennial of Flight. Since we all love a party we will celebrate over a period of time that we call 100 Days to 100 Years. Read through the Briefings, mark your calendar, and don't miss taking part in this special time in the life of the museum and aviation. Remember, time flies when you are having fun!

Alan D. Waufle
President & CEO

CHOPPERS

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The military invaded the show in force. A Marine assault AH-1W "Cobra's" and UH-1 "Huey" gun ship. The big Iron includes UH-3H "Sea King", and the HH-60 "PaveHawk". Joe Pike and Classic Rotors brought their 1949 HUP-1.

The U.S. Coast Guard returned this year with their HH-65 to perform a SAR (search and rescue) demo for the crowd. The California Department of Forestry brought their Bell Super Huey and full ensemble of equipment on display. Emergency services was represented by CHP Eurocopter AS350B3, Contra Costa Sheriffs Bell 206 and Bell 407, East Bay Parks PD AS 350 B-A, San Jose Police EC-120, Santa Clara County Sheriffs EC-120B, Oakland PD MD 500E, Stanford Life Flight BK-117, Calstar BO-105 and, Reach Air Ambulance Augusta 109. The headline act was the Show Copters, a two-ship helicopter act flown by Jim Cheatham and Chris Gularte. The ShowCopters demonstrate the versatility of a helicopter. They instruct the crowd with a helicopter lesson, then perform their spectacular 2-ship air show. A new act to Vertical Challenge this year,

from Canada, Capt. Lazer performed his high energy "Pyrotechnics" show.

There were a variety of private and commercial helicopters including KGO radio's Bell 206B Jet Ranger and KPIX Astar 350BA. Helicopter rides were the order of the day, provided by The Showcopters R-44's.

The "Vertical Challenge" helicopter air show is an important event that allows visitors to see first hand helicopter operations. The Helicopter Invasion is devoted to educating the public of how helicopters affect our daily lives from traffic and news reports, to its unique life saving ability, to National Defense. Next year will be a two day show June 26 & 27 2004. For more pictures on this year's event go to www.hiller.org



CONDOR

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in excess of about 140 knots. In fact, external weights were added to the wing tips to reduce torque and possible flutter.

The engine choice required a special propeller, which was very light Kevlar, 16 feet in diameter. Because of the lightweight propeller, low horsepower engine and two-speed gearbox, the engines had to be started using an external hydraulic unit with a shaft inserted into the prop spinner. This type of starting mechanism is called a "Hucks" starter and was from the World War I era. Once started there was sufficient

momentum to continue. However, the engine/propeller combination was sized for 60,000 foot operation; hence the drag on the blades at sea level was too much for the engine. So, the two-speed gear had to be shifted at 43,000 feet to reach maximum altitude.

Flight control was quite unique and different from many current UAVs. The total flight mission was pre-programmed in an on-board computer and was completed without any input from a ground station (the Global Hawk is also pre-programmed). Provision was made to modify the program in flight but there is no indication this was done. Two identical com-

puters were used, one for the operation and another for backup.

A number of US military groups expressed interest in the Condor but none had the financing to proceed. Several civilian applications were also suggested such as observing the ozone layer at the South Pole but, again, the financing did not materialize. So in the end, what did the US get for its investment? The answer can only be a matter of speculation but it is known that the Global Hawk uses preprogrammed computer control and many modern aircraft are constructed of laminated components. Perhaps more will be revealed in the future. Experience is a great teacher. Let's hope we learned a lot for our \$300 million!



Gift Shop Special: GeeBee Model E \$39.00

Display built by Bob Leisses.

Freeflight models range from \$1.00 to \$89.00. We demonstrate many in the Atrium of the museum. Our popular 'Flight Night' program teaches kids how to build and fly model planes."

Newsletter Contributors :

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