

# BRIEFINGS

MARCH 2017



## Hiller Aviation Museum WHERE INSPIRATION TAKES FLIGHT

### HIGHEST STEP IN THE WORLD PARACHUTING FROM EXTREME ALTITUDES

By Jon Welte

**B**etween the end of World War II and the dawn of the Space Age, aircraft performance led pilots to ever higher altitudes and faster speeds. The stresses on both pilot and aircraft were extreme, and the consequences of a pilot being forced to eject from an aircraft were dire.

place in November 1959. A series of mishaps during exit caused Kittinger's drogue chute to open early. The chute tangled around Kittinger's neck and he entered a spin of over 100 rpms. Kittinger lost consciousness in the 20 g spin, and the tangled drogue was unable to extract the main parachute as planned. Kittinger survived only through the automatic deployment of his emergency parachute. Many modifications were made, leading to an uneventful second test just one month later.

Excelsior III was the final jump in the series, and intended to reach the highest altitude. Riding the balloon to an officially recorded altitude of 102,800', Kittinger stepped out into the void—Air Force crew had placed a plaque at the foot of the balloon's egress port helpfully stating "This is the highest step in the world". Kittinger fell for over four and a half minutes, reaching a speed of Mach 0.9 – nearly the speed of sound – in his rapid descent.

The Excelsior III gondola held its billing as the world's highest step for over half a century. Earth's atmospheric pressure at 100,000' is about the same as the mean atmospheric pressure on the surface of Mars, and accidental depressurizations proved fatal for two would-be record breakers in the 1960s. This altitude—some 20 miles above sea level—is well below the internationally-recognized line at 62 miles considered to be the boundary to space, or even the 50-mile limit at which NASA and the United States Air Force issue astronaut wings to pilots and flight crew. Nonetheless, the low atmospheric pressure poses many of the same challenges faced by astronauts working in space.

In 1958 the United States Air Force launched Project Excelsior. The mission plan for Project Excelsior was outwardly quite simple: launch a helium-filled balloon to extreme altitude, and have the pilot within exit by parachute. Parachutes had been used since the 1780s, but a jump from 100,000' or more is daunting. At altitudes above 60,000', air pressure drops to a point at which water boils at human body temperature. Depressurization results in unconsciousness in seconds, and death in minutes. The pilot for Project Excelsior was Air Force Captain Joseph Kittinger. Kittinger traveled to altitude in an unpresurized balloon gondola, wearing a pressure suit and multiple layers of insulating clothing. The first jump, from 75,000', took



Joe Kittinger, Project Excelsior



**EASTER BUNNY BY HELICOPTER**

**SATURDAY APRIL 15**



**SPRING MODEL TRAIN SHOW**

**APRIL 8 – APRIL 15**



Smithsonian Institution  
Affiliations Program

# PRESIDENT'S PERSPECTIVE

It was not until 2012 that Joe Kittinger's record was finally broken. Professional skydiver Felix Baumgartner joined the Red Bull Stratos project in 2010 with the goal of breaking the altitude record. Unlike Project Excelsior, Stratos involved an ascent in a pressurized balloon gondola. This added complexity to the balloon system, but meant that the pressure suit need only provide primary life support for a span of minutes, not hours. The concept was demonstrated successfully in a pair of test jumps in early 2012. In October 2012 Baumgartner successfully jumped from an altitude of 127,800'. During nearly 4 minutes of free fall Baumgartner reached a maximum descent speed of Mach 1.25—jumping without a drogue chute to stabilize his descent allowed a faster free fall. Despite some stability problems early in the jump, Baumgartner maintained control and landed safely.

*Felix Baumgartner, Red Bull Stratos*



While the Red Bull Stratos project was under development, Alan Eustace became intrigued with the concept of exploring the stratosphere by balloon and descending via parachute. Eustace partnered with Paragon Space Development in Roswell, New Mexico, to develop a system capable of supporting a record-breaking launch and descent in a new project named StratEx. Unlike Excelsior or Stratos, StratEx did away with the balloon gondola altogether. Like Kittinger, Eustace would be protected by his pressure suit for the entire mission. Unlike either Kittinger or Baumgartner, Eustace would not need to exit a gondola. Suspended directly from the balloon, just beneath the balloon's avionics bus, Eustace would start his descent by simply firing explosive bolts to separate his pressure suit from the balloon assembly. This simplified the mission profile and removed appreciable risk: in 1962, Soviet test pilot Pyotr Dolgov was killed in a jump from over 90,000' when his helmet faceplate impacted part of the balloon gondola during exit, causing a lethal depressurization of his pressure suit. Eustace's flight began at dawn on October 24, 2014, as he was lifted in a face-down position from a launching platform. It took over two hours for Eustace and the StratEx balloon to rise to the mission's maximum altitude of over 135,000', nearly two miles higher than Baumgartner's previous record and more than six miles higher



*Alan Eustace, StratEx*

than Kittinger's mark from Project Excelsior. Following separation, Eustace returned to Earth in just 15 minutes, free falling for over 120,000'.

Despite its apparent daredevil aspects, extreme skydiving has had the practical effect of boosting access to the stratosphere for both scientific and commercial purposes. Paragon Space Development has leveraged its experience with StratEx to support World View, a program focused on providing high altitude balloon flights for both research missions and private sightseeing flights. With operational flights planned for later in 2017, World View expects to offer missions to 100,000' in gondolas containing two crew and up to six passengers. During recovery, the entire gondola will separate from its balloon, descending to land beneath an enormous para wing parachute.

The Hiller Aviation Museum welcomes Alan Eustace on Saturday, March 11th as he discusses his involvement in the StratEx project and his experience setting the world's high altitude parachute jump record. The following Saturday, March 18th, the Museum hosts its annual Leprechaun Leap event, featuring a parachute jump from a helicopter in the airspace above San Carlos. The Museum's Leaping Leprechaun will launch from an altitude of 4,000' – thirty times lower than the height of Alan Eustace's jump in 2014. Make your plans to join us and learn the full story of this remarkable achievement.

## Resources

<http://www.paragonsdc.com/stratex/#twentyeight>, downloaded 2 February 2017

<http://www.redbullstratos.com/>, downloaded 1 February 2017

<http://stratocat.com.ar/artics/excelsior-e.htm>, downloaded 1 February 2017

<http://www.worldview.space/voyage/>, downloaded 2 February 2017



*Alan Eustace, world record holder for highest parachute jump.*



**A**fter a busy holiday the museum has jumped headlong into 2017 with exciting new weekend events, workshops, Scout

programs and school experiences, many of which are described in this issue of Briefings. This year is especially busy with STEM-focused educational school field trips and we are seeing our highest attendance ever from area K-12 schools.

We've also been working steadily behind the scenes to improve gallery exhibits with the goal of making the museum experience even more intriguing, educational and fun. Our new display dedicated to "Women in Aviation" tells the stories of 29 aviatrixes who overcame adversity, accomplished much, and inspired the world in making their dreams of flight a reality.

We are pleased to add a new addition to the aircraft on display in our gallery, a full-size replica of SpaceShipOne, an aircraft which made world headlines in 2004 as the first privately funded vehicle to fly into space. We thank Chabot Space & Science Center for the loan of this impressive artifact, which will be on display until 2019.

Meanwhile, our Board of Directors continues to grow and provide diverse skill sets to help steer the course of the museum and assist with museum improvement efforts. Joining the museum's Board for 2017 is Brenna O'Boyle, a creative and energetic presence on the Peninsula with particular expertise in public relations and marketing. We welcome her enthusiastically!

Our goal is to make the Hiller Aviation Museum a place where inspiration takes flight and aviation dreams come alive. Thank you for helping make the Hiller Aviation Museum a vibrant and exciting place to visit. We look forward to seeing you soon at the Museum!

—Jeffery Bass, President & CEO



# NEW MEMBERS

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## Thank you to our Business Circle Partners!



TIER ONE



TIER TWO



TIER THREE



HILLER AVIATION MUSEUM

To join our Business Circle, contact Rebecca Duran, VP of Development:

duran@hiller.org or 650-654-0200 x203

www.hiller.org/join-and-support/business-circle

## FOOD TRUCK CRAZE CONTINUES!

AT HILLER! EVERY WEDNESDAY  
11AM TO 2PM – RAIN OR SHINE!

The parking lot of the museum turns into a food court every Wednesday. Several food trucks participate in this gourmet event. The trucks rotate weekly, so come for your favorite truck or try something new! Dine under our porte-cochere, or indoors when it's a little cold, or, grab and go!



## FLYING LEPRECHAUN

SAT, MARCH 18, 10AM-12PM  
LEAPING LEPRECHAUN AT 11AM

Come celebrate St. Patrick's Day at the Hiller Aviation Museum with face painting, bounce house, "Pot of Gold" treasure hunt and a Skydiving Leprechaun! Event included with museum admission.



## TRAINS AND PLANES DISPLAY

APRIL 8 – APRIL 15  
DAILY, 11AM-3PM

Join us for our annual Spring Model Train Show. This year there will be five separate model train layouts set up at the museum.



## HAPPY BIRDS

PARROTS,  
MACAWS AND  
COCKATOOS  
WED, APRIL 5,  
11AM

This talented team of precocious parrots gives a remarkable demonstration of feathered flight. Marvel at their antics as they fly, walk, talk and even sing through a wide range of amazing behaviors that will entertain the whole family!



## EASTER BUNNY ARRIVES BY HELICOPTER

SAT, APRIL 15, 10AM

Join the Easter Eggstravaganza on Saturday April 15 from 10AM-1PM. The Bunny arrives at 11AM. Get an Easter Egg straight from the Bunny and enjoy face painting, a bounce house and slide and an amazing model train display. All included with museum admission.



## PERFECT PAPER PLANES

FEATURING PAPER PLANE CHAMPION,  
JOHN COLLINS  
SAT, MAY 6, 11AM

Join a unique exhibition of paperlight flight! Author and master paper airplane builder John Collins leads an interactive 45-minute session investigating the science of making things fly and the notebook-scale engineering required to fold and fly record-breaking paper gliders. Come prepared to try your hand building and flying your own paper plane!



# CALENDAR

MARCH 2016

SAT, MARCH 11 • 11AM

Free Falling – World's Highest Parachute Jump

SAT, MARCH 18 • 10AM – 12PM

Leaping Leprechaun

SAT, MARCH 25 • 10:30 & 1PM

Starlab Sky Show

SUN, MARCH 26 • 10AM – 4PM

Drone Build-A-Thon

APRIL

SAT, APRIL 1 • 10AM – 12:30PM

Nano FPV Drones

APRIL 3 – APRIL 7

Aviation Camp

WED, APRIL 5 • 11 AM

Happy Birds

SAT, APRIL 8 • 10:30 & 1PM

Starlab Sky Show

SAT, APRIL 8 – SAT, APRIL 15

Spring Model Train Show

GOURMET FOOD TRUCK  
DRONE PLEX • SATURDAYS & SUNDAYS

INVENTION LAB • SATURDAYS

FLIGHT SIM ZONE • SATURDAYS

BOY AND GIRL SCOUTS

OFFERED EACH MONTH – WEEKENDS

WEEKDAY INVENTION LAB

HOURS APRIL 10-15

## OPEN COCKPIT DAY

SAT, MAY 13, 10AM – 2PM

Climb inside an L-39 fighter jet, A Grumman Albatross Seaplane, Cessna Cardinal, Boeing 737 and many more museum aircraft not usually open to the public. This is a unique opportunity to get a pilot's-eye perspective of these amazing machines.



## Volunteers Wanted

Volunteers Give the Gift of Time

Volunteer Opportunities include:

Spending time as a museum Docent

Working in the Restoration Shop

Volunteering in the Library or with office admin tasks

We are specifically in search of Docent volunteers for the Saturday or Sunday morning shift from 9:30 - 1:30

Contact Jen Roger - Volunteer Coordinator  
[jen@hiller.org](mailto:jen@hiller.org) 650-654-0200 Ext. 219





# OF EVENTS

**APRIL 10 – APRIL 14**  
Aviation Camp

**WED, APRIL 12 • 11AM**  
Water Rockets

**SAT, APRIL 15 • 10AM-1PM**  
Easter Bunny by Helicopter

**SAT, APRIL 16 • CLOSED ALL DAY**

**SUN, APRIL 23 • 8AM**  
Airport Runway Run

**SAT, APRIL 29 • 10AM – 4PM**  
Drone Build-A-Thon,

## MAY

**SAT, MAY 6 • 11AM**  
Paper Planes

**SAT, MAY 6 • 10AM – 12:30PM**  
Nano FPV Drones

**SAT MAY 13 • 10AM – 5PM**  
Scout Day

**SAT, MAY 13 • 10AM – 2PM**  
Open Cockpit Day

**MON, MAY 29 • 10:30AM & 1PM**  
Starlab Sky Show

**KS • WEDNESDAYS, 11AM-2PM,**  
**SUNDAYS, 10:30AM-12PM & 1PM-3PM**  
**DAYS & SUNDAYS, 10:30AM-4PM**  
**RDAYS & SUNDAYS, 11AM-2PM,**  
**SCOUT PROGRAMS**  
[WWW.HILLER.ORG/SCOUT-PROGRAM](http://WWW.HILLER.ORG/SCOUT-PROGRAM)  
**LAB & FLIGHT SIMULATION**  
**0-14 AND MAY 29**

## WATER ROCKET RALLY

**WEDNESDAY APRIL 12, 11AM**

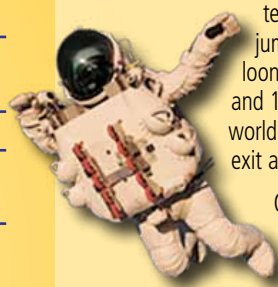
Discover the technology that has opened our solar system! Learn about the science of rocketry and space exploration, then staff and volunteers guide children to recycle an ordinary bottle into a high flying water rocket! Bring a clean, recycled soda bottle from home or purchase one at the museum Gift Shop for \$1 on the day of the event.



## FREE FALLING – WORLD’S HIGHEST PARACHUTE JUMP

**SATURDAY, MARCH 11, 11AM**  
**PRESENTATION BY ALAN EUSTACE**

In 2011, Alan Eustace decided to pursue a stratosphere parachute jump. Over the next three years, the test program included 5 airplane jumps from 18,000 feet, and 3 balloon jumps, from 57,000, 105,000 and 135,890 feet, setting 3 skydiving world records, including the highest exit altitude.



On October 24, 2014, Eustace made a jump from the stratosphere, breaking Felix Baumgartner’s 2012 world record. The launch-point for his jump was from an abandoned runway in Roswell, New Mexico, where he began his gas balloon-powered ascent early that morning. The balloon used for the feat was manufactured by the Balloon Facility of the Tata Institute of Fundamental Research, Hyderabad, India. Eustace in his pressure suit hung tethered under the balloon, without the kind of capsule used by Felix Baumgartner.

His descent to Earth lasted 15 minutes and stretched nearly 26 miles with peak speeds exceeding 821.45 miles per hour, setting new world records for the highest free-fall jump, and total free-fall distance 123,334 feet.



Alan’s talk summarizes solutions to critical issues like redundancy, emergency aborts, CO2, fogging, spins, drogue deployment, and balloon launches, along with photos and videos of the key milestones. Event included with Museum admission.

## Biggest Little AIR SHOW

**Saturday**  
**June 3**  
**10am-1pm**

Remote Control  
Air Show Featuring:  
Gas & Electric  
Powered Airplanes  
Helicopters  
Jets  
Drones

And one FULL Scale  
aerobatic performance  
by John Collver in his  
WWII SNJ





# WALK! JOG! STROLL!

**SUNDAY, APRIL 23**

5K/10K Benefiting Hiller Aviation Museum

Registration opens February 1 at [www.hiller.org/run](http://www.hiller.org/run)

Course includes San Carlos Airport runway and continues to Bay Trail.



Sponsorship Opportunities Available

MAJOR SPONSORS



HILLSDALE  
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# EDUCATION PROGRAMS SPRING 2017

## AVIATION CAMP

**SPECIAL SPRING SESSIONS: GRADES K-6**  
**EXTREME FLIGHT: APRIL 3-7 & APRIL 10-14**

Launch an adventure to the far edge of flight in a special Spring Break Aviation Camp! Investigate the largest and smallest airplanes, supersonic flight and vertical aviation. Fly a drone, experiment with electricity and more with flight simulations, model aircraft construction and hands-on experiments in flight.



## DRONE DAY WORKSHOPS

**HIRO 180/450 BUILD-AND-FLY (10AM – 4PM) AGES 18+**  
**SUNDAY MARCH 26, SATURDAY APRIL 29**

**NANO FPV (10AM – 12:30PM) AGES 10+**  
**SATURDAYS APRIL 1 & MAY 6**

Join the drone revolution! Drone Day Workshops provide high-quality hardware and flight training to all participants in the Museum's unique Drone Plex. Two different programs are available.



Build and Fly features a choice of two competition-level drones. The Hiro 180 provides "first person view" flight experience suitable for racing, while the larger Hiro 450 can be used for many applications. Participants build, fly and learn to safely operate the drone of their choice.



Nano FPV is appropriate for younger pilots and adults alike. Small, ready to fly drones with integrated cameras are used to provide an exceptional introduction to drone flight.

All participants leave with a working drone, radio, battery and charger, screen/goggles (FPV only) and all other equipment needed to fly safely. FAA registration is included with Hiro aircraft (it is not required for nanos).



## STARLAB SKY SHOW

**10:30AM & 1 PM**  
**MARCH 25, APRIL 8, MAY 29**

Enter the mysterious Starlab Planetarium and take a spectacular trip through the glittering stars, planets and constellations of spring. Identify star patterns visible from your own backyard this season during a special 30-minute presentation.

Space for each presentation is limited. Tickets are required and may be purchased at the Gift Shop on the day of the program. Visit [www.hiller.org](http://www.hiller.org) for more information.



## INVENTION AND EXPLORATION DROP-IN WEEKEND/HOLIDAY ACTIVITIES

The Hiller Aviation Museum offers special interactive activities for families on weekends and select holidays. Invention and Exploration destinations include:

- Imagination Playground, open 10AM – 5PM
- Flight Sim Zone, open 11AM – 2PM (additional fee required)
- FMX flight simulation, open 11AM – 2PM (additional fee required)
- Invention Lab, open 10:30AM – 4PM
- Drone Plex, open 10:30AM – 12PM and 1PM – 3PM

Visit [www.hiller.org](http://www.hiller.org) for a complete list of dates and topics.



## AVIATION CAMP SUMMER 2017

Registration is now open for this summer's Aviation Camp program! See the enclosed flyer or visit [www.hiller.org](http://www.hiller.org) for more information. Online registration now available. Make your plans now to join us this summer for an amazing experience in flight!



# HILLER AVIATION MUSEUM

601 Skyway Road, San Carlos, California 94070 [www.hiller.org](http://www.hiller.org)

Non-Profit  
Organization  
US POSTAGE PAID  
San Carlos, CA  
PERMIT No. 96

## Join Now!

### Senior (age 65+) \$50

Unlimited admission for you + 2 guest passes.

### Individual \$65

Unlimited admission for you + 2 guest passes.

### Family \$90

Unlimited admission for 2 named adults and up to 4 children (17 & under) + discounts on Aviation Camp.

### Pioneer \$125

Family Membership benefits + an additional card for a named member (ideal for caregivers) and 2 guest passes.

### Pilot \$275

Family Membership benefits with a total of 3 guest passes + 8 FMX Flight Simulator passes and 50% off additional FMX tickets.

### Barnstormer \$550 • Adventurer \$1,000

Pilot Membership benefits with a total of 4 guest passes + 10% off Museum Rental and Birthday Parties.

### Explorer \$2,500 • Navigator \$5,000

Pilot Membership benefits with a total of 8 guest passes + 15% off Museum Rental and Birthday Parties.

### Aviator \$10,000

Pilot Membership benefits with a total of 12 guest passes + 25% off Museum Rental and Birthday Parties and a Hiller Aviation Museum jacket.

## Annual Membership Application

Or join online at [www.hiller.org/member](http://www.hiller.org/member)

### I want to be a member of Hiller Aviation Museum in the following category:

- |  |   |
|--|---|
| <input type="checkbox"/> Senior (65+) \$50 | <input type="checkbox"/> Barnstormer \$550  |
| <input type="checkbox"/> Individual \$65   | <input type="checkbox"/> Adventurer \$1,000 |
| <input type="checkbox"/> Family \$90       | <input type="checkbox"/> Explorer \$2,500   |
| <input type="checkbox"/> Pioneer \$125     | <input type="checkbox"/> Navigator \$5,000  |
| <input type="checkbox"/> Pilot \$275       | <input type="checkbox"/> Aviator \$10,000   |

New Member     Annual Renewal

Primary Adult Member: \_\_\_\_\_

Second Adult Member: \_\_\_\_\_  
*(Family Memberships and up)*

Third Adult Member: \_\_\_\_\_  
*(Pioneer Memberships only)*

Address: \_\_\_\_\_ City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ Daytime Phone: \_\_\_\_\_

Email: \_\_\_\_\_

This is a gift membership from: \_\_\_\_\_

Payment Amount: \_\_\_\_\_  VISA     MC     AMEX

Card #: \_\_\_\_\_ Exp. Date: \_\_\_\_\_

CSC: \_\_\_\_\_ Print Name on Card: \_\_\_\_\_

Signature \_\_\_\_\_

## SUPPORT THE MUSEUM!

DONATE YOUR CAR,  
TRUCK, RV, OR BOAT, ↑↑



CALL TOLL FREE  
1-888-500-1555

Or call Development Office at

650-654-0200 x203

Tax Deductible Gift

## AN AVIATOR'S PARADISE! VISIT OUR GIFT SHOP

Shop on line: [www.hiller.org](http://www.hiller.org)  
Gift Certificates available!

Thank you for your support.

Please make checks payable to  
Hiller Aviation Museum  
601 Skyway Rd, San Carlos, CA 94070

