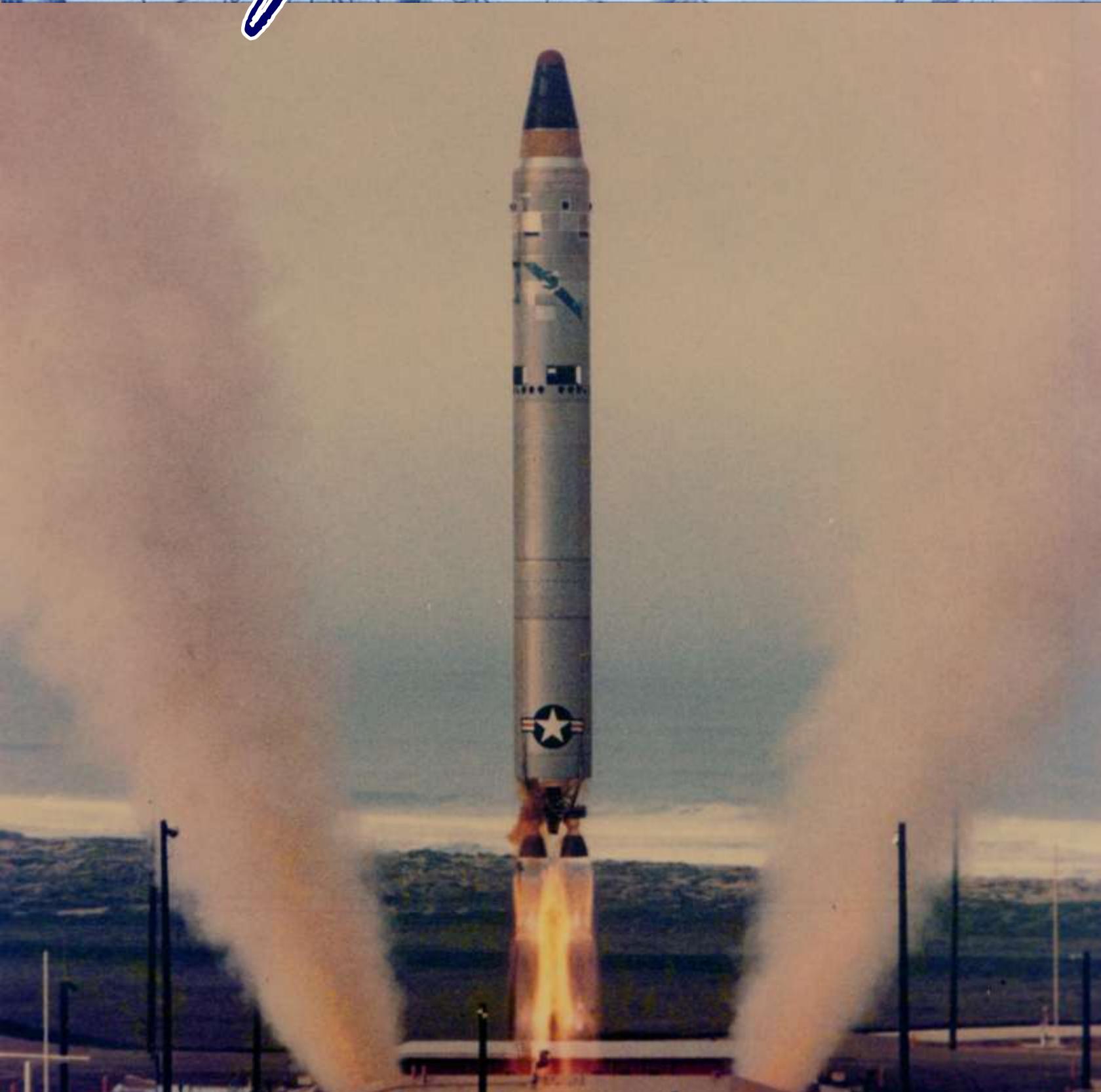


# Skypwriting

Pima Air & Space Museum and Titan Missile Museum



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*Site Manager, Titan Missile Museum*

## FROM THE CHAIRMAN'S DESK

by Count Ferdinand von Galen



I am very pleased to report that we finished FY 2012 with a positive cash flow from operations for the fifth consecutive year. I continue to believe that this is an outstanding achievement given the current state of our economy. Total visitor numbers increased by 4 percent over last year. The Titan Missile Museum's attendance climbed back over 51,000 and the Pima Air &

Space Museum set a new annual attendance record of more than 161,000 visitors. Admissions, the Museum Stores, Tours and Membership all saw improved revenue over FY 2011.

Also in FY 2012 the 390<sup>th</sup> Memorial Museum, located on the grounds of the Pima Air & Space Museum, broke ground on a capital improvement project that includes the addition of a mezzanine level and new entrance to their building, as well as the installation of new exhibits. This project should be completed in the fall of 2013. While technically not part of the Pima Air & Space Museum, the 390<sup>th</sup> Memorial Museum is an important asset to our organization and a valued partner. Many of our visitors tour the 390<sup>th</sup> to see its marvelously restored B-17, and I am sure that once the improvements are complete even more of our visitors will enjoy this memorable museum.

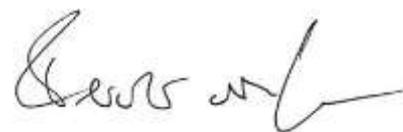
I want to thank all of the members who attended the Annual Meeting of the Membership on Mar. 26, 2013. As our membership grows it is very gratifying to see more and more members attending this important meeting. Staff, volunteers and Trustees work very hard on behalf of the Foundation throughout the year and we enjoy talking directly with members who share our enthusiasm.

We recently completed the installation of perimeter fencing along the eastern and southeastern boundaries of the Pima Air & Space Museum, a project that the Board has wanted to complete for a number of years. The entire grounds of the museum are now protected

by a 7-foot chain-link fence topped by barbed wire on the north boundary and razor wire on the east, south and west boundaries. The added fencing provides an additional layer of security for our important aircraft.

Throughout 2013 we will be working closely with Pima County to prepare for the Bond Election in November 2014. If we are successful, Pima County voters will be voting on two projects that will benefit the Pima Air & Space Museum—funds to build a 120,000 square foot Cold War Hangar and funds to build a new Space Gallery here devoted to showcasing the University of Arizona's impressive achievements in space. That our museum may be considered for two separate projects on the same bond election is a testament to the strong relationship the Foundation has forged with Pima County.

As you will read elsewhere in *Skywriting*, the Board of Trustees recently surprised me by naming Hangar 1 in my honor. It is my pleasure and one of the great passions of my life to be fortunate enough to lead the Foundation, and I want to thank the Board of Trustees for honoring me in this fashion. I look forward to continuing to work with the Trustees, staff, volunteers, donors and our members as we continue to improve and promote our world class museums.



**Cover Photograph:** *Test Launch of a Titan II Intercontinental Ballistic Missile from Vandenberg Air Force Base. Fifty years after the Titan II's deployment as a deterrent against nuclear war, it's continuing to execute its mission through education.*

**On the back cover:** *On Jan. 28, 2013, Pima Air & Space Museum Collections Registrar John Bezosky captured this 355th Fighter Wing A-10 from the back door of the museum's offices. It was a day of on-again and off-again rain and the A-10s just happened to be landing on the museum's side of the runway while the rainbow was out. The "Smithsonian Air & Space Magazine" recently used the image as part of their photo contest. To purchase a copy of the image please contact the Museum Store at 520 574-0462.*

## FROM THE VICE CHAIRMAN

by Boyd P. Drachman, Vice Chairman



November of 2012 marked Count von Galen's 15<sup>th</sup> anniversary as a member of the Board of Trustees and his 10<sup>th</sup> anniversary as the Chairman of the Board. Last summer the Board took advantage of one of his rare absences to reflect on how far we've come under his leadership and to determine how we could honor him for his vision and philanthropy on behalf of the Foundation. Count von Galen is our longest-serving Chairman, our second-largest donor and our most successful fundraiser. Under his leadership our relationship with our landlord, Pima County, is the best it's ever been and we've completed close to \$10,000,000 in capital improvements. As soon as he became Chairman of the Board he reignited the capital campaign for a new visitors' center at the Titan Missile Museum, making not only the tough decisions on scaling the project to our budget, but making the lead gift for the project as well. Just eighteen months after he took office we held the ribbon-cutting ceremony for the Count Ferdinand von Galen Titan Missile Museum Education and Research Center—and that was just the beginning.

The project at Titan was followed by projects at the

Pima Air & Space Museum. The first capital project at PASM was the Spirit of Freedom Hangar, home to our most popular aircraft, the SR-71 Blackbird, as well as one of our rarest aircraft, the PBM Mariner. After that came the Flight Central Hangar—southern Arizona's largest event venue—and the Flight Grill Restaurant. As I write this, we are just a month away from completing construction of the new wash pad and water treatment system for the Restoration Hangar. Ten years and \$10,000,000 in capital improvements and there are more on the horizon thanks to Count von Galen's leadership.

For these reasons and many more, the Board of Trustees voted unanimously to name Hangar 1 at PASM in Count von Galen's honor, which we did in early March at a surprise party hosted for the occasion by Countess Anita von Galen. (Thank you, Countess von Galen. It was a beautiful and memorable party.) I know I speak for all of the Trustees when I say it is an honor to work with Count von Galen and we are grateful for his tireless efforts on behalf of the Foundation. It was our pleasure and our privilege to name Hangar 1 the Count von Galen Hangar.

## SURPRISE PARTY FOR COUNT VON GALEN



**Above Left:** Arizona Aerospace Foundation Vice Chairman Boyd Drachman and Chairman Count von Galen.

**Above Right:** Jim Click, Ferdinand Otto von Galen, Susan Hutchinson, Senator Jim DeMint and Charles Simonyi.



**Left:** Ann and Ray Carroll, Chuck Huckelberry and Donald Diamond.

**Below:** Entertainment for the evening was presented by the Harry James Orchestra, conducted by Fred Radke.





## EXECUTIVE DIRECTOR'S NOTES

by Yvonne C. Morris

I first want to echo the Vice-Chairman's remarks about how fortunate we at the Foundation are to have a dynamic leader like Count von Galen. Ten years ago when he took over as Chairman of the Board, our museums were struggling to rebound from the negative effects on tourism and travel created by the terrorist attacks on September 11, 2001. Our relationships with Pima County and the Bureau of Land Management were strained, and as an organization we were not living up to our potential. As a member of the Board of Trustees at that time, I remember thinking that Count von Galen had his work cut out for him.

As Boyd Drachman said, one of the first things Count von Galen did was to reignite the Titan Missile Museum capital campaign. In one of the worst fundraising climates in the last fifty years, he raised more money in 18 months than the Foundation had been able to raise in five years. After that, he reignited the Foundation itself—running the Foundation (with two other Trustees) for a year while the Board searched for a new Executive Director. Pledging his personal honor, he forged new and stronger bonds with the County and the BLM. With his drive and commitment he propelled the Foundation forward into a new era of expansion, fiscal responsibility, and extraordinary achievement. Today, more than 10 years and \$10 million in capital improvements later, I believe our museums are finally beginning to realize their potential. It's been an honor for me to work with Count von Galen these past few years and to be his partner in transforming our museums. I am delighted that the Board of Trustees decided to name Hangar 1 in his honor.

Over the summer, staff at the Pima Air & Space Museum will be working on developing a new and improved website for the museum. Some of the improvements that will be folded into the new website include better functionality, expanded views of some of our most popular aircraft, and the ability to purchase and renew memberships online. Other e-commerce functions, including a web store and the ability to make donations online, are also in the works. We expect the new website to go live sometime in the fall.

At the Titan Missile Museum, preparations are under way to commemorate the 50<sup>th</sup> Anniversary of Missile Site 571-7 becoming operational—along with the other 53 Titan II missile sites around the United States. Preservation of the Cold War's physical legacy is caught up in an area of contention where public memory, emotions, agenda and scholarly arguments collide. Many Americans under 40 recall very little about the Cold War and attribute even less importance to it. But more than a third of our visitors not only remember the Cold War, they have firsthand experience with it. Balancing our interpretation of the missile site to accommodate these two extreme perceptions is an ongoing challenge. We must always be flexible enough in our approach to adapt to the evolving knowledge and viewpoints of future generations.

Many of our visitors over the years have been openly skeptical when they learned that the mission of the Titan II was "Peace through Deterrence," that its very existence was designed to discourage the former Soviet Union from thinking that it could survive a nuclear war with the United States. These same visitors are equally wary when docents tell them that the Titan II would have failed its mission if even one missile had ever been launched in anger. This skepticism often abates once the Titan II story is placed in context. As the steward of this nationally significant site, the museum's mission is to honor its status as a National Historic Landmark by doing just that—placing the Titan II in its proper historical context in the Nuclear Age, the Cold War, and the Space Age.

The first part of our mission is rooted in the past, but the second part of our mission looks to the future. The United States remains the only country to have used an atomic weapon and many people still struggle with this part of our nation's history. In that respect there is no other venue in our country that is better equipped to carry out the museum's second mission of inspiring public dialogue on the ramifications of that decision, the Cold War, nuclear weapons proliferation and disarmament, and the future of nuclear weapons.

The museum will commemorate the 50<sup>th</sup> anniversary on Jul. 13 during its regularly scheduled Moonlight MADness event and again on Jul. 15, the actual 50<sup>th</sup> anniversary. During Moonlight MADness the Southern Arizona Rocketry Association will launch several rockets, weather permitting, and also have a static display. Between their rocket launches, the museum's MAD Scientists will be launching seltzer rockets with the kids. Titan II historian and author Chuck Penson will be on hand for a book signing. Visitors will be allowed to visit the missile crew quarters where a number of former Titan II crew and maintenance personnel will be available to chat and answer questions. Door prizes will be awarded throughout the evening and visitors will also be able to purchase raffle tickets for a catered dinner for 4 with Chuck and me in the crew quarters. We are also hopeful that Brig. Gen. Kevin Jacobsen, the longest-serving missile-launch officer in the Air Force, will be able to attend. General Jacobsen and I served together in the 390<sup>th</sup> Strategic Missile Wing from 1980 to 1984, and he recently took time out from a trip to Davis-Monthan AFB to visit the museum with members of his staff. These are just a few of the activities scheduled for the site's 50<sup>th</sup> anniversary. Visit Titan's website and Facebook page for more details on this momentous occasion.



***Yvonne Morris and Brig. Gen. Kevin Jacobsen during one of his recent visits at Titan.***

More than 1 million visitors have toured the Titan Missile Museum since it opened in 1986, and all of them drove over the same road to the missile site that was built in 1961 and used by the missile crews and maintenance technicians to access the site. Fifty-two years is a long time for a road to go without repairs and in the last several years the access road had really started to deteriorate. In November and December of 2012, thanks to a partnership with Pima County and

American Legion Post 69, as well as a matching grant from FreePort McMoRan Copper and Gold, we were able to resurface the access road to the museum as well as its parking lot. As you can see from the before and after photographs below, this was a much needed improvement. The Foundation is grateful to our partners and to FreePort McMoRan Copper and Gold for making this capital improvement possible.



***Prior to resurfacing.***



***After the resurfacing.***

We continue to create new opportunities for our members and visitors to touch 100 years of aviation history and there are new and exciting programs and exhibits at both museums. Information about them can be found in this newsletter, on our websites and on our Facebook pages. As always, thank you for your continued support. I hope you will stop by one of our great museums in the near future.

*Yvonne C. M.*

## DETERRENCE AND THE ULTIMATE WEAPON: Titan II 50 YEARS Later

by Chuck Penson, *Titan Missile Museum Archivist*

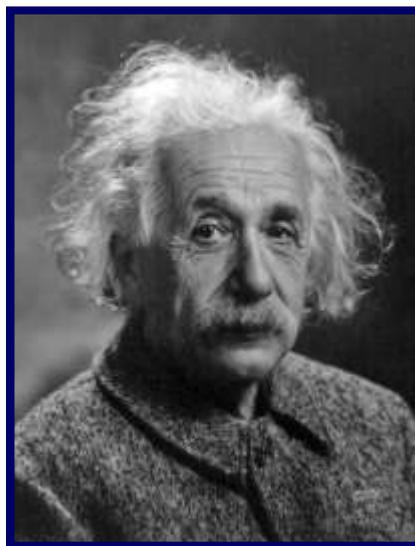
This year marks the 50<sup>th</sup> anniversary of the “first alert” of Titan II—the first day a Titan II missile crew stood ready to launch their terrifying missile. So it seems like a good time to take a brief look back and ask how Titan II—the largest and most powerful nuclear weapon system ever deployed by the United States—came to be.

Singer and songwriter Carol King once wrote, “My life is like a tapestry of rich and royal hue, an everlasting vision of an ever changing view.” History is like that also, a richly woven tapestry sewn from the countless billion threads of people, places, things, events and ideas. The way the threads run parallel or perpendicular to each other—and occasionally loop around each other—creates an ever-changing tapestry of all that has passed. Very often it is possible to look closely and follow just a few threads from where they start to get a sense for how some individual event came to pass.

The U.S. nuclear-missile program, including Titan II, was a product of many historical threads, but a rough picture of the whole can be stitched together from as few as three. These threads do not run in neat lines, but twist, turn and tangle in many places through the fabric of time.

### Physics

The first thread is that of physics, beginning in 1896 with Henri Becquerel's observation of mysterious radiations from a piece of uranium. Becquerel's chance discovery quickly led to the discovery of the electron, proton and neutron, and more generally, to the unraveling of the inner workings of the atom. Previously thought of as being like billiard balls, atoms were now correctly seen as a constellation of even smaller particles, each with their own distinct characteristics. Soon it was determined that these particles were glued together with some kind of energy. Further, it was found that if one smashed a bundle of these particles with sufficient force, not only would they break up into smaller clumps, but also some of the energy that held them together would escape. Along the way, Albert Einstein put an exclamation point on this phenomenon with his famous equation— $E=mc^2$ —which says, in essence, that a very small amount of matter contains a very large amount of energy.



*Albert Einstein*

Physicists are a clever lot and it didn't take long to put two and two together and figure out that if you split atoms rapidly and in large enough quantities, the energy released from the process could make a considerable bang. By the start of World War II in 1939 just about everyone in the physics community understood that it was at least theoretically possible to build a bomb—a bomb of unprecedented power—by splitting atoms, a process called fission.

In the world of science and technology it is axiomatic that if it is *possible* to do something, eventually someone will actually do it. And so it was with the atomic bomb. In the early morning hours of July 16, 1945, after two years of secret work by dozens of the brightest minds in the world, the world's first atomic bomb was exploded in a remote corner of New Mexico.



*“Trinity,” code name for the first detonation of a nuclear device.*

## Engineering

The second historical thread we see is engineering.

Rockets have been around for a very long time. The Chinese were building small rockets both as weapons and as fireworks as early as the 13<sup>th</sup> century. In the history of the development of modern rockets, two names stand apart from all others: Robert Goddard and Wernher von Braun. Neither of these men started out trying to build rockets for use as weapons. Both were interested in space travel.

Robert Goddard, an American, is credited with launching the first successful liquid-fueled rocket in 1926. By 1940 he had developed a number of important concepts and systems still in use today, gyroscopic stabilization among them. Although Goddard invented and patented many important technologies, he was never able to integrate all his advancements into a single, fully successful design. His best rocket, fired in 1937, reached



**Robert Goddard**

an altitude of only 9000 feet (2.7 km). Still, in the history of rockets, progress was often measured one painful step at a time.

In Germany, during the 1930s, Wernher von Braun was one of a group of amateur enthusiasts working on rockets mostly for fun. He too was interested in space travel. But it wasn't long before his extraordinary talents drew the attention of the military and he soon found himself working on rockets for use as weapons. With the power and financial might of the German armed forces von Braun made rapid progress, and in the final



**Wernher von Braun**

months of World War II thousands of von Braun's V-2 rockets reigned terror on England and Europe. The V-2 was the world's first fully developed and successful long-range missile.

In the United States prior to World War II there wasn't much interest in rockets—at least within the military. But after the war, having seen the V-2 in action, the military put rockets at the top of their wish list. The appeal of rockets is very simple. Because of their tremendous speed rockets are essentially unstoppable. Unlike “lumbering” bomber aircraft that could be shot out of the sky with comparative ease, there is no defense against an attack with missiles.

Here is where the thread of physics gets twisted with the thread of engineering: attach a super bomb to an unstoppable rocket and you have the ultimate weapon.

## Politics

The final thread is that of politics. Americans had always been deeply suspicious of communism, but after World War II their fears were heightened by the thought of the Soviet Union taking over all of Europe and the idea that the Soviets were bent on world domination.



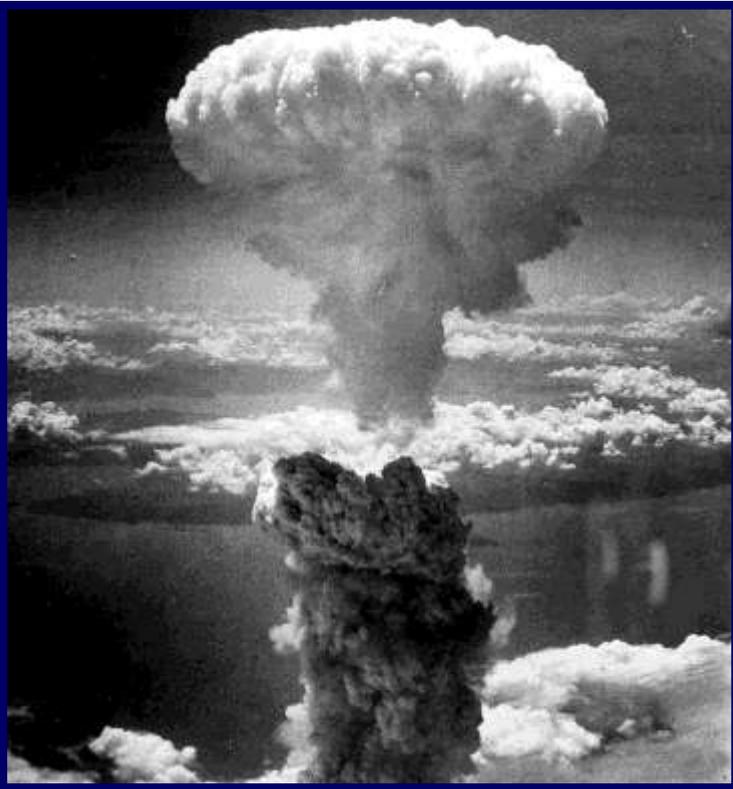
**Sputnik**

In 1949 the Soviets exploded their own atomic bomb and this is where the thread of politics gets tangled with those of physics and engineering. In 1956, the Soviet leader Nikita Khrushchev made his infamous “we will bury you” remark, and the following year Americans awoke to the news of Sputnik — the world's first satellite.

From that moment the arms race was on. Politics drove physics, physics drove engineering, and engineering drove politics. This cycle, driven by the fear of communism, could spin in either of two directions—toward a few missiles with larger bombs or toward a lot of missiles with smaller bombs. In the case of the United States it spun both ways.

## DETERRENCE AND THE ULTIMATE WEAPON: Continued

In 1958 the Air Force proposed a force of 10,000 Minuteman missiles, each with a yield of one megaton. The Kennedy Administration bargained down to 1,000 missiles, but also conceded to the addition of a smaller fleet of larger Titan II missiles, each with a yield of nine megatons. For perspective, nine megatons is about 650 times the yield of the Little Boy atomic bomb dropped on Hiroshima, and sufficiently powerful to lay waste to an area of about 900 square miles (2,300 sq. km).



**Cloud over Hiroshima**

With each side's nuclear arsenal growing ever larger and more powerful, it slowly became clear that actually winning a nuclear war would be essentially impossible. If both sides had weapons for which there was no defense, how could one win a war? We shoot at them. They shoot at us. Everybody dies. There must be a better strategy for nuclear war. Bernard Brodie, a military strategist at the RAND corporation (an Air Force think tank), summed it up nicely. He said, "Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them." He was framing a strategy that became known as deterrence.

Brodie is widely regarded as the father of deterrence, a strategy based on the fear of mutual annihilation, coupled with the knowledge that there is no defense against a nuclear-tipped guided missile, and predicated on the idea that each side could destroy the other, but only at the cost of being destroyed themselves. Dr. Strangelove said it best in Stanley Kubrick's 1964 classic film *Dr. Strangelove: Or, How I Learned to Stop Worrying and Love the Bomb*. Strangelove said that "Deterrence is the art of producing in the mind of the enemy the fear to attack."

Deterrence. This was the "winning" strategy and the mission of Titan II—not to start a war, but to prevent one from starting. Titan II made it clear to the Soviets that 35 feet underground in a fortified concrete and steel bunker, we could ride out a first strike and live to retaliate. And that if we were forced to do so, the consequences for the Soviets would be so unspeakably horrible that maybe they would prefer not to pick a fight with us in the first place.

It seems to have worked.

For 24 years, from 1963 to 1987, Titan II served admirably the purpose for which it was built—deterrence. Since its retirement in 1987, Titan II has had a new mission—that of preventing the threads of history from unraveling so that future generations can learn from the past. This is especially important because the past is not static. We see the past in the context of the present. And because the present is always changing, so also is our view of the past. As King wrote, "...an everlasting vision of an ever changing view."

History matters. As the philosopher George Santayanna once remarked, "Those who do not understand the past are condemned to repeat it."

## SLFSC!

by Chuck Penson, *Titan Missile Museum Archivist*

Each Titan II launch complex was equipped with a variety of antennas designed to provide constant communication with higher headquarters. In the past, visitors to the museum could see all of these antennas—except one: the Survivable Low Frequency Communication System Antenna, or SLFCS (usually pronounced as “slifix”). The reason visitors could not see the SLFCS antenna is that it is buried. The reason for burying the antenna is that putting it underground makes it all but indestructible—it can survive anything but a direct hit. It becomes the antenna of last resort. If everything else topside had been destroyed the SLFCS system would still work. Thanks to blueprints discovered in the archive a few years ago we know the exact location of the SLFCS antenna here at 571-7, as well as its location at all the other sites in Tucson.

A number of years ago we made friends with Drew who had purchased one of the other launch sites in Tucson. He invited us to document the process of excavating his complex. In the course of that work we had occasion to look at a number of blueprints for his site, and mentioned to him the existence of the underground antenna, noting that it probably had not been dug up when the site was demolished, and that most likely the antenna was still there. Drew was intrigued and said that someday he might dig it up and donate it to the museum.

That someday turned out to be December of last year.

We got a call from Drew last November telling us that he was going to dig up the SLFCS antenna, and did we still want it? When we said yes Drew fired up his trusty backhoe and started digging. It didn't take long to find this buried treasure. The top of the antenna was just four feet below the surface. Of course the antenna is six feet in diameter so a lot more digging was required. But in just a few hours Drew had fully excavated the antenna and hoisted it to the surface.



*The SLFCS antenna sees the light of day after 50 years underground.*

We had always imagined the SLFCS antenna was made of something like fiberglass or rigid plastic of some kind, but it turns out to be made of some sort of very flexible rubber-like material and is springy to the point of being able to bounce a little.



*The antenna arrives on Drew's trailer.*

Drew rolled the antenna onto a trailer and hauled it to the museum. He then generously donated his time and energy to mounting the antenna topside where visitors can, at long last, see what it looks like. He poured a concrete foundation and custom welded steel mounting brackets.

The SLFCS antenna is actually two separate antennas, each with its own connecting cable. There is a north-south hoop and an east-west hoop. Switches in the control center allowed the crew to select whichever hoop provided the best reception—this was a receive-only radio. Inside the two hoops are coils of copper wire that are the actual antennas.

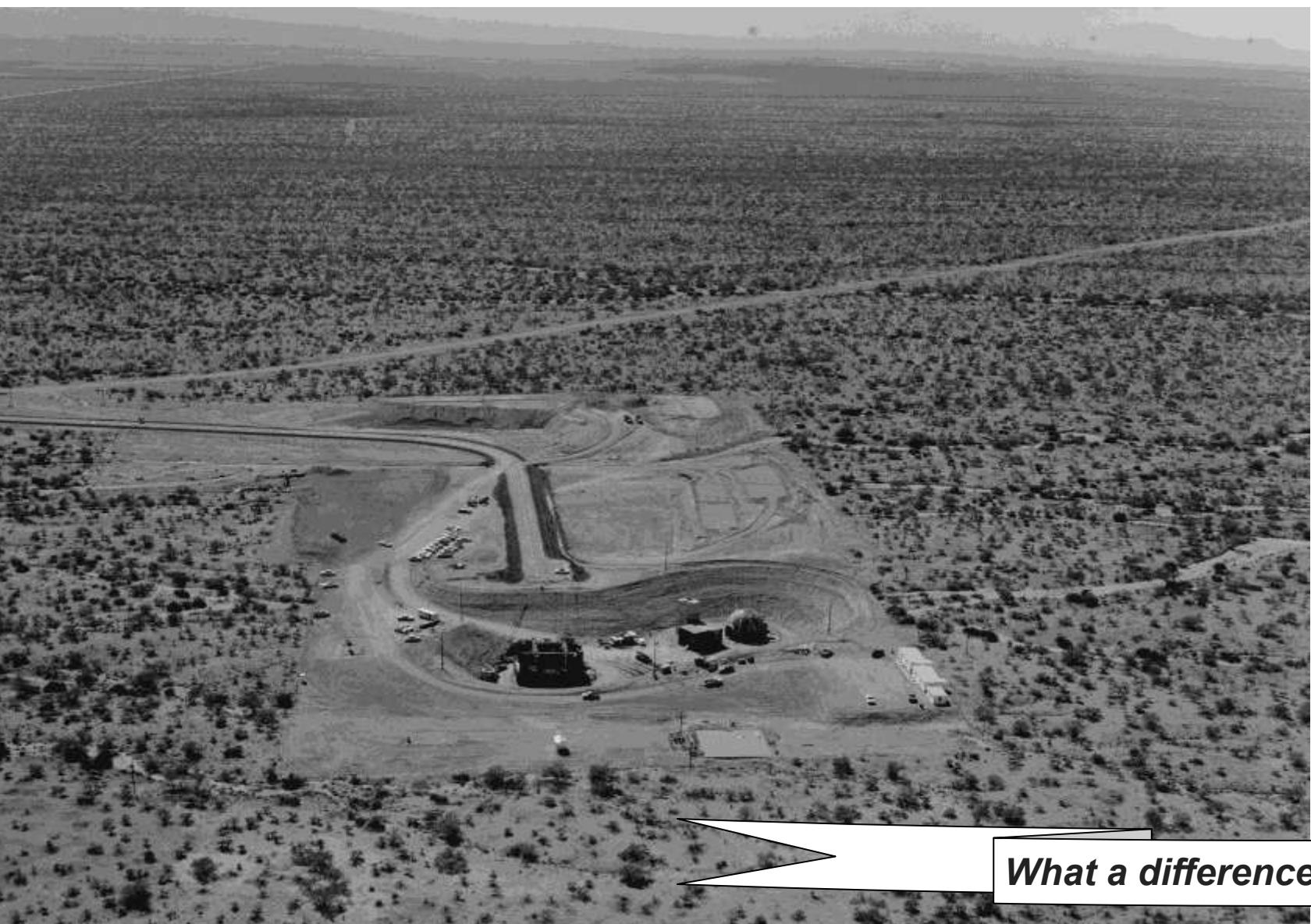
The SLFCS system received digital signals that printed out messages on a narrow strip of paper, like a cash register receipt. Because of its low operating frequency—between 14 and 60 kilohertz—the system is very slow and messages could take 20 minutes or more to complete. At frequencies this low the earth is transparent and radio signals can pass through the earth as if it wasn't even there. Just the ticket for post-attack communications.



*The SLFCS antenna is actually two antennas. The hoops are about six feet across.*

We have installed the new antenna directly over the spot where our antenna remains buried. We hope you'll visit soon and see this new display. We are truly grateful to Drew for his generosity and the hard work required to make this happen. Thanks!

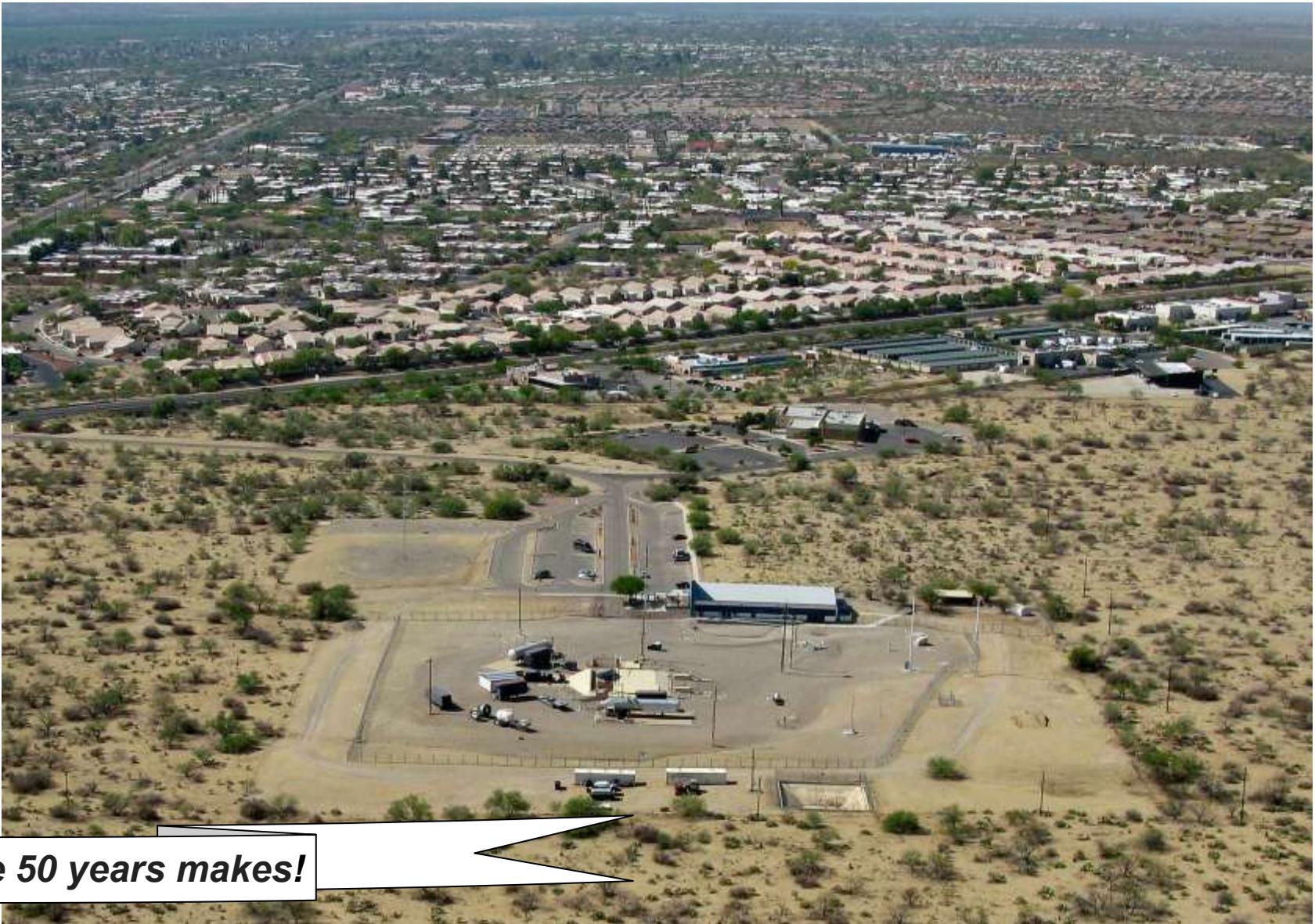
# THEN...



**What a difference**

*Missile site 571-7 under construction in 1962. The silo structure is seen at left side of excavation, with the blast lock and control center to the right. The cableway tunnel has not yet be installed.*

# NOW



**50 years makes!**

*Missile site 571-7 as it appears today. By 1980, civilization had encroached significantly on the complex, causing much concern among Air Force officials.*

*Current photography by Chuck Penson and pilot Bert Zaccaria.*

## TITAN MISSILE MUSEUM - Special Tours & Programs

### Moonlight MADness

This event takes place during the second Saturday of each month June - September, from 5-9pm with the final tour beginning at 8pm. Due to space limitations, reservations are required. Don't miss this special event, which features many special kids' activities, reduced admission prices (just \$7 for each adult, and kids 12 and under are free), and a chance to see the missile lit up after dark. Dates for 2013 are: Jun. 8, Jul. 13, Aug. 10, and Sep. 14. Admission is free for members. For reservations or more information call 520 625-7736 or e-mail [info@titanmissilemuseum.org](mailto:info@titanmissilemuseum.org).



### Top-to-Bottom Tours

This tour is nearly five hours long and takes you through all eight levels of the underground silo. The tour is limited to six people so reservations are required. For more information or to make reservations call 520 625-7736 or email [info@titanmissilemuseum.org](mailto:info@titanmissilemuseum.org).

### Beyond The Blastdoor Tours

Get a deeper understanding of the Titan II by going to areas of the missile site normally closed to the public. This tour is offered the first and third Saturday of every month at 9:30am and is free to members. Reservations are required. For more information or to make reservations call 520 625-7736 or email [info@titanmissilemuseum.org](mailto:info@titanmissilemuseum.org). This tour is not handicapped accessible.



### Titan Missile Museum MAD Scientists

We are proud to have our very own team of MAD Scientists here at the Titan Missile Museum. Stop by our classroom on Tuesday mornings until 11am to see what interesting experiments and activities are taking place. You never know what important discoveries may take place in our laboratory. Our MAD Scientists are also available for school tours and at Moonlight MADness.





# CALENDAR OF EVENTS

## MAY 2013

**May 7**  
2:00pm  
Crew Tour

**May 8**  
8:00am  
Titan Top-to-Bottom Tour

**May 10**  
8:00am  
Titan Top-to-Bottom Tour

**May 14**  
2:00pm  
Director's Tour

**May 15**  
8:00am  
Titan Top-to-Bottom Tour

**May 17**  
8:00am  
Titan Top-to-Bottom Tour

**May 18**  
9:30am  
Beyond the Blastdoor Tour

**May 21**  
2:00pm  
Crew Tour

**May 28**  
2:00pm  
Crew Tour

## JUNE 2013

**June 1**  
9:30am  
Beyond the Blastdoor Tour

**June 4**  
2:00pm  
Crew Tour

**June 8**  
5-9pm  
Moonlight MADness

**June 11**  
2:00pm  
Director's Tour

**June 12**  
8:00am  
Titan Top-to-Bottom Tour

## JUNE 2013 Cont.

**June 14**  
8:00am  
Titan Top-to-Bottom Tour

**June 15**  
9:30am  
Beyond the Blastdoor Tour

**June 18**  
2:00pm  
Crew Tour

**June 19**  
8:00am  
Titan Top-to-Bottom Tour

**June 21**  
8:00am  
Titan Top-to-Bottom Tour

**June 25**  
2:00pm  
Crew Tour

## JULY 2013

**July 2**  
2:00pm  
Crew Tour

**July 6**  
9:30am  
Beyond the Blastdoor Tour

**July 9**  
2:00pm  
Director's Tour

**July 13**  
5-9pm  
Moonlight MADness

**July 16**  
2:00pm  
Crew Tour

**July 20**  
9:30am  
Beyond the Blastdoor Tour

**July 23**  
2:00pm  
Crew Tour

**July 30**  
2:00pm  
Crew Tour

## AUGUST 2013

**August 3**  
9:30am  
Beyond the Blastdoor Tour

**August 6**  
2:00pm  
Crew Tour

**August 10**  
5-9pm  
Moonlight MADness

**August 13**  
2:00pm  
Director's Tour

**August 17**  
9:30am  
Beyond the Blastdoor Tour

**August 20**  
2:00pm  
Crew Tour

**August 27**  
2:00pm  
Crew Tour

## SEPTEMBER 2013

**September 3**  
2:00pm  
Crew Tour

**September 7**  
9:30am  
Beyond the Blastdoor Tour

**September 10**  
2:00pm  
Director's Tour

**September 11**  
8:00am  
Titan Top-to-Bottom Tour

**September 14**  
5-9pm  
Moonlight MADness

**September 17**  
2:00pm  
Crew Tour

## SEPTEMBER 2013 Cont.

**September 18**  
8:00am  
Titan Top-to-Bottom Tour

**September 20**  
8:00am  
Titan Top-to-Bottom Tour

**September 21**  
9:30am  
Beyond the Blastdoor Tour

**September 24**  
2:00pm  
Crew Tour

**September 25**  
8:00am  
Titan Top-to-Bottom Tour

Reservations required for all listed tours. Call 520 625-7736 or email: [info@titanmissilemuseum.org](mailto:info@titanmissilemuseum.org) All tours FREE to members except the Top-to-Bottom Tour.

**Daily Tours:**  
Docent-led Walking Tours offered daily starting at 9:00am

**Museum Hours:**  
8:45am - 5:00pm daily (last tour at 4:00pm)  
Open every day except Thanksgiving and Christmas.

## EXPERIENCE OF A LIFETIME



*Executive Director Yvonne Morris takes a father & son team through the launch sequence during their overnight stay at the Titan Missile Museum.*

What was it like for Titan II crew members to sleep underground only a few feet away from the largest missile ever made by the United States?

Now you can find out firsthand when you and three of your closest friends or family spend the night in the crew quarters at the Titan Missile Museum. This rare and unique experience is offered just a few times a year and can be custom tailored to your interests. Join the elite few who have slept in Titan's lair.

For more information, contact Steve Caputo, Site Manager of the Titan Missile Museum, at [scaputo@titanmissilemuseum.org](mailto:scaputo@titanmissilemuseum.org) or 520 625-7736.

# BRING YOUR FUTURE ASTRONAUT TO Moonlight MADness AT THE TITAN MISSILE MUSEUM

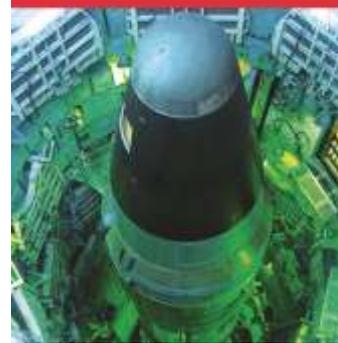
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BEGINS AT 8PM

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[info@titanmissilemuseum.org](mailto:info@titanmissilemuseum.org) - Not to be combined with other discounts



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Sahuarita, AZ (520) 625-7736  
[titanmissilemuseum.org](http://titanmissilemuseum.org)

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nation needs YOU! Volunteer at this amazing facility today!

[titanmissilemuseum.org](http://titanmissilemuseum.org) **Call Now!** 520-625-7736

## ARIZONA AEROSPACE FOUNDATION - NEW TRUSTEES

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The Arizona Aerospace Foundation is pleased to announce the addition of 3 new members to its Board of Trustees:

**Graham Dorland**  
**Tom Murphy**  
**John Tallichet**

“We are fortunate to have such concerned individuals as Graham, Tom and John among our trustees,” said Count Ferdinand von Galen, Chairman of the Board. “The Foundation’s success depends greatly on the guidance, knowledge and counsel of our officers and board of trustees.” Count von Galen continued, “We are grateful to these dedicated individuals for their service.”

About the recently elected Trustees



**Graham Dorland** graduated from Arizona State University in 1965. He is a successful entrepreneur who founded and served as the CEO of ABX Air, Inc., dba Airborne Express, the third largest package express carrier in the US and the only air carrier to own a Cat II Airport. Dorland later partnered in the development of DC-9 Hush Kits and then went on to found/serve as the CEO of Nautamatic Marine Systems, Inc., a marine autopilot manufacturer. His most recent venture is the Inde Motorsports Ranch in Willcox, the only sanctioned track in Arizona by the Sports Car Club of America. Mr. Dorland is involved in numerous community organizations and he is the Past Chairman of Big Brothers of Seattle, WA and a Past Trustee of Wilmington College in Ohio.



**Tom Murphy** is a third generation Tucsonan who graduated from the University of Arizona’s College of Law in 1972. Murphy practices general corporate and commercial law with an emphasis on healthcare law at Gust Rosenfeld. Prior to joining Gust Rosenfeld, Murphy served as General Counsel for the Carondelet Health Network, the oldest and largest nonprofit healthcare provider in Southern Arizona. In addition to healthcare law, Murphy also has expertise in nonprofit corporation law. He is a life member of the Tucson Fiesta Bowl Committee and of the St. Mary’s Centurions. A member of the DM-50 since 2001, he has served as Secretary, Vice President and President and he is currently the immediate Past President.



**John Tallichet** graduated from the University of Southern California and he also holds MBA degrees from the Haas School of Business at UC Berkeley and the Columbia Business School at Columbia University. Tallichet has over 25 years of restaurant-industry experience and he is the CEO and President of Specialty Restaurants Corporation where he is responsible for the company’s restaurant, real estate and aviation divisions. Tallichet is a member of the California Restaurant Association and has served on the CRA’s Orange County Board of Directors. He also serves as a board advisor to The Sam Pievac Company and he is a Trustee of the Flight Test Historical Foundation which supports the development of the Air Force Flight Test Museum at Edwards AFB, CA and the museum’s Blackbird Airpark Annex at USAF Plant 42 in nearby Palmdale.

## 2nd Annual Great Paper Airplane Fly-Off



On January 26 the Pima Air & Space Museum held the 2nd Annual Great Paper Airplane Fly-Off. Nearly 150 children ages 6-14 braved the heavy rain to put their paper-airplane-folding abilities to the test in three different age categories. The giant M&M, Red, was there to cheer on all of the contestants, courtesy of the Fly-Off sponsor, Mars, Inc. Guinness World Record holder for "time aloft" for a paper airplane, Ken Blackburn, joined us again as the event emcee. Mars, Inc. also brought its sponsor tent complete with a prize wheel for everyone to enjoy. The three Fly-Off winners each received a green pilot's jacket emblazoned with the Great Paper Airplane and museum logos, and a check for \$500. The winners' names will also be engraved on the perpetual trophy that will remain on display at the museum as part of the Great Paper Airplane Exhibit. Stay tuned for info on the 3rd Annual Paper Airplane Fly-Off, coming your way in early 2014.

# MARS

incorporated





**LEFT PAGE:**

**TOP:** Ken Blackburn instructs a heat to throw their planes.  
**BOTTOM:** The Mars Inc. sponsor tent was a huge hit for all contestants and their families.

**THIS PAGE:**

**TOP:** Contestants fold their paper airplanes.  
**RIGHT:** The perpetual trophy that will live at the Pima Air & Space Museum as part of the Great Paper Airplane Project.  
**BOTTOM LEFT:** A heat prepares to throw their planes.  
**BOTTOM RIGHT:** The 2013 Fly-Off winners left-right: Aaron E. (Ages 9-11); Ken Blackburn; Nathaniel R. (Ages 6-8); Tobias H. (Ages 12-14)



## AVRO SHACKLETON

By Scott Marchand, *Director of Collections & Restoration*



In May of this year we will have completed our refurbishment of the museum's Avro Shackleton. This airplane has been a popular addition to our collection and is very keenly followed by fans all over the world.

Soon after the end of World War II the Royal Air Force issued a requisition for a new four-engine long-range maritime patrol plane to replace its American-made Liberators and Fortresses. The Avro Company responded with a new design based on the Lincoln bomber and Tudor airliner and a little bit of everything else that was in use from iconic Avro designs like the Lancaster. The first prototype flew on March 9, 1949. It was configured to carry nine general purpose bombs, or three torpedoes or depth charges, and two 20 mm cannons, and was powered by the WW II classic Merlin series engines. The new design was named Shackleton after the famous British Antarctic explorer and entered service in February 1951. Beginning in 1971, a dozen Shackleton MR.2s were modified into Airborne Early Warning (AEW) aircraft by the addition of radar systems and domes removed from the Fairey Gannet. These aircraft served with the RAF until 1991 when the last of them were retired.

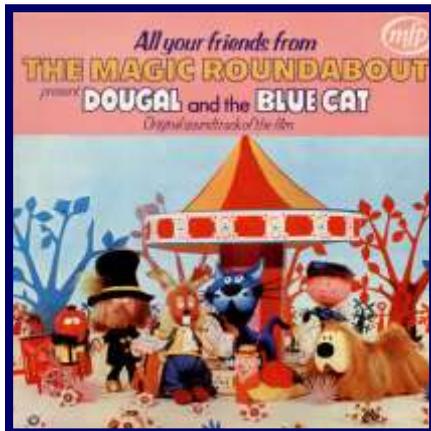
The "Shack" is a very popular spectacle for our visitors. Invariably anyone who spends even a few moments taking in its lines can't help but fall a little bit under its spell, an ugly duckling that has an almost unrivalled history of service, versatility and devotion from those who flew on it, serviced it or built it.

Two members of the Shackleton Association, Dave Hencken and Kevin Byron, summed up this affection in one of their presentations on the Shackleton:

*I believe that the key to the mystery lies in her uniqueness. She looked like an antique when she was new and while the rest of the Air Force was equipping with modern aircraft like the Valiant Vulcan and Victor, Coastal Command was getting its Shacks. It was difficult to believe that a machine that looked like a box of frogs could do the job at all, but her crews have always taken a perverse delight in proving conclusively that they could not only do the job with the old girl—but mostly do it better than anyone else could. In the process they tended to become fiercely protective towards the Shack. I have seen this demonstrated on 8 Squadron with young men who were not born until she had almost finished her first ASW incarnation. Among consenting adults in the Squadron they were as scathing as Shack crews have always been about her manifest shortcomings, but let an outsider pass a derogatory comment and he's dead. Although it must be said that Shack crews are the first to appreciate any Shack-related witticism, such as delivered by the Colonel who described the Shack as reminding him irresistibly of an elephant's bottom—grey and wrinkled outside and dark and smelly inside.*

By 1951 the MR.2 variant came into service and ultimately evolved into the AEW.3 in response to the evolution of the needs of the RAF and its role in securing the maritime sea lanes. Our Shackleton here at PASM finished service life in 1991 in AEW.3 configuration.

Our plane, Avro Shackleton WL790 *Mr. McHenry*, was delivered to the RAF on June 26, 1953. The typical Shackleton mission was the hunting of submarines, possibly for several hours, at around 500 feet or lower over huge desolate tracts of ocean.



So why is it called “Mr. McHenry?” The naming of aircraft by their crews goes back to the beginning of military aviation and aircrews continue this tradition today. The Royal Air Force's 8 Squadron's Avro Shackleton aircraft were named after characters from the children's television program called *The*

*Magic Roundabouts*. The BBC produced a version of the series (originally made in France) that aired from 1965 to 1977 and it attained cult status in the UK. It was enjoyed by adults as well as children, much like *Sesame Street* and *The Electric Company* in the United States.

One of the veteran RAF pilots, John Botwood, shared an anecdote with us a while back about one of his missions flying our Shackleton:

*One of my last operational flights was in 790 in Singapore during the Indonesian Confrontation in '64. We were helping the Royal Navy who had cornered a gunrunner and were faced with the old problem of having an extremely agile enemy refusing to surrender and running very tight circles inside the Frigate's turning circle.*

*He could have been left until his fuel ran out, but the dignity of the Navy had to be maintained. We were 'scrambled' on Christmas Eve 1964 at 1540 and ran up the Straits of Malacca at low level. We had a major lack of enthusiasm inasmuch as we were flying WL790, a 205 Shack that had been in the Far East Air Force (FEAF) since I had last seen her in 1962. The forward gun mounting was covered in thick corrosion and I, as the chosen one, had to work on it for 20 minutes to get "full and free" movement. As the chosen gunner for the trip I came back to our Captain and indicated my lack of trust in the beastie. Steve pointed out that I was nothing but a "cowardy, cowardly custard." I then pointed out that the rear breech of the port cannon was pointed straight at his groin and I could not guarantee that there was no danger of it coming sternwards on firing. I was politely asked to make all switches safe and return for a consultation.*

*When we reached the scene, the gunrunning sampan was still running free and the Navy asked us (as if it was our fault) if there was anything we could do; e.g. fire shots across the gentleman's bow? They could not do it because of the downward angle. This was all being observed by an Indonesian Gunboat a few inches over on his side of the International border.*

*I immediately requested permission to arm weapons, Steve said "Wait a minute, I'll try something else." We entered the arena at 40 feet or so, flat chat and right over the lad's head. Before we could have a look and see what effect that had, the Navy said "I think that will do, thank you!" The Indonesian Gunboat went home and the RN sent a boat to pick up a shocked gunrunner. Our post flight briefing spent quite a while on the possible maintenance required by mountings in the Tropics.*

The world's last airworthy Avro Shackleton completed what may have been the type's last flight on 16 December 2007, as it relocated from the Commemorative Air Force (CAF) ramp at Midland, TX to the Pima Air & Space Museum in Tucson, AZ. (A group of enthusiasts are currently trying to get WR963 back into the air – so a Shack may yet again take to the skies.)

Since 2005 there had been uncertainty over our "Shack's" fate. During that time, the aircraft's owner, Michael Collett of Atlantique Classic Flight, had been between a rock and a hard place: the Civil Aviation Authority in the UK would issue a ferry permit for the aircraft to fly back home, but once there they would ground her unless a very costly spar replacement was performed.

The aircraft had been for sale in the U.S. for a couple of years, but no interested parties ever appeared. The grey old lady was slowly dying under layers of Texas dust despite the efforts of the CAF, who had kindly allowed the aircraft to be parked on its ramp for free and who would also hangar her when the group's other aircraft were away.

The Pima Air & Space Museum was more than happy to offer WL790 a new home. Given the dry, warm climate in Arizona together with the experienced staff at Pima, this was probably the best place for the Shackleton to retire.

The aircraft will wear the markings of 8 Squadron RAF, the unit it retired from and served the longest with over its nearly 40-year service. It has been to the far reaches of the globe, flying maritime reconnaissance missions, anti-submarine, intelligence gathering, antipiracy and anti-insurgency missions in addition to humanitarian search and rescue. We hope it continues to capture the imagination of our visitors for decades to come.

AIRCRAFT RECENTLY PLACED ON DISPLAY

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*After numerous hours of polishing, the Boeing KB-50J Superfortress was placed back on display.*



*The McDonnell F2H-2P Banshee was recently placed on display after receiving a new coat of paint.*



*The Piper U-11A Aztec.*



*The Cessna 120 received a new coat of paint.*



*The Cessna 310.*

CURRENTLY IN RESTORATION

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*The Avro AEW.3 Shackleton is now in the Restoration Hangar being prepped for paint.*



*The Hind-D Helicopter is reassembled and prepped for paint.*



*The P-39 Airacobra is prepped and awaiting paint.*



*The Fm-2 Wildcat is in Area 51 for re-assembly, strategic repairs and selective re-painting. This will be done in such a manner to preserve its 1945 "as found" essence.*



*The Douglas A-24 SBD is in restoration currently having small parts work done.*

RECENT ACQUISITIONS

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*Boeing 737*



*The F-18A—Retired Blue Angel.*



*The English Electric F.53 Lightning.*



*This B-52 Tail Gun assembly will be integrated into the Vietnam display in Hangar 1.*



*The L-1011 Cockpit arrived from Roswell, NM. This will be turned into a interactive cockpit and placed in Hangar 1.*

## EXHIBITS - Phoenix Mars Lander



The Pima Air & Space Museum recently placed on display a mockup of the Phoenix Lander. Phoenix was a robotic spacecraft that landed on Mars under the Mars Scout Program. It was launched from Florida on August 4, 2007. The Phoenix lander successfully landed on Mars on May 25, 2008. Mission scientists used instruments aboard the lander to search for environments suitable for microbial life on Mars, and to research the history of water there.

The lander itself was originally built for the cancelled Mars Surveyor lander mission in 2001 and had been in storage for several years before being reactivated and modified for the Phoenix program. The multi-agency program was headed by the Lunar and Planetary Laboratory at the University of Arizona, under the direction of NASA's Jet Propulsion Laboratory and included participation by universities in the United States, Canada, Switzerland, Denmark, Germany and the United Kingdom; NASA; the Canadian Space Agency; the Finnish Meteorological Institute; Lockheed Martin Space Systems; MacDonalD Dettwiler & Associates (MDA) and other aerospace companies. It was the first

mission to Mars led by a public university in NASA history. It was led directly from the University of Arizona's campus in Tucson, with project management at the Jet Propulsion Laboratory in Pasadena, CA, and project development at Lockheed Martin in Denver, CO. In addition to leading the mission, the University of Arizona contributed the design of several of the lander's scientific instruments and cameras to the project.

Phoenix was NASA's sixth successful landing out of seven attempts and was the first successful landing in a Martian polar region. The lander completed its mission in August 2008, and made a last brief communication with Earth on Nov. 2nd as available solar power dropped with the Martian winter. The mission was declared concluded on Nov. 10, 2008, after engineers were unable to re-contact the craft. After unsuccessful attempts to contact the lander by the Mars Odyssey orbiter up to and past the Martian summer solstice on May 12, 2010, JPL declared the lander to be "dead."

## HANGAR 4 AIRCRAFT MOVES



The rearranging of Hangar 4's aircraft was done to make room for several new aircraft to be added to the hangar and to make it easier to move the new planes into the building. The largest move was the shifting of the C-46 Commando from one side of the hangar to the other. This required that the plane not only be moved to the opposite side of the room but that it also be turned nearly all the way around to face in the opposite direction. Once this had been accomplished the F4U Corsair was moved next to the P-51 Mustang and its wings were lowered to the extended position. Two aircraft have been added to the hangar so far, the Naval Aircraft Factory N3N firefighting aircraft and the MiG-15 fighter. These will be joined at a later date by other World War II and Korean War aircraft that are currently undergoing restoration including the P-39 Airacobra, F-86E Sabre, and FM-2 Wildcat.

## CAPITAL IMPROVEMENTS - Restoration Wash Pad

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***Construction of the new Restoration Wash Pad should be complete by the end of May. This will allow us to work on our largest aircraft.***



## 390<sup>th</sup> MEMORIAL MUSEUM - The Future 390th

by Emile Therrien, *Executive Director 390th Memorial Museum*



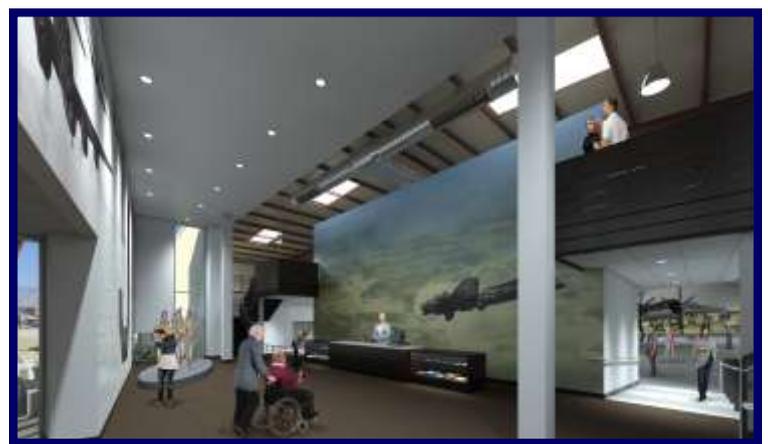
These concept drawings are of what the 390th Memorial Museum will look like after the current remodeling project is finished. The new exterior of the building will be squared off and a second floor mezzanine will be added, allowing for more square footage inside. A more modern exterior design will complement the surrounding Pima Air & Space buildings and draw visitors in. Both new and remodeled displays are being planned to improve the flow of the story of the 390th to Museum visitors. New windows will allow for more natural interior lighting and allow visitors to enjoy the surrounding desert landscape outside.



*A view from the upper mezzanine level.*



*A cutaway view showing the new interior with mezzanine level.*



*The new entranceway that will greet visitors to the Museum. The "J Wall" is shown in its future home on the left of the picture.*

## RECENT HAPPENINGS



*On Apr. 11, 2013 the Oscar Mayer Wienermobile paid a visit to the Pima Air & Space Museum. It took a slow lap around the museum grounds to the delight of many museum guests.*



*The Southern Arizona Greys had a special Greyhound Meet & Greet on Apr. 13 at the Pima Air & Space Museum. Our museum guests had an opportunity to meet fast greyhounds while looking at fast planes and talk to experienced adopters about what great companions greyhounds make.*

*Retired racing greyhounds that formerly raced at 45 mph are now looking for their forever homes, ready to “race into your heart.” For more information please go to: [www. agreyhoundadoption.org](http://www.agreyhoundadoption.org)*

## SNOW DAY



On February 20, we experienced a *Snow Day*, which are few and far between at the Pima Air & Space Museum. The white stuff didn't get deep, nor did it stick around for long, but it did create a rare sight.



# HUEY FORUM



On Feb. 22-24 we hosted the Huey Forum. During this event, 23 Huey pilots, crew, and designers shared their stories about this amazing aircraft. Visitors were treated to a pre-event reception on Friday night, a fly-in by a UH-1H Huey owned by Dillonaero, and a keynote address by Robert Mason, author of the bestseller “Chickenhawk.” We plan to hold events similar to this each year focusing on a different aircraft, so check the website frequently to learn more details.



## TURN YOUR SMARTPHONE INTO A SMART GUIDE

The Pima Air & Space Museum welcomes its first mobile app! The GeoTrexpedition—which runs within the MyGeoTrex app. MyGeoTrex is a free GPS-based app that provides information about the aircraft and exhibits as you explore the grounds. While outdoors, the four closest exhibits to your location will pop up on your screen. You can then touch anyone of those four tiles for additional information on that aircraft or exhibit. While indoors, since the GPS capability of your smartphone or tablet is limited, you can touch the “Manual Update” button at the bottom of the screen and you’ll be able to look up the exhibit alphabetically by scrolling the slider bar.



**To start:** The app can be downloaded by searching for “MyGeoTrex” in the Apple app store or Google Play for the Android version. If you are accessing the app for the first time, a tutorial will pop up and explain the different features of MyGeoTrex. Once the app is installed, find the Pima Air & Space Museum Trex under the Museums, Aquariums and Zoos category. Please note: You’ll use your device’s dataplan to download the information. (The museum does provide free wi-fi in Hangar 1—however, as stated earlier, inside a metal hanger GPS does not generally work.) Enjoy!

## FOUNDATION WISH LIST

### VISITOR SERVICES

- ◆ Durable Plastic Wagons
  - ◆ Wheelchairs
  - ◆ Filing Cabinets

### EDUCATION

- ◆ Plastic Storage Bins with Lids
- ◆ Children’s Books on Aviation & Aerospace

### OPs AND RESTORATION

- ◆ Gently Used Gator / Utility Vehicle
  - ◆ Portable Generator
  - ◆ Golf Carts

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## EDUCATION PROGRAMS & HAPPENINGS

by Mina Stafford, *Curator of Education*



### ARTS INTEGRATION SOLUTIONS

Last fall we entered into a partnership with Art Integration Solutions. This organization strives to transform the educational system by bringing the classroom practice of arts

integration to every child, in every classroom, every day, helping them succeed in math, science, literacy and life. The Pima Air & Space Museum is working with Ai Solutions to develop a professional-development program that will help teachers teach the science and math of aviation through arts integration. Stay tuned for more details about this awesome professional-development program.



### OUTREACH ACTIVITIES

During the Winter and Spring months the education department has been very busy with community outreach. We have had tables at com-

munity education events like the Ted Walker Youth Day at Old Tucson, the UA*presents* Children's Festival, Science In the City at the Children's Museum Tucson, and Science City at the Tucson Festival of Books. We will continue our community outreach throughout the Spring and into the Summer at the Pima Community College Northwest Campus Earth Day Fair Apr. 17th, Mini Time Machine Museum's 4<sup>th</sup> Annual May Day Celebration Apr. 27<sup>th</sup>, and other events to be announced. I hope to see you at one of these great events.

### MODEL AIRPLANE BUILDING WORKSHOP



On Mar. 2nd we had our first all-day model airplane building workshop. Members of the Sonoran Desert Model Builders volunteered their time and expertise to teach kids ages 10 and up the exciting hobby of model building. We made a model of the Hawker Hurricane and took the kids to study our Hawker Hurricane in Hangar 3 so they could be accurate in their paint jobs. Each kid took home a completed model and enjoyed a fun day at the Pima Air & Space Museum.

Mark your calendar for August 3 from 10:00 - 3:00pm for another Model Airplane Building Workshop. The workshop will be held for children ages 10 and up. The cost is \$15 for nonmembers and \$11 for members. Price includes the model and lunch. To make a reservation please email [mstafford@pimaair.org](mailto:mstafford@pimaair.org) or call 520 618-4819.



## SCHOOL TOURS AT THE PIMA AIR & SPACE MUSEUM



The docents at the Pima Air & Space Museum have been busy providing exciting and informative tours for students of all ages from all over the state. Students experience the wonder of aviation and aerospace history and learn about the science behind flight.

If you have children in school, encourage their teachers to make plans to visit the museum.

## VOLUNTEER PRESENTATION SERIES

The Volunteer Presentation Series is held the third Saturday of each month, at 10:00am in the Stitt Education Center at the Pima Air & Space Museum.

**May 25**

### **Jim Evans – “Dam Busters” raid by Avro Lancaster bombers from 617 Squadron on Ruhr Valley dams in Germany (70<sup>th</sup> anniversary of event).**

Mr. Evans will give an overview of a WWII RAF mission called Operation Chastise. In May 1943, RAF Lancaster bombers attacked the great dams of the Ruhr Valley in Germany using unique tactics and weapons. Jim will walk us through this raid and assess its importance and effectiveness.

**June – August Summer Hiatus**

**Sep. 21**

### **Paul Woodford – The F-15A and F-15C**

Mr. Woodford will be discussing the F-15A and F-15C and their flying characteristics, radar capabilities, and armament. Mr. Woodford will talk about basing, past and current.

## NIGHT WINGS

This summer we will be open from 5:00-9:00pm for Night Wings on Jun. 22<sup>nd</sup>, Jul. 27<sup>th</sup> and Aug. 24<sup>th</sup>. Make plans to come out and enjoy the museum in the cool of the evening. We will have hands-on activities for kids of all ages, tram tours of the outdoor aircraft until sundown, and a different special attraction each month. We look forward to seeing you in the evening light at Night Wings.

## SPECIAL EVENING ADMISSION **Night Wings!**

Explore almost 4 football fields of indoor hangars plus more than 150 outdoor aircraft

**5PM - 9PM**

On select Saturdays

**Jun. 22, Jul. 27, Aug. 24**

Adult Admission Only \$10 Kids 12 and Under FREE!  
Last admission is at 8pm

Flight Grill open until 9pm with food specials!

## SPECIAL KIDS ACTIVITIES



## PIMA AIR & SPACE MUSEUM

Exit 267 off I-10 and go east on Valencia, 6000 E. Valencia Rd. - pimaair.org



The Pima Air & Space Museum and the Titan Missile Museum both have Facebook pages! Each is a forum for our fans to talk about their recent visits, share photos and receive updates on the latest Museum events. If you haven't already, be sure to become a fan of both our museums.

# SOARIN' SATURDAYS

by Mina Stafford, *Curator of Education*

## Model Airplane Make 'N Take

**1:00pm—1st Saturday of the month**

Enjoy model building with the Sonoran Desert Model Builders. For children 5 years old and older and their adult companions. This program is designed to introduce students to the hobby of model building and the math and historical research used to build accurate scale models. Each student will build a snap-tight airplane they can take home with them and see models made by expert model builders.



*Model Airplane Make 'N Take participants showing off their models.*

## Imagine Rockets

**1:00pm—2nd Saturday of the month**

Learn about the science behind rocketry. For children 8 years old and older and their adult companions. This program is designed to introduce students to the principles of rocket science through demonstrations and hands-on rocket-building and testing activities. During this program participants get to build and test experiments that

demonstrate basic rocketry principles. Our rocket expert will lead you through Newton's laws of physics and show you how physics and chemistry are used in rocket science. Everyone gets to take home the experiments they build as well as test the Mighty Missile Launcher and the Mighty Seltzer Rocket which are available for purchase in our Museum Store. Members receive a 10% discount on all museum-store purchases.



## How Things Fly

**1:00pm—4th Saturday of the month**

Experience the fun and excitement of flight. For children 8 years old and older and their adult companions. During this program students will build and test aviation experiments that demonstrate things like the power of air pressure, aircraft stability, and lift. All students get to take home the experiments they build.

## Young Flyers Fun

**1:00pm—4th Saturday of the month**

For children ages 4-7 years old and their adult companions. This program is designed to introduce children to the world of Aviation and Aerospace through gallery activities and tours, story books, demonstrations and hands-on craft projects that can be taken home. A different topic will be featured each month.



*Young aviators enjoying Young Flyers Fun.*



# CALENDAR OF EVENTS

## MAY 2013

**May 4**  
1:00pm  
Model Airplane Make 'N Take \*

**May 11**  
9:30am  
Volunteer Orientation

-and-  
1:00pm  
Imagine Rockets \*

**May 18**  
9:00am  
British Invasion  
-and-

1:00pm  
How Things Fly \*

**May 25**  
10:00am  
Volunteer Presentation Series  
-and-

1:00pm  
Young Flyers Fun \*

## JUNE 2013

**June 1**  
1:00pm  
Model Airplane Make 'N Take \*

**June 8**  
9:30am  
Volunteer Orientation  
-and-

1:00pm  
Imagine Rockets \*

**June 15**  
1:00pm  
How Things Fly \*

**June 22**  
5:00pm

## JULY 2013

**July 6**  
1:00pm  
Model Airplane Make 'N Take \*

**July 13**  
9:30am  
Volunteer Orientation

-and-  
1:00pm  
Imagine Rockets \*

**July 20**  
1:00pm  
How Things Fly \*

**July 27**  
5:00pm  
Night Wings

## AUGUST 2013

**August 3**  
1:00pm  
Model Airplane Make 'N Take

**August 10**  
9:30am  
Volunteer Orientation

-and-  
1:00pm  
Imagine Rockets \*

**August 17**  
1:00pm  
How Things Fly \*

**August 24**  
5:00pm  
Night Wings

## SEPTEMBER 2013

**September 7**  
1:00pm  
Model Airplane Make 'N Take \*

**September 14**  
9:30am  
Volunteer Orientation

-and-  
1:00pm  
Imagine Rockets \*

**September 21**  
10:00am  
Volunteer Presentation Series  
-and-

1:00pm  
How Things Fly \*

**September 28**  
1:00pm  
Young Flyers Fun \*

All listed events  
FREE to members.

\*Reservations  
Required—Call  
520 574-0462

### NEW VOLUNTEER ORIENTATION

9:30am  
Starting in the  
Admissions Area

### MUSEUM HOURS:

9-5pm daily.  
Last admittance at 4pm.  
Open every day except  
Christmas and  
Thanksgiving.

### TOURS:

Docent-led Walking Tours  
Daily 10:15am

Tram Tour  
Daily 10am, 11:30am and 1:30pm.

390th AMARG TOUR  
Monday - Friday, Excluding  
Federal Holidays. Call 520 574-0462 for current times.

For information on all tours, please contact Visitor  
Services at 520 574-0462 or visit our

## GIVE THE GIFT OF MEMBERSHIP

An annual membership to the Arizona Aerospace Foundation provides the recipient with 363 days of free admission to both the Pima Air & Space Museum and the Titan Missile Museum, including special activities and tours. Members also receive a 10% discount in the museum stores and at Flight Grill, and a one-year subscription to *Skywriting*.

To order an annual membership please call Membership Services at 520 574-0462

# PASM DOCENT RECEIVES FAA'S WRIGHT BROTHERS MASTER PILOT AWARD

by Savanna Sargent



**Larry Clark**

The Federal Aviation Administration (FAA) presented Larry Clark, a Pima Air & Space Museum Docent, with the distinguished "Wright Brothers Master Pilot Award" on Dec. 12, 2012. This distinguished award is presented to pilots who have demonstrated excellence by maintaining 50 or more consecutive years of safe flying in both civil and military capacities. Larry has achieved 51 consecutive years of safe flying with over 12,000 flying hours in 45 different airplane and helicopter models. He himself has owned 16 different airplanes. He also holds FAA licenses as an Airline Transport Pilot (ATP) for airplanes and helicopters, Airframe & Powerplant Mechanic (A&P), and in Inspection Authorization (IA).

Larry was trained as a helicopter pilot in the U.S. Army and flew with the 128<sup>th</sup> Aviation Company in Vietnam under the call sign "Gunslinger 37" from 1965 to 1966. He was awarded 14 Air Medals and the Bronze Star for his combat flying. He has an Aeronautical Engineering Degree and has worked for several commercial helicopter operators, flying a hospital-based EMS helicopter, TV News helicopter for KHOU-TV in Houston, and surveying and forest fire fighting in Alaska. He is also a former Experimental Test Pilot for Honeywell's Commercial Aviation Systems in Phoenix, AZ.

At the award ceremony, Larry was presented with a certificate and his wife, Diana, was presented with a lapel pin. He is now recognized in the "Wright Brothers Master Pilot Award – Roll of Honor" that is located online at [www.FAASafety.gov](http://www.FAASafety.gov). Dominick Gallo of the FAA presented the prestigious award, which has only been given to 45 pilots in Arizona, four of those in Tucson, since the award's establishment in 2003. FAA volunteers Lee Unger, Brian Forstall and Barbara Harper were in attendance as well. Ms. Harper is the Chair of the Arizona Aviation Hall of Fame Selection Committee as well as an inductee.

The Wright Brothers Master Pilot Award is only one of many achievements for Larry Clark. He holds two U.S. patents on cockpit human interface, two U.S. and World Aviation records, and he is the founder of the Vietnam Helicopter Pilots Association. In addition to being a docent at the Pima Air & Space Museum, Larry is currently in training to achieve a Commercial Glider pilot rating.

The Arizona Aerospace Foundation congratulates Larry Clark for this most prestigious award. 51 years of safe flying is certainly something to celebrate!



**Gallo (left) presenting award to Clark (middle) and his wife Diana (right).**

## VOLUNTEER APPRECIATION DINNER



The annual volunteer recognition dinner was held on Feb. 13 in Flight Central at the Pima Air & Space Museum. It was the largest recognition dinner with 376 guests in attendance. The volunteers of the Pima Air & Space Museum and the Titan Missile Museum contributed 87,983 hours in Fiscal Year 2012. Col. Robert Lepper, 309th AMARG Commander, and Rick Barrett, both Trustees of the Foundation, were guest speakers and thanked the volunteers for their countless hours of volunteerism.

*Left: Volunteer Appreciation Dinner*

*Below: First Flight, photo by John Daniels*

## HAPPY BIRTHDAY ORVILLE (NATIONAL AVIATION DAY)

Join us for a special celebration commemorating Orville Wright's birthday at Pima Air & Space Museum on National Aviation Day: Mon. Aug. 19, 2013. Watch a special showing of the Wright Brothers' National Memorial

film "Flight Room Talk" depicting how the Wrights developed the first successful "heavier-than-air" flying machine. The 25-minute movie will be shown in the Education Room in the Dorothy Finley Space Gallery throughout the day (check our website for times). [This DVD will be available for purchase during the month of August in our museum shop too.] Climb into the T-33's open cockpit. Enjoy a cupcake (limited quantities, first-come-first served) in Flight Grill. As a special thanks

to our members, receive an extra 10% off in the museum shop on Aug. 19<sup>th</sup> only! Yes, a total of 20% savings even on summer clearance items! Members only! All included with regular admissions or membership.



## THANK YOU - VOLUNTEERS

Our large corps of volunteers at both the Pima Air & Space Museum and the Titan Missile Museum help out in almost every department at both museums, interacting with our 200,000 annual visitors, or working

behind the scenes in collections, restoration and on committees. Listed are volunteers with 250+ hours through March 2013.

### 250+ Hours

Susan Flemming  
Clint Swartz  
Paul Woodford  
Marsha Kwolek  
Phil Lacovara  
Catt Kestler  
Virginia Swartz  
Tom Cantrell  
Jim Evans  
Larry Macon  
Richard Hart  
Lorne Hawkins  
Lloyd Sandmann  
Jim Devine  
Bob Walsh  
Diana Clark  
Cliff West  
Robert Bassett  
Jim Hemenway  
Jim Abbey  
Tom Campbell  
Larry Knaff  
Len Voermans  
Bob Balck  
Jim Zimmerman  
Tom Gorman  
Lewis Hawkins  
Buster Cormier  
Doug Jenkins

### 500+ Hours

Floyd Dickerson  
Bernadette Bauer  
Kyle Rossi

### 500+ Hours Cont.

Richard Rogers  
John Kaminski  
John Gieb  
Christina Bentley  
Larry Clark  
Terry Eichenseer  
Bill Scott  
Mike Berk  
Dennis Anderson  
Jim Bergstrom  
Bill Sproull  
Ed Ackerman  
Kirby Dominguez  
Andy Stephenson

### 750+ Hours

Richard Carter  
Ed Duthweiler  
Jim Hartigan  
Randy Hoffman  
Tom Collins  
Tom Walton  
Don Kohls  
Werner Lawson  
Ed Bowers  
Steve Slocum  
Mike Noreen  
Michael Lennon  
Steve Austin  
Jim Hoffmann  
Joe Petska  
Buz Hudacky  
Fred Denson  
Karl Krumel

### 750+ Hours Cont.

Chuck Winkerwerder  
Lee Besse  
Gerald Geise  
Jack Battaglia  
Damon Blair  
Joyce Petska

### 1,000+ Hours

Margie Humphrey  
Richard Dougall  
Martin Anderson  
John Miller  
Jack Briggs  
Tom Schart  
John McGee  
Roger Misgen  
Steve Holt  
Dave Hinkelman  
John Newton  
Paul Kuras  
George Felton  
Hap Sumner  
Tom McDonnell  
Dana Lorenz  
Dennis Brindle  
Bob Robuck  
Al Ranes  
Jim Seidel  
Pete Herrman  
Don Severe  
Ken Crombie  
Bill Preble  
Jim Simonds  
Herbert Wolfe

### 1,000+ Hours Cont.

Jacque Thomas  
Wes Frost  
Hans Oppe  
Larry Fieland  
Bruce Saunders  
Jim Lewelling  
Ben Wermes  
Ken Leland  
Keith Connolly  
Marian Walsh  
Jeremy Rogers  
Lynne Severe  
Rey Johnson  
Felice Rolfes  
Bob Kurneta  
Bob Spackman  
John Eichelberg  
Terry Lingrel  
Bob Gaines  
Gerald Kohls  
Allen Shanahan  
Gary Thomas  
Jerry Carl  
Art Blue  
Don Cassidy  
Rod Farley  
David Steuck  
Bob Berger

### 2,000+ Hours

Wayne Butler  
Clifton Sonberg  
Dennis Mart  
Bob Darcangelo

2,000+ Hours Cont.

Rob Lovell  
 Al Frizelle  
 Ken Hollett  
 Bob Hewett  
 Glenn Carlson  
 Lathan Varnado  
 Bill Whalen  
 Dwight Mears  
 Bill Stickle  
 Paul Thom  
 Fred Faust  
 Chuck Morris  
 Rex Eaton  
 Carroll Oquest  
 Robert Flemming  
 Harvey Diesner  
 John Sprenkle  
 Phil Henderson  
 Ralph Laner  
 Howie Cosyns  
 Phil Place  
 Dennis Crowley  
 Earl McDonald  
 Dick Sharp  
 Bill Smith  
 Royal Heemeier  
 George Moore  
 John Edris  
 Tom Bard  
 Bill Carpenter  
 Bruce De Wald  
 Bob Weber  
 Leon Tracy  
 Carter Harrison  
 Joe Seibold  
 Allen Phillips  
 Neil Helgath  
 Pamela Asbury-Smith  
 Vern Spohn  
 Robert Peterson  
 Tim Mitman  
 Jim Smith

3,000+ Hours

Ron Kovar  
 Dennis Hull  
 Robert Harvey  
 Tom Rehm  
 Charles Schulz  
 Jim Schultz  
 Bob Ratledge  
 Chuck Mitchell  
 Norman Goetz  
 Bill Williams  
 Frank King  
 Ken Brandt  
 David Jester  
 Steve Taylor  
 Dennis Deatherage  
 Dick Casey  
 Gerry Quilling  
 Richard Flam  
 Richard Beaubien  
 Dick Brown  
 Tom Workinger  
 Dale Sprotbery  
 Bud Daniel  
 Sheldon Coudray  
 Ron Swanson  
4,000+ Hours  
 Tom Howard  
 Chuck Smith  
 Jim Stone  
 Jack Matteo  
 Patricia Johnson  
 Len Defendorf  
 Mike McAuliffe  
 Pete Lasho  
 Jerry McCafferty  
 Sam Densler  
 Bob Helmers  
 Fred Kemp  
 Dave Scoles  
 Ben Fisher, Jr.  
 Bob Brubaker

4,000+ Hours Cont.

Mac McFadden  
 Ed Sanford  
 George Matais  
 Harry Wells  
5,000+ Hours  
 Richard Peterson  
 Ted Schmidt  
 George Birch  
 Wes Whitman  
 Larry Kistler  
 Midge Bevilacqua  
 Bill Minor  
 Martin Keimon  
 Vincent Ferrari  
 Chet Harvey  
 Earl Larsen  
 Brad White  
 Joe Pacholec  
 Tom Geoghegan  
 Fred Hudson  
6,000+ Hours  
 John Moffitt  
 Don Snover  
 Ted Dore  
 Christopher Lefteroff  
 Ed Grant, Jr.

7,000 and above

Chuck Perger - 7,365  
 Richard Lockhart -  
 7,366  
 Rick Felker - 7,538  
 Buzz Bertolino - 7,629  
 Chuck Osborn - 7,739  
 Pat Donovan - 7,758  
 Mary Ellen Conrado -  
 8,168  
 Henry Dudley - 8,181  
 Ed Cullen - 8,854  
 Von Kimbrell - 9,207  
 Tom Bohan - 10,092  
 Irwin Feldman - 10,178  
 Frank Davidson -  
 10,363  
 Don Campbell - 11,275  
 George Kircher - 13,668  
 Bill McGuire - 23,263

**In Memoriam**

We would like to offer our sincere  
 condolences to the families and friends of  
 our recently departed Museum volunteers:

**Tom Clark**  
**Hank Dykhuis**

*Skywriting*



**THE  
ARIZONA  
AEROSPACE  
FOUNDATION**

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