

Airwaves and Afterburners

50 years of air show excellence with The U S Air Force Thunderbirds
by Gary Palamara



The radio goes silent as a lone F-16 crosses back and forth across the field, at a low altitude. This inspection tour, will add 10 more minutes, to a flight that's already been more than three hours long. It's a Wednesday afternoon in September. Bright blue skies and mild temperatures cover the northern Philadelphia area. Off shore and far out to sea, the remnants of a late season hurricane are now producing strong winds coming from the North. Suddenly, the tower frequency comes back to life ...

“Willow Grove Tower, Thunderbird 8, on Uniform”... “Willow Grove”

“Request a low approach final, for runway three, three”... “How low, Sir?”

“300 feet”

“Thunderbird 8, approved for a low approach final, runway three, three”...

“Click, Click”

All is quiet once more, as the glimmer of a sleek Air Force fighter can be seen approaching just south of the field. After landing, the tower will switch the jet over to a ground control frequency for taxi and parking instructions. Normally, meetings and media events follow within a short time after the advance team's arrival, but not today, not this Wednesday. Amidst the excitement and anticipation of this air show weekend, a feeling of solemnity hangs over this day. Today, the world is remembering other jets, other flyers, and other cities here in the northeast, for this is not just any Wednesday afternoon in September. This is September 11, 2002, the first anniversary of the attacks on America.

The Willow Grove Naval Air Station is located just north of Philadelphia in Bucks County, Pennsylvania. For the next five days, this community will be the home away from home, for one of America's premiere military air demonstration teams, the United

States Air Force Thunderbirds. On this, the 18th weekend of their 2002 season, it was my pleasure to follow the Thunderbirds, and take a look behind the scenes, at the making of a Thunderbird Air Show.

For more than a year, key members of this joint services Naval base and the surrounding community have planned for this weekend. At times, it looked as though the long history of aerial demonstrations might have come to an abrupt end, after the tragic events of September 11, 2001. But now, air shows are back, and the military performances take on an even greater sense of purpose.

Aerial demonstrations are an art form as old as the airplane itself, and 2003, marks several milestones in the long history of aviation. On December 17, the world will celebrate the 100th anniversary of powered flight. In the past 100 years, an aviation industry that began with two brothers from Dayton, Ohio, has taken man to the Moon and beyond. During that time, public demonstrations of the airplane have played an important role in both promoting and advancing the science of flight.



In May of 1953, five decades after the Wright brothers triumph at Kitty Hawk, North Carolina, the newly organized United States Air Force, decided to officially create the 300th Aerial Demonstration Squadron, to project Air Force pride and patriotism around the world. They called the team the Thunderbirds, after the mythical war bird found in Native American folklore.

For the United States Air Force Thunderbirds, spreading good will, and promoting the US Air Force, has always been job one. With today's all volunteer military, recruiting and retaining qualified personnel is also part of the Thunderbird mission. It is estimated that the Thunderbirds are directly responsible for 70 to 80 percent of the new recruits who join the Air Force each year. Before every air show, members of the Thunderbird team administer the enlistment pledge to the local recruits eager to join the Air Force family.



Fifty years ago, the Thunderbird's first home was Luke Air Force Base, Arizona. The team flew the Air Force frontline fighter of the day, the sub-sonic, Republic F-84G. Then, in 1956, the team changed over to the super-sonic North American, F-100. At the same time, the Squadron also moved to their current location, Nellis, Air Force Base, 8 miles northeast of Las Vegas, Nevada. To date, the team has flown six different types of jet fighters and currently flies the Lockheed/Martin F-16 C/D. While the Thunderbirds have seen many changes in technology over the past half-century, the one constant through the years has been the Thunderbird people.



More than 120 men and women make up today's Thunderbird team, and they represent some of the best personnel, in the Air Force. Along with the 8 pilots assigned to the squadron, the four support officers and enlisted members who make up the team, come from more than 25 different career fields throughout the Air Force. As a guard against complacency, Officers spend only two years as a Thunderbird. To allow for a smooth transition, 50 percent of the Officers change each year. Enlisted personnel are constantly rotated in and out, but spend no more than 3-4 years

with the team.

The normal air show season runs from March through November of each year, and a complete listing of all scheduled air show dates can be found on the Thunderbirds web site. During a normal season, the Thunderbirds will fly at least 65 air shows. While most performances are on the North American continent, from time to time, the Thunderbirds have also spread their unique form of patriotism overseas. To date, the team has visited all 50 states and more than 65 foreign countries in the past 50 years.

Together with the US Navy aerobatic team, the Blue Angels, the Canadian Snowbirds, and the countless civilian performers, air shows across North America draw between 15 and 18 million fans annually. While many in the crowd seem content to just watch the fast planes and daredevil aerobatics, others along the flight line, get a heightened sense of being "plugged in" to the action. A growing number of air show fans are using multi-band radio scanners to listen in to the aircraft chatter.

Long before a performer takes "center stage" in the sky, those of us with radios know who will be arriving and when they'll appear at show center. But while air show monitoring may be fun, officially, it's frowned upon by the performers.



Even before 9 - 11, all three military demonstration teams in North America, the Thunderbirds, the Blue Angels and the Snowbirds, have had an official policy of not publishing any information about their "private" communications. Unofficially, the coordinating organization for civilian air show performers, the International Council of Air Shows, (ICAS), has had the same policy. The reason cited most often for non-disclosure is the safety of the teams involved. All of that being said, I didn't bother to ask my Thunderbird hosts to hand over a list of specific frequencies used for air shows... the answer would have certainly been, "No."

Actually, there is little reason to discuss specific frequencies with team members, because much of the current air show information is readily available from other

sources. Bill Hoefler's column, "Plane Sense" has explored air show specifics in the past (see Pop/Com Aug. 2001). Tower frequencies for any airfield, as well as some of the most common frequencies used by the air show performers can also be found on the World Wide Web. In addition to having all of this direct information, those who are new to the hobby soon learn that part of the fun of scanning comes from hunting down new frequencies. Finding elusive transmissions, adds an element of excitement while listening in to the traffic. Respecting the team's privacy, my discussions with the Thunderbird's communications personnel were only about general topics.



opening day.

Good listening, starts well in advance of the actual air show dates. Normally all of the scheduled performers and static aircraft are on site by either Thursday or at the latest, Friday afternoon. Local tower and approach frequencies are used for the arriving performers and static aircraft. Taxi and coordination frequencies are buzzing with excitement for several days prior to the air show, as the static displays are moved and setup well in advance of

For a normal weekend air show, the Thunderbird advance team will arrive at the site, on Wednesday. The advance team consists of a single, two-seat F-16 D, flown by the team's narrator, Thunderbird 8. Riding in the back seat of the plane, is the luckiest enlisted man in the Air Force, the aircraft's crew chief. The job of this two-man advance team is to check out the field setup, and make sure that all of the logistics are ready for the entire team to arrive on Thursday.

Depending on aircraft availability and field location, the support group travels via two C-130 Hercules, or one larger C-141 Star-lifter aircraft. They will normally arrive around mid-day on Thursday using the radio call sign "Thunderbird 14." For the Willow Grove air show, the Thunderbird support team numbered more than 70 people! While at first, the large number of support personnel who travel with the team, might seem excessive, the Thunderbirds have a pretty high standard to uphold. In the 50-year history of the team, no scheduled air show has ever been cancelled due to a maintenance problem.

Once the support team arrives, they hit the ground running and prepare to recover the inbound F-16s. With all the activity on the ground reaching an organized frenzy, a Thursday afternoon "air show" begins, once the F-16s are within radio contact. For locations two hours or less from Las Vegas, the Thunderbirds will sometimes perform aerobatic maneuvers upon arrival. But, even without fancy aerobatics, seven red, white and blue F-16s flying in formation is a special sight. Normal tower frequencies are used as the Thunderbirds approach and make a quick circle around the field. At military field locations, you can look for the team to use frequencies in the UHF band. One by one the jets will pitch up and enter into their landing pattern after arriving. Once on the

ground, the team will taxi to their assigned parking locations and waiting crew chiefs.

Although some media events might take place on Thursday, Friday is the official media day for the Thunderbirds. While most of us can only dream of ever taking a flight in a Thunderbird F-16, for several members of the media, this dream will become a reality. At most locations, the Thunderbirds pre-arrange to fly one or two reporters on a once in a lifetime, one hour-long flight in the back seat of either Thunderbird 7, or Thunderbird 8. Reporters must submit applications several months in advance and also pass a physical examination on the day of their flight, but if all goes well, they will become a real member of the Thunderbirds... at least for an hour or two.



On Friday, the Thunderbirds, and other scheduled performers, will generally fly a practice air show. Friday is also the first opportunity to hear most of the real air show activity, on the radio. The Friday activities generally mirror the weekend demonstrations very closely. While a practice air show allows the Thunderbird crew to become familiar with their new surroundings, it also gives air show workers and invited guests a chance to view the Thunderbird demonstration, under less crowded conditions.

Saturday is the first of two public performances for the weekend and the Thunderbirds' get an early start on the day. At 7:00 am, members of the team meet with representatives of the FAA for a routine safety briefing. Soon after, the aircraft maintainers arrive back at the flight line and continue to polish and prep the F-16s. Hours before the formal show begins, the Thunderbird Communications team is hard at work, fine tuning last minute details and keeping track of the overall show schedule.



At the heart of any Thunderbird air show, is effective communications. Pilots need to talk to each other and to the ground. The support personnel need to communicate amongst themselves and other key members of the Thunderbirds team need to interface with the Tower, Weathermen and the air show coordinator, or "Air Boss". In addition to the RF communications, the Thunderbird air show also uses both music and narration to pump up the crowd. With such an important task at hand, the

Thunderbirds travel to each location with an 8000 pound, red, white and blue communications trailer affectionately nicknamed, "Christine."

Christine has state of the art everything! At most air shows, the crowds can number as many as 100,000 people or more, and stand along a half a mile long flight line. The

Thunderbirds bring a complete sound system, capable of delivering music, narration and cockpit announcements to the masses. Three pre-programmed digital mini-disk players, provide all of the music used for the tightly choreographed show. The music is mixed-in with live narration and occasional plane-to-plane communications before being sent to the power amplifiers and out to the crowd.

Along with all of the audio equipment, Christine carries wind speed and direction measuring devices for up to the minute monitoring, right on the flight line. Three, combination V/ UHF radios allow team personnel to monitor and talk to everyone involved with the air show. Since it takes several operators to work the communications trailer, signal routers allow each operator to select exactly what he or she needs to hear during the show.



In addition to talking on frequencies for the Air Boss, Control Tower, Ground and Thunderbird Net, the Com crew also monitors the aircraft communications between the Thunderbird pilots. In the air, Thunderbird 1, the Leader of the team, uses a discrete VHF frequency while he calls out each show routine like an NFL Quarterback. At the same time, the two solo pilots coordinate their maneuvers using their UHF radios. All six Thunderbird pilots can hear each other, using their on-board, combination V/UHF radios.



Once the show begins, the ground crew gives constant feedback to the pilots about current wind and weather conditions, as well as providing a valuable real time critique of the teams performance from a show center perspective. In the event of changing weather conditions or an emergency, the communications team can respond immediately with the needed information.

A Data Link system is the newest addition to the communications equipment used by the Thunderbirds. Aboard each of the F-16s, are at least two small video cameras, one facing forward, one looking back at the pilot, (the two seat F-16s have three cameras). These video images can be recorded aboard each aircraft using specially designed video recorders, housed on the left side of the plane. Later, the videotapes can be used to review any portion of an aircraft's performance.

In addition to the on-board recordings, each aircraft is capable of digitally broadcasting not only video and audio signals emanating from the cockpit, but they can also provide the ground crew with a complete look at the aircraft's in-flight data. Aircraft speed, altitude, direction and various other parameters of an aircraft's attitude may be

monitored or recorded on the ground, in real time.

At air shows where local television stations request this service, or at events with large screen TV type projection, the Thunderbirds can provide an in-cockpit view, of any one of the six F-16s used for the show. The Com folks can also switch the video output signal, from cockpit to cockpit, all in real time, during the show! This cutting edge technology makes you feel as if you're right in the cockpit with the team!

At take-off time, minus three hours, it's time for the Thunderbird maintainers to perform a last minute flight line check. Each of the aircraft crew chiefs, fire up their birds, and do a complete engine and communications evaluation. On the rare occasion that even a minor problem develops with one of the six F-16Cs, Thunderbirds 7 or 8 will be called upon to perform their back-up function. While an F-16 may be one of the best fighter aircraft in the world, it is after all, still a machine... not so with the people who fly the plane.



Each Thunderbird pilot is specifically trained for a unique position in the Delta formation and no two positions are the same. If a pilot can't fly on a particular day due to illness, with safety in mind, the Thunderbird team will fly one jet short, rather than try to substitute a "new" pilot, for the ailing comrade.

With all of the final checks out of the way, and with time to spare, the Thunderbirds are ready, and so is the crowd. Once the flying begins, the audience loses all sense of time, as the six red, white and blue F-16s soar and dive in perfect synchronization. After 45 minutes of beautifully choreographed and breathtaking maneuvers, the flying is complete. After touching down, the Thunderbirds will taxi to their assigned parking spots at show center, with the same precision used in the air. A billow of white smoke comes from the rear of the six fighters, as the team leader calls for the engines to shut down. Then suddenly, all is quiet, except for the cheering of the crowd.



The pilots exit their aircraft, stand at attention and salute their audience. The flying may be over, but there is still one more chance for the Thunderbirds to meet the public as they head for the crowd line. This is the time when the pilots get to answer questions, sign autographs, or perhaps shake the hand of a future Thunderbird.

Following the crowd line visit, the Thunderbirds gather for a post-flight debriefing. The first show day of the weekend has come to a close but tomorrow they'll do it all over again. Sunday is another demonstration and another

chance to put a smile on someone's face. Again tomorrow, the crowd will sense the pride that is within every member of the Thunderbird team.

The Thunderbirds will generally depart the air show location early on Monday morning, with Thunderbird 14 trailing the F-16s by about an hour. On rare occasions, the entire team will fly directly to the next performance site, but normally, the team will head back to Nellis, for a brief rest. From time to time, one or more of the Thunderbird pilots will make a side trip along the way, to scout out a future air show location, or to conduct other Air Force business. Tuesday of each week is a down day for the squadron, and a chance for the team to relax a little. On Wednesday morning, everything starts all over again, a new location, and a new air show. It's been going on this way, for a half a century!

When you are around the Thunderbirds, for any length of time, one thing is clear, they really enjoy doing what they do. If you ask any member of the team if they are heroes, they'll say, "no." They say, "We are not the best... just representing the best." However you look at it, the men and women who make up the current Thunderbird organization, and the thousands of others, who have come before them, are an asset to the United States Air Force and important to America. For the thousands who will join the team after this historic year, may they always remain, forever young.

In 2003, the Thunderbirds are celebrating their 50th anniversary at an air show near you. Why not join in the fun? For more information about the Thunderbirds and a complete list of show dates, you can visit the Thunderbirds website at www.airforce.com/thunderbirds/index.htm An in depth video featuring the 2000 Thunderbird team called "Reach for the Sky" is also available from Mountain Lake PBS, and can be found on the web at www.mountainlake.org

Special thanks to the following: Lt. Col. Richard G. McSpadden, Jr., Capt. DeDe Halfhill, SSgt. Katherine Garcia, SSgt. Brian Bahret, SSgt. Christopher Gish, SrA. Don Yates, and the entire 2002 Thunderbird team. Also, thanks to the public relations group of NAS Willow Grove and Mountain Lake Public Television.



About the Author - *Gary Palamara is a freelance writer with a love of aviation. From 1968-'72, he worked with the Armed Forces Radio & Television Service while serving with the United States Air Force. For the past 30 years, he has been a freelance broadcast engineer. Gary is also an Amateur Radio operator. His amateur call sign is, AF1US. Reach him via email at morningstar938@verizon.net*

copyright 2005