

# Surveying a Wall of Fire

By Judith Frank and David Woolley

Give me the ones with fire in their bellies, a steel-blue glint in their eye. Stand them next to jet engines that rattle vertebrae, pyrotechnics and exploding bombs that put forth a blast of heat that might melt nails and even better, make your guts rumble. Ask them to donate their time, put them in an orange vest and they smile from ear to ear. This is the hardcore surveyor. They love this profession! They'd survey the boundary of Hades just for the hell of it! We at Johnson-Frank & Associates have been very fortunate to have done a variety of survey projects that are cutting edge, over the top and far from mundane. We appreciate the conventional survey that challenges our abilities to fit all of the pieces of the puzzle together, but there are times when we really **relish** our assignment. We take on some assignments that call for "the hardcore". Such a challenge was the opportunity to survey a 2,500 foot Wall of Fire at the annual air show of the Marine Corps Air Station in Miramar, California, the original home of "Top Gun". This Wall of Fire would set a record for The Guinness Book of World Records.

## Little Did They Know

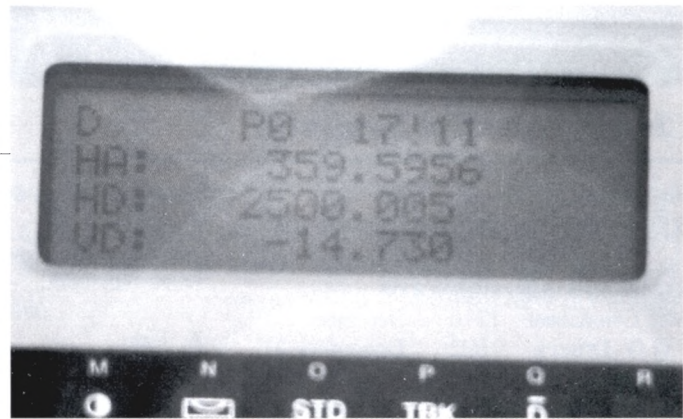
The volunteers, Dave Woolley, PLS, Steve Backes, Party Chief, and Roger Frank, PLS, had not anticipated the level of excitement this 14th day of October 2000 would bring. They had reported to the EOD (Explosive Ordnance Department) three days before the air show for orientation. On October 14th, they set up instruments adjacent to the flight line, working along side members of the MCAS Miramar Marine Corps Explosive Ordnance Disposal Team, the San Diego Bomb Squad, San Diego Sheriff's Bomb Squad, Navy Explosive Ordnance Disposal, Army Explosive Ordnance Disposal, and the Los

Angeles Bomb Squad, to name a few. Our role was to survey and certify the length of a Wall of Fire that would be detonated from bombs and gasoline containers during the grand finale of the show. The Wall of Fire was expected to stretch for nearly half a mile and establish a record for The Guinness Book of World Records.

Prior to the grand finale pyrotechnic event at twilight, the air show was in full swing with the world famous Blue Angels, the F-117 Nighthawk Stealth fighter-bomber, the B-1B Lancer bomber, Mig-17's, P-51 Mustangs, an AV-8B Harrier, an F-14 Tomcat and other aircraft that sliced and punched their way through the sky. The airshow on this day in October 2000 was dedicated to the 50th Anniversary of the Korean War and "The Forgotten Warriors", veterans of the Korean War. Approximately one million spectators filled the stands and milled about on the field to salute the accomplishments of both men and machines. Not a bad arena for setups.

## Miramar's History

Before we tell about the events of the day, let's explore the history of the ground beneath this pyrotechnical setup. What had scorched this earth years before and what events had evolved to make this the home of the Marine Corps' West Coast air power? MCAS Miramar once was part of a huge rancho owned by Don Santiago Anguello, Mexican Army Commandante of San Diego's



Official reading: 2500.005 feet

presidio. According to the historical files of MCAS Miramar's website, Edward Scripps arrived in 1890 from the East Coast and established a ranch on 2,000 acres in the Miramar area. He is credited with naming the mesa Miramar, loosely meaning "a view of the sea" in Spanish. Ownership of Miramar later went to the Jessop family and the area became a settlement of cowboys and ranchers. In 1917 the Army bought the Miramar area and established Camp Kearny. Few permanent structures were in Camp Kearny when more than 65,000 men passed through the camp to mobilize for World War I. After WWI the camp was a demobilization center and by 1920 it no longer served as a military base.

The base came back to life in 1932 when the Navy brought in the U.S.S. Akron and U.S.S. Macon, the largest aircraft of the times. A mooring mast was built for these dirigibles but once the Akron and Macon crashed at sea the Camp was idle once again.



L to R: Steve Backes, Dave Woolley and Roger Frank of Johnson-Frank & Associates, Inc.



Activity picked up again with the advent of World War II and runways were constructed in 1940. During World War II both the Navy and the Marine Corps used the base. In 1947 the Marine Corps moved to the El Toro base in southern California and Miramar was re-designated a Naval Auxiliary Air Station. Although Miramar prepared and supported carrier groups and squadrons during World War II and the Korean War, it was during the Vietnam War that Miramar rose to fame for its program in training air combat maneuvers and fleet air defense. "Top Gun" and "Fightertown, USA" were new aliases for Miramar. In 1993, a Base Realignment and Closure committee decision recommended that Miramar be re-designated as a Marine Corps Air Station. Although all of the Navy's F-14 Tomcats and E-2 Hawkeye squadrons were relocated to Fallon, Nevada, Miramar still houses F/A-18 and KC-130 Hercules squadrons, as well as CH-46E Sea Knight and CH-53E Super Stallion helicopters.

### **Our History with Miramar: Dave Woolley**

Johnson-Frank & Associates has a long and proud history of working with the Southwest Division of the Naval Facilities Engineering Command and subsequently the United States Marine Corps personnel stationed at MCAS Miramar. Back in 1993 we provided research, aerial control and ground utility location for GIS mapping for the developed part of the base from

Interstate 15 to the western boundary. In 1995 we did GPS aerial control and topo for the old Camp Elliott portion of the base. Our most recent project involved surveying the boundary of the 23,500-acre base as well as reviewing, plotting, scanning and indexing every recorded land document within the base

boundary. Our field crews searched for over 800 points and found more than half. We set over 250 boundary corners and did boundary calculations on 2,500 points. We searched for maps and deeds back to the 1850's and scanned over 10,000 documents, including more than 500 maps. The title report items alone numbered more than 550. You could say we have a "working knowledge" of the area.

Our familiarity with the runways at MCAS Miramar is also tied into another survey project that JFA performed in March of 1999 and November 2000. The base personnel had recently installed a new Instrument Landing System (ILS) that would not pass a flight check test. Realizing that I, Dave Woolley, am a licensed land surveyor and not an avionics expert, please stay with me on this; the planes coming in to land need to rely on the ILS when flying IFR (Instrument Flight Rules). Flying IFR means conditions are such that visibility is less than three miles and not VFR (visual flight rules). It is critical that accuracy be maintained when aircraft are flying IFR. Apparently, there was a digital anomaly in the flight graphics when the plane was on approach to the ILS. It was suspected that a reflection/refraction from the ground was the culprit. We were charged with providing a very precise survey of the area. Precise in this case called for ¼ foot contours, vertical profiles, digital photographs and dimensions of all surface features.

I found working 350 feet from the centerline of the runways proved to be a very exciting aspect of the job.

Throughout the day we had F16's doing "touch and goes" right next to us. Even at a distance of 350 feet, these planes rattled me to the bone. They can literally blur your vision with the decibels from the jet engines. Occasionally, other planes will pass through, some stay, others only touch down on a couple of hundred feet of runway, pull up, loop around for another pass and away they go.

I know that this all sounds really enticing, but if you are thinking that you can stroll out to your local base and check this out for yourself, think again. Access to a base can be difficult, access to a runway? Forget it! The survey work turned out to be the easier part. We were required to have an escort at all times and our escort was in constant contact with the tower. We were not permitted to wear caps or any clothing that could become separated from our person. You must request permission to cross a runway or to be within a given perimeter of the apron. Before you are allowed to cross a runway, you must first walk around your vehicle and dislodge any rocks from the tires and do a complete visual inspection of the vehicle. Debris on a runway can be fatal to a flight if sucked up into an engine. There are other rules and regulations, but the picture should be clear. I don't question these standards; I sure wouldn't want to try to explain that a 1986 Chevy pickup was responsible for the demise of a multi-million dollar jet engine.

Now back to this Wall of Fire. As I mentioned, all of the groups involved volunteered their time and all of the materials used were donated. We set out our 2500-foot line as well as 250' intermediate stations. The work was completed using a Geodimeter 500 series instrument. As experts in measurement, we applied all atmospheric corrections, checked our tribrachs and measured the line multiple times from each end. The day of the show we repeated the procedure for the official Guinness witnesses. Marine Corps personnel poured 5 gallons (19-litres) of

Background - Blue Angels



## Show Time - Bring on The Fire

Once the math was done, we sat back to watch the show. Planes screamed through the darkening sky and the fire was detonated. Initially it was a small bonfire but in a matter of seconds it erupted into an unbelievable wall of flames and heat. Flames rose 200-300 feet, dwarfing military vehicles and other structures in view (see photos on page 32). The crowd's hush became a roar and the bomb squad technicians joined in with shouts of resounding approval. The heat could be felt from a distance of 1,000 feet and more. In a matter of seconds it was over but the experience is with us forever. We had been partners in a feat that had never been accomplished before. Expectations were met and the record is published on page 143 in the 2002 hard cover edition of Guinness World Records. We were proud to be a part of the team to set a world record. We also felt pride and satisfaction with the inte-

gral role we played as surveyors to remind us that this profession is not always confined to stay within the nine dots. Surveying may be mundane to some, but to the "hardcore surveyor" there is nothing like a chance to blaze a path to a new adventure and carve a new grin across a weathered face.



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(see page 32 for photos of the Wall of Fire)

### Authors' Note

This article was written prior to the September 11th Attack on America. We are so proud to have worked with these brave young men and women who are serving our country. We know firsthand that they accept a challenge and will do all that is necessary to succeed. We extend our heartfelt sympathy to the families and friends of the brave men and women from the VMGR-352 "Raiders" Transport Squadron 352 who lost their lives on January 9th in Pakistan and the fallen heroes of the "Flying Tigers" HMMH-361 who perished in Afghanistan in support of Operation Enduring Freedom. Semper Fi.

unleaded gasoline into each of 334 bags stretched out in a 2500-foot string. A detonation cord that coiled like a cobra beneath each sack connected the bags. The gasoline bags were spaced 10 feet apart and the cord would burn at a sizzling speed of 25,000 feet per second. Ten drums were placed at points 250 feet apart with explosives in and around them. The explosives were set and we measured the layout.


Our final certification letter stated the length of the line as well as the positional tolerance of each point and relative error in the line. After all of this "precise" work, the Marines added another 30-40 linear feet of gasoline to the lines. There was little question that the line was 2500 feet long. It was a very complex but well coordinated mission. I know that I will not work with a finer group of professionals than Master Sgt. Anderson and the others on the line with us during the project.



Line gasoline bags being filled.



# Wall of Fire



Fully engulfed Wall of Fire (explosives  
seen and military trucks in foreground)

Fully engulfed raging  
Wall of Fire

(See article, page 26)