



## **A Hill Air Force Base, Utah, unit keeps an eye on the sky, making it virtually impossible for aircraft to fly undetected over the United States.**

by Tech. Sgt. Orville F. Desjarlais Jr.  
photos by Master Sgt. Scott Wagers

**W**hile smoke still billowed from the World Trade Center and the Pentagon after the Sept. 11, 2001, terrorist attacks, Pentagon officials turned to the 84th Radar Evaluation Squadron to learn exactly what happened.

Within two hours, the unit from Hill Air Force Base, Utah, had reviewed the radar trails of the four aircraft commandeered by terrorists. Using software the unit developed, evaluators created what's called a track of interest analysis on each hijacked civilian aircraft. Their software eliminated the clutter of all other traffic flying above the United States that fateful day. Imagine looking at the blips on the monitor of an air traffic controller in Los Angeles, multiplying those radar blips by 100 — then zooming in on the flight path of a single aircraft. Nobody else in the Department of Defense has that capability.

The good news was the Hill unit captured most of the flights of all four aircraft and sent that information up the chain of command. The bad news was they had lost sight of United Airlines Flight 93 that crashed in western Pennsylvania, amplifying a defense weakness: America's heartland was exposed to danger. When the hijackers switched off the aircraft transponders — a radio signal that allows air traffic controllers to track each aircraft — the civilian airliners were virtually “invisible” to the Federal Aviation Administration.

“We could show the hijackers when they were near the eastern coast, but the hijacked planes went so far interior that we lost sight of them,” said Master Sgt. Rob Freedman, a squadron superintendent.

Before Sept. 11, the unit focused attention on radars located around the nation's borders. Like wagons in a circle, these fully functional sites were used to protect America from outside threats. There were many more radar sites in the country's interior, but they were only being partially used by the FAA to track commercial aircraft that used transponders. After 9/11, that all changed.



*Inside the Air Route Surveillance Radar - 1E site located at the 9,495 foot summit of Francis Peak in Layton, Utah, Darrell McFarland, the 84th Radar Evaluation Squadron's technical advisor, adjusts the command digitizer that takes an analogue signal and changes it to digital.*

# **The Enemy from Within**

**Inside the Air Route Surveillance Radar - 1E site,** Tech. Sgt. Carl DeWitt (left) and Staff Sgt. James Furnish use an oscilloscope to measure sensitivity time codes on a receiver that evaluates the return signal strength and movement generated by the site's transmitter. This information enables a radar to determine and identify targets. DeWitt and Furnish, radar technicians with the 84th Radar Evaluation Squadron, Hill Air Force Base, Utah, include these measurements as part of a daily maintenance inspection.



“Our aerospace control and air defense missions have traditionally been oriented to detect and identify all aircraft entering North American airspace, and, if necessary, intercept potentially threatening inbound air traffic” said Gen. Ralph Eberhart, commander

of the North American Aerospace Defense Command and the U.S. Northern Command. He’s also the 84th’s main customer. “We are now also focused on threats originating within domestic airspace, such as hijacked aircraft,” Eberhart added.

Immediately after the attack, the 84th was determined to come up with a plan to help keep Americans safe. The unit’s idea was to optimize all the radar sites so the Air Force and FAA could work hand in hand in securing the skies.

There are two radars at every site. The FAA primarily uses beacon radar, which captures aircraft transponder signals. The other radar, known as search radar — the one the Air Force is interested in using — transmits 4,000,000 watts of power to beam signals 200 miles in all directions. It reflects and captures radar signals off aircraft. Before Sept. 11, search radars weren’t used at sites in America’s interior. The Air Force is now interested in using this capability at all sites. If an aircraft’s beacon is turned off, the Air Force can now use search radars to still keep tabs on it.

However, these search radars are pointed too high to track low-flying aircraft. It’s like putting up an electric fence that’s high enough to keep cows from wandering around, but not low enough to keep the wolves out. The idea is to keep the wolves at bay, so the radar unit is sending teams of engineers, radar maintainers and civil engineers across America to make adjustments.

“FAA radar is tilted up,” said Staff Sgt. John Dixon, an 84th radar sensor evaluator. “We go in and jack it down. We also evaluate their systems to find ways to make them better.”

This means not only ensuring the FAA’s 50-year-old equipment is working properly, but also that after analysis and adjustments, the equipment’s performance improves by 10 to 20 percent. The team expects to have all the sites operational by 2006.

The team also makes sure each radar site has a recorder. It’s like hooking up a video cassette recorder to each system. This will give the squadron the capability to record and play back radar data from any of the interior sites and remotely monitor each radar’s performance. The data identifies not only the specific aircraft involved, but also its altitude and location at any given moment.

“We check out every little detail, from antenna to transmitters and receivers,” said Darrell McFarland, the unit’s technical advisor and a team chief. “We balance FAA and Air Force needs.”

The radar sites are scattered across America, and they’re located at the highest points in the regions, usually atop remote mountains. Optimizing all the radar sites means a lot of temporary duty.

Tech. Sgt. Lanis Williams, a radar system evaluator, spends about 180 days a year on such trips.

“What we do is unique,” Williams said. “It’s challenging to work on radars that were made in the 1950s. It’s also good to be on a team that helps

America have a good defensive system. We don’t want to digress into pre-9/11.”

Once all radars are connected to a recorder, 84th radar experts like Master Sgt. John Henderson can keep an eye on possible threats over their sectors of the United States.

“If someone reported they saw a missile overhead, we’d be able to detect it moments later,” Henderson said. He and two other team members are stationed at McChord Air Force Base, Wash. They’re responsible for analyzing data gathered in the western sector, which covers about half of the continental United States. The unit has operating locations in each of the air defense sectors, including Alaska.

The threat of future terrorist attacks is real. They may come in the form of another hijacked aircraft, a missile launched from a civilian ship or even an unmanned remotely piloted helicopter. The helicopter scenario was actually detailed in a manual found in an al Qaeda safe house in Afghanistan in the early days of Operation Enduring Freedom.

“We get information to leaders so they can prevent things from happening,” said Chief Master Sgt. Tim Gordon, chief enlisted manager. “What if we’d had this capability during Pearl Harbor?”

Like everyone else, Tech. Sgt. Kevin Powell watched in horror as aircraft plunged into the World



**Following a 45-minute drive from Hill,** radar technicians arrive at the Air Route Surveillance Radar - 1E site atop Francis Peak.

Trade Center and the Pentagon. Unlike everybody else, the radar analysis chief could also study a computer monitor to see what was being captured by radar. But the radar signals became more than just bright dots on a screen.

“Once you get to the point where you can see past the process, past the blips on the screen, it was pretty sobering,” Powell said. “Looking at the TV and watching my monitor brought the human factor right to the front. I really felt the impact. It made me feel sad to know that my job is driven by tragedy.”

It’s a tragedy he and the rest of his unit hope they can deter in the future by upgrading all the radar sites in the United States — forever being able to detect the enemy from within. ☘

## Crash trackers

In 1996, members of the 84th Radar Evaluation Squadron discovered a secondary service they could provide by using radar instruments and unit-developed computer software.

No one realized the valuable contribution these “event analyzers” could make to search and rescue operations until a C-130 Hercules crashed off the coast of California that year.

While Federal Aviation Administration radars tracked the doomed aircraft until its electronic locator, called a transponder, quit, the unit’s radar analyzers were able to track the aircraft about 43 miles farther. A lone survivor was found in a life raft floating aimlessly in the ocean. The rest of those aboard the plane had died.

Rescuers determined the survivor would have perished if they had flown to the last FAA-recorded location to begin the search. Since 1996, the 84th contributed to saving 13 lives.

Recorded radar data is a valuable part of safety and

accident boards investigating military and civilian aircraft mishaps. The 84th analyzes the data and provides results to investigators.

Data recorded and analyzed by the squadron helped capture the final minutes before TWA Flight 800 broke up over the Atlantic Ocean in 1996, followed the flight paths of the terrorist attacks on Sept. 11, 2001, and helped determine the circumstances surrounding a multitude of other airplane crashes.

Within minutes of the Columbia disaster, the squadron was asked to find space shuttle debris scattered throughout eastern Texas.

“Within two hours of being notified, our products were on their way to the Pentagon,” said Master Sgt. Rob Freedman, a unit superintendent.

The radars picked up and tracked the pieces of the shuttle as they fell to Earth. The squadron then evaluated the data to determine which signals were shuttle debris and where they had likely landed.

— Master Sgt. Sonja C.R. Whittington  
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