

Live From The Boneyard

Code One

Jeff Rhodes

"I like coming out here at dusk. Most of the employees have gone home and it's quiet. A breeze will blow and a rudder will move slightly and creak. Once the sun sets, the metal skins cool off and contract. It almost sounds like the aircraft are waking up and starting to talk to one another," noted Teresa Pittman, the business affairs liaison with the 309th Aerospace Maintenance and Regeneration Group at Davis-Monthan AFB, Arizona. "With the ambient noise and the animals running around, there's more going on here at night than you might think. There's a whole lot more going on here during the day than you might think, too."



The US Army Air Forces began storing aircraft at Davis-Monthan AFB, Arizona, on 1 April 1946. Since then, this 2,600-acre facility widely known as The Boneyard, has had the image of only being the end of the line. But the primary purpose of The Boneyard is storing aircraft. Since 1964, Davis-Monthan has been the primary storage area for all US Department of Defense aircraft. This F-111, formerly assigned to Cannon AFB, New Mexico, is one of the last Aardvarks in storage at the Boneyard.

The US Army Air Forces began storing B-29 bombers and C-47 transports at Davis-Monthan on 1 April 1946. Since then, this 2,600-acre facility widely known as The Boneyard, has had the image of only being the end of the line where military airplanes went to be scrapped. Even a previous name—Military Aircraft Storage and Disposition Center—reinforced that impression.

But the primary purpose of The Boneyard is storing aircraft. Since 1964, Davis-Monthan has been the primary storage area for all US Department of Defense aircraft and, recently, for aircraft from two Allied nations. Currently, there are about 4,000 air vehicles of all types stored in neat rows along with 7,000 engines and close to 400,000 pieces of tooling used to manufacture a variety of aircraft, including B-1 and B-2 bombers, A-10 close air support aircraft, and C-5 transports.

The chief reasons for selecting Davis-Monthan as the site for this storage center are Tucson's meager rainfall—less than eleven inches a year—low humidity, and alkaline soil. These conditions make it possible to store aircraft indefinitely with a minimum of deterioration and corrosion. In addition, the soil, called caliche, is very hard, making it possible to park aircraft in the desert without having to use concrete or steel parking ramps.

But not every aircraft or helicopter that is flown to the Boneyard stays there. In addition to a relatively small number that are only stored temporarily, some aircraft are towed from their desert parking spots and returned to service every year. However, most of what comes out of The Boneyard is aircraft parts.

With a small number of active duty military personnel and nearly 700 civilian technicians, the AMARG team returns an average of 12,000 parts to service every fiscal year. "Many parts, particularly for older aircraft, can't be found on the open market," noted Pittman. "It's usually cheaper to get the parts here from stored aircraft than it is to manufacture them. The parts we reclaim often keep a fleet from being grounded."

Spraylat On, Spraylat Off

The numbers vary, but more than 200 aircraft come into the Boneyard every year. In nearly every case, the aircraft are flown in. The delivery pilot or crew taxis to the end of the Davis-Monthan runway, goes through the open gate, and parks on the AMARG ramp.

The pilot signs the release and the AMARG recovery team takes possession of the aircraft and all of its maintenance records. "We check and make sure the data plate is on board the aircraft," noted Pittman. "Later, we'll do a comprehensive evaluation of the aircraft's condition to make sure exactly what's there and what's not."

The next stop for a newly inducted aircraft is the flush farm where the fuel system is purged. Replacing the fuel with 10/10-weight oil, each engine is run up briefly and shut down. The oil is then drained. This process leaves a residual protective film in the tanks, fuel lines, and engines. Oxygen, hydraulic, and pneumatic systems are also preserved. The aircraft then goes to the wash rack where it is thoroughly cleaned.

Aircraft preservation follows. Large seams, joints, and control surfaces, as well as canopies, windows, and openings on the upper half of the aircraft are taped over and barrier paper installed to keep moisture out.

A thick black layer of sprayed-on latex, called Spraylat, is then applied. This serves as the preservative layer. White Spraylat is then put on top of the black Spraylat to provide temperature control. The white Spraylat keeps the aircraft interior ten to fifteen percent cooler than the outside temperature. A relatively recent innovation is that on many larger aircraft, breathing tubes—PVC pipes pointed toward the ground—are installed to ensure interior air circulation.

"Every 180 days each aircraft is checked for whatever animal or bird would like to make its home inside," noted Pittman. "We check the seals on the Spraylat and the plane's overall

general condition. Every four years, we'll completely re-preserve an aircraft." Re-preservation sometimes includes running the engines.

The Scarlett Letter

Aircraft at AMARG are characterized by how they are stored. "Type 1000 storage is inviolate storage: do not touch them. Type 3000 storage is flyable hold. The engines on those aircraft have to be run up regularly," said Pittman. "The majority of the aircraft here are in Type 2000 storage, which is parts reclamation."

When an order comes in for a particular part—for instance, a hydraulic pump for a C-130E for an international operator—the AMARG technicians use a negative inventory system to find it. Checking the inventory, the remaining pump in the best condition or with the fewest flight hours is chosen. The aircraft where the part is located is identified. The pump is removed, checked, and then prepared for shipment.

Shipping parts is an art in itself. Nothing is standard. Usually a specialized container for a particular part has to be built at the on-site carpenter shop. For large structures like wings, the shipping container is simply built around the outgoing part.

Over time, some of the Type 2000 aircraft are reduced to skeletons with multiple parts and structures removed. A good example is the early 1960s-era WB-57 high altitude reconnaissance aircraft. To keep the three WB-57s flown by NASA operational, several of the remaining EB-57 airframes at AMARG have been picked almost clean of their parts. The AMARG carpenters simply build wooden stands to support what remains of the aircraft.

Once an aircraft is determined to be excess to government needs, it goes into what is called Type 4000 storage. "These aircraft have been used up for parts support and the next step will be destruction," observed Pittman. "A big, red letter D cancelled with an "X" painted on the nose means that particular aircraft has been demilitarized, toxic materials have been removed, and is ready to be scrapped."

Shortly after the Royal Australian Air Force, the last operator of the F-111, retired its fleet in 2010, the aircraft stored at AMARG were moved into Type 4000 storage. What had once been several hundred F/FB-111s have nearly all been scrapped. The last of the nearly 260 C-141s stored in the desert was cut into sections and destroyed in place in early 2013.

Other well-known aircraft types are also disappearing. AMARG regenerated its last F-4 in support of Air Combat Command's full-scale aerial target program in 2013 after it spent nearly twenty-four years in storage. Of the thousands of Phantom IIs built, most have been scrapped and only a small number remain. Likewise, only ten F-14 Tomcats currently being held for museums are in storage at AMARG.

"Close to 300 aircraft get cut up or disposed of each year," noted Pittman. "Most of them go to one of several privately-owned scrap yards just beyond our fence."

Some Come Back

Not every aircraft at AMARG ends up with a big red D. Some are pulled into AMARG's large, fifty-two year-old open air maintenance shed—soon to be augmented with a state-of-the-art maintenance hangar—and returned to flight.

In 2013, the first of four retired US Marine Corps KC-130R tankers was pulled out of long-term storage, made airworthy, and flown to Hill AFB, Utah, where the 309th Maintenance Wing, AMARG's parent unit, is upgrading and modernizing them for service with the Japanese Maritime Self Defense Force.

Under a US Navy program for an international operator that began in 2007, a dozen P-3C Orions have been pulled out of storage at AMARG, disassembled, and trucked to the Lockheed Martin facility in Greenville, South Carolina. There, these maritime patrol aircraft are receiving new wings and other structural improvements under the P-3 Mid-Life Upgrade, or MLU, program, as well as receiving new avionics and mission equipment suites.

Since the 1980s, older fighter types stored at The Boneyard, such as F-100s, F-106s, and F-4s, have returned to flight—although without pilots in the cockpit—as full-scale aerial targets. Now, early model F-16s are being converted into target drones to give pilots who are training in F-22s and F-35s a highly maneuverable, more technologically worthy air combat adversary.

"When we start to restore an aircraft to flight, the first step is removal of the Spraylat with a high pressure hose," noted Pittman, who has been at AMARG for more than twenty years. "The Time Change Technical Orders that an aircraft had missed while it was stored are taken care of. Then there's a complete inspection. We drain out the residual oil and replace the rubber gaskets and seals. We do a hydraulic line check, run the engines, and attend to anything else that's needed to get the aircraft ready to fly."

AMARG also regularly hosts Crash-Damaged/Disabled Aircraft Recovery teams for training and in the past, hosted Aircraft Battle Damage Repair classes. "Those units come here to practice," Pittman said. "They train in the back of the long-term storage area. They certainly have exercise materials available."

AMARG is popular with the general public as well. Five days a week, the next-door Pima Air & Space Museum buses visitors through the complex. Close to 30,000 people a year tour the Boneyard to see several thousand C-130s, P-3s, F-16s, S-3s, C-5s, E-2s, F/A-18s, KC-135s, B-52s, and several other aircraft types parked in one place.

Visitors are also driven down Display Row where some historic examples of most major types of aircraft stored at the site is on exhibit along with some one-offs, like a US Navy T2V SeaStar trainer that dates back to 1956, which is one of the oldest aircraft at AMARG. Nearby, an LC-130R, nicknamed The Phoenix, was the Ski-Herk that crashed in Antarctica in 1971, was repaired on the ice nearly seventeen years later, and then returned to service.

"AMARG is also a popular spot for TV shows," said Pittman. "Larry the Cable Guy filmed a special here, the Jeopardy! Clue Crew has been here; the History and Travel Channels, BBC,

and the Smithsonian channel have all filmed specials there." A couple of C-5As and C-130s were used as part of an obstacle course for the TBS show *The Great Escape* in 2012.

"We are a unique national resource. What we do here is pretty important," concluded Pittman. "There really is a lot going on here."