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Home to Out-of-Service Marine Corps Aircraft, Arizona Desert Facility is More than Just a “Boneyard”

By Sara W. Bock

“Plane graveyard.”
“Aviation junkyard.”
“Where airplanes go to die.”

These are just a few of the misnomers that are commonly heard by personnel at the Air Force Materiel Command’s 309th Aerospace Maintenance and Regeneration Group (AMARG), located at

Davis-Monthan Air Force Base in Tucson, Ariz. And while the AMARG’s official nickname is the “Boneyard,” even that term seems to fall short of adequately characterizing the important role the facility plays in ensuring the continued viability of military aviation.

It’s not shocking that many perceptions

of the AMARG are misguided. It’s historically been viewed as a somewhat mysterious place, closed off to the general public with the exception of bus tours down its “Celebrity Row” of iconic aircraft, narrated by docents from the neighboring Pima Air Museum. For many, the only way to catch a glimpse inside



the fence that surrounds the Boneyard is on the big screen, where it provides a distinctive backdrop for heart-pounding action scenes in box office hits like “Transformers 2: Revenge of the Fallen.”

Covering 4 square miles of arid desert, AMARG is home to approximately 3,400 military aircraft—1,500 of which belong to the Navy and Marine Corps—as well as more than 6,000 aircraft engines. It is the largest facility of its kind in the world and the only repository for out-of-service military aircraft in the United States. Consequently, it’s a unique entity not only within the Air Force but also in

the entire Department of Defense, and is commanded by active-duty Colonel Jennifer M. Barnard, USAF, who manages the approximately 800 civil servants and contractors who keep the facility functioning smoothly on a daily basis. The work that goes on at the Boneyard, which includes storage, preservation, regeneration, parts reclamation, and disposal, as well as occasional depot-level maintenance, is all conducted with a singular mindset: that the needs of the warfighter are of the highest priority.

Within the vast areas designated for aircraft storage, row after row of helicop-

An aerial view of the 309th AMARG at Davis-Monthan AFB in Tucson, Ariz., shows the expansive swath of land that is dedicated to storing out-of-service military aircraft. (Photo by SSgt Perry Aston, USAF)

ters, fighter and attack jets, tankers and other aircraft rest directly on the rock-hard desert caliche soil, which is ideal for supporting their weight, eliminating the need for paving. Boasting low humidity year round and all but immune to natural disasters like earthquakes, tornadoes or hurricanes, the Tucson area offers prime real

A \$25 million high-bay maintenance hangar was unveiled at the 309th AMARG in December 2015. With nearly 80,000 square feet of space, the hangar accommodates a variety of aircraft for maintenance, repair and inspections for future regeneration. (Photo by SrA Chris Massey, USAF)



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Above left: Perhaps the most well-known of this CH-46 Sea Knight's exploits was in 1975 when, under the call sign "Swift 2-2," it took off from atop the U.S. Embassy in Saigon, carrying the last U.S. Marines in the city as it fell to the North Vietnamese. The helicopter now rests at the Boneyard and eventually will be relocated to the Castle Air Museum in Atwater, Calif.

estate for the outdoor storage of aircraft that are no longer flying but still remain viable assets to the Armed Forces.

Naval Air Systems Command (NAVAIR), which provides full life-cycle support of naval aviation aircraft, weapons and systems and foots the bill for all Navy

and Marine Corps aircraft stored at the Boneyard, is one of the AMARG's biggest customers, second only to the Air Force itself.

"They're a significant part of our business and therefore they're significant members of our team," said Steve

Schumacher, former deputy director of the 309th AMARG, of the Navy and Marine Corps, which provide 30 percent of the Boneyard's business and maintain a permanent presence there in the form of a Navy Field Service Office. And it is, indeed, a business. As a working capital



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Above: Out-of-service C-130 Hercules, some of which belong to the Marine Corps, are parked neatly in rows at the 309th AMARG in this 2016 photo. Currently, there are more than 300 C-130s at the Boneyard, making the Hercules one of the most represented aircraft on the premises—second only to the F-16 Fighting Falcon.

Below: As they are now completely retired from flying service, the Marine Corps EA-6B Prowlers have become more visible at the Boneyard in recent years.



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fund, said Schumacher, the 309th AMARG charges the entities that own the aircraft for the services they provide, which in turn funds the salaries, equipment and parts needed to keep the facility running.

The public affairs staff at Davis-Monthan AFB and 309th AMARG provided *Leatherneck* with a rare opportunity to get an up-close look at the Boneyard's seemingly endless stretches of static Marine Corps aircraft, which are tucked

into various corners of 2,600 acres of land, adjacent to planes and helicopters once flown by the Navy, Air Force, Army, Coast Guard, some foreign military allies and federal agencies like NASA and the United States Forest Service.

There's an unmistakable, eerie stillness one can sense when walking around the Boneyard, a stark contrast to the cacophony of rumbling engines the enormous cache of aircraft would make if each were

simultaneously fired back up. The only movement in sight is from the snakes, gophers, jackrabbits and other native critters that occasionally scurry around in the shadows of wings and rotor blades.

The desert sun beats down on dozens of EA-6B Prowlers, retired in recent years following the sundown of the Marine Tactical Electronic Warfare (VMAQ) squadrons at Marine Corps Air Station Cherry Point, N.C., and now neatly tucked into lines with just a few feet separating them. Just a few rows down are F/A-18 Hornets with AV-8B Harriers adjacent. They will continue to trickle in to the AMARG as they are replaced in the fleet by the F-35 Lightning II Joint Strike Fighter. The large footprint of KC-130T Hercules cargo tankers, which have been replaced by the KC-130J Super Hercules variant, requires the aircraft to occupy a considerably large plot of land.

One CH-46 Sea Knight helicopter boasts the famed "white top" Marine One presidential helicopter transport paint scheme; another's tail number indicates that it once flew under the call sign "Swift 2-2," the last to lift off from atop the U.S. Embassy in Saigon in 1975, with Marine security guards on board as the North



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Above: A newly arrived USMC F/A-18 is temporarily stored under a shelter where technicians with the 309th AMARG will remove its egress system prior to the final stages of preservation, Sept. 9.



COURTESY OF 309TH AMARG

This aerial photo, taken sometime prior to 1966, shows F-8s, F-3s, A-4s, P-2s and S-2s stored at the Boneyard in an arrangement similar to the way the aircraft are stored today.

Below: Marine Corps AH-1W Super Cobras sit directly on the desert soil at the 309th AMARG Boneyard. The climate and conditions in Tucson are ideal for the outdoor storage of military aircraft.



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ATC BLAKE GONZALES, USAF



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Above left: A 2019 “Boneyard Run” participant approaches the finish line of the 5K at the 309th AMARG, Oct. 5. The annual event is open to the public, making it one of the very few opportunities for visitors to set foot inside the facility.

Above right: An AMARG employee holds a C-130 Hercules engine starter that was processed, cleaned and shipped out to the active fleet within 72 hours of the initial work order tasking in 2013. The facility’s leadership emphasizes that the needs of the warfighter always come first, and the AMARG prides itself on being America’s “air power reservoir.”

Vietnamese approached and the city fell, marking the end of U.S. involvement in the Vietnam War.

If these relics could talk, there would undoubtedly be thousands of stories to tell—some harrowing, some light-hearted—yet each a unique part of the history of Marine aviation. On many, messages and signatures written in permanent marker on the fuselage by pilots, aircrew and maintainers offer glimpses into some of those stories in a final tribute to a beloved “friend.”

But despite their appearance in desert storage, none of the aircraft are futile. Many will remain there for years as sources of replacement parts that will keep other aircraft of their kind flying safely—continuing to serve as an asset to operational readiness, just in a different manner than in its previous life. Others will be transferred to museums where their presence will inspire the next generation of aviators or, for some, provide a walk down memory lane. Some will eventually be disposed of

and recycled, but only after every usable element has been removed. A few will be sold to qualified recipients such as foreign military allies, state governments, schools or veterans organizations.

Occasionally, aircraft will be destined for a more unusual fate, like the front of an Air Force F-15 that was crated and shipped from the Boneyard earlier this year at the request of Air Force Recruiting Command, bound for a Captain Marvel movie display at Disney California Adventure Park in Anaheim, Calif.

Most notably, some of the aircraft at the AMARG are simply in storage, with an average of 100 each year regenerated and returned to flying status.

It's a solution the Marine Corps has turned to several times in recent decades.

Faced with readiness issues within its fighter squadrons—particularly due to delays in the F-35 program and a dwindling number of mission-capable F/A-18 Hornets—the Marine Corps announced in 2016 its plans to retrieve 23 out-of-service F/A-18s from the Boneyard to refurbish them, update their avionics and deliver them to the fleet.

And this year, while the U.S. Navy Blue Angels demonstration team awaited the delivery of a KC-130J from the United Kingdom to replace the recently retired legacy model “Fat Albert” aircraft, NAVAIR looked to the Boneyard for a C-130 to be flown by the team's Marine pilots in the meantime. The C-130, nicknamed “Ernie” by the team, retained its standard gray exterior rather than receiving the Blues' signature paint job.

When an aircraft is regenerated, AMARG can use its own personnel to do

the necessary work or do the work in conjunction with another entity. In both of the aforementioned cases, NAVAIR sent Marines in to do the work, and AMARG provided the organic logistics support at a significant cost savings to the Department of the Navy.

Regenerating aircraft from the Boneyard is a practice that has been going on for the entirety of its existence. Established in 1946 as a solution for the post-World War II surplus of B-29 Superfortress bombers and C-47 Skytrain transports flown by the Army Air Corps, the site in Tucson was an obvious choice.

“Davis-Monthan was already here—it was a training installation in the 1940s for bomber crews,” said Robert Raine, a retired Navy public affairs specialist who serves as the AMARG's “workloader,” coordinating with customers—particularly museums—and handling requests for aircraft production tooling, which the facility also stores in the event that the equipment is needed to make parts or components for aircraft that are no longer being produced.

The Boneyard predates the Air Force

itself, which was established a year later in 1947; AMARG subsequently became an Air Force command. According to Raine, the Air Force pulled more than 400 B-29s from the Boneyard in 1950 when North Korea invaded South Korea and the U.S. entered the Korean War, doubling its number of operational bombers and helping ensure its air superiority throughout the war.

In 1965, Secretary of Defense Robert McNamara ordered that the 309th AMARG store aircraft from all branches of the Armed Forces. It's a move that deputy director Schumacher says continues to make logistical sense as it keeps costs low and allows for movement of planes without having to coordinate among multiple storage sites.

Additionally, the workforce at the 309th AMARG has the technical prowess to keep up with the demand.

According to Raine, most aircraft coming to the Boneyard for storage are flown there, and from the time the pilot lands the aircraft, AMARG guarantees that it will be in storage within 60 days. During those two months (or less), a series of prepara-

A Marine Corps F/A-18 with the markings of Marine Fighter Attack Squadron (VMFA) 112 is relocated via a “tug” vehicle to its designated location at the Boneyard, Sept. 9, where the final steps in the storage preparation process will take place.



tions ensure that they will be properly preserved and protected from the elements.

First, they are taken to the “fuel flush farm,” where the fuel system is flushed out and injected with preservative oil. For aircraft with egress systems and ejection seats, the cartridge activating devices or detonator cords are frequently removed following the fuel flush, depending on the customer’s request. These aircraft are marked with green crosses while those whose egress systems remain intact are marked with red warnings on the side. They then head to the wash rack where Navy and Marine Corps aircraft are generally washed twice due to their frequent operation in highly corrosive saltwater environments.

After the aircraft are moved to their designated home in the desert, protective tape is applied to all crevices and gaps and a barrier “paper,” which actually is an aluminized canvas, is placed over the engine inlets. Two different types of spray-on seal, one black and one white, are applied as protective coating, which lowers the interior temperature of the aircraft, helping preserve any electronics



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AMARG personnel spray a layer of black protective material onto an F/A-18 as they prepare it for storage, Sept. 9. The layers help lower the internal temperature of the aircraft, while also sealing up any crevices to keep dust, water and critters out.



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The nose of a Marine Corps F/A-18 in storage at the Boneyard served as a blank slate for the squadron’s Marines to write their farewells to the Hornet.



or avionics within the cockpit. Once the protective process is complete, the aircraft is not forgotten. Every six months, a preservation team performs an inspection, and the spray-on process is repeated each time the coating is cut through to remove parts.

The AMARG uses different storage designations to categorize the aircraft, said Raine. No parts can be reclaimed from Type 1000 storage aircraft, which can be returned to flying service if needed—for Navy and Marine Corps aircraft, Type 1000 storage is the “CNO’s [Chief of Naval Operations’] war reserve,” said Raine. Type 2000 storage aircraft can be used for parts reclamation, but only by the entity that owns it. As of Sept. 9, NAVAIR had reclaimed 282 F/A-18 parts from its Boneyard storage, with an estimated value of \$68 million if the parts

had been purchased new—not to mention the time saved by sourcing parts that can be shipped out the next day rather than waiting for a new part to be manufactured. It also has saved a staggering \$22 million on 139 parts harvested from AH-1 Cobras and UH-1 Hueys stored at the AMARG.

Aircraft in Type 4000 storage, which is not a category NAVAIR selects for Navy and Marine Corps aircraft, are reclaimed until disposed. Any government agency or U.S. service and occasionally foreign allies, depending on their military sales agreements with the U.S. government, can reclaim parts from them, Raine added.

Fielding daily requests for reclaimed parts to keep aircraft flying, the AMARG’s skilled personnel—most of whom served in the Armed Forces and many of whom are retired military—take pride in their

ability to turn around parts quickly and efficiently.

“If it’s something going to the warfighter deployed somewhere, that’s the first thing we’re going to work before anything else, and that’s built into our DNA here,” said Schumacher.

Disposal is the eventual fate of those aircraft that are no longer useful to the entity that owns them. Any and all radiological materials are removed as well as any other hazardous materials such as asbestos. Once it has been cleaned out environmentally, it’s marked for disposal and picked up by Defense Logistics Agency, which contracts with a disposal contractor to shred the aircraft, said Raine, pointing out a group of Navy and Marine Corps A-4 Skyhawks that had been marked as ready for disposal.



Left: This 2012 photo offers a birds-eye view of the meticulously arranged aircraft in storage at the Boneyard.



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Above: An F/A-18 boasts the signature paint job of the “Black Knights” of Marine Fighter Attack Squadron 314, which in June retired its last Hornet to transition to the F-35C carrier-capable version of the Lightning II Joint Strike Fighter.

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The period of time just after the Vietnam War, said Raine, marked the highest number of aircraft the Boneyard has housed at one time: a staggering 6,100. But running out of space is not an immediate concern. Currently, approximately 300 aircraft leave the boneyard each year—including those that “go to scrap”—and approximately 300 come in.

From the business side, it’s important that the AMARG leadership is attuned to the possibility of any future events that might cause an influx in their workload.

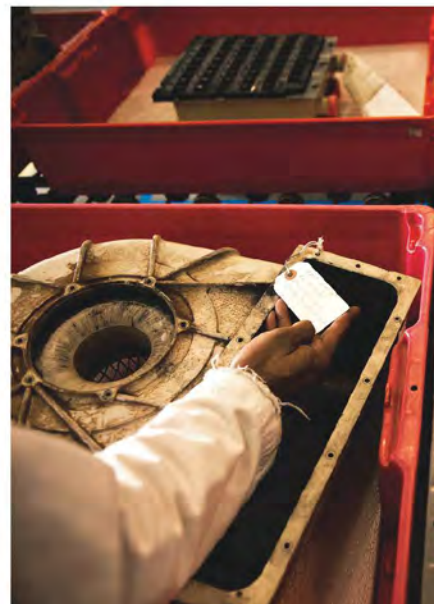
“Some of our business is highly sensitive to what’s going on in the larger services, especially,” said Schumacher, noting that planned aircraft retirements are of particular interest to the AMARG for preparation purposes. “What we find ourselves having to do is stay a little bit

closer connected than most people would expect to what’s going on in the political realm and in the force structure realm ... we try not to be reactionary, but try and anticipate so that we can actually respond.”

By anticipating what’s to come, the 309th AMARG is better equipped to respond to the needs of the warfighter. After all, said Schumacher, they call themselves “America’s air power reservoir.”

And aside from making huge contributions to the readiness of military aviation, there’s an added bonus for those who spend their days preserving and regenerating aircraft and reclaiming parts, Schumacher said with a twinkle in his eye:

“If you like aircraft, there’s no better place in the world to work than here.”



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Frank Luna, a priority parts puller with the 309th AMARG, double checks parts labeled for processing from previous work orders in January 2013. The red bins signify the parts are the highest priority.