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Feature

NAVAIR Spearheads Corrosion Prevention on Prowler and Seahawk Fleets

New Antenna Gaskets Improve Aircraft Readiness and Accessibility

By Cynthia Greenwood

It was dark and rainy around 7 p.m. when the aircraft carrier U.S.S. Constellation conducted flight operations in the Strait of Malacca after leaving Singapore during a scheduled deployment. It was December 2002, and two Navy EA-6B Prowlers named SKYBOLT 500 and SKYBOLT 502 had returned from a routine training mission in the Arabian Gulf.

After landing, the aircrews, assigned to the Lancers electronic attack squadron 131 from Whidbey Island Naval Air Station, went below deck to Maintenance Control for a debriefing.

"The crew of 502 reported that they lost communications in the heavy weather, but 500 reported all was clear," recalled Jay Shannon, the squadron's Quality Assurance Supervisor and a senior aviation structural engineer.

Though both aircraft appeared identical that night, SKYBOLT 500 had been modified with a new gasket sealant designed by Av-DEC, the aviation and electronic parts manufacturer. Shannon and NAVAIR's fleet support engineers attributed SKYBOLT 502's communication failure to a chronic corrosion and grounding problem where radio antennas attach to the aircraft skin.

After Successful Testing, NAVAIR Modifies Prowler Fleet

Traditionally, Prowler aircrews are accustomed to radio interference or precipitation static (P-Static) when they fly through thunderstorms or desert winds. But on the December 11 flight, SKYBOLT 500 experienced no problems at all, Shannon said. "I remember they radioed during the flight and said, 'Hey, I think your gaskets are working.'"

"It was a great comparison because one of them went 'NORDO' ('NO R-a-D-i-O') and one was crystal clear," Shannon said. The NAVAIR EA-6B Fleet Support Team based in Jacksonville, Florida, who developed the installation design and the data required for Shannon's squadron to install and flight-test the antenna gaskets, agreed. Engineers Ronald Headrick and Greg Gross were particularly impressed with the gaskets' performance.

The EA-6B Fleet Support Team took steps to secure funding and permission to install the gaskets on the entire Prowler fleet. Gene Pirosek, the EA-6B Deputy Assistant Program Manager for Logistics, anticipates that 108 Prowlers in the fleet should be outfitted with the gaskets by July of this year.



The Navy's EA-6B Prowler, a fixed-wing fighter aircraft, supports air strikes and ground troops by interrupting enemy electronic activity. Photo Courtesy of U.S. Navy.



Five EA-6B Prowlers fly by the aircraft carriers U.S.S. Constellation and U.S.S. Kitty Hawk. Photo courtesy of U.S. Navy.

But the Department of Defense (DoD) use of the Av-DEC gaskets does not stop there. Since 2000, when the Coast Guard first pursued a fix for antenna corrosion and suggested how the Av-DEC material could solve the problem, the Navy, Air Force, and Army have spearheaded testing and widespread implementation, with good results. In 2004 the Office of the Secretary of Defense Corrosion Policy and Oversight Office granted \$2 million to help the Services modify their fleets. (See "Antenna Gaskets and Floorboard Tapes Lower Price of Aircraft Maintenance," *CorrDefense*, October 2005. [Click here.](#))

Antenna Gaskets Erase P-Static and Radar Altimeter Problems

The likelihood of encountering P-Static in conflict zones such as the Persian Gulf is significant, noted Gross in a report summarizing the gaskets' performance and benefits. The air is moist, salty, and desert winds carry powder-like sand that increases the "impingement friction on leading edge surfaces as the aircraft flies, which causes tribo-electrical charging of the aircraft skin." These factors cause P-Static, the report stated.

For the Prowler, the antenna gasket serves as a corrosion block and offers a better conductive path, Headrick said. "Before the Av-DEC installation, satisfying the design requirements of corrosion prevention and conductivity proved to be a challenging goal for EA-6B structural and electronic engineers," he recalled. "After the installation, corrosion mitigation and current flow are together at last." In Shannon's report to Gross, he reported that SKYBOLT 500 had flown 434 hours in all types of weather while wearing the gaskets, and experienced no P-Static.

Shannon also noticed that the antenna life of the Prowler's radar altimeter (RADALT) has improved considerably since they have been equipped with the Av-DEC gaskets, a self-leveling green sealant, and cable connector wraps. "There are two of these in the tail section aft of the arresting gear, and they are subjected to hydraulic fluid, engine, oil, exhaust, and, of course, vibration," Shannon explained.

"On my last deployment to the western Pacific and Indian Oceans, our squadron never changed any RADALT antennas," Shannon said.

Gaskets Impress Seahawk Engineers and Maintainers

Joshua Honaker, an engineer based at the Marine Corps Air Station Repair Depot in Cherry Point, North Carolina, has been taking steps since 2003 to obtain data, funding, and authorization to outfit all Navy models of the H-60 Seahawk helicopter with Av-DEC antenna gaskets. Honaker, who works on the H-60 Fleet Support Team, started collecting data on the gaskets' performance after testing them on three SH-60Bs—missile-laden helicopters that engage in anti-submarine warfare—based at North Island Naval Air Station near San Diego.

"When we pulled the antennas off the aircraft, they looked the same as they did the day we put them on," Honaker said. The positive results enabled Honaker to initiate a change to the aircraft's airframe, which translates into numerous specification adjustments within NAVAIR logistics, supply, engineering, and technical publications. Honaker took it upon himself to compile a cost-benefit analysis for the Navy while he searched for funding.

To outfit the Seahawk fleet, he worked with Craig Matzdorf, Senior Corrosion Engineer at NAVAIR (Patuxent River, MD), to secure a portion of the gasket grant money from the DoD Corrosion Policy and Oversight Office, which offered more than \$400,000 for parts, and the Defense Logistics Agency (DLA), which contributed \$250,000 for engineering and administrative labor. NAVAIR added \$90,000 to help Honaker's team complete the project.



Dave Schmidt, Military Programs Manager at AvDEC, (left) works with Navy engineer Joshua Honaker to install antenna gaskets on an SH-60B aircraft, which was flown by the HSL45 Wolfpack squadron at North Island Naval Air Station during the Iraq war, in the summer of 2003.

"To the maintenance guys, these gaskets are a dream come true," Honaker said. "They spend 17,000 maintenance man-hours per year just on removing, inspecting and replacing these antennas fleet-wide. That's a conservative estimate, and that doesn't include cleaning the antennas or repairs to damaged connectors due to excessive removals." Honaker expects the first Seahawk model SH-60B to be outfitted with the gaskets in February 2006. Other models to follow suit include the SH-60F, HH-60H, MH-60S, and MH-60R. "With the Av-DEC gaskets, we've pushed our inspection cycle from every 28 and 56 days to a 364-day inspection cycle," he said. "In addition, new Navy and Army H-60s coming off the Sikorsky production line are now outfitted with the gaskets."

Air Force and Army Use Antenna Gaskets

In late 2000, the Air Force began examining the gasket material during flight-testing at Patrick Air Force Base. The Coast Guard conducted similar demonstrations at Elizabeth City, North Carolina. After presenting preliminary data about the material's effectiveness, and after finishing more lab testing, the Air Force and Coast Guard Corrosion Prevention and Control Offices granted full approval for field use of the gaskets for their aircraft fleets.



The H-60 Seahawk helicopter.

"Many of the Air Force's aircraft program offices have tested and fully approved the antenna gasket technology since those initial tests were performed," said Dave Schmidt, Military Programs Manager at Av-DEC.

The AMCOM (Army Aviation and Missile Command) Corrosion Office at the Redstone Arsenal in Huntsville, AL, evaluated the antenna gaskets for fleet-wide use on the C/MH-47 Chinook cargo helicopter and the H-60 Black Hawk in 2002. Then they showed it to the CH-47 and H-60 program office staff, who examined its merits and approved it for use for all Chinooks and Black Hawks. The Army is now expanding its application to the OH-58 Kiowa, a small reconnaissance helicopter, and the AH-64 Apache.

The Prowler and Seahawk gasket installation projects are only part of NAVAIR's good fortune and future plans for the technology, since corrosion engineers first learned about its effectiveness. To date, NAVAIR is looking into retrofitting its H-1 helicopter fleet with the gaskets, where the FLIR (forward-looking infrared) pod mounts to the front of the aircraft. It also plans to retrofit the E-6, a special communications aircraft built for deployment in the event of nuclear war. NAVAIR's fleet of F/A-18 Hornet aircraft—a fighter/attack plane that operates from aircraft carriers or land bases—is also planning to use the gaskets.

NAVAIR representatives are starting to incorporate the gaskets into the new designs of the aircraft fleet, including about 10 new platforms, Matzdorf said. "My vision for NAVAIR is to blanket every piloted aircraft we have with these gaskets where it makes sense," he added. "But it just takes time."

For SKYBOLT Prowlers flying in combat in the Arabian Gulf beginning in March 2003 during Operation Iraqi Freedom, communications were critical, Shannon reported. After SKYBOLT 502 went 'NORDO' alongside 500, the importance of the Av-DEC gasket hit home. "It does affect mission readiness," Shannon said.

This article is the second in a two-part series focusing on the widespread applications and benefits of a joint Service initiative supported by the DoD Corrosion Policy and Oversight Office. [Click here](#) to see the first article.