The War on Aging Aircraft:
One Battle Down, Many To Go

By John Milliman

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A Helicopter Combat Support Squadron 5 maintenance crew works on an HH-46D *Sea Knight* on 30 April—almost 38 years after the Navy accepted the helicopter in 1964.

The war began more than three years ago, but victory is still far from secure. Efforts by the Naval Air Systems Command's (NAVAIR) Aging Aircraft Integrated Product Team (AAIPT) to keep Naval Aviation a step ahead of the debilitating effects of age are starting to pay off. "The first battle was merely getting on the scope," explained Bob Ernst, head of the AAIPT at NAS Patuxent River, Md. "We had to educate the decision makers about something the fleet knew all along—aging platforms and weapons systems are eating our lunch."

Like the other services, the Navy and the Marine Corps face significant age-related challenges in extending the life span of some aircraft into the middle

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—Bob Ernst, Head, Naval Air Systems Command Aging Aircraft Integrated Product Team

Above, Bob Ernst leads a group of engineers, chemists, logisticians, technicians and support personnel to develop, test and field solutions to the challenges of operating aging Navy and Marine Corps aircraft. Right, Dave Kayser engineered several options for tackling obsolescence issues plaguing the F/A-18 *Hornet's* APG-65 radar.

of the 21st century. "The average age of our in-flight refueling and maritime surveillance aircraft is about 29 years," Ernst stated. "If they were cars in Maryland, they would qualify for historic license plates."

Recent congressional testimony by senior Department of Defense officials, including the Chief of Naval Operations, Commandant of the Marine Corps, various service secretaries and members of Congress, indicates that the AAIPT's message is getting through. The decision makers know about the problem, and sometimes knowing about it means more funding to do something about it. "Thanks to the Chief of Naval Operations' drive for near-term readiness, we have the support to make this happen," Ernst said. "Now, we have to actually do something if we want to effectively support these legacy platforms until their replacements start showing up in 10 to 15 years."

The battle plan involved joining the efforts of the AAIPT, which stood up in 1999, with similar teams set up by the other services. This has been accomplished with the formation of the Joint Council on Aging Aircraft (JCAA), a collaborative effort by the Navy, Marine Corps, Air Force, Army, Coast Guard, Defense Logistics Agency, Federal Aviation Administration (FAA), NASA and academia. "The JCAA is a true force/budget multiplier that helps us get fixes to the fleet faster, better and cheaper than we could do it alone," Ernst said. "It also increases our credibility, and makes for a stronger argument on Capitol Hill when asking for funding."

Finding affordable, available and supportable products for the fleet to ease maintenance burdens is the trick, explained AAIPT deputy Lieutenant Commander Lance Hernandez. "When I was in the fleet, I always wondered why it took so long to get something you knew you could get commercially. You stand around scratching your head in the hangar deck wondering why you couldn't just send out to Radio Shack for a replacement. Sure, we could find a part that would work right off the shelf, but would it survive the first trap or the Arabian Sea operating environment?"

According to Ernst, that sums up the big task ahead for the team and JCAA. "You can't take stuff right off the shelf and just slap it on the aircraft. You have to make sure it's available, it can withstand the harsh maritime environment and that the maintainers have the logistics manuals and training to use it. None of these things are hard, but they all require analysis and prototyping," he emphasized.

Already, the AAIPT is starting to field some new technology, albeit without the fanfare accorded to larger programs. "There are a lot of low-tech solutions that aren't sexy," Ernst said, "but they can provide immediate relief once they're mapped to the right application."

Thanks to the team's efforts, a corrosion fighting tool called the SemPen will soon meet the fleet. SemPen is a spot primer/paint applicator that's easy to use, easy to

dispose of and vastly reduces costly overgrinding and painting of aircraft. Also headed to the fleet is another corrosion tool called the radial bristle disk, developed from commercially available automotive paint removing disks that were found to be too aggressive for aircraft use.

To fight catastrophic electrical fires, the team is well along in testing arc fault circuit breaker technology for aircraft use. "A large portion of our funding for developing wiring solutions comes from our FAA and Air Force partners in the JCAA," Ernst added. "I love spending other people's money."

In addition to hardware, the team is developing process tools and cost models to address obsolescence. "A big challenge associated with our aging platforms is that we can't keep up with the rapid change in technology," Ernst stated. "At best, we upgrade our equipment every four or five years. What's killing us is the microcircuit technology upgrades every 18 months. We're often two or three generations behind, so 80 percent of the time our programs have to go to a costly redesign." That's why the team first tries to find old parts to fix a problem before proceeding with a new design.

One example to hit the fleet is an obsolescence fix the team developed for the F/A-18 *Hornet's* APG-65 radar. "We identified drop-in components to replace obsolete and discontinued high-failure components that were degrading mission capable rates," Ernst said. "Some of these components were also used in the Air Force F-15 *Eagle*, highlighting the joint nature of the challenge. The new components avoided a costly redesign while doubling the reliability of the systems."

That might sound easy, but it required a detailed engineering analysis of the microcircuits involved by AAIPT engineer Dave Kayser. "I had to look at the design application, operating environment and configuration failure modes just to identify the root cause and define the problem," he explained. "Then I had to research the available options, remembering that I wasn't allowed to do any major redesigns. Finally, I had to get the parts and prove it." And Kayser isn't quite finished. Doing the whole process once isn't enough, because there are so many configurations in use.

With a few successes soon to be fielded, the AAIPT still has a long war ahead of it that is segmented into five major thrust areas: avionics, corrosion, wiring, dynamic components and engines. "We've just started to scratch the surface," Ernst said, and "begun searching for the common problems in other areas in tandem with our JCAA partners. It's going to require the same focus and discipline to identify, develop and field affordable solutions to keep our legacy warriors viable and affordable—and not on the backs of our maintainers."

Ernst likens the team's efforts to the buildup that led to success in WW II. "We're still doing this as guerilla warfare. We snipe at technology applications from behind rocks. We've got to do this systematically so all the platforms can benefit." He sees the teaming opportunities through the JCAA as ultimately winning the war on aging aircraft, but not yet. "Victory in WW II came after extensive mobilization and buildup of forces, materiel and strategy."

Similarly, fighting the effects of aging aircraft isn't going to be over anytime soon. "We're not quite ready to sail into Tokyo Bay and sign anything just yet," Ernst concluded. "We're still at Guadalcanal. But we're making progress."

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Above, chemist Kevin Koveleski evaluates new corrosion preventive compounds and coatings for possible use in the fleet of aging aircraft. Right, a logbook reflects testing notes by members of NAVAIR's Organic Coatings Team.