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Top Stories

## Air Force Secretary Charges Corrosion Experts to Persist in Changing DoD's Culture

*Former Under Secretary of Defense for A, T, & L Delivers Tri-Service Conference Keynote*

*By Cynthia Greenwood*

Corrosion experts who attended the Tri-Service Corrosion Conference banquet at the Denver Hyatt on December 4, 2007, were treated to a rare appearance by a high-level Pentagon official and policymaker. Michael W. Wynne, confirmed as Secretary of the United States Air Force in November 2005, left no doubt before everyone who listened to him over dessert and coffee that he is as technically well versed as any corrosion science practitioner.

In the view of experts who work behind the scenes to preserve DoD aircraft, ships, and tanks, Sec. Wynne is a refreshing anomaly. A former executive in the private sector, he has also worked for General Dynamics and Martin Marietta. Sec. Wynne has a master's degree in electrical engineering, so he understands and speaks the language of corrosion scientists and engineers. From 2003-2005, before he took the helm of the Air Force, Wynne served as Acting Under Secretary of Defense for Acquisition, Technology, and Logistics, where he presided over an unusual Congressional mandate to make corrosion prevention a true priority throughout the military, Coast Guard, and NASA.



In the keynote address, researchers and engineers working to preserve weapon systems amid shrinking DoD budgets got more than just general kudos. Sec. Wynne talked in detail about how far DoD has come since it first undertook radical change within a military culture that favors the acquisition of new weapon systems.

Sec. Wynne recognized the important ways in which corrosion prevention is now institutionalized within DoD, through projects, training, and profound changes in the DoD mindset. He drew important comparisons between what DoD and the Air Force are doing to combat corrosion. He also reviewed the Air Force's unique progress in measuring the cost and impact of corrosion. He surveyed strategic challenges that have faced the Air Force since the first gulf war, and how ongoing operations in southwest Asia since 1991 have tapped resources needed for recapitalization.

Sec. Wynne further outlined the importance of injecting new capital into DoD and industry's burgeoning movement to preserve the aging aircraft fleet. He offered Air Force success stories in spearheading corrosion prevention technology, citing examples of better test methods for coatings and why they are important. He also lauded groundbreaking cost of corrosion studies by the Air Force, which paved the way for a wave of new studies sponsored by the Pentagon-based DoD Corrosion Policy and Oversight Initiative.

**Here are key excerpts from Sec. Wynne's address:**

### ***Congratulations on Progress***

"Today I want to congratulate you on the great progress you've made since 2003. DoD has funded 82 new corrosion mitigation projects, and there is now a set of DoD-wide instructions on corrosion. DoD has completed cost-of-corrosion studies related to all four services, that includes sections on ground vehicles, aircraft and missiles, ships and submarines, and DoD infrastructure.

"What may be more important than specific projects or studies is that corrosion prevention has increasingly been institutionalized into DoD. The Defense Acquisition University, for instance, has developed a Corrosion Prevention course. We have a corrosion Web site. There is now a standardized training system for corrosion prevention and we have an advisory team. DoD has also continued to refine its corrosion project road map, identifying specific actions that will prevent or mitigate corrosion.

"Above all, there are signs that the DoD mindset has begun to swing from maintenance, to prevention, and even to product design. For instance, there is now a standardized product introduction process. This change in mindset represents a sea change in the way we do business. We've come a long way!

### ***Progress by the Air Force in Measuring the Cost and Impact of Corrosion***

"Like DoD as a whole, the Air Force is doing great things. One of our biggest steps has been to step up measurement efforts. In 2003, I suggested that people pay the most attention to things that are measurable and that are, in fact, measured. To draw attention to the problem and to begin to measure progress we needed to develop accepted baselines. From there we could formulate reliable corrosion cost and impact estimates to guide future resource allocation.

"One of our biggest success stories has been our Cumulative Environmental Exposure Sensor. We use this sensor to identify the potential for corrosion. Currently, we are flying over 1,000 sensors on seven different aircraft types to support condition-based maintenance decisions. The uncoated sensors measure the severity of the environmental exposure and provide a strong indication of expected corrosion rates. The Army is also now using these sensors for its helicopters.

"We are also using exposure racks to measure actual corrosion rates almost everywhere the Air Force operates. We use data collected from the exposure racks to develop and refine algorithms to predict corrosion rates. In one application, we fine-tuned the model for use in areas where we don't have sensor data. Now rather than having to measure for a year to get the information we need, we can predict based on readings taken within a single day based on key measurable parameters such as temperature, humidity, atmospheric chlorides, and so forth. It's a big step forward.

"And these sensors make a difference. Based on the worldwide Environmental Exposure Sensor Data Study results, we made some changes. For instance, we extended aircraft and support equipment wash cycles from a 120-day to a 180-day interval for areas with mild climates. This initiative saves \$7 million annually and provides over 1,000 additional airframe-availability-days across the Air Force.

"These savings are a 20-to-1 return on investment every year, and the indirect costs of man-hours saved by our maintainers are significant."

### ***Air Force Paves the Way with Cost of Corrosion Studies***

"The USAF was also the lead for the *Cost of Corrosion Studies*. We've completed four studies of direct weapon system maintenance costs since 1991. With the demand by Congress in 2003 to capture the costs across all services, the Air Force took the lead in developing a method that would work across all services. These studies will drive future R&D project cost reductions.

### ***Operations Northern and Southern Watch***

"Now, I would like to open the aperture and tell you a little about some of the big strategic issues the Air Force is currently dealing with. Some of this moves well beyond corrosion, but as folks associated with maintenance and logistics, I hope you will appreciate the problem the Air Force is running up against today.

"When the Air Force went to the desert to fight Saddam Hussein in 1991, we expected a short war. As it turned out, however, when the rest of the military went home, the country asked the Air Force to stay to contain and deter Iraq with Operation Northern and Southern Watch. So while it's become popular to call Operation Desert Storm the '*Hundred Hour War*' in the States, to the Air Force it is the '*Seventeen Years and Still Counting War*.' (I'll add as an aside that I don't think that mission is going to end any time soon. Even after our troops come home, I suspect the Air Force is going to have to stay to patrol the skies around Iraq and Afghanistan for a long, long time.)

"Operations Northern and Southern Watch never got a great deal of press, but they cost the nation a lot. The price in wear and tear on equipment in the desert was, and remains, extremely high. Even more than that though, the cost of operations has eaten up the Air Force's recapitalization budget. The result is that our aircraft have steadily continued to age without replacement for almost two decades.

### ***Our Aging Fleet—a Problem for the Air Force***

"Our inventory is by far the oldest in Air Force history. The backbone of the inventory we are flying today, our KC-135 refuelers, the platforms that are essential to keeping Air Force, Navy, and Marine aircraft in the air, were built by Curtis LeMay in the 1950s and 60s. The same goes for our B-52s. Many of our F-15s and F-16s are well beyond their expected life spans.

"At the moment I am living a reliability nightmare, and this problem isn't likely to go away any time soon. For example, we have 50-year-old B-52s that will still be flying when they hit 75. And as Buzz Moseley, our Chief of Staff, likes to say...even with our hoped-for recapitalization, the mother of the pilot who will fly the last KC-135 probably hasn't been born yet.

"Those of you with an interest in maintenance issues may have noticed that we've recently had some trouble with our F-15 inventory. Specifically, one recently broke apart in mid flight. Thankfully, the pilot survived, but we have not been able to ascertain why the plane broke up and, as a result, we had to ground the entire inventory. This is not the first event of this type. While we still are trying to determine causes, we do know that we are beyond the engineering data and are flying into structure margins.

"And this is personal for the Air Force. Quite a few of our senior leaders have children flying those planes. Buzz Moseley, the Air Force Chief of Staff, has a son flying F-15s, as does Dave Deptula, our Deputy Chief of Staff for ISR, along with many others.

"Our stopgap for dealing with the aging fleet has been to improve maintenance. Our maintenance professionals have gotten very good at keeping our planes in the air. They are breaking down barriers to keep these jets flight worthy. We're learning things about reliability, structural mechanics, and fracture mechanics that no one thought we would ever have to know. We have moved beyond the known parameters of aging aircraft. We're in uncharted territory. And this applies to corrosion as well as everything else.

### ***Why We Need to Recapitalize***

"Our stopgap is maintenance, but our solution must be recapitalization. The cost of keeping some of our aging platforms in the air now exceeds the cost of buying new equipment. The readiness rate of many of our planes has dropped far below acceptable levels. Worse yet, our opponents are beginning to purchase new fighters and air defense missile systems that are a match for our 1970s-era 4<sup>th</sup> Generation fighters.

"Again, I'd like to pause for a moment and, though I'm here to speak about corrosion, tell you why this is such a big concern. For the past two decades, the United States has gotten used to fighting wars where we hold most of the cards. In Operation Desert Storm, Deliberate Force, Allied Force, Enduring Freedom, and Iraqi Freedom, it was not uncommon for the United States to inflict hundreds of casualties on our enemies for every U.S. soldier who died in action. Even in Iraq today, our ability to target insurgents within minutes across vast stretches of isolated geography prevents them from massing and saves countless U.S. lives.

"What the country needs to understand, though, is that these low casualty rates are not a birthright. We earned them by staying at least one step ahead of our enemy's technology. Pioneering fantastic new stealth, sensor, and precision technology in the in 1980s and 90s paved the way. But if you want to know what happens when you let your opponents catch up with your technology just look at the more than fifty thousand Airmen who died in WWII attempting to gain air superiority. Once we achieved air supremacy, the ground war changed fundamentally; but it was a long hard fight and a lot of people in the air and on the ground died before we achieved it.

"More recently, consider the vast price we paid for ignoring air superiority technology in the 1950s and 60s. During the Vietnam War, because we did not own the skies over North Vietnam, our joint forces lost over 3,000 aircraft to one of the smallest nations in Asia. Losses of that magnitude are unimaginable today. Yet unless we recapitalize, unless we continue to move our technology ahead, I fear we are headed down that road.

### ***Why Corrosion is of Great Concern—A Charge for the Future***

"To bring the discussion back to corrosion, I'll just say that we are moving mountains in order to ensure that we can recapitalize. As we develop new equipment, we must ensure that corrosion prevention is integrated into our new aircraft and infrastructure. By far, we get the biggest bang for the buck in corrosion prevention by proactively building protection into products.

"A second challenge that will become increasingly important as time goes by involves the environmental impact of corrosion prevention. I'm not telling you anything you don't know when I say that prevention deals with some harsh substances: Metals, Paints, Coatings. As you solve problems involving corrosion, do not set yourself up for a fall down the line by overlooking the environmental impact of what you're doing.

"The trick, I think, will be to think in terms of a balanced scorecard with environmental impact in a prominent place on that card. That means going beyond simple mitigation and thinking in terms of offsets and positive effects. Just as one example, as we think about how to build new shelters, why not think of ways to use all that surface area to place solar cells? I'm not sure how integrating solar paneling might affect corrosion, but it would certainly help us lower our energy footprint and help promote your organizations as environmentally friendly.

"I also challenge you to think of your work as fitting within a larger system. We are already starting to do this with how we build corrosion prevention into our new products; now let's begin to think this way about how our prevention processes relate to the environment. William McDonough recently wrote a book called *Cradle to Cradle* arguing that industries that think in these ways are best equipped to succeed in this century. One of his strongest arguments is the manufacture of the book itself. Rather than using paper, he manufactures the book from polymers that are 100 percent recyclable. I challenge you to think along these same lines as you fight corrosion. It is possible to do well when you do good.

"In conclusion, corrosion prevention isn't a particularly sexy field. Kids don't grow up watching war movies about the role of corrosion. But it is important. Corrosion eats up dollars and decreases readiness. It affects safety. It eats away at our defense. While we're working for the Department of Defense today, what we're doing to stop corrosion goes well beyond DoD. Corrosion is one of those great problems that knows no borders. Likewise, the solutions you develop transcend time and place."