

**NACRA'S GLOBAL WAR ON**

**RUST**

**Feature**



**John Milliman**  
 NACRA Knowledge Management Team

In a centuries-long war against a determined and relentless foe, every little victory helps. NACRA's Technology Demonstration and Development teams have joined with Industry in a new campaign to attack Naval Aviation's most implacable enemy -- corrosion.

"We estimate 90 percent of an aircraft's total ownership cost occurs after delivery," says Ashley Morgan, NACRA's Technology Demonstration project coordinator. "More than

30 percent of that is due to corrosion. Those costs escalate as the aircraft ages."

But more importantly, Morgan asserts, the issue is safety.

"Corrosion can alter residual strength and structural integrity."

Can we win the fight? Sure, says NACRA's resident materials expert, Dr. Suresh Verma.

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**Director's comments**

**Tim Gowen**  
 NACRA Director

"Gentlemen, we have run out of money; it's time to start thinking."

This quote from Sir Ernest Rutherford, nuclear physics Nobel laureate, is as appropriate today for the

Department of Defense as it was when Winston Churchill famously used it.

A difficult fiscal environment is an opportunity to find innovative and creative ways to accomplish the mission – doing more with less. NACRA is doing just that.

Imagine our "world" without stovepipes; where everyone within the organization is aware of everyone else's efforts, to include successes, failures, capabilities

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# T-Rex Update



## Current Projects

- \* **Improved-performance rotor blade**  
*Prep work with vendor to begin testing*
- \* **Non-Line of Sight Missile**  
*Workups for live weapons testing*

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“All you have to do is isolate the metal from the environment of salt and water and you eliminate the corrosion,” says Verma. “But that’s not realistic. The next best thing we can do is find it in its early stages. Especially in areas we can’t see or readily access.”

Like any other form of cancer, human or aircraft, early detection is the key to effective treatment.

“Once you know the corrosion is taking place, you can take action,” Verma continues. “And the earlier the action, the better.”

Traditionally, aircraft are inducted into the depot for complete disassembly and rebuild on a regular basis. While effective in reducing corrosion for awhile, it reoccurs with time during the interval between depot visits and requires additional cost and manhours to address.

And hopefully, the aircraft hasn’t suffered some form of structural failure in the meantime due to corrosion.

“If you can put sensors in the aircraft structure for early detection, and take appropriate corrosion mitigation actions, you can decrease overall downtime and expense,” Verma says. “Not to mention add a higher degree of safety.”

Enter NACRA’s corrosion sensor project that extends development efforts initiated through the Navy’s SBIR Program.

“We’ve installed a combined wired and wireless corrosion monitoring system provided by Luna Innovations, Inc., with installation design provided by Wyle, on our UH-1N testbed helicopter in July 2012 and have been flying it as a ‘ride along’ with our other project work,” Morgan explains. “With this technology installed, we can track environmental

exposure and specific conditions at corrosion hot-spots as a function of time using inputs from various environmental and corrosivity sensors.”

Specifically, the project measures air and surface temperatures, relative humidity, solution resistance and polarization resistance to predict aluminum corrosive activity.

“The wireless hub module was placed on an upper plate in the port aft avionics bay, and the wireless sensor and the wired sensor were placed on a lower plate in the port aft avionics bay,” says Morgan. “The sensors and processing hub gathered and stored environmental data over the next several months. Our test engineers extracted the stored data and sent it to Luna for analysis on a bi-monthly basis.”

According to Morgan, objectives of the on-going project are to:

- Test the operational functionality of the technology in flight and on the ground;
- Validate the data collected by comparing it to actual National Oceanographic and Atmospheric Administration environmental data;
- And demonstrate the capability to easily extract corrosive data in areas not easily accessible to maintenance personnel by using equipment external to the aircraft, integrated with wired and wireless technology.

“Two months after aircraft installation, test results revealed the sensors, data collection and storage systems were operating properly. Data from the wired sensors and the wireless sensor hub were used to classify corrosivity within the airframe, and the environmental measurements were strongly correlated to the NOAA weather station data,” says Luna’s director of Intelligent Systems, Dr. Fritz Friedersdorf.

“This project and the resulting data contributed to the Air Force ordering a total of 20 of these systems for demonstration on Air Force H-60s. The first set will be installed the week of February 18, 2013,” Friedersdorf adds. “This would not have been possible without the Navy’s support and the availability of the NACRA test bed aircraft.”

**‘This would not have been possible without the NACRA testbed aircraft.’**

-- Dr. Fritz Friedersdorf  
*Luna Innovations, Inc.*

# Knowledge Management

Feature Report



It's not *what* you know...  
 Or *who* you know ...  
 But how you share it

Danielle Trow  
 NACRA Knowledge Management SME

## Sharing what you know with who you know

**K**nowledge is power, right? If only it were that simple. It's only powerful if you know what to do with it, and where it is. That's why NACRA decided to re-visit and revitalize a rather old concept: Knowledge Management.

Ask anyone what the biggest asset of their organization is, and chances are they will say "the employees." Obviously, it takes the hard work and dedication of team members to realize the vision and mission of an organization, along with solid leadership, of course.

That's where we have a huge advantage: NAVAIR has a large, diverse, talented, experienced and knowledgeable workforce right at our fingertips. Each NAVAIR employee has an individual knowledge bank, network and resources. But, are we really taking advantage of all of it?

**Knowledge Management**  
 A systematic process of capturing, sharing, storing and applying what an individual, team, or organization knows.

**Elements:**

- Information & operations management** – Cataloging and retrieval systems/processes for the knowledge base.
- Collaboration and networking** – Avoid duplicative efforts! Systematically building and maintaining relationships and networks leverages best practices, reduces overall effort.
- Organizational structure** – Creating structure for your KM plan incorporates efficiency when everyone knows who is responsible for what.
- Learning** – Training, development and sharing must be continuous, especially for knowledge workers. Identifying best practices and sharing the information across platforms will benefit NAVAIR at large. Smart people learn from their experience. Wise people learn from others' experience and pass it on.

With that in mind, NACRA is taking stock of its collective resources and developing a new Knowledge Management discipline.

As with any initiative, it begins with a simple (and hopefully non-eye glazing) definition: Knowledge Management is a systematic process of capturing, sharing, storing and applying what an individual, team or organization knows.

Think this doesn't apply to your office? In this information age, we're all victims of information overload.

The significance of effective Knowledge Management, though, is its role as a catalyst for innovation -- encompassing more than just cataloging new and better technology.

It means understanding people and processes, using the best available technology, collaborating and knowledge sharing. And with that understanding,

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# Info Portal

## R/W R/DAT&E online

**Karen Tippett**  
NACRA Learning Organization Lead

## APP addicted ... at work!

**L**et's face it, if you aren't addicted, or at least highly dependent on your mobile device, you know someone who is. So imagine transforming your work SharePoint site into what looks like a giant smartphone screen on your computer.

NACRA's new internal collaboration site will allow team members to have at their fingertips (mouse) all the websites, documents and applications necessary for collaboration and their day-to-day work. No more trying to find what the site has, what information or what folder contains THE document you need right now, or worse yet, accidentally deleting the only copy on the ShareDrive.

Creating a single source, one-stop-shop "dashboard" not only uses our existing SharePoint portal, but will advance knowledge sharing among the team, eliminate server space issues and set the stage for collaboration

within the wider NAWCAD audience -- All accessed through icons that look very familiar to anyone who has a hard time remembering life before apps.

It's part of NACRA's Learning organization effort -- let us know if we can help you with yours. 



## Tech Devo Team Report

**You can see further when you look across programs, platforms and disciplines ...**

# Technology Development Team

**Katrina Zelonis**  
KM Team

**W**ith its outreach to Academia, Industry and other agencies, "Tech Devo" brings these groups together with the Programs to transition new rotorcraft technologies to where it's needed most -- the Fleet.

Using strategies implemented in the NACRA Strategic Plan, Tech Devo coordinates a variety of activities designed to bring normally disparate groups together in the spirit of collaboration and information sharing.

Industry Independent Research and Development reviews, on-site and electronic communication, workshops, white paper preparation and proposals for technology development are just

a few of the activities we plan and execute in collaboration with industry.

In particular, the team monitors activities at ONR, CTO, DARPA and others places for opportunities to "push technology" to NAVAIR POR and development of plans for effective transition.

Our team members are working with PMAs to identify their technology needs and help connect them with appropriate technology developments.

We're currently coordinating a data fusion proposal to JASPO in conjunction with Boeing.

Other collaborative efforts include preparing DoD-wide degraded visual environment requirements and the preparation of a proposal to ONR regarding multi-faceted approaches

for Dynamic EW Asset Mission Management. In 2012 NACRA accomplished evaluations for ONR-OSD funding of a five-year Basic Research on Photonics.

One of NACRA's many strengths is that we can look across the diverse platform of disciplines and industries as we consider technologies, sustainment and cost-effective components to determine the total ownership cost for the weapon system. We can evaluate technologies for particular applications especially when cross disciplines are involved.

Let NACRA's strengths and cross-discipline experience work for you.

For more information on NACRA efforts, please visit us at: [www.navair.navy.mil/NACRA](http://www.navair.navy.mil/NACRA) 



**DIRECTOR** ..... *From Pg 1*

and limitations. How often have we found several parts of the same organization trying to solve the same problem?

How often have we searched for solutions already discovered by someone else? In this fiscally constrained environment, we can no longer afford such duplication and inefficiencies.

NACRA is helping to do something about this with Knowledge Management. KM refers to how an organization processes organizational knowledge. As I mentioned last time, NACRA has tweaked our mission and vision to reflect our commitment to help the NAVAL rotary wing community.

To help us effect these changes, we have restructured NACRA as well. To be specific, we have created a new and improved Knowledge Management discipline, intent on sharing lessons learned, programs, projects, capabilities, and technology across the NAVAL Rotary Wing Research, Development, Acquisition, Test and Evaluation community. You'd be surprised (or, maybe not) at how hard it is to know what you know!

So, why knowledge management? NAVAIR has a vast, diverse network of talent at our disposal, and we need to make sure we're using it fully!

NAVAIR excels at collecting and processing data. LOTS of data! But that's not enough. KM, as a discipline, is the

systematic synthesis of all that knowledge -- cataloging, analyzing, retrieving it and sharing it to externalize the tacit knowledge.

More than data, though, KM is about people.

Knowing what we know, and sharing it requires an environment of trust, collaboration and interaction which then encourages creativity and innovation across boundaries. Until there are no boundaries! That's a big step, so it also requires having forums or other avenues for information sharing until the change becomes internalized.

**'...It's hard to know what you know...  
That's what we're here for.'**

*-- Tim Gowen  
NACRA Director*

So, as NACRA captures, stores, applies and shares the knowledge within our own organization, we want to hear your rotorcraft questions, issues, comments or even complaints - That's

what we're here for.

Our favorite quote here at NACRA is "none of us is as smart as all of us." This is the foundation of what we are trying to accomplish. We are very excited about it, and want you to get excited about it, too!

We've got a lot of successful experience under our belt with various projects, and although we have been in operation for over four years, there's still a lot we want to sink our teeth into -- a lot that we can help the rotary wing community accomplish.

Check out our website at <http://www.navair.navy.mil/NACRA/> Let us know how we can help you or your team. If you don't find what you're looking for, let us know that, too. If you're not a SharePoint member, contact us at [paxr\\_nacra@navy.mil](mailto:paxr_nacra@navy.mil) for details on joining. 

## Tech Devo helps Boeing's Blade Crawler

As a result of NACRA activities on AIRD reviews of different industry and academia projects, Boeing's *Blade Crawler* non-destructive testing technology was one of the selected projects receiving NACRA help for over a year for technology maturation and demonstration.

This concept provides a way to inspect rotor blades without removing them from the aircraft thereby reducing maintenance labor cost and

perhaps improve reliability through auto-inspections.

After significant coordination and discussions with Boeing and others at NAVAIR, a tech demonstration was successfully done at Fleet Readiness Center East (MCAS Cherry Point, NC) using V-22 proprotor blades Jan. 31.

NACRA coordinated with FRC East to supply V-22 blades during concept

initiation and provided Boeing with significant information to justify their investment for the utility of *Blade Crawler*.

FRC East also helped demonstrate the Boeing hardware at its facility and Boeing used its own resources for developing the hardware and is currently preparing a white paper for NAVAIR funding for development of a prototype and demonstration on one of the NACRA helicopters. 

**KM ..... From Page 3**

you can then say goodbye to encultured knowledge hoarding because you're using the networks already in place around you (that become obvious once we truly shed our concern for who gets the credit or the bill).

Of course, this may be easier said than done; but, building a culture of trust, where mistakes become "growth opportunities" is key to encouraging employee collaboration.

Plus, so much of what we do just seems to be second nature, and it's easy to lose focus on the bigger picture.

Taking a knowledge audit can help an organization codify the information they have and document exactly what their teams are responsible for. It can help identify ways to make your teammates' jobs easier. What could be better than that?

NACRA has already made several steps towards developing and improving our current KM.

Currently, we are:

- Focused on creating a **learning environment** by participating in the NAWCAD Learning Organization;
- Developing an **internal dashboard** (see p.2) on our SharePoint site that will make our everyday jobs more efficient;
- Creating **standard work packages** to capture the tacit knowledge retained by our team;
- And, **institutionalizing KM into our strategic plan.**

Improving our KM will be an on-going, long-term initiative – an initiative that will be well worth the effort -- sharing

knowledge is more powerful than hoarding knowledge, and it begins at the top.

Effective knowledge management is, in essence, securing the future of your organization. Who knows, maybe we can even be of assistance to you! Please contact us at [paxr\\_nacra@navy.mil](mailto:paxr_nacra@navy.mil).

# Transitions

Sideboys ... Post!

## Promotions ...

**Ed McDaniel** -- Program Analyst to Tech Demo Team Lead

*Congrats on the promotion, Ed!*



## Returning ....

**Gino Molinaro** -- Tech Demo Team Engineer



**NACRA Quarterly** is an unofficial publication of the Naval Aviation Center for Rotorcraft Advancement, located at the Naval Air Warfare Center Aircraft Division, Patuxent River, Maryland. Approved for public release (NAVAIR SPR 2013-113)

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