

Current Readiness & Enterprise AIRSpeed Newsletter



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Using a holistic aircraft carrier approach to deliver readiness

Capt. Ted Carter, Carrier Readiness Team Lead

Editors' note: Capt. Ted Carter turned over CRT leadership to USS Theodore Roosevelt's (CVN 71) commanding officer, Capt. Ladd Wheeler, during the CRT's face-to-face meeting April 28. Here he recaps the efforts and recent changes that will continue to support aircraft carrier readiness beyond his tenure.

This is a very busy time for the carrier world with significant milestones being accomplished daily. The deck of *USS Carl Vinson* (CVN 70) at peak activity as she prepares to begin post Refueling Complex



Capt. Ted Carter
Former CRT Lead

Overhaul (RCOH) workups with the completion of her RCOH imminent. After required workups, she will head out to the West Coast as the most state-of-the-art aircraft carrier in service prepared to serve our nation for another 25 years.

Other recent carrier milestones include the deactivation of *USS Kitty Hawk* (CVN 63) after 48 years of military service; her long years of military service made her the oldest active warship in America. In stark contrast to our oldest carrier, we also is witnessed the commissioning of *USS George H.W. Bush* (CVN 77), the newest and last Nimitz-class carrier. Designed to serve this nation for 50

years, she began Builder's Trials in February. Near by in Newport News, Va., design and early construction work continues on the next class of aircraft carrier *PCU Gerald R. Ford* (CVN 78), scheduled to join the fleet in 2015. All the while, the aircraft carrier fleet continues to execute our Maritime Policy and Fleet Response Plan.

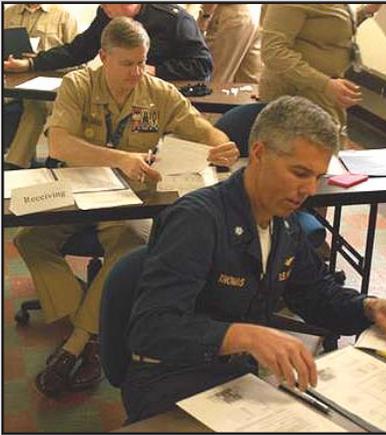
Working to stay on top of carrier readiness and availability is the Carrier Readiness Team (CRT), a sub-team under the Current Readiness Cross-functional Team. Its purpose is to enable Naval Aviation Enterprise leaders to define and achieve aircraft carrier

(CRT continued on Page 2)

This issue is the second in an occasional series that focuses on an aspect of the Naval Aviation Enterprise. This issue spotlights several of the strategic and tactical initiatives to improve readiness aboard aircraft carriers.

In this issue:

1. [Using a holistic aircraft carrier approach to deliver readiness](#)
An overview of CRT's initiatives. Page 1
2. [CV-SHARP enhanced version delivers real-time readiness reporting](#)
Tool provides greater fidelity into crew qualification data. Page 3
3. [Step by step: Removing and reallocating SE](#)
OPIS helps all 10 carriers identify and off-load underutilized equipment. Page 4
4. [USS Nimitz embraces CPI ahead of formal AIRSpeed implementation](#)
The aircraft carrier hosted its second "Boots-on-the-Ground" event. Page 5
5. [A thousand times better](#)
Another example of how "seeding" the Fleet with CPI practitioners improves readiness. Page 5
6. [Nominations for AIRSpeed Awards sought](#)
Sites can submit nominations in three categories. Page 6
7. [NAE Master Schedule](#) (link)
8. [Links on aircraft carriers](#) Page 7



“We need to CPI that!”

Maintenance and supply personnel aboard *USS Dwight D. Eisenhower* (CVN 69) learn how to use the Buffer Management Tool to determine their work centers’ times to reliably replenish. Realizing how continuous process improvement improves readiness and work life, Sailors are increasing applying the methodologies in areas outside of the ship’s aircraft intermediate maintenance department. *Eisenhower* completed her implementation last winter, during which members of Enterprise AIRSpeed Afloat Strike Team and the ship’s Sailors

also developed a template for future implementations and on how to synchronize intermediate-level maintenance to organizational-level readiness. The Operational Process Improvement and Standardization (OPIS) Team (a sub-team of the Naval Aviation Enterprise Carrier Readiness Team) Playbook initiatives were also deployed. (For more information on the OPIS Team’s Playbook, go to <http://www.cnaf.navy.mil/cr/main.asp?ItemID=1299>). *USS Nimitz* (CVN 68) completed its Phase 1 Strike Team implementation in mid-April.

(CRT continued from Page 1)

readiness standards and efficiently deliver them at the right time today and in the future, with definable risk.

The CRT aims to efficiently achieve the readiness required of the nation’s aircraft carrier fleet and drive results with integrated metrics to enable good resourcing decisions.

The CRT has three components - the Life Cycle Management Team (LCMT), the Operational Process Improvement and Standardization Team (OPIS), and the Training and People Readiness Team (T&PRT). Together they provide a framework to influence behavior and use a holistic aircraft carrier approach to deliver readiness by ensuring that: the right people are in the right positions; the crew is fully trained for the mission; and the equipment necessary for the mission is fully operational.

Our LCMT’s focus is on materiel readiness of the carrier platform, systems and equipment at optimum cost. The LCMT is responsible for maintenance and modernization of aircraft carriers. It has established four working groups to assist in carrying out CRT-related goals and objectives. These groups monitor 78 key carrier systems and provide barrier removal actions to help solve maintenance issues. The LCMT 2009 goals focus on mission critical problems in main propulsion, ship self defense, aircraft intermediate Maintenance department (AIMD), Command, Control, Communications, Computers, Intelligence (C4I), crew services, key sub-systems

and Aircraft Launch & Recovery Equipment (ALRE). Recent initiatives of a “hotwash” process for post deployment ALRE personnel are providing valuable information on problems and successes.

The value of LCMT can not be understated; it provides CRT linkage to the whole carrier maintenance community with a renewed emphasis on reducing shipyard annual run rate. Recent major changes to the Aircraft Carrier Class Maintenance Plan provide additional operational availability to our carrier fleet with the operation cycle proposed at 32 months vs. 27 months. This change incorporates required schedule maintenance adjustments that will provide 45 months of additional operational availability (Ao) over a 50-year life cycle. Additionally, changes to the RCOH program will streamline yard time to provide five months of additional Ao for each future RCOH.

The OPIS team continues its quest to improve and standardize carrier processes with a positive impact on readiness, costs, people productivity and cycle time. All carriers are in various stages of continuous process improvement (CPI) implementation, with 10 of our 11 aircraft carriers working toward establishing a CPI division/team. (See Page 4.)

The T&PRT tracks rating and

Navy Enlistment Classification (NEC) Fit data and saw an overall improvement for CVN Rating Fit of almost one percent in 2008. This positive trend is expected to continue with a 90 percent standard now established. Carrier Sierra Hotel Aviation Readiness Program (CV-SHARP) version 2.2 is installed on all carriers and CV-SHARP v2.2 + and the Ashore Module are on track with installs beginning in June. CV-SHARP is an Operational Training Accomplishment (OTA) management system based on an aircraft carrier’s training matrix that logs, manages and reports operational training accom-

plishment to a phase-based standard, attaches training to the individual, provides a comprehensive scheduler and event conflict resolution tool, predicts future OTA based on training schedule, provides gap analysis and closure tools, and provides the experience and performance data gathered to populate the training pillar within the Defense Readiness Reporting System-

Navy (DRRS-N) construct. (See Page 3 for more information.)

Together, these teams and the whole carrier community are working to deliver carrier readiness with continued emphasis and improvements in how we man, train and equip our carriers today, tomorrow and into the future. ■



Capt. Ladd Wheeler
Current CRT Lead

CV-SHARP enhanced version delivers real-time readiness reporting

By NAE Carrier Readiness Team

Imagine Fleet Forces or type commanders being able to get an up-to-date report of their Carrier Fleet Readiness at the touch of a button, and that the data is less than 72 hours old. Furthermore, imagine the carrier commanding officer and/or his designated representative drilling down to each watch team and watch team member to view their individual readiness levels.

That capability is rapidly approaching. Delivery of an enhanced version of the Carrier - Sierra Hotel Aviation Readiness Program (CV-SHARP version 2.2+) will begin this year. CV-SHARP is a tool to track and report training accomplishments at the individual level and to report ship-level training readiness to the Defense Readiness Reporting System - Navy (DRRS-N).

According to Capt. Rinda Ranch, N7A, Commander, Naval Air Forces Deputy Assistant Chief of Staff/Training, CV-SHARP is an afloat intranet application used by watch standers to record the operational training conducted during a watch. She said, "It ties training to people, unlike the legacy systems that associated training with the hull of the ship.

"The application uses the training information recorded for personnel to assess operational training readiness at the unit level," Ranch said. "It does this by running a roll-up calculation that builds qualified teams from the trained personnel on board."

This program that records and reports the 32-month training cycle for aircraft carriers has been evolving since its development in late 2005. The first version, 1.0, was used on *USS John C. Stennis* (CVN 74) in January 2006 with a goal to build a required number of trained teams for each team type. The rollup report showed individual, team, team type, Primary Mission Area Readiness (PRMAR), and overall readiness. Version 2.0 was deployed to all operational carriers in late 2006 and continued the evolution with increased reports

and included the exportation to DRRS-N. Version 2.1 improved upon the relationship between the training matrix and team types to deliver absolute Operational Training Accomplishment (OTA) with training tied to the people, not the hull.

Ranch explained that CV-SHARP uses the recorded watch data to provide experience and performance to DRRS-N through the Naval Training Information Management System (NTIMS). The Mission Essential Tasks in the Carrier Mission Essential Task List are comprised of sub-events, conditions, and standards. The execution of these sub-events and the corresponding conditions and standards are recorded when a watch is logged.

The Training and Readiness Matrix is at the heart of the CV-SHARP OTA metric. It currently has 307 training sub-events with 196 watch teams from 66 watch team types. As individuals accumulate points by being on watch teams that execute and log sub-events, their training is rolled up to create Type Team Accomplishments and then PRMAR for the carrier.

The latest version of CV-SHARP 2.2 added the ability to schedule and print daily/weekly/monthly schedule sheets. The scheduling feature will greatly enhance departmental coordination for multiple training events. It has been installed on all but two carriers with the final installations occurring this summer.

The next generation of CV-SHARP, version 2.2+, will have an added predictor modeling tool which will predict training readiness using the same logic and allow carrier commanders to get a look into the future. The predictive module highlights readiness degradation in advance, and enables watch team member training and a replacement strategy. It allows leaders to predict the outcome for

alternative scenarios without requiring any changes to the Schedule of Events.

Eventually CV-SHARP will replace Status of Resources and Training System (SORTS) as the carrier readiness reporting tool; currently the tentative date for turnover is Jan. 1, 2010.

"The fleet has presently begun a period of dual reporting," Ranch said. "It is up to Naval Air Systems Command to determine when the results from CV-SHARP are satisfactorily reporting so that SORTS can be turned off."

Other potential training applications exist for CV-SHARP since it can easily be adapted to any other platforms that are organized with a watch team structure. The magnitude of effort needed to accommodate other

platforms will be much smaller than the carrier fleet and it provides the potential to standardize operations across classes of ships.

Ranch agrees with the idea of

using this program across the Navy. "Absolutely," she said, "all training should be tracked at the person level. Ships don't train: people do. We have created a system that will track readiness down to every Sailor on the most complex warfighting platform in the Navy. Future application and benefit on other platforms/units has enormous potential.

"Training is something we do from boot camp to retirement, and everything in between," Ranch said. "The goal of CV-SHARP is to make the documentation of that training more accurate, effective, and efficient while maintaining a user-friendly interface." ■

Capt. Rinda Ranch, who served for more than two years as CV-SHARP lead, was recently assigned to U.S. Navy Central Command. Capt. Brad Margeson relieved Capt. Ranch in March.

"The goal of CV-SHARP is to make the documentation of that training more accurate, effective, and efficient while maintaining a user-friendly interface."
~Capt. Rinda Ranch

Step by step: Removing and reallocating SE

By Jacquelyn Millham, Current Readiness/Enterprise AIRSpeed Public Affairs

In late 2008, the Operational Process Improvement and Standardization (OPIS) Team completed the reduction and removal of 113 pieces of support equipment (SE) aboard all 10 aircraft carriers. The initiative, the result of the Support Equipment Reduction Study, reduced the number of ships' maintenance manpower hours, SE footprint and total ownership cost.

The underutilized SE was first identified through an Optimal Manning Experiment (OME) validation aboard *USS Nimitz* (CVN 68) in 2005. Although the equipment was part of ships' authorized allowance, the demand for them decreased or stopped altogether due to changes in the composition of the air wings and the capabilities of ships' maintenance. The components still needed to be maintained, housed and inventoried, all of which required manpower, space and funding.

The OME study was the first step toward change. As part of the effort, *Nimitz*' aircraft intermediate maintenance department (AIMD) conducted continuous process improvement (CPI) events that were identified as potentially reducing manpower requirements in the work centers. A Black Belt who had recently transferred from Naval Air Station Lemoore to the ship, recognized that the IM-4/ SE Division could benefit from using AIRSpeed tools.

"He felt that there was an underutilization of Support Equipment deployed on the CVN," said Cmdr. Lance Massey, who was the aircraft intermediate maintenance officer during the study and is now the commanding officer at Fleet Readiness Center West. "By reviewing usage rates, the division determined that we had 67 pieces of support equipment that could be offloaded without impact to the customer."



USS Carl Vinson (CVN 70) flight deck personnel stand near aircraft tow bars and chocks while waiting to assist in aircraft movement during flight operations. Tow bars were one of the 113 items identified for offload. Photo by Navy News Service.

The list included air conditioners, corrosion control carts, aircraft jacks, hydraulic jennys, nitrogen carts, tow bars, ejection seat dolly, and electric power plants.

But because they were scheduled to deploy, the division could not offload the equipment; instead, they prepared and placed the equipment in preservation, set them aside and conducted operations without them.

Nimitz leadership briefed the project to Commander, Air Forces (CNAF) N42 and provided the information to Naval Air Systems Command (NAVAIR) Program Manager (PMA) 260. Recognizing the potential for replication, NAVAIR 1.2 Aviation/Ship Inte-

gration Office, with the concurrence of Aviation SE Program office, PMA-260, and CNAF SE Program Manager, directed a study during 2007 and 2008 aboard *USS Abraham Lincoln* (CVN 72) and *USS Harry S. Truman* (CVN 75) to reduce the SE footprint by tracking daily usage and demand on all Nimitz-class ships, expecting that the lessons learned from the program might be applied to the Ford-class aircraft carriers.

A team representing SE stakeholders was formed and created an Excel spreadsheet of previously identified underused SE to track daily usage and demand. The ships forwarded the data to the team twice a month which was reviewed by PMA-260, CNAF SE Program Manager and Commander, Naval Air Forces Atlantic N4212.

Again, the majority of this event involved simple tracking of what was preserved and to see if maintainers could conduct operations without de-preserving that gear.

"Ultimately everything that started in preservation remained in preservation throughout the deployment," said Lt. Randy Berti, who was part of the study aboard *Truman*.

A reduction of more than 21,000 man-hours across all aircraft carriers was identified – about one man year per ship and a fleet-wide cost avoidance of \$900,000 per year.

Navy Manpower Analysis Center (NAVMAC) also conducted a review on more than 140 SE line items aboard *USS Carl Vinson* (CVN 70) in September 2008 to define the different requirements needed to support the SE Authorized Allowance and newly-defined inventory onboard.

(SE Continued on Page 6)

USS Nimitz embraces CPI ahead of formal AIRSpeed implementation

By Jacquelyn Millham,
Current Readiness/Enterprise AIRSpeed Public Affairs

USS Nimitz (CVN 68) hosted its second “Boots-on-the-Deck” visit Feb. 10, ahead of its scheduled formal Enterprise AIRSpeed Afloat Strike Team implementation in March.

(Afloat Strike Team implementation is a three-week long continuous process improvement (CPI) event for aircraft carriers instead of the traditional ashore six-week long implementation. This initiative will bring CPI training to all aircraft carriers and several L-class ships by 2011. For information on Nimitz’s previous Boots-on-the-Deck visit, go to <http://www.cnaf.navy.mil/cr/content.asp?AttachmentID=209#seamless>.)

Vice Adm. Tom Kilcline, Jr., Commander, Naval Air Forces and Naval Aviation Enterprise co-lead; Rear Adm. Raymond Berube, Commander, Naval Inventory Control Point; Rear Adm. John Miller, Commander, Carrier Strike Group 11; as well as representatives from Naval Air Systems Command, Program Executive Office Carriers, Surface Warfare Enterprise and contractor support attended

the event. This was Vice Adm. Kilcline’s first time to attend Boots-on-the-Deck.

Although *Nimitz* had not yet received formal training on AIRSpeed tools, such as the Theory of Constraints and Six Sigma, more than 380 maintenance and supply personnel have been trained as Yellow Belts since 2007. In anticipation of its scheduled implementation, *Nimitz* leadership had already identified which personnel will serve on its process improvement team to tackle CPI issues ship-wide.

The ship’s crew updated attendees on its improvement activities since 2007 and showcased its current 6S initiatives:

- **Airframes.** Productivity increased an average of 20 percent per job. The number of foreign object debris hazards was reduced by centralizing tool boxes and locating publications at the point of use (POU).
- **Support equipment.** Maintainers developed standard work areas inside the shop for better quality control and

(*Nimitz continued on Page 7*)

A thousand times better

By Jacquelyn Millham,
Current Readiness/Enterprise AIRSpeed
Public Affairs

Eighteen months ago, intermediate-level maintainers aboard USS Nimitz (CVN-68) said that it was faster to use a commercial transportation company to ship the Advanced Targeting Forward Looking Infrared radar’s (ATFLIR) electro optical sensor unit (EOSU) than to wait for the ship’s aircraft intermediate maintenance department (AIMD) to fix one.

And they had good reason to believe that. Delivery of an EOSU from an ashore maintenance activity was made within two weeks – much faster than the 30 days it took the AIMD to fix the same piece of equipment.

But AT1 (AW/SW) Aaron Vandergalien, FLIR Shop lead petty officer and a Green Belt, saw that efficiencies could be gained in the EOSU’s maintenance process. By applying the continuous process improvement (CPI) tools he learned at his



AT1 (AW/SW) Aaron Vandergalien (right) explains to Vice Adm. Tom Kilcline, Jr., Commander, Naval Air Forces (center), and a representative from Naval Air System Command Program Manger 260 (left), how he applied the Theory of Constraints, Lean and Six Sigma to improve the electro optical sensor unit for the Advanced Targeting Forward Looking Infrared radar’s time to reliably replenish. Photo by USS *Nimitz* Public Affairs.

previous commands and with the support of *Nimitz*’ leadership, he and his shipmates reduced the time it took to repair an EOSU by more than 1,000 percent.

When Vandergalien first arrived aboard *Nimitz* from Fleet Readiness Center (FRC) Southwest almost three years ago, the AIMD was maintaining the Targeting Forward

(*Thousand continued on Page 6*)

(Thousand continued from Page 3)

Looking Infrared radar (TFLIR) – ATFLIR’s forerunner –and was able to meet demand. But by winter 2007, the TFLIRs were being replaced by the ATFLIRs and immediately maintenance issues began to emerge.

“We had two EOSUs in work,” said Vandergalien. “There were no extras (for buffers), so EOSUs were always an expeditious repair item. Sailors were always performing a lot of re-work on the units.”

Vandergalien, who had been part of FRC Southwest’s AIRSpeed

“The results speak for themselves,”
~ AT1 (AW/SW) Aaron Vandergalien

core team before being assigned to *Nimitz*, saw an opportunity to apply the Theory of Constraints, Lean and Six Sigma in the work center. Six weeks after the first EOSUs were delivered to the ship, he began to put his training to work.

Some of the constraints, he said, were obvious: technicians worked on the EOSUs in three different areas and the required tools were not within arms reach in the bench’s area or even in the work center. He also knew that the first change had to be a shift in the maintainer’s mindset to ensure initial and continued success. And that required buy-in from his shipmates.

After he received the go-ahead from ship’s leadership and his chain of command to conduct a rapid improvement event (RIE), he began

to tackle the problem.

Believing that a team is better than one person, Vandergalien gathered representatives from airframes, supply and hazardous materials, a tools program manager and two maintainers from his work center. None of them had ever been part of a CPI event before. (Nimitz completed its Phase 1 CPI training in April.)

First, Vandergalien queried Sailors in their work centers asking them what type of problems they were dealing with in their work centers. “They said

the typical things—‘I don’t have any parts, we don’t have our consumables. We don’t have the proper tools.’

“I presented the list to the team and asked them hard questions to get them to look critically about their processes. They came up with the answers,” he said.

A primary constraint, they found, was the supply of EOSU screws. “Seventy-five percent of the delay in fixing the unit was awaiting parts due to screws,” he said.

The team also found that maintainers needed the right tools at the right place, such as heat guns and wrench sets at the benches. A cage in the shop had to be removed as well.

Equipment proved to be only part of the problem. “The EOSU is very complex and intricate, so a lot of variation in its maintenance was happen-

ing. If it is not done right, it can come apart. So we standardized the work,” Vandergalien said.

First, they silhouetted the components of the EOSU. “We took it apart and numbered the parts backwards, starting with the number 39. So when the maintainer puts it back together, he or she starts with the part marked ‘Number One’,” he said.

Then the team compiled step-by-step instructions on how to fix the EOSU, including required inspections and reports.

A laptop computer was also acquired to make the Naval Aviation Logistics Command Management Information System easier to use while working at the bench.

Their target turnaround time was five days. But after they fixed their second EOSU, the time had decreased to less than three days. The distance traveled by Sailors in the shop was reduced from more than three miles to 216 feet – a 7,500 percent reduction.

Naval Aviation Enterprise leadership recognized the value of Vandergalien and his team’s work during “Boots-on-the-Deck” aboard *Nimitz* Feb. 10. Commander, Naval Air Forces representatives said they would look at the RIE for replication aboard other ships.

Vandergalien said that the proof of CPI’s value is self-evident. “The results speak for themselves,” he said. ■

Nominations sought

Criterion for Enterprise AIRSpeed Site of the Year “Battle A” Award and the Master Gunnery Sergeant John S. Evancho Innovator of the Year Award nominations are posted on the Enterprise AIRSpeed SharePoint site. Nominations are also being solicited for a new category, Enterprise AIRSpeed Leadership Award, which recognizes excellence in continuous process improvement by E-7s and above. For more information, go to https://www.fleetforces.navy.mil/comnavair-for/Naval_Aviation_Enterprise/current_readiness/MSCM/AirSpeed/default.aspx.

(SE continued from Page 4)

The study determined that the manpower for the aviation support equipment technician rating could be maintained at an average of 48 billets versus the current billet allowance ranging of 45 to 54.

To date, four additional AIMDs have undergone reviews; the remaining six will be completed by NAVMAC 18 months prior to deployment.

OPIS is currently working on establishing CPI divisions/teams aboard all aircraft carriers. ■

(Nimitz continued from Page 5)

established three work stations stocked with POU tools and consumables.

- **Avionics.** Sailors improved maintenance processes on the Advanced Targeting Forward Looking Infrared (ATFLIR) pod's electrical optical sensor unit (EOSU). (See accompanying article on Page 5 for more information.)

Nimitz personnel said they plan to replicate improvements currently in place aboard *USS Theodore Roosevelt* (CVN 71) and other ships and ashore facilities, including consolidating its Document Control Unit and Aviation Maintenance Support Unit into a joint aeronautical screening unit and consolidating its medical storeroom.

Supply also will combine rotatable pool (R-Pool) and repairable asset management (RAM) into one area, creating one point of contact and reducing the distance that organization-level maintainers will have to travel to reach Supply. Items that have an average monthly demand of four times or more a month will be identified as a "fast mover" and will be re-located into R-Pool; equipment and supplies with a low demand will be moved into the ship's technical assistance for repairables processing area.

Nimitz crew also discussed other initiatives aboard the ship. *Nimitz* piloted an Optimal Manning Experiment (OME) Project (a DoN initiative which looks for more efficient models for shipboard manning) in its laundry shop which led to the centralization of laundry collection points,

reduced provision line items and established a 14-day menu cycle. Birth Month Recall (BMR), allows the ship's Health Services Department to monitor the crew's medical readiness by using Navy Medicine Online and by combining medical and dental departments. The frequency of BMR was changed from 12 months for medical checkups and 13 months for dental checkups to every 12 months for both and is conducted during a Sailor's birth month only.

During deployments in 2007 and 2008, *Nimitz* also validated OME recommendations in O2N2 Plants which stated its two oxygen and nitrogen producing plants should remain operational and that nine technicians is the minimum number needed to man the O2N2 Stowage Room.

Boots-on-the-Deck attendees also got a closer look at "Smart Carrier" technology used to store aircraft fuel. (The Smart Carrier Project is another initiative to reduce shipboard workload, enhance Sailors' quality of life and lower total operating costs by applying industry standard process reengineering and back fitting enabling technologies.) The system enables Sailors to monitor all of the ships' 186 fuel tanks and two sump pumps on one screen and reduces the need to sound tanks.

Nimitz and NAE leadership also discussed the need for an AIRSpeed designator for officers, the need to offload obsolete general support equipment, the ship's Combat Systems Operation Sequencing System, and how individual augmentation affects readiness. ■

Links on aircraft carriers

1. NAVSEA Eliminates CFC Refrigerants Onboard Navy Aircraft Carriers
The last of ozone depleting chlorofluorocarbon have been removed from *USS Carl Vinson* (CVN 70).
<http://www.cnaf.navy.mil/crt/main.asp?ItemID=1390>
2. *Nimitz* Sailor named Aviation Ground Maintenance Officer of the year
(Lt. Matthew Riggins was named the Capt. Charles J. "Chuck" Nechvatal Aviation Ground Maintenance Officer of the Year.)
<http://www.cnaf.navy.mil/crt/default.asp?PressReleaseID=53867>
3. Rhumb Lines:
 - Carrier Seapower- In Action Everyday Around the World (A recap of the role carriers play around the world.)
https://www.fleetforces.navy.mil/comnavairfor/Naval_Aviation_Enterprise/AirSpeed%20Newsletters/Newsletter%20repository/Rhumb%20Lines/Carrier%20Missions%2015%20JAN%2009.pdf
 - Where are the Carriers... Strategically Based for National Security (A look at the strategic homeporting of carriers)
https://www.fleetforces.navy.mil/comnavairfor/Naval_Aviation_Enterprise/AirSpeed%20Newsletters/Newsletter%20repository/Rhumb%20Lines/Rhumb%20Lines%20-%20Carrier%20Basing%2021%20JAN%2009.pdf
 - Carrier programs. (Information on CVN 78, *Nimitz*-class carriers and Refueling Complex Overhaul)
https://www.fleetforces.navy.mil/comnavairfor/Naval_Aviation_Enterprise/AirSpeed%20Newsletters/Newsletter%20repository/Rhumb%20Lines/Rhumb%20Lines%20-%20Carrier%20Programs%2030%20JAN%2009.pdf
 - CVN 77
Fact sheet on the Navy's most recently-commissioned aircraft carrier: *USS George H.W. Bush*
https://www.fleetforces.navy.mil/comnavairfor/Naval_Aviation_Enterprise/AirSpeed%20Newsletters/Newsletter%20repository/Rhumb%20Lines/CVN%2077%20Rhumb%20Lines%2008%20JAN%2009.pdf