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Our Aerospace

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Improving the Management of Reliability

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Reliability isn't everything; it is the only thing!

At the present time, the most serious problem in logistics support for the life of a weapon system is the asymmetry of the demonstrated reliability of components and the inventory necessary to match that reliability.

Reliability is the single most dominant life cycle cost driver and is the key enabler of acceptable cost effective operational availability. The greater the time between failures of components, the less we require expensive maintenance, critical test equipment, unique training and high priced inventories as well as other logistics elements. The DoD and the Navy are struggling with the results of the imbalance of poor inherent reliability of components on the one hand, and the consequences of highly exaggerated reliability figures of merit used for life cycle support planning on the other. The DoD and the Navy have not understood the results of a continuing failure to properly acquire, measure, manage and support *demonstrated* reliability. We simply have too many demands for too few spare parts because of this asymmetry.

For the sake of a common reference, let's define reliability. Reliability is comprised of four components: *probability*, *satisfactory performance*, *time*, and *specified operating conditions*. Taking these four elements together, we define reliability as the probability that a system, component, or part will operate satisfactorily for a specified period of time under specified operating conditions.

Probability in this definition refers to a quantitative expression representing a percent specifying the number of hours we can expect a system to operate satisfactorily when we operate it. For example, if we state that the probability of satisfactory performance for a hydraulic actuator for 100 hours is .8, then we can expect the system to survive 100 hours 80% of the time. In an inventory of like hydraulic actuators we can expect the same probability of survival, but experience shows us that failures will occur at different times in a probabilistic manner.

Satisfactory performance relates to the specific criteria, which describes proper performance, i.e. operate a trailing edge flap when a control input is made.

Time is the key consideration when referring to reliability. Time is how we measure the probability of completing a mission or how often we have to do maintenance or gauging satisfactory performance with respect to time for spares inventory-planning purposes. We commonly define reliability in terms of mean time between failure (MTBF), mean time between maintenance, (MTBM) and mean time to failure, (MTTF). It follows that the more frequent the failures, the greater the number of spares required as well as increased requirements for all the other logistics elements.

Specified operating conditions define the way a system or component will be used, the environment it will be used in, and includes storage, packaging, handling and transportation.

The qualities of each of the four elements of reliability result from a design-requirement synergy. The resulting reliability is an inherent quality of that design. That design produces a component that has a physically constrained reliability; an inherent reliability that is the best we can achieve in an ideal operating and maintenance environment.

I have heard maintenance officers say that they can improve the reliability of a component by improving the maintenance. That simply is not possible for the reason I just stated. In 1982 I participated in a study at NAVAIR that showed that the only way to improve the inherent reliability of a system is to change the technology or physical construct of that system. The inertial platform that was used in the A-6E is a good example of this concept. Initially, the platform consisted of 3 mechanical gyros, one each for the X, Y, and Z axes with MTBFs in the low two-digits and in its final configuration with ring-laser gyros, the failure rate was three to four figures.

Some additional reliability measures to consider:

$$\text{Failure rate} \quad \lambda = \frac{\text{number of failures}}{\text{Total operating hours}}$$

$$\text{MTBF} = \frac{1}{\lambda}$$

For illustrative purposes we will assume a reliability function in terms of a Poisson distribution thus reliability or the probability of survival is expressed as

$$R(t) = e^{-K\lambda t}$$

Where R is reliability
e is the natural log base (2.7182)

K is the number of items used of a particular type
λ is the failure rate (1/MTBF)
t is the time period of interest

Some factors related to reliability to consider:

Inherent availability- is the probability that a system when used under specified conditions in an ideal environment (i.e. specified operating conditions, properly trained technicians, spares at the ready, tools etc.) will operate satisfactorily at any time required. This definition excludes scheduled maintenance, logistics delay time, and administrative delay time.

The expression is:

$$A_i = \frac{MTBF}{MTBF + Mct}$$

Where MTBF is the mean time between failure and Mct is the mean corrective maintenance time or mean time to repair.

Achieved availability- is the probability that a system operated and supported under specified conditions in an ideal support environment as above will perform as required at any time. Achieved availability includes scheduled maintenance but excludes logistics delay time and administrative delay time.

The expression is:

$$A_a = \frac{MTBM}{MTBM + M}$$

Where MTBM is the mean time between maintenance and M is the mean active maintenance time.

Operational availability- is the probability that a system when used under specified conditions in an actual operational environment will operate satisfactorily when required.

The expression is:

$$A_o = \frac{MTBM}{MTBM + MDT}$$

Where MTBM is as above and MDT is the mean maintenance down time. The reciprocal of MTBM is the frequency of maintenance that includes scheduled and unscheduled maintenance. The mean time between unscheduled maintenance should be ~ MTBF.

Spare part quantity determination is a function of a probability of having a spare part when needed, the **reliability** of the item in question and the quantity of items used in the system. (It is significant to point out that the F/A-18 item manager at NAVICP is using MTBD, meantime between demands, for inventory determination that in application bypasses the source of the problem)

The expression is:

$$P = \sum_{n=0}^{n=s} \{R(1-\ln R)^n / n!\}$$

where
P = the probability of having a spare of a particular item available when required
S = the number of spare parts carried in stock
R = composite reliability as stated above
K = quantity of parts used of a particular type
lnR = natural logarithm of R

Now that we have common references, let's examine the concerns about properly acquiring, measuring and managing reliability figures of merit as the key parameter of providing life cycle support.

First, we will consider how we acquire a reliability figure of merit for a component. Typically, a vendor will submit a reliability measure based on testing, estimates, expected reliability growth etc. Since operational Test and Evaluation is expensive and focuses on systems rather than individual components, component unreliability may go unexposed. For the lack of any other data the logistics managers tend to accept the contractor's claim of X hours MTBF. (It is noted here that with a paucity of data, it would serve us well to examine the history of performance of like items already in service being used in a similar way) Based on that reliability figure of merit, it is then applied to our spare part quantity calculation that yields the number of spares we should carry. (for illustration purposes, we are ignoring component cost, operational scenario etc.)

As an example we will consider the Trailing Edge Flap Actuator (TEF) for the F/A-18 A-D. In establishing initial support for the TEF we set its reliability figure of merit at 4000 (According to NAVAIR APML circa 1997) hours mean time between failure. From the above we show that the failure rate is .0025 in this case. Now let's assume we have an airplane inventory of 200 airplanes, each of which is to operate 30 hours per month and we replenish stock every 90 days. Applying this failure rate to our equation to determine our spare parts requirement we will use the following:

P (protection level) is the Probability of having the part on hand when required in this case assumed to be .95
K = 400 parts (2 per airplane)
S = the number of spares to be determined
R = reliability $R = e^{-k\lambda t}$
LnR = natural log of R
λ = .00025 failures per hour
T = the stock replenishment cycle of 90 days or 3 months
$k\lambda t$= number of items X the failure rate X operating time per airplane X stocking intervals
thus:
$k\lambda t$ = 400(.00025)(30)(3) or 400 parts operated 30 hours per month for 3 months at a failure rate of .00025 = 9

To facilitate solving our equation we use the NAVSHIPS 94324 nomograph and enter the $k\lambda t$ value of 9 and refer to the P value of .95 and we get 14 spares are required.

If we assume a protection level of .85, 10 spares are required

Taking the **demonstrated** failure rate we solve our equation again. According to the latest APML reliability figure of merit we have an MTBF of 138 hours for the TEF (Cdr. Ellen Coyne, NAVAIR, email 20 July 1999)

Now, λ = 1/138 = .00722 per hour. It follows that $k\lambda t$ = 400(.00722)(30)(3) = 259.9. Now we need ~ 300 spares. We have a situation where the failure rate is 29 times that predicted and the spares on hand are ~ 1/20th that required.

The F/A-18 item manager states the TEF is presently performing at an MTBD of 900 hours. If we assume an inventory calculation substituting MTBD for MTBF we derive the following:

λ = .0011
$k\lambda t$ = 400(.0011)(30)(3) = 39.6

As in the above procedure we have a failure rate 4.3 times predicted and we require 50 spares which is ~3.5 times predicted.

The point here is that whichever reliability is correct, significant asymmetry exists.

The asymmetry shown in this example is one of many that have impeded the F/A-18 from achieving its inherent availability (A_i) since its introduction. We have a pattern of failure rates that far exceed unsubstantiated levels that have been used to provision support for the F/A-18 and other systems resulting in under-budgeting logistics support, cannibalization and its costs, increased workload on maintenance personnel, potential safety risks and most significantly an operational readiness potential that is unrealized. Although we know that the demonstrated reliability is not what was predicted we have not recomputed the spares required and have not made the necessary provisioning corrections and investments. Moreover we tend not to conduct a follow-on Level of Repair Analysis (LORA).

How can we improve the establishment of reliability figures of merit for the purposes of spare inventory symmetry? First, we should adopt a null hypothesis, which states that a claim of a reliability figure of merit for a given component is not true until proven by the contractor. (The Navy should verify contractor MTBFs in a DT/OT continuum) If the contractor's initial claim cannot be established, then we next ask what value can be proved and is that value acceptable? Once a value has been proved, then that is the value that should drive the spare inventory to support that given component.

Our experience in Naval Aviation has shown that reliability declines over time, but our support analyses are not recomputed to match those changes. It follows that logistics managers and sustainment engineers should recompute support requirements in light of declining reliability and that budgets must be adjusted to support the derived requirements.

We have the tools at our disposal to correct the asymmetry of reliability and spares inventories for our weapon systems. We should strive for accuracy in establishing reliability measures for new programs. In order to ensure we have the best measure of reliability, we should employ the Null Hypothesis that says the contractor must prove claims of performance and not the Navy. Once a figure of merit is demonstrated we must ensure the inventory matches the reliability. Throughout the life of a system we should continuously analyze reliability performance and recompute spare parts inventories based on our analysis and finally we must make the financial commitment to make these efforts successful.

Back to Basics

By CAPT Eric Dean
COMUSNAVEUR N43

May of 2002 marked the seventy-fifth anniversary of Charles A. Lindbergh's flight across the Atlantic in the *Spirit of St. Louis.* It was in many ways a simpler time, but the fundamentals of aviation and the basics of maintenance are as true today as they were in the beginning. Its time we got back to basics.

In an article for the New York Times entitled *"Man and Craft Were One, As a New Age Began",* John Noble Wilford commemorated that historic event. He indicated that those who have had a chance to visit the National Air and Space Museum in Washington and see the *Spirit of St. Louis* saw "an artifact from a time when human beings were on more intimate terms with their technology. Their machines still seemed understandable as evolved extensions of ordinary human abilities. Airplanes in those days were built and flown by people who knew the throb of their engines like their own heartbeats. Lindbergh always shared credit for the achievement with his airplane. For a critical period, the two were inseparable. He recommended the design specifications and oversaw each step in the plane's assembly. He took it on all the test flights. Lindbergh referred to himself and the plane as "we". It reflected a deep bond between the two, the lost intimacy between humans and their machines".

I suggest that it may be nigh time for many of us, especially the less Fleet seasoned Greenshirts among us, to become more intimate with our modern weapons systems, people and aircraft. Perhaps if we spent less time on writing point papers, FITREPS, awards and being devoured by the NMCI "collective", we might once again capture the thrill of pulsating engines in afterburner and get heady on the intoxicating aroma of JP-5. If we concentrated more on the actual aircraft, engines, support equipment, and avionics and less time on End Of Cruise Reports, status reports and fighting the business financial management wars, we might recall the excitement and rapture of our first launch and the paean of Flight Quarters on the 1MC. And in that fleeting moment, we might remember what it means to be a naval aviation Maintenance Officer.

Aviation Maintenance is more than planning, meetings, beatings and documentation. Weight and balance books, Aircraft Discrepancy Books, NALCOMIS, OPTAR logs, and EDVR are all very important tools, just like the OPNAV 4790.2, but they are only tools to do your job and not a substitute for knowing your trade. There is a significant difference. Maintenance is more than sound management, good administration and financial wizardry. Its about leadership and understanding the systems and people that make naval aviation what it is today, a throbbing, grime encrusted, noisy and awesome environment. Maintenance is about mechanics and things mechanical.

At AMO School in Memphis, we learned about Bernoulli's Principal, how to calculate the coefficient of lift and mastered the fundamentals of engine dynamics ('suck-squeeze-burn-blow") along with the essentials of the OPNAV 4790. But we learned "how to be a Maintenance Officers" in the field, the hard way, one day and one launch at a time from the "old guard" of former LDOs turned 1520, crusty CWOs, colorful LDOs, leathery Chief Petty Officers and ancient leading airman. There is no substitute for the real thing. Most of my tutors are gone now; Ernie O'Rourk, Bert Coffman, Harry Jacques, Glen Boston, John Kimmel, Jerry Renke, Denny Westoff and a legion of others who have moved on. They taught us how important it was to get dirty, how not to cut our hands on safety wire, and to stay alert on the flightdeck. They forced us to understand the demands of the unforgiving aircraft environment and to grasp the limitations of human endurance and mental stamina. They taught us about maintenance and I like to think they did a decent job of it after all.

As you sit there in front of your CRT, in your clean air conditioned office, banging away on the keyboard and attempting to create yet another wholesome and politically correct thesis on inventory control and accountability, ask yourself when was the last time you soldered a connector plug or circuit card assembly by flashlight? How long has it been since you safety wired a canon plug or smashed your fingers on a frozen engine bolt? Can you recall how hard it was to change out an engine on a rain slick flight deck at two in the morning? Have you ever shot or bucked a rivet or even bent metal for a drip pan? If you can't recall ever having done this, you need to get back to the basics. This is the soul of our trade, the essence of who we are and the legacy of our past.

Captain Stu Paul, when I worked for him on the *Theodore Roosevelt* a decade past, used to have this thing he called *"snakes-in-the-grass"* where he would drag the JOs around by the ears and walk them through their spaces asking them a myriad questions about their equipment. He would have them physically lay hands on an object like a sacrament and query them about its function, how long it had been dysfunctional and whether they knew how it operated. I suspect he had been taught the same thing years past by some salty CPO or LDO. It was amazing how little the Division Officers knew about their equipment functionality but more amazing how fast they learned! Within the matter of a few days they could not only recite the MRC or MIMs mantra, but also demonstrate how it operated and the theory behind the mechanics. As a result, they learned not only about the maintenance and logistics, but earned the respect and admiration of the Petty Officers and Airmen that taught them how it worked. They also earned the AIMD Officers confidence, no small matter in a department twice the size of most squadrons and destroyers.

Maintenance is more than watching a UUT run across CASS, chasing Due In For Maintenance and knowing what access code to use on NALCOMIS. It is also about "doing it". I have lost count of the number of times I was interrogated by the Skipper or MO and got that "deer-in-the-headlight" look about an aircraft or weapons system. You were expected to know or at least find out why the aircraft was down and going to be scrubbed from the flight schedule or why a bench was OOC. When Lt. Charlie Code, Lt. Tom Glass and Ensign Carlos Lopez and I were in CAG FIVE on MIDWAY, we didn't always have the right answers. But after a few "gotchas" in the Ready Room, we got into the details, disciplined our inquiries and gained enough confidence in our level of knowledge that we could answer most of the questions without the Maintenance Chief having to "translate".

Our aviator friends of the "loyal opposition" require keen insight, intellectual rigor, discipline and constant practice to ply their trade in the sky. They are fine officers, tacticians, strategists and leaders, but are also superb aviators and know the "mechanics" of their profession. Are we or should we be held accountable to a different, less demanding regimen? I think not. The systems of today may be more sophisticated, the technology more advanced, the modularity and miniaturization more complex, but the environment of salt water, high humidity, ice, sand, gravity and heat remains a challenge. It is an environment that requires constant "attention-to-detail", demands our absolute respect and mandates that we understand the basic mechanics of our tools and equipment. Mark Twain once wrote, "Training is everything. The peach was once a bitter almond; cauliflower is nothing but cabbage with a college education".

The process of "doing" rather than just reading about a technique or watching a "process" gives you that keen competitive edge. This accumulation of experience and technical knowledge isn't designed to make you the "subject matter expert", but it will bolster your confidence, expand your horizons and ultimately make you a better maintenance officer. Take a close look at your hands. Are they callused or manicured? Are there scars from previous metal or grinding cuts? Can you recall the last time you smashed your finger or gouged a chunk of flesh out of your hide on the fantail or bled on a hangar bay? Clumsy some would say, but I've "Been There, Done That and Got the Tee-shirt". Now the worst I get is carpal tunnel wrist syndrome, black smudges from changing a cartridge printer ribbon, eye fatigue and paper cuts!

Maintenance is about the sights, smells, and sounds of our world. Ever do a low/high power turn in the frozen sleet and know instinctively by the rhythm that it wasn't working at optimum pitch? Can you read a wiring schematic and understand the ebb and flow of electrons and sense the surge of power? We have come a long way since the days when we fixed F-4 Phantoms with coke can metal or knew that the MMCO, former one wire whiz kid, was tearing into an Eight Day Clock or flux valve in his State Room and then signed it off as RFI. Not only was it illegal and dangerous, but absolutely stupid. Admiral Heilman has repeatedly emphasized that "Naval Aviation Maintenance is NOT a Business", but rather a military mission which needs to be accomplished in the most "Business-like" manner possible. In order to do that, you need to know your people, know yourself, have an extensive breadth of mechanical knowledge and know your job better that anyone else.

There are encouraging signs that significant progress is being made in our overall level of effort to define the basic knowledge base and ensure continued exposure to achievements in general aviation. The recent promulgation of an AMDO PQS by OPNAV 789H is a major step in our collective efforts to quantify and clarify what an aviation maintenance officer ought to be exposed to. Enrollment in type/model/series Aircrew Familiarization by Greenshirts is up, as are the numbers of former enlisted personnel joining our ranks. Computer Based Training (CBT) for weapons systems and processes are expanding and there is an increased emphasis on Limited Duty Officer (LDO) Programs and Chief Warrant Officer (CWO) selections, including the addition of a CWO Five rank. The recent Director, Acquisition Career Management (DACM) directive mandates a new DON continuous learning policy for those designated as APC members. It is a far cry from the way we did business before and merits our attention and support.

But there is more that we can and should do in the fleet to ensure that we develop a sound and fundamental understanding of what it means to "go to sea and perform". Part of that essential "fleet seasoning" should involve changing engines, loading ordnance, assisting in the build up of a prop, changing oil in GSE, getting your hands dirty in an Emergency Reclamation effort and a myriad of other routine and mundane tasks. It will build a working rapport and professional respect with our White Hats, on which we depend so much, that far outweighs your rank or positional authority. It will also establish or renew the bonds with our "pioneer fathers" who were more than good officers and leaders of men. They were mechanics, a proud, honest and noble profession. You are more than "one-of-one" on a Fitness Report. You are but one of thousands that have gone before, a tradition that dates back to the beginning of the last century, the legacy of Lt. Eugene Ely and the

Wright Brothers. It is above all about being involved in what we do and understanding what is expected of us.

This coming year will mark both the 35th anniversary of our Aerospace Maintenance Community but also the 100th anniversary of the Wright Brothers flight at Kitty Hawk on December 17th. Think on this and remember their legacy.

Do you recall the myth of Icarus and Daedalus? Icarus' fall didn't stem from a lack of will, inept planning or non-existent skills, but his ignoring Daedalus' warnings. And "the boy, exulting in his career, soared upward. The blaze of the torrid sun softened the waxen fastenings of his wings. Off they came, and down the lad dropped into the sea". Enough said.

TRIAD Operational Risk Manangement

By CDR Tim Holland
CCG-1 (N4) Material Officer
CNAP (N422R) Aircraft Material Readiness Officer

Before your eyes glaze over and you skip to the next article, realize that while the topic is ORM the discussion is about applying ORM concepts to what we as maintainers do for a living: buy, maintain, and repair aircraft and aircraft parts to ensure those aircraft can break the things of and kill our enemies. ORM is about ensuring the operational mission is accomplished. In our business we take risks to achieve that mission and as maintainers we have to assess risk to mission accomplishment and execute mitigation plans that will ensure the mission is accomplished.

ORM is not about safe operations. If it were we would never go to the flight deck and kneel underneath the nose of an aircraft at military power and in full suspension on the cat. Obviously safety is a component of ORM and one of the most visible, but ORM is about managing ***all*** risks to successful operations. In some circles, it's referred to as operational ***success*** management.

Most if not all of us have taken the ORM University course available at https://www2.cnap.navy.mil. During battle group (BG) training we at CCG-1 have been incorporating ORM into the psyche of the individual warfare commanders as well as the BG Commander and his staff. The idea is to focus the warfare commanders on the risks to mission area success in the future (24-72 hours as well as long term). While safety may be a risk, another risk to success may be the availability of aircraft mission systems that support a particular warfare commander. That warfare commander must then evaluate the risk and then develop a mitigation plan to achieve success. In some cases the risk is acceptable without mitigation—our business is risky.

Here's an example: Let's say the surface component commander (SCC) needs to conduct radar flooding of an undersea warfare area threat sector with airborne surface search radar (e.g. SH60B, S3B and/or P3C RADAR) to find that pesky submarine while it's snorkeling. Based on ship positioning and inherent reliability of the three systems, he realizes he'll have a portion of the sector uncovered for a period of time. He must weigh the risks to the BG and produce a mitigation plan. One option is no plan—simply leave the area uncovered and risk attack from that area; another is to have the sector covered by FA18 or F14 aircraft—not as good a radar for the mission, but better than nothing; and a third option would be to double cycle one of the aircraft already on the air plan to ensure the coverage is there when the SCC believes the threat to be highest. There are many more options but the bottom line is evaluating the risk to the mission—and finding a solution as part of the mitigation plan.

So how does this apply to us, the maintainer or as my title says, the TRIAD?

The actions of maintainers, whether those who touch the aircraft on the flight line or those who repair aircraft parts or those who carry them from supply to the squadron, can either create or mitigate risk to mission success. Our covenant to the operator is that we will provide them with an operational aircraft and get it into the air. Their covenant with us that they will use it against our enemies successfully and bring it home. Due to the inherent reliability of some systems or aircraft we will provide unmanned, manned, turning or airborne spares for a particular mission as mitigation options depending on the risk of failure to the mission. The number of aircraft required for the flight schedule may be fraught with risk if too high or an easy fly day if low. In either case, as the MMCO evaluates his aircraft at the end of the fly day looking forward to tomorrow, he naturally plans for success to ensure he has enough aircraft.

The MMCO must ensure that if parts are required, they are the right parts so that Supply doesn't needlessly chase a part that will not result in a usable aircraft (proper troubleshooting). He must also ensure he has a good flight deck coordinator who will motivate and orchestrate the launch and recovery to ensure up and ready aircraft for the next go. The MMCO must let both his MO/CO and CAGMO know when he needs help to mitigate risk—and identify the impact of both mitigation and acceptance of the risk.

CAGMO must work with the Handler to ensure the aircraft are spotted to meet maintenance requirements as part of his mitigation plans. He must also manage the movement of assets (e.g. pods) where there aren't enough for each aircraft. He must also prioritize with AIMD and Supply their efforts to ensure the right parts are repaired in the right order. He must be aware of the future air plans to ensure he can meet long term (72 hours) requirements through scheduled maintenance as well as near term (24-48 hours). Where risks exist he must brief CAG as the aircraft component commander (ACC) so that he can coordinate with the BG staff and other warfare commanders mitigation plans where warranted.

FIXO (AIMD Officer) also coordinates with CV/N department heads to ensure resources are in place (e.g. parts on the shelf) to support the squadron maintenance efforts. Whether it's power affecting drills and the impact on production (power down benches during drill or risk damage due to power spikes) or running an engine on the fantail at night to plug a bare firewall in the morning (fuel, power, SE, as well as safety). Loss of SE (BROAD ARROW) may put the air wing at risk for future missions depending on how quickly FIXO can get the bench fixed (e.g. FA18 TFLIR bench failure).

SUPPO works to ensure parts are on the shelf and is typically successful 90% of the time. This means working with FIXO and CAGMO to ensure the right parts are ordered in the right quantities as well as ensuring FIXO retains his repair capability. He must weigh that other 10% against FIXO'S repair capability/capacity (expeditious repairs) and the risk of timely movement of parts from shore warehouses. In the rare case, a Type Wing may have to cannibalize a part from an aircraft, but that typically could not have been mitigated by SUPPO, however prioritization of that item during transit is vital.

The TRIAD brings this together and in a perfect world never has to speak during the daily BG Commander Briefing. Instead the discussion revolves around missions for the day and the risks that exist with any mitigation plans as well as key missions planned for the future. If a member of the TRIAD has to talk, it should be about risk identification and mitigation, not parts status (unless that's the mitigation plan). So why does the TRIAD attend? To hear the mission plans and requirements so they can identify risks and find solutions for the future.

In this context ORM is somewhat natural to success. Better maintenance leaders and managers naturally apply ORM to their decision process and achieve better results over time in the form of high sortie rates supporting high mission accomplishments. ORM also isn't just for the MMCO or the TRIAD. It's for any maintenance manager who can have an impact on the air plan.

So the next time you read the air plan don't just read the cartoon. Also take a harder look at the total requirement and what efforts you, as the maintainer, must do to ensure mission success in both the near and long terms.

AIMD at War – Getting Ready for Round 2

By CDR Dave Randle
AIMD Officer
USS CARL VINSON CVN 70

In the first article on AIMD at War, I covered some lessons learned during Operation Enduring Freedom, when we had to improvise and invent an entire logistics pipeline where none existed. I seriously thought that would be my last Navy deployment ever. Now I'm not so sure- USS Carl Vinson is on a short tether, ready to go if needed. How did this happen? We were on sea trials, expecting a leisurely pace that would culminate in a deployment almost a year away. Then we got a message saying "Get ready faster than anyone's ever done it before" No deployment date, just get ready. Suddenly our entire world was turned upside down. Keeping our priorities straight ("Suppo, load up the cigars"), we began planning how to do 9 months of training in one-third the time. I can honestly say that I've learned a lot more about AIMD in the last three months than I did during the combat cruise. Here are some things I'd like to pass on:

1) **Don't believe the doubters.** Our ship had people telling us that they hoped we would fail so that they could prove that a carrier couldn't do 300,000 mandays of shipyard work in 6 months. Sorry- if they were looking for somebody to fail, they picked the wrong team- we ended up doing 350,000 man-days in 5.2 months. We then disappointed them again by "validating" CART I and then finishing CART II and TSTA I, II, and III in 16 days. How did we do this? We had a varsity crew. Over 70% of the ship's crew were varsity players from the previous cruise which ended 8 months prior. Had this not been the case, our challenge might have been insurmountable.

2) **Air Wing composition.** In very short order, our air wing composition changed several times. We went from "You'll have SuperHornets" to "You'll have all short-wing Hornets, some brand new, some real old" to "All short wing, some brand new" It only takes about two weeks to go from "There's a rumor we may get some different jets" to "We're definitely getting different jets" to "AIMD, why can't you fix these jets? You've known about it for over a week." I was amazed at what my Sailors were able to accomplish as the deckload changed. Their flexibility and responsiveness stunned me. We onloaded 60 pallets of Superhornet gear, then offloaded it. We swapped out three test benches on the O1 level during a 13 day inport.

3) **Tell the emperor he has no clothes**. There are departments on this ship whose mission doesn't change much regardless of where we go or what part of the cycle we're in. Reactor still makes hot water and maintains the warp core field generator, Legal still processes our ethically-challenged suboptimal performers, and Admin still puts typos in my FitRep regardless of where in the world we are. However, the mission of AIMD and Supply changes dramatically when our cycle shifts. It takes an enormous effort to get over $400 million in test equipment active again. As Captain Cleveland and Commander Disano at AirPac put it: "Nobody asked the guys in the garage." What I learned from this was to not be afraid to show the pain, and to tell people that I could not accomplish my mission without a lot of outside help. I was the only one on the ship to seriously consider Sailors for OpHold. The ship's PERSMAR was over half AIMD. I was howling for manning, begging for Broad Arrow fills, etc. If I had not done this, I believe I'd be in much worse shape now.

4) **Be very cautious about the new stuff.** We all like new toys, and I was excited about getting some of the latest and greatest technology. However, I prefer toys that come with instructions on how to use them, particularly if they operate at 15,000 RPM. Instead of a joyous time with state-of-the-art test equipment, I had to relearn those 10 ILS elements all over again.

   a. I had to defer getting rid of some legacy benches because the new benches weren't ready to carry the full load yet.
   b. I learned the hard way that some benches use chassis ground while others use a floating ground- I found this out when contractors rewired an entire shop for chassis ground and suddenly I couldn't run a legacy test bench.
   c. One new bench came with no publications approved for fleet use. CNAP helped tremendously by demanding either good pubs or contractors to run the bench. I still have the same situation on another bench. In summary- be careful. By accepting a brand new bench you may find yourself with a lot less repair capability than before.

5) **Manning became our biggest challenge**, It's not that hard to get parts to fill Broad Arrows (thank you Stennis), and bench verification is a matter of time and some smart planning. What is really hard is trying to suddenly and dramatically improve your manning. Although my benches and spaces were in remarkably good shape coming out of the yards, my manning was typical for a carrier AIMD at that part of the cycle. My NMP says I rate two Master Chiefs and five Senior Chiefs. At the time of this writing, my Current on Board is one frocked Senior Chief and no Master Chiefs. Unfortunately, there are no technically trained Sailors planted in the fields around Millington just waiting to be plucked. Every player I get has to come from

somewhere. We got a lot of help from Airpac N422 to identify fills to make us healthy a lot more quickly.

6) **SeaOpDet manning**. When I got the data call "Where are your SeaOpDet manning shortfalls?", my first response was "What's my SeaOpDet manning?" I didn't have my MRWs yet, and my manning was changing to reflect a loss of Tomcats, a gain of some flavor of Hornets, and a lot of bench swapouts and upgrades. Thankfully my shore AIMDO comrades helped out tremendously by showing me what they had, and in some cases making best guesses. The result was SeaOpDet manning that made sense and got the job done.

7) **Execute the basics**. On any given weekend, the recipe for a winning football is straightforward. It's not the team with the most intricate offensive plays who wins the game. It's the team that can run the ball, stick to its game plan, and most importantly doesn't turn the ball over who almost always wins. In short, execute the basics. The AirPac milestones put together and monitored by Commander Holland give you a good foundation to assess how ready you really are. In the massive swirl of changes going on around us, we stuck to those milestones. In addition, I knew that our maintenance programs were rusty 8 months after cruise. I had QA step up their work center audits, invited AIMD Whidbey QA to give us a courtesy visit, and had the AMMT do an advance look. The result of sticking to the basics was that we achieved COMPTUEX milestones and got a better than average MPA after only 3 months of workups.

8) **Encouragement of my Sailors.** In the last article, I talked about using FixOGrams (I've published 57 so far) and regular quarters formations to encourage my Sailors and tell them how important their mission was. That helped sustain them when we had a very clearly defined mission. This time, it wasn't as simple. The most pressing question was "What's our schedule?" I didn't know, and neither did anyone else. I told my Sailors that when we headed south from Bremerton for COMPTUEX, to be ready for anything, including possibly deploying. What do you tell your single Sailors to do with their apartments? How do you put together a training plan when your schedule goes blank a few weeks out? How do you encourage your Sailors to extend for deployment without a deployment date? These were tough questions. Once my Sailors realized that the Captain, XO, and I didn't know anything more about the schedule than they did, they were very patient. The FixOGrams and quarters formations helped, but the indomitable spirit of the American bluejacket was most important. It was a tough challenge, but they stuck it out.

If you'd like more info, you can reach me at aimdo@vinson.navy.mil or on SIPRNET at drandle@vinson.navy.smil.mil. Compressing an IDTC cycle brings a host of challenges, many of which are not visible to the outside observer. The challenge of getting an AIMD cruise-ready in three months is daunting, but it can be done. Then again, if this were easy, they wouldn't need the varsity.

My Life as a Program Integrator

By LCDR Trent DeMoss
DCMA Orlando Program Integrator

As I sat in front of the Detailer a little over three years ago and said, "Yes sir, I will take orders to DCMA as a Program Integrator", two major issues were running through my mind. First, I had NO idea what DCMA stood for, and second, I had NO clue what a Program Integrator did. Regardless, the decision was extremely easy to make as shore duty in Orlando (the DCMA job) looked much more appealing than the other three choices of Japan, Japan or Japan. Not that I have anything against Japan, but a shore tour in Florida seemed hard to turn down.

Turns out that the decision was a wise one and the experience of a DCMA tour was worth it. Like most jobs out there I've had my share of frustrating times but as a whole the knowledge that I gained in Department of Defense contracting, financial management, systems engineering, manufacturing processes, quality control and program management far over shadowed the "not-so-good" days. So, what does DCMA stand for, it stands for Defense Contract Management Agency (formerly known as Defense Contract Management Command) and the agency's mission/vision is to "Provide customer focused acquisition support and contract management services to ensure warfighter readiness, 24/7, worldwide" and to be an "Indispensable partner, providing our customers flexible and responsive contract management and acquisition life cycle solutions."

And now to answer, "What does a Program Integrator do?" Well, after two and half years I did get somewhat of an understanding as to the Program Integrator's rule. The book answer is that a Program Integrator "is responsible for sustaining an open, professional dialogue with the various players in the systems acquisition process. These players include: the buying activity, Program Support Team members, other Contract Management Offices (CMOs), defense contractors, Defense Contract Audit Agency (DCAA), and other organizations involved in supporting the program." But what that really means is much more difficult to explain. Being a Program Integrator means being the program office's eyes and ears at a major defense contractor's facility (i.e., Lockheed Martin), relaying information on the health of a particular acquisition program. It means being the liaison between the contractor and the government. It means being the "called upon authority" as to the exact meaning and intent of responsibilities that are outlined in the contract. It also means, being the lead of a team of DCMA government employees that have specific skills required to administrate a contract. It means being a sounding board for new concepts, engineering changes, better business practices and budgeting matters, just to name a few. It also means ensuring that the government receives the services or products called for in the contract and making sure they are on time, on cost and functional, all the while being fair and equitable to all parties. It means being able to relate fleet experience to those that may have never even seen an aircraft carrier, F/A-18 or CASS station. Being a Program Integrator also means being a planner, a researcher, a communicator and a listener. With all this, program management opportunities at NAVAIR or OPNAV become very good prospects for future tours.

There are several interesting challenges that you will face as a military member working with DCMA. This is not a job for someone who needs a motivating force, you have to be a self-starter that is willing to go out and engage the services offered by your team. You will be working with three uniquely different groups of people, government civilian employees, civilian contractors and members of all the military services. Balancing this mix requires people skills, leadership, oh, and lots and lots of patience to say the least! Also, DCMA supports contingency operations around the world, such as in Haiti, Bosnia, Kosovo and other areas in the Middle East region. What does that mean for you? It means the POSSIBILITY of doing a six month deployment with the Army/Air Force to one of the United Nation/NATO backed operations somewhere in the world. Personally, I went to Kosovo in the late winter of 2001. While getting deployed on shore duty may not sound like something that you want to consider, I will say that being in the Navy and getting the opportunity to see "deployment" from an Army perspective was a great experience and I do not regret being "shipped out" to the Balkans at all.

I will end this by saying that a Program Integrator tour with DCMA is what you make of it. You can roll up your shirt sleeves, get involved, and be a part of the decision making process that ultimately affects the fleet. Or you can stand by and just let things happen. If you think that you are interested in a DCMA tour, touch base with the career manager and have them get you in contact with someone who is currently in a tour as a Program Integrator.

RCM and Naval Aviation

By LCDR Randy S. Tanner
NAVAIRSYSCOM HQ (AIR-3.2)
RCM Team Lead

Since 11 September 2001 NAPRA RCM (Reliability Centered Maintenance) means many things to many different people; or it may mean absolutely nothing at all. To the Surface Navy, it's a structured approach for making something last as long as possible. To Ford Motor Co., it's reducing maintenance costs on industrial plant equipment. To NASA, it's how long they can safely utilize something before retiring it. But to Naval Aviation, it has become a way of life. RCM affects everyone in the Fleet, Acquisition Community, and the Industrial workforce. Without it, we work harder and longer, waste valuable resources, and often spend more time investigating why engines failed and aircraft crashed. With it, well… we do a lot less of that stuff!

How did RCM come about?
The roots of RCM come from the early 1960's North American civil aviation industry. RCM came into being when then airlines began to realize that many of their maintenance philosophies were not only too expensive, but also actively dangerous.

Early PM was based on the concept that periodic overhauls ensured reliability and, therefore, safety. However, commercial airline industry research in the1960's revealed the truth that rigid overhaul schedules did not ensure, but actually reduced aircraft reliability. The airline industry put together a series of steering groups (representatives of the aircraft manufactures, the airlines, and FAA) to examine their current maintenance procedures.

The task force went on to develop a propulsion system reliability program, while each airline involved developed reliability programs for their particular areas of interest. These became the Handbook for the Maintenance Evaluation and Program Development for the Boeing 747, more commonly known as MSG-1 (Maintenance Steering Group 1). MSG-1 was subsequently improved and became MSG-2. In 1979 the Air Transport Association (ATA) reviewed MSG-2 to incorporate further developments in preventive maintenance; this resulted in MSG-3, the Airline/Manufacturers Maintenance Program Planning Document.

In the mid-1970's, the DoD wanted to know more about the state of the art in aviation maintenance thinking at that time. They commissioned a report on the subject from the aviation industry. Stanley Nowlan and Howard Heap of United Airlines prepared the report. It was called Reliability Centered Maintenance and represented a considerable advance on MSG-2 thinking, and eventually evolved into today's NAVAIR RCM Program.

A "true" RCM process entails asking seven questions about the asset or system under review:

- What are the functions and associated performance standards of the system in its operating environment?
- In what ways can it fail to fulfill its functions?
- What causes each functional failure?
- What happens when each failure occurs?
- In what way does each failure matter?
- What can be done to predict or prevent each failure?
- What should be done if a suitable proactive task cannot be found?

What is NAVAIR RCM? According to the NAVAIRINST 4790.20B, "RCM is a disciplined, analytical process used to manage risk by determining preventive maintenance (PM) requirements and identifying the need to take other actions that are warranted to ensure safe and cost-effective operations of a system. This process of developing PM requirements, with an auditable documentation package, is based on the reliability of the various components, the severity of the consequences related to safety and mission if failure occurs, and the cost effectiveness of the task."

What RCM isn't…
A very smart friend of mine with ten times more acquisition experience once explained to me his perception of RCM as "a big machine with a hand-crank. If you turn the crank, the machine will spit out MRC/PM tasks. The more you crank it, the more tasks you will get. So you better not turn it unless you can afford it."

Wow, somebody find the key to the clue locker! There are multiple, possible outcomes of an integrated RCM analysis, including:

- No PM – Fly-to-Failure
- PM to prevent failure / control consequences (high-time removals, inspections, NDI, etc)
- Age Exploration Tasks (to collect & refine insufficient data)
- Condition Based Monitoring (automatic prognostic/diagnostic sensors)
- Redesign for improved reliability

The Goal of RCM analysis is not to:
- Reduce the maintenance cost
- Ensure every aero-widget lasts as long as physically possible
- Find applications for high-tech prognostic/diagnostic sensor technology
- Justify preventive maintenance task we already perform
- Give the sailor/airman something to do between flights

Then why do we (Naval Aviation) do it? To ensure a pre-defined level of safety for aircraft at the lowest economical level. If properly planned and implemented, RCM principles will not only ensure safety, but also provide increased availability, reduced O&S costs, and an audit trail for all decisions made during the analysis.

Does every aircraft and major support equipment have the PM tasks justified by RCM analysis? No. Why not? PM tasks delivered by the OEM are often slanted toward ensuring low warranty costs. For in-service systems, many obstacles must be overcome to properly implement an efficient program:

- Poor item life tracking
- Accuracy of 3M data
- 3M system does not have all the information needed for proper analysis
- FMECA not done for in-service aircraft
- Only have design FMECAs which are at a level too low, or not updated
- Shrinking budgets & fear of committing funds now to reap savings later
- Lack of RCM-knowledgeable personnel

What Are The Steps In The RCM Process?

- Determine failure modes and their effects and criticality (what can go wrong & how bad it can get)
- Determine significant functions and failure modes (how it can go wrong & is it important?)
Identify action to manage each significant failure mode (how to prevent bad things from happening).
- Maintain an auditable, documented database (Document what you did)

Unfortunately, the majority of the fielded aircraft and support equipment have preventative maintenance tasks that are not substantiated by analysis but via the " we've always done it that way mentality" or through cursory judgment with little analytical back-up. Performing unnecessary maintenance increases costs, reduces readiness, and can create maintenance-induced errors (resulting in failures, some with a risk to personnel safety). Platforms and equipment where RCM has been diligently accomplished have documented significant cost and readiness improvements while preserving safe operations.

Safety: RCM has identified new flight critical failure modes that were not apparent during aircraft design. RCM assures the maintenance program is first and foremost, directly ensuring safe operations and maintenance. (Ex: AV-8 RCM identified that the Environmental Control System was creating FOD which was impacting the safe operation of the flight control system.)

Reliability: RCM analysis improves the overall reliability of an item by identifying areas requiring redesign and eliminating maintenance-induced failures. (Ex: T58-16 engine re-core for H-46 increased mean time between removal by 100%)

Aircraft Availability (FMC/MC): When preventative maintenance tasks are challenged via RCM analysis, the intervals are often extended, increasing availability while maintaining safety. (Ex: H-53 150-hour phase moved to 200 hours)

Reduced Maintenance Costs: Adjustment of the original overhaul procedures and frequency for the P-3 Actuator saved millions in AVDLR repair costs.

Redesign: The RCM analysis revealed best alternative for the EA-6B Generator Assembly was redesign for a better, more reliable bearing assembly.

Summary: A robust RCM program is not just another NAVAIR requirement; it is an attitude that ensures we perform the right amount of maintenance at the right time to achieve CNO goals of safety, readiness, and availability. RCM Analysis ensures the maintenance program preserves aircraft safety and readiness in a cost-effective manner. The analysis determines requirements for preventive maintenance, but may also result in other recommended actions such as design change or maintenance process improvements. Without it, we work harder and longer, waste valuable resources, and often spend more time investigating why engines failed and aircraft crashed.

Want More Info?
https://www.nalda.navy.mil/3.2/rcm/
NA 00-25-403 RCM Manual
NAVAIRINST 4790.20B RCM Policy & Guidance

An Eccentric English Inventor and His Flying Machine

By Ian Wormald (reprinted with permission)
Original article printed (Nov 17 2002) in The Register magazine of The London Times

Today is the anniversary of Sir George Cayley's definitive paper for the first manned aircraft, published in the *Mechanics' Magazine* on this day 150 years ago.

It was this aircraft that was flown in the summer of 1853, at Brompton-by-Sawdon in North Yorkshire. Family and parish documents record that it was probably Cayley's coachman who was instructed by his employer to "fly." The flight across the gentle vale ended with a somewhat rude arrival, and the coachman is reported as saying "Sir George, I was hired to drive, not to fly!" - and he quit.

This first manned "flight" was thus also the first dispute between aircraft management and aircrew. It should be noted that Cayley had no intention of flying in the aircraft himself. Also, the fact that the exact date is not known is indicative perhaps of an amateur project; a mere hobby for an enlightened member of England's gentry.

As can be seen in the image of the cover of the magazine, an aircraft configuartion had a high wing to create lift and a tail for control and stability. Underneath is a cockpit, for the "pilot," properly suspended below the centres of gravity and lift, thus further enhancing flight stability.

It is no coincidence that the cockpit looks like a boat because Cayley came from Scarborough and worked near by at his family seat at Brompton-by-Sawdon. Nonetheless, his configuration remains intact as an enduring design for manned flight. It could be said that, had the internal combustion engine existed, Sir George's aircraft might well have preceded the Wright Brothers' first powered flight by 50 years.

Blue plaques can be found at Cayley's London house in Hertofrd Street, and at Brompton-by-Sawdon and Scarborough. Apart from those architectural marks his pioneering work, 50 years before the Wright Brothers, is insufficiently recognized.

It is a particular injustice that Cayley, acknowledged by the Wright Brothers and commemorated in the Smithsonian and San Diego museums as "the Father of Aeronautics," is almost unknown in his native Britain. Let us hope that he will not be passed over again in 2003 - for the next year is not only the 150th anniversary of the first manned flight, in Yorkshire, but also, by coincidence, the centenary of the Wright Brothers' more famous flight at Kittyhawk in 1903.

Cayley enthusiasts, in universities and industry, plan to rectify the situation by the commission of a bronze bust of Sir George and commemoration of the first flight by the Royal Aeronautical Society an dBAE Systems. They hope also to persuade the National Portrait Gallery to display Cayley's portrait and explain his importance next year.

Similarly, they would like the Science Museum to make a feature of his work, displaying the silver disc of 1799, on which he had engraved, for the first time, the forces of lift and drag as vectors. These vectors remain fundamental to fluid dynamics.

No one should think that Cayley was a mere theorist and causal inventor of the aeroplane. He campaigned for an Aeronautical Society to be formed, but his lead was not followed until 1866, some nine years after his death. He also, however, invented the tensioned, spoked wheel that the London Eye exploits and every cyclist takes for granted.

Add to that brakes and signal systems for railways, the tracked tank, artificial hands, self-righting lifeboats, mechanised agriculture, lobbying for rail safety, founding philosophical societies and, in 1838, the Regent Street Polytechnic, now the University of Westminster, and you have a formidable portfolio of a pioneering, restless genius. It is time he had the credit he has too long been denied.

NAVRIIP Improves Aviation Readiness One Platform at a Time

By NAVAIR Public Affairs Office

Editors Note: *Please see two sidebars at the end of the article referencing a description of the NAVRIIP process and the history of the Norfolk triad alignment.*

Naval Aviation Readiness Integrated Improvement Program NAVRIIP continues to provide a process for identifying barriers to non-deployed readiness, but the focus has shifted from aviation bases to aircraft type/model/series (T/M/S) to realize results more efficiently and more systematically across naval aviation communities.

"We are solving readiness issues using a formal process," said Lt. Cmdr. Dave Spencer, assistant maintenance officer, Airborne Early Warning Wing, U.S. Atlantic Fleet (CAEWWL). "We are also sharing the information throughout the aircraft intermediate maintenance department (AIMD) and discussing the items hurting our heads to give the fleet a chance to solve their requirements issues."

Initially, NAVRIIP was designed to address non-deployed readiness issues site by site, not by T/M/S. Due to restructuring the approach, maintainers are now able to address readiness more efficiently across a specific T/M/S of aircraft by communicating and reporting the findings on barriers to other sites that support the same aircraft. The other sites can then move forward with the barrier removal process before the NAVRIIP team reaches their base. Adjusting the NAVRIIP system-wide process and schedule to locate barriers by T/M/S sequentially, lessons learned are more readily be passed from base to base as the NAVRIIP team visits continue. By facilitating open communication between bases with the same aircraft, maintainers are more enabled to move forward with analyzing other systems with readiness issues when the NAVRIIP team reaches their base. By systematically improving the NAVRIIP process, non-deployed readiness rates can quickly be increased.

"We concentrate on chipping away the barriers locally and realize that the big issues can be escalated when the resources are not locally available," said Lt. Don Heffentrager, avionics division officer, AIMD Norfolk.

The NAVRIIP BOG leaders visited Naval Base Norfolk for a look at barriers to and quick fixes for E-2C readiness. The Capt. Brian Roby, CAEWWL commodore, presented the leaders a brief that covered developments and implemented logistic solutions for aircraft systems that are responsible for degrading non-deployed aircraft readiness at the wing. This meeting concluded five-week barrier identification and mapping effort by the Norfolk NAVRIIP team and the Thomas Group. Specifically, the BOG team learned about and toured three system wide readiness barriers with the E-2C, the Navy's airborne early warning aircraft. The flag officers received direct accounts of the problems identified by the fleet within the specific aircraft systems.

The NAVRIIP team decided to concentrate on three degraders at the onset, and sequentially move through the remaining top degraders as a barrier is resolved. The three top degrading systems identified were the enhanced main display unit (EMDU), elevator load feel bungee and multi-function control and display unit (MFCDU), which are each integral for E-2C aircraft readiness.

"You'll notice we are centric on the E-2 side of the house," said Roby. "We chose to concentrate on the E-2; we'll be back next year to discuss other top degraders for other type/model/series."

Local fleet members resolved many of the initial problems identified. Aviation Structural Mechanic Chief (AW) Eddie Sanders, AIMD Production Control Division chief petty officer, resolved the elevator load feel bungee barrier locally by mapping the barrier removal process before the NAVRIIP program was introduced to his division. Sanders realized the problem with the bungee stemmed from a retaining washer being installed backwards and the spring length being too short. There are 104 bungees with this problem. Sanders developed a solution by breaking down the bungee, fixing the installation and then reassembling.

"One of the great points of the BOG process is that at the local level if the resources are available, the barrier is easily leveraged and resolved," said Rear Adm. Wally Massenburg, NAVRIIP chief operating officer and assistant commander for Logistics at Naval Air Systems Command (NAVAIR). "It's when the resources are not available that NAVRIIP really becomes essential. NAVRIIP provides the formal process for identifying the problems."

The EMDU and MFCDU systems become barriers to readiness due to problems with availability. Both systems have a high turn-around time in regards to availability which impacts the amount of time the E-2C is down between deployments.

"We ranked the degraders based on our work load," said Cmdr. Stu Jones, regional supply officer, Norfolk. "There were some barriers we could knock out locally and immediately. The BOG team identified some of our dirty laundry and made us aware of the local quick kills."

After top barriers were chosen for removal, barrier removal teams (BRT) were established to begin the break down process. Removal of local barriers is ongoing at the local triad level. Barriers that are not locally resolved in a timely manner will be escalated to the aircraft program office. At this time, no barriers have been escalated.

As of October 14, 17 local barriers were removed. In the next few months, the local triad anticipates five to six barriers removed, three BRTs formed to work solutions and that five barriers will be escalated to the aircraft program office. Future barriers for removal include 34 that are currently being investigated.

"We have realistic expectations with barrier removal. With three BRTs in work at all times, we know we will have some barriers escalated but we will continue to work the process," Cmdr. Mike Kelly, Norfolk AIMD officer. "The Thomas Group emphasizes and is honest enough to say that you will have a backlog but that keeping the rhythm going is important. We understand this process takes some time."

NAVRIIP Process

Naval Aviation Readiness Integrated Improvement Program (NAVRIIP) was created to improve naval aviation readiness in the inter-deployment training cycle (IDTC). NAVRIIP is a uniquely designed process that addresses the root causes of barriers to meeting non-deployed readiness with a goal to sustain long-term aviation goals in support of the fleet and warfighter. Readiness issues such as training, maintenance and supply are addressed in a coordinated systematic manner that makes best use of available resources. One of the most critical parts of NAVRIIP is the five-to-six week visit by the "Boots on the Ground" (BOG) team. The BOG team visits bases to facilitate interaction with the fleet maintaining and supporting the aircraft, weapons and equipment. During this period, the top detriments to readiness are identified, processes that support readiness are mapped out and barriers are identified. To conclude the visit, senior officers from the naval aviation readiness improvement team (NAVRIT) tour facilities, meet the maintainers, and then are briefed on the results of the BOG.

For more information, please contact NAVAIR Public Affairs by calling 301-757-1487, or by visiting the website - www.airpac.navy.mil/navriip.

The Triad Realignment

The Norfolk Naval Aviation Readiness Integrated Improvement Program (NAVRIIP) began in July 2001 when the Norfolk AIMD was directed to realign under CAEWWL by September 2001. The aviation support detachment (ASD) was also directed to realign under CAEWWL by October 2001. The realignment of the two departments under the wing established the Norfolk triad and created alignment between the fleet, which determines the requirements, the program managers that provide the requirements, and the planning and programming organizations, which provides funding if necessary to improve aviation readiness. The triad began to meet three times per week and conducted briefings with the wing commodore each Wednesday. After the September 11 terrorist attack, Operation Noble Eagle provided the triad an opportunity to operationalize weekly efforts in support of extensive shore-based E-2C operations. In October 2001, the triad's structure and scope was formalized, and in April 2001 expanded to include fleet forecast information for aviation readiness requirements. At this time, the commodore's first brief focused on a comprehensive list of top degraders that were increasing aircraft IDTC time. In mid -October 2001, the top degraders to readiness for the E-2C, which included supply and availability barriers, were identified. The triad then began system selection in August 2002 and the Thomas Group facilitation for the five-week process mapping and barrier identification session followed in early September 2002.

DAWIA courses documented in your record?

Have you taken the initiative to get your DAWIA courses documented in the SERVICE SCHOOLS ATTENDED section of your Officer Summary Record (OSR) ?

Do the following:
- Click on http://dacm.secnav.navy.mil
- Go to Register-NOW! For DAU training
- Review your ACQ Training History
- Save ACQ Training History as an attachment for e-mail or print for Fax

Options to submit Completed Courses:
- E-mail to p312odc@persnet.navy.mil
- Fax to (901) 874-2660 DSN 882

Follow-up in two weeks via "BUPERS On-Line" link to confirm OSR documentation.

Notes from the new AEDO Detailer

CDR Barbara "Tinker" Bell
AEDO Detailer
P446B@persnet.navy.mil or barbara.bell@navy.mil

I have been in the job for just over six months now and it is indeed a privilege to detail the AED community. This is my first newsletter article so here is a little background on myself. Originally an A-3 NFO, I transitioned to the AED community early in my Navy career just after graduation from Test Pilot School and during my first tour in the test community. I graduated from NPS with a Space Engineering degree and have had Program Office tours at the National Reconnaissance Office and in EA-6B Program Office. After two program office tours, I was selected for one of the AED O-5 Commands. After completion of my CO tour at DCMA Australia, I came to Millington to serve as your detailer.

Proactive Career Management.

My job as the detailer is to ensure that you have every opportunity to stay promotable in your AED career and I will advise you accordingly. I am only part of the equation, however, and I cannot stress enough that **YOU** must be proactive with your career. While you may think you have lots of time to get the tickets you need to get you to Major Program Manager or Major Command, from my perspective time is limited. You may only have two to three tours (four if you went AED early) to fit in the jobs required to keep you promotable to O-6 **and** eligible for MPM or Major Command.

Acquisition Professional Community (APC)

If you are not an AP already, get going. A missing "MGT ACQ" stamp in an AED's record is considered negatively by a selection board or slating panel. Membership in the APC is through the bi-annual APC board and is a prerequisite for assignment to critical acquisition billets (all O6 and senior, plus selected O5 billets). Criteria for APC membership are:

- Paygrade of O4 or senior;
- Baccalaureate degree from an accredited institution with (1) at least 24 credit hours of accounting, business finance, contracting law, purchasing, economics, industrial management, marketing, quantitative methods, or organization and management; or (2) 24 semester hours in a primary acquisition career field and 12 semester hours from disciplines listed above;
- Be certified at or meet all mandatory training required for either level II or level III of the member's primary acquisition career field;
- At least four years acquisition experience, e.g., time spent in a government or industry acquisition position (one year can be credited for education and up to 18 months can be waived for URL officers in CDR command)
- Screening for CDR command (URL officers only).

Preparation for Major Program Manager

Preparation for Major Program Manager equates to acquisition experience and time in program offices. Prepare now, as waivers for program office time and acquisition experience will not be given for AEDs. Here is a quick summary of the requirements. **Plan your career accordingly.**

ACAT I Major Program Manager (MPM) Eligibility Requirements:

a. APC member.
b. 96 months acquisition experience of which at least 48 months were in a program office or similar organization.
Level III certified in Program Management.

Note: APC members have 6 months from the date of assignment to meet the statutory requirement(s) before a waiver must be obtained. Up to 12 months of academic training or education may be substituted for acquisition experience (but not program office time). At least 2 of the 4 years "in a program office or similar organization" must be spent in an actual program office position. "Similar organization" program office positions which qualify for program office experience are positions of equivalent acquisition responsibility in which tasking also involves cost schedule and performance issues and frequent coordination with one or several program offices. These "similar organization" positions include but are not limited to:
- Various PEO and OPNAV staff positions that involve frequent coordination with one or several program offices (e.g. PEO OPS and BFM positions, OPNAV TMS Requirement Officers).
- 24 months of CO/CTP command tour at test squadrons VX-20, VX-21, VX-23, VX-30, and VX-31.
- CO tour at NAMRA & NAPRA

ACAT II MPM Eligibility Requirements:

a. APC member.
b. 72 months acquisition experience.
c. Level III certified in Program Management.

Note: Up to 12 months of academic training or education may be substituted for acquisition experience. Additionally, URL officers may count up to 18 months of Commander command tour experience toward acquisition experience.

ACAT III/IV Acquisition Program Manager Eligibility Requirements:

a. APC member.
b. Level III certified in Program Management.

Opportunities to Excel-

In order to get you the acquisition experience you need, I will often advertise high visibility jobs via e-mail. If you see one that you need to get you to Major Program Manager, call me immediately and start pursuing the job. Many jobs have to be "proposed" so just because you want it or need it, the Program Manager will have the final say in who gets the job.

On a final note, if you have not served on a selection board, get on one. All officers need to understand the process by which the Navy selects officers for promotion, for schools and for career milestones. Experience at a board will make you a better FITREP writer, FITREP reader and a savvier Naval officer. While I often hear "I don't have time to serve on a selection board", my response is that you do not have an excuse to take 2-3 weeks out of a 20-30 year career to not serve on a board. Contact LCDR Tom Popp and make your desires known. I look forward to hearing from you and wish everyone a Peaceful New Year.

AMDO Community Manager CDR Fred Hepler Departing

By CAPT John Scanlan
NAVAIRSYSCOM HQ (AIR-7.9)
Head AED/AMD Detailer

CDR Fred Hepler recently transferred to the Industrial College of the Armed Forces and will subsequently report to the USS Carl Vinson (CVN 70) in Bremerton, Washington as the Aircraft Intermediate Maintenance Officer. For the past 23 months, "HEPMO" superbly led the AMDO Community and positioned us for continued success in the 21st century.

Without question, CDR Hepler's extraordinary contributions will ensure long term stability for the AMDO Community. CDR Hepler will be sorely missed. We appreciate the incredible support and outstanding esprit de corps that he ALWAYS provided.

Welcome aboard to LCDR Art Pruett who is Fred's replacement. LCDR Pruett recently completed his IM1 MMCO tour aboard USS John C. Stennis (CVN 74) in support of Operation Enduring Freedom. I encourage you to give him a call.

Art,… it's great to have you on the AED/AMD Detailer and Community Management Team !

Community Manager's Corner

CAPT John Scanlan, USN
LCDR Art Pruett, USN
LCDR Tom Popp, USN

CONGRATs to our new APC members:

LCDR Robert B Armstrong 1510
CAPT Stephen W Bartlett 1520
LCDR Matthew J Browning 1527
LCDR Nora A Burghardt 1520
CDR Ronald M Carvalho 1510
LCDR Albert R Costa 1520
LCDR Trent R Demoss 1520
LCDR Mark A Fondren 1510

LCDR Sean P Fuller 1510
LCDR Michael L Gales 1527
LCDR Mark S Goodale 1520
LCDR Bryant E Hepstall 1520
CDR Karl E Jensen 1510
LCDR Michael J Kingston 1527
LCDR Lance E Massey 1520
LCDR Patrick K Morrow 1520
CDR Robert D Newman 1527
LCDR Bruce A Nickel 1527
LCDR Kenneth W Parnell 1520
LCDR Scott D Porter 1510
LCDR Elisa A Raney 1510
LCDR Kurt B Reinholt 1520
LCDR Joseph A Rodriguez 1520
LCDR Martin R Rumrill 1527
LCDR Daniel Vanorden 1520
LCDR Matthew A Webber 1520
CDR Robert W Worringer 1527

CONGRATS to the following selected for transfer to 1510:

LCDR Frank L Bradfield 1310
LT James M Carrasco 1375
LT Brent T Channell 1310
LT Scott Drayton 1320
LCDR Kimberly A Dyson 1310
LT Matthew W Edwards 1310
LCDR Jeffrey T Elder 1310
LT Samuel Y Hanaki 1320
LCDR Thomas A Hole 1310
LCDR Matthew D Humphrey 1320
LCDR Edward W Kneller 1310
LCDR Neal D Kraft 1310
LCDR Daryl J Martis 1320
LCDR Scott A Mckenzie 1310
LCDR Gerald R J Mcmurray 1320
CDR Robert S Murphy 1310
LT Gregory A Ouellette 1310
LT Richard M Plagge 1320
LT Jason L Rider 1320
CDR Robert S Roof 1320
LCDR John H Rousseau 1310
LT Jay S Schultz 1310
LCDR Robert N Severinghaus 1310
LCDR Blake T Weber 1320

CONGRATS to the following selected for transfer to 1525:

LTJG Victor Allende 1305
LTJG Thomas M Clementson 1305
LTJG Francis J Gault 6332
ENS Randall G Johnson 1305
LTJG Clayton B Massey 1305
LT Winford A Peregrino 3105
ENS Jose A Riefkohl 1305
LTJG Osmay Torres 1305
LTJG Chad E Trevett 1305

CONGRATS to the following selected for MAJOR AIMD OFFICER:

CDR David Geerdes (USS Kitty Hawk)
CDR(s) Neil Williams (USS Enterprise)
CDR Jim Gilles (USS Eisenhower)
CDR(s) Jon Albright (USS Roosevelt)
CDR(s) Chris Kennedy (USS Truman)
CDR(s) Art Pruett (USS Reagan)
CDR(s) Bruce Brosch (NAS Lemoore)
CDR(s) John Smajdek (NAS North Island)
CDR Mike Beaulieu (NAS Norfolk)
CDR Kate Erb (Bank)
CDR(s) Mike Zarkowski (Bank)

NAVAIR SLATE (07 JUN 02) AWOC Approval:

CO, PMA-290 Maritime Surveillance Aircraft
CAPT Steven Eastburg, 1510

BUPERS Sea Duty Component
CAPT Michael Murray, 1310

Commander, DCMA Van Nuys
CAPT James Rainwater, 1500

NAVAIR SLATE (21 OCT 02) Results:

PMA-251 Aircraft Launch & Recovery Sys
CAPT(s) Spencer Miller, 1310

PMR-51 Low/Counter Low Observables
CAPT Steven Kiepe, 1310

CO, NAMTRAGRU
CAPT Charlie Code, 1520

CO, NADEP Jacksonville
CAPT John Scanlan, 1510

Commander, DCMA Lynn
CAPT(s) Chris Bergey, 1320

CO, NAMRA Naples
CDR Will Ainsworth, 1520

CO, NATEC
CDR Joe Beel, 1310

CO, VX-20
CDR Steven Wright, 1510

PMA-265, PMA-234, PMA-201 and PMA-242 will be announced upon AWOC approval.

NAVAIR SLATE (24 APR 03)

Programs/Commands that will be slated:

PMA-208 Aerial Target Systems
PMA-264 Air ASW Systems
PMA-241 F-14
PMA-218 Operational Support Aircraft
PMA-271 E-6A/B
PMA-281 Cruise Missile Command & Control
PMA-205 Aviation Training Systems
CO, NAES Lakehurst
CO, NAVAIR Training Systems Div, Orlando
CO, HX-21
CO, VX-31

Note: PMA-225 and PMA-207 will merge into PMA-218

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47123 Buse Road Suite 445
Patuxent River, MD 20670-1549

Reference Corner

**Fitness reports. If missing a fitness report from your microfiche send a copy to:

(via regular mail)
NAVY PERSONNEL COMMAND
PERS-311
5720 Integrity Drive
Millington, TN 38055-3110
DSN 882-3316/COMM(901)874-3316

(via Certified Mail/FEDEX)
NAVY PERSONNEL COMMAND
PERS-311
Bldg 769 – Wood Hall
5751 Honor Drive
Millington, TN 38055-3110

**Photograph. The official requirement to submit a photograph is within three months after acceptance of each promotion. At minimum you should be in your current paygrade. Photographs can be submitted on NAVPERS 1070/10 to:
NAVY PERSONNEL COMMAND
PERS-313C
5720 Integrity Dr.
Millington, TN 38055-3130

**Microfiche. Order your microfiche online at BUPERS Access It will be mailed to your command - (to your command's official address) No fax or signature required! Log on to BUPERS Access, click Programs and then Microfiche Req.

BUPERS Access should be your primary source for obtaining your Microfiche. Only if you cannot access BUPERS Access should you fax or mail in the Microfiche Order form and mail or fax it to: (Don't forget to sign the form!)

NAVY PERSONNEL COMMAND
PERS-313C
5720 Integrity Dr.
Millington, TN 38055-3130
DSN 882-3415/3596
COMM(901)874-3415/3596
FAX 882-2664 COMM (901) 874-2664

**Performance Summary Record (PSR)
Officer Summary Record (OSR)
Officer Data Card (ODC)

Go to the BUPERS Home Page
www.persnet.navy.mil/index.html
and click on "BUPERS On-Line" link; log in using your SSN and password, click Performance Summary Record, click View Now!
**Have you updated your contact information on the AEDO /AMDO web site lately? If not, please click on the appropriate website and update your contact info. It will only take a couple of minutes and will greatly assist your Detailer! Thank you for your support!

** Download the latest AEDO or AMDO E-Directory at the respective website. User Name "aed-p446"
Password "engineering"

**Medals. If missing an award send a copy of signed citation to Navy Department Board of Decorations and Medals (print or type your SSN in upper right corner).

(SECNAV Awards Board & Unit Awards)
Navy Department
Board of Decorations and Medals
Attn: N09B13
2000 Navy Pentagon
Washington, DC 20350-2000
COMM (202) 685-1770 DSN 325

(CNO Awards Board & Personal Awards)
Chief of Naval Operations
Board of Decorations and Medals
Attn: N09B13
2000 Navy Pentagon
Washington, DC 20350-2000
COMM (202) 433-4992 DSN 288

**Letters to the Selection Board:

President, FY0X (Grade) (Competitive Category) Promotion Selection Board
Department of the Navy
NAVY PERSONNEL COMMAND
PERS 80
5720 Integrity Drive
Millington, TN 38055-0000
FAX 882-2746 COMM(901) 874-2746

**Educational Achievements:

NAVY PERSONNEL COMMAND
PERS 313G
5720 Integrity Drive
Millington, TN 38055-3120
FAX 882-2660 COMM(901) 874-2660

Web Sites:

AEDO/AMDO info:
http://www.persnet.navy.mil/pers446/p446_webpage.htm

AMDO info:
http://www.amdo.org

DAWIA and APC info:
http://dacm.secnav.navy.mil

The AED/AMD Newsletter, Our Aerospace, is published by the Career Management Office of the Aerospace Engineering Duty (Aerospace Engineering and Aerospace Maintenance) communities. The purpose of this newsletter is to provide information of general interest to officers of both the AED and AMD communities and to serve as a forum for the publication of technical papers and articles. Contributions and comments are solicited and should be sent to:

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