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### Feature:

### Royal Logistics Corps Update

### **Ammunition Logistics**

### French Army Logistics Transformation



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Feature

**Royal Logistics** 

**Corps Update** 

Ammunition Logistics

French Army Logistics Transformation







F-35 Lightning II



#### BETWEEN PARTNERSHIPS PROMISED AND PARTNERSHIPS ACHIEVED, THERE IS ONE IMPORTANT WORD: HOW.

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# HOW SAFE NOW?



any might have focused their attentions during the recent fight between Russian and Georgian forces on such things as the relative weak air performance of the former, or the air defence tactics of the latter, and even the raft of errors that seem to have occurred on both sides. For many, some of the Russian decision making would have led to a belief that Russia is in no state to "challenge" western states, no matter how belligerent the noises from Moscow were. But those concerned with logistics really should look at another feature of the short conflict: the cyber attacks waged against a wide range of Georgian ministries industries and facilities which hit around a week before the shooting war began. Attention has to be focussed onto these cyber attacks as there could be a major impact on how militaries

#### scope and develop future logistics Information Technology (IT) systems.

There has been a debate underway for some time about logistics communications and IT systems. At the heart of it has been the debate about what type of C3I capability logisticians actually require. To date, logisticians have almost entirely been ignored, or overlooked as armed forces discuss and formulate their C3I plans, with the attention being placed on "sexier" frontline command networks devoted to the teeth arms.

At best, most C3I enhancements have tended to have logistics applications and communications capabilities as an add-on, and often, plans have tended to put logistics units towards the end of any delivery schedule, or sometimes, logistics C3I is displayed as an aspiration.

In the meantime, a good many logistics communications networks

have relied on commercial communications systems such as civilian satellites and even telephone networks. The reason for this is that a) the bandwidth for many logistics applications is not readily available on military satellites as it is eaten up by G3 traffic and, b) how secret does logistics information need to be?

The second point has been, perhaps, the most relevant to date. After all, even if the Iraqi Army under Saddam Hussein had been able to intercept Allied communications traffic from Kuwait in 2002-3, and pick up lightly encrypted logistics data, would it have given them any battle-winning advantage or intelligence? Unlikely. And were the Taliban able to intercept a series of NATO stock numbers or requisitions, would this necessarily provide them with an edge against Allied forces in Afghanistan? Again, it would seem to have little chance of affecting their general chances and options.



To put it mildly, the overwhelming majority of logistics/support communications traffic is at one level remarkably mundane. It is only information such as Combat Logistic Patrol routes, timings, drop off points, and that level of tactical and operational information that would be of any real use to an enemy able to intercept lightly or un-encrypted communications.

But this analysis only concerns, so far, relatively weak armed forces such as the Saddam-era Iraqi army, or the Taliban. It does not address the situation seen recently in the Georgia, nor various other incidents over the past few years.

One should not forget that in 2007, Estonia was the object of a massive cyber attack from "forces unknown", but widely suspected to have been linked with Russian government elements. And also last year, France, Australia, and New Zealand all also suffered concerted cyber attacks on government and industrial computer systems. Although official statements rarely point the finger of blame directly at the People's Liberation Army or the Chinese government, private statements tend to say that it is believed that agencies such as these are behind the growth of concerted and regular cyber hacks on western computer systems.

So what? How does this affect logistics IT, so often run on lightly encrypted networks, or even unencrypted ones? Well, the scale of the threat that the Chinese and Russian hacking poses is way in excess of what is presented by a lower tech adversary. For a start, with reports of highly organised cyber warfare units, even lowly NATO stock number data could be used to create a useable battle picture, with ideas about stock levels and equipment use rates and so forth. Perhaps not quite as sexy as hacking the battle orders for an American task force, but still something.

And let one think a little bit further about what a highly organised cyber warfare operation could do to vulnerable logistics and support communications. Arguably one of the worst case situations would be for an adversary to be able to intercept logistics data, alter it subtly, and then allow it to be transmitted onwards, with sender and recipient none the wiser. Think about the situation whereby a requisition for, say, Apache helicopter spare parts gets subtly altered so that instead, the stock number refers to truck wheel nuts. Without careful reconciliation of the demand and the stock numbers, as well as possibly a double checking by the sender of what they actually asked for, there is room for immense confusion.

As ever, this is a sign of the joys of asymmetric warfare: someone with relatively simple computers and connections could well have the ability to cause huge problems to their adversary. And the knock on effect is that a growing awareness of the potential capabilities of cyber warfare should – and note the conditional tense – mean that western nations look to harden their logistics C3I means faster rather than slower.

But will the funds be found at a time when the emphasis on "current operations" means that the emphasis is on items deemed to be far more important, especially force protection ones? Because there is the emphasis on current operation, and because there is no evident cyber threat to NATO nations' that is critical, it would seem unlikely that for the time being, the lowly topic of logistics IT will receive the attention that it deserves. Pressured budgets will bulge and squeeze elsewhere, but unless there is evidence to the positive that this area requires immediate attention, then it is likely to languish, unloved, in the background.

But *MLI* will keep an eye resolutely fixed on this area in the future. If we learn anything from history, it is that many, if not most threats were readily identifiable some time before they actually come to pass, and it is also those in the least likely areas that can have the most effect. Logistics C3I bears all the hallmarks of an academic exercise which seems to be of less importance, but which could well end up a significant Achilles Heel.

# END OF KC-X – FOR NOW

n 10 September 2008 the U.S. Department of Defense notified Congress and the two competing \_ contractors Boeing and Northrop Grumman - that it was terminating the current competition for a U.S. Air Force **"KC-X"** airborne tanker replacement.

According DoD to the announcement, "Secretary Gates, in consultation with senior Defense and Air Force officials, has determined that the solicitation and award cannot be accomplished by January. Rather than hand the next Administration an incomplete and possibly contested process, Secretary Gates decided that the best course of action is to provide the next Administration with full flexibility regarding the requirements, evaluation criteria and the appropriate allocation of defense budget to this mission".

Secretary Gates stated, "Over the past seven years the process has become enormously complex and emotional – in no small part because of mistakes and missteps along the way by the Department of Defense. It is my judgment that in the time remaining to us, we can no longer complete a competition that would be viewed as fair and objective in this highly charged environment. The resulting 'cooling off' period will allow the next Administration to review objectively the military requirements and craft a new acquisition strategy for the KC-X".

In making the decision, Department of Defense representatives, "concluded that the current KC-135 fleet can be adequately maintained to satisfy Air Force missions for the near future. Sufficient funds will be recommended in the FY09 and follomon budgets to maintain the KC-135 at high-mission capable rates. In addition, the Department will recommend to the Congress the disposition of the pending FY09 funding for the tanker program and plans to continue funding the KC-X program in the FY10 to FY15 budget presently under review."

The termination announcement follows months of political criticism over DoD's handling of the KC-X program. For example, during 10 July 2008 hearings on the tanker program, House Armed Services Committee Air and Land Forces Subcommittee Chairman Neil Abercrombie (D -Hawaii) observed, "We had been assured by the most senior Office of the Secretary of Defense and Air Force acquisition officials that the tanker source selection was handled fairly, openly, and 'mell executed'. That does not appear to have been the case, resulting in huge expense to the taxpayers, endless delays, and personnel flying very old tanker aircraft that have become increasingly expensive to maintain."

"It is not an infrequent occurrence that we read about tanker aircraft experiencing in-flight emergencies and having to abort their missions for emergency landings — the most recent ones being in Afghanistan two weeks ago and at the former Pease Air Force Base in New Hampshire, last week. These tankers are old and getting older. We have little experience with flying 45 year old aircraft and no experience flying 70 to 80 year old aircraft, which our constituents are going to have to do," he said.

Coming just two months before U.S. national elections, the DoD termination announcement drew immediate comments from both sides of the political aisle.

House Armed Services Committee Chairman Ike Skelton (D-Missouri) stated, "I appreciate the Secretary of Defense's efforts to use a cooling off period to ensure the tanker competition proceeds in a fair and competitive way. I will urge the new administration to put this program at the top of its acquisition agenda". "The Air Force continues to tell Congress that it needs to recapitalize its airborne tanker inventory because of the age of the current fleet and budget constraints that limit the annual procurement numbers," he added. "This process has gone on for seven years and it appears will go on for at least another year, but we need to move forward to replace the venerable Air Force KC-135 tanker."

U.S. Rep. Duncan Hunter (R-California), Ranking Republican on the House Armed Services Committee, echoed, "The decision by the Secretary of Defense to cancel the current KC-X tanker program is a win for America's taxpayers. I've long had concerns regarding the process used to develop the requirements for the tanker program".

"Warfighter requirements are the foundation of any acquisition program," he said. "If the requirements aren't clearly defined, you can't have an objective competition and the result is an endless cycle of protests. It's for that very reason that I included a provision in the 2009 defense authorization bill that would require the Secretary of the Air Force to explain to Congress exactly how the requirements for the tanker were established. Unclear requirements in an acquisition program make it impossible to objectively evaluate any competitor making it impossible to ensure the best capability for the warfighter and deliver the best value for the taxpayer."

Hunter continued, "Instead of continuing to pursue a flawed process based on subjective criteria, the Air Force can now focus on a new acquisition program based on objective requirements. There is no doubt that the Air Force and our military personnel need new aerial refueling tankers. We must expeditiously move to field this critical capability. I look forward to hearing more from the Air Force about how it intends to proceed".

# NEW CHALLENGES AND NEW OPPORTUNITIES IN APACHE SUPPORT

#### MLI's North American Editor, Scott Gourley, looks at how the ever-increasing OPTEMPO has put new strains on Apache logistics, causing new solutions to be found.

oting that the U.S. Army's AH-64 series Apache helicopters, "are flying three, four, and five times their normal **OPTEMPO** [operational tempo]," Tim Sassenrath, director of Apache attack helicopter worldwide support within the Support Systems business unit of Boeing Integrated Defense Systems, recently provided an update on accomplishments the and challenges facing the company's Apache support activities.

Sassenrath, who noted that he recently joined Boeing after 26 years as a self-described "Aviation Logistician and test pilot for many of these aircraft, including other brands," adds, "I will tell you that it is a pleasure to be in Support Systems, where we are supporting soldiers and making things happen out there. 26 years is a long time and I felt a little bit guilty [*leaving service*] while we were still at war but I realize that I am still part of a significant contribution to that effort".

He offered an overview of the Systems Support business, highlighting its status as, "a very large piece of Boeing Integrated Defense Systems." The status was further quantified as 16,000 employees at ten major sites and 170 locations worldwide. In addition to the United States, Boeing Support Systems operations can be found in Afghanistan, Canada, Egypt, Germany, Finland, Iraq, Israel, Italy, Japan, Korea, Kuwait, Malaysia, Netherlands, Spain, Switzerland, Taiwan, United Kingdom, and United Arab Emirates.

"We're located all over the world," he says. "Basically we take care of everything 'after market,' both in services and in support of the aircraft and other Boeing products."

The Support Systems portfolio of operations includes:

- International;
- Training Systems and Services (including simulators, other training devices, and actual training for the platforms);
- Maintenance Modifications and Upgrades (primarily U.S. Air Force);
- and Integrated Logistics.

Noting that Integrated Logistics comprises the majority of the complete portfolio, he explains, "Basically that includes all 'after market' support, parts, processes, tools, some training, and engineering support to support the fleet that's out there fighting the war".

Sassenrath then shifted the overview to a "spectrum of support" within Army Integrated Logistics,

stretching from "traditional organic support" to more recent experiences with "performance based support."

"Traditional support is transactions and spares that you've seen for years and years," he says. "And we still do that when we have customers where that is the level of support that they want. There are customers where that's the right thing for them. You have to look at each case and design the best kind of support program for that particular customer."

He continues, "Then, as you move up the spectrum, you go into component PBLs [*performance based logistics*] and support PBLs. You'll have a PBL where you may have a metric for performance along the lines of: 'X' number/availability on the shelf or so many hours of specific parts. And then you move to the far end of the spectrum, where you have total system PBL, not unlike the TLCS [*Through Life Customer Support*] for Chinook that the United Kingdom has.



US DoD – 2nd Lt Daniel McGurl

"And what we're finding in doing the business case is that the performance based support is a win/win for both Boeing and for the government. From the government's perspective, they're getting the readiness that they're looking for. And from Boeing's perspective, we are incentivized to give them the best performance. So, at the end of the day, most of the business cases are showing that a PBL, or a mixture, depending on the needs of that particular customer, is the best way forward," he says.

Running parallel with the spectrum of support was a subset spectrum of risk, in which traditional organic support featured increasing government risk, with that risk shifting to the contractor as program moved toward performance based support.

"Basically we're taking the risk in the parts, as opposed to the government taking the risks," he notes.

Sassenrath followed the background foundation with specifics on past, present, and future company activities surrounding Boeing's logistics support for U.S. Army Apaches.

The first step in the company's "Apache PBL Roadmap" was the company's Contractor Logistics Support (CLS) contract, which addressed 1400 AH-64D unique supply support items with a resulting availability rate of approximately 92%.

"The truth is that we have been doing this for a long time with Apache," he observes. "We had a CLS contract, which is a 'PBL-esque' type contract – although not called PBL. And we've been doing this for over 12 years and had a very, very good [*supply availability*] rate. We just went to a 'true PBL' with a performance metric under it last year. We have been maintaining well above our 85% baseline requirement – 85% on the shelf within 24 hours and then getting it there. In fact, for the last three months, we've been at 93%."

The "true PBL" noted by Sassenrath was awarded 21 December 2006.

"What we found with the 1400 [Longbow AH-64D-unique] parts covered by CLS was that not all of those parts were readiness drivers," he says. "Some of those were not too hard to get. The real items that were readiness drivers were 344 parts, the



'hard to get' parts. Those were the ones that were causing readiness issues. So, we concentrated on those specific parts in the PBL. They are hard to get so, they get moved around very quickly and we have total asset visibility as to where those parts are. They may not be sitting on the shelf in Taji [*Iraq*], but we know exactly where they are, and we can get in there within 24 hours, based on the limited number of assets that are out there in the world."

The U.S. Government Apache Phase I PBL award calls for 85%t supply availability, financial incentives (both plus and minus) for certain metric achievement, and preestablished over and above procedures. In addition, it continues to add both "D-unique" and "A/Dcommon" parts currently managed by Defense Logistics Agency.

Emphasizing that future movement along the Apache logistics roadmap will only be driven by a win/win business case for both the government and the company, Sassenrath adds, "We put things onto this PBL based on what the Army needs, where they need a better readiness rate, and where we're going to make some money."

"So the next stage will be a 'Dunique' extension and growth to 'A/D common' parts. So there are some things that may not be 'D' specific, but are specific to both the original "A' airframe and 'D' airframe that are readiness drivers. So some of those items are going to start migrating into this logistics support based on readiness and not based on whether it's a 'D-unique' item or not," he says.

The projected award date for that PBL phase II extension is November 2009.

"And then, beyond 2010 or whenever it makes sense to do it, we



go to the far end of the spectrum where we could assume total aircraft readiness responsibilities," he says. "But we walk into that with both eyes open while teaming with the U.S. Government to make sure that we're doing the right thing."

"So I'd have to say that the key to PBL success is not doing PBL for PBL-sake, but looking to what the customer needs and determining if there is a better way to give it to them," he explains.

Elaborating on the logistics approach being taken, he continues, "Basically, we sit down with the customer and ask, 'What things are causing you issues? What things are you having problems with? Can we put those under a PBL and how can we do that?' And what we're finding is really that the U.S. Government has a pretty significant infrastructure for supply. So there are some things where they are in pretty good shape. But we're working on those things where they may not be in good shape, and might need a little help with. What we're finding in the international arena is that a lot of countries don't have the same kind of infrastructure. So a PBL from right off the starting blocks might look very attractive to some of them because it solves a lot of problems that they don't have infrastructure for. They say, 'That's great. I contract for this at this price, because I don't have a bunch of people who are already doing that job.' So this is a bit of an evolution."

"For example, we're looking at Netherlands right now, and looking at how we could do a PBL where they've got Apache and Chinook. You've got a 'window' with a guy there that makes sure they have their parts and brings those parts in and out. So, if there is some synergy that I can get from both Chinook and Apache there, then maybe we could make it cheaper for them. And we look at those kinds of things all the time; storage, warehousing, any of those kinds of things," he says.

"Most of the customers that are emerging that you may have heard about are very interested in PBL," he adds. "When they do a comparison of the costs of Boeing holding equipment and parts, versus the costs to a country with a very small fleet, and somebody can guarantee them that they will have those parts when they need them, it's very attractive and a lot less money for them. Because there are a lot of holding costs for having those parts. There are also obsolescence issues. If they happen to be in a salt water environment they have issues with corrosion. With all of those kinds of things, PBL takes the risk off the customer and puts it on us."

One of the key underlying metrics spotlighted by Sassenrath concerned increasing the reliability of component parts.

"We're not necessarily getting paid, under the 95% metric, to have 'X' number of things on the shelf," he notes. "We're being paid to say, if you need them, we can provide them. So if we can make that part last twice as long, we don't need to have as many parts, we don't need to pay as much shipping, in fact we don't need to pay a whole lot of things. The real metric is that we are incentivized to make sure that each of those parts is as reliable as possible. Because we're not selling numbers of parts: we are selling availability."

He acknowledged that one consequence of this reality is enhanced value of longer term PBLs, where companies will be willing to invest their own money in improving component reliability during the early years of the contract and then enjoy the financial benefits of those investments in the later years of the award.

Returning to the realities of the current OPTEMPO facing U.S. Army Apaches, Sassenrath concluded with a brief highlight of the U.S. Army's 4th Squadron, 3rd Armored Cavalry Regiment. With 24 AH-64Ds based at Taji, Iraq, the squadron had been flying six Apaches at a time over Sadr City on a 24 hour a day basis. The activity equated to five times the "normal" tempo for those aircraft.

"It's incredible, he observes. "Keeping them operational, keeping them mission ready is what Support Systems is all about. This is an exciting time for us."

# RFID TRACKING PUSHES MRAP PRODUCTION

#### by Scott R. Gourley.



hereNet Corporation, a Zebra Technologies company, recently announced Navistar that Defense has implemented its WhereNet active RFID, realtime locating system to work-in-process automate tracking at its West Point, Mississippi, manufacturing facility. The RFID system helps reduce production costs and accelerate delivery of the MaxxPro<sup>TM</sup> MRAP vehicles for the Department of Defense.

"I work with the sales team to design and organize systems for

customer opportunity," explains Jason Rushton, System Architect for Aerospace and Defense, Zebra Enterprise Solutions. "So I was the guy, when Navistar said they had a work-in-process tracking challenge, who reached into our case histories and saw what we had done before that was similar. Then I helped lay out the most cost effective way to solve their problem."

According to Rushton, the WhereNet RFID system "supports an ISO Standard real-time location system that primarily works in the 2.4 GHz range with about 1000 foot read range. It's a little bit unique in that it will tell you where things are down to about a parking slot, out of 1000 feet. So the idea is that, if you've got hundreds of vehicles, all painted desert tan, and you need to find three of them in the lot because they are the ones that need to have a specific electrical modification installed, then you can go find those three vehicles pretty quickly."

"And that's pretty much how we're used in places like Navistar, where people have a lot of things that look similar," he adds.

"After a thorough evaluation of solutions providers, we selected

WhereNet because its real-time visibility solution has a proven track record of reducing costs, improving quality, and expediting production industrial manufacturing in environments," says Rex Baldwin, IT project lead for Navistar Defense. "Among all of its other benefits, the system's impact on reducing cycle time aligns perfectly with our ultimate goal of rapidly delivering MRAP vehicles to the U.S. military to protect our troops in harm's way."

The WhereNet Visibility Software Suite (VSS) provides constant visibility for each tagged vehicle, enabling Navistar to track and manage the manufacturing of every MRAP vehicle as it passes through the assembly, paint, testing, and adjustment, inspection processes. After the on-site Defense Department officials perform the final testing on each finished MRAP vehicle, the WhereTag transmitters are removed, and the vehicles are loaded onto flatbed trailers for final delivery.

Rushton noted that the RFID installation process began at the Navistar manufacturing plant around the end of 2007, and was completed in January of this year.

"We've done a lot of implementations and a lot of third parties have implemented our stuff. It's never a 'science project.' It's just pretty straightforward engineering work," he says. Describing the installation as a "closed loop system," Rushton said that the RFID tags are applied to the basic chassis when they arrive on site and stay on that chassis until they are removed just prior to DD250 government acceptance/delivery to the customer.

The system spans more than one million square feet indoors and outdoors, and consists of a local infrastructure of five wireless WhereLAN<sup>TM</sup> location sensors and 13 WhereLAN locating access points that can be used for determining the location of assets as well as Wi-Fi mobile data communication; 400 active RFID WhereTag<sup>TM</sup> transmitters that are attached to MRAP chassis at the beginning of the armor-plating process; and WherePort<sup>TM</sup> magnetic "exciters" that trigger the transmitters to emit a signal when entering or leaving a specific work cell, enabling the system automatically record such to information as arrival, dwell, and departure time without any human intervention.

Active tags can be set by the user to go off every few seconds or every few minutes, with the default setting at four minutes. Consequently, the WherePort<sup>TM</sup> "exciters" can be used to force the tag to blink if it happens to be "asleep" between its four minute interval.

"The ISO standard that we support was specifically designed to locate," Rushton continues. "So it gives you long range, good accuracy, and non-interference with other systems. So what that does for a user is, again, if you want to cover a couple of hundred acres, and you were trying to do it with a technology that has lower range, you would have to put up a tremendous amount of infrastructure. The physical installation costs would be cost-prohibitive. The other thing is that there are some other systems out there, like the WiFi locate, that are kind of good enough for finding office equipment in a hospital. But if you need to get down to work cell visibility on a manufacturing line, or parking slot visibility for a parking place, 30 feet is not good enough. So that's where our 10 foot locate and ISO standard is useful."

Asked about other current defense applications for the WhereNet technology, Rushton selected his words carefully, noting, "We are implemented with several other defense manufacturers and government agencies."

"The 'other largest MRAP producer' is also a customer. In the aerospace world, there are a couple of manufacturers using us to build airplanes and airplane components. In the Air Force, their overhaul facilities, the Air Logistics Centers, have 'installs'. Robbins Air Force Base is a very large 'install' – they cover about four square miles – for multiple things: for flightline tracking, for computer equipment tracking; for overhaul and repair tracking," he says.

The system is also employed at Tobyhanna Army Depot to reduce inventory, lower operating costs, and improve operations.

In terms of time savings for the MRAP production process, Rushton observes, "I believe they originally said that it would take about two hours before their morning standup meeting to get an estimate on where things were, work-in-process wise. So that two hours goes away completely and, instead of having a once a day snapshot of production, they have an accurate snapshot continuously that is available to anybody."

"We certainly think there is a tremendous potential for site-to-site extended supply chain and visibility," he added. "And some folks are starting to look at that, because within the site, and again this is a relatively small site, we have larger sites that cover square miles and multiple buildings, the real process delays are the latency in the handoffs between organizations internally. And some of these extended manufacturing or overhaul chains are also very time consuming. If people ship something, and it gets sent to the other site it may show up on site but it isn't properly receipted. So something can sit in the vard waiting to begin processing for a day or two before they realize that it got there. So what we see, again, because it is an ISO standard, is that we are starting to get not only the government but also the manufacturing community to realize the benefits. I think the next step is that we will see the technology expand to the entire remanufacturing supply chain and the extended delivery chain for manufacturing."

He concludes, "What we would really like to see is things getting tagged when they come off the battlefield for retrograde, and from that point accelerate the retrograde process."



# Defence Equipment & Support 08

Keynote Address: The Right Honourable Baroness Ann Taylor Minister for Defence Equipment and Support, Ministry of Defence

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Brigadier Chris Murray CBE ADC, Director of the Royal Logistic Corps keeps *MLI* up-to-date on how the British Army's RLC is continuing to adapt under the pressures of operations.

**B** rig Murray is bullish about how the RLC has been doing on operations over the past few years. "Some people seem surprised that logistics doesn't go perfectly", he says. "I have to say that I am surprised that *they* are surprised. I'd actually say that we do pretty well." This comment is not based on any degree of complacency: far from it. He outlines further why he has this view of operational life:

"Military logistics differs from the logistics practised by Asda [a UK supermarket chain]. When Asda managers wake up in the morning, they know that the 347 stores will still be in the same place they were when they closed the previous night. The 27 regional distribution centres are also unlikely to have shifted their location. And the managers actually know lots about their customers through loyalty cards and the like. And they also know about seasonal variations in foods, what people tend to buy at different times of year. And they also have a good sight of things such as the weather over the next few weeks, as well as things such as traffic patterns. And what on-shelf availability rates does a supermarket like Asda get? About 98%. So even if you know all of that detail, and have that degree of certainty, you can still 'only' get 98% success rate."

Brig Murray goes on to contrast this with the situation that faces the RLC in Iraq and Afghanistan. "For Operation Herrick [the British operational name for the deployment Helmand province]. there's a 5000km air bridge: you have to remember that it costs 45 times to fly equipment than to send it by sea", he goes on, "By sea and land, even if everything goes well, then it's still a 35-40 day process to get stores and supplies to bases in Afghanistan. So you really need to be timely in any demands that you make for spare parts. And this is before you take the weather or the terrain into account."

It is on this basis that he feels that while not perfect, the RLC has managed to overcome a major number of operational obstacles to become a far more respected outfit. "Our biggest fans are G3 combat commanders", he says. "They are really happy to queue up and tell me what we are doing for them. There's now a generation of commanders who 'get' what we do for them." But he does add a slight rider: "One of the issues for the Corps is that anything that doesn't go well, and which has the word 'logistics' in it automatically becomes your fault. It is pretty easy to become associated with failures of the supply chain even if it is absolutely nothing to do with you".

#### **STEADY CHANGE**

Brig Murray goes on to talk in wider terms about the scope of changes in the operational outlook of the RLC.

"In the Cold War, we knew what we had to do, and there was the front line, and then rear areas. It was all about delivering stores in bulk to predetermined areas. The Balkans in the mid-late 1990s changed our perceptions a little, but not that much", he outlines. "But the scope of the threats that we've faced in both Iraq and then Afghanistan has really caused us to change."

He concentrates on one area which he sees as crucial to the changes in the RLC: force protection.

"Fighting logistics through has become a strapline – it's the ethos of the Corps at the moment", he says. "At the business end of logistics, force protection has become a real issue. Everyone now 'gets' force protection for logisticians."

"More often than not, force protection is now provided by RLC personnel, rather than from other units", he continues. "We tend to take a troop from a regiment, and train them up as a force protection troop. It's comforting for the rest of the soldiers in a Combat Logistics Patrol (CLP) to know that it's their mates providing force protection." In the past, even early on in the deployments to Iraq and Afghanistan, force protection was provided by sub units from other infantry or cavalry units.

"Dismounted close combat is also a real part of our business now, in a way that it never used to be", he explains further. "You used to have a couple of guys poking up through the cupola of a truck with a light machine gun, but this has really changed." This has involved far more training in what might be termed "standard" infantry skills. When MLI interviewed Brig Murray's predecessor as Director of the RLC, Brigadier Geoff Little, the lack of resources for this form of training was

raised as a real concern, so it is evident that progress has been made.

He also adds on the topic of force protection in the field, "The Corps has become very 'air aware'. The use of Support Helicopters (SH) to deliver logistics is of great importance in theatres such as Iraq and Afghanistan, and we see air delivery as growing in importance. If you can deliver 14 1-tonne containers within a circle of 400m, this is a very good way of beating some force protection issues." A recent British government report highlighted the fact that RAF C-130 Hercules' were now dropping on average some 123 tonnes of stores per month in Afghanistan, compared with around 20 per month in 2006, and this was likely to rise.

But the mission to fight logistics through brings new demands on RLC personnel: "The word 'convoy' doesn't do it any more. Everyone has a picture of what a convoy looks like it's nothing like what we are doing on operations. It's a totally different type of operation nowadays in Afghanistan - it's all arms operations. You get a young RLC officer running a CLP, integrating Attack Helicopters as top cover, fast jet and artillery on call, as well as the ground force protection."

But there is a major issue to always keep in commanders' minds: "We must never forget that the entire purpose of a CLP is actually to resupply units."

The increased risks to CLPs means that they have taken on a far more warlike appearance and approach than would have been the case a decade ago. Brig Murray explains that they are now planned much as an offensive operation would be. No longer do people load up a few trucks, and drive off to deliver supplies. "Nowadays, CLPs are deliberate operations, and they can go up to brigade-sized, and are often multinational", he says.

The size of CLPs is partly a result of the realisation that with a relatively permanent threat to each and every CLP, if you are going to go to the trouble of planning such an operation, you might as well make it a large one.

Brig Murray describes one such CLP, Operation Lava, in December

> 2007, which saw 85 vehicles in the CLP, covering a distance of 8 km. "This type of move provides some special command and control problems, as well as force protection ones", he adds.

> The level of threat is well shown by the fact that in 2007 and 2008, over a third of CLPs encountered significant enemy action, a figure which would have been unthinkable a decade ago.

> But Brig Murray, despite the increasingly warlike nature of operational logistics - "We talk about fighting logistics through" - does add a significant rider to this: "We might go out of a base loaded for bear, but that doesn't mean that we go looking for trouble. We use intelligence to get a handle on the threats, and if that means



No longer "convoy", but "Combat Logistics Patrol". In Afghanistan, CLPs can extend for tens of miles, and can be made up of dozens of different vehicles.

DRLC

that we take a 30km detour to avoid it, then we'll drive the extra distance."

He also adds an extra concern, that the new concentration on areas such as close combat might impact on other skill areas: "But we need to make sure that we get the balance right between dismounted close combat and our logistics trade excellence. There's no point in having great specialists who might not survive to do their job. But then, even if the guy has to be a fighting soldier, the fuel operator has got to be a ninja at delivering fuel, the DROPS driver must be an expert at dropping those flatracks."

#### NEW KIT FOR NEW ROLES

Arguably the biggest change to the "look" of the RLC has been the arrival of what might be described as a raft of new equipment to allow it to cope with the operational pressures.

Brig Murray explains how a handto-mouth approach to equipping the RLC with the equipment they need has become far more formalised, with better results: "Some pretty ad hoc solutions to improve force protection were made: some strange bolt-on bits of armour lashed up with wire. Then we got better seats, weapons mounts and other equipment.

"Even five years ago, when we were starting Telic 1 [*the 2003 invasion of Iraq*], if you'd told me that in five years time, every logistics vehicle would be fitted for armour, I'm not sure that I'd have believed you."

He goes on to describe the new MAN Support Vehicle that is being procured for the British Army, but which will be the backbone of the RLC's transport capabilities. Brig Murray sees the MAN vehicle as providing the capabilities needed, and with the growth potential necessary, especially for armour and other protection measures.

"You buy the truck for €160,000, but it's a similar amount of money that you then need to spend for UORs", he says, adding that one of the biggest problems facing the RLC, and thus the British Army, is that the ubiquitous DROPS truck (Demountable Rack Offload and Pickup System: a truck mounted system that allows rapid unloading or loading of stores loaded onto flatracks or into rack-mounted containers) is at the end of its weight budget, and cannot be fitted with the type of protection systems that are deemed necessary.

While a longer term solution is being worked out to cope with the probable early retirement of DROPS in combat areas, Brig Murray explains that around 100 MAN 8x8 trucks will be fitted with a DROPS-style container handling system so as to provide the sort of capability that DROPS has provided so well up to now.

But it isn't simply the trucks that have seen improvements. The RLC now operate the sort of equipment types which once they could only have wished for. For Force Protection of CLPs, the "wagon of choice" is the 6x6 Force Protection Mastiff: "I spoke to one of our drivers who was in a Mastiff when it was hit by an IED. He said, 'I knew something had happened boss, because there was quite a lot of dust in the cab", Brig Murray relates a tale from a surviving Mastiff crew.

And for other elements of Force protection, the RLC FP troops also have access to the lighter Force



Over a third of all Combat Logistics Patrols are attacked by one means or another. CLP commanders, often junior Royal Logistics Corps officers, now have to be able to manage fast air and attack helicopter support, as well as the ground forces

Protection 4x4 Ridgeback MRAP, and the highly mobile off-road weapons platform, the Jackal.

And on top of these vehicles have arrived a major scaling of weapons to use with the vehicles, as well as a better supply of radios – the RLC had been very low down the list for secure communications originally – as well as night vision goggles to allow night CLPs.

#### STOCK V LEAN: NO CONTEST

Operations, especially in Afghanistan, are causing lessons to be learned quickly, and then implemented. One such, and one which *MLI* has come across from a variety of sources over the past couple of years, is the balance between holding too much stock, and not enough.

"Part of what we are asked to do is to go from the Cold War days, where we had predictability and volume, to a state where we want velocity rather than

want velocity rather than stockholding", Brig Murray says. "But I think that we have learned that 'Just In Time' tends to means just too little and just too late."

"Some of the Lines of Communication can be fragile, so we have to hold quite a lot of 2nd line stock", he continues. "And for safety sake, we have to keep quite a lot of 2nd line stock up at the 1st line. We can't always guarantee to deliver effectively in a timely manner." The terrain, distances, and weather can all conspire to limit delivery options, driving people to deliver more stock to deployed units than might have been the case planned for in peacetime.

"We are doing a little bit more 1st line work than we were organised and structured for", he explains. "The CLPs go right up to the bases, so they are really doing the 1st line piece. And as we see it, the 1st line is happy for us to do the job." Under the "traditional" combat supply/support system, the RLC would have taken



An example of the appliqué armour pack fitted onto the newly arrived MAN Support Vehicle. The cab has in-built protection, augmented under Project Citadel by additional armour slabs and bar armour.

supplies up to a point in the notional rear area of a battlegroup, where it would be picked up by that unit's own trucks and distribution network. Quite early on in the southern Afghanistan deployment, it became obvious that the 1st line transport and distribution capabilities were not as well adapted to the task as would have been desired.

Brig Murray provides one particular example of the RLC's regiments "beefing up" combat battlegroups on operations. "We've been detaching Close Support Tankers [a new Oshkosh fuel tanker which can carry up to 20,000 litres of fuel or 18,000 litres of mater] up to the first line because their tankers, the Unit Bulk Refuelling Equipment is old, un-manoeuvrable and unreliable. And while it is there, the CST can also act as a recovery vehicle for the lighter Support Vehicle trucks if needs be."

Much of these operational experiences mean that experience

could be said to be driving the RLC against the wider trend of "leaning" of the logistics supply chain, getting rid of stock. Brig Murray has very firm views about what "lean" means, and where it is applicable, and where it isn't:

"Lean gripped has everyone's attention for some time. We like bits of lean - it's about pulling waste out, and there are frequently times and places where you can see genuine waste", he outlines. "But you have to remember: lean is only a technique to drive out waste. Lean books say that transport is waste, and stock is unnecessary. But for us, transport is natural, and stock is our life blood. The last time Ι looked, 'flexibility' and 'agility' are principles of logistics -'lean' isn't."

Brig Murray finishes his discourse on operational experience about stock levels and agility by saying, "If you really want to ensure logistics, you need to make

sure that it gets to you via a guy in a green suit. You'd better make sure that you have a 'Plan B'."

#### C4I: THE LONGEST POLE IN THE TENT

Brig Murray, while happy about the state of play of the RLC's physical equipment, has concerns about what it is that holds the Corps back from progressing: "What stops the RLC from being better? Logistics C4I and data connectivity, the right bandwidth. I have no doubt about this in my mind."

"There is only one thing that will revolutionise British military logistics. It isn't airships, it isn't spaceships: it's the application of commercial IT systems that allow the rapid sharing of data. With good logistics IT, you get better logistics decision making. Commanders can than calculate military risk better. If we get the right improvements to logistics IT, we can



Armour packs are now standard – a return to the days of "light scaled" vehicles is not seen as likely, ever.

go from doing things better to doing better things."

There have been some improvements to logistics C4I so far: "Bowman [*the tactical communications system*] has largely been done now, so we have the tactical communications piece right. And as the brigades get upgrades to Bowman, so do we, so that's no problem".

Brig Murray goes on, "But at a higher level, logistics C4I has been the problem area for a number of years. One reason why Mr Asda is quite good at his job is that he has a serious IT system so that he can get global inventory control. In comparison, today, if we issue something, then we assume it has been consumed, but we don't know what has happened to it".

He acknowledges that there are some advances on the way: "We have some systems coming over the

### STRUCTURAL CHANGES

Sometimes, there seems to be a never-ending process of change in the British Army, and this is partly true when looking at the RLC. The 2004 Future Army Structure (FAS) outlined some major changes in the organization of the British Army, and the re-organization process is still underway.

Brig Murray outlines where things are as a result of FAS: "The big idea for FAS was the Logistic Support Regiment. Getting the support to the manoeuvre brigades right was the drive. We now have one LSR for each brigade." This involved the creation of some new units, bringing together some new capabilities for brigade support. Brig Murray outlines how the LSRs are more "multirole" in their capabilities and outlook.

"The RLC also saw a slight rise in personnel numbers as a result of FAS", Brig Murray explains. "We've seen a rise in key areas such as Close Support Ammo technicians, Heavy Improvised Explosive Device Disposal troops, Ports and Movements personnel. Broadly, the Corps is about the same size, although in key trades, we've grown."

But there is still more work to be done. "For the Force Level of support, the 3rd Line, there are a few areas to look at here", Brig Murray says. "We need each 3rd Line unit to have some multirole capability. So Transport Regiments will get some Supply capabilities, and Supply Regiments will get some Transport capabilities. To be honest, it is a degree of the bleeding obvious really."

Brig Murray continues, "The 3rd Line Review isn't really a huge change. It's a degree of shuffling the pack, taking the existing resources and making them multi-role." He goes on to explain how the RLC has already shown that the "pack" can be "re-shuffled" successfully for operations: "We've shown that we can be ingenious. 27 Transport Regiment [*a third Line, "single role" regiment*] deployed in support of 52 (Highland) Brigade, but it did so looking much more like an LSR. It wasn't that tricky to provide the extra equipment and support to make it more multirole." This Brig Murray takes as a good example of how reforms can increase the effectiveness of the RLC.

At the core of the "re-shuffling of the pack" is some reorganisation that is dear to Brig Murray' heart: the resurrection of the Supply trade within the core.

"One of the challenges I face in the Corps is developing better supply expertise. It is a complex role, and we haven't managed yet to make it intellectually the attractive area that it should be. The supply trade area is where the real future challenges lie", he explains.

"So we are putting a bit of supply capability with every unit so that the Commanding Officers get to understand it", he goes on. "The next generation will get to understand supply – it's where the real challenges lie. It isn't a Black Art, but you need to understand what makes it tick. If we manage to do these things with the 3rd Line, then we will drive supply to the fore of what the Corps does."

horizon such as Management of the Joint Deployed Inventory (MJDI). But logistics C4I, especially at the higher level, at the moment is the single biggest bar to operational logisticians being better".

#### **UPS AND DOWNS**

*MLI* asked Brig Murray to look back over the past couple of years to list his three "Ups", and three "Downs" as regards the Corps and its capabilities.

"As regards 'Ups', I'd say that first, we have people who are world class logisticians. Then, I'd say that the people in the RLC have adapted to contemporary operations, and are delivering in spades. And then, I'd list Force Protection: we now have the kit to do the job, and everyone now understands that proper force protection is the right way to go."

As regards the personnel piece, he adds, "Our Territorial Army [the reserve component of the British Army] piece has never been more needed, and never has the TA been more respected by their regular counterparts. We have put quite a lot of operational risk onto the TA. Twinning regular regiments with TA has been working units extraordinarily well. Each RLC unit deploying on operations goes with a TA contingent. What with the operational tempo, and undermanning in certain trade, the RLC couldn't deliver without the TA contribution."

"For 'Downs', I would highlight two areas that worry me. The first is the imbalance between individual and collective training, especially technical training. For Technical Collective Training, there's something about scale that impacts, especially in the Combat Service Support area. We are breeding outstanding logisticians who understand the brigade fight. But there's little collective training for logistics at a scale that might prepare them for the next, unexpected happening. Saif Sareea [an exercise in Oman in 2001] was the last major logistics exercise. You just need to do it every so often.

"And we don't have world class logistics C4I in place. Until we do, we will continue to have senior officers gripping the rail at a

### JINGLIE ALL THE WAY

The role of local contractor transport in Afghanistan, as well as in Iraq is often forgotten or ignored. But for the RLC, it is a serious topic, and one that is of great importance. The often gaudy Afghan/Pakistani "jinglies" might look strange, but they provide an amazing service.

"An extraordinary amount of logistics is taken by jinglies, as they blend into the environment", Brig Murray says. "We estimate that jinglies are doing the equivalent work of two transport regiments in Afghanistan, and one in Iraq. Sometimes, it can be inappropriate to use them because of the train or force protection issues, but they play an amazing role."

The only real concerns are about how one can "integrate" jinglies into a system that might require RFID tags, and other systems which might be alien to jinglie operators. As several RLC officers have commented to *MLI*, trying to "integrate" jinglies into any form of C4I would seem to be a hopeless task.



### TOWARDS NEW LOGISTICS IT

*MLI's* Robbin Laird and Murielle Delaporte, get briefed on the new approach to logistics IT within the USMC.



The challenge is how to take an IT system into an austere battlefield environment, yet still get improved functionality. Rolling out into the battlefield is being based upon USMC recent lessons learned.

he USMC is building a new information technology system as a core part of their new logistics enterprise. In so doing, the USMC has followed a deliberate business approach in order *not* to hand over the task to a systems integrator. The USMC initially worked through their judgment on what they knew, and what they did not with regard to shaping an approach to IT for their logistics modernization. They worked through their own domain expertise to determine what help they actually needed and could effectively use as thev modernized. They then worked with Oracle Corporation to

develop appropriate software for the new system, with Oracle owning the licenses emergent from support to the USMC.

"We did not want a systems integrator, for they never put themselves out of business. We wanted someone like Oracle who did what they did best, develop software, while we do what we do best support our troops," says the Randy Delam, USMC program manager for the Global Combat Support System-Marine Corps (GCSS-MC).

The partnership in this program is evident in the scope and level of participation of both the USMC and Oracle participants. Both made it clear that this was an evolving partnership and their focus was on deploying the capability and applying actual lessons from deployment to the further evolution of the new system.

The GCSS-MC program is a modernization effort that will consolidate USMC legacy systems into an integrated infrastructure based on the Oracle E-Business Suite in order to improve the effectiveness of the Marine Corps, with special emphasis on Marine Air-Ground Task Force (MAGTF) operations. The purpose of GCSS-MC is, "to develop integrated enterprise logistics information systems that provide supply, maintenance, acquisition, transportation, health, and engineering services to the Marines in a deployed and garrison environment, enhancing their war fighting capability."

Sgt Ryan Scranton, USI

According to the USMC-Oracle team, "GCSS-MC is based on commercial-off-the-shelf Oracle software (COTS), primarily in the service, areas of customer relationship management, supply, maintenance, logistics (and the financial and human competency information required to support these areas), and other related areas. In addition. GCSS-MC is implementing a service-oriented architecture (SOA), using Oracle SOA Suite which includes Oracle Web Services Manager and Oracle BPEL Process Manager for integration and orchestration requirements."

The USMC team underscored that the new system was being introduced to support expeditionary operations, not simply current land operations in Iraq. Indeed, the system was being crafted to support the far end of engagement and deployment and worked backwards from that point. In other words, if the system worked in CONUS but not in the tip of the deployed spear, the USMC was not interested. Rather the deployment at the tip of the spear was the defining element for the entire system.

#### DRAWING UP THE CONCEPT

In shaping an approach, which can reach from CONUS to the field and the back again, team has conceptualized a five-zone model within which the logistics IT system must function. This model is based on the functioning of the current USMC Tactical Communications network. The USMC Tactical Communications Network and the IT model can be conceptualized as five Zones:

- Zone 1 Garrison
- Zone 2 Naval Network
- Zone 3 Expeditionary Network Tier 1
- Zone 4 Expeditionary Network Tier 2 on the move (Tier 2 OTM)
- Zone 5 Expeditionary Network Tier 2 on the pause (Tier 2 OTP).

For the USMC. the "austere" network needed for operations refers to Zones 2–5. The robust capabilities necessary to operate in an austere network condition define the overall requirements for the Oracle IT system to be deployed with the Corps.

The lessons learned from Iraq and Afghanistan are important to this effort. For example, the USMC realized that during the first thirty days of Operation Iraqi Freedom, the readiness status of the MAGTFs (in zones four and five) was not visible to logistics planners (in Zones three and one) due to the austere network conditions. Requests for supply were either not fulfilled or fulfilled repeatedly due to the lack of visibility of the need to



The US Marine Corps is looking at a complete, end-to-end logistics enterprise. This will require an end-to-end information technology system.

planners. Furthermore, repair and maintenance of assets were not documented appropriately due to lack of accurate reporting tools.

The objective of the new logistics system is to be able to enable the USMC to provide the status of readiness, and to request for logistics support under maneuver and austere network operational conditions. The new IT system will provide links between the needs and fulfillments, and will also enable the USMC to record the repair and maintenance work done by the organic support units.

Although the USMC-Oracle team did not focus on the differences between the U.S. Army's FCS logistics modernization model and their own, it is important to note that the USMC is crafting its approach based on existing communications capabilities. The team did note that they were building their approach with the possibility of expanded communications bandwidth being deployed in the future. As bandwidth increased, they could narrow the gap between zones 1–5, as the austere zone became less so. It is notable that they are not building their approach on assumptions that such bandwidth will inevitably be provided. Rather, they are sizing it to current communications capabilities.

#### MEETING THE CHALLENGE

The challenge for the combined service/industry team has been driven by the austere communications environmental standard. As one team member commented: "How do we take a modern tool like Oracle systems and make it useable on the battlefield. In the first 30 to 60 days of battle, the network available would only be our classified means after which we can combine commercial with classified systems with significant bandwidth increases. But how to combine these two experiences into one system"?

A key part of the effort has been to determine the proper data mix between what needs to be communicated back to Zone 1 and what stays in Zone 5. The team has determined that the determination of what data needs to be moved throughout the system, and by what means, is crucial to success.

Normal commercial IT logistics software requires significant bandwidth: a "normal" Oracle solution would require large bandwidth with a heavy footprint. Such a solution is not possible for zones 3 through 5. The Oracle team focused on leveraging services tools and messaging technologies to simplify the data to be transmitted. Among the simplifications are the core metrics, which started at 209 and have now been reduced to 144 core elements. By crafting new business processes for the USMC, IT tools are being developed to provide mobile field service for the USMC.

In other words, data is not simply being accumulated and pushed through the system: business processes are being shaped which turn determine where information needs to go, and in what form to be processed at the appropriate level.

For example, after an engagement, an infantry weapons unit calls in a Service Request for supply:

- 1. Request is approved by the Request Manager (using Multi-Function Switch communications in Zone 5), and then routed via COTS standard security protocols to the Battalion Supply Section (Zone 5) for action. If the requested supply is available at the Battalion Supply Section, the Service Request will be fulfilled in Zone 5.
- 2. Or, the system checks for inventory at Battalion Supply, and recognizing that no inventory exists

for the requested item, the request is routed via COTS standard security protocols to the supporting Supply Management Unit (Zone 3) for action. If the requested supply is available at the supporting SMU, the Service Request for Supply will be fulfilled in Zone 3.

- 3. Or, the items requested are not available at the supporting SMU, the system automatically creates purchase orders for the items and routes the orders to the source of supply via a secure data synchronization store and forward approach to Zone 1 for fulfillment.
- 4. The source of supply fulfills the orders and provides the items to the requesting unit and records the transaction in the system as having filled the order.

For Oracle, the USMC opportunity allows them to adapt their COTS software to more robust deployment situations. By learning how this is done, they can improve the performance and security of their software applications. By adapting software and retaining their intellectual property rights, Oracle then is in a position to leverage the USMC experience throughout their core businesses. In turn, the USMC does not have to pay for extensive and exclusive customization and be held in bondage to a systems integrator. And the USMC gains a foothold in logistics interoperability because they are using a commercial product.

#### FROM THE INDUSTRY SIDE

Nick McCabe, Senior Project Director at Oracle Public Sector Consulting, the Oracle leader on the USMC program, outlined what the company was providing to the service, and what it did.

"The Oracle Service Orientated Architecture (SOA) Suite is a comprehensive, standards-based software suite for the building, deployment, and management of SOA. This includes the serviceoriented development of applications, service-oriented integration of applications and IT systems, and process orchestration of system services and human workflow," he explains. "The software integrates diverse, existing IT infrastructures, and enables organizations to adopt SOA incrementally. The components of the suite share common capabilities including a single deployment and management model, tooling, end-to-end security, and unified metadata management."

Oracle's SOA Suite consists of:

- Oracle BPEL Process Manager. To compose services into business processes;
- Oracle Business Activity Monitoring. To gain real-time visibility into operation and performance of business processes and services;
- Oracle Business Rules. To capture and automate business policies;
- Oracle Enterprise Service Bus. To connect IT systems or business partners and route messages;
- Oracle Web Services Manager. To enforce authentication and authorization policies on services;
- Oracle JDeveloper: To develop, debug, profile, and deploy services.

"The SOA Suite improves an organization's ability to predict change," McCabe says. "It improves visibility into happenings in the realtime tactical environment, and it allows a rapid response to change by enabling the organization to develop and optimize business processes rapidly. Further, the suite leverages existing investments because it is modular, open, and extensible. Organizations can adopt it in a heterogeneous environment, without removing or replacing existing systems, as well as in an incremental fashion."

The Marine Corps will deploy the Oracle SOA Suite in and outside the continental United States, as well as in forward deployed Marine Expeditionary Forces (MEF) and Marine Expeditionary Units (MEU). Oracle's software is expected to enable the Marine Corps to more effectively track, transport, and deliver services and support to forces in the field. It will enable the USMC to meet Combatant Commanders' information requirements and facilitate integration with other USMC/Department of Navy units.

# PLANNING FOR AMMUNITION SECURITY

#### MLI looks at the recent contract to ensure military and industrial certainty in the field of ammunition.

"The main reason that we got this contract was because of the performance of the business over the past two years," Charlie Blakemore, Managing Director of the Ammunition business unit of BAE Systems Land Systems.

The Munitions Acquisition Supply Solution (MASS) contract signed between the UK Ministry of Defence and BAE Systems Land Systems Munitions is worth  $\pounds 2$  billion at the very least, and possibly as much as  $\pounds 3$  billion, and covers the supply of ammunition from small arms natures such as 5.56mm, 7.62mm, through medium calibres such as 30mm, 81mm mortar rounds, and then heavy calibres such as 120mm tank main armament natures and 105mm and 155mm artillery rounds. In total, over 50 natures of ammunition are covered.

The UK MoD states that this deal will cover approximately 80% of the ammunition natures and quantities that are used by British forces. The initial contract period is intended to cover ammunition supply for 15 years, although talks are underway about a potential extension of the contract to 25 years. There are break-off or renegotiation points after the first five and ten years.

"This deal now gives us advance information on what is going to be needed. So we can go away and plan better now. The security of the MASS contract allows us, and our supply chain, to plan over the next fifteen years. You need that long term horizon: you can't get the safety of supply working on a year-by-year basis," Blakemore says.

Blakemore continues explaining about the background to the MASS

deal: "Under the existing Framework Partnership Agreement, the company has really stepped up to the challenge. Overall, our output in certain areas has risen by over 60% over the past two years to meet a huge surge in customer demand, and in small arms natures, it has been even more than that. And we have achieved this despite

the infrastructure that we have to work with. Some of the buildings, as well as the machinery, are at least 40 years old."

Investment in new facilities will be at the heart of the MASS arrangement. In return for the guarantee of a steady level of business, BAE Systems is investing over £100 million in new equipment for the three main munitions production facilities at Radway Green (small arms ammunition), Glascoed (medium calibre, insensitive munitions, engineering), and Birtley (engineering and heavy calibres). This investment, Blakemore says, "will let us reduce tack times on products significantly." Over the past 3-4 years, BAE Systems has also invested around  $\pounds 10$  million annually in modernising its munitions facilities.

He goes on to provide further details about the rise in output that the division has achieved over the past 2-3 years: "Look back a couple of years, and the requirement for 81mm mortar ammunition was pretty low: it's now up to 370,000 rounds for 2008. For small arms natures, we have seen close to a 300% increase in delivery. We were at around 70 million per year, and we are now up to over 200 million. At the "worst", we have a steady state for small arms



ammunition of well over 100 million rounds per year."

He adds that medium calibre ammunition production, which had been at a very low ebb, has jumped to over 500,000 rounds in 2008: "Prior to 2007, maybe 2008, the ammunition stockpiles, the war stocks, were being drawn down. But they reached a stage where they could not get any lower."

Of interest, although combat operations have been a driver in the increased production rate for ammunition, it is not the largest area of use. Statistics published by the MoD showed that use rates for 5.56mm ammunition in Afghanistan between 2006 and late 2007 saw average monthly figures of "only" 150-200,000 rounds fired. "Training is the largest area of use," Blakemore explains. "The need for realistic pre-deployment training is really driving the demand. Even if the operational theatres are 'quiet', the need for the next units to be ready means that they fire a lot."

#### FLEXIBILITY, AGILITY THE KEYS

Although MASS does provide stability for industry, it is also aimed to provide the user with a degree of flexibility. "The joint working



### HERDING SUPPLY CHAIN CATS

The MASS contract is not just about the business and supply relationship between BAE Systems Land Systems and the UK MoD: it involves a major piece in handling the extended supply chain. It should be explained that under MASS, BAE Systems Land Systems Munitions is responsible for the supply not just of ammunition that it actually manufactures, but of natures produced by someone else. As an example, some 81mm mortar bombs are supplied by an Italian supplier.

"I'd say that our broader supply chain accounts to some 300 or so suppliers," Charlie Blakemore says. "But generally, I'd say that around 20 of those amount for 80% of the value of the externally supplied sub-systems and systems." As an example of how the supply chain can extend, he points out that something as "simple" as 7.62mm ball ammunition can have over a dozen subcontractors.

"We have to be aware that if we do have some quite large sub-suppliers, we also have some quite small ones who also need to be managed," Blakemore continues. "If a small supplier has problems, then it can still impact adversely delivery at the very end. You're only as strong as your weakest link.

"We have to maintain a relationship with our extended supply chain that allows us to understand what risks they have, and how we can mitigate those," he adds. "We are developing individual supplier strategies that best suit ourselves, the individual suppliers, as well as the customer."

But MASS has made business, and management of the supply chain, far easier, as Blakemore explains: "All of us, the supply chain included, now have security of throughput. As a result, people can now look to the long term, and to invest in their facilities. Even the smallest sub-suppliers now have work that they can really bank on. In the past, I think that some people have been reluctant to invest in the UK in areas such as this – but MASS changes that attitude."

Business optimisation will be driven across the whole supply chain: "Lean manufacture will be taking out the waste from procurement and production to reduce lead times wherever possible," Blakemore outlines. "And we will lean out operations not just in our organisation, but we will look to work with our suppliers to help lean their operations."

"I can state categorically that our supply chain has really stepped up to the mark," Blakemore ends.

environment gives us the visibility about what natures are needed now, what are probably going to be needed soon," Blakemore says. "The front line needs the right products at the right time. We have to remember that the weapon of choice on operations in, say, Afghanistan, might not be the weapon of choice tomorrow. We now have a contract that provides the flexibility and agility for us to be able to change our focus if that is needed."

Blakemore provided a few examples of the ebb and flow of ammunitions requirements: "The .50 calibre machine gun has often been the weapon of choice, with a raised demand for ammunition as a result. But it can sometimes be too big for use. At the moment, we do see an increased use of 7.62mm machine guns, as they have the power to knock down walls, but are lighter than a .50 calibre weapon."

The flexibility does not just extend to increases in the production of certain natures: "But we understand that over, say, seven years, the delivery requirement might fall off," Blakemore outlines. "But the MASS deal gives us the time and space to optimise the business to the output needed."

Another aspect to the flexibility and agility of MASS results from the new working practices between BAE Systems Land Systems Munitions, and the Integrated Project Teams, and their staffs.

"The Manufacturing and Delivery Group meets once a month to review potential risks resulting from operational issues," says Blakemore. "We get an idea of the changing picture of operations, and we give back our views about some of the issues that affect us or our supply chain. We see joint management of risk, and this has allowed us to meet unprecedented levels of delivery rates."

And on a broader canvas, the MoD provides BAE Systems Land Systems Munitions with an indicative picture of its requirements. "We get the two year picture," Blakemore outlines, "But we also get a three year predicted picture too. It's an innovative way of working that gives us in industry a pretty clear picture from which to work. We can then optimise the supply chain so as to provide the best value for the customer."



MASS recognises, in a way that few



UK defence contracts have for some time, that stock holding is not necessarily a "bad" thing, but is often vital for security of supply. And operational sovereignty in the area of ammunition is now recognised as vital in the UK. "With close relationships with the customer, we can keep an eye on the operational and tactical surges," Blakemore says. "If you have spare capacity to hand, then you can dramatically reduce lead times."

"If there is operational risk, production risk, then we'll take in stock to manage that risk," Blakemore explains. "And if a supplier goes out of business, or looks as if they might, then we need to have the capacity to handle that supply until a new contractor can be found."

Certain items, too, simply have a certain lead time. Blakemore gives

the example of fuses, where 12 months is not uncommon to receive new supplies. He allows that managing the complexities of lead times for hundreds of items is a challenging business, always bearing in mind that the end user is the front line soldier.

He also outlines some of the core capabilities that need to be kept inhouse, and up-to-date: "If there are changes in the supply chain for subsystems, that will mean that we might have to update an ammunition nature, and once you update it, you have to reproof it as a safety precaution," he continues. "This means that at all times, we have to keep the capacity inhouse to manage any reproofing, but this also allows us to undertake obsolescence management over the longer term. The customer really needs us to keep the reproofing capability going."

MASS is arguably one of the most ground breaking contracts in the UK, in an area where the UK has often been at the forefront of radical thought concerning support and logistics. What is even more astounding is that at the time of the 2005 Defence Industrial Strategy, there was a belief that in many areas, there was little need for the UK to maintain a strategic ammunition capability: rather, the market was buoyant enough that whatever was needed could be sourced globally. Looking further back, a lack of business had resulted in BAE Systems down-sizing its ammunition business remarkably, as there was little point in keeping the facilities open. So MASS has seen a 180 degree turn around in how the UK, and the UK industry, deals and support ammunition supply.

### KEEPING QUALITY UP

Lessons are being learned via operations about the storage and maintenance of ammunition. "Iraq and some parts of Afghanistan have environmentally controlled storage," Blakemore says. "But some of the places that we send ammunition to are pretty basic. You have to remember that even if you have some shelter to store ammunition, you still get sand storms, floods, and all of that affecting them. In some places, troops are having to dig in, so where the soldier is, so that's where our product is: it has to be designed and produced to deal with the harshest of conditions."

Blakemore continues, "We have to test ammunition from extreme freezing conditions right up to extremes of heat. You need to make sure that you have a premier product. We get feedback from the customer, and we have had absolutely no complaints concerning our ammo. In fact, we've been told that where there has been a coalition ammo storage area, and British troops are drawing ammo, they try to go through the different boxes to find the 'Radway Green' stamp on it".

### GETTING MORE BANG

### MLI's US Editor, Scott Gourley, looks at changes in the production of ammunition, a commodity in ever-increasing demand.

July 2005 report prepared by the US Government Accountability Office (GAO) acknowledged that the end of The Cold War was accompanied by a significant reduction in purchases of small and medium caliber ammunition, as well as a reduction in the number of government-owned plants producing that ammunition.

"Since 2000, however, DOD's [US Department of Defense's] requirements for these types of ammunition have increased notably," the report noted, adding, "DOD's increased requirements for small and medium caliber ammunition over the past several years are largely the result increased weapons of training requirements needed to support the Army's transformation to a more selfsustaining and lethal force - an effort



accelerated after the terrorist attacks of September 11, 2001 – and the deployment of forces to conduct recent U.S. military actions in Afghanistan and Iraq."

Quantifying that increase, the report added, "Between fiscal years 2000 and 2005, total requirements for small caliber ammunitions more than doubled, from about 730 million to nearly 1.8 billion rounds, while total requirements for medium caliber ammunitions increased from 11.7 million rounds to almost 22 million rounds."

It continued, "DOD has initiated several steps to meet the increased demand, including funding about \$93.3 million for modernization improvements at the three government-owned ammunition plants producing small and medium caliber ammunition. DOD is currently able to meet its medium caliber requirement through modernization efforts at

the government-owned ammunition plants and through contracts with commercial producers. The government-owned plant producing small caliber ammunition cannot meet the increased requirements, with even these modernization efforts. Also. commercial producers within the national technology and industrial base have not had the capacity to meet these requirements. As a result, DOD has had to rely at least in part on foreign commercial producers to meet small caliber its ammunition needs."

Among the many recent steps taken to ensure that the national technology and industrial base can meet future small caliber ammunition needs has been the implementation of an Ammunition Industrial Base Modernization Strategy for Army Ammunition Plants.

Some of these modernization efforts were highlighted in the 2005 GAO report, which noted, "In an effort to help meet the increased need for small and medium caliber ammunition in the near term, the PEO [In early 2002, the Army established the Office of the Program Officer (PEO) Executive for Ammunition] upgraded the equipment at the Lake City, Milan, and Radford Army Ammunition plants. While these upgrades enabled Milan and Radford – the government-owned, contractor-operated producers of medium caliber ammunition – to meet DOD's requirements, Lake City – the small caliber ammunition producer - was unable to meet DOD's fiscal year 2004 requirement of about 1.6 billion rounds of ammunition. As a result, the PEO made additional procurements from the commercial market to make up for fiscal year 2004 shortfalls. The three government-owned, contractor-operated plants that produce small and medium caliber ammunition were built in 1941. Between fiscal years 2001 and 2005, DOD funded a total of about \$93.3 million to upgrade these facilities. This included replacement or refurbishment of ammunition cartridge production equipment and other facility improvements. According to a PEO official, ongoing modernization is needed for the Army ammunition plants to continue to operate into the future, and in the case of the Lake City Army Ammunition Plant, additional equipment and facility upgrades will be needed to increase capacity to address future needs. According to a PEO official, the Army plans to replace and ammunition production refurbish equipment through fiscal year 2011".

#### BRAC CHANGES AMMO PRODUCTION SHAPE

Aspects of the industrial base modernization process were further complicated by facilities decisions stemming from the 2005 Base Realignment and Closure (BRAC) process. One recent ammunition infrastructure summary noted, "The current organic ammunition industrial base consists of eleven (11) GOCO (Government Owned, Contractor Operated) facilities, ten (10) of which are production facilities, and eight (8) GOGO (Government Owned, Government Operated) facilities, three (3) of which include production facilities."

However, the 2005 BRAC findings will reportedly reduce the ten GOCOs down to six, including: Radford Army Ammunition Plant (RFAAP), (Radford, Virginia); Holston Army Plant (HSAAP). Ammunition Kingsport, Tennessee); Lake City Army Ammunition Plant (LCAAP), Independence, Missouri): Scranton Army Ammunition Plant (SCAAP), Scranton, Pennsylvania); Iowa Army Ammunition Plant (IAAAP), Middleton, Iowa); and Milan Army Ammunition Plant (MLAAP), Milan, Tennessee).

The BRAC results also retain three GOGOs, including: Crane Army Ammunition Activity (CAAA), (Crane, Indiana); McAlester Army Ammunition Plant (MCAAP), (McAlester, Oklahoma); and Pine Bluff Arsenal (PBA), (Pine Bluff, Arkansas).

Finally, the 2005 BRAC directed creation of a GOGO/GOCO hybrid facility at Rock Island Arsenal (Illinois) to accept capabilities being relocated from Riverbank Army Ammunition Plant (California).

Various mission assignments for the ten organic plants include propellants, energetics, small arms, metal parts, and load/assemble/pack functions.

According to a recent service information paper, "The overall modernization objective is to improve manufacturing readiness to meet current and future requirements, improve manufacturing effectiveness and efficiencies, reduce operating footprint, and improve product quality while achieving a cost competitive product to the maximum extent practicable. Near term modernization projects are necessary to avoid catastrophic failure of a capability and to avoid significant supply disruptions, and to resolve safety and environmental deficiencies".

"The Army's investment to modernize the GOCO AAPs is reflected in the Fiscal Year 2009 President's Budget submission under Procurement of Ammunition, Army (PAA), Activity 2, Provision of Industrial Facilities. The Army Working Capital Fund (AWCF) Capital Investment Program (CIP) targets general maintenance and modernization at the GOGO AAPs. Accordingly, significant investments are being made to address the immediate needs at Radford Army Ammunition Plant (AAP), Lake City AAP and Holston AAP for propellants, small caliber ammunition and explosives; and the near-term needs at the other remaining government-owned production facilities," it read.



#### GOCO INVESTMENT

For example, the primary mission of the Radford AAP GOCO facility is to manufacture propellants and explosives in support of field artillery, air defense, tank, missile, aircraft and Navy weapons systems. The plan was established 5 April 1941 as Radford Ordnance Works and New River Plant. In 1995, Alliant Techsystems, parent company of the current contractor, Alliant Ammunition and Energetics, obtained a "facilities use" contract. In 1999, RFAAP gained the load, assembly and pack mission with closure of Joliet the Army Ammunition Plant, Joliet, Ill.

As the only North American producer of nitrocellulose (NC) and double-base solventless propellant, the service overview noted, "*The* 

Army is making investments at RFAAP comply with environmental to requirements, sustain operations, and modernize capabilities to improve operating efficiencies and reduce costs. Specifically, its steam plant is being modernized to comply with the Industrial Boiler National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Maximum Achievable Control Technology (MACT) requirements. This will reduce air emissions and operating expenses. Other investments will reduce supply chain disruption risks for NC and acids, which are essential for propellant manufacturing. RFAAP's nitric acid concentrator/ sulfuric acid concentrator production trains, which have exceeded their design life, is currently being modernized. Near term project is underway to upgrade the NC manufacturing process to improve the quality of the NC. A longer-term project to build a new NC production line with modern manufacturing technologies and equipment to reduce energy consumption and hazardous waste streams is currently in the planning stage".

The overview paper also highlights Holston AAP as "the sole North American manufacturer of Research Department Explosive (RDX), High (HMX),Melt Explosive and RDX/HMX-based explosives. The Army is modernizing the steam plant at HSAAP to comply with Industrial NESHAP Boiler and MACT requirements. The Army will modernize the antiquated pump house and replace old water lines to meet the latest industry standards for water distribution and to prevent production shutdowns. Other modernization investments include a fluid energy mill process for RDX; modernization and activation of a second nitration reactor to expand RDX and HMX production capacity; and twin-screw extrusion equipment to produce thermobaric explosives".

Originally established in December 1940, the mission of Lake City AAP (operated by Alliant Techsystems) is to provide quality small-caliber ammunition for training, maintaining and sustaining combat power—safely, on-time, economically and in an environmentally responsible manner, while also maintaining a viable, reliable and responsive small caliber ammunition production capability. In addition, Lake City performs small caliber ammunition stockpile reliability testing and has ammunition and weapon testing responsibilities as the NATO National and Regional Test Center.

Capabilities include small arms cartridges, components (percussion and electric primer), pyrotechnics, small caliber ammunition (5.56 mm; 7.62 mm; .50 caliber and 20 mm), reliability testing of small caliber ammunition (5.56 mm; 7.62 mm; 9 mm, .22 caliber; .45 caliber; and .50 caliber), and demilitarization and disposal of small caliber ammunition and explosives.

According to the service modernization update, "It is the primary North American government-owned producer of small caliber ammunition. Investments are being made to modernize and increase production capacity from 1.4 to 1.6 billion rounds per year. As part of the overall modernization of LCAAP, the Army plans to modernize .50 caliber ammunition production. This includes the replacement, modification or refurbishment of legacy and unreliable .50 caliber ammunition production equipment; the replacement of obsolete electronic processing and inspection sensors, and the incorporation of programmable logic controls with integrated statistical process control capabilities."

Highlighting the modernization thrusts at Scranton AAP (operated by General Dynamics Ordnance and Tactical Systems, Scranton Operations), it continues, "Scranton AAP is a critical North American source for high volume forge press manufacture of large caliber projectile metal parts for 105mm and 155mm artillery, 5-inch Navy gun, and 120mm mortar ammunition. The Army is investing funds to repair and rebuild SCAAP's outmoded high-tonnage forge press systems. Necessary improvements will be made to install state-of-the-art process replace heat controls, treating equipment, and upgrade cooling towers and electrical systems."

Iowa AAP, operated by American Ordnance LLC, performs the load/assemble/pack (LAP) of explosives pressed and tank ammunition, and melt pour and LAP of mortar and artillery ammunition. Modernization investments include replacement of the existing electrical power system and to design and install a flexible LAP production line to melt pour and cast cure insensitive

munition explosive formulations.

The final GOCO plant, Milan AAP, also operated by American Ordnance LLC, performs LAP of 40mm grenade cartridges, mortar and artillery ammunition, and C-4 explosive extrusions.

According to the service overview, "Investments are being made for a permitcompliant wastewater treatment plant and spray irrigation system to reduce risk of overflowing or discharging untreated *wastewater*. The current system does not handle *wastewater* overflows, which led to notice of violations from the

Tennessee Department of Environment and Conservation."

The briefing also identifies a range of modernization thrusts being directed at the three governmentowned/government operated plants.

McAlester AAP, for example, "performs mixing operations for both cast cure and melt pour explosive formulations, and LAP operations of all penetrator, general purpose, and inert (practice) bombs. Investments are being made to the melt pour production line to LAP bombs with an insensitive munition (IM) explosive fill to comply with a DOD directive. This includes explosive screening, material handling and kettle modernization. equipment Other investments include deluge system upgrades to increase operational safety, and pallet screening equipment upgrades to increase through-put to support bomb line production demands."

It continues, "Crane AAA performs explosive loading (cast cure, press and extrusion) and LAP of Navy gun ammunition, candles, and pyrotechnics. Investments are being made to modernize production capabilities and facility operations for pyrotechnic production, explosive handling and storage, fire suppression systems, bomb renovation, and wastewater handling and treatment."



Highlighting Pine Bluff Arsenal as "the Army's only ammunition production arsenal," it notes, "They perform LAP of various smoke, incendiary and riot-control ammunition (artillery projectiles, mortar cartridges, grenades, and 40mm cartridges) filled with white phosphorus, illuminating candles, smoke, CS, red phosphorus, and incendiary formulations. The Army is completing modernization of a white phosphorus fill system capable of filling ammunition from the 60mm mortar cartridge to the 155mm artillery projectile and the 2.75 in. rocket canister."

Finally, under the BRAC 2005 GOGO/GOCO direction, the Hybrid at Rock Island Arsenal (RIA), "received the mission from Riverbank AAP which manufactures deep-drawn steel cartridge cases for use in 5-inch/54 caliber Navy gun and 105mm artillery ammunition, and cargo grenade metal parts. Once the relocation from Riverbank is completed, RIA will be the sole North American manufacturer of deep-drawn, steel cartridge cases. Modernization investments are being made to prepare floor plans, process layouts, and operation specifications for a right-sized and improved cartridge case manufacturing capability at Rock Island Arsenal that will initially be operated by Norris Industries, current operator of Riverbank AAP."

# IN THE EYE OF THE HURRICANE: FRENCH ARMY SUPPORT ON THE MOVE (Part One)

*MLI's* MD interviews at the Versailles-Satory-based Direction in charge of equipment (DCMAT – Direction Centrale des Matériels), with General Jean-Tristan Verna, IGA Jean-Claude Boussiron and Colonel Patrick Hocquart and Colonel Hénaut, as well as at the Army Chief of Staff, Colonel Bienfait (EMAT, Bureau MCO). This first article lays out the main elements of the on-going military reforms affecting the French MCO (Maintien en condition opérationnelle) in the light of the publication of the new French

he winds of change have blowing been for sometime France in around defence and defence policy. The new French White Paper, published on 17 June, confirms the assumption that sweeping transformation is under way all across the French defence sector. Observers see an "End of History", as so many "givens" of French defence policy are disappearing, such as the withdrawal from the NATO military command in 1966. President Sarkozy has made clear that his approach to defence policy is based on the lucid appreciation that the "operational contract" laid out fifteen years ago was not only never implemented, but was not realistic to start with.

Part of the problem has been the systematic – and in the view of some military observers not always rational – participation of France in multinational intervention abroad estimated at a cumulative cost of €20 billion over the past thirty-two years, and the fact that they have been funded year after year out of



acquisition money, rather than new obligations. The other side of the equation has been the gap between the operational tip of the spear of the French armed forces, and a base somewhat anesthetized by the erosion military expenditures, of the absorption of the end of conscription and a number of dysfunctions which various waves of reforms failed to properly address. In the aftermath of the Cold War, periodic defence reorganisations have been too often dictated more by job imperatives (the

traditional policy of "*aménagement du territoire*", which could roughly be translated as urban and social policy), rather than strategic considerations.

This has been especially the case of the armed forces support sector as a whole, which represents the second budget line item after social expenditures, some €561 million in 2007, according to Col Bienfait. Part of the answer to these problems has been to reduce the size of the armed forces in quite a drastic manner, and reform the support sector. The hope is that these two strands will deliver funds which can then be re-invested into the armed forces, enabling them to be refocused on 21st Century operations and capabilities.

French Defence Minister, Hervé Morin, repeatedly said over the last year that the military should not be responsible for the preservation of local employment policies, and that all savings realized via cuts and restructuring will be allocated to improve the condition of the military and to upgrade its equipment. Quite a few doubts and uncertainties remain, given the current not-so-cooperative economic environment. However, the recent waves of reforms affecting the support sector, and more particularly the French Army support sector or (Maintien en Condition MCO Opérationnelle Terrestre) constitute a solid attempt to address incoming challenges.

#### **A REVOLUTION** IN THE MAKING

The French Army saw at the end of the 1990s a major crisis in the operational availability rates of a wide range of military equipment. This was common across all services, but there were some major examples of this trend in the French Army. This situation became even more worrying in the early years of this decade when the pressures continued to grow, and were exacerbated by such things as the reduction in manpower available to planners as a result of the end of conscription.

To address the dramatic decline in operational availability rates, the government - not just the Defence Ministry - adopted a range of financial and organizational measures. Although the process of change and transformation is still underway, some real progress has already been made.

The support transformation audits acknowledged that the existing structure, in spite of a reorganization undertaken in 1998, tended to favour multiple, wasteful duplications. As the Cour des Comptes, the government body charged with undertaking financial audits of state bodies and ministries said in a report in 2006:

"In terms of organization, the structures of maintenance for the Army appear dispersed under the authority of multiple chains of command and marked by certain incoherencies such as the 'double hatting' of the central direction of the Army equipment (DCMAT), which at the same time is both the "maître d'ouvrage" [project owner] and *"maître d'œuvre"* [project manager] for some of the maintenance tasks. The Cour [des Comptes] regrets that the Ministry of Defence did not go ahead in creating, similarly to SIMMAD and SSF [the unified maintenance/support structures for air equipment and the Navy], a joint support service for Army equipment, or even, like in the United Kingdom, a main joint logistic management entity."

Corrections were made in the mid-2000's, but in 2005 the level of readiness of major armoured vehicles was alarming, with 41% for the wheeled armoured fighting vehicle, the AMX 10 RC, 59% for the older ERC 90 armoured car, and even 54% for the modern Leclerc MBT. Overall, the average availability rates for Army equipments stood at 73% in France, but availability rates for equipment on operations was higher, at around 90%, but this is a situation seen in other countries, where support resources are directed at operational equipment.

In spite of several sets of reforms three or four over ten years both at the Etat-Major level and the MCO level -

aimed at improving the situation (the reinforcement of the authority of the Chief of Staff in this area, and a slight financial boost under former Minister of Defence, Michèle Alliot Marie, were part of the effort), the overall support/maintenance malaise continued.

In 2007 however, following a 2006 audit made by a private consulting firm, Newton Vaureal Consulting, as well as other strands of support transformation, the "MCO Terrestre" was born, and the whole Army supply and support chain has since then started a process of reorganization under a fundamentally different logic.

A late-comer to reforms compared to its Navy and Air Force counterparts, the Army MCO has found itself in the words of Colonel Bienfait, "in the eves of the hurricane, having to modernize in an unstable environment, buffeted by budget pressures, the White Paper, and the lessons learned from the reorganisation of the air support sector on the domestic side, as well as the lessons learned from foreign armies on the international side".

With a knife under its throat, the MCO Terrestre started from scratch to completely overhaul its organization alongside dealing with its legacy culture. The de facto "mission de modernization du MCO terrestre" (MCO



Changes in the way that French air systems are supported are being looked at as a road map that can be adapted for land systems. Air systems availability has also suffered from serious shortfalls in the past.



More modern does not mean easier. The newest French Army Main Battle Tank, the Leclerc, while more maintainable than predecessors, still requires a large support network.

modernisation mission) had to do in one or two years what the air sector's MMAé (Mission de Modernisation du Maintien en condition opérationelle Aéronautique: Mission to Modernise Air Systems Support) took five to do, although MCO Terrestre could draw a lot of the lessons from the latter.

#### THE ARMY MCO IN FIGURES (SOURCE: DCMAT)

- 17,000 military and civilian personnel
- 350 million Euros in public contracts
- 10,400 different types of equipment
- 38,000 tactical vehicles and 15,000 utility vehicles
- 384,000 portable weapons
- 24,500 communication systems
- 35,000 optronic systems
- 5,800 command and information systems
- 456 helicopters (transferred to SIMMAD)

• 137,000 tons of munitions (to be transferred to the future joint munition service)

General MCO in the French services is organised in three levels. At the top, the service HQs act as the "Maîtrise d'Ouvrage" (MOA: Project Owner). Here, the support policy is defined for each service, the objectives are set and the resources essentially money - are then allocated to the next level, the "Maîtrises (MOAD: d'Ouvrage Délégué" Delegated Project Owner).

The individual service MOADs are the Service de Soutien de la Flotte (SSF: Fleet Support Service) for maritime assets, and the Structure Intégrée du Maintien en condition opérationnelle des Matériels Aéronautiques du ministère de la Défense (SIMMAD: Integrated Structure for the Support of Defence Ministry Aerospace Systems) for pan-defence air systems. These two, already operational, will be joined by the Structure Interarmées de Maintien en condition opérationnelle des Matériels Terrestres (SIMMT: Inter-

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arms Structure for the Support of Land Systems).

The MOADs then direct the operational support layer, the "Maitrises d'Oeuvre" (MOE: Project Managers). Looking at the land systems support structure in the MOE layer, the operational control is exercised by the Commandement de la Maintenance des Matériels Terrestres (COMMT: Command for the Maintenance of Land Systems), and the individual maintenance units with the combat regiments. The industrial MOE will see a new structure – Service de la Maintenance Industrielle TERrestre (SMITER: Industrial Maintenance Service (Land)) - which draws together the state-owned industrial entities as well as depots. Private industrial concerns make up the operational MOE piece.

At the local level, the White Paper officially confirmed the drastic consolidation of bases with the integration of the support element each time it makes sense. A new military map implementing an unprecedented number of base closures is the direct consequence of the reduction of the armed forces, and is still partially being negotiated on a case-by-case basis. A few "poles of competencies" will emerge from the on-going revolution, as Colonel Bienfait describes it.

#### STREAMLINING ASSETS MANAGEMENT

Similar to the British Whole Fleet Management concept (WFM), the process of reorganization of the management of Army equipment is dubbed in French the Politique d'Emploi et de Gestion des Parcs (PEGP: Policy for the Employment and Management of Fleets). In the making since 2006, it has been partially tested in the past eighteen months and officially launched in June with the filling of the "parks" by the DCMAT with the main categories of equipments as a starter: mostly "everything that is on wheels," says Colonel Bienfait, that is to say armoured vehicles, artillery, and assorted arms systems.

Interestingly, munitions are going to be stripped out of the process via the creation of a joint service similar to the French fuel service (*Service des Essences*) and medevac system (SSA: *Service de Santé des Armées*), with the stated ambition in the White Paper of promoting a European Munition pole).

An ongoing and dynamic process, the PEGP is to be updated by the end of 2009 and fully implemented by 2011–2012, when the adequate infrastructures will have been delivered. The dual objective of the PEGP is basically to better "use the equipment to optimize the costs of employment and to better manage assets in order to reduce the costs of support". The idea is to split the fleet of a given equipment in four parks, "organized by missions rather than by equipment, the way it had been till now," explains Colonel Didier Hénaut in charge of the PEGP at DCMAT. A first "permanent park" (parc en service permanent) is devoted to operational readiness (preparation opérationnelle); a "emergency park" (parc second maintains d'alerte) ready-to-go equipments and ensures combat readiness; a third "training park" (parc d'entraînement) centralizes in a few sites

the necessary equipment for military exercises on a joint tactical basis; finally, a "management park" (*parc de gestion*) is devoted to long-term maintenance, overhaul and upgrade of equipment and should be the guarantor for a good rotation of assets. This latter park is described by Col Bienfait as the park system's, "breathing lung".

According to the EMAT briefing that MLI received, "the PEGP belongs first and foremost to a strategy chosen by the Army to face the coming challenges: operational challenge due to the numerous overseas deployments, and to demanding operational preparation, technical challenges posed bv equipment renewal ... and the technological evolution of the fleet, budgetary challenges expressed in the long-lasting limits in the growth of financial and human resources. This is why, if we want to reserve the most update fleet to the OPEX and manage some imperatives such as the creation of a NATO alert park, we have to commit to the management of the technical fleet approach. Finally, the PEGP is a response to a demand by the Chief of staff to rationalize the use of the fleet by the Army. It is part of the general movement towards a rationalization of the MRO within the ministry of defence."

Streamlining the process means realigning the supply chain to match the operational needs, but just the needs. It hence means reducing redundancies, getting rid of duplicate equipment which till now drained resources – in men, parts and funding – without being useful to the combatant.

"The idea is that it is far better to run one truck a year driving 8,000kms and will need only one maintenance visit during that time, than running two trucks driving each 4,000kms and requiring twice the number of maintenance interventions," notes Colonel Bienfait. The issue obviously is to determine what are those needs – in other words, what kind of readiness level one needs.

Army officers agree that it depends on the type of equipment, but that generally speaking, the best readiness level optimized in terms of costeffectiveness obeys the following "law": readiness costs the most under 30% and beyond 70% with a doubling of costs when one attempts to go from 70 to 80%, and from 80 to 90%. Beyond 95%, a problem with spare parts starts to occur. In most cases and except for deployed forces (on operations such as in Afghanistan, the readiness level is maintained at 95%). officers at the EMAT estimate that 70% is a rather good level of readiness under "normal" constraints. What matters though is what Col Patrick Hocquart and IGA Boussiron refer to as the, "echelon of reactivity": the ability to mobilise maintenance resources to enable higher availability in 24 hours, 36 hours and so forth. The delay necessary to get to the next level needs to be optimized to the maximum, the goal being to be able to go from 70% to 80% in three months.

Getting rid of extra equipment will allow a better focus on retrofit, and will improve the level of maintenance. Disposals should eventually lead to substantial savings, since 40% of the current Army park is to be retired under the new reorganization. This is revolutionizing in many ways, but the biggest challenge for the French Army is going to change the "ownership mentality": it is not so much the reduction in numbers that is challenging, but the change of habits and culture induced by the creation of a common pool of equipment ("mutualisation") which each regiment will learn to share.

#### TRACKING THE FLEETS

Up until now, each regiment would "own" its equipment which it would maintain fully and manage for its own exercises and needs, with the natural classic tendency to pile up and create surplus. This "dis-ownership" process is on its way and will offer a much better visibility of assets, which is to be enhanced with the development of a new IT architecture called "Système d'Analyse pour la Gestion et l'Emploi des Equipements" (Analysis System for the Employment and Management of Equipment).

"These analytical tools have been experimented with over the past year and the 'lessons learned' should help determine the average use of equipment," notes Colonel Patrick Hocquart from DCMAT. Indeed, another advantage is that it will allow the MoD to better plan and manage



equipment rotation on the basis of their lifecycle, as well as via a better overall planning for exercises in order to avoid the peaks and troughs in use rates.

SAGEE will be used in particular by a new organization called SIPREFOR – "Système d'information pour la préparation à l'engagement des forces", Information Systems for the Preparation of Force Deployment – which will plan operational needs based on the foreseen forces activities over eighteen months.

As EMAT told *MLI*, "SAGEE is in fact an expert system which takes its information from SIPREFOR in order to identify the needs in terms of equipment. Then the CREDO IT system [*CREDO provides information about unit organisations and their equipment*], while the system of information of the Army Maintenance Information System (SIMAT) provides the visibility of the status of the fleet in terms of availability."

In the view of the Sarkozy government, the reduction of the planned projection forces from 50,000 men to 30,000 men is also meant to have a more realistic approach to French real abilities to deploy in OPEX. "PEGP is not a maintenance process, but the preparatory phase to deployment," recalls General Verna, while the first strategic axis of the transformation of the *MCO Terrestre* is the, "... alignment of support on operations back onto the efficient support process done in metropolitan France."

#### OLDER AND YOUNGER: DIFFERENT PROBLEMS

One of the main current challenges the DCMAT is facing is the age of the various categories of equipments: on the one hand, the French Army has been operating on 15 to 30 year-old equipment (sometimes more: e.g. 48 years for the GBC8 KT truck, and 34 years for the Puma), which requires a certain type of maintenance.

On the other hand, new equipment is already operational or expected to be in the next coming years, requiring completely different maintenance guidelines. Not only does this complicate any planning effort based on equipment life-cycle, but this twospeed system tends to blur cost projection assessments. This leads to an interesting debate about the of the estimation cost of MRO/MCO when jumping from one generation of equipment to another, which so far in the French Army has

not been generating savings, rather the opposite. This may change in the future, especially as maintenance staff will be reduced, but here is the assessment of Colonel Bienfait about such an issue:

"The MRO cost is practically proportional to the value of acquisition of any given equipment and varies between 2 and 5% of the latter. The more the sophistication, the more its cost and its MRO cost technology has a price and the MRO of technology has a price as well. Indeed, when one does compare proportion the of manpower spare over parts, one has to acknowledge that for a basic piece of equipment (a light armoured vehicle with four wheels and an

engine), the cost of manpower is far superior to the one of spare parts, when it is exactly the reverse as far as a high-tech equipment is concerned. If one compares a Gazelle helicopter (basic) to a Tigre, the Tigre MRO costs ten times more in terms of flight hours than the Gazelle. The reason is not only due to the cost of spares, but also to the use of integrated systems."

Another issue is of course linked to the training of maintenance personnel, which will also have a cost: indeed the transition towards a better, leaner force has a structural costs (base closure; social compensations; reconversion; training; etc ...), which can slow down the expected benefits from massive cuts, the way the *Livre Blanc* encompasses them.

The hope is that a simplification of maintenance process will occur via the standardization of equipment: General Verna underlines the fact that if the AMX13 had 13 engines, the Leclerc ended up having far more - "500 engines for 300 Leclercs" complicating even more the MCO. One engine per tank is the hope and fully integrated programmes, such as the future Scorpion advanced AFV system, will drive this vision forward. All of which means a totally new bargain with the industrial suppliers.

#### MCO AND THE INDUSTRIAL LANDSCAPE: TOWARDS A NEW BARGAIN

With the Livre Blanc, and maybe more with the on-going budget balancing process, President Sarkozy has in many ways overhauled the defence foundations in place since General de Gaulle. The future challenges are numerous, but two deserve attention: one is the financial variable, as the promised increase in military expenditures could well be halted by a stagnant economy, making the defence sector as a whole and the MCO within it the usual "adjustment variable"; the other is the hope that Europe will do its share in defence, which till now has been more the common lowest denominator than the other way around.

France is still comparable to the United Kingdom in terms of overall spending and capabilities, but if one looks carefully at the amount spent per military person per year, it only counts for about €52,500 in France, compared to about €121,250 in the United Kingdom and about €218,750 in the United States. The current process, if reform properly implemented, may indeed improve such a ratio and allow the French Army to be "leaner and meaner" and end up doing less with more, rather than doing more with less the way it has been doing in the past decades.

promising What is and revolutionary though, is the new emerging relationship between the armed forces and their industrial suppliers. As France leaves the era of monopolies behind, and as the big-ticket military investments shrink, the industrial landscape in the defence sector is rapidly evolving. This is particularly the case as far as the MCO is concerned, where new opportunities are being shaped with the support of the government: the contracting

framework - the infamous "Code des marchés publics" - still needs a lot of improvement to be more flexible, but change is on its way with longerterm multi-year contracts more attractive for industries, and the awareness for the need, and willingness, to include small and medium size companies along with the Primes. New alliances are emerging and success stories are now creating innovative business models for the MCO providers: the relationship between DCMAT and Renault Truck Defense is one such.

To put it bluntly, the good news is that Army support activities should from now on not only be truly integrated within the conception of needs and planification of means at the top political and military levels, but are also at last becoming an integral part of the services provided by the equipment makers from the beginning of the negotiation process. A win-win solution for France, it seems ....



Industry is a key partner in the planned changes to land systems support. Much as industry has been given a larger and larger role in the support of systems in countries such as the USA and UK, so a similar, if more nuanced trend, is underway in France.

## STRATEGIC AIRLIFT CAPABILITY: GETTING THERE...

### MLI's European Editor, Nick Fiorenza looks at the approaching reality of a NATO strategic airlift capability.

he NATO Strategic Airlift Capability (SAC) programme is entering its implementation phase, following the signing of the memorandum of understanding by enough nations to three C-17s. purchase The memorandum of understanding is expected to come into effect by the end of the year, and leadership posts have already been filled.

Dutch Defence Minister Eimert van Middelkoop on 12 June signed the Netherlands up to 500 flight hours with the SAC, allowing the programme to reach the 3,500 hours required to make it viable. A C-17 normally represents 1,000–1,200 flying hours but for the purposes of SAC 1,000 hours. This works out to three C-17s, despite wobbling by Italy, whose defence budget has been reduced, and the withdrawal from SAC of Latvia with its 45 hours (Denmark withdrew at an earlier stage). A mission from Pápa, Hungary, where SAC will be based, to Kabul and back represents around 16 hours.

STRATEGIC AIRLIFT CAPABILITY: NATIONAL BREAKDOWN BY FLIGHT HOURS	
Bulgaria	65
Czech Republic	40
Estonia	45
Finland	100
Hungary	50
Italy	300
Lithuania	45
Netherlands	500
Norway	400
Poland	150
Romania	200
Slovenia	60
Sweden	550
USA	1,000
TOTAL	3,505

Plans to deliver the first C-17 by the end of the year will probably be changed to all three being delivered in



2009. The initial and full operational capability has not been fixed, but the first aircraft will be operated by the US Air Force, so it should be ready soon after delivery. The original initial operational capability was mid-2008.

Norwegian Navy Capt. Gunnar Borch, formerly director of the Movement Coordination Centre Europe in Eindhoven, the Netherlands, has been selected as the general manager of the NATO Airlift Management Agency (NAMA) established to purchase, own and support the three SAC C-17s. Hungarian officials would like to see NAMA move to Pápa air base in Hungary, but others see a logic in keeping it where it is now co-located with the NATO Maintenance and Supply Agency in Luxembourg.

Wherever NAMA is located, the SAC Heavy Airlift Wing will be commanded by US Air Force Col. John Zazworsky. His deputy will be Swedish air force Col. Fredrik Heden, reflecting the fact that Sweden has signed up for the second greatest number of flight hours, 550.

The SAC C-17s will be operated by 150 military personnel from all 14 signatory nations. Many nations have identified and named crew members and training for non-US crew is in progress in the United States. Boeing has been asked to evaluate providing contractor logistics support services to SAC under contract to the US Air Force under the C-17 Globemaster III Sustainment Partnership (GSP). GSP is a public private partnership based on the concept of performance-based logistics in which the customer pays for readiness, not specific parts or services. Under the GSP contract in effect with the US Air Force, Boeing is responsible for supply support, supplier management, technical manual support, maintenance, modifications and upgrades, logistics engineering services and field support services.

A Boeing spokesman told *MLI* his company was performing a workforce size and makeup analysis on SAC and would not comment beyond saying, "The makeup of the workforce will be determined by the scope of work to be performed, the skill of available personnel and the level of support required."

*MLI* understands that the civilian workforce will number 70 people, as previously reported. Boeing plans to set up a company in Hungary to support the SAC C-17s, drawing on local skills which have supported Pápa in the past, instead of expensive expats.

The Hungarians have already provided all governmental and parliamentary resolutions and acts necessary for the stand-up and operation of both NAMA and HAW in Hungary. Preparations are being made by both the hosting Hungarians and by the US Air Force. In May, an Airfield Pavement Evaluation team from the US Air Force Civil Engineer Support Agency drilled samples and tested overall strength of the airfield's tarmac at Pápa to determine its load bearing capacity. At the end of June, Zazworsky visited the base for the first time and the first group of personnel were scheduled to follow by the end of July.

Improvements to Pápa include a new and bigger multipurpose hangar for the aircraft, workshops and social facilities; the expansion of the existing stand/parking area; the modernisation of other buildings and infrastructure; the installation of new, more secure perimeter fencing, and the procurement of de-icing equipment, towing vehicles and fuel trucks. In addition, the Hungarian military unit operating the base has been reinforced.

## BUILDING ON FLEET COMMONALITY

## MLI's Scott Gourley looks at the growing benefits to the US Navy of commonality of weapons systems.

n addition to building successful 57mm naval gun service in the fleets of 14 naval forces worldwide, US and associated industry representatives note that the entry of the new Mk 110 57mm naval gun into US Navy and US Coast Guard platform inventories will provide those maritime services with a range of new logistics benefits.

The 57mm Mk 110 Naval Gun System is the system of choice for providing surface warfare and homeland defense to the US Navy and US Coast Guard. It is a multimission capable medium-caliber shipboard weapon that has been selected for the US Coast Guard's National Security Cutter (NSC) and the US Navy's Littoral Combat Ship (LCS) program. Additionally, the complete system has been baselined by the U.S. Navy's DDG 1000 destroyer and the U.S. Coast Guard's Offshore Patrol Cutter (OPC).

The Mk 110 from BAE Systems is based on Bofors Defense 57mm Mk 3 naval gun, and once in full-rate production, will be assembled at BAE Systems' facility in Louisville, Kentucky.

The U.S. Coast Guard received its first Mk 110 in January 2006 for the first National Security Cutter (NSC-1) CGC *Bertholf* (WMSL 750), which was formally commissioned on 4 August 2008. A second gun was delivered in December 2006 for NSC-2, CGC *Waesche* (WMSL 751). The third Coast Guard Mk 110, which was the first gun manufactured at BAE Systems' Louisville, facility, was delivered to the Coast Guard for acceptance testing in late August 2008.

For the U.S. Navy's LCS program, the first gun was delivered to Lockheed Martin in March 2006 for USS *Freedom*.

According to the manufacturer, the Mk 110 allows Sailors and Coast Guard crews to respond quickly and effectively to eliminate all types of threats, by delivering high rates of with fire extreme accuracy against surface. airborne and shorebased threats with proven effective 6-mode programmable 57mm Mk 295 ammunition.

"The logistics advantages are one of the key aspects of the Mk 110, especially within the United States," observes Tom Danczyk, Mk 110 Program Manager at BAE Systems.

Noting that the system had been selected or baselined for two Coast Guard platforms (NCS and OPC) as well as two

Navy platforms (LCS and DDG1000), he added, "That's another interesting thing about the MK110. It was basically independently selected by four different ship platforms: the Security Cutter, National bv Northrop Grumman; the LCS ship, by Lockheed Martin; the GD LCS ship, by GD; and for the DDG1000 ship, basically by Raytheon and PMS500. So it was independently selected by those four different communities as being the medium caliber gun of choice."

He continues, "Now that we're on three of those ships and also baselined on the DDG1000 – we will be building those next year. – there will be a common logistics package for the US. That means you have



common training across those platforms. You can train all those sailors – there are unique nuances between ship classes but in essence, 90% of the training is the same. You also have common spare parts across those platforms. You don't have to have a separate logistics trail for each one of them. You also have common technical manuals."

"That logistics package is so critical," he says. "Logistics can be 80% of your cost in a system. You can't just look at your initial procurement costs. You've got to look at any additional burdens that the Navy or the Coast Guard are going to incur over the life cycle of a system. And that's why having a common system across all of these platforms is so critical."

# COMUNED PROGR FOR NAVAL SUPPORT

MLI's Scott Gourley looks at continuous improvement in US Navy vessel support on both coasts.

S. Naval Sea Systems (NÁVSEA) Command representatives have highlighted a number of recent activities and accomplishments at NAVSEA's four naval shipyards. Those shipyards include Norfolk Naval Shipyard in Portsmouth, Virginia; Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility (IMF) in Pearl Harbor, Hawaii; the Portsmouth Naval Shipyard in Kittery, Maine; and Puget Sound Naval Shipyard and IMF in Bremerton, Washington.

Logistically, the four shipyards perform logistic support and work in connection with ship construction, conversion, overhaul, repair, alternation, dry-docking, outfitting, manufacturing research, re-development and test work. Under NAVSEA's "One Shipyard" concept, the naval shipyards level the workload and mobilize the work force across the yards to best ready the Fleet, and stabilize a vital industrial base for America's defense.

Norfolk Naval Shipyard (NNSY), for example, covers approximately 800 acres on the southern branch of the Elizabeth River. The property houses seven dry docks, four miles of waterfront, about 30 miles of paved streets and 19 miles of railroad tracks, its own police and fire departments, electricity and steam generating plant, and about 400 cranes.

In addition to 3,585,239 square feet of production space, and 1,195,480 square

feet of warehouse space, NNSY's eight dry-docks include:

- #1 319 feet 5 inches opened 17 June, 1833;
- #2 498 feet 6 inches opened 19 September, 1889;
- #3 550 feet opened 8 December, 1908;
- #4 1011 feet 10 inches opened 1 April, 1919;
- #6 465 feet 9 inches opened 31 October, 1919;
- #7 465 feet 8 inches opened 31 October, 1919;
- and #8 1092 feet 5 inches opened July 1942.

Although the NNSY drydock inventory may seem rather historical, additional modern specialized facilities also include:

- Naval Shipyard Development and Integration Test Site, a multi disciplinary engineering site dedicated to integrating, testing and implementing business process improvements in Navy and Department of Defense maintenance depots;
- Network Center of Excellence and Network Operations Control Center, the Navy's entities responsible for coordinating and controlling the wide area network (WAN) and local area network (LAN) in the shipyards;
- East Coast cryptographic repair depot which repairs, modifies, overhauls, certifies and installs cryptographic equipment;

- A depot level antenna repair facility and range site that removes, restores, tests, ranges and reinstalls IDD, ACLS, navigation and surface/air search antennas;
- An accredited environmental and materials testing laboratory that provides complete chemical, metallurgical and metrology analysis and engineering services;
- A Shipyard Instructional Design Center, which is a full-service training development and media production facility.

The most recent milestone shipyard activity focuses on the "combination" of NNSY and the Mid-Atlantic Regional Maintenance Center (MARMC), in Hampton Roads, Virginia. The resulting facility represents the largest consolidation of Intermediate and Depot (I&D) level work in the naval ship repair community.

The action represents the third consolidation of Navy I&D-level repair work in a region, following Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility and Puget Sound Naval Shipyard and Intermediate Maintenance Facility.

According to NAVSEA representatives, Hampton Roads is the first region capable of performing large-scale work on all of carriers, submarines, and surface combatants.

With large-scale scheduled shipyard jobs traditionally considered depot-level

repair work, NNSY Operations Officer, Capt. Bill Kiestler, emphasized the top priority was maintaining work quality on I-level availabilities (Continuous Maintenance Availabilities) at the naval station. "I told everyone, 'whatever was being done for the ships before, had to be at least as good if not better," says Kiestler. He added that the successful I&D implementation has now formed a "Super Intermediate Maintenance Activity" at the naval station.

This pooling of area naval ship repair resources has already helped achieve more ship maintenance under the same operating budget. Bob Harrell, the Program Manager for Regional Maintenance and I&D Integration, further explained the concept of being able to shift workers between the two facilities. "When we have an available capacity here in the shipyard," he says, "we are able to instantly utilize workers by moving them to the I-level site and take on additional work for the operating Fleet."

NAVSEA also highlighted recent accomplishments at one of the earlier facility consolidation sites, Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility (PHNSY & IMF).

According to a command release, PHNSY & IMF provided multinational fleet maintenance support to nine US Navy and foreign ships during the recent Rim of the Pacific (RIMPAC) maritime exercise.

Conducted 29 June–31 July, RIMPAC involved 10 nations, 35 ships, six submarines, and more than 150 aircraft and 20,000 sailors, marines, soldiers, airmen and coastguards expanding cooperative relationships and contributing to the security and stability of the maritime domain.

"Most of the repairs done during the exercise were of an urgent nature and required rapid response," say Tyson Livingston, assistant project superintendent for PHNSY & IMF's Fleet Maintenance Project – Surface Craft.

PHNSY & IMF provided maintenance support for five US Navy ships, including the aircraft carrier USS Kitty Hawk (CV 63), as well as two Canadian vessels and two Royal Australian Navy (RAN) ships (After spending the last 10 years deployed to Yokosuka, Japan, USS Kitty Hawk (CV-63) is slated for decommissioning in Bremerton, Washington, in January 2009). According to Livingston, the RIMPAC logistics support priorities were established, funding was negotiated, and work was allocated based on funding, material availability, and capabilities.

According NAVSEA to representatives, "One of the most challenging ships that the PHNSY & IMF's Surface Craft Maintenance Division repaired was the RAN's HMAS Tobruk. The amphibious ship is a multi-purpose roll-on/roll-off troop and heavy vehicle carrier with both stern and bow doors. HMAS Tobruk had several items that required immediate repair so she could perform her mission during RIMPAC. HMAS Tobruk also had an inoperable gantry crane. The motor that operated the main hook had burned out on the way to Hawaii. The RAN's port engineer ordered a new motor prior to her arrival and it was waiting on the pier for installation."

They continue, "PHNSY& IMF's Engineering and Planning Department performed a ship check and determined that gears first had to be checked for cracks, then dressed and inspected for proper alignment. The Shipyard's Outside Machine Shop, Nondestructive Test Division, Fluid and Mechanical Division, and Rigging Shop quickly installed the motor. Weight-testing the crane required following RAN procedures and testing to a total weight of 77 tons. The test needed to be performed in increments, requiring the individual weights to be distributed over several areas of the deck. The weights first had to be gathered and landed on floating crane YD-261, then relocated from the floating crane onto HMAS Tobruk. The ship's gantry crane then picked up the weights, swung them over the side and held them for 10 minutes at each phase of testing.

"The shipfitting, welding, shipwright, plastic fabricator and temporary services shops performed outstanding work on these jobs," says Livingston. "The ship was able to participate in her RIMPAC mission as scheduled and reported zero leakage during the operation."

NAVSEA also highlighted recent activity at its Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNSY & IMF), where USS Kentucky (SSBN 737) completed a dry-docking for emergent maintenance and returned to the fleet three days earlier than scheduled.

Command representatives noted, "During USS Kentucky's Trident Maintenance Refit period, Navy divers discovered unforeseen but necessary maintenance work. This finding prompted a Naval Sea Systems Command (NAVSEA) assessment and recommendation for an unscheduled docking. Despite the challenges of this emergent work, the ship was docked and the Shipyard-IMF team successfully completed all repairs ahead of schedule.

"The men and women of the IMF site performed admirably," says Captain James F. Stone, IMF commanding officer. "They instinctively responded to the challenge and planned, engineered and executed the tasking without rework or churn and rapidly turned the vessel back over to the operator ... days earlier than planned. This demonstrated professionalism, dedication and sense of urgency validates the need for such an organization under the NAVSEA umbrella. I am proud to be serving with such a team."

Captain Mark R. Whitney, commander, PSNSY & IMF, adds, "This is yet another great example of what the maintenance professionals of IMF can do to support the warfighters."



US shipyards have not just supported the US Navy: on the RIMPAC 08 exercise, facilities at Pearl Harbor, Hawaii, undertook repairs to the Royal Australian navy's logistics ship, HMAS Tobruk.

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