Mobility Air Forces (MAF) Logistics Capability Gap & a Vision for the Future
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By: Mrs. Lorna Estep, Ms. Jenna Fletcher, & Ms. Andrea Truman

Readiness, Lethality and Resilience beyond the Flightline
By: Lt Gen Lee Levy II

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On the Cover

The cover this quarter is inspired by the article “Mobility Air Forces (MAF) Logistics Capability Gap and a Vision for the Future”, by Ms. Linda Szabo, Capt Travis Hollin, and Mr. Gene Matthew. The article discusses the importance of integrating many unique logistics systems to provide seamless logistics information flow across the enterprise. Instead of maintenance, transportation, supply and others having their own networks, what if there was a “Swiss Army Knife” logistics enterprise system that comprised everything? (Chris Gray)
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From the E-Ring

Are You Ready?

Greetings Log Nation! As we continue to rebuild Full Spectrum Readiness and ensure the Air Force is logistically postured, trained and equipped to operate on a global scale, our focus must also include personal readiness, unit readiness, and deployment training readiness. In the past, Phase I exercises were the norm, as Wings would conduct an installation-wide exercise to test their ability to deploy. These Phase I exercises not only exercised getting Airmen out the door in support of global contingency operations, but also exercised force protection along with operational and information security measures. We understand our most important asset is our Airman, and making sure you are prepared both personally and professionally must always be a top priority.

When most of you think of Phase I exercises, you think of walking the Personnel Deployment Function (PDF) line, checking deployment folders, making sure you have dog tags, and verifying that all your immunizations are up to date. However, that is just one aspect of a Phase I exercise. While the PDF focuses on the individual, the Cargo Deployment Function (CDF) focuses on making sure your unit’s cargo is packed properly and airworthy. These functions are under the Command and Control (C2) of the Deployment Control Center (DCC). Together, they are the linchpin to a Wing’s ability to deploy, and they provide the management level oversight needed for Wings to stay proficient in the deployment process. In the past, Phase I exercises were conducted at home-station and regional exercises like RED FLAG and SILVER FLAG, that provided the training to integrate functions from multiple Wings to conduct military operations. From these large-scale exercises, Airmen gained the necessary hands-on large muscle-movement training needed to operate in a contested environment.

While RED FLAG and SILVER FLAG exercises have continued, home-station Phase I exercises significantly decreased in frequency or ceased to be conducted at all due to the Air Expeditionary Force (AEF) generation construct. Over the past two decades our main demand for resources has been the steady-state rotation of forces to the CENTCOM AOR. Unfortunately, the predictability of this
rotational cycle has dulled our ability to deploy the entire force in support of potential future Major Combat Operations (MCOs). In order to reinvigorate the force, what is old will become new again. Phase I exercises were an essential part of our culture, and through their execution the Air Force practiced, prepared and demonstrated its ability to meet Operational/Contingency Plan (OPLAN/CONPLAN) requirements. As such, senior leaders have made Phase I exercises a priority for MAJCOMs and Wings as we “knock off the rust” to improve our readiness posture.

So the question I ask you is, “Are you ready?” In the past, we have used a “Just-in-Time” training approach to get our Airmen ready to deploy. Airmen would complete a majority of their pre-deployment training only after they were tasked to deploy. While this method works for steady-state rotational requirements (i.e. ones that are predictable), this approach would fail if a Wing were tasked to mobilize and deploy as a whole at a moment’s notice. In order to regain that “Ready-all-the-Time” stance, we are taking a look back in time at how Wings were postured to deploy. The Air Force will take a hard look at all pre-deployment training requirements, and look at what an optimal schedule for recurrent training should look like balancing the Airman’s time, mission, and budget requirements/restraints, which will ensure the force is ready to deploy today and not at some point in the future. This is only the beginning of many changes to come, and the focal point will be where the action happens, at the squadron level. Squadron Commanders, through their Unit Deployment Managers (UDMs), will be heavily involved in making sure Airmen under their command have all their personal readiness items in order to include institutional training requirements, Wills, Powers of Attorney, immunizations, gas mask fit tests, and a variety of other items. Maintaining items such as these will ensure our Air Force will remain at a constant state of readiness.

At this point you may be asking yourself, “Why all the focus on personal and institutional training and readiness requirements?” The answer is simple, these items are the foundation for Phase I exercises. Phase I exercises test a Wing’s “Deployment Machine” (i.e. the PDF, CDF, and DCC work centers), which is the C2 arm that facilitates execution of deployments. Our success moving forward will directly correlate to the work put into pre-deployment training and Phase I readiness exercises. Commanders and their UDMs understand the task at hand, and will be armed with the necessary tools to get the job done.

In closing, I’d ask each of you to take a look at what you personally need to do to be prepared and stay prepared to deploy. If you have not been part of a Phase I exercise, reach out to some of the more
experienced military, retired military and civilians in your unit to become familiar with the process and how it works. The enemy is unpredictable, and does not operate on a regular schedule. That is why we must restructure how we practice today to ensure we are ready to fight when called upon. Every Airman represents a key capability, and as such they are vital to our ability to conduct military operations around the globe. Our preparedness as a military is one of the greatest tools in our nation’s arsenal, and it serves as a deterrent to any enemy that would seek to challenge us. As always, I am confident that together we will rise to meet the demands the Air Force and our nation have placed upon us as we remain the most technical and dominant Air Force in the world!

ABOUT THE AUTHOR:

Lt. Gen. John B. Cooper is Deputy Chief of Staff for Logistics, Engineering and Force Protection, Headquarters U.S. Air Force, Washington, D.C. General Cooper is responsible to the Chief of Staff for leadership, management and integration of Air Force logistics readiness; aircraft, munitions, and missile maintenance; civil engineering; and security forces, as well as setting policy and preparing budget estimates that reflect enhancements to productivity, combat readiness and quality of life for Air Force people.
The growth of the defense industrial base before and during the Second World War was an unprecedented event in the United States’ history. These efforts after Pearl Harbor mobilized our entire nation and greatly invigorated the economy slowly recovering from the Great Depression, creating 17 million new civilian jobs and increasing American industrial production by 96%. Wartime readiness directly consumed one-third of industry production, and as a result, Americans saw up to 50% wage increases and full employment. Defense industry partners provided military readiness through the production of aircraft, munitions and targeting sensors, and all of the materiel US and Allied forces needed to fight; additionally, they created new technologies, eventually leading to the first reconnaissance satellites, the development of modern computers and many technologies we even use today. During WWII, Franklin D. Roosevelt called upon the defense industrial base to be the “Great Arsenal of Democracy.” Many of our industrial partners converted their factories to support the Warfighter. Willow Run was an automotive plant in Michigan owned by Ford Motor Company that was converted to build B-24 bombers; Singer Sewing Machine and Smith Corona Typewriter Companies made M1 Garand rifles. The US had an industrial base that was capable of surging rapidly and fully mobilizing to provide the goods and services that our nation, and in many cases our allies, needed to go to prosecute the largest war in history; in fact, it can be argued that it was our industrial capacity that enabled us to prevail. Much of that domestic industrial base no longer exists.

During Dwight Eisenhower’s presidency the Defense Industrial Base continued to produce the finest and most advanced equipment in the world. Since the conclusion of WWII, the US has arguably been the leading military power in the world. No other nation can employ forces, project power, and win decisively like the US military. That position on the world stage is not a given and certainly not a national birthright. Simply, the US must maintain a strong and responsive industrial base that provides innovative, cutting-edge technologies and manufacturing capabilities that is tightly integrated with the
Department of Defense (DoD). A healthy industrial base is critical to keeping our military advantage over our adversaries. Not only do we need to meet the requirements for the current generation of weapon systems, but we also need to plan to meet the requirements for future generations of weapons...rapidly. What follows will reveal some of the challenges the US faces in the diminishing defense industrial base, complexity of weapons systems and source of supply, scarcity of natural resources, the gap in Science, Technology, Engineering, and Math (STEM)-based career fields, and what our global DoD Logistics Enterprise needs to focus on to meet our requirements now and into the future.

Currently, the defense industrial base faces many challenges; the capacity to surge as we did during WWII no longer exists. We no longer can utilize a “just-in-time” industrial base that can surge as military demands increase. As Air Force Logisticians—and across the entire DoD logistics enterprise—we have to mature our ability to support our combatant commanders and understand our part in the essential supply chain element that underpins our combat power. Often Air Force Logistics discussions are centered on sortie generation, aircraft maintenance, personnel deployments, material maintenance, vehicles and munitions. Our strategic logistics discussions on war readiness and combat power need to change to include the status and capabilities of our defense industrial base. Without a defense industrial base, there will be no sorties to fly, nor parts to put on aircraft or weapon systems. Leaders at all levels need to have an appreciation for the criticality of the entire sustainment function that supports our operational capabilities; I have been describing it in recent years as “the logistics kill chain.”

In Mark Cancion’s recent article in “War on the Rocks,” he stated,

“Here’s the basic problem. Major wars against peer competitors are burning up weapons and ammunition at a ferocious rate, far beyond what the highly consolidated and fragile US defense industry can produce. Therefore, the industrial base is designed for peacetime efficiency, not mass wartime production, because maintaining unused capacity of mobilization is expensive. Congress and the Pentagon believe weapons are expensive enough without paying for something that may never be needed.”

Many of our Air Force logisticians experience this gap in industrial capacity every day. The Air Force Supply chain moves 2.2M parts every year to support the fight. Approximately 65% of those parts come from single-source vendors. During WWII, we had numerous ammunition plants in the United States, but over time we have sized our defense industrial base, organic and commercial, for efficiency, not for effectiveness. Our industrial base is geared towards supporting modern aircraft and equipment vice our legacy Air Force platforms, with obsolete technology. Multiple causes have driven
this decision, such as changes to acquisition policy, political influences, and reduction in defense budget and force structure.

The continually increasing (and obviously welcome) sophistication of our weapon systems has consequently made the challenge of sustaining our equipment ever more daunting. This combined with our conscious efforts to improve efficiency places ever more pressure on us to maintain our effectiveness. Consider the amount of suppliers and global manufacturing it took to build and maintain a B-17, versus what it takes for an F-35. During WWII, the B-17 was produced by Boeing in Seattle, WA; Long Beach, CA; and Burbank, CA. Production ended in 1945, and totaled 12,731 aircraft. For the F-35, Lockheed Martin’s global footprint represents over 1,400 large, small, domestic and international suppliers across more than 15 different countries and 46 states. Final assembly of the F-35 is not only taking place in the Fort Worth, TX plant, but also facilities in Nagoya, Japan, and in Cameri, Italy. Managing and tracking parts and commodities through multiple sources of supply internationally, compounds the challenge of identifying shortages and weakens our ability to be flexible to respond quickly, if called upon to do so. The defense industrial base capabilities have become more important than ever to provide this capability.

Additionally, during and post WWII, the US had access to an abundant, virtually unlimited supply of natural resources. From the 1960s to the 1980s, the United States was the leader in global rare earth production; since then, production has shifted almost entirely to China. The complexity and variety of natural resources needed for current weapons systems such as the F-22 or KC-46 have changed dramatically versus the resources needed for airplanes post WWII. Many modern defense electronics systems require a portable high-capacity power source, or the ability to use high-energy storage and amplification. These include storage batteries and electronic jamming devices (known as ECM pods) used in the field, as well as more exotic defensive systems that are in development, such as microwave-generating Area Denial Systems and Electromagnetic Railguns. For example, Yttrium-Iron-Garnet (YIG) is a key material used in electronic countermeasures for what are known as dispersive delay lines and microwave filters. These filters are robust and guarantee a high signal-to-jamming ratio and are an essential component of electronic warfare systems. The US currently has no production of yttrium, and the DoD projected a 93-ton shortfall of yttrium for military requirements in 2013. China accounts for 95% of rare earth production worldwide, and yttrium is found in ores such as fergusonite and monazite. Additionally, the level of complexity and the level of engineering in our modern weapon systems are higher than it’s ever been. AF Logisticians need to “anticipate” the chal-
lenges with diminishing defense industrial capabilities and rare natural resources when we plan for war readiness. As a Logistics enterprise, we need to identify how we can incentivize the industrial base, and create/sustain industrial partnerships with industry so that we will have the elasticity in the logistics “kill chain” to deploy, employ, sustain and reset to project power globally and potentially in multiple regions simultaneously.

On top of the growing complexity and scarcity of natural resources for our weapon systems, we also face challenges with resourcing the human capital of the industrial base, both within and outside of the DoD. The competition for world-class talent for STEM-based career fields is fierce and gets stronger every day. Realizing that all of our modern weapon systems contain tremendous amounts of embedded software, how we maintain, modify, and adapt the software packages to increase effectiveness and protect our vulnerabilities plays a huge role in combat air power. Ones and zeros are the new coin of the realm, and just as important—or possibly more—as how much fuel we put in the aircraft or how we hang bombs for the next sortie. The STEM-based human capital piece of our industrial base is fragile; our United States doesn't produce enough scientists and engineers. Despite programs and initiatives toward recruitment to hire STEM employees, a significant gap remains. One recent study by Aerospace Industries Association (AIA) found that 39% of aerospace companies predict an “extreme” impact on their business growth caused by this labor shortage, one reflecting concern not only about a lack of senior-level engineers, but also a paucity of skilled/technical workers versed in technology fundamentals and “soft” skills such as problem-solving, critical thinking, literacy, communication and collaboration. Without STEM-trained employees, and our ability to wield ones and zeros with great agility and great flexibility, the defense industrial base, and the US government has a problem.

I am tremendously proud of our total-force, civil service, and commercial Airmen who work hard every day to make our Air Force and our joint team ready to meet our national security commitments and build the capabilities we will need in the years ahead. It is all of our responsibility to look ahead and to challenge ourselves and our organizations to do everything we can to enhance our lethality and affordability. Have you asked your team: What lies ahead? Where are the risks? How do we articulate them to our leadership and the nation's policy makers? Are we ready...?

So now what? What I have described is not an ethereal issue meant only for discussion at the highest levels of our government and industry—we all have an essential role to play in thinking about and making improvements to our supply chains,
maintenance processes and above all our ability to project requirements. We, no one else, own the Logistics Kill Chain.

Have you read about, studied and discussed these challenges and how we might best address them? If not, we are late to need. Our adversaries haven’t stood still. I have great faith in the talent, dedication and potential of our workforce and in particular the generations of younger leaders who are truly awe-inspiring in their creativity and enthusiasm—this is a resource that we absolutely must continually nurture. This is truly a team sport in the most profound sense of the term.

Considering the challenges we face with the diminishing defense industrial base, scarcity of natural resources, and the gap in STEM-based human capital, our national security risks have increased and vulnerabilities are exposed. Logisticians have to look at this problem differently and understand the requirements and acquisition processes from the factory to the flightline, how we create readiness, deliver and sustain combat effects for our combatant commanders and our allies. Leaders, and not just logisticians, need to offer ideas and advocate for policy change within the Air Force and across the DoD to ensure we can be ready to support our combatant commanders when called upon to do so. It is unlikely that we will have much warning before our next war starts; it is possible that we are already in the first phases of the next conflict and we just don’t realize it. General Goldfein, Chief of Staff of the Air Force, recently said, “I don’t know when the next war is going to start, but we have from now until then to get ready.” Fighting and winning our nation’s wars in the 21st century require a ready and lethal force... underpinned by an industrial base that ensures our joint force can always, always prevail. The nation is counting on it.

ABOUT THE AUTHOR:
Lt. Gen. Lee K. Levy II is the Commander, Air Force Sustainment Center, Air Force Materiel Command, headquartered at Tinker AFB, OK. As the AFSC Commander, he leads nearly 43,000 Total Force Airmen to deliver combat effects for the immediate and long-term requirements of component and combatant commanders in every area of responsibility. Serving as the Logistics Numbered Air Force, AFSC is the supporting command for the readiness of Logistics and Sustainment activities around the world. The Center comprises three Air Logistics Complexes, three Air Base Wings, two Supply Chain Wings, and 23 CONUS and OCONUS geographically separated operating locations. The AFSC has $16 billion in execution authority and $26 billion in assets providing logistics operations, supply chain management, supply chain operations, depot maintenance and modifications, as well as sustainment for the nuclear enterprise, joint and interagency operations and foreign military sales partners.
By: Colonel Kjäll Gopaul

Buried deep in the pages of an obscure Air Force technical order about the airdrop and recovery of supplies is the unassuming phrase “Sling loading of airdrop loads by helicopter is an optional means of transport.” However, using this simple sentence from AFTO 13C7-1-5, a team of aerial porters was able to masterfully construct a formidable airmobile mission integrating warfighting elements from all three components.

As the deceptively cool morning skies over Martindale Army Airfield started their climb to 90 degrees, a joint, Total Force team of Texas Army National Guard Soldiers, Air Force Reserve Airmen, and an Active Duty Pathfinder team prepared for their own climb into the heavens on wings of titanium. Their mission, dubbed Operation ALAMO EVACUATION, was concise in its definition, but far-reaching in its demonstration for how components of the armed services can flawlessly converge on an objective and excel in its execution.

The exercise scenario took place November 18th at Martindale Army Airfield, and it simulated Airmen from the 26th Aerial Port Squadron (APS) receiving airdropped relief supplies from the 136th Airlift Wing in a remote part of Southwest Asia. The Airmen then re-rigged the loads for sling load evacuation and pinpoint delivery by the Soldiers of Company C, 2-149 Aviation to the relief supply recipients in the impassable mountains overlooking the drop zone. The Soldiers subsequently conducted no-notice “alert” 9-line medical evacuation (MEDEVAC) responses in support of the scenario’s follow-on operations that afternoon, then flew the Airmen (as MEDEVAC actors) from Martindale Army Airfield to Joint Base San Antonio-Camp Bullis and back.

“We started the morning with an aircraft safety brief and rehearsals for our hookups,” said SrA Justin King, 26 APS ramp operator, as he described the morning’s activities. “Once things got going, the UH-60 Black Hawks came in two at-a-time, picking up the sling loads for a simulated relief supply drop-off. It was exciting to do something that is part of the aerial porter job, yet not part of our everyday norm. This was a great experience! Now we’ve all conducted live sling loads and understand how they can benefit our future operations wherever we go.”
During the exercise each two-person hook-up team on the ground stood beneath a helicopter while it hovered overhead, then attached the load to the aircraft’s cargo hook.

“It was neat watching the Soldiers bring their aircraft in over us,” added 2LT Matthew Gonzales, 26th APS officer in charge of the passenger terminal. “It’s also intimidating as a huge helicopter approaches the load with the blades spinning. The rotor wash was incredible.

I didn’t think that it would be that powerful, or that someone would really be needed to stand behind and brace the hook-up person, but I’m glad they were there. This was an awesome opportunity. I just received my commission last week, and I haven’t done anything like this in my 10 years in the Air Force. This is my first drill weekend at the 26th Aerial Port Squadron, and this type of training instills military pride, develops a joint mindset by working with other services, and aligns with the Chief of Staff of the Air Force’s vision on joint operations.”

CMSgt Joe Gonzalez, 26 APS operations superintendent, served as the pick-up zone NCO in charge (PZ NCOIC) and remarked on the opportunity this mission afforded his Airmen.

“As the PZ NCOIC, I participated in the mission planning and supervised the safe execution of hook-ups at the touchdown points,” he said. “It was great to see our Traditional Reservists get outside the normal garrison training environment and onto a flightline with the Army National Guard Soldiers. As aerial porters, we deploy downrange and don’t always know what we’ll be asked to do; so we have to work with what’s there. Likewise, this mission gave us valuable experience with less familiar tasks. We rigged A-22 cargo bags and conducted sling load training with live helicopters, something that that most aerial porters rarely do before deploying. This was especially valuable as our unit approaches its deployment window.”

Offering an aviator’s perspective of the sling load hook-ups is 1LT Christian Lubbe, Texas ARNG Company C, 2-149 Aviation, aeromedical evacuation officer and platoon leader for the Sustainment Platoon: “The ground crews were very proficient and clearly had been trained to be familiar with the task at hand. I was impressed at the rate at which we were accomplishing the iterations. The aircraft would leave and the ground teams were ready to hook the next load.”

He particularly noted the joint benefit: “From an interservice standpoint, it’s amazing to have a team of Airmen here with us. This is my first type of training like this, and I hope to do more in the future.”

SGT Tiffani Smith, a flight medic also of the Texas ARNG Company C, 2-149 Aviation, echoed that
the morning sling loads were well coordinated from beginning to end.

“It was well-thought out process, executed well, and served as a good refresher for me,” she said. “I thought that the visual cues with the ground marking panels and hook-up teams’ colored safety vests were helpful. It allowed me to see when the hook-up team was ready, and where to aim the aircraft as we approached the load.”

SGT Smith noted the interservice camaraderie demonstrated during her safety brief to the Airmen that morning carried over to their MEDEVAC flights as passengers that afternoon.

“They were all eager and professional,” she said. “During the safety brief, they were focused and paid attention. I think it’s because we’re all familiar with American military operations. We just came back from Kosovo, and working with other nations presents different challenges. Today’s team was calm, cool, and collected. They were prepared and followed directions very well so we could focus on the mission.”

In keeping with its exercise name, Operation ALAMO EVACUATION witnessed the sling load evacuation of more than 36,000 pounds of cargo and the medical evacuation of 27 MEDEVAC actors. Both of the leaders of the participating Texas Army National Guard and Air Force Reserve units emphasized that the day’s mission had value far beyond these tactical measures of accomplishment.

Lt Col Jeremy Moore, 26 APS commander, underscored that the mission of the exercise aligned with his unit’s warfighting mission.

“Our primary mission at the 26th Aerial Port Squadron is to train and provide combat ready aerial porters,” he said. “This joint opportunity let us exercise some of our more unique support requirements that we normally wouldn’t see outside of a deployed location. More importantly, it provided our younger Airmen the opportunity to build and understand inter-service relationships with a key mission partner: the Army. It was exciting to see this come together and to reinforce our ability to provide Rapid Global Mobility.”

Offering his key leader perspective, Lt Col José Reyes, Texas ARNG Company C, 2-149 Aviation commander, remarked how beneficial the training was for developing both technical proficiency and inter-service relationships.

“This was a tremendous opportunity for our units to work together,” he said. “I challenged my staff to plan the most efficient training with aircrew and aircraft sequencing. Integrating the Air Force hook-up teams and pre-rigged loads improved the process, allowing faster iterations. We trained 12 pilots, six crew chiefs, and four medics. To put that many crews
through training with only two aircraft in such a short amount of time speaks volumes for the value of interservice cooperation.”

Lt Col Reyes proclaimed that the success of the day’s exercise shows a promising future for joint operations.

“We’re building a relationship. We’ve established an association, successfully executed this mission, and now we can plan on future opportunities to reinforce our Joint, Total Force partnership.”

ABOUT THE AUTHOR:

Colonel Kjäll Gopaul, Deputy Director, Air Force Personnel Operations Activity
Mobility Air Forces (MAF) Logistics Capability Gap and a Vision for the Future

By: Ms. Linda Szabo, Capt Travis Hollin Mr. Gene Matthew

Turning Reactive Maintenance (Mx) into Predictive Mx that reduces unscheduled Mx

Today’s aircraft maintenance process is too reactive; primarily due to the way system health information is tracked and captured. In the field, assets are flown to failure before troubleshooting techniques are employed to isolate the problem and identifying the part to be replaced. Once identified, a technician must research the part to be ordered and place a demand on supply. If the part is available locally, it is delivered immediately. If the part is not available, a MICAP is created to expedite its movement to the point of need. In the meantime, the aircraft is non-mission capable and maintenance action is on hold until the new part arrives. This legacy maintenance repair cycle generates an abundance of avoidable downtime.

The legacy maintenance process for MAF aircraft out in the system looks something like this: A C-17 pilot experiences an inflight failure that illuminates their Aircrew Caution Warning and Alert System (ACWAS). Upon landing, the information is provided to the ground maintenance crew, who troubleshoot and identify the part required to correct the failure. The part is ordered, but not available at that location so a Maintenance Recovery Team (MRT) is expedited to bring the part and complete the repair. The MRT arrives 24 hours later and completes the repair so the C-17 can continue its mission. This “expedited” repair took 36 hours to complete.

If the use and wear of parts within a system could be identified and tracked, part degradation could be continuously monitored and give an accurate prediction of failure. With a projected failure point, predictive maintenance actions could be scheduled at the right time and at the right place; therefore, reducing unnecessary downtime and the movement of personnel and parts to the point of need after an aircraft has already broken. This reduction of unscheduled repairs would not only improve mission effectiveness and operational efficiency, but also provide a long-term economic advantage as fewer parts are needed to fill the supply chain.
There would no longer be a need for large inventories of safety stock at multiple locations, instead supply assets could be centralized at strategic locations to facilitate rapid movement. This could result in a more agile supply chain, precisely moving parts to the right location ahead of the scheduled replacement.

Today, scheduled and periodic maintenance for programmed depot maintenance and time change items is based on historical failure and key component condition data. This rearward-looking, periodic assessment provides the foundation for a reliability centered maintenance approach that attempts to minimize unscheduled repairs. This philosophy provides a great deal of stability in the depot maintenance process, which enables process efficiencies to accelerate performance. Over the past decade we have seen significant improvements to depot maintenance performance, but the legacy maintenance process still lacks the real time condition based health monitoring to precisely execute aircraft maintenance, both in the field and at depot.

If predictive maintenance was used in the C-17 scenario described earlier, an aircraft monitoring system would identify part degradation while in flight and data burst that information to a controller who reviews and identifies the pending failure. The controller would determine where parts and repair capability exists and schedule the aircraft to the most effective repair facility, or move the required repair resources to the right place at the right time, minimizing mission impact of the repair. Conceptually, the C-17 lands and the maintenance team, with the needed resources in hand, replaces the degrading part and returns the aircraft to service for an on-time departure the next morning.

Overcoming limited system health monitoring/analysis with real time, secure aircraft health monitoring updates/analytics

Legacy maintenance monitoring systems are manually downloaded at intervals defined by the system program offices. The information is used for Aircraft Structural Integrity Program (ASIP) and Mechanical Systems Integrity Program (MECSIP) monitoring to help System Program Office engineers create work packages to effectively maintain their weapon system. This information is valuable in shaping depot maintenance activities and optimizing time change intervals, but there is room for improvement. The legacy maintenance monitoring capability is a reliability-based strategy that induces excessive unscheduled maintenance into the field, causing avoidable delays for troubleshooting and resource
Today an aircraft enters programmed depot maintenance to receive a precisely planned and programmed set of inspections, time changes, and maintenance activities. This work package was carefully developed from years of historical feedback, system information, and adjustments from the field in the form of a 103 submission, which is basically an addition to the depot work package. Despite this meticulous planning, we see too many aircraft with large amounts of over and above work that stretches the depot timeline as maintainers identify additional repair requirements well after induction.

Through the use of real time health monitoring, not only could aircraft identify pending system and key component failures to prevent unscheduled repairs, but it could also prescribe more effective depot maintenance packages. This properly analyzed, big aircraft data could be used to prepare the enterprise to support full-spectrum maintenance activities at all levels: operational, intermediate and depot. One of the biggest challenges in obtaining the right data, at the right time to spawn predictive maintenance, is outfitting mature weapon systems with adequate monitoring technology. Another large challenge is providing the secure communication conduit with the required velocity to transfer information between the aircraft and the ground 24/7/365 anywhere in the world. While we are not there yet, we are confident the sustainment enterprise can leverage commercial best practices and rapidly advancing technology to fill this gap.

Integrating many unique logistics systems to provide seamless logistics information flow across the enterprise

The logistics information network evolved from numerous functional stovepipes, creating a web of partially connected systems with limited integration. Aircraft maintenance has its own system, supply has its own network, transportation has its own network, and the operational community uses its own tools to manage activities. While progress has been made in integrating segments of this informational web, there are many gaps that prevent the efficient harvesting of data needed to make the best enterprise decisions. This information fragmentation is one of the greatest obstacles impeding the ability to unlock the power of focused analytics, which is foundational for predictive maintenance.
“I asked A4Q to tell us what happened on all our aircraft 5 days ago and I still don’t have a response. Why is it taking so long?”

“Well Sir, to understand what aircraft were flying we need to access our MAF Log C2 System (G081) and IMDS to get all of our fleet’s flying activity, status, delays and failures as well as GDSS2 for all the mission related information. Since you also asked for cargo and pax information, we had to cross-reference the mission information with GATES, and because some delays were impacted by supply we had to deep dive with our supply experts and DLA to get those details. The integration of those information streams is very time consuming and we are still a week away from providing you with a draft data set for the MAF fleet.”

To effectively integrate independent systems through a common storefront, data that provides an enterprise perspective needs to be pulled from a single input. The analytic story is very different in this environment.

“Sir, your preferences have been uploaded into the enterprise view and it is available for review on your computer. Please use the icon on your desktop to access the fully integrated system view, which displays the location and status of each aircraft. If you would like more details, please mouse over or touch the aircraft symbol. You can review aircraft at each depot and change the view to a status sheet looking at the MDS enterprise. It shows boundaries and current execution data with the ability to look at informational excursion that will allow you to view what might negatively impact your fleet. Seeing an issue on a flying aircraft, you will see health monitoring information and be able to review controllers’ actions taking place, or planned, to route aircraft, or resources for an off-station expedited scheduled maintenance action.”

Change from a high dependency on manual cargo loading techniques to an Aerial Port of the Future

Aerial Ports continue to use the same manual cargo preparation and movement methods that were developed in the early 1960s. These manual operations, which have not substantially changed over the past 50+ years, require intense manual labor for the movement of cargo through the Defense Transportation System. This is in stark contrast to the technological developments on display in industry where fully automated seaport cargo yards, autonomous warehouse operations, and autonomous unmanned vehicles – all with minimal human interaction – are already being employed. Now is the time for the Air Force to modernize the air transportation system and leverage innovation to automate the processing, preparation, and loading of cargo onto aircraft.

An initial step in this direction would be the development of algorithms and planning tools for palletizing cargo to capture key data points regarding
incoming cargo to aerial ports such as size, weight, cube, intermediate and final destination, etc. Once captured, the algorithms would be used to design optimal pallet builds and aircraft loads. The current selection and assembly process is time consuming and inefficient as Airmen optimize pallet configurations and build cargo manually or by forklift. Possible technologies include, but are not limited to, Automatic Identification Technology (AIT) scanning to provide cargo information, sensing technology to capture cargo dimensions, integrated multi-variate routines to optimize cargo configurations, and robotic pallet building to mitigate human error and reduce injuries. The main goal of this effort is to increase the efficiency and effectiveness of pallet planning to optimize pallet building and aircraft loads.

Automating aircraft loaders should be the next step in advancing cargo loading operations to provide autonomous capability. This technology would allow for the option of completely unmanned operations, as well as driver-assist capabilities to enhance situational awareness when operated by an Airman. Through the use of sensors, cameras, semi-automated alignment assistance, and in-cab information, a single operator could perform standard movement operations in a safer and more efficient manner. This would lead to improved effectiveness of cargo loading operations, all the while increasing safety and reducing manpower. Repurposing manpower could potentially allow units to increase workload capacity by servicing more aircraft with the same amount of assigned personnel, leading to increased overall mission velocity. The Army has already developed this technology and has confirmed that it can be added to our current fleet of aircraft loaders.

Another automation improvement would be implementing a system of flexible powered rollers on aircraft to increase overall efficiency, and reduce injury, during cargo on-loading and off-loading operations. The development of a formfitting replacement roller system, integrated into aircraft with power source management and sensor systems for controlled roller operations, would eliminate the need to manually push cargo on and off aircraft, and reduce the physical stress placed on Airmen. This system would also eliminate the need to manually reconfigure the cargo bay between both pallet and rolling stock configurations. These rigorous operations are directly connected with injuries and disabilities in the Air Transportation career field. According to a recent study conducted by the USAF School of Aerospace Medicine, approximately 25% of Aerial Porters who left active duty over the past 15 years received VA compensation for musculoskeletal injuries (e.g. back, knee, shoulder) as a result of performing day-to-day Aerial Port duties.
In theory, automating Air Force cargo loading operations would result in cargo arriving to Aerial Ports, pre-evaluated and processed for maximum pallet optimization by an automated pallet planning system. Robotics would be used to build cargo and pallets would self-load onto automated aircraft loaders. These loaders would self-drive to designated aircraft and align/sync via a system of powered rollers to load cargo onto aircraft with minimal human interaction. This entire process would be controlled by a cloud-based, all-encompassing IT system ensuring real time situational awareness, and providing end-to-end total asset visibility for the entire air transportation enterprise. The realm of the possible is exciting as the Air Force looks forward to turning automation gaps into strengths; combining aircraft and Aerial Port modernization to ensure an efficient, effective and safer means of moving material to the Warfighter through the Rapid Global Mobility logistics enterprise.

Our challenge moving forward is turning these gaps into strengths, so we can change the way we operate and sustain the Rapid Global Mobility logistics enterprise. For our aircraft, the first order of business is carefully defining our current capability. Efforts are underway in Headquarters Aircraft Mobility Command to capture the on-board health monitoring and data collection capability, regardless of how we use that data today, for all of our weapon systems. Next we will build a roadmap of how to grow from where we are today into what we want to be in the future, highlighting roadblocks and hurdles to achieving our ultimate goal of predictive maintenance. This journey will require more than technology insertion. We will also need to change the way we do business, the way we process information, how we use that information, and the processes/procedures/policies that guide logistics activities. Our aerial ports have already begun this transformational journey, building the “Aerial Port of the Future” concept of operation. This vision clarifies the aerial port end state and provides the path for moving the enterprise towards that goal. A number of benchmarking trips and events have been conducted to mature the “Aerial Port of the Future” concept, but it will take time for investments to materialize and full change to occur. The MAF logistics enterprise is on an exciting transformational journey. While it will take time to reach our ultimate goal of comprehensive predictive maintenance and fully autonomous aircraft loading, the future is now and we are moving forward to make these changes a reality.
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What is an Air Force Civilian Logistician?

While logistics operations are incredibly integrated in most aspects of the Air Force, the role of the civilian “loggie” is often overlooked, but is vitally important. Like the Airmen working in logistics related AFSCs, the civilians are a diverse group of supporting the customer. There are over 170,000 civilian Airmen and over 43,000 civilian Logisticians filling a variety of roles serving globally, ranging from forward operating bases to the depots, ensuring the Air Force can fly, fight and win in Air, Space and Cyberspace. The interviews below briefly highlight what they do and their impact on supporting America’s National Security.

Andy Morris, 18 LRS: I serve as the 18th Logistics Readiness Squadron Logistics Manager providing sortie generation and installation logistics readiness support to Kadena Air Base units and mission partners. I enable a diverse range of materiel, fuels, vehicle, deployment, and distribution process management and execution. I love what I do because every day is different ... well that is an understatement, every hour is often different. During my tenure as a civilian logistician, I have experienced a great deal of career satisfaction through enabling Warfighter successes. Without planning and execution of logistics processes, military operations as we know them would cease to function. Every aspect of the Air Force mission from the aircraft parts repair cycle to shipments of household goods are bonded together with logistics. Logistics supports home station training and directly enables deployment and sustainment of expeditionary operations supporting US National Security objectives.

Kevin Lehmkuhl, F-16 AFETS: Air Force Engineering and Technical Services (AFETS) employees are on-the-job supporting the Warfighter, anytime, anywhere around the world. There are currently over 300 AFETS personnel working side-by-side with Airmen across 6 MAJCOMs and at every major contingency deployment location. They provide technical assistance, training and sustainment solutions for aircraft and cyber systems. Working alongside the troops, embedded in Aircraft Maintenance Units (AMUs), Air Operations Centers (AOCs) or Combat Communications Squadrons (CCSs) is what makes...
AFETS work so fulfilling. This is a major reason why people join and stay with the organization for many years. It's obviously not a job or lifestyle for everyone, but long-time AFETS employees enjoy their daily interaction with Airmen, understand the requirement to go where the mission needs them, and experience the gratification of knowing what they are doing is important to the Air Force mission and our nation.

Tasha Miles, 421 SCMS: I am the Program Manager for the F100 220/229 engine, and I have the pleasure of working with every function of the supply chain. I learned early in my career as a Program Manager that I am responsible for more than supportability analysis to determine the health of an engine part. Instead by being the focal point, I am a big part of the solution for parts acquisition/procurement that are not available to support our customers—the Warfighters. I enjoy my job because I get the opportunity to work with a team of people with various backgrounds and knowledge; and together we brainstorm and execute plans to make an engine part healthy.

Jennifer Hardt, LCMC: I am currently a Weapon System Liaison Officer for the Royal Air Force (RAF) in the United Kingdom. I directly manage logistics support for their MQ-9, Reaper fleet. I ensure the proper supply items are on-hand at the Forward Operating Base and that UK leadership is kept abreast of the fleet status; I oversee the contractor personnel who conduct maintenance and are tasked with keeping the aircraft fully mission capable. The British are arguably the United States’ strongest ally and supporting them enables RAF aircraft to operate alongside our USAF counterparts. Together we are eliminating the enemy and fighting against terrorism!

Martin Gruber, AMC: Air Transportation Operations Specialist/Station Chief 733rd Air Mobility Squadron (AMS) Operating Location Bravo (OL-B), U-Tapao Royal Thai Navy Base (RTNB), Sattahip, Thailand. I currently support over 100 DoD aircraft per month carrying 900 plus passengers and over 100 tons of cargo. These missions include a robust joint and combined bilateral exercise program, averaging over 72 per year, demonstrating the rapid expandability of U-Tapao RTNB. One U-Tapao RTNB exercise, COBRA GOLD, is the largest multinational annual Asian-Pacific military exercise and is among the largest in which the United States participates. Additionally, OL-B provides AMC representation and acts as technical advisor to Joint United States Military Advisory Group, Thailand (JUSMAGTHAI), Defense Attaché Office (DAO), Pacific Command (PACOM) and the foreign host military for all air transportation functional or operational areas. Furthermore, OL-B
directly supports Foreign Military Sales, Humanitarian Aid and Disaster Relief missions, and Defense POW/MIA Accounting Agency (DPAA) Detachment One. I love my current position because I work in an environment founded on integrity, trust and personal relationships that maximizes efficiency of operations while maintaining 24/7/365 DoD access in support of bilateral national objectives. Supporting the DPAA Detachment One mission is near and dear to my heart. We provide logistics support to include transportation and supplies to all teams working in this region to search, recovery and identify our Missing In Action (MIA). They do amazing work and I am happy to be a small part of their success! (http://www.dpaa.mil/Our-Missing/Recently-Accounted-For/)

Ta’Mara Ross, 421 SCMS: I have served as a Production Management Specialist for both organic repair and contract repair for 15 years of an 18 year career for the US Air Force. I look forward to coming to work each day knowing that what I accomplish in support of the TF33 engine program makes a difference in the defense of our country. I work hard to ensure engine parts are readily available for my maintenance co-workers and in-turn keep planes in the air. In 2016, the B-52 set a new record of flying 227 sorties in-theater without interruption, breaking an old record of 200 sorties in 2007. This is why being the best Production Management Specialist I can be is important. In today’s fast changing environment, my ability to provide parts supportability is a direct reflection and tangible result that the supply chain supports the Air Force’s missions, thus protecting and defending our great Nation.

Rob Miller, LCMC: I am currently the USAF Product Support Manager (PSM) for the C-130 Weapons System. I’m the single point of accountability for supportability considerations associated with USAF C-130 Combat Delivery and Cold Weather variants, as well as items common across other USAF C-130 variants and C-130 variants of sister services and FMS nations where the USAF is Primary Inventory Control Activity. As PSM, I am also the Logistics Functional Manager for the C-130 Hercules Division, responsible for personnel, manpower, and workforce development activities of the Division’s logistics community. Cultivating the career and personal development of future logistics leaders within my span of control is a role that I take very seriously. Service is in our blood as my extended family has served continuously for over 300 years now. Since I am no longer able to serve in uniform, the logistics career field stimulates me both spiritually as a warrior—the vocation of my family—and intellectually. The field is vastly complex with long-lasting ramifications on our ultimate customer—the Warfighting community. I can think of few roles—clergy, the medical
field, emergency services, and education—that might offer the same level of fulfillment or opportunity to impact society in such a positive way. I view our ultimate customer as the brave group of late-teens or early twenty-somethings, “fighting in a foxhole”, who desperately need something delivered or something dropped on someone shooting at them. Availability says that we have the capability to meet those needs in the battlespace in real time, both today and for decades to come. Lastly, I view the budget as a largely zero-sum game. It is paramount to behave as sage stewards of our government resources today, so that we have the capability to expand other critical areas.

Brian Muller, TRANSCOM: I work at US-TRANSCOM in the J5, Strategic Plans, Policy, and Logistics Directorate, Global Plans Branch. Our branch is responsible for writing and managing the Campaign Plan for Global Deployment and Distribution. It is a different level of planning than I have previously done. Unlike other Combatant Commands, USTRANSCOM’s AOR is the whole world. We are affecting every region of the globe every day. You may be asking what a Campaign Plan is. In short, it is the commander’s plan that operationalizes his and the Secretary of Defense’s strategy. Not a day goes by that I do not talk to the Office of the Joint Staff or the Office of the Secretary of Defense. It is exciting to be working plans at this level. USTRANSCOM is getting recognized for the global mission and effects on national objectives, as every Combatant Commander relies on USTRANSCOM to move and resupply its forces. Campaign Planning formalizes how we will execute the mission. Working at this level of planning reinforces how important it is for planning to flow down to the operational level. This experience will greatly benefit me when I return to the base-level again.

Crystal Ajeel, 418 SCMS: I serve as the metrics OPR, supporting the 638 SCMG in various queries in developing their MICAP, backorders, ORT, LIMS-EV support, target setting, as well as, asset availability for monthly or quarterly reviews. I assist in improving supply chain performance, increasing support to customers and reducing costs to the Air Force. I identify high-level trends, constraints and potential solutions, corrective actions for the performance metrics to improve supply chain performance. I love working for the US Air Force and the Department of Defense because I am a true patriot. My motivation has always been supporting the troops, no matter which service. Our work is important to the Air Force mission and to National Security because we provide sustainment and logistics readiness to deliver combat power for America. Our vision is to deliver globally integrated, agile logistics and sustainment to the Warfighter while striving towards efficiency while never jeopar-
dizing effectiveness. The national strategic values include support to nuclear enterprise, weapon systems, aircraft battle damage repair, commodities, software, engineering and supply chain.

Ched Deckett, STRATCOM: As Chief of the Installations and Infrastructure Branch, in the Logistics Directorate, at United States Strategic Command (USSTRATCOM) headquarters in Omaha, NE, I get to work with a great bunch of professionals from all services, at the strategic-level focused on the long-term supportability and operational effectiveness of the Joint Force. In regards to Installations and Infrastructure, our team is responsible to ensure required infrastructure is in place to accomplish missions assigned to commanders, USSTRATCOM, as well as providing strategic-level oversight of missile defense and early warning radar logistics support. Based on the breadth and long-term focus of our responsibilities, each day’s excitement can range from pop-up situations affecting the USSTRATCOM enterprise anywhere across the globe to in-depth budget analysis and discussions with Service, Joint, and Office of the Secretary of Defense staffs. It is exciting, and motivating, to work as part of a great team, where we can have an impact on improving support for and the viability of joint operations far into the future.

Carole Yeatts, LCMC: As the Program Analyst for the Combat Survivor Evader Locator (CSEL) System, Joint Program Office (JPO), I support the Warfighter rescue effort. This mission involves the rescue of Isolated Personnel (IP) on a global scale and extends beyond the Air Force to include direct support to the Army, Navy, and Joint Personnel Rescue Centers. In my current role, I assist the Program Manager and Logistics Specialists in managing contract deliverables, resolving funding shortfalls, and identifying future program and funding requirements. My actions contribute to our program mission ensuring our systems are optimized to securely communicate and identify Isolated Personnel, ultimately leading to their recovery. It is extremely important and satisfying to me to be part of an effort that directly supports the rescue operations of our men and women downrange who are in harm’s way on a daily basis.

Aircraft Ops at U-Tapao RTNB
ABOUT THE AUTHORS:

Mrs. Lorna Estep, Logistics Functional Manager

Ms. Jenna Fletcher, Logistics Career Field Manager

Ms. Andrea Truman, Logistics Career Field Team Chief
New Isochronal Inspections, New Processes

The 317th Maintenance Squadron at Dyess AFB is responsible for the long-term health of 28 C-130J aircraft by performing rigorous isochronal inspections to ensure safety of flight. We originally performed three in-depth time based inspections referred to as the B, C1 and C2, and all focused on key interest items and routine maintenance. However, in February 2018 a new set of inspection guidelines dropped—effectively rewriting requirements and timelines for each inspection. More interestingly the C2-check was replaced with the new D-check and we were tasked to create and test this process.

At the time of this change, our maintainers were in the in the process of performing a C2 inspection. Once tasked, the team had to adapt to the new requirements of the D-check while staying on schedule. Due to the timing and transition between the inspections, we had little guidance other than the technical orders. Local procedures and best practices were common for the many B, C1 and C2 processes, but the D-check was a new matter.

Once the new work cards were dropped, our organization put together a dedicated team that was tasked with reviewing the new inspection criteria and building an initial procedure flow. Their primary task was to identify all areas of the inspection that could be worked concurrently, determine order of priority for steps, as well as outline the process. We could only afford two days for the team to reflow and rebuild the operation.

This two-day investment paid off, as the team reduced the initial projected 30 days to only 18 days! Additionally, after each shift, the leads from every shop convened and discussed the work performed for that day to create feedback from this first undertaking. These discussions led to questions about what would come next, which was something we took for granted with our old inspections. Two examples of process redesign involved supply. Changes related to insulation inspections and inspections under the critical areas of the flooring proved a challenge as the items required were not commonly used in isochronals. Things such as cotter pins, insulation locks, and apex bits made our team engage with LRS and supply to amend what we needed for the

By: 2d Lt Daniel Boeke
isochronals. Even though we did not have the items on-hand at the time, these conversations showed that we needed to change our processes and ultimately reduced time by leaning forward and ordering what will be needed in the next D-check. Because of this communication with supply, we expect another reduction of 2 additional days in the workflow.

Even if the new inspection arrived with little notice or expectations of what the change would include, the new process went very smoothly. We have taken many lessons learned and upon receipt of legitimate data points, we are planning a process improvement event. The goal of this effort is to make a solid foundation for the next D-check to roll into the hangar and we are expecting further efficiency improvements.

ABOUT THE AUTHOR:

2LT Daniel Boeke is an aircraft maintenance officer stationed at Dyess AFB. He is the Maintenance Flight Commander for the 317th Maintenance Squadron, which supports C-130J operations. 2LT Boeke is currently learning process improvement techniques in hopes to use this knowledge to improve his unit’s processes and share the benefits around the Air Force.
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