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Journal of the Air Force Association

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MAGAZINE

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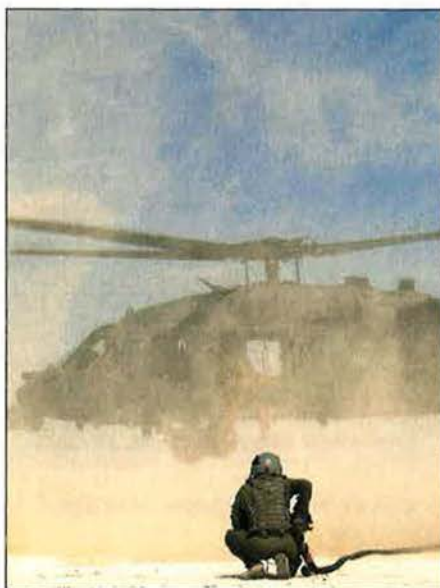
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About the cover: SrA. Casey Kubick prepares to refuel an HH-60 Pave Hawk during Angel Thunder. See "Angel Thunder," p. 26. Photo by SSgt. Tim Chacon.

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Educate the public on the critical need for unmatched aerospace power and a technically superior workforce to ensure US national security.

Advocate for aerospace power and STEM education.

Support the Total Air Force family and promote aerospace education.

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Et Tu, Congress?

DURING the last week of April, the Federal Aviation Administration began furloughing air traffic controllers. The FAA made the high-profile cost-saving move to stay under the budget limits imposed by sequestration.

The number of takeoffs and departures from the nation's airports was therefore limited, and flight delays predictably followed. It was as if a moderate winter storm had snarled flight schedules, but these delays were man-made and avoidable.

The normally placid flying public—which regularly subjects itself to all manner of inconvenience and indignity for the privilege of traveling by air—demanded action. When this group of relatively wealthy and well-connected travelers asked Congress to jump, lawmakers asked, “How high?”

Within a week, Congress passed legislation to enable the FAA to end its furloughs and consequently end the delays. President Obama signed the legislation into law May 1st, and the delays were gone almost as quickly as they began.

This episode proved two things.

First, contrary to its reputation, Congress can indeed act quickly to get things done.

Second, Congress' priorities are all wrong.

The air traffic controller furloughs had exactly the effect that sequestration was supposed to cause. When the Budget Control Act of 2011 was passed nearly two years ago, sequestration was designed as the stick to compel Congress to come to a budget agreement. Sequestration was going to be so arbitrary, and so horrible, that lawmakers would have no choice but to prevent it.

Instead, what we now have is a Congress willing to make exceptions to the law, diluting sequestration's short-term effects and inconveniences without fixing the underlying problem. This is not a good thing. Every exception increases the likelihood Congress will come to view sequestration as an acceptable status quo.

Sequestration does not end with the FAA, of course. By mid-May, the Pentagon was implementing draconian and arbitrary cuts to its programs. The dam-

age got progressively worse with each passing day as Air Force and Defense Department training, maintenance, and readiness fell further and further below acceptable levels.

At the time of this writing, more than a month had passed since the Air Force began grounding more than a dozen front-line fighter and bomber units as a desperate cost-saving measure. Large-scale training exercises such as Red Flag, which prepare airmen for upcoming missions, were shuttered.

“This lands somewhere short of a profile in courage.”

“These actions severely degrade Air Force readiness,” USAF Secretary Michael B. Donley and Chief of Staff Gen. Mark A. Welsh III told lawmakers May 9th. “Lost flight hours ... result in severe, rapid, and long-term unit combat readiness degradation. We have already ceased operations for one-third of our fighter and bomber forces. Within 60 days of a stand-down, the affected units will be unable to meet the emergent or operations plans requirements.”

The Air Force has preserved training and operational funding for deployment prep, such as for the Angel Thunder combat search and rescue exercise for units preparing to head overseas. But under sequestration, the ability to address an unexpected crisis is going out the window, and the nation's ability to provide trained follow-on forces is quickly withering.

As sequestration progresses, “we won't have forces that are adequately ready and will either have to make the choice to deploy with less-trained forces or take extra time to get them ready,” Pentagon comptroller Robert F. Hale recently said.

This approach may have worked for the United States, just barely, for World War I—but today and in the future the nation will not have the luxury of declaring war, mobilizing, and then going off to fight. The strength and speed of the Air Force has been one of the United States' key military advantages. For decades, airpower has stood ready to quickly respond, worldwide, to any

need from humanitarian relief to full-fledged war.

“Allowing the Air Force to slip to a lower state of readiness that requires a subsequent long buildup to full combat effectiveness will negate the essential strategic advantages of airpower and put joint forces at increased risk,” warned Donley and Welsh in their prepared testimony last month.

This plea that Congress not send the Air Force into a tiered readiness status, limiting the nation's military options, was essentially met by the sound of crickets.

Training, maintenance, and readiness shortfalls are growing, and they become more difficult to repair the longer the sequester continues.

This is not just an Air Force problem. Army Chief of Staff Gen. Raymond T. Odierno recently told defense reporters some 80 percent of the Army is now limited to small-unit training—but when he met with congressmen, “they told me, ‘I haven't gotten a single call from a constituent about defense.’”

Meanwhile, the Navy has idled ships, and DOD announced on May 14 that 680,000 civilian employees will be forced to take an unpaid day off for 11 straight weeks.


That's right, they're being furloughed.

Referring to Congress' recent action ending the FAA furloughs without solving the underlying budget problem, Rep. Rick Larsen (D-Wash.), said, “This lands somewhere short of a profile in courage,” adding, “Congress created this problem. We need to fix it.”

Yes, and before even more damage is done. What Congress needs to do—now—is reach an agreement to meet the Budget Control Act's requirements. Until that happens, Band-Aid “fixes” are only hiding sequestration's accumulating damage.

Through its inaction, Congress has turned its back on the military's needs while the nation is at war. It has not even allowed DOD to properly posture itself for smaller future budgets.

People can easily lose track of what “risk” means for the nation. Sometimes it is flight delays, but for the military it means more. “What is the risk?” Odierno asked in his meeting with defense reporters. “The risk is lives.” ■



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NORTHROP GRUMMAN

Kinda Magic?

In "Seeking the Sex-Assault Solution" by Anna Mulrine, Brig. Gen. Eden Murrie asks, "Does anyone have a 'magic bullet?'" [April, p. 48].

I don't have a magic bullet to completely solve sex assaults throughout the military—no one does—but I do have one to solve the kind of behavior at basic military training (BMT) units. Keep the males and females separated.

DOD and senior leadership in the military have always been opposed to this idea for two reasons: (1) Train the way you fight—together. I agree, but do you think keeping them separated for eight to nine weeks is going to detract from the ability of an operational unit to operate and fight together? (2) We don't have enough female training instructors. Yes, you do: Assign senior qualified females to those positions the way you assign nonvolunteers when you have a critical skills shortage.

The magic bullet of separating during BMT will work despite generational and cultural changes that seem to serve as a common crutch these days. While I was commander of Lackland Air Force Base for four years and ATC commander for three years, we had very few cases of sexual assault. Why? (1) Magic bullet (2) Luck.

Gen. Andrew P. Iosue,
USAF (Ret.)
San Antonio

Lt. Gen. Craig A. Franklin is, without question, the finest senior leader for whom I've ever worked. His integrity is unflagging and his fairness uncompromising. Before I deployed to work for him under hostile fire, I sought to know what kind of man I'd be working for and found his reputation to be excellent over the course of a long and distinguished career. He did not disappoint me. Do those who suspect malfeasance really think such a man would pursue this course of action without good cause,

realizing the certain backlash by those who might see this as a politically expedient opportunity? No, only a man of great conviction would make a call this difficult and stand to take the heat.

Lt. Col. Jack A. Klein,
USAF
Fairchild AFB, Wash.

Goldwater-Nichols Strikes Again

Thanks for the continuing great work representing our Air Force. The April 2013 edition was exceptionally well-assembled and written. All of the articles hit on the compelling topics of the day.

Regarding the "Airmen Absent" [p. 34] piece, I think there are some pretty interesting conclusions that can be drawn from the magazine's annual almanac and the section on Air Force leadership ["Leaders Through the Years," May, p. 108]. If you look at the period starting in 1990—very soon after Goldwater-Nichols—you will see what I think is a pretty sad picture. In that period the Air Force had: 12 SECAFs, 12 CSAFs, and 15 VCSAFs. In the same period, there had been a similar number of commanders of three of the key major commands: 16 TAC/ACC, 13 PACAF, and 14 USAFE. This includes a lot of great officers, managers, and leaders, including some "acting" in their positions for only a few months or so. Nevertheless, this is certainly a set of circumstances differing from the pre-1990 era, when senior leaders were often in these key positions for four to six years. This turbulence over the past couple of decades comes from a host of reasons, but regardless of the causes, this rate of turnover would not be considered a good thing by any experts in leadership and management, and probably contributes to the small number of Air Force generals serving as COCOMs or in the key positions on the Joint Staff.

Finally, regarding the quote, "What-

ever check (you write), I will cash," I think I understand the commitment to jointness this is meant to convey, but I would hope that the circumstances leading to the comment included a very healthy, open, and frank discussion on the amount of the check and the payee before the transaction is finalized.

Col. Stephen A. Mosier,
USAF (Ret.)
Williamsburg, Va.

Former Air Force Secretary James G. Roche has a Navy background, so it is no surprise to me he was amazed when "former AMC general officers bad-mouthed the F-22." I spent a career as an airlifter and found both the Navy and Army folks I was supporting to be very team-oriented. Not so Air Force pilots. When I reported to my first assignment after pilot training, Korat Air Base, I was advised not to go in the Officers' Club bar. (Do second lieutenants ever listen?) As a few of us walked by a group of fighter pukers at the bar we were greeted with, "What are you trash-haulers doing in here?" So, because I didn't finish in the top 10 of my class I deserve that? Nothing in my career made me feel that I was part of a team that included fighter pilots. When *Air Force Magazine* wrote an article about the evacuation of Kham Duc, the pilot of the C-123 who [received] a Medal of

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Honor for this incident was described as a fighter pilot. I believe the pilot of a C-123 is an airlifter, regardless of his past assignments. Those AMC general officers undoubtedly had similar experiences. Airlifters will always do their job with skill and dedication, but help sell fighter planes? Not likely.

Maj. Tom Phillips,
USAF (Ret.)
Niceville, Fla.

1944 to 2010

I am writing about an article in *Air Force Magazine*, "The Mustangs of Iwo," in the April 2013 issue [p.74].

On p. 77 there is a picture of a flight of P-51s of the 462nd Fighter Squadron of the 506th Fighter Group, in formation on a mission to Japan. The flight leader in plane #627 is my father. I do not know if he was a lieutenant or captain at that time. My dad's name is Jack Rice. This was a flight of four planes, and my Dad loves this picture. In fact, not only does it hang in my parents' home, it hangs in the homes of all us children, and in my classroom as well. My dad flew numerous eight-plus-hour missions to Japan, not only as bomber escort but also on strafing missions; top cover missions over Iwo protecting the marines; and missions against Chichi Jima.

After the war, my dad stayed on flying status in the Connecticut Air National Guard. He was recalled for the Korean conflict, and then stayed in the Air Force, serving our country for 32 years. He flew around 30 different types of airplanes and has actually recently flown one that he had never flown back in 1943. He served in TAWC, the Vietnam conflict, and with NATO toward the end of his career.

In 2010 my dad was "recalled to service" as a guest speaker with the 53rd Air Wing, at which time he gave an average of three briefings a day to the airmen of the wing, and we also sat in on some staff meetings. With this unit, though with varying names, Dad served in 1944, 1963-64, and 2010.

Cheryl Anderson
Hurst, Tex.

Show Us the Thunderbirds

It's unfortunate that we as a country have lost confidence in our government to do the right thing for saving "billions" of tax dollars [*Cutting Readiness*, April, p. 22]. We continue to read or see news about billions of funds unaccounted for and no answers to "where's the money?" We fund programs/governments overseas for their civil wars when they do not even want us involved. When the government bailed out the auto manufacturers they were critica

when the CEOs flew their own jets to Washington. However, how much does our government waste utilizing Air Force One for unnecessary trips? The sequestration hit on a Friday and the new Secretary of State John Kerry announced \$250 million in aid for Egypt on that Sunday!

And look at the adverse effect this now has on our military. Grounding the Air Force Thunderbirds! It is a sad day for the current Thunderbird team who have worked so hard during training season and are now grounded. An approval show flown today for the ACC commander was a waste since there are no air shows now. I suppose that most of our politicians don't know that all the team members are operationally ready as a requirement! And it takes less than 72 hours to have the jets ready for battle!

I wonder how many new recruits who would have enlisted at their hometown show sites with the Thunderbirds' commander are now disappointed, as well as our Air Force Academy graduates? It's such a shame for those team members who proudly serve to end up missing the opportunity to represent our Air Force, especially for the 60th anniversary show season of the team.

Perhaps we need as a nation to have new members of our executive, legislative, and judicial branches who don't fight and agree. It's called leadership!
SMSgt. Dave Branks,
USAF (Ret.)
Maryville, Tenn.

Defense Secretary Chuck Hagel wants to cut Pentagon personnel costs, which he cites as a key driver of soaring DOD budgets. He should start by cutting the civilian tail that wags the military dog. DOD has roughly two million uniformed troops and 800,000 civilian employees, which means a ratio of more than one civilian staffer for every three military troops. That's lopsided leadership. The Pentagon must cut its civilian staff in half via a permanent hiring freeze, reduction in force, and attrition. It plans to slash 15,000 staffers, but that's not nearly enough.

Along with federal government workers, DOD hires roughly 100,000 private contract workers doing tasks that GIs used to perform, such as food services, logistics, security, transportation, and intelligence gathering. Those duties must be transferred to military personnel who can perform them just as efficiently at a much lower cost. DOD should also dump a small army of consultants producing meaningless reports and PowerPointless briefings. A consultant just looks at your watch and charges a high fee to give you the

right time. We must not outsource the defense of our country to Halliburton, Blackwater, and RAND.

Richard Reif
Flushing, N.Y.

Hail to the Chief

I became quite interested in reading the *Air Force Magazine* publication for April 2013, announcing what we truly have in our next Chief Master Sergeant of the US Air Force [*"Chief Cody," p. 44*]. What a leader and representative of our great enlisted force. Calling the airmen the service's most important asset takes me back to the year of 1972 when the then-Secretary of the Air Force gave an address and

emphasized the fact that our most important and valuable asset of the Air Force was its PEOPLE.

Chief Master Sergeant of the Air Force Cody is bringing forth so many issues regarding our enlisted force that have been sitting on the sidelines for far too long. Throughout my entire career I always had the highest regard for the welfare of the enlisted force I was responsible for.

Col. Norman H. Happel,
USAF (Ret.)
Spokane, Wash.

I really enjoyed your article on the new Chief Master Sergeant of the Air Force, CMSgt. Jim Cody. When Chief

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Cody's selection was announced it was almost as if I'd hit the "trifecta." I worked with then-master sergeant Cody on the HQ ACC airfield operations staff; his spouse, CMSgt. Athena Cody, was my ATC functional at HQ AMC before her retirement; and General Welsh was my wing commander while at Kunsan AB, South Korea. I was indeed blessed!

I could tell early on that there was something very special about Jim Cody. It wasn't a question of whether he'd have a successful career; it was just a question of just how far he'd go. Over the years I flight followed him up each rung on his career ladder and was impressed with his success at each level.

I used to tell folks that he looked just like Steve Canyon although many of the younger troops didn't even know who that was. I guess now your readers ("Up in the Air With Milton Caniff," April, p. 66) will be saying Steve Canyon looks like him. His professional look coupled with his extensive knowledge, intensity, and attention to detail made him a force to be reckoned with on ATC standardization-evaluation team visits to ACC airfields. Controllers, aviators, support personnel, or leadership he dealt with didn't always like or agree with what he had to say but always respected his right to say it. With the many and diverse challenges facing today's Air Force enlisted force we can be in no better hands as we move forward!

Col. Bill Malec,
USAF (Ret.)
O'Fallon, Ill.

It was a sight for sore eyes, seeing pictures of the change of command ceremony for Chief Master Sergeant of the Air Force and both men in Air Force blue. I think it is time to put the BDUs in closet and start wearing the "Air Force blue."

TSgt. Pete Reasner,
USAF (Ret.)
Turbotville, Pa.

Dragon Lady, Terry, Steve, and Milton

Your recent article on Milt Caniff brought back fond memories ["Up in the Air With Milton Caniff," April, p. 66]. In 1951 I was an F-84 gunnery instructor at Luke Air Force Base. The Air Force decided to send some cartoonists and assistant cartoonists to various bases so they could accurately depict Air Force life in their cartoons. I was assigned as escort officer to Frank Engli, who was an assistant to Milt Caniff. I told Engli that I was a fan of "Terry and the Pirates" and that Terry and I checked out in the P-40 and the Mustang at about the same time. Mr. Engli thought that was cool, and he offered to send me some of Milt Caniff's

original work. A few weeks later I got an original pen and ink panel of Terry, a large watercolor drawing of Steve Canyon, and a beautiful watercolor drawing of Miss Lace—all signed by Milt Caniff and dedicated to me! They hang in my "Air Force" room and I am honored to have these wonderful treasures from the legendary Milt Caniff.

Col. Bill Landis,
USAF (Ret.)
Escondido, Calif.

In the April issue, I very much enjoyed reading John Correll's fantastic article about Milton Caniff. It was a real treat for me, having grown up reading the funnies in that era, but there was a piece of lore the author missed that your readers may enjoy learning. One of the best assignments I experienced during my USAF career was flying the U-2 Dragon Lady out of RAF Alconbury, UK, (then labeled a TR-1 for political reasons) in the latter half of the 1980s. After retiring from the Air Force, one of my jobs was working U-2 advanced concepts for Lockheed Martin. In that role, I had the pleasure to give classified briefings to many political and military officials on U-2 capabilities. One of the commonly asked questions was how the Dragon Lady moniker came about. Having access to people who had been connected to the very beginnings of the program, my research discovered the name was adopted early in the program from the Dragon Lady character in the then-popular "Terry and the Pirates" comic strip, whose persona fit the U-2's flying characteristics perfectly—graceful but don't dare let your guard down. I didn't want to miss an opportunity to share how Milton Caniff had connected with yet another unique aspect of today's operational Air Force. Thank you for your great publication, keeping the past and future tied together for the generations that have served and the generation serving now.

Lt. Col. Mark A. Mitchell,
USAF (Ret.)
Maple Valley, Wash.

I am Milton Caniff's nephew and after his death in 1988, I now own the trademark on Steve Canyon, Male Call, and Dickie Dare. Your article was terrific. I am trying to keep Milton's and Steve Canyon's names alive. We are working on a DVD set of the 1958-59 TV series and when finished, hope the Military Channel will be interested.

IDW is doing the Steve Canyon books in large size and I trust they will do the 40 years of it.

I was in the military from 1941 to

1964 and helped in research for many of Milton's projects.

Milton visited me while [I was] stationed in Panama and we visited Albrook Air Force Base on the Pacific side. When we arrived, we were met by, I believe, General Stranahan. He informed Milton his old buddy Curtis LeMay had been visiting and when he heard Milton was arriving, he immediately jumped in his plane and took off. You are correct. He was not fond of Milton.

Harry Guyton
Yuma, Ariz.

Short Flight

The Kfir was the subject of "Airpower Classics" in the April issue [p. 84]. I think that the "Airpower Classics" is one of the highlights of the *Air Force Magazine* and I always carefully read about the selected aircraft. However, I can't help wondering about the listed "max range 215 mi." Certainly this can't be the max range. Maybe a "1" was omitted and the max range is 1,215 mi? Or maybe it was mislabeled and the 215 mi is the combat radius? Inquiring minds would like to know, what is the real story here?

Charlie Friend
Alamogordo, N.M.

■ *The Kfir's combat radius is 215 miles. The article has been corrected in the online version.*

I always enjoy Walt Boyne's "Airpower Classics" feature. It's the first thing I check out when I get a new issue of *Air Force Magazine*. I would like to offer a few comments for the April 2013 edition. For the Famous Fliers section, "Ace: Giora Epstein" is a little misleading. Epstein, who is one of the world's top jet aces (the Hussians muddy things up a bit with claims that one of their MiG-15 pilots in Korea has about 23 kills) got all his 17 kills in the Mirage III and Nesher derivative of the Mirage 5. He checked out in the Kfir, and did, indeed, come to NAS Oceana, Virginia Beach, Va., in 1985 to help check out naval aviators in their newly leased Kfir C.1s. But he did not get any kills in the Kfir and so is definitely not an ace in the aircraft.

For the Interesting Facts section, an Ecuadorian Kfir scored against a Peruvian A-37 in January 1995.

I greatly enjoyed John Correll's thankfully lengthy feature on Milton Caniff, especially all the examples of his "Steve Canyon" and "Terry and the Pirates" strips. Wonderful work, the artist and the article's author.

Cmdr. Peter B. Mersky,
USNR (Ret.)
Alexandria, Va.



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Washington Watch

By John A. Tirpak, Executive Editor

Repairing sequester; Readiness first; The Long-Wait bomber

THE LONG ROAD BACK

It will take quite some time to undo the damage to Air Force readiness done by the sequester—more than a year, in some cases—and there's still no sign the nation is reconciling its strategic situation with its finances. That reconciliation needs to happen, and soon, said Air Force Secretary Michael B. Donley in a late April meeting with defense reporters.

Donley is stepping down this month after five years in the post, bridging two presidential Administrations. Even if Congress acts to halt the sequestration cuts that have so far caused the Air Force to idle 17 combat squadrons, the damage to readiness will extend "well into Fiscal '14," Donley said. It will take "anywhere from three to six months" to rebuild the lost proficiency of pilots and crew members who have stood down due to slashed flying hours and get them back up to "combat mission-ready status," he said.

However, sequestration is putting USAF in an even bigger hole with regard to depot maintenance. The Air Force has deferred the induction of dozens of aircraft and engines into depot. Even if sequester is reversed, "that's a capacity-limited sort of situation," Donley said, and an accelerated get-well plan may not be possible. These deferrals will "ripple through the depot maintenance system over many months, and in some cases, [it] may take a year or more" to catch up. "It will take a while to dig out" of the maintenance hole, he warned.

More broadly, however, "the tension between needing to do something to address the deficit and the strategic environment has been two separate discussions ... [moving] along in parallel," Donley observed. It is of course "up to the national leadership to decide when those streams cross, and to make the right decisions on a budget plan that fits the strategic realities we might face," he said, adding that he doesn't doubt the US would prevail in any conflict for the near future. However, he warned bluntly that "we're adding risk" about how long that will be true.

The trade-offs required are seen "very clearly" within the Pentagon, he said, and the department is trying to convey "to the national leadership and to the Congress where those risks are."

It's important that "we get to a national-level discussion and decision on the way forward for resources for defense," he asserted.

If sequestration isn't undone, the Pentagon faces another half-trillion dollars in cuts over the next decade. Decisions on how much of that the Air Force will have to bear "haven't been made," Donley said, "but we all recognize significant adjustments" in the size of the service would result. Deeper force structure and personnel cuts are a certainty, he said—"you have to take things out to get to \$487 billion"—and modernization accounts will be in peril, especially given that readiness accounts will get top priority.

The nation's leaders are "fairly set that we need to have a ready force, whatever size it is. There are different ways of measuring that ... but I think there's broad agreement that the smaller the force, the more ready it needs to be." The \$487 billion taken from defense so far has already drastically reshaped the force, Donley said; doubling that figure would "be more dramatic."

He acknowledged, "It's controversial, but we've already demonstrated [that] stuff has to be retired or you can't proceed with modernization."

NEW BOMBER: WAIT FOR IT

The Air Force is committed to the Long-Range Strike Bomber, which is intended to replace the B-1B and B-52H fleets beginning in the mid-2020s. Donley assured reporters that the need for the program is well-established.

"It's a high-profile part of our force structure; it's an integral part of the strategic triad as well." Because of that, the program gets "good and appropriate attention" in the new defense strategic guidance; planned funding "grows in the outyears and it remains one of our most important priorities."

Lt. Gen. Charles R. Davis, the top military deputy in the Secretary's acquisition office, told a panel of the House Armed Services Committee on April 24 the bomber is "absolutely critical" to USAF's future ability to project power. The existing bomber fleet is being modernized to the degree possible, Davis said, but that money doesn't really "provide a new capability" and merely maintains the status quo.

"All we have been able to do is react" to increasing anti-access threats around the world, Davis said. Legacy bomber updates help stay on top of vanishing vendor issues, new threat radar modes, and missile technology, but "I do not know how we do that for another three decades," he told the sea power and projection forces subcommittee.

The LRS-B will allow USAF to operate in parts of the world where it "can't necessarily survive for lengthy periods of time today," Davis asserted, adding that the aircraft will oblige enemies to react to the Air Force, instead.



Donley (left, here with Chief of Staff Gen. Mark Welsh) says digging out of sequestration will take time.

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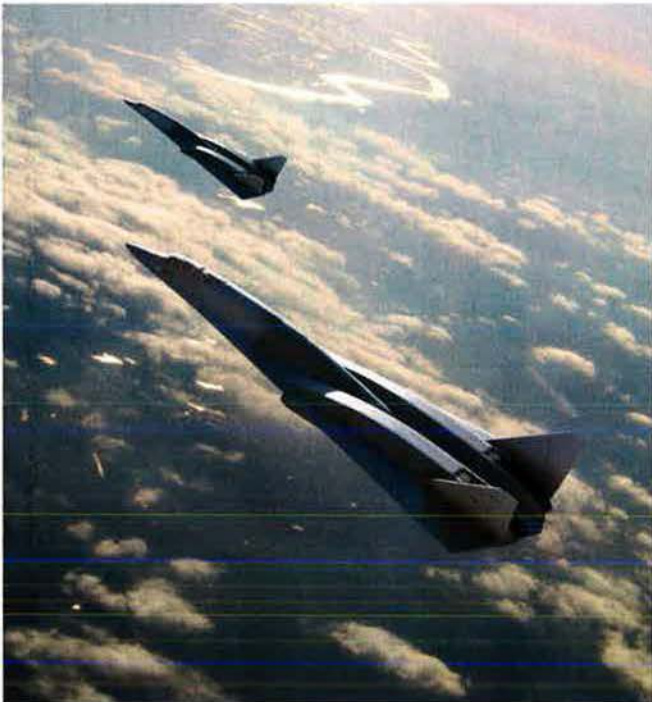


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Future USAF Long-Range Strike Bomber—absolutely critical.

Along with the Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics, USAF is working on a bomber contract strategy, Donley said. He cautioned, though, that the Air Force is “still a year or two away” from “what I would call the down-select decision” to one contractor that would take the project through development and into production. He specifically declined to discuss the current status of the competition.

The LRS-B timetable is ambitious by any measure. Waiting to launch the actual metal-bending phase of the program for two more years means USAF would have just 10 years to achieve its long-stated goal of having what Donley called “the first article” on the ramp in the mid-2020s. By comparison, the F-22 program was at a similar stage of planning in the mid-1980s and didn’t achieve initial operational capability until 2005.

The planned goal of 80 to 100 bombers at a base-year unit cost of \$550 million is still in force, Donley added. That, however, was as far as Donley would go in describing the classified project, and he warned reporters it will be “several years down the road” before more details are released. One of the few public disclosures so far is that USAF envisions the bomber being “optionally manned.”

While the Air Force will honor its promise to reveal annual funding numbers for the LRS-B, more specifics will have to wait, because “we think the capabilities it will have represent advantages not unlike those that we’ve enjoyed on the B-2.” He pointed out that the B-2’s capabilities have never been discussed “in great depth” and that the public didn’t see that airplane “until it rolled out of the hangar.”

UPGRADED AND UNMANNED FIGHTERS

The Air Force can’t bear any further reduction in fighters and must upgrade older ones, but it is also apparently having trouble filling the fighter cockpits it has left. Two top planners recently called attention to these twin problems in prepared testimony for the House Armed Services tactical air and land forces subcommittee.

Lt. Gen. Burton M. Field, deputy chief of staff for operations, plans, and requirements, and Davis explained that the Air Force has come down hundreds of fighters in recent years, raising risk to worrying levels.

The F-35 has been delayed by both technical challenges and budget cuts, they said. To “bridge” until the new fighters enter the force, USAF is pursuing “programs that will modernize and extend the service life of our remaining fleet.” Without these service life extension programs and capability upgrades, “it will not be possible to manage risk,” they said.

The A-10 is so heavily used in Afghanistan that it poses “substantial sustainment challenges,” they reported. The service will reduce the fleet by another 61 aircraft, leaving 283, which are expected to last through 2035, thanks to a re-winging program.

The F-16, comprising half the Air Force fighter fleet, is due for a \$1.32 billion update across the Future Years Defense Program. A SLEP will extend service life from 8,000 to more than 10,000 hours, and will include structural improvements as well as the Combat Avionics Programmed Extension Suite, or CAPES, on 300 aircraft. These aircraft will get an active electronically scanned array radar, new displays, data links, and electronic warfare systems.

The Air Force expects to keep 175 F-15C/D aircraft through 2035—assuming a fatigue test now under way gives a green light—fitted with AESAs, new EW gear, and structural life-extension projects, expected to cost \$1.9 billion across the FYDP. The F-15E strike inventory also will be retained through 2035—again, given favorable fatigue test results—and will also get AESAs, a helmet-mounted cueing system, and new EW/self-protection gear. Strike Eagle upgrades will total \$2.5 billion across the FYDP.

The F-22 program is requested to get about \$920 million in Fiscal 2014 alone, split evenly between research, development, test, and evaluation (RDT&E) and production, to keep it able to “operate effectively” in increasingly lethal anti-access, area-denial conditions. Improvements being fielded now are supposed to be installed fleetwide by Fiscal 2017. These include synthetic aperture radar ground mapping, threat geolocation, and ability to use the Small Diameter Bomb.

“Any further delay in the F-35 program will create a serious shortfall (mid- and far-term) in fighter capabilities and force structure,” the generals reported. “The Air Force is very concerned with recent budget reductions and continues to monitor how these cuts affect risk.”

The two asserted that “it is absolutely critical” that the fourth generation improvement programs and requested F-22 enhancements go forward, “and the F-35 matures and begins full-rate production.”

Despite “retiring or reclassifying” some five A-10 squadrons, one F-16 squadron, and one F-15 aggressor squadron last year, the service has enough fighter power to fulfill national strategy, the two generals said.

However, “manning these aircraft is a challenge we are aggressively working,” they added. The Air Force is “200 fighter pilots short” of manning requirements, and they project “this deficit growing to approximately 900 by 2022,” exclusive of flying training problems inflicted by the sequester. The reason is that Active Duty fighter squadrons were cut “to a number that cannot sustain billet requirements.” The service is “currently unable to produce and absorb the required number of fighter pilots across the Total Force.”

The Air Force is taking steps to manage the problem—which leaves fewer experienced pilots for planning air operations or training—and will probably get it under control by 2028, the two generals said, but “even with these changes,” USAF won’t be able to do any better than “82 percent of our overall requirement for fighter pilot expertise” in the meantime. ■



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Three Airmen Die in KC-135 Crash

Three airmen from the 93rd Air Refueling Squadron at Fairchild AFB, Wash., were killed when their KC-135 tanker crashed near Chon-Aryk, Kyrgyzstan, May 3. Killed in the mishap were: Capt. Victoria A. Pinckney, 27, of Palmdale, Calif.; Capt. Mark T. Voss, 27, of Colorado Springs, Colo.; and TSgt. Herman Mackey III, 30, of Bakersfield, Calif.

"These airmen leave behind an incredible legacy of service and honor in protecting our nation and the world," said Col. Brian M. Newberry, 92nd Air Refueling Wing commander at Fairchild. "They show what we all know; freedom is not free."

The cause of the accident was under investigation as of May 6. The crash occurred shortly after the KC-135 took off from the Transit Center at Manas, near Bishkek in Kyrgyzstan. The tanker, from McConnell AFB, Kan., and crew were assigned to Manas, a major air hub for sustaining coalition operations in Afghanistan.

The first operational KC-135 was delivered to the Air Force in 1957. The bulk of its accidents occurred when the aircraft was relatively young. The last KC-135 accident where the aircraft and crew were lost happened in Germany in 1999.

Donley Stepping Down

Air Force Secretary Michael B. Donley announced in April he will step down as the service's leader on June 21—five years to the day since he began his tenure, first as Acting Secretary and then, beginning on Oct. 17, 2008, as Secretary.

Donley is the longest serving Secretary in Air Force history, including his four months as acting Secretary in 2008 and his seven months as acting Secretary in 1993.

"It's been an honor and a privilege to serve with our Air Force's great airmen," said Donley in an April 26 release. In a statement, Defense Secretary Chuck Hagel called Donley "an outstanding leader" and "an unwavering champion for our airmen, their families, and for American airpower." Hagel added, "The Air Force he leaves behind is more re-

silient and more respected because of his leadership and personal dedication."

New USAF Undersecretary

Eric K. Fanning became the Air Force's undersecretary on April 29, filling a position that had been vacant since June 2012.

"I look forward to being part of the Air Force family," said Fanning, who took the oath of office during a ceremony in the Pentagon, according to an April 29 service release. He added, "I am honored by this opportunity and look forward to stand[ing] beside [the Secretary of the Air Force] in making sure the men and women of this great service receive the support they need in undertaking the mission of defending our country."

President Obama nominated Fanning in February. The Senate confirmed him for the post on April 18. Since 2009, Fanning served as the Navy's deputy chief management officer. The undersecretary is responsible for Air Force matters on behalf of the Secretary and serves as the service's chief management officer, its senior energy official, and focal point for space at the headquarters level.

Jamie M. Morin, acting undersecretary since last July, will continue in his role as the Air Force's assistant secretary for financial management and comptroller.

Wilsbach Leads Task Force

Maj. Gen. Kenneth S. Wilsbach, former deputy director of operations for US Pacific Command, in April assumed command of the 9th Air and Space Expeditionary Task Force-Afghanistan during a ceremony at Kabul Airport. Wilsbach took the task force's reins from Maj. Gen. H. D. Polumbo Jr. during the April 25 change-of-command ceremony. Polumbo led the organization since May 2012 and moved on to lead the 9th Air Force at Shaw AFB, S.C.

"It is my distinct honor to pass the guidon between two of the very finest airmen and leaders our service has ever raised," said Lt. Gen. David L. Goldfein, Air Forces Central Command chief, who presided over the ceremony.

Addressing the airmen at the ceremony, Wilsbach said, "We will continue to work as hard as humanly possible to ensure coalition forces in the country

★ screenshot

USAF photo by SSGT. Stephanie Rubi



have the decisive airpower they need to accomplish their missions." He added, "We will continue to aid and assist our Afghan partners to continue to grow their air force and establish a national airspace system that supports a stable and prosperous society."

Not-So-Red Line in Syria

Despite evidence that chemical agents were used in Syria, President Obama said there were still too many un-

answered questions to significantly alter US strategy toward the Syrian conflict at the moment.

For example, it was still not clear "how they were used, when they were used, who used them," he said during an April 30 press conference at the White House. "We don't have a chain of custody that establishes what exactly happened. And when I am making decisions about America's national security and the potential of taking additional action, ... I've

got to make sure I've got the facts," said Obama. "If we end up rushing to judgment without hard evidence, then we can find ourselves in a position where we can't mobilize the international community to support what we do," he added.

Obama has called on the United Nations to investigate the use of the chemical agents in the two-year civil war. "If I can establish in a way that not only the US, but also the international community, [feels] confident in the use



05.09.2013

Three flight suits and aircrew oxygen masks were displayed during a memorial service at Manas Transit Center, Kyrgyzstan, on May 9, remembering the airmen who died in the KC-135 crash there on May 3. Each uniform bore the name of one of the deceased airmen. (See "Three Airmen Die in KC-135 Crash," p. 16)

of chemical weapons by the [Bashar al] Assad regime, then that is a game changer because what that portends is potentially even more devastating attacks on civilians, and it raises the strong possibility that those chemical weapons can fall into the wrong hands," he said.

No Distinguished Warfare Medal

Defense Secretary Chuck Hagel has eliminated the Distinguished Warfare Medal, intended to honor remotely piloted aircraft controllers, cyber operators, and other airmen who made significant combat contributions while not located on the actual battlefield. Hagel opted instead to create a new distinguishing device to affix to existing medals in order to recognize military personnel who have an extraordinary impact on combat operations while distant from the battlefield.

"Utilizing a distinguishing device to recognize impacts on combat operations reserves our existing combat medals for those service members who incur the physical risk and hardship of combat, perform valorous acts, are wounded in combat, or as a result of combat give their last full measure for our nation," reads Hagel's April 15 memorandum explaining his decision.

The Joint Chiefs of Staff, concurring with the service Secretaries, recommend Hagel forego the medal. His April memo directs the Defense Department to develop the award criteria and other details of the distinguishing device for his final approval.

The Pentagon had originally unveiled the DWM in February. The medal's order of precedence—above the Bronze Star Medal—raised objections among some lawmakers and veterans' organizations.

Another Sequester Casualty

The Air Force is shuttering its Weapons School at Nellis AFB, Nev., due to budget sequester-related cuts, said Gen. G. Michael Hoston III, commander of Air Combat Command, in April during an Atlantic Council event in Washington, D.C.

"That is going to affect the Air Force for years," as the availability of certified "patch wearers"—Weapons School graduates—will have wider effects on readiness as time goes on, he said.

Hoston said he is truncating the Weapons School's current class and will graduate it without the final capstone exercise as a result of the cutbacks. In addition to the Weapons School closing, ACC also implemented "tiered readiness" over a large portion of the combat air forces. As the sequester bills pile on top of the bills for paying overseas contingency operations out of ACC's base operations

Limiting the Force

Numerous Active Duty combat units in the United States, Europe, and the Pacific in early April began standing down as the Air Force absorbs the funding cuts imposed by budget sequestration, announced Air Combat Command. Taking this step, which affects about one-third of Active Duty combat aircraft, will ensure other combat units supporting worldwide operations can maintain sufficient readiness through the remainder of the fiscal year, said ACC officials in an April 9 release.

"Approximately one-quarter of ACC's Active Duty squadrons and Active Duty pilots in our active associate units have stopped flying," command spokeswoman Kelly Sanders told *Air Force Magazine*. "The resources from these units will enable units deployed or preparing to deploy to maintain their currency and flight operations," she added.

The standdown stems from the funding cuts to ACC's operation and maintenance account from the sequester. ACC is absorbing the cuts in part by having pilots fly about 45,000 fewer training hours between now and the end of the fiscal year on Sept. 30.

"We must implement a tiered readiness concept where only the units preparing to deploy in support of major operations like Afghanistan are fully mission capable," said ACC Commander Gen. G. Michael Hoston III. "The current situation means we're accepting the risk that combat airpower may not be ready to respond immediately to new contingencies as they occur."

Specifically, flying hours for two-and-a-half Air Force fighter squadrons in Europe were reduced to zero, leaving three-and-a-half squadrons to fulfill the command's missions, stated US Air Forces in Europe-Air Forces Africa officials. "Units preparing to deploy in support of major ongoing operations will remain fully mission capable," said Lt. Gen. Noel T. Jones, now USAFE-AFAFRICA acting commander. "The risk we face is that combat airpower may not be ready to respond to unforeseen contingencies and crises when called upon." This particular standdown also will reduce Air Force participation in NATO missions.

Eight other Air Force fighter and bomber units ceased flying and entered a dormant status, with five additional units expected to standdown when they returned from deployment, said Air Force Secretary Michael B. Donley.

In light of such drastic changes, funding flight hours must be a priority in Fiscal 2014, Donley told members of the House Armed Services Committee during an April 12 hearing to discuss the Air Force's Fiscal 2014 budget request. The Air Force seeks 1.2 million flying hours next fiscal year—an increase of 40,000 hours from Fiscal 2013. In the past, the Air Force relied heavily on overseas contingency authorizations to fund its flying hours, but as the wars in Iraq and Afghanistan come to a close, the service is moving those accounts back into its base budget.

budget, the steady toll on readiness is going to build, he added.

"This is challenging within a normal fiscal process," he said, but the flexibility to manage the CAF is decreasing the longer the sequester goes on. "The degradation is not something immediately visible," he said, noting that on March 8, he put nine fighter squadrons and three bomber squadrons in a low state of readiness. As time wears on, getting those units back to a higher state will be increasingly challenging as currencies begin to lapse, he said.

UCMJ Changes Recommended

Defense Secretary Chuck Hagel announced in early April he's directed the Pentagon to prepare legislation for Congress that would modify Article 60 of the Uniform Code of Military Justice. He wants the code amended so that

convening authorities could no longer change the findings of a court-martial for major offenses such as sexual assault. He also wants Article 60 modified so that the convening authority would have to explain in writing any changes made to court-martial sentences.

"These changes, if enacted by Congress, would help ensure that our military justice system works fairly, ensures due process, and is accountable," read Hagel's April 8 statement.

His action came after the Pentagon's general counsel completed a review of Article 60 that Hagel ordered in March after Lt. Gen. Craig A. Franklin, 3rd Air Force commander, overturned the sexual assault conviction of an Air Force colonel at Aviano AB, Italy. Some lawmakers have condemned Franklin's action, but there has been no public pronouncement from Hagel

or the Air Force leadership thus far that Franklin's justification for dismissing the conviction was flawed.

The Defense Secretary also said he is reviewing other options and actions to strengthen sexual-assault prevention and response efforts and would announce his decisions soon.

Minuteman III Test Delayed

The Office of the Secretary of Defense has delayed the scheduled test of a Minuteman III ICBM from Vandenberg AFB, Calif., in an attempt to ratchet down tensions between the United States and North Korea, a Pentagon official told *Air Force Magazine*. The Pentagon leadership believes an ICBM test that was scheduled for early April might be "misconstrued by some as suggesting that we were intending to exacerbate the current crisis with North Korea," said this official. "We wanted to avoid that misperception or manipulation," he added.

The Air Force conducts several of these Minuteman III operational tests each year—shooting a missile from Vandenberg westward over the Pacific Ocean toward the Kwajalein Atoll—to validate the accuracy and reliability of the missile, one leg of the US strategic nuclear deterrent.

When a new date is determined for the postponed test, the Defense Department will make an announcement, said the spokesman on April 8.

US officials have stressed that US and South Korean activities in April in response to North Korea's bellicose rhetoric have been defensive in nature but meant to show strength in order to prevent North Korean aggression.

KC-135s, V-22s for Israel

During his official visit to Israel in April, Defense Secretary Chuck Hagel announced a new arms package for the US ally. In a joint appearance with Israeli Defense Minister Moshe Ya'alon at Israel's defense headquarters in Tel Aviv on April 22, Hagel said the proposed deal would include anti-radiation missiles, radar upgrades for Israel's tactical fighters, KC-135 refueling

Doolittle Raiders Celebrated

Three of the four surviving Doolittle Raiders gathered in Fort Walton Beach, Fla., in April for what they've said will be the Raiders' final public reunion. Retired Lt. Col. Richard E. Cole, retired Lt. Col. Edward J. Saylor, and former SSgt. David J. Thatcher took part in the reunion festivities, which ran from April 17 to April 20, marking the 71st anniversary of the Doolittle Raiders' B-25 bombing raid on Japan on April 18, 1942. Retired Lt. Col. Robert L. Hite, the fourth surviving Raider, was not in attendance.

"Who could imagine volunteering for our mission in 1942 and celebrating its success 71 years later?" asked Cole in a video on the reunion. "We were just doing our job helping our country win the war."

Among their activities, the three Raiders on April 17 attended the dedication of an F-35 hangar at Eglin AFB, Fla., in Saylor's honor. That same day, they took part in the unveiling of the Doolittle Raiders' exhibit on the campus of the Northwest Florida State College in Niceville. On April 18, they spoke to airmen at Hurlburt Field, Fla. Two days later, they participated in Fort Walton Beach's parade of heroes, which included flyovers of vintage World War II aircraft, including the B-25, the model the Raiders flew.

Meanwhile, back in Washington, D.C., a bipartisan group of senators and House members introduced legislation that would award a Congressional Gold Medal to the Doolittle Tokyo Raiders of World War II. HR 1209 and S 381, the respective House and Senate bills, would honor all 80 of the airmen for their "outstanding heroism, valor, skill, and service to the United States" in conducting their daring bombing mission against Tokyo less than four months after the Japanese strike on Pearl Harbor.

Rep. Pete G. Olson (R-Tex.) introduced HR 1209 in March. As of May 7, the bill had 100 co-sponsors. Sen. Sherrod C. Brown (D-Ohio) presented S 381 in late February. It had 15 co-sponsors as of May 7.

aircraft, and V-22 Ospreys. This would mark the first foreign sale of the V-22.

"These decisions underscore that military-to-military cooperation between the US and Israel is stronger than ever," said Hagel, who was on his inaugural trip to the Middle East as Defense Secretary.

US defense officials also announced during Hagel's trip that the United Arab Emirates would move forward with the purchase of 25 additional F-16 Block 60 fighters to add to its existing fleet of some 80 of these airplanes. The United States also intends to sell advanced air-launched standoff weapons to the UAE and to Saudi Arabia for their respective fighters.

Russian Bomber Gets Green Light

The Russian Air Force has approved the design and specifications of a new flying-wing type stealth bomber, dubbed

the PAK-DA, reported Russia's state-owned RIA Novosti news agency.

Lt. Gen. Victor Bondarev, commander in chief of the Russian Air Force, told Russian lawmakers the bomber's development "is going as planned," according to the April 11 report. "The outline of its design and characteristics has been approved and all relevant documents have been signed, allowing the industry to start the development of systems for this plane," he said.

The Tupolev design bureau, builder of most of Russia's Cold War-era bombers, has reportedly received the contract for the PAK-DA, which will replace Russia's aging Tu-95 Bear and Tu-160 Blackjack bombers. The aircraft will have a dual-role nuclear and precision conventional mission and will feature advanced electronic warfare systems, said the Russian Defense Ministry.

Production is expected to begin in 2020 at the Kazan plant, which assembled the Bear and Blackjack. Initial operations are projected in the 2025-2030 timeframe. Russia had hoped to build a hypersonic bomber, but has opted for the subsonic, stealthy design, potentially to be armed with hypersonic missiles, as an interim step.

USAF Bolstering Andersen

Air Force officials have begun detailing plans to beddown additional US military assets at Andersen AFB, Guam—a key component of the Defense Department's "rebalance" to the Asia-Pacific. In addi-

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Budget Overview for DOD, Air Force

The Defense Department is requesting \$526.6 billion in discretionary budget authority to fund defense programs in its base budget for Fiscal 2014, announced Pentagon officials in April.

“Even while restructuring the force to become smaller and leaner and once again targeting overhead savings, this budget made important investments in the President’s new strategic guidance—including rebalancing to the Asia-Pacific region and increasing funding for critical capabilities such as cyber, special operations, and global mobility,” said Defense Secretary Chuck Hagel in a release. “Most critically,” continued Hagel, it “sustains the quality of the all-volunteer force and the care we provide our service members and their families.”

The request at the time did not yet include a detailed budget for overseas contingency operations. DOD budget officials were preparing an OCO request for submittal to Congress in the following weeks. The request also does not reflect the full amount of cuts under the budget sequester. Instead, it incorporates the White House’s “balanced deficit reduction proposals” meant to cut about \$150 billion from the defense budget out to Fiscal 2021 as opposed to the approximately \$500 billion sequestration would strip over that span.

Of that base budget, the Air Force is requesting \$114.1 billion to fund its base operations, according to Maj. Gen. Edward L. Bolton Jr., the service’s budget deputy. These funds also do not include overseas contingency operations or spending cuts that would be necessary if budget sequestration drags into Fiscal 2014, Bolton noted to Pentagon reporters. The \$114.1 billion topline includes: \$46.6 billion for operation and maintenance; \$29.2 billion for military personnel; \$18.8 billion for procurement; \$17.6 billion for research, development, test, and evaluation; and \$1.9 billion for military construction, according to the documents. Bolton said the budget request has “no major muscle movements”—meaning no major new program starts or other changes.

tion, US Pacific Command officials have noted they are proceeding with initiatives to make the island more resilient against potential attack.

Kathleen I. Ferguson, the Air Force’s acting assistant secretary for installations, told lawmakers on April 12 the Air Force is committed to hardening “select hangars” as part of the Pacific Airpower Resiliency initiative.

In Fiscal 2014, the Air Force also plans to invest in building a Silver Flag fire and rescue training facility and a RED HORSE engineer operations facility on Guam to promote the skills necessary to maintain and recover basing in forward locations, she noted.

Air Force Secretary Michael B. Donley and Chief of Staff Gen. Mark A. Welsh III also told lawmakers on April 12 that hardening and dispersal activities will ramp up on Guam.

“This is not a choice between dispersal or hardening, it’s a combination of factors that will help make our bases ... resilient in any number of threat scenarios,” Donley told the House Armed Service Committee.

Reflections: SrA. Adrian Alvarez and A1C Steven Adler, both response force members with the 509th Security Forces Squadron, scan the perimeter during a training exercise at Whiteman AFB, Mo.

USAF photo by SSgt. Nick Wilson



Operation Enduring Freedom

Casualties

As of May 15, 2013, a total of 2,212 Americans had died in Operation Enduring Freedom. The total includes 2,209 troops and three Department of Defense civilians. Of these deaths, 1,737 were killed in action with the enemy, while 469 died in noncombat incidents.

There have been 18,535 troops wounded in action during OEF.

Post-2014 Afghanistan Picture Emerging

The Air Force will maintain a small airlift and intelligence, surveillance, and reconnaissance presence in Afghanistan into 2015 and possibly beyond, said Maj. Gen. H. D. Polumbo Jr., then commander of the 9th Air and Space Expeditionary Task Force-Afghanistan, in April. Polumbo has since moved on to lead 9th Air Force at Shaw AFB, S.C.

"The types of airmen that we'll have besides the advise-and-assist airmen will be primarily airlift—people that assist in regards to any of the drawdown that might not yet be done and assisting with the aerial ports of demarcation for our retrograde ops," Polumbo told Pentagon reporters on April 23 from his location in Kabul via a satellite-enabled video connection. "Some manned ISR" also will remain in theater, he said. He noted that this "would be a small footprint."

Polumbo said the United States will be able to maintain its ISR capability "with very few people forward" following the 2014 withdrawal because most remotely piloted aircraft flying over Afghanistan are operated from Stateside locations such as Creech AFB, Nev., or Holloman AFB, N.M.

Defense Department and State Department officials have been saying the US would continue to provide support in Afghanistan following the 2014 withdrawal of American combat troops, but haven't yet provided the details of what the footprint would look like.

Mission Transition

NATO's International Security Assistance Force is to begin assuming more of a support role as Afghan security forces take the lead for security in Afghanistan, Maj. Gen. H. D. Polumbo Jr., then director of ISAF's Air Component Coordination Element in Kabul, told Pentagon reporters.

US and coalition forces would continue to work alongside the Afghans to achieve four "mutual goals," he said. The first is to build a "competent and self-reliant Afghan National Security Force," said Polumbo during the April 23 video teleconference.

The second is to deprive al Qaeda of a safe haven, rendering the terrorist organization ineffective. The third goal is to achieve an "acceptable political transition" through "free and fair elections next year," he said.

Finally, Afghan and coalition partners hope to "improve regional security relationships," particularly with Pakistan. "The ISAF commander is confident these goals are achievable, but he also reminds us, his staff, every day that they're not inevitable," said Polumbo.

Aircraft Mishaps Top Cause of US Deaths in Afghanistan

As combat operations wind down in Afghanistan, aircraft accidents have become the main cause of combat-related deaths among US military personnel there, reported McClatchy news service.

Of the 33 US lives lost since the start of the year, 13 have been in five aircraft crashes, including the four airmen who were killed on April 27 in the crash of an MC-12 surveillance airplane near Kandahar Airfield, according to McClatchy. The four other crashes involved an F-16, Apache attack helicopter, Black Hawk helicopter, and Kiowa reconnaissance helicopter.

Among the remaining deaths, eight came from improvised explosive devices, four from small-arms fire, two from indirect fire, and six more from some other means, including two so-called "green-on-blue" attacks, states McClatchy's April 30 report. The latter are cases in which Afghan security forces suddenly turned their guns on US forces.

These casualties do not include the commercial 747 cargo airplane under contract to the Defense Department that crashed on April 29 while taking off from Bagram Airfield, killing the seven civilian crew members, or the three airmen killed when their KC-135 crashed in Kyrgyzstan, May 3.

"Andersen is a very important asset to us," added Donley. If the US military expects to survive an attack and continue to operate from there, "hardened facilities will be mandatory," Welsh said.

Patriots Could Extend Allies' Reach

Patriot batteries based in Turkey to shield against Syrian ballistic missiles could also, if closer to the Syrian border, help establish a safe zone in northern Syria to protect civilians and aid opposition forces fighting Bashar al-Assad's regime, said Gen. Philip M. Breedlove, then commander of US Air Forces in Europe-Air Forces Africa, in April.

"They have the capability to do it," said Breedlove in response to questioning during the Senate Armed Services Committee's April 11 hearing held in consideration of his nomination to be NATO's Supreme Allied Commander, Europe, and head of US European Command.

There are six Patriot batteries stationed in Turkey: two US, two Dutch, and two German. While Breedlove agreed, when asked, that the presence of the Patriots would be a powerful deterrent to Syrian pilots flying over parts of Syria, he said "creating a safe zone in northern Syria" would require "much more" than just the Patriots.

"It would probably require fixed wing air and other capabilities," he said. Establishing a no-fly zone in Syria would start "with having to take down" the Syrian military's integrated air defenses, he said.

ANG Below End Strength

The Air National Guard has fallen below its congressionally authorized end strength in Fiscal Year 2013, largely because of recent uncertainties regarding missions and budget turmoil, Lt. Gen. Stanley E. Clarke III, ANG director, told lawmakers in April.

As of March 8, there were 104,204 Air Guardsmen, 1,496 under the Fiscal 2013 authorized level, stated Clarke in his April 17 prepared testimony to the Senate Appropriations Committee's defense panel. Clarke noted that throughout Fiscal 2013, Air Guard recruiters have "met or exceeded" monthly accession goals; however, monthly losses were higher than expected.

"Fiscal uncertainty, force structure changes, and mission turmoil, combined with the drawdown of the war in Afghanistan, are the primary causes of the increased loss rate," said Clarke. To attack the problem, ANG officials have taken steps such as increasing recruiting goals and offering bonuses or incentives to more career fields. The Air Guard also is introducing tools so that unit commanders can better identify loss trends.

Senior Staff Changes

RETIREMENTS: Maj. Gen. Robert C. Kane, Brig. Gen. Francis L. Hendricks.

NOMINATION: To be Brigadier General: Andrew P. Armacost.

CHANGES: Brig. Gen. Balan R. Ayyar, from Dep. Commanding General, Detainee Ops., Combined Jt. Interagency Task Force-435, US Forces-Afghanistan, CENTCOM, Kabul, to Commanding General, Combined Jt. Interagency Task Force-435, US Forces-Afghanistan, CENTCOM, Kabul ... Maj. Gen. (sel.) Paul H. McGillicuddy, from Cmdr., 380th AEW, ACC, Southwest Asia, to Dir., Ops., Plans, & Prgms., PACAF, JB Pearl Harbor-Hickam, Hawaii ... Maj. Gen. (sel.) Edward M. Minahan, from Principal Dir. to the Dep. Asst. SECDEF, Middle East Policy, Office of the USD, Policy, Pentagon, to Dir., Strategy, Policy, Prgms., & Log., TRANSCOM, Scott AFB, Ill. ... Maj. Gen. (sel.) Michael T. Plehn, from Dep. Dir., Spec. Plans Working Gp., CENTCOM, MacDill AFB, Fla., to Principal Dir. to the Dep. Asst. SECDEF, Middle East Policy, Office of the USD, Policy, Pentagon ... Maj. Gen. (sel.) Margaret B. Poore, from Sr. Mil. Asst. to the SECAF, OSAF, Pentagon, to Cmdr., AFPC, JBSA-Randolph, Tex.

SENIOR EXECUTIVE SERVICE RETIREMENT: Steven F. Butler.

SES CHANGES: Michael A. Gill, to Exec. Dir., AFMC, Wright-Patterson AFB, Ohio ... Stephen R. Hayden, to Tech. Dir., Data Exploitation, Natl. Air & Space Intel. Center, AF Intel., Surveillance, & Recon. Agency, Wright-Patterson AFB, Ohio ... William A. LaPlante, to Principal Dep. Asst. Secy, Acq. & Management, Office of the Asst. SECAF, Acq., Pentagon ... Patsy J. Reeves, to Exec. Dir., AF Life Cycle Mgmt. Center, AFMC, Wright-Patterson AFB, Ohio. ■

“Overall, I’m very confident in our ability to not only meet end strength, but to recruit and retain the skill sets necessary to perform the missions the nation asks of its Guard airmen,” stated Clarke.

S&T Investment Priority

The Air Force’s Fiscal 2014 budget request includes \$2.3 billion for science and technology projects—a slight increase from the service’s Fiscal 2013 request, David E. Walker, deputy assistant secretary of the Air Force for

science, technology, and engineering, told lawmakers during April’s budget hearings.

“This year’s budget request reflects a strong support for S&T from our leadership [even in] this challenging fiscal environment,” said Walker in testimony before the House Armed Services Committee’s intelligence, emerging threats, and capabilities panel. “It is a balance across ... needs for near-term, rapid-reaction solutions, midterm technology development, and revolutionary far-term capabilities.”

Walker also highlighted the Air Force’s efforts in the realm of cybersecurity, saying the Air Force Research Lab is leading efforts to draft a joint cyber S&T roadmap for the Defense Department, using the Air Force’s CyberVision 2025 as a blueprint.

Reprogramming Requested

Defense Secretary Chuck Hagel said the Pentagon is preparing to send “a large reprogramming” request to Congress to offset significant shortfalls in Fiscal 2013 operation and maintenance accounts.

“The military’s experiencing higher operating tempos and higher transportation costs than expected when the [Fiscal 2013] budget request was formulated more than a year ago,” said Hagel on April 17 before the Senate Armed Services Committee. “As a result, the department is now facing a shortfall in our operation and maintenance accounts for [Fiscal] 2013 of at least \$22 billion in our base budget for Active [Duty] forces.”

To mitigate the shortfall, DOD has already reduced official travel, cut back on facilities maintenance, and instituted hiring freezes, among other efforts. Even with the reprogramming, officials will still

Birdman of Alcatraz: The Liberty Foundation’s B-17, painted in the iconic markings of the World War II airplane Memphis Belle, flies over Alcatraz Island in San Francisco Bay. Only a few of the bombers survive and are airworthy today.

Photo by Sagar Pathak





have to consider additional measures—such as civilian furloughs.

The reprogramming “can only solve some of our problem,” said Hagel.

Space Investment 2014 Priorities

The Air Force has requested about \$6.5 billion for its space investment portfolio in Fiscal 2014, including some \$2.7 billion for research, development, test, and evaluation activities and another \$3.8 billion for procurement of satellite systems and associated ground assets, service officials told defense reporters in April.

The top five programs in the space portfolio for Fiscal 2014 are: the Evolved Expendable Launch Vehicle (\$1.9 billion), Space Based Infrared System early warning satellites (\$964 million), Global Positioning System III navigation satellites (\$699 million), Advanced Extremely High Frequency Satellite System military communications satellites (\$653 million), and space situational awareness systems (\$400 million), according to an Air Force budget document.

“The Air Force is in a key time right now as we transition several major space programs from research and small-scale production into the core of their production. This is a period where we can and have worked hard to squeeze costs out,” said Jamie M. Morin, then Air Force acting undersecretary, during the April 15 briefing.

“I think you’re seeing a turning around from the environment where year after year the question was how much is the cost growth going to be in the space programs. We’re now at the point where we can truly start squeezing the cost down.”

Sequestration and Defense Health

The defense health program is expected to absorb about eight percent, or \$3.2 billion, of the Defense Department’s portion of the sequestration cuts in Fiscal 2013, said Jonathan Woodson, assistant secretary of defense for health affairs. Testifying before the House Appropriations Committee’s defense panel on April 24, he said about half of that shortfall would be in the accounts that DOD uses to reimburse Tricare claims.

“Our challenge is to find money from other areas to ensure that we have the ability to pay those claims,” he said.

To fill the health-funding gap, the department is reducing funding in areas including health-related equipment, research and development, medical facility maintenance, and restoration and modernization.

“This will produce significant, negative long-term effects on the overall military health system,” stated Woodson in his prepared remarks.

Despite the difficulties in managing the sequester cuts, Woodson wrote

We Assume He’s a Volunteer: TSgt. Matthew Mensch, a parachute tester, exits an SC-7 Skyvan during a low-profile parachute jump over the Edwards Farm Drop Zone on Edwards AFB, Calif. New parachutes are slated to replace the ones currently used aboard AC-130 gunships.

that wounded warriors “should see no difference in the care they receive,” and “to the greatest extent possible, we will work to sustain access to our military hospitals and clinics for our service members, their families, retirees, and their families.”

The ISR Alliance

Britain and Australia both will have their own nodes of the Distributed Common Ground System, said Lt. Gen. Larry D. James, deputy chief of staff for Air Force intelligence, surveillance, and reconnaissance, in April. The DCGS is a network of centers worldwide for processing, exploiting, and disseminating intelligence products from imagery and other data gathered by overhead ISR assets and other sources.

Speaking at an Air Force Association-sponsored Air Force breakfast program event in Arlington, Va., on April 18, James said the Air Force has “a tremendous partnership” with Britain, which stood up its first MQ-9 Reaper remotely piloted aircraft squadron at Waddington this year, “a major milestone for them.”



The Royal Air Force has been flying Reapers and MQ-1 Predator RPAs out of Creech AFB, Nev., “for several years; in fact they’ve flown over 40,000 combat hours to date,” said James. “They also have a DCGS node there in the UK,” providing PED for “one line” of Predator/Reaper data, and this summer will start to perform PED for MC-12 Liberty aircraft as well, he added. Britain’s first of three RC-135-type signals intelligence aircraft is now undergoing testing and will be operational in October.

Australia has had four pilots flying MC-12s in Afghanistan, and the Air Force has been operating some space assets from Australia. “They’re also developing their own Distributed Common Ground System; they can help us with some of the data processing,” James added. “That coalition is extremely important.”

Slip the C-17 SLEP

There’s no service life extension program in the Future Years Defense Program for the C-17 transport, Gen. Paul J. Selva, commander of Air Mobility Command, told defense reporters. While on a “micro” level, there are C-17s that have dramatically flown past their planned usage rates during the wars in Iraq and Afghanistan, on a “macro” level, the fleet is about at the 1,000-hours annual usage rate expected, and USAF hasn’t found a need for a SLEP yet, he said.

More worrisome to him is the “vanishing vendors” problem. Selva noted that the C-17 production line is winding down

and some suppliers are exiting the business. AMC is working toward a common configuration for the C-17s to eliminate separate engineering teams and logistics trains for each block variant, he said.

“A decade ago, we had five blocks of C-17s,” said Selva during the April 11 meeting with the press. That number is now down to four and he wants it down to one.

Reaching More Vets

There are some 8.9 million veterans enrolled in the Veterans Affairs Department’s health care system; however, there are 22.4 million veterans eligible for these benefits, said Tommy Sowers, the VA’s assistant secretary for public and intergovernmental affairs.

“We’re working closely with [the Department of Health and Human Services] on information about the Affordable Care Act to make sure that veterans are informed and understand some of the changes moving forward,” said Sowers in explaining what the VA is doing to reach more veterans. He testified April 24 before the Senate Veterans’ Affairs Committee.

The hearing covered the VA’s outreach and community partnerships. Sowers said a large portion of Vietnam War veterans already use Facebook. He acknowledged that the department needs to do more to reach out to the older generation of veterans. Especially in rural regions of America, “face-to-face” action is required for “veterans to sign up,” said Sowers

My, What Big Eyes You Have: An A-10 Warthog taxis to the flight line as it readies for takeoff from Bagram Airfield, Afghanistan. Long loiter time and the ability to fly in low-visibility conditions make the aircraft well-suited for the harsh conditions of Afghanistan.

Satellite Prototypes Unveiled

Boeing announced in early April it is developing a family of small satellite prototypes, called Phantom Phoenix, for missions ranging from intelligence collection to planetary science. Sharing a common architecture, flight software, and simplified payload integration options, these satellites are designed to be manufactured and configured for specific missions “quickly and affordably,” according to the company’s April 8 release.

“Our customers need greater mission flexibility from smaller satellites that can be built more affordably and delivered more quickly, without sacrificing quality,” said Boeing Phantom Works President Darryl W. Davis.

There are three Phantom Phoenix configurations: the Phantom Phoenix class of 500- to 1,000-kilogram satellites; the Phantom Phoenix ESPA class of 180 kg spacecraft; and the Phantom Phoenix Nano class of four- to 10-kg nanosatellites. Davis said the Phantom Phoenix line addresses the market “between large geosynchronous spacecraft and nanosatellites.”

Boeing intends to conduct initial technology development for these satellites at its facility in Huntington Beach, Calif. ■

By Robert S. Dudley

New Normal

"Here we are, 70,000 people have been killed in Syria, a million-plus refugees destabilizing the region in Turkey, Jordan, other countries—500,000 in Jordan alone—and the United States is messing around trying to figure out how we're going to have enough pilots to enforce a no-fly zone or how we're going to be able to make sure our Air Force can maintain the proper training in order to execute this particular mission."—*Rep. Tim Ryan (D-Ohio), on sequestration's damage to USAF capabilities, Air Force Times, May 13.*

Long-term Degradation

"The 2014 budget will not reverse the damage done by the Fiscal Year 2013 sequestration. Recovering the warfighting capability that we lost and improving readiness will certainly require some reduction in operations tempo and/or additional resources. Reduced flying hours will cause some units to cease flying operations, resulting in severe, rapid, and long-term combat readiness degradations. Today, for the first time I can remember, we have 12 squadrons—bombers and fighters—that will not fly for the rest of the fiscal year. It's about an 18 percent of our flying hour, a 200,000-hour, flying cut, by the end of the year."—*Lt. Gen. Charles R. Davis, USAF acquisition official, Senate Armed Services Airland subcommittee, April 24.*

Good Luck With That

"We are going to have to think about how to remain a global power with fewer resources. I think we are going to have to find ways to accomplish almost the same things but with smaller force structures. It's a mess. It's just a real mess."—*Gen. Martin E. Dempsey, Chairman of the Joint Chiefs of Staff, remarks to USAF troops in Japan, Wall Street Journal, May 3.*

Fighting the Stupids on RPAs

"There is a growing impression that [remotely piloted aircraft, or RPAs] are a grotesque, futuristic, out-of-control weapon of war. Collateral damage, always a regrettable event in war, including casualties among the civilian populace that our terrorist enemies are wont to use as cover, is somehow blamed on the use of armed RPAs. But, as unfortunate as these casualties among the innocent are, would they be any fewer or less consequential if they were caused by

attacks from aircraft actually carrying the pilots onboard? To think so is absolutely ridiculous."—*Bruce S. Lemkin, former deputy undersecretary of the Air Force, op-ed in defense news.com, May 5.*

And As If On Cue ...

"The idea that this President would leave office having dramatically expanded the use of drones—including [against] American citizens—without any public standards and no checks and balances, ... that there are no checks, and there is no international agreement—I would find that to be ... terrible and [it] ultimately will undermine a great deal of what this President will have done for good. I cannot believe this is what he wants to be his legacy."—*Anne-Marie Slaughter, former State Department director of policy planning 2009-2011, Washington Post, April 7.*

Like "Law and Order"

"What we now have is evidence that chemical weapons have been used inside of Syria, but we don't know how they were used, when they were used, who used them. We don't have a chain of custody that establishes what exactly happened. And when I am making decisions about America's national security and the potential for taking additional action in response to chemical weapon use, I've got to make sure I've got the facts."—*President Obama, White House press conference, April 30.*

"Weak and Legalistic"

"The muddle that is President Obama's policy on Syria has grown still muddier. On Tuesday the President backed away from a 'red line' he had drawn on the use of chemical weapons by the regime of Bashar al-Assad, setting the threshold for proof of a violation in such a way as to virtually exclude the possibility that one could ever be confirmed. ... His weak and legalistic words about the need to verify a 'chain of custody' on any chemical weapons use—and his declaration that even a hard confirmation would lead only to a 'rethink [of] the range of options'—simply invite further chemical attacks."—*House editorial, Washington Post, May 2.*

We're Here To Help

"Our goal would be to remove all decision-making out of the chain of command about whether to prosecute a case and whether to bring a case to

the chain of command. And it would not just be for sexual assault. We're looking at all violent crimes. Everyone knows the current system is not working. Everyone knows that 19,000 sexual assaults and rapes a year is unacceptable. I think the military has been trying to grasp this for a while now, without success, and so they may need some outside assistance in looking at it freshly. ... It's not one of those situations where they can say, 'We got this,' because they clearly don't."—*Sen. Kirsten Gillibrand (D-N.Y.), responding to a USAF officer's decision to overturn a court-martial conviction in a sexual-assault case, Associated Press, April 30.*

More Dreck From Headquarters

"When on duty or in an official capacity, Air Force members are free to express their personal religious beliefs as long as it does not make others uncomfortable. Proselytizing, as defined above [i.e., 'to induce someone to convert to one's faith'], goes over that line."—*Official Air Force statement sent to news organizations, USA Today, May 2.*

What Marines Want To Know

"When I was at [Marine Corps Base Camp] Pendleton, I told the marines: 'OK, I'm going to answer your questions up front, the ones you want to ask. Are we going to go sleeves up? The answer is no. Now, I know you want to show your guns. Believe it or not, there was a period in my life when I had some good-size guns. So I get it. But I have a solution to show off your guns: Wear Charlies [uniform with short-sleeve shirt]. ... And by the way, I'm not changing the tattoo policy. Three Commandants and nine years went into that. If you think I'm touching that, you're crazy.'"—*Gen. James F. Amos, Commandant, Marine Corps, interview with Marine Corps Times, May 13.*

Wingless T-Birds

"Sequestration temporarily limits our ability to travel, but it doesn't stop us from reaching out within our community to tell the Air Force story. We've always had a robust community relations effort. Until this issue is resolved, we'll continue to engage the public as best we can."—*Lt. Col. Gregory M. Moseley, commander of the Thunderbirds aerial demonstration team, whose flying season was canceled, Washington Post, April 5.*



SSgt. Daniel Holmes, a pararescueman, goes through swiftwater rescue training near Davis-Monthan AFB, Ariz., during Angel Thunder, the world's largest combat search and rescue training exercise.

COMBAT SEARCH AND RESCUE TEAMS HAVE
SEEN THE VALUE OF TRAINING AS THEY FIGHT.

By Amy McCullough

Angel THUNDER

By the time TSgt. Brandon Daugherty and his four-man team arrived on the scene in Afghanistan's tumultuous Helmand River District, it was clear no one was alive in the vehicle they were approaching.

It was nearly dark, except for the flames that burst from the overturned Mine-Resistant Ambush Protected vehicle. Inside, three Georgian troops were dead. The MRAP had rolled over an improvised explosive device.

Daugherty, then an Active Duty pararescue jumper assigned to the 48th Rescue Squadron at Davis-Monthan AFB, Ariz., and his team managed to put out the flames and right-side the vehicle. Billowing smoke, however, made breathing difficult and forced them to quickly pop in and out of the vehicle's hatch.

As the PJs struggled to recover the bodies, an AH-64 Apache crew flying overhead reported that a man, who was carrying a large cylinder on his shoulder, had run into a house roughly 300 meters away. Everyone on the ground took up a defensive fighting position, but the man showed little signs of movement and an attack never came. After about 20 minutes, the team got the all clear and went back to work.

That's when the situation turned from bad to worse.

A second IED detonated, blowing Daugherty and his combat rescue officer "a pretty good little distance" away, he said. The blast was so strong it blew the CRO's helmet off his head and sent his satellite phone flying.

Other than "seeing stars," Daugherty and his team escaped without injury, but a US marine who was embedded with the Georgians was in bad shape.

"His face was completely blown off. It was the worst trauma I've ever seen in my life. His chin was completely gone. Everything was mush. He was twitching and trembling and you could tell he wasn't getting any air," said Daugherty.

The PJs conducted a cricothyrotomy (cric)—making an incision in his cricothyroid membrane to open his airway. Over the next few minutes, they pumped the marine full of medicine, breathed for him, and did every medical procedure in their power to save his life before passing him off to a British medical team for evacuation.

Their efforts paid off in a big way—the marine is still alive today and has successfully completed several facial reconstruction surgeries, said Daugherty.

That January 2012 deployment only lasted 60 days, but it was by far the "craziest" and most action-packed deployment Daugherty ever experienced. That's saying a lot considering he deployed seven times—five to Afghanistan, once to Iraq, and once to the Horn of Africa—over a seven-year period.

The pararescue career field is one of the most stressed in the Air Force, but you'd be hard pressed to find anyone in the rescue community who expects

USAF photo by SSgt. Tim Chacon

the operational tempo to ease up any time soon.

In fact, as of mid-April less than half of deployed pararescue members were in Afghanistan. "We are not worried about being out of work," said Col. Jason L. Hanover, commander of the 563rd Rescue Group based at Davis-Monthan. "We are in demand and at this time we are still not able to fulfill all the requests for forces that are out there, so when Afghanistan closes we are just going to

shift our forces elsewhere as we already have," said Hanover.

Afghanistan may be the US' only war zone at the moment, but the threat to the country and to Americans abroad is probably not going to diminish.

"As long as the Air Force is sending expensive planes and pilots, who take a lot of money to train, out into harm's way, I can understand [personnel recovery] being a core mission of the Air Force. You have elements of the Air

Force that put themselves in harm's way with less backup than say the Marines or the Army," said Charles Ray, former ambassador to Zimbabwe and a white cell participant, or exercise controller, in Angel Thunder, the world's largest, personnel recovery exercise.

Brett Hartnett founded Angel Thunder in 2006 when he was an HH-60 pilot assigned to Davis-Monthan. Hartnett, who is retired from the military and now serves as the exercise's civilian director, had

RESCUE TEAMS AT PLAYAS

Playas, N.M., April 16, 2013 —

It was almost noon, but it was surprisingly chilly for the desert. As an MC-12 hummed overhead, the windy day's cold air was full of dust. Nearby was a remote and desolate mud hut village where the homes looked decrepit. The only life in the surrounding area was small thorny bushes scattered every few feet.

Small burrows near the bare bushes alluded to more treacherous life just below the ground. No hustle and bustle of life, simply an air of abandonment.

Welcome to Playas, N.M.

Built to mimic a village in Afghanistan, Playas, located near the southwestern corner of New Mexico by the Arizona border, is an "urban" training ground for the US military and coalition forces to prepare them for deployment. One planner even "went to Afghanistan for four months to actually learn how they build their mud huts," said TSgt. Brandon Daugherty, a Reserve pararescue jumper with the 306th Rescue Squadron at Davis-Monthan AFB, Ariz., serving as the logistics manager of the exercise.

The training is all part of Air Combat Command's Angel Thunder joint personnel recovery exercise. In its seven years of existence, Angel Thunder has grown exponentially as international allies catch wind of the exercise. This year 11 countries participated and another 10 observed.

In the desert, at the top of a hill, US and international troops were getting ready to play the role of enemy rebels.

Some of the exercise's mission planners were up on the hilltop watching the day's scenario as well. One planner squawked back and forth to players on a walkie-talkie, preparing the situation on the ground. Mission planning usually took place at the rescue operations center in the makeshift but realistic tent city, Desert Lightning City, situated at Davis-Monthan, some 230 miles away, but the exercise needed planners on-site, too.

Within an hour, the scenario burst into life when a Mine-Resistant Ambush Protected armored vehicle set off an IED, trapping personnel inside as the blast bulldozed the MRAP onto its side. A few minutes later, A-10 Warthogs swept in low over the hill to provide protection for the rescuers who were on their way.

Another few minutes passed before two HH-60 Pave Hawk rescue helicopters appeared. One of the Pave Hawks landed, rotors whirring, tossing up sand and swirling it into the air. Pararescue jumpers filed out and headed toward the MRAP.

As they began working to get the victims out, enemy ground forces started shooting in their direction.

The A-10s were still in the area and came back to provide close air support, strafing the enemy forces and momentarily quelling the attack.

Soon after, a suicide bomber drove his truck toward the MRAP and detonated his vehicle. The attacker's truck bed had been full of explosives, and the resulting blast injured a PJ.

As chaotic as the scenario seems, that is its whole purpose. "When we go out to Playas, ... [we want] to make it as realistic as possible," said Brett Hartnett, director of Angel Thunder. Scenarios such as this one are "dedicated to maintaining irregular warfare competency. This is where the majority of the coalition is. ... They're all in IW," he said.

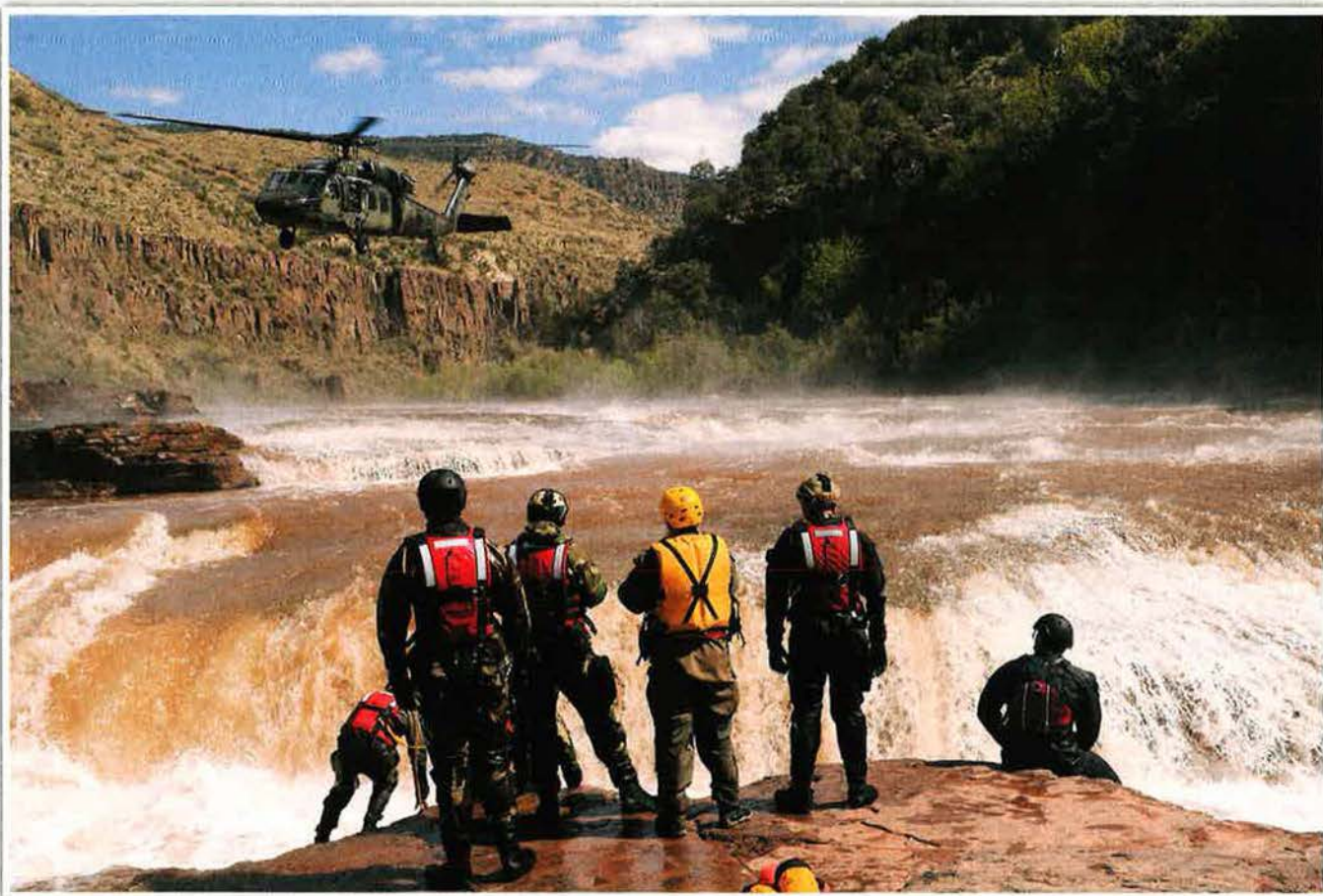
The following day, personnel recovery forces went back out to Playas and took part in an urban operations mass casualty scenario in the village. Simultaneous bombs went off, an eerie recall of the bombing that took place at the Boston Marathon the same week.

One Angel Thunder bomb went off in a marketplace, another by the roadside, one by a host-nation location, and the last bomb near a UN convoy. Joint coalition forces were tasked to assess the situation and effectively evacuate the casualties.

Kyle Sauls, ground boss for Angel Thunder and a former PJ, said that despite the different services and different scenarios, all the "missions sets are very similar": free-falling, diving, patrolling, special operations, etc. The mission may be different, but the "tactics are all the same," he said.

Not only does this training hone irregular warfare skills, it also prepares PJs for their "worst nightmare," said exercise director Hartnett. Angel Thunder mission planners sketch out scenarios so that when the PJs are deployed within the next few months, they will be ready for just about anything. —June Lee





Above: Pararescuemen prepare to leap into the rapids as part of their training at Angel Thunder. Below: A simulated IED explodes near a bus carrying "passengers" at Playas Training Center, N.M., requiring a response from military rescue forces during another portion of the massive training exercise.



Photo by Charles Ray

extensive exercise planning experience through various NATO assignments. He said he realized Air Force exercises, such as Red Flag, offered superb training for pilots, but weren't really designed to accommodate personnel recovery.

"We set up an exercise that was just for us and because it was just for us it was much more useful and was much more relevant," said Hartnett, who also served as the combat rescue helicopter commander at Camp Bastion, Afghanistan, during one of Daugherty's deployments.

Daugherty said the scenarios at Angel Thunder are so realistic he actually had "flashbacks" to training he received in October 2011 as he flew over that fiery crash last year.

Getting Huge

The scenario, he said, had taken place in a barren mountain village in Playas, N.M., along the Arizona border. An MRAP had flipped over and caught fire after driving over an IED. Wounded troops, including one with a severe simulated facial injury, were spread all around the crash site. His team was forced to conduct a simulated cric—a fairly unusual procedure—on one of the wounded troops.

Daugherty didn't know it at the time, but the training was an eerie foreshad-



Above: An HH-60G hovers over a canyon during Angel Thunder. Right: A pararescueman gives the signal to hoist a simulated casualty during the exercise. This year's Angel Thunder saw 11 foreign countries participate and another 10 observe.

owing of what he would experience just a few months later in Afghanistan.

"In the real world it was 10 times worse. However, I cannot confidently say that if we hadn't done a dry run at Angel Thunder, with the kind of stress we had to deal with, that [the marine] would even be alive today," said Daugherty.

In fact, that's one of the reasons why he decided to leave Active Duty and work full-time for Angel Thunder. He now serves as the Angel Thunder logistics manager, although he is still a PJ with the Air Force Reserve's 306th Rescue Squadron at Davis-Monthan.

"When Brett told me about [the position available] at Angel Thunder, I said I would love for somebody else to have a story just like mine," he said.

Angel Thunder has grown immensely since its inception. Only 22 aircraft and 175 personnel participated in the first exercise, compared to the nearly 2,000 participants and some 87 aircraft in Angel Thunder 2013. This year's exercise included players from all four



USAF photo by A1C Christine Griffiths

US services, a host of agencies, and foreign partners and observers.

The training area also has grown significantly with scenarios taking place anywhere from the Texas panhandle to a few miles off the coast of California, said Hartnett.

The geographic expansion can be directly tied to the drawdown in Afghanistan and the planned pivot to the Asia-Pacific, where rescue crews will not only face the “tyranny of distance” but may also have to operate in contested and degraded environments for the first time in well over a decade, officials said.

“We deliberately said ... let’s do a long-range [scenario],” said Hanover. He added, “That changes the calculus when it’s long-range and you are dealing with helicopters.”

Beeps and Squeaks

Angel Thunder actually comprises eight program elements. For the first time, Week 1 was set aside for academic training and what Hartnett called “forced networking.” The idea is to give participants time to learn what the others are capable of before engaging in the scenarios in Week 2 and future coalition missions downrange.

Although partner nations participate in various aspects of Angel Thunder, many focus on the irregular warfare scenarios, said Hartnett.

Even though the war in Iraq has ended and the expectation is that major operations in Afghanistan are coming to a close, Hartnett said it’s important to maintain irregular warfare skills.

AirSea Battle in Angel Thunder

Davis-Monthan AFB, Ariz.—This year’s Angel Thunder combat search and rescue exercise contained an AirSea Battle scenario, Operation Tenacity. During the scenario, which was conducted four times with slight variations each time, aircraft from Davis-Monthan were tasked to support ongoing missions off the California coast—some including special operations forces and other Navy crews, said Col. Jason L. Hanover, commander of the 563rd Rescue Group at Davis-Monthan.

The area off San Clemente Island, near San Diego, included “a robust, integrated air defense” and “small boat swarms,” he said.

In one of the four ASB scenarios, a ship was disabled after being attacked by a fast inland attack craft and rescue crews were called in to get a compromised SEAL team off the boat.

“The threat will be relatively similar [in each scenario], but who you are picking up, how much signaling they have, how competent they are at being an isolated person, will all change,” Hanover told *Air Force Magazine* in mid-April, just before the scenarios took place.

The support aircraft also were to change, so some ASB scenarios included A-10 Warthogs, while others included Apaches or Navy helicopters launching off a nearby aircraft carrier.

“All of that changes the scenario just a little bit, just enough to make them difficult and worthy of these guys comparing notes at the end,” added Hanover. “They all learn from each other.”

—Amy McCullough

“Americans are really good at forgetting what they did in the last war,” he said. “We’re probably the world’s experts right now at irregular warfare. We don’t want to lose that mission set.”

However, the changing defense strategy also calls for a new kind of training. This year, Angel Thunder included an anti-access, area-denial scenario, dubbed Operation Resilient, conducted at the Melrose Range at Cannon AFB, N.M.

Most of the scenario was classified, but Hartnett said it included “threat emitters” and “space aggressors.”

“They do all their little beeps and squeaks and stuff and all the stuff you normally have, all magically goes away,” he said.

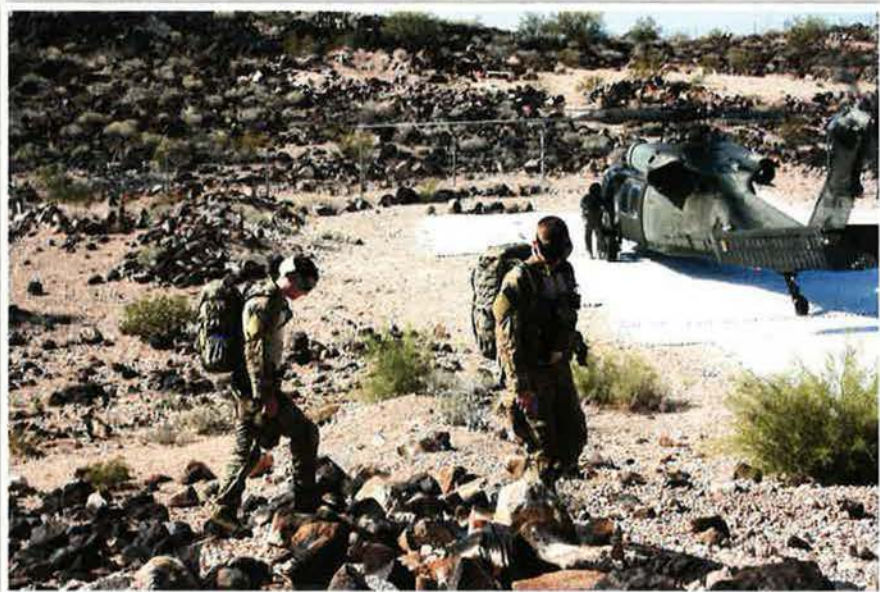
This year, planners also incorporated modeling and simulation into the exercise to “create false tracks” on crews’ data links, simulating as many as 120 aircraft on an air tasking order even though there may only be 20 aircraft actually in the air.

Thus, if a rescue mission commander sees an enemy threat and wants to bring in an F-16 to suppress the threat, he could do so even though there were no F-16s actually participating in Angel Thunder.

Personnel assigned to the Combined Air and Space Operations Center North at Nellis AFB, Nev., “actually change the track of the F-16s that are notionally flying toward the target and when the aircraft gets within the weapons-engagement range, it will show the threat disappearing, the aircraft turning off and going back to its orbit,” Hanover added.

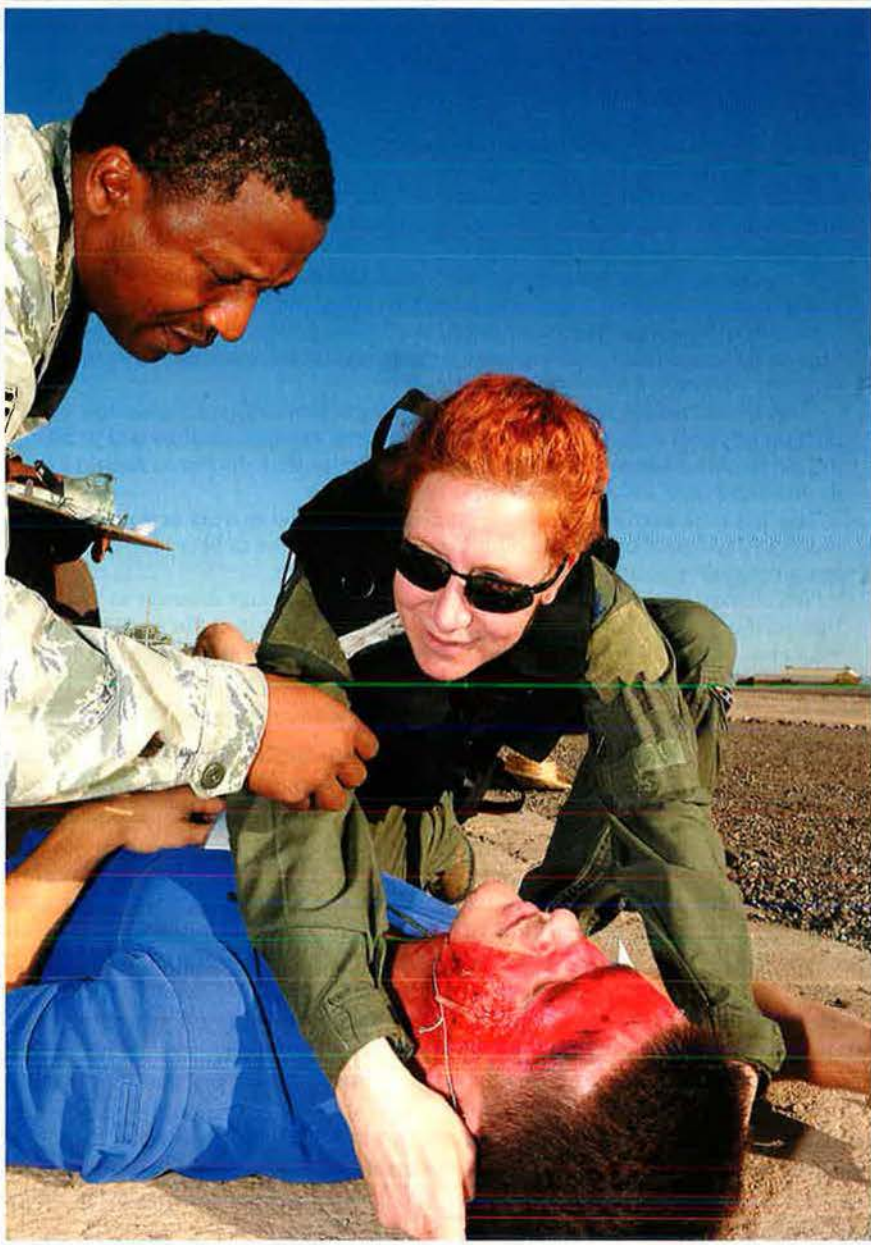
“It really makes the participants think more and that’s part of the focus of this second week of scenarios,” he said. “If we did our job right, every one of them will land exhausted. They will want to go into the corner and suck their thumb.”

Another significant change anticipated in the post-Afghanistan era is the switch from an almost exclusive Title 10 role—where combatant commanders establish the rules of engagement—



SSgt. Bryce Winder and SSgt. Gary Roland inspect their surroundings on what is known as “NATO Hill,” a makeshift landing pad in the middle of the Sonoran Desert, about 150 miles west of Tucson, Ariz., during Angel Thunder.

Staff photo by Amy McCullough



to one in which military personnel recovery teams conduct operations governed by Title 22—chief of mission authority. In a Title 22 situation a US ambassador has final mission approval, officials said.

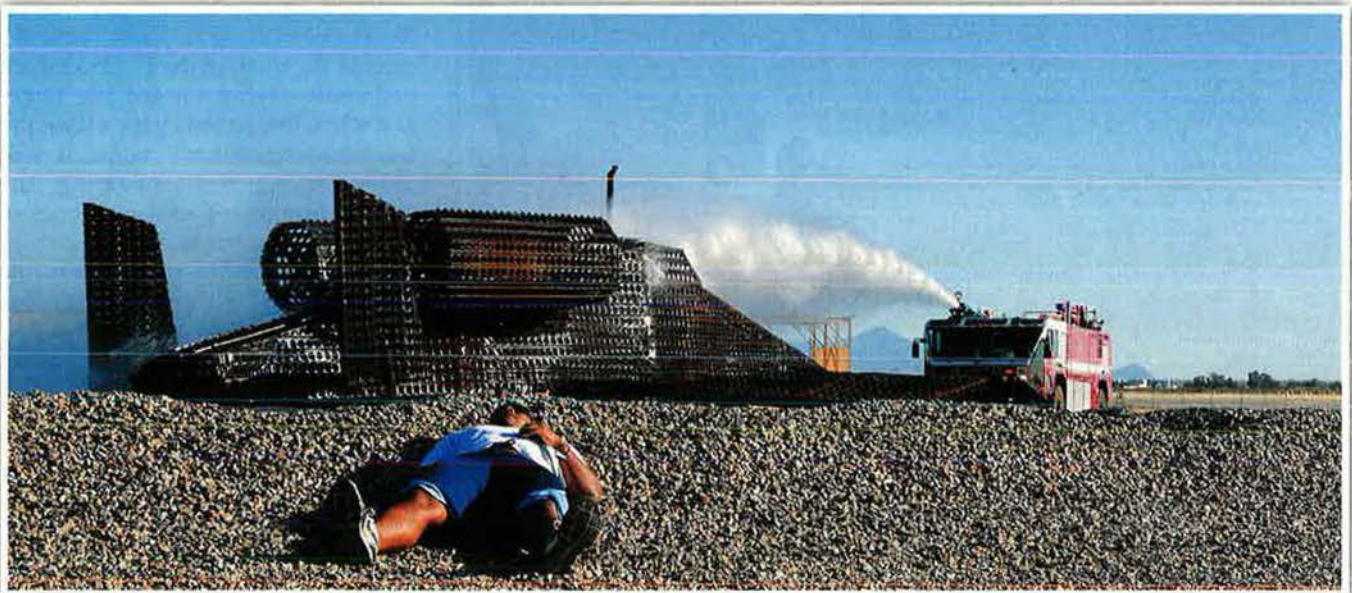
“It’s the new normal,” said Ray, who served 20 years in the US Army and 30 years in the Foreign Service. However, he acknowledged the change “can be a bit of a problem for DOD forces because they are not accustomed to it.”

It’s not so much the physical skills that pararescuemen will need or the implementation of the mission that will change, but rather “the realization that they have constraints that may not be present in a combat environment,” said Ray.

For example, while operating in a friendly or host country, it may be acceptable for personnel and aircraft to be armed for self-protection, however, it would be frowned upon for those arms to be visible because of the political ramifications such images can create.

In one Title 22 humanitarian relief scenario in Angel Thunder 2011, Ray restricted crews from flying Black Hawks or other heavy downdraft rotary wing aircraft below a specific altitude because the mission was being carried out in a village where the houses were made up entirely of thatched roofs.

Left: Col. Laura Brodhag and SSgt. Covito Redman place a tag on a “victim” of a simulated aircraft crash during Angel Thunder. The tags identify their injuries so medical personnel can triage the incoming wounded. Below: SrA. Sammie Ervan plays the victim of an aircraft crash while firefighters douse the flames on the “airplane.”





the person responsible for personnel recovery in an embassy is the regional security officer. That person would serve as the liaison between the senior defense official and the ambassador; however, it is the ambassador who makes the final call.

“What that means is that sometimes communications might be a little slower than you would normally expect and allowances have to be made for that,” said Ray.

Left: SrA. Casey Kubick (l) and TSgt. Christopher Roof set up a forward area refueling point in White Sands. Below: USAF pararescuemen practice a high-angle rescue in a mass casualty exercise at the Grand Canyon during Angel Thunder. Bottom: A team prepares for a swiftwater rescue training mission.

“It would not do bilateral relations any good if in rescuing two Americans you took the roofs off 20 buildings,” said Ray. “It required [participants] to be able to process that information. It also required a civilian, in this case me, sitting there and watching their planning and injecting a little modification in how they would do that.”

One of the biggest lessons to emerge from both the 2011 and 2013 Angel Thunder embassy scenarios is that rules of engagement and force conditions must be approved by the chief of mission—based on the host country’s limitations, said Ray.

It’s also important for DOD forces to understand how an embassy is structured, he added. For example,





A Chinook helicopter flown by a Singaporean crew delivers rescue forces from Colombia, Chile, and Brazil during an Angel Thunder scenario at Playas.

The relationship between DOD, the State Department, and other agencies continues to improve, but Ray acknowledged that budgetary constraints may impact that momentum.

Other agency participation in critical exercises such as Angel Thunder is likely to dwindle under sequestration. Of the 10 US agencies expected to participate, only four were still able to attend after the across-the-board budget cuts were implemented in March, said Hartnett.

It Ain't 35 Hours

It also just "takes time for the mindset to change and [for people] to grapple with having to deal with the new realities," added Ray.

Perhaps more troublesome, however, is the impact sequestration will have on personnel recovery operations and modernization efforts.

In the future, Hanover said personnel recovery will have "to be a very rapidly deployable, agile force" that can quickly move to an "unimproved location" and can either operate for extended periods of time or short durations for specific missions. In addition, rescue crews will need to be able "to get out of town quick, have folks organized, trained, and equipped so they are ready to deploy" at a moment's notice.

However, he acknowledged, "we can't get there from here."

Because of budget constraints, in early May Air Combat Command was

in the process of standing down about one-third of all combat aircraft based in the United States, Europe, and the Pacific. Under the stand-down, units will be forced to enter a dormant status until they are tapped for a named operation or an overseas deployment. Flying hours also will be significantly reduced for Stateside units. "Ultimately, we are focusing on the guys that are deliberately deploying. We don't have a plan for the folks that are not [scheduled to] deploy," said Hanover. Instead, under the new tiered readiness model, ACC has opted to focus its resources on the crews planning to deploy, placing other crews temporarily on the "back burner," he added. That means rescue crews will no longer be able to deploy within 35 hours of receiving a tasking order, said Hanover.

"If a deployment order drops, they will say spin your guys up. Then there will be a time frame, as of now undetermined as to how long it takes, to make sure our guys are spun up and mission ready," said Hanover. "It ain't 35 hours. We're talking weeks"—or maybe even months, he acknowledged.

As the Air Force battles the "sequestration swirl," decisions made today will have a lasting impact for the next two to five years, said Hanover.

"If we make smart decisions now, we can come out more gracefully and end this thing at the two- or three-year point," he said. "If we make poor deci-

sions now, we are pushing that years and years beyond."

But the rescue community already desperately needs modernized equipment to replace its aging, war-torn assets. The Air Force has been trying to replace its 1980s-era HH-60 Pave Hawks for years.

A solicitation for a new "Combat Rescue Helicopter," issued last October, called for an affordable solution that leveraged in-production air vehicles and training systems integrated with existing technologies.

Air Force officials said early this year that their target date for awarding the CRH contract is September 2013 with a Fiscal 2018 notional date for initial operational capability of the new fleet.

"I think it's important to arm the HC-130 to provide armed overwatch. I think that information superiority is absolutely Step 1—we need Internet on board the HC-130, beyond-line-of-sight and data link capability on the HH-60s, and the ability [for] all of our players ... to talk to anyone," said Hanover.

He said his worst nightmare is having a Guardian Angel—PJ, combat rescue officer, or survival, evasion, resistance, and escape specialist—on the ground and unable to communicate with inbound aircraft potentially coming in for a strike. The enemy could force the Guardian Angel toward the strike zone, and those on the ground would be unable to call off the strike.

"That completely fluid ability to push voice data link across every platform to achieve information superiority is critical," said Hanover.

He estimates that the rescue triad of the HH-60, HC-130, and Guardian Angels is "at maybe a 10-year disadvantage of other weapons systems," due to a failure to develop during the interwar period between Desert Storm and Operations Enduring and Iraqi Freedom.

"Just as we hit our stride, we have sequestration, and the fear is that all of this inertia and the momentum we have comes to a screeching halt and sets us back again," said Hanover. He added, "We finally have a voice because we are a service core function and we could be set back years. [Then] we will have to start the whole process over."

As long as the rescue community is tasked with saving "anyone, anytime, anyplace," it is going to need equipment "to penetrate defenses and be interoperable and survivable," Hanover concluded. ■

Brodie and the Bomb

On Aug. 6, 1945, a 35-year-old Yale professor named Bernard Brodie was working as a naval theorist. The next day brought the headline, "First Atomic Bomb Dropped on Japan." Within days, Brodie discarded sea power and began working on a nuclear strategy book, *The Absolute Weapon: Atomic Power and the World Order*. Brodie not only served as editor but also authored two chapters. One, a 12,000-word essay titled "Implications for Military Policy," became famous. It contained the passage, "Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose." Brodie was thus the first to cogently express the idea of nuclear deterrence, the watchword of the Cold War.

The essential change introduced by the atomic bomb is not primarily that it will make war more violent—a city can be as effectively destroyed with TNT and incendiaries—but that it will concentrate the violence in terms of time. A world accustomed to thinking it horrible that wars should last four or five years is now appalled at the prospect that future wars may last only a few days. ...

Is it worth while even to consider military policy as having any consequence at all in an age of atomic bombs? A good many intelligent people think not. ... If our cities can be wiped out in a day, if there is no good reason to expect the development of specific defenses against the bomb, if all the great powers are already within striking range of each other, if even substantial superiority in numbers of aircraft and bombs offers no real security, of what possible avail can large armies and navies be? Unless we can strike first and eliminate a threat before it is realized in action—something which our national Constitution apparently forbids—we are bound to perish under attack without even an opportunity to mobilize resistance. Such at least seems to be the prevailing conception among those who, if they give any thought at all to the military implications of the bomb, content themselves with stressing its character as a weapon of aggression. ...

If it [an aggressor] must fear retaliation, the fact that it destroys its opponent's cities some hours or even days before its own are destroyed may avail it little. ...

If the aggressor state must fear retaliation, it will know that even if it is the victor it will suffer a degree of physical destruction incomparably greater than that suffered by any defeated nation of history, incomparably greater, that is, than that suffered by Germany in the recent war. Under those circumstances no victory, even if guaranteed in advance—which it never is—would be worth the price. The threat of retaliation does not have to be 100 percent certain; it is sufficient if there is a good chance of it, or if there is belief that there is a good chance of it. The prediction is more important than the fact. ...

There is happily little disposition to believe that the atomic bomb by its mere existence and by the horror implicit in it "makes war impossible." In the sense that war is something not to be endured if any reasonable alternative remains, it has long been "impossible." But for that very reason we cannot hope that the bomb makes war impossible in the narrower

"Implications for Military Policy"

Bernard Brodie
Essay in *The Absolute Weapon: Atomic Power
and the World Order*
Institute of International Studies
Yale University, 1946

Find the full text on the
Air Force Magazine's website
www.airforcemag.com
"Keeper File"

sense of the word. Even without it the conditions of modern war should have been a sufficient deterrent but proved not to be such. If the atomic bomb can be used without fear of substantial retaliation in kind, it will clearly encourage aggression. So much the more reason, therefore, to take all possible steps to assure ... arrangements to make as nearly certain as possible that the aggressor who uses the bomb will have it used against him.

If such arrangements are made, the bomb cannot but prove in the net a powerful inhibition to aggression. It would make relatively little difference if one power had more bombs and were better prepared to resist them than its opponent. It would in any case undergo incalculable destruction of life and property. It is clear that there existed in the [1930s] a deeper and probably more generalized revulsion against war than in any other era of history. Under those circumstances the breeding of a new war required a situation combining dictators of singular irresponsibility with a notion among them and their general staffs that aggression would be both successful and cheap. The possibility of irresponsible or desperate men again becoming rulers of powerful states cannot under the prevailing system of international politics be ruled out in the future. But it does seem possible to erase the idea—if not among madmen rulers then at least among their military supporters—that aggression will be cheap.

Thus, the first and most vital step in any American security program for the age of atomic bombs is to take measures to guarantee to ourselves in case of attack the possibility of retaliation in kind. The writer in making that statement is not for the moment concerned about who will win the next war in which atomic bombs are used. Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose. ■

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NATO's LESSONS FROM LIBYA

UNIFIED PROTECTOR COULD HAVE BEEN A DISASTER,
BUT NATO AIR FORCES MANAGED TO PULL TOGETHER
A MASTERFUL OPERATION.

By John A. Tirpak, Executive Editor

Spanish F-18s flew from NAS Sigonella, Italy, during Operation Odyssey Dawn, the start of the NATO air campaign that led to the overthrow of Libyan dictator Muammar Qaddafi.



DESPITE its success in fulfilling United Nations mandates, Operation Unified Protector—NATO's seven-month 2011 air campaign which led to the ouster of Muammar Qaddafi from Libya—raised red flags about NATO's inadequate resources and its lack of preparation for a new shooting war. It also exposed the reality that the Air Force's expeditionary structure has been badly oversubscribed. Unified Protector shouldn't be the template for a future operation, according to its air commander and think-tank experts who have studied the operation for the last two years.

Although some members of Congress, alarmed at the two-plus years of mounting bloodshed in Syria, have suggested an Operation Unified Protector-style intervention in that country, "I think many have recognized this: It's not the model," said Lt. Gen. Ralph J. Jodice II, head of NATO's Allied Air Command at Izmir, Turkey. He

was the Operation Unified Protector (OUP) combined forces air component commander.

The operation was the direct result of UN Security Council resolutions 1970 and 1973, adopted in February and March of 2011. The resolutions authorized a no-fly zone, an arms embargo, and a mandate to protect the Libyan people from their own government, in addition to sanctions on some members of the Qaddafi regime. After an initial takedown of Libyan air defenses—Operation Odyssey Dawn, led by the United States—OUP was the NATO continuation operation which struck at regime forces moving against civilians and maintained a naval blockade on arms shipments. It started on March 23 and ended on Oct. 31, shortly after Qaddafi was captured and killed by Libyan opposition forces, which then set up a transitional government.

The Air Force contributed strike aircraft, intelligence, surveillance, and reconnaissance platforms, and the bulk of the aerial refueling assets to OUP.

However, given that the air and space expeditionary force structure was almost wholly focused on rotating units in and out of Iraq and Afghanistan, there was little left over for yet a third air campaign. The Air Force Reserve played a crucial role in USAF's ability to respond.

Unified Protector proved the air and space expeditionary force "really doesn't work," said Robert Owen of Embry-Riddle Aeronautical University in Daytona Beach, Fla. Speaking on an Air Force Association symposium panel in February, Owen said USAF was already at "100 percent commitment" when the Libya crisis unfolded.

"There were no assets to send forward without digging into the reconstitution force" of equipment and units that were supposed to be resting up from Southwest Asia deployments, getting necessary training and reset, before going back to those wars, Owen explained.

It was the Air Force Reserve that "saved the Air Force's bacon" by providing personnel and assets the



Photo by SSgt. Brendan Stephens

Innovative Over Libya

There were a number of airpower "firsts" in Operation Unified Protector, according to Lt. Gen. Ralph J. Jodice II, head of NATO's Allied Air Command at Izmir, Turkey.

■ **Mixed Pairs:** Britain flew mixed pairs of Typhoon fourth generation fighters with Tornado GR4 "trucks" laden with bombs, taking advantage of the sensor and connectivity capabilities of the former and combining them with the proven air-to-ground weapons delivery capabilities of the latter. Mixed pairs also were flown by French and Qatari Mirage 2000s, sometimes in concert with French Rafale fighters.

■ **Dynamic Deliberate Targeting:** Some specific targets were moved forward on the 72-hour air tasking order if the assets were unexpectedly available to attack them or if they were deemed more time-sensitive than originally thought. Sometimes this happened in single digit hours.

■ **CSARs on Flattops:** Air Force combat search and rescue HH-60s were deployed aboard the British flattop *Ocean* for two weeks and aboard the similar French ship *Tonnerre* for two days to support operations far deeper into Libya than were flown in most of the operation. The flying time from the initial base in Greece was four hours—a long time to wait if someone has been shot down, Jodice said.

■ **SCAR-C:** strike, control, and reconnaissance coordination—a throwback to forward air control but conducted by platforms ranging from the French Atlantique to a Predator, which would scout and sometimes laser-designate targets for other platforms.

■ **The United Arab Emirates and Qatar Dropped Bombs in Anger:** Jodice was unhappy that France and Qatar pushed to get Qatar's French-made Mirage 2000s on the ATO for a bomb-dropping mission, even though the pilots had not trained to do it. "This is not a test range," Jodice said, but eventually assented because three of the four jets in the eventual mission were French, flown by UAE and French pilots trained in ground attack.

■ **Attack Helicopters and the Air Tasking Order:** France and the UK insisted that OUP make use of attack helicopters: French Tiger and Cougar aircraft and British Apaches. Those governments felt the appearance of attack helos would send a strong statement to the regime, at a time when they felt the conflict was entering a stalemate. Jodice said the "first" was putting attack helicopters on the ATO and integrating them in an air campaign, when such aircraft typically are under the direction of a ground commander and tied to ground maneuver.



Rebel fighters fire at a Libyan government MiG near the town of Ras Lanuf in March 2011. With the death of Qaddafi, fractious opposition forces came to power fairly rapidly—and some elements don't share US interests.

Active Duty USAF simply didn't have to spare, Owen said. The situation was tougher than it looked due to the fact that Congress never got around to authorizing the campaign or appropriating money to carry it out. This meant both Active Duty and reserve forces had to pull money from other operations and maintenance accounts.

Overall, though, on the American side, Unified Protector was a "rabbit-out-of-the-hat" operation that should be recognized as a warning: that the Air Force was "already stressed" before sequestration, "and the nation needs to understand that," Owen said.

"There wasn't necessarily a lot of guidance" from the NATO countries on how to fulfill OUP's given mission, which came with a mandate to limit collateral damage and inflict zero civilian casualties, Jodice noted.

Except for a NATO ministerial finding that the operation would continue until hostilities in Libya ended, "it didn't say how they were to end," he observed. And "no one knew" how that would happen. In fact, there was the strong sense that when the smoke cleared, NATO would be dealing with "some aspect of the regime—either Qaddafi himself or one of his sons" or another regime holdover.

However, "I don't think they could have told us much more," he added. Because Unified Protector was a war

by committee, it was tough even to define the mission to protect civilians. NATO's military structure didn't seek more clarification over the next seven months because "they didn't want to open up that bucket of worms."

NATO members were not advocating for regime change, he hastened to add. The notion that "Qaddafi must go"—all 28 could never agree to that and *would never agree to that*," he said.

Absent Space-based Support

The operation started slowly because it took some time to marshal needed assets and because NATO was starting practically from scratch in terms of its military understanding of Libya. For most air campaigns, there is a period when "you have time to plan, and you do IPOE: intelligence preparation of the operational environment," Jodice said. "Those first two to three months were really our IPOE."

At the same time, there was a woefully undermanned ISR organization for the operation and a sharp shortage of actual ISR assets. For the US, platforms like E-8 JSTARS, E-3 AWACS, and even remotely piloted aircraft were hard to spare from Southwest Asia. Initially, just one JSTARS and one AWACS were available, but the operation gradually added a British Sentinel ISR aircraft, a French Atlantique 2, two Predators, an unarmed MQ-9 Reaper provided by

Italy, and a French unarmed Harfang RPA.

This was not nearly enough. For example, even when the AWACS fleet grew, only one was up at any time, and "to be able to cover from Benghazi all the way to [the] west of Tripoli, you probably needed three or four AWACS across the front," Jodice said.

Similarly, there was one RC-135 available, and none of the solo Rivet Joint, JSTARS, or Sentinel aircraft flew more than eight hours a day. That meant the Alliance effort was fully effective across the ISR spectrum "for only about a third of a day," he noted.

Because of that, and a similar limitation on command and control assets, "we probably never had more than four fighters over Libya at any one time, doing weapons employment," Jodice revealed.

There were other oddities as well. Unified Protector essentially inherited the basing structure of Odyssey Dawn, and most of those arrangements were made bilaterally, instead of as an Alliance. With more time to prepare, a more sensible basing structure could have been worked out—for instance, placing all common-configuration F-16s together. Belgium, Denmark, Netherlands, and Norway all have similar F-16s and indeed fly them together in mixed squadrons in Afghanistan.

In OUP, these F-16s were located in three different places, which was far from ideal, although a single mega-base was not really an option either. Not everyone could have deployed to a single base, such as Sigonella on Sicily. "We would have sunk the island," he joked.

There were no air-to-air engagements and no Libyan regime aircraft were shot down, but that doesn't mean the no-fly zone was completely uneventful. "At least once," Jodice said, opposition forces managed to get a MiG-23 airborne. It was intercepted and escorted back to its base, "and then we told them, 'Hey, you do that again, we're going to shoot your ass down. It's a no-fly zone; we don't care who's flying.'"

Overall, the limited airpower assets forced NATO to focus on one specific area at a time. The operation didn't have "a whole lot of space-based support" either, Jodice noted, though some U-2 and Global Hawk missions were flown.

NATO's lessons-learned study of OUP came up with six major findings. Some of them are "not new," Jodice allowed, and he warned the problems identified may pop up again.

The first big lesson is that NATO didn't adequately train or organize for an operation like OUP. The NATO Response Force—a sort of rapid-reaction force—didn't prepare the combined force air component commander organization for what Jodice called “a small, joint operation” with “air-heavy” combat operations. The structures in place were more geared toward “humanitarian assistance-disaster relief.”

Secondly, the CFACC shop wasn't able to stand up an ISR division “that was truly competent across all the processes that were required in supporting a very dynamic ATO [air tasking order] cycle and a kinetic operation.” It was a lack of “butts in seats,” Jodice said. It took time to get specialists in, train them, and “get processes put in place.”

The fix is that under the new NATO air command structure, there will be a “standing JFACC” [joint force air component commander] inside the new headquarters of the single air commander at Ramstein AB, Germany. Jodice's position inactivates at the beginning of this month, and its functions will transfer to Ramstein and to the head of US Air Forces in Europe-Air Forces Africa.

Gen. Philip M. Breedlove, then commander of USAFE-AFACRICA, has been emphasizing “having the people

appropriately trained” and having a database of subject experts across the Alliance, Jodice reported.

In his April confirmation hearing to be NATO's new Supreme Allied Commander, Europe, Breedlove said the Libyan operation taught NATO that the ability of partner nations to sustain their contribution to the fight “is not very deep.” He said the Alliance has “work to do in weapons and the amount of weapons,” and other “critical enablers” such as in aerial refueling.

The Iron Gets Tired

The ISR shortfalls were “probably the most glaring thing we need to work on,” said Breedlove. He added, “What we don't want to do is be the only supplier of that superb capability.”

Similarly NATO found it was deficient in having other divisions of the CFACC shop adequately trained and is taking steps to identify on-call people to reinforce it in an emergency.

Another lesson was that NATO must have enough “critical enablers” on hand to go directly into operations on short notice. An adequate stable of on-call ISR assets is critical because “the speed and the flow of information is so fast that a fused ISR picture from strategic [to] operational to tactical levels is required,” Jodice asserted. Given the practically instant window

into a conflict provided by global media, commanders have to be able to make confident decisions “in single digit seconds,” he observed.

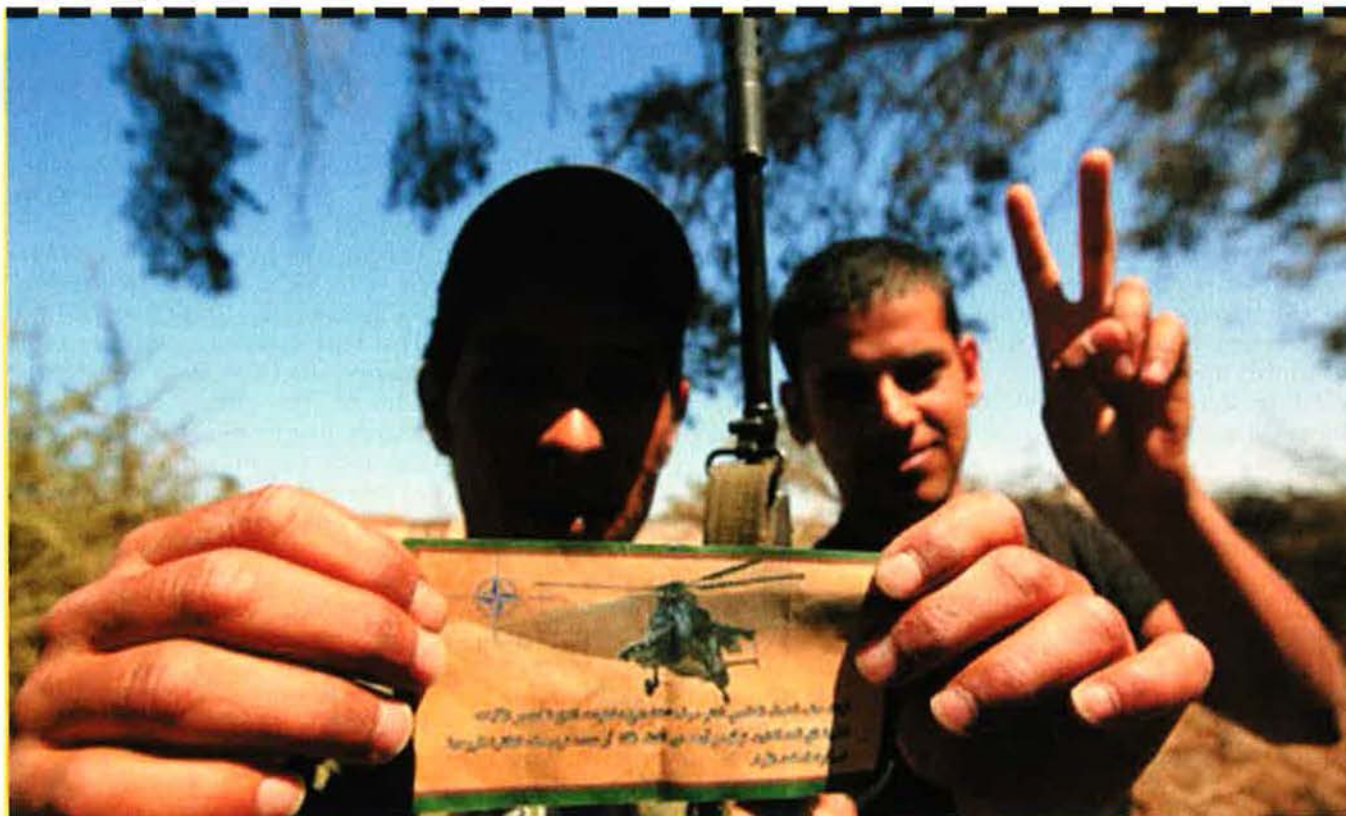
Planners “see it time and time again,” he said, “how a tactical-level decision or ... event can have a huge strategic impact.”

In the first few months, when the operating tempo was not as high, “we were able to meet the number of sorties that were needed, based on the assets that we had,” Jodice pointed out. However, “as time goes on, as we all know, the iron gets tired” and “some of our sortie rates started to drop.”

This was due to many factors. NATO countries had shrunk their air forces, they were committed in Afghanistan and Iraq, and their spending on things like munitions had fallen. Adm. James G. Stavridis, who was then the Supreme Allied Commander, Europe, “did a great job in trying to get the nations to give us more,” said Jodice, but in general, “there wasn't more to be had.”

NATO is now exploring a new concept with the blanket name “Smart Defense” which will explore the Alliance's real minimum required capabilities. “It's a continuation of ‘interoperability,’” Jodice

Libyan men show a leaflet that was dropped from NATO air assets during Operation Unified Protector. Officials would have liked more expertise applied to information operations.



USAF photo



USAF photo by Maj. Andra Higgs

noted, “realizing that no one nation can do it on its own.”

One of the goals to come out of this concept will be that no one NATO member should have to provide more than 50 percent of the capacity in any particular specialty. “That could be difficult,” Jodice said, as the US provided nearly 70 percent of all the aerial refueling capacity for Unified Protector. It’s one of USAF’s “unique enablers,” along with ISR, that no other nation can provide in such capacity.

Likewise, the US ability to stockpile large numbers of precision guided weapons (PGMs) were the only weapons used in OUP) is unique. Jodice said it’s unrealistic to expect smaller NATO partners to maintain months’ worth of precision munitions. But the 50 percent rule is still a discussion point; “the nations haven’t agreed to it,” he said.

Non-CFACC staff military representatives from every country were enormously helpful in smoothing the action, Jodice said. Liaison officers explained what their nations could contribute, helped with the air tasking order, and were on hand to answer questions when their country’s aircraft were flying.

Jodice said it would have been helpful to have more staff expertise on how desired effects might be achieved through nonkinetic means. Those means range

from public affairs to EC-130 broadcasts to leaflets to cyber, although there was no cyber warfare applied.

Unified Protector wound up as a NATO-plus-four operation which was more a collaboration than a coalition, he said. Decisions and campaign planning largely came out of the NATO chain of command, with the consent of the non-NATO participants, Jodice explained.

No Repeat in Syria

“Every nation is going to have its own political will,” he noted, and the additional partner nations had restrictions about what they would and would not do. The lesson is to stay aware of the big picture.

“The will of the Alliance and the goals and objectives of the Alliance always have to be greater than the individual goal or objective of an individual nation,” he said.

Despite the shoestring nature of the operation, Jodice doubts success would have come about any faster.

NATO needed time for intelligence preparation and “to really mature our overall plan and mature the strategy,” he said. NATO wasn’t working directly with anti-Qaddafi forces, “but they needed time for their abilities to mature and for them to figure out ... what they needed to do,” he surmised.

A C-17 positions for air refueling from a KC-135 over the Atlantic Ocean in October 2011. The C-17 was transporting wounded Libyan opposition fighters to Massachusetts for medical care.

The Libyan operation ended with a fractious opposition force coming to power relatively rapidly. Many of its elements don’t share the interests of the US, and this outcome posits yet another hazard for using the Libya model in Syria. At the AFA panel, Karl P. Mueller of the RAND Corp. asserted that permitting the opposition to take power “allowed NATO to walk away from responsibility” for managing the post-Qaddafi Libya. That cost avoidance probably made the operation politically feasible, he allowed. However, the OUP-aided victory conferred legitimacy on the fractious opposition forces.

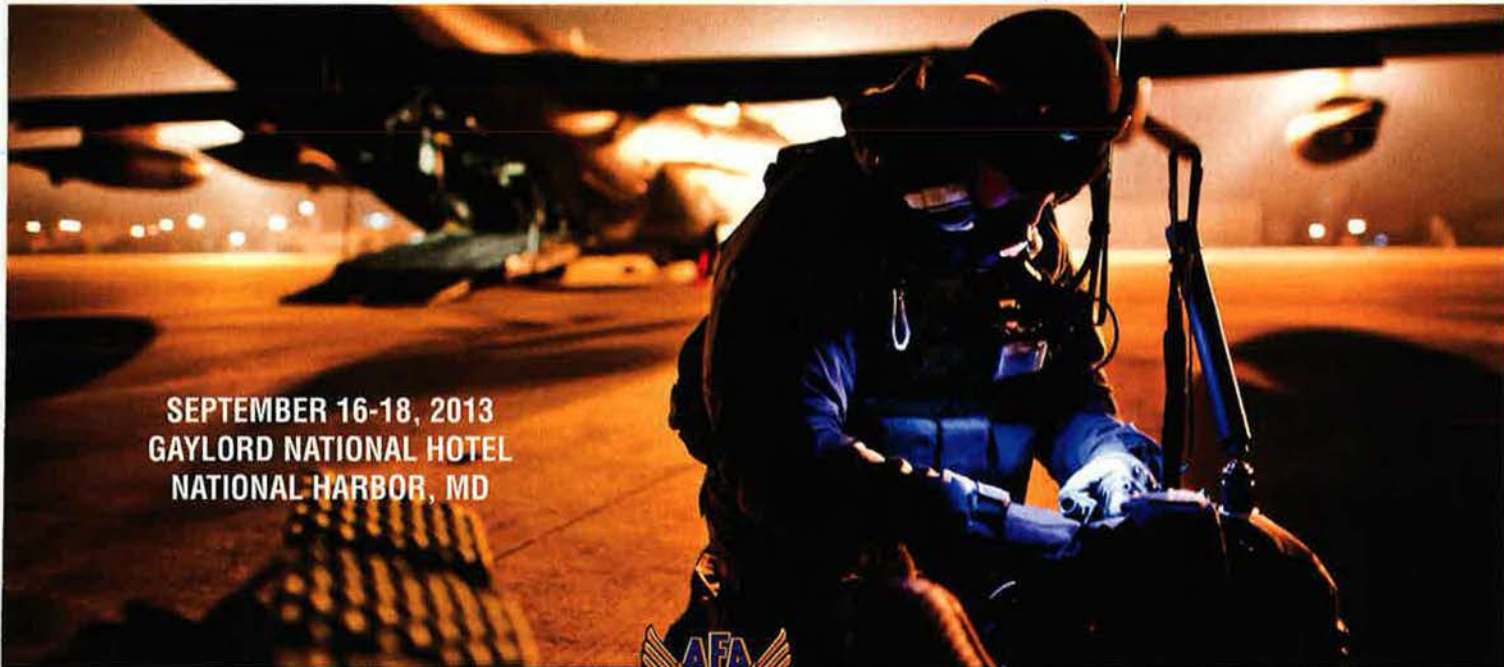
Fellow RAND analyst Christopher S. Chivvis said the fact that the US was not in the lead when OUP wound down removed the stigma of what would have been seen as a US-installed new government. But the quick victory also likely made inevitable the “highly fractured security” in Libya today, Chivvis said.

That is an outcome the West would probably rather not see repeated in Syria. ■

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The Air Force's premier cyberwar simulator is used to train against a broad range of threats.

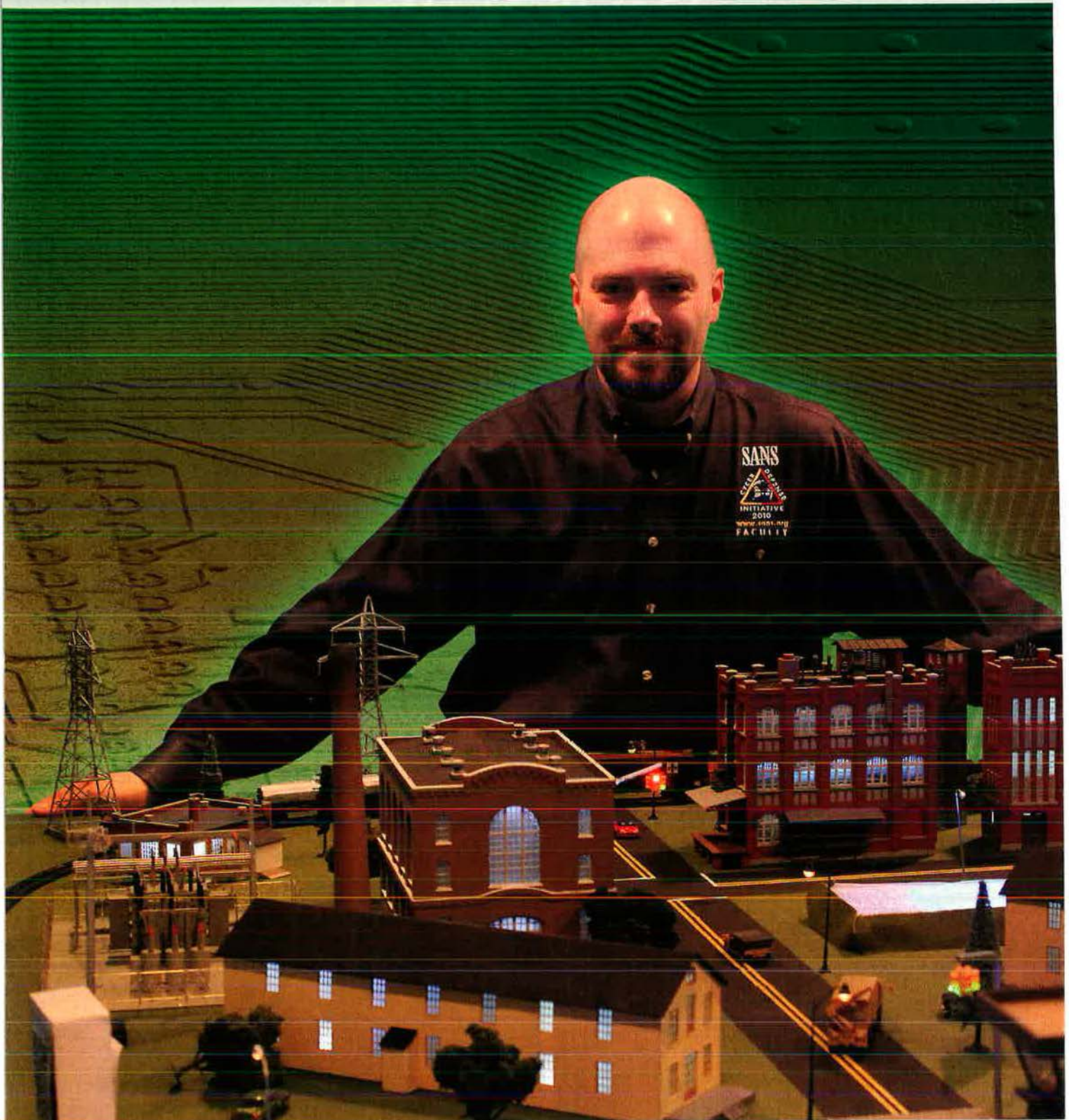


Photo courtesy of Ed Skoudis

Welcome to CYBERCITY

By Anna Mulrine

Ed Skoudis, founder of Counter Hack Challenges and a trainer at the SANS Institute, USAF's go-to organization for cyber training, with CyberCity, an eight-by-10-foot model of a "typical" town. The model is used to test cyber attack scenarios and responses.



IN a nondescript region of eastern New Jersey, a train carrying radiological material is barreling toward a small town, and it is up to the Air Force to derail it. The town is the kind of idyllic whistle-stop hamlet where residents socialize in a cafe called Cuppa Jo (named after the town founder's wife) and enjoy free Wi-Fi while surfing FaceSpace, a social networking site.

But danger lurks all around. Terrorists have used the open Wi-Fi connection at Cuppa Jo to hack into the laptop of a doctor patron who works at the hospital down the street. They plan to use the hospital codes stored in his computer to access the medical records of the town mayor, where they will then change the dosage of a prescription he refills regularly in an effort to poison him.

The terrorists have other nefarious future schemes, too: They will cut the power grid with a nasty cyber virus and destroy the local water supply by engineering a cyber program to make the employees at the reservoir think it is polluted.

When the well-intentioned employees dump chemicals into the water to fix the problem, they will inadvertently be doing just what the terrorists want: contaminating the water supply.

The town is the US military's premiere cyber war simulator—CyberCity—and senior officials believe it has the potential to revolutionize the way the Air Force fights wars.

It is a city built with the help of a local hobby shop, complete with model

trains, miniature cell phone towers, and street lights attached to a power grid and spread out on an eight-by-10-foot table. It resides in the basement of the offices of Ed Skoudis, founder of Counter Hack Challenges, a company that designs cyber challenges, and a trainer at the SANS Institute, the Air Force's go-to organization for cyber training and certification.

CyberCity grew out of a request from senior Air Force officials—a request that offers some clues into what the force fears the most when it comes to cyber warfare and, in turn, the skills they desperately need to cultivate in the cyber workforce of the future.

It's clear that increasingly, for starters, officials fear that enemies will use computers not merely to steal secrets, but to manipulate power grids or supply line data, for example, to cause effects in the physical world—effects detrimental to US interests.

Real World Manipulation

"They came to us and said, 'We need you to figure out some way to teach cyber warriors that cyber attacks have a kinetic effect—that they make stuff move, blow up—that people can get killed,'" Skoudis says. "They were interested in having a reservoir. And they wanted a landing strip with lighting on it."

In short, "they wanted to get into cyber warriors' minds the idea that things can be manipulated in the physical world—it's not just stealing and exporting data."

Training a new class of cyber warriors is a Pentagon-wide endeavor. Senior de-



USAF photo by A1C Kate Thomson

A1C Micah Schrotberger, a cyber transport technician, troubleshoots an information transfer node port at Ellsworth AFB, S.D. The US military needs 20,000 or more cyber personnel to plan and combat cyber attacks.

that is something top Air Force officials continue to grapple with.

“We have not, in my opinion, fully cracked that nut yet,” says Lt. Col. John Weigle, commander of the 39th Information Operations Squadron, the Air Force’s information operations and cyber formal training unit.

Maj. Gen. Suzanne M. Vautrinot, commander of Air Forces Cyber and Air Force Network Operations at JBSA-Lackland, Tex., cites congressional figures that indicate that while the military has nearly 1,000 cyber warriors who can operate at the highest level, “what we need is on the order of 20,000 or 30,000.”

Boosting the Force

Even more than that, she adds, “Every airman has to have an understanding of cyber, because everything you do in your mission is dependent on it.”

In today’s force, “cyber is foundational to everything we do.”

The recent announcement within DOD that it would be boosting its force of cyber warriors is an acknowledgement of this point.

“It’s also a recognition that the problem has become so great that they need to act quickly,” says Alan Paller, founder of the SANS Institute. “And it’s recognition that in this arena, the skills are the weapon.”

fense officials are planning to boost the size of DOD’s cadre of dedicated cyber war specialists from 900 to 4,900.

Not only will these US troops protect computer systems, they also will include “combat mission forces,” according to defense officials, to help the command plan and execute attacks.

The challenge, however, also entails finding the thousands of qualified workers, getting them trained, and then retaining them in the armed forces. Just how to do

There are some particular personality traits that senior Air Force officials believe enhance these skills. “The biggest trait we’d like to see is curiosity,” Weigle says. “We need the technical skills, but also that curiosity about what’s around the next bend and that attitude that ‘I want to see it. I want to go do it.’”

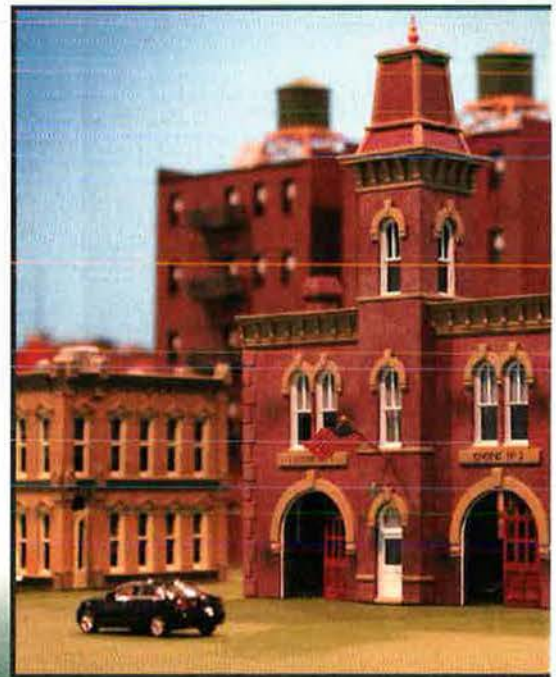
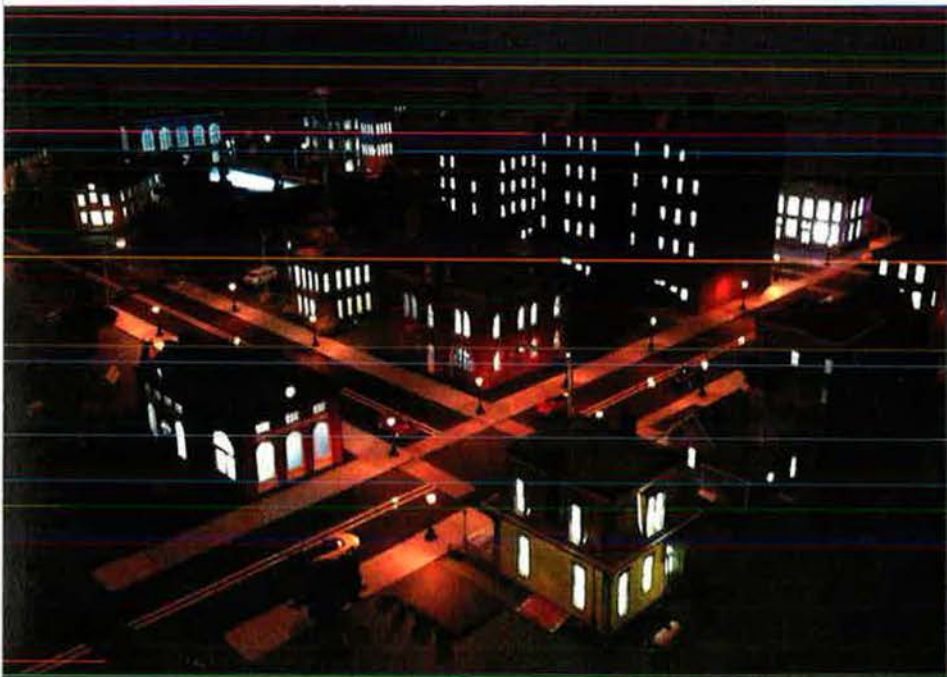
In the quest to prevent and repel cyber attacks, rank matters little. “I’ve got very young troops that have done this since before high school, and they do scripting and computer stuff on weekends, too. This generation—well, I’ll say this up front, I’m extremely jealous,” says Weigle.

Indeed, at the highest levels, the military is becoming increasingly open about its growing need for the cyber skills of a young generation.

In order to train them, Weigle says that he would like to see the number of trainers in his command double “because some of the demands [from US Cyber Command] coming down from the services—we’re not able to pump out as many as they require over a five-year plan,” he says. “I could easily see this all doubling, given the correct instructors, to be much [closer] to what the nation needs.”

That said, there are limitations, Weigle acknowledges. “It all costs money, and my needs smack into the fiscal reality. They say, ‘Well, Colonel, that’s nice.’”

If the Air Force “has to take more operational cuts to feed the training piece, it’s a risk-reward type of function. So I can sit here as the training commander and say, ‘Yes, I need my staff to double.’ But at what expense, right? I do have to weigh that,” he says.



L-r. Petty Officer 1st Class Joel Melendez, USAF SSgt. Rogerick Montgomery, and Army SSgt. Jacob Harding analyze a scenario during Cyber Flag 13-1 in 2012. The exercise focused on DOD computer networks across the full spectrum of operations against cyber attack.

Cyber is a growing priority for DOD, which has become increasingly transparent about its need to grow these skills in the force—including offensive skills—about which the military has been close-lipped in the past.

The first major hint that this was happening began in the summer of 2012, with a request from the Defense Advanced Research Projects Agency (DARPA)—the high-tech arm of the Pentagon—for proposals to develop offensive cyber techniques.

Skoudis estimates that one-third of the CyberCity missions are designed to practice defensive skills, one-third to try to find vulnerabilities in the system, and one-third to hone cyber attack skills.

To illustrate the impact of these cyber attack skills, Skoudis has installed a miniature Nerf rocket launcher on the outskirts of CyberCity.

When the US military begins to use the cyber range regularly later this year, the mission for trainees will be to reverse engineer the controls to the rocket launcher to make sure it fires away from the hospital rather than—as terrorists would have it—toward innocent patients.

“If you can hack a computer and use it to launch a Nerf rocket launcher, you have some interesting skills, no?” Skoudis

USAF photo by S/A Matthew Lancaster



asks. “The skills that we’re building can be used for offense or defense.”

Indeed, cyber warriors of the future often will need to deploy offensive skills to defend US interests, he points out.

“All the offensive stuff we describe is to take control of things to keep bad things from happening,” Skoudis adds.

“Of course, you can always use those skills to make bad things happen.”

Even though finding top cyber candidates has become a top priority for the military, the challenge has become to make the screening process sufficiently rigorous.

In some cyber training programs within the Air Force, even among airmen who have already shown a talent for cyber operations, there is a washout rate of roughly one in 10, Vautrinot says.

Five years ago, the screening process for cyber warriors got so tough that no one could pass the tests, says Paller of the SANS Institute. But then there was the danger of a ricochet effect—in other words, of making the screening tests too easy.

“Because it was hard to build this talent, the danger was that the military could fall back and send up not-so-qualified people.”

Left: CyberCity is equipped with miniature buildings, model trains, cell towers, and street lights attached to a power grid. Officials fear that enemies will use computers not only to steal secrets, but to manipulate power grids or supply lines.

Today the Pentagon is building “phenomenal training programs in advanced cyber skills,” says Paller. “The big idea there is a talent search within the existing military forces.”

The National Cyber Range developed by DARPA, for example, allows cyber specialists to quickly replicate real-world incursions in a variety of networks—from top secret to open. It then times their ability to identify the source of the attack and quickly shut it down.

In the past, many cyber training programs have involved a “king of the hill”-style approach. That means that “two percent of the players do very well and get to the top of the hill,” says Skoudis. “And then they push off the rest.”

So while it’s possible to find the very top cyber warriors, it’s difficult to rank the rest, he adds. The emphasis now is to more clearly find ways to assess the skills of cyber warriors. “One of our big focuses” has been to find ways to separate players into fifths, says Skoudis. “You want to know who’s the best, but also who are the rest in the first quintile, and who’s in the second quintile—those people are also very interesting.”

Gradually, more pipelines into the military are opening up to try to bring more talent into the cyber corps.

The 39th Information Operations Squadron, run by Weigle and located at Hurlburt Field, Fla., has the only simulator in cybersecurity in use, which is helping to build training programs in advanced cyber skills, in much the same



Photos courtesy of Ed Skoudis



USAF photo by SSgt. Christopher Boetz

Maj. Gen. Suzanne Vautrinot, head of Air Forces Cyber, fears sequestration will hurt recruiting for cyber specialists. Before the budget bludgeon, talented civilian cyber gamers were brought in for a temporary stint—something that may be forbidden under sequestration.

way, Paller adds, that the US military trains fighter pilots.

The military also has begun adding considerably to the cyber course offerings, and the services are reaching out to high school-aged students in the form of talent searches.

Thousands of schools throughout the country are building cyber game teams, with mentors from across industry and the military. Cyber training companies are building games to assess individual skills, too. The Air Force Association's CyberPatriot program has gained national prominence and engaged more than 1,000 teams each of the past two years in the nation's largest high school cyber defense competition.

"You've got to find a way that reaches to the individual, so if you compete well, there's a recognition that you do really well in those skill sets," Vautrinot says. "They highlight you to the industry, 'Hey, this guy's got game.'"

Students who have caught the eye of commanders for their skill in cyber games are recruited into an internship program to do temporary stints in Air Forces Cyber and are given security clearances as well. "We gave them clearances and they were actually doing forensics on intrusions into our network," Vautrinot says. "It's like that game tape: How did that work so I can thwart it the next time?"

This tends to involve heuristics, she adds, expanding on the sports analogy. "What does it look like when they move back their arm to throw? So that even before the play sets up it can be identi-

fied and automatically responded to on the network."

These skills, in turn, help the students' participation in the games: Last year's winning team was made up of interns in Vautrinot's cyber emergency response team. "Early engagement is vital for closing the gap," she says.

There have been some hiccups, however—Vautrinot worries that sequestration will keep Air Forces Cyber from recruiting at least one class of top students because of its prohibitions on hiring temporary employees. "A couple" of the interns from these programs have come into the Air Force so far, Vautrinot says, emphasizing that "this is about rising tide, all ships."

Holding On

Keeping talent can be just as difficult as finding it in the first place. Once the Air Force provides the recruits with the necessary skills, the problem is that they are very valuable to industry and have often been recruited away. While the concern is getting qualified troops to fill the growing demand for cyber professionals, it can be a problem when it comes to retaining top trainers, too.

Retention "is a big concern, to be honest, and all the more so for my instructors," says Weigle. "The best cyber pros out there are instructors." He recalls some recent employee losses. "We let them go with the gnashing of teeth, as we do," he says. "It's an issue—one that we all take very seriously." That said, he adds, there is "extreme job satisfaction in turning out the next generation."

Weigle recognizes, however, that for instructors "the incentive is not only to do good things, but also to put food on the table. I can't fault a guy or gal who has an offer." If they are "exporting" their skills into industry, "that's OK, too. We're giving this person up to go out in industry, but he boosts it up. We all rise with the tide."

There has been some discussion about whether there should be a two-tiered track of sorts for cyber specialists. Because they often work back in garrison,

for example, maybe they don't need the same physical skills that, say, infantry troops have.

"I've heard that: 'Why do I need to be able to shoot straight and run a mile-and-a-half in 10 minutes?'" says Weigle.

But many officers remain skeptical of troops who don't also meet the physical requirements required of everyone else in the military.

"One of the insurmountable things in the military is [that] the way you rise is through acts of valor, wielding weaponry in the traditional sense—bullets, bombs, planes," Skoudis says.

While civilian analysts like Skoudis acknowledge that "from a military perspective, to gain respect, you need the discipline to wake up early in the morning, for example," he also believes that "creating a dual track is vital."

So, too, is a sense of respect for the work the specialized troops do. The force is increasingly acknowledging the role that cyber specialists play in national security, most recently with the proposed creation of the new Distinguished Warfare Medal, created in part for distinguished acts in the cyber realm. "Since Sept. 11, 2001, technological advancements have, in some cases, dramatically changed how we conduct and support combat and other military operations," said Defense Secretary Chuck Hagel. "It recognizes a specific type of contribution that is vital to the defense of our nation."

But even the Distinguished Warfare Medal got caught up in the debate about what represents valor and what is vital in the military. Bowing to concerns, DOD killed the medal, opting instead to create a new distinguishing device to affix to existing medals in order to recognize military personnel such as cyber operators.

Still, the new device is "an acknowledgement of the fact that the military knows that cyber is a critical role now. In the new ways that wars are being fought, drone operators are more important now than ever," Skoudis says. "In fact, they can take actions that can save thousands or hundreds of thousands of lives. They are not specifically on the front lines, but the actions they are taking impact the front lines directly."

"It shows the military knows that to retain these folks, they need respect. And the military is increasingly giving it to them because they are earning it." ■

Anna Mulrine, a staff writer for the Christian Science Monitor, reports frequently from Iraq and Afghanistan. Her last article for Air Force Magazine, "Seeking the Sex-Assault Solution," appeared in April.

The 2012-2013 national high school cyber defense competition saw a record number of teams and ever-greater intensity.

CyberPatriot Heats Up

By Peter Grier



The Air Force Association's CyberPatriot—The National High School Cyber Defense Competition—attracted a record number of teams—more than 1,200—for its fifth season. Participants hailed from all 50 states and the Canadian province of Manitoba, plus Department of Defense schools in Europe and the Pacific.

The contestants began last October with practice rounds. Then they battled through three official online rounds to determine who was best at protecting simulated computer networks from a variety of intruder attacks. The top 28 scoring squads earned a trip to the National Finals Competition, held in March just outside Washington, D.C.

CyberPatriot is split into two tracks. One is the Open Division, for teams unaffiliated with the military, from any public, private, parochial, or accredited home school or civic organization. The second is the All Service Division, which includes high school teams with military

ties, such as Junior ROTC, Civil Air Patrol (CAP) units, and Naval Sea Cadet Corps.

CyberPatriot V saw the top three teams in both divisions as first-time winners. In the past, CyberPatriot has seen some teams repeat as winners.

"There were some interesting developments in who made the medal round," said CyberPatriot Commissioner Bernard K. Skoch.

Teams from Virginia swept the Open Division. First place went to a squad named "VOID" from Chantilly Academy in Chantilly, Va. Second and third went to two teams, "Flying Bacon" and "_Invaders," from the same school, Marshall Academy in Falls Church, Va.

JROTC teams affiliated with the Marine Corps swept the All Service Division. First went to the "Devil Dogs" from Marine Military Academy, Harlingen, Tex. Second went to the "Marine Raiders" from Montachusett Regional Vocational Technical School, Fitchburg, Mass. The "CyberBears" from La Cueva

The Open Division finalist team from Palos Verdes Peninsula High School, Rolling Hills Estates, Calif., competes for top honors during CyberPatriot V.

High School in Albuquerque, N.M., took third.

The cream may have risen to the top in what is becoming an ever-more intense competition. Skoch said the fact that teams concentrated in Northern Virginia and with Marine Corps connections dominated the leaderboard in CyberPatriot V was "a reflection of the seriousness of the competition."

This year's National Finals Competition was far more business-like than previous years, said Skoch. Students came in better prepared and more intent on winning than just soaking up the atmosphere.

Teams got right down to work after the clock started ticking. They had their processes better defined. They worked by checklists. They knew what they were looking for.

"I think that our program has grown into adulthood," said Skoch. "People have learned the value of it not just as a competition itself but as a genuine source of education and training for these young people."

CyberPatriot V attracted 21 percent more teams than CyberPatriot IV. Though most had five or six members, one team composed of only two students—from Flour Bluff High School in Corpus Christi, Tex.—made the final round.

"What we have learned is that smaller teams do very well in competition," says Skoch. "Each student gets a broader exposure to cyber security."

Backed by AFA, presenting sponsor Northrop Grumman Foundation, and other supporters, CyberPatriot is intended to get high school students interested in cyber defense, an area of great national need, as well as science, technology, engineering, and math in general.

Today, the news is full of stories about cyber attacks on every level, from individual hackers attacking Facebook pages to national-level assaults on US government agencies and critical industries. The development of national cyber defenders and cyber airmen in particular is vitally important, noted CMSgt. Linus Jordan, command chief for Air Force Space Command, in a speech to space and cyber industry leaders at the National

Space Symposium in Colorado Springs, Colo., earlier this year.

Video Games

Jordan is the father of an airman in the cyber operations field. He cited CyberPatriot as an example of the sort of program that could draw more young people into cybersecurity.

"There is goodness in that type of program [CyberPatriot] for those young Americans, whether they join our team or not, because it exposes them to what the opportunities of the future may be," said Jordan. "More importantly, it reinforces just how critically important STEM is to them as individuals and to us as a nation."

CyberPatriot is set up as a competition because that appeals to youngsters who have grown up playing video games, including games that are run as an online multiplayer environment. CyberPatriot also develops teamwork and provides pride and peer recognition to computer-oriented kids who may not play football or other interscholastic sports.

This year's competition began in early November. In three preliminary rounds conducted online, teams downloaded simulated computer networks preloaded with security problems. They raced to patch these holes, throw out "intruders," and armor the system against new attacks, while a central CyberPatriot server kept their time and score.

This year's CyberPatriot finals added a new twist: a Cisco Networking Event. It consisted of teams taking Cisco-provided hardware and designing, building, and securing their own virtual networks. Event scores constituted 10 percent of the teams' final total.

Training for the networking element began before the teams traveled to Washington, D.C. Cisco arranged for more than 20 teams of adult engineers to meet with finalist teams and coach them in network design and sub-netting, physical design, and network configuration.

"It added another element to the competition. It received rave reviews," said Skoch.

The finals also featured a new Digital Forensics Event. This forced competitors to decrypt and decode rogue files on their computers while competing in the network security aspect of the competition.

Compared to this year's event, CyberPatriot IV had featured an additional test: a cyber forensics crime scene. In this, teams received a cyber crime scenario and the interrogation transcript of a "suspect." Teams got to search a "suspect" mannequin for concealed passwords, thumb drives, and other

Jasmine Talavera, a student competing with the Open Division finalist team from Benjamin Franklin High School, Los Angeles, concentrates during the competition.

Photo by Brittany Gray





evidence to help construct an idea of what had happened.

This was a popular activity but CyberPatriot V was not able to offer it because at the last minute the Department of Defense Cyber Crime Center personnel who designed and constructed it were unable to attend due to sequester-related budget cuts.

“We’re hoping to see them next year,” said Skoch, who added that the crime scene cancellation “was unavoidable.”

Work on CyberPatriot VI is well under way. Preregistration opened in January. Within a few weeks nearly 400 teams had signed up and were looking forward to the 2013-2014 competition.

The extensive training materials available online at CyberPatriot’s website are now much improved, thanks to help from the Center for Infrastructure Assurance and Security at the University of Texas, San Antonio. CIAS is a pioneer in the area of cyber competitions and runs a contest for college students. In addition, competition software has been much improved, meaning the online rounds no longer have outages or other problems to deal with.

“We’re already rolling into next year,” Skoch said.

But perhaps CyberPatriot’s biggest jump does not deal with its high school competition. In April, the organization announced it is expanding its offerings to the middle school level.

A middle school pilot program will begin in the Los Angeles Unified School

District in late summer. More pilot programs in CyberPatriot Center of Excellence areas will begin in October. The intention is for CyberPatriot Middle School to go national in 2014.

This program will have two aspects. The first will be education aimed at inoculating the younger students against the dangers they face on the Internet and their smartphones. CIAS is helping CyberPatriot design cyber safety modules of instruction for kids younger than high school age.

Meeting the Demand

“In some cases we expect to have whole school assemblies. In some cases we’ll do a subset of a school. We’re aiming to help them be safer users of the Internet,” Skoch said.

The middle school initiative also will provide a taste of what CyberPatriot participation would offer the students when they are old enough for high school. Skoch said AFA has long fielded requests from educators to provide materials suitable for younger children.

“Our challenge is going to be meeting the demand that is out there,” he said.

Five seasons in, CyberPatriot is just beginning to be able to collect hard data about its effect on the educational and employment choices of past contestants. Everything they have had up to this

Secretary of the Air Force Michael Donley congratulates the two winning teams of CyberPatriot V. On the left is All Service Division champion team “Devil Dogs,” Marine Military Academy, Harlingen, Tex. On the right is Open Division champion team “VOID,” from Chantilly, Va.

point is anecdotal—but encouraging, said Skoch.

“I am absolutely positive we are drawing more students to STEM. Students who compete in our competition universally say it is wonderful and it has shaped [their] career intentions,” he said.

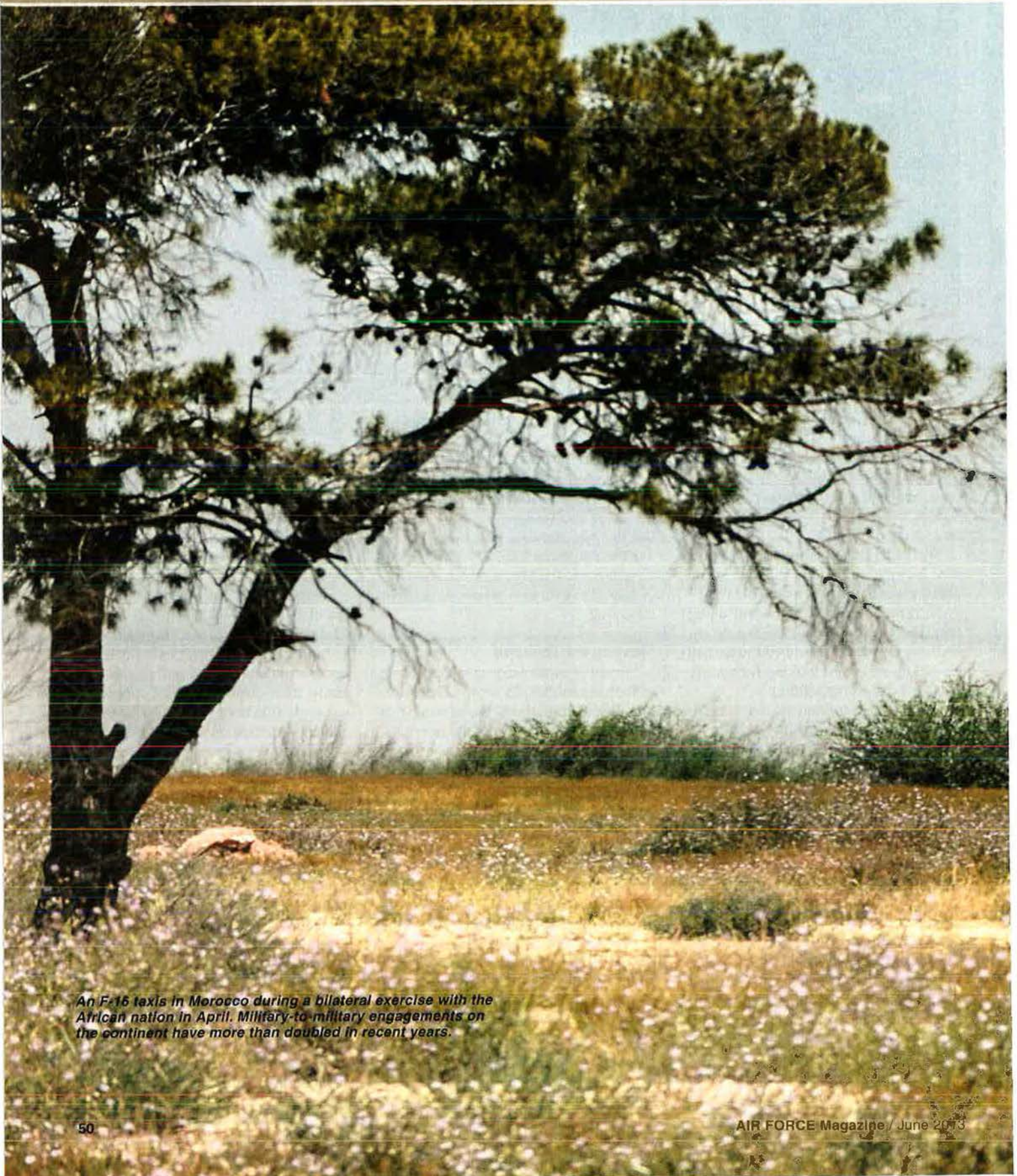
In this sense, CyberPatriot fits into a broader universe of national efforts. Laterally, there are other STEM opportunities for high school youth, from robotics contests to rocketry design. Vertically, CyberPatriot veterans can move on to more sophisticated college-level cyber defense competitions.

In this niche there is still much room for growth. The Northrop Grumman Foundation has announced a three-year commitment to CyberPatriot operations, so the program has an element of financial stability as well.

“We have an enormous opportunity in front of us,” said Skoch. “There are 40,000-plus high schools in America, and we’d like to reach every one. There are three times as many middle schools, and we’d like to reach them, too.” ■

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, is a longtime contributor to Air Force Magazine. His most recent article, “Halvorsen,” appeared in March.

US Airpower in A



An F-16 taxis in Morocco during a bilateral exercise with the African nation in April. Military-to-military engagements on the continent have more than doubled in recent years.

Africa

By James Kitfield

Africa Command's lean counterterrorism approach relies heavily on airpower.

Little-known Manda Bay is an important forward operating site in US Africa Command's campaign to help destroy al Qaeda's affiliated al-Shabaab terrorist group in Somalia.

On a recent afternoon, a detachment of Navy Seabee engineers was working around-the-clock shifts to finish a runway extension before the rainy season arrived. Once completed, the extension would allow Air Force C-130 transports to land at this remote base, the better to support Special Forces training detachments, other US forces in the region, and African Union troops deployed in Somalia.

Last summer, for instance, a Kenyan Ranger battalion trained by US Special Forces "Green Berets" arrived for a joint exercise with a US-trained Kenyan Special Boat Unit. Armed with US Special Forces doctrine, and backed by US airpower in the form of intelligence, surveillance, and reconnaissance flights, the Kenyan Special Forces launched a combined amphibious landing and assault on the Somali port city of Kismayo last September.

The Kenyan Special Forces quickly routed al-Shabaab insurgents from their last urban stronghold in Somalia, denying the terrorist group a key port of resupply from the Arabian Peninsula.

The campaign against al-Shabaab is an early test of a larger effort under way to transform AFRICOM from a relatively quiet organization—concerned in the past primarily with "security cooperation" exercises and civil affairs projects—into a focused counterterrorism command bent on defeating resurgent Islamic terrorist and extremist groups on the African continent. The "Somalia model" is already being touted by US officials as the likely template for AFRICOM's response to Islamic extremists that captured much of northern Mali earlier this year. Indeed, as the US prepares to withdraw its combat forces from Afghanistan and starts bringing more than a decade of operations there to a close, the counterterrorism business is booming in AFRICOM's area of operations.

The recent, post-Arab Spring resurgence of al Qaeda-affiliated terrorist groups in the Middle East and North Africa has lent new urgency to AFRICOM's counterterrorism efforts. The growing

USAF photo by SSGT Stephen Lynch





SrA. Michael Ruehrwein (l) and SSgt. Sean Clark (r) clean the cockpit windows of an HC-130 at Camp Lemonnier, Djibouti. Two HC-130s are on 24-hour alert at the base as part of Africa Command's Embassy Response Force.

threat from Islamic extremist groups has also highlighted an “economy of force” operational model that relies on relatively few US boots on the ground (primarily for training local security forces), instead leveraging the full panoply of US airpower, to include ISR missions, air transport, aerial refueling, and precision strike.

“The growing threat that al Qaeda affiliates are posing to nations in North, East, and Southwest Africa has really changed the dynamic by making counterterrorism a growth business on the continent,” said Air Force Maj. Gen. Carlton D. Everhart II, vice commander of 3rd Air Force/17th Expeditionary Air Force, the air component of US European Command and AFRICOM.

“There are some great capabilities we can offer those nations that want to partner with us,” he said. “When you consider just how vast Africa is, and the fact that there are almost no railroads and

very poorly maintained roads, airpower is critical to nearly all the support we offer to our African partners.”

Indeed, at Ramstein AB, Germany, headquarters of the US Air Forces in Europe-Air Forces Africa, planners talk frequently about the tyranny of distance that affects operations on a continent more than three times the size of the United States. The sheer breadth of the landmass explains why, when Islamic extremists laid siege to the US consulate in Benghazi, Libya, last September, there was no US military response force able to reach them in time to save US Ambassador J. Christopher Stevens and three other Americans killed in the attack. When Islamic extremists launched an offensive that captured much of northern Mali earlier this year, AFRICOM had to build a new base for Predator remotely piloted aircraft in Niger to support French, Malian, and African Union troops who organized a counteroffensive.

A Toehold in Africa

The new Niger RPA base will add to a growing constellation of staging bases in Africa that already includes airfields for surveillance aircraft in Djibouti, Arba

An HH-60G Pave Hawk lands to pick up a pararescue team and simulated patients during a combat search and rescue exercise in the Grand Bara Desert of Djibouti.





USAF photo by ATC Nicholas Byers

Minch in Ethiopia, and the Seychelles in the Indian Ocean.

Few Americans are familiar with Djibouti, a tiny nation in northeast Africa whose international airport—where the single runway is shared by civilian airliners and military traffic—isn't even certified to conduct operations by radar. Yet observant air travelers visiting there sometimes spot US MQ-1 Predator RPAs parked on the military side of the field. Other visitors include French Mirage and American F-16 fighters, Japanese P-3 patrol aircraft, and French Puma and US HH-60 helicopters.

Since 2010, air traffic at the Djibouti airport has more than tripled, creating a headache for overburdened air traffic controllers. According to a recent article in the *Washington Post*, 16 Predators have been deployed to Djibouti since 2010; five have crashed after taking off from Djibouti since January 2011.

All of this makes Col. David Harris Jr., the air component commander for Combined Joint Task Force-Horn of Africa, one of the busiest airmen in uniform. On an average day, Harris sits in the task force's headquarters at Camp Lemonnier—a former French Foreign Legion post on one side of the airport—and helps orchestrate an airborne ballet that includes everything from slow-flying Predators and civilian

jetliners to fighters and search and rescue helicopters.

"The fact that we have so many different aircraft types operating in this airspace definitely complicates our mission," said Harris in an interview at Camp Lemonnier. "Sequencing the flight paths of everything from fast-flying 757 airliners to drones powered by modified snowmobile engines is an intricate dance, but we manage it every day."

As an example of how the increased Islamic extremist threat has intensified operations at CJTF-HOA, Harris pointed to two HC-130s on the tarmac at Djibouti. They are on 24-hour alert, part of the new Embassy Response Force that CJTF-HOA created after the Benghazi tragedy. Days after that incident, protesters in Khartoum, Sudan, breached the gates of the German and British embassies. Other demonstrators threw Molotov cocktails at US embassies in other countries.

Because of those attacks, US commanders at CJTF-HOA stood up the Embassy Response Force—a first-of-its-kind quick reaction force for Africa, designed specifically for the protection of US embassies. In January, the Embassy Response Force went on alert during an attempted coup in nearby Eritrea, where the State Department maintains a small diplomatic

USAF pararescuemen and US soldiers evacuate "patients" during a CSAR exercise in Djibouti in February. Response times to emergencies will vary due to the vast distances rescue airmen must transit.

outpost. The force stood down after State Department officials confirmed that the Eritrean government had successfully put down the coup.

In assembling the Embassy Response Force, US commanders first queried American embassies in Africa about the kind of help they would need in a crisis. The principal needs were perimeter security and possible evacuation of personnel. That dictated a fairly large force that includes Army infantry, USAF pararescue jumpers, and Navy explosives and ordnance-disposal experts. Each member of the team must be ready to launch within an hour after the alert is sounded. At that point, their response time is dictated by how fast the two HC-130s can transit Africa's vast distances.

To give an idea of the kinds of challenges the Embassy Response Force might encounter on a real mission, Harris recounted a recent personnel recovery mission in Ethiopia. The HC-130s landed at night on a pitch-black airstrip, but first had to make a "clearing pass" to scare a congress

of baboons and a pod of hippopotamuses off the runway. The site security team rapidly secured the area, as Air Force PJs treated and evacuated a badly injured US government worker.

"In terms of the need to respond quickly and to secure a site for the extraction of personnel, there are definitely parallels between the Embassy Response and personnel recovery missions we conduct on a regular basis to extract wounded or sick US personnel from far-flung locations in Africa," said Harris. "That mission consumes a lot of my time."

In written testimony for his Senate confirmation hearing in February, incoming AFRICOM Commander Army Gen. David M. Rodriguez declared the US military needs to increase its intelligence-gathering missions in Africa by nearly 15-fold to counter the growing terrorist threat on the continent.

"Counterterrorism and counterinsurgency are clearly the top priority missions at AFRICOM, and they demand key airpower capabilities that include ISR, air mobility, airborne command and control, and sometimes precision strike," said Col. David Poage, chief of the international relations division at USAFE-AFAFRICA.

To get a handle on the scope of the challenge, planners at Ramstein plot areas of conflict or potential conflict and overlay them on a map of Africa; they then identify military capabilities that would be useful in countering those

threats and regional allies willing and able to partner with the United States. "That exercise reduces this huge continent to an AOR [area of responsibility] that is more manageable," said Poage. "We slice this elephant up in a way that lets us eat it one bite at a time."

Greatly complicating AFRICOM's challenge, however, is the unique nature of the command. Because of lingering colonial-era scars, African nations remain highly sensitive about any large-scale Western military presence. This is one reason AFRICOM operates out of a headquarters in Germany. Because it has few permanent forces of its own and relies primarily on rotational units for conducting operations, AFRICOM also has to file regular "requests for forces" that can take up to a month to fulfill, slowing the command's response time.

Keeping Small

Air Force planners often find that force protection concerns and the limited infrastructure across much of Africa dictate that operations be conducted out of southern Europe. The NATO air operation that helped depose Libyan dictator Muammar Qaddafi in 2011 were flown and commanded out of Italy, for instance, while aerial refueling tankers supporting French and African Union forces in Mali are flying out of southwest Europe.

"Whenever we plan a mission that puts aircraft or boots on the ground in Africa

we have to essentially start from scratch, sending an advance team to set up the required relationship," said Lt. Col. John Chan, an operational planner for USAFE-AFAFRICA.

"We also have to keep the footprint of our operations small because of the difficulty of procuring even basic staples such as food and fuel, and yet that force must be robust enough to ensure that our people are protected and not in jeopardy," he said.

As a form of outreach to African nations, USAFE-AFAFRICA frequently brings African air Chiefs to Ramstein for commanders' conferences and exercises. Military-to-military engagements on the continent have more than doubled just in recent years, including an Africa Partnership Flight exercise in 2012 that taught participants from five West African countries how to deploy peacekeepers by air in an emergency.

"Sure enough, when the Mali crisis erupted, a number of our African partners who took part in the exercise put their training to use in actually deploying their troops in a crisis," said Poage. "They learned that deploying forces by

USAF pararescuemen prepare for a static line jump from an MC-130P Combat Shadow over the Gulf of Tadjoura, off the coast of Djibouti, during a training mission for Combined Joint Task Force-Horn of Africa.

USAF photo by SSgt. Devin Doskey





USAF photo by A1C Nicholas Byers

air is a lot more complicated than just showing up at the airline ticket counter and throwing your bag on a carousel.”

With the proliferating threat from Islamic extremist groups in Africa, USAF officials acknowledge the key to future operations is developing more partnerships and getting access to more runways and facilities in key regions.

“Strategically, Africa presents an anti-access challenge, which is why building relationships is so key,” said Everhart. “In each critical region we would like to build a hub-and-spoke type operation that allows us to bring in critical support, whether that’s ISR, air mobility, or midair refueling. That’s why having the Combined Joint Task Force-Horn of Africa is so vital to our strategy in East Africa. It’s allowed us to build friendships with regional governments that all see a common threat.”

African nations whose forces are battling terrorists or insurgencies most frequently request the sophisticated ISR that has become a calling card of US counterterrorism operations. That’s why, shortly after helping French forces deploy to Mali to fight terrorists associated with AQIM (al Qaeda in the Islamic Lands of the Maghreb), AFRICOM admitted it was building the base for Predators in nearby Niger to offer additional ISR support.

Locals frequently observe MQ-1 Predators taking off from Djibouti airport, some flying north toward nearby Yemen to track targets associated with al Qaeda

in the Arabian Peninsula (AQAP) and others flying south toward Somalia to help African Union forces deployed there hunt down the al Qaeda-linked terrorists and insurgents of al-Shabaab.

A challenge for Air Force officers on CJTF-HOA’s staff was how to transmute state-of-the-art—and highly classified—intelligence information for those African Union forces. Their answer was the Africa Data Sharing Network.

Using outdated and surplus computers donated by the Defense Reutilization and Marketing Office, they equipped African Union forces in Somalia with a secure data network that can access US surveillance imagery—imagery that has been carefully scrubbed to avoid compromising US sources and methods. African intelligence officers have been taught to read the images in such a way as to estimate the strength and positions of al-Shabaab forces.

“It was like turning on a lightbulb in a dark room, because suddenly the African Union forces were aware of who and what was moving all around them,” said Col. James Clark, director of command, control, communications, and computers for CJTF-HOA. “At that point we began seeing the African Union operations against al-Shabaab, both offensive and defensive, improve by a whole order of magnitude in terms of effectiveness.”

US military personnel secure a simulated patient on a stretcher during a January exercise in Djibouti. US airmen, marines, soldiers, and sailors participated in the exercise. It aimed to enhance interoperability during personnel recovery missions.

A third, unspoken pillar of the US air campaign in Africa is direct targeting of high-value terrorists. Though CJTF-HOA sources refused to comment on these operations, it’s an open secret that the United States conducts the same kind of targeted, counterterrorism strikes in Somalia and Yemen—often by RPAs—that it also uses to deadly effect in Pakistan.

However, it is the “eyes in the sky” provided by advanced ISR platforms that are consistently in highest demand.

“At a recent commanders’ conference with African Air Chiefs, I asked them what they needed most, and almost all of them answered, ‘More ISR,’” said Everhart.

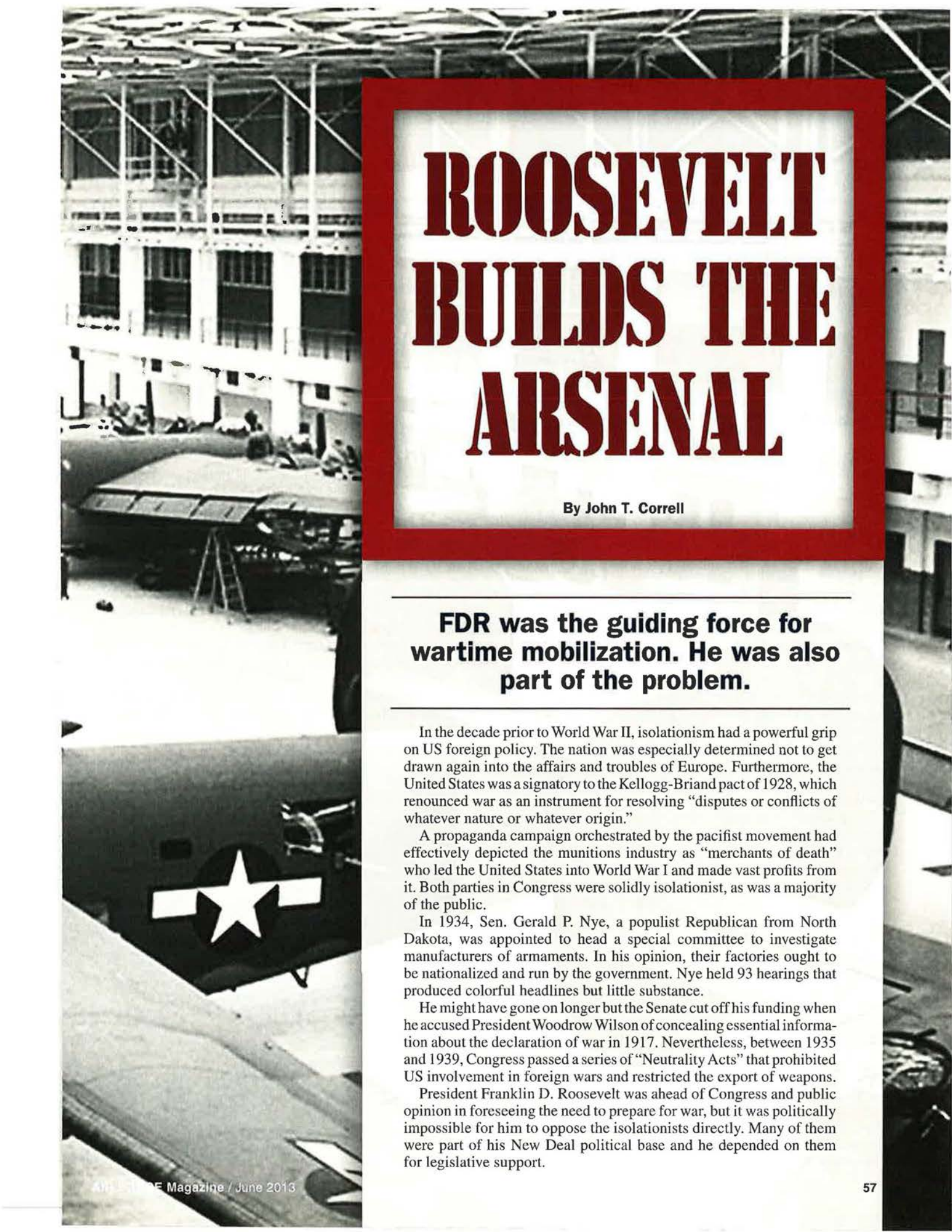
That response was echoed by the French, he noted, when their troops in Mali were asked what US support was most important to them.

“Anytime someone tastes that sweet beverage we call ISR, they really like it, and they want more,” said Everhart. “It’s a great way to make friends and find partners.” ■

James Kitfield is the defense correspondent for National Journal in Washington, D.C. His most recent article for Air Force Magazine, “With the JTACs” appeared in the April 2012 issue.



B-24s under assembly at Willow Run. At one point during the war, 500 B-24s a month rolled off the plant's mile-long, L-shaped assembly line.



ROOSEVELT BUILDS THE ARSENAL

By John T. Correll

FDR was the guiding force for wartime mobilization. He was also part of the problem.

In the decade prior to World War II, isolationism had a powerful grip on US foreign policy. The nation was especially determined not to get drawn again into the affairs and troubles of Europe. Furthermore, the United States was a signatory to the Kellogg-Briand pact of 1928, which renounced war as an instrument for resolving “disputes or conflicts of whatever nature or whatever origin.”

A propaganda campaign orchestrated by the pacifist movement had effectively depicted the munitions industry as “merchants of death” who led the United States into World War I and made vast profits from it. Both parties in Congress were solidly isolationist, as was a majority of the public.

In 1934, Sen. Gerald P. Nye, a populist Republican from North Dakota, was appointed to head a special committee to investigate manufacturers of armaments. In his opinion, their factories ought to be nationalized and run by the government. Nye held 93 hearings that produced colorful headlines but little substance.

He might have gone on longer but the Senate cut off his funding when he accused President Woodrow Wilson of concealing essential information about the declaration of war in 1917. Nevertheless, between 1935 and 1939, Congress passed a series of “Neutrality Acts” that prohibited US involvement in foreign wars and restricted the export of weapons.

President Franklin D. Roosevelt was ahead of Congress and public opinion in foreseeing the need to prepare for war, but it was politically impossible for him to oppose the isolationists directly. Many of them were part of his New Deal political base and he depended on them for legislative support.



Roosevelt (in passenger seat) tours the Boeing plant in Seattle. By 1942, the US was the world's foremost producer of military aircraft. By the war's end, the nation would manufacture almost 100,000 fighter aircraft alone.

Photo by the Bonneville Power Administration for the War Production Board

Roosevelt gave the Nye committee his general endorsement and declared the arms embargo to be "entirely satisfactory." He was still expressing isolationist sentiments in a campaign speech in 1940, promising, "Your boys are not going to be sent into any foreign wars."

He could (and often did) espouse both sides of an issue. He was not one to let consistency hold him back. Long before Pearl Harbor, Roosevelt was working behind the scenes to prepare the nation for the coming war.

The Arsenal of Democracy is the great American success story. US munitions production in World War II was almost equal to the total output of allies and adversaries combined. At the Big Three conference in Tehran, Stalin raised a toast to "American production, without which the war would have been lost."

A politician with lesser skills than Roosevelt could never have pulled it off, but at times, he was part of the problem. He created one special organization after another with overlapping authority to direct the mobilization effort but he did not back his own appointees or intervene to resolve the inevitable conflicts. The clash of government organizations, control boards, and special interests did not stop until the end of the war.

"Roosevelt never moved in only one direction at a time," said historian Doris Kearns Goodwin.

Roosevelt's preparations were without precedent. In the past, US foreign wars were mostly against relatively weak adversaries like Mexico and Spain. The approach always was to first declare war, then mobilize and prepare to fight. World War I was almost over before the United

States got into it and there was no mobilization in advance.

FDR's "Quarantine" speech of October 1937 was a trial balloon to test whether public opinion had shifted. He warned of growing aggression abroad but did not mention Germany or Japan. He said peace and trust must be restored but did not say

how. He used the word "quarantine" as an analogy only, comparing the situation to containment of a medical epidemic.

Head Start

Finding isolationist sentiment still strong, Roosevelt backed off and continued his effort in less conspicuous ways. He saw that the shortfall in ships and airplanes had to be addressed first. He told his special confidant Harry L. Hopkins that he was sure the United States would get into the war and that airpower would win it.

In November 1938, Roosevelt called his principal military and civilian advisors to the White House and said he wanted a major buildup of the Army Air Corps. According to historian Eric Larabee, he told them "he did not want to hear about ground forces, that a new barracks at some post in Wyoming would not scare Hitler one god-damned bit."

Newspaper reports in 1939 quoted Roosevelt as saying, "Our American frontier is on the Rhine." That set off angry protests from the isolationists. He denied that he had said it, attributing the mistake to "some boob."

When Germany invaded Western Europe and France in 1940,

Roosevelt called for the production of 50,000 airplanes a year. Critics ridiculed it as a wild fantasy. Indeed, it was not possible at the time, but the goal was not as far-fetched as it sounded. By 1944, annual US aircraft production would reach almost twice that number.

As the situation deteriorated in Europe and the Far East, Roosevelt spoke with less restraint. In May 1941, he declared an unlimited national emergency and said, "Our Bunker Hill of tomorrow may be several thousand miles from Boston."

He was careful to add assurance that the United States was not about to enter the war and said there would be "no new group of war millionaires" as a result of "the struggles abroad." In the same speech, he said "the policy and the laws for collective bargaining are still in force" and that labor would be "adequately represented" in the deliberations to come.

When rearmament began in 1939, the Air Corps had almost no modern airplanes except for the B-17 bomber. Its best fighter, the P-40, was no match for the German Bf 109, the Japanese Zero, or the British Spitfire. However, the fundamentals were in place. By the time of the attack on Pearl Harbor in 1941, production had begun on most



John Lewis, head of the United Mine Workers, was a thorn in Roosevelt's side. A strike by 400,000 members of his union prompted Congress to pass the Smith-Connally Act, which required 60 days' notice for any labor strike. At right, Lewis testifies before a Senate subcommittee.

Photo via Library of Congress

of the types of aircraft with which the Air Corps fought the war, such as the P-47 Thunderbolt, P-38 Lightning, P-39 Airacobra, and P-51 Mustang.

Arming the Allies

The Neutrality Act of 1935, which imposed the arms embargo, did not distinguish between aggressors and victims, forbidding shipment of weapons to all "belligerents" without regard to where US interests might lie.

Roosevelt had to work the seams and loopholes. The first of these was "Cash and Carry," thought up by financier Bernard M. Baruch, who had managed US mobilization in World War I. Baruch pointed out the risk was in the shipment of weapons, not in the sale, and that the strict requirements of not arming belligerents could be met if a purchaser took direct possession and did not use US vessels for transport. Such sales began with the approval of Congress in November 1937.

When Germany invaded Czechoslovakia in 1939, Congress repealed the arms embargo despite the bitter opposition of isolationists, including aviation hero Charles A. Lindbergh and Nye, who was still in the Senate. The repeal vote also renewed Cash and Carry.

FDR's next venture was "Surplus Sales" in 1940. A loophole in the Neutrality Acts allowed the sale of surplus war materiel to a private corporation, which could then resell the goods abroad. US Steel was recruited as the middleman and armaments conveniently declared to be surplus soon found their way to Britain and France.

In December 1940, following the forma-

tion of the Rome-Tokyo-Berlin Axis, Roosevelt declared in a famous radio address, "We must be the great arsenal of democracy. For us, this is an emergency as serious as war itself." Even at that dire moment, though, he felt compelled to stipulate that any talk of US forces being sent to Europe was "deliberate mistruth."

The masterpiece of Roosevelt's improvising was "Lend-Lease." In a major break from isolationism, the United States announced that it would lend or lease weapons and war materiel to the Allies but would not expect to be paid immediately. Nor would hard cash be demanded later. When the war was over, Britain and the USSR could return the equipment or some substitute for it. Congress went along with Lend-Lease in a split vote in March 1941, effectively putting an end to neutrality.

Initiatives to arm the Allies were so successful that equipping the US Army Air Corps fell behind as new aircraft coming off the production line were diverted to the British.

Uneasy Partners

The New Dealers and big business had a mutual disdain for each other, which made it difficult for Roosevelt to establish a cooperative working relationship with industry. In the new distribution of power, wealthy corporations were to be taken down a peg and, as Secretary of the Interior Harold L. Ickes put it, "be satisfied with much less than they have." Roosevelt denounced "war profiteers" as part of his standard political pitch. In the 1936 election campaign, he said that "the forces of organized money are unanimous in their hate for me—and I welcome their hatred."



Industry had taken a beating in the Nye investigations and did not regard defense work as all that desirable. DuPont, which had supplied gunpowder to the Army for 150 years, cut its production of munitions to less than two percent of the operation. The excess profits tax kept a tight lid on earnings from military contracts and the amortization period for fully deducting the costs as a business expense was 16 years. There was no assurance that investment in new plant facilities or prototypes would lead to an actual contract.

Roosevelt understood, even if the more doctrinaire New Dealers did not, that concessions had to be made. Legislation in 1940 relaxed the profit ceiling somewhat, reduced the amortization period to five years, and reduced the risks of capital investment.

Ickes was outraged. "This is abandoning advanced New Deal ground with a vengeance," he wrote in his diary. "If private citizens won't supply munitions of war at a reasonable rate and take potluck with the rest of the citizens in the matter of taxation, then the government ought to build its own plants and conscript the necessary managers to run them." He was even more outraged when it became the norm to issue contracts on the basis of the contractor's cost plus a fixed fee.

Roosevelt appointed a seemingly endless succession of boards and advisors in hopes of making industrial mobilization run smoothly. The first of these was the War Resources Board in 1939. It had no powers and was disbanded after three months.



Harry Hopkins (l) and Roosevelt confer in 1945. The President told Hopkins, his special confidant, early on that he was sure the US would enter the war and airpower would win it.

Photo via Wikipedia

Next was the National Defense Advisory Counsel in 1940. It had no formal leader and no authority but one member, William S. Knudsen, managed to be effective despite the bureaucratic hobbles.

Knudsen, the former president of General Motors, had played a leading part in the invention of the automobile mass production process. He persuaded all of the big automakers, including Henry Ford, who despised Roosevelt, to convert 20 percent of their facilities to defense production. In January 1941, Roosevelt created the Office of Production Management and named Knudsen as director general. *The New Republic* complained that it was “a business dictatorship.”

In January 1942, Roosevelt gave in to Knudsen’s critics and replaced him in the usual roundabout fashion, creating the War Production Board to take over the functions of OPM and naming Donald M. Nelson, a former executive of Sears Roebuck, to head it. Nelson had extensive knowledge about the nation’s producers and suppliers and he continued Knudsen’s implementation of mass production.

FDR gave Knudsen a direct commission as a lieutenant general—the only such appointment ever to that grade—and assigned him as director of production for the War Department, where his authority overlapped to some extent with Nelson’s.

Roosevelt did not back Nelson either and supplanted the WPB with the Office of War Mobilization in May 1943. This time the President found a mobilization czar he would support. The OWM director was James F. Byrnes, a well-connected former US Senator and

Supreme Court Justice who had resigned from the Supreme Court in 1942 to head the Office of Economic Stabilization, which oversaw wage and price controls.

Roosevelt did not allow anyone to undercut Byrnes or get around him. The industrial approaches introduced by Knudsen were firmly established and Byrnes ran the system with a sure hand.

Air Detroit

American businesses, large and small, converted to war production. As recounted by Arthur Herman in his book, *Freedom’s Forge*, Frigidaire turned to making machine guns instead of refrigerators and Rock-Ola, a Chicago manufacturer of juke boxes, made M1 carbines. The biggest change was in the huge automobile industry.

After Pearl Harbor, Roosevelt gave Leon Henderson, head of the Office of Price Administration and Civilian Supply, authority to shut down nonessential manufacturing. In January 1942, Henderson ordered a halt to passenger car production for the duration of the war. The automakers turned to output of war materiel, including trucks and tanks for the armed forces and more than half of all the aircraft engines made between 1940 and 1945.

All of the big automakers produced aircraft parts, but at its massive new plant at Willow Run west of Detroit, Ford manufactured entire B-24 bombers. Five hundred airplanes a month rolled off the L-shaped assembly line, a mile long and the largest in the world. Pilots and crews slept on cots at Willow Run, waiting to fly the bombers away as soon as they were ready.

Willow Run had barely opened in 1942 before

production there slowed to a crawl when the Army directed one major design change after another, 575 of them in the first year. If the production line stopped to retool for all these changes,

few finished airplanes would be delivered. The solution was for the main production lines to keep on rolling, turn out basic models, and send them to 10 field modification centers that made the necessary changes.

Ford built half of all the B-24s produced during the war, 6,791 complete aircraft and 1,893 “knock-down” units assembled by other contractors. The Eastern Aircraft Division of General Motors made airplanes for the Navy. In addition to aircraft and engines, the auto industry produced a third of the machine guns and 80 percent of the tanks and tank parts.

The Home Front

All sorts of things were rationed, but not always for the obvious reason. Canned goods were on the list because of the tin that went into the cans. Gasoline was rationed primarily to conserve the rubber used in car tires. The Dutch East Indies, the source of 90 percent of the prewar rubber supply, was in Japanese hands and the shortage was made more acute by wartime demands. A single B-17 bomber required half a ton of rubber. Manufacture of synthetic rubber helped the problem but did not solve it.

The government regulated the allocation of numerous materials and commodities, the most critical of them being steel, copper, and aluminum. Inevitably there were conflicts between priority ratings set by agencies with differing requirements.

There were also elaborate programs to regulate the labor supply. During the war, 10.1 million men were drafted into the armed forces but farm workers, employees in defense plants, and others got deferments.

In December 1941, representatives of organized labor and their counterparts in industry made a “no strikes or lockouts” pledge for the duration of the war. However, to the embarrassment of the Administration, which counted labor as a pillar of its political base, the big unions could not always control their locals and there were thousands of wildcat strikes every year.

Tempers reached the boiling point in 1943 when John L. Lewis, head of the United Mine Workers, pulled 400,000



Millions of “Rosie the Riveters” entered the defense manufacturing industry. Here, women install fixtures and assemblies to a tall fuselage section of a B-17 at the Douglas Aircraft plant in Long Beach, Calif.

Library of Congress photo



P-40s lined up for scrapping at Walnut Ridge Marine Air Facility in Arkansas. Many surplus airplanes were sent there after the war for short-term storage and subsequent disposal—stripped of useful parts and melted down for their aluminum content.

National Archives photo

coal miners out on strike seeking a wage increase of \$2 a day. Roosevelt threatened to cancel the miners' draft deferments and they went back to work but Congress was not satisfied. The Smith-Connally Act, passed in June, requiring 60 days' notice of a strike and set stiff penalties for the encouragement of strikes in war production plants. Roosevelt vetoed it, arguing that it would produce labor unrest, but it took the Senate only 11 minutes to override his veto.

The number of women in the labor force surged and by 1944, women accounted for 37 percent of the workers in prime defense plants.

"Rosie the Riveter" became a cherished wartime symbol, but the reality was often more interesting.

One of the riveters at the Bell Aircraft B-29 plant at Marietta, Ga., was Helen Dortch Longstreet, 80, widow of Confederate Gen. James Longstreet. She worked the day shift, commuting from her home in Atlanta in her Nash coupe. She wore a visored cap, usually had a cigarette hanging off her lip, and was not bothered by the noise and kick of the rivet gun. She worked until the war ended. Her foreman said she never missed a day and was never late.

The labor force was even extended to include San Quentin prison in California where inmates made antisubmarine nets and night sticks for the National Guard.

Despite the fame of Willow Run, the regular aircraft companies produced more than 70 percent of the wartime production of 300,000 military air-

planes. To get it done, they had to expand their plants, open new ones, and make fundamental changes in their operations.

In the 1930s, the aircraft industry subsisted on small orders, several thousand a year, from the armed forces and the airlines. Each airplane was hand-built. The plants worked one shift a day and did not use their full capacity. However, when war came the requirements rose so rapidly that they could not be met by expansion of existing floor space.

Reconversion

The most challenging task was manufacturing the big bombers. For B-24s, Consolidated tripled the size of its San Diego plant, built a new one in Fort Worth, Tex., and licensed production to Douglas and North American.

Half of the B-24s were built by Ford at Willow Run. Boeing enlarged its B-17 plant near Seattle and licensed further production to Douglas and Vega. B-29s were built by Boeing in Seattle and Wichita, Kan., by Bell in Marietta, Ga., and by Martin in Omaha, Neb.

Like the automobile industry, the aircraft companies had to adopt mass production techniques. By 1942, the United States was already the foremost producer of military aircraft in the world. Its wartime totals included 98,000 bombers, almost 100,000 fighters, 24,000 transports, and 58,000 trainers, plus other aircraft for reconnaissance, communications, and special purposes.

Production of warships increased, too, but the amazing story on the maritime front was the "Liberty Ships," the simple, stripped down, and undeniably homely

merchant vessels that carried most of the war materiel to foreign theaters. They were produced by Henry J. Kaiser, an industrial entrepreneur so unfamiliar with naval matters that he continued to call a ship's bow "the front end."

In 1942, in what was called variously a demonstration and a publicity stunt, he built a Liberty Ship in four days, 15 hours, and 26 minutes. In all, more than 2,700 Liberty Ships were launched and many of them continued in service for years.

When the Arsenal of Democracy was running at full tilt, it incorporated just over 47 percent of US economic output. War production peaked in 1943 and declined sharply in 1944. The time was at hand to begin reconverting industry to civilian and consumer goods, but the Army resisted, fearing it might lead to a slackening of the war effort.

Business leaders also opposed early reconversion. Large companies were more committed than smaller ones to defense production and did not want their competitors to gain an advantage.

Thus, reconversion was a slow process. Automobile production resumed in July 1945 and gasoline rationing ended in August. The automakers put 500,000 cars on the market before the end of the year and small appliances such as toasters and electric irons became available. Great numbers of military airplanes were suddenly surplus. Some were sold to the airlines or transferred to civilian government agencies or allied countries. A few were saved for historic purposes but most were cut apart and melted down for the metal in them.

Ford sold the Willow Run plant in 1947 to Henry Kaiser, who made Kaiser-Frazier automobiles there before reselling the facility to General Motors in 1953. Among its diversified output was 20 mm cannons during the Vietnam War.

The big plant hung on with the manufacture of automatic transmissions until 2010 when it was closed as part of the General Motors bankruptcy proceedings. ■

John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributor. His most recent article, "Up in the Air With Milton Caniff," appeared in the April issue.

Chart Page Special

Defense Budget at a Glance

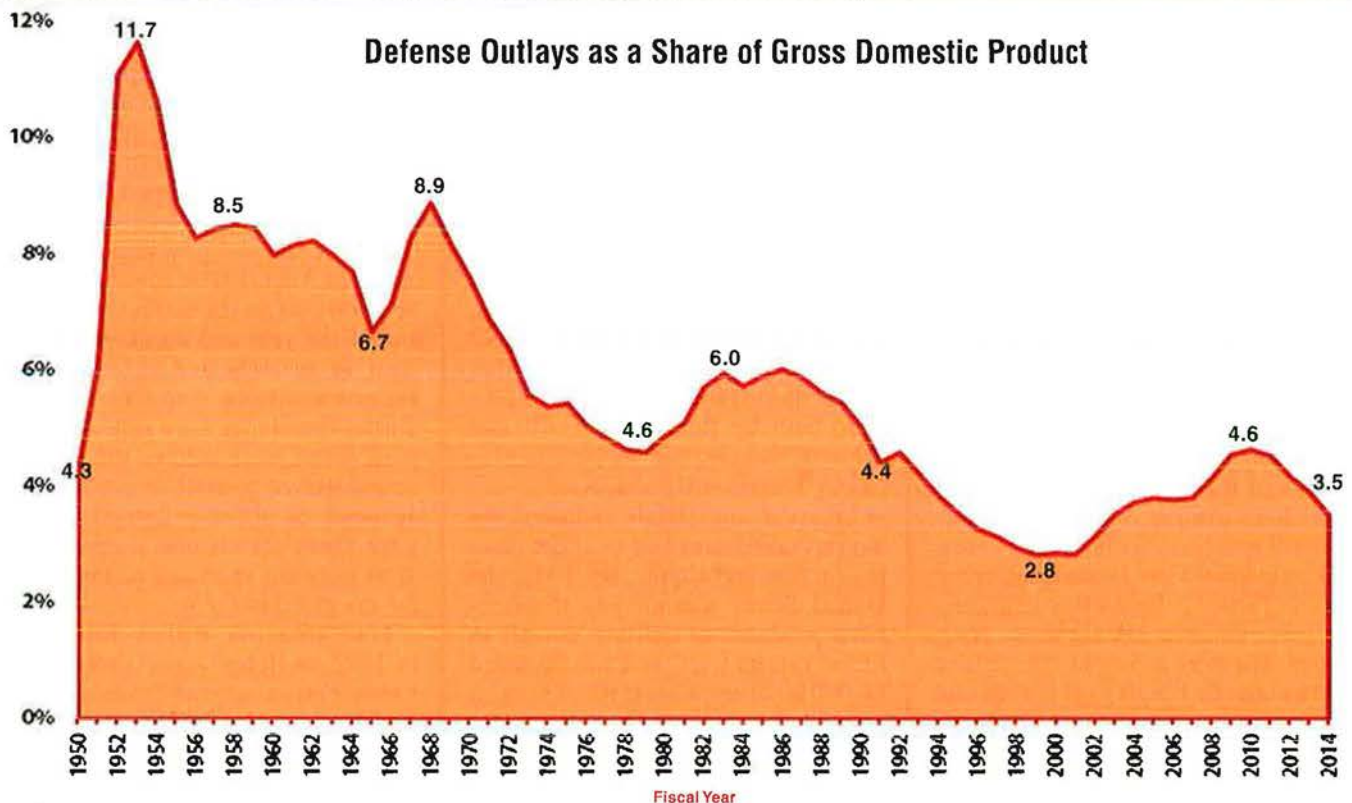
President Obama on April 10 presented Congress a DOD budget request for Fiscal 2014. It seeks \$526.6 billion in budget authority not including war costs and \$615.1 billion in BA counting war costs. Funding most often is stated in BA—the value of new obligations DOD can incur. (Some are

paid in future years.) Figures can also be expressed in outlays—actual checks written in a given year. “Current dollars” include inflation. With “constant dollars,” inflation has been factored out. Charts address only the Defense Department program.

Defense Budget Authority

(\$ billions)

	2012	2013	2014	Planned 2015	2016	2017	2018
No War Costs, Current Dollars	529.9	527.5	526.6	540.8	551.4	560.0	568.6
No War Costs, Constant FY 2014 Dollars	548.6	538.1	526.6	530.0	528.5	524.9	521.3
With War Costs, Current Dollars	645.0	614.7	615.1	540.8	551.4	560.0	568.6
With War Costs, Constant FY 2014 Dollars	667.8	627.0	615.1	530.0	528.5	524.9	521.3



Defense Outlays

(\$ billions)

	2012	2013	2014	Planned 2015	2016	2017	2018
Current Dollars	650.9	633.3	597.6	584.0	561.9	562.1	564.1
Constant FY 2014 Dollars	673.9	646.0	597.6	572.3	538.5	526.9	517.1

Service Shares

(Budget authority in billions of constant FY 2014 dollars)

	2012	2013	2014	2015	2016	2017	2018
Dollars							
Air Force	150.0	142.6	144.4	145.2	144.8	143.8	142.8
Army	138.6	134.5	129.7	130.4	130.0	129.1	128.2
Navy/Marine Corps	162.3	162.1	155.8	156.9	156.4	155.4	154.3
Defense agencies	98.4	98.8	96.8	97.5	97.2	96.6	95.9
Total	548.6	538.1	526.6	530.0	528.5	524.9	521.3
Percentages							
Air Force	27.3%	26.5%	27.4%	27.4%	27.4%	27.4%	27.4%
Army	25.3%	25.0%	24.6%	24.6%	24.6%	24.6%	24.6%
Navy/Marine Corps	29.6%	30.1%	29.6%	29.6%	29.6%	29.6%	29.6%
Defense agencies	17.9%	18.4%	18.4%	18.4%	18.4%	18.4%	18.4%

Note: USAF shares above include non-Blue funding. FY 2015-18 estimates based on FY 2014 shares.

USAF's Blue-only share

Dollars	123.2	112.3	114.1
Percentages	22.5%	20.9%	21.7%

Note: USAF budget includes Blue, dollars for programs actually managed by USAF, and non-Blue, dollars USAF does not manage but that simply pass through USAF's accounts, such as some intelligence and space-related funding.

Cutting the Pie: Who Gets What

(Budget authority in billions of constant FY 2014 dollars)

	2012	2013	2014	2015	2016	2017	2018
Military personnel	146.8	138.1	137.1	138.0	137.6	136.7	135.7
O&M	204.2	214.3	209.4	210.7	210.1	208.7	207.3
Procurement	108.2	101.9	99.3	99.9	99.7	99.0	98.3
RDT&E	73.9	70.8	67.5	67.9	67.7	67.3	66.8
Military construction	11.8	9.1	9.5	9.6	9.5	9.5	9.4
Family housing	1.8	1.7	1.5	1.5	1.5	1.5	1.5
Other	2.7	2.2	2.3	2.3	2.3	2.3	2.3
Total	548.6	538.1	526.6	530.0	528.5	524.9	521.3

Note: FY 2015-18 estimates are based on FY 2014 shares.

Manpower

(End strength in thousands)

	1990	2000	2012	Est. 2013	Est. 2014	Change 1990-2012
Total Active Duty	2,065	1,384	1,400	1,402	1,361	-665
Air Force	535	356	333	330	328	-202
Army	751	482	550	552	520	-201
Navy	582	373	318	323	324	-264
Marine Corps	197	173	198	197	190	1
Selected reserves	1,128	865	840	842	834	-288
Civilians (FTE)	997	660	765	777	765	-232

Operational Training Rates

	1990	2000	2010	2012	Est. 2013	Est. 2014
Air Force						
Flying hours per crew per month, fighter/attack aircraft	19.5	17.2	19.4	13.5	12.0	13.2
Army						
Flying hours per tactical crew per month	14.2	12.7	12.0	10.4	11.6	10.6
FSTM*	800.0	669.0	427.0	1,053.0	1,249.0	881.0
Navy						
Flying hours per tactical crew per month	23.9	20.9	16.6	21.0	17.6	17.8
Ship steaming days per quarter						
Deployed fleet	54.2	50.5	58.0	59.0	51.0	45.0
Nondeployed fleet	28.1	28.0	24.0	24.0	24.0	20.0

*Note: Data prior to 2012 is annual tank miles.

Acronyms

AEHF	Advanced Extremely High Frequency
AFRC	Air Force Reserve Command
AMRAAM	Advanced Medium-Range Air-to-Air Missile
ANG	Air National Guard
ARNG	Army National Guard
AWACS	Airborne Warning and Control System
BA	budget authority
BCT	Brigade Combat Team
BM	battle management
BUR	Bottom-Up Review
CRH	Combat Rescue Helicopter
C3	command, control, and communications
DCGS	Distributed Common Ground System
DMSP	Defense Meteorological Satellite Program
DSRP	Defense Space Reconnaissance Program
EELV	Evolved Expendable Launch Vehicle
FSTM	Full Spectrum Training Mile
FTE	Full-Time Equivalent
FWE	Fighter Wing Equivalent
GPS	Global Positioning System
Helo	helicopter
ICBM	intercontinental ballistic missile
ISR	intelligence, surveillance, and reconnaissance
JASSM	Joint Air-to-Surface Standoff Missile
JDAM	Joint Direct Attack Munition
JSTARS	Joint Surveillance Target Attack Radar System
MEF	Marine Expeditionary Force
O&M	operation and maintenance
PAA	Primary Aircraft Authorized
QDR	Quadrennial Defense Review
RDT&E	research, development, test, and evaluation
SATCOM	satellite communications
SBIRS	Space Based Infrared System
SDB	Small Diameter Bomb
Sigint	signals intelligence
SOF	Special Operations Forces
UAV	unmanned aerial vehicle

Major USAF Programs RDT&E

(Current million dollars)

Program	2012	2013	2014
Bombers			
B-1B	32.1	16.3	19.6
B-2	201.7	317.0	403.7
B-52	84.2	53.2	24.0
Long range strike	289.6	291.7	379.4
Fighter/Attack			
A-10	11.0	13.5	9.6
F-15C/D/E	184.7	192.7	244.3
F-16	128.5	190.3	177.3
F-22A	531.8	511.8	459.6
F-35	1,375.8	1,218.4	849.3
Helos			
CRH	11.1	123.2	393.6
HH-60	0.0	0.0	0.0
ICBM			
Minuteman III	201.6	280.1	361.6
ISR/BMIC3			
Airborne Recon Systems	115.5	96.7	37.8
Airborne Sigint Enterprise	108.3	129.1	117.1
Air & Space Ops Center	116.9	76.3	81.7
DCGS	82.4	88.0	30.5
E-3 AWACS	111.8	65.2	186.3
E-4	5.1	4.2	18.3
E-8 JSTARS	72.0	24.2	13.2
EC-130 Compass Call	19.2	12.1	10.8
Endurance UAV	108.0	21.0	3.0
MQ-1 Predator	51.6	9.1	3.3
MQ-9 Reaper	107.6	148.0	128.3
RC-135	0.0	0.0	0.0
RQ-4 Global Hawk	423.3	236.3	134.4
U-2 Dragon Lady	0.0	23.6	18.7
Mobility			
C-5	12.9	35.1	61.5
C-17	81.9	99.2	109.1
C-130	6.3	5.0	0.4
C-130J	38.4	30.7	22.4
KC-10	30.9	24.0	0.0
KC-46	819.0	1,815.6	1,558.6
KC-135	6.2	0.0	0.0
Munitions			
AGM-158A JASSM	5.7	8.0	6.4
AIM-9X Sidewinder	7.9	8.2	15.5
AIM-120 AMRAAM	75.3	87.0	84.2
GBU-31/32/38 JDAM	0.0	0.0	2.5
GBU-39 SDB	133.9	143.0	115.0
Hellfire	0.0	0.0	0.0
Space			
AEHF	385.0	229.2	272.9
Counterspace systems	29.0	28.8	23.9
Cyberspace	3.5	6.4	24.5
DMSP	0.0	0.0	0.0
DSRP	0.0	0.0	0.0
EELV	14.1	8.0	28.0
GPS	939.6	831.4	742.0
Joint Space Ops Center	75.8	54.7	58.5
MilSatCom	338.9	227.9	265.0
Rocket sys launch program	146.5	16.2	14.2
SBIRS	621.6	448.6	352.5
Space control technology	43.6	25.1	27.0
Spacelift range system	9.3	8.8	13.4
Space situation awareness	261.9	309.3	460.0
Space technology	118.0	98.4	104.1
Wideband Global SATCOM	12.1	12.0	14.0
SOF			
AC-130J	0.0	0.0	0.0
CV-22	12.8	28.0	46.7
HC/MC-130	21.6	19.0	6.2
MC-12W	0.0	20.0	0.0

Major USAF Programs Procurement

(Current million dollars)

Program	2012	2013	2014
Bombers			
B-1B	202.8	150.7	135.9
B-2	126.4	129.9	63.8
B-52	93.4	9.8	118.0
Long range strike	0.0	0.0	0.0
Fighter/Attack			
A-10	12.5	95.0	47.6
F-15C/D/E	257.7	150.7	357.0
F-16	61.3	15.4	15.3
F-22A	318.9	283.9	291.7
F-35	3,518.6	3,565.7	3,582.3
Helos			
CRH	59.6	60.6	0.0
HH-60	143.2	26.2	27.7
ICBM			
Minuteman III	125.7	54.8	21.6
ISR/BMIC3			
Airborne Recon Systems	0.0	0.0	0.0
Airborne Sigint Enterprise	0.0	0.0	0.0
Air & Space Ops Center	18.4	33.9	26.9
DCGS	215.2	142.9	137.8
E-3 AWACS	134.8	193.1	197.1
E-4	57.8	47.6	14.3
E-8 JSTARS	22.6	59.3	57.5
EC-130 Compass Call	302.2	64.0	34.5
Endurance UAV	0.0	0.0	0.0
MQ-1 Predator	161.3	30.9	9.7
MQ-9 Reaper	845.0	885.4	375.2
RC-135	190.1	197.4	196.3
RQ-4 Global Hawk	484.6	95.9	68.1
U-2 Dragon Lady	62.3	91.3	45.6
Mobility			
C-5	1,035.2	1,127.6	1,024.4
C-17	485.8	386.8	225.2
C-130	462.2	111.1	58.6
C-130J	188.9	138.9	710.0
KC-10	15.5	60.0	70.9
KC-46	0.0	0.0	0.0
KC-135	64.6	60.1	55.2
Munitions			
AGM-158A JASSM	236.2	240.4	291.2
AIM-9X Sidewinder	88.5	88.0	119.9
AIM-120 AMRAAM	202.2	229.6	340.0
GBU-31/32/38 JDAM	127.3	155.8	188.5
GBU-39 SDB	20.1	47.0	47.3
Hellfire	75.8	82.0	48.6
Space			
AEHF	551.5	557.2	379.6
Counterspace systems	23.7	21.0	7.2
Cyberspace	128.5	125.8	97.6
DMSP	100.0	89.0	95.7
DSRP	231.4	39.2	45.2
EELV	1,681.7	1,679.9	1,852.9
GPS	603.8	553.1	535.7
Joint Space Ops Center	0.0	0.0	0.0
MilSatCom	36.5	47.6	106.0
Rocket sys launch program	0.0	0.0	0.0
SBIRS	324.9	454.3	583.2
Space control technology	0.0	0.0	0.0
Spacelift range system	125.0	109.6	98.1
Space situation awareness	0.0	0.0	0.0
Space technology	0.0	0.0	0.0
Wideband Global SATCOM	792.9	36.9	38.4
SOF			
AC-130J	128.5	164.0	470.0
CV-22	359.9	309.2	230.8
HC/MC-130	999.0	554.1	729.9
MC-12W	33.8	17.1	5.0

Historical Force Structure

Current Force Structure

	Cold War Base 1990	1990 Base Force	1993 BUR Plan	1997 QDR Goal	2002 Defense Budget		2009	2010	2012	Est. 2013	Est. 2014
Air Force						Air Force					
Active FWEs	24	15	13	12+	12+	Active PAA strike aircraft	1,281	1,077	1,183	1,169	1,176
ANG/AFRC FWEs	12	11	7	8	7+	ANG PAA strike aircraft	462	429	408	351	387
Army						AFRC PAA strike aircraft	104	98	90	71	72
Active divisions	18	12	10	10	10	Army					
Army National Guard	10	8	8	8	8	Active BCTs	44	45	45	45	44
Navy						ARNG BCTs	28	28	28	28	28
Active Aircraft Carriers	15	12	11	11	12	Navy					
Reserve Aircraft Carrier	1	1	1	1	0	Aircraft Carriers	11	11	11	10	10
Active Air Wings	13	11	10	10	10	Active Air Wings	10	10	10	10	10
Reserve Air Wings	2	2	1	1	1	Reserve Air Wings	1	1	1	1	1
Marine Corps						Marine Corps					
Active MEFs	3	3	3	3	3	Active MEFs	3	3	3	3	3
Marine Reserve Air Wing	1	1	1	1	1	Marine Reserve Air Wing	1	1	1	1	1

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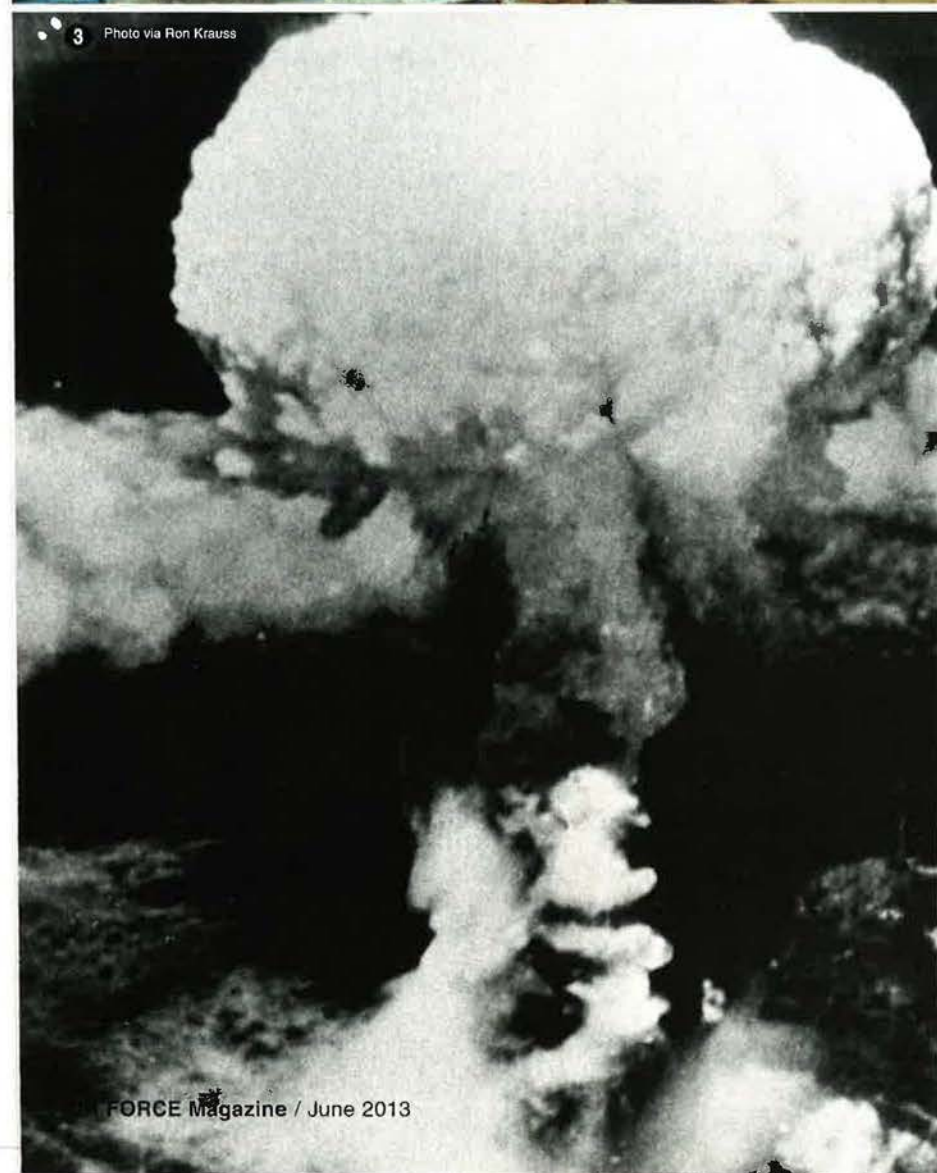
The supersecret mission required preparation and practice runs.

Tinian's Atomic Bombers

Photos via Warren E. Thompson



2 Photo via Carl Garner



3 Photo via Ron Krauss

Late in World War II, Col. Paul Tibbets Jr. took command of the 509th Composite Group to carry out a special, secret mission: attacking Japan with atomic bombs. The unit took shape at Wendover AAF, Utah, and then deployed to Tinian island in the Pacific. Practice and familiarization missions preceded the attacks on Hiroshima and Nagasaki. The "Silverplate" B-29s shown on these pages were among those that carried out or supported the missions. **11** The tail symbol of the 509th was an arrow inside a circle, but to hide the unit's identity and confuse the Japanese, tail codes and symbols were regularly changed. The ground crew member here is repainting the vertical stabilizer symbol. **12** Bockscar, piloted by Maj. Charles Sweeney, dropped the second A-bomb on Aug. 9, 1945, on Nagasaki. The primary target was Kokura, but bad weather there shifted the mission to Nagasaki. Bockscar is on permanent display at the National Museum of the US Air Force in Ohio. **13** The image of the mushroom cloud over Nagasaki was taken from the tail gunner's position as Bockscar made a high-speed dash to outrun the blast. The bomber was still caught by the shock wave.

111 Arguably the most famous named airplane, Enola Gay is shown at Tinian. Later, "Fat Man" mission markings would be applied to the canopy rail. After years of controversy about whether and how it would be displayed for posterity, today the fully restored bomber is a central exhibit at the National Air and Space Museum's Udvar-Hazy Center in Chantilly, Va. 121 A briefing before Enola Gay's mission. At far left is Tibbets, the mission commander and pilot of the aircraft. Facing the camera at the head of the table is Gen. Carl Spaatz, commander of US Strategic Air Forces in the Pacific. 131 Big Stink supported both A-bomb missions: It was the backup aircraft for the Hiroshima attack, though it stayed behind on Tinian, and provided standoff photography for the Nagasaki mission.



1 Photo via Carl Garner



2 Photo via Adolph Gasper



National Archives photo 4

141 Maj. Gen. Curtis LeMay, 20th Air Force commander, standing in front of a B-29 on Saipan. LeMay, an aggressive advocate of bombers and the architect of the bombing campaign against Japan, went on to lead Strategic Air Command.



3 Photo via Carl Garner

NO SMOKING WITHIN
100 AIR FORCE Magazine / June 2013



Photo via Carl Garner 1



Photo via Kenn Rust 2



Photo via Carl Garner 3



Photo via Adolph Gasser 4

11| Laggin' Dragon flew weather reconnaissance over Nagasaki and confirmed the conditions there were acceptable. 12| The loading pit on Tinian. Fuses were to be set here, but fears of a takeoff crash led to the bombs being armed in flight. 13| Great Artiste was named after Sweeney's bombardier, Capt. Kermit Beahan, known to be the 509th's most accurate bomber. Note the "Fat Man" mission markings on the canopy rail. 14| Here, Enola Gay, at left, has just returned from the Hiroshima mission and members of the 509th are surrounding the crew. Due to intense secrecy, it was only at this point that many of the group's personnel realized the nature of the weapon they were working with.

A critical, secret mission with an unproven weapon demanded rehearsals. Practice missions were flown with "Pumpkin Bombs"—their official designation, so-called because of their shape. They mimicked the weight and behavior of the "Fat Man" atomic bomb. Some were inert, but some had explosive fill, and 49 were used against targets in Japan. **11** Some Pumpkins flew several such missions. **12** Down time between Pumpkin missions, circa Aug. 1, 1945. **13** Next Objective carried markings of the 444th Bomb Group as a deception tactic. **14** An early model of the "Fat Man" atomic bomb; Pumpkin Bombs were very similar in shape. **15** Tibbets, at right, wishes Sweeney good luck just before the mission to Nagasaki.



1 Photo via Carl Garner



Photo via Adolph Gasser **5**

Photo via Ron Krauss **4**



2 Photo via John Dullin

3 Photo via Carl Garner



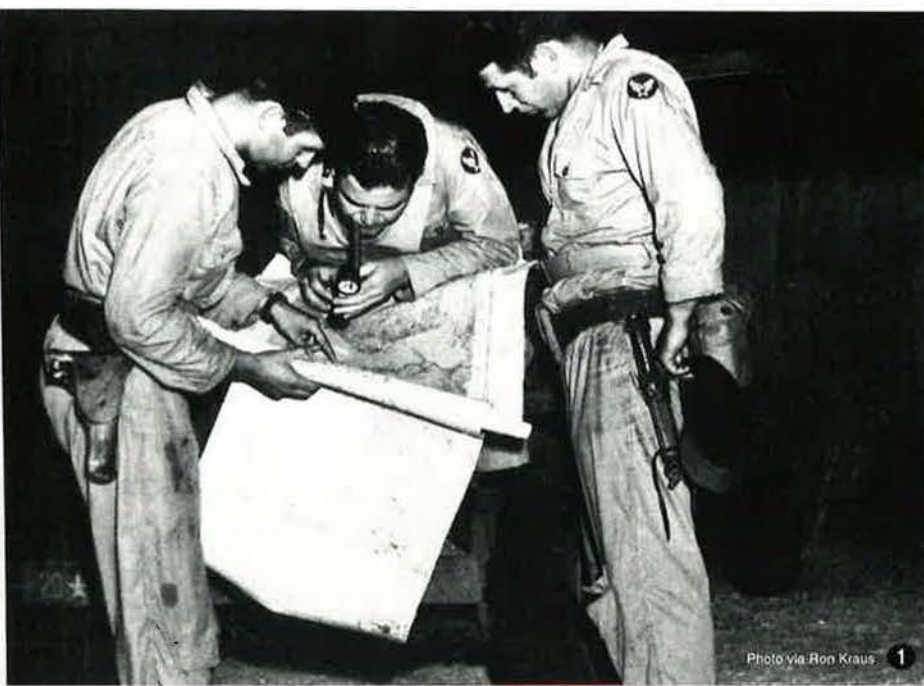


Photo via Ron Kraus 1

111 In the predawn hours, Bockscar crew members discuss the route to their target. Left to right: Capt. James Van Pelt, navigator; Swee-ney; and 2nd Lt. Fred Olivi, an observer. 121 The Hiroshima weapon was "Little Boy." A test version is shown here being lowered into the loading pit at a Stateside location. The B-29 would be positioned over the pit and the bomb winched into the weapons bay. 131 Up an' Atom was the weather scout over Kokura, initially the primary target for the second bomb dropped on Japan. Visibility was too poor for a successful drop, sending Bockscar on to its secondary target, Nagasaki. 141 Strange Cargo used the symbol of the 497th Bomb Group on its vertical stabilizer and flew four Pumpkin missions.



Photo via Robert Krauss 2



Photo via John Dullin 3

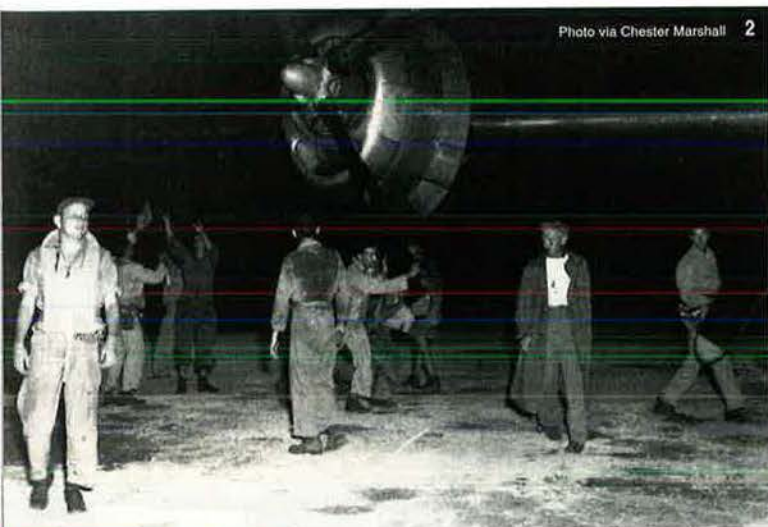


Photo via Carl Garnet 4

111 The supply needs of the 509th were met by the 320th Troop Carrier Squadron. All the A-bomb parts were brought to Tinian either by C-54s or by USS Indianapolis. Here, a C-54 is unloaded on Tinian. 121 Enola Gay's ground crew gets ready to start engines for the Hiroshima mission. 131 Top Secret, like most of the 509th bombers, was a B-29-35, which differed from standard B-29s. Tibbets ordered certain features removed, such as the dorsal gun turret, to reduce weight and extend range. 141 Straight Flush was a weather scout for the Hiroshima mission.



1 Photo via John Dulin



2 Photo via Chester Marshall



3 Photo via Carl Garner



4 Photo via Carl Garner



Photo via David Wilson 1



Photo via Ron Krauss 2



Photo via Carl Garner 3



Photo via John Dulin 4

111 Circa 1949, this picture shows some of the enduring damage from the A-bomb in Hiroshima. This is the Prefectural Building for the Promotion of Industry, near the epicenter of the blast. 121 A Pumpkin Bomb leaves the bomb bay of a B-29 over Japan. Given their large size, Pumpkins with explosive fill could do significant damage. 131 Full House flew weather recce over Enola Gay's secondary target, which was Nagasaki. 141 Lt. John Dulin, navigator on Strange Cargo, in his B-29 "office."


To commemorate and preserve the heritage of the 509th, the Air Force's B-2 stealth bombers of Whiteman AFB, Mo., operate as the 509th Bomb Wing. ■



THE 1940 NORWAY CAMPAIGN SHOWED HOW MODERN WARFARE
WOULD REQUIRE AIRPOWER AND JOINT OPERATIONS.

War Over the FJORDS

By Phillip S. Meilinger



German paratroopers near Narvik, Norway, during the invasion.



AP photo

The 1940 campaign in Norway was an important proving ground for both Germany and the Allies. Although the Germans had been blooded against the Poles, it was in Norway that they would fight against Britain and France, as well as the Norwegians.

For their part, the Allies had done little since declaring war in September 1939 except sit on the defensive in France and drop leaflets over Germany. Norway would be their first real test.

This campaign in the north illustrated the importance of two key military concepts—jointness and air superiority—that would become increasingly necessary as the war progressed.

Jointness is a modern pillar of effective military action, but this was not always the case. In centuries past, it was possible to wage war with soldiers and sailors having virtually no contact with one another; coordination was only necessary at the highest levels of government. In those rare instances when armies and navies had to work together, decisions could be made as the situation arose.

This attitude changed dramatically during World War II. Not only were armies and navies working together more closely than they had before—amphibious operations became commonplace—but jointness was forced on the services because of airpower. Even the most die-hard ground or sea warfare zealots realized by 1941 that the airplane had become essential to the conduct of operations. Scarce air assets had to be apportioned between numerous commanders to avoid waste and duplication. Aircraft could fly from land bases to attack targets at sea—and vice versa. The air, and airmen, could not be ignored. As a result, all the services were drawn more closely together.

In wartime, the stakes are usually too high to permit parochialism among soldiers, sailors, and airmen. Even so, disagreements and tensions occur. Soldiers, sailors, and airmen have different views on the nature of war—on battle, strategy, and doctrine—and these differing viewpoints would clash in the Norwegian campaign.

Though Britain and France declared war on Germany in September 1939 after the Nazi invasion of Poland, they were loath to strike the enemy head-on. Instead, they looked for an easier venue, and Norway was it.

Germany was heavily dependent on high-quality Swedish iron ore; it had twice the iron content of German ore.



Troops train in the use of mortars. Germany's joint planning was more effective in Norway, but the Allies learned their lessons well. In the near future it was the Allies who would excel in exploiting the advantages of joint operations.

This material, which came largely from the north, was then usually shipped by rail through Norway to its ice-free port of Narvik. From there it traveled south by freighter to Germany.

In 1938, more than 40 percent of Germany's iron ore imports came from this source. Although Sweden and Norway were declared neutrals, the Allies nonetheless wanted to deny this resource to Germany.

Secure the Ports

Two weeks after the outbreak of war, Winston Churchill, then First Lord of the Admiralty, suggested mining Norwegian territorial waters in order to force German ore freighters onto the open sea, where they could be found and destroyed by the Royal Navy. As months passed, this option, and even the thought of occupying parts of Norway, shifted from an idea to the planning stage.

Britain feared Germany might act first and simply invade Sweden and Norway to ensure access to the iron ore and protect its supply lines for shipment. On April 8, 1940, the Royal Navy began laying mines in Norwegian territorial waters. This was a clear violation of

international law, but Britain thought it necessary for her survival.

The Germans were indeed concerned about their access to Swedish ore and the Norwegian ports. In February 1940 the Royal Navy had violated Norwegian waters to intercept and capture the German transport *Altmark*. This, along with memories of the Allied "starvation blockade" of World War I that killed hundreds of thousands of German civilians, persuaded Hitler that access to neutral trade couldn't be guaranteed, regardless of the law. In addition, German planners thought Norway could serve as a valuable submarine site and also provide air bases that would outflank the Allied blockade of Germany and allow powerful strikes on Britain's lines of communication.

On March 1, 1940, Hitler ordered plans drawn up to occupy Denmark and Norway to protect Nazi access to the Baltic Sea and also ensure the ore lines remained intact. The invasion of Denmark and Norway was set for April 9—coincidentally, the day following the Allied mining operation.

Since Napoleonic times, Prussia/Germany had enjoyed a reputation for meticulous and effective military planning, with its General Staff serving as the model for the military staffs of most major powers. Germany was not yet adept, however, in planning major joint operations. Nonetheless, things started auspiciously. A small working group headed by senior officers from the navy, army, and air force began writing plans.

Almost immediately, however, problems arose over the issue of command and control. The planning group posited a theater command with one officer—a soldier—having control over all the forces in his theater. Hermann Goering, head of the Luftwaffe, protested: He would not allow air units to come under the operational control of another service.

It was the German navy that had ignored all attempts at joint training, exercises, or doctrine formulation during the interwar period; the army and air force had developed a close and effective relationship. Now, Goering disavowed it. During the Norwegian campaign the commanders of air, land, and sea forces would receive their orders separately from Germany.

Inexplicably, Hitler—who was notorious for meddling in military affairs—chose not to intervene and impose unity of command on the Norwegian operation.



L-r: Norwegian politician Vidkun Quisling, who seized power in his own country after the Nazi invasion; Heinrich Himmler, Hitler's right-hand man; Josef Terboven, the Nazi reich's commissar of Norway during the war; and Gen. Nikolaus von Falkenhorst, the commander of German forces in Norway.

Deutsches Bundesarchiv photo via Wikipedia

The German plan called for a series of quick, powerful, and wide-ranging attacks. Denmark would be seized and its two major airfields at Aalborg immediately put to use by the Luftwaffe, ferrying troops and supplies into Norway and serving as a base for long-range strike aircraft. Some 30,000 German troops were airlifted into Norway—the first major airlift of the war. The five major port cities of Norway would be attacked simultaneously: Oslo, Bergen, Trondheim, Kristiansand, and Narvik, as well as the major airfield at Stavanger. These attacks would employ most of the German surface fleet, six army divisions and a paratroop battalion, and about 1,000 aircraft.

The plan succeeded despite bad weather and the determined resistance of Norwegian units. By the end of the first day the situation was clearly under German control. Denmark surrendered in a nearly bloodless assault, and the five major Norwegian cities fell, as did the main airfields near Oslo and Stavanger.

Airpower was crucial in all of these actions. Besides the operations in Denmark and Stavanger, airlifted troops secured the airfield near Oslo without a fight; *Luftwaffe* bombers suppressed Norwegian air defenses at Kristiansand, allowing an easy capture. The next day Allied help arrived, but it would prove to be too little and too late.

Allied joint planning was similarly in its infancy. Although a joint planning group was established in March 1940 to draw up a scheme for a preemptive landing in Norway, it wasn't effective. For example, it was thought air units wouldn't even be necessary for the initial stages of the operation—an incredible oversight. Indeed, historian John Terraine stated that the joint planning staff "displayed an amateurishness and feebleness which to this day can make the reader alternatively blush and shiver."

To make matters worse, relations were strained between the British navy and air force over the issue of the Fleet Air Arm (FAA). When the Royal Air Force was established in 1918 it was given control over the navy's aviation assets. For the next two decades the Admiralty bitterly protested this arrangement. In 1937 the British government returned the FAA to the navy, but the matter still rankled. Caught between the warring sides for 20 years, the Fleet Air Arm was an unlucky stepchild that suffered in the crossfire. In 1940 it was armed with obsolete aircraft such as the Fairey Swordfish—an open-cockpit biplane—and the Skua,



which was totally outclassed by modern fighters of the day.

Like the Germans, the Allies did not institute a joint theater command for Norway, although British doctrine called for such a headquarters. Instead, in the Narvik area, for example, Admiral Lord Cork commanded naval forces and Maj. Gen. P. J. Mackesy headed the ground troops. Both, however, received orders from London that were sometimes contradictory. Moreover, the two seldom saw eye-to-eye.

Control of the Skies

Cork, for example, thought the army should assault Narvik forthwith, but Mackesy considered that "sheer bloody murder" and refused. Instead, he landed 45 miles away on an undefended island and approached Narvik in a systematic land operation, all the while Cork chafing at the "delay." Such problems were aggravated when Mackesy established his headquarters on land, while Cork remained afloat. Mackesy was eventually relieved in the hope joint operations would improve, but by then the campaign was practically over.

The other Allied task force was directed to liberate Trondheim. This port, however, was well within range of Luftwaffe aircraft and Allied operations there were a disaster. The Royal Navy's cruiser *Suffolk* was so badly mauled by German bombers, it barely limped back to port. This event convinced the Admiralty that a direct assault on Trondheim was impossible in the face of enemy air superiority. Instead, landings were made

B-17s, part of the Allied air defense of Norway, fly high above the fjords on a mission during World War II. It became clear for the first time that airpower, desperately needed for both land and sea operations, meant that modern warfare would of necessity be joint.

north and south of the city, and it was hoped these two independent pincers would be able to march on Trondheim and retake it. This was soon seen to be impossible, again due to Luftwaffe controlling the skies. Maj. Gen. Carton de Wiart, commander of the northern pincer, signaled London: "I see little chance of carrying out decisive, or indeed, any operations unless enemy air activity is considerably restricted."

The following day he was even more emphatic: There was "no alternative to evacuation" unless he could gain air superiority. With its nearest air base more than 600 miles distant, the RAF could not intervene, and the FAA was simply outmatched. The Royal Navy moved two aircraft carriers toward the area, *Ark Royal* and *Glorious*, but the Luftwaffe drove them off. Soon after, the ground forces were evacuated.

The situation at Narvik was not quite as dismal for the Allies—despite the disagreements between Cork and Mackesy—simply because it was so far north the Luftwaffe had difficulty covering the area. The RAF, through Herculean efforts, managed to carve three airstrips out of the snow and ice and deploy some Gladiators and Hurricanes that had been transported by aircraft carrier.



German destroyers at Narvik after the capture of the port there. The Allies hoped that landing at Narvik would allow them to establish a foothold and build air bases.

The German garrison had been resupplied by seaplane and flying boat, but the RAF quickly drove these off. As a result, Allied ground forces were able to make some headway. Then, on May 10, the Battle of France began and Norway became a sideshow.

Before the Allies had even retaken Narvik they were planning its evacuation. It finally fell on May 28, but the Allies returned to their ships and departed two weeks later. The Germans quickly moved back in, and the campaign was over.

Norway would remain in Nazi hands until the end of the war.

Two aspects of the Norway campaign are worth noting. First, modern warfare would forever after be joint warfare. The days when admirals and generals could blithely ignore each other while fighting their separate campaigns were over. The arrival of airpower—necessary for both land and sea operations—made joint planning and joint command absolutely essential.

The lack of jointness in the Norwegian campaign—on both sides—manifested itself in numerous ways. There was no unity of command, and conflicting orders were often sent to the component commanders, who generally maintained separate headquarters. Intelligence was poorly shared, so numbers, quality, and location of enemy aircraft, vessels, and shore batteries were often unknown

to the key parties. Doctrines between the services were seldom compatible, and the lack of joint exercises during peacetime became painfully obvious.

This was especially apparent in the poor results gained by naval gunfire in support of troops ashore and in the poor results obtained from close air support. Germany's joint planning, command and control, and operations were more effective than those of the Allies. However, it was the Allies who took the lessons of Norway more to heart. In the future, they would excel in the area of joint operations.

Slow To Learn

Second, air superiority was shown to be essential for successful joint operations. The RAF's bases were too distant for it to intervene effectively, and the FAA's outmoded aircraft were of limited utility. As a consequence, the Luftwaffe controlled the air, and the Royal Navy could not maintain a presence in the face of that control. The Royal Navy's official historian later concluded: "If effective air cover was lacking, warships could not be maintained overseas." It was a startling admission. The Chief of the Imperial General Staff, Lord Alanbrooke, concurred with this assessment, writing that Norway demonstrated "the undermining of sea power by airpower."

The sole bright spot for the Allies was at Narvik, but this was so only because the Luftwaffe was unable to intervene

effectively and the RAF gained local air superiority. As planners phrased it: "The crux of the Narvik operations would be our ability to establish the necessary anti-aircraft defenses and to operate fighters from a shore aerodrome." However, the Allied hope that a landing at Narvik would allow them to establish a foothold, build air bases, and then use land-based airpower to both interdict the ore rail line to Sweden and gradually push their forces farther south to reconquer Norway never came close to fruition.

Prior to the Norway campaign, it had been a major tenet of naval theorists that one of sea power's great strengths was its ability to prevent an enemy from conducting a major amphibious operation. If such an operation were successfully initiated, so the conventional wisdom held, the Royal Navy would be able to strangle it by preventing resupply to the troops ashore.

This concept was a serious miscalculation that didn't take account of the emerging importance of airpower. The British Cabinet initially believed sea power could dispose of German forces in Norway in "a week or two."

Instead, the tone of the campaign was set on the first day when a portion of the British fleet was intercepted far out at sea by the Luftwaffe. Without air cover, one destroyer was sunk and the battleship *Rodney* was damaged. The fleet withdrew and moved north, out of range of German aircraft. The Luftwaffe had achieved air superiority over the littoral. In short, control of the air determined who would control the surface.

The Royal Navy was slow to learn these lessons. On Dec. 10, 1941—more than 18 months after the events in Norway and just three days after the Japanese attack on the US fleet in Pearl Harbor—Adm. Thomas Phillips rejected the need for air cover over his flotilla. His force was attacked by land-based Japanese bombers and torpedo airplanes; two hours later, the attackers had sunk his flagship—the battleship *Prince of Wales*—and the battlecruiser *Repulse* off the coast of Malaya.

These were the only two British capital ships in the region and they were lost because the naval commander refused to recognize the fundamental change in warfare. ■

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Not Clowning Around

For her enthusiastic and effective work as an aerospace educator, Lori Bradner is AFA's National Aerospace Teacher of the Year.

When she was little, Lori B. Bradner wanted to grow up to be a Broadway star. As a self-described "girlie girl," the Flint, Mich., native was always dancing and singing, sometimes with a towel draped over her head to imitate the long hair of one of her idols, Cher.

She attended the local music institute, took vocal lessons in glee club, and practiced public speaking in front of

groups. Eventually she took off for the footlights of New York and the life of a young actress.

"I'm a thespian from way back. That was my lifelong dream," she says today.

But life has twists—and sometimes takes sharp turns. Today, Bradner is one of the nation's top science, technology, and math educators. Vivacious and passionate about her subjects, she has drawn upon her drama background to make seemingly dry subjects sparkle in

the classroom. She's done everything from helping students design a reduced gravity experiment for NASA's "Vomit Comet" to enlisting a Norwegian sister school for joint scientific exploration.

After serving as a teacher in the Central Florida Aerospace Academy in Florida's Polk County, Bradner is now executive director of education at Sun 'n Fun, a Lakeland, Fla.-based organization devoted to promoting aviation through fly-ins, summer camps, and



Photo by Ernest Peters/The Ledger

nd

By Peter Grier

Lori Bradner instructs a class on mineral identification at the Central Florida Aerospace Academy in Lakeland, Fla., in 2011.

other events. It's safe to say she's the only winner of the Air Force Association's National Aerospace Teacher of the Year award who has both a B.S. in zoology/genetics and a Bachelor of Fun Arts degree from Ringling Bros. Clown College.

"There is no doubt my theater and performing arts experience helps," she says. "Whether you're teaching teachers or students in a classroom, it's a stage, it's a theater. I'm competing with cell

phones. It's not really all about education anymore. It's edutainment."

Teaching is all about relationships, she says. It's about meeting people of all ages where they are, celebrating their strengths, and helping them recognize their talent, values, and gifts. "At the end of the day, if you can do that as a teacher, you have touched the future. ... What you give in teaching, you get back tenfold," says Bradner.

Lori Bradner is unit commander for the Civil Air Patrol squadron at Central Florida Aerospace Academy (CFAA). She's taking flying lessons herself. But the first half of her life revolved around performing arts and musical theater.

Not a Clown Question

Out of high school she earned a drama scholarship to the University of Michigan. Then, without telling her parents, she snuck away from Ann Arbor to Chicago to an audition for New York's American Musical and Dramatic Academy (AMDA). She thought her performance was terrible—"worst audition of my life," she says now—but the judges thought differently.

"I got a call saying, 'We're offering you a full-ride scholarship to come to New York City and come to school,'" she recalls.

After two years she earned an AMDA certificate and plunged into the life of a young aspiring New York City actress. That meant doing regional tours and waiting tables to meet the thousand-dollar price tag of her share of apartment rent.

Then on a whim she applied to Ringling Bros. Barnum & Bailey Clown College. A friend from her AMDA days told her about it, saying he thought it would be a good fit for her bubbly personality. Bradner got her acceptance call while rehearsing the role of Maria in a summer stock production of "The Sound of Music."

She said yes without looking back.

At Clown College in Florida she adopted the persona of "Oopsie" (a childhood nickname). She learned to juggle, ride unicycles, walk on stilts, and fall like a clown. Eventually she graduated with her BFA, a Bachelor of Fun Arts degree, and worked a season as a clown on the Ringling Bros. eastern tour.

She enjoyed it but sleeping in a cubicle on a train and moving constantly from place to place was a tough way to make a living. Plus, she still had no real university degree. So Bradner went back home and enrolled in Michigan

State, majoring in zoology and biology. Her intention was to qualify for medical school.

"I was going to be the female Patch Adams," Bradner says, referring to the clowning real-life physician portrayed by Robin Williams in a movie of the same name.

But then another turn occurred. She found she enjoyed science and math—even had a talent in those areas. The extroverted ex-actress also liked the solitary precision of lab work. Eventually, she entered a doctoral program in physiology. She had completed everything but her dissertation when she got a call from Florida. Her mother, who by then lived in the Lakeland area and worked as a guidance counselor in local schools, was ill and needed her.

"I had to make a choice, and family came first," she says. "I will never regret it."

Bradner worked as a pharmaceutical sales rep, married, and raised four children. Along the way, she worked to earn a state certificate that would enable her to teach science. Prior to her move, she sometimes performed as *Oopsie* at her mother's schools. Kids loved it.

Finally, in 2009 she got a call from a Polk County Schools administrator who had worked with her mother and seen her school appearances. Would she like to apply for a job at the newly created Central Florida Aerospace Academy?

She got the position. Eventually she taught everything from honors biology and chemistry to environmental science and Earth and space studies at CFAA, which aims to prepare students for aviation-related careers.

"I went kind of a long way around to get where I am now," Bradner says. "But I believe there are no mistakes; things happen for a reason. I'm still learning and growing."

In Lori Bradner's ideal classroom, the teacher is not someone who hands down rote knowledge from a place of authority at the front of the classroom. They are not "answer givers" or "problem solvers," in her words. They are facilitators who help students develop the tools to inquire and produce solutions of their own.

She's not fond of textbooks. In the fast-moving fields of science they can often be out of date, and in any case, they're not intrinsically inspiring. Students are most engaged when they are given a hands-on problem to solve, she says. And aerospace-related projects are almost guaranteed to hook classroom interest.

"Anytime you mention a plane or a rocket, whether to a child of nine or an adult of 90, I have yet to have that person go, 'OK, that is very boring,'" Bradner says.

NASA has been a great partner for her in this educational area. She and her CFAA students began with a NASA-sponsored egg-drop competition, in which participants must design a way to drop an egg from a height such that it lands unbroken. Then they were chosen to participate in Down Link, a program where students communicate directly with astronauts on the International Space Station.

This led to Bradner's CFAA class being chosen to view the final launch of the space shuttle *Discovery* from a VIP seating area at Kennedy Space Center. Finally, CFAA students designed a reduced-gravity experiment and presented it to a group of NASA engineers. It was selected for completion aboard NASA's Reduced Gravity Flight, which simulates weightlessness via parabolic flight paths.

The experiment had its origins in foam. Bradner was teaching chemistry at the time, and the class was studying colloids—mixtures with particles of one substance evenly distributed throughout another. To illustrate the concept Bradner brought in everyday colloids such as shaving cream and other common foams. Among them was the kind of insulation in spray cans used to fill holes around pipes and other cutout spaces.

"I brought that in as an example," says Bradner. "A group of students said, 'Would this expand if it were in space?'"

Rather than provide the class with a ready-made answer, Bradner encouraged them to research the problem for themselves. They designed an experiment for the foam's expansion qualities in Earth's gravity to be compared to what happened in a zero G environment.

NASA picked the experiment for an actual test aboard the Reduced Gravity Flight, aka the "Vomit Comet." Bradner herself was given the opportunity to carry it out.

"I got to experience micro-gravity," she says.

She also got to bring out her costume and portray Oopsie in a floating environment. While Oopsie and crew were in the air, her clown character was recorded for safety promos for the Reduced Gravity Flight.

As to the results, the CFAA experiment showed that insulation foam sprayed into an empty two-liter soda

bottle fills the container differently, depending on gravitational forces. On Earth, the foam just fills the bottle from the bottom up. In zero Gs it splatters everywhere within the container.

"It would fill it randomly. You would end up with a floating ball of goo," says Bradner.

Then, when the Vomit Comet hit the bottom of an arc in its roller-coaster flight path and the pilot pulled up the nose for a climb, the experiment was suddenly subjected to two or three times Earth's gravitational pull. This compressed the colloid foam, squeezing out its air pockets. That meant it was no longer good at insulation.

"You lost the integrity of the product," says Bradner.

Moving Forward

The bottom line of the effort might be summed up like this: If the US wants to construct a base somewhere with less gravitational pull than Earth—such as on the moon—it will have to consider carefully whether construction materials that work back home might be compromised in space.

Of course, space is not the only foreign environment Bradner and her students have connected with. Through a relationship struck up at a Sun 'n Fun aerospace event, she and CFAA began collaborating with a sister school in Norway that features a similar science curriculum.

The two schools have exchanged student and teacher visits in recent years. They have also worked together comparing Norwegian and American soil samples via a core-drilling project.

CFAA had obtained a grant from a local water management authority and Motorola to do core drilling in their area. On a visit to Norway, Bradner looked at the surrounding landscape and wondered if they could share resources for a compare-and-contrast soil test effort.

The final experiment was student-designed. The two schools did soil and water tests on roughly equal land—comparing agricultural areas in Florida with agricultural areas in Norway, for instance. Then they swapped data with their international counterparts via Skype and social media. Given the time difference, this could have been a problem.

"I had students that would literally come to school at six o'clock in the

morning" to Skype with Norway, says Bradner.

This international relationship has now expanded to an experiment involving the University of Oslo, among other sponsors, with classrooms tracking ships using new satellite technology. By the time a contingent of Norwegian students came to the US last year to compare notes, the partnership was working smoothly.

"If you looked around and didn't listen to the accents you would not have known which student was which," says Bradner. "We had built a commonality."

For all of this enthusiasm and classroom innovation, Bradner's superiors recommended her wholeheartedly for the AFA Teacher of the Year award.

"Lori is the quintessential optimist; the effervescent intellectual; and the scholar whose heart is bigger than Texas," wrote Sherrie B. Nickell, Polk County School Board superintendent. "She is one of the brightest people I know, yet with an incredible creative and charming personality."

Bradner credits her students for much of what happens in her classrooms. It was the kids who asked to reach out to other nations and form some sort of international alliance, she said. It was a group of students who came and asked her to help them establish a Civil Air Patrol squadron.

"Students are very open-minded. They think bigger," she says. "Because of technology, the world is becoming a very small place."

She has continued to move forward in her career preparation, recently earning a master's in educational administration from Purdue University. Her new position at Sun 'n Fun may enable her to expand her influence even further. As educational director of a nonprofit organization that produces some of the nation's largest gatherings of general aviation enthusiasts, she can help teachers throughout the region augment their science, technology, engineering, and math lessons.

"I can bring a plane that we can set out in your courtyard and we can talk about force and motion," she says. "We are going to help you teach the students so they not only understand the concept, [but] they can touch, see it, and feel it."

Looking back on her career thus far, Bradner says, "I have died and gone to heaven." ■

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, is a longtime contributor to Air Force Magazine. His most recent article, "Halvorsen," appeared in March.

By Frances McKenney, Assistant Managing Editor

Painting a Soul That Is Lost

In March, **San Jacinto Chapter** members visited an art exhibition that pays homage to Texans who have died in the wars in Iraq and Afghanistan.

Portrait of a Warrior Memorial Art Gallery in Baytown, Tex., features paintings by Ken Pridgeon, who served as an Air Force electronics technician for a decade until 1963, then became a billboard and sign painter.

In 2010, the organizer of a memorial run-walk for Pfc. Wesley R. Riggs asked Pridgeon to paint a portrait of the Baytown native, who had died in Tikrit, Iraq, in 2005. As Pridgeon sat outdoors, working on the painting, a visitor came up and told him that the funeral for SSgt. Jesse W. Ainsworth was taking place that day; the soldier deserved a portrait, too, the visitor suggested. Creating paintings of the Texas fallen then became Pridgeon's full-time job.

San Jacinto Communications VP Robert Kjar read about Pridgeon in a couple of magazines and last year joined chapter members Tom Short and Mimi Friel in visiting the gallery. It is a former storefront donated by Baytown.

The trio were so taken by the portrait gallery that they arranged the chapter field trip this spring, with Pridgeon conducting a tour and having lunch with the AFAers afterward.

Pridgeon does more than simply paint the service member's portrait; he includes hobbies, favorite moments, and other highlights to personalize it. As he said in a "Texas Country Reporter" TV program, "It brings to life a soul that is lost."

Practicing for Life

West Virginia's **Chuck Yeager Chapter** sponsored its 17th Air Force JROTC drill competition in Parkersburg, W. Va., in March.

Cadets from seven high schools in Ohio, Pennsylvania, and West Virginia gathered at Parkersburg South High School to compete for awards provided by the chapter. How much hardware would that be? "Wow!" exclaimed Chapter President Herman N. Nicely. He quickly counted them up in his head

San Jacinto Chapter members, and guest Jackie Glass (foreground), take in the oil-painting portraits of Texans killed in the wars in Southwest Asia. Artist Ken Pridgeon (in hat) conducted this tour of his gallery. When he completes this project, he will have painted more than 500 portraits.



and came up with two dozen trophies, nine medals, and the big traveling trophy. Photos of the tables laden with these awards provided proof.

The overall top three winners were cadet units from: McDowell High School in Erie, Pa.; Knox County Career Center in Mount Vernon, Ohio; and Pine-Richland High School of Gibsonia, Pa.

The top three West Virginian units came from: Parkersburg South High School, South Charleston High School, and Jefferson High School of Shenandoah Junction.

Seven AFROTC cadets from Ohio University in Athens judged the event.

Nicely, who spent the entire day at the meet, said the chapter supports it because the drill meet promotes character and gives the cadets practice for "competition in life."

Painting the Big One

Famed aviation artist Keith K. Ferris spoke to New Jersey's **Shooting Star Chapter** in February, describing how he painted one of his most high-profile works.

"Fortress Under Fire," a huge mural in the World War II Gallery of the Smithsonian's National Air and Space Museum, measures 25 feet high and 75 feet long. It depicts the B-17G bomber *Thunder Bird* returning from a 1944 mission to Wiesbaden, Germany.

New Jersey State and Chapter President Howard H. Leach Jr. said that in

his presentation, Ferris told the audience he used only four colors—blue, red, yellow, and white—to create the piece in 1976. On the other hand, he spent 135 days on planning the mural and 75 days on ladders and scaffolds actually painting it.

Other aircraft in the artwork's background include the B-17G *Bonnie B*.

The chapter bought a Ferris lithographic print, "Slow Timing *Bonnie B*," highlighting the bomber. After the artist's talk, held at the Library of the Chathams, the chapter presented it to the library for display. The library serves both the New Jersey borough and township.

Framed with the print is a plaque dedicating it to Amos L. Chalif, a B-17 bombardier and founder of AFA New Jersey and the Shooting Star Chapter. He died on Nov. 2, 2012, at age 94.

In Local News

Chapter Teachers of the Year in two states earned recognition from their local newspapers—and, in turn, so did Florida's **Hurlburt Chapter** and **Central Florida Chapter**, as well as the **Chattanooga Chapter** in Tennessee.

The *Crestview News Bulletin* quoted Hurlburt Chapter Aerospace Education VP John Jogerst explaining how the chapter singles out science, technology, engineering, and math teachers at the elementary, middle, and high school level. The chapter's Teacher of the Year is Stacy Burlison, a physics and advanced math teacher at Baker High School.

More photos at: airforcemag.com. Choose "This Month's Table of Contents."

Continued on p. 85

How To Get on TV

The local ABC TV affiliate in Minneapolis has covered the awards ceremony of the **Gen. E. W. Rawlings Chapter** every year since at least 2009.

During an evening news broadcast in April, KSTP Channel 5 ran a 32-second video segment on the latest one. The newscaster also told viewers to check its website for a list of awardees. The list encompassed winners from the ANG's 133rd Airlift Wing and AFRC's 934th Airlift Wing; university ROTC units; JROTC units; the Civil Air Patrol; and the chapter's Teacher of the Year, Joshua Kohn of the Farnsworth Aerospace magnet school in St. Paul.

How did this merit sending out a TV camera crew?

Chapter President Jonathan E. Powell—who appeared briefly in the video—said it was due to Harold C. Crump. The chapter member is a VP at KSTP, owned by another chapter member, Stanley S. Hubbard. The CEO and chairman of Hubbard Broadcasting Inc. has been an AFA member for more than 40 years; he is a pilot and founded Hubbard Aviation Technologies in 2009.

Crump, an Air Force veteran, arranged funding for the banquet, held at the Town & Country Club, with the Mississippi River as its backdrop.

The chapter posted on its website an hour-long video of the event.

Involving TV station executives in the chapter is one way to garner attention. Powell lists other methods:

- As a 1998 Air Force Academy graduate, he met potential chapter members through the Association of Graduates and through the academy's parents' club.

Darrell J. Tamosuinas, for example, has three academy daughters. Powell took him to the AFA National Convention and appointed him to the chapter's board of directors. Three Tamosuinas family members joined AFA last year.



Jon Powell (l), the Gen. E. W. Rawlings Chapter president, and Darrell Tamosuinas (c) chat with guest speaker Dick Newton, AFA Executive VP. AFA field leaders at this banquet included North Central Region President Vic Seavers, Minnesota State President Glenn Schull, and North Dakota State President Jim Simons.

- Powell tells parents of cadets that they need to read *Air Force Magazine* and the *Daily Report* to keep abreast of issues to help their young adults navigate a USAF career. "You must be a coach," he told them.

- Powell's fellow academy grads have recruited Community Partners—"avid supporters, year to year," he said.

- A comment that the Minneapolis/St. Paul Arpt./Air Reserve Station should have an Air Force-themed room led Powell to seek permission to create one at the Officers Club. The project starts this summer.

"Our organization has been able to grow in a few ways that attract the Guard and Reserve" without pressuring them to join AFA, Powell commented.

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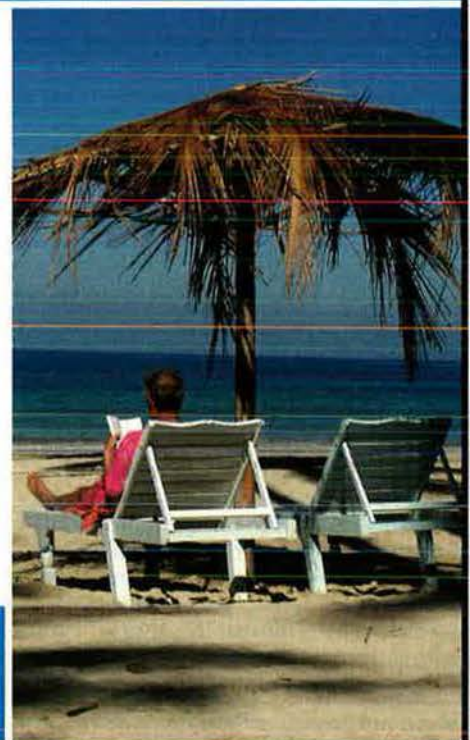
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USAF photo via A1C Kari Giles



Fort Dodge Chapter VP Justin Faiferlick holds up the sky-blue ribbon of the AFA Civil Air Patrol Award. He presented it to Jacob Lewandowski (left). The award recognized Lewandowski as outstanding cadet in CAP's Northwest Iowa Composite Squadron.



Genesee Valley Chapter member retired Lt. Col. Kyle Mullen presented an AFA Outstanding Cadet award to Lauren Forcier at the Military Ball and Awards Ceremony for the Rochester Institute of Technology in New York in April.

Central Florida Chapter's Teacher of the Year for Lake County is Robert Moore, a science instructor at Tavares High School, the *Daily Commercial* reported in April. The chapter will later select one teacher from among five county awardees for its top Teacher of the Year award.

In Tennessee, Chattanooga Chapter President John W. Glass III presented the Teacher of the Year Award to Bryant Haynes at a schoolwide assembly at Girls Preparatory School. According to the online news source Chattanooga.com, Haynes also earned the State Teacher of the Year award, presented at the state convention in Knoxville.

More Chapter News

■ In a Milwaukee suburb, the **Billy Mitchell Chapter** "flew the flag" during one of the city's St. Patrick's Day parades. Chapter VP Ralph Pietruszynski and Veterans Affairs VP Don Adams rode on the Shriners' Legion of Honor float, towed by a truck decorated with the AFA logo and the chapter's name. It was one of some 90 units, according to Pietruszynski. A local business association sponsored the parade. It ran along a mile-and-a-half route on Blue Mound Road. Legion of Honor Shriner's units comprise those who serve or have served in the armed forces. ■

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Cadets from seven high schools compete in the knock-out drill category at the Chuck Yeager Chapter's Air Force JROTC drill meet in West Virginia.



The Shooting Star Chapter presents a Keith Ferris print to a New Jersey library. L-r: Ferris, Peggy Ferris, Deborah Fitzgerald, Steven F. Kiss, Steven S. Kiss, Peggy Chalif, Howard Leach, and Eric Taylor.

Reunions

reunions@afa.org

1st Fighter Assn. Aug. 15-17, Crowne Plaza Hotel in Hampton, VA. **Contact:** Pete Marty (1stfighter@comcast.net).

72nd Aeromedical Evacuation Sq (1970-1992). Sept. 27-28, Quality Inn, 531 Rt. 38 W, Maple Shade, NJ. **Contact:** David Cushing (908-500-1888) (reunion72nd2013@cs.com).

86th Fighter-Bomber Gp. Sept. 18-22 in Fort Walton Beach, FL. **Contact:** Dallas Lowe (850-319-3047) (fighterbomberpilot@yahoo.com).

340th BW, Whiteman AFB, all units. Sept. 13-15, Lodge of the Ozarks in Branson, MO. **Contact:** Bob Barnhill (501-772-2820) (rjbarnhill@aol.com).

366th Tactical Fighter Wg, all units. Sept. 25-29 in Dayton, OH. **Contact:** Paul Jacob (614-906-4470) (366fga.dayton2013@gmail.com).

444th FIS. Sept. 29-Oct. 1, Sheraton Charleston Airport Hotel in North Charleston, SC. **Contact:** Jon Matthews (jrmatthews05@aol.com).

511th Aircraft Control & Warning Gp Reunion Assn, including the 613th, 847th, 848th AC&W Sq. Oct. 2-6 in Nashville, TN. **Contact:** Don Simmons: (972-231-6518) (dona7112@sbcglobal.net).

526th FIS/Tactical Fighter Sq. Oct. 10-13 in Tucson, AZ. **Contact:** Joe Shambo (520-572-4636) (eshambo618@gmail.com).

815th Troop Carrier Sq, Ashiya, Japan (1954-1960). Sept. 18-22, Marriott in Colorado Springs, CO. **Contact:** Carrie Clausen (720-937-9569 or 303-485-3876) (carrie6585@msn.com).

AC-119 Gunships. Sept. 26-29 in San Antonio. **Contact:** Jerry Hester (210-663-3159) (hester7.satx@gmail.com).

Nuclear Weapons Technicians Assn. Sept. 5-7, Red Lion/Radisson Hotel Denver Southeast in Denver. **Contact:** Bob Welz (502-645-3181) (rwelz@aye.net).

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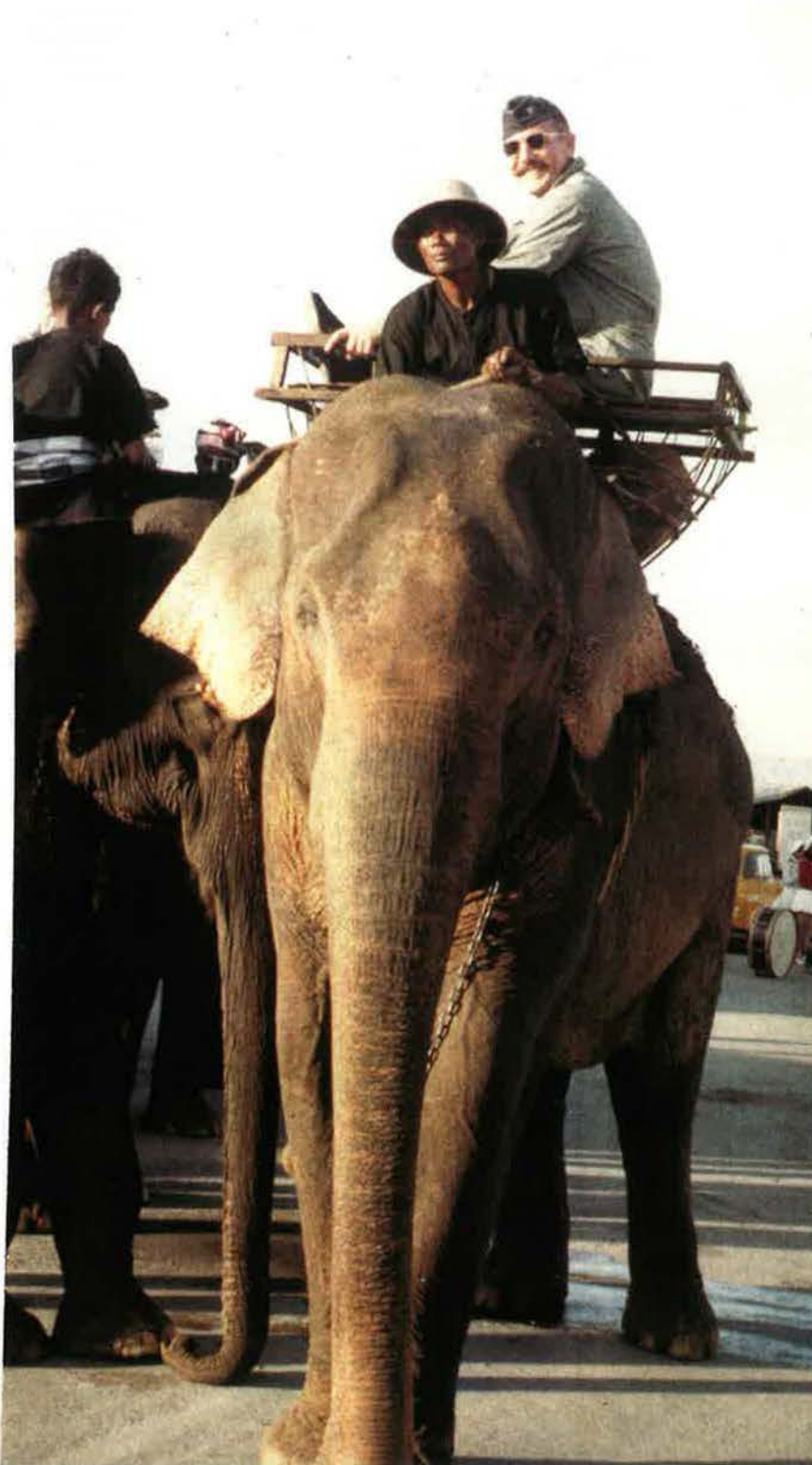
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E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Unit Reunions," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

Wolf Packyderm



USAF photos

In 1966, USAF Col. Robin Olds arrived in Thailand and took command of the 8th Tactical Fighter Wing, the famous "Wolf Pack." The Olds brand of leadership featured boldness, flair, and courage. Also, it seems, he liked to mix in a bit of humor. Here, the legendary triple ace and Air Force Cross recipient sits atop an elephant taxi on a ride from the flight line to Officers Club. The ride came during one of the wing's "practice reunions," so-called because they were held in anticipation of war's end, when POWs would be released and the wing would hold its "real" reunion. The inset shows Olds wearing a flight helmet now on display at the National Museum of the United States Air Force in Ohio.



B-52 Stratofortress



The huge, long-range B-52 bomber indisputably rates as the most capable and versatile warplane in history. From the Cuban Missile Crisis and Arc Light and Linebacker II in Vietnam to the Gulf War, Iraq War, and Afghanistan today, the Boeing Stratofortress has been the indispensable combat aircraft. The B-52 is now in its sixth decade of service. First employed as a high-altitude deliverer of free-fall nuclear weapons, it has been constantly evolving in tactics, weaponry, and missions to meet every challenge in many different flight regimes.

The all-metal, shoulder wing B-52 defined the concept of an aerial platform, for new equipment, modifications, and changes in tactics have kept it as a first-line weapon. A Boeing team created the basic design in October 1948. The team seized upon the promise of the new Pratt & Whitney J57 engine and in-flight refueling as the keys to development of a jet-powered intercontinental bomber.

First deployed in 1955, the B-52 experienced some initial technical problems but rapidly became the primary bomber in the Strategic Air Command fleet. Production concluded in 1962 when the final B-52H—the last model—rolled off the line.

Numerous upgrades and refittings have kept it combat-worthy. It can perform strategic attack, close air support, air interdiction, offensive counterair, and maritime operations. In fact, never in history has a single combat aircraft served so well, for so long, in so many ways. The B-52 will remain in front-line service until 2040. —Walter J. Boyne

This aircraft: Air Force B-52H Stratofortress—#60-048—as it looked in September 2005 on visit to RAF Fairford, UK. This bomber was from the 96th Bomb Squadron, 2nd Bomb Wing, Barksdale AFB, La.



USAF photo

A Boeing B-52 takes off.

In Brief

Designed, built by Boeing ★ first flight April 15, 1952 ★ number built 744 ★ crew of five (commander, pilot, radar navigator, navigator, EW officer) ★ armament early models, four .50 cal guns; H model, one 2 mm gun ★ **Specific to B-52H:** eight Pratt & Whitney TF-33P-3/103 turbofan engines ★ armament one 20 mm gun, eventually removed ★ max load 70,000 lb of nuclear and/or conventional munitions (guided or gravity bombs, PGM, ALCM) ★ max speed 650 mph ★ cruise speed 525 mph ★ max range 8,800 mi ★ weight (loaded) 488,000 lb ★ span 185 ft ★ length 159 ft 4 in ★ height 40 ft 8 in.

Famous Fliers

Air Force Cross: James McCarthy, John Mize. **Combat record:** R. J. Smith (506 missions). **Notables:** William Eubank, Robert Huyser, Curtis LeMay, Earl O'Loughlin, Joseph Pitts. **Test Pilots:** Chuck Fisher, Tex Johnston, Guy Townsend. **Others:** Dale Brown (novelist), Robert Certain (President Ford's minister), Tom Jones (astronaut).

Interesting Facts

Nicknamed "Buff," for Big Ugly Fat Fellow (in polite terms) ★ featured in many films ★ begun as a scaled-up B-29 bomber with six turboprop engines ★ stripped of tandem seating at insistence of Curtis LeMay ★ carried the X-15 on experimental flights in the 1950s ★ modified for low-level tactics ★ became key aircraft in SAC's "Chrome Dome" airborne alert concept in 1961 ★ dropped its first bombs in Vietnam War in June 1965 ★ flew more than 126,000 combat sorties over South Vietnam ★ delivered 40 percent of all weapons in 1991 Gulf War ★ flew 16,000-mile round-trip mission to launch 35 ALCMs at the opening of Desert Storm ★ set record for nonstop, around-the-world flight in 1957 nonrefueled nonstop flight of 12,532 miles (1962) ★ two B-52s can monitor 140,000 sq mi of ocean surface in two hours.



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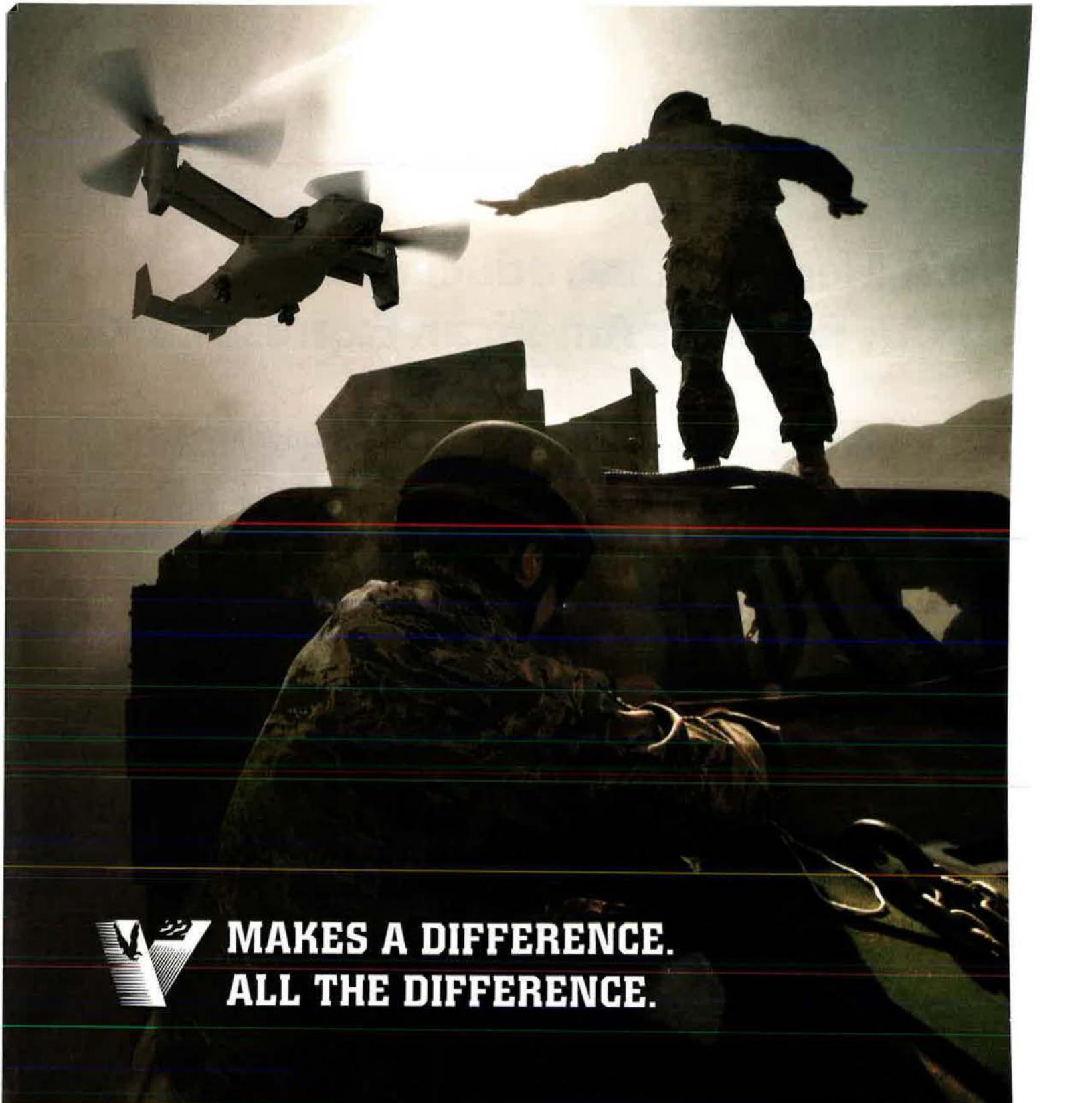


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