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# AIR FORCE

MAGAZINE

# SPACE FORCE RISING

The Birth of the 6th Service | 44



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# AIR FORCE

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Photo/illustration: USAF/Johnny Linder

A photo illustration of a satellite and planet Earth. See "Space Force is Here," p. 44.

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# Launching the Space Force

**T**he birth of the Space Force some 73 years after the Air Force separated from the Army is rife with opportunity. Executed correctly, it can empower new thinking and creativity in how space is applied to warfare and diplomacy, accelerate the development of new capabilities, and yield unimagined strategic advantages for US defense.

Yet we must not ignore the risks should the launch fail to go as planned. Increased tribalism, underfunding for necessary resources, insufficient personnel, lack of integration of the multitude of agencies with a role in space, and the associated loss of synergy, trust, and coordination, could all undermine the intent of the new military service. The entire Defense Department must unite to keep that from happening, as all of DOD will depend on the capabilities a strong and effective Space Force brings to the fight.

Air Force Chief of Staff Gen. David L. Goldfein and the new Chief of Space Operations, Gen. John W. "Jay" Raymond, clearly understand the stakes. They've seen their share of interservice and interagency dysfunction over their 30-plus years of active service, and both are respected for consistently rising above that parochialism to form high-performing cross-functional teams. Their experience as joint operators will inform the decisions they make now and into the future.

For the thousands of Airmen affected, however, the risks and challenges may not be fully apparent. The rush to declare independence and the power that results could be dangerously intoxicating for some. Unity of effort and joint force thinking can easily collide with the natural drive to settle old scores, create new power bases, and form new fiefdoms. How leaders respond, and what they do to ensure perpetual affinity between the Air and Space forces will go a long way toward defining how we look back at Dec. 20, 2019, the day the Space Force was born.

The Department of the Air Force, in which Space Force lives, must evolve. To make clear its full role and responsibility, it should become the Department of the Aerospace Forces. The Air Force and Space Force can and should coexist within that single framework, a nod to the inextricable ties between air and space warfare and the hazy line that separates the two domains. There is no reason to create a new secretariat to oversee space.

This is not to say, however, that it is not essential for the new Space Force to develop and establish its own identity and culture. Doing so will communicate what the new force values and what kind of leaders it develops in the future. If today's leaders do not begin to define those cultural touchpoints and values now, others will do so for them, and not necessarily with the best vision or intent. General Raymond won't do it all on his lonesome, but he will have to take the point in nurturing the best ideas and debates while gently redirecting—and even, when necessary, snuffing out—divisive and counterproductive influences.

First in the order of cultural matters is what to call members of the Space Force. For now, of course, they remain Airmen, but that's not going to last—nor should it. Space Force members deserve to be distinctly recognizable and identifiable, just like Soldiers, Sailors, Airmen, and Marines. Coast Guardsmen sail, but they are not Sailors. So it is with Airmen in the Space Force. If the service tries to stick with "Airmen," the space Airmen will inevitably differentiate on their own—or, worse, succumb to whatever nickname others pin on them.

What should they be called? Spaceman is uninspired. Few, if any, will ever actually operate in space, and the term evokes hokey images from ancient sci-fi movies.

Sentinel, favored by some, is not much better. By definition, a sentinel is a Soldier standing watch. Our new Space Force will do far more than that, deploying systems and weapons in space, enabling complex communications and intelligence gathering, and ultimately operating offensively and defensively from among the stars.

Astro or Astron are also options. Meaning "of or relating to the stars," Astro derives from the Greek Astron, meaning star. These relate directly to space and check all the other boxes: just two syllables (like Sailor, Soldier, Airman, and Marine); gender neutral; self-explanatory; without significant secondary meaning. They are unique and relatable.

Uniforms will be another matter. Clothes make the person. While some will inevitably cry out about waste, uniforms matter to recruiting and retention; how one looks relates to how one feels. The Space Force will have a unique opportunity to design uniforms for precisely the kind of work its members do and for the times in which we live.

Think of dress uniforms for the information age, no neckties, and performance fabrics.


Uniform envy poses risks, of course. In the utilitarian 1970s and 80s, the military adopted common camouflage utilities. When Marine Commandant Gen. James L. Jones wanted to

create a uniquely Marine camouflage pattern in the late 1990s, the Marines' eagle, globe, and anchor logo was designed into the pattern to ensure the other services would steer clear. In the resulting arms race of camouflage patterns, the Navy created a uniform that perversely made Sailors stand out on the decks of ships but hid them in the waves if they fell overboard. The Army wasted \$1 billion before it dropped its universal camouflage pattern because it was putting troops at risk in Afghanistan. Such is what happens when tribalism reaches illogical extremes.

Nomenclature and uniforms are symbolic touchpoints. They mask the more contentious struggles to come over roles, missions, and resources.

For the Space Force to be successful, Congress and the Pentagon will have to consolidate space assets, capability, know-how, and budgets from the other services. Simply renaming Air Force Space Command "Space Force" won't get us anywhere. Just as critical, they will have to finally address the fate of pass-through funding that has for years masked the true size of the Air Force budget.

That so-called "non-blue" pass-through amounted to \$38 billion in 2019 and will top \$39.1 billion in 2020, money that funds the space assets of the National Reconnaissance Office. Significantly, it's more than the entire Space Force budget and will be for years to come.

The right solution is to consolidate the NRO and its budget into the Space Force, providing the means and capability to make bold and significant decisions about space investment into the future. Failing that, the pass-through should be specifically attached to the NRO if that is to remain separate from the Space Force, because neither the Air Force nor Space Force has any control over those resources. This will help to accurately and honestly portray the nation's investment in each military domain—air, land, sea, and space—and ultimately better defend the American people. That, after all, is why we have armed services in the first place. 

**Culture change is a leadership issue. Time is of the essence.**



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## Short End of the Stick

Of note, in addition to the apparent negligence by [Gen. Douglas] MacArthur and his staff resulting in the Dec. 8, 1941, destruction of FEAF ["Disaster in the Philippines," November, p. 46], there is at least one other instance of similar bungling by the "Bataan Gang"

MacArthur and staff were convinced that guerrilla operations could not be conducted in the Philippines in World War II. They held this contention despite the evidence that Lt. Col. Wendell Fertig was successfully conducting extensive operations against the Japanese. Recognition and support from MacArthur's headquarters were both late arriving and limited.

It is an irony of history that Adm. [Husband E.] Kimmel and Gen. [Walter C.] Short were both blamed for the disaster at Pearl Harbor while MacArthur was awarded the Medal of Honor for his own disaster.

Patric Baumgartner  
Mount Airy, Md.

One factor which John Correll does not mention in his article about the Philippines is that, in order to control the air over the central Philippines, on Dec. 12, 1941, a force of less than 1,000 Japanese troops landed at Legaspi in southeastern Luzon and began flight operations at the airfield there. The Japanese aircraft carrier Ryūjō, accompanying the landing fleet into Legaspi Bay, provided air cover for the unopposed landing and ferried aircraft to the airfield.

I was a teenager, living near Legaspi with missionary parents at that time. We hurriedly left home and headed into the backcountry to avoid capture. From a vantage point on a hill, we looked back over the bay to see the Japanese ships, including the carrier, unloading troops and supplies into small boats that carried them to the shore. I noticed that the

carrier had no superstructure rising above the flight deck, which was unusual. About 10 years ago, after an Internet search, I found that it was the carrier Ryūjō, the only operational carrier in either Navy with a flush deck. According to the report, it had remained about 100 miles out to sea to launch its planes, but I know that was in error.

Maj. John W. MacDonald,  
USAF (Ret.)  
Missoula, Mont.

## Tanker Travails

Reading the "New Tanker Still Years from First Deployment" article ["World," November, p. 16], I think, "we did it to ourselves." My recollection of the bidding process is initially the Air Force awarded the tanker contract to the maker of Airbus. This created considerable outrage in Congress, most notably the late Sen. John McCain (R-Ariz.). How could we have our tanker produced by a foreign entity, even though manufacturing would be in the US? The Air Force reneged on the contract, requested new bids, and hurray, Boeing was awarded the contract. Fast forward to 2019 and what do we have? The KC-46 cannot carry passengers or cargo and is probably three to four years from becoming operational; the flawed-designed 737 Max is still grounded, and there are quality problems with the 787. To paraphrase an old saying, when it comes to Boeing, you don't get what you pay for.

Col. Thom Weddle,  
USAF (Ret.)  
Minneapolis

The seemingly intractable problems with the KC-46 infuriate me as a veteran and taxpayer; I can only imagine what those directly involved in the Air Force must think. In what universe is Boeing's performance even close to being marginally acceptable?

Remember, right after Sept. 11, 2001, it was proposed to buy off-the-shelf tankers. That project died. Then we had a bid system won by Airbus with their tanker—Boeing protested and it was killed. Next, Boeing won the new contract by underbidding on price, according to reports. Does it look to anyone else that they skimped on quality and management to make up for the underbid?

Now, we're told it's still three to four years before these jets are deployed. There has got to be some accountability.

MSgt. Bill Brockman,  
USAF (Ret.)  
Atlanta

Personally, I agree with Colonel Romero on his perspective on the issues with the remote vision system in the KC-46 (December, "Letters," p. 5). How is it the Japanese remote system works and their KC-767J reached IOC in 2009, and here we are 10 years later and cannot seem to get it right? What was wrong with putting the boomer back where he/she can directly view the receivers? It has worked so well since the KC-97 through the KC-10. Some modernization is good, but if it ain't broke don't waste tax dollars trying to do what ain't necessary.

Col. Frank Alfter  
USAF (Ret.)  
Beavercreek, Ohio

## Not People Friendly

[Regarding] caption five in "Combat Heavies," November, p. 36, the leaders of Air Mobility Command have not read the history of the C-5. We tried pretty much the same thing April 4, 1974, with #68-0218. The crash killed all of the children in the cargo compartment because the aircraft collapsed down on it. The plane was not, and is not, stressed to withstand such a crash.

I loved the aircraft, having delivered the first one to Travis in 1970 and flying it until I retired in 1978. It just is not made to carry people in the cargo compartment. *Please* do not try this stupidity again.

Maj. Ernest O. Brown,  
USAF (Ret.)  
Sonora, Calif.

## Trophy Culture

Any organization, especially ones as big as the military branches, need to have reviews, bottom to top, concerning personnel issues and programs. These reviews should frankly and honestly look for policies that are no longer rational in a changing world.

Some of the medals/awards/ribbons seem a little odd. For example, the Air Force Special Duty Ribbon. The criteria addresses only special duty within the Air Force. Why? To me, special duty by an Air Force member should include, or be limited to, duty by an Air Force member outside the Air Force—like NATO or a joint assignment within the DOD. And to make things more rebellious, why have this ribbon at all?

Then there is the issue with time frames. Take the Nuclear Deterrence Operations Service Medal. The guidelines state:

"The medal is authorized for airmen who directly impacted the Nuclear Enterprise. The NDOSM may be awarded retroactively to Dec.

## WRITE TO US

Do you have a comment about a current article in the magazine? Write to "Letters," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198 or email us at [letters@afa.org](mailto:letters@afa.org). Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.

—The Editors

27, 1991, to fully qualified airmen”

What about Air Force members that met the criteria, but in a time period before Dec. 27, 1991? Having time periods for awards like this have never made sense to me.

These type of criteria remind me of the umbrella policy. I grew up in the Air Force and, of course, no one was allowed to use an umbrella. Better to get wet than look like a civilian. I was on the IG at MAC when the policy was changed. I used an umbrella, but many of the colonels were upset at the change. Again, why?

These reviews of nonoperational areas need to be taken seriously and not used as a whitewash to maintain the status quo. “The SECAF approved this” is not a valid reason for not seriously consider changing things. I was assigned to DEOMI [Defense Equal Opportunity Management Institute], and as result of that, I am authorized to wear the Office of the SECDEF badge. The Navy members were only authorized to wear the badge while assigned. Shouldn’t the wear criteria be the same, across the board?

H. T. Whitehurst  
Prescott Valley, Ariz.

I do not have any problem with the many ribbons one can earn as long the policy is “fairly” applied to all potential personnel. Whenever possible, exceptions should be made to be inclusive of all personnel who directly or indirectly participated or supported a mission or war. Drone participants, global air missions, or production of specific mission aids and functions are a few examples of such exceptions. Specific statements regarding the individual unit’s mission and statements in performance reports should be sufficient qualifiers. Special devices can be attached to ribbons as required.

I am also considerate of awarding personnel who contribute significantly to the accomplishment of another command’s mission.

A common reason to disapprove an award or decoration in the past was that the personnel did not “complete a full tour of duty.” When a supervisor submits a recommendation and it is approved by one or two commanders up the chain of command, in my humble opinion, it should be awarded and not arbitrarily downgraded or outright disapproved

Among all joint commands, there should be a policy that allows any recommendation to be approved rather than rejected because of use of a “wrong form,” “wrong format,” or “wrong process.” Why should anyone be denied an award for outstanding performance because of administrative miscues? I hope to see any nominee for an award get the benefit of the doubt.

When a person has a formal “two-hat” job in another command, command center, or joint function as a staff officer or adviser, a separate award should be allowed by the other command for a completely unique function or

service. The military personnel center used to disapprove one award because the awards overlapped in time.

Lt. Col, Russel Noguchi,  
USAF (Ret.)  
Pearl City, Hawaii

### Preservice Check

Regarding the article “DOD Releases Military Family Suicide Statistics:” [World, November, p. 23]. Maybe the military recruitment system needs to put more focus on the mental health of those who want to serve in the military. There already is a strong enlistment emphasis on physical health. Those of us who have served know that there are many pressures very unique to military life. Unfortunately, there are many individuals who cannot tolerate the pressures of military life, which can lead to depression and often suicide.

Col. Raymond G. Schwartz,  
USAF (Ret.)  
Pinetown, N.C.

### Threat Assessment

The editorial “Matching Up Against the Threat,” in the October 2019 issue of the *Air Force Magazine* [p. 2] provides a very revealing and concise assessment of the threat posed by China (and Russia, plus others) to both our national security and economic future. I concur with the article’s assessment of how vulnerable we are now, let alone in the future, as a result of the current Air Force being too small, inflexible, and our equipment too old and worn-out from Middle East wars and lingering conflicts, as well as the “threats” and technical advancements we face, which are evolving and getting stronger. We have not been investing enough in our Air Force to keep pace, let alone maintain a dominate force to deter serious aggression. Our Air Force equipment, personnel, strategies, tactics, policies, funding, and even some technologies are generally in a “ketch-up” situation to the changing times.

Our overall national defense capabilities face similar weaknesses and increasing threats. This weakened position lessens our options to deter aggression and to counter direct threats through conventional means, leaving us little choice but to “go nuclear”—when pushed! These very real “enemies” know this, and will likely become even more bold and aggressive, increasing the risk of armed conflict, perhaps challenging and mistakenly perceiving our nuclear deterrence strategy protecting many areas of the world as a potential “bluff.”

This situation is a very real “war,” involving political and economic dominance, as well as very dangerous military posturing. There is no “easy fix,” nor any foreseeable peaceful end to this growing danger. Seventy-five years after World War II, we face very similar evil threats to peace and freedom, and we must respond

accordingly. Our new Secretary of the Air Force faces these many challenges, and we wish her well.

Lt. Col. Stephen P. Pedone,  
USAF (Ret.)  
Naples, Fla.

### MiGs in Vietnam

The article “Against the MiGs in Vietnam” [October, p. 53] is a superb account of the Russian and Chinese-trained North Vietnamese pilots going up against USAF and US Navy aircraft over North Vietnam during the Vietnam War. For me, it cleared up a lot of questions as to why the NVAF pilots could accomplish so much in the early days of the War. John Correll is to be commended for the excellent research and extensive detail that went into this article making it a “keeper” in my Vietnam War library.

However, this article, good though it may be, lacks one other detail: the role the Chinese Air Force played in the downing of several US aircraft, the loss of American pilots/crew members and the incarceration of the surviving pilots/crew members until their release in 1973.

Halfway through the eight-month 1967 combat cruise of Attach Squadron VA-196 aboard the USS *Constellation*, CVA-64, the “Main Battery” had thus far not lost a single aircraft to the formidable North Vietnamese defenses. Their luck ran out on Aug. 21, 1967, when only one A-6 Intruder of a flight of four returned to the “Connie” from a midday Alpha Strike. The target was the Duc Noi Railway Yard, five miles northeast of Hanoi. The commanding officer of VA-196, Leo Profilet, was the strike lead and ironically the first to go down when a SA-2 SAM blew one wing off their Intruder. Commander Profilet and his bombardier/navigator Lt. Cmdr. Bill Hardman safely ejected and spent the next five years in POW prisons. Profilet’s wingman, Lt. Phil Bloomer, piloted the only Intruder to return to the Connie from this Alpha Strike that fateful day.

On Aug. 21, 1967, the weather over North Vietnam was not good. While the target area was marginal, there were thunder storms covering much of “the backdoor,” a mostly uninhabited egress route northeast of Hanoi and a relatively safe route from Hanoi back to the Gulf of Tonkin. Shortly after pulling off the target, the second section of A-6s were jumped by a pair of MiG aircraft identified by one of the crewmen of these two Intruders with the radio transmission “... MiGs, MiGs, ... Farmers, Farmers ... !” The Russian MiG 19 had been given the NATO code name “Farmer,” so it is assumed at this point that the MiGs in pursuit of the ill-fated pair of “Milestones” (radio call sign of VA-196) were Chinese (the MiG-19 or Chinese J-6 was not introduced to the NVAF until 1969).

The two Intruders were shot down 11 miles inside China. Of the four crew members, only one, Lt. Bob Flynn, the B/N of the section lead

aircraft, safely ejected and spent the next five years in a Chinese prison. Flynn's pilot, Lt. Cmdr. Jimmy Buckley, and the crew of their wingman aircraft were all killed.

Flynn was released to the American authorities in Hong Kong together with Maj. Philip E. Smith of the USAF, who had been imprisoned by the Chinese since his F-104 Starfighter was downed over the Hainan Island in September 1965. After the war, Flynn held command positions and received a bachelor's degree from the University of Washington. He retired with the rank of commander in 1985 and died of a heart attack in 2013 at age 76.

On Feb. 14, 1968, Cmdr. Joseph Dunn flew his propeller-driven A-1 Skyraider from the Philippines to the USS *Coral Sea* aircraft carrier. As Dunn neared Hainan, MiG aircraft, probably MiG-17s, attacked and shot down the pilot. His body was never recovered. These are two instances of Chinese shooting down three US aircraft during the Vietnam War. There may be more.

Lt. Phil Waters,  
USN (Ret.)  
Arvada, Colo.

The article by John T. Correll has missed an important event that took place during the MiG engagement on April 4, 1964, during the F-105s second attack in as many days on the "Dragon Jaws" bridge at Thanh Hoa.

As noted in the article, two Thuds and crews were lost that day as the result of MiG-17s coming in through a thick layer of haze, eluding a flight of F-100s from the 416TFS flying out of Da Nang as MiGCap. In the No. 2 slot was Capt. Don Kilgus, who with the rest of the F-100 element heard the radio chatter of the engagement of the MiGs attacking the F-105s. He talks about gazing through the coffee brown haze for bogies.

Then-Captain Kilgus and his flight lead spot TWO MiGs clearing the haze. The MiGs split with one overshooting Kilgus and locking on the six o'clock of his flight lead. Kilgus closed in on that MiG and fired a short burst just enough for the MiG to see the 20 mms winking. The MiG instantaneously pulled off the lead and Kilgus followed in chase in full afterburner.

After a few short bursts and moving in a near-vertical dive from 20,000 feet at approximately 580 knots, he came down on the trigger. Just as he was pulling up at 6,500 feet, Kilgus saw puffs and sparks and debris falling off on the vertical tail of the MiG—this action was also observed by other flight members. The MiG was back in the haze, and Kilgus saw nothing more of the MiG. Although Kilgus was convinced the MiG pilot could not have returned to base, Kilgus was only awarded a probable kill because no ejection was observed.

However, Tran Hanh was the only survivor of his flight of four on April 4, 1964. His other flight members, Le Minh Haun, Pham Giay, and Tran Nguyen Nam were all killed that day. Tran Hanh himself had to crash-land his fuel starved MiG-17. Hanh attributed the three losses to US fighters, nominally F-105Ds (although no claims were ever made by the 355th TFW), and he may have mistaken the two F-100Ds that attacked him for F-105s. It is also possible the North Vietnamese gunners were unused to seeing MiGs in the vicinity of their usual American aircraft targets and may have hit "friendly" aircraft, resulting in fratricide.

Regardless, Don Kilgus in F-100D #55-2894 was the only F-100 to engage in aerial combat during the Vietnam War. Soon after, F-4s were in country and bagged two MiG-17s in July 1964. F-100s were reassigned to bases in South Vietnam where they proved to be the perfect platform for ground attack and aiding troops in contact. F-100s flew 360,283 sorties during the war, more than any other aircraft in the Vietnam War. Clearly, a real workhorse.

Mike Dean  
Gordonville, Pa.

**Polar Opposites**

I want to correct John A. Tirpak's article in the September 2019 issue, "PACAF Chief Concerned by China-Russian Cooperation, Antarctic Competition" [p. 22].

The South Pole is located deep in the interior of Antarctica, and the Chinese ice breaker probably only assisted to McMurdo Station, not the Pole. That is a common error by people who are not familiar with Antarctica.

And the Antarctic Treaty DOESN'T expire in 2048.

Lt. Col. Peter J. Anderson,  
USAFR (Ret.)  
Columbus, Ohio

■ *You are correct; the treaty does not expire in 2048. Rather, at that time any party to the treaty may call for a conference to review and discuss amendments to the protocol; changes must be ratified and approved by three-fourths of the parties to take effect.—THE EDITORS*

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# Reconstruction and Resiliency

*John W. Henderson is the Assistant Secretary of the Air Force for Installations, Environment, and Energy. He came to the Air Force after a 23-year career with the Army Corps of Engineers. He spoke with Air Force Magazine Editorial Director John Tirpak in late November 2019 about reconstruction at Tyndall and Offutt AFBs; power generation resiliency; the backlog of facilities maintenance; and overcapacity. The conversation has been edited for space and clarity.*

**Q. Let's start with the Tyndall and Offutt recovery. It's been just over a year since the hurricane in Florida, and almost a year since the flood in Nebraska. Where do things stand?**

A. The bottom line with Tyndall [AFB, Fla.] and Offutt [AFB, Neb.]—because we're kind of running those recoveries in parallel—is, we're off to a good start, thanks to a lot of help from Congress. They appropriated a total of \$1.67 billion in disaster supplemental funds that we've put to good use. We funded designs for over \$3.6 billion in military construction, and those are underway. We're getting traction on some of the bigger work that has to be done.

Both Tyndall and Offutt have restored their mission capabilities in the interim.

The numbers of people at Tyndall are still down because the folks flying the F-22s have moved to other places. But they're still running Checkered Flag exercises; they still have the capability to run the exercises and do the missions. All the other mission sets that were there supporting Tyndall have been restored, and all those people have returned.

The flying mission is still coming back, and those folks will come back as the F-35s start arriving in 2023.

The \$1.67 billion was a good start. But we'll have to continue to work with Congress in FY 20 and probably FY 21 to authorize and appropriate additional funds to meet the rest of the construction that has to be done.

**Q. So the grand total for Tyndall is about \$5 billion?**

A. Just under \$5 billion, probably \$4.8 or \$4.9. That number includes the money spent out of operations and maintenance for the initial response; the recovery; the relocation of F-22s to other bases, etc. With regard to infrastructure and the rebuild, that bill is more like \$3.6 billion to rebuild Tyndall. ... So far, those have all been supplemental appropriations.

**Q. Tyndall was virtually scraped clean—a chance to create a 'base of the future.' What will that look like?**

A. We're working with the provider to bring 5G into Tyndall and with public and private innovators on a lot of smart technologies, trying to figure out which ones make the most sense. Our intent isn't just to go in and put a bunch of smart technologies in there if they don't directly support the missions. We don't want to be the early adopter on every new technology that's out there.

But it will include some energy resilience technologies. Also, predictive artificial intelligence for facility maintenance. The idea is, as you rebuild the facilities, sensors are already embedded into the construction, and the facilities can tell you when they need maintenance, kind of like your car check engine light coming on.

It allows us to extend the lifespan of these buildings and nests very well with our infrastructure investment strategy. The idea is, get in and fix things before they're completely broken, when it would

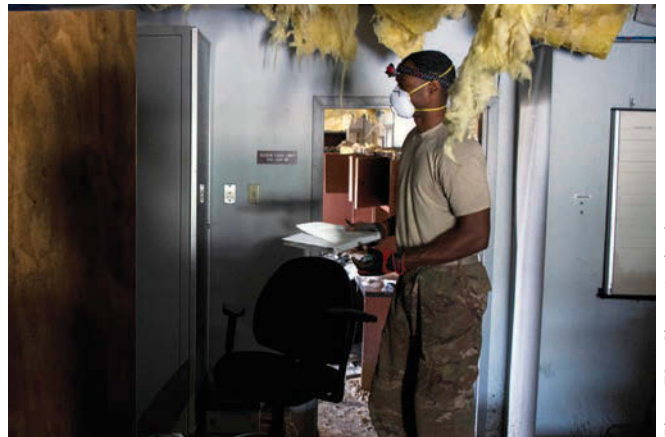


Photo: TSgt. Clayton Lenhardt

**TSgt. Samuale Bailey works on re-establishing communication nodes hit by Hurricane Michael at Tyndall AFB, Fla.**

cost 10 times as much to fix.

We're also taking the opportunity to put improved and integrated base defense infrastructure in there; the security component. And then, things that are less technological but important for the mission, like walkable campuses and centralized community support facilities that will improve the overall quality of life for our airmen.

**Q. Same ideas at Offutt?**

A. There's a little different problem set at Offutt. There, we're probably more focused on rebuilding out of the flood-prone areas. A lot of what we're doing is repairing the existing facilities in place just because that's the most economical way to do it. We don't necessarily have a clean slate.

But whether it's repair or reconstruction, those new buildings will meet the updated codes, building standards, and design criteria. We'll do smart building techniques for the facilities that we end up touching.

**Q. There was discussion of maybe moving some of the Tyndall amenities—the base exchange, bowling alley, etc.—outside the gate, and relying on the local economy for those things. Where does that stand?**

A. All that community support infrastructure was significantly damaged at Tyndall and it has given us an opportunity to re-look at how we address some of the quality of life and community support infrastructure on the base.

We're generally looking at how some of those services could be provided better through a public-private partnership. We haven't made any decisions yet. But our intent is to rebuild Tyndall with all the mission and community support infrastructure it needs to sustain airmen and families there. Because the quality of life of our airmen and families and having access to that stuff inside the base is absolutely essential for retention, recruitment, and just taking care of our people. So, we'll build all that back, in some form or another.

**Q. How much does the local retiree population influence planning on those issues?**

A. Oh, it's significant. And it's not just retirees, there's joint service aspects. For instance, we were pretty quick to get the commissary

and the BX back up and running because there is a huge retiree community there, Reserve and National Guard folks there. There are people from other services that rely on the community support services provided by Tyndall, and that is germane to the conversation.

**Q. What are your plans for power generation/resiliency, both at these two facilities and around the Air Force?**

A. At each facility, we're doing installation energy plans. We've got to have a primary source of energy and then backup sources for all of our critical facilities.

Specifically at Tyndall and Offutt, we have commercial providers doing the generation. To make sure it's more resilient, we're looking at maybe burying the power or putting another substation in to have another source of power.

Where it makes sense, we're working with the power providers to have maybe a complete alternate source of energy, combined with a micro grid, so if the grid goes down externally, we have another, wind or solar or a peaking plant, built on base.

**Q. What are the big lessons that you're learning from 'pull-the-plug' exercises?**

A. We've done two of these exercises in this fiscal year; at Hanscom [AFB, Mass.,] and at Vandenberg [AFB, Calif.,] We're looking over those findings now. These exercises were planned, specifically, to identify gaps. The primary lesson learned is, while we have backups for critical facilities, there are second- and third-order effects around the base when the power goes out.

For instance, with an operations center, you need a backup generator for cooling, because if you don't, the server room that feeds the ops center will overheat in only about an hour, and then you lose your communications and your ability to do [command and control]. The server may be two blocks away, so even though the lights in the ops building are on, and maybe even the computers are running, they get knocked off the network.

So you can miss the fact that something is a critical facility. What we've learned is where we need to put projects together to ensure bases can run and be fully operational in the event of a long-term power outage.

And, it's one thing to be able to run on emergency power for two hours. Being able to do it long term—for 24 hours, for 72 hours or having to go two weeks—is a whole 'nother thing that we're also looking at.

**Q. Talk about your Infrastructure Investment Strategy. You've said repair is no longer going to be simply 'worst first.'**

A. We've put a strategy in place to address the \$33 billion backlog of facility maintenance and repair that's built up over the last six to eight years. Funding just the absolute worst facilities was only building more backlog and was not a good plan for the future. The IIS really represents a feasible way forward to address some of this backlog.

It clearly has to be a long-term strategy. You can't buy down \$33 billion inside of the [Future Years Defense Program]. But Congress and [the Office of the Secretary of Defense], to date, have been very supportive of us asking for more money, toward two percent of our plant replacement value each year.

And the data analytics of understanding the condition of what you have, that will help us target the investments. That'll save billions of dollars for the Air Force in facility work over the next 30 years.

**Q. The Air Force has long asked Congress for another round of Base Realignment and Closure. When you plan, how much do you expect to keep open?**

A. Assessments have been done saying that we've had overcapac-

ity in our infrastructure. But those measurements were, essentially, quick looks to determine whether a BRAC was needed or not.

At some point, I expect the discussion about BRAC will come up again, and we'll work with Congress for the authority to study what's required and when.

**Q. That 30 percent overcapacity estimate was done before the National Defense Strategy and the Air Force's "The Air Force We Need" paper saying the service should be bigger. Does USAF still have too many bases?**

A. That's a great point. The Air Force had drawn down for a number of years, but our infrastructure hadn't drawn down commensurately. We have more ramp space than we have airplanes.

But when I go out to bases, I see that those facilities are being used for *something*. Maybe it's not an Air Force mission; maybe it's a [Federal Emergency Management Agency] mission. Maybe we've pulled National Guard or a sister service into those buildings. Maybe we repurposed hangars to be gyms. So the 30 percent is kind of hard to see out there.

Having said that, in "The Air Force We Need," we talked about growing to 386 squadrons. That puts a whole new capacity crunch on the infrastructure. Just because there's a number of 30 percent out there doesn't mean we could automatically add another 60 or 80 squadrons at our bases, because we've repurposed a lot of that infrastructure. We probably have the runways and the ramp space, it's all the supporting facilities that have either been demoed or repurposed that would put us in a tight position.

**Q. Would you have to evict some of the activities that have taken root in those dormant areas?**

A. That would be very hard to do. Some of those are other government entities or other services that have moved onto the bases because of heightened security requirements, for force protection. We've taken on a lot of missions over the years that way. What we could do is make better utilization of the space we have. Tell them, 'Hey, we're going to consolidate some of these missions. Your offices and classrooms won't be as big, but we'll get more use out of the facility.'

**Q. Has the Air Force wound up paying a lot of the house-keeping bills for the other services because of joint basing?**

A. There are 12 joint bases. The Air Force serves as the lead service on seven of those bases, and we're working with the Navy right now to potentially take over an eighth base, and that would be JB Anacostia-Bolling, D.C. We would just switch executive agency there because the bulk of forces there are actually Air Force.

When we get a joint base, we take on other services and facilities onto our real property books, and there's a commensurate transfer of funding authority to the Air Force from DOD. So, it's not necessarily an increased bill to pay, but it is organizational infrastructure we've got responsibility for running.

**Q. Privatized housing on bases is getting a lot of attention. What's changing?**

A. We acknowledge that we still have a long way to go on several things, but as all good organizations do, we're holding ourselves accountable through an [Inspector General] assessment, through commander-directed inquiries.

It's a strategic imperative for the Air Force to continue to recruit and retain the best and brightest people. We owe it to them to have good facilities. The Secretary and Chief have taken a personal interest in this and said we need to handle this such that we don't lose the trust of the nation that supports us. ❏

An aerial photograph of a lush green landscape with a winding river. The terrain is hilly and covered in dense vegetation. The river flows through the center of the image, creating a meandering path.

**ANY CONDITION**

An aerial photograph of a tropical ocean. The water transitions from a deep blue on the left to a bright turquoise on the right. There are several small, rocky islands scattered throughout the water.

**ANY TEMPERATURE**

An aerial photograph of a desert landscape. The terrain is arid and brown, with some rocky outcrops and sparse vegetation. The overall color palette is dominated by earthy tones of brown and tan.

**ANY MISSION**



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By John A. Tirpak

# The End of Nuclear ‘Kick the Can’

Technicians perform a vibration test to analyze the structural integrity of a B61-12 nuclear bomb at Sandia National Laboratories in New Mexico. The aging US nuclear infrastructure, some of which dates back to the Manhattan Project, will cost billions of dollars to modernize.



Photo: Randy Montoya

**T**he US can postpone modernizing its nuclear deterrent forces no longer. The triad of delivery systems, the warheads, the scientific infrastructure that builds and tests them, and the command and control system that ties it all together, have all long outlived their planned service lives. Now comes the task of convincing the public this massive recapitalization must somehow be afforded, among many other national priorities.

“We are out of margin, and we are out of time,” said retired USAF Gen. C. Robert Kehler, former commander of US Strategic Command, at a December MITRE Corp. seminar. “We have deferred modernization as long as we can defer it.” The last—partial—recapitalization of the nuclear deterrent was 30 years ago, and many of the systems, such as the B-52 bomber, are more than 50 years old.

A newly released RAND report—completed for the Air Force in 2018 but not publicly released until November 2019—warns the service must step up advocacy for strategic modernization or risk seeing existing infrastructure fail. RAND said the Air Force should spell out in detail its master plans for replacing land-based ICBMs, bombers, and the nuclear command and control (NC2) system, which is sometimes referred to as the “fourth leg” of the nuclear triad.

The “sheer scale of the programs is daunting, has not been performed at scale for many decades, and will need to be relearned,” said RAND.

The B-52 bomber, KC-135 tanker, AGM-86B Air-Launched Cruise Missile, and Minuteman III ICBM all date from the 1960s and 70s, Kehler said—well before the last modernization of the nuclear force. The information technology system tying it all together “aged out 30 years ago,” he said.

Meanwhile, Russia and China have “modernized—past tense,” Kehler stated. Their nuclear arsenals are fresh and the rapid buildup of the Chinese military has shifted the strategic landscape from a bipolar to multipolar world. “Further delay is just going to add risk,” he asserted.

## TRILLION WITH A ‘T’

The Congressional Budget Office said in 2017 that the cost of modernizing and operating the nuclear deterrent enterprise for the 30 years through 2046 would reach \$1.24 trillion. Of that, \$399 billion would fund buying or updating nuclear forces and \$843 billion would fund operations and sustainment. Parsed another way, the Defense Department would spend \$890 billion while the Department of Energy would invest \$353 billion to support scientific infrastructure.

“This is not the Cold War,” Kehler said: The world situation is very different than when the Soviet Union collapsed in 1991. “We are facing a new set of uncertainties and global challenges that we have not faced before.” In addition to strategic nuclear weapons, the US faces cyberattacks and other threats “below the threshold” of a nuclear strike. That demands new strategy, new long-range conventional weapons, missile defenses, and assurance that the bedrock systems will all function properly when needed, he said.

Nuclear weapons underpin all other aspects of national security, Kehler said, and play a central role whenever diplomacy and military action are considered.

“In cases like Iran, [the threat of nuclear weapons is] being used by a country that doesn’t even have them,” he said.

Peter Fanta, deputy assistant secretary of defense for nuclear

matters, said the US stopped designing, building, and testing nuclear weapons in 1992, "and the rest of the world did not."

The weapons development complex was built in the 1940s through 1960s and has not been upgraded, he said. The engineers and scientists who designed the nuclear weapons built in the 1980s "are now retiring or dead."

## DEMAND SIGNAL

The US must build a minimum of 80 "pits" a year, referring to the core of a nuclear warhead, which resembles a peach pit, and is essentially a plutonium sphere surrounded by a reflective explosive shell.

"Why 80 pits per year? It's math," he said. "Divide 80 by the number of warheads we have—last time it was unclassified, it was just under 4,000—and you get a time frame," Fanta said.

At only 30 pits per year, it would take until 2150 to upgrade the US nuclear stockpile—"after your children's children are retired," he said. The National Nuclear Security Administration says its facilities at Los Alamos, N.M., have the capacity for 30 pits a year, while those at Savannah River, near Aiken, S.C., have capacity for 50.

Exacerbating the problem is the question of how long each pit remains viable. Plutonium "is warm and, over time, it can deform what's around it," one expert told *Air Force Magazine*, and the plutonium itself will eventually transmute into uranium, devolving into "something that doesn't produce the desired effect or expected yield."

Fanta said, "There's disagreement on whether they're good for 100 years. ... But we're beyond that at this point. At 80 pits a year, we'll have 100-year-old components by the time we replace those. ... We need to stop arguing about it and get on with it."

## SWAPPED DOCTRINE

The US countered Russia's overwhelming Cold War conventional advantages with nuclear weapons, Fanta said. Today, "the shoe is on the other foot."

Russia is rapidly developing "underwater nuclear-powered weapons, hypersonic cruise missiles, and cruise missiles powered by nuclear reactors." Why? "It's a challenge for our conventional forces ... an asymmetric threat," Fanta said. "It's our doctrine, swapped."

The strategy, he explained, is a "reasonable way to rapidly close the gap against a larger, conventionally superior force."

China, meanwhile, has also learned from watching the US. Still smarting over its inability to repel the US from the Taiwan Straits in the 1990s, China is now "outbuilding us 10-to-1" in conventional forces and "on the nuclear side, they are improving every capability they have," Fanta said. That includes road-mobile ICBMs, advanced submarines, and ballistic missiles.

While "we've been discussing this for two decades, talking about pit production in the US, they were building," Fanta continued. Now, to replace the Minuteman III with the Ground-Based Strategic Deterrent will take "one GBSD missile built, shipped, installed, tested, and made operational every week for almost 10 years."

The Navy's Ohio-class ballistic missile submarines are also aging out. The Ohio-class subs, designed to serve 30 years, are being extended to 42 years, when they will be retired in favor of the new Columbia-class boats, according to the Congressional Research Service. But those "tin cans," as Fanta characterized them, can only "squish back and forth" so many times under the pressure of deep submergence. "We need to ... stop doing unnatural acts to keep the submarines going more than 42 years and start building now."

The risks today are greater because none of the triad systems were upgraded in a timely fashion, said Deputy STRATCOM Commander Vice Adm. David Kriete.

"If we're going to defend the country, we must remain a nuclear power," Kriete insisted. "If we're going to remain a nuclear power, that demands that we get on with our modernization plan right now."

Air Force Lt. Gen. Richard M. Clark, director of USAF strategic deterrence and nuclear integration on the Air Staff, said James Mattis came into office as Defense Secretary in 2017 openly wondering whether a "dyad" of sub-launched missiles and bombers was sufficient. He left convinced that the triad is the right solution, concluding, "America can afford survival."

The numbers matter, Clark said. Having 400 ICBMs compels an enemy to hit every one if a nuclear first strike is to be successful; without them, however, the US nuclear enterprise could be crippled "with about 10 strikes: You could take out our two sub bases, our three bomber bases, STRATCOM, the Pentagon, and our three labs ... Los Alamos, Sandia, and Livermore."

Hit those 10 targets and "our nuclear enterprise would be devastated," he said.

Yet as dire as it seems, GBSD won't be accelerated. "We are pushing it about as fast as we can go," he said. Rather than accelerating GBSD, "We're looking at every way we can to keep Minuteman III viable, reliable, and survivable," Clark said. "You can only get so much out of maintenance; it's such an old system."

## WORLD WAR II-ERA

Charles Verdon, deputy administrator of defense programs for the NNSA said aging infrastructure is not limited to weapons.

The NNSA is the nation's nuclear weapons industrial base, having to "renew critical manufacturing facilities to ensure we have the materials necessary to ensure warhead delivery," he said.

Yet, "Many of our critical facilities actually date back to the Manhattan Project." Now, for example, the agency is trying to "put modern earthquake standards into a building built in 1945-1947," according to Verdon.

A new building might be better, but it could take a decade for it to become productive.

The NNSA believes it needs to build 80 pits a year by 2030 to keep the warheads safe and "address the age of the systems that are presently there." This number is deemed enough to "smoothly and methodically address the current pits/plutonium cores ... over time, and respond to peer competition ... or to meet a new military requirement," he said. The longer the delay, though, the more pits that will be needed per year.

## MAKING THE CASE

William LaPlante, former Air Force acquisition chief and now MITRE vice president for its national security sector, said the conference was designed to stimulate a national discussion on the need for nuclear modernization. To that end, it was cosponsored by George Washington University's School of Media and Public Affairs.

"Since the fall of the Berlin Wall and certainly after 9/11, nuclear matters have not gotten much attention," LaPlante said. "There deserves to be a better understanding by the American public."

Frank Sesno, director of the GWU's media school and a former CNN correspondent, said in past decades, when the Intermediate-range Nuclear Forces and START treaties were major news events, "there was never a problem, as a reporter ... getting a story about nuclear weapons or readiness or preparedness on the air or into print."

That's no longer the case, he said. Yet the public still needs to be engaged. "What is the investment? Toward what end?"

For Fanta, that end is clear: "Getting the entire nation to understand the world has changed, and we need to do things differently." That's a big challenge in itself, across the country and on Capitol Hill. "There's change, there's risks, and we need to address them." 🌐







The sun burns pink over an HC-130-J Combat King II at Kirtland AFB, N.M. The Combat King II can fly at low to medium altitudes in contested and sensitive airspace. With night-vision-compatible interior and exterior lighting, the aircraft can operate at any hour, including refueling combat search and rescue helicopters.

Photo: SrA. Ian Beckley





Four Rolls-Royce turboprops, rather than eight tiny reindeer, power a C-130J Super Hercules, as it makes like Santa's sleigh during Operation Christmas Drop 2019. The plane took off out of Yokota AB, Japan, and made the drop about 2,000 miles south over Woleai Atoll, Micronesia.

Photo: SrA. Matthew Gilmore



# Washington Debates Role of Satellites in Open Skies Treaty

By Rachel S. Cohen

**A**lmost 20 years after countries began enforcing the Open Skies Treaty, the idea of using satellites to replace the Air Force's decades-old OC-135B surveillance airplanes is gaining new life in Washington. But is it feasible?

The treaty allows about three dozen signatory nations to fly over other countries to monitor their domestic military operations and, occasionally, local developments like natural disasters. America's two OC-135B jets were equipped with wet-film cameras to take photos of foreign land, but are now switching to digital cameras and are in the early stages of being replaced by newer planes. Both are housed at Offutt AFB, Neb.

The challenges of maintaining nearly 60-year-old aircraft, a standoff with Moscow over Russian sensor upgrades and behavior during flights, and improved satellite imagery capabilities are driving the treaty's critics to call for a new way forward. Critics say new electro-optical sensors give Russia an unfair advantage, which the US should use satellites to offset. Others note that the resolution of Moscow's cameras fall within the treaty's parameters, are commercially available, and could be matched by American camera upgrades in the works.

"The president should withdraw from the Open Skies Treaty and redeploy the hundreds of millions of dollars the Pentagon wastes on the flights and equipment to increase US combat power," Sen. Tom Cotton (R-Ark.)

**"The president should withdraw from the Open Skies Treaty and redeploy the hundreds of millions of dollars the Pentagon wastes on the flights and equipment to increase US combat power!"**

—Sen. Tom Cotton (R-Ark.)

said on Twitter in October.

Can satellites handle the job instead? Some experts say yes but relying on space-based assets may not be the smartest approach.

Satellites have long been part of the Open Skies conversation. In written testimony submitted in November for a House Foreign Affairs Committee hearing on the treaty, Amy Woolf, a nuclear weapons expert at the Congressional Research Service, noted that at the Senate's hearings on treaty ratification in 1992, officials agreed US and Russia's reconnaissance satellites already offered information on foreign military forces and infrastructure.

Flying overhead wouldn't provide much more detail for those advanced countries, they said, but the treaty would still offer a new level of transparency and stability.

"While nations that lacked satellite capabilities would benefit most from the information collected during Open Skies flights, the United States would benefit from the improved security environment in Europe," Woolf wrote.

Security concerns have changed in Europe, another factor that is driving the push toward satellites. Some analysts say that despite Russia's continued aggressions, "there is little risk of war among most nations in Europe," Woolf wrote. "They argue that US satellite capabilities, along with other sources of data and intelligence can monitor military deployments that threaten the rest of Europe."

Those analysts now argue that commercial satellite and open-source intelligence could collect data that



A USAF OC-135B flies near Kubinka, Russia, during an Aug. 3, 2012, Open Skies Treaty flight. America's two Open Skies aircraft are in the early stages of being replaced by other aircraft.

Photo: Alex Belyukov

is similar to what comes out of observation flights, she added.

The treaty allows countries to collect images with a resolution up to 30 cm, a clarity that commercial remote sensing satellites now provide, according to Todd Harrison, an aerospace expert at the Center for Strategic and International Studies. Commercial synthetic aperture radar satellites also offer better resolutions than what Open Skies allows.

Melissa Hanham, a nuclear and open-source intelligence expert at the One Earth Future Foundation, said that while satellites are more capable than ever before, all space sensors could instead fly closer to land on aerial platforms, so planes offer higher-quality images. Other countries can also reap the benefits of overflights, letting them keep an eye on geopolitical neighbors and rivals themselves instead of relying on other countries for information.

“Satellites do have a great use when planes aren’t flying and offer a consistent view over time of potential changes,” she said.

Analysts who support the treaty disagree that satellite and open-source data would offer the full scope of coverage that is useful to the US, especially if the satellites don’t send back images focused on areas that interest treaty participants. Countries may also doubt whether commercial satellites are giving them accurate information, Woolf wrote.

“There is a risk that these images might be altered in ways that could exacerbate, rather than mitigate, misperceptions,” she said.

Supporters also point out that the Open Skies Treaty offers opportunities for people from around the world to interact with each other, building trust and strengthening military partnerships. That helps US participants get a better sense of what’s going on overseas on a human level.

“We [the 32 countries that aren’t Russia or Belarus] get to hang out

with Russian officers almost weekly and feel out how things are going over there,” said Steffan Watkins, a Canadian expert on the treaty. “Are they unusually tense? Are they mellow? This provides invaluable information.”

Harrison argues that the US could retire its Open Skies aircraft—an idea some lawmakers have resisted—but remain in the treaty. That way, other countries would still reap the benefits of transparency and international cooperation, and the US could use foreign aircraft to perform Open Skies flights.

Operating and maintaining the OC-135B is relatively expensive, he said, while the cost of pulling photos from military and Intelligence Community space systems that are already in the inventory is “essentially zero because we are presumably collecting this imagery already.”

“In many ways, I think the Open Skies Treaty has been overtaken by technology,” he said. “It mainly serves to benefit countries that don’t have the same space-based capabilities as the United States and Russia, but advances in commercial satellite systems are further leveling the playing field.”

Watkins said buying and launching additional satellites to perform the Open Skies mission would exceed the cost of flying, maintaining, and replacing the OC-135B. He added that the idea of using satellite imaging is a distraction while the treaty’s opponents try to convince the Trump administration to leave the pact, despite opposition from international allies.

“It’s not about catching [another country] doing something at that moment,” Watkins said. “It’s about capturing imagery to confirm a suspicion and have incontrovertible proof by using a camera/sensor and handling procedures that everyone has agreed [are] tamper-proof.”

# US-Iran: A History of Rising Tensions

■ US ■ Iraq (Regional Allies) ■ Iran

**April 8, 2019:** The White House designates the Iranian Revolutionary Guard Corps (IRGC), including its elite Quds Force, as a foreign terrorist organization.

**May 7, 2019:** US deploys B-52 bombers and the USS *Abraham Lincoln* Carrier Strike Group to the Middle East in response to "clear indications" of potential Iranian attacks on US forces.

**May 14, 2019:** US Central Command elevates Operation Inherent Resolve to "a high level of alert" in response to "credible and possibly imminent threats to US forces in Iraq."

**May 15, 2019:** US pulls diplomatic personnel from Iraq; NATO allies suspend training of Iraqi troops.

**June 21, 2019:** President Trump calls off a retaliatory strike saying he wanted to avoid loss of life.

**June 24-27, 2019:** US State Department sanctions the Supreme Leader's Office and associated people. F-22 deployment to Al Udeid AB, Qatar, approved.

**July 18, 2019:** The US downs an Iranian drone as the Defense Department prepares deployments to Saudi Arabia.

**July 24, 2019:** USAF jets practice supporting and defending US surface ships in a Persian Gulf exercise.

**Oct. 25, 2019:** B-1s deploy to Saudi Arabia.



Photo: MSgt. Joshua L. DeMottis

**Nov. 9, 2019:** Iranian-backed Shia militias launch a rocket attack against Q-West Air Base in Northwest Iraq.

**Nov. 19, 2019:** Defense Intelligence Agency says Iran's military is gaining strength. The report details Iran's advancing missile capabilities.

**Dec. 27, 2019:** A US contractor is killed in a rocket attack near Kirkuk. In response, President Trump orders strikes against Kataeb Hezbollah forces in Iraq and Syria.

**Dec. 31, 2019:** Shia militias attack the US embassy in Baghdad. DOD deploys Marines from Kuwait to Iraq and an Army brigade of the 82nd Airborne Division from the US to Kuwait.

**Jan. 3, 2020:** IRGC Quds Force Commander Gen. Qassem Soleimani is killed in a US drone strike. Also killed is Abu Mahdi al-Muhandis, deputy head of the Iranian-backed Popular Mobilization Forces.



Photo: khameneir via CC BY-4.0

The faceoff between the US and Iran dates back decades before the two teetered on the brink of war in January. The nations have had a rollercoaster relationship since at least 1953, when the US backed a coup that overthrew the democratically elected government in favor of a monarchy under the Shah, Mohammed Reza Pahlavi. In 1979, after years of protest, the Shah was ousted and a new Islamist revolutionary government was established. In the midst of the upheaval, the US embassy was stormed and 52 American hostages were seized and held captive at the embassy for 15 months.

Iran has supported terrorist and insurgent forces across the Middle East, periodically threatened to shut down shipping in the Persian Gulf and to attack Israel, Saudi Arabia, and other regional US allies. Iran has also persisted in seeking to develop nuclear capabilities. In 2015, the Obama administration agreed to a multiparty international deal constraining Iran's nuclear program, but President Donald J. Trump withdrew from the agreement in May 2018, reinstated economic sanctions, and implemented a "maximum pressure" campaign intended to compel Iran to abandon support for terrorism and insurgents in Yemen, Syria, Iraq, Lebanon, and elsewhere, and to forswear nuclear weapons. How tensions escalated from April 2019-January 2020.

**May 24, 2019:** US says it will deploy additional intelligence, surveillance, and reconnaissance aircraft and another fighter squadron to the Middle East to "improve our force protection and safeguard US forces" from Iranian threats.

**June 13, 2019:** F-15Es from Seymour Johnson AFB, N.C., deploy to Al Dhafra AB, United Arab Emirates.

**June 20, 2019:** An Iranian surface-to-air missile shoots down a US Navy Broad Area Maritime Surveillance drone over the Strait of Hormuz.



Photo: DOD video-screenshot

**Aug. 29, 2019:** The Pentagon launches a maritime security effort amid de-escalation with Iran.

**Sept. 14, 2019:** Iran or proxies launch a major air attack on Saudi oil facilities. Iranian drones and cruise missiles are recovered from the site. The US sends aircraft to reinforce Saudi defenses.

**Oct. 7, 2019:** The White House announces that US forces will withdraw from Syria.

**Oct. 11, 2019:** US deploys fighter squadrons, an air expeditionary wing, and missile defenses to Saudi Arabia.

**Nov. 30, 2019:** Iraqi PM announces plans to resign; Parliament approves resignation two days later.

**Dec. 3, 2019:** Iranian-backed Shia militias launch rocket attack against Al Asad AB, Iraq.

**Dec. 5, 2019:** Kataeb Hezbollah launches rocket attack on Balad AB, Iraq.

**Dec. 9, 2019:** Iranian-backed Shia militias fire rockets at the Baghdad diplomatic support center at Baghdad International Airport.

**Jan. 5, 2020:** Iraq's Parliament approves a nonbinding resolution seeking the expulsion of US forces from the country.

**Jan 7, 2020:** Iran fires 16 tactical ballistic missiles at Al Asad Air Base and a second base in Erbil, Iraq, damaging buildings but causing no casualties.

**Jan. 8, 2020:** President Trump announces that "the United States will immediately impose additional punishing economic sanctions on the Iranian regime," as tensions ease.



Photo: DVIDS video-screenshot

# AFGSC Eyes Second Decade Changes

SrA. Sean Velazquez performs preflight checks on a B-52 at RAF Fairford, UK. BUFFs were deployed to Europe in support of Bomber Task Force Europe 20-1, an exercise designed to promote allied interoperability.



Photo: SSgt. James Cason

By Rachel S. Cohen

**A**ir Force Global Strike Command's second decade in business will be a busy one. Created in 2009 as Strategic Air Command's post-Cold War replacement, AFGSC oversees the bulk of the Pentagon's nuclear weapons and provides bomber aircraft for combat operations and deterrence flights around the world.

More than 70 years since a nuclear weapon was last used, and three decades after the Cold War ended, Global Strike is making changes to take on a new era of deterrence—one that spans not just nuclear assets but faster weapons and growing space, cyber, and electromagnetic spectrum concerns, as well.

In a recent interview with *Air Force Magazine*, Global Strike Commander USAF Gen. Timothy M. Ray discussed what the command is trying as it heads into the 2020s, facing a world in which Russia is not the stand-alone strategic concern for the US.

The command on Oct. 18 announced it had created a new, classified strategic plan to position itself for the coming decades, calling it the "largest redirection in the command's 10-year history."

"The need for a clear way ahead is more prevalent now than ever with the rising tensions between Russia, China, North Korea, Iran and transnational violent extremism, and the increase in our adversaries' nuclear capabilities and innovations," AFGSC said in a release. "This plan directly aligns command forces more closely with the 2018 National Defense Strategy."

Among the roadmap's nine overall goals is an effort

**"I want to have the operational concepts and how we present the forces redone in the next six to nine months."**

—Global Strike Commander Gen. Timothy Ray

to grow the services Global Strike can offer US Strategic Command, which oversees daily operations of nuclear forces, as its air component.

"I want to have the operational concepts and how we present the forces redone in the next six to nine months," Ray said.

Global Strike and STRATCOM practiced what that might look like during Exercise Global Thunder earlier last fall, trying approaches that "have not been done since the Cold War ended" and—in some cases—offer more capability than the military had at that time, Ray said.

Global Thunder is an annual exercise where the US and allied nations such as Australia, Canada, and the United Kingdom train for conflict scenarios involving nuclear forces.

"We don't have sanctuary in the United States based on lots of different threats," Ray said. "We start thinking about hypersonics, cruise missiles, ballistic missiles, submarines, space, and cyber—all those things will be a dimension of this. How do we operate with those particular challenges working against us? That's probably been more relevant than ... in a very long time."

He added that the exercise incorporated newer aspects like space, cyber, and electronic warfare "probably more correctly," but said the details are classified.

Global Strike is considering changes to how it supports STRATCOM as it prepares to bring on the B-21 bomber, Ground-Based Strategic Deterrent missiles, the Long-Range Standoff Weapon, refurbished B61 bombs, the MH-139 helicopter, and modern command and control technologies and aircraft in the next few decades. The command wants all those new assets to come



together seamlessly so it can properly partner with STRATCOM.

Holistically thinking about that portfolio now “drives how we operate on a day-to-day basis, our command and control on a daily basis, and how the wings report and how they manage their alert force,” Ray said. “A few small changes for how we’re managing the schedule has given tremendous stability to the maintenance and security and operations teams.”

He acknowledged that the service can’t grow its bomber squadrons to the extent envisioned in “The Air Force We Need” plan. Even though the command is working through implementing its bomber roadmap now—with plans to retire the B-1 and B-2 so the B-52 can fly for 100 years alongside the new B-21—Ray said it’s imperative to think about the fleet in new ways, not just in numbers.

A recent report by the nonprofit research organization RAND Corp. argued that to successfully modernize its enterprise while facing financial and technological challenges, Global Strike needs to craft master plans for the transition between old and new missiles and bombers and to draw on the experience of older USAF groups such as Air Combat Command.

“Nuclear-specific tasks related to testing and certification have not been performed at scale for many decades and will need to be relearned and revised for the current conditions,” the report said. “The sheer scale of the programs is daunting. And this ambitious set of programs will be fielded by [AFGSC], a relatively young command with a relatively small staff that has limited experience in fielding new systems.”

A workforce of about 34,000 people manages the nuclear enterprise, though that number will never be as big as the Air Force wants, Ray said. For a more productive and efficient staff, Global Strike is creating cross-functional teams that will focus on broad issues such as modernization, sustainment, and human capital.

“Instead of it being a platform-by-platform discussion, talk


about how we drive through this with enterprise partners and ... be able to help ourselves across the board,” Ray said. Building combat readiness isn’t about making the flight line work harder, he said: “This is about moving the big levers of the enterprise.”

For example, Global Strike said a team of people from across the command, Defense Department, and federal government were able to drive down the cost of new weapons generation facilities (WGF) that support bomber maintenance, training, and storage. The price of a B-52 facility dropped from \$750 million to \$229 million, and a B-21 facility fell from \$580 million to \$199 million, according to command spokeswoman Linda Frost.

“These facilities will be the backbone of the generation of Air Force combat lethality,” Frost said. “Modernized designs improve safety, security, and capability and meet the requirements for current and future weapons. Our goal is to have five bomber WGFs and with the reduction of costs, it allows for the right weapons generation footprint.”

Global Strike also hopes for a better future for its missileers and bomber crews. Its first decade was marred by a major operations test cheating scandal, periodic reports of drug use, and even several lost weapons.

Now, the Air Force is beefing up its nuclear education and leadership development, charting missileer career paths for Reservists, and trying to be mindful of operations stress, the need for a sense of purpose, and other health concerns. As the service tries to cut its suicide rate, Ray noted his command can draw on the knowledge of a nearby Department of Veterans Affairs hospital in Louisiana.

“This plan encourages Strikers to know their part of the mission and execute it with the knowledge that their leaders, through the four-star level, have their back,” CMSgt. Charles Hoffman, Global Strike’s command chief, said in the release. 

# Congress Wants to Grow Organic USAF Aggressor Capability

By Amy McCullough

**T**he 2020 defense policy bill prohibits the Air Force from transferring any low-rate initial production F-35s to the adversary air role until the Chief of Staff submits a report to Congress detailing the service’s plan for modernizing its organic aggressor fleet.

The Air Force has two aggressor squadrons, one at Nellis AFB, Nev., and one at Eielson AFB, Alaska. Both fly F-16s, but the Air Force announced plans last year to reactivate the 65th Aggressor Squadron at Nellis and transfer nine non-combat capable F-35As from Eglin AFB, Fla., to Nellis in an effort to improve training for fifth-generation fighters. The 65th, which previously flew F-15s as aggressors, was inactivated in 2014 due to budget cuts. The service also wants to move two more F-35s from Edwards AFB, Calif., to the 24th Tactical Air Support Squadron at Nellis for additional close air support training.

Specifically, Congress wants the report from Gen. David L. Goldfein to outline:

■ “Potential locations for F-35 aggressors, includ-

**“Aggressor squadrons have been honing the skills of Air Force pilots since the early 1970s!”**

—USAF Chief of Staff Gen. David Goldfein

ing an analysis of installations that have the size and availability of airspace necessary to meet flying operations requirements; have sufficient capacity and availability of range space; are capable of hosting advanced-threat training exercises; and meet or require minimal addition to the environmental requirements associated with the basing action.”

■ An analysis of the costs and timelines associated with expanding and modernizing existing USAF aggressor squadrons, to include “upgrading aircraft radar, infrared search-and-track systems, radar warning receiver, tactical data link, threat representation jamming pods, and other upgrades necessary to provide a realistic advanced adversary threat.”

“It is critical that the Air Force has the capability to train against an advanced air adversary in order to be prepared for conflicts against a modern enemy force, and that in order to have this capability, the Air Force must have access to an advanced adversary force prior to United States adversaries fielding a fifth-generation operational capability; and the Air Force’s plan to use low-rate initial production F-35As as aggressor aircraft reflects a recognition of the need to field a modernized

An F-35 Lightning II pilot prepares to refuel at Eglin AFB, Fla. Nine non-combat capable F-35s will move from Eglin to Nellis AFB, Nev., providing fifth-generation aggressor aircraft to enhance air-to-air combat training.



Photo: USAF

aggressor fleet,” according to the policy conference report released on Dec. 9.

Congressional emphasis on improving organic USAF aggressors comes as the Air Force also looks to bolster the role of contracted Red Air under a potential \$6.4 billion multi-award contract. In October 2019, USAF awarded seven companies an indefinite delivery, indefinite quantity (IDIQ) contract, allowing them to vie for task orders at up to 22 locations, including as many as 12 for adversary air and 10 for contract CAS.

The service announced it planned to expand contractor-run adversary air from one to three locations in 2020. In addition to support from Draken International at Nellis, the first task orders offered could be to set up a permanent presence of private adversary air at Klamath Falls Arpt./Kingsley Field, Ore., and Holloman AFB, N.M., service officials have said.

Kingsley is home to the 173rd Fighter Wing, the sole formal training schoolhouse for the F-15 Eagle, while Holloman’s 54th Fighter Group—a detachment of the 56th Fighter Wing at Luke AFB, Ariz.—hosts F-16 pilot training.

Draken, which has been flying Red Air at Nellis since 2015, is on contract to fly about 5,600 hours of adversary air there a year, but that could be increased to 7,500 hours. The first of 24 Draken Mirage F1 supersonic aircraft, purchased from the Spanish Air Force, took flight in November at the company’s facility in Lakeland, Fla. The F1s eventually will complement the company’s 11 A-4 Skyhawks and 18 L-159 Honey Badgers already flying Red Air at Nellis.

For Top Aces, one of the seven companies awarded a contract in October, the IDIQ was a “very important milestone” because it allowed them to bring their fleet of F-16s purchased from an unidentified country into the United States, Top Aces President Russ Quinn told *Air Force Magazine*.

“Our aircraft have been in preparation for quite some time in anticipation of this, so now the next move for us is really with the US government in the formal third party transfer we’re involved in right now,” Quinn said. He acknowledged the transfer

is a “complex process,” but said he hopes to move through it as “expeditiously as we can,” noting that Top Aces has been working with the US State Department for two years already.

“We have invested millions of dollars to make sure that as soon as the F-16s arrive in the US they are ready to service the contract that we have,” he added.

Mick Guthals, the senior manager of business development at Tactical Air Support, another company included in the October award, told *Air Force Magazine* that eight of its 21 F-5E/F supersonic aircraft purchased from the Royal Jordanian Air Force have gone through FAA certification and five have undergone required modifications and are awaiting military flight clearance. Those five aircraft are likely to service the Navy; Guthals said the company is still building jets for Air Combat Command.

Airborne Tactical Advantage Company also has made progress with its F1 fleet. Its parent company, Textron Airborne Solutions, procured 63 Mirage aircraft from the French air force in 2017, and the company plans to allocate the majority of those aircraft for Red Air. Since August, ATAC has qualified its first F1 pilots for duties, conducted its first F1 flight for the US Navy, and held a ribbon-cutting ceremony for its ATAC ACE facility at Fort Worth Alliance Airport, where they will conduct maintenance and training for the F1s, an ATAC spokesman told *Air Force Magazine*.

Other companies who received the October contract award include: Air USA, Blue Air Training, and Coastal Defense.

“Aggressor squadrons have been honing the skills of Air Force pilots since the early 1970s,” Goldfein said in May when the F-35 decision was announced. “They provide a dose of realism in air exercises and their training value is crucial. These F-35 aggressor aircraft will keep us ahead of adversaries for years to come.”

President Donald Trump signed the 2020 National Defense Authorization Act into law in December. ❖

# USAF Changes Promotion System

By Tobias Naegele

**T**he Air Force is moving forward with changes to the way officers compete for promotions, beginning with the next lieutenant colonels board in March 2020. That board will see eligible majors compete not against the vast pool of officers who could be promoted, but instead within six new categories.

The change means officers in smaller, specialized communities, such as cyber, space, or intelligence, will no longer compete against combat-experienced pilots and other airmen in the Line of the Air Force category, but instead compete against peers whose skills, career progression, and experience more closely align with their own.

More, smaller categories means promotion opportunities for each can be tied to the number of openings in that category, minimizing the potential for officers to be placed in positions where they must oversee work they haven't ever done themselves.

The service first floated the idea of a new promotion system in May, then put it on hold in order to gather feedback from the field over the summer. Chief of Staff Gen. David L. Goldfein endorsed the plan in September and Under Secretary Matt Donovan, who was acting secretary at the time, approved the plan Oct. 7.

Lt. Gen. Brian Kelly, the Air Force's deputy chief of staff for manpower, personnel, and services, spent the summer seeking feedback on the planned changes.

The categories and the Air Force specialties they encompass are:

- Air operations and special warfare: Includes all conventional (11X) and remotely piloted aircraft pilots (18X), along with combat systems (12X), air battle manager (13B), special tactics (13C), combat rescue (13D), and tactical air control party (13L) officers

- Nuclear and missile operations: Includes only nuclear and missile operations (13N) officers

- Space: Includes both space operations (13S) and astronaut (13A) officers

- Information warfare: Includes cyber operations (17X), intelligence (14N), operations research analyst (61A), weather (15W), special investigations (71S), information operations (14F), and public affairs (35X) officers

- Combat support: Includes airfield operations (13M), aircraft maintenance (21A), munitions and missile maintenance (21M), logistics readiness (21R), security forces (31P), civil engineering (32E), force support (38F), contracting (64P), and financial management (65X)

- Force modernization: Includes chemists (61C), physicist/nuclear engineers (61D), developmental engineers (62E), and acquisition management (63A) officers

"This will be the largest change in the way officer personnel management is working in our history," said Shon Manasco, assistant secretary of the Air Force for manpower and reserve affairs. "There have been a number of people looking at this for quite some time."

Kelly said the makeup of the categories could still change over time.

"The only thing I'm 100 percent sure of is we didn't get it 100 percent right," he said. "But until we flush this out and actually go through it a couple of times, we won't know exactly."

Manasco said there will be little apparent impact for the majors reviewed by the next lieutenant colonel promotion board. For future majors, though, "they will have benefited from more



Col. Jason Klumb's children pin on his new insignia at a promotion ceremony in Kansas City, Mo., in October 2019.

tailored developmental experiences, such that it actually should make them more competitive," he said.

This, he and Kelly argue, is the key: Under the old system, every officer specialty had to adapt its career path to look like the others, so that officers would portray the right kind of leadership development to get promoted. But engineers and logisticians require different experiences in their career paths than do pilots and air battle managers.

Officials argue that officers should instead follow developmental paths that provide unique skills and experiences needed for a particular career field.

"Changing the promotion system was the key to unlock our ability to create these unique development paths," Manasco said. "We are convinced that, with this, over time, an even more talented group of officers will populate our ranks."

Officers in each category will compete with all other officers in that group, even when there may be significant differences between their development paths.

That means public affairs officers will have to compete against cyber warriors and intelligence officers in the information warfare category. That won't be easy, acknowledged one career public affairs officer: "But it's still better than having to compete against everybody, including pilots."

Each competitive category will effectively need a separate board, as is the case with medical specialties, lawyers, and a few others today. Boards will include specialists from that field and others who represent the broader interests of the Air Force. All of the checks and balances designed to guard against individual biases or other challenges to the board's fairness will remain in place.

To help make the process more transparent for all airmen, the Air Force will publish the secretary's annual guidance to promotion boards, called the Memorandum of Instruction. That document defines "what we expect of an officer in terms of competence and character, regardless of AFSC," Kelly said.

The secretary will also approve and publish "Career Field Briefs," which will be briefed at the promotion boards. For the first time, those will provide specifics for "the education, training, and experiences that we value and need to look for," Kelly said.

Both types of guidance will be published by December or January and will remain in effect throughout the year for all promotion boards meeting in 2020.

Sharing that information is one shift that grew out of the summer briefings, Kelly said.

"We're still a military hierarchical organization, but this idea of being more collaborative and having the field involved is really powerful and I think it's served us well," he said. "We changed some processes to make sure we could meet those expectations of transparency." ❄

# JSTARS Heads Home After 18 Years in CENTCOM

By Rachel S. Cohen

Air Combat Command has pulled its E-8C Joint STARS fleet out of the Middle East after 18 years, another change for the platform that recently saw its long-running replacement effort canceled and is ramping up in-house maintenance.

“Joint STARS has been continually deployed to the [US Central Command] area of responsibility every day since November 2001,” according to a press release from Robins AFB, Ga., where the fleet is based. “Since then, they have flown 10,938 sorties, equaling 114,426.6 combat flying hours in support of nearly every CENTCOM operation including Enduring Freedom, Iraqi Freedom, Freedom’s Sentinel, and Inherent Resolve.”

Joint STARS collects and sends information that helps direct ground forces and can track moving targets on land, a mission crucial to Army operations. Joint STARS crews flew every other day in CENTCOM, totaling more than 100 combat missions since June.

The last E-8C jet left Al Udeid AB, Qatar, on Oct. 1 amid a broader reshuffling of troops in the region as combat operations against the Islamic State group wind down and as the US largely leaves Syria.

“The priorities for the National Defense Strategy have higher demand signal for JSTARS support to other [combatant commands], but JSTARS stand ready to provide support if their capabilities are needed,” ACC told *Air Force Magazine*. “We prioritize geographic combatant command requests by weighing current demand against National Defense Strategy priorities.”

The Pentagon declined to discuss where the 16 E-8Cs could focus the bulk of their time going forward, but the NDS centers on potential conflict with Russia and China in Europe and the Indo-Pacific. Joint STARS can still deploy to CENTCOM in the future if needed, a command spokesman said.

In the meantime, CENTCOM says it still has “a number of manned and unmanned [intelligence, surveillance, and reconnaissance] platforms in theater to provide situational awareness to US forces and to deliver valuable battlefield intelligence” in the absence of Joint STARS. While the Air Force had started work to add ground moving target indication capability to the MQ-9 Reaper, Joint STARS is the only platform dedicated to the GMTI mission.

Leaving CENTCOM will allow the platform to fly missions in other parts of the world while keeping up with training, maintenance, and other readiness needs.

Col. Konata Crumbly, commander of the 116th Air Control Wing at Robins, said in an email that all training is the same, so pivoting to other theaters won’t change the E-8C’s training and maintenance needs. The 116th is an Air National Guard wing that operates Joint STARS alongside the Active Duty 461st ACW.

Ending the CENTCOM deployment isn’t expected to change the maintenance workload for the jets, which are based on Boeing 707 airframes that had already accumulated up to 60,000 flight hours by the time they were repurposed as USAF battle management planes.

The Air Force has begun tackling more heavy maintenance at Robins rather than relying on Northrop Grumman, which traditionally handles in-depth sustainment but has been criticized for keeping the E-8C in depot for too long.

The service now expects that Joint STARS can continue flying into the 2030s, instead of running out of service life early that decade. The platform will support the initial stages of the Advanced Battle Management System, which will ultimately take over the E-8C mission.

The Joint STARS recapitalization program was canceled in part because the jets would be vulnerable against surface-to-air missiles and other threats wielded by more advanced adversaries than those in the Middle East. Instead of purchasing a newly designed fleet with an upgraded radar, the Air Force is exploring how to spread battle management duties to a network of other aircraft, satellites, and ground systems. The idea is that if one node of the network is taken out, it wouldn’t affect the service’s ability to disseminate information on missions such as force protection, defensive operations, overwatch, and combat search and rescue.

Crumbly said leaving CENTCOM won’t affect development of ABMS, which is also expected to be run out of Robins.

“Our departure from CENTCOM is not related to future missions including ABMS,” Crumbly said. “Whatever future missions, to include ABMS, we are asked to fulfill, we will approach it with the same level of commitment and professionalism we have shown with our JSTARS mission in CENTCOM and other areas of the world since this program was established.”

A US Air Force E-8 Joint STARS aircraft takes on fuel from a KC-135. JSTARS aircraft were pulled out of the Middle East after almost two decades helping to direct ground forces and track moving land targets.

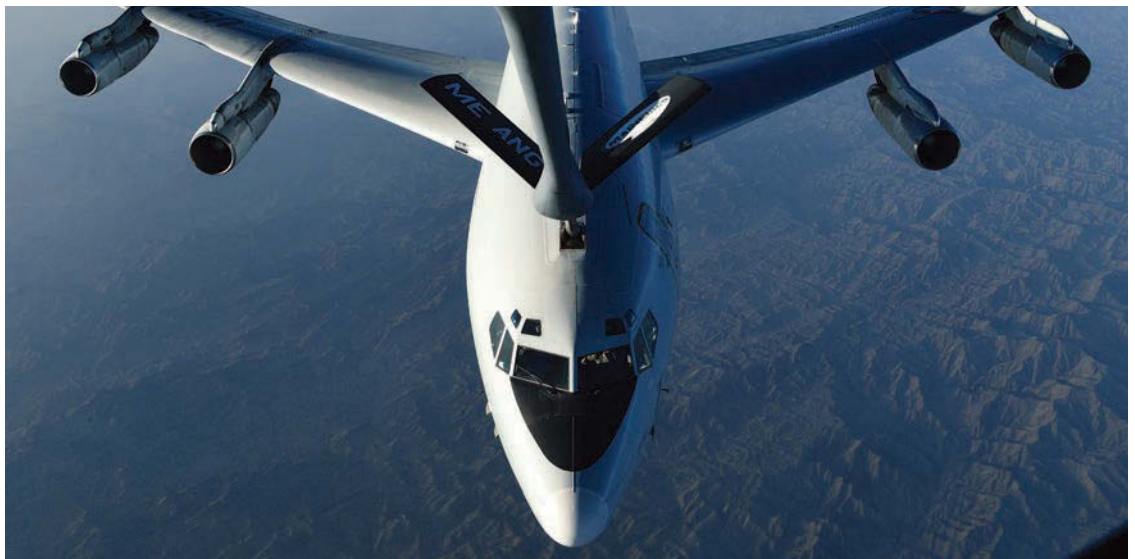


Photo: SSgt. Chris Drzazgowski

# USAF Housing Contractor Rocked By Fraud Allegations



Photo: Kelly White/USAF

Isaul Garcia, center, a construction manager with the Air Force Civil Engineer Center, points out deficiencies in housing units at Tinker AFB, Okla., to Sen. James Inhofe, left, and Undersecretary of the Air Force Matthew Donovan.

By Rachel S. Cohen

A Balfour Beatty Communities official promised to refund performance bonus money the company received from the Air Force if an investigation finds that the landlord's employees committed fraud.

BBC fired 17 employees in 2019 for failing to comply with its company code of conduct, as the Air Force housing provider investigates reports that it falsified maintenance documents to earn extra money for its management of USAF homes, Rick Taylor, Balfour Beatty's president of facility operations, renovations, and construction, told the House Armed Services readiness subcommittee Dec. 5.

Taylor called the allegations "quite shocking." It is unclear whether the employees, including project site managers, were let go as a result of the fraud investigation or for other reasons in 2019.

"We are all accountable," he said. "If we don't have staff members that are willing to follow those policies and procedures, that's an obvious weakness in any organization."

Following a Reuters and CBS News report in June that showed how the contractor earned millions of extra dollars after faking home improvement records at Tinker AFB, Okla., for years, Taylor said Balfour Beatty is cooperating with a Justice Department investigation into the same issues. Similar problems have popped up at Travis AFB, Calif., and Fairchild AFB, Wash., according to Reuters.

Balfour Beatty earns about \$4.3 million in performance bonuses each year, according to Rep. Kendra Horn (D-Okla.). Mold, asbestos, vermin, fire hazards, and other construction issues remain at Air Force bases across the country.

"In the event that we are found to have falsified records, then we are absolutely committed to refunding any incentive fees received back to those projects," Taylor said.

John Henderson, the Air Force's assistant secretary for installations, environment, and energy, called out the company in a Sept. 30 letter that requires Balfour Beatty to submit an action plan by the end of the year.

"Unless the Air Force sees prompt and substantial improvement in BBC's performance at all 21 housing privatization project sites, and specifically Tinker Air Force Base, we intend

to initiate formal action under the dispute provisions of the project documents for certain BBC projects where serious performance failures have not been resolved or continue to arise," Henderson wrote.

Taylor said at the hearing that Balfour Beatty has made "significant changes" to the way it does business and manages technical issues, ensuring that top officials have insight into what's happening. He said he is accountable for the changes the company needs to make.

Balfour Beatty is improving at forming resident groups at each installation so tenants can voice their concerns, and town halls run with the military are happening more often, he added. The company also offers a toll-free phone number to report problems that haven't been addressed.

"We certainly recognize that we could do better in many locations and so we've addressed that through a number of staffing level increases, looking at the policies and procedures that we do have in place, and where we saw that they were deficient, we're addressing those," he said. "It's not as simple as addressing one area ... but we're taking on a number of different areas to improve."

The Pentagon is preparing to roll out a tri-service "bill of rights" for military housing tenants that offer them greater protections when dealing with their landlords and more avenues to raise issues. ✪

## All-Domain C2 Gets a Workout



Photo: A1C Alexander Cook

An F-35 (top) and an F-22 fly in formation over Offutt AFB, Neb. USAF is testing new methods to allow the fifth-generation fighters to communicate more efficiently.

By Brian W. Everstine

The Air Force recently kicked off its exercise and development of joint, all-domain command and control and is expecting the initiative to start in earnest with \$185 million in funding.

From Dec. 16 to 18, the service for the first time trained with its new Advanced Battle Management System at Eglin AFB, Fla. The system, which began as the service's planned replacement for the E-8C Joint STARS aircraft and has progressed into an operating concept, focuses on cloud-based technology to fuse sensors, combat aircraft, ships, and personnel on the ground.

For the first exercise, the scenario was a cruise missile threat to the homeland. Optionally manned QF-16 targeting drones simulated the missile and were detected by space and ground

sensors. This information was relayed to the USS *Thomas Hudner*, an Arleigh Burke-class destroyer in the Gulf of Mexico, along with two USAF F-35s, two Navy F-35s, two F-22s, an Army High Mobility Artillery Rocket System, and special operations forces on the ground. In a command cell, senior leaders watched the real-time data.

In addition to ABMS, the exercise also tested new methods for F-22s and F-35s to communicate via a networking node. Currently, the jets can only communicate via radio.

US Northern Command developed the scenario for the first event to test how ABMS can help protect the homeland.

“Peer competitors are rapidly advancing their capabilities, seeking to hold our homeland at risk,” NORTHCOM boss USAF Gen. Terrence O’Shaughnessy said in a release. “Working across all of the services and with industry toward solutions to complex problems ensures we meet defense challenges as well as maintain our strategic advantage in an increasingly competitive global environment.”

USAF expects the initial \$185 million in funding to grow in future years and is planning more of the exercises at an expected schedule of one every four months.

Preston Dunlap, the service’s architect overseeing ABMS, told *Air Force Magazine* recently that a different combatant command will oversee each exercise with a scenario representing different threats they face. The next is scheduled for March, and the hosting COCOM has not been announced.

“Our four-month ‘connect-a-thon’ cycle unlocks industry’s ability to iterate with testers, acquirer, and warfighters,” Will Roper, the service’s assistant secretary for acquisition, said in the release. “For example, the insights from connecting the F-22 and F-35 for the first time will help our industry partners take the next leap.”

## USAF Pitch Bowl Planned for March



Photo: SrA. Christian Conrad

A small business owner (left) watches as Capt. Ashley Feldman, center, and Will Roper award a grant with the swipe of a credit card at US Air Force Space Pitch Day in November.

By Rachel S. Cohen

The Air Force is gearing up to host its inaugural “Pitch Bowl” in March 2020, an event that will bring together the best ideas from the growing pool of Pitch Days where companies try to snag a military contract without the years-long wait of traditional procurement.

Will Roper, the service’s assistant secretary for acquisition, technology, and logistics, floated the idea of a “big Super Bowl of Pitch Days” at the Air Force’s first quick-investment event in March 2019. The events work with companies through the

federal Small Business Innovation Research program, via a series of written submissions, minutes-long live presentations, and the swipe of a credit card. Contracts are worth up to \$1 million and can last up to two years.

Whereas Pitch Days focus on a particular technology portfolio and offer early-stage development contracts, the bowl offers the next step: a path to greater research and development funding, the commercial market, and the Air Force’s inventory. The Pentagon is increasingly interested in “dual-use” technologies that can be sold to both the military and the general public.

The Air Force has hosted a slew of pitch events since its first in New York last year, and it expected to hold about a dozen overall in 2019. Those have looked at new ideas for unmanned aerial systems; the Kessel Run coding center; space; simulators; the F-35; science and technology, broadly; the fighter and bomber portfolio; rapid sustainment; mobility and training aircraft; the intelligence, surveillance, reconnaissance, and special forces portfolio; airborne communications; hypersonic technologies; and base modernization.

The Air Force hasn’t finalized its participants for the Pitch Bowl in Washington, D.C., which appeared in announcements about the hypersonics Pitch Day but is still under wraps.

According to the Doolittle Institute, an organization that helps bring Air Force Research Laboratory technologies to the private sector, the seven companies that received contracts in the hypersonics competition were invited to the Pitch Bowl: Advanced Silicon Group; Fourth State Communications; Go-Hypersonics; Powdermet; Spectral Energies; UES; and Ursa Major Technologies.

Roper told reporters at a space-focused competition in November that as the service increasingly focuses on software, it should also boost its investment in hardware so the software has somewhere to go. He has also suggested the Air Force should use the Pitch Day concept in its major acquisitions.

“Why should we let someone build an airplane or satellite, unless they bring in their design team and production team?” Roper said earlier this year.

Service spokeswoman Capt. Cara Bousie said that while Pitch Days have made it easier for small companies to access and partner with the Air Force, and that contractors are “paid faster than ever,” the service can do more to help companies through the process.

“There are a lot of avenues to reach out to AF [and for different phases], but sometimes it’s not totally clear which avenue is the best/most appropriate for small businesses,” Bousie said. “In response, AF is working quickly to streamline and clarify access points and share concise guidance to partnering.”

## Donovan Tapped to be Acting USD for Personnel and Readiness

By Amy McCullough

Matthew P. Donovan will assume a new role as acting undersecretary of defense for personnel and readiness following the resignation of James N. Stewart on Dec. 13, Defense Secretary Mark Esper announced.

Esper said Donovan will bring a “wealth of experience and knowledge” to the job.

Donovan has served as undersecretary of the Air Force since August 2017, though he was named Acting Secretary of the Air Force from June to October 2019 after Heather Wilson stepped down to become president of the University

of Texas-El Paso. He served as an enlisted airmen for five years, before getting his commission, and was a command pilot with more than 2,900 flight hours in the F-15C and F-5E. Donovan held various command positions before retiring as a colonel in 2008. His last assignment in uniform was as commander of Officer Training School at Maxwell AFB, Ala., but Donovan also has held a variety of positions as an Air Force civilian, including as deputy chief of staff for strategic plans and programs. He worked for the Senate Armed Services Committee from January 2015 to August 2017 before coming back to the Air Force as undersecretary.

Stewart also is an Air Force veteran who served nearly four decades, both on Active Duty and in the Air Force Reserve, before retiring as a major general in October 2014. He was sworn in as assistant secretary of defense for manpower and reserve affairs on Oct. 22, 2018, but has been performing the duties of undersecretary of defense for personnel and readiness since then—"a role that is critical to the National Defense Strategy, in support of our families and readiness," said Esper in a statement. Stewart also is a command pilot, with more than 4,700 flight hours in five different air frames.

"I note that Jimmy came out of retirement, after having served 37 years in the Air Force, to serve his country again. It's people like Jimmy, the selfless individuals who put service before self, who are the backbone of this country. I thank Jimmy and his family for their service to the department and the nation, and wish him the best in his retirement," Esper said.

The announcement was among a series of senior-level Defense Department resignations in December. Randall Schriver, the Pentagon's top policy expert on Asia, resigned in mid-December, and Defense Advanced Research Projects Agency Director Steven Walker announced he is stepping down effective Jan. 10 to return to industry. ✪

## Walter J. Boyne, 1929-2020

By John A. Tirpak

Walter Boyne, retired Air Force pilot, author of more than 50 books about aviation, former director of the Smithsonian's National Air & Space Museum, and former chairman of the National Aeronautic Association, died Jan. 9, 2020, aged 90.

Raised in East St. Louis, Mo., Boyne attended Washington University in St. Louis for two years, then left to join the Air Force's aviation cadet program, earning his wings and commission in 1952. He flew B-50 bombers before transitioning to the B-47 and then the B-52. He was selected for the 4925th Nuclear Test Group and was a "nuclear ace," dropping five nuclear weapons in tests. Returning to school, he earned a bachelor's degree from the University of California at Berkeley and an MBA from the University of Pittsburgh. As commander of the 635th services squadron, Boyne flew 120 combat hours in Vietnam as an instructor in the C-47. He retired from USAF as a colonel in 1974, having logged more than 5,000 flight hours during his 22 years in uniform.

Boyne launched his writing career in 1962, ultimately building a catalog of 47 nonfiction aviation books, seven novels, and more than 1,000 magazine articles, including frequent contributions to *Air Force Magazine*. Some of his books made it onto *The New York Times* bestseller list. In a 2007 interview, Boyne said he was "intoxicated" by having his first magazine article accepted for publication and strove to write about new aviation



Photo: USAF

Walter Boyne was a pilot, a historian, a museum curator, and a writer of dozens of books about airpower, both fiction and nonfiction.

topics and present freshly-researched histories. Among his own books, he counted as his favorites the nonfiction "The Influence of Air Power Upon History" and the fictional "Dawn Over Kitty Hawk: the Novel of the Wright Brothers."

After the Air Force, Boyne joined the staff of the Smithsonian National Air & Space Museum as curator of air transport, and organized the placement of aircraft in the then-new museum in downtown Washington, D.C. He also modernized the Smithsonian's Silver Hill, Md., aircraft restoration facility and oversaw the digitization of NASM's massive photographic collection. Boyne was named Acting Director of the museum in 1982, and Director in 1983. During his tenure, he founded the Smithsonian's *Air & Space* magazine, helped secure land for the museum's annex at Dulles Airport, Va.—now home to its Steven F. Udvar-Hazy Center—and arranged for the space shuttle flying test article, *Enterprise*, to be stored and later displayed there. He resigned as Director in 1986, to devote more time to writing and producing aviation histories for television.

In later years Boyne chaired the National Aeronautic Association and created the aviation-themed cable television channel Wingspan. His book, "Beyond the Wild Blue: A History of the US Air Force" was serialized in a 13-part series.

Boyne received numerous awards and decorations. Among them, the NAA recognized Boyne in 1987 with a lifetime achievement award, and in 1998 named him a Distinguished Statesman of Aviation. In 1997, the Air Force Association presented him with its Gill Robb Wilson Award for Achievement in Arts and Letters. The Aerospace Industries Association recognized Boyne with its Lauren Lyman Award for communications in 2005, and in 2007 he was inducted into the National Aviation Hall of Fame. ✪

## DOD's New Top Enlisted is First Airman in That Role

CMSgt. Ramon Colon-Lopez on Dec. 13, 2019, took over as the newest senior enlisted adviser to the Chairman of the Joint Chiefs of Staff, the top enlisted position in the military.

Colon-Lopez, who previously served as the top enlisted leader in US Africa Command, is the first airman in the job. The position of SEAC was created in 2005, and Colon-Lopez is the fourth to hold the title.

Colon-Lopez is a pararescueman who served extensively in special operations, and he received the Bronze Star with Valor and Combat Action Medal for a 2004 mission in Afghanistan. In the mission, his helicopter was damaged by small arms-fire, and he moved through enemy fire to over-



run enemy positions and suppress additional fire aimed at friendly helicopters. His team killed two and captured 10. Artifacts from that deployment are on display at the National Museum of the Air Force.

He previously served as the command chief for Air Forces Central Command; command chief for the 18th Wing at Kadena AB, Japan; and command chief of the 1st Special Operations Wing at Hurlburt Field, Fla.

He takes over for retiring US Army Command Sgt. Maj. John Wayne Troxell. Before leaving the position, Troxell created a new rank insignia for the position, which was recently unveiled and worn by Colon-Lopez at the ceremony. The insignia is similar to that of Chief Master Sergeant of the Air Force, though it has four stars instead of two and a star instead of the wreath. —Brian W. Everstine

## Pararescuemen Awarded Silver Stars for Afghanistan Battles

By Brian W. Everstine

Two pararescuemen on Dec. 13 received Silver Stars for their actions during separate battles in Afghanistan in 2018 and 2019. TSgt. Gavin Fisher, a PJ with the 350th Special Warfare Training Squadron at JBSA-Lackland, Texas, received the medal for a two-day fight in Ghazni Province in 2018. SSgt. Daniel Swensen, a PJ with the 58th Rescue Squadron at Nellis AFB, Nev., received the award for a two-day fight in September 2019 in Farah Province. Combined, the two PJs are credited with saving nearly 40 lives and eliminating more than 100 enemy fighters, according to an Air Force release.

Fisher was part of a Combined Joint Special Operations Task Force that was on a 10-day crisis response mission to defend Ghazni City from more than 500 Taliban. He was the rear gunner of a lead vehicle in a convoy that came under attack on Aug. 11, 2018, when he was hit by grenade shrapnel. He continued to fire back and directed the vehicle out of danger, according to the release. While treating two critically injured soldiers, he was ambushed again, and 12 more partner soldiers were wounded. Fisher called for an evacuation and drove 75 meters through heavy fire to treat more injured troops. He then jumped back into the rear gunner seat to continue clearing the city until a rocket-propelled grenade hit the vehicle, severely wounding him. He continued to fire and direct the team to safety before relenting to medical care, the release states.

"Getting this medal is important because it lets people know the war is still going on, and valiant efforts by men and women are still going forth," Fisher said in the release. "People are still out there dying and fighting for each other, and it needs to be recognized."

On Sept. 13, Swensen was attached to Army Special Forces Operational Detachment-Alpha 1215. His team was conducting a helicopter assault with the goal of reclaiming a district center and police headquarters controlled by the Taliban in Farah Province, according to the Air Force.

During a ground assault through a compound, the Taliban ambushed with heavy machine guns and RPGs. A grenade hit a wall near Swensen, injuring him and five teammates. The group was trapped and separated, and Swensen fired back while directing the rest of the team to safety, the release states. He then ran through enemy fire to rescue a fallen soldier who was incapacitated, treating wounds that were life threatening. Ignoring his own injuries, Swensen loaded a soldier onto his

shoulders and directed the team to a helicopter landing zone that was about 800 meters away, according to the Air Force.

He guided the casualties to cover and continued treatment. When the helicopter arrived, Swensen led the rest of the team back through the city to retrieve four additional casualties before allowing his own wounds to be treated, according to the Air Force.

## Honorary Promotions for Raider Cole, Tuskegee Airman McGee



Photos: SSgt. Vernon Young Jr.; SrA. Christopher Quail

Dick Cole, left, and Charles McGee will receive honorary promotions under the fiscal 2020 defense policy bill.

Two US Air Force legends will be promoted, one posthumously, as a result of the 2020 National Defense Authorization Act.

Lt. Col. Dick Cole, the last living Doolittle Raider, died April 9, 2019, at the age of 103, and was promoted to colonel. Retired Col. Charles McGee, a famed Tuskegee Airman who flew 409 combat missions through three wars, and celebrated his 100th birthday in December is promoted to brigadier general.

On April 18, 1942, Cole co-piloted the lead B-25 Mitchell on a raid into Japan in response to the Pearl Harbor attacks. While the raid did not inflict heavy damage, it was a large boost to national morale following the surprise attacks in Hawaii. Cole and his crew bailed out of their aircraft in China after it ran out of fuel. The airmen evaded Japanese soldiers, aided by locals and missionaries, and eventually returned to the US. Later in his career, Cole flew "over the Hump" of the Himalayan mountains and was part of the founding cadre of Air Commandos.

McGee served in the famous "Red Tails" of Tuskegee Airmen during World War II. Through his service in that war, along with Korea and Vietnam, his 409 combat missions remain a record. He has received many awards including the Legion of Merit with oak leaf cluster and the Distinguished Flying Cross.

### ■ The War on Terrorism

#### Casualties:

As of Jan. 6, 2020, 85 Americans had died in Operation Freedom's Sentinel in Afghanistan, and 89 Americans had died in Operation Inherent Resolve in Iraq, Syria, and other locations.

The total includes 170 troops and four Defense Department civilians. Of these deaths, 79 were killed in action with the enemy, while 95 died in noncombat incidents.

There have been 559 troops wounded in action during OFS and 81 troops in OIR.



# **FACES OF THE FORCE**



Photo: USAFA

A group of US Air Force Academy cadets from Squadron 26 (known as “The Barons”) have become social media celebrities and unofficial Academy ambassadors via the short-video platform TikTok. The “Baron Boot Boys”—**C3C Vincent LoPiccolo, C3C Jack Giannettino, C3C Matthew Walters, C3C Reese Wendfeldt, C3C Dalton King, and C3C Joel Weber**—amassed over 371,000 followers and 4 million likes on the platform, which the Pentagon banned from members’ use in early January. In a recent group interview with *Air Force Magazine*, Weber said the videos—which feature choreography pulled from viral dance challenges and satirical takes on different aspects of military culture—are chiefly meant “to make people laugh.” Raising awareness about the Academy is “a nice side bonus.” King said the videos prove that “we’re not all robots up here.” More importantly, Giannettino said the videos have sparked questions from youth interested in learning more about the school.

**Know of someone we should recognize? Send nominees to [afmag@afa.org](mailto:afmag@afa.org)**



Photo: A1C Aubree Milks

**SSgt. Jahmal Lawson**, a mobility equipment custodian with the 30th Security Forces Squadron at Vandenberg AFB, Calif., won a silver medal in basketball at the 2019 Military World Games in Wuhan, China. This marked his second appearance at the games. “I had no idea that I would be competing again, but with the encouragement from my leadership and the amazing support from my team and my flight, I was able to do it once more and represent this base and our country,” he said.



Photo: A1C Gerald Willis

**Capt. Julian Gluck**, a 29-year-old pilot and USAFA graduate from Shreveport, La., was selected to be part of *Forbes*’ “30 Under 30—Law & Policy 2020” list. A USAF “pilot who flew air combat missions as part of the campaign against ISIS, ... Gluck has also worked as a nonprofit leader and policy advocate to bridge the civilian-military gap,” his *Forbes* citation reads. Gluck is the executive officer for the 2nd Bomb Wing’s 2nd Operations Group at Barksdale AFB, La.



Photo: SSSgt. Jordan Martin/ANG

Air National Guardsman **MSgt. Bryan Whittle** of the 205th Engineering and Installation Squadron received the Airman’s Medal on Dec. 8, 2019, for his role in helping to neutralize an active shooter at an Oklahoma restaurant in May 2018. The medal recognizes those “serving in any capacity with the US Air Force,” who risk their lives to help others outside of combat. “I was surprised there was an award that honored your actions when you weren’t in a wartime environment,” he said.



Photo: William Birchfield/USAF

Air Command and Staff College student **Maj. Jay B. Doerfler** received the 2018 Lt. Col. Anthony C. Shine Fighter Pilot Award on Nov. 18. The annual award is given to a USAF fighter pilot demonstrating excellence and professionalism while in the air and commitment to service while on the ground. While serving as his squadron’s assistant director of operations, Doerfler counseled youth, volunteered to help charities, and helped provide food for homeless children “all while executing 5,700 sorties and more than 9,300 flying hours,” the service said.



Photo: USAF

**James P. Ostler**, a 99-year-old WWII B-17 navigator who served with the 36th Bombardment Squadron, received a French Legion of Honor Medal on Nov. 21. A recipient of the DFC (as well as its British equivalent), Ostler flew 25 combat missions in addition to counterintelligence missions, and helped test radar-jamming technology that was used on D-Day. “What you did sir, as part of America’s greatest generation, for us is a debt that ... we cannot repay,” said the consul general of France to the Midwest.



Photo: SRA, Tristan Biese

633rd Medical Operations Squadron physical therapist **Capt. Michelle Jilek** is pulling double-duty to help make sure untreated pain doesn’t impede the 1st Fighter Wing’s mission effectiveness. “Ninety-six percent of the pilots at Langley were flying in pain without treatment,” said Jilek, who’s been embedded with the wing to help. After completing her regular duties from Monday-Thursday, she dedicates off-hours and Fridays to treating 1st FW pilots whose schedules make it difficult or impossible to get help during regular hospital hours.

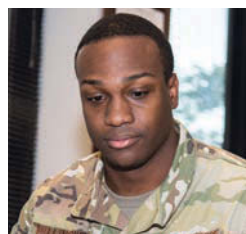


Photo: A1C Kaitlyn Brewer

**SSgt. Darius Willingham**, a member of the 20th Comptroller Squadron commander’s support staff at Shaw AFB, S.C., helped to save a life after witnessing a car accident. Willingham pulled a woman from the wreck, contacted authorities, attended to her injuries until first-responders arrived on-scene, and kept her calm. “It is important to serve the community while we are here,” Willingham said.



Photo: SRA, Kristine Gruwell

**A1C Brandon Ong’s** mother, Tammy Ha, was 7 years old when she was evacuated from the flight line at Tan Son Nhut AB, Vietnam, in 1975 on the final USAF C-130 to leave the country. Now, over four decades later, Ong, a 19th Aircraft Maintenance Squadron guidance and control apprentice, works on Super Hercules aircraft at Little Rock AFB, Ark., where the A model that carried her to safety is displayed—a parallel he calls “fate.” “This was an opportunity for me to give back to the United States,” he said.



Illustration: Staff

**Don't Stop Believing**



Photo: Monica King/USA

"We must figure out how to get on a cycle that allows us to design, engineer, build, rebuild, upgrade, modify, modernize [nuclear weapons] on a continuing cycle so we don't have to train a whole new cadre of designers and engineers and production people every 30 years."

**Peter J. Fanta**, Deputy Assistant Secretary of Defense for Nuclear Matters, MITRE Corp. seminar on nuclear modernization [Dec. 12, 2019].

**Baby Space**

"This is like the birth of a new baby. Its mother is the Air Force for some time. But this child will grow up to be independent."

**Rep. Jim Cooper (D-Tenn.)** after the passage of the fiscal 2020 National Defense Authorization Act.

"Some people have been trying to kill this baby in the womb for the last three years. I believe there's going to be some who want to see it die in the crib over the next three years. We're not going to let that happen."

**Rep. Mike Rogers (R-Ala.)**, on the threats still ahead for a nascent Space Force.

**Who's Hungry?**

"I would rather not have to shove this down industry's throat. I would rather this be a conversation than direction, but we've unfortunately seen over the years ... if there's no repercussions to not having security, there's no incentive to have it."

**Maj. Gen. Thomas E. Murphy**, director, Protecting Critical Technology Task Force at the Pentagon, stating that the ability to protect your own data could affect whether DOD does business with companies or not. [Breaking Defense, Dec. 16, 2019]



Photo: USAF

**Call of Duty**

"This was a bad guy, we took him off the playing field. And that's important because this was a fella who was the glue, who was conducting active plotting against the United States of America, putting American lives at risk."

Secretary of State **Mike Pompeo** to ABC News Chief Anchor George Stephanopoulos in regards to the death of Iranian commander Qassem Soleimani. [This Week, Jan. 5]

**Excellence in All We Do**

"Getting this medal is important because it lets people know the war is still going on ... People are still out there dying and fighting for each other, and it needs to be recognized."

**TSgt. Gavin Fisher**, a PJ with the 350th Special Warfare Training Squadron at JBSA-Lackland, Texas, who received the Silver Star in December for a two-day fight in Ghazni Province, Afghanistan, in 2018.



Photo: A1C Bryan Guthrie



Photo: Lucasfilm Ltd.

**Taboo**

"I'm going to say the word you're not supposed to say in public—lethal AI is real. It's going to have to be real ... We're going have to figure out how to do it, and feel like we're controlling it, and how we're going to exercise control and jurisdiction over it."

Retired Marine Corps **Gen. James "Hoss" Cartwright**, former Vice Chairman of the Joint Chiefs of Staff at a MITRE seminar on strategic modernization in Tysons, Va., [Dec. 12, 2019].

**Discipline**

"We will not turn into a gang of raping, burning, and pillaging (soldiers). ... That is not going to happen as a result of this."

Chairman of the Joint Chiefs of Staff, Army **Gen. Mark A. Milley**, under questioning from Rep. Seth Moulton (D-Mass.) about President Trump's pardoning of three Navy SEALs convicted of war crimes.

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# The Bone is Back

A surprise deployment sent a message to Iran—and DOD: B-1s are fast, agile, and readier than you think.

By Brian W. Everstine

**W**hen four B-1 bombers launched into a sunny October sky at Ellsworth AFB, S.D., last fall, they were on a mission to send a message—or maybe two.

Bomber crews had been preparing for their roles in Exercise Global Thunder, US Strategic Command's largest exercise, when new orders arrived. Instead of attacking exercise targets in the US and Europe, they headed east to the Persian Gulf, the physical embodiment of a message to Iran: Don't mess with the US. The other message was to the rest of the Air Force, and perhaps the world: The Bone is back.

US Central Command had seen increased threats from Iran all year, including its downing of a US Navy RQ-4 Broad Area Maritime Surveillance drone in the Strait of Hormuz in June. By October, without any bombers in theater, Air Forces Central Command wanted to send a message, and Gen. Timothy M. Ray, commander of Air Force Global Strike Command, wanted to make a point.

**“Our fleet is recovering and we’re flying more, so we’ll steadily build more aircrew readiness.”**

—Gen. Timothy Ray, commander of Air Force Global Strike Command

Throughout most of 2019, the B-1B Lancer fleet's troubles were well-known. After 18 years of continuous deployments to the Central Command area of operations, B-1s had limped home in need of major repairs. For months, maintainers painstakingly tended to a long list of required fixes. So by October, Ray thought the B-1s could deliver a surprise message with an unexpected, long-range deployment.

“They needed to show a little bit of something different in CENTCOM because of Iran,” Ray said. “The B-1 wasn’t being considered for a lot of obvious reasons. But I saw an opportunity. ...

“It was the right, unpredictable message,” Ray continued. “The Iranians and everyone else didn’t see coming. ... It showed we can get bombers anywhere we want to and play in a different way.”

## OFF THEY GO

While Ellsworth and other Global Strike bases were getting ready for Global Thunder, the four B-1 crews launched from South Dakota. They linked up with a KC-10 operating out of JB McGuire-Dix-Lake-



A B-1 from Ellsworth AFB, S.D., prepares to take on fuel from a KC-135 out of Al Udeid AB, Qatar, during its deployment to the area in October 2019. The surprise arrival demonstrated that the Bones still can deploy in rapid fashion.

hurst, N.J., tanked up, and headed out over the Atlantic. They took on more fuel from two KC-135s from RAF Mildenhall, UK, then crossed Europe. Soon, approaching the Middle East, they gassed up from two more KC-135s operating from a CENTCOM base.

Just 51 hours after the initial call from AFCENT, the four B-1s landed at Prince Sultan AB, Saudi Arabia, their arrival prompting photographs and news coverage broadcasting just the message AFCENT had hoped for.

The flight was “completely out of the blue,” Ray said. “So, I think what it shows is that we don’t need to park bombers in-theater full time. We can get there. I know I have the [combined forces air component commander’s] confidence that if he needs me, I’ll be there in nothing flat.”

### WORN TO THE BONE

Just months earlier it wouldn’t have seemed possible. After years of constant combat operations in the Middle East, and two high-profile groundings in 2018 and 2019, the B-1 community was exhausted and licking its wounds.

When B-1s returned home to Dyess AFB, Texas, from Al Udeid AB, Qatar, after a deployment in March, they had much to be proud of: Over six months, the Lancers flew 4,471 hours over 390 sorties, launching 920 airstrikes in that time. It was just the second time B-1s had returned from the region; the last was when the Lancers came home in 2016 for upgrades.

Extended combat operations took a heavy toll on the bombers. With their powerful engines and swept-wing design, B-1s were designed to fly at supersonic speeds at low-altitude for strategic bombing runs. But in the Middle East, the B-1s flew high and slowly, with their wings forward and loaded up with heavy bombs, on call for close air support missions in Iraq and Afghanistan.

Air Force Chief of Staff Gen. David L. Goldfein acknowledges the toll this mission took. As the combined forces air component commander in the region from 2011 to 2013, he called on B-1s flying from Al Udeid to northern Afghanistan, where the mission required them to loiter with tanker support while standing by for strikes. He even flew on one such mission himself on Christmas Day.

“You think it wouldn’t be a demanding environment,” Goldfein said. “But it turns out it puts stresses on the

Photo: MSgt. Joshua DeMott

Weapons crews load AGM-158B JASSMs on a B-1 Lancer at Al Udeid AB, Qatar.



Photo: TSgt. Ted Nichols/USAF

airplane you don't anticipate. ... Now we're having to pay the piper."

Inspectors at Dyess found 1,400 discrepancies as they combed over the aftermath of that last deployment, and in June, the House Armed Services Committee divulged that the mission capable rate of the B-1 fleet had dropped into the single digits.

For those in the know, it was no surprise. In May 2018, a B-1 from Dyess experienced an in-flight emergency during a training mission. When the crew attempted to eject, the first ejection seat failed, forcing the crew to try to land the bomber instead. The crew members were ultimately awarded Distinguished Flying Crosses for successfully landing the aircraft, and the rest of the B-1 fleet was grounded while inspectors checked all of the fleet's ejector seats.

Less than a year later, the fleet was grounded for four weeks when flaws were detected in the drogue chute system.

## FIXING THE FLEET

The return from combat, and downtime at the two B-1 bases, prompted AFGSC to evaluate its processes and work urgently to address shortfalls. This included a new focus on fleet management, increasing maintenance resources with help from Boeing, methodically working through large numbers of time-compliant technical orders, and fixing the problems with the egress systems.

At Tinker AFB, Okla., the Air Force stood up a dedicated B-1 Structures Repair Line to address damage identified during individual inspections by the B-1 Systems Program Office. The first B-1 arrived in October and completed the refurbishment in December.

"We know by tail number which parts of the aircraft have excess fatigue or corrosion that could cause mishaps later on," Col. Gregory Lowe, commander of the 76th Aircraft



Photo: Greg Davis/USAF

Bones undergo maintenance, repair, and overhaul at Oklahoma City Air Logistics Complex. Heavy ops took their toll on the bombers, but the fleet is recovering.

Maintenance Group, said in a news release.

The first phase of the repair work focused on completing seven urgent tasks for each of 10 aircraft with high flying-hour requirements when compared to the rest of the B-1 fleet. The line allows for a fly-in, fly-out repair process with 5,000 man-hours invested in each B-1, according to Tinker. Two shifts of aircraft technicians use sheet metal on the first phase. The second phase on the line begins in April, with 14,000 hours of repair planned for each plane. More than 100 new hires have started at Tinker.

By September, the number of discrepancies at Dyess was down to 200. In November, Ellsworth had its first "normal" flying month in about a year; Dyess expected to follow suit in December.

“Our fleet is recovering and we’re flying more, so we’ll steadily build more aircrew readiness,” Ray said.

In December, this included “deploying” two bombers from the 9th Bomb Squadron for a “bomber agile combat employment” exercise. They took off from Dyess and deployed to NAS JRB Fort Worth, Texas, where C-130s from Dyess and Little Rock AFB, Ark., met them with support equipment.

Ray said he expects his B-1 fleet to continue to improve and to be able to take on real task force deployments within the next year. In the meantime, B-52s will maintain the continuous bomber presence at Andersen AFB, Guam; B-1s will return as a task force eventually, but no schedule has been set, said Brig. Gen. Gentry W. Boswell, commander of the 36th Wing at Andersen.

## CHANGING MISSIONS?

For the long-term, however, B-1s will likely have to change how they operate to stay relevant. Structural damage to some jets is so severe it may not be cost-effective to fix them. For others, it could mean reducing low-altitude, terrain-following capability to avoid additional stress.

The command is also eyeing changes to increase the B-1’s conventional weapons-carrying capacity. Global Strike Command showcased a modified B-1 at Edwards AFB, Calif., last September. The jet featured an extended bomb bay to accommodate 5,000-pound munitions or future hypersonic weapons, and eight hard points on the wings to let it carry Joint Air-to-Surface Standoff Missiles (JASSMs). With those changes, two

B-1s could carry the weapons load of three, Ray said.

Those aircraft that survive will be used differently than in the past, Ray said. He envisions using B-1s as fast-response bombers, much like the October rapid deployment to the Middle East, and to be “roving linebackers” in the Atlantic or Pacific—covering large geographical areas by virtue of their supersonic speeds.

Having asked air component commanders across the globe what they needed most, Ray anticipates delivering on requirements for all.

“I think you’ll see us come back with a balanced approach for the bomber resource needed by the air components,” Ray said.

Since the beginning of the B-1’s life, from its original cancellation in the 1970s to moving to a conventional-only role in the 1990s, it has faced challenges and bounced back. Ray said this will continue through its current readiness challenge and last until its planned retirement in the mid-2030s.

That is, if the B-1s stay around that long. Air Force leaders have hinted that the 2021 budget request could seek an earlier retirement date for the B-1s, though critics of that plan have pushed back hard, saying the reason those airplanes are so worn out is because of how useful they are—and how much in demand.

Ray acknowledges that, praising the resilience of the B-1 crews and maintainers.

“That’s a community,” he said. “Those are people who have been voted off the island so many times. There is no quit in those people.”



Bomb bay modifications allow the B-1 to accommodate 5,000-lb munitions and, potentially, hypersonic weapons. Lt. Col. Dominic Ross, B-1B program element monitor for Air Force Global Strike Command, explains the modifications to visitors.

# The Future of COIN



TSgt. Matthew Coutts launches a Raven B Digital Data Link drone in Southwest Asia. The Raven B uses battery power to patrol performing intelligence, surveillance, and reconnaissance for 60 to 90 minutes at a time.

Photo: SSgt. Joshua Kleinholtz

## How the Air Force is preparing for counterinsurgency in 2030.

By Rachel S. Cohen

**N**early 20 years after the US invaded the Middle East in the aftermath of the Sept. 11, 2001, terror attacks, discussions about the future of air warfare are turning away from the persistent counterinsurgency missions and regional conflict that have defined modern combat.

Military publications and speeches now focus on “great power competition” and looming conflict with Russia and China. They worry that US technology is falling behind, concerned that two decades of focus on the Middle East has weakened the Pentagon’s ability to do much other than play whack-a-mole with the likes of the Islamic State group, al-Qaeda, and al-Shabab.

Yet, not only will insurgency persist in the Middle East, Africa, and elsewhere, but it will also evolve as insurgents adopt new technologies for their own purposes. Just as ISIS learned to employ small drones for surveillance and strike missions and has entered the world of cyber warfare, the Air Force should anticipate that terror groups will continue to use technology in new ways, and change how they wage war as a result.

“Robots, artificial intelligence, cyberwar, 3D printing, bio-enhancements, and a new geopolitical competition” are among the many emerging technologies that will shape 21st Century warfare, writes

**“Robots, artificial intelligence, cyberwar, 3D printing, bio-enhancements, and a new geopolitical competition ... shape the worlds of insurgency and terrorism.”**

—Peter W. Singer, strategist and senior fellow at New America

Peter W. Singer, a strategist and senior fellow at New America, a Washington, D.C., think tank. “We should also expect them to shape the worlds of insurgency and terrorism.”

To prepare, the Air Force must rethink how it wields airpower both in US Central Command and US Africa Command. With airstrikes winding down in Iraq and Syria, the service wants to withdraw its most advanced fighter jets from the counterinsurgency fight to focus them on potential peer conflicts. It is also pulling out B-1 bombers and E-8C Joint STARS aircraft from CENTCOM now that ISIS is weakened.

But what kind of aircraft should be in the counterinsurgency, or COIN, fight? At the center of Air Force considerations are unmanned aircraft and light attack planes. But defense experts differ over whether the Air Force is making the right investments.

Singer, a futurist who has researched what insurgency could look like in the 2030s, told *Air Force Magazine* that the Air Force’s drone portfolio needs to expand because remotely piloted aircraft don’t put pilots’ lives at risk—and are cheaper to replace when lost. While unmanned aircraft may not equal manned aircraft in many aspects, the risks are much lower when things go wrong, as when an AFRICOM drone went down over Libya in November or when Iran felled a Navy RQ-4 variant last June.

John F. Lehman, vice president of strategy and cor-



A drone operated by the Islamic State group and captured by Iraqi police rests on a table at the Joint Operation Center at Qayyarah West Airfield, Iraq, in 2017. ISIS uses the small UAVs to surveil US and allied forces, and some have performed airstrikes.



Photo: SSgt. Jason Hull/USA

porate development at Fincantieri Marine Group and a former Senate Armed Services Committee staffer who focused on Air Force issues, said inexpensive, long-endurance unmanned aerial vehicles are needed for persistent intelligence, surveillance, and reconnaissance and that the Air Force should also explore cheap, small drones for tactical ISR and strike missions.

“We do not need large numbers of exquisite platforms, such as the MQ-9 and RQ-4, to deliver the ISR and strike needs of counterinsurgency,” Lehman said. “Additionally, the development and integration of artificial intelligence and machine learning will be essential.”

*Foreign Policy* recently reported the Pentagon is considering cutting the majority of the Air Force’s RQ-4 Global Hawk fleet as it postures against countries with advanced air defenses, fearing the remotely piloted aircraft is too easy a target for surface-to-air missiles.

The MQ-9 Reaper rose to prominence in the post-9/11 era, but now its future is under debate. Todd Harrison, director of the Aerospace Security Project at the Center for Strategic and International Studies, said the Air Force could add air-to-air missiles or longer-range air-to-ground weapons to the Reaper to make it more useful in future fights.

Reapers are also spreading across Africa, including a growing presence in Niger, which military officials see as a hub from which to gather intelligence on and attack terror groups like al-Shabab.

But it’s how others use drones that could shape the Air Force’s tactics and decisions. Tasking one operator to control multiple aircraft at once may not be an option in a contested environment; instead, USAF could allow aircraft to execute certain tasks on their own.

Singer envisions counterinsurgency involving more people operating a growing number of commercially available autonomous aircraft in new roles. A September 2019 report titled “The Drone Databook” by Bard College’s Center for the Study of the Drone found that of the 101 nations it analyzed, 95 have an active inventory of unmanned systems. That’s up 58 percent since 2010.

“We will continue to see commercially available RPAs modified for military missions,” Harrison added. “As more civilians own and operate these aircraft, it may become increasingly

difficult to differentiate hostile RPAs from civilian RPAs—especially in densely populated areas—which will make force protection a major challenge.”

Swarms of UAVs may also play a part in COIN, as commercial or homemade drones are already spurring a growing market for defensive systems designed to take out encroaching small aircraft. The US will also need to watch out for adversaries that reap the benefits of drone automation.

In his “Insurgency in 2030” report, Singer notes that ISIS has a “self-made air force of drones” that surveil US and allied forces and have conducted “several hundred airstrikes.”

“It may be ad hoc, but it still achieved their goals at a minimal cost,” he wrote. For ISIS, drones indicate “a change in the overall story of airpower and insurgency,” according to Singer. “Now, as exemplified everywhere from Yemen to Ukraine, the insurgents can fly and fight back.”

Yemen’s Houthi rebels claimed responsibility for sending 10 drones to strike two oil facilities in Saudi Arabia that process the majority of the country’s crude oil output.

Singer believes the Air Force will ultimately be tasked with defending against UAV swarms from above.

The close air support replacement to the A-10 Thunderbolt could be unmanned, as well. The Air Force has long struggled with its view of the A-10 and has repeatedly sought to retire the airplane from the fleet.

Michael E. O’Hanlon, senior fellow and director of foreign policy research at the Brookings Institution, argues that the Air Force’s past opposition to the A-10 is a sign that it’s not making the right investments for the future of counterinsurgency. (The service kept the Warthog in the inventory after Congress pushed back on its retirement.)

“Something like it makes sense—or we can perhaps just keep re-engining and rewinging that very plane for a while to come,” O’Hanlon said.

That gets at the heart of the Air Force’s main ongoing, COIN-focused procurement debate: What kind of light attack aircraft should it develop? The propeller-driven light attack aircraft it’s looked at so far would not be a direct replacement for the A-10. They lack its armor and its heavy cannon. Rather, they would be light attack aircraft that Air Force Special Operations Command could use to train foreign militaries to

go after insurgents.

It's a polarizing issue.

"In a world where ... insurgents possess not just unmanned systems but surface-to-air missiles, it is not just dangerous, but fallacy to put pilots in planes that even World War II anti-aircraft defense would feast on," Singer said. "That money could be far better spent elsewhere."

Lehman disagrees. He says a low-cost, light attack plane would bolster the COIN fight and free up higher-end jets for other missions. The cost of the airframes, training, and upkeep would pale in comparison to cost of maintaining F-22s and F-35s, which are pure overkill in COIN missions, he argues.

"A fleet of light attack aircraft would be able to prosecute the same targets with the same weapons at a fraction of the operations cost," Lehman said. Another benefit: "A light attack aircraft would create many more opportunities to engage with allies and potential allies that do not and will not operate jet fighter/attack aircraft."

Light attack could be a crucial part of any air component kept in the Middle East in the wake of ISIS's collapse.

According to a 2017 Center for Strategic and Budgetary Assessments report, US air and special forces will still need to continue training and equipping partner forces in the Middle East while providing the occasional "reprisal raids and strikes."

As part of a "persistent counterterrorism campaign" against the group's lingering nodes, a limited US military presence would likely require "more air combat missions enabled by special operations forces with joint terminal attack controllers, as well as looser rules of engagement for both airstrikes and to enable US troops advising Iraqi forces to accompany them into combat," the report noted.

"The United States will need to maintain and manage the international coalition that it has put together to fight ISIS" CSBA experts Eric Edelman and Whitney McNamara wrote. That means supporting both "nations participating in airstrikes, as well as training and equipping local security forces and special forces operations in both Iraq and Syria." In January, the US-led coalition fighting ISIS paused its operations as tensions peaked between the US, Iran, and Iraq.

## CYBER AND ELECTRONIC WARFARE

The most challenging aspect of counterinsurgency will not be so plain to see, however. The ability of insurgents to attack digitally and to confuse the populace with disinformation is

a greater threat. Such "gray zone" conflict is a murky mix of political and digital influence campaigns, backed by cyber, electronic warfare, and other nonkinetic means. It does not quite rise to outright armed combat, but it can be even more disruptive.

Cyber operations fall under US Cyber Command, but the Air Force contributes forces to that fight. The new 16th Air Force, which stood up in the fall, includes an information operations organization designed to walk that blurry line between offense and defense in the digital world.

As Harrison notes, the cost of entry to the world of cyber ops is low. Nonstate actors can acquire hacking services on the Dark Web, as when in 2015 hackers claiming ties to the ISIS co-opted CENTCOM social media accounts and posted threatening messages and propaganda.

"Cyber capabilities will become easier and easier to acquire and utilize," Lehman said. "For groups like ISIS that seek to cause destruction and chaos in the societies of their foes, their target sets will grow exponentially. Willingness to preempt known threats and timely attribution of attacks will be increasingly important to successful US counters."

Terror groups use social media to recruit new members but can also use it to sow dissent and confusion. Fake news and false narratives can be planted about situations on the ground, fueled by apps, livestreams, hashtags, and the rise of deepfake technology.

Despite the ability to conduct outreach and disinformation campaigns, ISIS's "cyber caliphate" has not waged effective cyber warfare with consequential hacks. But time and increased connectedness could change the nature of US and allied attack surfaces. The growing Internet of Things could be an easier target and could put physical consequences on the line as more systems, from highways to drones, are added to advanced networks. The Air Force will have to take those threats as seriously as it does other cyber targets, Singer said.

"The cybersecurity of every system we weave into the IoT has to be reconsidered," he said. "We are baking in vulnerabilities now that we will regret years from now."

The Air Force's EC-130H Compass Call electronic attack platform and other electronic warfare assets must also be factored into the COIN fight. A CENTCOM document that acknowledged the potential crossover between EW and cyber operations was uncovered in a 2017 report by the news site The War Zone. It reported a CENTCOM strategy that could



An airman performs maintenance on an EC-130H Compass Call at Bagram Airfield, Afghanistan, in 2018. Compass Call aircraft will continue to play an important role in COIN as USAF adjusts to increasing cyber and electronic warfare challenges.

Photo: SSgt. Kristin High

use cyber tools to “force an adversary from wired to wireless networks,” which the US could then exploit.

As terror groups increasingly rely on digital means, “EW may be used to set favorable conditions for cyberspace operations by stimulating networked sensors, denying wireless networks, or other related actions,” the document states. “In the defensive environment, EW systems may detect and defeat attacks across wireless access points.”

That could, in turn, push insurgents to either upgrade their technology or retreat to new low-tech ideas similar to those that have kept the US on its toes for years.

## SPACE

The space revolution and advent of an independent Space Force will also have ripple effects on COIN. For one, the growth of satellites and sensors for missions such as communications and navigation will continue to provide the backbone of global operations, including COIN. Satellites guide GPS-enabled weapons to their targets and pass location and intelligence data from user to user.

“The barriers to entry for having organic space capabilities remain high, but terrorist and insurgent groups can still access commercial space capabilities for ISR and communications,” Harrison said. “As these commercial capabilities increase, especially the proliferation of nearly continuous commercial space-based imagery, US forces will have to adapt to this new reality.”

In September, Lt. Gen. Joseph T. Guastella Jr., commander of US Air Forces Central Command, told *Air Force Magazine* that nonstate actors like ISIS and al-Qaeda are unable to cause problems for American space assets because they lack the funding, research strength, and organizational structure of a national government.

“They’re just not in that game yet,” he said.

But Harrison said insurgents can already access counter-space capabilities, and their use of jammers, spoofers, and more will increasingly disrupt and degrade US space functions.

“The No. 1 job of the Space Force will be to improve the defense of our existing space assets to make them more resistant to these threats,” he said.

That means more jam-proof satellite communications systems and full deployment of multi-Global Navigation Satellite System GPS receivers, which boost navigation signal availability and accuracy.

While insurgent groups may lack the wherewithal to interfere with space assets, nation-states could assist, either with funding or access to their own platforms.

“Iran is definitely funding proxies to try to do us and the coalition harm in any way they can,” Guastella said. “Space will be affected. ... We’re staying ahead of them.”

## ORGANIZE, TRAIN, AND EQUIP

As the wars in Iraq, Syria, and Afghanistan enter another, less overt era of conflict, and as counterinsurgency operations ramp up in Africa, should the Air Force organize and train its people differently?

Harrison says COIN requires different skills than high-end combat operations, but suggests training for COIN might not be worth the service’s time, given the emphasis the 2018 National Defense Strategy puts on competing with Russia and China.

O’Hanlon agreed, noting that while targeting insurgents is still important, it doesn’t need to be at the center of training and doctrine.

Lehman takes a different view. Great power competition



Photo: ULA

**A United Launch Alliance rocket lifts off carrying a GPS III payload from Space Launch Complex 37 in August 2019. Satellites and sensors are the backbone of global COIN operations.**

is prompting a need for service members to specialize, he said, so perhaps the Air Force needs to develop its own COIN specialists.

“A cadre of light attack, dedicated intel, SOF, and other support personnel could be Air Force’s COIN Center of Excellence that maintains the COIN expertise, as in the way the Warthog community maintains the service’s close air support expertise,” he said.

Lehman pointed to a recent experiment where the Air Force practiced temporarily running the Combined Air Operations Center for the Middle East out of Shaw AFB, S.C., instead of Al Udeid AB, Qatar. The exercise demonstrated that airmen could manage aircraft just as well from the other side of the world should the CAOC ever be threatened, and they said that practicing for such contingencies would become part of regular operations.

“We will command and control airpower from distributed locations for a portion of every 24-hour air tasking order period,” 609th Air Operations Center Commander Col. Trey Coleman said in an Oct. 1, 2019, release.

This is an idea that transcends the COIN/great power debate and is part of a broader strategy to be less reliant on established bases that could be vulnerable to attack, and instead create flexible, pop-up sites as needed. The approach is most often discussed as a strategy for moving resources around the vast Indo-Pacific theater, but Lehman said the concept applies anywhere.

“The general concepts of being more flexible, agile, and unpredictable are essential whenever and wherever you are operating,” he said. “In the event of any conflict in the Mideast, having the ability to disperse agilely gives our commanders more options and greatly complicates the enemy’s plan of action.”

## THE NEW PROXY WARS

Just as happened in Korea, Vietnam, and Afghanistan, great power rivalry will continue to bleed into other regions through proxy wars and economic competition. In the 1970s, the Soviet Union and US competed for attention in Africa and Southeast Asia; today, China is the US’ principal foreign investment rival,

Airmen preflight an MQ-9 Reaper at an undisclosed location in Southwest Asia in February 2019. USAF is considering adding air-to-air or longer-range air-to-ground missiles to the heavily tasked UAV to increase its utility in future COIN operations.



Photo: SSgt. Arielle Vasquez

while Russia seeks strategic partnerships wherever they can disrupt US advantages.

That is especially true in the fuzzy space between truth and fiction.

“The Russians have really learned a lot from this, and they are working all the time now in the gray zone, so the idea that we’re going to get to choose our next war, I think, is a fallacy,” said Barbara Leaf, a former US ambassador to the United Arab Emirates from 2014 to 2018 and deputy assistant secretary of state for Iraq, at an April 2019 Foundation for Defense of Democracies event titled “Lessons Learned from the Iraq War.”

Russia is exerting its influence in myriad ways in Syria, where its ties with Syrian President Bashar al-Assad are allowing it to fill the security vacuum left by the US withdrawal by establishing new bases and taking over Washington’s joint border patrols with Turkish troops. The US, promising to continue air patrols against ISIS as needed, must continue deconflicting operations with Russians in Syrian airspace.

In Afghanistan, too, Russia is acting as a broker between the US, regional warlords, and the Kabul government, negotiations that could finally bring an end to the nearly 20-year war there.

Great power competition is also in play in CENTCOM as the US sends fighters, bombers, and other aircraft to the Middle East as a warning to Iran.

“[DOD] needs to think about how proxy warfare and great state rivalry mean that COIN won’t go away,” Singer said. “Think of how much of the Cold War was about the two sides jousting back and forth via insurgencies they either fomented or fought.”

As the US stresses the importance of building joint air and space ventures with its allies, Russia is selling weapon systems to countries like NATO ally Turkey, while Chinese-made drones and fifth-generation wireless technology promise to spread across the globe.

“The United States could one day find itself fighting a guerrilla force that brings better technology to the fight,” Singer said.

O’Hanlon said the next National Defense Strategy should

seek a more realistic balance between peer, near-peer, and asymmetric warfare than the 2018 version, which marked a dramatic departure from the Pentagon’s prior focus on counterinsurgency that had endured since 9/11.

“Overall the strategy has the right priorities, but it’s also important to remember that it is not a binary decision,” Harrison said. “DOD can focus more on preparing for great power competition and also maintain forces capable of COIN operations, albeit at a smaller scale.”

That means the military has to juggle growing long-range missile procurements with maintaining its urban warfare training, deterrence with close air support, and nuclear weapons advancements with the proliferation of weaponized commercial products.

At the Reagan National Defense Forum in Simi Valley, Calif., in December 2018, then-Air Force Secretary Heather A. Wilson argued the service needed to invest fewer high-end resources in the Middle East in order to succeed in the Indo-Pacific.

“We cannot continue this high level of effort and get prepared for a high-level fight,” she said. “So the question is, are they going to reduce their level of demand?”

Now it appears demand is falling. But to avoid a resurgence of the groups the Air Force helped beat back, the service says it must be able to share its burdens with partners and to invest in a more demanding set of requirements in the future.

The only clear requirement is that the Air Force must ensure the ability and capacity to provide persistent ISR, resilient command and control, and the ability to fight both high-end and low-end threats in every domain.

“The blending and intertwining of insurgents and the local populace and the resulting need for extensive ISR and precision weapons will continue to endure,” Lehman said. “As information technology continues to become more and more ubiquitous, the information war and cyber threats will play a larger and larger role.”



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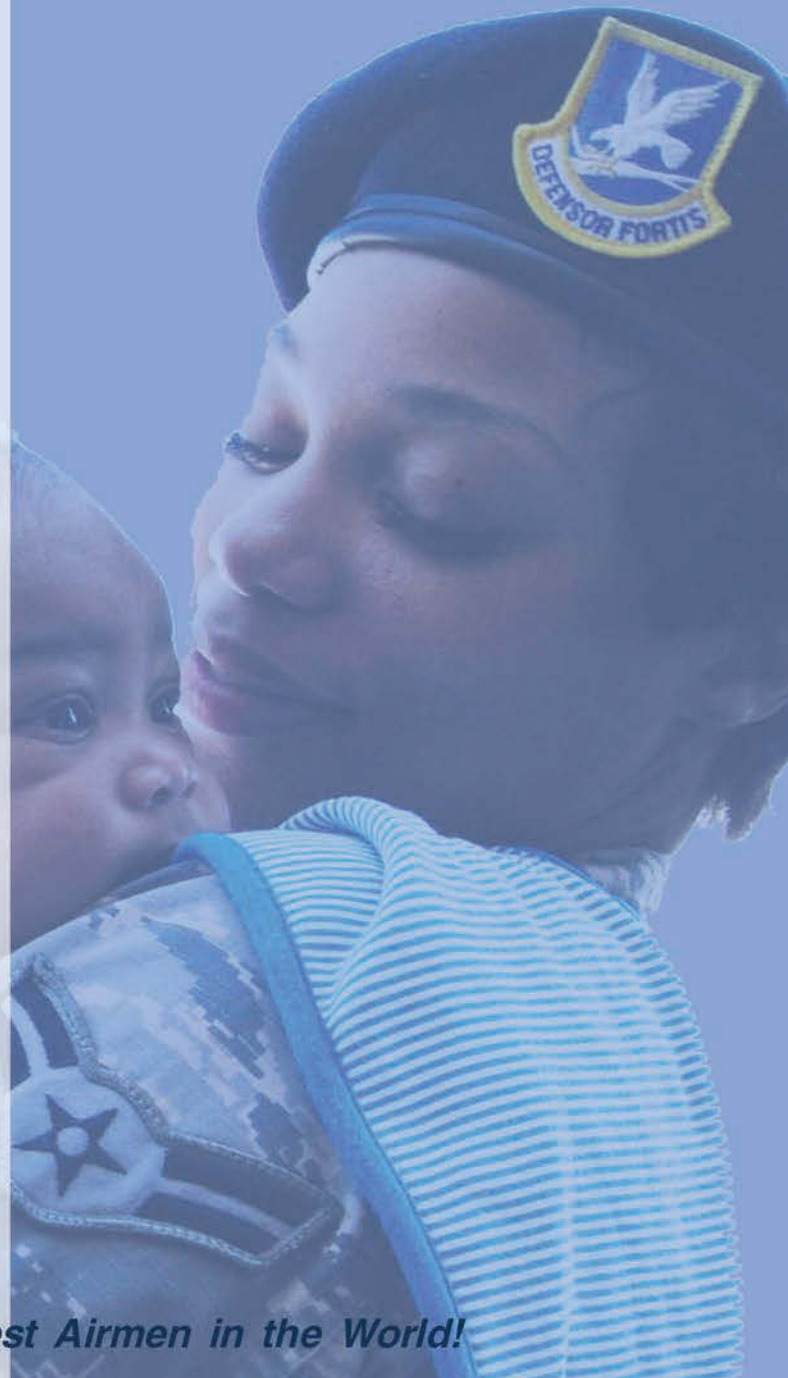
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# Space Force is

Now comes the hard part.

By Rachel S. Cohen

**T**he idea of a new military space organization had barely entered public consciousness when Comedy Central's "The Daily Show with Trevor Noah" arrived in South Carolina to ask about the Space Force. President Donald J. Trump was touting the prospect of a sixth service, and a "Daily Show" correspondent attended a Trump rally to see how attendees felt about the proposal.

One man thought it had to do with cloud computing. A woman said she expected a new venture into space exploration. Someone else acknowledged the need for space regulations. "I think ISIS could get to space," another woman suggested.

The Islamic State group isn't advanced enough to launch anything into orbit, and the segment was styled for comedic effect. But it illustrates a larger issue ahead for America's new Space Force: Getting everyday people to grasp exactly what a military space service can and will do. For most, space policy is still more science fiction than reality—the stuff of a galaxy far, far away. They

**"Personnel issues are the most troublesome ones, and those will take years to work out."**

—Space Force supporter Rep. Jim Cooper (D-Tenn.)

imagine laser-toting gunships and interplanetary bases, not airmen at consoles adjusting satellites in orbit.

Those perceptions have persisted through about 18 months of pressure from the White House to make the Space Force a reality. Cheered by years-long proponents in Congress, legislators approved the new service as part of the Air Force in the fiscal 2020 defense policy and spending bills. The US Space Force was officially launched Dec. 20, 2019.

As Gen. John W. Raymond and others from Air Force Space Command—the nearly four-decade-old organization that oversaw space personnel and programs and now forms the basis of the Space Force—begin to define and build the fledgling service, the Pentagon will have to dispel misconceptions and get to the real work of bringing in members.

At its core, the Space Force aspires to pull together the Defense Department's space experts—the majority of whom work for the Air Force—under one umbrella to look after military interests in the cosmos. Although the initial population will come from the Air Force, "the long-term vision of the DOD is still to consolidate the preponderance of space missions across the services into the Space Force," officials said. That spans everything from the Global Posi-



Photo: A1C Jonathan Whitley

**TSgt. Michael Vandenbosch at Schriever AFB, Colo., monitors satellite signal interference on Dec. 16, 2019. Protecting satellites and communications in space will be job No. 1 for the Space Force.**

# Here

tioning System satellite constellation to weather satellites, nuclear missile detection systems, military rockets, and communications networks.

Air Force, DOD, and White House officials say the Space Force will also support NASA's push to return to the Moon and go beyond, leveraging commercial industry's space boom driven by companies such as SpaceX and Blue Origin, and partner with other federal agencies such as the Commerce Department that will act as the traffic cop of the heavens. It can track the growing amount of space debris and fend off potential missile attacks and signal jamming—leading the way toward possible offensive capabilities of its own.

## WHAT'S NEXT

Much of the Air Force's initial blueprint for establishing the early Space Force over the next 18 months requires officials to figure out details as they go. Stand-up is slated to last until 2024.

As part of the Fiscal 2020 National Defense Authorization Act, lawmakers asked for a slew of information in the first organizational blueprint, which should cover fiscal 2021-2025, and other reports. Members of Congress want to see the Space Force's requirements for its procurement, development, personnel, construction, and operations accounts in the Feb. 1 report.

They also asked for the Defense Secretary to suggest amendments within two months of the law's enactment to help "fully integrate

the Space Force as an Armed Force, and the regular and reserve military and the civilian personnel of the Space Force, into current law." A separate report, due within 180 days of enactment, would help ensure the Space Force brings in quality employees, sets up pay and promotion processes, details training, and more.

The first step will be to bring in uniformed service members. Over the next year and a half, the Space Force will begin to consolidate Air Force-run space programs under the control of the new Chief of Space Operations. AFSPC boss Raymond will play that role for now, while at the same time leading the Joint Force combatant command US Space Command. In his role as CSO, he will answer to the USAF Secretary, who will double as the civilian head of the Space Force, just as the Secretary of the Navy oversees both the Navy and Marine Corps.

Officials are still developing plans for recruiting and for setting a path for bringing airmen into the Space Force and, ultimately, to train and promote them. Plans are also underway for establishing a Space Force organizational structure and how its wings and squadrons will be organized.

"Personnel issues are the most troublesome ones, and those will take years to work out," said Rep. Jim Cooper (D-Tenn.), an early advocate of a space branch, in December.

For the new service to fully tackle its mission, it must figure out who exactly should come over from the Air Force and the other services. Operators will make the switch, but will intelligence analysts and engineers? Will the Space Force later need its own security forces and lawyers, or could it rely on those within the Air Force? And when should it pull in Army and Navy space personnel?

The ultimate size and cost of the Space Force remains an open question. About 16,000 AFSPC Active Duty members and civilians are initially assigned to the new service, but the formal process of transferring them from the Air Force to the Space Force will take months to develop. The Trump administration previously estimated a sixth service would number 15,000 to 20,000 members and cost \$2 billion over five years. But the Congressional Budget Office offered a higher estimate: \$1.1 billion to \$3 billion in one-time expenses, plus between \$820 million and \$1.3 billion a year to pay for 4,100 to 6,800 new management and administrative positions.

By law, the Space Force is not yet allowed to add any new military billets; all of the jobs must come from existing billets within the Defense Department. Todd Harrison, an aerospace security expert at the Center for Strategic and International Studies, and a strong advocate for creating the Space Force, said the most important first step will be developing a comprehensive plan for transferring talent from across the Defense Department into the Space Force over the next few years. "This should be a clean-cut transfer," he said.

Then there is the question of skilled space experts who are not currently assigned to Air Force Space Command, said Kaitlyn Johnson, associate director of the CSIS Aerospace Security Project. "Service members rotate all the time, so there are some space professionals who may be on a non-space rotation at the moment," she said. "The Air Force needs to do a full review of its dedicated space professionals instead of just transferring every person within [AFSPC] at this moment."

Space airmen may get a new set of ranks and uniforms and could be called something other than airmen. These issues will be key to developing an organization and culture distinct from the Air Force, just as the Air Force, in its initial years, set up its organization and culture to be distinct from its Army roots.

The easiest path forward would be to adopt Air Force ranks, said Brian Weeden, a space policy expert at the Secure World Foundation. But others have called for using naval ranks, as used in "Star Trek" and other science-fiction thrillers.

Brent Ziarnick, an assistant national security studies professor

at the Air Command and Staff College at Maxwell AFB, Ala., has written multiple articles arguing for the adoption of naval ranks for the Space Force and on what to call airmen in the new service (he prefers “sentinel.”) Ziarnick says naval ranks would help “develop a separate and unique service culture, independent of the US Air Force and suited best for the reality of military space missions.”

For now, though, they’re all still airmen.

The Space Force could draw members from all of the services and from multiple agencies and entities, including DOD space, intelligence, cyber, the US Air Force Academy, and the public at large. It will also need experts in engineering, human resources, law, public affairs, and more.

There won’t be a Space Force Academy, a senior Air Force official said in December, but young adults from the other military schools could commission into the space service. It’s unclear how the Reserve Officers’ Training Corps would adapt to the change.

“We already have a process set up today through Air Force Recruiting Service and through our commissioning sources to bring people into the space professions and those places,” the USAF official said. “Going forward, we see that continuing.”

Excitement about being part of something new and exciting is running high, said Rep. Mike Rogers (R-Ala.), one lawmaker who first pushed for a Space Corps.

“I get so many young people that are so excited when I’m out talking. They want to know where they can apply,” Rogers said. “There are people in the other services who are looking forward to transferring over. [Recruitment will] be the least problem in this service of all the services. This is going to be the cool service that the young, bright people want to be in.”

But Maj. Gen. John E. Shaw, head of Space Operations Command within the Space Force, has other concerns. Last year, he said the Space Force could face the same recruiting and retention challenges as the Air Force, where competition for talent is severe, especially for pilots and cyber specialists who can often earn more in private industry. Space Force must consider creative ways of letting space personnel move between government and industry along with sharing them between organizations, said Shaw, then AFSPC deputy commander.

He started crunching the details of how Space Force recruitment might work, including ways to piggyback on the brick-and-mortar recruiting offices operated by the other services nationwide, or the potential to do all its recruiting online.

“We could probably follow the models from our sister space agencies (at the National Reconnaissance Office and National Geospatial-Intelligence Agency) that are represented here, as well as NASA, in that regard,” Shaw said.

Harrison said it would be smart to transfer space-minded recruiters from the Air Force to the Space Force to help launch that pipeline.

National Guard and Reserve components, which weren’t included in the approving legislation, can also play an important role in staffing the Space Force. The service plans to bring along Reservists and Guardsmen with space-related missions, which could help draw on the private sector’s experience, according to Air Force Secretary Barbara M. Barrett.

Margaux Hoar, a Space Force expert at the Center for Naval Analyses, said modern demands are changing for space. “You can’t just have space generalists anymore, you need specialists, you need that breadth and depth of experience,” she said in December. “You want to be able to maintain currency in the newest in space science and technology and engineering.”

That allows the Space Force to experiment and be “a little bit heretical” when it comes to keeping people in the service or replacing those who leave, she said. Hoar recommends doing away with “up-or-out” promotions that boot people out of the military once



Photo: ATC Aubree Wilks

**Gen. John Raymond (left) and Maj. Gen. John Shaw at Vandenberg AFB, Calif., in November 2019. Raymond is the new Chief of Space Operations, and Shaw is the head of the Space Force’s Space Operations Command.**

they are twice passed over for a promotion, and instead looking at ideas like letting people ping-pong between Active Duty, the Reserve, and industry.

“You can off-ramp and on-ramp and get into industry and get exposed to some of that thinking ... and then come back and bring that with you to use that energy and some of that new thinking back into the Space Force,” Hoar said.

Another radical idea: CSIS’ Johnson said there’s no reason to impose strict physical requirements on Space Force members. That could help the Space Force achieve a more diverse workforce. The service could attract experts in robotics, artificial intelligence, and data science who might not even qualify for military service in other services because of the physical demands. Those aren’t really the same for a Space Force.

On the industry side, leaders are optimistic about the new frontier but say the space sector’s growth presents myriad challenges. The National Defense Industrial Association is the dominant defense industry group representing firms providing military space equipment. Its president, retired Air Force Gen. Herbert J. “Hawk” Carlisle, said the growth in commercial space demands could strain resources across the defense industrial base. Space excites the imagination and could invigorate the tech sector, he said, but will prompt a huge demand for people and systems.

Within the policy community, Carlisle said, the government needs to provide much more clarity about what space warfighting will look like and how the various operations and acquisition pieces will fit together. Without the right funding and support, he worries the idea will fail.

Traditional defense suppliers and the commercial sector alike will need graduates with experience in science, technology, engineering, and math, skilled tradesmen, cybersecurity experts, and others to develop and control the next generation of communications, propulsion, sensors, weapons, and more. Industry has tried to incentivize growth in those areas for years but says the demand still outpaces supply.

The Air Force has struggled in recent years to keep from losing pilots, software coders, cyber specialists, and highly trained and



skilled technical specialists to the private sector. As space changes from being a government-run enterprise to a commercially dominated one, it could face the same talent crunch.

Mike French, vice president for space systems at the Aerospace Industries Association, said the competition will be fierce across the industry and military sectors. “We will need even more technical talent than before,” he said. “That means funding and encouraging STEM education throughout students’ lives, from kindergarten through college. The US should also capitalize on the Space Force stand up to educate our youth—from all backgrounds and experiences—on the importance and benefits of a space industry career.”

As the Space Force gets up and running, the Defense Department has more work to do to educate the American public about one of the most significant changes to Pentagon bureaucracy since the Air Force was created in 1947.

## SURVEY SAYS ...

Public opinion about whether the US needs a space service still appears split, even among service members:

■ A *Military Times* poll of Active-Duty personnel in fall 2018 found that about 40 percent of troops surveyed supported the idea of a sixth military branch for space operations, while about 37 percent opposed it.

■ A CNN/SSRS poll in 2018 found only 37 percent of all Americans supported forming a Space Force, while 55 percent of Americans did not.

■ A November 2018 Anderson Robbins Research and Shaw & Company Research poll conducted for the Ronald Reagan Presidential Foundation and Institute found Americans were split on the idea of a Space Force, with Republicans favoring it twice as much as Democrats.

■ A poll conducted in August 2018 by The Hill and the HarrisX polling company found a majority favored creating a new organization, with 57 percent approving of “creating a sixth branch of the military, the Space Force, which would be designed to protect US interests and assets in space.” By contrast, 42 percent disapproved of the same statement.

Do Americans outside the military policy bubble need to grasp the specifics of what their sixth service will be doing? Weeden says no—if only because many only understand the broad strokes of how the other branches work anyway.

But government officials acknowledge they have a crucial window of opportunity to shape the narrative before others, like late-night talk show hosts, continue to do it for them.

## IN SECRET OR OPEN?

Space operations are often classified, highly technical, and rarely explained in a way meant for the average American. In the nearly four years since Rogers first floated his Space Corps proposal, the Air Force has started to recognize the need to describe space operations in a way that clicks with people inside and outside the Beltway.

“There’s a lot that needs to be classified, but there’s a lot, most of the stuff that we’ve seen in the [Sensitive Compartmented Information Facility] doesn’t need to be in a SCIF,” Rogers said. “In fact, if it had been declassified, this would have been a much easier lift two years ago, because it would upset you to know what China and Russia have been doing and what we haven’t been doing and the threat, what it could do to us if they were to shut our satellites off or destroy them.”

The Air Force Secretary wants to declassify as much space information as possible, both about what the US is planning and what China and Russia are up to. If America’s adversaries hear what the US is capable of, Rogers said, that could discourage an attack.

CSIS’ Johnson believes communicating the Space Force’s role

is one of the biggest challenges to standing it up. She added: “The organization needs strong technical experts and communicating these new opportunities will be key to public understanding that the Space Force is not Marines in space with laser guns. ... The loss of GPS, for example, does not only shut down your Google Maps app, but also Uber, ATMs, the New York Stock Exchange, online shopping, and so much of our current way of life.”

## THE FUNDING FLOW

Sufficient funding for space programs also depends on how well the Pentagon explains those needs and threats to Congress, Johnson added.

Harrison criticized the Air Force for initially resisting the push for an independent Space Force and said USAF missed its chance to educate the public about what the military already does in space and its importance. The Air Force didn’t recognize the discourse was changing, he said. Now it is up to Raymond and civilian leadership to tell the public this force is not about aliens.

In January 2019, Comedian Steve Carell emerged as an unexpected spokesman for Space Force.

In a secretive trailer, Netflix announced that Carell, known for his work on the TV hit “The Office,” would create and star in a sitcom about the men and women who have to figure out how to launch a Space Force.

The show, slated for release this year, aims to join a storied history of military sitcoms that includes “Gomer Pyle, USMC,” “Hogan’s Heroes,” “McHale’s Navy,” and “M.A.S.H.,” the finale of which was the most-watched television episode in history. As the Pentagon works to spread its own message, the comedy heavyweights involved with “Space Force” will be more visible in the public eye than Raymond.

Robert Thompson, a pop culture expert at Syracuse University, said it’s too early to tell whether the TV version will help or hinder broad understanding of military space missions. But its existence will pose an interesting conundrum for the fledgling service: the other services were well established when TV built programs around their military cultures. Not so for “Space Force,” which will roll out alongside its namesake.

“Since this Netflix thing is getting up and running before Space Force is getting up and running, the real Space Force ... is going to have to emerge into an environment where there’s already a parallel Space Force running in a comedy, and probably a pretty snarky comedy at that,” Thompson said.

In fact, the show appears set to launch with one of the false narratives of space warfighting: that the Pentagon wants to put “boots on the Moon.” Such actions are banned by the 1967 Outer Space Treaty.

Harrison says it will be incumbent on the government to spread the word about what’s fiction and what’s not.

But Weeden suggested that all public relations could be good PR, as long as it keeps the issue in the public sphere. And Thompson said the show could have some educational and recruiting power.

Just as “Star Trek” and “Star Wars” drove viewers to join the space sciences starting in the 1960s and 1970s, seeing a Space Force in popular culture could pique people’s curiosity.

“There is a number of ways in which this could go,” Thompson said. “There are people who might have watched [“Veep”] and seen through the parody ... and still been inspired to the excitement of government at that level, and that could very well be what happens with the Space Force.”

In the meantime, the actual Space Force will start to unfold under new leadership in this era of renewed federal commitment to what lies beyond Earth’s atmosphere.

“We will be watching it like a hawk,” Cooper said. “Pretty soon the stars in the sky will pale in significance to what’s commercially overhead. This is amazing, and we need to get ready for this era.”

# Who's Paying Their Share



**After years of declining investment, NATO members' spending on defense is rebounding. But frictions persist.**

By John A. Tirpak

In his last speech to NATO before stepping down as US Defense Secretary in 2011, Robert M. Gates offered an exasperated and dark warning to his fellow defense ministers: Spend more on your own security, or the American taxpayer may lose patience with paying for European defense. At the time, the US accounted for 75 percent of all NATO defense spending, up from 50 percent only a few years earlier.

Flash forward eight years. Celebrating the 70th anniversary of NATO in London in December, alliance leaders proudly touted the fact that, today, eight countries are meeting NATO's stated goal to invest 2 percent of Gross Domestic Product in defense, up from only three nations when Gates issued his warning. Indeed, virtually every one of NATO's 28 members has boosted defense spending. The alliance is back on track. Or is it?

French President Emmanuel Macron wondered on the eve of the summit if NATO had lost its way.

**“What we are currently experiencing is the brain death of NATO.”**

—French President Emmanuel Macron

“What we are currently experiencing is the brain death of NATO,” he declared in an interview with *The Economist*. Europe, he added, must “wake up” to the notion that it is on “the edge of a precipice,” and European nations must view themselves strategically not as members of an alliance dominated by the United States, but rather as part of Europe and a geostrategic entity unto themselves. Otherwise, he said, Europeans will “no longer be in control of our destiny.”

Asked whether he believed in NATO's Article 5—which states that every NATO member will come to the aid of any member should it be attacked, he answered, “I don't know.”

Meanwhile, Turkey appears to be warming to Russia, NATO's traditional adversary, and pulling back from its traditional close ties to the United States. Having not been allowed to join the European Union, Turkey has been flirting with Russia and China for more than a decade. In 2019, it took delivery of the Russian S-400 air defense system, prompting the United States and its partners in the F-35 fighter

# e in NATO?



The first of five NATO-owned RQ-4D RPAs at MOB Sigonella, Italy, in November 2019. In all, NATO members total defense investment could top \$1 trillion in the coming year.

Photo: MSgt. Christian Timmig

program to drop Turkey as a partner.

President Donald J. Trump has also roiled NATO. Campaigning for president in 2016, Trump openly questioned the value of the alliance, wondering if it was “obsolete.” NATO, he said, was “costing us a fortune.”

By then, Europe and Canada had already begun to increase spending, driven by Russia’s annexation of Crimea and parts of eastern Ukraine in 2014 and its ongoing “hybrid war” against the rest of that country. Though Ukraine is not a NATO member, nations that lived for decades under Russian domination in the former Soviet bloc, including the Baltic states of Estonia, Latvia and Lithuania, feared they might be next.

After Trump became president, his first Defense Secretary, retired Marine Gen. James Mattis, sought to reassure the world that NATO membership was the bedrock of American international power and influence, even as Trump continued to insist that other NATO members pick up more of the alliance’s financial burdens.

The tactic appears to have worked. NATO statistics released in November 2019, just ahead of the London Summit, shows Europeans and Canada increased their collective spending by a combined 5.6 percent in the last five years. That includes



Photo: MSgt. Scott Thompson/ANG

Latvian JTACs conduct close air support training with USAF A-10 aircraft and crews in October 2019. Despite cracks in the NATO alliance, the most important deterrent tool, Article 5, remains intact.

a 1.7 percent in 2015, 3.0 percent in 2016, 5.7 percent in 2017, and about 4.5 percent each in 2018 and 2019.

From 2015 to 2019, non-US NATO countries increased defense outlays more than 20 percent to \$302 billion, while US defense spending increased from \$660 billion to \$685 billion. In all, NATO members’ total defense investment could top \$1 trillion in 2020. Today, while nine NATO-member countries meet or exceed the 2 percent target (including the US) seven are within 0.5 percent of the target, and all 28 have increased defense spending since 2014.

When it comes to investing in new equipment, the trends appear to be even better. NATO members have all agreed to invest 20 percent of their defense spending on new gear, and now, 16 NATO members are hitting the mark. Indeed, only Albania, the UK, and France have reduced their level of investment in weaponry since 2014. This separate accounting is useful because member states spend differently on pay, amenities and support for their troops, while the cost of equipment is largely equalized across the alliance.

At a lunch Trump hosted at the London meeting for the “2 percenters,” he lauded the progress in investment and took credit for spurring allies to spend more on defense. “Some day,” he said, “we’ll raise it to 3 percent and 4 percent, maybe.”

NATO Secretary-General Jens Stoltenberg celebrated the achievement, saying the growing number of 2 percenters “demonstrates we are making real progress.” More is to come: Most other NATO members “have plans in place to meet the 2 percent guideline by 2024,” he said. The European allies and Canada have added \$130 billion to their defense budgets since 2016, he said, “and this number will be \$400 billion by 2024. ... So this is making NATO stronger.”

Of course, some allies are not following suit. Germany will still be under 2 percent of GDP in 2024, for example.

Whether all that new investment is because of the president is hard to determine. But in an interview with National Public Radio last summer, Garrett Martin, a NATO scholar at the American University School of International Service, said Trump may deserve credit. “Maybe there’s a bit more urgency now because he’s blunter than his predecessors in criticizing his European partners,” Martin said.

The US has also put its money where its mouth is. At the NATO ministerial meeting in Brussels last year, Stoltenberg noted that the US had increased spending on the European Deterrence Initiative by 40 percent since 2016. “Actions speak louder than words,” he said. The US Congress has strongly supported the alliance with numerous resolutions supporting

NATO, and after the London Summit, Sen. Tim Kaine (D-Va.) introduced legislation that would bar the president from withdrawing from the alliance without Congress' approval (See sidebar.)

## MACRON'S CHARGE

Amid the self-congratulation in London about NATO's improved military spending, there was also friction, some of which was spurred by French President Macron's remarks in *The Economist*.

"The unarticulated assumption is that the enemy is still Russia," Macron said. While Russia remains "a threat," he said, he suggested it is "no longer an enemy." Rather, the common enemy of NATO, Macron argued, is terrorism, a challenge Russia shares, and on which it could be "a partner."

Not surprisingly, that remark stirred concern among NATO's Eastern European members, which view Russia's efforts to undermine Georgia and Ukraine—like them former members of the Warsaw Pact—as a threat to their own independence.

In London, Macron declined to apologize for his remarks, saying instead he hoped that they stimulate new discussions of the alliance's future. A debate is needed, he said, on how to "build sustainable peace in Europe."

The alliance, he said, should be worried about "things other than finances and budgets."

NATO leaders have all but begged Turkey to drop plans to buy the Russian S-400 air defense system, which they say is incompatible with the F-35. It could reveal secrets about the low-observable fighter and assist Russian technicians helping Turkey set up and operate the S-400 to enhance Russia's defenses against those jets. Turkey has remained resolute about buying the system, however, and at the Moscow Air Show last fall, Turkish President Recep Tayyip Erdoğan inspected Russian Su-35s. Turkish defense officials have said they could buy up to 24 of the fighters since they can't acquire F-35s.

After the US, Turkey has NATO's largest military with 435,500 troops, according to NATO statistics. Third is France, with 207,800 people in uniform, followed by Germany with 182,000 and Italy, at 178,000. Collectively, including the US, NATO members have 3.26 million people in military uniform.

Trump had a sidebar meeting with Erdoğan in London, saying afterward the two discussed the situation in Syria, Turkey's offensive against the Kurds, and the cease-fire that froze hostilities in the region. The White House later said Trump urged Erdoğan to honor Turkey's "alliance commitments." Trump said he was "looking at" sanctioning Turkey over the S-400 dispute.

As recently as last summer, Trump toyed with economic punishment of Turkey under the Countering America's Adversaries Through Sanctions Act, or CAATSA, but in recent months the discussion between the two countries has been about increasing trade, not limiting it. Turkey remains a major industrial partner on other defense programs, including Lockheed Martin's F-16 (Turkey has 270 of the jets in several variants).

During the acrimony over the F-35/S-400 dispute, Turkish Defense Minister Mevlüt Çavuşoğlu suggested the US may be asked to leave Incirlik AB, Turkey, from which the US Air Force operates KC-135 tankers and other aircraft. The US has short-range nuclear weapons on Turkish soil, also, but neither side has said much about them.

Turkey also raised eyebrows at the summit when Erdoğan threatened to withhold support from a plan to increase the military capability of the Baltic States fronting Russia and

## Bill Would Give Senate Final Say on NATO Withdrawal

A bill passed by the Senate Foreign Relations Committee would prohibit a US president from unilaterally withdrawing from NATO without the approval of Congress.

"Recent actions have raised serious questions among our allies about America's commitment to NATO," said Sen. Tim Kaine (D-Va.), the bill's sponsor. "This sends a strong message that, after 70 years, Congress sees the continuing vitality of the alliance."

If passed, the measure would require the president to alert the Senate and House Foreign Relations Committees within 48 hours of any action to withdraw from the alliance and to seek the advice and consent of the Senate before he could exit NATO. The bill also allows the Senate Legal Counsel and House General Counsel to challenge the administration in court if the president tried to unilaterally quit NATO.

Surveys suggest the public supports that position. An April 2019 survey of more than 2,400 registered voters conducted by the Program for Public Consultation at the University of Maryland found:

- 83 percent of respondents favored the US staying in NATO, including 90 percent of Democrats, 77 percent of Republicans, and 76 percent of those who said they voted for President Trump.

- 50 percent agreed that the US should "remain part of NATO but reduce US military investments in Europe to bring them more in line with the level that Europeans make."

- 35 percent endorsed pressing NATO allies to do more, but without threatening to leave the alliance.

- 12 percent said the US should press NATO allies "to spend more on their military and say that if they do not, the US will disengage from Europe militarily and possibly withdraw from NATO."

Poland, a sign of his growing alliance with Moscow. But he did not follow through. Even though Turkey endured criticism for its incursion into Syria and its S-400 deal, NATO made no mention of either in its final declarations in London. Rather, it called out Russia for its "aggressive actions" and said improved relations and a "constructive relationship with Russia" would only happen "when Russia's actions make that possible."

"We, as an alliance, are facing distinct threats and challenges emanating from all strategic directions," the NATO partners said in their final communiqué. Russia's "aggressive actions constitute a threat to Euro-Atlantic Security."

The partners said they would "address in a measured and responsible way Russia's deployment of new intermediate-range missiles, which brought about the demise of the Intermediate-Range Nuclear Forces Treaty and which pose significant risks to Euro-Atlantic security." NATO, they said, would also remain "a nuclear alliance," but would continue to honor the nuclear nonproliferation treaty.

Russian spokesman Dmitri Peskov, reacting to the NATO communiqué, said NATO's increased spending "reinforces" Russia's concerns about the alliance, and makes the Russian frontier less secure, but he also said Russia will not get into "an arms race or spending race." He said Russian President Vladimir Putin is "operating in a different way."

# Allies Ante Up

Every NATO member increased its total investment in defense from 2014-2019. But only eight NATO members have achieved the goal of investing 2 percent of its national gross domestic product. Five nations experienced modest declines in defense as a share of GDP.

■ Decrease in GDP percentage  
 ■ More than 2% of GDP

	2014	2019	Real change 2014-2019 (%)	Share of GDP 2014 (%)	Share of GDP 2019 (%)
	Million US dollars (2015 prices and exchange rates)				
Albania	150	166	10.73	1.35	<b>1.26</b>
Belgium	4,383	4,494	2.53	0.98	<b>0.93</b>
Bulgaria	638	1,872	193.39	1.32	<b>3.25</b>
Canada	15,553	21,860	40.55	1.01	1.31
Croatia	892	934	4.77	1.84	<b>1.68</b>
Czech Republic	1,686	2,512	48.94	0.95	1.19
Denmark	3,399	4,333	27.48	1.15	1.32
Estonia	432	569	31.55	1.93	<b>2.14</b>
France	43,914	47,771	8.78	1.82	1.84
Germany	39,304	49,712	26.48	1.18	1.38
Greece	4,353	4,723	8.50	<b>2.21</b>	<b>2.28</b>
Hungary	1,027	1,739	69.35	0.86	1.21
Italy	20,777	23,281	12.05	1.14	1.22
Latvia*	245	622	153.86	0.94	<b>2.01</b>
Lithuania*	358	957	167.27	0.88	<b>2.03</b>
Luxembourg	210	348	65.68	0.38	0.56
Montenegro	59	78	32.92	1.50	1.66
Netherlands	8,646	11,414	32.02	1.15	1.36
Norway	5,864	7,422	26.57	1.55	1.80
Poland*	8,521	11,311	32.74	1.85	<b>2.00</b>
Portugal	2,561	3,307	29.12	1.31	1.52
Romania*	2,309	4,374	89.44	1.35	<b>2.04</b>
Slovak Republic	832	1,754	110.74	0.99	1.74
Slovenia	411	525	27.99	0.97	1.04
Spain	10,599	12,336	16.39	0.92	0.92
Turkey	11,784	18,000	52.74	1.45	1.89
United Kingdom	61,227	65,944	7.70	<b>2.16</b>	<b>2.14</b>
United States	660,062	685,099	3.79	<b>3.73</b>	<b>3.42</b>

Notes: Figures for 2019 are estimates.

\* These allies have national laws and political agreements which call for 2% of GDP to be spent on defense annually, consequently estimates are expected to change accordingly. For the past years, allies' defense spending was based on the then-available GDP data and allies may, therefore, have met the 2% guideline when using those figures. (In 2018, Lithuania met 2% using November 2018 OECD figures.)



Photo: SSgt. Wendy Kuhn/ANG

Other threats called out by the alliance included “terrorism in all its forms and manifestations,” as well as challenges to “the rules-based international order” from both state and nonstate actors.” Instability beyond NATO’s borders is creating large-scale movements of refugees, NATO noted, along with the persistent threat from “cyber and hybrid threats.”

While China doesn’t border NATO, the members said they “recognize that China’s growing influence and international policies present both opportunities and challenges” the alliance needs to address. They pledged to “maintain our tech-

nological edge,” in all domains, including cyber and space, and improve the resilience of member nations to attacks of all kinds.”

As for Macron’s worries about Article 5, nothing happened. Despite the frictions, NATO members left intact the glue that holds the alliance together and gives it its strategic deterrent effect, reaffirming their “solemn commitment” to Article 5. Stoltenberg, wrapping up the meeting, said members “stand together, all for one and one for all,” and that commitment to Article 5 is “ironclad.”



# Remotely Piloted Aircraft: Implications for Future Warfare

Photo: ATC William Rio Posado

Airmen from the 432nd Wing pose with an MQ-9 Reaper at Creech AFB, Nev., on Nov. 19, 2019. The Reaper has proven valuable in both reconnaissance and attack roles, including close air support.

By Lt. Col. Johnny Duray

**W**hen an MQ-1 Predator fired an AGM-114 Hellfire missile in the opening stage of Operation Enduring Freedom over Afghanistan, the world discovered a new form of power projection: kinetic force delivered from unmanned, remotely piloted aircraft (RPA). That proof of concept drove exponential growth in RPA usage, with combat air patrols (CAPs) swelling from just four in 2004 to 65 simultaneous, worldwide CAPs every day in 2014.

Yet there is still more work to be done to fully realize the power of RPA technology. As the new National Defense Strategy focuses on an era of great power competition, RPAs will provide valuable capabilities and capacity to address the persistent threat posed by violent extremist organizations. In doing so, RPAs will also allow other portions of America's air arsenal to focus on near-peer competitor challenges.

Achieving this goal requires a new vector for the use of RPAs, as illustrated in the vignettes that follow. Though details have been obscured for operational sensitivity, the narratives and lessons remain largely intact.

**There is still more work to be done to fully realize the power of RPA technology.**

## THE CAMP STRIKE

In one recent RPA mission, intelligence sources helped the US military discover a remote jihadi training facility. Plans called for eliminating the radicals with airpower.

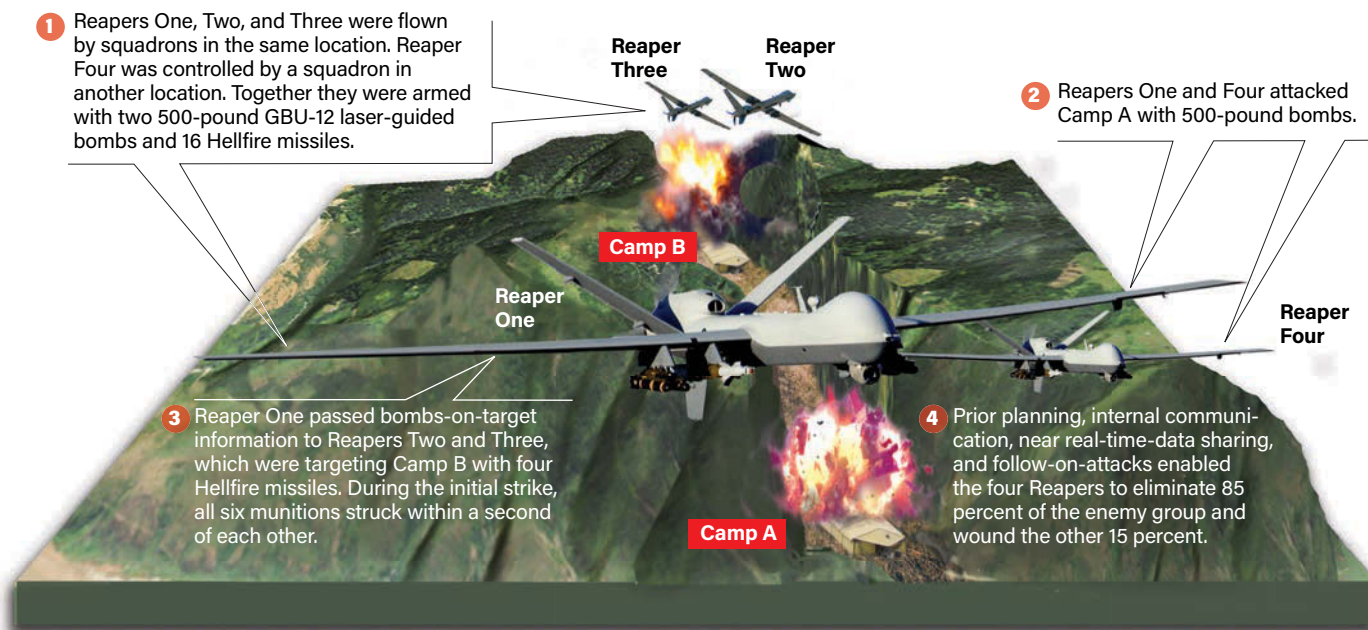
Leaders initially sought bomber aircraft for the strike, which required scheduling and positioning refueling aircraft, obtaining overflight clearances, and coordinating for personnel recovery—all time- and resource-intensive factors that didn't apply to the RPAs already providing persistent intelligence, surveillance, and reconnaissance overhead, as explained in RAND publication *Armed and Dangerous? UAVs and US Security*.

When bombers proved unavailable, a four-ship formation of fighter aircraft was requested. This option necessitated an even more robust support structure, as the fighters needed to forward deploy closer in theater. This also required a massive undertaking involving the movement of support personnel and equipment, despite the fact that multiple armed MQ-9 aircraft were already conducting daily surveillance and intelligence missions in the vicinity of the camp.

Two environmental factors introduced further complexity into this mission. First, the camp was

# The Camp Strike

Four MQ-9 Reapers were selected to strike a remote jihadi training facility located in a deep canyon with a valley floor just 15 feet wide. The jihadis were in two camps, A and B, two to three miles apart. To ensure surprise, both camps had to be struck simultaneously.



embedded deep inside a canyon with a valley floor only 15 feet wide. Any air-launched weapons would need to be precisely aimed to strike the narrow space between the canyon walls. Second, the jihadis were broken up into two distinct groups, two to three miles apart. A first-run attack would require delivery of simultaneous effects. Reattacks on survivors would need to be conducted expeditiously.

Once the bomber and fighter options proved unavailable, leaders finally selected four MQ-9 Reapers to execute the mission. Reaper One, Reaper Two, and Reaper Three were flown by squadrons in the same location, while Reaper Four was flown by a squadron at a separate location. The first three Reaper crews planned, briefed, and executed as a formation, or flight, bringing the geographically separated Reaper Four into the planning as much as possible before execution.

The four Reapers were equipped with two 500-pound GBU-12 laser-guided bombs and 16 air-to-ground Hellfire missiles. Reaper One teamed with Reaper Four to make a run on the first target group, dropping the 500-pound bombs. Once established inbound, Reaper One passed an estimated “bombs-on-target” time to Reaper Two and Reaper Three, which targeted the second group of terrorists-in-training with four Hellfire missiles in order to achieve simultaneous effects.

The synchronicity was near perfect. Weapons impacts from the bombs on the first group and the Hellfires on the second group were within a second of each other. The four MQ-9s hit two separate target sets with six munitions on four different aimpoints with a time on target calculation formulated as the mission progressed, based on outside clearance authority.

Reaper Two and Reaper Three teamed up to immediately reattack the survivors. Prior planning, internal communication, and near-real-time data sharing enabled an unprecedented display of efficiency. RPA pilots physically located together can speak into each other’s headsets without delay on an intercom channel, for example. Reaper Three rifled off all four of its Hellfires on three separate reattacks in under seven minutes. In one instance, Reaper Three fired a Hellfire on a group of

terrorists without ever having even seen it, since Reaper Two had tracked the group and provided final weapons guidance for Reaper Three’s missile. Reaper One and Reaper Four were left to conduct reattacks as solo aircraft, since they lacked the prerequisites for the seamless integration enjoyed by Reapers Two and Three. As such, they were only able to employ three of their available eight Hellfires in the first 16 minutes following the initial strike.

The final attack was conducted two hours later when Reaper Three found a group of eight enemy combatants hiding in a small ravine. Out of munitions, Reaper Three talked the crew of Reaper Four on to the group. The terrain only allowed a window of approximately 20 seconds for an MQ-9 to provide final guidance onto the target before becoming masked by rocks. Reaper Four shot a Hellfire into the ravine, target unseen, while Reaper Three came in from the opposite direction, crested the terrain, and timed the aircraft’s positioning so that final guidance was placed on the enemy group in the last 10 seconds of the missile’s flight. By the conclusion of the mission, some 85 percent of the combatants were killed with the other 15 percent wounded.

## CAMP STRIKE LESSONS LEARNED

Some of the lessons from this operation:

- 1. The MQ-9 Reaper delivers unique capabilities in combat.** The Reaper’s slow airspeed permits more time to strike targets in steep or inaccessible terrain, while supersonic fighters and bombers permit only brief execution windows before sensors and targeting capabilities are masked. Nevertheless, the training required to take advantage of this capability is akin to the demands for manned aircraft crews. The range and effectiveness of present-day RPA strikes is possible because of the robust training, US Air Force Weapons School caliber planning, and RPA technological advances made since 2001.
- 2. Remotely piloted aircraft provide synergistic effects when employed together as a flight.** The idea of operating

RPA in a flight is still new. Operational planners typically task the closest RPA available just prior to the execution of a complex strike, requiring extensive coordination among the participants. But an RPA flight generates synergistic effects, just like manned aircraft, through a mutual understanding of responsibilities and a shared awareness of the battlespace. This is best cultivated through extensive prestrike planning and briefing, along with real-time information sharing during execution. Bringing together single aircraft from separate squadrons just before a mission ignores the lessons of airpower history in the name of convenience.

3. **Decentralized execution is fundamental to successful RPA application.** RPAs present an unprecedented opportunity for “reach-in.” With unparalleled observation and communication capabilities, commanders at all levels have violated the long-held tenet of decentralized airpower execution and exerted direct control.
4. **Focus on platforms rather than effects stifles RPA operations.** The fluid, dynamic nature of kinetic engagements demands mission-command orders that rely on tactical expertise and the situational awareness of those employing the aircraft. Yet effects are what matter in operations, not platforms. As long as commanders tie specific aircraft to specific missions, rather than desired effects, RPAs will continue to be underutilized. RPA aircrews routinely participate in operational planning sessions where the ability to position fighters overhead to provide close air support (CAS) is deemed a “go/no-go” factor by ground and air planners alike. When queried to elaborate on desired effects, ground force representatives routinely reply that they want airpower to assist in “breaking contact with the enemy” to facilitate a return to safety. Although a flight of MQ-9s armed with a dozen Hellfire missiles and a few 500-pound bombs could achieve this effect, planners continue to revert to their default understanding that only aircraft with an A-, F-, or B-designation can provide effective CAS.

### VIGNETTE: THE 15-SECOND WINDOW

As part of global counterterrorism operations, US and coalition forces tracked a senior terrorist leader several years ago. After extensive study, a concept of operations (CONOPS) developed to facilitate a strike on this individual within an incredibly tight window—the time it took for him to ride his motorcycle to his home, after departing from a main road but before entering a courtyard near his residence. This strike window lasted only about 15 seconds.

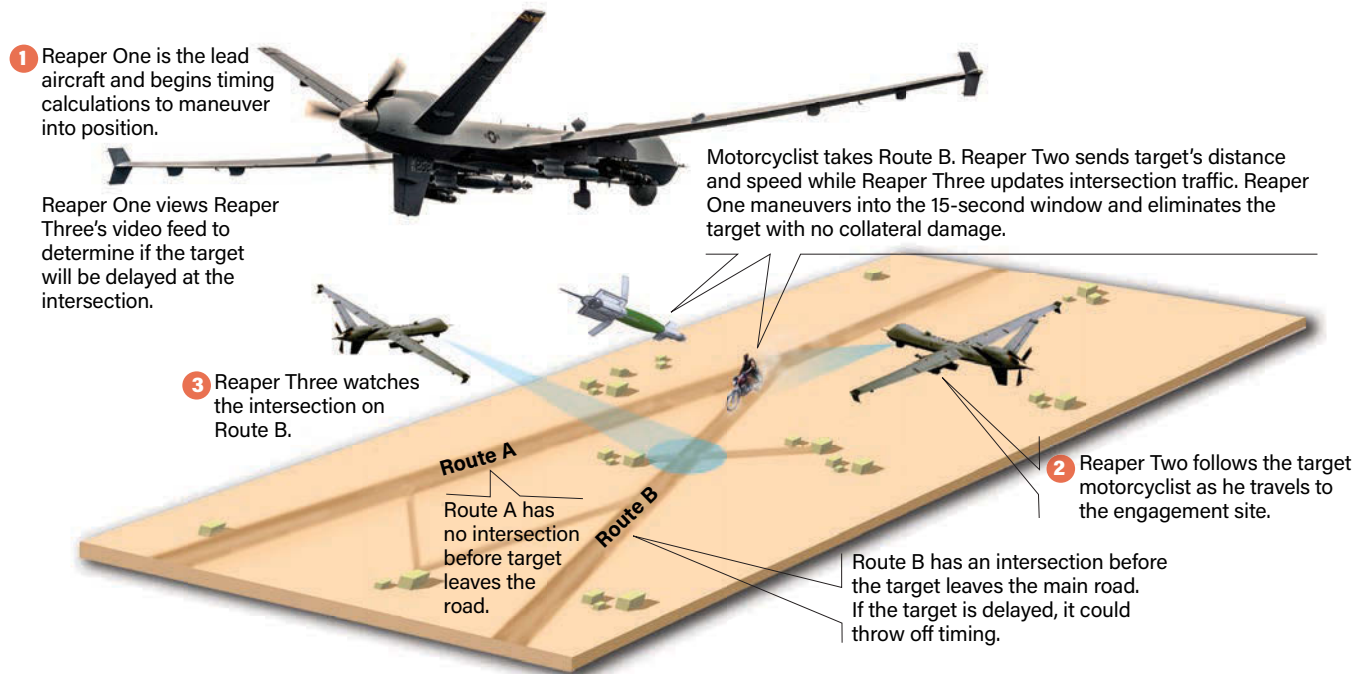
This broke down into two problems: First, successfully positioning a shooting aircraft within a 15-second engagement window within seven seconds of the target departing the main road, and second, planning around a fork in the main road that afforded the target two options. Route A was simple—there were no further intersections before the target left the main road and entered the engagement window. Route B was more nuanced, with one additional intersection before the target left the main road. The shooting aircraft would need to maneuver to get into position before the target hit the additional intersection. If the target was held up for even a few seconds, it could throw off timing and negate all previous planning.

Three MQ-9s were allocated for the strike. Reaper One took the lead and began timing calculations to maneuver into position. Reaper Two followed the target motorcycle as it traveled toward the engagement site. Data-sharing allowed Reaper One to position itself within the 15-second window at precisely the time the motorcycle turned off the main road and came into the field of view (FOV). Reaper Three stared at the additional intersection along Route B. Reaper One was able to view Reaper Three’s feed to determine the possibility of the target getting held up at that intersection should he travel along Route B.

As events unfolded, the target chose to continue down Route B. Updates on the target’s distance and speed from

## The 15-Second Window

A well-protected terrorist leader presented a very limited window for aerial attack. A successful strike had to take place within a narrow 15-second window, when the target departed a highway on his motorcycle but before he entered the courtyard of his home. Adding to the complexity, the target had a choice between two routes during that 15 seconds.



Graphic: Mike Tsukamoto and Dash Parham/staff



Reaper Two and the intersection traffic from Reaper Three enabled Reaper One to successfully maneuver the aircraft into the 15-second window, fire, and eliminate the target with no collateral damage.

### 15-SECOND LESSONS LEARNED

The success of this strike was made possible by a flight-focused operations approach, paired with an intensive training program, and truly decentralized execution. It also introduced three new areas to reflect on.

- 1. Data-sharing brings asymmetrical advantages to bear in modern warfare.** The strike on the senior terrorist was heavily reliant on real-time data sharing between aircrews, which allowed the flight to get inside the adversary's decision loop and reorient quicker than the adversary.
- 2. Risk acceptance enables rapid advancement.** The rapid acceleration of software (and some hardware) enhancements have enabled RPA airmen to execute kinetic engagements that would not have been proposed just five or six years ago. These capabilities were largely possible because the RPA community's close working relationship with industry allowed it to accept imperfect solutions in the name of accelerated capability.
- 3. Tactical oversight offers enhanced RPA capabilities.** The ability of an MQ-9 squadron to place additional personnel in a ground control station (GCS) to support a traditional two-person crew transforms what that aircraft can bring to bear in combat. This tactical oversight boosts the capability of the crew, elevating success rates for complex engagements. This is especially important, since in modern operations, the MQ-9 pilot has neither a flight lead nor an experienced aircraft commander to rely on for decision-making, in most cases as a result of years of surging RPA demand.

### VIGNETTE: THE ATTEMPTED RESCUE

On one calm, moonless night a few years ago, a small group of US special operations forces parachuted from a transport aircraft on a hostage rescue mission. Overhead, three MQ-9s and a U-28 manned ISR aircraft provided support to the SOF team from insertion, through the rescue operation, and the exfiltration. The three MQ-9s were co-located and operated out of the same RPA operations center, where a small staff stood up to support the three flying crews.

As the SOF team worked its way toward the hostage's reported location, it became apparent to the RPA operations center director that key real-time intelligence was taking too long to get to the ground forces via the joint operations center (JOC)—the main mission hub. The MQ-9 elements overhead had direct radio contact with ground forces and, more importantly, instant access to the intelligence as well. After a quick discussion about transferring responsibility from JOC leadership to the MQ-9 pilots, the time frame for essential intelligence processing to ground forces went from a minute to under five seconds. A U-28 aircrew member was prepositioned inside the ROC to provide subject-matter expertise on the ISR aircraft, as well as techniques, tactics, and procedures to the MQ-9 crews and ROC staff.

Unfortunately, as the team arrived at the location, it discovered that the hostage had been moved from the village just prior to the raid. However, the event offered a real-world opportunity to explore several underutilized capabilities that RPAs and the operations center could apply to future missions.

### ATTEMPTED RESCUE LESSONS LEARNED

- 1. RPAs' ability to port talent into any cockpit at any time is unprecedented in the history of airpower.** Because of the physical setup of the ground stations that operate RPAs, any individual can "enter" the airplane while airborne. In this example, a U-28 expert was brought in to assist with airborne integration. Airborne integration could also be extended to fighters, bombers, and any number of other assets. Ground forces could send delegates to a ROC to educate and enable integration between RPAs and supported surface elements.
- 2. RPA operations centers are uniquely positioned to fuse and disseminate information.** These centers allow operational directors to seamlessly communicate face-to-face with the aircrews that provide a majority of the center's data. It is the equivalent of a combined forces air component commander (CFACC)—while in charge of an AOC—being able to jump into the cockpit of any manned aircraft under his authority. Additionally, the land-based setup of the GCS enables an RPA cockpit to connect to modern combat untethered by bandwidth and connectivity limitations that plague most airborne manned aircraft.

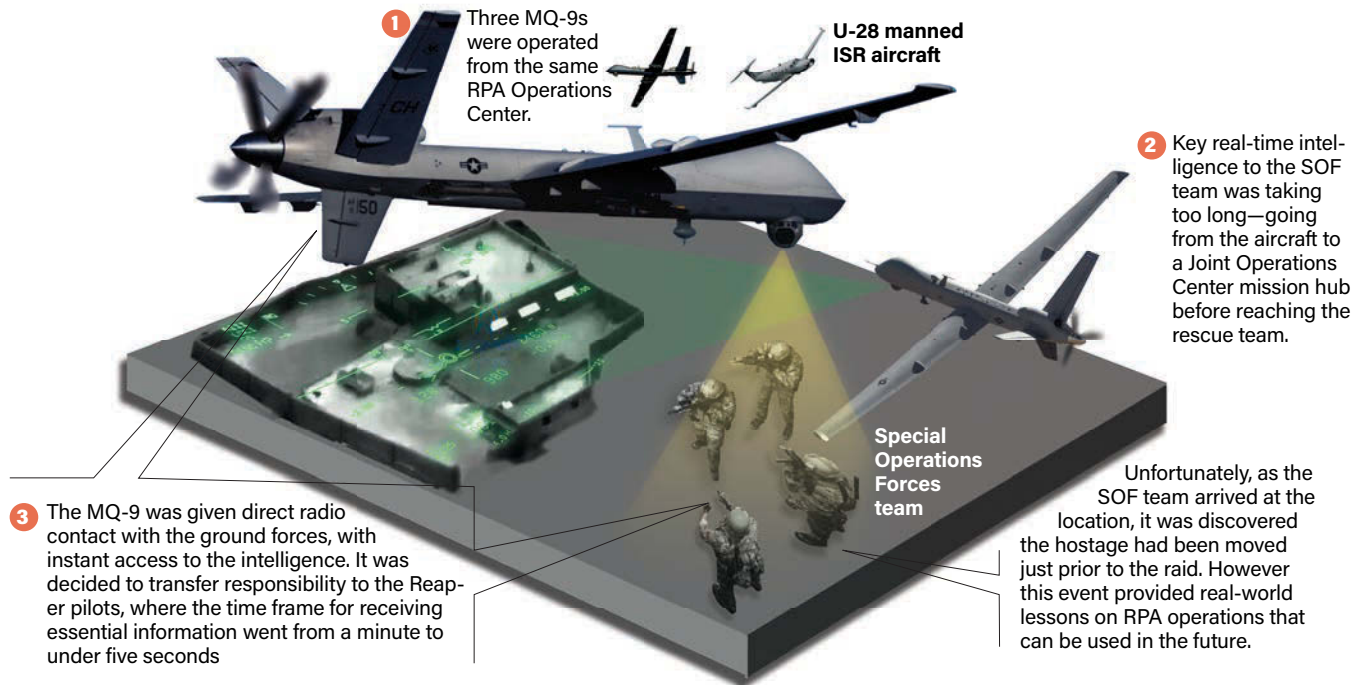
### THE WAY FORWARD FOR AIR FORCE RPAs

These three vignettes provide substantial food for thought about how RPAs expand the flexibility and capability of air component commanders. This leads to four critical implications that policy makers, DOD leaders, and Air Force officials should consider:

- 1. Reconsider airpower force posture in the fight against violent extremist organizations.** In light of changing national priorities and finite resources, it is imperative to find ways to sustain the counter-extremist mission in a more cost-effective manner. The cost of employing fighter or bomber aircraft is so much greater than MQ-9s that it should be self-evident. MQ-9 RPAs provide cost-effective capability that can assume many of the mission sets now prosecuted by high-end aircraft in today's counter-terror missions. Redeploying the majority of American high-end fighter and bomber aircraft back to their home bases prolongs their service life and generates valuable aircrew training hours to recapture depleted high-end skills.
- 2. Investment in information-sharing will bring transformational advantages.** As a whole, the US military must tear down parochial walls and allow information between disparate elements of hard power—tanks, ships, aircraft, infantry, and other forces—to flow more freely. The successful execution of the time-sensitive targeted strike on a terrorist leader described above was made possible by the rapid exchange of information between platforms. Unfortunately, this type of interconnectivity is sporadic between air assets even within the same US military service, and even worse among multi-domain assets from other services. Investment in RPA infrastructure is necessary to better share data and information with other systems, services, and the rest of DOD's network.
- 3. Airmen must understand and articulate appropriate command and control (C2) relationships for RPAs.** To fully realize the potential of present and future RPAs in combat, airmen must oppose any effort to centralize execution and challenge command structures that fail to place airmen in positions where their "air-mindedness" could maximize the Air Force's contribution to joint

# The Attempted Rescue

On a moonless night, a small group of US special operations forces attempted a hostage rescue mission. Three MQ-9 Reapers and a manned U-28 ISR aircraft provided support to the SOF team from insertion throughout the rescue operation.



Graphic: Mike Tsukamoto and Dash Parham/staff

operations. In other words, airmen should influence airpower decisions at all levels of warfare. RPAs offer unprecedented opportunities for outside “reach-in” during tactical execution—and while senior commanders have indeed attempted to control all sorts of tactical elements, from aircraft positioning, to weapons placement, to camera field-of-view, this type of centralized execution stifles RPA aircrews from successfully exploiting fluid operational situations.

4. **Expand RPAs mission sets to include close air support.** MQ-9 capabilities and tactics have reached a stage where planners need to rethink allocation for key missions, especially close air support. RPAs have transformed both the amount of firepower they bring to bear on the battlefield and the speed at which this ordnance can be delivered. Despite this, the MQ-9 is still predominantly regarded across the Air Force as an ISR asset, and rarely incorporated into CAS scenarios. According to one *Air and Space Power Journal* article, a mission ISR plan “is completed on a different timeline by different people in a different division in the [Air and Space Operations Center] and published in a different document. If CAS and ISR integrate, they do so by luck.” While not all CAS scenarios are appropriate for MQ-9s, military planners should embrace an effects-based perspective and try to minimize platform-centric bias.
5. **RPAs and their associated operations centers present an ideal platform for entry-level multi-domain exploitation and rapid acquisition trials.** Compared with traditional aircraft, RPA cockpits offer a prodigious amount of space and connectivity. Limited only by bandwidth and imagination, RPA offer unique opportunities to take advantage of multi-domain exploitation and use rapid acquisition capabilities to further the state-of-the-art.

In current combat operations, the Air Force’s MQ-9 is as different from its Operation Enduring Freedom-era 2001 MQ-1 forebearer as an F-16 is from a P-51. However, this

transformation has collided with cultural differences rooted in traditional notions of force employment—both in the air and on the ground. This has led to suboptimal utilization and investment considerations.

Today, fighters and bombers are no longer the only option for mass strike, and RPAs are no longer just airborne sniper rifles. RPAs can effectively conduct CAS, particularly with small ground team elements like SOF units. These two considerations alone should cause US military leaders to rethink American force posture for the fight against violent extremist organizations.

Remotely piloted aircraft operations are ripe for exploitation with centralized execution, yet “mission-type tactics”—where operational outcomes are emphasized more than any specific means of achieving them—are a central tenet to maximizing RPA potential. Continued investment in the RPA community is crucial to building on the momentum these assets are gathering in operations around the world. This will require harnessing information-sharing through open system architectures.

The United States’ continued prosecution of low-intensity conflicts around the world, and the need to prepare for potential near-peer military confrontations, both benefit from an agile, decentralized, and well-connected RPA force whose lethality is intelligently incorporated into joint force operational planning. Military leaders with a commanding grasp on RPA capabilities and a willingness to think beyond traditional aircraft mission sets will be best positioned to take full advantage of every capability RPAs can bring to bear in future combat. ☪

*Air Force Lt. Col. Johnny Duray is a senior pilot with more than 3,200 flight hours in the MQ-9 and U-28 and extensive experience in combat and combat support missions. He has supported Operations Iraqi Freedom, Enduring Freedom, Inherent Resolve, and Freedom’s Sentinel, and deployed to four different areas of responsibility. The opinions and assessments expressed in this article are the author’s alone and do not reflect those of the Department of Defense or the US Air Force.*

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A Soviet SS-20 missile launches from its transporter-erector-launcher in the mid-1980s. The introduction of the SS-20 was a provocation at a time when the Soviet Union's missile forces had largely caught up with those of the US.



# The Euromissile Showdown

Deployment of the Soviet SS-20 sent tremors through western Europe.

By John T. Correll

In March 1976, the Soviet Union began deploying a new missile, the SS-20, that upset the balance of power in Europe. It was one of the pivotal events of the Cold War, igniting a confrontation between NATO and the USSR over medium-range “Euromissiles.”

The multiple-warhead SS-20 differed significantly from its outmoded predecessors, the SS-4 and SS-5. It had a range of 5,000 kilometers—just short of the 5,500 that would have made it subject to SALT treaty arms control—and could hit any point in Western Europe from launch sites in the Soviet Union. It was more accurate than the older missiles. It was also mobile and easily concealed.

NATO had nothing comparable. Its forward-deployed nuclear forces in Europe were relatively short range, intended for operations along or just behind a European battlefield. They could not easily reach targets in the Soviet Union.

For strategic deterrence—holding the Soviet homeland at risk—NATO relied on the promise of extended protection by US intercontinental weapons, but the Europeans were not certain the US would use them in response to a limited attack.

The Soviets hoped that even without an actual military conflict, the SS-20s would intimidate the Europeans, erode NATO cohesion, and perhaps lead to “decoupling” Europe from the US deterrent.

The Europeans were alarmed, especially the West Germans, who wanted the United States to take action to restore NATO’s “flexible response” strategy in which weapons based on European soil were supposed to be a credible deterrent against a limited attack.

The United States was initially reluctant to make any big changes, but to reassure the Europeans and head off Soviet intentions, agreed to support the “Dual Track” policy that NATO adopted in 1979.

One track sought to resolve the issue through negotiation. The second track was to deploy US intermediate-range weapons—ground-launched cruise missiles and Pershing II ballistic missiles—if arms control failed.

The Soviets would not give up the SS-20s, so NATO began deployment of the US missiles in 1983. There was great furor on the European left, accusing the United States of fomenting an arms race. The US, which had

acted in response to European concerns, had gained ownership of the problem. As a consequence of the NATO deployments, the Soviets walked out of the arms talks.

Negotiations did not resume until 1985. Finally in 1988, the Intermediate Nuclear Forces (INF) Treaty eliminated all ground-launched missiles on both sides with ranges between 500 and 5,500 kilometers.

The INF Treaty endured for 30 years before it was undercut by blatant violations by the Russians. The United States pulled out of the treaty in 2019, and shortly thereafter, so did Russia.

**“Every Soviet leader since Khrushchev saw the lesson that Khrushchev had been deposed in 1964 because he had lost the Cuban Missile Crisis against Kennedy in October 1962.”**

—NATO Deputy Assistant Secretary General for Emerging Security Challenges  
Jamie Shea

## STIRRING THE BALANCE

There was no compelling reason for the Soviets to introduce the SS-20. It was a provocative step when things were already going their way. Soviet missile forces, once clearly inferior to those of the West, had moved to a position of equality.

In the mid 1960s, the United States abandoned the goal of strategic superiority, canceled weapon systems, imposed a ceiling on missile and bomber forces, and sought parity with the Soviet Union. In 1969, the objective of détente—the relaxation of tension—was adopted, with the planning principle of “strategic sufficiency.”

By 1974, the Soviets were substantially ahead of the United States in ICBM launchers and reentry vehicles. The US and NATO were outnumbered in conventional forces as well.

The decision to deploy the SS-20 was made by Soviet General Secretary Leonid Brezhnev on the advice of Defense Minister Dmitry Ustinov. Marshal Sergei Akhromeyev, a future chief of the general staff, counseled against it.

In the opinion of Brezhnev’s eventual successor, Mikhail Gorbachev, the deployment was “an unforgivable adventure” that “reflected the style of the Soviet leadership at the time” and “decision-making fraught with grave consequences for the country.”

There was some belief that the SS-20 was simply modernization of the aging Soviet medium-range force, but that does not seem to have been the primary reason.

“Every Soviet leader since Khrushchev saw the lesson that Khrushchev had been deposed in 1964 because he had lost the Cuban Missile Crisis against Kennedy in October 1962,” said NATO Deputy Assistant Secretary

General for Emerging Security Challenges Jamie Shea. “Everybody feared failure above everything else.”

Brezhnev had been part of the coalition that ousted Khrushchev. Looking back, Brezhnev made two big miscalculations. He underestimated the NATO reaction to the SS-20, and he did not believe the Alliance would deploy its own missiles to counter it.

## DUAL TRACK

The SS-20 was brought to public notice by West German chancellor Helmut Schmidt in a speech in October 1977. His references were general and indirect—he cited “disparities between East and West in nuclear tactical and conventional weapons”—but the US State Department and informed observers took notice and got the message.

The Europeans looked to the United States to take a central role. One choice was to deploy new missiles to counter the SS-20. President Jimmy E. Carter hoped to avoid that, having come to office earlier that year with nuclear arms reduction as one of his principal themes.

The Soviets were unrelenting, however, and two possibilities were advanced. The US Army’s Pershing missile could be upgraded to Pershing II status with better range and accuracy, and the Air Force could adapt the Navy’s sea-launched Tomahawk as a mobile ground-launched cruise missile (GLCM) with even longer reach.

The perception of the Carter White House was that “the Soviets would not risk launching SS-20s against Western Europe, but they would play upon European fears of vulnerability in order to obtain valuable political concessions from the West Europeans,” said William Leonard in an analysis for the Center for Strategic and International Studies.

Carter went ahead with Pershing II and GLCM to reassure the Europeans of the US commitment, to restore the credibility of NATO’s flexible response, and as bargaining leverage as arms control efforts continued.

Brezhnev reacted with threats and bluster. He offered to freeze SS-20 deployments at a total of 120 but only if NATO turned down the US missiles.

Despite hesitation by several member nations, notably the Netherlands and Belgium, the NATO ministers unanimously approved the Dual Track strategy Dec. 12, 1979. The Soviet Union was put on four-year notice. Unless the Soviets agreed to a negotiated solution, NATO would begin the deployment in December 1983 of 108 Pershing II launchers and 464 GLCMs. To preclude an escalation in numbers, the US would more than compensate by a reduction of 1,000 in tactical nuclear warheads already in place.

## THE MISSILES

The missile known to NATO as the SS-20 Saber was officially called the RSD-10 Pioneer by the Soviet rocket forces. It was a big improvement on the SS-4 and SS-5, which were described by *The New York Times* as “decrepit.”

The older missiles were not very accurate, liquid fueled, and slow to launch. The solid fuel SS-20 was highly accurate. Its range was 5,000 kilometers, a substantial gain on 2,000 for the SS-4 and 4,000 for the SS-5. It was shuttled around on a multi-wheeled transport vehicle and accompanied by extra missiles so it could be reloaded.

Most of the SS-20s were based in the Western Soviet Union opposite NATO. From sites in the Urals, they could reach London with range to spare.

As decision time on the Dual Track policy approached in 1983, the Soviets were deploying SS-20s at the rate of one



A ground-launched cruise missile emerges from the transporter-erector launcher during a test firing at the Utah Test and Training Range in 1982. GLCMs were deployed to Belgium, Britain, Germany, Italy, and the Netherlands.

a week. More than 300 of them had been fielded, with 900 warheads.

The SS-4 and SS-5—like Pershing II and GLCM—had one warhead each. The SS-20 carried three independently targeted warheads.

The US Pershing II was a ballistic missile with fast launch and good accuracy. It could strike points in the Soviet Union in six to eight minutes. Its operational range was 1,770 kilometers, not enough to hit the USSR from England or Italy, so it had to be forward-based in Germany.

The Air Force’s BGM-109G GLCM flew a course like that of an airplane. With an operational range of 2,500 kilometers, it could reach the Soviet Union from bases in Britain.

GLCM was transported by a huge tractor-trailer. It was blasted out of the launch tube by a rocket booster. Seconds later, the stubby wings and control fins snapped into place and a turbofan engine took over to fly the GLCM on a planned path to its target. Sensors in the guidance system constantly matched the contour of the ground below with a digital map in the missile’s computer. It entered hostile territory at an altitude of about 50 feet. The GLCM’s capability to fly under the radar was a problem for the Soviets.

## NEGOTIATIONS FAIL

The Soviets refused for almost two years to engage in INF arms discussions unless NATO revoked its deployment decision, but then relented. Between 1981 and 1983, US and Soviet negotiators met repeatedly without any results.

In November 1981, President Ronald W. Reagan proposed the “Zero Option”: The United States would eliminate all of its Pershing IIs and GLCMs if the Soviet Union would dismantle all of its SS-20s, SS-4s, and SS-5s. The Soviets declined.

Brezhnev’s idea of a deal, which he put forth in 1982, would have included the British and French weapons—mostly subma-

rine-based missiles not under NATO control—in the count. The Soviets would keep the 300 SS-20s already deployed, but none of the US missiles would be permitted.

Another Soviet offer would have included removing from Europe US tactical aircraft that could carry nuclear weapons. The Soviets wanted to count several hundred F-4, A-6, and A-7 American fighter-bombers, but not 2,700 of their own Su-17s, Su-24s, and MiG-27s.

Brezhnev died in November 1983 and was succeeded by Yuri Andropov. If anything, the Soviet position became more belligerent. Seeking to frighten the Europeans, the Soviets threatened to shift to a hair-trigger, launch-on-warning strategy if NATO deployed the Pershing II and GLCM.

Soviet threats had some effect in Europe, leading to large protests and demonstrations. “The leaders of the peace movement tend to ignore the fact that by deploying these new missiles, the West is responding to an existing Soviet challenge,” said Bernard Kalb of NBC TV. Critics in the West predicted that the Soviets would never agree to zero-zero and urged NATO to take the best deal it could get.

Helmut Schmidt was isolated within his own Social Democratic Party and swept from office. However, Helmut Kohl and the Christian Democrats, solidly aligned with the US deployment, won the 1982 German elections. In Britain, Prime Minister Margaret Thatcher, also a strong supporter, led the Tories to a decisive victory in 1983.

In March 1983, NATO defense ministers endorsed Reagan’s Zero Option as the primary objective in arms talks, and in June, NATO foreign ministers gave formal approval to deploy US missiles. Only the Socialist government of Greece refused to agree.

In November, with the first Pershing IIs and GLCMs arriving in Europe, the Soviets walked out of the negotiations.

## THE MISSILES ARRIVE

The British anti-nuclear protesters got to the first GLCM base, RAF Greenham Common in Berkshire, before the missiles did.

A clutter of tents, house trailers, and rough facilities known as the “Women’s Peace Camp” had been set up outside the main gate since 1981.

The first GLCMs arrived Nov. 14, 1983, aboard an Air Force C-141. The first Pershing IIs were delivered by truck to the Army base at Mutlangen, West Germany, on Nov. 26. Protesters did not manage to interfere with either deployment.

NATO decided to withdraw another 1,400 nuclear warheads. This was in addition to the 1,000 removals that had been part of the original Dual Track package, a net reduction of 2,400 warheads since 1979. This would bring NATO’s nuclear stockpile to the lowest level in many years.

All of the Pershing IIs went to West Germany, but the GLCM was based in Italy, Belgium, Germany, and the Netherlands in addition to two locations in Britain. Deployments of both the US missiles and the SS-20s continued, as did anti-nuclear activity.

The women at Greenham Common came from all over the world. At one point, their numbers were sufficient to completely surround the base. In another instance, thousands of protesters formed a human chain that stretched 14 miles across the English countryside between Greenham Common and a nuclear weapons factory at Burghfield.

The demonstrators were often disruptive, but they did not have a serious effect on operations or readiness of Pershing II or GLCM.

In February 1984, the Oxford Union staged a debate spun off the Euromissile issue. The proposition, as stated, was that “there is no moral difference between the US and USSR.” A noted Marxist argued for the resolution but to the surprise of the leftists, the debate was won—by a 271-232 vote of those attending—by US Secretary of Defense Caspar W. Weinberger, who spoke against it.

## THE INF TREATY

The INF talks, suspended with the Soviet walkout in 1983, were resumed in 1985, concurrent with sweeping changes in the leadership of the Soviet Union. The new general secretary



Photo: SSgt. James Pearson via National Archives

Anti-nuclear protesters, part of a long-lasting contingent of protesters dubbed the “Women’s Peace Camp,” at RAF Greenham Common, Britain, during the arrival of GLCMs in 1983. The site was designated historic in 2000.

President Ronald Reagan (right) and Soviet General Secretary Mikhail Gorbachev sign the INF Treaty in 1987. The agreement provided for all US and Soviet ground-launched missiles with ranges between 500 and 5,500 kilometers to be eliminated.



Photo: White House via National Archives

was reformer Mikhail Gorbachev, following the brief regimes of Andropov (1982-1984) and Konstantin Chernenko (1984-1985).

Success of the negotiations was not immediate. The Soviets tried their old line one more time, proposing that the number of SS-20 warheads allowed be equal to that of the GLCM and the British and French forces combined. NATO did not agree.

In December 1987, Reagan and Gorbachev signed the INF Treaty and it went into effect in June 1988. It provided for all US and Soviet ground-launched missiles with ranges between 500 and 5,500 kilometers to be eliminated.

In effect, it was Reagan's Zero Option. A total of 2,692 US and Soviet missiles were taken out: Pershing I, Pershing II, and the GLCM for the United States, and for the USSR, the SS-20, SS-4, SS-5, SS-12, and SS-23.

The last of the cruise missiles left Greenham Common in 1991, but the Women's Peace Camp was not disbanded. It was maintained as a general protest against nuclear weapons until 2000, when it became a commemorative and historic site.

The INF Treaty had a long run but it did not last. The Russians, again dissatisfied with the balance of power, began covert development in 2008 of a short-range cruise missile, the 9M729. Road mobile and ground launched, it was tested in 2014 and entered service in 2017.

The new missile, called the SSC-8 in the West, was a violation of the INF Treaty. The Obama administration in the United States protested repeatedly to Russia but was not willing to take the major step of withdrawing from an arms control treaty.

The Russians claimed the 9M729 had a range of only 490 kilometers—conveniently short of INF constraint by the whisker margin of 10 kilometers—but US intelligence reported flights longer than that from the Russian base at Kasputin Yar.

## WITHDRAWAL

In October 2018, President Donald Trump's administration announced that the United States would leave the treaty and formally suspended compliance Feb. 2, 2019. US withdrawal would follow in six months unless Russia

returned to compliance by eliminating the 9M729. The next day, Russian President Vladimir Putin also declared suspension.

On Aug. 2, 2019, the State Department said Russia was still in "material breach" of the treaty and announced that the United States had formally withdrawn. The Russian Foreign Ministry said that "the US has embarked on destroying all international agreements that do not suit them."

There was considerable speculation that the end of the INF Treaty would bring on a new arms race. If so, the Russians began early. They already have four battalions of 9M729s, nuclear-capable but probably conventionally armed so far.

Concerned about the Russian INF violations, the US Congress in 2017 and since has given approval and funding for development of conventional ballistic and cruise missiles to counter the 9M729. The ground-launched cruise missile, a modified Tomahawk, was test fired in August 2019 and again in December 2019.

Even so, the Russian missile is not equal to the SS-20 by a long shot, and both sides have substantial numbers of air- and sea-launched cruise missiles operating at intermediate ranges. The immediate threat of destabilization is not nearly as great as it was during the Euromissile crisis in the 1970s and 1980s.

A key question is whether withdrawal from the INF Treaty is a preview of things to come. The New Strategic Arms Reduction Treaty—New START—expires in February 2021 unless the US and Russia agree to extend it.

New START limits the numbers of long-range missiles and bombers and the warheads they carry, but the demise of the INF Treaty has done major damage to the spirit of arms control.

"Without New START, there would be no legally binding limits on the world's two largest nuclear arsenals for the first time since 1972," the Arms Control Association said in a recent issue brief. ✦

**John T. Correll** was editor in chief of *Air Force Magazine* for 18 years and is a frequent contributor. His most recent article, "The Ups and Downs of Close Air Support," appeared in the December issue.



# Marking the Spot Where Eight Airmen Were Lost



Photos: Courtesy of Col. Jeffrey Decker



This new roadside marker (left) honors eight crew members who lost their lives on Oct. 15, 1959, in a midair collision. Right: Members of the KC-135 crew.

By Col. Jeffrey W. Decker, USAF (Ret.)

During a Cold War aerial refueling mission on Oct. 15, 1959, a B-52F and a KC-135A collided. Eight of the 12 crew members, all assigned to the 4228th Strategic Wing at Columbus AFB, Miss., were killed. The incident occurred above Hardinsburg, Ky.

The Air Force Association's General Russell E. Dougherty Chapter 407 raised \$3,000 in just over four months to sponsor an approved Commonwealth of Kentucky Historical Marker near the Hardinsburg crash site. The marker was dedicated on Oct. 15, 2019, the 60th anniversary of the incident, with 30 relatives of the airmen who flew the mission in attendance.

A B-52F (#57-036) assigned to the 492nd Bombardment Squadron and commanded by Capt. William G. Gutshall would be one of 12 airborne B-52s flying a predesignated 15-hour "Operation Steel Trap" mission that day. A "Steel Trap" mission of that duration would require at least two aerial refuelings from KC-135A Stratotankers. Flying a "racetrack" pattern in the skies above western Kentucky, a KC-135A (#57-1513) under the command of Maj. Robert H. Imhoff awaited the first scheduled refueling for #57-036 about four-and-a-half hours into the mission.

At 6:40 p.m., the two aircraft began to refuel, 31,500 feet above Hardinsburg, Ky. Six minutes into the operation, the two aircraft came into contact with each other, igniting an intense fireball that could be seen up to 150 miles away in Cincinnati. The KC-135 immediately disintegrated and all four crew members were lost. The B-52F maintained integrity long enough for four of the six crew members to successfully eject.

According to the accident investigation report, the bulk of the KC-135A fell to Earth near Ruby Jones and Briscoll Thurman's farmhouse, cutting a trench 75 feet long and 35 feet wide. The main portion of the B-52F hit the ground about two miles away, near the Whitier farm;

## 4228th Strategic Wing

Those who lost their lives that day included:

- **Maj. Robert H. Imhoff**, KC-135A commander
- **Capt. Lyle P. Burgess**, B-52 instructor navigator
- **First Lt. Donald Arger**, B-52 co-pilot
- **First Lt. William E. Epling**, KC-135A co-pilot
- **First Lt. John W. Mosby**, B-52 navigator
- **First Lt. Harold E. Hemlick**, KC-135A navigator
- **TSgt. Howard L. Nelms**, B-52 tail gunner
- **SSgt. Paul E. Thomasson**, KC-135A boom operator

Those who survived the crash included:

- **Maj. Milton E. Chatham**, B-52 instructor pilot
- **Capt. William G. Gutshall**, B-52 commander
- **Capt. James W. Strother**, B-52 radar navigator
- **First Lt. Gino Fugazzi**, B-52 electronic warfare officer

with other significant wreckage on the Reason Sebastian farm in the vicinity of the Blacklick Baptist Church. The section of the fuselage carrying the weapons dug a crater 35 feet long, 10 feet wide, and 4 feet deep. A separate accident report filed by the Nuclear Safety Research Directorate confirmed the two weapons maintained their integrity and the radiation survey conducted during recovery operations did not detect any related radioactivity.


The four surviving crew members landed near the village of Glen Dean, Ky. Maj. Milton E. Chatham and Captain Gutshall were assisted by Ray Ashley and Raymond Sosh, who brought them to Critchelow's Store. The remaining two survivors, Capt. James Strother and 1st Lt. Gino Fugazzi, were transported to the hastily arranged "command post."

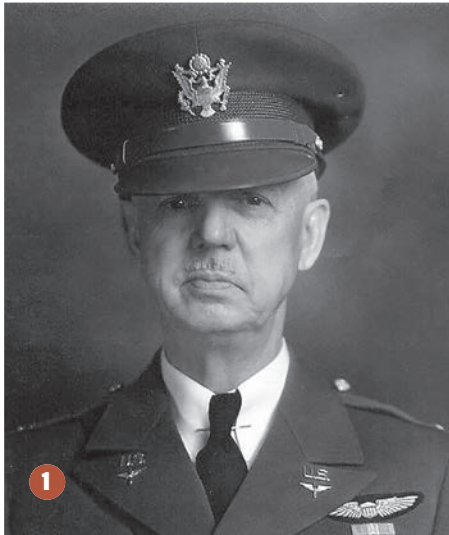
Luckily there were no casualties on the ground. An engine off the B-52F landed 50 feet from one bystander, and the KC-135A wreckage missed a farmhouse by only about 100 yards.

Crowds gathered to see the spectacle. According to news accounts, more than 1,000 cars were parked along the two-lane road as the sun rose, as local residents came to see what happened. My father-in-law recalled observing the fireball from some 80 miles away while attending a pep rally at his high school in Louisville, Ky.—assuming his crosstown rivals were enjoying a heck of a bonfire. AFA Chapter 407 Treasurer, retired CMSgt. Bobbie Smith, remembers that "many people after hearing the explosion thought an oil well had exploded."

Recovery operations began the next day and lasted three weeks. The citizens of Breckinridge

and Grayson Counties went back to their lives, and SAC continued the airborne alert missions until the late 1960s.

Today, the kids who wore bobby socks and were driving into the night to catch a glimpse of that incident are now in their late 70s, while the B-52 and KC-135 aircraft continue to serve the US Air Force, playing a pivotal role in our current conflicts. 



1/ Col. Roy Kirtland. 2/ CV-22 Ospreys take off from Kirtland AFB, N.M. 3/ Roy Carrington Kirtland, undated.

# KIRTLAND

## Ring Leader

Mere months after his death in 1941, Col. Roy C. Kirtland was accorded a high honor: Albuquerque Army Air Base, N.M., was renamed Kirtland Army Air Field.

It was an unusually speedy step, directed by none other than Gen. Henry H. Arnold, Chief of Staff of US Army Air Forces.

Kirtland was the man who in 1911 recommended Arnold for military flight training. More importantly, Kirtland was a genuine aviation pioneer who, in the early days of Army flight, helped plant the seeds of the modern Air Force.

Roy Carrington Kirtland enlisted in the infantry in 1898 and was commissioned in 1901. In 1911 he transferred to the Army Signal Corps and helped set up its Aviation School at College Park, Md.

He learned to fly, becoming one of the first Army pilots. In 1911-12, he took part in experimental work involving airborne radio transmission, photography, night flying, and aerial bombing.

Yet Kirtland's greatest contributions came in working to free Army aviation from the Signal Corps' bureaucracy and pettiness.

Kirtland led a 1913 pilots' revolt at Texas City, Tex. The Aviation School moved there to support a division in anticipation of war with Mexico, but this unit suffered from inept leadership by non-pilots. Its junior pilots threatened to abandon aviation altogether unless the Army fired several senior officers.

The Army met these demands, but Kirtland was forever tagged as "the ring leader" of a "an incipient mutiny," according to a foe.

In another infamous incident, Kirtland acted as a key



witness in the 1915 Goodier court-martial. He revealed unsafe flying practices, improper command actions, bribery, and fraud. Kirtland was again fingered as insubordinate.

These incidents helped to generate concerns that eventually led to a clean break with the Signal Corps and establishment of a new Air Service in 1918. Kirtland's career entered onto a different path.

Kirtland left the field of aviation and returned for a while to the infantry. After the US entered World War I, he was recalled to aviation but did not take up a flying position. He was given orders to organize and command an Air Service Mechanics Regiment in France, which he accomplished.

After the war, Kirtland became a flight instructor, but he mostly commanded aviation supply depots and training units. In the 1920s, he spent years in Army schools and on the General Staff.

In 1930-31, he served as acting commandant of the Air Corps Tactical School at Langley Field, Va. Then, he was assigned as Air Officer of 2nd Corps Area in New York and of 9th Corps Area in San Francisco. His last duty was on the inspector general's staff.

Kirtland retired as a colonel in 1938 after 40 years in uniform. In 1941, he was reactivated but died of a heart attack at Moffett Field on May 2, 1941, a few days shy of age 67. He was the Army's third oldest pilot.

On Jan. 13, 1948, USAF renamed the field "Kirtland Air Force Base." It is home to 58th Special Operations Wing, 150th SOW, and USAF's Nuclear Weapons Center, among other units.

### ROY CARRINGTON KIRTLAND

**Born:** May 14, 1874, Fort Benton, Mont.  
**Died:** May 2, 1941, Moffett Field, Calif.  
**College:** Army War College  
**Occupation:** US military officer  
**Services:** US Army—Infantry (1898-1911); Signal Corps (1911-18); Air Service (1918-26); Air Corps (1926-38 and 1941).  
**Main Era:** Pioneer  
**Years of Service:** 1898-1938 and 1941  
**War Zones:** Philippine Insurrection, World War I  
**Final Grade:** Colonel  
**Famous Friend:** Gen. Henry H. "Hap" Arnold  
**Resting place:** Fort Rosen-crans National Cemetery, Calif.

### KIRTLAND AIR FORCE BASE

**State:** New Mexico  
**Nearest City:** Albuquerque  
**Area:** Approx. 80.6 sq mi / 51,558 acres  
**Status:** Open, operational  
**Opened as Albuquerque Army Air Base:** March 8, 1941  
**Renamed Kirtland Army Air Field:** Feb. 24, 1942  
**Renamed Kirtland Air Force Base:** Jan. 13, 1948  
**Current owner:** Air Force Global Strike Command  
**Former owners:** AAF Training Command, AAF Air Materiel Command, Air Force Systems Command, Military Airlift Command, Air Force Materiel Command  
**Home of:** 58th Special Operations Wing, 150th SOW, Nuclear Weapons Center, Air Force Operational Test and Evaluation Center

Photos: US Army Air Corps: SSgt. Markus Maier/USAF; 377th Air Base Wing History Office

A man in a military uniform, wearing a cap with "STAR" and other insignia, is saluting. In the background, a woman is also saluting. The scene is outdoors, possibly at a ceremony. The text "YOU SERVED OUR NATION, let us serve you" is overlaid on the image. The words "YOU SERVED OUR NATION," are in a bold, white, sans-serif font, and "let us serve you" is in a white, cursive font, underlined with a yellow line.

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