



Building combat networks that can survive high-threat environments is key.

By Marc V. Schanz, Senior Editor

THE COMBAT CLOUD

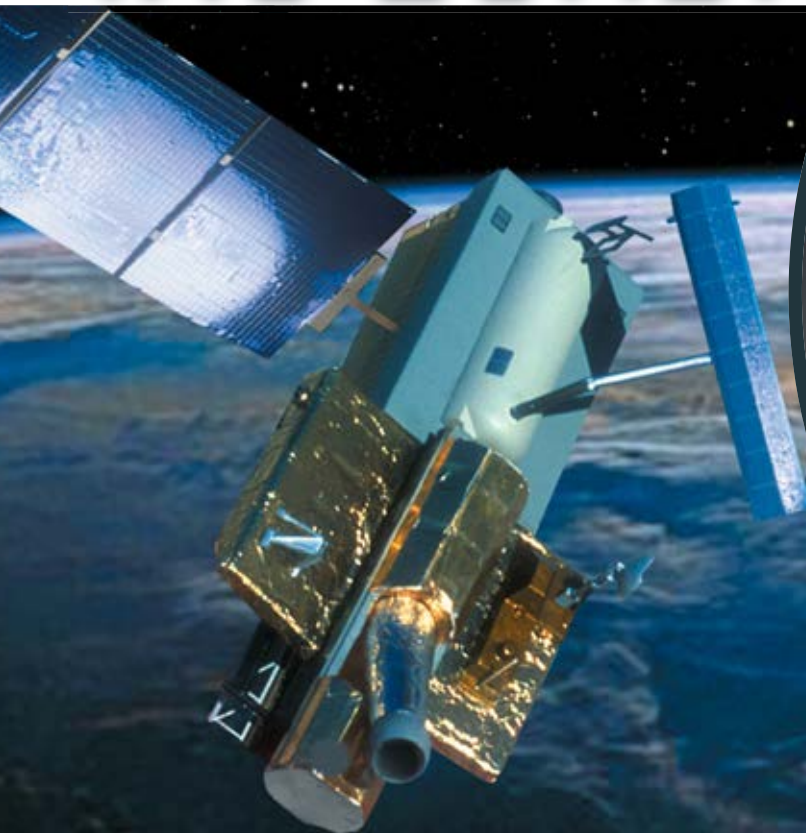


Photo illustration by Erik Simonsen



The Air Force has built a formidable air armada, one it has used effectively to support continuous air operations for more than two decades. In Afghanistan and Iraq, USAF has linked its intelligence, surveillance, and reconnaissance tools with its capacity to deliver precision strikes from bombers, fighters, and remotely piloted aircraft across a theater of operations in minutes.

But integrating these capabilities in a highly contested environment is a different matter. An adversary may attempt to deny the United States use of its space systems and attack US command and control elements. Even with the advent of the Pentagon's AirSea Battle, or ASB, initiative to integrate air and sea forces more closely so that the United States prevails in such environments, the Air Force and Navy appear to be in different places in unifying their efforts.

While AirSea Battle has opened discussions between the two services on how to better combine their respective capabilities, the current aviation modernization plans of the Air Force and Navy show they are not yet synchronized. There is a risk of developing solutions that wind up stove-piped, to quote Pentagon parlance, meaning they are not well-coordinated.

It is a predicament some have already suggested the Air Force, along with the sea-based combat air arms, needs to address. "It is time for Congress and the Defense Department to take a hard look at the mix of combat air forces that will be needed to sustain America's asymmetric airpower advantage," wrote Mark A. Gunzinger, senior fellow at the Center for Strategic and Budgetary Assessments in Washington, D.C., and retired Lt. Gen. David A. Deptula, former Air Force intelligence chief, in an April 2014 CSBA report.

They advised the Air Force, now operating the smallest and oldest combat air fleet in its history, and its sister services to rethink old habits and focus on tools and concepts that will address real-world security concerns and anti-access, area-denial (A2/AD) threats. Long-range intelligence, surveillance, and reconnaissance assets and strike aircraft should receive emphasis, they argued, along with concepts that will allow real-time adaptation to sophisticated enemies employing tools such as cyber warfare, electronic jamming, and ballistic missiles.

Speaking on the CSBA report in April, Deptula advocated that the services embrace distributed air combat operations, harnessing data links that have evolved over time, jam-resistant communications, and new targeting tools. This would help ensure that space-based capabilities would not become a liability in an A2/AD fight and could lead to leaps in information sharing across the air, land, sea, and space domains.

Likening the approach to network cloud computing, Deptula called this concept a "Combat Cloud." It would integrate both manned and unmanned systems and utilize advances

in stealth, precision weapons, and advanced command and control tools, ensuring that no single point of attack would cripple US combat operations. Such an effort would also present an opportunity to create modular, scalable combat capabilities, rather than force individual aircraft or other assets to take on more and more tasks.

While it sounds distant, some of the capabilities have already been battle tested, particularly in the command and control arena. Recent combat operations have shown the utility of the Link 16 data link, the Battlefield Airborne Communications Node, Tactical Targeting Network Technology, and other systems, albeit in a permissive combat environment where US assets have ruled the skies.

Well-tailored to Coming Missions

However, as Deptula and others have noted, these systems came into being without a construct to maximize cooperation between the services and allies. A Combat Cloud approach would help solve this problem, minimizing potential capability gaps, among its advantages.

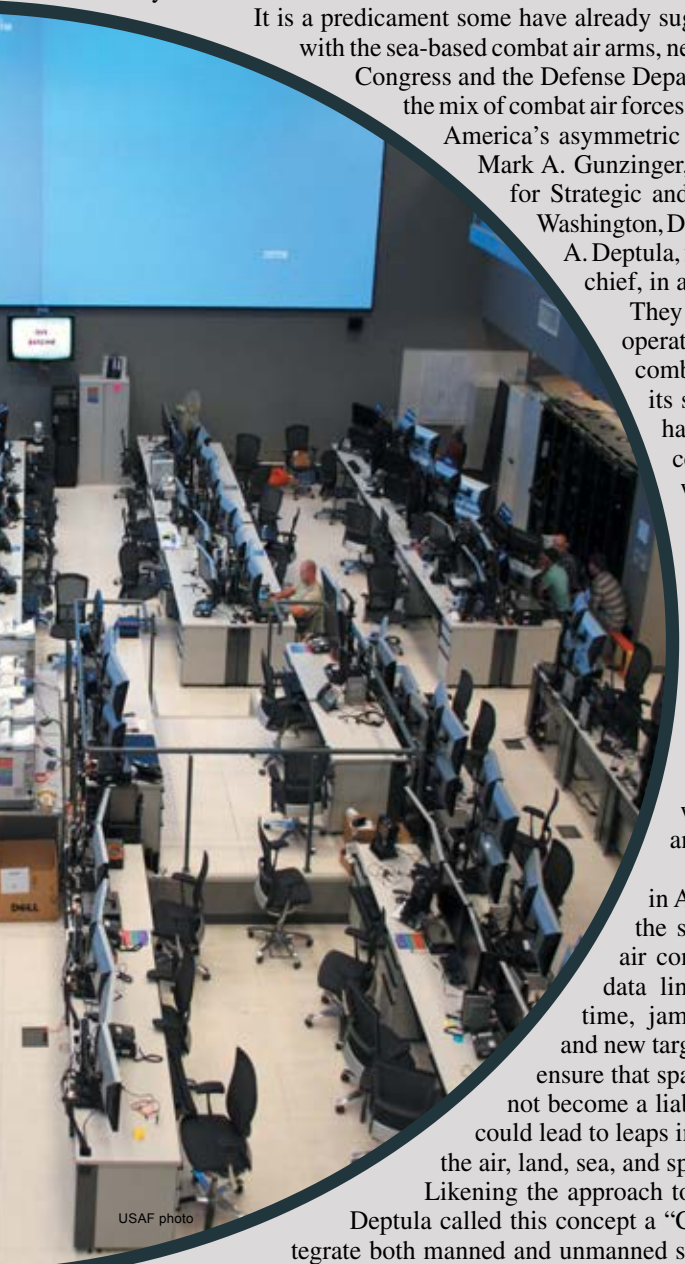
The Air Force, so far, has focused its energies on dealing with its deep fiscal and structural crisis, as it struggles to decide what capabilities it will retain and let go in the next decade. Service leadership has made clear what kind of fight the Air Force should prepare for, and it is one the Combat Cloud appears well-tailored to respond to.

After becoming Chief of Staff in August 2012, Gen. Mark A. Welsh III began tackling hard choices with the service's modernization and reset initiatives; he delayed making long-term strategy pronouncements until relatively recently. But Welsh has made clear a guiding principle in his stewardship: The Air Force will not forfeit its ability to fight in a contested, high-intensity conflict, as it represents the existential purpose of a military air arm.

Welsh told reporters in Washington, D.C., in November 2013, "We don't exist to fight a counterinsurgency. ... We can participate in that, we can help in that, but major air forces exist to fight a full-spectrum conflict against a well-armed, well-trained, determined foe."

This understanding has guided the development of the service's new strategy document, which was due for release in June, and the vigorous protection of its three core acquisition programs: the KC-46A tanker, the F-35A strike fighter, and the long-range strike bomber. It's also behind what Welsh calls strategic agility,

Clockwise from top: A B-52 comes in low over JB Pearl Harbor-Hickam, Hawaii, during a training flight in April; a combined air and space operations center; a photo illustration of a military satellite on orbit. Similar to network cloud computing, the combat cloud concept would integrate manned and unmanned systems, space assets, and advanced command and control tools.



USAF photo

something he first articulated in February. The Air Force's existing modernization plans, at least the ones preceding June's strategy document, are one big "pipe dream," said Welsh in March at the Center for Strategic & International Studies. The service has to be more vigorous in scrubbing lists of wishes down to lists of needs, he asserted.

"We really have to start by making a concerted effort to look at the long term for the solution," he said in April. However, it is a unifying strategy bringing together operational concepts from strike, unmanned operations, command and control, and ISR that has gone missing for nearly a decade, declared Welsh.

Thus, the first part of the Air Force's new strategy is the "call to the future," he said. "It's the priorities for science and technology, for research and development," and for "new approaches to training and educating our people." Officials involved with ASB are working on some of this.

Welsh, drawing on his experience flying A-10s in the later days of the Cold War, has noted that the Cold War-era AirLand Battle concept began as a series of initiatives that guided the Air Force and Army to communicate more effectively and link their capabilities, such as procuring better radios. "It was a series of steps designed to develop capability to work together that resulted in what you see on the battlefield in Afghanistan today, with battlefield airmen, combat controllers," joint terminal attack controllers, and tactical air control party personnel, said Welsh in November 2013. All of these capabilities make air-ground communication "virtually seamless" today. "All that was an outcome of AirLand Battle," he said.

Multi, Multi, Multi

Today, the Air Force and Navy are engaged in the same problem-solving exercise, said Welsh. "How do you pass hard quality data to weapons that now have longer ... ranges than they have the ability to target?" he asked rhetorically, adding that sensor ranges are longer and detection ranges are greater in weapons now being fielded and proliferated around the world.

The services are already making some changes in how they train together to help operationalize ASB. The Air Force's Red Flag exercise now features interaction with naval planners to familiarize the two services with each other's operations, while Air Combat Command and the Navy's US Fleet Forces Command now collaborate in a Navy Air Force Integration Forum.

However, the Air Force still lacks a blueprint for how it will consolidate and operationalize these concepts with its planned modernization program. Some senior leaders have declared they want to move forward with integrating ISR and strike assets in a more holistic manner—reflecting many of the concepts in the cloud.

"We must prepare for an era of warfare requiring new levels of cross-domain collaboration, operational level command and control, and the dynamic integration of national, theater, and tactical capabilities across the full range of military operations," Maj. Gen. John N. T. "Jack" Shanahan, commander of the Air Force ISR Agency, said during an address at a May defense conference in Arlington, Va.

USAF, and the services, need to get out of building "exotic single-mission platforms" designed for one threat, he added, only to find they are obsolete by the time they are fielded. "Multidomain, multisensor integration is where the future lies" in contested fights, Shanahan said. This will emphasize multisensor, stealthy, long-endurance aircraft, "redundant and resilient" information networks, and "self-learning, self-protection capabilities," among other attributes.

The Navy, on the other hand, has been hard at work on its future concepts. In Naval Aviation Vision 2014-2025, the sea service lays out a blueprint for its airpower modernization, something officials call Naval Integrated Fire Control-Counter Air, or NIFC-CA. This operational concept, the Navy argues, "extends the battlespace, increases survivability, and provides maximum engagement capability in the air and at sea."

Naval planners call NIFC-CA a system of systems that, by 2025, will provide long-range fire control and power projection and the ability to operate in contested areas and enable "coordinated and cooperative situational awareness."

Rear Adm. Michael C. Manazir, director of air warfare on the Chief of Naval Operations Staff, said NIFC-CA is built around exploiting situational awareness and long-range collaborative targeting concepts, some of the same ideas articulated in ASB.

While the Navy will largely have many of the same capabilities in 10 years it fields today, a carrier strike group will be far more networked by the 2020s and able to move valuable battlespace information seamlessly between assets.

"We'll be able to show a common picture to everybody," Manazir told the US Naval Institute in December 2013. In a shooting war in an A2/AD scenario, a "decision-maker can be in more places than before," he said.

Manazir's justifications echo many of the points laid out by Deptula and Gunzinger in their critique of today's combat air fleet. "In the past, we bought platforms for platform capabilities," he said. Now, the Navy is concentrating on its "integrated capability to deliver an effect on the maritime battlefield."

Air Force officials said no formal cooperation has been inked yet with the Navy on NIFC-CA, but airmen are already working on pieces of the problem set that the Navy's concept addresses.

At the operational level, Pacific Air Forces' Commander Gen. Herbert J. "Hawk" Carlisle, as part of his commandwide strategic initiatives, has made command and control resiliency a key. It is critical to carrying out the Air Force's mission in the Pacific, he said in September 2013. Steps include linking Army Terminal

Top: A KC-135 tanker tops off a US Navy F/A-18E Super Hornet over the Pacific Ocean. Right: Gen. Hawk Carlisle speaks at the first AirSea Battle forum at JB Pearl Harbor-Hickam in March. Both services are working hard to improve operational collaboration.

USN photo by Mass Comm. Spec. 1st Class Trevor Welsh



High Altitude Area Defense anti-missile batteries and Navy Aegis cruisers to Air Force air and space operations centers. Combat operations in permissive environments have allowed USAF to defer tackling issues like defending against electronic jamming and surviving without space assets for too long, he said.

In the meantime, the Air Force Association's Mitchell Institute for Aerospace Studies is pushing the conversation forward. The institute, with Deptula as its dean, has initiated a project to win support for the Combat Cloud vision.

An in-depth study to propose possible solutions for the Combat Cloud is in the works. A Mitchell Institute working group, gathering inputs from across the services, has already helped define elements of the concept and possible obstacles to its implementation.

Combat capability, as the Navy has discovered, is by and large not the limiting factor in adapting to future conflict. The sticking point is connectivity. The Air Force leadership appears to believe this as well, and both services have suggested there is an opening for a cloud-like concept to take hold.

"We are taking elements of [NIFC-CA] and we are integrating them into exercises with the Air Force," Chief of Naval Operations Adm. Jonathan W. Greenert told reporters in May, citing Northern Edge and Valiant Shield as examples. The collaboration "needs to be better," he said, "but we are working on it." Not all Navy networks can just plug into USAF networks, particularly tactical nets. "The key is to sort through the tactical nets" and get them compatible, Greenert said.

"For some time, we will need to operate at two speeds and in two directions" Shanahan said in May: manage "legacy" ISR operations while rapidly building the foundations for operations in a contested and degraded environment. This will affect many USAF functions from combat to ISR collection and analysis. The Air Force should be at the forefront to design a "resilient, secure, redundant, high-capacity cloud-based information architecture" and ensure that "integration is at the heart of everything we do," he said.

Building architecture to support core missions is the key to success, Welsh said last November. "It's the distributed common ground station. It's the people, the analysts, the network administrators, the folks who flow data, create intelligence, and move it to where decision-makers need it."

Welsh said, "That's kind of the heart of this whole thing for us, and we'll continue to focus a lot of time, energy and investment on that." ■



USAF photo by MSgt. Matthew McGovern