



WIDENING THE C2 HIGHWAY

As the nature of war changes, the Air Force needs its systems to provide better, faster, more useful information.

Support elements, enabling capabilities, and behind-the-scenes assets simply do not garner the same level of attention as the Air Force's high-profile weapons, aircraft, and exercises. Bombs will probably always get more attention than loaders, acquisition draws more scrutiny than sustainment, and kinetic operations generate more interest than the command and control (C2) networks that enable them.

On that last point, at least, USAF's top leadership is trying to change the conversation and bring more attention to the critical role C2 and fusion war-

fare play in winning today's wars. The criticality of the C2 "highway" was, in fact, one of the hottest issues at AFA's 2017 Air Warfare Symposium held in early March in Orlando, Fla.

"We're going to be old and new, we're going to be manned and unmanned, we're going to be conventional and unconventional," Air Force Chief of Staff Gen. David L. Goldfein said in an AWS meeting with reporters.

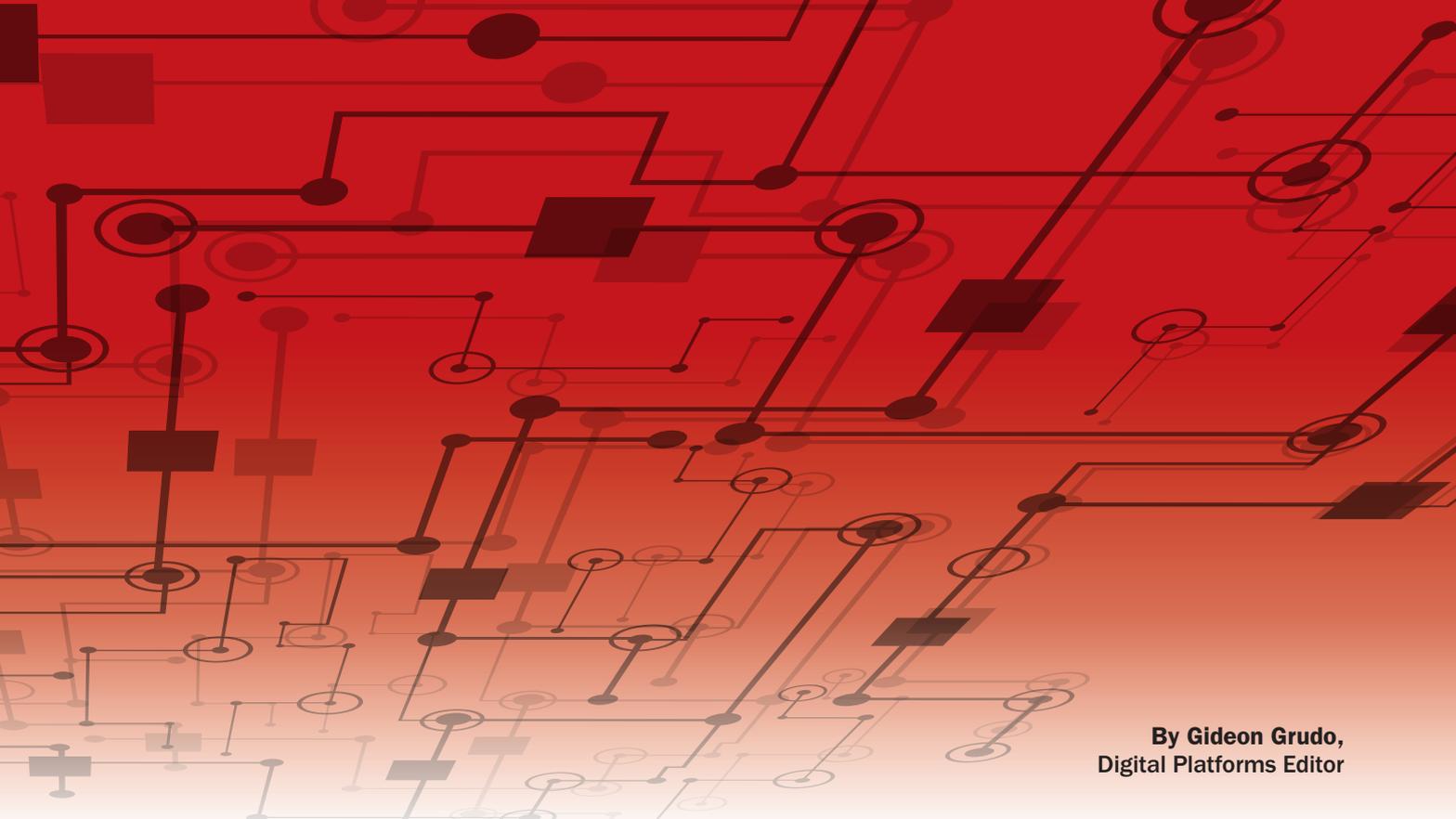
At the March 3 roundtable, Goldfein argued the challenge at hand is "how we actually focus not so much on the trucks and the cargo, right, the aircraft or the satellites or the ships or the trucks

or the sensors or the munitions, but focus first on the highway they ride on, which is the network and how we connect it together."

I WAS LOST IN THE CITIES

"The volume of data we collect [today] is far greater than anyone can actually analyze," said Goldfein in his symposium address. "How do we create a common operating picture and present it in a way that leaders can then act and make decisions?"

This has been a sticky problem for years, as new aircraft, spacecraft, and processing systems bring in a torrent of data to analyze and exploit. Still, Brig. Gen. Peter J. Lambert, Air Combat Command's director of intelligence, said at the symposium that ACC is making progress in this area "faster



**By Gideon Grudo,
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SrA. Gene Kellenberger, a cyber systems operations journeyman, reconnects cables at Dover Air Force Base in Delaware. Gen. David Goldfein, USAF Chief of Staff, says the volume of data collected outpaces the capacity for analysis.

than anticipated.” He listed improvements through open architecture, better software, and open source intelligence as the main tenets of the progress.

To cope with the ever expanding information influx, ACC is hiring what it’s calling “chief data officers.” Lambert said it’s a pilot program to address “the data problem.”

“We’re awash in data,” he said, and it’s impeding airmen from focusing on “things that are important to them.”

But the Air Force and, by extension the US, isn’t the only contender vying for an advantage through data. The Russian military is testing fu-

sion capabilities in Syria—much like Americans experimented with similar technology during Desert Storm—but they’re “absolutely not” where USAF is with regard to C2 and fusion warfare, Lambert said.

He cited three other areas presenting information challenges: ISIS, Russia in Crimea, and the Pacific.

On the counterterrorism front, harvesting and understanding data is one way to counter ISIS’ “very adept” utilization of social media. Lambert said big data manipulation and analysis could have predicted the Russian move into Crimea. And in the Pacific,

the information domain is a “contested domain.”

Lambert said USAF is at the “inflection point” in achieving the C2 and fusion warfare capabilities needed to succeed in an increasingly data-centric battlefield. He cited a 2015 AFA Mitchell Institute for Aerospace Studies paper, “An ISR Perspective on Fusion Warfare,” which highlights the service’s C2 challenges. Lambert said the Air Force has made “significant progress” since the paper came out two years ago.

Shortly after the symposium, Goldfein released a white paper placing multidomain command and control (MDC2) front and center. In the March 10 document, the Chief argues that the national security environment “requires us to examine how we sense, decide, and act rapidly and in concert across all domains.”

“Our adversaries have invested heavily in technologies to deny us the superiority we have come to rely upon,” Goldfein wrote in a letter to airmen released with the paper. He argued that MDC2 requires more than connecting multiple domains and more than connecting operations in one domain to operations in another. It’s really about enabling “joint and coalition capabilities across all military operations.”

Freepik; Roland Balik/USAF



David Hall, a crisis action team director, conducts command and control operations at Hill AFB, Utah, in November 2016. The war-winning importance of C2 and fusion warfare is gaining more attention from USAF.

Goldfein outlined three “elements” that will make command and control work better for the Air Force.

Situational awareness, the first element, is USAF’s ability to acquire and distribute data, which Goldfein wrote is “robust.” But to better present leaders with information they can understand—information that, despite its complex nature, can be simplified—the Air Force needs to better integrate “nontraditional sources of information.”

To make more sense of these large and growing swaths of data, Goldfein wrote that USAF will need “common architectures, standardized data formatting, increased machine-to-machine and artificial learning systems, and better integration.” With this, leaders will be able to make decisions faster.

Rapid decision-making is Goldfein’s second element. Whether tactical, operational, or strategic, calling the shots “at the needed operational tempo” is challenging both technically and in a human sense. From “empowering airmen” to leveraging the aforementioned situational awareness, USAF needs people and technologies that can engage situations holistically.

Lastly, Goldfein argued that commanders should be able to direct forces

across domains and missions using all the MDC2 capabilities they have. While the leader in charge needs to be able to communicate efficiently with the right set of boots, that same leader should be consuming incoming data from the battlefield in real time.

DECEPTION IN THE DATA

One of the biggest challenges to information networks is outside actors aiming to infiltrate these channels and steal data or, conversely, inundate these channels with false information.

The human component of information warfare could make this challenge a dangerous one, said Lani Kass, CACI’s corporate strategic advisor and a former senior Air Force and DOD official.

“It is ultimately the young operator who has to act upon this data,” she said. “The technology enables what remains a contest between human brains.” Citing the pilot’s “speed is life” mantra

and the political “information is power” mantra, Kass emphasized the significance of fusion: “If you can indeed fuse speed and information, you do have a winning combination, because you truly combine life and power.”

But Kass said she doubted information could ever “completely lift the fog of war.”

“All the information on the planet won’t make war fully open to anticipation,” she said. One of the reasons for this is what Kass called “deliberately deceptive data.”

“The only thing worse than being a victim of deception is not knowing you just fell victim and sharing deceptive data,” she said, adding that “at the speed in which we operate, it is almost humanly impossible to sort the wheat from the chaff.”

So on top of sifting through data to find worthy information, analysts must be wary of, and keep an eye out for, information that was intentionally injected into their feeds by the enemy.

Kass urged caution and vigilance in response to Lambert’s assertion that the Russians are behind the Americans in the information arms race. Kass said the US must take care “not to underestimate the adversary,” and “what we see in Syria is what Russia wants us to see. Do not assume that’s all they [have].”

“They are a nation of mathematicians, chess players, and engineers,” Kass said, and China is the same. ★

USAF NEEDS PEOPLE AND TECHNOLOGIES THAT CAN ENGAGE SITUATIONS HOLISTICALLY.