

AIR FORCE ASSOCIATION AIR WARFARE SYMPOSIUM
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So Larry, thank you and to Secretary Peters and for this association for all that you do, for the warm welcome and for all you do on the business of air and space power. You know from Gen. Deptula and the Mitchell Institute, to the many engagements you sponsor on behalf of Airmen and their families, I speak on behalf of all Airmen to thank you for your passion and your dedication.

Every year, you changed and evolved this convention into the premiere professional development opportunity of the year, and an unparalleled opportunity for Airmen and industry, this Airmen-industry team to get together to re-blue, reconnect, and recharge for the important work ahead. And I tell you I cannot be more excited to see so many uniforms. And I thank the commanders who have brought your Airmen to this one of a lifetime opportunity.

All right, so first things first. Chief, what's with the crooked face and the weird speech? So when I took over from Gen. Welsh, he gave me some great advice. And one of the things he told me, he says, hey, really be careful about really long trips. You know, the Pacific it can really crush you.

And of course, I didn't take his advice, went through a 19-day trip, which was spectacular by the way, spent time with Gen. O'Shaughnessy, got a chance to assess our readiness in the Korean peninsula with our secretary, flew with the Indian Air Force, was able to meet with the global air chiefs, international air chiefs there in Singapore, went to Guam and got eyes on that critical terrain. I mean, it was a spectacular trip.

And then I woke up last Saturday morning with half my face completely frozen. And it turns out it's this thing called Bell's Palsy. So here's the good news. It's fully recoverable. I'm on the mend and it only hurts you when I laugh.

But it turns out I'm in good company. Curt Lemay had Bell's Palsy while he was the chief of staff of the Air Force. And it turns out because he never actually truly recovered, he started smoking cigars so he could hide this disfigurement of his face.

(Laughter)

So if you know me, you know that I'm a believer that every challenge in life you're handed is an opportunity. And so it turns out that the treatment, the best, most effective treatment for this condition is acupuncture.

And so I met up with an individual, Dr. Philip Niemtzw. That's not can you take that slide down, please. That's not the slide.

All right. That will come up in a minute.

So Dr. Niemsow is 70 years old. He was born the same year we became a separate service. And his passion is bringing battlefield acupuncture to the point of injury and he's still serving in our Air Force. And he is not going to stop until we have battlefield acupuncture, which is producing incredible results, by the way, at the point of injury and bringing it to the battlefield and across our medical industry, but Dr. Niemsow is facing a challenge.

Now you can bring up that slide.

Chief used this yesterday. This is the frozen middle. He's facing some resistance bringing this innovative technology into our Air Force.

So think about this, this uniquely Air Force story. How appropriate that a man born the same year as our Air Force became a separate service, an airman for life, is treating the current chief of staff for a condition shared by a former chief of staff that, oh, by the way, he knew and they were good friends when Curt Lemay was chief.

Is that like uniquely Air Force or what? Dr. Niemsow, please stand and be recognized.

(Applause)

So from the lab bench to the flight line, it's not just about who has the best ideas. What matters for us is who can act on these ideas and deliver the lethality that out paces our adversaries?

And I would offer to you in today's complex global security environment, victory goes not to the innovator, but to the rapid integrator of ideas.

So the theme of my presentation this morning is thriving in the revolution.

How do we as a learning institution continually redesign ourselves in a dynamic new era to embrace change, to stay ahead of our adversaries, and bring increasing lethal and credible military options to our civilian leaders as the service that's responsible for global vigilance and global reach, and global power for America?

Since World War II, we've relied very heavily on technological supremacy. And as Secretary Wilson highlighted yesterday, we've had control over the rheostat of time in war over the past 27 years in a way that's almost unparalleled in the long history of warfare.

In fact, for the last quarter of a century, we've had the luxury of being a global giant, able to go where we want, when we want, and for the most part militarily do what we have needed to do almost unopposed in the air.

And with the exception this one golden bb in Serbia a few years back, we've lost less than a dozen aircraft to enemy fire.

And while we're not up against any go Goliaths today, I believe we got to start thinking and acting more like David, like a competitor in the ring that doesn't assume overmatch. It's time to be edgier and hungrier. It's time to think big, start small, and scale fast because we find ourselves in a revolution driven by two key features: a stark change in the geopolitical landscape coupled with dramatic technological accelerations.

And if we're going to thrive in this revolution, we better understand these two elements that are defining the world at which we are called upon to fight and win.

So we recently completed the National Defense Strategy, the first one in 10 years. And it is a terrific document. I highly encourage everyone here to read it. It might be the best 11 pages you have read in a long time.

In the NDS, Secretary Mattis lays out that a return to great power and competition is the central challenge to our collective security and prosperity.

Now look, we are going to always seek areas of cooperation with other major powers, focusing on common interests. We'll never forget that our economic fortunes are tied to rebalancing trade with China. And we simultaneously partner in the international space station with Russia. Nations throughout our history have disagreed with each other, yet still found areas of common interest, but the national defense strategy is clear. China is a strategic competitor using predatory economics to intimidate its neighbors, while militarizing features in the South China Sea.

Russia has violated the borders of nearby nations and pursues veto power over the economic, diplomatic, and security decisions of its neighbors.

Each is attempting to reshape the world in line with authoritarian values by replacing the international rules based order, which has enabled global security and prosperity for all nations, them included, since the end of World War II.

So in response, the national defense strategy directs us to be more lethal and a more ready force to strengthen alliances and partnerships, and to deliver a greater and more affordable performance in order to compete, to deter, and when called upon, to fight and win.

And it states in this environment, there can be no complacency. We must make difficult choices and prioritize what is most important to field a lethal, resilient, and rapidly adapting joint force.

This may be the most important line in the nation defense strategy: America's military has no pre-ordained right to victory on the battlefield.

So as the world changes geopolitically, we're also in the midst of an acceleration of technological growth that's pushing the limits of Moore's Law. And yesterday's presentation for those of you who were here by Peter Wicher from Singularity University on the power of disruptive and exponential thinking, I thought, was superb.

And as Mr. Wicher stated, some forecasters are predicting roughly 30 billion devices will be

connected to the Internet by 2020. By 2020, 30 billion.

At least two-thirds of the world's population, is going to have access to gigabytes a second through some kind of mobile device and where the computing power of those devices doubles every two years.

And oh, by the way, same goes for our platforms, sensors, and weapons. Hold that thought. More about that in a minute.

Meanwhile, opportunities in space technology continue to grow with the combination of increased access to domestic and international launch providers, miniaturization of satellite technology, and rapid expansion of both commercial and international space investment.

We all saw this just a couple of weeks ago, Starman was in a cherry red Tesla Roadster, space junk tracking number 43205, heading toward the asteroid belt after Space X's successful launch with the help of our amazing 45th Space Wing Airmen, depicted on the slide, of the most powerful rocket since Saturn 5 in the late 1960s.

And we're just a few years away from being able to go to a commercial website that's imaging every inch of the globe 10 tens per second. Companies like Amazon, OneWeb, and Google, and others are going to create Internet-like options from space with literally thousands of miniaturized and expendable satellites.

For an airman, these are exciting technologies. Rocks in our sling. If only we can think and act like David, like competitors in the ring. If we're able to embrace the increasing speed of technological advancement and adapt faster than our adversaries.

As Charles Darwin put it, "It isn't the survival of the fittest as much as it's survival by those fastest to adapt." And as Chief Wright correctly stated yesterday, it's not enough to just adapt, we got to lead if we're going to thrive in the revolution. And from what I saw yesterday in the Spark Tank, this is not an issue for our Airmen today.

So some good news. We've been here before. Going back to the morning after VJ Day in August 1945, Hap Arnold proclaimed to his staff, "The next war may be fought by airplanes with no men in them at all. Take everything you've learned about aviation and throw it out the window. It'll be different than anything the world has ever seen."

Hap Arnold and Billy Mitchell were visionaries and they saw new ways to go over, not through. And they knew that in order to fully utilize air power, they'd have to break glass and unleash innovation.

And just as Hap predicted, a different future in 1945, I see a vastly different future for our Air Force in 2045. Great power competition and accelerating technology growth demand that we redefine ourselves.

And so the billion dollar question is are we as an airman-industry team postured to thrive in this

revolution? Or will we be consumed by it? And as I stand before you today as your 21st recovering chief of staff, following 20 giants of Air Power, who built the force we enjoy today, I got to tell you, I have never been more optimistic or excited about our future, because this is our 1945 moment. We've been here before. And so perhaps it's time to return to our youth as we follow the path before and prepare for our future.

So our success is going to be driven by Airmen who live and work in squadrons and squadron-like organizations. Because you've heard me say consistently the squadron is the beating heart of our Air Force and restoring readiness remains Secretary Wilson and my top priority.

And this calls for building healthy squadrons, our most essential fighting formation. And squadron revitalization translates into investing in squadron innovation based on a fundamental trust and confidence in our commanders, our Senior NCOs, our command teams.

Now I got to tell you, when I was a wing commander, the most coveted award to compete for was the Annual Installation Excellence Award. And I say most coveted, because it was the only award that I knew of that came with money that a wing commander could actually use to get at the readiness challenges within his wing.

And we won it one year. And it was eye opening how much we got done with a little bit of flexibility and a rather small amount of resources. As the wing commander, I got to tell you, I knew what my wing, group, and squadrons needed. And we got two bucks of value for every dollar we spent.

But perhaps most importantly, we took ownership of the projects and Airmen felt empowered to bring me game changing ideas. Pride in the wing soared as Airmen saw their ideas not only get a hearing, but get the backing and the resources to come to life.

So I'm proud to announce today that we are pushing out \$64 million to wing and squadron commanders next week to kickstart squadron level innovation at the tactical edge.

(Applause)

So this money is designed to let commanders on point who know what their units need best, to test, to experiment, to refine their best tactical ideas. This is about trusting and empowering commanders and your Airmen because the nation relies on us to be incredibly innovative, as we look to increase our lethality and our readiness in this increasingly contested world.

Wing commanders, you got an email from me in your inbox waiting for you that I pushed out an hour ago. Explains the details. Fight's on.

We're going to learn together through each iteration and move us a step closer to the answers that our nation needs, because we're going to enable innovation at the tactical edge and unleash the game-changing ideas, like we saw yesterday in the Smart Tank, that are there across our Air Force, that are in the minds of this Airmen and industry team.

And we cannot afford to go slow. It's time to push up the throttles. We need game changers in the labs, game changing partnerships with academia and industry, and game changing processes that untethers our professional acquisition workforce.

Fellow Davids, it's time to think big, start small, but scale fast.

In parallel, we got to also strengthen the way we develop our leaders to fight and win in the global security environment described in the National Defense Strategy.

When an Airmen walks into a room with a joint teammates and our international partners, they don't actually know what our specialty badges mean. And to be honest, I don't think they really care. What they really see is this tape. It says U.S. Air Force.

And with that recognition comes an expectation that we own the high ground. We understand the operational art of integrating air, space, and cyber in a joint campaign. And we further know how to integrate these capabilities with land and maritime operations.

Think about this. We've had about 200 years to refine modern land and naval warfare and about half of that to mature Air Power. Never before in our history have two additional contested domains of warfare -- space and cyber -- been added simultaneously. And we've had less than a decade to refine our operating concepts.

It is time for us as a Service, regardless of specialty badge, to embrace Space Superiority with the same passion and sense of ownership as we apply today to Air Superiority.

This is so important to our future. I'm going to repeat it. It is time for us as a service, regardless of specialty badge, to embrace Space Superiority with the same passion and sense of ownership as we apply to Air Superiority today.

Air and Space are a continuum, as it must be within our Air Force because I believe we've going to be fighting from space in a matter of years. And we're the service that must lead joint war fighting in this new contested domain. It's not only our destiny, it's what the nation demands.

So Secretary Wilson and I have direct Lt Gen Kwast, the commander of Air Education and Training Command to take on force development as a command responsibility. Over the course of this year, we are going to revolutionize how we develop our officer and NCO leadership to better prepare ourselves to thrive in the revolution.

It's time to modernize what we teach through professional military education, how we deliver educational content over a career beyond traditional classroom models, prioritize assignments that expose leaders to the operational arts, and re-focus the incentives we put in place to reward the right behaviors and promote against those core competencies that we truly value.

And at the same time, for the Airmen in the room, I've heard you loud and clear that we also have to offer you more choice and more control over your career if you're going to stay with us.

So if we work on these internal initiatives, we also got to partner with industry to look through a different lens for future modernization. Preparing for or executing wars of attrition drove a dialogue that we had had over years on what platform, sensors, weapons, industry could produce, how fast could we field it, how many could we field.

And then we would talk about connecting these capabilities after the fact. We'd start long, multi-year, contractual obligations, knowing full well the informational capacity of the platform, sensor, or weapon would likely be either obsolete or vulnerable to cyber-attack long before the contract was completed.

If we're going to fight and win in wars of cognition, we got to ask a different series of questions before starting an acquisition program on any platform, any sensor, or any weapon.

Does it connect? Good. Does it share? Better. Does it learn? Perfect.

As we defend our budget over the next few months, I'm hoping to shift away from platform-centric discussions about the relative merits of the F-35 versus the J-20. What I'm looking for is a robust discussion about how a J-20 will likely never see an F-35 all by itself.

If it ever sees an F-35 at all, it ain't going to be alone. It'll be integrated and connected to satellites, penetrating standoff ISR, cyber operations, electronic warfare, possibly a light ground maneuver force, possibly an Aegis cruiser, and operating on a disaggregated and a distributed and resilient command and control network.

And the only thing holding us back today and slowing us down is our ability to connect these capabilities and get this new way of operating in our head.

And as you heard from Secretary Wilson yesterday instead of a discussion about the merits of JSTARs as an individual platform and sensor combination, and whether we should replace it with a similar, albeit newer platform and sensor that brings little new combat capability, despite years of investment, I look forward to discussing how we can leverage new technologies, and new ways of networking sensors, and new concept of operations, multi domain command and control that can bring more lethality to the fight in both contested and non-contested environments as specifically directed in the National Defense Strategy.

These are the discussions we have to have and they're worthy of our intellectual investment if we're going to thrive in the revolution.

And I repeat, it's in our blood and I've never been more optimistic about our future. To further accelerate this journey into network-centric, multi-domain operations, Secretary Wilson, the MAJCOM commanders, Chief Wright and I, have been looking over the past several months at the organization of the Air Staff and how we can accelerate our ability to design the Air Force we need in this new environment.

And a challenge we faced is our ability to look across mission portfolios and build the integrated network solutions that we can then take to industry as problems to solve.

It became clear to us that our process left integration to me and the Secretary far too late in the budget cycle, which doesn't allow the major cross-portfolio trades that we need to advance in the business of integrated multi-domain operations.

So as a result, Secretary Wilson and I set up the Air Force Warfighting Integration Capability, or AFWIC, under the leadership of Maj Gen Clint Crosier. As core function lead integrator roles and responsibilities are transferred from major commands, MAJCOMS to AFWIC, Maj Gen Crosier and his team will be responsible for working across the scenes to drive early and deliberately integration across all of our missions and domains in full partnership with the MAJCOMs.

This is going to connect warfighter ideas with technologies that'll strengthen and integrate our force united by a common blueprint.

From, the lab bench to the flight line, does it connect? Good. Does it share? Better. Does it learn? Perfect.

And just like we are pushing decision authority down to our squadron command teams based on trust and confidence, so we are working to push the same to our incredibly talented program managers and acquisition professionals, who are the best in the business.

So how do we get our minds around this? How does this vision of a future not become so opaque or cloudy they all walk away and slide back to a happy place or comfort zones, back into planning and acquiring for wars of attrition?

Well, it turns out one of our most visionary leaders in our past has given us a useful framework to see the future and build a force we need to fight and win in the age of cognitive warfare.

Col John Boyd's popular framework, Observe, Orient, Decide, and Act or as most of us grown up with, the OODA Loop, has driven operational and strategic thinking for a general of Airmen and our joint teammates and it's still relevant today.

So what might OODA Loop 2.0 look like in the 21st century?

Observe:

Today we sense the globe simultaneously in six domains. Air, land, sea, space, cyber, and undersea or what we call a sensing grid. Our goal is to connect across the domains, share information at the speed of light, and manage the volume of data in ways that virtualize the information so we can pull what we need, when we need it, that will allow us to sense the environment and create a common operational picture.

Equally important is our ability to break down the barriers to aggressively sharing this picture and the information with our allies and partners. There is no greater confidence-building measure than sharing the critical and timely information with our allies and partners needed for

success on the battlefield.

And many of our international teammates are here today and I want to especially welcome several of our defense and air attaches. We truly are stronger together. And if we're going to win in wars of cognition, we got to be able to observe more than our adversaries while denying them the ability to do the same.

Orient:

We already collect volumes of data from every domain. So the next question is how do we make the information both timely and useful, so we gain better understanding of the operational environment than our adversaries?

It's not enough to have more data than our adversaries. It's how we understand the information and use it at the speed of relevance that matters. Our manual, time-consuming process today will only inhibit that speed. In future conflict, we are going to have to leverage artificial intelligence, human machine teaming, quantum computing, other technological advancements, so that we have humans doing what only humans can do and let computers and learning software rapidly accelerate the speed and the quality of our analysis.

Does it connect? Good. Does it share? Better. Does it learn? Bingo.

And I don't see this as managing large cumbersome volumes of data or trying to connect every platform sensor or weapon in the inventory. We got to be far more nuanced and advanced than that.

It's time for us to embrace and advance computing at the edge. Each of these platforms, sensors, and weapons are individual computers advancing and growing at the rate of Moore's Law.

We got to think beyond an already old idea of big data and think more about timely access of the right data. So what algorithms are required to leverage the computing power of systems at the edge that can connect and compare information sources in ways specific to improving our ability to orient, to gain superior operational understanding of the environment?

And for industry, how do we build the contractual mechanisms to make what I'm describing not only doable, but also profitable for the Defense industry.

Decide:

As Airmen, we have grown up with the foundational doctrinal tenet of Air Power as centralized control and decentralized execution. And for many of us, it's been engrained into our psyche.

However, multi-domain operations requires us to integrate all domains and all components simultaneously, creating rapid, multiple, choreographed dilemmas for our adversary.

In addition, adversaries have developed ways to hold large complex command centers at risk

with both lethal and non-lethal long range fires.

So now is the time for us to evolve centralized control and decentralized execution to meet the challenges of future conflict. Future warfare against pure level adversaries may no longer afford direct control.

Instead of demands maintaining centralized command with the ability to push forward or distribute operational control. It still allows for decentralized execution, but it also provides the flexibility and the adaptation we need to adversary actions.

Commanders armed with a better understanding of the operational environment must be able to provide clear and concise intent through mission-type orders. And that intent must be executed by leaders who have access to resilient networks and communication tools spread across geographic boundaries.

This isn't about synchronizing operations in the battlefield. This is about better integrating operations across all domains to achieve commander's intent.

Moving from historically proven centralized control to a decentralized model is actually technically feasible. The question for us is whether we can adapt culturally out of our comfort zone. It's going to require us to violate the number one rule of wing walking, which is to hold on tightly with both hands. Hey, if it were easy, it wouldn't be any fun.

Act:

If joint forces are to engage simultaneously and effectively in all domains, we as Airmen must not only understand our traditional operating environments, we must also better understand each other's.

It's no longer enough for an Airmen to be good only at Airmanship. We must have a working knowledge of ground maneuver in maritime operations if we are to truly integrate air, space, and cyber operations in a seamless joint campaign.

And likewise, Soldiers, Sailors, and Marines must have a better understanding of air and space operations. And we have to be prepared to lead that force.

Said another way, we had to build a joint smart space force and a space smart joint force. Easy for me to say.

As director of the Joint Staff for two years, I had the opportunity to see jointness in action. I watched each service approach the same problem through the lens of their own unique culture. How they saw problems and designed campaigns was directly reflective of the domains they were responsible for dominating.

Airmen, we tend to look at the world from the top down. And we bound the problem from the outside in, figure out the edges, determine how to control it, and then crush it from the outside in.

Our Soldier and Marine brothers and sisters tend to look at the same problem and then determine the center of gravity to mass against. And once they control this, they'll work that from the inside out to gain and maintain control of the enemy.

And I believe our naval shipmates own the gold standard for mission command and operating independently through commander's intent. You know, if you're a submarine captain, you don't spend a lot of time getting daily guidance from higher headquarters. You better understand commander's intent and be able to operate independently, which forms the essence of command at sea.

No one culture is better or more suited to winning than another. And we do our best our work as a joint team when every service culture is represented equally and the different ideas for how to solve complex challenges are presented to a joint forces commander.

Multi-domain operations: outside in, inside out, mission command? All of the above. So this week, we're kicking off several initiatives from Secretary Wilson, Chief Wright, and me to posture ourselves to thrive in the revolution. We're kickstarting innovation at the tactical edge. With resources and authorities, we continue to push the commanders', Senior NCOs and command teams.

We're thinking differently about how we design our future force under the AFWIC organization. We're shifting our doctrinal dependence on large, vulnerable C-2 nodes to a more agile and network solution.

We're advancing from centralized control to centralized command. And we're thinking differently about data and how to leverage computing at the edge.

So let's let this Airmen-industry dialogue here at AFA help refine our response to how we're going to thrive in this revolution.

Going back in time, once again, it's January 1905, two full years after the Wright Brothers' momentous first flight and the open negotiations with the U.S. government to pitch their new invention, but they faced a heck of a challenge. You couldn't spread a verified message back then with any degree of speed, certainly not like you can today.

And even though their first flight was two years prior, Orville and Wilbur were still trying to convince the world of their accomplishment. In a memo that went to William Taft, who was then the Secretary of War, the Wrights said their flying machine not only flies through the air at high speed, it also lands without being wrecked. And additionally, they added, flying has been brought to a point where it can be made of great practical use in a variety of ways, one of which is that scouting and carrying messages in time of war. And the Board of Ordnance and Fortification denied the request, saying we find it necessary to decline, to make allotments for the experimental development of other military inventions.

You see, the government had been burned too many times. And so they put the responsibility of

R&D upon the Wright brothers.

Imagine today if two bicycle mechanics had given up. What if they got tired of the red tape? What if they didn't have the money for their own R&D and just leaved a little boost from the government? The future of aviation as we know it now hung on that moment and their decision to persevere, for them to continue against a disinterested government.

This is a story that can be told 100 different ways. While we had remarkable acquisition professionals, they valiantly push up a large rock up a steep hill often and we make it difficult for them to accept ideas, put them on contract, and quickly get them to the war fighter.

I sometimes worry that the next daring idea is trying to break through the bureaucracy, that we're close to giving up, that if we don't have some folks who are willing to push against the frozen middle and bring battlefield acupuncture to the point of injury, it won't happen. It's time for us to give these ideas an audience and incubate the most promising innovations.

And then we have to take those ideas and integrate them for best effect. I am confident as your Chief that the next set of Wright brother equivalence is somewhere in this room today. I'm looking at you right now with my one good eye and I'm telling you as your chief, let's get after it and don't quit.

It is the honor of my life to serve with each and every one of you and once again, to AFA, thank you for putting on this convention. Thank you very much.

(Applause)