

Installations and Operational Energy: The Margin of Victory in Great Power Competition

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Tobias Naegele:

Wow, we've got lights in our faces. Welcome back from lunch. This session is titled "Installations and Operational Energy: The Margin of Victory in Great Power Competition." So, I'm going to just start.

I'm not going to bother with titles, but we do have the assistant secretary here, whose life is energy and installation. How does Great Power Competition fit into the installation perspective and why does that matter?

Dr. Ravi I. Chaudhary:

Hey, thanks a lot for having me here today, and thank you to the entire AFA team for putting this particular event together. It's quite simple, and our secretary and all of our leadership, our chief, our CSO, couldn't have put it clearer yesterday and today. We are in for the fight of our lives, but I can't think of a better service, a better department more prepared and ready than this one.

Think about it. It's in our DNA to be ready for changing times. Who we are as Airmen goes all the way back to 1941, and I'll still quote from Hap Arnold who said, "Our air bases are the determining factor in air operations," so we better be ready. We better make sure our installations are ready. If you think about what the PRC has done over the past couple of decades, they've established a rocket force.

They've established a support force to do two things. One, come at our infrastructure and we, as a department, have got to be ready for that. That's my job and I'm going to do it with each of you, but I need your help. Let's talk about some of the challenges we face, challenges in critical infrastructure. Critical infrastructure has been identified in our National Security Strategy and National Defense Strategy, as a portfolio that our adversaries are going to come after.

So we need to think about that and be ready for that moment. What are we going to do about it? It's simple, and our secretary and our two chiefs laid it out. We're going to be ready to fight the base in three areas. Technology, thought and organization. Start with the organization. We're organizing a base command so our commanders have the unity of effort and unity of command to execute in an environment, which will no longer be benign.

That goes for deployed, that goes for CONUS, in garrison, Space Force, Air Force, and just about any other installation that executes our missions and projects combat power. A thought, we're going to think about how we do this in the coming months. But most importantly, we've got to understand how we manage our energy, and that's the core of what we do in the Air Force.

As a former pilot, everything I did in my previous job was to learn how to collect, manage and discharge that energy for one reason, in order to be decisive when it counts. When it comes to energy at our installations, we're looking at new technologies, starting off with microgrids. We know that microgrids give us an edge because it allows us to plug in and out of the community. It hardens our infrastructure against cyberthreats.

It ensures that we can distribute our energy the way we need it when we need it, and it gives vital redundancies. That's one technology, but then we're going to move into an innovation space that we've not done before, that our nation has not done before, and your DAF is leading the way. That's with microreactors, geothermal technologies. Essentially, we're going to science the shit out of this problem.

Thinking about how we look at Operational Energy, getting fuel to the fight, that means we got to be more efficient. That means back in the day when we thought it was great to guzzle gas and fuel, fire and desire got us to where we needed to fight, we have to realize that we're in an entirely new ballgame. We're in the Pacific, and in that Pacific we're going to have long ranges. That means we're going to demand more range.

That means we're going to demand more capability. That means that we've got to think about how we fly our aircraft. The right altitudes, the right software for planning, the right ways to employ them. Lowering ground times, lowering fuel rates at takeoff times. How we fly aircraft is going to be as important as what we fly with our aircraft and the technology we employ. Speed, range and agility is coming back in a big way, and we're going to train to that standard.

Think about how we've all got to be part of this solution moving forward. We can do this. We just got to put our nose to the grindstone and get it done. We're going to talk about a lot on microtechnologies. One of them is Microvanes on the sides of C-17s, the aircraft that I used to fly. You can reduce millions of gallons of fuels. What does that mean to the warfighter?

That means when you land at a hub or spoke location, that means you won't drain the bladders. I remember landing in Bagram, draining a bladder once and then delaying the rest of the aircraft that had to take off. That means more CAPs in the air. Extending the range of our tankers, making sure that we can have orbits that extend CAPs. Inside-outside game is what we've always talked about within the WEZ.

We're going to talk about micro solutions that will result in macro impact. I hope you all are up for it because I sure am.

Tobias Naegele:

All right, thank you. General Miller, I'd like to just pivot just a little bit and let's talk about the vulnerability of bases.

We've had the frequency over the past 20 years of major storms or unpredictable weather has really doubled the number of outages.

You're dependent on energy grids that are not 100% reliable. How are we protecting our bases energy-wise? Then what are you doing to make them more resilient?

Lt. Gen. Tom D. Miller:

Great question and thanks for AFA for having this. When you look at the lineup, when you go to AFA, the problem you have is picking which breakout to go to, which is a good problem to have. That tells you that the lineup is the right lineup.

Tobias Naegele:

Hey, just as a commercial, you can watch everything on a taped delay.

Lt. Gen. Tom D. Miller:

A taped delay.

Tobias Naegele:

Just go on the website and it will be available.

Lt. Gen. Tom D. Miller:

Everything for aviation fuel, you think about we live in a world where electricity and cooled air is the JP-8 of a lot of the national-required missions that we have. That we, as an Air Force and as a Space Force, provide to the whole joint force and to the nation. The difference between Lieutenant Miller who might've been hot, uncomfortable in the desert somewhere because the air conditioning wasn't working in the building I worked in.

That's different completely than crippling a server farm or another, you name the employed-in-place mission. Those have changed dramatically in just the 34-ish years that I've been in the Air Force, so we're more dependent on that. One thing that you've really got to also look at is the way our installations have evolved over time. There are very few single-mission bases left in the Air Force, and between the Air Force and the Space Force.

So there are more complex and there's more employed-in-place missions. When you are going to exercise resiliency of energy and see what it looks like to turn off the power and watch and learn, it's more complex than it was. It's not that it isn't important if there's a single flying mission on a base to figure that out. It's not hard to put your brain around how incredibly complex that is if you have a COCOM, if you have a missile mission.

You think about the cyber wings, ISR wings, there are a lot of missions that are doing their mission right from there. To get to a main piece of your point, is in that exercising it requires a higher game for us to figure that out.

Tobias Naegele:

Okay. Now we're going to talk to somebody who owns a base. Colonel Townsend commands the 354th Fighter Wing at Eielson. It's a little warm there today. I wore my Alaska socks, by the way, just in your honor.

You, a few weeks ago, had a really cold snap and a few years ago, you lost power for quite a while. Tell us a little bit about the power challenges and then how you expect to get after that.

Col. Paul P. Townsend:

No, and it's a great opportunity for me, really privileged to be a part of this panel. Alaska is beautiful, but it's a land of extremes. When you talk about extreme daylight, extreme darkness, for us in the summertime, extreme heat, and especially without the air conditioning. Then in the winter, the extreme cold. Just as was mentioned, on February 3rd, we hit -51 on the installation.

As I went for a run yesterday, that's 100 degrees colder than it was for my run yesterday just to put that in perspective. Could you imagine if it was 100 degrees hotter? When you look at energy and the ability to sustain the fight. When you talk about the mission of the 354th Fighter Wing, uniquely postured between Northern Command and Indo-Pacific Command, we have a no-fail mission.

Whether that's putting fighters airborne to protect the Alaskan Air Defense Identification Zone, accomplishing our number one priority for the DOD of homeland defense or projecting power into the Pacific, it's no fail with our F-35s. Something that we demonstrated last July when we launched four F-35s direct into the CAP, off the first island chain. Executed a 30-minute vulnerability period and then landed into Kadena.

That's the ability to project power, in Eielson closer than where they sit in Hawaii, to the fight, to the first island chain, to the Korean Peninsula, so extremely important it's a no-fail mission. We can't just survive when it's -50, we have to thrive. What we do with that now is the central heating and power

plant. Think of a 1950s era coal-fired power plant. One of the great things is I get a locomotive to basically haul around coal.

But this is such a critical piece to our infrastructure. We just recently put in a \$600 million campus for the F-35, the ability to operate that aircraft in the Arctic. You think about the ability for that mission to survive, is dependent on reliable heat and reliable electricity. We have a great team of professionals that sustain and maintain that capability.

But as you mentioned, we did have an outage for a certain period in time, and luckily for us it was in October. Though the temperatures were more mild, but you can imagine when you're seeing -40, how quickly that can affect an installation. One of the advantages that we're looking to, is to increase our resiliency at Eielson Air Force Base with the pilot program of the small microreactor.

We're super excited to be leading the effort for the DOD, partnering with the SAF/IE, partnering with Defense Logistics Agency, to basically bed down this new technology. Think about a compartmentalized, mini-nuclear reactor providing up to five megawatts of heat and energy to basically help sustain the base.

When you talk about the carbon footprint of that coal-fired power plant, doing it with a lower carbon footprint is definitely something that's very critical, and so we see this as a wonderful opportunity. From my perspective, Eielson already houses the premier fighter in the Air Force, so why not bed down this new, premier technology there? I think it's a perfect match for us.

Tobias Naegele:

While we're on that roughly, because most of us have seen nuclear power plants, we've driven past them giant things, how small is this micro?

Col. Paul P. Townsend:

Right.

Tobias Naegele:

How micro?

Col. Paul P. Townsend:

We're partnering with the contractor right now to understand what this looks like. When you look at the artist's renditions, think of a railroad car type of a size to be able to be self-contained.

To generate that heat and the electricity, and really look into dial back the demand signal for the central heating and power plant.

Tobias Naegele:

That won't replace the coal, it'll complement it?

Col. Paul P. Townsend:

It will, it will most definitely complement this. But when you think about it, when I'm flying my F-35 around, as much as I would like to be in full afterburner the whole time, I can't. I'm going to use too much fuel, but also there's a wear and tear on those mechanical parts. So same thing with the central heating and power plant.

If I can dial back that demand a little bit, if I can supplement it with alternate energy sources, such as the one we're talking about here, that definitely increases the life of that program and makes it more resilient. When we look at living in Alaska, you got to be resilient. When we talk about fighting the base, for us, sometimes that's Mother Nature is our competitor.

We really look to say, "Hey, what we can do to build the resiliency of the installation, to be able to not only survive but thrive and deliver on our no-fail missions."

Tobias Naegele:

Okay, so I want to bring Tom O'Leary into this discussion. We've been talking about really keeping bases alive.

But you're looking at energy in a different way and with a new flying technology that will be a whole lot more efficient. What are you doing at JetZero and how will that change the nature of energy and flight?

Tom O'Leary:

Sure, thanks. First of all, honored to be here with this group and honored to serve. JetZero's goal is really just to help put innovation at the service of the warfighter with this particular effort. It's all about demonstrating a capability to take energy, fuel further than we're able to do today, so improving capabilities. If that's Great Power Competition, developing capabilities, it's all about what can we bring to bear to move energy further?

Double the offload, double the range or a combination. That effectively, because I'm not the expert here, we're a private sector. When we hear, "What are the problems, what are the challenges you're trying to solve?" We know that the enemy is not going to give a free pass on the supply lines. That's what we've heard. And so being able to move energy further to be able to allow force projection in the Pacific, to be able to deal with some of those threats, it's incredible.

The other thing that we're trying to do and really, just in collaboration and partnership with the Air Force here in terms of developing capabilities, is to be capital efficient. To lower the cost to develop a technology, to bring that technology into manufacturing. To bring that technology into service with fleet commonality, that's the whole purpose of a derivative program.

Tobias Naegele:

Commercial derivative.

Tom O'Leary:

Yeah, exactly. A commercial derivative program, and so this is just the first step of that. This is just about demonstrate the capability.

It's crawl, walk, run, but first step, demonstrate the capability to use efficiency to improve capability.

Tobias Naegele:

The efficiency that you're bringing to the equation, is less fuel by design using a blended wing body.

Could you just describe, give us the 30-second elevator's pitch? You got General Minihan right here, he's your customer.

Tom O'Leary:

Yeah, right. There you go. Look, we've been flying jets for a long time. Our entire lives, we've been flying in jet airplanes and they're basically the same shape. Our mission is essentially just to reshape aviation, whether it be commercial or military. Because we've improved efficiency from a propulsion standpoint, but we also have lift, weight and drag.

Really, an airframe can solve those other three forces of flight, and deliver a step change function in efficiency that we haven't seen. That's where you get 50% lower fuel burn with this particular type of configuration. We've just left so much on the table. Really, that's the thing is just like we had decades ago with the B-2, and now we're already into next-gen with B-21.

Can we do the same thing when it comes to carrying payload essentially? It doesn't matter what that payload is, but it's about reestablishing US aerospace dominance. That's really what we're all about, is this is an innovation whose time has long since come. Over a billion dollars in NASA research has gone into blended wing body technologies. We're here to say, "Okay. Time is now, time for action."

Tobias Naegele:

I want to go back, Dr. Chaudhary. We started out with Great Power Competition. Fuel across the Pacific is going to be among the biggest issues we're going to face, if we do end up in a hard conflict there.

We got a long way to go and you got to have fuel out there. You also have, I think, five Rs to your energy policy, and I'm not going to try to recite what the five Rs are.

Dr. Ravi I. Chaudhary:

Neither will I.

Tobias Naegele:

But you might walk us through that particular problem set and how you're getting after that, because that's where you put the fuel, it's how much fuel you have.

Dr. Ravi I. Chaudhary:

That's good. Show of hands, who's flown it themselves? Who understands the vastness of the Pacific? If we want to train to fight a near-peer competitor, we can't train and prepare on half a court. We've got to make sure we're ready for a full-court effort.

That means understanding the ranges and distances that are going to drive constraints on us, and then we've got to find out ways to mitigate them. At AMC, we're doing everything we can to increase the speed and range and capability going forward. General Minihan, I call it Minivation, how we're leading ourselves in the future.

Tobias Naegele:

Does that mean it's getting small?

Dr. Ravi I. Chaudhary:

What's that?

Tobias Naegele:

Does that thing make it smaller, Minivation?

Dr. Ravi I. Chaudhary:

No, I don't know. It's General Minihan's way of pushing us forward to meet the threats that we face. But blended wing technology is a methodology of disrupting the current state of play in acquisition advancement. It allows us to bring forth technologies that allow a better understanding of the science of flight, and how we can get gains we need to be more operationally effective.

The best thing about this is that we're bringing industry together, academia is coming together, all in the name of bringing technologies that can reduce our fuel flow and allow us to extend range, to extend loiter. To extend our ability to prolong our support to warfighters. To make sure those CAPs are able to fly longer and accomplish their mission in a more efficient fashion.

Tobias Naegele:

Right. I do think one of those R's is resiliency. Am I correct?

Dr. Ravi I. Chaudhary:

Yeah, absolutely.

Tobias Naegele:

All right, so let's talk about cyber.

Dr. Ravi I. Chaudhary:

Yeah.

Tobias Naegele:

Maybe this could be really for either of you guys. Your infrastructure is vulnerable. We have vast amount of operational technology, as well as information technology.

It's all mixed up together when you're using those networks. How are you protecting that element of your energy infrastructure?

Dr. Ravi I. Chaudhary:

Absolutely. General Miller just mentioned that ultimately, power is a JP-8 in employed-in-place missions, particularly I'm thinking primarily about our Space Force. Their mission is so vital to the nation, that we need to make sure that their capabilities are uninterrupted. That includes places like Schriever, Buckley and our spaceports. The Space Force is embarking on a spaceport of the future.

That means making sure that their power requirements are met as we modernize. Interesting factoid, the more requirements you place on your systems, the more power that it's ultimately going to man. That means protecting our data centers and ensuring our data centers are safe. That includes the control systems that are included in that employed-in-place mission. So making sure that's more robust with the right redundancies.

I talked about geothermal capabilities, bringing microgrids on board. Adding that redundancy to the system, to include novel ways of energy storage that aren't dependent upon natural resources owned by our potential adversaries. Areas in which you can employ deception to ensure that uncertainties with where potential vulnerabilities might lie can be masked.

This is a whole new space that we're going to be actually bringing investments in and upping our game in when it comes to cyber. Working with SAF/CN, we're going to be tightly integrating, and that's

something that hasn't happened in the past. In the past, we've viewed ourselves as titanium stovepipes. But we're going to disrupt that a little bit and fuse the natural definition of infrastructure within our critical capabilities.

To include how the connection between cyber infrastructure and what we know as traditional infrastructure, how they come together to make us stronger. And allow us to meet and exceed some of those resiliency gaps going forward.

Tobias Naegele:

So General Miller, you want to add to that? You do exercises, we were talking about that earlier.

You shut off the energy and see what happens. I assume you also are testing the cybersecurity of those systems.

Lt. Gen. Tom D. Miller:

Great point. Dr. Chaudhary was talking about industrial control systems are something that we've thought about for a long time. In some cases, the way we do, for instance, maintenance and repair and overhaul of airplanes, weapon systems, engines, you name the part. The way we do those repairs are now much more connected. Having that connection be secure, it's not just administrative or even operational, but it's the sustainment that supports all that and those have to be protected.

There's a lot of ways to mitigate that risk. Dr. Chaudhary's point about reimagining what the definition of infrastructure really counts as, I think, is vital. Because we used to look at them as these separate things and you might do evaluations separately. Then somewhere, those things have to be fused together as a total risk profile. Doing that earlier, I think, is key to understanding really where the puts and takes are.

Where to spend the precious resources we have, to get the most resiliency out of the system. I think looking at Operational Energy, it's not hard to imagine that it takes energy to produce the jet engine that will go back to AMC and the other MAJCOMS to fly that mission. That Operational Energy sometimes at a base, is producing the readiness components that will go to the operational Air Force to be able to go fly the mission.

We're a service of aviation. The infrastructure doesn't exist simply for infrastructure's sake. It is inextricably linked to aviation. That's why we are here. So being able to look at the way that's changed over time isn't just send an airplane off. And when it comes back, we turn it working all those missions together is a part of the resilience piece, which it's more complicated than it was before. But we've got brilliant Airmen looking at it every day.

Tobias Naegele:

Colonel, you deploy people. You talked about sending a unit on a mission earlier. ACE, Agile Combat Employment, is something that you are exercising and practicing and trying to prove.

How much of your work there is planning the energy piece of that and making sure that the fuel is there when you need it?

Col. Paul P. Townsend:

Well, that's a really fantastic point. When you look at how critical Agile Combat Employment is, not only to survive, to create challenges for the competitor, but also to deliver lethal effects, it's absolutely critical. It's going to be an outstanding scheme of maneuver that we're going to employ to execute those

lines of effort. When you talk about training air crew and training maintainers and having them operate in those environments, we're working very hard to do that.

But a lot of the energy and the fuels and those types of things that are going to be delivered at the time when they're needed, is a significant challenge and something that we're continuing to work through. When you look at technologies like the microreactor and the portability and transportability of that particular system. As it becomes more mature, that's definitely something that can create an opportunity for us.

Using the fuel delivery capacity and really setting it up to be just in time and to provide you some of that resiliency. It's something that you really can't get at home station. You really can't train to say, "Hey, I'm going to be delayed on my fuel," because the R-11 is right there. You need to go to the environment, you need to deploy into the theater, and you need to execute those operations and see where those friction points are.

Then to be able to start to develop game plans, and now it's also building a community of knowledge. The fighter pilot and the logistician, they're of one mind on how to meet those requirements. I think we're already starting to advance that capability and that understanding. Really starting to build those tactics, techniques and procedures to be more lethal in that environment, and do so in a way that makes us more survivable.

Tobias Naegele:

I'm assuming that you also are reporting back and you're saying, "Hey, this didn't work. I didn't have enough fuel when I got there." I know nobody wants to air dirty laundry and it's a little unfair perhaps to put you on the spot.

But I think that there is sometimes a disconnect between the theory and the execution. Since you're the guy who has to do the executing, what happens when you don't get what you need?

Col. Paul P. Townsend:

Well, that's where the debrief comes in and building those lessons learned. We want to make sure that it's not just a lesson observed, but it's something that's learned and internalized. Then an update to those tactics, techniques and procedures to be able to replicate that in moving forward. When you talk about whether it's employing from a wing, A-Staff concept, building those experts, building those teams in order to be able to execute effectively.

Then having that unemotional, fact-based debrief to build those lessons learned and start to build that common understanding. So that everybody knows that in order to generate this particular ATO sortie, these are the requirements that we're going to have those things and processes in place to be able to support that. It's going to be a challenge, but you know what is going to make us better? It's practice and exercising, and getting into theater and facing those challenges.

Because a lot of times you just assume, "Hey, I'm just going to tag into the local economy. I'm just going to tag into the local airfield and what they provide," but they may not have those capabilities. Where do we need to put the prioritization of efforts, and build that understanding? Is something that we're very keen to exercise and focus on.

Lt. Gen. Tom D. Miller:

Tobias, can I add just one bit to the ACE piece? Klaxon was talking about the fuel, the R-11 that's there at the location, but all the support equipment that he has, takes fuel to get it... It's a pallet position, it takes

fuel to get it there. If industry's looking for things they can do that we are interested in, we are interested in things that are light.

You can buy a carbon fiber bicycle that's never going to rust. We buy the same bomb lifts to load munitions into an F-35 that we did probably the year I was born. It burns fuel, and it doesn't need to burn fuel. Using electric to be the munition's loader, making it out of carbon fiber so it's lighter and doesn't rust.

There are things that industry can do that help us reduce our energy footprint, gives us the flexibility to have support equipment that can meet an F-35 or you name the weapon system so there's one set of equipment. That all reduces the amount of energy that has to be consumed to get there and to maneuver in the space once you are there.

Dr. Ravi I. Chaudhary:

Can I build on?

Tobias Naegele:

Yeah, please.

Dr. Ravi I. Chaudhary:

Perfect answer, Colonel Townsend, but I'm going to be honest with you, we and the staff owe you more. We owe you a hell of a lot more. That's why we're embarking on this. That's why we understand and have to keep the drum beat going, that operational and installation energy is a margin of victory in Great Power Competition. We have to keep that mantra up, but we need to back it up with action.

That's why the blended wing technology, that's why drag reduction technologies, that's why microreactors all play in the part of getting us ready for the fight, the biggest fight of our lives. With that, that's what this is all about, and why we want to period dot this with a moment of action and less discussion going forward.

Tobias Naegele:

Okay. So let's go back to operational, because it looks like that a lot of this is going to depend on you, Tom.

Tom O'Leary:

No pressure. I think it's going to depend on us, something us, we. Something's occurred to me recently when we were having a discussion with the supplier and we started to say, "Wait, wait, wait. We're not looking for a supplier, we're looking for a partner." We do feel a partnership and a sense of service to the Air Force. To my mind, the difference between a supplier relationship, that's where you do the least you can do.

In a partner relationship, that's where you do the most that you can do. Those are the kind of relationships, those are the kind of things that we need to be at. Just speaking for ourselves that's the way we come to it. We know there's a great history and there's a lot of great programs, et cetera. But when you see Great Power Competition and you read that document on the plane yesterday.

I'm getting a little emotional just thinking about it, because that's how deeply I feel about what our challenge is to defend this great nation. I'm a startup guy. I've worked for companies like Tesla, and startup people tend to say things like, "If money was no object and you could do anything that you wanted to, what would you do? Would you just go play golf?"

I probably feel like, and I've never spoken with a group like this, that most of the hands would go up and say, "I'd still serve my country." We feel that sense of service too. The thing is, this is a technology. It's about delivering a demonstration that provides a capability to the Air Force. Deliver energy further, more efficiently, blended wing body. It's time has come.

But for us to do this and other things to improve our position, to be able to rise to the challenges we have, I think we need partnerships. I think we need everybody in the game to be saying not what value can I extract from this? But what is the most that we can do in service of the nation? That's the way we look at it, truly.

Tobias Naegele:

I'm just going to put you a little bit more on the spot though. How soon?

Tom O'Leary:

2027.

Tobias Naegele:

2027 you're going to have a demonstrating?

Tom O'Leary:

We're going to demonstrate the capability because really it's about optionality. This is not a program, it's a project. It's about how do we demonstrate a capability? How do we take things that our most brilliant scientists, aerodynamicists have been working on that we invented? How many times have we seen a technology that was invented in America get made somewhere else?

This is about making sure, because our adversaries are working on this technology too. They've taken our ingenuity and decided, "Oh, let's take a look," and we know that. The time has come and really it's just about action, so our action with the help of Operational Energy in the Air Force, will be to demonstrate this technology in 2027 with the first flight of a full-scale aircraft.

Tobias Naegele:

Okay. There's a reason why they call it Great Power Competition. It's because we are competing industrially, we're competing economically, we're competing militarily. We're also increasingly across the world, competing for water.

Now water isn't energy, but it's awfully, closely related, isn't it? Dr. Chaudhary, maybe take a stab at how important water is and how you're addressing water concerns.

Dr. Ravi I. Chaudhary:

Yeah, absolutely. Thank you for that. It's no secret that water is vital to our operations. It sustains us, allows us to execute our mission. It cools our data centers. It allows us to operate in the flight line. It is integral to everything we do in our mission, so those utilities are critical to an installation.

One of the things we're doing in response to the challenge of Great Power Competition is up our game with utility privatization, which folks haven't talked about, and that includes water resiliency as well too. By privatizing our utilities, particularly on the water side, we can get a couple things out.

One, we get an instant boost to our current infrastructure, which is antiquated, and we've got pipes breaking all over the place. Two, we could reduce the amount of outages we have. Currently, the

department is about 25% privatized, but in the next five years or so, we're going to opt that by we're shooting for around 15% where we're going to finalize where we want to go.

But we know that that's going to reduce our maintenance backlog. It's all going to allow us to put in more sustainable systems that allow us to work with local communities, to ensure more resiliency for our installations. Again, improving the resiliency of our installations and our bases going forward.

Tobias Naegele:

We got three minutes. That means that each of you have about 45 seconds.

I'm going to go from this end down, because I want you to get the last word, Ravi. If we can start there, you've got 45 seconds.

Tom O'Leary:

Well, just echoing what I just said about partnerships, we've had the great pleasure to be working with Northrop Grumman and Scaled Composites that are helping us accelerate.

You put me on the spot and said, "When, when?" 2027 we think is clearly in frame, because we're working with those great partners, with Northrop Grumman and their group, Scaled Composites, on this so we're happy to be doing that.

Tobias Naegele:

Colonel?

Col. Paul P. Townsend:

Well, 2027 could turn out to be a pretty big year. We know about the blended wing. It's also where we're going to employ the microreactor if everything goes on track. Then also with the rhetoric of 2027, the importance of that. When you look at the installation, the power projection that Dr. Chaudhary talked about.

It's absolutely critical that we continue to invest into the infrastructure, building that resilience. The importance that the bases play in the Pacific, not just west of the International Date Line but also in Alaska, are absolutely critical that we continue to maintain that investment and use that power projection.

Because I already demonstrated the 354th Fighter Wing can reach out and touch into the first island chain with the support from our air refueling partners, and be lethal and deliver that air power. It's something we need to continue to build that resiliency to ensure the no-fail mission and valor and combat.

Tobias Naegele:

General Miller?

Lt. Gen. Tom D. Miller:

So rare in time where you have a secretary and under and two chiefs that are, and it was described today and yesterday, that are so aligned. They are very well aware of the issue we are talking about here and that our installations are not sanctuaries. Dr. Chaudhary has talked the team through that a number of times in the last few months.

The point being that it is going to be different. To think about things differently requires uncomfortableness, and uncomfortable by its nature is not something people are usually drawn to, but irrelevance is worse so we've got to make the changes. Some of the changes we talked about today, some of the changes that'll be talked about later on and also tomorrow.

I am encouraged that we have, there's a leadership team at the very top of the Air Force and the Space Force that sees this issue so clearly.

Dr. Ravi I. Chaudhary:

Thanks. Our secretary and our chiefs and our entire leadership team couldn't have been more clear yesterday and today, we are out of time. Think about that. We are literally out of time. That means we're going to have to innovate and do things that we are uncomfortable with, but that's who we are as Airmen and Guardians.

We've been innovating for over 80 years from the first of flight, first area we're fueling, first supersonic flight, Tuskegee Airmen, stealth, flying wings. We've done it all in our history. It's time to do it again. We've had competitions before. We had competitions this last weekend.

But this is an endeavor in which we dare not come in second place and we won't, because of all of you and the team we have up here. Thanks again, it's an honor to be with you.

Tobias Naegele:

Well, thank you all for the session. I think we all know what the secretary said. Change is hard, losing's unacceptable. Thank you, everybody.

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