



Maj. Gen. Larry Stutzriem, USAF (Ret.):

Well, good afternoon all. We're in the home stretch of a fantastic Air, Space, and Cyber Conference and I really hope you've taken the opportunity to really share in the extraordinary things that the staff has set up this year and welcome to this panel on "Guarding the Northern Tier: Domain Awareness and Air Superiority in the Arctic." I'm Larry Stutzriem, I'm Director Research at the Mitchell Institute for Aerospace Studies. Well, defending the homeland isn't just another DOD mission set. It's the department's primary obligation. In an era of great power competition, our homeland is no longer a sanctuary immune from conventional adversary attack. Both Russia and China have developed a wide array of weapons, capable of striking it, and the Arctic is an attractive pathway for launching these attacks. We need to improve Arctic domain awareness to bolster deterrence against conventional air and cruise missile threats. Adversaries will be less inclined to launch strikes on the US homeland if they know the United States can anticipate and take actions that can dissuade an attack or mitigate its success.

This comes down to empowering US leaders with sufficient time to respond using decision quality information more quickly than the adversary. So we're fortunate today to have a fantastic panel from three very unique perspectives in our topic today. We're fortunate to be joined by General Glen VanHerck, who is Commander of US Northern Command and of course, Commander of NORAD. And in those roles, General VanHerck has been a leader not only overseeing the day-to-day air defense of the North American continent, but also advocating for next generation technologies and capabilities. We're also glad to welcome Lieutenant General David Abu Nahom.

You can sign up for the fan club afterwards. He's the Commander of Alaskan, Commander in US, Northern Commander, of course, dual headed as the Commander of 11th Air Force and he's responsible for planning and executing all homeland defense operations within his AOR. Finally, we're also joined by Major General Greg Gagnon, and he is the Deputy Chief of Space Operations for Intelligence. In orbit, dude. That's nice. He's an Intelligence Officer and Advisor to Chief of Space Operations General Salty Saltzman. So from each of you, I'd like to just jump right into questions. We're not going to do opening comments because it's important to start and understand how the nature of the threat has changed. So going down the stage from my position here, general, I'd like you to talk about a bit that changed since the Cold War about threat, what's different about it?

Gen. Glen D. VanHerck:

Well, thanks and thanks to AFA and you, Stutz, for having us. It's a privilege to be here with you. What's changed? A lot has changed. First I'd start with the platforms. When NORAD stood up in NORTHCOM just over 20 years ago and we were set up for Soviet type platforms coming over the pole to drop gravity weapons on North America since that time, the threat that when NORAD stood up, we were really focused on those bombers and intercontinental ballistic missiles. Today, those bombers still exist, but now they have long range standoff cruise missiles that can shoot cruise missiles from within Russia, from over their own airfields or submarines off our coast out in the middle of the Atlantic or the Pacific or in the Arctic that can hold much of North America and the United States at risk.

Other things that have changed, what I would tell you is the characteristics of those platforms. Now, low observable cruise missiles, which make it really challenging to detect those cruise missiles, the other platforms. Other capabilities, not only airplanes and submarines that have developed capabilities to hold the homeland at risk, but they're coastal defense cruise missiles right across the bearing sea from the Arctic, from Alaska that hold much of our critical infrastructure at risk with even hypersonic capabilities today. I expect to see in the future continued changes to platforms that'll challenge us such as

commercialized containers and those types of things. I should expect to see that being developed in the future.

Other things that have changed, the maneuver of the platforms and the capabilities. So not only are we fighting against a ballistic platform that you can easily predict where it's going to impact, but now we have hypersonics and AMVs that are maneuverable vehicles, which makes it really tough to predict impact location and where the threat's actually going to go. I can tell you what hasn't changed. I think that's just as important to talk about what has changed, is our ability to detect those threats. We still have the 1980s North Warning System. I see a Canadian out here as well that was designed in the '70s and fielded primarily in the eighties to detect those threats.

And I said previously that that's like a picket fence today and I'll say that again publicly because you can plan around that with low observable capabilities and fly around that as well. And so, we're being significantly challenged. Some of those locations by the way, are falling off into the ocean due to environmental change in Alaska as well, and General Nahom can talk to you about some of that. I think that's important to talk about other things. What's the impact of that really quickly and I'll pass it over. The impact of that has reduced decision space and time for our senior leaders and it erodes strategic stability. That's what is most concerning to me. The risk of strategic deterrence failure candidly goes up when you can't detect threats to your homeland. You don't have great response options to give to the president or the secretary or in the case of my Canadian bosses, the CDS or the minister or the prime minister.

So I'm concerned about that, but what are we doing about it? I'm encouraged a lot of money going into NORAD modernization, about \$80 billion out of Canada over 20 years and then I'm encouraged with what the Space Force is doing as well with proliferated low earth orbit capabilities to allow me to see some of those threats that we're talking about. But there's much more to do. The over the horizon radars that are going to get fielded for in the United States and two in Canada are not the end all be all. They'll help us with that domain awareness, but we have to connect that domain awareness, that data and information to some type of a capability that gives us an integrated air and missile defense capability to effectors and those effectors can be non-kinetic or kinetic. And so, we're doing a lot of work there as well. I'll turn it over to Abu to answer anything else.

Lt. Gen. David Nahom:

No, again, thanks for having us here today. It's wonderful to get to here and talk about the Arctic and you say we have different perspectives, but I do work for them, so it is a similar perspective. I'll tell you that. What has changed, you talk about the threat, but what has changed is very significant is the environment and we have to talk about that because number one is the sea ice is changing and what that's doing is it's uncovering areas of exploration for rare earth minerals, fossil fuel exploration areas that are attracting a lot of attention. It's opportunity. It's also uncovering new passageways to get to and from Asia and Europe. This opportunity is bringing competition and competition can bring crisis and what has been an open common to the world, so we have to watch it. The CI shrinking is also having effect on the coast and it's causing much more coastal erosion.

As General VanHerck alluded to, we see it's threatening a lot of our north warning system sites. In fact, if you go up to a [inaudible 00:07:53] on the Northern Shore, the site is quite literally falling into the ocean. These things take investment and the other piece of the environment that we're watching very closely from the defense perspective is a permafrost. Much of our infrastructure in the Arctic was built on permafrost and it's not as permanent as we like anymore. So we're seeing things like large cracks and runways and foundations giving away on buildings. These things are going to take investment otherwise we're just not going to have the infrastructure up there that we need in the future.



Maj. Gen. Gregory Gagnon:

General VanHerck opened his comments with sort of an explanation of the threats and use some examples and then talked about the value of having awareness and a key element in that awareness is time. A wise man often says homeland defense doesn't always start at home. It's actually General VanHerck's line, I've heard.

Gen. Glen D. VanHerck:

He doesn't work for me by the way.

Maj. Gen. Gregory Gagnon:

I don't.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

I think he's trying to work for you though.

Maj. Gen. Gregory Gagnon:

But I've had the opportunity to sit in Congress with him in skiffs that are highly classified as he educates senior leaders in our government to the threat. And the important thing for people to understand is homeland defense doesn't start at home. It starts with understanding the threat. And today, our ability to understand the threat has some constraints and has some limitations and it has those limitations because it's set on the foundation of investments made when I was in diapers. Okay, we talked about the 1970s. I was born in 1972, so put that in your mental framework as you think about things like vacuum tubes that help run radars, we couldn't possibly be using those today, could we? Well, maybe we are. And then let's talk about where we're headed. Domain awareness deep into the Arctic and penetrating into foreign countries. Sometimes that domain awareness comes from another domain.

Sometimes it comes from penetrating cyberspace capability. Sometimes it comes from penetrating space capability that can see in denied areas, that can detect a missile launch the second it launches. And it may in the future and it will very likely in the near future be able to detect and track and also track those new threats that General VanHerck talked about. New threats are threats that are not just ballistic, they're threats that can maneuver and that is the key characteristic of space development agencies, missile warning, missile track that the space force is bringing to bear at the latter part of this decade to handle new threats. So not only will we continue to have the world's best missile warning to deliver time to decision makers, we will also now have the warning to handle the new threats.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

While we're here, while we have this discussion going on, I was listening to a couple of comments in the audience before we started and maybe jump right into sizing up for us, what kind of modernization pieces are there? We use these current Northern Warning System always since the Cold War. Of course, it's been upgraded in some ways, but there's many pieces in it that you referred to. So maybe down the line each one of you, what do you see as the priorities to modernize?

Gen. Glen D. VanHerck:

Yeah, I break that into time epics and so what I'm focused on near term within the fight app let's say, is not a lot of things you can buy in that timeframe candidly. So it's focusing on resiliency, hardening. I didn't have policy on what to defend. And so, now I have that policy and you take that and you assess it

to make yourself as resilient and capable as you can to defend that, but there's not a lot we can do in the near term. In the midterm, I think there's a lot we can do and you can do some of this in the near term as well. And as General Gagnon said, the only thing I can never give the president and the secretary enough of is time and decision space. And I think we need to focus on better data and information usage of which much of the data and information today is in stove-pipes.

We build singular systems designed to do a single mission. So for example, a ballistic missile defense system can actually see small UAS to space-based capabilities and everything in between. The question is what are we doing with the data and the information? We have to process it faster, so that means we have to take it, use artificial intelligence, use machine learning and distribute it to decision makers in a timely manner to create deterrence options and if required defeat options. Unfortunately, where we're focused primarily with the services is on censored to shooter, not censored to decision maker. The National Defense Strategy has tasked me with a globally integrated layered defense of the homeland.

To do that, you have to have the ability to see across all domains, collaborate in real time to generate those effects. And as said, homeland defense, I don't believe it starts in the homeland. It actually starts with our asymmetric advantage of our allies and partners and my fellow combating commanders generating effects for me. So that requires the better usage of data and information I think, and that's what we should be able to feel. By the way, we've demonstrated this 18 months ago in Global Information Dominance Experiment 4. I handed that off to the department and candidly we've gone backwards. We've got to change our culture to go faster within the department.

And finally, in the long term, I just published my Homeland Defense design Next, the future of Homeland Defense looks vastly different than today and that includes in the Arctic. And it includes the use of autonomous platforms, unmanned platforms that can lower for a long time that frees up joint assets to go to a forward fight. So I'm not in direct competition with Admiral Aquilino and General Cavoli for assets. I'm able to do those things on my own. It has non-kinetic effectors or limited area defense through the use of the electromagnetic spectrum, more deception and denial than we use today. I think that's the future of a homeland defense. It also involves campaigning, which I'm doing today, campaigning to demonstrate every single day the ability to defend our homeland through capability and readiness. But also to ensure that we're demonstrating our will and our resiliency and those I think are crucial to integrated deterrence. And so, that's where we're focused. I think we need to go modernization in the future.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

Well said.

Lt. Gen. David Nahom:

Yeah, just a couple of things to add. First when you look at and kind of steering it back to the high north, if you come in my office and you look at the map that I look at every day, Alaska's in the center of it. And when you put Alaska in the center of it, you really quickly realize that the competitor nations were most concerned with the acute threat from Russia, the long-term threat from China. They're going to have to come through Alaska airspace to get to the homeland and that includes Canada and the continental US. And so, we have got to be able to build that sensor system within Alaska so we can defend the homeland as far out as possible. General VanHerck talked about the sensors and we look at where we're going right now with over the horizon radar and certainly some space borne capabilities. I'll let General Gagnon talk about it.

Those are important as well as the sensors that give us the aerospace warning aerospace control right now we rely on a very outdated system as General VanHerck alluded to, of mountaintop radars that



were designed a long time ago, that are not built for us to complete kill chains of anything ingressing on our nation. And those we must not only address some of the other sensors that give us a situational awareness, but we also have to address the sensors that will give us the ability to engage things coming into our nation. And then there's the data piece too. General VanHerck talked about it.

What I'll expand on right now, and obviously we can't get in the details in this forum, but we do build a lot of systems that have a lot of data out there and in many cases, they were built for that specific system General VanHerck talked about and they may be only using 5 percent of the capability of that system. The other 95 percent, I'm here to tell you there's a treasure trove of data that I could use and right now we're working to find out how we can get that data and put it into our system so we can help build that picture because some of the things we're talking about are 10, 15 years down the road, unfortunately with investment. There are absolutely some things we can do in the next two or three years to give some more decision space to our senior leaders.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

Very good.

Maj. Gen. Gregory Gagnon:

One thing that's not readily understandable to everyone is how austere and unpopulated the Arctic is. I had the opportunity about three months ago, I went up to Norway and that's one of the most populous parts inside the Arctic Circle. But because there is a lack of population, there tends to be a lack of market demand and that absence of market demand for what you do on your phone or what you want to do with broadband has sort of limited commercial development of connectivity for the Arctic region.

There's a change underway in the use of proliferated LEO as an orbit and as an approach to providing communication. Most communications from space come from the geo belt, which is the one that's way out there and that satellite kind of stays in the same place above your house all the time. It's how you get DirecTV.

But what the US economy and the international economy is doing today is they're starting to use what they call proliferated LEO, which is one of the terms we used earlier on the panel. That's hundreds of small satellites moving around the earth, close to the earth and becoming like a mesh network. That mesh network just by the design of it and the orbitology can't help but pass over the arctic poles. And in doing so, let's just say that today there's a large network in outer space, whose goal it is to connect the world that has 4,000 satellites that are connecting the world. Five percent of that constellation is passing over the poles, so the market itself will change what's available in the high North in a way that it couldn't before. A second demand signal for the high North is what General Nahom covered about five minutes ago, it's the melting ice.

It generally takes 31 days to go from the eastern seaboard of China to Northern Europe. When they have a continuous 12-month Arctic route that will go up through the bearing sea and then hook a left, that'll cut 10 days off that. And although all of us are in national security, the rest of the city is in business. And if you're in business, 20 days is cheaper than 30 days and they know that. That'll drive international commerce through that sea line of communication. Being aware of that the Russian government is continuing to build their military along their northern edge and that is something that we have to watch for long-term domain awareness if you will, but really geography awareness. Because when you look at a map, if it's centered on Alaska, it looks one way. If it's centered in Moscow, you're not only the largest Arctic nation, you're not only the nation with 11 time zones, you're also the largest geographic nation in the world.



Maj. Gen. Larry Stutzriem, USAF (Ret.):

Yeah, very well said. We'll get back to some space topics and where they apply, but can I peel back over the horizon radars you mentioned general, can you talk a little bit about how that's different from radars traditionally and what that might do for you in terms of your missile defeat strategy?

Gen. Glen D. VanHerck:

Yeah, so as far as missile defeat, it really does nothing directly for missile defeat other than give me more time and decision space by overcoming the curvature of the earth problem by bouncing off the ionosphere to see further. I think the biggest thing it does is not only helps me with the air domain, it can help with space domain awareness. It can also help with maritime domain awareness and give us that time and decision space that we talked about. The real question is what are you going to do with that data? And the common answer is, well, once we give you over the horizon radar, you'll have everything you need for domain awareness.

Actually, I don't believe that's correct. We need to connect those over the horizon radars to additional systems that can maintain track awareness, help us then feed effectors to generate the effect that you talk about for defeat. And defeat by the way, doesn't mean kinetic solution. I believe we'll talk about that a little bit later, but defeat may mean a non-kinetic effector. It may also mean that I get further left where I pick up the phone, I call the President of the United States and I say, "Mr. President, what we see ongoing 3,000 miles away is this right now. I recommend you pick up the phone and call that nation's leader to create a deterrence option." And so, there are multiple ways to use over the horizon capability.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

General Nahom, from your perspective as the air commander, over the horizon radar enhances what you do?

Lt. Gen. David Nahom:

Yeah, anything that would give us indicators and warnings sooner would help us out because we can put assets in the correct place at the right time. Because as General Gagnon said, it is very sparse up there and you're not going to have enough assets to be everywhere every time. You're going to have to be much more selective. And whatever the kill mechanism is or the mechanism right now what we do in relative peace time with the Russians, it's a lot of monitoring. We've got to have a way to direct the aircraft in the right place at the right time, otherwise it's just too much time and distance. And when you talk about the distance, the number one thing I deal with, the number one concern I have every time we have an incident up in the Arctic and we do have them all the time, is search and rescue.

And when General VanHerck talked about uncrewed systems, it is very attractive because when you start sending fighter pilots and single engine airplanes, 6, 700 miles out over the Arctic Ocean, if there were to be a problem, there's not a lot of quick solutions I have. And so, these are things that go through our mind and over the horizon radar will give us some situational awareness so we can make better decisions sooner, not just at the national level, but certainly at the operational tactical level as well.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

Yeah. Well, General VanHerck, you kind of launched this into a discussion, this concept of how to operationalize the concept of missile defeat that getting as far left of launch as possible. You want to talk a little more on that?



Gen. Glen D. VanHerck:

Sure. So what I would tell you, when I first got to NORAD and NORTHCOM, now 37 months ago, my Ops and Intel brief every morning we do was a PowerPoint briefing that talked about what happened yesterday and I'm like, "I'm mildly interested in what happened yesterday, what's going on right now and what's going to happen tomorrow and what are we going to do about it." I took command on August 20th, 2020. On the 3rd of September I came here to Andrews and we did the first global information dominance experiment and that's truly when I realized the incredible power of data and information. Now having flown the F-35, it's a data and information machine and that's kind of where I became the data and information zealot. But I saw the need to take that and harness that to get more decision space and time. And so, where we are now, I see live data on my ONI and that was driven a lot by COVID by the way. The chairman asked questions like, "How many nurses, how many respirators?"

And so, that database exists. I can go plug that in and tell exactly immediately how many nurses or wherever they are. So that's how you take that and gain more decision space and modernize going forward. Now, I told you my strategy doesn't start in the homeland. It starts forward with my allies and partners and my fellow combatant commanders and the NDS directs me to defend forward through a layered defense concept. Well, to do that, you've got to be able to collaborate. And so, Admiral Aquilino's priorities may not be the same as my priorities. We have unique challenges, especially in the Arctic where three combatant commanders come together right off the coast of Alaska. And so, being able to collaborate in real time across all domains to develop deterrence and defeat options is really powerful. And the only way you do that is you share that data and information and collaborate utilizing that. So I'll pause there and let these other guys talk about it.

Maj. Gen. Gregory Gagnon:

So one of the things on improving the ability to not just track ballistic but track maneuvering missiles, that is where the US is headed in the 24 to 36 month timeframe. In the last 12 months, we've added 23 new satellites to outer space that start what's called tranche zero of the Proliferated Space War Fighting Architecture. That's the architecture that's being built for today. That's the architecture that sends an upgrade into outer space every 24 months. The first part of this is to build our weapon space that helps with missile warning, missile track. The second part of this is to provide a data fabric that not only links to command and control centers, but can also in the future link to weapons in flight to help create shorter response times after decisions have been made. The elements in space that are critical moving ahead remain similar to the elements in space that were critical the last 15 years, warning, command and control and being able to use space at the time and place of our choosing.

Gen. Glen D. VanHerck:

Yeah, I'm going to do a re-attack on you too. So how do you operationalize defeat is really the question, right? And so, defeat doesn't imply a kinetic effect. It may be many other effectors. Every time North Korea launches a ballistic missile, when we go back and we look at the overhead imagery, what we see is our satellite constellations see it, commercially available data and information sees that, but we didn't analyze it and process it in a timely manner to actually take options against that potentially. So the question is when are we going to go to on orbit, AI and ML? That actually takes immediately upon sensing that information based on pre-programmed information to process it and disseminate it in a timely manner. I think we have to go to space to even get further left supply chain interdiction. And we can't go talk a lot about that in here, but missile defeat involves much more than potentially even military means, it's supply chain interdiction options and other things to give us defeat before we have to do kinetic endgame defeat.



Maj. Gen. Larry Stutzriem, USAF (Ret.):

We are not in the Cold War anymore, it's a new age. General Gagnon, let me pursue one thing and that is traditionally your space coverage of the Arctic has been sparse. Do you see commercial companies rushing to cover that? As you mentioned before, that's starting to open up. There's more tourism, there's more activity. But do you see that's going to have to be a defense priority to fund that coverage or can we see some support from industry?

Maj. Gen. Gregory Gagnon:

You will see industry demand, which is what I think you're asking. You will also see demand from other countries that operate in the Arctic. Space Norway is highly involved in space and in the Arctic, and that's part of where they see themselves going for not only their commercial development but also for the defense because they border Russia, so that's part of their plans. The bigger issue, going back to the AI and ML is making sure we get to what we call automatic target recognition starts to work. That's when we're starting to use pixels that come either from the synthetic aperture radar satellite or from the electrical optical satellite and getting those pixels to automatically correlate to a prebuilt model of what we think something is.

We have been trying to tackle that project since I was a captain at PACAF. It is very difficult. It is doable. So there's a lot of IRAD in the audience that is really a touchstone that we need to pursue. I was in this room last year with the SIOs, the senior intel officers, and what they caught out of the 30 minutes was analysis Trump's collection, every time. It is, we have plenty of data. What we need for these gentlemen is penetrating insights. Those are two different questions.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

Yeah. Let me ask, General Nahom, you brought up a couple of things. One is to fill this gap between now and the 10 years, 15 years modernization takes, do you see the use of UAVs possibly filling some of the holes we have?

Lt. Gen. David Nahom:

Yeah, absolutely. Uncrewed systems provide a huge opportunity, especially in Alaska and the Arctic. The ability to persist and offer us not just on top of the on orbit capabilities, but in the air ability to see things and stay airborne a lot longer. There's a lot of opportunity. There's been a lot of questions to me. Could you see actually in the defeat mechanism, you could see that in the future, when I look at the end of the kill chain, how would we defeat a threat? It doesn't have to be kinetic, it could be non-kinetic. There could be a lot of reasons. What we really need is we need something that can sense because something that's going to go out, there's going to have to sense by just to complete the kill chain, it's going to have to carry some kind of weaponry, whether it's kinetic, non-kinetic, it's going to have to be able to persist and an un crewed system could persist a lot longer.

And then probably most importantly, it's going to have to be able to connect and because if it can't connect to the data systems, then especially in an uncrewed system will be challenged. I think that may be a little further away in the next couple of years because of that last part, the connect part, that's the part I worry about the most up in the high north. So we are going to be left with crude systems to do a lot of our work, certainly in the near term. And sir, if you want to...

Gen. Glen D. VanHerck:

I agree a 100 percent with Abu, we have to go there. As a matter of fact, the homeland defense design next I put out is a 2035 epic and it talks a lot about the use of uncrewed autonomous and autonomous



doesn't mean pulling the trigger autonomously. Autonomous means processing data and information autonomously to connect and share that. So we have to go there. Going back to the commercial thing real quick, we're utilizing commercially available information today. The thing we have to ask ourselves is do we want to find ourselves where an individual or a business can impact national security by their perception or their political views? And we find ourselves in a situation where now they're impacting our ability to conduct operations around the globe. So I think we have to take advantage of commercially available information and data and capabilities, but not at the risk of national security and we have to balance that.

Maj. Gen. Gregory Gagnon:

I think the commercial sector provides a niche capability. It can't be the replacement for government capability. It needs to be used in the proper way. If we go back 16 months ago to February of 2022 where Russia is massing forces to invade further into Ukraine, the United States intelligence community as well as our foreign policy experts hit the road. They hit the road, they flew to Europe, they went to each capital. They tried to pitch that the Russians were about to try to drive to Kiev. What really made it work, because our allies don't always believe us. What really made it work was showing them proof.

And because there are other government officials that have high security clearances, we generally tell them the proof that we have. But they're handcuffed because they can't talk to their parliament and they can't talk to their public. That's where the commercial imagery came in so valuable. It helped us tell the story, not just to the decision maker, but to the decision maker stakeholders in Europe and today we see a Europe that went from not meeting 2 percent to agreeing to have 2 percent be the goal, and commercial imagery helped do that. But commercial imagery is not the replacement for government imagery, it's a compliment to it.

Lt. Gen. David Nahom:

Yeah. One more on the US piece too is it's very interesting up in Alaska right now because when you look at how we would experiment and how we would actually further this technology, Alaska offers a lot. You're looking for bases and runways you can operate off of, we have that. Airspaces you can operate in, we have that, and the permissions to do it, we have that as well. So for the companies out there, it is a place to come and experiment because we also have a need to get to some of this technology quickly.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

Open invitation.

Gen. Glen D. VanHerck:

Open invitation. So we need to work the policy aspect of that right now though, because what's going to happen is we develop and field the capability, then we try to fight the policy battle of flying uncrewed systems in North American airspace. We'll find ourselves with a challenge. So right now is the time to address the policy issue to ensure that the whole of government understands the need to go down this direction and we can do this. We don't have to fly them in the central portion of the United States, but off the coast in Alaska in very unpopulated areas. I think we can get that policy in place.

Maj. Gen. Gregory Gagnon:

We went through one of those policy battles probably about four years ago when we looked at doing autonomous launch and autonomous destruction for rockets going to outer space because that was



scary. That was new and because we were able to work through that, our space ports of 2019 are not our space ports of today. Today compared to 2019, America is launching three times more than it did in 2019, and that volume is enabled by autonomous systems and that has helped us on the range and it has helped us with safety and it has helped us maintain the environment and it's been wonderful, but the policy fight can generally be the hardest fight.

Gen. Glen D. VanHerck:

We don't do a good job candidly of bringing in those other stakeholders. In the beginning, if you bring in commerce, you bring in transportation, the FAA, and you partner with them alongside you through the development process, it makes it much easier than waiting until the end and trying to change the policy. So we have to be more aggressive in making them part and Congress is the same way. You got to make them part of the discussion early on.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

Yeah. We probably got time left for one question and I'd like to change it up a little bit and it does go to what you said general, and that is the nature of the need for good weather coverage, forecasting, sensing, and so forth in the Arctic that's traditionally been a weakness up in the Arctic DMSP. The defense program is sunset, it's on its last leg. There is a program, the electro-optical infrared weather satellite, which is doing very well. But can you talk a little bit about the importance, especially in the operation side of having defense dedicated weather coverage up in the north?

Gen. Glen D. VanHerck:

I'll quickly go from the operational perspective. So one of the biggest challenges we have every single day, and we've been conducting operations through my campaigning plan here recently is exactly that the weather in the north is very challenging and having great domain awareness on what's going on. So I need it as an operator. I'll defer to the expert down here from space to tell us how we're going to get there.

Maj. Gen. Gregory Gagnon:

We do have a weather system follow on satellite that'll program in later in this decade, and weather is something that's provided from a sensing perspective from the Space force as well as from NOAA and other parts of our government. So there are multiple contracts that are used. Weather's also important when you're trying to forecast what the adversary's going to do. War is hard and everything in war is hard and the weather always gets a vote. So it's important on both sides of the equation as things play out in conflict and it will continue to be just as important in the future.

Gen. Glen D. VanHerck:

Quickly. So 52 percent of my AOR is in the Arctic, and for me to execute the plans that I'm tasked to defend our homeland, we must be able to operate in the Arctic, and that requires the domain awareness, which also is the weather aspect of that. It also requires us to develop the capability and organize training, equip to operate in the Arctic. We can't just say, Hey, this is really hard. We have to do a better job. And being able to forecast that weather will help us, but ultimately technology can help us too. We don't need to solely focus on the technology aspect though, because I think the human aspect of operating in the Arctic is just as important to develop humans and capability to support the humans to enable better human operations.



I think search and rescue and personnel recovery in the Arctic, we need to go a different direction from the model that we've been on. That model is the golden hour. We got to get you within an hour. I think we can use uncrewed platforms to focus on enabling somebody that is down in the Arctics to survive until we can get them, not necessarily go recover them within a timeframe. So I think there's many things technology wise in the Arctic. It requires a culture shift to get after it.

Lt. Gen. David Nahom:

And General VanHerck's right, that is one of the number one concerns and some other things obviously that we don't do well and we're trying to do better now is how we outfit Airmen, how we train Airmen for the Arctic, and those are things we're addressing right now. We frankly did not do a very good job of even giving Airmen the correct clothing when they came up north. The good news for us is the US Army's done a much better job and we're actually drafting on some of the technology the Army's given to the individual soldier and now to the individual Airmen. We're also not just training aircrew how to thrive in the Arctic, we're now training everyone how to thrive in the Arctic because it is important as we learned to operate up there in a very tough environment. I'll just say you saw last year with a high alt two balloon incident, what people saw in the lower 48, which is how we refer to the rest of the country by the way, in Alaska, they saw a bunch of fighter pilots chasing balloons.

From my perspective, what I saw was an incredibly difficult air operation. In January, in Alaska, in the middle of a blizzard, we had F-35s taken off 30 minutes before a blizzard hit with no idea how they're getting home. You had tankers taken off in the middle of a fight. You had snowplow drivers working around the clock trying to keep the runways clear. You had HH-60 Air Force rescue guys flying through the valleys of the Brooks Range at night in NDGs in a snowstorm. And when we asked for resupply from other helicopters from other services, I was told, "Oh, it's too dangerous to operate in the Brooks Range in the winter," but Air Force Rescue didn't get that note and they did it anyway. It is absolutely on our mind and how we predict it and how we operate it and how we train and operationalize the Arctic is going to be something we have to keep an eye on moving forward.

Maj. Gen. Larry Stutzriem, USAF (Ret.):

Very well said. Thank you so much. Please pass our respect and our thanks when you go back. We appreciate it. That concludes this panel.