

2024 Air and Space Power Conference

Transcript – National Mobilisation: Perspectives on the Ukraine Conflict

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JAMES B. HECKER: Thank you for that introduction, it doesn't go past me that I am following the CDF. Thanks for that. What a wonderful speech he just gave and I am the last speaker of the conference. The next three hours should be pretty good. (LAUGHTER) We will have a good time.

You might ask why am I here? As the Air Component to Europe, the Air Component for Africa and the Air Component for NATO, why am I here in the Indo-Pacific? It is easy because Air Marshal Chipman invited me to do this, and it is something I wanted to do, because Australia has done some great things and, in my career, I have spent a long time getting to know the professionals, aviators, maintainers, space operators that you have and I need to pay it back a little bit because you guys have done a lot for us in NATO. Whether it was my first time here in 1997, at Tandem Thrust, whether it was Red Flag exercises, Northern Edge exercises, Cope North, it didn't matter, any time that I was with the Aussies, they are always professional and I could always count on them. It didn't stop there. When I got over to Afghanistan, I worked with several Aussies. I did own the joint staff as well and I met a lot of them here. When I got to NATO, the contributions that you have made with over a billion dollars, given into the effort to Ukraine has been essential. Thank you to you and your government and then, most recently, we asked "Do you have an E7 that we can borrow for six months?" Without hesitation, the answer was "Yes". It came over and it helped us secure the logistic lines that we have to get things into the Ukraine and whether that was humanitarian assistance, or whether that is military equipment, we made sure that those lines were safe and we couldn't have done it without your help. Thank you, you and New Zealand also provide a lot of folks over there that train the Ukrainians and it's been roughly 30,000 folks that you have trained. Some great work and we really appreciate it and it is an honour to be here and speak to this great crowd.

He asked me to talk about lessons learned of the Ukraine. I think like the CSO talked, we are still learning lessons but there is some definite things that we have learned and I would like to go over a couple of those. The one that comes to mind to start with - I was brand new on the job and we were at Riyadh at an Air Chiefs Conference and there was 15 Air Chiefs there. A lot of the Air Chiefs were talking about their Ministers of Defence and what we need and these kind of things. The big thing was all of our Ministers are talking about we need more artillery. This kind of went on for a while and how do we change the nature of this? I was relatively new there but I had to raise my hand and say "Why don't we talk about nobody got air superiority?" And that is why we are talking a lot about artillery. When you look at the war in Ukraine, everybody here thought it was going to be over in maybe two weeks, I think, maybe a month at best, because we all assumed Russia would get air superiority early on in the conflict. If you look at it, the thing that stopped them from getting air superiority is a good integrated air and missile defence system that Russia made and Russia supplied to the Ukraine a long time ago and they were not able to defeat that integrated air and missile defence and gain air superiority. If they were able to do so, I think we could have seen a two-week war or a one-month war because all the equipment that the 50 nations so far have contributed to the Ukraine would never have gotten over the border or, as soon as it went across the border, it would have been hit with close air support and it would never have made it to its destination.

Air superiority, I don't have to tell the aviators and airmen here how important that is. We kind of take it for granted now and I spend a lot of my time talking to other services about "Hey this is going to be a different war when we are going against peer competitors, whether that's Russia, or whether that's the PRC", it is going to be hard to get". In the US, we pride ourselves that not a single friendly soldier has been killed by an enemy aircraft since April 15th, 1953, so we just celebrated the 71st year of protecting our soldiers on the ground.

Over the last 30 years, 35 when you go back to Desert Storm, we didn't have air superiority to start with but we got it fairly quickly. It was primarily air that got it with some help from space. We got it fairly quickly and then we did what we did.

Over the last 20 years in Afghanistan, it has been largely uncontested so we had it going into it, same with Iraq, the second time, and Syria. I think people became accustomed to that and one of the greatest posters that I like to look at, it's a picture of some soldiers and some marines, laying in the desert in Iraq, sleeping - they are not in a bunker, they don't have any protective gear on and above it says "This is what air superiority gives you" because they weren't afraid that anything was going to attack them.

Unfortunately, that is not the case anymore. When we go against peer competitors, Russia has a very sophisticated integrated air and defence system. China is even more sophisticated and it is going to be very difficult to break down those barriers. When I took over, I took about six months to kind of take a look at what it would take NATO to get us back in the game because, quite honestly, we went to sleep for about 30 years. We are primarily a defensive alliance and now we saw that we might need to change some things. When I first got there, I was not allowed to do any detailed planning. I could only do prudent planning. We couldn't do advanced targeting. I couldn't build the first five days of an ATO. The Ukraine war changed all that. Now, we are starting to do that but, unfortunately, we forgot a lot about how to do that. We are starting to have to build that muscle memory back.

When I first got in the Air Force 36 years ago - 35 years ago, and I was at Holloman Air Force Base going through my mission qualification training, everything that I was taught was about Russia. What is their area of battle? What is their leadership? How do they think? When they hit the merge, do they like to turn left or right? I know exactly what base I was going to go to and when we go there every year, I knew where I was going to eat, I knew where I was going to sleep, I knew where my combat air patrols were going to be and I could land at any base in Europe and get gas, get my tyres changed and, more than likely I could also get munitions. That is not the case anymore and we are having to learn that all over again.

I came up with some priorities, we call them operational focus areas and I think a lot of them apply to the INDOPACOM theatre as well. I will go over those but I think what we're seeing is a shrinking of the world here. You see a lot of

NATO countries that are very interested in what is going on in INDOPACOM. You have Exercise Pitch Black that is coming up and I think we are going to have five countries from NATO participate in that. You have Exercise Talisman Sabre coming up and I think 15 countries will participate in that in '25. Then we see INDOPACOM becoming more interested in NATO and sending us E7 aircraft, sending us aid to Ukraine. I think those kind of actions provide a deterrent, I think, to both of our peer competitors. It is very useful, and I think we need to continue that as we go on.

The first priority, and really it is in order to make sure we can get air superiority, is to make sure that we have a good way to counter the anti-access aerial denial system of our peer competitors. It is very difficult to do. It is not like I described in Afghanistan, it is very sophisticated and we've seen that that is a primary reason that neither side, Ukraine or Russia, was able to get air superiority. It's not just a single domain or two domains that's going to make that happen, it needs to be all domains. It needs to be the Air Force, with ISR, with the jammers, with the fifth generation fighters and fourth generation fighters, AEW, they are all going to have to be working, in concert with space effects which are timed exactly right, space effects can help the fine-fixed portion to get the location of the tactical SAMs, special operators that help find, fix and do BDA after an attack has occurred. We need cyber effects that are timely to help render some of their integrated air and missile defence to go autonomous and then we also need the help of the army with their long-range fires to be able to strike some of these things. It is not an easy game. It is very difficult. I think it is going to be even more difficult in INDOPACOM theatre, because you don't have bases that are only 40 miles away or 100 miles away or 200 miles away. A lot of the times you guys are going to have to go seven or eight hours, you will have to have several air refueling along the way. You can going against a long-range kill chain from the PRC that you will have to deal with, so it is will be even more difficult. But that is a priority that I have because we have to get that, and we will never - I think we have to accept that we will never get air superiority like we had in Afghanistan against a peer competitor. We will get to a point where we can get some of the Stat SAMs down to give us manoeuvre air space but we will have to pulse

packages to go after the Tac SAMs and get localised air superiority for a period of time where we can go in, get our job done and get back out and then we are going to pulse these and just use it when we can get it and come back out. The days of taking doing circles over a target for three days to get patterns of life to figure out when they wake up, when they go to sleep, when is mum there, when are the kids there, when do they leave? Then three days later have a strike with zero collateral damage because we are able to get that kind of essay, those days are gone against a peer competitor. We have to erase that from our memory and most of us, as aviators and airmen know that but we need to make sure that we educate the other domains that it's not going to be like it was over the last 20 years. That is priority number one.

Priority number two is to make sure we have a good integrated air and missile defence system and I will speak for NATO and I think it is true for INDOPACOM as well, we have kind of taken a knee over the last decade or two on investing in integrated air and missile defence. We can't do that. When you look at the way war has changed, because Russia could not get air superiority, what are they resorting to? It's long-range aviation aircraft to start with, launching AS-23 cruise missiles. That is how it started. They didn't have a lot of them but they have enough where they could do that. Then they go "We still can't get air superiority, we can't use our fighters or bombers to do anything" so they bought Shahed 136s and 131s from Iran and now they have built a plant where they are producing them in Russia itself and they are doing that en-masse and they are throwing these things out. Recently, we have seen not only with Russia but with Houthis and any country can do this now for about \$10,000 they can buy a one-way UAV that costs pennies on the dollar and send it our way. We just saw this obviously we see it in the Ukraine all the time, Ukraine does it to them as well but we also saw it from Iran and Iran's proxies on the attack on Israel here lately, where they put roughly 250 some ballistic missiles, a lot of Shahed 136s and one-way UAVs in a mass strike against Israel. We took a lot of them down. I think a few got through and it was at the exact right thing to do but it was extremely expensive. I have heard numbers all the way up to \$2 billion to thwart that attack because we are using SM2s and SM3 missiles to do it, we

are using a lot of airborne aircraft and then you have Israel using a lot of aero 3s to knock down the ballistic missiles etc. Very expensive. Not very expensive for the Houthis that launched the \$10,000 one-way UAVs that we knocked down with one million dollar missiles. That is not sustainable. That is on the wrong side of the cost curve. I will talk later on some innovation things that we could do to help get us on the right side of the cost curve but when we do integrated air and missile defence, we have to make sure that we are looking at the high end solution but we also have to look at a low end solution to knock down some of these \$7-10,000 one-way UAVs because we will go broke if we don't.

When we look at building integrated air and missile defence, what typically has happened in NATO is you have one country buy one system and another country buys another system etc. and all 32 countries are buying different systems and they aren't interoperable and we pay as much as a system cost to make them interoperable. We need integration by design from the get go, you figure out we need this stuff for the low-altitude and low-cost UAVs and then against the ballistic missiles, you need the exquisite stuff. That all needs to be integrated by design and we need to buy the system together and Germany is leading an effort to do that and they have 17 NATO nations that have signed an agreement to look at doing that, the European Sky Shield initiative. We need to get after that.

The third priority is information-sharing. This is the cheapest way and quickest to get capability. Just by sharing information. When Russia invaded Ukraine, the US shared 30 points of interest a month to NATO allies. Today, we share 3,000 points of interest a month. You know how much that cost? Zero dollars. It was just a stroke of a pen and a policy change and now we are able to do that. We have made a lot of strides on information-sharing, a lot in space that we didn't used to share before and now we share with our allies. We have made a lot with F-35s. Two different ways, sharing information amongst the F-35 communities and also sharing F-35 capabilities to fourth generation aircraft, so we are more interoperable and now we can put a package together in the fourth gen, feel safer because they know fifth gen capabilities and vice versa. This all came up recently, thanks to Kelli Seybolt and her team for pushing these things through for

us because it is increasing our game at very low cost.

For the F-35 community, I will speak for Europe, by around 2032 we are going to have 650 F-35s. You know how many are going to be US?

54. Less than 10%, so every F-35, the other 90% need to be just as capable as the 8 or 9% that the US is going to have and this information-sharing policy helped us get that way. We need to do that even more, cyber capabilities. We are making headway in NATO with cyber capabilities from different nations. I got it. We can't and we won't share all the information from every country to the other but the big ones we need to know about, because we cannot plan - I cannot do a detailed five day ATO plan if I don't know what capabilities the 32 nations can bring, so I need to know that to a certain extent, certain people, and I got it that we can't share everything but we have to do a lot better than we are doing now. The next thing is the fourth priority, which is ACE, I think you call it agility operations, we call it Agile Combat Employment. If you noticed, there hasn't been very many aircraft from Ukraine that have been hit on the ground. When I talk to General Oleshchuk, who is the Ukrainian Air Chief, I asked him "How are you successful in being able to do that?" He goes "Well, we almost never take off and land at the same airfield". We can't do that right now in NATO because we don't have the cross-servicing agreements that allows an F-35-nation to even put gas in another F-35 aircraft. It is ridiculous. We have made vast improvements on that, so we have some nations with agreements now that we can do that and we are practising it but we have a long way to go to get back to where we were 35 years ago. We need to make that happen.

Equipment. In order for ACE to work you have to have equipment pre-staged at different places or you have to have the tactical airlift and sometimes strategic airlift to bring munitions in and those kind of things. We are starting to set the theatre but we have a long way to go and I think it is the same here in INDOPACOM. That is important.

The last priority is command and control. How are we going to command and control all these units that are landing now at different bases, hubs and spoke and make sure that they get what they are supposed to do? Some of that is by putting the data that used to reside at an AOC in the cloud, dispersing your

AOC folks. There is plenty of places you can go. You can go to facilities and you can hide in plain sight in a hotel, you cruise with a Starlink terminal. Easier for us than it is in INDOPACOM because we have 4G and 5G, we have landlines, where you don't have that in the middle of the Pacific Ocean. We all have Starlink capabilities. I am getting more confident that I will be able to command and control, because I will have the comms because there is such a redundancy of comms available now, at least in my theatre. There is probably more concerns in INDOPACOM if you will be able to do that but you have to have a backup plan and the backup plan, I think we all discuss is you have to have mission command, so commander needs to give their intent, they send out an ATO but attach that ATO is five days worth of mission command. Here is I want you to do if you don't hear from me for the next five days, and you have to practice that. It is pretty easy to go "If you don't hear from me, continue to have a defensive cap over Poland". That is easy, I could do that as a squadron commander. It is harder to say "If you don't hear from me, I want you to do a counter AD attack against Kaliningrad". Because now you have tankers and jammers and everything that needs to be synced and we are figuring out a way to do that safely and we trade thoughts all the time on how we can do this. That is a great thing is sharing amongst what we are learning as well is what you are learn to go make sure we share those best practices and we get it out.

A little bit on the high-low mix. I talked about how whether it is the Houthis launching or whether it is Russia launching, cheap one-way UAVs and we are using exquisite Patriots etc. to take them down. Not sustainable. Ukraine know it wasn't sustainable. What are we doing about it? We are going to take a lesson from Ukraine. The first thing you need to do, you need to be able to detect the threat and it's very difficult because these things are flying down at 100, 200 feet and you have the curvature of the Earth and if you use a traditional radar, once you get past five miles you can't see it, unless you are up on a mountain or something like that, so it is difficult to detect these things. Ukraine realised this early on in the war when they were going against the AS-23s launched off their LRA aircraft. Two physicists in a garage in Ukraine came up with a system and what they did, and they did this in a five-month period, they took cell phones, they put a

microphone next to it, they mounted it on a - wherever they could mount it, a 6-foot pole, top of a tower and they put several thousands of these around their country. They just listened, so it is an acoustic sensor that listens for noise and they were able to categorise what is a one-way UAV sound like, what does a Shahed 136 sound like and they were able to, through triangulation of all these sensors, get a general idea of where the threat is coming from. They then feed that into a central database and then they send out forward-firing elements and they have an iPad and it is mounted to a mobile machine that has anti-aircraft artillery. They are looking at their iPad, the acoustics detect it and shows where it is coming. They haul arse, get over in that position and then they get ready with their AAA and shoot these \$10,000 one-way UAVs down for pennies on the dollar. That is the right side of the cost curve. This acoustic system they put together, they have briefed me two different times on this. You can do the country of Romania all over their entire country, surface to about 8,000 feet for \$6 million. Much less than one radar. They have several of these around. That is innovation. You know how long it takes to train the guy that is cooking off the AAA? Six hours. Pretty phenomenal stuff. We are looking into it. We bought 50 of them. We, the US, are testing them out now. We threw a bunch around Ramstein, did a demo. It proved it could work. There is a lot of cat and mouse going back and forth. The reason I am talking to you about this is because Russia knows about it, otherwise I wouldn't be able to talk to you about it. They put mufflers on. They added the acoustics to the data library and went to fuel injection as opposed to carbureted. They figured that one out as well. It is a cat and mouse game. Now they are doing a high-low stack, the low is a decoy and shoot it down. High one is now in radar coverage because it forced them up, so now you can shoot them down with a hand-held relatively cheap stinger. A lot of stuff going on but when your back is up against the wall, and you are at war, you come up with innovative solutions. We need to act like Ukraine is acting. Our back is up against the wall. We need to start thinking of these innovative, cheap solutions as well. Not only do we need to think about it on the defensive side, we find a lot of the success Ukraine has when they are doing an offensive operation in Crimea or into their own country but Russian-occupied territory, the high-low mix works. We are all used to the exquisite, the

E7s, the P8s and the F-35s. They don't have those. We give them some exquisite things from countries but if it's just that one thing going in, it is probably not going to make it because it is going to get shot down by SA-22s or something else. If you mix that with our own one-way UAVs and you put EA on some of the one-way UAVs or you take 2 x 4s and wrap them in foil and put them on a balloon and put them over their way and the combination of all that causes confusion and it is very cheap to do, compared to a counter A2/AD package we would put together to make that happen.

Easier in my theatre because we have land right there. Taiwan is pretty close. We got all of our things into Ukraine during a time of war, whether it was secure comms, whether it was a common operating picture, whether it was military equipment and then, as we move forward, NASAMS and everything else. The more that you can do that in advance, and not during a conflict, the better off you are going to be. I wish a lot of that stuff was already taken care of but we had to do it while conflict was going on. If you can do that in advance, you are going to be much better off, and it sends a deterrent message. Hopefully there is no conflict and that is what an alliance is about, at least western alliances, to deter so we never have to fight.

I was pleased to learn a lot about the strategy that Australia has put together and when you look at it, there is different pieces here and there that are different from what we have in the US but it is really overall, it is pretty much in alignment. Same with a lot of our NATO allies. The other thing about high-low mix, I have let's say half of the 32 countries can afford the exquisite. The other half can't. But they can afford a \$10,000 one-way UAV. If they can do that at scale, at mass, number one, it feels like they're contributing and, number two, it gives me a capability that I didn't have before that will cause confusion, and, as a minimum, it will deplete magazines on their side and if we do this in synergy, it will allow our exquisite to be much more successful with the contributions of their low mix as we go in. That is pretty much what I had for you today. I think that leaves us about 20 minutes or so to do some Q&A. I will turn it over over to our Q&A guy. (LAUGHTER) (APPLAUSE)

MICHAEL SLEEMAN: Thanks, very much, General Hecker, for your wide-ranging comments. I will start with a question and then open it up to the audience. Do you assess that Russia's activities in Ukraine will embolden or encourage other nations to undertake similar actions elsewhere?

JAMES B. HECKER: Act like you are a President of a nation. You are analysing what Putin wanted to happen and then what did happen. He wanted a two-week to one-month war. We are on our third year. Do you think he wanted two more nations to join NATO with the accession of Sweden and Finland? Probably not. Did he want five more countries to buy the F-35 since the invasion? My guess is he probably didn't want that. Did he want to lose over 100 aircraft? Probably didn't want that either. Tonnes of tanks, armoured vehicles, depleted a lot of his capabilities when it comes to cruise missiles, etc. To me, if I was an adversary here, that would cause me pause with all that, and did he want 50 nations to get together almost every month - got together 20 times - the Ukrainian defence contact group, led by Secretary Austin, have gotten together 20 times and they get together and talk about what kind of equipment that Ukraine needs and those kind of things, but that is a big coalition that goes well beyond NATO. I think that would cause pause if I was a leader of a country and I wanted to take over a smaller island, without mentioning names. I think it would cause some pause and wouldn't emboldened them to do this and make them rethink it, especially when you have allies in the region that have talked, if this happens, we're probably going to do something about it, which we don't have that in NATO, other than giving them military equipment and training and those kind of things.

MICHAEL SLEEMAN: Opening up to the floor now if you have any questions?

JAMES B. HECKER: Another thing that he probably didn't want, is to have three nations spending 2% of their GDP, prior to the war and now 18 nations are paying 2% of their GDP and several others have a plan to get their momentarily.

MICHAEL SLEEMAN: Back to the app now. Assuming there were warnings signs

of the potential Russian invasion, did Ukraine national mobilisation occur early enough? What lessons can we learn about how to have ourselves best set up, so if we need to mobilise in the future, we are best postured?

JAMES B. HECKER: A lot of people were skeptical if an invasion was going to happen. One of the things that we did that we have almost never done before is we took some very exquisite information that we had and we shared it open-source to basically the world. In the past we never would have done that. We were afraid we were protecting sources and this kind of thing. Getting that message out beforehand that this is what is going to happen and then watching it unfold and, yes, he was going to say "They provoked us and we are just in defence" but exposing that plan early on, I think it was a good thing to do. It got the nations behind it once it actually unfolded. Not everyone believed it. Ukraine believed it, so I think they were mobilising as best they could with what they had. But it goes back to my earlier comment, is what can we do before that, we could have helped out, I am sure, we had the information to put those secure comms into Ukraine, to put equipment down there. The more we can do that in advance, the better off that we are going to be.

MICHAEL SLEEMAN: Talking about supply chain and munition expenditure, is the rate of expenditure higher than you would have expected in a conflict like this, or is it about what you would expect and how are we with the supply chain and manufacturing across the world?

JAMES B. HECKER: It is much higher. I don't think we have ever experienced a conflict, at least on our side, where you have this many cruise missiles, this many one-way UAVs. With North Korea supplying ballistic missiles and you have ballistic missiles coming as well. It eats it up. Early on, before they figured out with the Sky Fortress system, which is the acoustics and taking it down with AAA, before that was there, we were shooting down one-way UAVs with Patriots. There is a strike a few months ago. 84 one-way UAVs. The Sky Fortress system tracked all 84 and AAA shot down 80 of the 84. That is the right side of the cost curve

and that has lowered expenditures of the more exquisite things that we have and we need to do that and NATO and probably a good idea to do it in INDOPACOM as well. The magazine depth just can't be deep enough. We are going to have to, as we look for better ways to go after these one- way UAVs, obviously EMI is a way to get after it. Microwave has a deep magazine. High energy lasers but there is issues with that. You can't just zap one, you have to put it on there for a while and you need to get the batteries recharged if it is a mobile one. We have to look at those solutions because no-one is going to have an unlimited magazine. We have got to save the good stuff for the ballistic missiles, the high end is what we need those for and the one-way UAVs and cruise missiles, we need a lower-class solution to make that happen.

MICHAEL SLEEMAN: I will look to the floor if there is any hands up?

JAMES B. HECKER: There is one right there. If we can get a mic over here.

>> Thank you, so much. My name is Toby, I am in Defence export controls. You were talking about Starlink as a means of providing communications. I am wondering if you can elaborate a bit more on how comfortable you are with depending on the private sector and commercial providers for essential services like that?

JAMES B. HECKER: I am fairly comfortable. Everyone reflects back to when Starlink turned off their terminal. There is more to that story that I can't go into here. Starlink, and correct me to 100% here CSO, that is a hard one to jam because it is constantly - by the time it breaks the horizon, it is constantly hopping between different Starlink terminals, almost not at the speed but it is hopping, it is harder to find it, jam it before it switches to the other one. They have capabilities now, if they sense they are getting jammed that automatically goes over to another system. We have to keep looking at other vendors and other vendors will come up with more which will give us more capability, if you will, or more redundancy, more resiliency. It would be a mistake if Starlink becomes our go-to and we can't operate without it because we got so dependent on

Starlink. We need to look at other things. I don't think we need to shy away from it because we feel like somebody is going to pull the plug and it is not going to be available. We do need to work with industry because it was mentioned earlier, Russia uses Starlink and I think of it like a VPN, they act like they are somewhere else and they jump in and they use it. SpaceX and others are looking at ways to counter that. I think it is useful. We need to embrace it but I don't think we need to get dependent on it and we need to make sure we have other means of communication. Easier for me in my theatre because we got cellular networks, landlines, hotel rooms etc., it is more difficult to do that in the INDOPACOM. Did I do OK there, CSO? He has given me a thumbs up.

MICHAEL SLEEMAN: Any more hands up?

>> Thank you for an excellent presentation. Darren Kerr, currently Defence Attache, China and Mongolia. We have seen some reporting that suggests that the Russians, or Putin has directed tactical-level training drills close to Ukraine. I was wondering how you assess this threat and are we doing enough to ensure that Putin doesn't wake up one morning and decide that tactical nucs are the solution to his problems?

JAMES B. HECKER: Yes, that has been widely-reported. You probably remember it was about four or five months after the war, there was some intelligence that came out that - and rhetoric in the press that he was considering using a nuclear weapon. They didn't specify back then if it was a tactical nuc. They didn't specify what he would use it against. Would he blow it into an open field, just as a demonstration or was he going to actually use it for war-fighting purposes? It is a thing that we obviously have to plan for and we do plan for. It is a thing that we have to try and deter, although it is very difficult to try to deter that. A lot of that is rhetoric back and forth between different nations that happen. The bottom line is we don't know what he is going to do. We have a good idea what his red lines are and we are careful to make sure we don't cross those red lines to try to make sure that this doesn't happen and escalation occurs, so it is concerning, of course. We plan for it, we try and deter against it and if it happens, we have to have what are we going

to do if something like that happens? And we do plan for it. We will see what happens. I am not going to make a prediction if it is going to happen or not. Just the rhetoric makes us nervous and heightens our alert, if you will. Just to put it into perspective and I was trying to figure out what is his definition of a tactical nuc? An article I read the other day, unclassified, is the one that was dropped over Hiroshima, it was 15 kilotonne and the tactical ones he is talking about is a one kilotonne. It is a big boom.

MICHAEL SLEEMAN: A question from our app, the top question we have here is "What deterrence initiatives were tried prior to the invasion of Ukraine as Australia looks to a strategy of deterrence, how would you reflect on the initiatives prior to the invasion and what can we learn from them?"

JAMES B. HECKER: I showed up February 24, 2022 is when the invasion happened and I showed up at the end of June. I wasn't in the seat personally making recommendations or doing some of the deterrence stuff. I know what the Air Force did, the NATO Air Forces, they put up several combat air patrols along the eastern front and they were able to do that fairly quickly because of the nature of air power, to do a deterrent and that deterrent worked, in the sense that NATO nations haven't been attacked and weren't attacked, part of the initial attack, not that he planned to do that but maybe he did and that showed a deterrence. It obviously didn't deter him enough not to invade. There is a lot of rhetoric from national leaders of all countries but that didn't work is a deterrent either. I think he was hell-bent to get it. Don't know if there was really anything that we could have done to deter him and nobody in NATO was willing to declare an Article 5 situation because Ukraine is not part of it, or even to talk about potentially using NATO power if Ukraine is invaded, which it was, but that wasn't part of the calculus and I wasn't there during those three and four months leading up to that. I think it was probably the right thing but obviously didn't deter him.

MICHAEL SLEEMAN: Moving onto cyber. I have a quote and a question. Russian cyber capabilities has not had the effect in Ukraine that it was forecast to have. "The cyber capabilities didn't have the effect in Ukraine that they were forecast to

have" is that an accurate comment?

JAMES B. HECKER: It has had some effect and I am not a cyber expert but they have done things but you are right, it hasn't had a huge effect. What we are seeing now is a lot of cyber attacks against European nations. They are a hindrance, they are not anything like taking a dam and releasing the water and those kind of things. There has been several cyber attacks. There is a lot of threats out there to European nations that we don't take with a grain of salt and we try to counter it. Cyber is very difficult, especially on the offensive and defensive side but on the defensive side, everyone, it is kind of like when I was putting on a muffler here and then of fuel injection. You are trying to cat and mouse this thing in cyber, as soon as you clear out a threat, they find another way around it. It has definitely had an impact but I don't think it has had a major impact.

MICHAEL SLEEMAN: Who is learning more from this conflict, is it the Russians or NATO, talking of the cat and mouse you mentioned?

JAMES B. HECKER: That is a great question. We have to - we, NATO, have to learn from this and I think in the military, we are learning a fair amount. Russia is learning a lot. Their targeting cycle, which if you think about acing, you have to ace inside of their targeting cycle or else they will get you. We have a good idea what their targeting cycle was before Ukraine and after. Let me just say, it has shrunk a lot. So they are learning a lot. They are learning about one-way UAVs. They are learning - increasing their industrial capacity much faster than European nations are and probably more than INDOPACOM nations are as well because they are in the war. As is Ukraine, by the way, as well. This goes to what I was saying earlier, if we think about our backs up against the wall and we can get not just the military but also our industrial base, our politicians and our public to understand if we don't move out, their learning curve is going faster than ours because they are in a conflict which makes sense. It only takes one tactical nuc and now all of a sudden, we might be in the conflict. We are

already behind in a certain extent, we just have to make sure we continue to press forward and get the things that we need and it is those five priorities. If we can do that and command and control and have everything else and involve all our domains, we will be OK. We can't just sit around and think that it is going to be OK 10 years from now. If we don't start now, we could see that we are falling behind.

MICHAEL SLEEMAN: I look to the floor if there is any questions?

>> Squadron leader, Michael, with the Air Force history and heritage and a wonderful talk, thank you. I am wondering, with an eye on the historical long game, as it were, is NATO and the US daring to contemplate a post-Putin Russia and what might that look like?

JAMES B. HECKER: We haven't really, at least in my world - it might be different at other levels - mainly everything that I have been dealing with hasn't been post-Putin. It is Putin or somebody who is going to take over that's like Putin. The short answer from where I sit is no.

MICHAEL SLEEMAN: Any more from the floor? A hand up there.

>> Thank you. Madeleine, from Defence Strategic Policy. Noting the geographic and economic complexities of the Indo-Pacific, what can Australia do to improve the resilience of our supply chains?

JAMES B. HECKER: The last thing that I am going to do is tell your government what to do. (LAUGHTER) I think the big thing is sense of urgency. You never know when it is going to happen and if you are not ready when it happens, it is a lot harder to catch up in war time than it is in peace time. To me, and this would be the same advice if you said about the United States, is to have a sense of urgency. For us in the military, don't be afraid to talk to industry. We have Air and Space Foundation, we get together twice a year and industry is there. I go there and tell them all the things that we need and things they can help us with. Some of it they hear and some of it they don't. The primes don't want to produce

\$10,000 one-way UAVs. It is not profitable for them. There is several start-up companies that would love to do that. When we start talking about doing that at scale, it turns into a bit of money for them, maybe not as much as selling an F-35, if you will. Just getting a sense of urgency, I think, is the big thing and engaging with industry and investing with industry to get them going and then they are all about - they don't want a one-year contract. They need to know they can hire people and those people will be hired over a period of five or 10 years or something like that to make money and I totally sympathise with that. Anything that the governments can do to kick-start that and give them a sense of assurity and their employees will be paid I think helps out.

MICHAEL SLEEMAN: Do we have any more questions from the floor? What is Russia's capacity to tolerate attrition and what off-ramps can or are being built in for Putin?

JAMES B. HECKER: Attrition. They have more war-fighting-aged folks than what Ukraine has. They have gone through most of their prisoners, unfortunately. Serious casualties that you guys know the numbers, I am sure but a lot of casualties and they are not afraid to put them on the front line and, unfortunately, they are getting mowed down but they will keep getting more is what I think. What is the second part of your question?

MICHAEL SLEEMAN: Off-ramps for Putin?

JAMES B. HECKER: How much does he want? How much - if things are going good, I think he might probably want to continue. I think it is a good time - over the last three weeks, Ukraine hasn't had the weapons and the surface-to-air-missiles and all that that they have had in the past. The good news is a fair amount of countries here recently have stepped up to the plate and logistically all that stuff is flowing now. Our country was able to pass a supplementary so that will flow and they will be in better shape. Hopefully, the success on the ground in the north that you saw earlier, hopefully that will subside a little bit. It might be a good time to see what we can do to negotiate. It is going to be two

sides need to negotiate, so what is President Zelenskyy willing - is he willing to give up anything, or not? They are doing some pretty good work, some of their oil refineries, their oil production is down 15-20% right now. At the same time, Ukraine has taken a good hit on its electrical grid and those kind of things. We just need to start talking to one another right now and whoever the country is that holds those talks, I don't care but I think we need to start going because thousands and thousands of people are getting killed and a lot of them are women and children that shouldn't be having to put up with what is going on right now. Hopefully we can find an off-ramp. That is more political than what I got.