Space in the Integrated Force

Moderator: Lieutenant General Susan Coyle, AM, CSC, DSM

Panel Members:
Vice Admiral Justin Jones, AO, CSC, RAN, Air Marshal Allan Marshall, OBE, RAF, Brigadier General Brian Denaro

GPCAPT J Laroche: Well, good afternoon, ladies and gentlemen, and welcome back for our final session of the day. I hope you've had an opportunity in the breaks to meet with the other attendees during the day and have some really good discussions. Some of that connection that we create here doesn't just occur on the stage and between the audience, but in the breaks, and so we hope you've made the most of that opportunity.

Before I begin, we might have the house lights on for this panel, please, so that they can see you and they can engage as we go. And on to that, our first panel looked at how we could build fighting depth. We then heard from General Spicer Blanchet, who shared with us Canada's journey in building air and space power, and now we move to our second and last panel to build on those discussions by exploring the vital role of space in the integrated focused force and address the challenges in realising enhanced space capability.

Moderating the discussion is Lieutenant-General Susan Coyle. General Coyle is the chief of space and cyber and the chief of national support. She has extensive operational and strategic experience and has commanded at every level. She has deployed to Timor-Leste, the Solomon Islands, Afghanistan and the Middle East, and has held senior roles including head information warfare and commander forces command. General Coyle is ideally placed to facilitate today's discussion on space power and the integrated force.

Ma'am, over to you.

LTGEN S Coyle: Many thanks, Jesse. And good afternoon, everyone. Can I please start by thanking Air Marshal Chappell, your chief of air force, for putting on such a phenomenal air and space power conference. I know a lot of work goes into coordinating something like this and for me to be able to piggyback on and we're having our inaugural space chief's conclave starting tomorrow. We've got 11 nations present, nine space chiefs, all their representatives and we're really excited to have this opportunity.

Today we are joined by an exceptional panel of defence leaders whose experience spans operations, partnerships and the evolving role of space in modern warfare. And as the chief of space and cyber within our defence force, I have the privilege, as was mentioned, to be the master of ceremonies.

Can I please introduce the panel members to you? To your left, Vice Admiral Justin Jones, chief of joint operations for the ADF. JJ is responsible for the command and control of joint operations and exercises globally.

Brigadier General Brian Denaro, commander of our US Space Forces Indo-Pacific. Brian oversees the planning and execution of integrated and synchronised joint allied and partnered space operations that protect and defend US interests in the Indo-Pacific.

And last but not least, in the middle we have Air Marshal Alan Marshall, our air and space commander from the UK Royal Air Force, who is responsible for the conduct of air operations at home and overseas. Working together with the other services and international operational commanders, he oversees the generation and employment of air power in all environments, which includes the air, defence of the United Kingdom, the delivery of intervention operations, as well as the conduct of humanitarian and disaster relief operations.

A pretty impressive panel.

So today's panel selection may inadvertently look like it's AUKUS, but that's not the intent. Our panel's expertise spans far beyond any single partnership. When we talk about our integrated force, we often think about how we synchronise the effects across sea, air, land, space and cyber. And a quote that I like to throw out there is that if you're zero in one domain, you're zero in all.

But increasingly, space is not simply another domain in that mix. It's the domain that I argue that permits the others to operate, as it has become the backbone of how modern militaries operate. It drives tempo. It accelerates decision making. It unlocks effects that simply are not possible without it.

And regardless of how many exquisite fifth or sixth generation technology you have, it's essential. It enables us to navigate with precision, to communicate globally, to sense at distance and to make decisions faster and with greater confidence. It gives us that global situational awareness, assured communications across vast ranges and the ability to coordinate complex missions with precision timing.

In many ways, it's the engine room of the integrated force, the element that will allow air forces and cross-domain teams to operate not just faster but smarter, more coherently, and with greater reach. At the same time, I attest though that space is no longer a quiet or an uncontested environment and arguably has not been for some time.

It's congested, it's competitive and it's increasingly challenged by actors who understand the advantage that it provides. That reality demands urgency, which is why things like today, this Air and Space Power Conference, are so critical.

It means integrating space that cannot be a theoretical ambition. It must be a practical habit embedded in our training, embedded in our planning and included on all operations, which is why

I'm pleased to have the panel that we have today to talk to this. It's not just at the specialist level either; it's across the entire force.

Integration also requires us to think differently about partnerships. No single organisation, whether they be military, civilian or commercial, operates in space alone. Our strength, which is our people, comes from the networks that we build with our allies, with academia, and with other domains inside our own organisation. The more deliberately we fuse these partnerships, the more resilient and agile our integrated force becomes.

And as space becomes more central to operations, we face questions about workforce and expertise. How do we balance deep technical mastery with broader understanding required across the integrated force? Not everyone wants to be a space operator, but secretly I know some of you want to be. But everyone does need to understand what the space domain brings and what it can offer to our mission.

So we're building a workforce that is technically sharp and strategically aware that will be essential to maintaining our advantage.

So I've set the scene now for our panel. Today's conversation is really about one thing. It is about how space can propel the integrated force forward, but not complicate it. And how we ensure that it strengthens our decision-making, sharpens our military effects and increases resilience.

It's not a supporting act in the integrated force, and I'm pretty confident that's going to come clear through this discussion. It's a decisive contributor. The engine room, the domain that allows the other domains to operate as one, all together. So I'm looking forward to exploring this now with the panel.

We have a few questions and we'll intersperse your questions as we go, hence keeping the lights on. I was entertained by the AI feed that's been happening with some of the text here. I assure you that AI is in no way going to take over the roles of command decision making or targeting boards based on some of the interpretations of the words that I saw up on the slides.

All right, let's get into the questions.

All right, the first question:

Acknowledging that we're in a room of air power professionals, from each of your perspectives, can I ask you to talk about what specifically does space offer to air as part of the integrated force? Brian?

BGEN B Denaro: Thank you, ma'am. And thank you for the Air and Space Power Conference for hosting us here and thank you to the Australian Defence Forces for putting on this great event. It's been a real pleasure to be here and appreciate your leadership through all this. I came from the Air Force, transitioned to the U.S. Space Force, and so that alone should say that there's a strong connection between the Space Force and the Air Force because many of our guardians are in fact and used to be airmen. And I think that just demonstrates the level of integration that we have today.

Where I sit today in my command at Space Forces Indo-Pacific, our purpose is to integrate space into the joint force. And for all the reasons that you just laid out, it's absolutely essential that we do that in order to make the Army, the Air Force, the Marines, all the joint forces successful in their operations. And we do that in a couple ways, a couple unique ways, I think.

All the things that you mentioned, whether it's the position, navigation and timing, missile warning, the weather capabilities, the communications, those are all capabilities integrated in our joint operations that the joint force has come to enjoy for many decades now. And it's our responsibility to protect those capabilities.

In addition to that, though, we have to protect the joint force from space-enabled attack and make sure that they are protected against any adversary that may want to use space to attack our joint forces.

And then on the other side of that, we need to deny the adversary their ability to use space to close kill chains. And I think if we do those jobs well, then we are integrating space exquisitely well into the joint force.

LTGEN S Coyle: Great, great points. Al?

AM A Marshall: Yeah, again, thanks for the opportunity, Susan, and to everybody. You know, I guess for me, the arguments why space is important for the integrated force are the same why it's important for an Air Force. In the UK, we're working on a thing called the digital targeting web, and there'll be a huge space element to that. So our intelligence and our targeting underpinned by space, our ability to communicate with each other, both Air Force to Air Force, with partners and with the integrated force by space.

And then, of course, the effects that space can do, be it making sure we have the PNT, the Navigation and Timing. We needed a time point in space, jamming out the enemy or doing other things, or just some reasons. And then you can take it down to the sort of tactical level where I think as we do the long-range kill chains, as we're going to get these long-range weapons. I think we will see weapons supported by space-enabled capability at long ranges, and that's the only way Air Power is going to be able to match the enemy over time.

But yeah, absolutely a fundamental building block to Air Power right now and for the years to come.

VADM J Jones, RAN: I thought I might start by just saying none of us; we're not exactly unknown to each other either. Brian and I, three weeks ago, were sitting together in a room in INDOPACOM at the INDOPACOM Commanders Conference. Alan came to visit JOC last year, at the start of the year, and then reappeared for TAL SABRE, because it's a great time of year to come and visit Australia, obviously.

But that's important amongst the Allies, AUKUS or not.

I'm going to deviate in my answer a little bit because it was framed as for the room full of Air Power enthusiasts. I look out at the audience here and actually, I see an integrated force. I see Navy, Army, Air Force, Australian Public Service, and contractors or industry.

And that is important because not only do we have a national defence strategy that directs the department to become more integrated, but we have a capstone concept, integrated campaigning for deterrence that applies as well.

And to our hosts' comments, that includes the role of Allies and partners, academia, industry, the entire nation. We've got to think about the integration of all of the levers of state power in all that we do.

Now, in Joint Operations Command, that is applying integrated forces and effects to protect Australia and our interests in competition and in conflict. We do that using those five services, Navy, Army, Air Force, Public Service, contractors across the five warfighting domains.

So, land, sea, air, space, cyber.

Now, Space and Cyber underpin everything that we do - another point made by our panel hosts. And I would say, in fact, that cyber is probably the true underpinning capability for all of our components in Joint Operations Command and for every operation we do. And even in the space sense, if you don't have cyber power, space power is just junk on orbit.

I'll leave it there.

LTGEN S Coyle: I love this. Well, as the Chief of Space and Cyber, I don't disagree with you, JJ. Can I just say, though, in terms of the workforce and actually your commentary about contractors, ADF and APS, actually came up in an earlier panel where you were publicly acknowledged for the fact that you contribute that.

I know within Joint Capabilities Group, we've got 10,000 people Half of them are contractors and the other half are made up of part-time, full-time, ADF as well as APS. So, I think that is the magic pudding, isn't it?

Moving on to the second question, and then I'm going to go to a couple of questions online. So, it builds on the first question:

What do you see as the largest challenge or opportunity when considering what effective integration of the space domain into the integrative force could be?

Al, I'll start with you.

AM A Marshall: Yeah, I think in terms of your challenge, I think we're getting there. I think we're getting better. But it's making sure we've got a level of space education across the whole force. And space is not the tail end of the agenda, which it was a few years ago, and it's not the “Oh make sure you invite the space person” going forward.

I think, not trying to steal Brian's words, but I saw something from the Chairman of the Joint Chiefs very recently for the conference in the Middle East where he said space and cyber was the first mover for the force. So, very much not supporting, very much more needs to be supported.

And we're sort of doing this in the UK, speaking to the UK Chief of Joint Operations, JJ's equivalent. Again, there are a bunch of operations he just won't do now unless his sort of required space activity is all in place.

So, I think we're getting there, but we still need to make sure we increase the education. So, space is actually probably at the beginning of the agenda rather than the last item at the meeting, which sometimes drops off.

LTGEN S Coyle: Yeah. JJ?

VADM J Jones, RAN: I think assured access to space has got to be one of the challenges. And, you know, we're not talking about just satellite communications, which I think many gravitate to when we talk about space. It's much broader than that.

Some has been covered already, position navigation timing, intelligence surveillance, reconnaissance, missile warning, targeting, you name it.

It delivers for the air domain, of course, as well. But assured access is going to be the challenge for us, I think. And in some ways, the flip side of that coin is building our own – this is probably more opportunity, which I think is a follow-up – is building our capabilities. Certainly in Australia and in our own space command and space component in joint operations command, with an eye on space domain awareness and in the future, space control and the like.

BGEN B Denaro: Yeah. Ma'am, I'd say for the challenge, it's a challenge accepted and it's integration. I think we've made a lot of progress there. When I say integration, I mean, you know, joint integration, allied and partner integration, industry integration, interagency integration. I think we can always do better at that.

You know, I was just down in Exercise Cobra Gold down in Thailand where we exercised the first combined space component in that exercise with eight partner nations. And just seeing the level of organic integration that was happening in that exercise was really promising.

And I think we just need more exercise like that to prove it out.

On the capability side, you know, we're seeing development with the Japanese and the U.S. working on a quasi-zenith satellite system, which is a joint partner opportunity there. And then here in Australia with the dark radar that's being built. I think those are just examples of better and better integration that we're having.

On the opportunity side, I would say, you know, there's enormous opportunity here in Australia and across the globe to integrate commercial capabilities into our forces, into our everyday operations. Every day I read the news about a new business opportunity in space, from space and through

space. And the limits on commercial innovation is limitless, I think. And it presents a lot of opportunities for us to capture in our defence forces.

LTGEN S Coyle: And I agree. I mean, I do regular engagement, as do many people in the room with industry and the opportunities that can be afforded if we're able to. It's a great point.

Let's do a question from the audience before I go to one online. Who would like to ask a question? Here we go. We have a lady there in the middle section. I can't see through the lectern to see if there's - and there's another one over here. Okay. And one here. In fact, there's plenty of questions.

Let's go.

Audience member 1: Hello. Firstly, thank you for such an informative panel. My name is Anjana Muralidhar. I'm from the Directorate of Navy Engineering. My question to the panel is, what specific steps should be prioritized to strengthen preparedness and resilience in the space domain, particularly in innovation and manufacturing to support joint force fighting depth? Thank you.

LTGEN S Coyle: Who would like to start with that one? I'm the patron for ADF Rugby, by the way. So I get what Kouros is asking. Let's go to the United Kingdom.

AM A Marshall: Yeah, I can sort of give it a go. I think certainly I think for a nation the size and scale of the UK and I expect many others in the room that don't have the space capability of the US. I think one thing we're really looking at is a level of resilience. We don't want these digital areas, whilst it can be quite daunting as the cost of launch goes down, I think the ability to be able to sustain a level of space capability, be that a low earth constellation and replace damaged assets is something we should look at.

If you see how quickly the commercial sector is now is putting up these satellites, and I think an increasing number of nations, given that the cost of launch is down, are looking at low earth orbit constellations of hundreds of satellites. I think that's where we need to go in terms of the bearers because actually the software and the tech and everything else, you can work with that.

So there are many things, but I do think adding a level of resilience, we have a small number of highly specialised satellites and I think we feel a little bit vulnerable, so we do need some resilience.

LTGEN S Coyle: Anyone else want to add?

VADM J Jones, RAN: Well, I was going to pick up on that point as well. I think whatever your aspirations for the constellation of capabilities that you want to put in space, it needs to be, like almost everything else we do, have an eye on redundancy and resilience to your point.

So layered capabilities in low earth orbit and farther out, geosynchronous, and just be cautious about exquisite capabilities in one package that is susceptible to forms of targeting. So as the saying goes, quantity does have a quality of its own.

LTGEN S Coyle: Abby?

BGEN B Denaro: Yeah, I agree with both my colleagues here.

I think that what's really important as we build resiliency and we build disaggregation of our capabilities across multiple satellites, we have to think about that both in the space domain and in the terrestrial domain and make sure that we've got resilience across the entire architecture so that they don't have one single point of failure.

I think we're doing that in spades. And then you've just got to practice, and we heard that this morning. Preparedness is so important, yes ma'am, for maintaining the deterrence that we have in this theatre. And I think the more we practice with those resilient capabilities, the better we get at being able to adjust for anomalies or adversary actions against those architectures.

LTGEN S Coyle: Let me go to the most popularly liked question online and then we'll go over to the other side here. So this one's from Cam Porter.

What opportunities do you see for collaboration with like-minded powers, and it specifically says Australia, UK, New Zealand et all, in building space capabilities that might be infeasible or unaffordable for us each individually?

AM A Marshall: Yeah, go on, I'll give that a go. So there's a common discussion amongst allies, you know, in Europe and elsewhere. And I think, again, you know, apart from, you know, the US, potentially Russia and China, none of our nations have got anywhere near the ability to have space mastery with resilience and everything else to the scale we want to.

So we absolutely have to work together, and we will be stronger together to do so. I think at the moment, what we see, we don't really see the political conditions to make that easy to, you know, we'll buy this one, we'll buy the Leo one, you buy the Geo one , and we'll buy the ISR, you buy the communications, because everybody wants a level of sovereignty. Industry is sort of finding its feet internationally at the moment going forward.

So in terms of an aspiration, yes, of course, we should coordinate as best we can the four. So I think the reality right now is nations are doing their own thing, and we are trying to aggregate and share and work together. And that's a really good first step. And the sharing is amazing, and the cooperation is amazing.

I would love us to be able to go to the next level and actually plan procurements and capability growth between different allies, but I do think that's a very high bar.

BGEN B Denaro: I would just add to that, I completely agree. I think that an important element of this is that our systems have to be allied by design. So we've got to build in that plan up front so that we can, whether it's a cost share arrangement or it's you're better at building this thing than we are, and we think through kind of where the strengths of the various nations that want to contribute.

I think as the cost of launch has come down so dramatically, it's given us way more opportunities in low earth orbit and other orbits to think of creative ways to do that. And even buying something as a

service or buying one tranche or the initial launch of a plane of satellites, it's not yesterday's version of like, okay, we're going to buy six satellites, and you buy three and we'll buy three.

There's a lot more creative ways, I think, that we can think through the business models of how we pay for and procure and field satellites.

LTGEN S Coyle: Yeah. You're happy not to get, oh, you want to go to capability?

VADM J Jones, RAN: I'll talk just briefly about, you should talk about CSPO because that's your part. I'll talk about Olympic Defender. We're a part of a seven nation multinational force operation, Olympic Defender. The Australian operation that contributes to that is Operation Jara. Now, that gives us exposure to the operations of seven spacefaring nations and obviously critical insights into potential and opportunities for us.

It develops our people. We're not as immature as you might think. We have contributed within the space component at JOC a critical estimate that went into Operation Olympic Defender that is underpinning parts of that operation, which shows that we have quality people coming through the system building their space knowledge.

LTGEN S Coyle: And the Combined Space Operations Initiative is a 10 nation initiative. And again, I mean, Op Olympic Defender came out of it. It was one of the ideas that was born from that. And we get together a couple of times a year and we do, we talk about everything from policy to opportunities, about shared collective messaging, particularly in relation to unsafe practices.

So there's lots of great opportunities. Thanks. We might go over here. There was a question. Yep. That lady there. And then I'll go to the next popular question online.

Audience member 2: Hi, my name is Lene. I'm from the Department of Defence. So given the decision to abolish Australia's first national space mission in 2023, the $1.2 billion cut from space infrastructure, what does this mean for the future of Australia's sovereign space capability and its ability to support climate monitoring, disaster management, and national security?

Has there been any changes since 2023, perhaps a new program or something that's come up?

LTGEN S Coyle: Are you referring to 9102?

Audience member 2: In 2023, that was a $1.2 billion cut by the Albanese government.

LTGEN S Coyle: I'm just trying to think. The only one that I would talk to inside defence would be Joint Project 9102, which was our geo military satellite communications replacement.

And the project has not been cancelled. Due to the threat changes and enhanced technology available now, defence is getting after a multi-domain solution that will actually provide a better capability, greater resilience, lethality and survivability for us to be able to conduct military satellite communications.

It's always a myth that it's been cancelled, I think, when we change direction, which we should do as a defence force to make sure that we get the best equipment available for our warfighters.

But I'm not familiar with the other one that you're referring to. Right, thanks.

Okay, we're going to go online. Let's talk to Jenna.

If space is central to modern military operations, does over-classification risk making space power less usable, less integrated and ultimately less effective?

How about we start with the US, you like to classify? Allegedly.

BGEN B Denaro: Classification is a piece that I think we can always do better at and there's opportunities to improve how we share information. And classification isn't always the barrier. It's one of the barriers,

But it can also be an enabler too.

So space being a war fighting domain, it can be a very decisive domain. And so we need to make sure that we classify the things at the right classification levels to protect the capabilities that are going to be those decisive enablers in conflict.

And then we need to break down the barriers to better share information at all classification levels with the right partners in the right environments. And I think we're making a lot of progress on that, as we've had many discussions. I think there's a lot of opportunity to improve there.

One of the areas that I think we can all work better on is the systems that we use to do that and enable the technology that allows us to share the information is really important.

I would say too, there's a lot of information available in the unclassified domain. And so we can expand our situational awareness through things like the joint commercial operations cell that allows, I think it's up to 23 partner nations now, many of which are represented in this room, to share information that commercial providers are just amassing in that venue and improve the overall situational awareness of all our forces.

And I think that's one way to get after the classification problem. And then if there's additional pieces that we need to pursue as we discover those things, then we attack those in the right venues.

LTGEN S Coyle: And it's not just specific to the space domain either, is it? It's across everything. And there's a need to know, does anyone want to add something or I can go on to another question?

AM A Marshall: Yes, I'll just add to that. From my perspective, compared to the air domain and my experience of other domains, actually, I don't feel the space domain is particularly constrained your classification.

Like some of the points that Brian's made, huge amount of information and a huge amount of activity we do without that. Yes, there is an amount of classified information, what you may have on

your platforms, what you think the enemy has and some of the techniques you use. But I think it's a very small part. So I do feel that we are less constrained in space than we are actually in other environments by classification.

VADM J Jones, RAN: Yeah, I think there is a tendency in both space and cyber to very quickly move up in the classification. But there is opportunity there to take a critical look at that. Space and cyber are on my short list of priorities for Joint Operations Command this year. And when I say space and cyber, I mean in the sense that I want people to become more familiar with those domains and those components in our command.

They are the more immature of the components. In terms of space power, if you read space power doctrine, the term used in there is space mindedness. I want our people to be more space minded.

And so it's a priority. And yep, there is enough out there in open source for them to start to broaden their understanding of space power, cyber power included. It's a central tenant really of operating in an integrated headquarters. We all need to understand the basics of each other's domains and the war fighting domains and therefore the components within the command.

LTGEN S Coyle: All right, I'm going to do one more question here because it's got 17 likes and then I'm going to go to another question in the audience.

Jessie Lovell, I feel like this one's aimed at me but I'm going to get the international answers first before I put a comment on as well.

Do you realistically see Australia establishing a space force, that's in italics, as a separate ADF service from Navy, Army and Air Force, more firmly removing space from air power when it has similar characteristics?

AM A Marshall: Yeah, hey, so I'll give you the UK perspective on that one. I think it's just been reinforced. I think

UK defence is comfortable having UK space command as is now within the Air Force. I think we've grown successfully over the last three or four years under that construct and that's just actually been reinforced.

But it is a joint organisation. My two-star space commander is an army general who works for me and there are people of all the services within.

But I think right now as we're constructed, I think we're comfortable that that's the best home for it from our perspective. I think in terms of the future, I don't think we know but I think we can all see there is a reasonable possibility space may grow to such a scale of requirement and a level of, I guess, need within the joint force that we do set up a separate entity in the future.

So we're very much open to that. I think what we don't wish to do is at the scale we are, unlike the US, we don't want to rush to that because we think that will dilute the goodness we've got right

now. But I think any nation that doesn't have that possibility open is probably not keeping the aperture sufficiently wide.

LTGEN S Coyle: What does the US Space Force think of this question?

BGEN B Denaro: Ma'am, I would say hit depends is a great way to answer. But I think more broadly, I think every nation should look at what are the interests and then what are you trying to achieve and then build the capability around that, build the force structure around that.

We talk to many partners about what they want to do. And frankly, as we were standing the US Space Force up, we went through our own journey of, well, what do we want to be? What does that need to look like? And we're still learning that. And I think the answer is going to be different for every nation and it'll be different in time.

And so we're more than happy to work with nations to have that discussion and work through some of those options. It comes down to what are the national interests and then to the point of joint integration. I think it's vitally important that we, all of us, maintain that joint integration, whatever we do as far as our space organisations are developed and as they proceed going forward.

LTGEN S Coyle: I might just make an observation, JJ, on service like and then I'll tie it into the third question about the mastery.

So one of the remits that I have from Chief of the Defence Force is about becoming a service like or on the journey to service like. So there is no intention to become a fourth service as such in the current environment and nor is there any need to.

But the service like accommodates the fact that we have deep specialists in space and in cyber who are there to make sure that as part of the five domains, as part of the integrated force, they bring that level of specialisation.

It's certainly not meant to be exclusive to any of the other three domains. It is absolutely the strength of the integrated force that it's across all five domains, which ties in nicely with our question that we actually had, which is about how can space professionals find that right balance between the mastery of their space versus the other domains across the integrated force.

And it's that whole chicken and egg. Are we specialists? Are we technical? Are we generalists?

JJ, we give you three of your eight component commands. We give you space, cyber and theatre support. Would you like to comment on that?

VADM J Jones, RAN: Sure. I do. I mean, to the previous question, you know, I don't think that Air Force's P8s should be owned and operated by the Navy because they're a maritime asset. I mean, form follows function. So to Brian's point, determine what your needs are and take it from there.

And it's the same here. I think it's just about getting the balance right. Services will want to ground their people in service-based mastery that gives them the deep cultural experiences and

perspectives that are what I would call the rich vein that we tap into in an integrated command when we're trying to do integrated operations.

So I don't see a need for a fourth service dedicated to space. I see that the services need to dedicate some time to creating specialists in space within their services that can then be used in the joint integrated world.

Now, for some, that is going to be a challenge because, for instance, in my own service, there's a deeply held belief that you've got to send people to sea to get their sea legs, so to speak, but to understand the maritime environment. So across specialisations like intelligence, space would be one of them.

Where do we fit creating a space professional into that kind of career continuum?

So I think all services will grapple with that to some degree. It's not an easy answer or a straightforward answer, but for me, it's about finding the right balance between the two.

LTGEN S Coyle: And the inaugural space operations officer and space operations specialist courses are being conducted at the moment out at HMAS Harman out at the Defence School of Space and Cyber, and there's tri-service representation on that course. They are internal transfers. And the inaugural ab initio course that will start later this year is initially all of the individuals will be coming in through Air Force.

Let's go to a popular question online, and then we're going to go over here.

So given how dependent monitoring militaries are on space for communications, targeting and navigation, is there a risk that space has become a single point of failure for the integrative force?

Who would like to start?

AM A Marshall: Yeah, I can sort of do that. I think we had an interesting conference in London called A Day Without Space, and it was quite interesting because the people running that were all the space professionals, which is actually probably the wrong way around. It should have been the rest of the force working out how they can do without that.

So I think there are a whole bunch of elements that we are becoming increasingly reliant on, certainly for the highest level of performance in space. And I do think regardless of your environment, you probably need to work out how you can work as best as you can without that, hopefully on a temporal basis, whilst we re-establish that service. It comes down to the resilience question we had earlier.

So I think everybody is alive to that. If I'm honest, there are probably many nations around the world that don't have the level of resilience for some of the space provided services we may need to have. If you look at some of the environment in Ukraine, the electromagnetic environment is really intense. I don't think we've seen that before and sometimes the space services don't get through to

the level that you wish to do. So I think we both need to protect space and we both also need to train the force in how to work with a lower level of space services, hopefully for a temporal period.

LTGEN S Coyle: Any other observations?

BGEN B Denaro: I agree. I think building in that resilience has been key to making sure that there is no single point of failure.

But make no mistake, I think the nations represented here on this stage, there is no better set of space capabilities in the world today than our integrated allied and partner capabilities that we enjoy. And it's a formidable set of capabilities that I think the joint force can rely upon throughout the spectrum of conflict.

But we're not going to rest on our laurels and we always have to get better and better, and I think we are keenly focused on that as we develop new systems as a joint and coalition force. So I see us in a really good position today and only getting better as we continue to develop new capabilities.

VADM J Jones, RAN: Yeah, definitely. And we need to build resilience and redundancy and practice it, which we do, space-free days and the like. But in the opening phases of an unambiguous crisis leading into conflict, it is highly likely that the space capabilities upon which we rely on a day-to-day basis may not be available to us and we need to practice that. We need to rehearse it.

And space power doesn't exist just above the Karman line. There are ground segments too that are also very attractive targets. So it can happen in many and varied ways, not just all up in space.

LTGEN S Coyle: We'll do one question from the audience and then we'll start to wrap up. Is there one on this side of the room? I can't see. There is? Excellent. Let's go.

It's like an interrogation room up here by the way.

Audience Member 3: I took one for the side of the team. Thank you. Randy Abraham from KPMG. We've been talking a lot about downstream space effects and in-orbit effects. I would like for us to leave orbit, hit escape velocity as some would say, and think about the potential militarisation of outer space. We've seen private companies land on the moon for example over the last couple of years. In some nations, I'm not going to name names, are planning enduring lunar presence as well.

Is there things we need to consider about potential militarisation of space and what should we do now and into the future?

LTGEN S Coyle: Great question. Who would like to start?

BGEN B Denaro: I would link it to the maritime domain where we have a responsibility to protect the lines of communication for all shipping across the globe. As commercial companies and civic organisations, civil space expand throughout outer space, I think there's increasing responsibility that they can operate and have the freedom to operate and the flow of trade and goods and the open communication is essential to preserve.

I think all our nations have a responsibility to make sure that that's the case, just like it is on the oceans, protecting those sea lines of communication.

LTGEN S Coyle: It's a whole nation endeavour, isn't it? Civil, commercial and military.

We're down to two and a half minutes to go, so I'm just going to allow the panel members now to give any closing remarks that they would like.

There are plenty more questions here and we'll make sure that we get those through in case you would like to offer any commentary that can be recorded by the Air and Space Power Centre.

So JJ we'll start with you.

VADM J Jones, RAN: I think really back to my opening comments. I see space as an integral part of an integrated force and an enabler between space and cyber. They underpin everything we do. When we are commanding and controlling integrated forces and effects around the world, there's great opportunity there for those interested in the audience and watching online to be a part of space power and the space domain, be it within the broader defence community or within a space component that is running the ADF's operations around the world.

AM A Marshall: Yeah, I think for me, I think throughout history, militaries have fought for the high ground and I think I would refer to space as the ultimate high ground. It allows you to see stuff, it allows you to communicate, it offers persistence the other environments don't get and it allows you to deliver effects or support effects.

So that's the way I see it. It's hugely important and as such, the opposition is going to contest the high ground and so we need to be prepared for that to make sure we can continue to do the integration operations that JJ talks about.

BGEN B Denaro: I think it's really important that we continue to have these sorts of discussions about integrating space into the air forces and into the joint force in order to make the joint force more successful. When the joint force is there, the space force and all of our space capabilities are there and I think it's really important that we underscore that and make those available.

Because if we do, then we ultimately maintain peace and can deter conflict by demonstrating those capabilities.

LTGEN S Coyle: Yeah, a phenomenal chance to have some real inputs into some of these hard issues and questions that come up relating to the space domain. I'm very proud to work in this domain. I just find it a fascinating time each and every day, more so because of the incredible professionals that we work with and we get to work with.

But the fact is we work across an integrated force. We are allied by design or we're trying to be in every area. But importantly, as I said at the start, if you're zero in one domain, you're zero in all. So it's not an either or, it's an end end.

And how we balance that, well that's the responsibility of senior leadership and government.

Can you please join me in thanking the panel?