

**CENTER FOR
STRATEGIC AND INTERNATIONAL STUDIES (CSIS)**

**THE NATIONAL SECURITY SPACE STRATEGY:
IMPLICATIONS FOR THE DEPARTMENT OF DEFENSE**

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JOHN J. HAMRE: Morning, everybody. My name's John Hamre. I welcome you to CSIS, part of military strategy forum. A little unusual today: We normally just are able to get one big guy and we ended up with three. I'm not sure how that happened. You know, the country is perilously on the edge of insecurity right now because they're here. But we're really delighted that they'd take the time to be with us.

And of course, the purpose is to dig a little deeper into this new National Security Space Strategy, which has just been released. It's an important document; it's a part of a series of strategy documents that the administration has been releasing. This, of course, is, I think, the latest, most interesting in some sense.

It involves a historic problem we've had in – from, I remember, my time, where, you know, how do we organize ourselves for space? And is it really an AOR? Or is it simply an ancillary adjunct to other activities that are really defense activities? It's a complex, interesting, interesting question.

And of course, it has with it the complexity of being both a government activity and a private sector activity and a national security activity and a commercial activity. So it's got – it's a, really, a complicated problem. And we're going to dig into this a little bit today.

So thank you all for coming. I'm delighted that you're here. Let me begin – by the way, if Secretary Lynn says anything that's a little goofy, it's because he just flew in at 1:00 in the morning so he's still on California time. So don't blame him.

But, Secretary, let me start with you and ask you, okay, you've got a new strategy – what's different about this than the one that you inherited from the Bush administration?

WILLIAM J. LYNN III: Well, thanks, John, and thanks again for hosting this and I appreciate the opportunity to be here with General Cartwright and Secretary Donley. I'm here, mostly, because I flipped a coin with Secretary Gates earlier in the week and I won and I'm here. And he lost – he's testifying this morning before the House Armed Services Committee.

MR. HAMRE: Right. (Laughter.) I think we all won too, didn't we? (Laughter.)

MR. LYNN: But the first thing that's different from this strategy, John, is this is actually the first space strategy. We have not dedicated a strategy document before this point to our space strategy and I think it represents the importance that this domain has for our military capabilities, our industrial capabilities and our economic wellbeing.

You asked what's different. And I think what's different is that space is far more congested than it was just 20 years ago. It's no longer the private preserve of the U.S. and the then Soviet Union. There's more than 60 nations now that have a presence in space.

It's also more congested in the sense that there's much, much more debris. Debris itself has become a real danger. There's a table in the space strategy that points out that it took something like 40 years to get the first 10,000 objects in space and it's taken us about six years to get the next 10,000 objects. So we're really – the growth of debris in space is a threat in and of itself.

Space is also more contested than it was. The dangers to our space assets now are far more than just direct ascent ASAT weapons. Jamming, lasers, cyber threats all pose a threat to space. And finally, it's a far more competitive environment – 20, 25 years ago, the U.S. had two-thirds of the space market. Now, we're still a leader in space but our share of the market is now 35 or 40 percent.

So we thought we needed a strategy to deal with these changed circumstances and the strategy is intended not only to protect our capabilities in space, but we need a strategy to protect space itself. And we need a strategy to protect the space industrial base. And that's what this strategy is intended to do.

MR. HAMRE: Secretary, let me follow that. You can usually judge, you know, the importance of a document by how quickly the opposition documents appear in the press. Not lightspeed.

Recently, there was a letter that was authored by – I don't know, 15, 20 members of the Senate voicing concern about one dimension, which I'm not sure is even in your strategy, which talks about this European Union code of conduct. I couldn't find it actually in the strategy and yet it's implying that this is part of it. Can you help me understand what this little controversy is about?

MR. LYNN: Sure. The EU code of conduct is not mentioned in the strategy – that's right. And it's a code of conduct that the Europeans are developing. I think they hope to have it final in the next 12 to 18 months. It promotes freedom of access and exploration and use of space. It's focused on timely notification and consultation for space activities.

Now, as I said, this is not in our space strategy. But frankly, it's very consistent with some of the goals of the space strategy: to promote responsible use of space and transparency of activity in space. So we are looking with great interest at this code of conduct and working with the Europeans. And it has some important protections. In particular, it recognizes the right of self-defense. So it's not restrictive in that way. But we think it promotes transparency and responsible use of space. So we think it's a positive. It has a very strong potential of being a positive step.

MR. HAMRE: I think that's one of the concerns of the authors, who said it would constrain our missile defense capabilities.

MR. LYNN: I think there are proposals out there, more in the traditional arms control realm, that might well have that impact. For that reason, we would share that reluctance –

opposition, frankly – to going down that road. But we think that this kind of voluntary code of conduct where it promotes responsible behavior. I talked about the proliferation of debris in space. This would be an answer – a partial answer to that kind of threat. So we think it's a – we view it very positively.

MR. HAMRE: Let me come back on that – on this question of responsible behavior. That becomes a very interesting issue.

Secretary Donley, let me ask you: You're the daddy rabbit for space now. That's not the technical term – (laughter) –

MR. LYNN: Executive agent. (Laughter.)

MR. HAMRE: Executive agent. It's amazing how you forget when you leave government, you know?

But as the daddy rabbit, (laughter) – one of the things that I've always wondered: If we're going to have a space policy, you've got to have a pretty good idea of what's in space. And yet we always seem to struggle with the tools for space reconnaissance. What's the status of our capacity for good situational awareness in space?

SECRETARY MICHAEL B. DONLEY: I think this is a new part or certainly a growing part of the job jar for the space domain. As the secretary alluded to, just the increase in the debris in space and the number of objects that need to be tracked for, basically, safe and secure operations is reason enough for us to be more interested in what's happening in the space domain.

For decades, we've used the space domain for important missions: missile warning, communications, ISR, weather – all kinds of purposes. But I think it's only recently that we've come to appreciate the importance of surveilling (ph) space itself and understanding what is going on in this domain.

We've had capabilities in place for a number of years to do that. But they need to be modernized and we need to improve our capacity to understand what's going on in the space domain in many different dimensions.

So we've had – we've had optical tracking capabilities. We have had a space fence across the southern part of the United States to help capture space objects traveling overhead. Just this last year, we launched the first space-based surveillance system that will help us do some of that work from space. We need to modernize and continue to expand capacity in this area.

MR. HAMRE: I'll tell you: A lot of that is as old as I am. It's been kept up better than I have. But it's as old as I am. This stuff really needs investment, doesn't it?

SEC. DONLEY: It does. And I think, again, this is a growing part of the mission set associated with space.

MR. HAMRE: General Cartwright, Secretary Lynn talked about there's more of a contested regime. And let me ask you very much this question. I'm familiar with some of the wargaming that's been done on space. And I'll use my terms, not anybody else's, but it kind of looks like whoever gets off the first shot, wins.

So what do we do? Is this a hardening strategy? Is this a deterrent strategy? Is it a dissuasion strategy? What do we do because of this unique asymmetric vulnerability of space assets?

GENERAL JAMES E. CARTWRIGHT: I mean, I guess the first thing, John, that comes to mind is one, if there's going to be a contested activity in space, it doesn't mean that you have to respond in space, number one.

Number two, all of space is not in space. There's a large amount of it that is part of the terrestrial systems. And so those are vulnerable areas but they're also our strengths and can be. I think key – kind of going back and playing off the first two answers – is you have to know what's going on in space in order to have an idea of what happened to you and whether it's appropriate to respond in a way that would be self-defense or whether it's more appropriate to do other things.

And the norms in space are what we're trying to get to. We have a good idea of what's out there, as long as you can give us days to determine it. Conflict, resolution of commercial issues, resolution of economic issues in space needs to happen faster than that. Every time there is a conjunction, when two bodies are predicted to come too close together that one of them probably ought to get out of the way – that's an investment. Somebody who has a space craft up there has to invest and expend fuel and life in economic terms.

And so we get into a game of chicken because we don't have a set of rules about passing left-to-left or whatever it is we're going to do out there, number one. And number two, our instruments are not precise enough that we know exactly when we need to move and when we don't need to move.

So having a better set of norms so that space vehicles go in certain places, have certain footprints, have certain areas of protection around them – sovereignty, if you want to call that, having that be a norm, understanding who's responsible for moving and who's not responsible for moving if it's just a collision.

But having a way that you norm the behavior in space so when an anomaly appears, it is an anomaly and it's detectable. And having a system that can see it in a timely fashion so that we know what's going on and who's there raises the bar in deterrence, raises the bar on behavior in space in a way that's beneficial to all the participants.

So that space situation awareness layer is unto itself an element of the dissuasion, of the deterrent strategy that we would put in place. That's critical. To me, that's the first step to understand out there. Absent that, you're really in a very large area of ambiguity.

And so much of the priorities that we're putting into our investment portfolios and into the policy have to do with space situation awareness: understanding what's going on out there in a time that's actually relevant to the activities.

MR. HAMRE: I may be asking a question that you can't answer here but how do we norm activities or assets that countries don't want to acknowledge exist?

GEN. CARTWRIGHT: We've kind of gotten to this cultural approach that, because I'm in space, nobody knows. And generally what happens is only the people in your own country don't know. Everybody else does. (Laughter.) So at some point, you have to say, okay, enough is enough. Because of the explosion, because of how many vehicles are out there, because of the debris, you still have to provide all of the services to something that somebody wants to pretend is not there.

And so at some point, we have to really – just like we did in the air, just like we did in the ocean, you have to acknowledge and put traffic control out there and know what's out there and know what can get in the way.

MR. HAMRE: Is there a concept of sovereign dimensionality around assets? Has that been thought through? It's the first I've heard of it. It's very interesting.

GEN. CARTWRIGHT: It is a thought process. It is what we need to start to understand. Because unlike men in the other AORs, you don't have a piece of land on which you say, that's the border between X and Y. So what is reasonable?

And we usually think about it in two dimensions. One is the physical properties and how close two objects come together. The other is the spectral side of this equation because much of what's in space is emitting or receiving. And we probably have more challenges with stepping on each other's signals, so to speak, and making sure that they're de-conflicted.

So you have to think about it in both ways. And that comes down to Earth, to landing rights – where can they emit to on the surface of the Earth? All of those are considerations that you have to put in place as you talk about the norms in space.

MR. HAMRE: I will say I think the department's done a very good job of protecting spectrum in space assets through the years. Now, that may be – it's more of a contended space now.

GEN. CARTWRIGHT: When you look at the geo-belt and you look at vehicles stacked three and four deep in the same slot, it becomes a huge issue.

MR. HAMRE: Secretary Lynn, you brought up the question, when you talked about the industrial base and the challenges with the industrial base. Let me ask what – or how would you – how would you evaluate the space-relevant industrial base today, for the United States?

MR. LYNN: Well, as I said, I think it's – we have the leading share but it is no longer the majority share. And so I think we do need to take steps to ensure the vitality of our space industrial base.

And indeed, in this budget, led largely by the Air Force Secretary Donley, we've tried to take some concrete steps, one to preserve access to space by having a much more stable buy of the EELV. Frankly, the commercial market for EELV has not come in the way we had hoped. And we need to ensure that that program is as solid in the industrial world as – in order to preserve that access.

At the same time, in this budget, we've found – we think we need to modify our approach to acquisition of space assets. And we've proposed, at least with a couple of programs, the AHF communications satellite and then next year, the SBIRS satellite to try and use a block buy fixed-price contracts, stable R&D, sustaining engineering line, a combination of those things to get far more predictability, far more stability in our buys in space and far more defined infusions of technology.

So it's not – we don't – we tend to buy space assets as one-off and then a few years later, we buy – we invent a new one and buy another one. So everything is a unique asset going into space. We don't use regular industrial processes.

Now, there are some unique aspects to space that you can't get away from. But we think, for example, with block buys we can get far more learning on satellites as we build them and then do block upgrades and then do another block buy. So this is an initiative we have with Congress this year. We're hoping that will lead to more stability for the industrial base.

Those are a couple of concrete steps. But it reflects our belief that we do need to take steps to preserve our leadership in space industry.

MR. HAMRE: Can I press on two – two kind of dimensions here? One, on international cooperation: We've had kind of an attitude that we're going to restrict our space-satellite manufacturers so they can't do anything internationally unless they can prove somebody else can already do it. That doesn't make a lot of sense to me but we've kind of done that.

What is your thinking now about how to manage technology – sensitive technology in the space domain, given that so many other people are in – are capable of launching satellites?

MR. LYNN: Well, I think that's – your premise is exactly right but it extends far more than space. I think we have an export-control regime that was, frankly, built during the Cold War with the intent of a peer-to-peer competition and basically keeping all of our stuff out of their hands.

The Cold War is long dead. But that export-control regime still thrives today but now seems to be designed to keep technologies from our closest allies, even as we're fighting side by side. So we have a broader effort inside the administration to reform that export-control process – to try, in Secretary Gates' words, to put higher walls around many fewer items – those crown jewel technology items: protect those, frankly, more strongly but to allow much more international export of the things, as you say, that everyone else has anyway.

MR. HAMRE: And international partnering, it seems, because it's – you know, if they're going to – if this is going to become a global industry – and it is becoming a global industry – it seems to me we want an American company in the lead everywhere. But that means you've got to let them partner. And we've got to let them get out and be in the lead and –

MR. LYNN: No, I think that's exactly right.

MR. HAMRE: Let me ask about the booster side. This is, of course, a little more difficult problem. Fifteen years ago, when we had visions of two and three launches a day, we thought we would have a large, robust, commercial sector that we could ride on, as the government.

Of course, that fell apart. At the same time, Congress enacted a restriction preventing us from working with the Chinese, thinking that, then they'll never develop an ICBM, if they're not allowed to work with us. Of course, that didn't work – (laughter) – and led to them developing the most reliable space booster in the world right now.

So we've got the worst of all worlds. We've got an industry that was built on commercial demand, which doesn't exist. We've got a government that doesn't buy enough from it. And we've got restrictions that don't let them cooperate.

Something's got to change here. What are you thinking about? What do we change?

MR. LYNN: Well, that's part of what I was alluding to – the EELV. I think we did build – the EELV program was premised in the '90s on the idea that there would be a robust commercial market and we would just be, frankly, a minority buyer in that. But we're now, clearly, the majority, if not the only buyer.

And so we have adjusted our procurement pattern to reflect that. It's not the world we wanted but it's the world we have. And so we've tried to do this now in a way that we think will protect that capability in order – so that we have guaranteed access to space.

SEC. DONLEY: We've made a couple adjustments programmatically in terms of how we're approaching the launch work. Over the past several years, our approach has been to align the launcher with the payload. And so if and as the payload and programs get adjusted, then the launchers fall in and out of our procurement plans. And this is produced – and just as the secretary alluded to sort of inefficiencies in the satellite or program area, it applies also in the booster area and to EELV.

So we made a decision this past summer to decouple the launchers and the payloads so that we can buy the launchers on a more routine basis and wait longer to make decisions about which payloads get married to which launchers.

But to stabilize the industrial base, we'll now have a steady flow of EELVs across the future year defense program. And we did that work in coordination with NASA and NRO as well, to establish what was identified to us as the minimum required to sustain that base effectively.

And now we have to go in and negotiate the best prices that we can get from that. That's still work to be done with ULA. But I think we've put in place a much more stable approach for buying boosters. And we're doing it with interagency coordination here so that we get more of a U.S. government approach to this, than having three separate departments, agencies speaking to one provider.

MR. HAMRE: And what will we do to help our booster industry be globally competitive? Is there something that we're thinking we can do there as well?

SEC. DONLEY: Well, I think the export control issue is really our key here in sort of working through those.

MR. HAMRE: If we guarantee a production base, obviously, they get the price more on the margin and that would be helpful as well for them.

GEN. CARTWRIGHT: There's another piece to this that I think is worth – in the debate going into the policies, there was an element here of, even if we get the best acquisition system in the world and got everything smoothed out so that we could get the price to – to best we could do, we still can't afford most of the constellations we have up there.

So at some point, you have to come to a position of partnering. And does that mean that you partner in kind or does that mean that you partner by other nations putting assets and then you network them together? We right now still want to believe we're going to go it alone. It's not affordable. We can't do it for all of the things that we expect as a nation to get from space. We need to start partnering. We need to build constructs to partner. That's kind of piece one.

Piece two is, for our national industries, we've got to put them on a base where the transaction rate is not, build me two and I'll come back in 10 years and then I want you to build the next two. It just doesn't work. I mean, you can't build a labor force against that.

And so how are we going to change those constructs in order to be able to work in space? We don't have to be the only people that have sensing in space. We aren't. There is good sensing out there in other places. If we have a four-ball constellation and then the guy next door has a four-ball constellation, if you just do in revisit rates, you cut it in half. It's very important to the warfighter, very valuable. And all you do is combine the data. Pull the data together.

We have this construct where we believe it's got to come from us. And the problem is, we don't fight as a single nation anymore. We fight in combined constructs. And so if I'm expecting the guy in the foxhole next to me to fight and sacrifice and I say to him, you watch my flank, but I can't tell you what's coming over there because it's a secret, nobody knows I'm in space, it's just crazy. You can't do that.

So if we're going to operate and if we're going to fight in a combined way, we've got to build our constellations, whether they be sea, air or space, in a combined way. It just – there are certain things that we will want to keep competitive advantage on. But the others have got – we've got to find a way to get to scale. We've got to find a way to preserve the intellectual capital in the industrial base, and we can't do it on these cycles that we're doing it today.

And I don't have any strong feelings about it.

MR. HAMRE: (Laughter.) I'm glad for that, and I'm glad you lectured John (ph) in the Green Room. In that regard, we're going to have to tackle the way we deal with security clearances for foreigners in our installations. I mean, we want them in, we consider them federated partners, but then we say they can't look at the memo they just wrote because it went into SIPRNet. I mean, we've just got to – we'll have to find a solution.

Mike, you are going to be the executive agent. About 90 percent of the people in this room are here to figure out how you're going to do that, because they're going to report back to bosses or clients that they now understand. So why don't you tell us, what are you going to do with this – (inaudible, laughter) – because all of these people have to fill out a report to justify coming today.

MR. DONLEY: And my boss wants to know, too. (Laughter.) No, the space policy and strategy work has gotten a lot of close attention over the last couple of years. As we saw that building up, it was obviously the case that we needed to step up our game in space and the department.

And under Secretary Lynn's leadership, we stepped through several discussions at his defense – or, Deputy's Advisory Working Group, the DAWG-level discussion to sort out the way forward on how we do space governance in the Department of Defense. So we've had those debates, and the result of that was the establishment of the Defense Space Council, which will be chaired by the executive agent. And we've had a couple of meetings to get going already.

The purpose of this really is to coordinate and integrate the department's space work across the board, not to micromanage the programs, but to coordinate some of the international, some of the industrial work that crisscrosses these programs and the architectures and assumptions that we have going forward about how we're going to do MILSATCOM and how we're going to do missile warning and how we're going to do other aspects of our work – weather, for example.

So there are international, industrial, interagency partnerships to be had in all that, and the purpose of the Defense Space Council is to keep all that coordinated and integrated in the

department. And to the extent issues need to come up to the secretary's level for decision, it's our job to work those issues up through the Defense Space Council.

So between the president's space policy and the national security space – National Security Space Strategy just released, there are 30-some action items out there for departments and agencies. Not all of them are DOD, but we have either leadership or equity in many of them. And our task is to work through those to-do lists, working on industrial-base issues, working on architectures, working on partnerships and how to put those together.

The secretary – the vice-chairman is spot-on in terms of – the overall emphasis in this strategy is recognizing the reality that we are not alone, that we can't do everything on our own and that we need to have more partnerships, not just across the industrial sectors and commercial sectors – it's not just the people that carry our payloads or build our payloads, but who are doing commercial work from which we can benefit and looking into the possibilities for more hosted payloads, and such, and partnering.

Secretary Gates just signed a Space Situational Awareness partnership with the government of Australia. So I think the purpose of the Defense Space Board in general was to recognize the volume of work in the Department of Defense and in the interagency that would be coming from this new emphasis and to prepare ourselves to organize to meet those tasks.

MR. HAMRE: And do I understand, then, that the Defense Space Council, Defense Space Board, is the focal point for all interagency things as well? So for example, NOAA interface or NASA interface or FAA interface? Is it all – is it through you?

MR. DONLEY: We still have to work out some of those relationships because, for example, the NPOESS or the weather-satellite consortium that's been out there, has been an interagency governance process in and of itself. GPS has had some of the same interagency governing processes that we do not own as a department of defense. So we'll have to kind of work through those going forward.

But in the near term, our focus will be really to partner with the DNI and the intelligence community. This National Security Space Strategy is a joint product of DOD and the DNI. So as the DOD has gotten the Defense Space Board up and operating, General Clapper on the DNI side is sort of working through governance in his community. And we expect in the next couple of months for that to be resolved in a way that we can then identify the two – we've got to the DOD and the DNI piece identified, and we can figure out how we will go forward together.

MR. HAMRE: Let me just personally lobby you on one thing, that you are also the executive agent for the national airspace plan for the Defense Department – you know, airplanes flying through the air. And of course, the new navigation system is going to be a space-based navigation system. So this uniquely ought to be brought together in that space. You and NASA and FAA should be working this.

MR. DONLEY: We are certainly working the FAA piece of that intensively.

MR. HAMRE: General Cartwright, let me – you already touched on this, the war-fighting issues associated with space, and what's emerged in the last couple of years has been this kind of notion of a global commons. And I'd like to drill in a little bit on this, the idea that all of humanity shares some things in common and that we benefit from it being available to everybody.

That's clear, but what happens when you got a rogue actor that's in the global commons? How do we deal with that? I mean, how do you identify? How do you stigmatize? How do you – you know, how do you bring global condemnation for behavior? How do we know it, how do we verify it? How are you thinking about this?

GEN. CARTWRIGHT: The concept of commons really was heavily debated in the development of these strategies, because there are legal implications to using the term that have developed over the years. But suffice it to say, the attributes of an area in which multiple nations expect to do commerce, expect to do military activities, et cetera, is in some terms a commons area.

And the thought process right now is, we have put structure to the commons that we call the sea. We have put structure to the commons we call air. That structure gives us confidence that we can do commerce, that we can do military activities in a way that sets a pattern and an expectation of behavior.

And the question is, should we be doing the same in space? And the numbers clearly drive you in that direction. Even if a large part of it is debris, just the management of traffic and avoidance of collisions which take away the – or increase the cost of commerce, the price of doing business, drives you to some sort of pattern.

It's true on the national security side also. To the extent that you can have a standard behavior such that an anomaly can be detected when somebody's not behaving in a standard way, helps you identify who is causing the problem. It may be willful, it may be a malfunction. You really don't know until you can assess it.

So again, I take you back to space situational awareness. It's got to get down to a level of fidelity that things like attribution, things that are not necessarily willful, can be detected for what they are, acted on in a timely fashion, because every minute that somebody's not broadcasting a satellite image for television or whatever is revenue to somebody. And it changes the cost factors out there.

That's the same on the national security side. Every minute that somebody is doing something out there that they shouldn't is a problem. The sooner that you're going to be detected, the more difficult it is to hide your actions. And so there is an element of deterrence in this structure that has to be a part of what we do.

What we have today, again, is not as robust as we want. We are putting new systems in, new processors. But quite frankly, this is back to partnering. We couldn't afford to put all the

terrestrial sensors up there that we need to do this in minutes and seconds rather than in days and weeks. And so we've got to rely on partners.

One of the concepts we're discussing with partners is, would you like to be part of the Combined Space Operations Center? If so, bring your sensors, because we've got to find a way to get a global awareness. And there is a terrestrial element to that. You've got to be on the land or in an area with things like transfer orbits to geosynchronous. You have to be in the right place to detect these activities.

We don't necessarily own those places, and they're not necessarily in the commons. And so we have to have partners to start doing this, but the more that anomalous behavior can be detected, the more the cost of operating a space goes down and the more the security issues are better managed.

MR. HAMRE: I would just mention, you know, that NOAA has pioneered with the GEO system a very good international model of collaboration on technical sensors. And it's potentially something you might want to look at in this space.

But let me again come in, if I could. Obviously, we have to have the technical capacity, but when a drunken Chinese fisher-trawler captain rams into a Japanese patrol craft, we can take a picture of that and put it on YouTube and CNN, you know? But what do we do in space? I mean, this is a – this gets to be a lot harder to create that sort of deterrence environment when frankly, the capacity to monitor, real-term, is hard – really hard.

GEN. CARTWRIGHT: It's hard, but it's no harder than trying to take the same picture in the middle of the ocean when two tankers run into each other. I mean there's not a camera post sitting out there. The intent here, though, is to be able to track this stuff just like we do other things. Track in the larger area, look for patterns that deviate, focus in with sensors that need to – if you think there's going to be a conjunction in space.

So that you can see it, we have the optical sensors, we have the space-based optical sensors. We have a system that can do it. The question is, can we bring it to scale and get it to report in a coherent way so that we can actually act inside of the decision loops rather than oh yeah, those two did run into each other. I'm kind of running the tape back now to take a look at it. That's the mode that we're in today. We've got to get that changed.

MR. HAMRE: Colleagues, we're going to take questions from the floor. We've got two microphones and I might ask you to kind of work your way up. I'm going to ask one last question and then the people that want to ask questions, start queuing up and we'll try to get as many in as we can here.

General, one last one for you and that is the other domain that's frequently referred to in commons now as cyberspace. How do you think about space and cyberspace as related activities? Are we integrating them? Are they integratable? Should they be? Are they, you know, because cyberspace is – has terrestrial attributes. Of course, so does space. So how would you think about this?

GEN. CARTWRIGHT: People – people have often talked about putting the two together. We thought about commands that would be basically the command having those responsibilities. In some of the services, that's the case. But you know, essentially, you're dealing in two areas that have a very different relationship to geography.

I mean in comparison to the water, in comparison to the air, et cetera. So the speeds, the lack of reference to the ground, et cetera, those are similar. But the reality here is that – at least from my perspective on the war-fighting side, really pretty much agnostic to the medium in which you operate.

So if you're in the operations in space and you need to work at speeds that we're talking about there – in orbital speeds, speed of light is a nice way to operate. It tends to catch things in a hurry. And so if you're going to move cyber through space either in a defensive way, in a just general path-of-communications way, moving at those speeds are – there's a synergy with space that's there and you don't have a lot of buildings in between, you know, to get in the path.

So that's the nice part about this. The other part that comes, particularly for the Department of Defense or national security is that if you're trying to get from country X, the United States, to country Y and there's several countries in between, you really are not passing through their airspace. You don't necessarily have to pass through their land, et cetera.

You can move over and move down. We're a global force. We need the space capabilities to operate in that global force. Cyber, whether it be just the use of information and the movement of information or whether it be in a defensive nature to protect that information, tends to want to operate in the same.

In other words, we can't operate globally without that information and we've got to protect that information as it moves. Space gives us a venue to do that in a way that we can't necessarily do in other venues.

MR. HAMRE: Good, thank you. Okay, let me open it up here. Bruce, you're the brave one. Go ahead. Just come up here, folks.

Q: Hi. I'm Bruce MacDonald with the United States Institute of Peace and author of the Council on Foreign Relations' study on "China, Space Weapons and U.S. Security." I was very pleased – first, let me thank the gentlemen for being here and sharing your views with us.

I was very pleased to see in the space strategy, as well as in the space policy, references to deterrence and stability and all those good kinds of things. If you look in the nuclear area, there's a lot of information out there about what our nuclear forces are, what are our policies are, doctrines, you know, the Nuclear Posture Review is full of that.

But if you look in the space area, you see very – you see references to space deterrence, but I'm sure maybe the classified version of the strategy might have a little more about it. But there's a – it's very vague. When can we expect or is it possible that we're going to see at some

point a little more explication of what we mean and what we think of by “space deterrence” and how it operates?

For one reason, because if you wanted to deter somebody, it’s very important for them to know what your red lines are, how your thinking works, rather than say, well, we’re going to deter people but we’re going to keep it a real big secret as to what our key constraints are. Thanks.

MR. HAMRE: I’m going to let you guys decide who wants – (inaudible, cross talk).

MR. LYNN: Let me – and Hoss may want to jump in. I mean I – this is, as I said, the first space strategy. And so not everything is in there, but I think there are a couple of important concepts in deterrence that are in there that we need to unpack some.

I mean, one is you have the core concept that we just retain our right for self-defense and that we would respond to attacks on our space systems as we would on any systems. And as General Cartwright indicated, it might not be limited to a response in space. We choose the time and fashion of our response.

There are two other concepts that are in there. One is the – the concept of partnership that General Cartwright was talking about, that that enhances deterrence because as you start to cross-fertilize capabilities in space, it means that attacking one – attacking a constellation will not necessarily be an attack against one country, it’ll be an attack against many. And so you start to put in the concepts of restraint that way.

The other concept that’s in there is an emphasis on cross-domain capabilities so that we don’t have a single point of failure going through space, that we have alternatives in an air-breathing or terrestrial capabilities. So there’s a redundancy there. So again, you’re constrained from striking those space assets because the effect that you’re looking for won’t be gained and you’ll get a response that you won’t be happy with.

So I think those – in addition to self-defense, you have this cross-domain as well as this partnership approach.

GEN. CARTWRIGHT: I mean I agree with you that in the domain itself, we’ve done very little development of deterrence strategy. But there’s generally two approaches. There’s an in-kind deterrence, which is what space-type deterrence is talking about.

And then there’s a broader deterrent strategy which allows all of the mediums to be part of the coherent strategy. The idea behind deterrence in its essence is to get in the mind of your adversary that his approach or her approach would not necessarily get them where they want to be. Change the calculus; put doubt in their mind that they can get away with something.

A couple of things that you can do in space that will allow you to do that is, number one, if you decide that you’re going to be a bad actor in space, then you’re doing to be denied all of the other services of space. That’s going to be a calculus for you because we move so much

information through space today. Run a business – if it's Walmart in China, you're going to lose your Walmart. So there's a price for it.

The other is that what we would term “combined arms” is that, don't put anything up there that you can't replicate someplace else. So if the adversary decides he's going to take it out there, okay, I got two more ways to get there. You're not going to win because you took it out there.

The third goes back to the industrial base and partnering issue. We have moved away from ideas of scale in space. You know, we go up and do onesies and twosies in many of our constellations. We can't do that. I mean, there is this idea, a first-shot idea that, I'll just knock everything out in five – that's not going to happen. That's just physically not going to happen.

But what you have to worry about is, how long before it degrades to a point that it can't be used and how much hardening do you want to do to put in the adversary's mind that that time may not be enough for them to act. And so we need to do more writing, we need to do more thinking about how we integrate it into the larger deterrence strategy. And I turn to you to do that. (Laughter.)

Q: Amen. Thank you. (Laughter.)

MR. HAMRE: Brother Wheeler.

Q: Mike Wheeler, Institute for Defense Analyses. The – we're working hard to establish a more stable strategic relationship with Russia. And we have a long history of some kinds of implicit and explicit partnering with Russia in space. I wonder if you might share thoughts on how the prospects of future partnering in space with Russia might work into the larger strategy that we have of the nature of the relationship we want with them?

GEN. CARTWRIGHT: I'll take a crack initially. I mean I have, now, probably 15 years and in that 15 years of working at STRATCOM and in these jobs and in the joint staff, my counterpart, General Popovkin on the Russian side and I have had a very rich dialogue during that whole time.

And we're trying to figure out way forward. One of the areas that we think there's great benefit here or great opportunity is in warning. Why wouldn't the whole world benefit from knowing if anything comes off the face of the earth, particularly if it's not supposed to? And where it's going – why would we keep that a secret from each other? Why wouldn't that increase stability?

Go back to the deterrence construct, make the price of trying to do something like that a lot higher. In other words, a lot of people are going to know what you did and you're going to know – attribution will be very quick. Why wouldn't we want to share that? Why wouldn't we want to co-build, cofound, co-run, co-operate, you know, in space on situation awareness and on warning? There's really no reason not to.

Now, the question is: Can you find a model, a business model to do that? And then can you work your way through the actual exchange of the information? Everybody worries, gee, if I partner with somebody, will they, at some selected time, turn their share of the system off or shut it all down? I mean, at some point, you have to trust and you have to put things together. I think there's great opportunity in space to go into a cooperative activity with the Russians.

Q: Sir, Amy Butler with Aviation Week. To build off the discussion about partnering, I'm curious, with this sort of austere fiscal environment coming down on the Pentagon, you started partnering with MILSATCOM. You've done it on weather.

At what point do you start getting into, you know, more, I guess, urgent or core-considered missions such as GPS? You just mentioned warning, maybe space-based missile warning, space-based missile tracking. Do you allow them – whoever they are – to buy satellites? To buy time on satellites? To contribute to development in those areas?

GEN. CARTWRIGHT: Amy, you know – I'll let you all jump in, but you know, we're trying to expand now. We started with COM because that was relatively ubiquitous and everybody understood, you know, that that would be a good way to go forward and there was a good commercial market there also. So it had great benefit.

And we've done it in two or three different ways. We've done it by – you can buy – technically buy one of the heads off a satellite and put it on a different satellite. You can go buy a satellite and put it into constellation so if it's a five-ball constellation, you buy one. With one, you get the value of five.

I mean those types of approaches – we share data and ground stations and geographic landing points for satellites as ways to increase the value and reduce the burden, so to speak, on any one nation. The question is can we start to get into some of these core issues?

I mean GPS, Beidou and GLONASS are out there and the question is can you come to a common schema? If you put the two of them together, can you find a way to move forward where you get more – more vehicles in the constellation, therefore more precise time, therefore an ability to do things in a more precise way than we can today? Things like agriculture tend to drive that requirement and can you, in fact, find a way to do that?

And B, in the diversity of those signals – is that also a way to raise the deterrence strategy? In other words, okay, so you can knock one kind out, but can you knock both kinds out at the same time? Those kinds of questions change the calculus of deterrence. So there is a national security aspect that favors doing this kind of work. There is a commercial business case that favors it.

The question here is trust. You know, and when are we going to get – when are we going to get to the point of trust? And generally, when we get to the point of trust is when we can no longer afford to do it ourselves anyway. So I don't know which one comes first, but at some point.

Q: But are we there yet? I mean are we there yet? Is there a financial environment – (inaudible, cross talk).

GEN. CARTWRIGHT: It's close enough that people are willing to talk now.

MR. LYNN: Let me just to what General Cartwright was saying. So I think you have to look at a spectrum of capabilities. At one end, as we've said, it was situational awareness, it was some communications capabilities. There's already a broad interest in sharing and collaborating on those capabilities.

As you move up with the GPS, I think there's a – there are some core missions that we need to be able to perform. But there's some things – there's redundancy that can be provided. There's the diversity of signal, as General Cartwright – so you start to balance those things. And then there are probably some core capabilities that we are going to feel that we need to – need to have at the very – at the very high end.

But I think as you look across that spectrum, you're balancing both, you know, what are our national security needs? But as General Cartwright was saying is that there are fiscal needs and there are clear deterrent and other advantages to collaborating. So I think you have to go system by system up the spectrum and make that – those judgments.

Q: My name's Jim Scheimer. I'm with SES WORLD SKIES, U.S. Government Solutions. The question I'd like to pose is with respect to space situational awareness. The two largest owner-operators out there launch eight to 12 communication satellites into the geo-belt every year. Every one of those is a candidate for an SSA sensor, giving you redundancy, giving you higher resolution.

Heretofore, the logjam has been things that you've already mentioned. The government must do it. How do we share standards? How do we share the data? Those things have always stood in the way of us actually seeing a real partnership between the government and the owner-operators who've got these platforms going on.

With the budget as it is and will be for some time, with the advent of the Defense Space Council, do you see any hope of breaking down that logjam in the near future so that – because we have a commercial interest that. Too obviously, we don't want things running into our spacecraft any more than you do.

GEN. CARTWRIGHT: Well, I mean from a council standpoint, we've had, for several years, the form by which we have worked with the industrial sector and the commercial sector. That, we need to keep robust. Now, the question is can we start to move towards instrumenting spacecraft for some proximate area around them to be aware of themselves and what's around them.

If nothing else, to say, I just got run into by debris or I just got run into by an explosive package. But what do we want to know about that and trying to work with the commercial

sector to see what's appropriate to carry on the spacecraft and what's appropriate to be off-board and where do the two meet because you can't afford anything?

MR. LYNN: I think, taking it up a step, I think one of the broad thrusts of this strategy is to move away from the world in which the U.S. government developed unilateral capabilities. There's still a role for that in certain instances, but we think it's much narrower. And we think not only do we need collaboration with – internationally, but we need collaboration commercially.

And in both cases, that diversity provides fiscal advantages and it provides deterrent and capability advantages. So we're – the thrust of this document is exactly down the lane that you described.

MR. HAMRE: Colonel, you get the last question. I'm sure it's a good one because you're never going to ask these guys a bad one. (Laughter.) No pressure though, no pressure. (Laughter.)

MR. LYNN: Easy one would be the –

Q: Colonel Chris Crawford, Joint Staff J-3. Gentlemen, thank you for doing this. This question is primarily for Secretary Donley. One sentence in the strategy says, "Human resources, processes must provide the right personnel for successful execution."

Since the Air Force provides the majority of our space operators, our acquisition personnel, but given that over the last 20 years, we've dramatically reduced the percentage of our personnel with technical degrees and we've reduced, especially at the Accession level, the broad-based space training.

We typically now just focus them primarily on operating a particular system. Do we re-attack, at the Air Force level, that Accession level, to produce the human capital to really make all this go to the long term? Sir?

MR. DONLEY: The human capital issues are extremely important to the Air Force and to the rest of the community and we continue to work those. The real driver or engine for getting into the space business has been being in the ICBM business and building – because we have a high requirement for lieutenants and captains in the ICBM fields. And they feed the space business; that's been the model in the past. We need to continue to tweak that going forward. We're not getting all that we need out of that model.

And in particular, right now, we're focused on building up the business expertise at space and missile center out at Los Angeles to help us work through some of the programmatic tradeoffs, work through some of the tough negotiations that we have going forward with our industrial partners to get the right business models that will help sustain these architectures and build additional capability going forward.

So we need – we need not just the space operators, but we need some stronger business heads in that mix as well. But take the point that the human capital piece is extremely important.

Q: Thank you, sir.

MR. HAMRE: That was a great question. Okay, colleagues, these guys, unfortunately, have other work to do today. I'm going to go to lunch. (Laughter.) So – (chuckles) – so let them get out the door, but please, before they leave, thank them with your applause.

(Applause.)

(END)