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**(Panel IV) The Geopolitical Technology Landscape:  
Challenges and Opportunities**

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FEATURING  
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*President and CEO, RAND Corporation*

**David L. Norquist**  
*President and CEO, National Defense Industrial Association*

CSIS EXPERTS  
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Kirti Gupta: OK, welcome back everyone for our final fireside chat of the day. We've been talking a lot about innovation and intellectual property, but we are sitting at one of the top national security defense think tanks in the country. And we have to ultimately talk about how national – how all of these things are inextricably linked with national competitiveness, which is directly related to technology leadership and innovation.

And to connect those dots we have our fireside chat of the day with real defense and technology innovation experts in the field. Dr. John Hamre, who you heard from in the morning, is going to lead the discussion. He didn't mention it, but he is a former deputy secretary of Defense and also has served as a DOD comptroller in his previous life before he started – (laughs) – running CSIS. And he is enjoying dabbling – right, Dr. Hamre? – we'll call it dabbling in the field of innovation and IP – (laughs). With that –

John Hamre: It's a whole new journey. (Laughs.)

Dr. Gupta: – I hand it over to you. Thank you.

Dr. Hamre: Well, thank you. And this morning I – when I said welcome and greetings to everybody, I really – I failed to say a special thank you to Laurie Self and to Qualcomm for being such a generous supporter of keeping this going and giving us a chance to bring this forward. And we have other partners, but I want to say a special thank you to Laurie.

OK, so I think the most important thing right now for me is to introduce you, the audience, to my two speakers because they are going to – they'll say, who the hell are these people, OK? And so – well, let me just say you share something in common. You guys have defense backgrounds – these are all warriors, OK? – and everybody in this room has been involved in pretty fierce battles, you know, during the last couple of years, but they're involved in a different kind of warfare than – I'd say it's probably just as kinetic, but it is different. These folks are battling for people that have invented ideas and want to protect their property rights for those ideas.

And they're in a world that was all new to me. I mean, this, as I said, Walt Copan introduced me here to a community that is working every day in one of the foundation elements of our innovation as a society.

Intellectual property was something that we enshrined in the very earliest days of the founding of the country, but it is something that I just have taken for granted. I never really understood it. So these are the folks that are working. They're in – they're warriors on very real battles every day working on intellectual property, its issues, and there have been a lot these last years. So that's who you are talking to.

Let me ask each of you to talk about yourselves. What I want to do at the first is ground you with understanding who these two remarkable gents are. Let me start with you, Dave. David Norquist was the 34th deputy secretary of Defense. I was the 26th, and we were in a fraternity of the wounded, OK – (laughter) – I mean, those of us – everybody knows what it’s like to be a deputy for a principal, you know, but David did a fabulous job, and he went through more secretaries than the normal deputy secretary. But currently he is heading up the National Defense Industrial Association, OK, and it is the premier defense industrial base association for America.

Dave, why don’t you just say a little bit more about you and about the association?

David L. Norquist: Sure. So let me first start with a little bit about myself, then I’ll go to the association.

So I entered government as a civil servant; worked for the Army doing programming, budgeting; did a number of years on the Hill with House Appropriations Committee – make sure I turn my head so the microphone gets me, I’ll have to keep mine turning – went to DOD into the Comptroller shop; then I went to be the first Senate-confirmed CFO at Homeland Security because, if you think DOD isn’t sufficiently challenging, Homeland Security is all set there waiting for you – (laughter) – to give you an opportunity; went into the private sector for a number of years; and then I came back and I ordered a shot of John Hamre, which is you do a shot of comptroller time, and then you follow it up with deputy secretary time as a chaser.

Dr. Hamre: Yeah. (Laughs.)

Mr. Norquist: It’s a little thick on the PPBS, so if you don’t like that one, it’s OK –

Dr. Hamre: (Laughs.)

Mr. Norquist: But if you live in our world where the defense budget process is what you enjoy, that combination –

Dr. Hamre: Was perfect.

Mr. Norquist: – is delightful. So I have walked in many ways in his footsteps. There are three of us that have done that combination. Bill Lynn I believe was the other.

So when I got out, I’m now with the National Defense Industrial Association, the largest and oldest defense association. We are 501(c)(3) so while we can do a little bit of lobbying, our focus is mostly educational. Seventeen hundred members, the majority of them are small businesses, so we represent them, for example, when there is a new regulatory change coming out – CMMC or

some of the others. We – in fact, we’ve done 10 of these in the first quarter of this year where we go to government on behalf of industry and say these are the concerns of our membership, these are the consequences of the regulatory change that you are proposing. We’ll also do friends of the court briefs if there is an issue there, but we have – and we have different companies, we have law firms and others who are members as well because we have divisions that focus on subjects, so there’s a division that deals with acquisition regulations or a division that deals with chemical and biological warfare. So the government can come to us to talk to subject matter experts.

So just as an example, most recently the Special Access Program Office in the Pentagon that deals with the most classified information wanted to revisit how they did security standards for buildings. And they wanted to talk to industry. So they came to us, we did the invite, we brought the industry into a room – about 55 people – and they could walk through their plans and get feedback on industry on what the consequences of what they are doing.

So that’s really our role, which is we are a bridge to let government talk to industry about what their requirements are, let industry talk to government about their solutions, and to educate government on the consequences of some of their actions on what it does for competition – what it does to discourage people or encourage people to participate.

Dr. Hamre: David, thank you.

Now let me ask Jason Matheny to introduce himself. I’ll just give you a little bit of background. Jason is currently the head of RAND Corporation, and of course it’s probably one of the premier, you know, FFRDCs in America. Before that, he served in the Biden White House. He was the only guy that had a senior bridging role between OSTP and the National Security Council staff. I mean, he was in – so he was the senior technologist in national security.

Before that – he got that job, I think, because he had headed up – he was the founding director of CSET, you know, the Center for Emerging and Strategic Technology – is that what it is? Tell me. Did I get that wrong?

Jason Matheny: Security and Emerging Technology.

Dr. Hamre: Security and Emerging Technology – CSET – and was also – you were at IARPA. You were the director of the Intelligence Advanced Research Projects Agency. So he has had a long, long history.

But tell us about – well, tell us both about your Biden journey and then your current job.

Dr. Matheny: So the goal in dual-hatting a position between the Office of Science and Technology Policy and the National Security Council was to bridge those two portfolios that were sometimes separate. And I think there was recognition, both within the NSC and within OSTP that there was significant intersections between our work in technology policy and our work in national security.

That kind of bridging has been sustained. I think the team there is now extremely collaborative in building technology policy that serves national security goals as well as domestic goals.

The work is also one that helped, I think, create sort of a cohort of technology strategists of a type that I think we need more of in the country. You know, we're very good at building pipelines of military strategists to think about move/countermove, to think about war gaming, asymmetric strategies, cost imposition strategies. We don't do that as much when it comes to technology policy. But this group at the White House currently is, I think, really expert at that, and I hope to see more of it.

RAND is a wonderful research institution, probably the world's largest policy research organization – certainly the country's largest policy research organization – about a thousand projects at any given time on virtually every policy topic that the federal government works on. We have offices in five countries, primarily in the United States but then also in allied countries.

I come from the Santa Monica office so I am constitutionally prohibited from wearing a tie – (laughter). I should have brought scissors for you, John. But we have an office here in D.C. right in Pentagon City, and we have offices in Boston and Pittsburgh.

What I find really interesting about RAND's work is that it's about half national security and half social and economic policy, and you find researchers who are moving across both portfolios. So we manage four of the federally funded research and development centers for the national security community – three for the Pentagon, one for the Department of Homeland Security – but then we have half of our work that's in health and human services, education, labor, working on environmental issues, working on civilian technology policy issues. So that intersection that allows us to draw on the best talents in both is, I think, one of the things that makes RAND really unique.

Dr. Hamre: Thank you. Thank you both.

Now I said a little bit of this this morning when we – when we were in the introduction. When I talk to my defense colleagues I always say, look, I think there are two types of national security: capital N, capital S – “National Security” – and small-case n/s. For me, small-case national security – n/s – is

aircraft carriers, tanks, how many divisions you've got, ammunition, et cetera. Capital N/S, "National Security," that's the strength of your economy. That's the creativity of your ideas industry, the sense of fairness in your society and shared conviction. That's real "National Security." So we're going to talk about both of those today, but let's start out very narrowly with small-n, small-s, David, because you represent the industry that's in this business.

Tell us about how research and development – how important is research and development in the world you are sponsoring? How important is it for the Department of Defense, and how important is it that we have this protection for intellectual property in this world?

Mr. Norquist: So I think the value of the research and development in the Department of Defense depends on the nature of the challenge that you are facing. And so one of the things to recognize is how different our situation is today.

So in World War II – Nazi Germany, Imperial Japan – the U.S. economy was simply larger. We had more people, we had a large economy. We are going to win through volume, no matter what, even if your vehicles a slightly better than ours.

When we look at a potential situation of deterring China, a nation with a billion more people, who produces 50 percent of the world's steel and we produce 5 percent, you are not going to have a strategy of winning through attrition and through volume. Now, all of a sudden, research and development moves dramatically higher in your demand and your need because you are now counting on that as one of your strategic advantages. It also splits in that you have both government-funded research and industry-funded research. And the challenge is communist countries can also do government-funded research with the same level of top down. What they don't do well is the industry side. So part of the challenge to the United States is that if you really want to be competitive in this environment, you have to take advantage of your strength that they don't have, which is what's the innovations and the ideas coming out of the industry side, and how do you bring that into your system.

And so you'll have some innovations that are very specific. Stealth is not something the private sector would have much interest in, but it will be very hard for the government to spend enough money on space to keep pace with what the private sector is going to do tomorrow anyhow, with or without your investment. And so I think the challenge here for industry is recognizing that combination and the role that both of those play in deterrence.

Dr. Hamre: We'll come back – very interesting.

Let me – Jason, let me ask you – you’re wearing both your National Security Council hat and your RAND hat. In both, you were really intensely interested in technology and research and development. So how do you look at that as a foundation for our national security?

Dr. Matheny: Yeah, I mean, first, the way in which the world has changed in the last, say, 20 years in key areas of technology – look at, say, computing where processor speeds have increased by over a factor of a thousand, you know, per unit cost. It means that you are going to need to be investing in what the leading edge is today in order to keep up with procurement that is likely to last years to a field-deployable system.

So you can’t rely, as much as we are today, on legacy hardware. It’s not going to survive well in a future competition where you have electronic warfare systems that are state of the art, ballistic missile systems that are state of the art, hypersonic weapon systems that are state of the art. So first is the need to invest in R&D simply to address the weaknesses or vulnerabilities of legacy systems to today’s weapon systems that are fielded by other countries. On the sort of big National Security – capital National Security side, research and development is the fuel for our national competitiveness.

As you, among others, have noted, John, the future of our competition with China is primarily a technology competition, so understanding the role that research and development has in driving a pipeline of technology that we’ll need in order to stay competitive is, I think, critical. And right now, the United States’ lead in some areas has diminished. We used to be responsible for about half of global R&D, right after World War II; now it’s about a quarter of global R&D, and China is about another quarter of global R&D. Also the share that is responsible from the federal government has diminished from over half now to around a quarter of that number. So we are falling behind, especially in areas of R&D that serve national missions.

Dr. Hamre: So both of you have opened up some really interesting questions to explore here. You know, when we – the great competition with the Soviet Union was also a technology competition, and we designed systems to restrict technology that was to be shared with, or sold to, or stolen from – by the Soviet Union.

We have such a different format with China. I mean, we’ve had a strategy of engagement with China, not containment, and so we’ve had a lot of interaction. But, you know, in recent years, as you said, I mean, there have been some remarkable advances.

While I think you were still in the Biden administration, we started the process of looking at restricting semiconductor technology. You know, we’re dependent on an international engagement, and yet we want to restrict stuff.

Why don't you share with us the way you thought about that when you were – when you were at the NSC, and then, you know, any insights that you have right now. I mean, what do smaller yards, taller fences mean?

Dr. Matheny:

Yeah, I think this is an area, too, of policy continuity, really, from the last administration and the current administration of seeing the strategic picture, I think, roughly the same, which is if you are in a technology competition, you don't need to be giving fuel to your primary competitor. It doesn't make it a fair race for you to be the primary source of technology for your competitor, and in the case of semiconductors, we were not only sharing our most advanced chips with China, we were also sharing our most advanced tool-making equipment – so advancing China's own goal to become self-sufficient in its own supply chain.

When we looked at that, it didn't make much strategic sense, so first it was increasingly clear that semiconductors were at the heart of so much technology advancement broadly. They sit at the foundation of supply chains from data centers to personal electronics to weapon systems that are fielded and have microelectronics serving as their heart. It serves as the primary driver for innovation in other technology areas; everything from quantum to synthetic biology, and we found that U.S. supply chains were absolutely critical to the way in which China was advancing; ways that were militarily relevant and economically relevant.

On the military side, we saw that U.S. chips and chip-making equipment were critical for China's own efforts for developing modeling and simulation tools for hypersonic weapons as well as for its own cyber operations, including offensive cyber that instead is used now to target U.S. semiconductor firms in order to steal IP. So there is some sort of a feedback loop here. It was also used in data centers for human rights abuses, so the Xinjiang data center that's responsible for real-time monitoring of the Uyghur prison camps is built with U.S. chips. And then third, when we looked at the key areas of economic competition, these were ones where China was reliant on U.S. technology.

So the goal was to build a fenced yard that picked a relatively small number of key technologies within semiconductors – so not every chip and not every piece of tool-making equipment, actually about less than 5 percent of each – that were most responsible for the things of greatest concern: the key military technologies, the key human rights abusive technologies, and the key areas of where we see the high terrain of future economic competition. And instead of diluting attention across thousands of different export controls, focus that attention on the areas where it's going to make the biggest difference.



Dr. Hamre: Is there any other area than semiconductors that you could make this model – small fence – I mean, small yard, high fence – work?

Dr. Matheny: I think the semiconductor has turned out to be among the most highly concentrated supply chains on the planet, and probably, you know, disproportionately effective in terms of leverage in this competition we are in.

But there are other areas that are important. In synthetic biology, DNA synthesizers are an important key node of supply chain leverage as are DNA sequencers. The components of those are also ones where the U.S. and allies have a lot of leverage, as well as in quantum technologies, things like niobium chip manufacturing, dilution refrigerators – these are areas where the U.S. and allies have quite a lot of supply-chain advantage.

Dr. Hamre: Do – one last one for you – do you anticipate that we're going to see restrictions like the semiconductor when it applies to, say, AI or things of that nature – or I mean, quantum?

Dr. Matheny: I think there is a strategic logic for controls on technologies that we think will have disproportional impact on national security. Quantum is certainly among those because of the applications to cryptanalysis for breaking current forms of encryption. So that's one where it makes sense to try to maintain a supply-chain advantage.

Dr. Hamre: Yeah. Let me go back to something, David, that you said, which I thought was really very important. You said, you know, there are some things like stealth technology, there's not going to be a market in the private sector for stealth, so you don't go out and buy that. But if you look at access to space, that's now in the private sector, and increasingly space technology is in the private sector and not in the government.

So how do we balance that in this new environment where we want to draw on the creativity of the private sector, but it has a national security dimension, and how do we think about that – while protecting the country but also protecting the companies, you know, that we want to succeed.

Mr. Norquist: Well, I think the key thing is to recognize for government that, for companies, intellectual property is an asset, right? It is a real thing. You invest research to develop intellectual property to generate revenue, so that's the sequence because the government would tend not to think in terms of intellectual property but think in terms of tanks and planes and others. And there are some firms for whom that intellectual property is the edge on their otherwise standard solution that says pick me over them. And there are some companies for whom intellectual property is the company. It is the

whole thing, right? There is not a factory as well; there is the intellectual property and that's what defines that firm and its capabilities.

So for the government, when they talk to someone about it and they start to reach across the table to grab it, they are going to get a very strong reaction if they don't understand the role that IP plays to a commercial firm. And when you realize how many of the technologies we're interested in – the lead is on the commercial side, you really have to pay attention to how do I encourage them to come in instead of chasing them away, and how do I have this conversation in a way that recognizes how they value intellectual property and the way they're going to deal with it – knowing they need to see a return on their investment. And so you have to have the conversation in a way that you understand that when you are engaging with them.

Dr. Hamre: This is going to be a snotty question about the government – not about anybody here – but, you know, I've seen a pattern in recent years where defense acquisition, they'll say, well, we're going to have a competition, and we're going to give you money to develop a product, but then we're going to make you give your technical data package to the competitors so we can have a competition.

Mr. Norquist: Right.

Dr. Hamre: Isn't that – isn't that dumb? (Laughter.)

Mr. Norquist: Well, there's two parts to this, right? There are some –

Dr. Hamre: That's a technical, think tank term –

Mr. Norquist: It's a technical term, yes. (Laughter.) So I think that if the – the best thing they can do is to say that in their conversation up front, right? One of the – if you go to a company and you say, I want to do an extension on my house, and I will pay you to do the design, but I'm going to go to somebody else to do the bid, they say, OK, and they charge you differently. But you don't go have somebody do design-build, and after the design say, thank you for the design, I'm now going to compete it, because their business model was generating the revenue of both.

So if you're a company that works with Defense, you can make your money off of the research – full stop. You can make your money back in the procurement of the asset that your research generated, and you can potentially make your money back on the maintenance of that item over a long time. What matters to the company doing the bid is knowing up front how the government is going to model this because frequently the government doesn't really think about this issue until it is three to four years into program, and go, wow, we've got to do maintenance; we should get the

rights to the maintenance data. And they're like, whoa, whoa, whoa! That was part of my bid, right? I thought of that four years ago when I wrote the proposal. You're completely changing my calculation after the fact.

So one of the things we always encourage the government is you have to think about this at the very beginning because the business model you are going to get depends on what you are signaling your intent. Now I do have to say the government is always a challenge on this because, at our best, we say to you, good job, well done. Here's a one-year contract. We may cancel the program next year. And the Congress says, and even if they don't, we might, which means the private sector research, when it goes to the government side, has a much less certain return because of the unstable nature of the government's behavior. But, you know, whether you look at the 2018 laws or you look at the outcome of the 813 Report, one of the core things is if you are going to ask for some amount of the private sector IP, do it early, and then understand what you are really asking for. Are you asking for the intellectual property rights, or are you asking to understand the interface so that you know how to talk to it and receive data from it? The interface is very different, and firms have a different view of that.

If you want to understand maintenance cycle information so you can project maintenance, that's not quite the same as the IP, so – (inaudible). And do recognize that at the end of the day there are some firms that won't deal with you.

We do an annual study – we just released it, I think, last week – called Vital Signs. Come and look at our website for it. In it there was a section on IP, and we asked companies, our membership, have you ever declined to bid because you did not think the government was going to protect your IP? Twenty percent of the vendors said, absolutely, that they had declined a bid on the issue of IP, and then 28 percent – separate question was have you ever offered a different solution in order to not give them your better IP because you wanted to protect the better information? And 28 percent of the firms said yes. So you can, in transparency, offer the information up front about what you want to do early – that helps the pricing – but you still have to recognize there are firms who will not share it with you or will offer you their second version, not their primary version, because they do not trust that you are going to protect their IP, and it's too important. So that – the signal they send with that discourages firms from being willing to play with them for perfectly legitimate business reasons.

Dr. Hamre:

Yeah. And I would also add I think that often the government doesn't want to pay the real, full cost of R&D, and companies historically then say, well, I'll – you know, I'm willing to bet on this, and I'll put in, you know, a couple of extra million bucks on developing this because I can win – I'll get that back if I win the contract, and then all of a sudden that's open.

Mr. Norquist: Yeah, you have an absolute budget incentive on the government side to have the firm underprice R&D and procurement and make it back on operation maintenance because that is many years out, and it's not part of your cap that you are dealing with. So your life becomes easier, and so that's why there is an incentive to have them price that way, but then you can't change the rules halfway through the game –

Dr. Hamre: Yeah, yeah.

Mr. Norquist: – and then act as if somehow this was a reasonable play.

Dr. Hamre: David, what you just told us about surveying companies and what they offered, that's the first time I've ever heard it, and I hope that you advertise it. And I think it's important.

I must confess – I must admit in three-and-a-half years as deputy, I cannot remember a single time when somebody came in and talked to me about intellectual property rights.

Mr. Norquist: I will tell you between us, in terms of number of years, I had multiple IP conversations. (Laughs.)

Dr. Hamre: Well, that's good.

Mr. Norquist: Some of the people in this room, I think, were part of the IP conversations.

Dr. Hamre: Well, I think – I'm glad for that. It was not a topic of conversation when I was there. It should be because it's so crucial going forward.

Let me ask, if I could – really more for you, Jason. So much of advanced development these days involves international teams; often international teams in China, you know. I think General Electric, they had a major design center for jet engines in China. Boeing had a major – they took over a big part of the old Mikoyan design bureau, you know, in Russia at one of the plants.

So we have these international partnering, and yet we still have a desire to protect. How well do we do this, and how do we do it without shutting off ourselves from the talent around the world?

Dr. Matheny: So this dilemma goes back decades, and there was a policy document in the Reagan administration – NSDD-189 – which sort of laid out a framework – I think this was in '85 or so – for thinking about what counts as fundamental research, and for fundamental research, the idea is you don't put any special protections around it.

In the last part of the last administration, there was NSPM-33, which was an effort to kind of relook at research security in light of increasingly aggressive intelligence operations by China and Russia – and others – to acquire U.S. technology from probably our soft underbelly for security, which is from our academic institutions and our civil research institutions.

And I think part of the process in developing an NSPM-33, which is just to do a careful assessment of where do we have vulnerabilities, and as part of that, found a number of things that were concerning: foreign PIs – principal investigators – who were misreporting what their affiliations were, who were double-dipping – basically turning in the same proposal to get funding from multiple agencies for the same work or double-billing for that work. Third was people who had clear conflicts of interest who were working from both the funding side and from the receiving side at the same time, and then cases where there was a clear nexus with a foreign defense or intelligence organization.

And the goal with NSPM-33 was to strengthen the resources for research security: first, to do more due diligence on research proposals, try to prevent double-dipping, prevent the lack of full disclosure around affiliations, and an effort to strengthen cyber security at academic institutions and other civil research organizations.

But I think we still have this dilemma, which is how open do we want to be in our system? It is a great source of strength for us. It's one of our asymmetric strengths – is that we are a country that is so welcoming of international participation in science and engineering. I'd say it's like one of our greatest strengths because it attracts foreign talent to the United States, and given that we are competing against a country that has a billion more people, demographically we're at a disadvantage. Potentially our greatest advantage is in being able to attract the best scientists, engineers from around the world to our shores, just as we did during World War II and during the Cold War. But we don't always do a great job of that without the right immigration policies or with research security that is overly restrictive. So it is a balancing act.

I think we really need to be thoughtful about what is it that we want to protect. Do we want to protect early-stage, peer-reviewed research that's going to show up in Science and Nature anyway? If so, what is it that's important to protect about that if it's going to get published.

If it's work that's happening in a corporate lab that's protected by IP, if it's work that's happening in a national security laboratory, then we need to be much more cautious. So I think this is an area where we need a sliding scale.

Dr. Hamre: Can I just add – I absolutely agree with what you said, but a lot of that depends on having a stronger, healthier communication channel between the security community and the science community. How would you – it strikes me that we just don't have that right now. I don't – you know, look, I come from – I've got cop's blood in my veins, you know. Cops are not particularly imaginative people, you know? So I need help to know what's important to protect. But if I don't have an open conversation with scientists to know what's important – really important – I'll walk into the laboratory and say, well, you better lock that thing up. I don't know what it is, but you – you know, how do we get a better conversation between scientists and security professionals?

Dr. Matheny: I think that's a really good point, John, and I do think we lack that kind of freer exchange of threat information that goes from the intelligence community and the FBI to academic leaders, university presidents, provosts, but also the heads of research organizations that aren't connected to the national security community, industry research organizations. We don't have those threat assessments that are being shared frequently with the heads of research organizations, and we also don't have the knowledge that exists within industry and academic research organizations regularly shared with national security leaders.

One of the things that we've been thinking about at RAND is what does the structure for that look like. We've, in the past, had freer exchange of this. I mean, certainly during the Cold War there were a variety of venues in which you had academic leaders with security clearances getting threat briefings, and academics who were at the leading edge of their fields advising national security decision-makers.

We have much less of that today. So what is the venue that can help support that?

David, you probably have thoughts on this, too.

Mr. Norquist: Yeah, so one of the things we – when I was in government we worked with is there are certain universities that were quite forward-leaning in working with you on the national security challenges. They understood, they would pay attention to whether or not they had students from potentially hostile countries working on certain types of projects.

It is not a culture of university professors and researchers to restrict information flow, right? They tend to live in a world where you share and you talk publicly, and frankly, 6.1 research, our most basic level, isn't designed to be classified or sensitive, which nevertheless there's an advantage to having somebody on the project in terms of what you learn from it than trying to read the paper later. So we would find that there were certain universities

you could work with where you could give some of the leadership clearances, they'd come talk to you about what they were doing, share information so you were aware of what was really cutting edge and what isn't. And you could give them awareness of how foreign agents would attempt to operate in their community so they could see it, and they would recognize the patterns. And over time, as that becomes less spooky, people become more comfortable with it. But you sort of have to start with folks who – whether their parents were in the military or something – give them some reason to have this conversation, and you don't come across as being from two different universes. But you then have to work your way to bring everybody else along.

Dr. Hamre: Let me ask – shift just slightly but, you know, we're in this great competition with China. It's a – I think primarily a technology, commercial competition. Xi Jinping, five, six years ago, you know, they put out this China 2025, which was a national strategy to dominate the world in technology and, you know, they gave us a blueprint of where they were going, you know.

Now we don't really have a technology strategy for America. I mean, you were there. Tell me, Jason, what do you – you know, because we really count on the private sector to be doing so much of that. So how do you think about competing against China where we still want the impetus in the private sector. How do we help them? How do we protect them? What's the right posture for us?

Dr. Matheny: I mean, we have an uneasiness with the idea of industrial policy, the term "industrial policy." We practice it all the time. Intellectual property protection, as a function of the federal government is industrial policy. R&D tax credits, industrial policy. Federal procurement is industrial policy. But we have not developed a sort of systematic approach to thinking about the strategy of industrial policy, what are the goals that we prioritize, what policy levers do we have to achieve that goal with industry and academic partners.

I think there are some key strategic moves that the U.S. has made in the last several years, though, that are important ones that double down on U.S. advantages. The first is in exercising exports controls on key supply chains where we have asymmetric advantages with our allies. A second is in thinking about human talent in science and engineering, and thinking about immigration as a key technology tactic for getting an advantage.

And John, compliments to you and to others at CSIS for I think also raising attention about the importance of talent. A third is in thinking about moves like the Bipartisan Infrastructure Act, the CHIPS and Science Act – that include important federal investments in infrastructure, in manufacturing capability. It's not enough just to have software companies. We also actually

need to be able to produce hardware. We need to derisk that supply chain since so much of it is bound up in Taiwan, one of the more complicated places on the planet. And I think working out our technology diplomacy, and I think important institutional moves have been made within the State Department to strengthen our ability to shape an international coalition around technology competition.

The U.S. has a great advantage there in that if you combine the U.S. and our five closest allies, that's over half of all global R&D. If you combine China and its five closest allies, it's still only a quarter of global R&D. So having friends matters, and this is an advantage that we should be doubling down on.

Dr. Hamre: Yes – (laughs) – I absolutely agree. But, you know, when we are talking about advanced cutting-edge things, our allies are frequently intimidated by that. You know, I mean, especially our European allies, they don't have deep strength on IT, the way we do, so they tend to be – are there ways that we can overcome that?

Dr. Matheny: I think some countries are certainly boxing above their weight, so U.K. has amazing AI talent. The Netherlands has, you know, the best photolithography company in the world. And we see this with other allies where there will be an area of deep expertise – Japan, for example, in superconducting manufacturing. So figuring out what are – what are we all good at, what are our comparative strengths – and weaknesses that we can compensate for as a team.

We have this amazing unfair advantage as a country. I mean, if you are thinking about this like as a sports team, we're on the team that most of our competitors even want to be on. You know, most of the leading-edge scientists and engineers of China origin want to be on Team U.S. Ninety percent of the Chinese scientists and engineers who get their Ph.D.s in the United States want to stay here. And that's true of international collaboration with our allies, as well. Everybody wants to be on Team U.S. So figuring out what are the best positions to play on this team that we're building with our allies is, I think, a really, really important problem.

RAND and CSET and others have done this sort of, you know, landscape review of what are the comparative advantages of different countries when it comes to specific technology supply chains, key areas of research, key areas of industrial advantage, and how can we work off of each other strengths collectively.

Dr. Hamre: I'm writing myself a note so – one of your latest reports I'd better pick up. (Laughter.)



You brought up the question of human talent and, by the way, you deserve the credit, Jason, when you led the way to try to expand the number of green cards, you know, that were available and visas for highly qualified people. You know, the National Commission on Artificial Intelligence listed this as one of the premier challenges, is recruiting talent from around the world, and yet, we've got this deep paranoia seizing the country about it. Is there any way to break through that in your mind? I just – I find it very frustrating because it's overwhelmed by, you know, people coming across the southern border. That's an important issue; I don't minimize it, but this is – this is just swamped by that topic.

Dr. Matheny: Well, first, the credit goes to you actually because we had lunch down the street, and you convinced me to work on CSET at this problem –

Dr. Hamre: (Laughs.)

Dr. Matheny: – and then I think you hired our strongest researcher –

Dr. Hamre: We did. (Laughs.)

Dr. Matheny: – (laughs) – to do that work at CSIS. Well done, sir.

So I think this is such an important area, and I think that the work that you all have done here is among the most important policy analysis on the role of human talent and immigration as a key point of leverage for technology competition.

I think the politics of this are challenging; not because technology immigration or STEM immigration is controversial. It's the one area that everybody can actually agree on across the parties. Because everybody can agree on it, it's used as a bargaining chip for the other parts of immigration policy where people disagree. And I think figuring out a way to prevent this from being the bargaining chip that both sides are using in order to achieve their more partisan immigration policy goals is a big challenge. We have to make progress on STEM immigration if we want to stay competitive. I think this is among the most important priorities for our future competitiveness.

Dr. Hamre: Is this an –

Mr. Norquist: Immigration is the ultimate cheat code in global competition, right? Your ability to say to the rest of the world, lovely team you've got there. I'm going to steal your top five draft picks and have them come to the United States, and I don't have to do anything; they'll get on the plane on their own and come here – is an incredible advantage to the United States. I mean, we have 50 million people in the United States, the largest number of immigrants of

any country in the world, and they come from virtually every country in the world. I mean, that's sort of the draw that we have.

And one of the things that we have a challenge on is often you will see surveys that will ask the public, what do you think of immigration, and the survey won't differentiate, which means you really don't know what answer you're getting, and you're leaving it up to the person, what they have on their mind.

When we – and I had to search to find them – but when you have a survey question that asks you, what do you think of legal immigration, one, you get extraordinarily high percentages, and if you ask, do you think that should go up or down, up wins. More people are in favor of more legal immigration and, you know, the average person is not worried that we're going to bring in 12 more Ph.D.s. You know, that's not the issue.

If you ask them about illegal immigration, you get numbers off the chart the other direction. I think there was a survey in February that asked people to rate it as a national security threat. Fifty-five percent gave it the highest rating, and 15 percent said it wasn't. So you've got two very strong emotional reactions toward, fundamentally, two very different issues. And the fact that we try and push them together really interferes with the ability to address the green cards, and the university students who we're trying to keep because we often don't – we aren't clear.

But I think, from the United States' point of view, if you look at the demographic trends of most countries, they all go south – they all go down, except the United States. And the United States doesn't go down. Our birth rates are not as they need to, but we always have immigration coming in. That means that, by some models, you know, China is going to go from 1.3 billion down to 800 million and lower, and the U.S. is going to go from 3 (hundred million) to 4 hundred (million), and all of a sudden, that billion-person difference goes away. And then you've got a very different national security environment.

So I think this is a very important issue. I think it's a huge strength of the United States, and part of it is sometimes we can't talk about one issue as long – until we address the other, and so that may be part of the challenge they have to work through.

Dr. Hamre:

Yeah, it is, but it strikes me we should try to find a way to free it up. I mean, as you say, it is – if it is shared on a bipartisan basis, then we should have more talent. But it is being used as leverage. But at some point we should say, let's not hurt ourselves for the sake of a game we can't win, you know, and both sides have got this irrational approach right now to immigration reform,

and it's only focused around the hardest problem and not the easy – it's blocking things up.

Anyway, well, I feel better. I got that out of my system. (Laughter.)

Mr. Norquist: Do CRs next. (Laughter.)

Dr. Hamre: OK. We've got a few minutes if there are people that have questions they would like to pose to my colleagues. Let's see – start with you. Do we have a microphone that comes around? Let's get these down here, to this – to the middle table, and then we'll come down to the front table.

Audience Member: (Off mic.)

Dr. Hamre: No, I don't think it's on.

(Pause.)

Audience Member: (Comes on mic.) One of the things that you mentioned, you said that China was ahead of the United States as far as, what, technology. OK, that may be true. But as far as the environment goes, they are not doing a lot of work towards cleaning up their environment. We know that when COVID-19 happened, because it's so crowded, it spread like wildfire in China. I think it spread faster in China than it did in the United States. I don't know; I'd have to go look up the records.

But when I was taking a course, and it was called, what, Global Health, their environment is really going down, and they are not working towards trying to improve it. And the more it becomes – I mean, the pollution is higher than the United States. I think the United States is working harder towards cleaning up the environment because you have so many organizations and so many groups, and Capitol Hill – I guess they're finally listening.

So we are moving more towards cleaning up our environment and making it safer, and they're maybe working harder on technology. However, their environment is going down, it's crashing.

Dr. Hamre: Yeah, do you want to comment, David?

Mr. Norquist: Yeah, I was just going to say that there's a risk of making the Chinese 10 feet tall. And let's also be very clear. The concern is the Chinese Communist Party. The Chinese people may be perfectly lovely human beings. They have a government that sits over them that is very different than the one that we would want to live under. They may do some things very well, they may prioritize some things. But you will notice the environment, you know, many

of those other areas do not go well for them, and so it's a risk to overstate all the things they are capable of.

We should recognize – if you produce 50 percent of the world's steel, that is an advantage, but there are other places, as you point out, where they are clearly either not investing, not caring, or not capable. And so we need to recognize that in some of the challenges it creates, both for them internally as well as for the rest of the world that has to deal with them.

Audience Member: Do you hit them with a nuke? (Laughs.)

Mr. Norquist: So none of us on the panel are advocating that, just in case there's anybody in the room taking notes. (Laughter.)

Dr. Matheny: This is for the record.

Mr. Norquist: That would be rough on the environment, among other things.

Audience Member: If that happened, it would –

Mr. Norquist: Yes.

Dr. Hamre: Look, I've spent a lot – I spend a lot of time studying China every day and, you know, Xi Jinping is – he is obsessed with his problems. He is not obsessed with us. He's trying to solve it, and he does feel we're kind of stepping in the way and making his problems worse, but he's not looking for a war to solve his problems. I mean, he is anxious to minimize the problems he has to deal with because he's got a – his economy is imploding, his youth population is disaffected, unemployment is over 20 percent for his young graduates from universities, the property sector has collapsed, people have lost – the only place that they could save money was buying real estate – they've lost all that. I mean, he's got his hands full. He is not looking for a war. So I think we ought to be very careful not to get too wrapped up with China. So anyway –

We've got a question right down here in the front. (Pause.) No, no, down here in the front.

Audience Member: Yes, but I was looking for a microphone.

Dr. Hamre: Yes, I know, and I was trying to get him to get it to you.

Audience Member: Yes. You guys have been talking about the talent and immigration. But I think that it's immigration – thanks to immigration the economy of the United

States keeps growing, and this is very important because if you look at Europe and the United States, the population is declining. And in China, in addition of all the things that you say, also the population is declining because of the past law that only one child per family.

Here in the United States it's the same. The population keeps going down – Europe. Without immigration, whether talent or not, it's very important to the United States because it is what keeps growing the economy of the U.S. This is one comment. You can say something about it.

My second comment is about intellectual property. We keep talking about the importance of the intellectual property for national security. I agree with that. However, we know that we are an open society, so everything we do, everybody knows about it because we publish, we talk about it in open forums, everybody knows what's going on. And therefore, unless all your intellectual property is protected, and all over the world – you can actually download the entire database of patents – the United States patents – and you don't think China has them? Everybody – and they get around, all those inventions, and that's what – it's the new mode of advancing the technologies of countries, even adversaries – not just allies, but also adversaries.

So – and also, I see, for example, that a lot of people that come from China, apparently they are – there is a lot of theft of intellectual property. You look at the database –

Dr. Hamre: Why don't you wrap it up? We'll give you one minute to wrap it up, OK?

Audience Member: Yes. Just quickly – if you look at the database of the Department of Justice, most of the individuals that have been caught are from China. Either they come as employees, as skilled, as whatever, and they have stole a lot of information – private information from companies, from Pharma. I see them every day.

So how we're going to talk about just protecting the IP without looking all these external factors that are happening every day?

Dr. Hamre: OK, thank you. Jason?

Dr. Matheny: Thanks. I think on the first point one thing to add to the discussion of immigration is also the still vast opportunities for education in the U.S. for folks who are U.S. citizens, born in the U.S. And credit to Lynn Parker for having spearheaded a lot of important initiatives related to AI education in the United States, making sure that was on the policy agenda in the U.S. There is still so much to do there. I'm really excited about the opportunities to use AI as sort of a digital tutor for expanding STEM education in the U.S.

On the second point, I totally agree there's so much work to be done around IP protection. I think cybersecurity is an area where even leading-edge firms we're seeing aren't as strong as they should be. If you look at some of the frontier AI companies that are building very powerful models, those models may be not as robustly secured as we would wish because they weren't developed in mind with thinking about, you know, state adversaries that might want to steal them, so there's a lot of work to be done.

Mr. Norquist: Yeah, so I think I would highlight a couple of things. First is there is a price we pay for the transparency, right? We produce justification books that go to Congress, in excruciating detail, that tell you exactly how much of every type of munition we intend to buy and build. It takes a lot of work to get that information about what is going on in China and Russia, and I wouldn't necessarily have confidence that our predictions are very good. We make that a lot easier. The flip side of that is we have a country that runs differently because we have that level of transparency and operation. And so you have to have confidence that you will take advantage of the openness and the innovation that you have to overcome that.

Now with – back to intellectual property, you need to make it as hard to steal as possible, you need to have much better cybersecurity in those types of challenges. And the other one is speed. If somebody is getting the technology from you that you developed three years ago, and you're already two generations down with your upgrades and your patches, they're chasing a losing target.

The other one is you also have to have the culture to know how to use it, right? You could give a lot of our military equipment to another country, and our air pilots – our pilots would still shoot them down because the training, and the doctrine, and everything that goes with it is more than just the plane. And so knowing how companies are set up to take advantage of this through speed, knowing how to use it, those are all changes that are much harder to steal, but you need to have access to the information to do it. So got to make it hard to steal, but we also have other ways, through our operations, that we can make it complicated for somebody to duplicate what we are doing.

Dr. Hamre: And my – I've got a very good friend who is a senior business guy – just came back from China, and he said – he said everybody in China now is an actor. Nobody is afraid to tell the truth; they're all presenting the image they think they need to present to stay alive. You know, I'll take – I'll take our openness any day over that kind of a world.

Mr. Norquist: And that lack of information transition makes leaders make really bad decisions.

Dr. Hamre: Oh, yeah.

Mr. Norquist: And so all of a sudden you pour enormous sums of research into a solution that's never going to work because no one was willing to tell you, and you don't have the market feedback we do that tells you that's not going to work.

Dr. Hamre: Well, they subsidized over 400 companies to become electric vehicle manufacturers. And now there are about 80, you know. Over 300 of them have collapsed, OK, and that will probably drop down to three. So, I mean, you know, we may be having troubles, but we don't waste money like that.

OK, let me go back here.

Audience Member: Yeah, I've a brief question, which is, in light of what feels like an escalatory technology environment between the U.S. and China, do you think that there is a point at which we reach an equilibrium, or do you think it continues to escalate? And I'm specifically thinking about areas where you might see symbiosis between Chinese intellectual property in manufacturing and American R&D intellectual property.

Dr. Matheny: I think regardless of sort of key domains of competition that have like clear national security implications or competitive implications, there is going to continue to be so many interconnections between the economies of the U.S. and China in key areas of collaboration, cooperation, and risk reduction. Even at the height of the Cold War, the U.S. and the Soviet Union were engaged in multiple forms of scientific cooperation, of technology exchange. We had confidence building measures that were important for de-escalating and for reducing the likelihood of conflict – things like the Pugwash Conferences, Apollo-Soyuz. Having something like the Incidents at Sea Agreement but for different domains like cyberspace would also be an important form of de-escalation; having crisis hotlines that are actually used. But I think there will continue to be important industrial collaborations in key sectors as well that help to reduce the likelihood of conflict.

Mr. Norquist: I'd just say that the – we had decades of relations with the Soviets, and they started out of a European context that we started to understand each other's signals. We do not have a really good tradition of understanding Chinese signals or them understanding ours, and the level of conversations – if you're not willing to tell your leadership the truth, you're sure as heck not going to have an open conversation with an American counterpart.

And so we have to get to that point where we can have those so you can avoid a conflict that neither side intended, through miscommunication. And in some cases, the actual – the better communication is actually on the commercial side, and so some of that will –

Dr. Hamre: That's right.

Mr. Norquist: – continue, some of that will become the source. It really depends on their leadership's desire to – you know, if the leadership of China wants to compete on economics, that's a lovely thing to do. Every country gets to do that, and we can just have confidence in our system versus theirs.

The goal is to have a strong enough U.S. military that deters somebody from picking conflict through military force as a resolution. There aren't territorial ambitions on the U.S. part, but there is a desire to keep it as an economic competition, and if it stays there, many things are possible over time.

Dr. Hamre: Back here in the corner.

Audience Member: Thank you. I asked a similar question this morning in the first panel. I'm Cal Goldman from Toronto, Canada – flew in this morning.

We in Canada, as a member of the Five Eyes, have just enacted major new, enhanced national security provisions to protect technology, particularly in relation to China. As you may know, there's a foreign election interference inquiry going on in Canada, run by an appellate judge, calling people to testify, directed primarily at Chinese interference. The temperature in Canada, in relation to China, has gone up dramatically over the Huawei and other incidents such as foreign interference.

I was in Berlin at an international conference a month ago. The temperature there is also very high. There were U.K. and German, of course, and other representatives – legal and business – focused on issues with Russia and China. And I was also in Israel a few weeks ago, and there is tremendous AI depth there, focused in part on Iran and China – China, China, China in all three.

I haven't heard you speak about the Five Eyes relationship and the support of your Western allies. I'd be interested in your views. Thank you.

Mr. Norquist: So I'm happy to talk about Five Eyes. So, for example, when I was comptroller, I would get together with my Five Eyes partners. We would go up to Quebec to meet, and all of us would get there – and we would invite them to the United States – because there is so much development and overlap with them.

I just came from an AUKUS meeting yesterday, and there's one going on today. So there's a number of opportunities to work with allies and partners. Five Eyes is one of the most common formats that you will see, in part because the issue that you are seeing in Canada, you know – similar to something Australia said – something, if you haven't seen it yet in another



country, you are going to because these things are coming – great opportunity to share, learn from each other and develop a common set of responses.

Dr. Matheny: RAND has offices in the U.K. and Australia, so we spend a lot of time on Five Eyes issues as well as on AUKUS issues. I think these are such critical alliances, and I think these countries are also highly capable technology competitors and collaborators, so it makes sense to be linking up in areas around technology strategy.

And then, lastly, I do think NATO is an important forum as well. RAND has an office in Brussels, and a lot of the work that we've been thinking around technology planning for NATO is along the lines that we were talking about earlier, is thinking about what are each of the NATO members good at when it comes to technology, what does each have to contribute?

Thank you.

Dr. Hamre: And you didn't ask me, but let me offer my thought, which is, you know, there's only one extant international structure for technology protection coordination, and that's Wassenaar. But Wassenaar is dead as a doornail. I mean, it's got 40-some members – Russia is in it. I mean, that Wassenaar is no structure for coordinating on things like technology – understanding technology coordination, technology restrictions if we have to do that.

We're going to have to create something new, and probably the best platform for that will be the G-7. But then we're going to have to find a way to expand the G-7 because it doesn't have some very key players on it. So we're going to have to think about probably a G-7-sponsored coordination mechanism, but that is augmented in a very open way when other countries – Netherlands will never be a G-7. I mean, it's too small a country, but it's a powerhouse when it comes to semiconductor manufacturing. So we have to find ways where we can use that G-7 framework to establish a dynamic technology coordination mechanism with each other.

We've published a little report on this, and I'd be happy to get it to you, but this is something we're going to have to do.

Thank you all – we'll take one last question, and then we're going to let everybody go out and get something to –

Audience Member: I'll make this very quick. You mention data rights previously, and the question that I've got is there is two major impacts and roadblocks for small business to be able to do more work with the defense business. The first, for SBIR companies, is data rights when the law specifically states the SBIR

company gets the data rights, but none of the contracting officers will give the small business their data rights.

And the second is security clearances where you are in a Catch-22, you can't get a clearance unless you get a contract, and you can't get a contract unless you've got a clearance. Are either of your organizations doing anything about solving either of those two to be able to help build up our defense infrastructure?

Mr. Norquist:

So the short answer is absolutely. On SBIR, it was set to expire. We, with a thousand small businesses, were all over the effort, pushing to get that renewed. We're very keen and working with ANS on the importance of training their folks on IP rights so they understand what the rules are – who is entitled to them – and it's part of the incentive of SBIR. It has explicitly got a different set of criteria for who gets the IP rights than other things do precisely to draw small businesses in, give them the rights on the commercial side. And so that's key.

The security challenge one is just one of those challenges where you want to go to the government and say, OK, if you are going to have this requirement, you ought to let people pay to get people cleared prior to having a contract – give them that option – because otherwise you've got a limited set of bidders. The only bidders you have are those who already have clearances, and you have that trap. And I've spent enough time on the other side, running bids where you just look at the government person, and they just didn't have an understanding of the limit of the supply of people with clearances on the topic they were in, and how that was minimizing their competition. And other ones would actually – if you won the competition, they would clear your staff. And they got very different prices because, all of a sudden, they had bidders who simply had to put clearable people in the pipeline in order to be ready versus pulling cleared people from other projects.

So it is a little bit of a challenge. I won't even get into reciprocity, which is just a fascinating split inside the U.S. government over recognizing – heaven forbid Customs and Border Protection would recognize a security clearance issued by the U.S. Coast Guard, even so they are inside the Department of Homeland Security.

Dr. Matheny:

I think we've done evaluations in the past of the SBIR program. I'll take it as homework as to whether we've looked at the IP rights as an area of, like, key improvement that's needed.

On the question of clearances, I think so much progress has been made on clearance reform in the last few years, thanks to Sue Gordon and others, but clearly so much still needs to be done, including ways for there to be sort of easier in, easier out for clearances that are going to be needed for specific

projects. That has been an area of ongoing work at RAND, is to think about what the future of security clearance processing should be.

Dr. Hamre: I'll just – I'll be outrageous. I think we've got the dumbest security clearance process in the world, OK? (Laughter.) We're the only country I know of that asks a spy to fill out his own form, and then we give it to a GS-5 to try to figure out if there are any blanks in the form. (Laughter.) I mean, that's literally how dumb this is. I've had security clearance people come and read my SF-86 to me and ask if I would validate that I wrote down the truth. And I said, look, if I lied, I'm not going to tell you the truth now, so – (laughter) – let's just – you know me – this is just dumb. I can get a – I can get a better quality background check for \$25 dollars from a commercial source, OK? And I buy that. I do that when I hire people here, and instead of a – fill out a(n) 85-page security form, and expect somebody to figure out what's wrong with it. You know, this is dumb.

We have a dumb system, and it just – there are so many ways we could make this more – how many of you have, you know, been trying to – you know, you've got some kind of a credit check, and then they say, OK, which of the five addresses have you lived at in the last three years; which car did you have; you know, how many – how many fireplaces were in this home, you know. And within about eight questions, they can get a 99 percent identity check on you.

Would we do anything like that in the government? No. (Laughter.)

Mr. Norquist: We are – we are –

Dr. Hamre: I mean, this is so – we have such an opportunity, and we spend a billion dollars a year on security clearances, you know. And what does it take to get one in the private sector right now – just a – you've got to start off –

Mr. Norquist: You have to have a project. You can't – you can't just pay for it. To the point you are making, though, there is a move towards continuous vetting, which is the look that says, rather than check every five years, I'll have a monitor that triggers me when you get a DUI, and then I don't wait four years to ask you whether or not you've reported it. I know you have it now, knowing that your vulnerability to blackmail or anything else is now, right, and so looking and monitoring those types of things, that's the transition. One is fewer people, much less expensive.

Dr. Hamre: Absolutely.

Mr. Norquist: But likelihood of having a much higher chance of catching a problem person before they get compromised –

Dr. Hamre: Absolutely, absolutely.

Mr. Norquist: – than waiting the five years.

Dr. Hamre: But we're just choking on this massive system –

Mr. Norquist: Yes.

Dr. Hamre: – of processing giant numbers. I mean, we have companies that will buy another company just to get the clearances.

Mr. Norquist: Uh-huh.

Dr. Hamre: OK. That's a problem, OK? That doesn't make any sense. So we've got – and this is a bigger issue. I mean, I don't feel any better saying all of this. (Laughter.) But it's a problem we need to solve. We're not going to do it today, and there is food out here, and there is liquid refreshment – adult beverages – up in that corner, and we think we should let you all go enjoy that.

But I think you should say thank you to these gentlemen. (Applause.)

Dr. Gupta: Thank you. Thank you, all three of you.

(END.)