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AND THE FUTURE OF WARFARE

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P R O C E E D I N G S

MR. O'HANLON: Good morning, everyone. I'm Mike O'Hanlon with the Foreign Policy program at Brookings. And I'm honored today to be joined by Mitch Snyder, who's the CEO and president of Bell, as well as part of the broader leadership at Textron. And Congressman Anthony Brown from the fourth District of Maryland. We're here as part of the Brookings defense industrial base working group and project to talk about the future of defense technology, how it fits with national defense strategy, and with a specific focus on vertical lift technologies, helicopters, tilt-rotor aircraft, but more generally on military modernization and how this relates to not only the broad national defense strategy, but the Indo-Pacific region, which has some specific interest to us as well.

The way we'll proceed, I'll make a couple of remarks to introduce the distinguished gentlemen who are featured guests today. And then we'll have a conversation amongst ourselves. I'll begin with a question to Mr. Snyder and then to the congressman and we'll have a couple of more rounds before we then take questions from the audience. You're welcome to submit them at events@brookings.edu. Again, that's events@brookings.edu. I would also like to thank Bell for its support of Brookings. It's been an important member of our defense industrial base working group where we bring a lot voices together from industry, from Congress, from the Department of Defense, from the think tank world, with differing views on various issues in defense, but trying to inform and illustrate many of the choices before the nation. And it's in that spirit that we'll discuss things today.

The two gentlemen who are on this panel are remarkable individuals. Mitch Snyder is an electrical engineer by training with a degree from Kansas State. He has spent a good chunk of his career in defense industry, including with Lockheed Martin working on the F-16 program there among other things. But he's now been with Bell for about 16 years. And in that period of time, he's been very important in their program, the V-22 tilt-rotor Osprey aircraft, as well as a number of distinguished and path breaking defense technologies. And again, joins us today in his capacity as president and CEO.

Congressman Brown, you really can just look at the number of titles that can be associated with his name and it tells you an amazing story about his career. We could begin with “Esquire.” He is a graduate of Harvard Law School and also a JAG, a retired JAG, and retired colonel. Another one of his titles from the Army Reserve. Where in addition to being a JAG, he was an aviator.

He was Delegate Brown in the Maryland House of Delegates. He was Majority Whip Brown in that same body. He was lieutenant governor of Maryland and now he is Congressman Brown, where he is also vice chair of the House Armed Services Committee. And an important member of its thinking on various task forces having to do with the future of warfare, but also the wellbeing of military families and the full panoply of defense issues.

So, gentlemen, thank you again for joining us today. It's really a privilege and pleasure. And if I could, Mr. Snyder, I'd like to begin by just asking you to do a little bit of a mini technology deep dive and give us a historical perspective on where we are today with tilt-rotor technology. It's come a long ways from the invention of the helicopter in the 1950s, in effect. And then through the various improvements in helicopter frames, you know, the Black Hawk being one of the big five Army modernization efforts of the Reagan period. Many other aircraft have come along since. But with the Osprey and now some of your new technologies, I realize we're at a new threshold in tilt-rotor and vertical lift operations. And I wondered if you could just explain a little bit of that to us today, please.

MR. SNYDER: No, again, and I'd like to thank the Brookings Institute and Michael for having me. And it's an honor to sit here on the panel with Congressman Brown. So, again, thanks for having me.

And you're right, it has been quite a change over the years. And I really believe the Army's focus on modernization right now has really been driving another change in requirements. And if you, right, if you think through technology changes, the air assault mission for the Huey was introduced in the late 50s, right? The helicopter very near and dear to our hearts by the way, the Huey. And then as you mentioned, the Black Hawk introduced in the late 70s. So, late 50s, late 70s, you talk about a 20-year iteration of advancement and new capabilities for the Army there in terms of vertical lift. And then you talk it's been '99, 2009, 2019, and now we're talking 2020 now. So, you're talking almost 50 years between the last major capability upgrade provided in vertical lift to the Army to where we're at.

But as you mentioned, we have a great technology here at Bell called the tilt-rotor. And over the years, the tilt-rotor has evolved. And you're right we did the XV-3. We did the XV-15. We've done the V-22. We've done the 609. So, we've had iteration upon iteration of tilt-rotor advancements. And today with the V-22, you know, if you talk to whether it's the commanders of the Marine Corps, it's

one of the most in demand platforms, again, required in theatre due to its range and speed that it can provide to project that power.

So, a big change in the technology. But what we really wanted to focus on and this really started in 2013 with the Army, with the JMR TD program, the Joint Multi-Role Technology Demonstrator where we said, hey, we really want to design a tilt-rotor specifically to the Army's needs and specifically to the Army assault mission. And so, a tremendous partnership and collaboration with the Army, we signed that contract in 2013. And, you know, 4-1/2 years later in 2017, we had first flight of the V-280 Valor, which is a completely redesigned tilt-rotor based on the 500,000 combat hours -- or excuse me, operational hours that the V-22 has incurred over these years.

And another intense focus on sustainability, reliability, affordability. Because, again, really a lot of the costs of the platform is designed in. So, we really did have a lot of focus there along with the unique characteristics of what Army will do in air assault. And here we are now today, and we've flown 200 hours on the test platform, 150 flights. We've demonstrated 305 knots air speed, along with tremendous agility. You know, we call it level one handling qualities. This is the acceleration in pitch, yaw, and roll of the aircraft, and hover performance.

We've even flown the aircraft autonomously. It took off and flew an entire mission translated from helicopter mode to airplane mode, came back, flew waypoints, and landed. So, tremendous capability in the last few years. And what I can say is that was really done and it really demonstrates the partnership with the Army and industry working together and how quickly you can bring a new capability like that to bear.

And I think the way we did the acquisition was groundbreaking as well. So, a lot's been happening and to see that evolve and that new capability come to bear. And, again, we're using that to inform the requirements working with the Army's Futures Command and the CFTs to really inform on the future long-range assault aircraft program. So, a lot's happened with our tilt-rotor over the years and we're super excited about this next level of competition.

MR. O'HANLON: So, if I could follow-up with one more question before going to the Congressman.

MR. SNYDER: Sure.

MR. O'HANLON: And you touched on a lot there and that was great. And I like being able to hang on to a couple of sort of big facts that help understand the history. You mentioned 305 knots, which is, I think it's fair to say roughly twice the speed of a typical traditional helicopter. And so, certainly, one of the big things that tilt-rotor technology brings us is, indeed, that greater speed and the ability still to do vertical lift, vertical takeoff, and landing.

I wondered if you could also give any highlights about two other key metrics. One would be cost/affordability. And the other would be safety. I remember the V-22 went through some serious difficulties and growing pains in the 90s. And the question of backwash and a couple of tragic accidents during the period of development. And much of that has apparently now been solved. And the last time I checked out statistics on the V-22 Osprey, it was at least as safe as the other helicopters -- or the other -- I shouldn't say other helicopters. It's a whole different kettle of fish unto itself. But at least to say if there's any helicopter in the rest of the U.S. military last time I saw. So, I wondered if you could speak to safety and affordability? Put this in a little bit of perspective as well, please.

MR. SNYDER: Sure, and as you said, the statistics bear out, right? 500,000 flight hours now and if you talk to the marine corps, they'll tell you it's one of the safest rotor craft. That's how they described it. It's one of the safest rotor craft that they have in their inventory. It's in huge operational demand. And you're right, the safety numbers bear out. It is now flown not only by the Marine Corps, but it has been flown by the Air Force Special Operations Command. And we have now introduced it to the United States Navy, as well as Japan. So, it's gaining the hours, you know, the safety record is there. So, it has proven out the safety is definitely inherently in the aircraft now and proved out in the facts and the numbers.

As far as cost goes and affordability, again, you know, we designed this aircraft now based on all those hours. So, we understand tilt-rotor. And as I mentioned, you know, we evolved from XV-3 to XV-15 to V-22. So, this is another iteration of those designs to really understand where is the cost? How do we design out the cost? Make the aircraft much more reliable than it's been in the previous version.

And we also have to design it for the requirements it's going to operate in. You know, a lot of what happened in the previous, you know, conflicts that we've had, we designed it to fly from hard

surface to hard surface. And it ended up fighting in Iraq and Afghanistan, which again, originally the design was not intended to do that. And we did evolve the design as we went through. But knowing all those facts right now, we can design those systems, for example, inlet barrier filters, to make sure we clean the air as you go in.

So, all of the things that drive affordability, maintainability, and reliability have been designed in. And, again, we are showing that the price per unit of the aircraft can be much, much lower than we had on the V-22. And as you know, most of the cost is not necessarily in the acquisition. It's the lifecycle and sustainment. And back to the way we've designed the aircraft with the 3D digital thread model, you know, it's set up now to be very maintainable. You know, as far as, you know, changing out engines, changing out different components on the aircraft, we made it very accessible. We could do that through 3D design, virtual reality, augmented reality. We designed the aircraft. And we used all that in the maintainability of the aircraft as well. So, we've designed it to be affordable up front for acquisition. And we've designed it to be affordable over its lifecycle.

MR. O'HANLON: Thank you. Extremely helpful. Congressman, if I could go to you, please. And again, thank you for joining us today. It's nice to welcome you to a Brookings event and I've been a fan for a long time. And really wanted to just express my gratitude for you joining us and invite to you comment on specifically tilt-rotor and vertical lift technology. But also, to relate that to how you see where we are at this moment in U.S. military modernization and defense innovation, more generally. And then I'll have a follow-up question about the budget environment and some other things in a minute. But we just welcome your broad thoughts to start off, please.

MR. BROWN: Sure. First of all, let me thank you, Michael, for not only hosting today's conversation, but for the inciteful and informative coverage and commentary that you've offered on so many different defense matters and issues both during and before your time at Brookings. I also want to thank Brookings for hosting today's discussion and giving me an opportunity to participate. And I'm certainly pleased to be present with Mitch Snyder who I had an opportunity to meet when I visited Fort Worth and the center where the 280 is being developed. And, Mitch, thanks for inviting me back when I'm able to be able to put on my flight suit and maybe strap in and take it.

I'm really excited about future of vertical lift and what's being done at Bell. I think not only

in addition to range and speed, which is greatly needed particularly in this, you know, multi-domain battle space, a very contested battle space. The thought of getting troops to the right place on time in Europe and in the Indo-Pacific with the current rotary wing assets that we have seems nearly impossible. But with future vertical lift and the speed that it'll deliver. It's not only speed. It's maneuverability, survivability. It'll reduce the logistical footprint required to support that platform, that movement of troops and supplies. So, I'm really excited.

I'm also excited about the manner in which this is being developed and fielded. And Bell has made a significant investment in the research and development, the design, building on lessons learned from the Osprey and other platforms. And the partnership with particularly the Army as the lead agent here and through requirements to get to the capability that we all desire. I think it's a really good example of a modernization effort.

You know, in terms of modernization broadly, the United States is going to have to prioritize the development of emerging technologies over fielding and maintaining legacy systems. You know, we've heard a lot about the Army Night Court, identifying those legacy programs that have sort of outlived their usefulness. Spending more money to maintain or recapitalize in what we might otherwise be able to put into a more modern technology technologically advanced system. So, it's going to be important that we continue in that effort, not just in the Army, but across all the services. This might require significant changes to the Pentagon's force structure, our posture, operational plans, and certainly, the acquisition system.

But I think that now is the time that we have to conduct a tough and full sum review of these legacy systems and platforms, and even missions. I don't think that the Department of Defense should be doing it alone. I think they need to do it in partnership with Congress. There are 435 members of Congress. You can be certain that the supply chain for every major program resides somewhere in one of those congressional districts. Members of Congress tend to get territorial, which can interfere with the introduction of emerging and new technologies in defense. So, I think they're going to have to work closely with Congress and explain that rationale.

But if we're going to win this race for technological advancements, whether it's in these larger platforms, in systems, in artificial intelligence, biotechnology, quantum computing, micromechanics,

you name it, all of which are the foundation of emerging technologies and our modernization efforts. It's going to require a whole of nation approach. And that means harnessing the ingenuity, the investment in America's private sector, along with the investments and the experience and the know-how of the public sector.

We know that much of the leading research is performed in industry today. And industry needs to be a vital partner in national security. In the 1960s, the federal government provided 65% of research funding. That's down to 20% today. The DOD receives more than 40% of all federal R&D appropriations, much of which should be invested in basic scientific research. And to see that pre-government investment in basic scientific research complemented by increased cooperation with the private sector to quickly adopt the resulting technologies. Partnerships between the federal government and industry are critical to ensuring that we have both the emerging technologies pushed out to the war fighters and that we can continue to develop the talent needed in the national security workforce and maintain the United States advantage in R&D, which many would argue and agree is waning and perhaps even slipping to China.

Some suggestions to winning this race, particularly for artificial intelligence, would be to include AI development in every major defense acquisition program. Increasing U.S. investments in foundational science and technology research. Some would suggest we should commit to spending at least 1% of GDP on basic research that is government supported. So, modernization and new platforms, emerging technologies is a direction we're needing to move in. It's going to take a rigorous review of legacy platforms and systems. A review of our acquisition systems. Changing the culture and the mindset of how we do business, what risks we're willing to accept. What we need to share with the private sector. But I'm really excited and I think future vertical lift is a fine example of how we can modernize our forces.

MR. O'HANLON: Thank you. If I could now, I'd like to connect this conversation to some of the recent developments in our world and in our country of the last year in particular. Everything from COVID-19 to some of the societal churn and racial issues that we face. I know both of you have thought a lot about this and how it connects to defense, which is not always the most obvious, but is still very important.

And if I could begin by sort of more broadly just depicting that new world. You know, I've been struck that with the House Armed Services Committee in particular, Congressman, there's a lot of bipartisan cooperation. And a lot of what you just said echoes or perhaps informs the task force that Seth Moulton and Congressman Banks led in a bipartisan fashion. We were able to showcase about a month ago at Brookings as well, with the emphasis on AI, the emphasis on innovation over legacy systems. But also, a recognition in a bipartisan way, that the defense budget has probably stopped growing for a while, barring some major new development abroad.

And, certainly, COVID would seem to reinforce that by compounding our deficit and debt situation. So, when the National Defense Strategy came out to wide acclaim, Secretary Mattis released it in early 2018, there were a lot of people who were saying to implement this properly including the kind of platforms that you both have been talking about today, would require 3% to 5% annual real growth above and beyond the rate of inflation indefinitely into the future. In other words, a constantly growing defense budget growing at least as fast as the GDP, probably a little faster.

That was what everybody from General Dunford to now General Milley to the National Defense Strategy Commission, including people like Michele Flournoy. Everybody was saying about two years ago, and nobody is saying that anymore. I'm slightly exaggerating, but not by much because we know the Trump administration's own budget projections released before COVID became a major crisis, already anticipated a flattening of the defense budget in the next five years. And we also know the 2021 fiscal year that we've now entered is going to be characterized by the same level of defense spending as 2020, without even a full adjustment for inflation.

So, how do we protect innovation in this environment? Do people like yourselves think it's realistic to try to get the nation to accept 3% to 5% real defense budget growth per year? Or do we have to just make tougher choices than we were anticipating a couple of years ago? And if it's the latter, can you give an example of where a tough choice or two might have to be made? So, if I could, maybe I'd begin with you, Congressman, since that's sort of where policy and budgets meet innovation.

MR. BROWN: Sure.

MR. O'HANLON: And come back to you, Mr. Snyder, with the same question.

MR. BROWN: Sure. And let me just start maybe a little broader and then kind of hone-in

on that. But, you know, because for starters, I'd like to emphasize and every time we talk about the budget (inaudible) budget (inaudible) for the defense, I always like to emphasize my firm belief that our entire federal budget should be viewed as a national security budget. Some of the budget items are directly related to the military and others aren't. And it's important that we strike a balance between what we've generally considered domestic spending in priorities and programs and what we traditionally view as national security or foreign policy or military might spending objectives.

I think many of us anticipate that the defense spending is likely to decline or at least remain flat in the coming years as you mentioned. And I think that's regardless of who wins in November's presidential election. As you mentioned, the pressures on the economy from the coronavirus, the pandemic, and a growing budget deficit are just too great, I think, to see significant growth, if any, in the defense budget. Now, I do believe that if Vice President Biden defeats President Trump, the president's budget request for the Pentagon may be a bit smaller, but I would put an exclamation mark after a bit. I don't think you're going to see that much difference.

The biggest difference and people have commented on this, is going to be how those dollars are going to be spent. And that's, I think, what your question goes to. And the United States needs to continue to find ways to counter China and Russia. We're going to continue to defend against North Korea and Iran. And we're going to have to continue to deal with the inevitable instability in the Middle East.

And to the extent that the budget is driven by these threats and risks to our national security, those haven't diminished, and nor will the budget. In fact, they've only intensified. So, I think defense spending in a Biden administration is going to compete with other costly national priorities, including healthcare, repairing this post-pandemic economy, climate change, other domestic priorities. We've heard during the campaign Vice President Biden has proposed large investments and projects from infrastructure to energy and education. They're all going to require new federal spending.

And the Pentagon is going to have to compete, not only with those, but with also the effort to increase funding and attention into rebuilding the State Department and USAID and other non-military foreign policy tools. I think that both the Vice President Biden and President Trump have expressed the desire, although I think Vice President Biden seems to be more principled than Trump in

doing so. But both have expressed a desire to reduce large U.S. deployments.

To make the investments in modernization, I believe, that further spending cuts are likely to occur in the reductions in troop numbers and maybe even weapon buys. Look at, for example, what the commandant of the Marine Corps is suggesting, to sort of look at the footprint going from a heavier to a leaner, more expeditionary force. The same may be said and not necessarily in terms of leaner and expeditionary but looking at the formations in the Army and whether we need the same large force that we've seen in the last few years.

I don't think Congress or the Pentagon are interested in keeping high personnel numbers. But then cutting their training and maintenance to save money, I think we saw this during the mandatory spending cuts, the Budget Control Act sequester in 2013. And that led to a decline in military readiness. We saw an increase in training and operational accidents, long delays in maintenance depots and shipyards. So, yeah, tough choices are going to have to be made and some of it may be around the size of the force.

The Pentagon is committed to buying new aircraft and ships, ground vehicles, modernizing our nuclear arsenal. Because many of the systems that they'd be replacing as we all acknowledged in the previous round of questions, they're reaching the end of their life. And cancelling these projects isn't a realistic option. But to be certain, no matter -- and I'll restate this because I said this before, no matter who wins this election in a few short days, Congress is going to want to be and I'll say as a member of Congress as someone who represents the American people, we're going to have to have greater visibility on the rationale and the analysis behind the decisions to retire certain weapon systems. And to make the changes in the force structure that's required.

Nothing I said is new. As you mentioned, the National Defense Strategy Commission, I've spoken to this, the task force on future defense led by Seth Moulton and Representative Banks has spoken to this as well. So, we'll be making some tough choices and it's going to be difficult and a challenge regardless of the outcome in November.

MR. O'HANLON: Thank you. Mr. Snyder, same question over to you, and, you know, to place vertical lift and modernization in the broader context of this difficult budgetary and national and strategic environment.

MR. SNYDER: No, thank you. And I think, you know, it's similar, I'm just echoing kind of what the Congressman said. You know, it's tough choices are going to have to be made. And I think if you look at what we have been doing on future vertical lift, and really preparing and bearing down risk on this innovation and having it ready is important. There will be tough decisions made in the budget. At AUSA, you know, they said, hey, people readiness and modernization are there. And actually, modernization is our future readiness.

So, they have to continue and they are -- all the conversations we've had, they are committed to make those priorities and those tough choices that they're going to have to make to continue with modernization. And if you look at us from an industry perspective, with the JMRTD program, you know, a lot of that was industry funded. And from our perspective, gave essentially 5/6 of what was done to invest and bring that new capability to show off that that's capable of meeting those speed and ranges that we discussed earlier was funded by industry to help, you know, get us to the point where we needed to be.

And the fact that like for example, Secretary McCarthy has said, hey, we're not going to buy PowerPoint anymore. We have to buy a capability that we have flown and demonstrated and checked out. And so, I think the fact that you've got industry's skin in the game. You know, that we're investing along with it to bring these capabilities to bear and working hand in hand with the government, and the government making those tough choices that they're going to have to make.

But as we mentioned, you know, the 50 years from the last major update and we talked about the great power competition and we're going to have to do some things to bring these new modern capabilities to bear. And so, like we said, it's a tough choice. I think either administration is going to make those. The services have been committed to modernize. So, the budget, you know, while it may be limited, is still there. And I think it's really moving on from some of the legacy programs to the new modern programs to bring the capability that we need. And like I said, we in industry are supporting and continuing innovating and using our R&D to help advance it.

MR. O'HANLON: Thank you. In the context of COVID and everything else that's been going on in the country, I know, Mr. Snyder, that you've done a lot at Bell to try to be responsive. Whether it's protecting the health of your workforce, whether it is addressing issues of diversity and

inclusiveness in your workforce. I know this has been very much on your mind. And some people might think it's a little bit of a tangent from our main focus on innovation today. But I know that you're both very much of the view that it's not a tangent at all, that it gets to the heart of the strength of our society and our defense industrial base. So, I wanted to invite first you, Mr. Snyder, and then the Congressman, to speak to that set of questions as well.

MR. SNYDER: No, and it is. And it is because it's all about people. And as we as a company we're just a group of people, right? And so, when you think about what's going on in the world and I'll talk about COVID first and move to the civil unrest that's occurring.

And in terms of COVID, you know, the government actually helped out a lot in that perspective by naming us an essential business. By helping us be delegated as, hey, we need to be there for you and we need to support the war fighter and the first responders with our capabilities that we have. So, by getting that designation was critical.

And you said, we start off by saying first and foremost, we really do want to keep our employees safe. We want to keep the employees safe. We want to stop the spread of the virus and do our part for society. And, third, we want to deliver on our mission to the war fighter and the first responders and those folks that need our systems. And so, we had that mission in mind.

We also had a cultural change going on at Bell where we had the ability to communicate directly with our employees. For example, every other week, myself, and the leadership team, we talk to 400 of our leaders. So, there's a direct communication link that's already been established. We have our culture change going on. I had mentioned earlier to the Congressman we have a strong relationship with our unions and our workforce out here. So, that trust and respect with each other has already been built in. So, when COVID hit, our promise to keep them safe and take care of them and have them come to work was important as we entered that phase.

If you move towards the civil unrest that was occurring back to my first point on COVID, the first thing is we care very deeply about our employees and our communities in which we work, our customers, our nation. And so, that caring manifests itself in our value system. And one of our big values, our values is lift each other up. And what we mean by that is we really want to respect each other for who they are and we want to encourage each other. We have a servant leadership philosophy here at

Bell where we ask our folks not to worry about themselves but worry about folks around them and try and make them successful. And if you make them successful, you will be uplifted and be successful.

So, with these kind of philosophies and beliefs in the background, even when the civil unrest was here, we already had the tools in place. We have employee research groups -- resource groups, which are a representation of all of our folks here at Bell. All of us at different experiences and backgrounds. We had that communication link.

As you mention, diversity, inclusion, and belonging is very important to me personally and to the company because we're an innovative company. A very creative company. If you think about our history of X-1 and breaking the sound barrier with Yeager as far as the first commercial certified helicopter, jet packs, lunar landing research vehicle, the tilt-rotor. We had a very, very innovative company. And to have an innovative company, you have to have an innovative and diverse culture. We have to have everybody's backgrounds and experiences brought to bear to be very creative. So, our differences are our strength.

So, very much we embrace that. When the civil unrest occurred at that point, we actually brought our employee research group employees in and asked them, you know, what's going on? How are you feeling about what's going on? And what could we do better as a leadership team as a company to support you through this process?

So, I will tell you that I'm a very much aspirational leader, so, I never believe we get there. We always got to be evolving. I want to be a better person tomorrow than I am today. I want our company to be better than we are today. So, we're on a journey. They gave us feedback and I can tell you that the trust is built with not only listening and listening and I can tell you, we listen with empathy and compassion and equity.

But it's the action that occurs after that where the trust gets built. And so, we have continued to take action, will take action and as our culture develops. But there's always more to do. And honestly, that's what's great about what we're doing here in our culture transformation.

So, I can say as we work through COVID and civil unrest, our employees always came to work. We never missed a day. At one point, our office workers were out for a period of time, but we had really 60% of the workforce was here every day, came to work. We now at this point, in September, we

have 100% here locally of our workforce back in the office working. We've been very productive. We've actually grown our revenue this year.

So, I think that really, to me, is a testament to our employees and our people that are here. And I couldn't be more proud of them of what they've done in this environment. And I really want to thank them for what they've done. So, it's quite a culture journey and I do believe it plays into the defense part of this because we are the industrial base. We represent that to our nation. And the fact that during these crisis times, the relationships and trust was there and we came to work and we supported the industrial base. We supported our nation.

MR. O'HANLON: Thank you very much. And, Congressman, the same question over to you. I know you have passionate thoughts about this. And you did a lot on these sorts of issues not only in Congress, but in Maryland state government before that. So, please, the floor is yours.

MR. BROWN: I'll end with the diversity and inclusion piece. But let me just briefly comment on in terms of COVID-19 and the actions that Congress took to support the defense industrial base. You know, we took a number of actions. One is we authorized a higher percentage for advance payments trying to get money and resources out to companies, both the large contractors, their supply chain, so they could keep people on payroll, keep production lines going and not see a diminishing capability in our defense industrial base.

And we also authorized our defense contractors probably more important on the service delivery side than the production side, but to pay their employees who are unable to come to the workplace because of closures. Many of our partners work in federal buildings alongside DOD military and civilian employees. And as we've tried to successfully implement physical distancing and the CDC protocols, it required many people to work from home or at distance from the workplace.

And for some it meant they wouldn't be able to work. Because the ability to work remotely just was not available. But we didn’t want them on the workplace. So, we were able to -- we did authorize the Pentagon to make payments for that payroll even where people weren't showing up. And from all accounts, whether it's from Mitch as we just heard, the other conversations I've had with industry leaders, the briefing that we received at HAS from Secretary Lord, we've seen few, if any, disruptions in production schedules, in development timelines, in the supply chain delivery.

So, while the pandemic has had a severe, tremendous impact on so many industries and sectors, I think about retail and hospitality, I think about the airline industry, I think about so many small businesses, when it comes to the defense industrial base, we seem to be in pretty good shape. But I wouldn't take that for granted because depending on what metrics you're using, you know, someone could argue that we're not even, you know, passed the midway point in this pandemic both in terms of time, in terms of the number of cases of infection, and tragically, in terms of the number of deaths that we might see.

Let me pivot now to the question about diversity and inclusion. And I'll pick up where Mitch left off. And so many people have studied and opined that if you're going to enhance innovation in the workplace, and that's whether innovation is necessary for technological advances or problem solving in any setting, we know that a more diverse and inclusive group or setting or workplace is going to be a much more effective problem solving creative workplace. Unfortunately, I don't think that we see the kind of diversity and inclusion that we need to see either in the defense industrial base, although I will acknowledge that efforts are underway. Or at the Department of Defense, particularly on the military side. So, this year, the House Armed Services Committee focused on a number of provisions that we thought we believe if enacted into law, will provide some tools to the service components, to the industrial base, to academia, to more diversified and provide for a more inclusive workforce. Whether it's DOD military and civilian, whether it's defense industrial base.

You know, when President Truman ordered the desegregation of the armed forces in 1948, you know, there was a lot of pushback in the military. And in the early 1950s, studies were done then that showed what we know today, which is that it doesn't impact unit cohesion, it enhances effectiveness and readiness, and it enhances innovation and creativity in the force. And studies have been shown the same to be true whether it's a team working in Silicon Valley or in Fort Worth, Texas. When you bring in divergence and different perspectives based on different backgrounds and experiences and cultures, you see things from multiple perspectives and angles, you get better results.

So, some of the things that we've done. We know that the DOD is the largest spender of R&D dollars in the federal government. We also know that our historically Black colleges and universities produce about 30% of our engineers. Yet as institutions, they receive less than 1% of DOD R&D dollars.

In some cases, they may not have the capacity to compete for and employ those dollars. So, this year, we directed the Secretary of Defense to commission a national academy to look at how do we enhance the capacity in our historically Black colleges and universities so that they can more successfully compete for research dollars. And we think that's really important.

On the military side, we've done a number of things. And I won't go through the full litany, but to address this data set. And this is the start a truth about the lack of diversity and inclusion in the military. 43% of the men and women in uniform come from Black and Brown communities. That by itself is encouraging. But when you look at the 41 most senior officers in the Army, air force, navy, and marines, those four-star generals and admirals, only two are African American and one is a woman. That's not a lot of diversity and inclusion.

So, we've incorporated at least in the House version there are companion provisions, although not identical in the Senate version of this year's Defense Authorization Act. And I have implored Chairman Smith and Ranking Member Thornberry, as well as Senator Reed and Emhoff to make sure that the Defense Authorization Act that comes out of the conference committee gives the Department of Defense the tools they need to create a richer, more diverse, and inclusive military, which I believe will lead to greater innovation, both among our forces and with the defense industrial base.

MR. O'HANLON: Fantastic, thank you both for those inspiring answers.

I now want to turn audience Q&A. And in some cases, I'm going to merge or combine some of what we're getting. I think there maybe three broad questions. And let me pose the first. The first gets back to sort of nitty gritty dollars and cents. One of our members of the audience wants to understand as well as possible why certain parts of defense industry are actually showing pretty high profit yet at a time when that might be somewhat surprising. And then there's a more nitty gritty question about the R&D tax rule which allows for full expensing as opposed to amortization, but that may be expiring soon.

So, one question is about industry profit. One question is about the specific R&D, you know, expensing structure within current tax code. And I don't know if either one of you would to speak to those questions. Maybe starting with Mr. Snyder?

MR. BROWN: I think Mitch would probably be better suited to answer that question.

He's got the inside, birds eye view on both of those.

MR. SNYDER: Yeah, well, like I said, you know, as you know, we have -- we do have our research and development dollars that we spend and invest in our programs. And, of course, a lot of that R&D we work with the government, we focus it on our defense base. So, that's reinvesting in the industry of defense. So, we do put our R&D there.

As far as the profits go, you know, we sign long term contracts. You know, and that's where, you know, you sign a contract for five years and the performance and I think that's what the government looked for is that we perform well and we continue to get cost out of the products. So, I think, you know, the contracting that the government give us, they entice us to do better and get profits.

And by the way, when we negotiate the next contract that's based on our performance and in actuals and a cost base system, so, we continue to negotiate those the next time around. So, I think the system is set up and likely so for us to reduce our costs and continue to provide high quality product at a low-cost value. And as you work through these longer-term contracts, the margins fluctuate. But the next time we contract, you know, the government understands what our cost structure is at that point and we would renegotiate and usually the price for the product goes down, as it should.

So, I think the way the contracts have been set up, they entice us to do well. And as we negotiate each contract, we adjust it on the cost basis. But our job is to provide a great value product for the government and at the lowest cost possible. And that's what we do. And like I said, the margins fluctuate depending on the timeline of the contracts and where we're at in that performance.

MR. O'HANLON: Excellent. Congressman, do you want --

MR. BROWN: Let me just, you know, if I could just add, you know, a --

MR. O'HANLON: Okay.

MR. BROWN: -- a kind of a general comment on that. You know, whatever policies you develop in the form of, you know, tax incentives and credits for research and development or otherwise, I do believe that, you know, our defense industrial base policy it does deep incentivize greater investments in R&D by the private sector. They have now since eclipsed the government in total R&D. But as a country, we are slipping behind many of our competitors. And we also have to incentivize whether it's through taxes or, I mean, no one really wants to talk about grants in this space. But whatever tools we

have available, that greater cooperation and investments from commercial and defense firms with government labs and research organizations.

But for all of that to be palatable to the taxpayer, the Pentagon with congressional oversight needs to constantly do a rigorous review are we getting the value? Are we getting the return? If you can give a tax incentive for $1 and get $5 in return, then one might say, hey, that's a good incentive. But if we're getting nickels on $1 of tax incentives, then we've got to review it. There are a lot of incentives out there, a lot of programs. And I think they require, you know, continual review for their efficacy, right? Are we getting what we're trying to achieve with these programs?

MR. O'HANLON: So, there's a couple of questions that get back to the issue of defense budget tradeoffs. And I realize we're not here today to write an alternative quadrennial defense review or alternative national defense strategy. But there's still some valid questions about just how can we get by and look for savings that protect innovation, protect people and readiness and robust funding there? But still find enough economies that we can cope with a, you know, budget trajectory that may wind up leaving us several tens of billions a year at, you know, less than we were previously anticipating in the defense budgets of the let's say the mid-2020s. Because we're not going to have probably that 3% to 5% real growth. We're probably going to have more like 0% plus or minus.

And so, one of the questions was how (inaudible) Leninist phrase of, you know, quantity has a quality all its own. Just how much smaller can we make the U.S. military and still not get too small for the era of great power competition?

I'll add one last footnote to that, which is I was struck I think it was last week when Secretary Esper gave a speech at the Center for Strategic and Budgetary Assessments about a future Navy, which is not quite as close to home for our discussion today. But I know you folks both think about the Navy as well. And, you know, I'm a big fan of Secretary Esper, but I was struck that his proposal sort of doubled down on the 355 ship call, which is a much bigger Navy than we have today. And then he said, in fact, I want to have 500 ships if I'm allowed to count unmanned and other kinds of innovative platforms in addition to the more traditional force structure.

I have to say that as much as the idea sounded good, they did not sound affordable. And so, I wondered if again I could come back to this question building on the audience interest in this of at

what point do we have to cut quantity? But how do we make sure we don't cut too much quantity? I mean, for example, one more example and then I'll turn things to you, Mr. Snyder and to you the Congressman. The Army today has somewhere around 30 brigade combat teams in the active force and about that same number in the national guard. Could we cut that number by 10%? Could we cut that number by 20%? These are the kinds of questions that I think we're going to have to face pretty soon if defense budget projectories in fact stay flat. So, I wondered if you wanted to speak to that set of questions, Mr. Snyder?

MR. SNYDER: So, no, yeah, I understand and I think, you know, of course that's not my background necessarily is how big the Army should be or not be. Really what I want to do is provide the capabilities that the Army wants to really, you know, be that different fighting force and have the capabilities. But if you look at -- if I go back to peak vertical lift, you know, if you have aircraft that can fly at speeds that are twice -- as fast with twice the range, the question is then how many assets do you need to accomplish a mission within a certain given timeframe, right? So, if you're moving so many squads, you know, they can go off and look at that and, again, that's up to the war fighter to figure that out. But if I can give them capability that's twice the speed, twice the range, or X% more lethal than they currently have, that definitely tells them that they can go calculate that to figure out what their force size should be to accomplish their mission.

So, again, from my perspective, it's really I want to provide them with the most capability they can get with the technologies that we can provide that is affordable and reliable that they need. And then really it's up to them to decide the force size they need to accomplish their mission.

MR. O'HANLON: Great, thank you. Congressman, over to you.

MR. BROWN: You know, look, let me start by acknowledging I know, Michael, you spoke basically before about, you know, the defense budget how do you decide what's, you know, an appropriate budget. And, you know, you can use metrics to argue for or against increasing or decreasing the budget whether it's, you know, what percent is the DOD, you know, percent of GDP and how does that compare historically? What percent of the federal budget is defense? And, you know, and you argue one way or the other.

But, you know, I think, you know, most people recognize but it's very difficult to

implement. And I know that the National Defense Strategy Commission spoke to this and they said that, you know, the force development plan, what the force structure looks like, what our procurement program requires, the capabilities that we have to invest in, it requires a very rigorous connecting of the dots, right? The DOD's investment or spending strategy has to link our objectives, right? Okay, that's, you know, competing and beating, if necessary, you know, China and Russia to our operational concepts.

Right now, it seems to be, you know, we're moving in the direction of multi-domain operations. So, what capabilities does that take? What do we have? What do we don't have? What's the delta? And then what programs of record do we need? Once we get down to that, I think you can start quantifying dollars. Well, okay, well, this is what it's going to cost. Are we willing to spend that much? If, yes, great. If, not, what rates are you going to accept or what programs are we either not going to field in terms of new ones? Which I would argue against because we've got too many legacy programs. But rather, what legacy programs no longer provide the capability that supports our operational concept to achieve our objectives?

I'm not saying anything new. People have studied this. They've analyzed it. They've opined on it. They've given multi-day lectures on this. We all know this, but we're not doing it. And the Pentagon's got to lead that effort and they've got to include Congress in that effort.

MR. O'HANLON: Thank you. So, very last question. And now we can take our gaze again internationally. I had mentioned earlier, and I know both of you are interested in the Indo-Pacific theatre and the elements of national defense strategy to focus on that hugely important in vast part of the world. We've also had a question in the chat about cooperation with foreign partners. The question was specifically about African partners, but let me broaden beyond to other places where you might be thinking about working with foreign sales or, you know, allies that have an interest in new technologies, especially in the vertical lift domain.

Mr. Snyder, you mentioned Japan earlier in regards to the V-22, but I wanted to invite you to go beyond one country and one platform and think about the future whether from the point of view of arms sales or from the point of view of preparing for new military operational concepts for the U.S. armed forces in the vast Indo-Pacific. And that'll be my last question. So, also feel free to wrap up as you see fit and then we'll go to the Congressman. Thank you.

MR. SNYDER: No, thank you. And like you said, it is a vast region and as I mentioned, we have been working -- if I talk about (inaudible) products, you know, we have been working with Japan, but we've also had lots of discussions with, for example, like Indonesia on different platforms there were looking for. And they've already, as you've seen, publicly expressed interest in the V-22 tilt-rotor. Again, because of the large region. And then Australia we've had discussions in that region as well.

So, we had lots of discussions about new capabilities for military sales in that region, you know, to provide different capability. And when you talk about V-22, one thing we didn't mention too is besides the tilt-rotor being used for its military capabilities, it's also been used extensively in those parts of the world for humanitarian relief. Whether it was earthquakes, you know, in Nepal or Philippines with, you know, the devastation they had at that time. When you have runways knocked out, tilt-rotors are the only platforms that could fly long range just get in and provide humanitarian relief. So, there's a lot of interest not only for military sales, but for humanitarian relief type services that those kind of capabilities can provide in the region for our allies.

And if you (inaudible), you know, think forward now for the new platforms in the V-280 for example our new tilt-rotor new capabilities in that region, it is a true power projection capability. When you think about the current vertical lift aircraft, you know, as I mentioned earlier, you're talking ranges now of you can -- you can take a squad 500 to 800 nautical miles depending on the fuel that we need aboard the aircraft, it can actually self-deploy 1,700 miles. You know, if you a refuel probe it will go as long the pilot wants want to set in the seat.

So, the thing is is when you look at that vast region out there, you know, there's those kind of ranges and speeds are necessary to quickly move combat forces around in the region like the Army. So, I think it's very relevant in the region. And I think working with our international partners we've had lots of interest by the way on the V-280 from international customers that they've seen it fly. Want to come see it. They actually go to our Crystal City Advanced Vertical Lift Center to see and learn about it. So, we have a lot of international interests and I think we are going to need our allies in that region as well. So, the good thing is is we're working with them currently on existing foreign military sales as well as our new product lines, so.

And again, to wrap it up, you know, Michael, I really appreciate and Brookings Institute, to

have this opportunity to speak with you as well as dialog with the Congressman. And, Congressman, I appreciate all your support that you provided to us as a defense industrial base. And you mentioned earlier those advance payments and for our ability to keep our supply chain working extremely well during this time was very, very much helpful. And thank you for providing that. So, with that I'll close my time knot and turn it back over to you as well. Thanks, Michael.

MR. O'HANLON: Super. Thank you. And, Congressman, for the last word, over to you.

MR. BROWN: Sure. Look, the national defense strategy it appropriately sets as a priority great power competition and conflict primarily with China and Russia. But it also places a great value and necessity on our alliances and partnerships around the world, particularly NATO. But that's true not just in Europe with NATO in the Indo-Pacific, and in Africa. I've had an opportunity to travel to each of those regions. Every time I'm there, I hear a similar theme from our allied partners. And that is that we are their preferred partner. We are their preferred ally. And we should not take that for granted.

In Africa, they see China making huge investments, establishing military bases in the Indo-Pacific. And, look, we are just as much a Pacific nation as China is. It's these Chinese investments and presence in nations that we consider friends. And in conversations with them, it's not the preferred direction that they want to take. However, over the last several years, in their view, we don't seem to be demonstrate the same commitment to them and the partnerships.

We got to give back to these partnerships. Congress recognizes that. We're the ones that created or established the European, first the European Reinsurance Initiative and now the European Deterrence Initiative. We've done the same thing in the Indo-Pacific region. And I'm working with my colleagues to establish a similar statutory sort of framework for a commitment. And not just military, diplomatic, development, humanitarian framework to assist and partner around the world because that is a big part of the great power competition.

And if we're going to make more investments in modernization, we need to leverage the resources of our partners so that they can, in fact, make those investments to keep the world safe this international order that the United States enjoyed and benefitted from in the last 70 years.

So, as you said, I want to thank you, Michael, thank Brookings for including me today for the wonderful work that you do military, domestic issues, you name it, you're a real asset to the country.

Thank you.

MR. O'HANLON: Very kind of you both. It was a privilege. Thank you for all you're doing for the country and all the people who work with and for you and all the men and women of the armed forces and their families. So, as we sign off here, I'll wish folks as well, a good rest of October. Happy Halloween. Happy Election Day. And best wishes for the future. So, with that we'll be signing off from Brookings. Thank you again and goodbye.

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