

U.S. and Adversary Hypersonic Programs

House Armed Services Subcommittee on Strategic Forces

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WITNESSES:

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Lieutenant General Robert Rasch

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Lieutenant General Donna Shipton

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Paul Freisthler

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DOUG LAMBORN: Today's hearing will come to order. The Strategic Forces Subcommittee meets today to review US and adversary hypersonic capabilities. Good morning to our witnesses, Mr. White, Mr. Horowitz, Lieutenant General Rasch, Vice Admiral Wolfe, Lieutenant General Shipton, and Mr. Freisthler. And Mr. White, we understand you'll be leaving this role soon and this will be your last appearance before Congress.

We want to thank you for your years of service and express our appreciation for all that you've done.

MICHAEL WHITE: Thank you very much. It's been a pleasure and an honor.

DOUG LAMBORN: This is the first time this subcommittee has conducted a hearing on hypersonic capabilities.

Given the magnitude of the threats posed by **China** and Russia and our relatively slow pace of development, I think this is far overdue. With that in mind, we appreciate all of you being with us here today to share your expertise to address these challenges.

Before we begin, I believe it's useful to revisit the history of hypersonic weapons development. Despite leading the development of this technology in the '70s and '80s, the US foolishly decided not to pursue hypersonic weapons. Russia and **China** made the opposite decision. Instead of mimicking our restraint as we hoped, they developed and deployed increasingly sophisticated and numerous hypersonic capabilities of various types, including nuclear capable and orbital hypersonic weapons.

As a result, our adversaries have the advantage. Their hypersonic capabilities provide them novel ways to hold our homeland and our deployed forces at risk. This is not just about them having a capability that we do not.

There are inherent and compelling advantages that hypersonic systems have that could bolster our military plans and capabilities.

Retired General John Highton said once that hypersonic weapons enable quote, "responsive, long range strike options against distant, defended, and or time critical threats when other forces are unavailable, denied access or not preferred," unquote. We are behind and I am concerned we are not doing enough to close the gap as our adversaries continue to test and develop new capabilities at a much faster rate.

This is an instructive lesson and it reminds all of us about the risks that come with giving up the advantage as well as the difficulty that comes with trying to recover it. So we have our work cut out for it, but we have taken steps in the right direction, particularly over the last two years. Congress has provided

additional resources to accelerate the development of hypersonic capabilities and upgrade the necessary test infrastructure.

We have worked with the Department of Defense to formalize initiatives that we included in the NDAA, such as the National Hypersonics Initiative and Hypersonic Asymmetric Defeat Strategy. We look forward to receiving these documents from the Department. The president's decision last week to authorize the Defense Production Act to invest in our hypersonics industrial base was a welcome step.

I do have questions as to how it will be used and on what specific technologies and components. Hopefully our witnesses will provide some clarity. Perhaps some of this will come in the closed session that we'll have after our votes, which will be after our open session this morning. Despite this positive development, there is a lot more that must be done.

And I intend for this subcommittee to play a key role in this effort starting with today's hearing. Welcome again to our witnesses. We look forward to hearing from you about your efforts to develop these capabilities and how this subcommittee can be helpful. I now recognize Ranking Member Moulton for his opening comments.

SETH MOULTON: Thank you, Chairman Lamborn. I also want to extend a welcome to our distinguished panel of witnesses here with us this morning. I'm thankful we are holding this hearing on hypersonic, not only to understand our adversaries capabilities and intentions when it comes to these weapons, but also to gain a better understanding of how the department envisions the employment of our own hypersonics in a future conflict.

In 2020, I chaired the House Armed Services Committee Future of Defense Task Force. In our many discussions with department officials, academia, industry, and various think tanks, we learned that hypersonics were a capability both Russia and the **People's Republic of China** had prioritized in their modernization efforts, mainly due to their asymmetric capability to avoid detection by existing US air and missile defense systems.

As [inaudible] Freisthler's testimony starkly lays out, those investments have resulted in at least four different types of hypersonic weapons systems being fielded today that can reach targets anywhere on the globe. While our adversaries have been developing these weapons systems for years, ever since we built an anti-ballistic missile system, the department has watched and done little to negate their asymmetric advantages over our systems and capabilities, especially our domain awareness.

Congress has had to come in repeatedly to address this problem. Authorizing in the FY '19 NDAA and then appropriating the hypersonic Ballistic Missile

Tracking Space Center. Launches of the operational satellites are still two years away. Despite General VanHerck's consistent warnings of his inability to detect and track these types of threats, it took a high altitude balloon from the PRC for many to fully understand that the severity of our gaps in domain awareness.

One of the top conclusions of our future defense task force was that it's not enough for the department to pursue technology for technology's sake. We need to develop the operational concepts for how that technology will actually be employed. Indeed, the operational concepts should come first and then we should develop whatever technology is needed to best address the need.

Otherwise, you can waste a lot of money and time developing technology you don't need or technology that's not best suited to what we need to do. Seen through this lens, US hypersonic weapons development is troubling. We restarted hypersonic weapons development because our adversaries were developing them without having a clear operational concept ourselves for how they will be employed.

Last year, I asked this simple question of department officials, how will you use these weapons that are costing taxpayers hundreds of billions of dollars? I was met with blank stares. This week I asked the question again. Why are we developing them and how will they be employed? The answer I received was that we are developing them because our adversaries have them.

Again exactly the wrong answer. There are plenty of weapons our adversaries are developing that we are not such as the Russian nuclear powered missile that blew up and killed its own test crew not long ago. What matters is how we will use them not chasing after what our adversaries have just because they have it. But there is an even deeper level at which our development of hypersonics is troubling and that is that they may well be fundamentally destabilizing weapons.

Since after years of development, the department can't even make a clear case to our committee for how these weapons will be employed, we also have not seriously examined the results of whether – of whatever that employment might be. Many theorists believe hypersonics will be fundamentally destabilizing to our national security and indeed perhaps to humanity.

This is in stark contrast to the other legs of our triad that have helped keep the peace between superpowers for decades. If a nation cannot tell whether an inbound hypersonic missile is a strategic nuclear weapon or not or simply where it is aimed, that nation could feel compelled to launch a full nuclear response and nuclear holocaust could be the result.

During a hearing this week, there was a clear disagreement among the four stars on that panel about whether these weapons are stabilizing or destabilizing. That is troubling not just for the American taxpayer but for humanity itself. The

bottom line is that we have a lot of work to do. And I have not even mentioned the success of technical failures in our programs to date as we chase our adversaries more advanced programs.

I hope that the hearing this morning will for the first time help answer some of these fundamental questions.

Thank you, Mr. Chairman. I yield back.

DOUG LAMBORN: We now turn to our witnesses. Your prepared remarks will be made part of the record. Since we have a full panel today, I would ask that you each limit your opening comments to five minutes. And Dr.

Horowitz, you're recognized.

MICHAEL HOROWITZ: Thank you, Chairman Lamborn, Ranking Member Moulton, and members of the subcommittee. Thank you for the opportunity to speak with you today. I'm honored to be here. Today I want to lay out the department's view of hypersonic weapons, both offensive and defensive, and how they contribute to Department of Defense objectives in the context of the 2022 National Defense Strategy.

The central premise of the National Defense Strategy is the urgent need for the department to sustain and

strengthen integrated deterrence. The NDS is clear eyed and its assessment of the range of threats posed to the United States by a number of adversaries. In particular, it notes that the **People's Republic of China** is the only competitor with both the intent and increasingly with the capability to systematically challenge the United States across the board, militarily, economically, technologically, and diplomatically.

The Department of Defense's efforts to mature, develop, and field hypersonic technologies contribute to our objectives in the context of implementing the National Defense Strategy. They're key to support vital US national interests, to contribute to a stable and open international system, and to maintaining strengthen our defense commitments to US allies and international partners.

We see offensive hypersonics as a logical and necessary addition to the mix of capabilities that the Joint Force employs to deter, if necessary, prevail in future conflicts. To help meet the broad challenges outlined by the NDS and to transform the foundation of the force, Secretary Austin and Deputy Secretary Hicks have pushed the Department to invest in innovation to ensure that US military capabilities go beyond the cutting edge.

And with the support of Congress, which we're grateful for, the Department's FY

2023 budget contained our largest ever commitment to developing and deploying the breakthrough technologies required to deter future conflict. DOD investments in hypersonics are growing and accelerating, but it's not enough to simply spend and produce more.

Deterrence today and tomorrow requires integrating capabilities into new operational concepts through a dedicated campaign of learning. And the department is exploring creative concepts that expand US options and constrain those of potential adversaries. Put another way, it is not just about building hypersonics, rather the department is focused on building and deploying these systems and defending against them in a way that maximizes the effective implementation of the National Defense Strategy.

In concert with select allies, DOD is pursuing multiple hypersonic based capability solutions as complements to the existing suite of diverse warfighting capabilities. You'll hear today about specific hypersonic programmatic efforts from the military services and from my research and engineering colleagues.

For offensive strike weapons, the department will take advantage of the opportunities presented by employment of regional hypersonic systems and its global planning considerations. And across these capabilities, DOD is purposefully generating a diverse array of options to launch hypersonics from different platforms across different distances and based in different technological approaches.

Delivering these – these capabilities will ensure that the Department of Defense maintains the ability to deter potential adversaries and to defeat aggression if necessary. Thank you.

DOUG LAMBORN: Mr. White.

MICHAEL WHITE: Thank you, Chairman Lamborn, Ranking Member Moulton, and distinguished members of the subcommittee. I appreciate the opportunity to testify in the state of hypersonics and I'm honored to be here with key department leadership to discuss the progress that we made and still what's left to be done.

Hypersonic systems travel for a significant portion of their trajectory in the upper reaches of the atmosphere at sustained speeds at or above Mach 5, or five times the speed of sound, which is approximately 3,700 mph.

Their combination of speed, maneuverability, long range, and high altitude provide clear and distinct operational advantages, enabling highly survivable and responsive defeat of time critical, heavily defended, and high value threats from outside an adversary's defensive perimeter. Offensive hypersonic systems will be especially critical on a battlefield where the adversary is deployed high end

defensive and anti-access systems designed to limit the effectiveness of traditional US weapons in time scales needed to avoid a military diplomatic or political fait accompli.

Like any military technology, hypersonic systems are not a be all and end all. However – however, as the battlefield environment becomes increasingly more contested, hypersonic systems will be a critical tool to deliver highly responsive, survivable, and long range effects to supplement and sometimes enable our more traditional capabilities.

We are moving with urgency to put advanced technologies and new concepts and – new operating concepts, including hypersonic strike and defensive capabilities in the hands of the Joint Force to ensure we have the

right mix of capabilities to deter potential adversaries and if necessary defeat aggression.

The accelerated delivery of transformational warfighting capability based on hypersonic systems is a key contributor to the overall superiority as it directly contributes to the three pillars of the Department's National Defense Strategy: integrated deterrence, campaigning, and building enduring advantages.

Our peer adversaries are developing high end systems designed to create a highly contested environment and challenge US battlefield dominance in space, in the air, on land, and at sea. The primary mission driver for the development of US strike – hypersonic strike capability is to hold at risk these systems by leveraging the unique combination of speed, range, lethality, and survivability.

It is important to note that the United States is not engaged in an arms race, but instead hypersonic strike systems are needed to preserve deterrence because they offer a critical regional advanced strike capability that will complement existing Joint Force strike options such as cruise missiles, tactical aircraft, and bombers.

In addition to developing offensive hypersonic weapons, we are developing a comprehensive layered defeat capability to defend against adversary hypersonic systems. And we are evaluating the military utility and technology requirements for reusable hypersonic aircraft. These systems are essential to ensure that we maintain the ability to deter potential adversaries and if necessary, defeat aggression in a time scale of relevance on the future battlefield.

Over the past year or so, we have made significant progress building partly on the knowledge gained and overcoming challenges faced in our early flight tests. We have significantly increased the pace of flight testing across the hypersonics portfolio from once every two years just a couple of years ago to over a dozen flights per year last year and this year.

The Air Force Air launched Rapid Response weapon or ARRW program, completed two successful booster test flights last year, followed in December by the first test of the – their full prototype operational missile launched from a B-52 aircraft. The ARRW hypersonic glide body was developed under the DARPA Air Force Tactical Boost Glide program and is the most sophisticated air launched hypersonic glide body in the world.

The DARPA Air Force hypersonic air breathing weapon concept or HAWC program demonstrated in flight two distinct hypersonic cruise missile concepts, one of which has been chosen as the basis for the Air Force hypersonic attack Cruise missile program, HACM. The Air Force and Navy demonstrated on the ground and then in flight the common tactical rocket motor that will launch the already demonstrated common hypersonic glide body for the army long range hypersonic weapon and navy conventional strike – conventional prompt strike weapon systems.

The Navy and Army and MDA worked together to conduct two high operational tempo for – hypersonic H4H flight test campaigns to enhance future hypersonic systems with a total of five flights and over 50 technology experiments. Despite this progress, there remains much to do to deliver hypersonic systems with the capabilities and at the capacity necessary to meet warfighting needs and to continue on a path of accelerated development of next generation and leap ahead systems.

Under the next phase of the Department’s strategic approach, we must first leverage commercial production practices and design for production approaches to achieve affordable capacity in our industrial base and enable the fielding of capability and quantities necessary to defeat an increasingly capable adversary.

Second, we must identify and develop next generation and leap ahead hypersonic capabilities and technologies to maintain battlefield dominance well into the future. And third, we must significantly improve the throughput of our testing infrastructure and improve our modeling and simulation capability to further accelerate learning and development.

On behalf of the department, I appreciate the continued interest and support we receive from Congress for accelerating the delivery of transformational war fighting capability based on hypersonic systems. And I look forward to your continued support as we begin to field hypersonic offensive and defensive capabilities.

Thank you for this opportunity. I look forward to your questions.

DOUG LAMBORN: Thank you. Lieutenant General Rasch.

LG ROBERT RASCH: Hey, good morning, Chairman Lamborn, Ranking

Member Moulton, and distinguished

members of the subcommittee. Thank you for allowing me to be here today to represent the Army for this hearing on hypersonics alongside my colleagues and the other services as well as the Office of the Secretary of Defense. As part of the Army's modernization strategy, we have prioritized the development of the long range precision portfolio in order to provide an array of complementary capabilities to the combatant commanders at a multitude of ranges.

Within that portfolio, the Army's long range hypersonic weapons, or LRHW, program is designed to be the longest range asset to hold heavily defended high value targets at bay, especially targets in anti-access aerial denial environments. The LRHW is designed to be a road mobile and C-17 transportable ground based hypersonic weapon system with a first prototype battery being delivered in FY 2023. The development of a ground based hypersonic capability is crucial to support the Army's role in multi-domain operations and as part of the joint fight.

I am here today to discuss the Army's LRHW effort. But the success of this system is also reliant upon the great relationship we share with Vice Admiral Wolfe's team in the United States Navy. The Army and the Navy are partnered in hypersonic development and resourcing as the Army's LRHW and the Navy's conventional prompt strike programs share key components such as a common missile booster stack also known as the all up round and canister and the use of a common hypersonic boost glide vehicle known as the common hyper – hypersonic glide body.

We also share joint testing opportunities at the subcomponent and component level, all the way up to full system flight test and have received significant support from Mr. White and OSD in the execution of this testing. The commonalities between the services helps incentivize the emerging industrial base.

It creates economies of scale and maintains aggressive development and fielding schedules for our hypersonic weapons. We are also reliant on the relationships amongst our industry partners as no single entity can build a hypersonic weapons capability alone, especially since so much of this valuable technology was initially solely developed within the government labs.

In September of 2021, the Army fielded its ground support equipment to the first hypersonic unit, the battery unit, located at Joint Base Lewis-McChord. Q battery unit that is also part of the Army's first multi-domain task force. Since the initial fielding, the soldiers have successfully completed their new equipment training and have participated in multiple joint test events in which they have displayed and demonstrated full employment of the system in a combat like environment.

As many of you are likely aware, we recently prepared to conduct a hypersonic

test on 5 March from Cape Canaveral Space Force Station, and as a result of the preflight checks during that event, the test did not occur.

We are still in the process of processing and analyzing the data we received at that event.

But Vice Admiral Wolfe and I will field as many of your questions as possible this morning, especially in the closed session. Above all, I am confident however in our team and we will persevere together to get this system capable and safe for fielding to our soldiers. I sincerely appreciate Congress's steadfast and consistent support of our efforts to develop hypersonic weapons as we would not be here today without the relationship that we share with you all.

And I'm so incredibly proud to be a part of this team, this joint team and especially grateful for all the countless hours the Army, the Navy, and the industry teams puts in day in and day out to support this mission. Thank you again for having me today as the Army's witness and I look forward to answering your questions.

DOUG LAMBORN: Thank you. Vice Admiral Wolfe.

VA JOHNNY WOLFE: Chairman Lamborn, Ranking Member Moulton, and distinguished members of the subcommittee, thank you for the opportunity to discuss the Navy strategic systems program's conventional prompt strike hypersonic weapon known as CPS. I'm proud to be here alongside this panel of witnesses who are working tirelessly to deliver a portfolio of hypersonic capabilities to the warfighter.

In particular, I'm pleased to be here with Lieutenant General Rasch who I am partnered with to deliver the common hypersonic missile to the Army as the long range hypersonic weapon, LRHW, before then delivering CPS as a sea based capability to the Navy. The support we received from Mr. White and the Office of the Secretary of Defense has been essential as we continue on the path to rapidly field these capabilities.

The Navy and the Army are partnered to execute the CPS and LRHW programs through the use of a common hypersonic missile, which consists of a two stage missile booster designed, developed, and produced by the Navy as well as a common hypersonic glide body designed and developed by the Navy and produced by the Army.

By leveraging joint developmental test opportunities, the programs have marked significant testing milestones at a consistent pace. Our March 2020 flight test demonstrated that the common hypersonic glide body technology is mature. Multiple static fire tests and a 2022 flight test provided vital data on the performance of our newly developed missile booster.

In partnership with the Missile Defense Agency, the Navy and Army have completed two sounding rocket campaigns to inform the future development of the common hypersonic capability. During a recently planned flight test, automated preflight checks identified that a battery did not activate, which resulted in not conducting the test.

We are aggressively investigating the cause of the no test and will continue to move forward with our development and additional testing in support of Army fielding as soon as the cause is identified and corrected. The services are making great progress transitioning hypersonic capabilities out of government laboratories and into commercial production.

And in the spring of 2022, we celebrated the delivery of the first industry produced common hypersonic glide body. Hypersonic industry partners are working diligently with the government national team to facilitate a rapid transition to production, platform integration, and delivery to the warfighter. In order to deliver this capability at the speed of relevance, the Army and Navy teams will continue to work closely with industry partners, OSD, and Congress to identify supply chain issues and put mitigation plans in place.

The Navy is diligently preparing for the filling of CPS on both the Zumwalt class destroyers and the Block Five Virginia payload module equipped submarines. Making a critical development milestone, testing at our in air launch test facility has validated the cold gas launch approach the Navy will use to launch the common hypersonic missile from both of our sea based platforms.

The CPS building on Zumwalt class destroyers will mark the first use of this cold gas launch approach on a service ship platform. The program is continuing construction and outfitting of the underwater test facility that will allow the program to test how the CPS missile transits through the water using the newly developed CPS launcher.

We have begun a series of exercises that allow sailors to execute scenarios in an operationally representative environment and will soon be deploying a weapon system prototype and a missile simulator on a Zumwalt class destroyer. The ship will take the equipment to sea and demonstrate employment concepts and command and control with USSTRATCOM and INDOPACOM. I remain confident that the CPS program will be ready to fill the hypersonic weapon system upon the availability of the Navy platforms.

I'd like to thank Congress for the support you have shown our program and the important focus that you have placed on this essential capability. As the 14th director, it is my honor to represent the men and women of SSP's CPS program. One of my top priorities is to ensure that these dedicated Americans are poised to execute the conventional prompt strike mission with the same level of success, passion, and rigor as we have since SSP was founded.

Thank you for the opportunity to testify today on behalf of the team that will provide our nation with a credible and reliable intermediate range hypersonic strike capability. I look forward to your questions.

DOUG LAMBORN: Thank you. Lieutenant General Shipton.

LG DONNA SHIPTON: Good morning, Chairman Lamborn, Ranking Member Moulton, and distinguished members of the subcommittee. Thank you very much for the opportunity today to provide testimony on the Department of the Air Force's hypersonic programs. Our continued efforts to develop and field and operational hypersonic air launched weapon will enable us to hold high value time sensitive targets at risk in contested environments from standoff distances.

A hypersonic weapon in concert with a wider weapons force mix is key to providing a war winning Air Force.

The Air Force's hypersonic portfolio consists of three major thrusts: the air launched boost glide missiles, air

launched air breathing cruise missiles, and the foundational science and technology hypersonics portfolio.

Our boost glide missile is the air launched rapid response weapon, also known as ARRW. In fiscal year 2023, the Air Force will continue the development of ARRW. To this date, we have successfully completed the booster test flight series in July of 2022 and the first all up round test flight ATF one in December on the B-52.

ATF one represents the Air Force's first successful test of an end to end.

Operationally representative air launched hypersonic weapon. ATF two is scheduled to take place by the end of this month and we are planning for two additional all up round test flights prior to program completion. Our air breathing cruise missile is the hypersonic attack cruise missile, also known as HACM. It is an air launched, air breathing weapon that can be integrated on current and future fighters as well as provide expanded capacity on bombers.

The Air Force awarded the HACM contract in September of 2022 and is developing the weapon using middle tier of acquisition rapid prototyping authority. We are working to mature HACM to critical design along with other development activities in order to enable the flight test program to begin in FY 2025. For our SNT efforts, in collaboration with the wider hypersonics community you see seated here today, our foundational science and technology hypersonics portfolio is executed by the Air Force's research laboratory, AFRL. AFRL has made many enduring contributions to the field of hypersonics.

They have achieved recent successes with their completed high speed strike weapon technology maturation, or tech mat, program. This program transitioned over 30 technologies to various DOD hypersonic programs ranging from advanced materials to propulsion technologies to air vehicle designs. Based on these successes, we look forward to the launch of Tech Mat two this year to further develop and transition technologies for next generation hypersonic capabilities.

Lastly, AFRL will continue technology development efforts this year towards expendable hypersonic, multi-mission, intelligence surveillance and reconnaissance, or ISR, and strike capabilities for larger, long range, multi-mission hypersonic platforms. Thank you again for the opportunity to testify and to provide additional details in the closed session.

I look forward to your questions.

DOUG LAMBORN: Thank you. Mr. Freisthler.

PAUL FREISTHLER: Chairman Lamborn, Ranking Member Moulton, and distinguished members of the subcommittee, thank you for the invitation to provide the Defense Intelligence Agencies assessment of **China** and Russia's hypersonic weapons systems. Amid the backdrop of strategic competition, the events of the past several years demonstrate in no uncertain terms that our competitors are developing capabilities aimed to hold the US homeland at risk.

Hypersonic weapons designed to evade US sensors and defensive systems pose an increasing and complex threat due to the availability of both nuclear and conventional capabilities, challenging flight profiles and maneuverability. These weapons include air, ground, and naval launched variants as hypersonic glide vehicles, hypersonic cruise missiles, and ARRW ballistic missiles.

Unlike ballistic missiles, these hypersonic weapons which fly at speeds at least Mach 5 the – for a significant portion of their flight, do not follow a ballistic trajectory and can maneuver in route to their destination. While both **China** and Russia have conducted numerous successful tests of hypersonic weapons and have likely fielded operational systems, **China** is leading Russia in both supporting infrastructure and numbers of systems.

Over the past two decades, **China** has dramatically advanced its development of conventional and nuclear armed hypersonic missile technologies and capabilities through intense and focused investment, development, testing, and deployments. **China** has a robust research and development infrastructure devoted to the development of hypersonic weapons.

For example, the **China** Aerodynamic Research and Development Center claims to have 18 wind tunnels and the **China** Academy of Aerospace Aerodynamics claims to operate at least three hypersonic wind tunnels capable of operating at

speeds of Mach eight, Mach ten, and Mach 12. **China** has conducted a number of successful tests of hypersonic weapons systems, including the DF-17, which is a medium range ballistic

missile with a hypersonic glide vehicle payload.

It is estimated to have a range of at least 1,000 miles enabling it to reach US military forces in Western Pacific and may have been fielded in 2020. **China** is also pursuing an intercontinental range ballistic missile with hypersonic glide vehicle payload and has conducted several flight tests since 2014, including a test in July of 2021 that circumnavigated the globe.

China also is actively pursuing high speed engine or scramjet technologies which have applications in hypersonic cruise missiles and has used their Mach six plus scramjet testbed to research thermal resistant components and hypersonic cruise missile technologies which would further expand its hypersonic weapons capabilities.

Russia has performed research on hypersonic weapons technologies since at least the 1980s. Russia reportedly conducts hypersonic wind tests – wind tunnel testing at the Central Aerohydrodynamic Institute and the Khristianovich Institute of Theoretical and Applied Mechanics and has performed hypersonic weapons testing at several locations across the country.

Russia currently has three deployed hypersonic weapons systems. In 2018, President Vladimir Putin mentioned the first. The Kinzhal air launched ballistic missile claiming it has a top speed of Mach 10 with a range of over 1,200 miles. The second system, the SS-19 Mod 4, achieved initial operational capability in 2019 and is the world's only deployed strategic range hypersonic glide vehicle.

Russian government officials claim the hypersonic glide vehicle is capable of flying at speeds over Mach 20 with a range of approximately 6,500 miles. The third system, the Zircon, is a ship launched hypersonic missile that travels at speeds up to Mach eight with a maximum range of approximately 600 miles.

Russia has also declared its intentions to expand its strategic hypersonic weapons inventory in the coming years by eventually placing multiple hypersonic glide vehicles on the developmental intercontinental ballistic missile, known as the Sarmat, and developing another air launched hypersonic long range missile called the Ca-95. My goal in this hearing is to help Congress and the nation better understand the threats we face as a nation.

DIA aims to support this committee in identifying opportunities to respond to these challenges. Thank you for your continued confidence and I look forward to your questions.

DOUG LAMBORN: Thank you all for your statements and for being here. We have one vote that will occur at 10 to 10:15. My hope is that we can get the opening hearing done before the vote. Then we'll go vote and all of us reconvene up in room 2337 in the skiff for the classified session. I'd ask members and witnesses to keep our questions and answers as succinct as possible so we can get to more members.

President Biden's decision last week to authorize the Defense Production Act to invest in hypersonic – hypersonics was welcome. This move demonstrates a recent and serious realization more and more of us are having of the need for hypersonics. So General Rasch and Vice Admiral Wolfe, do hypersonics meet a need not otherwise met by our existing weapons and forces?

In other words, are we developing this just to be copying potential adversaries or do hypersonics meet a need that if not met, puts us at an unacceptable risk? General Rasch, start with you.

LG ROBERT RASCH: Thank you, Chairman, for – for the question. So as a material developer, I'm not necessarily involved in the policy decisions regarding the – the implementation and usage of those. But from an Army perspective, as part of the joint fight, when we did the long range fire study across the Army portfolio looking at the capabilities we had and the ranges we had and the allocation or apportionment of targets that we as part of the joint fight were – were supposed to address it was determined at that point in time that hypersonics – the long range hypersonic weapon system was needed.

If you need more – more information, I can absolutely get that report to lays out that – that additional information.

DOUG LAMBORN: Vice Admiral Wolfe or Mr. White, can you – or Mr. – Dr. Horowitz, can you add to that?

VA JOHNNY WOLFE: So – so from a Navy perspective, I – too like General Rasch, I'm a material provider, but I would tell you the Navy's view is this does fill a need for the United States Navy. It's not just because of parity

with what the adversary or our strategic competitors are doing. But again, like General Rasch, if you'd want more detail on that, it would have to go to the classified session.

MICHAEL HOROWITZ: Thanks so much. I think we – we believe in the department that hypersonics are a critical part of the mix of capabilities that we need. They expand the range of options available to senior decision makers. And – and as Mr. White said, their – their speed, maneuverability, and range give them novel capabilities that will be helpful from the perspective of the Joint Force.

That's why the National Defense Strategy calls them out as priority capabilities from the perspective of – from the perspective of development. And so I think there are – there are reasons why the department needs to develop hypersonics clearly laid out in the National Defense strategy that are aside from whatever Russia and **China** are doing.

DOUG LAMBORN: Mr. White, do you have anything to add?

MICHAEL WHITE: I think that pretty much covers it.

DOUG LAMBORN: OK. Very good. Very good. And Mr. White continuing with you. Last year, I worked with the department to formalize the National Hypersonics Initiative and have included – and had it included in the fiscal year 23 NDAA. This provision directed the department to provide a report on options to enhance hypersonic development efforts through the establishment of a national hypersonics initiative.

Can you give us an update on that and preview – preview what will be in the report? And will we need any more legislation in the 2024 bill?

MICHAEL WHITE: Thank you for the question. The National Hypersonics Initiative really is a descriptive term for the next phase of our hypersonic strategy that moves us from the initial prototyping phase of development to operational fielding with affordable capacity. So the key elements of that next phase of our strategy have to do with affordable capacity and getting industry and the industrial base designs capable for – of being built affordably and at high rate to meet the needs of the warfighter as well as continuing to evolve our technology.

So the two key pillars of that next generation strategy is affordable capacity and next generation leap ahead technologies. In addition, we want to make sure we enhance the technology base and the workforce providing the capabilities and currently and for the future in hypersonics as well as the T and E, and test and evaluation, infrastructure necessary.

So those are the key elements of the strategy. The report is in – has been completed and is in review and it should be out and about a month.

DOUG LAMBORN: Thank you.

MICHAEL WHITE: Thank you.

DOUG LAMBORN: And hurrying right along. Mr. Freisthler, your opening statement mentioned the **Chinese** hypersonic fractional orbital bombardment system, or FOB, that circumnavigated the globe. Some people call this a Sputnik moment. Can you explain why **China** is pursuing this technology and when can we expect it to reach initial operational capability if it hasn't already?

PAUL FREISTHLER: Thank you for the question. In order to provide you a full and robust response, I would like to defer that to the closed session if I may.

DOUG LAMBORN: OK. We'll address that in closed session. And let's see, at this point, I'm going to hand it off to Representative Moulton and we'll try to do as much as possible, but when votes are called, we will adjourn here and reconvene after votes in the skiff.

SETH MOULTON: Mr. Chairman, thank you very much. So in my opening remarks, I commented on how we need to have operational concepts before we just pursue technology for technology's sake or just because our adversaries have it. And the Chairman addressed this in his first question, but I have to say I was struck by how vague your answers were.

I mean, two of you essentially said, hey, I'm just developing this, but the policy people are figuring out how to use it. Others talked about vague things like options that it provides our warfighters. There's not a weapon system on Earth that doesn't provide our warfighters new options. But we have to be smart about what we

invest in. We cancel weapon systems all the time that provide options to our warfighters, but we decide are not a top priority.

Now in your testimony, Mr. White, you said mission planning work is well underway for Air Force, Army, and Navy capabilities and the US -snited States Strategic Command has been developing a concept of operations for support of the Army's first fully operational – operationally weapons. Has been developing, is working on, doesn't sound like we have an operational concept first for which we're developing a technology.

You also said earlier in your testimony, we are moving with urgency to put advanced technologies and new operating concepts, including hypersonic strike and defensive capabilities, into the hands of the Joint Force.

Again, this doesn't sound like we have this figured out. It sounds like we're trying to just catch up with our adversaries.

Now I asked this question in the earlier hearing this week of General Cotton and his answer was essentially we need them because **China** and Russia have them. I then asked if he thinks they are stabilizing or destabilizing weapons and he said that they will be stabilizing if we reach parity. That sounds like we're just trying to get to parity with our adversaries.

He didn't give us an operational concept for how they're going to be used. Just a few minutes later, General VanHerck described an operational concept in which Russia or **China** attacks us with a hypersonic weapon and we can't tell where

it's going. And he said very explicitly that is destabilizing. But let's just take General Cotton's line of reasoning for a minute and argue that we need them because the other guys have them.

And once we get to parity, they will be stabilizing. But Dr. – Dr. Freisthler, in your testimony, you made it very clear that Russia and **China** are developing hypersonic capabilities that we have no intention of developing. Do we have intention of developing nuclear hypersonics? Does anyone on the panel think that we are?

No. So we're not even going to reach parity in that sense. It's not like we have ICBMs and they have ICBMs. So we know that we don't want anybody to fire an ICBM because that's where they're going to get back. So on the one hand, people come before us all the time arguing as you have that we need these capabilities because our adversaries have them.

And you have the commander of STRATCOM saying that once we reach parity with our adversaries, then these will be stabilizing weapons, good for our national security across the board. And yet you don't even have a plan to reach parity because we're not developing the same type of hypersonic weapons as they are.

So it seems to me that there is a fundamental disconnect here. Not only that, it does seem like we're quite far behind. Dr. – Mr. White, you said that we are not in an arms race. How would you define an arms race?

MICHAEL WHITE: I define an arms race in the traditional sense of numerical parity. They have 47 widgets, so we need 50.

SETH MOULTON: Which is exactly what General Cotton said is our – is our path.

MICHAEL WHITE: I would disagree with that. I don't believe I interpreted what he said in that – in that vein. But that is not what we're doing. Our development of our hypersonic capabilities for offensive strike is dictated by the target set and the mission capabilities needed to complement our existing and other types of weapons so that we can perform our operational missions successfully and deter preferably.

SETH MOULTON: Well, I would highly encourage you as I have in years past to accelerate the development of these operational concepts so you can come before us and before the American people who are footing the billions and billions of dollars to develop these weapons just so that your STRATCOM commander can tell us we can reach parity with our adversaries even though we don't even really have a plan to do so. Now, let me ask one other question.

JOHN GARAMENDI: [off-mic]

SETH MOULTON: Oh, I'm sorry. Lieutenant General Rasch.

LG ROBERT RASCH: Sir, I was just going to add from an operational employment perspective separating that from how we execute. We do exercise from General Cotton's team at STRATCOM through the combatant command and did actually this last week that full chain of events. Obviously, decision authority is not something that the

material developer is necessarily focused on, but the ability to employ that – deploy and or employ that when we conduct that first unit of issue later this year is something that we are exercising from the top all the way – all the way to the bottom.

So when it is capable and ready and the leaders decide that we need to – to execute it, we have a system that can execute that mission.

SETH MOULTON: I appreciate that very much. Do you think that these are strategic weapons, Lieutenant General Rasch?

LG ROBERT RASCH: I would actually rather defer that to – to policy if I could please.

MICHAEL HOROWITZ: These – these are conventional weapons that can have strategic effects. And we think that because of their speed, maneuverability, and range that they offer something potentially unique to the – to the Joint Force.

SETH MOULTON: Well, as I said in the very beginning, I don't doubt that they offer something unique, but let's figure out how that's actually going to be used. And fundamentally whether at the end of the day it contributes to our national security or makes the world a more dangerous place, not only for us but for everybody else.

Dr. Freisthler, what is your assessment on **Chinese** and Russian capability to track US hypersonic weapons? Do they have the same limitations that we obviously do when it comes to tracking them in flight?

PAUL FREISTHLER: Thank you very much for the question. So the physics is the same across the universe. So I would say they definitely have similar struggles that the US may have to attack. I'm not saying we have the struggle with the capability, but looking at it from a physics perspective, as you travel through the air at that velocity, there becomes challenges with onboard sensors, but also then with capabilities from ground in space to detect and track vehicles.

SETH MOULTON: Dr. Horowitz, when – when the strategic deterrence that we have and have had for decades between the US, Soviet Union, US and Russia

relies not only the fact that we have a lot of ICBMs on the ground, but that we have detection capabilities so we can tell when they launch. What is our policy if Russia were to take out our detection capabilities?

How would we treat that?

MICHAEL HOROWITZ: I think we view the – we view our – we view our capabilities in this area as robust. And we'd be happy to talk about it more in a close –

SETH MOULTON: No, no, that's not my question. My question is what is our policy if Russia takes out our capability to detect nuclear launches from Russia?

MICHAEL HOROWITZ: I don't think we – I think the – I think we'd need to talk about that in a closed session.

SETH MOULTON: I think that's intimately related to the question that I just asked. So I look forward to that discussion. And I hope you can resolve the pretty obvious logical discrepancy here. Thank you, Mr. Chairman.

DOUG LAMBORN: Representative Wilson.

JOE WILSON: Thank you, Chairman Doug Lamborn, and thank you also Ranking Member Seth Moulton. It's so refreshing as you see the bipartisan working together, concerned for the American people. And then thank goodness we have such capable people as you are here today. And a gruesome reminder of what – how important and what you're doing was the hypersonic attack last night – yesterday across Ukraine.

The people of Ukraine were given no warning. There's no tracking. There's not a capability of providing air siren capabilities of people to go to shelters. There's the whole situation of evading to create – the courageous people of Ukraine have been so successful in blocking by their missile defense systems.

The war criminal Putin's attacks on the people of Ukraine. But this yesterday was just horrific, again, to see civilian targets intentionally to create the mass slaughter of civilians. And it's just so critical that we have a capability hopefully to deter war criminal Putin. But yesterday was such a reminder of how critical what is today and I'm concerned to. It may have been a response by war criminal Putin to – to the actions by President Biden last week that his message is that, hey, we shall proceed and the global conflict that we have between

democracies rule of law with authoritarians rule of gun.

And so I believe that we are sadly obviously in an arms race. We're in a competition. And the good news is we've been through competition like this before called the Cold War where we had no chance of victory, but we did. So

what you're doing is so critical I want to point out to General Shipton. First of all, we're so thrilled to have a distinguished graduate of Clemson University School of Engineering.

And so since I have a grandson there and I've had a son follow you. So, hey, we appreciate what you've done.

Sen – General, the senior Air Force leaders have discussed the need to determine the optimal weapons mix for hypersonic capabilities conventional munitions to make production decisions. How is the Air Force resolving these concerns?

LG DONNA SHIPTON: Thank you for the question, sir. And go Tigers.

JOE WILSON: Hear, hear.

LG DONNA SHIPTON: So, sir, yes, the Air Force is proceeding with understanding what our operational weapons mix will look like incorporating hypersonics into that discussion. We do see that it is a probably high value but low volume addition to our wider weapons mix. We do believe that we will be adding this capability to our – especially with our future fighter force that our wargaming and analysis has shown, especially with HACM, that it will provide a superior capability to our current inventory.

And we are looking forward to bringing that in the inventory as I mentioned in 2027.

JOE WILSON: Well, thank you very much. And indeed, go Tigers. And I'm so grateful to be with you. And Dr.

Freisthler, again Russia – Putin developing his capabilities, the **Chinese** Communist Party developing their capabilities, the collusion with Tehran, with the intent of Tehran to vaporize the people of Israel, to vaporize the people of America.

We know of their capabilities. With those capabilities, is there evidence of cooperation between Russia, **China** and any other here we go with DPRK too, North Korea – does this ever end – in weapons development and what is their industrial production capability?

PAUL FREISTHLER: Thank you very much for the question. If I may tackle that slightly in reverse order. So production, the costs remain a barrier for everyone that is in pursuing development of hypersonic weapons.

You know, **China**, Russia as well as France, India, Austria, North Korea, Japan, and others, as you mentioned, there are all looking at the technologies that are in this and working to overcome them.

So from an industrial base perspective, we do see some collaboration Beyond that, I would have to defer to the closed session, sir.

JOE WILSON: Thank you. And I hope we collaborate with other countries, ie, India and Japan. Thank you.

DOUG LAMBORN: Representative Norcross.

DONALD NORCROSS: Thank you, Chairman. I'd like to thank the panel for being here today. And I don't want to go point for point on the line of questioning that my colleague had. I want to take it one step down. The assumptions that technically we are getting to where we need to be although nowhere near the time frame, but operationally still a huge question.

The Defense Production Act typically is there for when there's not an industrial base to support it. There is no doubt in anybody's mind up here is we have been throwing billions of dollars at this. Why at this time the Defense Production Act being deployed by the president, what need is it because you usually do that when, A, it's not there, B, industry is unwilling to do this.

I'm not sure which one you are in a position to answer this question, but why now is that being invoked? Where is the industry not answering the call? I know you're all dying to answer this question.

MICHAEL WHITE: Thank you for the question. The – I think the – I think that we're – we're pleased and excited that the president is allowing us the opportunity to act on behalf of the nation to accelerate the advancement of hypersonics capabilities in the – in the US. These investments we think will lead to new training and job opportunities for American citizens.

DONALD NORCROSS: No, I got that. Why? What is the defense – why does that need to be employed instead of industry just answering the call. Because this is to force industry's hand. Where is that not being addressed?

MICHAEL WHITE: The administration has made a determination that – that invoking it is necessary given where industry is now. But – But I would also have to take this for the record given that our colleagues from acquisition and sustainment are not represented on this panel and could bring more to bear on the specific question of the decision on the timing.

DONALD NORCROSS: I hear you. Let me shift gears here a little bit. The CBO recently released the US Hypersonic Weapons and Alternatives Report. I assume everybody has seen this and came to some takeaways that are extremely concerning to many of us up here that the ballistic missiles in many ways be well suited to address these.

Second of all, that it probably hypersonics would not be more survivable than ballistic missiles. Third, the cost, considerably less. So my question is, given those challenges, what are we getting with a hypersonic missile that we're not getting with the ballistic that's going to address it in light of this report?

Dr. Horowitz, if you could start.

MICHAEL HOROWITZ: Thanks for the question. The – the department believes that the intersection of the speed, maneuverability, and range of hypersonics provides capabilities that are not simply provided by ballistic missiles. But we also believe hypersonics are not a one size fits all solution. That's why they're important as part of the mix of capabilities that the – that the Joint Force is – that the Joint Force is planning to operate in the future.

And why am I – why my colleagues in uniform have talked about some of the – some of the plans we have concerning different quantities of hypersonics that we think might be useful in different – in different scenarios.

DONALD NORCROSS: So let me interject. What are we getting from a hypersonic that we are not getting?

Speed is obvious. Maneuverability is questionable that we're getting that additionally. What is it? That time frame cuts down from six minutes to three minutes that makes an operational difference?

VA JOHNNY WOLFE: Rep. Norcross, if I could just weigh in here. So I'd be happy to answer that question, but we really need to be in the classified discussion for me to give you an example of exactly where this is useful.

DONALD NORCROSS: I yield back and we'll address it in the closed session.

SCOTT DESJARLAIS: I thank the gentleman. I'll now recognize myself for five minutes. Mr. White, I'd like to start by thanking you for the work that you've done in the Department through your briefings on the Hill to raise awareness of the state of our hypersonic test infrastructure. It's not a flashy – flashy topic, but it's critical.

Because of your persistent work shedding light on the dire state of our T and E infrastructure, we've seen tremendous support built on this committee for necessary investments. So I really appreciate your efforts. But I would like to ask you where we are now. As you know, my district is home to Arnold Engineering Development Complex and we've seen significant funds dedicated to Arnold over the past few years.

I'm curious to know how you would assess the state of our ground test infrastructure presently. Are we dedicating sufficient resources? Are there

additional construction or hiring authorities that we could provide you all to help with these modernization efforts? So in short, what do you need from this committee to continue the progress we've made in our modernization of our ground test infrastructure?

MICHAEL WHITE: Thank you for that question. And let me first start off by saying that we greatly appreciate the support we've gotten from this committee and Congress in general for our T and E infrastructure improvements and the tremendous amount of funding that's been added by Congress for T and E infrastructure. The Arnold Engineering Development Center really is the crown jewel in our hypersonics T and E capability, and our facilities in Tennessee provide critical capabilities for testing of high temperature materials for thermal protection systems and everything [ph] propulsion systems for hypersonic cruise missiles.

Right now, we have worked to increase the capability of the current facility infrastructure to improve the throughput by a factor of two over the last couple of years. But the – the investments that we're being able to make with the additional funding is allowing us to dramatically improve that throughput and capability by

building new facilities, both for air breathing propulsion and for high temperature materials testing in Tennessee.

So we look forward to bringing those systems online over the next couple of years to dramatically improve our ground test capability. In addition to those investments, the additional funding and support we've gotten from Congress has allowed us to make investments across the board with our industrial – industry partners as well as our government laboratories elsewhere to enhance our facilities – facility needs for ground testing, and so we really appreciate that.

And the investments are going to universities, industry elements in Minnesota and New York in particular, and government facilities outside of Tennessee, for example, the Holloman sled track in New Mexico. So quite – quite a lot of investment and it will dramatically improve the robustness of our ground test facility.

Beyond that, the investments are allowing us to improve the capability and throughput of our flight test infrastructure. As I mentioned in my opening remarks, we've gone from testing about once every two years to over a dozen times per year and that's put a demand signal on our flight test infrastructure.

That's being enabled by advanced capabilities being – being pursued for moving our range instrumentation to airborne platforms from maritime platforms, a dramatic improvement in flexibility and agility for our range assets. So there's a lot of investment going – going on across the T and E infrastructure enabled by

the robust funding approved in the recent Congress in particular.

SCOTT DESJARLAIS: One other thing, something General Thurgood raised on a trip to Huntsville last August was utilizing some of these small scale facilities of our academic institutions to help alleviate some of the testing shortfalls. To what extent is the department utilizing these facilities and are there additional opportunities?

And I think you kind of answered that, but specifically like the UT Space Center in Tennessee.

MICHAEL WHITE: Yeah, the – the university ecosystem is an important part of our – our strategy moving forward. The University Consortium in Applied Hypersonics is allowing not only investments in the students, but in the infrastructure in the universities. We've made numerous investments in universities like Purdue and Notre Dame for quiet hypersonic wind tunnels.

We're making additional investments in the University of Illinois for their hypersonic facility. And then in Texas, we're making a number of investments. So we are through the UCAH and additional investments through the test resources management center energizing our university ecosystem for testing and evaluation.

SCOTT DESJARLAIS: Thank you. And again appreciate your efforts and thanks for all you've done.

MICHAEL WHITE: Thank you.

SCOTT DESJARLAIS: And I will now recognize Mr. Carbajal from California.

SALUD CARBAJAL: Thank you, Mr. Chair. Welcome to all the witnesses. Hypersonics are an innovative technology. They have a lot of potential. They have the potential to be the next generation of weapon system that increases our capabilities and they also have the potential to cost taxpayers a whole lot of money. We need more clarity on where supersonics will fit in with our national defense strategy and what the plan and metrics are for future research, development, testing, and evaluation.

I must say I associate myself with the comments and statement of Ranking Member Moulton and Mr.

Norcross. In my district Cal Poly San Luis Obispo in partnership with the Air Force Research Laboratory is in the process of building a Ludwig Tube wind tunnel capable of Mach six to conduct hypersonic research and workforce development opportunities for students.

Mr. White and General Shipton, can you speak to the benefits of partnerships

between the university and the department like we have with Cal Poly and the Air Force Research Laboratory in advancing the research of technologies like hypersonics?

MICHAEL WHITE: Thank you for the question. I'll start. As I just mentioned, the University Consortium in Applied Hypersonics is a major initiative that we established with the Joint Hypersonic Transition Office.

Started – started largely due to congressional support and funding in earlier bills. And we've really energized

that – that community.

We have over 100 universities involved in that university consortium to not only develop future technologies and build facilities that allow that research, but really to train that next generation workforce so that we can make sure the country's capability and future is robust to – and delivering this capability to our warfighter.

I just want to re – or emphasize that I don't view my job as being hypersonic technology development. I view my job as developing – developing transformational capability and delivering that transformational capability to the warfighter based on hypersonic systems. So our emphasis really is getting the capabilities and the weapon systems in the hands of the warfighter so they can make sure that we can perform what we need to do on the battlefield and accomplish our mission objectives should deterrence fail.

SALUD CARBAJAL: Thank you.

LG DONNA SHIPTON: Thank you for the question, sir. And I would just add that I agree completely with Mr. White's comments earlier. I would just say that I think adding any additional capability is going to allow us to do increased testing at a faster rate. Just very basic simple math. And so I think these efforts with the university are certainly going to be helpful in allowing us to do more tests more quickly and bring that capability sooner.

So that's all I have, sir.

SALUD CARBAJAL: Great. Thank you. Dr. Horowitz, I think it's clear that the **PRC** and Russia are ahead of us in hypersonic weapon deployment. Can you walk me through current discussions taking place or strategies that will allow us to keep pace while keeping in mind the cost of this technology? And can you give specific examples of how President Biden's announcement last week regarding DPA title three will allow the department to field technology sooner?

Obviously, within this setting.

MICHAEL HOROWITZ: Thanks so much for your question. The – I think

the question of the intersection between our hypersonic development and – and what **China** and Russia are doing is interesting. But the most important question is – is the – is the Joint Force developing the capabilities it needs to fight and win the nation's wars.

And we think hypersonics are a critical part of that for – for some of the reasons that I've stated before for their speed, for their maneuverability, the intersection of their speed, maneuverability, and range, which is why we think they complement subsonic missiles and supersonic non hypersonic missiles as part of the package of capabilities that the Joint Force – that the Joint Force needs.

And that's our overall development of capabilities is paced to the challenge posed by the **PRC**. But as my colleague, Mr. White said, we're not seeking to one to one develop hypersonics just because **China's** developing them. We seek to develop them. And my colleagues giving several examples of capabilities, you know, HACM, LRHW, CPS, that – that we think are necessary for the Joint Force to implement the National Defense Strategy.

The DPA we believe will be helpful in accelerating the development of these capabilities and that they – they'll help the market fill the demand that we have for development of – for fielding of hypersonic technologies and the time frames that we need given the production challenges. But – but again, as I said before, I think our colleagues from acquisition and sustainment be much better poised to answer specific details of those – of how it will – how it will make a difference.

SALUD CARBAJAL: Thank you, Mr. Chair. I yield back.

SCOTT DESJARLAIS: Gentleman yields back. Chair now recognizes Representative Khanna from California.

RO KHANNA: Thank you, Mr. Chair. My understanding, Dr. Horowitz, and correct me if I'm mistaken is that once we developed the precision strike capability to possibly strike the nuclear capability that **China** has prior to their launch that this in part incentivized them to develop hypersonics to be able to do that to us. Of course, we have the second strike capability through our submarines and so that would deter them from doing that.

I guess my question is what additional deterrent value would the hypersonics provide that we don't already have with the triad?

MICHAEL HOROWITZ: That's a really great question. Obviously strategic deterrence is fundamentally based in

the – in the triad. And my – my colleague, Assistant Secretary Plum, spoke about this a few a few days ago.

And I would defer to him actually on all things. But the – I think in this specific case, we see offensive hypersonics as providing another – another rung of conventional capabilities that can help deter conflict and deter and potentially deter escalation.

And that hypersonics because they have the potential to have strategic effects because of their – the intersection of that speed, maneuverability, and range give not just capabilities for their own sake, but capabilities that – that potentially can make a difference for the Joint Force and in potentially avoiding escalation.

They give senior decision makers more options.

RO KHANNA: Are they needed to do the precision strike force that President Bush started? I forget the exact name of that which can allow us to have a preemptive strike on nuclear facilities or do we have that capability without it?

MICHAEL HOROWITZ: I think we'd want to talk about that question in a – in a closed session.

RO KHANNA: OK. Thank you.

DOUG LAMBORN: Representative Vazquez.

GABE VASQUEZ: Thank you, Mr. Chairman. Thank you to all the witnesses here today taking the time to be here with us this morning. Over the last several years, hypersonics have become an increasingly important strategic tool for the world's largest militaries to project power. While we've made progress in testing and development of hypersonics, we should continue to do more to make sure we're outpacing and out competing our adversaries.

It is imperative that the United States military has the necessary capabilities to defend ourselves and our allies. Built in design correctly hypersonic weapons can be valuable non-nuclear deterrent that will allow the United States to keep our adversaries at bay without threatening the outbreak of a nuclear conflict.

In my district, the second District of New Mexico, White Sands Missile Range and Holloman Air Force Base are leaders in testing and developing hypersonic weapons. Congress should ensure that our brave service members, researchers, support workers, and others have the resources they need to accomplish their mission, including the bases in my district.

So I thank you for today's discussion. My question – my first question is to Lieutenant General Rasch, Lieutenant General Shipton. Could you explain the role that White Sands Missile Range in Holloman Air Force Base play in the testing and development of the future of hypersonic weapons?

LG ROBERT RASCH: First, Congressman, thank you for the question. And

I've spent a lot of time at White Sands Missile Range in my previous job testing many munitions for – for the United States Army. And today still we – we use White Sands Missile Range and have used it for our program activities to date in sensitive munitions testing on several fronts as well as utilizing the processes that have been established by the great professionals out of that workforce for several decades.

With regards to larger scale hypersonic weapons testing, I think that actually would – would – would go to OSD R&D for discussion as it gets to the bigger discussion of test range development over – over a longer period of time. But – but we certainly use White Sands at every opportunity we can given the – the great work force in that area over.

LG DONNA SHIPTON: Sir, thank you for the question, but I'll have to take it for the record. My apologies.

GABE VASQUEZ: No problem. Thank you.

LG DONNA SHIPTON: Thank you.

GABE VASQUEZ: My next question here is since White Sands, Holloman Air Force Base, and other military installations in New Mexico are so necessary for the continued development research of hypersonics. My question is what additional resources does the military need to utilize a place like White Sands Missile Range and Holloman Air Force to achieve this next level of competitiveness and to make sure that the development is adequate for the future of these weapons?

And I'll give that question to anybody on the panel.

VA JOHNNY WOLFE: Yes, sir. So – so – so here I would say, first of all, thank you for the support that you've given us in this area. In the – in the FY '23 plus up that we were given, we've started a program called MultiService Advanced Capabilities for Hypersonics TestBed. As we've talked about test infrastructures, we've talked about, you know, our need to get these technologies developed quicker.

That money is being used for just what you're asking about. We're looking at a whole portion of industry where historically we would not have engaged to help us understand and certainly some of those capabilities, what we're looking at that we'll leverage, they actually use White Sands as kind of their home base.

There's others across other ranges. So we are opening up our aperture and with the support of Congress and the plus up that you've given us, that's exactly what we're doing to make sure we grow the base to be able to get after this problem.

GABE VASQUEZ: Thank you Mr. –

MICHAEL WHITE: I would just add that one of the key investments being made by the Test Resources Management Center is in the Holloman sled track to look at high speed testing at the Holloman sled track to enhance our ability to learn more about end game performance of hypersonic weapons and the way they perform against various threats.

So it's a very critical part of understanding the capability actually delivered by these weapons when they're fielded.

GABE VASQUEZ: Thank you both. I look forward to working with you all to bring those investments home to those two bases into our district. Mr. Chairman, I yield back.

DOUG LAMBORN: Thank you. Representative Houlihan.

CHRISSEY HOULAHAN: Thank you so much for the chance to talk to you all. I served in advanced plans and programs in the Air Force as a young person decades ago and have the background as an engineer and wondering if I might be able to use my open time to talk a little bit about the things that we've been focusing on in my office, which are specifically supply chain related and critical minerals and rare earth elements, composites, chips, alloys, those kinds of things which are very essential, not just in domestic products, but also in what we're talking about here today, hypersonic missiles.

And so Mr. White, if you wouldn't mind speaking a little bit about if you have any concerns about our access to or supply of critical minerals that we might need to produce these sorts of weapons or any other materials that you're worried about in terms of composites or chips or alloys? I notice of course that the president has implemented the Defense Production Act. Are you concerned about our access domestically to any of these particular products?

MICHAEL WHITE: Thank you for the question. I think it's really important as we field all of our future capabilities that we've described today that we ensure we've got domestic supplies for that capability. And we're not – we're not sourcing our supply chain from – from foreign sources, especially those who – who are potential adversaries.

The Defense Production Act that and the presidential determination recently really enables us to incentivize and invest in industry to accelerate their ability to deliver these capabilities. General Rasch mentioned that we have technologies that really are coming out of the laboratories, largely government laboratories that were transitioning to industry.

And so the real purpose for that there's – that presidential determination for

hypersonics is to really accelerate the pace at which industry can respond to our supply chain needs. And there also was a Defense Production Act that was supply chain focused for kinetic weapons, and that also is applicable to hypersonics.

So when we look at high temperature materials, when we look at advanced microprocessors, we look at air breathing propulsion, all those technologies and capabilities are enablers. And we have to make sure we have a robust supply chain, and even beyond that, a supply chain that can deliver capacity affordably.

So as we move out of the laboratory environment and into a production environment, we have to make sure

we're pulling in even nontraditional and commercial based industry practices and procedures to deliver affordable capacity moving forward.

CHRISSEY HOULAHAN: And would anyone else like to contribute to that first question? My second question is can you speak to any advantage that **China** or Russia might have in this area given they do in fact control mines in Africa, South America and even in their own countries? Mr. White?

MICHAEL WHITE: Can we save that for closed session.

CHRISSEY HOULAHAN: Of course. Of course. And my other question –

MICHAEL WHITE: I defer to my DIA colleague on that in a closed session.

CHRISSEY HOULAHAN: OK. My – my other question is for the closed environment. And so thank you. I yield back my time.

DOUG LAMBORN: Thank you. Representative Strong, did you want to ask any questions or do you want to wait till closed session? OK. And we are going into closed session almost immediately. I'll just clarify one thing. I said this in my opening statement. I quoted former Vice Chairman of the Chiefs Of Staff, General John Hyten, who said that hypersonic weapons enable quote, responsive, long range strike options against distant defended and or time critical threats when other forces are unavailable, denied access, or not preferred.

Showing that this fills a serious gap in our capabilities. Does anyone disagree with what General Hyten said? If so please raise your hand and I'll give you a moment. I'm taking it that you agree with General Hayden on this quote. OK. Thank you so much. We will now be –

DON BACON: Too late?

DOUG LAMBORN: Oh no, just in time. Representative –

DON BACON: [off-mic] Try to figure out how to do it.

DOUG LAMBORN: Representative, you didn't have enough stars to – Representative Bacon.

DON BACON: First question for Dr. Horowitz or Mr. White. Is there a need for a hypersonic weapon that can be fired from the United States that could have the range to hit Russia or **China**?

MICHAEL HOROWITZ: The – the department is currently planning to develop conventionally armed regionally based hypersonic weapons. We think the – the state of our – of our nuclear deterrent is strong. And from a – from a policy perspective, I'd defer to Assistant Secretary Plum's comments a few days ago to this committee.

DON BACON: Yeah. I think I might also say for the record, I think it's more destabilizing to have Russia and **China** have these weapons and does not have them. I don't think that helps us out at all by not – not fielding them. So I just wanted to point that out. I have a question here for Mr. White too. This relates to the current limitations in hypersonic flight test capacity.

Last week, the president announced the Defense Production Act authority for the hypersonic industrial base, but is it not clear to many of us how these individual hypersonic components technologies can be tested in flight at sufficient tempo to catch up with the pace **China** – **China** has right now given – given our limitations.

So is our national industrial base capable of performing flight tests or hypersonic components and technologies? And do you believe these new Defense Production Act authorities can or should be applied to help create a robust and healthy industrial base or hypersonic flight test?

MICHAEL WHITE: I think the answer to that question is yes and yes. I think industry can step up, but I think it's really critical that we as a government incentivize and accelerate their ability to do that. And we're doing that not only through Defense Production Act investments, but as well as manned tech investments, IVUS investments, and our test resources management centers, making considerable investments in the T and E infrastructure to enable all of that.

I mentioned earlier the next phase of our strategy and the importance of T and E in that next phase of our strategy. And I've given the team the charge of being able to do flight test once a week. And that's – that's quite – quite a quite a stretch from just a couple of years ago when we were testing once every two years.

We're at about once a month now, a little bit better than once a month. So we're on a good trajectory. And Admiral Wolfe mentioned the Mach TB program

where we're pulling in nontraditional methods and means and partners really in industry and government to try to develop the tools and techniques to achieve that rapid flight test pace to accelerate our learning moving forward.

DON BACON: Well, we look forward to that. That's great. General Rasch, I was – I can see the need for ground based hypersonics in Europe and Middle East. I don't understand how – how we're going to do it in the Far East or in the – or in the Pacific theater Given there's very little basing options that make sense.

I understand the – the sea launched or the air launched, but can you explain a little more? Do you think we'll have the ability to fuel these weapons that were – that are within range? How do we do this?

LG ROBERT RASCH: Congressman, thank you for your question. And unfortunately as the material developer, I don't necessarily get to make the stationing decisions for that. But – but given the quantities that the Army is currently prepared to – to procure for a total of three batteries supporting our multi-domain task force, those stationing decisions are ahead of us in the Army.

But we can take a question for record and get back a more formal Army position on that.

DON BACON: Appreciate it. Thank you. Mr. Freisthler, am I seeing your name right? What's the best way to say that?

PAUL FREISTHLER: Freisthler.

DON BACON: OK. Freisthler. I apologize. Are there plans to use hypersonic weapons to identify gaps and develop tactics, techniques, and procedures to keep the United States safe against hypersonic weapons?

PAUL FREISTHLER: I would defer to my esteemed colleagues to my right. We look at US systems, capabilities, tactics, et cetera.

DON BACON: I'll just close with a comment. I – I see a need for hypersonic weapons, but really concerned that **China** and Russia has them because they are destabilizing and we can't detect them. They're going to put – it appears they're going to put nuclear warheads on there. And from my vantage point, we could be targeted with weapons with like 15 minute warning times or less.

And this all comes back to nuclear command and control survivability for me. How do we ensure that we have a survivable command and control capability? And that's not a question for you all here, but that's – I think that's the number one thing we need to work on on the Armed Services Committee is ensuring that we have nuclear survivable C3. But thank you very much.

DOUG LAMBORN: We will now reconvene in five minutes up in room 2337

for our closed session. Thank you all for being here.

UNKNOWN: Thank you.