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MEMBERS' DAY HEARING: HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HEARING

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

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May 17, 2019

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MEMBERS' DAY HEARING: HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

FRIDAY, MAY 17, 2019

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Committee met, pursuant to notice, at 9:35 a.m., in room 2318 of the Rayburn House Office Building, Hon. Eddie Bernice Johnson [Chairwoman of the Committee] presiding.

Chairwoman JOHNSON. The hearing will come to order. Without objection, the Chair is authorized to declare a recess at any time. Good morning to all. I'd like to welcome everyone to the Members' Day Hearing for the Committee on Science, Space, and Technology for the 116th Congress. Today's Members' Day Hearing gives Members, including not on the Committee, the opportunity to come before us and discuss proposed legislation, or simply discuss interests and priorities under the Committee's jurisdiction. We have four Members before us today, if the next two will come. We also had Members submit testimony for the record.

Mr. Lipinski provided testimony on his bill, H.R. 2202, the *Growing Artificial Intelligence through Research Act*. Mr. Weber's written statement discusses his forthcoming bill, the *Nuclear Energy Research Infrastructure Act*. And Dr. Foster's testimony covers an assortment of topics within our legislative jurisdiction, including the importance of national laboratories, perils of human genetic engineering, the need for investment in artificial intelligence, and priorities for NASA (National Aeronautics and Space Administration) funding. That testimony will be entered into the record and has previously been distributed to all Committee Members.

[The statement of Mr. Lipinski follows:]

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COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
RESEARCH AND TECHNOLOGY, RANKING MEMBER

May 15th, 2019

Congressman Lipinski Statement for the Record for Member Day

Thank you Chair Johnson for organizing this important Member day event to get Members' input on their Science, Space, and Technology priorities. I appreciate the opportunity for SST Members to work with the Committee on their priorities. While I have many priorities in this area, I wanted to highlight one today, growing and coordinating federal Artificial Intelligence research. My Congressional district, Illinois' 3rd, is home to Argonne National Laboratory, which is currently building one of the fastest, if not the fastest, supercomputers in the world. Additionally, my district benefits from access to the many universities in the northern Illinois region, many of which contain artificial intelligence expertise. I often hear from my constituents and our neighbors throughout the state of Illinois about how artificial intelligence is already used to do wonderful things like improve weather forecasting and design drugs. However, I also hear a lot of fear from my constituents; fear that they don't have requisite skills to keep up with rapid AI advancements in the workplace, or that devices using AI developed offshore may have malicious intent.

We are already in a global race to build effective AI, and we need a long term, coordinated plan with committed resources to retain U.S. leadership. This is why I've already introduced H.R. 2202, the Growing Artificial Intelligence Through Research Act, which would improve federal coordination and fortify AI research, infrastructure, and education through NIST, DOE, and NSF.

I look forward to working with my colleagues on the Committee to further develop AI legislation to meet this challenge.

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[The statement of Mr. Weber follows:]

Energy Subcommittee Ranking Member Randy Weber
Statement
Members' Day Hearing
9:30 a.m. Friday, May 17, 2019

Science Committee Colleagues, after my many years of championing this cause on the Energy Subcommittee, it should come as no surprise to you all that I am here today in support of advanced nuclear energy technology. More specifically I am here to testify on behalf of my draft bill, the Nuclear Energy Research Infrastructure Act.

Over the past four years, the Science Committee has held hearings, met with stakeholders, and worked extensively with our colleagues in the Senate to draft S. 97, the Nuclear Energy Innovation Capabilities Act (NEICA), which became law in September, 2018. I'm incredibly proud of this comprehensive, bipartisan authorization bill, and believe it sets the appropriate direction and program priorities for the Office of Nuclear Energy.

A key part of that bill was the authorization of a research reactor, known as the Versatile Test Reactor.

This facility is crucial for the development of advanced reactor designs, materials, and nuclear fuels. While modeling and simulation can accelerate R&D, nuclear energy research must be validated through a physical source, like a research reactor. This type of research requires access to fast neutrons – which are currently only available for civilian research in Russia.

The bill I am testifying on today – the Nuclear Energy Research Infrastructure Act – will build upon the bipartisan successes of NEICA by providing additional direction to DOE as they implement this law. This draft legislation authorizes specific funding from within the DOE Office of Nuclear Energy for the construction of the Versatile Neutron Source and sets a defined start date for full operation of this facility by December 31, 2025. This legislation passed the House last Congress with bipartisan support, and I look forward to introducing an update version of this legislation in the coming weeks.

Building this open-access user facility in the DOE national lab system will facilitate secure and efficient advanced nuclear energy research across the United States. The access to fast neutrons this reactor provides can support private sector development of the next generation materials and fuels needed for advanced nuclear reactor technology. The Versatile Neutron Source will also enable the Nuclear Regulatory Commission (NRC) to verify data on new fuels, materials, and designs more efficiently, expediting regulatory approval for American advanced nuclear reactors.

Without this user facility, this research simply will not take place. In order to maintain our leadership in nuclear power, the United States must continue developing cutting edge technology here at home. We cannot afford to miss the economic opportunity provided by next generation nuclear technology, and we can't let our best scientists and engineers go overseas.

The updated version of my legislation also includes new language, addressing nuclear research infrastructure at the National Institute of Standards and Technology (NIST). The Institute currently operates the NIST Center for Neutron Research (NCNR), which is one of two reactor-based neutron sources in the United States. NCNR provides both thermal energy neutron beams from the heavy water or graphite moderators, and low energy neutrons from a liquid hydrogen moderator, or cold source. This facility allows 1700 researchers per year to conduct measurements for a broad range of scientific research, including biology, materials science, chemistry, engineering, and physics.

But after 50 years, the reactor that powers this facility is aging – and any upgrade of the NCNR would require complete closure of the facility for several years, leaving the U.S. with only one reactor-based neutron source to meet the needs of the scientific community.

In a 2018 assessment, the National Academies recommended that NIST commission a detailed assessment of the existing facility and begin the conceptual design of a new reactor. This would allow NIST to determine the lifespan of their existing facility, while taking the necessary steps to plan and invest in a next generation facility. My legislation authorizes both important steps forward and will help maintain American leadership in this critical neutron science.

The Nuclear Energy Research Infrastructure Act is a commonsense bill that will maintain American leadership in nuclear science and power. By authorizing funding for the construction of these research facilities, we will fortify the U.S. commitment to safely advancing nuclear energy and discovery science.

I want to thank Chairwoman Johnson for cosponsoring this important legislation last Congress, and for her leadership in advocating for nuclear energy research and development.

It is my hope that she – and our Science Committee colleagues on both sides of the aisle – will consider cosponsoring this legislation in the 116th Congress.

[The statement of Mr. Foster follows:]

Written Testimony for the Science, Space, and Technology Committee
Member's Day Hearing
Congressman Bill Foster (IL-11)
Friday, May 17, 2019

Thank you, Chairwoman Johnson, for the opportunity to submit written testimony for the Member's Day Hearing for the Science, Space, and Technology Committee. My written testimony will touch on five topics that I hope the Committee will consider: the importance of our National Laboratories in maintaining a strong U.S. science and technology enterprise; the promise, peril, and need for international regulation of human genetic engineering; accelerating investments in Artificial Intelligence; examining the potential of advanced nuclear technology, including reactors which are "walk-away safe" and have the potential to burn existing nuclear waste; the need to rebalance NASA's efforts between repetitive demonstration projects using already-proven technology versus the development of transformational technologies which would dramatically lower the cost of space exploration; the need for detailed cost estimates and a coherent plan for returning to the Moon by 2024 and traveling to Mars by 2030; the importance of NASA establishing an R&D program space power reactors that do not use weapons-grade uranium.

1. The Importance of our National Laboratories in the U.S. S&T Enterprise

Despite the fact that over half of U.S. economic growth since World War II has been driven by science and technology, federal investments in R&D are at a historic low, comprising less than four percent of the federal budget. I believe that scientific research is the foundation for the innovative solutions that will enable us to overcome many of our greatest challenges, from economic stagnation and dependence on foreign energy to curing diseases and addressing threats to our national security.

In particular, our National Laboratories tackle the critical scientific challenges of our time, allowing the U.S. to maintain its position as the global leader in science and technology. The labs possess unique instruments and facilities, many of which are found nowhere else in the world. Without these critical facilities, tens of thousands of users could be forced to move their job-creating research activities overseas or terminate their research altogether. In addition, the National Labs employ over 55,000 scientists, engineers, and support staff and are critical components of regional economies, having forged strong partnerships with universities and industry. Continued investment in these vital capabilities will help the U.S. maintain our competitive advantage as the global leader in science and technology and grow our economy.

2. The Promise, Peril, and Need for International Control of Human Genetic Engineering

Early hearings of the House Science Committee played a significant role as prominent members of the scientific community came together to warn our leaders that our legal system and society are not prepared for the discovery of CRIPSR and related gene-editing tools. This technology – discovered in 2012 – is the already providing benefits by accelerating scientific research and treating genetic diseases. For example, sickle-cell disease is now being cured by replacing the bone marrow of someone suffering from this disease a with a genetically-modified version of their own marrow with the genetic defect removed.

The dangers of uncontrolled use of this technology were revealed last year as a rogue scientist in China announced that he had used this technology to genetically modify a human child. Other applications of this technology such as Gene Drives to control invasive and nuisance species must be carefully regulated and controlled before use. It is my hope that we can work together to ensure safety without erecting barriers to research that would prevent us from curing disease. Just as the advancement of science does not respect international borders, our conversations about what we do with those breakthroughs must be expansive and inclusive. This is a conversation that needs to happen domestically and internationally.

For this to succeed, I feel it is important that the beneficial side of CRISPR be the first that the public and especially those in government hear. Continued hearings of the House Science Committee on this subject could play an important role in that discussion. Lawmakers have a tendency to be short-term thinkers and we need to avoid a political over-reaction that could jeopardize the research that is still needed to bring this technology from breakthrough to treatment. In particular, we need to ensure that, should we agree that a legal moratorium on germline editing is the necessary step forward, that things like in vivo treatments do not get caught up in that ban. With the increasingly real possibility that CRISPR and tools like it could yield cures to multiple diseases within our lifetime, we also must guarantee that treatments are not reserved only for the rich and the privileged in our world.

3. Accelerating investments in Artificial Intelligence

Recent breakthroughs in the performance of Artificial Intelligence (AI) algorithms based on neural networks are leading to wide ranging applications across science and technology. They are being applied to fields as diverse as social sciences, signal processing in astronomy, to the discovery of new chemical catalysts. It is important that the House Science Committee highlight the importance of this work and support the development of this field, both by supporting workforce development and access to state-of-the-art AI data processing facilities by researchers.

4. Examining the Potential of Advanced Nuclear Technology

There is bipartisan and bicameral interest in accelerating investment in advanced nuclear reactors which are "walk-away safe", promise lower cost, are proliferation resistant, and have the potential to burn or minimize nuclear waste. These may be essential to provide carbon-free low-cost electrical power in the U.S. and in countries where renewable wind and solar is not a realistic possibility. The House Science Committee should continue its role in supporting the development of these technologies. One specific useful step would be to provide a platform for proponents to discuss the potential advantages of each technology, in terms of cost, safety, proliferation resistance, and residual nuclear waste.

5. Rebalancing NASA's R&D Portfolio

Over time, a large fraction of NASA's efforts and budget have shifted towards repetitive demonstration projects using already-proven technology. The chemical rockets being proposed for return trips to the Moon and voyages to Mars would be completely understandable to Wernher von Braun. I believe that it is crucial that a larger part of NASA's budget be devoted to the development of transformational technologies which would dramatically lower the cost of space exploration. Examples of this include electromagnetic launch systems, material development for Space Elevators, laser-assisted rocket propulsions, and other such innovative concepts. The country that first succeeds at proving a technology to dramatically lower the cost of launching objects into Low Earth Orbit will own the future of space travel.

Autonomous robotics will play a larger and larger role in lowering the cost of both manned and unmanned space exploration. NASA should accelerate its efforts to remain at the forefront of these developments, which will have large spin-off benefits to the terrestrial economy and the possibility of exciting the next generations of space enthusiasts. The House Science Committee should support NASA in expanding its efforts in this area.

6. The Need for Detailed Cost Estimates and a Coherent Plan for Returning to the Moon by 2024 and Traveling to Mars by 2030

Rational planning of the space program by Congress requires at least rough estimates of the cost of potential alternatives. Just after the FY20 President's Budget Request was released, NASA changed its plans to accelerate the planned return to the Moon by four years to 2024. NASA finally released its updated budget request this week, which calls for nearly $1.9 billion in additional funding for developing lunar landers and accelerating work on the Space Launch System and Orion, exploration technology development, and additional science missions to the moon. That increase would be offset by cutting funding for the lunar Gateway by $321 million and other Federal programs, most notably, Pell Grants. Moving past the absurdity of cutting

education funding that could produce our future NASA scientists and engineers in order to move up the landing to an arbitrary date, I want to focus on the lack of transparency associated with NASA's plan. Administrator Bridenstine has said the additional $1.9 billion is a "down payment",[1] meaning we do not know how much it will ultimately cost and how exactly NASA plans to accomplish it. This is why I am asking the Committee to direct NASA to release a detailed plan and cost estimate for their 2024 return to the Moon, as well as rough cost estimates for future trips to Mars.

7. The Importance of NASA Establishing an R&D Program for Space Power Reactors that do not use Weapons-Grade Uranium.

NASA has primarily powered its deep space probes with radioisotope thermoelectric generators (RTGs) using Pu-238. It has recently been increasing efforts to develop fission reactors, which can provide both propulsion and power. NASA is currently developing nuclear thermal propulsion (NTP) systems using low-enriched uranium (LEU), and nuclear reactor power systems using highly-enriched weapons-grade uranium (HEU).

If all the spacefaring nations start using HEU reactors, then it would involve the utilization of a significant amount of weapons-grade material. Also, no plan has been developed on what will happen to the reactor once it is placed in orbit or on the Moon or another planet – will it be kept secure? How? Is there a plan for its deactivation and decommissioning? These are a few of the many issues the agency needs to address before it moves forward to the deployment stage of its HEU power reactor.

NASA has been lagging in its efforts to develop space-qualified reactor power system designs using LEU. If the U.S. develops such a design, it is reasonable to believe it would be adopted as a de facto standard by other spacefaring nations. There is also significant commercial interest in LEU reactors. At this time, it does not appear that NASA is devoting any resources to developing a power reactor using LEU, despite available appropriations. I urge the Committee to shed light on this important issue.

[1] https://spacenews.com/nasa-seeks-additional-1-6-billion-for-2024-moon-plan/

Chairwoman JOHNSON. I'd like to welcome our colleagues testifying before us today, and we look forward to hearing your thoughts on these very important policy areas. It is my desire to have this Committee work in a bipartisan manner because we must all work together to tackle the many challenges in our jurisdiction, including science education, energy research, national competitiveness, and climate change.

[The prepared statement of Chairwoman Johnson follows:]

Good morning. I would like to welcome everyone to the Members' Day Hearing for the Committee on Science, Space, and Technology for the 116th Congress. Today's Members' Day Hearing gives Members, including those NOT on the Committee, the opportunity to come before us and discuss proposed legislation, or simply discuss interests and priorities under the Committee's jurisdiction.

We have four Members before us today to testify on a variety of policy areas and bills. We also had Members submit testimony for the record. Mr. Lipinski provided testimony on his bill H.R. 2202—the *Growing Artificial Intelligence through Research Act*. Mr. Weber's written statement discusses his forthcoming bill—the *Nuclear Energy Research Infrastructure Act*. Dr. Foster's testimony covers an assortment of topics within our legislative jurisdiction, including the importance of national laboratories, perils of human genetic engineering, the need for investment in artificial intelligence, and priorities for NASA funding. Their testimony will be entered into the record and has previously been distributed to all Committee Members.

I would like to welcome our colleagues testifying before us today. We look forward to hearing your thoughts on these very important policy areas. It is my desire to have this Committee work in a bipartisan manner, because we must all work together to tackle the many challenges in our jurisdiction including science education, energy research, national competitiveness, and climate change.

Chairwoman JOHNSON. I will now ask Mr. Lucas if he'll have an opening statement.

Mr. LUCAS. Thank you, Chairwoman Johnson, for holding this Members' Hearing, and thank you to my colleagues who are joining us today to testify about their priorities for the Committee this year. The Science Committee has jurisdiction over some of the most interesting aspects of our government, including research, energy, technology development, space flight. I welcome my colleagues' thoughts on these issues, and I look forward to your testimony, and I would simply note, as I yield back to the Chairlady, that that spirit of bipartisanship, and the effort with which we've all worked together, has gone amazingly smooth, and I very much appreciate her efforts. Yield back, Madam Chair.

Chairwoman JOHNSON. Thank you very much. Now, if there are Members who wish to submit additional opening statements, your statements will be added to the record at this point.

Now to our testifying colleagues: We will have one panel, and each of you will have 5 minutes for testimony. When you have all completed your testimony, we will then open the floor to questions from all attending Members of the Committee. We will begin with Mr. Norman, and you may begin your testimony.

STATEMENT OF HON. RALPH NORMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF SOUTH CAROLINA

Mr. NORMAN. Thank you so much, Chairman Johnson, and Ranking Member Lucas. Thank you all for having this. It's a little bit weird sitting on this side of the aisle, but thank you for having this. I have a special heart for veterans. I'm like many of you, you

have a lot of veterans serving in the individual districts, so it's my honor to be able to present what I think is a great bill that can be bipartisan, and one that benefits all.

My bill is H.R. 617, the *Department of Energy Veterans' Health Initiative Act*. This legislation authorizes a partnership between the Department of Energy (DOE) and the VA (Veterans Administration) in order to facilitate research on high-priority healthcare needs of the VA, further research on artificial intelligence, and to advance our Nation's Big Data science. And I might add that this was requested by both the VA and the Department of Energy. The VA is good on a lot of things, but what the VA is lacking is the ability to have information stored. They don't have the computers to do it, and that's why the DOE has that, and both of them requested it.

I introduced this bill last Congress, and was thrilled to see it pass the House unanimously. I was proud to reintroduce the bill again this Congress, and was glad to see that it retained bipartisan support. I'm grateful to the many Members of this Committee who co-sponsored this legislation, including the continued support from Ranking Member Lucas, and my friend across the aisle, Mr. Lipinski.

Even more encouraging for our Nation's veterans is that Senator Ernst introduced a bipartisan Senate companion to my bill. Under the VA Voluntary Data Collection Program, the Million Veterans Program, the VA has collected detailed health information and geonomic data volunteered by over 600,000 veterans. They volunteered this information. However, the interagency partnership authorized by my bill is necessary to analyze this data, and ultimately provide better care for our Nation's veterans. The DOE has the capability to securely store and analyze this data based on its robust research in computational sciences and data analytics. In addition, the DOE national labs have 6 of the world's top 10 fastest supercomputers, which I did not realize until I started doing this, which includes having the world's fastest supercomputer.

If we're able to sign this legislation into law, then supercomputers would be used to analyze VA health data and look for patterns that will help improve the medical treatments for our heart disease, traumatic brain injury, and cancer. While this alone should warrant consideration of the bill, because we should be taking any steps possible to improve the medical care of our men and women who answered the call to serve, and were willing to make the ultimate sacrifice, this partnership would also benefit the DOE. Analyzing the complex health data will allow our scientists to remain leaders in advanced computing, and allow for the development of computing tools necessary to address Big Data in the future. This legislation also includes a critical pilot program to help the DOE develop infrastructure to support other interagency partnerships, allowing the Department to help other Federal agencies to tackle similar problems.

Chairwoman Johnson, I urge you to rise to the occasion and make the needs of our veterans, and the potential to improve their medical care, a top priority, which I know is the case. With the passage of this bill, we will be able to show the country that, regardless of our differences, there is still common ground, and pro-

viding better care for our veterans is a place we can come together and agree, because the men and women of our armed forces keep us all safe, regardless of our political party. By supporting this bipartisan legislation, we are showing our veterans and the Nation that we can work together for the greater good. I encourage my colleagues to support this bill. It's a bill that promises to improve our veterans' ability to access better healthcare services, and challenge our scientists so that they can remain the world's leader in advanced computing. Thank you so much.

[The prepared statement of Mr. Norman follows:]

Statement of Oversight Ranking Member Ralph Norman
Members' Day Hearing
9:30 a.m. Friday, May 17th, 2019

Good morning. Thank you Chairwoman Johnson for holding this Member Day and allowing me the opportunity to speak on behalf of my bill H.R. 617, The Department of Energy Veterans' Health Initiative Act.

I introduced this bill last Congress and was thrilled to see it pass the House unanimously. I was proud to reintroduce the bill again this Congress and was glad to see that it retained bipartisan support. I am grateful to the many members of this Committee who cosponsored this legislation, including the continued support from across the aisle, of Mr. Lipinski. Even more encouraging for our nation's veterans is that Senator Ernst introduced a bipartisan Senate companion to my bill.

This legislation authorizes a partnership between the Department of Energy (D-O-E) and the Department of Veterans Affairs (VA) in order to facilitate research on the high priority health care needs of the VA, artificial intelligence, and big data science.

Under the VA's voluntary data collection program, the Million Veterans Program, the VA has collected detailed health information and genomic data volunteered by over six hundred thousand veterans.

However, the interagency partnership authorized by my bill is necessary to analyze this data and ultimately provide better care for our nation's veterans. The DOE has the capability to securely store and analyze this data based on its robust research in computational sciences and data analytics. In addition, the DOE national labs have six of the world's top ten fastest supercomputers, including the world's fastest super computer.

If we are able to sign this legislation into law, then these supercomputers would be used to analyze VA health data and look for patterns that will help improve the medical treatments for heart disease, traumatic brain injury, and cancer.

While this alone should warrant consideration of the bill, because we should be taking any step possible to improve the medical care of our men and women who answered the call to serve and were willing to make the ultimate sacrifice, this partnership would also benefit the DOE. Analyzing the complex health data will allow our scientists to remain leaders in advanced computing and allow for the development of computing tools necessary to address big data challenges in the future. This legislation also includes a pilot program to help DOE develop infrastructure to support other interagency partnerships, allowing the Department to help other federal agency tackle similar complex problems.

I encourage my colleagues to support this bill – a bill that promises to improve our veterans' ability to access better health care services and challenge our scientists so that they remain world leaders in advance computing.

Thank you.

Chairwoman JOHNSON. Thank you very much. We'll move now to Dr. Babin.

STATEMENT OF HON. BRIAN BABIN,
A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF TEXAS

Mr. BABIN. Yes, ma'am. Thank you, Madam Chair. I appreciate you, and Ranking Member Lucas. Good to be with you this morning. And I want to thank the rest of my SST colleagues as well for allowing me the opportunity to address all of you this morning. I'm very proud to serve as both the Ranking Member on the Space and Aeronautics Subcommittee, and also on the Environmental Subcommittee. And with the limited time that I have, I would like to lay out a few of my priorities, and encourage the Committee to work together to accomplish as many of these as possible in this Congress.

Our Nation's space arena, whether it be in commercial, civil, or defense, is growing exponentially. We, this Committee, are faced with challenges that set the stage for us to lead the discussion on how to navigate this growth and to maintain, or better yet, to grow, America's role as the world's pre-eminent spacefaring nation. To do that, I believe that we need to focus on three different areas.

First, we must re-evaluate the way that we regulate commercial space activities. As a Committee, we should be encouraging the creation of conditions for economic growth and opportunity right here, not making it so hard to participate that we push high tech, space-focused companies abroad. In the 115th Congress, the House passed the *American Space Commerce Free Enterprise Act* (ASCFEA). That would've accomplished this very goal, while streamlining the bureaucracy into a one-stop shop at the Department of Commerce, all while maintaining our compliance with the Outer Space Treaty. This Committee unanimously approved the ASCFEA last Congress, before we sent it to the floor, where it passed without opposition. Let's do it again.

Second, as access to space continues to increase, so does the need for more significant steps to be taken in terms of space safety, specifically, issues relating to space situational awareness and space traffic management, but also with regard to how we investigate accidents.

And third, thanks in large part to the leadership of this Committee in years past, the United States is now closer than ever to launching American astronauts on American rockets from American soil. And couple that with this Administration's ambitious plans to return to the moon by 2024, the Science, Space, and Technology Committee is going to have its hands full in ensuring that we accomplish the goal of a sustainable presence on the moon as we push outward to Mars, and eventually beyond. All of this, while also being responsible stewards of the taxpayers' dollar.

And I represent Johnson Space Center (JSC) in Houston, which is the lead NASA center for human space exploration. The International Space Station, which is managed out of JSC, is a test bed for technologies and capabilities that will make the goals of pushing outward possible. Last Congress I introduced the *Leading Human Space Flight Act*, which recognizes the importance of a per-

manent and continuous U.S. human presence in low-Earth orbit, and directs NASA to work with the private sector in developing commercial capabilities to meet our future needs there. My bill also authorizes NASA to operate the ISS (International Space Station) until 2030, or until a sustainable lower cost alternative is demonstrated. The *Leading Human Space Flight Act* maintains our national capabilities to manage space operation and space integration, spacesuit development, and habitat integration as we return to the moon, and push outwards to Mars.

I ask that the Committee work with me as I work to advance this legislation again in this Congress. I'm very proud to have served as the Chairman of the Space Subcommittee last Congress, and I'm very honored to continue as the Ranking Member now. NASA has accomplished unbelievable things in the last 60 years, and I wholeheartedly believe that the next 60 will be even more impressive for the American space enterprise as a whole, to include NASA, and I look forward to working with each one of you on this Committee to ensure that we here at SST play an indispensable role in that. I will be reintroducing these bills soon, and seeking co-sponsors.

I know I'm short on time, but I'd be remiss if I didn't touch on my role as the Subcommittee on Environment. Regardless of party, environmental policy is of universal importance, and I welcome these often polarizing conversations, but I'm very certain that when we decide to work together, we will accomplish significant achievements, like leading the world in weather prediction, which should be a great priority. We have the privilege of having some incredibly unique topics under our jurisdiction, from cybersecurity, to protecting our Nation's proprietary data, to artificial intelligence and hypersonics, to weather prediction, and the human and scientific exploration of our galaxy. We work on turning the science fiction of today into the technology of tomorrow.

I look forward to working together with both sides of the dais to ensure that we at SST maintain jurisdiction on issues like space launch, accident investigation, remote sensing, or anything else that others have publicly or privately made a claim to. Let us always be inspired by the profound words on the wall back behind where you're sitting. And, quoting from Proverbs 29:18, "Where there is no vision, the people perish". Once more, I'm proud to serve with each of you, and look forward to working together with all of you in the 116th Congress. Thank you.

[The prepared statement of Mr. Babin follows:]

SST Committee Member Day Hearing
Rep. Brian Babin (TX-36)
17 May 2019

Thank you, Mrs. Johnson for allowing me the opportunity to address all of you today. I am proud to serve as both the Ranking Member on the Space and Aeronautics Subcommittee, and also on the Environment Subcommittee. With the limited time I have, I would like to lay out a few of my priorities and encourage the Committee to work together to accomplish as many of these as possible this Congress.

Our nation's space arena - whether it be in commercial, civil, or defense - is growing exponentially. We, this Committee, are faced with challenges that set the stage for us to lead the discussion on how to navigate this growth and maintain – or better yet, grow - America's role as the world's preeminent space fairing nation.

To do that, I believe we need to focus on three areas:

First: we must re-evaluate the way we regulate commercial space activities. As a committee, we should be encouraging the creation of conditions for economic growth and opportunity right here - not making it so hard to participate that we push high-tech, space-focused companies abroad. In the 115th Congress, the House passed the American Space Commerce Free Enterprise Act that would have accomplished this goal while streamlining the bureaucracy into a one-stop shop at the Department of Commerce. All while maintaining our compliance with the Outer Space Treaty. This Committee unanimously approved the ASCFEA last Congress before we sent it to the floor where it passed without opposition. Let's do it again.

Secondly: as access to space continues to increase, so does the need for more significant steps to be taken in terms of space safety — specifically, issues relating to Space Situational Awareness and Space Traffic Management, but also with regard to how we investigate accidents.

And third: thanks - in large part - to the leadership of this Committee in years past, the United States is closer now than ever to launching American Astronauts, on American rockets, from American soil. Couple that with this Administration's ambitious plans to return to the Moon by 2024, the Science, Space, and Technology Committee is going to have its hands full in ensuring we accomplish the goal of a sustainable presence on the Moon as we push outward to Mars and eventually beyond. All of this, while also being responsible stewards of the taxpayer's dollar.

I represent the Johnson Space Center, which is the lead NASA center for human space exploration. The International Space Station - which is managed out of JSC - is a testbed for technologies and capabilities that will make the goals of pushing outward possible. Last Congress, I introduced the Leading Human Spaceflight Act which recognizes the importance of a permanent and continuous U.S. human presence in LEO and directs NASA to work with the private sector in developing commercial capabilities to meet our future needs there. My bill also authorizes NASA to operate the ISS until 2030 - or until a sustainable lower cost alternative is demonstrated. The Leading Human Spaceflight Act maintains our National capabilities to manage space operation and program integration, space suit development, and habitat integration as we return to the Moon and push towards Mars. I ask that the committee works with me as I work to advance this legislation again this Congress.

I am proud to have served as the Chairman of the Space Subcommittee last Congress and am honored to continue as the Ranking Member now. NASA has accomplished unbelievable things in the last 60 years, and I whole-heartedly believe that the next 60 will be even more impressive for the American Space Enterprise as a whole, to include NASA - I look forward to working with all of you on this Committee to ensure that we - here at SST - play an indispensable role in that.

I would be remiss if I didn't touch on my role with the Subcommittee on Environment. Regardless of party, environmental policy is of universal importance. I welcome these often-polarizing conversations, but I am certain that when we decide to work together we will accomplish significant achievements - like leading the world in weather prediction.

We have the privilege of having some incredibly unique topics under our jurisdiction. From cybersecurity to protecting our nations proprietary data, to artificial intelligence and hypersonics, to weather prediction and the human and scientific exploration of our galaxy - we work on some incredibly exciting things. I look forward to working together with both sides of the dais to ensure that we, SST, maintain jurisdiction on issues like space launch accident investigation, remote sensing, or anything else that others have publicly - or privately - made a claim on. Once more, I'm proud to serve with each of you and look forward to working together in the 116th Congress.

Thank you.

Chairwoman JOHNSON. Thank you very much. We'll go to Mr. Sherman.

STATEMENT OF HON. BRAD SHERMAN,
A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF CALIFORNIA

Mr. SHERMAN. Thank you. It's been a pleasure to rejoin the Committee after a decade of absence. I believe that science will transform our lives even more this century than it did last century. If someone's describing what the future will be 30 years from now, and they paint a picture that you think looks like a science fiction movie, they might be right, they might be wrong. But if somebody paints a picture that doesn't look like a science fiction movie, you know they're wrong. We're going to be living in a science fiction movie. We just don't know which one yet.

There is an issue, something in the world more explosive than nuclear fusion, and that is intelligence. After all, it is intelligence that allows us to develop nuclear fusion. We now have two groups of scientists working to develop new levels of intelligence. They are the computer engineers on the one hand, and the bioengineers on the other. The last time a new higher level of intelligence appeared on this planet is when our ancestors said hello to the Neanderthal. We then said goodbye to the Neanderthal. As we develop intelligent computers, we will find them useful tools. As we find them useful tools, we will use those tools to develop faster and smarter computers.

We had a hearing in this room, in 2003 in which experts said that computers would reach human intelligence within 25 years. I think they might have been a little premature. Might be 30, might be 35 years from 2003, which means next decade, or the decade after. There are those who say that even if a computer is intelligent and malevolent, it's in a box, and can't affect the world. But I believe there are those of our species who would sell hands to the Devil in return for a good stock tip. What I do draw solace from is that computers may be intelligent, but that does not mean they'll be self-aware or ambitious. By ambitious I mean a desire to protect themselves, expand and affect the world so that they can do that. My computer doesn't seem to care whether I turn it off or disassemble it. A mouse does.

That leads us to the next form of enhanced intelligence, and that is what the bioengineers are doing. They can start with human DNA, and we're alarmed by what happened in China, where the CRISPR technology was used to create a "designer baby," and they could also start with the DNA of some other mammal. DNA is inherently ambitious. Those microbes that didn't seek to replicate and survive, didn't. So you could view this as a contest between the bioengineers and the computer engineers to see who will be first in developing super-intelligence. Will our successor species be carbon-based or silicon-based?

What should this Committee do? Most immediate is the area of artificial intelligence. We fund it, we develop it, we authorize it, the U.S. Government is critical to it. And as we develop smarter and smarter computers, we should direct 1 or 2 percent of the effort to preventing self-awareness, ambition, self-initiative, and autonomy.

This should be done both by requiring that those who do research in AI have separate studies focused on that, and build it in. Otherwise, they'll pay lip service to this issue, but they'll focus on the immediate issue—thing they're trying to do. When it comes to genetic engineering, we should prohibit any effort to increase the intelligence of any life form. I don't care if they create a fatter cow, or a leaner cow. I do not want to eat a smarter cow, let alone what can be done to create levels of intelligence either above that of a human being or just below.

Finally, we had hearings in Foreign Affairs that I chaired last decade on using the *Non-Proliferation Act* as a plan to deal with this internationally, but I think that the U.S. has to develop its own standards before we'll be effective in dealing with the world. I chair the Asia Subcommittee now, and I talked facetiously with a Chinese Foreign Ministry official. I told him that the computers that displace humankind will be created in California, not Shanghai, therefore, America wins. No, I don't reach that conclusion. It was a facetious one. So I look forward to working on this Committee to make sure that, as we move forward with these two important areas of scientific development, artificial intelligence and genetic engineering, that we have the appropriate controls, and that we do not create a replacement species without even thinking about it. And I yield back.

[The prepared statement of Mr. Sherman follows:]

Engineered Intelligence: Creating a Successor Species

Congressman Brad Sherman

Statement for the Committee on Science, Space, & Technology

May 17, 2019

I believe that the impact of science on this century will be far greater than the enormous impact science had on the last century.

As futurist Christine Peterson notes: "If someone is describing the future 30 years from now and they paint a picture that seems like it is from a science fiction movie, they might be wrong. But, if someone is describing the future a generation from now and they paint a picture that doesn't look like a science fiction movie, then you know they are wrong." We are going to live in a science fiction movie, we just don't know which one.

There is one issue that *I* think is more explosive than even the spread of nuclear weapons: engineered intelligence. By that I mean, the efforts of computer engineers and bio-engineers who may create intelligence beyond that of a human being.

In testimony at the House Science Committee[1], the consensus of experts testifying was that in roughly 25 years we would have a computer that passed the Turing Test[2], and more importantly, exceeded human intelligence.

As we develop more intelligent computers, we will find them useful tools in creating ever more intelligent computers, a positive feedback loop. I don't know whether we will create the maniacal Hal from *2001*, *or* the earnest Data from *Star Trek* --- or perhaps both.

"We are going to live in a science fiction movie, we just don't know which one."

There are those who say don't worry, even if a computer is intelligent and malevolent --- it is in a box and it cannot affect the world. But I believe that there are those of our species who sell hands to the Beelzebub, in return for a good stock tip.

I do draw solace from the fact that just because a computer is intelligent, or even self-aware, this does not mean that it is ambitious.

By ambitious, I mean possessing a survival instinct together with a desire to affect the environment so as to ensure survival, and often a desire to propagate or expand. My washing machine does not seem to care whether I turn it off or not. My pet mouse does seem to care. So even a computer possessing great intelligence may simply have no ambition, survival instinct, or interest in affecting the world.

DARPA[3] is the government agency on the cutting edge of supercomputer research. I have urged DARPA to develop computer systems designed to maximize the computer's utility, while avoiding self-awareness, or at least ambition.

Bio-engineers may be able to start with human DNA and create a 2,000 pound mammal with a 300 pound brain designed to beat your grandkids on the LSAT. No less troubling, they might start with canine DNA and create a mammal with sub-human intelligence, and no civil rights.

DNA is inherently ambitious. Those microbes which didn't seek to survive or replicate, didn't. Birds seem to care whether they or their progeny survive, and they seek to affect their environment to achieve that survival.

In any case, you have the bio-engineers and the computer engineers both working toward new levels of intelligence. I believe in our lifetime we will see new species

possessing intelligence which surpasses our own.

The last time a new higher level of intelligence arose on this planet was roughly 50,000 years ago. It was our own ancestors, who then said hello to the previously most intelligent species, Neanderthals. It did not work out so well for the Neanderthals.

"Will our successors be carbon-based or silicon-based?"

I used to view this as a contest between the bio-engineers and the computer engineers (or if you use the cool new lingo, wet nanotechnology and dry nanotechnology), in an effort to develop a new species of superior intelligence. I felt that the last decision that humans would make would be whether our successors are carbon-based or silicon-based:[4] the product of bio-engineering or of computer engineering.

Now I believe we are most likely to see combinations that will involve nature, computer engineering, and bio-engineering: humans with pharmaceutical intelligence boosters; DNA enhancements; computer-chip implants; or all three.

First, this will be used to cure disease, then to enhance human capacity. The enhanced-human will precede the trans-human.

Now how should we react to all of this? It is important that we benefit from science, even as we consider its more troubling implications.

I chaired the House Subcommittee on Nonproliferation which deals with the only other technologies that pose an existential threat to humankind, namely the proliferation of nuclear and biological weapons.

The history of nuclear technology is instructive. On August 2, 1939, Einstein sent Roosevelt a letter saying a nuclear weapon was possible; six years later, nuclear technology literally exploded onto the world scene. Only after society saw the negative effects of nuclear technology, did we see the prospects for nuclear power and nuclear medicine.

The future of engineered intelligence will be different. The undeniable benefits of computer and DNA research will arrive long before the problematic possibilities. Their introduction will be gradual, not explosive. Fortunately, we will have far more than six years to consider the implications --- unless we choose to squander the next few decades. My fear is that our philosophers, ethicists and society at large, will ignore the issues that will inevitably present themselves until they actually present themselves. And these issues require more than a few years of thought.[5]

I am confident that if we plan ahead we can obtain the utility of supercomputers, and the benefits of bio-engineering, without creating new levels of intelligence. We can then pause and decide whether we in fact wish to create a new intelligent species or two.

Finally, I would quote Oliver Wendell Holmes who said 100 year ago, "I think it not improbable that man, like the grub that prepares a chamber for the winged thing it never has seen but is to be -- that man may have cosmic destinies that he does not understand."[6]

Likewise, it is possible that our grandchildren --- or should I say "our successors" --- will have less resemblance to us than a butterfly has to a caterpillar. Our best minds in philosophy, science, ethics and theology ought to be focused on this issue. Now.

1. On April 9, 2003, the U.S. House Committee on Science and Technology, held a hearing titled "The Societal Implications of Nanotechnology."
2. If a human receives a text message and cannot determine if it was composed by a computer or a human, then the computer has passed the Turing Test.
3. The Defense Advanced Research Projects Agency (DARPA).
4. Despite the fact that supercomputers may not use chips with silicon substrate, for these purposes, we'll still refer to computer chips as "silicon."
5. This issue is discussed in "Brave New World War" by Jamie Metzl. Published in Issue 8, Spring 2008, Democracy: A Journal of Ideas.
6. Oliver Wendell Holmes. "Law and the Court," speech at the Harvard Law School Association of New York, 15 February 1913.

Chairwoman JOHNSON. Thank you very much. Mr. Upton? Tipton, I'm sorry.

Mr. TIPTON. That's OK, yes. I'm in politics. You can't believe what I get called.

STATEMENT OF HON. SCOTT TIPTON,
A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF COLORADO

Mr. TIPTON. Thank you, Chairwoman Johnson, and Ranking Member Lucas. I appreciate you very much opening up the process for legislation of those that are not on the Committee to be able to address issues that will certainly impact all of us here at home.

Since the 1960s the U.S. has dominated space exploration, and has excelled in aeronautical innovation. My State of Colorado has played a critical role in the success of this, serving as the home to one of the largest aerospace industries in the country. In my office we consistently meet with stakeholders who have engaged us in the newer issue of space resource utilization. In the past decade, there's been a lot of interest in in situ research utilization, known as ISRU, which is the practice of using materials found on the lunar surface, and on asteroids, to replace materials that have been brought from Earth to make space travel more affordable and flexible. Federal agencies, academia, and the private sector have agreed across the board that more space exploration will be supported by extraction of materials in space, which can decrease the cost of human space flight to the moon and to Mars.

In 2019 alone, this Committee has held hearings on topics related to NASA's deep space exploration programs, America's role in space, and keeping our sights on a manned mission to Mars. All of this are reliant on ISRU, which has also been discussed in the Committee. Dr. Peggy Whitson, a former NASA astronaut, even testified during a Committee hearing about how the future of America's presence in space will in part be related to America's ability to be able to conduct ISRU on lunar surface for resources like water and minerals. American scientists and engineers have diligently worked to be able to advance research into the field, but there is no central hub to support such efforts. That is why I've come to testify here today, and advocate for consideration of legislation that I have introduced within the jurisdiction of this Committee related to this issue.

This past February I introduced H.R. 1029, the *Space Resources Institute Act*. If signed into law, H.R. 1029 would direct the administrator of NASA to submit a report to Congress on the merits of, and options for, establishing an institute relating to space resources, and advance the objectives of NASA in maintaining U.S. pre-eminence in space. These objectives include identifying and distributing space resources through the encouragement of developing foundational science and technology, reducing the technological risks associated with identifying and distributing space resources, and developing options for using space resources to support current and future space programs, and enable ones that wouldn't otherwise be possible.

I was proud to introduce this bill with my colleague from Colorado, Congressman Ed Perlmutter, and, since its introduction, it

has gained additional bipartisan support. It's my goal that, with the passage of H.R. 1029, that we can build upon the accomplishments of the *U.S. Commercial Space Launch Competitiveness Act*, (CSLCA) which was introduced by Minority Leader Kevin McCarthy in 2015, and was signed into law by President Obama. The CSLCA made it legal to facilitate, and to participate, in commercial exploration, and recovery of, and for space resources. As academia, the private sector, and Federal agencies engage in ISRU research, all parties will benefit from a central institution where research can be shared, expanded upon, and put into action.

Given the support on both sides of the aisle for future manned missions to the moon and Mars, I'm hopeful and confident that H.R. 1029 will advance U.S. interests in space. At a time when Russia, China, and other foreign actors are attempting to grow and invest in their space programs to surpass us, we must act swiftly to maintain our position in the global space arena. America has always excelled in space, and we must continue to do so through legislative measures like H.R. 1029. I'd respectfully request that H.R. 1029 be considered in a Full Committee hearing and markup as soon as possible, and I thank you again for the opportunity to be able to address you here today, and for the openness of this process through your Committee.

[The prepared statement of Mr. Tipton follows:]

Congressman Scott Tipton
Testimony before the Science, Space and Technology Committee
May 17, 2019

Since the 1960's, the U.S. has dominated space exploration and excelled in aeronautical innovation. Colorado has played a critical role in this success, serving as home to one of the largest aerospace industries in the country. In my office, we consistently meet with stakeholders who have engaged us on the newer issue of space resource utilization.

In the past decade there has been a lot of interest in In-Situ Research Utilization (known as ISRU), which is the practice of using materials found on the lunar surface and asteroids to replace materials that have been brought from Earth to make space travel more affordable and flexible. Federal agencies, academia, and the private sector have agreed across the board that more space exploration will be supported by the extraction of materials in space, which can decrease the cost of human spaceflight to the Moon and Mars.

In 2019 alone, this committee has held hearings on topics related to NASA's deep space exploration programs, America's role in space, and keeping our sights on a manned mission to Mars – all of which are deeply interacted with ISRU. ISRU has also been discussed in this committee. Dr. Peggy Whitson, a former NASA astronaut, testified during a committee hearing about how the future of America's presence in space will be in part related to America's ability to conduct ISRU on the lunar surface, for resources like water and minerals.

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- Identifying and distributing space resources through the encouragement of developing foundational science and technology;
- Reducing the technological risks associated with identifying and distributing space resources; and
- Developing options for using space resources to support current and future space programs and to enable ones that wouldn't otherwise be possible.

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As academia, the private sector, and federal agencies engage in ISRU research, all parties will benefit from a central institution where research can be shared, expanded upon, and put into action. Given the support on both sides of the aisle for future manned missions to the Moon and Mars, I am very hopeful and confident that H.R. 1029 will advance U.S. interests in space. At a time when Russia, China, and other foreign actors are attempting to grow and invest in their space programs to surpass us, we must act swiftly to maintain our position in the global space arena. America has always excelled in space, and we must continue to do so through legislative measures like H.R. 1029. I respectfully request that H.R. 1029 be considered in a full committee hearing and markup as soon as possible.

Chairwoman JOHNSON. Thank you very much. We will now begin our question section, and we will start again at the beginning, so, Mr. Norman, you will be open for questions, and anyone can ask them, and we'll move down the line.

The question I'd like to ask you is, in your bill H.R. 617, is it only limited to the areas, the medical conditions, which you identified?

Mr. NORMAN. Yes, ma'am. It's based on the medical information that the veterans have donated that the DOE can use to further the treatment, try to predict who's going to get what. But, yes, it's the medical data that the veterans have given to the DOE.

Chairwoman JOHNSON. The reason I'm asking that is because trying to get the records organized and compatible between the time the veteran leaves military service to the VA has been very difficult, and mental health is one of the critical areas that is not being addressed right now with the VA, and timely. And that's why I asked you that question. I think the bill has merit. Are these areas in which the Department of Energy has great information now, which they just want to share compatibility?

Mr. NORMAN. Yes, and I consider the mental illness PTSD (post-traumatic stress disorder) is a part of that, and I know we visited Dorn, which is a hospital in my area, to pay the veterans who are coming back from the Vietnam War or Iraq, that's a medical condition. So whatever they can get the data on, that would be included.

Chairwoman JOHNSON. OK. I have the second largest VA hospital in the Nation in my district, and we see the problems on a day-to-day basis. That's my largest district office case workload, is complaints.

Mr. NORMAN. Mine too, Chairman Johnson. I tell you, the suicide rate is a direct result of just what you're talking about——

Chairwoman JOHNSON. Um-hum.

Mr. NORMAN [continuing]. And that's why it's so important. If you don't have the backup data, how do you—and if you can't find it, like you say, then how do you act on it? And I know in my district, one of the big things is the suicide rate, which stems from medical illness, and mental illness is triggered by the PTSD that a lot of them suffer.

Chairwoman JOHNSON. Yes, that's very true. Our community has seen it very clearly. We had four policemen killed a little over a year ago, 2 years ago now, that was a mentally ill veteran that had not been able to get seen for a year at the VA. And so this continues. It has had really no improvement, taking 6 and 8 months for patients to get a psychiatric appointment. And then all of those external services, like home health care, are going out of business because they can't get paid from the VA. And so I just thought, if we're going to link with another agency, if we could have information that would help to close some of these gaps because of the rapidity of which they could be addressed with that computer service.

Mr. NORMAN. I agree, and in my office this week, National Police Week, we had six police officers, three of them had gotten shot, and guess who did the shooting? A veteran from the Vietnam War who was on the SWAT team. 65 years old. And one of the issues we face is a lot of them are quiet. You know, mental illness is something, how do you address it? And it's a two-edged sword. That's why the

value of this, if we can have data, however small, it will pay dividends on down the road. Maybe this veteran could've gotten help to stop him from opening fire on the officers, killing one, and wounding the other. So it's something that's well overdue, and I think will save lives in the long run.

Chairwoman JOHNSON. Thank you. Any other questions? Yes, Mr. Baird.

Mr. BAIRD. Thank you, Madam Chair, and Congressman Norman, I would make one comment. I can't resist making a comment about the Vietnam veterans and the PTSD. I think you have to recognize also that, when we came home from that war, we did not receive the welcoming that they had for prior wars and so on, and I think that had an impact on those veterans. But in any case, I really appreciate you making this effort with this bill to help veterans. I do think information of this kind can be useful, particularly in helping them identify what appointments, where to go, and keeping track, doing the follow up on that. Because, as the Chairlady mentioned, it gets a little frustrating for veterans in order to try to make appointments, get appointments canceled, even getting through to the VA system. And so I think having this kind of data, as long as we can protect the individual privacy, I think having the data to make quicker decisions, and more relevant decisions, would be good, so I commend you for that.

I guess I'm supposed to ask a question, aren't I?

Chairwoman JOHNSON. You've got 5 minutes to do whatever you want to do.

Mr. BAIRD. OK. Thank you. I guess my question is, can this program with the DOE, because they have such capable computers, also help making appointments, and enhancing the computer system that the VA operates with today? Do you think that's——

Mr. NORMAN. Thank you, Congressman Baird. The answer is, you know, the answer's yes, short answer, but to explain it further, you know, you've got to have measurables to go by. What greater service can we provide than people such as yourself, when you call in with a particular illness, be able to say, we've included your data, along with others, here is what some treatment can be based on the information. If you don't have the information, it's like flying with a blindfold on. You don't know where you're going, or driving with a blindfold on. So, yes, I think it'll help all the way around, and it'll help that hospital.

When you have data that's pulled up, particularly if it's from that particular hospital, the supercomputer would be able to file individual cases with that particular illness, and you'll be able to address it directly, and ask that hospital, if a veteran has not gotten a timely response, this is the information we gave you, why haven't you responded? Because a lot of these veterans are, particularly on some of the surgeries they need, being put off time after time again. And we got involved with some cases where the veteran could not afford to drive to the hospital. So we said, we don't know, you need to tell us why this veteran can't get there. Just saying you can't do it—we need to look further, and say, well, we can provide either the means to get there, or have a family or friend to do that.

So, yes, it's just being able to accumulate information, and use it. This isn't something that's going to be stored and left—and just not used. Thank you for the question.

Mr. BAIRD. Thank you.

Chairwoman JOHNSON. Thank you. Mr. Tonko?

Mr. TONKO. Thank you, Madam Chair. Representative Norman, interested in the additional pilot program activity for DOE——

Mr. NORMAN. Um-hum.

Mr. TONKO [continuing]. To see and explore where there might be some other interagency interaction. Is there anything that you have in mind that you think they might connect with, in terms of an agency, and in a social or programmatic issue?

Mr. NORMAN. Yes, sir, Congressman. I think one of the advantages, and why we put the pilot program in, is to give it time to see what works and what doesn't work. And we're going to put the burden on them to come up with whatever tools they can use from any other agency that could provide not only the information, but the backup information. So the pilot program is to give them time to do that.

Second is, after 24 months, they'll present a written response to Secretary Perry, and anybody else, as to the effectiveness of it, what agencies have they reached out to, and what agencies have given them useful information. Because at the end of the day, it's to help that veteran. It's to help that family of the veteran. And they've got a list of agencies that they want to reach out to. Again, this was asked for by the VA and the DOE.

Mr. TONKO. I appreciate that. You know, I think, Madam Chair, and Ranking Member, it seems as though there's so much data compilation in our given world, and the big challenge to all of us, as a society, is to make sense of all that data that's compiled, and to put it to good working use. So it seems like this is a good opportunity for us to move forward, and respond in the interim to the needs of the veterans. So I yield back.

Mr. NORMAN. And, Congressman, I think, by having the 2-year window to evaluate it, we're going to encourage the patients, the veterans that are actually being served, to get involved. Were they answered in a timely manner? Were the symptoms and the issues that they were having medically, were they addressed? So this is the interaction between not just the two agencies, but the veteran, to get his opinion, the patient, and that's what's exciting about this.

Chairwoman JOHNSON. Thank you very much. Any other questions on this issue? Guess not. Thank you very much for your presentation, and we look forward to working with your bill. Now we'll move to—any other Members at the dais here would like to comment or ask questions on this particular bill?

Mr. BABIN. Yes, ma'am. As a veteran myself, and with over 50,000 veterans in my district, in the 36th District of Texas, from Houston over to Louisiana, this is very promising, because some of the biggest problems we have, you talk to law enforcement and the veterans groups, the mental health aspect falls through the cracks, and it sounds like this is a bill that—if I'm not already on it, please put me on it, OK?

Mr. NORMAN. Thank you, Congressman Babin.

Mr. BABIN. Thank you. Just wanted to commend you.

Mr. NORMAN. The thing I was asking, how'd they come up with the 24 to 26 million? How'd they pick that number out? And I was happy to see that they both got together and came up with a number that they thought was not too much, but could get the job done. That's why we sunsetted it, and had the 2-year pilot program, if you will. So, you know, we put the burden on them to: One, to have enough funding, and then to evaluate it. That's the beauty of this.

Chairwoman JOHNSON. Thank you very much. Any other Member of the panel like to comment on that particular—thank you for presenting your bill, and I'm sure we'll have very favorable approaches to it.

Now we'll go to Mr. Babin's bill, and see if there are any questions there. My question, is this the Space Force bill that you——

Mr. BABIN. No, ma'am. This is——

Chairwoman JOHNSON. OK.

Mr. BABIN [continuing]. Not the Space Force bill. This is different. I'm not sure who's pushing that Space Force bill, but, you know, all I can say to that is I'm glad the Administration sees the need, you know, and the importance and significance of space in today's world, and the future. So I'm very glad to see that the proposal is coming forth. What it's going to look like when it gets, you know, when it's finalized, I don't know.

Chairwoman JOHNSON. Well, I ask that question because I've had a number of questions asked me because there are two different approaches coming at the same time, as it relates to space. There's still some confusion as to whether this is one commercial project, or more than one, and whether or not the route to the moon, to Mars, has any relationship to the other one. I think I understand the difference, but I just wanted to be sure.

Mr. BABIN. OK. Maybe I misunderstood your first question, then. I thought you were talking about the proposed Space Force that the President proposed months ago. Is that what you're talking about, or are you talking about the——

Chairwoman JOHNSON. I'm really asking for the delineation. There's some confusion as to whether or not the Space Force is going to be intertwined with the vision of going to the moon, to Mars. I think they're very different.

Mr. BABIN. Yes, I have not heard anything about that. I've actually got a couple of bills that I mentioned in my little opening there. The first one is the *American Space Commerce Free Enterprise Act*, which we passed out of Committee last year, and we never could get it through the Senate, unfortunately. But what that would do would be to streamline the bureaucracy. We don't want a regulatory bureaucracy that drives commercial space companies out of the United States, overseas. We want to make it as easy as possible for them to do business here, and have a one-stop shop so they don't have to go to various agencies for licensing, and what have you, that they would be able to go to the Department of Commerce, and that would facilitate a lot more ease for them to get their, you know, their projects done, and their launches, and licensing, et cetera.

As far as your question about the Space Force, that's got a military aspect, and I'm sure that what we develop on the civil side

certainly can enhance the war fighters, but that's not what my bill addresses.

Chairwoman JOHNSON. OK. Thank you.

Mr. BABIN. Yes, ma'am.

Chairwoman JOHNSON. Mr. Baird?

Mr. BAIRD. Congressman Babin, I have just one question, I think, as it relates to your first concern there, about the way we regulate commercial flight. You mentioned something about not having so much regulation that we end up forcing it to other countries. I just thought I'd give you a chance to have a second thought on that, and make sure that I understand what you mean by that.

Mr. BABIN. Well, the way things are currently, it's surprising, but many of our commercial space companies, whether they be American or foreign, we need to facilitate them to want, and enable them to come to the United States to do business. It's a multibillion-dollar business that's going to do nothing but grow in the future. And you'd be surprised, but some companies go to Luxembourg, or other foreign nations, because they have a lot less red tape to go through. And so this is what our bill is all about. And we just want to make sure that we have a burgeoning, robust space program that is second to none in the world, and that people want to come to the United States to do business.

Because, as you know, our Administration wants public-private partnerships. We've seen amazing things develop out of our commercial space industry over the last years. Reusable rockets, you know, who would've thought, you know, 25 or 30 years ago we'd have private companies that might be able to land men and women on the moon? We want to make sure that the United States is the center of that world.

Mr. BAIRD. Thank you. I yield back.

Mr. BABIN. Yes, sir.

Chairwoman JOHNSON. Thank you. Thank you very much. Now, for our last two Members, I don't particularly have any questions for either of you, but if you have further statements, or if you might have questions for either one of them, Mr. Tipton or Mr. Sherman.

Mr. TIPTON. I think I'm good.

Chairwoman JOHNSON. OK.

Mr. SHERMAN. I would just stress how important it is, as we deal with artificial intelligence, to not just focus on the immediate problem at hand, how to develop a computer that will give us better insight into weather, et cetera, or whatever else we're focusing on, but that we also focus on avoiding self-awareness and ambition. I yield back.

Chairwoman JOHNSON. Thank you.

Mr. TIPTON. Again, thank you for the opportunity. A few of us, the other night, went to First Steps, a showing down at the Air and Space Museum, talking about when we sent man to the moon for the first time. And I think the great blessing, really, to this Committee is to be able to look out into what is possible, not what is, that what is possible can certainly impact what is to come. And I appreciate, really, the progressive nature, in terms of being able to let us reach to our highest and to our best levels, and, again, for

the opportunity to be able to come in. And I would encourage your support for our legislation for the in situ mining.

Chairwoman JOHNSON. Thank you very much, and I appreciate all of you coming, and I'm hoping that you will feel that your thoughts and legislation will be given fair and open opportunity to move forward.

Now, before we bring this hearing to a close, I'd like to thank all of you, but also to say that our record will remain open for 2 weeks for any additional statements from Members or any additional information you'd like to submit for the record. Thank you again for coming, and we're adjourned.

[Whereupon, at 10:21 a.m., the Committee was adjourned.]

