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DOING BUSINESS WITH DOD: GETTING INNOVATIVE SOLUTIONS FROM CONCEPT TO THE HANDS OF THE WARFIGHTER

HEARING

BEFORE THE

PANEL ON BUSINESS CHALLENGES WITHIN THE DEFENSE INDUSTRY

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

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PANEL ON BUSINESS CHALLENGES WITHIN THE DEFENSE INDUSTRY

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[There were no Questions submitted post hearing.]

DOING BUSINESS WITH DOD: GETTING INNOVATIVE SOLUTIONS FROM CONCEPT TO THE HANDS OF THE WARFIGHTER

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
PANEL ON BUSINESS CHALLENGES WITHIN
THE DEFENSE INDUSTRY,
Washington, DC, Monday, January 23, 2012.

The panel met, pursuant to call, at 3:02 p.m., in room 2212, Rayburn House Office Building, Hon. Bill Shuster (chairman of the panel) presiding.

OPENING STATEMENT OF HON. BILL SHUSTER, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, PANEL ON BUSINESS CHALLENGES WITHIN THE DEFENSE INDUSTRY

Mr. SHUSTER. Well, I want to call the hearing to order and thank our witnesses for being here today, appreciate you taking the time, spending it with us, hear your insights.

As you probably know, the House Armed Services Committee [HASC] Panel on Business Challenges in the Defense Industry was set up specifically to look how entities, organizations, firms—small, medium, large, private, public—all do work with the Department of Defense [DOD] and the challenges that they face, the hurdles that they face, and specifically today talking about some of the technologies that institutions like the three of you represent here bring to the game, bring to the warfighter to help them do a better job. As I said, we are working on trying to understand the challenges that all those entities face.

Equally important to the industrial base is the role of universities, nonprofit research institutions, and development centers in bringing those different scientific discoveries and new ideas to the market or to the Defense Department.

In the many roundtables we have conducted with industry, the constant refrain has revolved around the problems in bridging the so-called valley of death in transitioning good scientific ideas and prototypes to actual production and programs of record. We hope that our witnesses today will be able to shed some additional light on the problem and hopefully make recommendations on how to improve the overall technology transfer and transition process.

While the industry is the maker of things, universities and research institutes are the makers of new ideas; and without that cross-flow of ideas, technical expertise, and manufacturing capacity and capital, most of the great innovations in the marketplace today simply would not exist. Business, and particularly small businesses, are the backbone of this economy, but they rely on a robust

pool of new scientific ideas to create new commercial opportunities and keep the Nation's economy competitive. Looking at how the process can be better supported is why we are here today.

And, as I said, welcome our three really terrific witnesses. Dr. Stephen Cross is Executive Vice President for Research at the Georgia Institute of Technology; Dr. Norman Winarsky, Vice President of SRI Ventures, the Stanford Research Institute; and Dr. Stephen Huffman, Vice President and Chief Technological Officer for The MITRE Corporation. That is right, MITRE, right? Are you still in McLean, Virginia?

Dr. HUFFMAN. McLean, Virginia, and Bedford, Massachusetts.

Mr. SHUSTER. Okay. Well, Bedford is not a bad place. Bedford, Pennsylvania, is a little bit better than Bedford, Massachusetts, but it is all good.

I am looking forward to the discussion we will have with our distinguished panel, but, before I do that, I would like to, first of all, introduce those on the panel.

I think you have all briefly met Colonel West, who represents a district in Florida; Congressman Jon Runyan from New Jersey; and Colleen Hanabusa; and our ranking member, Mr. Larsen, is unable to make it; and Ms. Sutton is, I understand, having some problems getting here because of the weather. So our senior Democrat today is Ms. Hanabusa, but she has really been the star of the panel. She has made every hearing. She has traveled everywhere in the country we have gone. So it is a great pleasure. I yield to her for some remarks.

[The prepared statement of Mr. Shuster can be found in the Appendix on page 31.]

STATEMENT OF HON. COLLEEN HANABUSA, A REPRESENTATIVE FROM HAWAII, PANEL ON BUSINESS CHALLENGES WITHIN THE DEFENSE INDUSTRY

Ms. HANABUSA. Thank you. Thank you, Mr. Chair.

And, first of all, I would like to say to our testifiers today that this is a topic that is really very important to—Mr. Larsen has been an advocate of it and so has Ms. Sutton. So, believe me, if they could be here, they would be here.

And it is one thing about being from Hawaii, is that I don't get to go home. So it is just a matter of whether the sidewalks are not so slippery that I don't take a spill, I will be here.

Having said that, Mr. Chair, and again thank you for having this great hearing, I would like to ask for your unanimous consent to have Mr. Larsen's opening statement put into the record.

Mr. SHUSTER. Without objection, so ordered.

[The prepared statement of Mr. Larsen can be found in the Appendix on page 33.]

Ms. HANABUSA. And with that, I think we are ready to begin.

Mr. SHUSTER. Okay, great. Thank you very much.

One thing, a little housekeeping, I need to introduce the summaries from the roundtables we held in New Jersey, California, Hawaii; and, without objection, the summary memos will be included in the record.

[The information referred to can be found in the Appendix beginning on page 71.]

Mr. SHUSTER. One thing I didn't mention is Mr. Larsen and I have been doing this now for several months, and it seems to me that we were stood up for about 6 months and that we are coming close to the end to come out with some concrete recommendations we can put in the next defense authorization bill. But it seems to me this is probably going to be a longer-term process, because there are some big problems that I think we face getting those ideas and those new technologies to the DOD.

So it is my hope that after we come forth with some concrete ideas and legislation we will continue this look backward over history. And it took about 4 years for Goldwater-Nichols to finally pound it into the Department of Defense's head that they need to operate jointly, so I think this is another situation—this is not going to be 6 months or one piece of legislation. This is going to be over a period of time convincing folks who have been doing business for a long, long time the same way that they need to look at things differently.

So, with that, I will hear testimony from our panelists. First, Dr. Cross, please.

STATEMENT OF DR. STEPHEN E. CROSS, EXECUTIVE VICE PRESIDENT FOR RESEARCH, GEORGIA INSTITUTE OF TECHNOLOGY

Dr. CROSS. Chairman Shuster and panel members, thank you first for the opportunity to testify today. My name, for the record, is Stephen E. Cross. I am a proud veteran; and I currently serve, as was noted, as Executive Vice President for Research of the Georgia Institute of Technology, more commonly called Georgia Tech.

Over the past 25 years, I have been involved in defense research and technology transition activities through leadership positions in Department of Defense laboratories, DARPA [Defense Advanced Research Projects Agency], through the directorship of a federally funded research and development center at Carnegie Mellon University in Pittsburgh, Pennsylvania, called the Software Engineering Institute, and through my current position. I have also led many advisory boards related to your topic today; and, besides my academic appointment at Georgia Tech, I am proud to also serve as a member of the Defense Science Board.

Georgia Tech includes the largest engineering school in the country, and it is ranked in the top 10 of technological universities in the world, has an enviable track record of economic development success, and I think this is attributable to both a culture and a unique integration of leading-edge research and technology transition and economic development. So in addition to the world-class faculty and graduate students, it includes what is called the Georgia Tech Research Institute, which is 1,500 people devoted to applied research and subject matter experts that work on many defense problems, as well as the State of Georgia-supported economic development arm that includes 225 specialists.

It is—so we also have unique infrastructure and a culture where we work on classified problems right on the main campus. We pride ourselves on our agility and our ability to do research that anticipates future needs. So I will probably explore this more in the testimony today.

But the challenges that we face today are, if we look at military history, are not completely unprecedented. What is changing more than anything today is the rate of change.

It used to be that we could rely on time to respond. I remember when I was still on active duty in Operation Desert Storm, we had 5 months to respond until the Iraqis came into Kuwait. We just don't have that luxury anymore, especially with cyber attack, for instance. We also used to be able to rely on our geography, but we can't do that anymore. And we used to rely on just technologies that would come out of our laboratories in the United States. But the globalization of research means that we need to be aware of what is being done across the globe.

So, not surprisingly, and of course I strongly urge continued support for defense-related research, but I also applaud this panel's looking into improvements that can be made in the entire defense enterprise, both cultural and in business practices, so that we can actually ensure that our forces can continue to meet the future threat, have an unfair competitive advantage on the battlefield, and continually embrace practices of innovation.

So I look forward to doing my best to answer your questions here today. If I fumble or if I don't completely answer a question, I would be very happy to at any other time answer any questions or support your staff in any way I can.

Again, thank you very much for this opportunity.

[The prepared statement of Dr. Cross can be found in the Appendix on page 35.]

Mr. SHUSTER. Thank you very much, Dr. Cross.

With that, Dr. Winarsky.

STATEMENT OF DR. NORMAN WINARSKY, VICE PRESIDENT, SRI VENTURES, STANFORD RESEARCH INSTITUTE

Dr. WINARSKY. Chairman Shuster and members of the panel, thank you for the opportunity to submit written testimony to you about independent nonprofit research and development organizations.

I am Norman Winarsky. I am Vice President of Ventures for SRI International, a nonprofit research and development organization with facilities in Menlo Park and locations around the United States and internationally, including Princeton, New Jersey; State College, Pennsylvania; and Tokyo, Japan; to name a few.

SRI International was founded as Stanford Research Institute in 1946 and performs sponsored research and development for governments, businesses, and foundations. We are known worldwide for world-changing innovations in computing, health and pharmaceuticals, and in chemistry and materials, sensing, energy, education, national defense, and more.

We bring our innovations from the laboratory to the marketplace through technology licensing, products, and spin-off ventures. Our innovations have created entirely new industries, billions of dollars in marketplace value, and lasting contributions to society.

SRI invented the mouse, it helped advance the Internet, it invented HDTV [high definition television], and those yellow lines that you see in the ball games, that was augmented reality that was invented at SRI Princeton.

SRI's most important contributions relate to innovation itself. We teach innovation best practices, which we call the discipline of innovation. We have started more than 40 spin-off companies to leverage our technology in new commercial applications, with total market value of those companies exceeding $20 billion. One recent example, SRI's artificial intelligence project for DARPA, called CALO, led to the technology underpinning of Siri, the virtual personal assistant in Apple's new iPhone. My role in Siri was cofounder and board member.

However, I am not here to talk about my organization. Instead, I would like to inform the members of this panel about the important role nonprofit research institutes play in keeping our armed services strong and ready.

Let me begin by thanking the members of this panel and the full committee for including in its report accompanying the 2012 National Defense Authorization Act the requirement that the Department of Defense brief the members of the Armed Services Committee on DOD policy relating to nonprofits. Nonprofits perform basic and applied research as well as development and limited production in a large number of areas. Since we are neither universities nor for-profit corporations, we are sometimes overlooked when procurement policies are established. In fact, we are often treated as if we are for-profits.

Because we are chartered pursuant to 501(c)(3), nonprofits possess unique advantages over other organizations. For one, we have no shareholders. That means we can focus on the warfighter with the best possible solution, less concerned about bottom line. We are also impartial. Nonprofit research and development organizations are not affiliated with any government agency or corporate entity, nor do we endorse products or services. And DOD's reluctance to use the Competition in Contracting Act exception that allows noncompetitive procedures to establish or maintain an essential engineering, research, and development capability is in—contrary to the intent of Congress. It is clear from the plain language of the statute that Congress authorized sole source awards to nonprofits because it recognized that we, like universities, FFRDCs [federally funded research and development centers], and government labs, exist to provide a public service. We would very much like to see this opportunity for nonprofits as well.

The nonprofit community would also like to have the opportunity to participate in programs like the UARCs, the University Affiliated Research Centers, for which we are currently excluded. If nonprofits were given the opportunity to be designated as UARCs, then we would be able to much better support the STEM [science, technology, engineering, and mathematics] capabilities. Many of our organizations already provide internships, for example, to graduate students.

On behalf of the independent nonprofit research and development community, we appreciate the role Congress is playing in facilitating a discussion between all sectors as to how to best serve the warfighters and the American taxpayer. We look forward to reading your report and working with you. I am happy to answer any questions.

Thank you.

[The prepared statement of Dr. Winarsky can be found in the Appendix on page 44.]

Mr. SHUSTER. Thank you very much; and, with that, Dr. Huffman.

STATEMENT OF DR. STEPHEN HUFFMAN, VICE PRESIDENT AND CHIEF TECHNOLOGY OFFICER, THE MITRE CORPORATION

Dr. HUFFMAN. Chairman Shuster, honorable Members, thank you for the opportunity to appear before your panel.

My name is Stephen Huffman. I am the Vice President and Chief Technology Officer of The MITRE Corporation. Our company's 53 years of experience, contributions, and accomplishments have given us the perspective that I believe is highly relevant to today's topic of getting innovative solutions from concept to the hands of the warfighters.

To maintain superior military capability in a declining budget environment, the DOD must explore creative ways of rapidly deploying new capabilities in an affordable manner. Achieving this objective will require the best innovative thinking of the DOD, Government, and private laboratories and research institutions, and suppliers in the defense industrial base. As a part of this effort, federally funded research and development centers, or FFRDCs, are well-positioned to contribute to transitioning innovative technologies from concept to fielded capability.

The MITRE Corporation is a not-for-profit organization chartered to work only in the national interest. MITRE manages FFRDCs; and it applies its expertise in systems engineering, information technology, operational concepts, and enterprise modernization to address our sponsors' critical needs.

An FFRDC is a unique organization that assists the U.S. Government with scientific research and analysis, development and acquisition, and systems engineering and integration. FFRDCs address problems of considerable complexity, analyze technical questions with a high degree of objectivity, and provide creative and cost-effective solutions to government problems.

To ensure the highest levels of objectivity, FFRDCs are organized as independent entities with limitations and restrictions on their activities. This unique standing provides special access to government information and provides a long-term perspective. Since FFRDCs are prohibited from manufacturing products, competing with industry, or working for commercial companies, both industry and government confidently provide them with sensitive information. FFRDCs operate as long-term partners with their sponsoring government agencies and achieve a deep understanding of their sponsor's evolving roles, issues, and challenges.

MITRE has supported numerous rapid capability development programs that address urgent operational needs. In our experience, there are three keys to success: Number one is to work closely with the operational users to understand their needs, the second is to adapt mature technology and build operational prototypes to prove the concept and get user feedback, and the third key is to acquire operational capability through an agile acquisition strategy.

Operational users have the best understanding of the capabilities they need. However, they rarely have the in-depth technical knowledge necessary to conceive a solution. FFRDCs are well equipped to bring technical knowledge to the end users and work closely with them to solve their problems. Whenever possible, MITRE deploys staff to the field to study firsthand the special challenges our end users, including warfighters, face.

Agile acquisition is a strategy for providing multiple, rapid deliveries of incremental capability to the user for operational use and evaluation. The incremental deliveries can be made every few weeks or every few months, and each iteration will be built with continuous user participation and feedback.

The advantages of this strategy are, first, that development can begin immediately without the time and expense needed for the development, refinement, and approval of functional requirements; and, secondly, significant user involvement during the development process guarantees that the capabilities delivered will meet the user's needs.

An example of the successful application of an acquisition strategy is the Battlefield Airborne Communications Node [BACN], an innovative solution that uses commercially available components to provide communications gateways airborne where the warfighters need them most. MITRE serves as the lead systems engineer on the BACN program for the Airborne Networking Division at the Air Force's Electronic Systems Center. These airborne gateways significantly shorten command and control response times by enabling machine-to-machine transactions, data-link translations, and voice bridging. By the end of 2010, the BACN team had deployed five aircraft carrying the new operational nodes into theater.

In addition to directly supporting government capability development and conducting their own research, FFRDCs play an important role in interacting with other sources of innovation and channeling them toward government needs.

FFRDCs often serve as brokers for interaction between government and industry on technical issues. For example, in the not-too-distant future, soldiers will routinely use smartphones with situation-specific mobile applications. It is not difficult to imagine the existence of a robust industrial ecosystem supplying the DOD with various mobile applications through the DOD's own app store. To bring that moment closer, MITRE created the Government Mobile Applications Group, which includes participations from commercial companies such as Apple and Google and a number of government agencies. Dozens of representatives from government and industry meet quarterly to discuss the DOD's special needs, for example, for extra security, and how to lower barriers to quickly fielding products.

FFRDCs also interact with industry to transfer the practical results of FFRDC work to the commercial sector through such methods as cooperative research and development agreements, technology licensing, open source participation, and contributions to industry standards.

The current fiscal environment requires significant reduction in DOD spending without jeopardizing national security. I believe that with the best innovative thinking of DOD, government and

private research institutions, and suppliers in the defense industrial base, the DOD can maintain its superior operational capabilities even in an austere fiscal environment. Federally funded research and development centers play a unique role in addressing this challenge, working with government, academia, and industry to transition innovative technologies from concept to fielded capability.

Again, I thank you for the opportunity to address this panel. I request that my prepared statement be included in the record, and I would be pleased to answer any questions.

[The prepared statement of Dr. Huffman can be found in the Appendix on page 58.]

Mr. SHUSTER. Thank you very much.

I want to start off with Dr. Winarsky. You had mentioned that sometimes nonprofits are treated like for-profits. What does that look like?

Dr. WINARSKY. Well, relative to, for example, the opportunity to participate in the UARCs, which are university participation, the nonprofits have not been permitted, or other types of RFPs [requests for proposal] or BAAs [broad agency announcements] that correspond to university or FFRDCs just don't mention nonprofits. This would be very helpful if the nonprofits could be thought of as a major force that can help and accelerate bringing products to the warfighter.

Mr. SHUSTER. Most universities I know, Penn State in particular, claim they are not for profit.

Dr. WINARSKY. They are nonprofit.

Mr. SHUSTER. Well, some would question with that.

Dr. WINARSKY. Right, right.

Mr. SHUSTER. But you operate very similarly to what they do?

Dr. WINARSKY. We do. The difference is universities have an educational goal, you know, educating, advancing knowledge in the world.

Mr. SHUSTER. Right.

Dr. WINARSKY. We also have an invention goal. We are not educators, and that is partly why this happens, but we have a goal of making an impact on this world. We are nonprofit with a mission for the health and peace and prosperity of mankind.

Mr. SHUSTER. Right. Do you work closely with the universities?

Dr. WINARSKY. We do. We were originally, as you know, spun out of Stanford University. And, in fact, for example, the CALO program that I mentioned that led to the creation of Siri, we were prime with DARPA. We had 23 subs, including Stanford, Berkeley, Carnegie Mellon, MIT, and, you know, the who's who of the AI [artificial intelligence] world.

Mr. SHUSTER. Right. Thank you.

As I mentioned in my opening statement, we have heard over and over throughout our roundtables and our hearings about the valley of death and how do we bridge that from research to education programs. Each of you could take a few minutes to talk about your recommendations on improving that process. You know, how do you see it? What has your experience been?

Dr. CROSS. Sure. Let me make a brief comment about the valley of death.

Mr. SHUSTER. Is your mike on?

Dr. CROSS. Yes, Mr. Chairman, it is now. Just showing that I am trainable. That is good.

The valley of death is a problem usually when we think about technology transition as a linear process of going from the research laboratory to some kind of demonstration until full-scale development or use in a commercial application. But it is not a linear process at all. Some people describe it as sausage making. It is really a messy process with a lot of give-and-take and back-and-forth.

One of the things that I have found to be most useful is to have infrastructure in terms of laboratory or facilities where all the parties can come together and people can have wide bandwidth communication. Let me give an example.

When I was a DARPA program manager, before Operation Desert Storm, our command and control systems—and I worked quite closely with both MITRE and SRI on this; they were both supported by my programs—we really couldn't respond to the kind of deployment that we saw from Europe to Saudi Arabia that was going to have to take place very quickly. And what we were able to do is all come together in a command center at Scott Air Force Base and have the developers work with the warfighters, work with the trainers, work with the testers, work with everybody across the DOD spectrum, and we worked pretty much night and day to build a system.

So we had high bandwidth communication. We were all working together on the same infrastructure. There wasn't any confusion. There was clarity on what the goals for the project were, and we were all motivated to solve that problem. So that is one of the reasons the valley of death happens.

Another reason it happens in our own work at Georgia Tech, and I suspect in other research universities as well, is where we are trying to go into the commercial market with intellectual property that we have created often through defense or other Federal sources of funds and, you know, there is just a gap in terms of the venture capital funding that is available or the cadre of CEOs [chief executive officers] that could help create these spin-out companies.

I could explore later, if you wish, some of the things we have tried to do to address that, and I know other universities are doing the same, but those are a few examples.

Mr. SHUSTER. Mr. Winarsky.

Dr. WINARSKY. Wonderful question.

The valley of death is real. Invention—going from invention to implementation is often where ideas fall. SRI specializes in crossing the valley of death. That is one way that we as a nonprofit actually differ.

One of the things, in terms of what could be done about it, first of all, focusing on the customer need is crucial, even in 6.1, 6.2, when you are doing fundamental research at SRI, everyone focuses on who is the customer and what is their need. That is in antithesis to focusing on the technology and how can we advance it. It is not quite antithesis in the sense that it is opposition, but in fact you have to do both. You have to constantly look at market need.

So in the case of Siri, for example, with CALO, the cognitive assistant learns and organizes this huge DARPA program, $150 million. There was always the advancement of AI technology, learning in the wild in a way that people had never done before, artificial intelligence for all small devices and large. But understanding the use and who might have it, who might use it, was what led to the creation of a venture, Siri, and led to the continued success there that would then, as we have heard, almost certainly assist the warfighter as well.

So I would say, first of all, focus on customer need. Second, as your experience with your own businesses, focus on the market and the revenue opportunities that you might create that could sell to the warfighter so that this might be possible. Teach the language of innovation. Very few people actually understand what is a value proposition, what is value, and SRI does that, in fact. And realize that we should be able to cross the valley of death not all the time but many times with a rigorous innovation process. So that sounds a little funny because it can be the—innovation can be the work of a mad genius overcoming all obstacles, but it can also be the work of a genius team facilitated—not overcoming but actually supported in reaching its market.

Mr. SHUSTER. Dr. Huffman.

Dr. HUFFMAN. Yes, I think one of the key things in overcoming the valley of death is really to recognize that research and development [R&D] of advanced technology is inherently risky, so those who are doing research are more likely to take risk, risk of failure in the research. Those charged with delivering a fielded capability have the charge to eliminate risk from their activities. They want a certain outcome so that they can guarantee that a capability will be delivered to the warfighter at a time certain.

So those two things are inherently in conflict, taking additional risk with research on the one hand and trying to get the risk out of your acquisition program so you can ensure capability.

Again, I think a key is to get the end users more closely engaged with the development of the technology and capability so they can see interim steps along the way and be able to provide incremental feedback to the developers. Some of the most success we have had is, as Dr. Cross said, when we got all the developers, the users in the same infrastructure and very closely operating together so that they could basically try out interim products, give immediate feedback to the developers, and then modify what they were doing, and that has proven successful on a number of occasions.

Mr. SHUSTER. Thank you very much.

That is one of the things I think we have heard from the for-profits, is they are unable or not allowed to talk to the end user going through some of these processes. It makes it extremely difficult, which makes absolutely no sense to me if, you know, what you three have said, is you have got to be in the room with all hands on deck, everybody trying to figure out how to best put this product, this technology forward.

So, with that, I will yield to Ms. Hanabusa.

Ms. HANABUSA. Thank you, Mr. Chair.

Dr. Winarsky, in reading your prepared statement, of course, I am not sure how many people can claim nine Emmys and one

Academy Award plus a DARPA award, but, having said that, certain parts of your statement have got me somewhat confused.

You state that nonprofits like yourself excel at transitioning products from the laboratory to the assembly line. Yet on the prior page you said that because nonprofits are treated differently from the FFRDC that Mr. Huffman speaks to and universities and not able to receive sole source contracts that you really cannot take that product and develop and sell it commercially.

So I am trying to figure out from your two statements exactly what it is that when you talk about dealing with the Defense Department, which we are curious about, what is it that SRI does and what has been the prohibitive parts of your structure or the way we do procurement that just makes it prohibitive for you to do it?

Dr. WINARSKY. Sorry if there was any confusion.

We are able to, as a nonprofit, develop technology and deliver it to the warfighter. Just because we are a nonprofit doesn't mean we are not able to overcome these obstacles. So we can, in fact, overcome them, and we have demonstrated that many times.

Ms. HANABUSA. Can you give me an example? For example, what exactly comes to mind as something that you have been able to do as SRI?

Dr. WINARSKY. So today in the—in Afghanistan and Iraq there is a system called TerraSight that SRI developed that enables you to view outside the bases and see everything that is going on. There are other flying systems that we can't go into depth on that can determine or find IEDs [improvised explosive devices], for example. So many, many technologies have left SRI and gone to help the warfighter, including the invention of the mouse, going back to that day.

So it is not like it is not possible. It is just much more difficult to take the process and work with the warfighter in a way that universities and other FFRDCs and other organizations are capable of doing. Rather than prevent, that wasn't meant to be my indication, it—by virtue of giving this capability to us, we will be able to accelerate and be far more—even more productive and more efficient.

Ms. HANABUSA. So the capability that you are asking for is UARC or is it—and procurement?

Dr. WINARSKY. As one very specific concrete example, yes. And the other example is that the DOD would consider us for sole source because we are nonprofits when there is sponsored research in other occasions.

Ms. HANABUSA. So why are you—do you know why, if you do know, you are not treated as a sole source like everyone else and that you must compete with manufacturers, which is I think what your statement was here?

Dr. WINARSKY. The competition is with everyone, manufacturers, universities, and the like. I don't know why we—my best guess in terms of our discussions about this is that we are a small group relative to the others, and that—basically overlooked often in terms of these procurements.

Ms. HANABUSA. Is there a problem with the commercial application of whatever you may create when dealing with the DOD? We have heard a lot of that, that, you know, there is an issue about

the creation and then what you do after that in the commercial application of it.

Dr. WINARSKY. Do you mean the valley of death again?

Ms. HANABUSA. Right.

Dr. WINARSKY. Yeah. So there is always a problem with the valley of death. Invention is often by researchers, for example, and they are looking at technology to advance the technology. But, in fact, unless it is really 6.4 and beyond, it is very difficult for manufacturers, primes, to say this is what we want. And, you know, it hasn't been constructed for them. It has been constructed in a parallel path. So whether the manufacturers that make these products want that is very difficult and takes a great deal of collaboration with the manufacturers, too.

Ms. HANABUSA. Thank you.

Dr. Huffman, in your description of what you do and the ability to go in—for example, when you said you have put them on the ships and then, you know, they get to really interact with what is going on, let me understand. You are sort of an entity that you are not doing the actual research and development, you seem to be doing more of the T&E, the testing and evaluation, of what is then brought to the warfighter. Am I correct in that understanding?

Dr. HUFFMAN. Well, actually, all of the above.

We do—we are a systems engineering FFRDC, so we are not into pure research. We do our own research and development to explore new concepts and develop proof of principle, proof of concept prototypes. We work very closely with the Government in acquiring operational capabilities so that we help translate their needs into the requirements that industry can then provide solutions for and help the Government be basically an informed consumer.

I like to use the analogy of a building architect as the type of service we provide to the Government. The architect works for the client, not for—has no vested interest in who is going to build the building, and really make sure that the client's needs are met, that they can do trade-offs of the capability that they will be acquiring versus the constraints they have in terms of cost, schedule, and things like that.

So that is basically how we really work from the early concept all the way through to the test and evaluation.

Ms. HANABUSA. Thank you very much.

Thank you, Mr. Chair.

Mr. SHUSTER. Thank you.

And with that, Colonel West is recognized.

Mr. WEST. Thank you, Mr. Chairman and Ms. Hanabusa as well.

Gentlemen, thank you for being here; and, as I shared Dr. Cross, you know, my time selling Cokes at Georgia Tech was a great opportunity for me to learn some responsibility and, of course, get a chili cheese dog at the Varsity.

When I look—my alma mater is actually the University of Tennessee, and the University of Tennessee has a Defense Business Institute that is there. And so as I am sitting here and I look at the title here, "Getting Innovative Solutions from Concept to the Hands of the Warfighter," I would like to throw this idea out here and see what you all think about this. You know, if there is some kind of way that we could develop, you know, regional research and devel-

opment partnerships between, you know, our colleges and universities with, you know, the military—I will give you a great example.

Georgia Tech is not that far from Fort Benning. Fort Benning is now the maneuver warfare center for the United States Army. All infantry and armor is coming out of there. Or we look at the Research Triangle where Duke and the University of North Carolina is. Right down the road you have United States Special Operations—I mean, the Army Special Operations Command and the airborne, you know, forces there at Fort Bragg.

You know, is this a way that we can maybe streamline so we don't have these valleys of death or things like this, where we can develop these types of partnerships with our colleges and universities with these installations that are close by, you know, being Naval installations, Air Force or whatever, as we look across the country? So that we can start looking at, you know, if there is something that I am dealing with at Fort Benning, I want to see, you know, how can we take this concept and bring it to fruition, I can drive up the road to Georgia Tech, and the students at Georgia Tech or wherever can immediately come right down to Columbus. And that cuts down, you know, on the travel time and everything. So is that a viable solution to help us go from concept into the hands of the warfighter?

Dr. CROSS. Congressman, it is; and if I can give a couple examples of what we are doing in Georgia along those lines.

Specifically with Fort Benning, the State of Georgia supports both the infrastructure of Georgia Tech and our economic development outreach. So we have 27 locations throughout the State of Georgia, including a location in Columbus, Georgia. And one of the things that is going on right now with the National Guard in Georgia, Fort Benning's increasing emphasis, as you mentioned, the maneuver function that came from Fort Knox with unmanned vehicles, unmanned ground vehicles, if we go over to Warner Robins Air Force Base, they are the sustainers now for the Global Hawk and the Predator, so unmanned air vehicles. And if we go over to Kings Bay, just south of Savannah, there is a lot of emphasis in the Navy with undersea autonomous vehicles or intelligent torpedoes.

Much of that great work is done at the UARC at Penn State. So what we have done in the State of Georgia is we have set up a coalition, if you will, that involves the National Guard, the State government, the military operations in the State, and the research universities, Georgia Tech, but other research universities, to look at how do we bring, what—in a use-inspired research way, what are the open research issues that a research university can look at and how can we accelerate those research results into practice through that entire ecosystem, if you will?

There is another existence proof of where that works really well. If we go to—it is Robins Air Force Base—I am sorry—and the Warner Robins Air Logistics Center where the electronic warfare systems for the Air Force are maintained, and much of that research is done out of Wright-Patterson Air Force Base in Dayton, Ohio, and what we have developed at Georgia Tech is a great deal of forward-looking research in electromagnetics and electronic warfare,

but also through our applied research function, the Georgia Tech Research Institute, the institutional memory for electronic warfare systems in the Department of Defense. And we can upgrade those systems very quickly and then produce production plans that companies can take forward and produce, and we have many examples of where we have done that as well.

So creating these partnerships is very much key for addressing the valley of death and working closely with the warfighters, and it is spot on.

Dr. WINARSKY. Great question, Congressman West. I would say absolutely it would be highly valuable. I mean, SRI basically believes that innovation comes from learning from the customer. So customer need, building a differentiated technology approach, understanding the benefits to the customer, and understanding the competitive approaches to doing all those things. If we have those four ingredients, then we can create great value for the customer.

And in the case of what you just described, that would far better improve our ability to have those ingredients. We would understand the warfighter's needs. They would be right with the technologists. Otherwise, you have the separation. Oh, I am going to advance what I am doing, but I am not quite sure what it is good for.

It is a little like, you know, tech transfer without—what you suggested is a little like driving in a car where technology is behind you and business is in front of you and you are driving by looking in the rearview mirror. So what we need to do is more of what you suggested.

Dr. HUFFMAN. Well, I definitely agree.

I think Dr. Cross mentioned one of my favorite terms, use-inspired research, which is having a purpose to why you are doing research. In my role, I interact very frequently with our academic partners, and one of the things that they are really asking me for is help us understand what the real needs are. They want to work on things that ultimately they can see someone benefiting from in the future. So they are highly motivated to have that, but they just don't know how to connect to have a good avenue, and that is one of the roles that we try to play.

I think one of the other things that can help with such a mechanism, as you might suggest, one of the other things they lack often is connection to sources of data or information with which to test out their ideas. I can make anything work in a laboratory environment almost, but when you get out in the real world, things get messy, and they need to be able to acquire information and data to test their concepts, and very often there are barriers for universities to be able to access that kind of information and data.

Mr. WEST. I think that what you just talked about was an unmanned vehicle center of excellence, and if we could kind of have that type of synergy, I think it would go a long way.

So thank you, Mr. Chairman. I yield back.

Mr. SHUSTER. Thank you.

Mr. Runyan.

Mr. RUNYAN. Thank you, Mr. Chairman.

Gentlemen, thanks for your testimony today.

Dr. Winarsky and Dr. Huffman, you are kind of talking about the exchange of ideas, the need for them or a new idea. Dr. Winarsky, in that realm, give me an idea of percentage numbers of the original ideas or you are furthering a current technology.

Dr. WINARSKY. SRI has about 2,000 projects a year. We are continuing with all of those projects to serve the government requests. Sorry, not all, about 70 percent of those. The rest are commercial.

We create two or three ventures a year, but only because that is what—the ventures we create we expect or have to be potentially billion dollar companies in order to get Silicon Valley to invest in it. But then, in terms of transitioning to the warfighter, I am sure there is maybe 50 or so that—maybe more—that transition and make great success for the warfighter.

Mr. RUNYAN. In talking about—and I will have all of you eventually weigh in on this. But when you talk about the federally funded research—and, obviously, we know the budget crisis we are in, and I know all of us sitting on HASC, we deal with it on a daily basis. Because we are going to lose our next generation of colonels and all that kind of stuff when you have these drastic cuts. So can each of you kind of talk on whether we are—you know, where we are talking education, we are talking STEM and all that stuff, how that is going to affect our ability to move forward and that fine line that we have to walk. Dr. Huffman.

Dr. HUFFMAN. Certainly. I think the STEM education problem is not just a problem for DOD. It is a problem for our Nation as a whole. I think the number of engineering graduates, you know, continues to fall off.

It used to be that we lived for many decades on the intellectual capital provided by citizens of other nations who immigrated to the United States, were educated, and stayed here because this was where you could pursue a career in high technology and engineering. That is no longer the case. We have competitors in other countries who now welcome those people back to work in their industries. They are developing their own universities, not quite yet maybe to the level of ours, on average, but continuing to improve. That is great for the world in general, but for us as a nation and our competitiveness economically, I think science, technology, engineering, mathematics is critical for our future.

Mr. RUNYAN. Dr. Winarsky.

Dr. WINARSKY. I agree completely.

We have a terrific shortage of people in all of these areas. They are crucial for innovation, which is going to be the way that we create wealth and health and success for this country.

I would say that we are also seeing innovations in education itself that can help. Education is being transformed in e-textbooks. There is a course at Stanford right now, by the way, that is offered to 60,000 students simultaneously, one course.

So there is ways to teach a nation, even, and open this up to the world in ways that we never had before. But in terms of the crucial nature of bringing more students in the science, technology, education, and mathematics area, absolutely essential.

Mr. RUNYAN. Dr. Cross.

Dr. CROSS. I agree completely, Mr. Congressman.

Just personally, I was interested in becoming an engineer in the early 1960s in third grade when President Kennedy announced the moon shot, and, you know, I wanted to be part of that. That was exciting. That drove a whole generation of people going into science and technology.

We spent a lot of our volunteer time at Georgia Tech—and I know this is done at other nonprofits and research universities, too—going out into the public school system and trying to get kids interested in science and technology. One of the ways we have been able to do that quite effectively across the country is through robotics and supporting robotics clubs in schools; and kids get really, really excited about this. So showing them that there is actually a path and a future in science and technology is very critical.

Now, as was mentioned, at a research university like Georgia Tech, our product are the students; and one of the concerns I have about the future of S&T funding from the DOD is what would be really irreversible in terms of production of Ph.D. students that stay in this country and work. It takes about 10 years now to train a Ph.D. student, about 6 years for the education. Increasingly in engineering, post-doctoral assignments are required. It is common in the sciences. That is 2 to 4 years.

So from the time you start your graduate studies until you are actually hired as an assistant professor at an American university or a nonprofit or an FFRDC, you are looking at 10 years; and the cuts in funding will cut down the number of such students we can have.

So we really have two problems. One is getting kids interested in the first place, and the second one is the irreversibility if we cut out that pipeline.

Mr. RUNYAN. And I just—I brought that point up really to talk about because we always talk about hollowing out our force from the military operations aspect, how we now are a support force in the same manner, and it is really something. Because if there is no need for it—like you said, you know, if there is a need for it, there is interest in it, and people are going to gravitate toward it, and we have to be careful with that.

I yield back, Mr. Chairman.

Mr. SHUSTER. Thank you very much.

With that, I am going to yield another 5 minutes to Ms. Hanabusa. We outnumber her over here only in numbers, not in brain power.

Ms. HANABUSA. Thank you, Mr. Chairman.

Dr. Cross, I don't want you to feel left out. You made a statement about what we needed to do was the ability to do research for future needs of the military.

Dr. CROSS. Right.

Ms. HANABUSA. And I am just curious, because this has been an issue for me, is what is the military going to look like in another 20 years, 30 years, and how do we define it. So when you say to address the future needs, and we know research begins and it takes a long time before we get the final product. I think an example we have is like F–22s, 17 years in the making, or something along those lines.

Dr. CROSS. Right.

Ms. HANABUSA. So can you tell me in your mind when you made that statement, who do you feel defines the future needs?

Dr. CROSS. Well, it should be defined in——

Ms. HANABUSA. And don't say us because——

Dr. CROSS. It should be defined by the user, Congresswoman. The warfighter should be the ultimate source. And if we use this valley of death metaphor and visualization of it, we should be on the far side of the valley of death, looking and trying to understand what the users are going to need.

There is examples from military history. One I like to cite is at Maxwell Field in Montgomery, Alabama, back in the 1930s. It was before there was an Air Force. It was the Army Air Corps. And they knew that in a future combat that daytime high altitude bombing was going to be required, so the military was training and they were testing systems there before we had engines that were powerful enough to lift an aircraft to 25, 30,000 feet.

So that is an example of a venue for innovation where the warfighters and everybody connected to that was working together, and that was driving the technology requirements where there was missing technology, and that drove the research.

At Wright Field in Dayton, Ohio, when they first built an aircraft with engines that still weren't powerful enough, they built the runway up a hill so the airplane could get enough velocity coming down the hill just to get it up into the air and test these systems.

So I am not saying we should do things at that high risk, but these venues that are created to brainstorm—Skunk Works would be another term for that—to look and brainstorm about the future.

Ms. HANABUSA. We went to Skunk Works.

Dr. CROSS. Okay.

Ms. HANABUSA. But the other thing—and, Dr. Cross, the other thing I throw into this is the fact that almost every single person who has spoken to us—and the most recent was I believe General Chiarelli. He said, the one thing that you can count on is the fact that what we have been 100 percent perfect on is that we have been 100 percent wrong in predicting what the war is going to look like.

Dr. CROSS. Uh-huh.

Ms. HANABUSA. So, for example, we were beginning Afghanistan and Iraq with World War II technology. And so I guess that is the concern. We know what we needed in Afghanistan and Iraq, but is that what the warfighter is going to need in the future? Because we may not be in that arena. So how do we define it?

And you made also a statement that the U.S. needs to be aware of developing technologies worldwide.

Dr. CROSS. Right.

Ms. HANABUSA. Are you aware of anything in government or someone? Is your entity, for example, actually studying what is going on worldwide in terms of defense type of technology?

Dr. CROSS. Well, in terms of technologies for materials, electronics, absolutely.

We, for 22 years, have had—I didn't put this in my written testimony, but it is on our Web sites. We have had a campus in Europe, in France. We have partnerships in China, in Singapore, in Ireland, and Panama. Researchers today, regardless of any of the or-

ganizations they are in, this is a global pursuit, and your colleagues doing research are going to be at the best universities, the best research organizations worldwide. So to have credibility, you are going to be interacting with them, and that is very important. So, absolutely, we are engaged in research on a worldwide basis.

Ms. HANABUSA. And this is one that I am going to ask every one of you to answer.

One of the concerns everyone has, of course, is that as the defense budget begins to collapse or we start to cut the defense budget, and normally one of the things that always gets hit first is research and development, that seems to be one of the categories that gets cut. If there were to be major cuts, how would that affect the number of actual professors or people employed at Georgia Tech?

Dr. CROSS. Sure, Congresswoman, if I could respond, it is going to be linearly related to the cuts. So you could—we are very competitive in terms of receiving defense research funding. It is about a third of our overall research portfolio. And for a proportional cut, there will be a proportional number of faculty and, more importantly, graduate students. Faculty are not completely supported by research. Usually, they are covered for 9 months by the tuition and by the State support in a public university or by whatever the budget is for a private university. But it is traditionally 3 months that they are trying to cover with research support. But the graduate students will be cut, and that will be—and, to be honest, that is where the real innovation comes from, the younger people who are driven and willing to work 20 hours a day and 7 days a week.

Ms. HANABUSA. How much of your budget is defense related?

Dr. CROSS. Approximately one-third of our research portfolio. Our research portfolio was $643 million last year. It is approximately $230 million in defense-related research. That is not all basic research. That includes 6.2 and 6.3(a) as well.

Ms. HANABUSA. Dr. Winarsky.

Dr. WINARSKY. Yes, so the question you want me to answer is, given major cuts, how would SRI respond?

Ms. HANABUSA. Right.

Dr. WINARSKY. My feeling is it would be worse than linear. And that is because SRI has and hires people here in Silicon Valley, in one of the most difficult places on the planet to recruit great engineering staff, given Google and Apple and Microsoft and everyone else around us. And should there be this decline, it has an effect on the staff that says, you know, this is harder and harder to do something that we want to do greater and greater.

By the way, during a period of time that we have never seen greater market disruptions. Market disruptions are happening in mobile, bio, in cyber security and everywhere else. So the impact will not only reduce the staff for working on R&D for the Government. It will encourage them to go elsewhere. So we would very much like not to see a reduction.

Ms. HANABUSA. Dr. Huffman.

Dr. HUFFMAN. Yes, I think certainly we would obviously be affected by significant decreases in proportion. I think we would expect that.

I think, also, as my colleagues said, the desire of talented engineering professionals to come and work for an organization which

primarily supports the government and particularly the DOD and declining defense budget will be very difficult. They will seek opportunities elsewhere in the commercial sector because they perceive that as more stable, more opportunities to move up, particularly if they are early in their careers. So I think that would probably be a bigger impact than the direct reduction in our work, would be the perception of the workforce that maybe this is not the career path for me.

Ms. HANABUSA. Thank you.

Thank you, Mr. Chair.

Mr. SHUSTER. One more quick question. As far as compensation between—I would assume scientists and researchers in the Government make less than you folks pay versus what Google and Microsoft, would that be accurate?

Dr. WINARSKY. Yes.

Mr. SHUSTER. Significantly? Do you pay significantly more than a government researcher or scientist would make versus—significantly more than government?

Dr. HUFFMAN. Well, again, I don't know the government pay scales, so I can't comment on that.

Mr. SHUSTER. It can't be more than about $175,000.

Dr. HUFFMAN. We are in a competitive market for talent, and we work very hard to try to understand, you know, what the market is paying that talent so that we can attract and retain those individuals. But primarily in an organization like ours you find a lot of the motivation of the staff is really about the missions we support, and they are closer to being—you know, desiring government service than making huge amounts of money in a start-up.

Mr. SHUSTER. Go for all three of you basically?

Dr. CROSS. Mr. Chairman, your rankings there are accurate. I would just point out one of the things that all of our organizations do is public service is important, and we support people coming back into government service from our organizations under the—with the Inter-Personnel Act [Intergovernmental Personnel Act Mobility Program], the IPAs. And so this is one of the ways that the government is able to have the high-caliber, relevant technical capabilities that it is able to have. But, you know, it is capped, too, in pay for doing that.

Mr. SHUSTER. Right.

Dr. WINARSKY. One of the other ways we are able to retain staff and—again, in this most difficult environment—is, when we do create a venture or a license, SRI rewards a share of the royalty or equity to the staff. So even though we don't have any ourselves as a nonprofit, when they help create and innovate, they are motivated by helping make that happen.

Mr. SHUSTER. Right. Thank you.

And, with that, Mr. Schilling.

Mr. SCHILLING. Thank you, Chairman.

Welcome. Sorry I was late. I was helping my wife get six kids to the airport. Pretty good excuse, I guess.

So let me—I guess what I am trying to figure out here—so would you say basically what we are saying is to get rid of death valley or minimize it, basically by taking the end user or the warfighter

with the researcher and get those folks basically together, is that pretty much what we are saying?

Dr. WINARSKY. That is one way.

So another way—that is a direct way. Here is the warfighter. Here is the technology. Let's get together.

Another way is commercialization, and then the warfighter can buy it off the shelf, basically. The GPS [Global Positioning System] is a good example of that or Siri or mobile phones or any of those other technologies. We do both at SRI.

Mr. SCHILLING. Okay, very good.

I know this will probably range all over the place, but what is the average time from concept to the end product from research?

Dr. CROSS. Congressman, it does range all over the place, but if I could just pick up on my colleague's comment about the commercial sector. The commercial sector is incentivized to be fast and to get products into the marketplace. Plus, the investment they make in maturing the technology is much higher than you can typically make in the DOD, which now gives the DOD a competitive advantage of buying back commercial products at a lower cost than they could possibly do over the long life cycles that the acquisition process kind of subjects everybody in the DOD to.

Having said that, I have to point out that the DOD is better than other government agencies. So that is one answer to that.

But industry, it is the speed of the market, how quickly can you get it to the marketplace.

Mr. SCHILLING. Very good.

Mr. Cross, you had mentioned in the testimony—and I just want to clarify this—Georgia Tech's research expenditures were $643 million.

Dr. CROSS. That is correct.

Mr. SCHILLING. Did you say about a third of that money goes to DOD?

Dr. CROSS. That is correct. And I could get you the correct numbers. About 40 percent of—I have to do these numbers correctly now, because I have to break them down. It is approximately one-third that is based on defense sources. I would say about 10 percent of that is related to basic research, quite a bit of the supply, 6.2, and then development work that we have as subcontractors to defense contractors, for instance.

Mr. SCHILLING. Okay, very good.

As you pointed out, we are in a time of budget crunching, I guess you might say. How do we ensure that we maintain the competitive edge when we cannot fully fund all the research that is needed?

Dr. CROSS. Congressman, if I could—part of it is not being able to predict exactly what is needed, but having the capacity to produce options for the future is one of the things we need to think about doing. If we look at the definitions of basic research and applied research that are used by the DOD, it is to create understanding and knowledge of phenomena and of opportunities. So that doesn't mean it has to be created inside the DOD. We need to do a much better job I think also working with our international colleagues and technology scouting. Wherever those ideas come from. This I think is a perceptive innovation, casting the net wide, crowd sourcing, looking for ideas anywhere, and then being able to

realize that those are good ideas and apply them in this use-inspired research methodology.

Mr. SCHILLING. Very good.

Mr. Winarsky, I have got—I am one of the new kids on the block like these three are—well, two guys.

Mr. WEST. He is big enough to make two.

Mr. SCHILLING. He is two of us.

How are FFRDCs created? And then basically—maybe this could be for Mr. Huffman—and how do we narrow down which projects that they research, I guess?

Dr. HUFFMAN. FFRDC—there is a section of the Federal Acquisition Regulations that cover the creation of FFRDCs. They are basically to be employed whenever the Government can't acquire the services either from in-house resources or from normal means. So there has to be a special reason to do it.

Basically, an FFRDC is created by a government agency when they have such needs. There is a very tight governance process—or definitely should be—in terms of the operation of FFRDC to ensure that the work performed by the FFRDC is meeting those special needs. In the case of the Department of Defense, Congress has chosen to limit the size of the FFRDCs that the DOD employs, and DOD has a comprehensive management plan that governs how the work is selected and how the governance process works.

Mr. SCHILLING. All right. Very good.

I yield back the 2 seconds of my time.

Mr. SHUSTER. Thank you very much.

A couple questions concerning who you mainly work with, do business with, the three of you. Are they mainly dealing with the large primes or do you go down from large primes all the way down to the mom and pop who is developing something in his garage? Who are you working with out there?

Dr. CROSS. Go right down the line.

We work with most of the DOD research organizations, DARPA and the laboratories on their competitively selected awards. We have master agreements with most of the large defense companies—the Boeings, the Lockheed Martins. We will work directly with them, both the transition technology and to be subcontractors on their projects.

And we also in the State of Georgia try to work with small companies that either spin out of research universities or locate there and plug into the State infrastructure for that support. So we work with everybody, sir.

Mr. SHUSTER. The majority of the work is being done, obviously, with the primes, because they have the majority of the work.

Dr. CROSS. Well, the 6.3(a), the development work, is done with the primes. There will be a subject matter expert on some aspect of the technology. With the DOD laboratory and research infrastructure, we work on grants and contracts that are competitively selected and awarded by those organizations like a DARPA or an Air Force research laboratory.

Dr. WINARSKY. About the same as Dr. Cross mentioned is what we do.

I would also add some of the companies we work with we create, we incubate and make companies that we then spin off, and then they sell to the warfighter or to commercial.

Mr. SHUSTER. How does a company come about, one person with an idea?

Dr. WINARSKY. No, we have a rigorous process—it sounds again strange to have a rigorous process of innovation, but, in fact, we do it to help the process. So we start with the market need. We create a commercialization board. That board reviews and incents by funding, helps recruit team members to the venture, helps define the value proposition and so on. And then we move that along to create the venture—usually venture capital work as well, investors.

Dr. HUFFMAN. Well, we work exclusively for the Federal Government in terms of who pays us. We interact with all of the above, certainly with the large prime contractors all the way down to very small organizations. We are primarily in the information technology business, so it may take a lot more wherewithal to build an F–35 than it does to develop the software application that can be employed by the DOD.

Mr. SHUSTER. And how do you—I guess you are working with the Federal Government exclusively. How does industry know what is available to work with you folks? Do you have a program of education, of marketing? I don't know what you would call it.

Dr. CROSS. We have an array of services here. We have strategic partnerships through master agreements with many companies; and, frankly, we leverage our alumni network quite a bit at Georgia Tech, too. We pride ourselves on people that have gone into the executive ranks of major companies. The State of Georgia and their Department of Economic Development is on our campus, and they are very proactive in advertising to companies on our behalf. Most research universities, their reputation speaks for themselves as well. So that is very helpful.

We also have some specialized contracts. I will just cite one that I did in my testimony. It is called the Military Sensing Information Analysis Center. It was a contract we won from the Defense Technology Information Center, DTIC, and it is the repository for defense sensor technology. It goes back to the 1950s. And so we are a dissemination service on behalf of the DOD for information in this area as well, and any industry in the United States can come in and use the services there. It is like an online library. So, many different approaches.

Dr. WINARSKY. We also have a diverse number of approaches, strategic partnerships working closely with the DOD awards, working and talking to our peers and friends and going to conferences, all of that.

Mr. SHUSTER. Do you play a role, if any, in technology transfer from the Federal labs?

Dr. CROSS. The one example I can give you, it is not a DOD laboratory but the Department of Energy laboratories. We are in a partnership with Oak Ridge National Laboratory and working very closely with them in high-performance computing. We have faculty in our college of computing that are deployed there.

But there are not many instances that I can point to elsewhere. I think most of the instances that I have heard about and seen from my own military time is where there is unique infrastructure or colleagues, but it is most of our efforts like at SRI are trying to take the intellectual property that we are allowed to own through the Bayh-Dole Act and accelerate it into commercialized activities.

Mr. SHUSTER. All right.

Dr. WINARSKY. We may work on occasion with some of the DOE labs. Argonne might be an example of that. To my knowledge, I don't know of many instances.

Mr. SHUSTER. You had mentioned, Mr. Winarsky, about taking this technology and you needed to—billion dollar companies to deal with. I just wondered if any of you are familiar with the Army Venture Capital Fund?

Dr. WINARSKY. I have heard of it, yeah.

Dr. CROSS. I have heard of it as well, but I don't have——

Mr. SHUSTER. No experience with it at all?

Dr. WINARSKY. We were supposed to be responsible for that fund, but we lost that competition.

Mr. SHUSTER. Okay. I learned about it—I don't know where we were—in Hawaii or somewhere in the last week or so.

I have no further questions. I don't know if any other folks on the panel do.

Mr. WEST. Just one.

Mr. SHUSTER. Sure.

Mr. WEST. Thank you, Mr. Chairman.

Do you all get the opportunity to go over to the combat theaters of operation maybe to get an opportunity to see some of these tools that are being implemented in the theaters—Iraq, Afghanistan, Kuwait, wherever?

Dr. HUFFMAN. I haven't personally done that, but we have a number of people who do that on a regular basis.

Dr. WINARSKY. Same with SRI.

Dr. CROSS. Okay. It is ad hoc, but through these advisory boards like the Defense Science Board, their opportunity.

But one of the things that I want to commend the DOD for is a program that they run through DARPA—and I believe it is through the Institute for Defense Analyses—that recruits young scientists from all of our organizations to have that experience, to go out into the theater, to go out to the national test range, to learn what it is like to carry 120-pound packs, so we need to do more research on batteries, et cetera, et cetera. So those programs are extremely valuable for providing the young researchers the opportunity to understand what use-inspired research is all about.

Mr. WEST. And last question, what do you think are the two most critical or vital areas where the not-for-profits and with your capability and capacity can help the Department of Defense in research and development? If you look across the different type of battlefield functions, where do you think the top two, where you guys can really have the most impact?

Dr. WINARSKY. Persistence surveillance is one. We can have a tremendous impact in deploying. And cybersecurity is another.

Dr. CROSS. In our case, Congressman, it is going to be many specific areas. Autonomous systems will be one, for reasons for a pre-

vious answer to a question. Certainly cybersecurity for the future. And then I think the next generation of electronics and some of the materials that we are developing would be very important as well.

Dr. WINARSKY. Robotics, by the way, is going to have a major impact as well.

Dr. HUFFMAN. Our area is information technology, and cybersecurity is one of the top areas that I think we are trying to make a contribution, as well as intelligence surveillance, reconnaissance, and communications, moving large volumes of information and turning it into information that the warfighters can use.

Mr. WEST. Thank you, Mr. Chairman. I yield back.

Mr. SHUSTER. Thank you.

Anybody else?

Ms. Hanabusa. Sure, go ahead.

Ms. HANABUSA. I have a question.

Mr. SHUSTER. Sure.

Ms. HANABUSA. Dr. Winarsky, Dr. Cross gave us an idea how much of his research budget is DOD. Can you tell me how much of whatever—I know you are a nonprofit, but how much money comes in that is DOD related?

Dr. WINARSKY. In terms of total government, it is about 70 percent. That includes—my guess is about 20 percent is NIH [National Institutes of Health] and NSF [National Science Foundation]. So it is 40 to 50 percent, somewhere in that range probably, with the DOD.

Ms. HANABUSA. And can you tell us what that equates to in terms of money?

Dr. WINARSKY. Total budget for SRI is about—total revenue, rather, is about $600 million a year.

Ms. HANABUSA. Thank you.

And do you have any ideas about how many—you have 2,100 employed people. So do you know about how many of them are actually working on DOD-related matters or are they just all cross-trained, that you can't say?

Dr. WINARSKY. No. I am trying to think. There are five divisions, and I would say three out of five, but one is much larger, so I would say somewhere around 70 percent are DOD.

Ms. HANABUSA. Thank you.

And we know, Mr. Huffman, you are totally government, but can you give us an idea for MITRE how much is your budget and how much you think might be affected? And, also, of the FFRDCs that you actually supervise, if I understand where you oversee, how much that equates to in terms of money, too?

Dr. HUFFMAN. Okay. Overall, the DOD provides about 60 percent of MITRE's revenue. We manage five FFRDCs, one for the Department of Defense, one cosponsored by the Internal Revenue Service and the Department of Veterans Affairs, one sponsored by the Federal Aviation Administration, one sponsored by the Department of Homeland Security, and one sponsored by the U.S. courts.

Ms. HANABUSA. How much does that equate to in terms of money?

Dr. HUFFMAN. Total about $1.35 billion annually.

Ms. HANABUSA. And that is all of MITRE?

Dr. HUFFMAN. All of MITRE.

Ms. HANABUSA. And 60 percent is DOD?

Dr. HUFFMAN. Roughly $950 million I think is DOD.

Ms. HANABUSA. And of the FFRDC that you said is DOD, do you know how much money that is——

Dr. HUFFMAN. Approximately $950–$980 million.

Ms. HANABUSA. Thank you very much.

Thank you, Mr. Chair.

Mr. SHUSTER. Thank you, and thank all of you for being here. We appreciate you taking the time and helping us try to understand this.

Again, we look forward—I know the staff may be contacting you with some further questions for clarification, so we appreciate any help you can give us.

Thank you all very much, and this hearing is adjourned.

[Whereupon, at 4:16 p.m., the panel was adjourned.]

A P P E N D I X

JANUARY 23, 2012

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

JANUARY 23, 2012

Statement by Chairman Bill Shuster,
Panel on Business Challenges within the Defense Industry

Hearing on "Doing Business with DOD: Getting Innovative Solutions from Concept to the Hands of the Warfighter"

January 23, 2012

Good afternoon. The House Armed Services Committee panel on Business Challenges in the Defense Industry meets today to continue our dialogue regarding the health and future of our nation's Defense Industrial Base.

Today, we are specifically looking at how the DOD executes research and development activities in order to get innovative tools and technologies from academia to the warfighter. Typically, when we think about that process, we focus on the many businesses out there working to build things that support our national defense. But equally important to the industrial base is the role that universities, non-profit research institutions, and federally funded research and development centers (FFRDCs) play in bringing new scientific discoveries to market.

In the many roundtables we have conducted with industry, a constant refrain has revolved around the problems in bridging the so called "valley of death" in transitioning good scientific ideas and prototypes to actual production in programs of record. We hope that our witnesses today will be able to shed some additional light on problem, and will hopefully make recommendations on how to improve the overall technology transfer and transition process.

While industry is the maker of things, universities and research institutions are the makers of new ideas. Without the cross flow of ideas, technical expertise, and manufacturing capacity and capital, most of the great innovations in the marketplace today simply would not exist. Businesses, in particular small businesses, may be the backbone of this economy, but they rely on a robust pool of new scientific ideas to create new commercial opportunities and keep the nation's economy competitive. Looking at how that process can be better supported is why we are here today.

We have three terrific witnesses with us today to explore this topic and shed insight on how we might leverage those resources better. We have:

Dr. Stephen E. Cross
Executive Vice President for Research
Georgia Institute of Technology

Dr. Norman Winarsky
Vice President, SRI Ventures
Stanford Research Institute (SRI)

Dr. Stephen Huffman
Vice President and Chief Technology Officer
The MITRE Corporation

I'm looking forward to the discussion with this distinguished panel. Before I turn things over to the minority for any remarks, I'd like to take a second to introduce the summaries from the roundtables we held in New Jersey, California and Hawaii. Without objection those summary memos will be included in the record.

With that, I'd like to recognize the minority for any comments they'd like to make.

Statement by Ranking Member Rick Larsen,
Panel on Business Challenges within the Defense Industry

Hearing on "Doing Business with DOD: Getting Innovative Solutions from Concept to the Hands of the Warfighter"

January 23, 2012

Thank you, Mr. Chairman. I'm pleased to be joining you and the other panel members here today.

Today's hearing focuses on how the Department of Defense executes research and development activities in order to get innovative tools and technologies from academia to the warfighter.

Innovation from the defense industry, from Federally Funded Research & Development Centers (FFRDCs), University Affiliated Research Centers (UARCS), and non-profit organizations has long been a cornerstone of our nation's military dominance. The ever-increasing technological complexity of modern weaponry, derived from the transfer of sound science and technology research into manufacture-able weapons systems, has continued to revolutionize how we fight and win wars.

In the weeks and months ahead, the HASC will hear from senior leaders at the Department of Defense on what their budget priorities are for FY2013. As a part of these discussions with DOD, the importance of science and technology will certainly be discussed. We must continue to fund S&T at levels that will allow our nation's thought-leaders to continue supplying our fighting women and men with world-class weapons systems.

The innovation that comes out of FFRDCs, UARCS, and non-profits cannot be an afterthought to our national security and budgeting strategy. Military capabilities that we rely upon – Intelligence, Surveillance, and Reconnaissance (ISR) capabilities; unmanned weapons systems; and the multitude of space and cyber space capabilities employed by our armed forces, were first envisioned decades ago without practical applications to tactical military operations. Today, these capabilities are paramount to the new military strategy recently released by DOD.

As highlighted by the military strategy, the threat environment we face continues to evolve, and the tools needed by our armed forces to meet these threats must, in turn, also evolve. Investing in science and technology and then

transitioning those investments into our weapons arsenal is essential to meeting our varied threats.

This Panel has the responsibility of recommending actions to not only bolster the existing defense industrial base supporting our military, but to also take steps towards creating a 21st century defense industrial base that is more diverse, more agile, and more able to respond to an array of potential threats.

This past year, the House Armed Services Committee took positive steps towards helping FFRDCs, UARCS, non-profits, and defense companies quickly conceptualize, design, prototype, and eventually field weapons systems that are used by the warfighter overseas by authorizing up to $200M for the Rapid Innovation Fund.

I would like to thank each of our witnesses for appearing before the Panel this afternoon.

I hope they offer the Panel a brief overview of what they feel are the key elements hindering innovation in the defense sector and what steps this panel can take to reverse that trend.

I am also interested in hearing from our witnesses about what steps DOD can take to better transition technology from basic and applied research, and how that research can be inserted into weapons systems.

Thank you to Dr. Cross, Dr. Winarsky, and Dr. Huffman for their participation this afternoon and I look forward to hearing from each of you.

Thank you again, Chairman.

Testimony of

Dr. Stephen E. Cross, Executive Vice President for Research
Georgia Institute of Technology, Atlanta Georgia

before the

House Armed Services Committee Defense Business Panel

January 23, 2012

Chairman Shuster, Ranking Member Larsen, and members of the House Armed Services Committee Defense Business Panel, my name is Dr. Stephen E. Cross and I serve as the Executive Vice President for Research of the Georgia Institute of Technology. I am honored by your invitation to present this testimony to provide a perspective on the role that universities, research institutions and laboratories play in developing innovative technologies for the Department of Defense (DoD), and specifically how those organizations support DoD laboratories and private sector companies in transitioning research from academic concept into production. I will do this from the perspective of someone who has served in leadership positions at two major research universities, has participated in many related studies on DoD advisory boards, and has held several leadership positions in DoD research organizations. I will first provide a brief overview of my background and that of my university. I will then cite examples of how the results of sponsored research benefit and support DoD organizations, how these results transition to use in the DoD and the private sector and provide a brief overview of innovation best practices and how they are applied in an overall strategic approach at a major research university. The summary section will explain why this is critically important in our current uncertain and rapidly changing world.

Personal and University Background

My work for the past 29 years, including my R&D assignments as a military officer, has focused on technology transition. I currently serve as a member of the Defense Science Board (DSB) and I am a past member of the Air Force Scientific Advisory Board (AFSAB) and the Defense Advanced Research Projects Agency (DARPA) Information Science and Technology (ISAT) panel. I have led and participated in many studies related to defense research and technology transition including two recent studies on the topics of disruptive innovation and organizational adaptability. I received a Ph.D. degree in electrical engineering from the University of Illinois Urbana-Champaign in 1983 while serving as an officer in the United States Air Force. I retired from the military in 1994 while serving as a program manager at DARPA. The research I supervised at that time was recognized for its innovation and impact through accelerated transition into fielded applications during Operation Desert Storm. Subsequently, I was a research faculty member and the Director and CEO of the Software Engineering Institute (SEI) at Carnegie Mellon University in Pittsburgh, Pennsylvania until 2003. The SEI is a DoD Federally Funded Research and Development Center (FFRDC) focused on the transition of research on best practices in software engineering and cyber security. Over 5,000 organizations worldwide have adopted practices attributable to SEI related research.

In 2003, I became the director of the Georgia Tech Research Institute (GTRI), the applied research arm of the Georgia Institute of Technology (or Georgia Tech as it is more commonly known). Unlike FFRDCs located at major universities, GTRI is constituted as a college level unit within Georgia Tech and competes with the rest of the research community for sponsored awards. With a staff of more than 1,500 and unique laboratory facilities on the main campus (including space for classified work), it supports an extensive program in defense-focused research for many of the DoD laboratories and many other research organizations (e.g., DARPA). Its technical staff consists of subject matter experts (SMEs) who also hold

faculty status within Georgia Tech. As SMEs, the faculty is equally comfortable engaging in fundamental research with their college colleagues in a broad area of technical areas as they are in applying research results to solve hard problems for DoD clients and other industry stakeholders. Prohibited by policy as a nonprofit state-supported institution, GTRI does not compete with industry, but has effective approaches (e.g., transition of production and manufacturing plans, information dissemination programs) to facilitate technology transition and adoption. As stated, GTRI is an integral part of Georgia Tech.

I assumed my current role in 2010, a position responsible for guiding and implementing a research strategy for the Institute. Georgia Tech is one of the nation's top research universities, distinguished by its commitment to improving the human condition through advanced science and technology. From its Atlanta base, Georgia Tech provides a technologically focused education for more than 20,000 undergraduate and graduate students. Its engineering college is the largest in the United States and it supports affiliated degree programs at the undergraduate and graduate levels in architecture, business, computing, humanities and the liberal arts, policy and international affairs, and the sciences. Its professional and executive education program is one of the largest in the country. Georgia Tech leverages its state-supported economic development arm, the Enterprise Innovation Institute with its staff of 225 economic development professionals, to assist in the transition and use of research results in various commercial markets that are strategically important to the State of Georgia.

Research Strategy of Georgia Tech

In FY2011, Georgia Tech's research expenditures were $643 million, of which 65% was attributable to federal sources. It ranked as the #3 producer of patents in Georgia, behind AT&T and Kimberly Clark,[1] and #8 in the country among research universities in economic development impact.[2] During this year, it was granted 78 patents and it created 17 new companies through its internal incubator. These companies attracted $100 million in start-up funds from the private sector and resulted in 583 new jobs. In addition, Georgia Tech managed 980 contracts with companies and transitioned 127 technologies. The State of Georgia also invested directly to support research and economic development (including support for research and labs and other infrastructure). Collectively, the non-defense resource base represents significant leverage and amplification of funding provided by defense research organizations via competitively selected awards.

Georgia Tech pursues a research strategy across its integrated research enterprise focused both on leading-edge, use-inspired research and economic development. This strategy recognizes that technology development and transition is not a sequential and linear process. Georgia Tech pursues a concurrent strategy focused on strategic theme areas, such as national security, biomedicine, food processing, and manufacturing. Concurrency means that teams of faculty, graduate students, application and economic development experts, and professional staff work together to define and pursue grand challenges, meet and exceed the expectations of research sponsors, foster early engagement with industry, and accelerate the maturation and transition of technology. It should be noted that to accomplish this, a balance is required between high-risk, discovery-focused research, and economic development and transition activities. Not every research task is successful. Research is an experimental pursuit where new insights and fundamental learning often come from failure. The balance sought is to engender and support a culture that blends high-risk, discovery-focused research with early identification of commercialization potential. Another way of stating this is that Georgia Tech's approach to technology transition blends

[1] http://www.uspto.gov
[2] http://www.autm.net/FY_2009_Licensing_Activity_Survey/5879

best practices in sustained and disruptive innovation.[3] This will be further illustrated throughout the remainder of this testimony.

A key reason that Georgia Tech is able to achieve such economic development impact is due to an alignment of federally sponsored programs, support from the State of Georgia, and an active industry outreach program. Through a unique public-private partnership called the Georgia Research Alliance,[4] the State of Georgia provides support for 65 eminent scholars at Georgia Tech and four other universities in Georgia, and for Venture Lab incubators at each Georgia research university. In addition, with state support, Georgia Tech manages the Advanced Technology Development Center which supports over 500 small companies through the state, hosts the NIST Manufacturing Extension Program in Georgia, and provides the home site for the state's Department of Economic Development.

Furthermore, the state has partnered with industry to create unique venues[5] to support key markets to Georgia, such as a building for innovation and research translation to the food processing industry.[6] Similarly, with the help of a construction grant from that National Institute of Standards and Technology, Georgia Tech is constructing a Carbon Neutral Energy Systems building that will serve as a model for collaborations between research universities and global energy companies.[7] As noted by Google CEO Eric Schmidt in a June 2010 CNN special on innovation, such facilities are crucial for supporting technology transition, recognizing and supporting game changing innovations, and in realizing economic development impact.[8]

Examples

Three examples will illustrate how Georgia Tech supports and translates defense research through technology transition and innovation programs. The practices are codified by a national academies sponsored private-public partnership known as the Government-University-Industry Research Roundtable (GUIRR).[9] It is also illustrates the direct benefits afforded by the Bayh-Doyle Act of 1980. As described in a background paper by the American Association of Universities,[10] before 1980 there was little demonstrable economic benefit from federally sponsored research. The Bayh-Dole Act in 1980 provided that universities and other non-profit research organizations can elect to take title to inventions arising from federally-funded research provided that they take steps to ensure utilization. Among other things, Bayh-Dole requires institutions to license new technologies for US manufacture (or in the US) and retain for the US Government the right to practice inventions royalty-free for government purposes.[11] The number of patents issued to US universities doubled by 1985 and the most recent economic development indicators cited by the Association of University Technology Managers (AUTM)[12] shows incredible rapid escalation since that time.

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[3] Sustained innovation involves incremental enhancements to products and/or processes. Disruptive innovation involves game changing breakthroughs. As described by Clayton Christenson in his book *The Innovator's Dilemma* organizations that have a commanding market position typically focus on incremental innovation in order to meet near term stakeholder need and to maintain market share. It is not uncommon for such organizations to miss the next big thing. There are many examples of this throughout military history too.

[4] http://www.gra.org

[5] Often called "skunk works" patterned after the famous Lockheed facility from an earlier era, see Rich, B. and Janos, L. (1996). Skunk Works. Boston Little, Brown & Company, ISBN 031674[illegible]

[6] http://www.fpt[illegible]

[7] http://www.gatech.edu/newsroom/release.html?[illegible]48988

[8] http://www.youtube.com/watch?v=UsxMxXX[illegible]

[9] http://sites.nationalacademies.org/PGA/guirr/index.htm

[10] AAU Report on *Understanding University Technology Transition*, www.aau.edu/WorkArea/DownloadAsset.aspx?id=1158

[11] The second part (requirement to license for US manufacture) is an often overlooked, but crucial feature of this legislation.

[12] http://www.[illegible].org/FY_2009_Licensing_Activity_Survey/5879

Example 1 - Direct Support to the DOD: Georgia Tech pursues a broad array of basic, applied, and development R&D activities in partnership with the DoD laboratories and research organizations. Three excellent recent examples involve sensor technology, advanced information technology, and technology related to autonomous systems.[13] In each area, Georgia Tech's fundamental research has been well described in the technical and popular literature. Space will not be allocated here to describe it but references are provided. In the case of sensor technology, Georgia Tech manages an information dissemination and support service for the Defense Technology Information Center (DTIC) called the Military Sensing Information Analysis Center (SENSIAC).[14] SENSIAC holds 10 conferences a year for the defense research community and it also provides direct transition services and information to defense organizations and industry.

Similarly, the extensive body of information technology and electronics work has resulted in quick response innovation programs for DoD logistics centers and the National Guard. A well-known result is Falcon View, the standard military mission planning mapping system.[15] Another recent example shows how GTRI responded quickly to an urgent operational need by going from design, test, and delivery of production plans for an electronic warfare upgrade for the A-10 aircraft deployed to Afghanistan.[16] GTRI produced production plans that were made available to DoD contractors for the full-scale production. Similarly, GTRI also works directly with the National Guard, including a forward presence in Tucson, AZ to support rapid integration of new technologies to the F-16 aircraft.

In the area of autonomous systems, Georgia Tech faculty and students are engaged in leading edge research.[17] Significantly, GTRI is also involved in thought leadership about how to bring modeling and simulation techniques to support improvements through its work on a test and evaluation roadmap for the DoD. These are but a few examples of how Georgia Tech engages in leading edge research sponsored by the DoD and works aggressively to accelerate the maturation and transition of results to use in the defense community.

Example 2 – Leveraged Benefit to DoD Research: Georgia Tech receives research sponsorship from many other federal sources and industry stakeholders. For example, Georgia Tech has participated in several Engineering and Research Centers (ERCs) and other research centers for the National Science Foundation in areas spanning nanotechnology, materials, and biomedical devices.[18] Similarly, Georgia Tech is engaged in leading-edge energy research sponsored by the Department of Energy. As mentioned, NIST is providing funding to support the construction of an industry scale facility at Georgia Tech for carbon capture research. Georgia Tech also manages the NIST Manufacturing Extension Partnership (MEP) for the State of Georgia. Additional sponsors include the National Institutes of Health, the Department of Homeland Security, and NASA. Collectively, the research conducted across the Georgia Tech enterprise compliments and benefits the portfolio of work sponsored by DoD organizations.

There is another important aspect of Georgia Tech's overall research sponsorship. It has enabled the support of a world class faculty that provides global thought leadership in many areas. The US no longer retains dominance in research. But faculty, coupled with a diverse international graduate student base, understand and leverage (and often lead) research on the global stage. Increasingly crowd sourcing methods are used to "cast the net wide" to foster a generation of innovative ideas and to engage a global research community to establish critical mass with which to attack a fundamental problem. This is an important means to leverage investment, to provide thought leadership, and to understand trends.

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[13] http://www.gatech.edu/research, http://www.gtri.gatech.edu/history/innovations
[14] https://www.sensiac.org
[15] http://www.falconview.org
[16] http://www.gtri.gatech.edu/news/fly-mad-disciplinary-gtri-team-tackles-urgent-air
[17] http://spectrum.ieee.org/robotics/military-robots/autonomous-robots-are-here-to-stay-w-p-o
[18] http://www.nsf.gov/pubs/2000/nsf00137/start.htm

Example 3 – Lateral Transfer to Other Markets: Because the Bayh-Doyle Act allows universities to retain ownership of intellectual property generated under DOD sponsorship (for non-DoD applications), Georgia Tech is very active in supporting other commercial markets in areas such as biomedical devices and food processing. An excellent recent example is the spin-out company CardioMEMS,[19] a biomedical device company in Atlanta spawned from Army funded research for the development of a pressure sensor to be used in particular locations in an engine to provide control signals and thus ensure optimal engine performance. The government funding provided by the Army Research Office that was directed to the development of this sensor was approximately $500,000. The DoD need was for a small size sensor capable of operating in harsh environments, such as high temperature and with wireless interrogation capability. In 2000-2001, discussions with a medical doctor interested in exploiting microelectromechanical systems (MEMS) based manufacturing technologies to create a new generation of medical devices were held. Wireless sensors, that could detect disease states from within the body, were a particular interest. CardioMEMS licensed key patents originating from the Army funded research project exclusively in the field of medical devices. Based on these patents, CardioMEMS engineers developed wireless sensors as monitors of endovascularly- repaired abdominal aortic aneurysms. The sensors are integrated with an external measurement antenna. A real-time waveform of the pressure environment of the excluded aneurysm is extracted and provided to the physician to diagnose the state of the aneurysm repair. Nurtured in the incubators at Georgia Tech, today CardioMEMS resides in a building on the Georgia Tech campus devoted to private-public innovation and technology transition in the biotechnology space and to date has received approximately $50 million in private equity investment, a ratio of approximately $100 of private investment for each $1 of government investment. CardioMEMS currently employs over 100 people. Its wireless pressure sensors for aneurysm sensing were cleared for sale in the United States by the FDA in late 2005 and to date thousands of people have received them.

Benefits of Sponsored Research

The Georgia Tech research strategy and examples cited underscore seven benefits derived by the DoD.

1. **Breakthrough Research:** Discoveries related to advance materials (e.g. composites, graphene) systems analysis; sensors of phonon, electromagnetic and infrared, nanotechnology, control multiple autonomous vehicles, and in many other areas are examples of significant research results from defense sponsored research.

2. **Access to subject matter experts**: Georgia Tech has an outstanding faculty, including a large cadre of defense subject matter experts, who engage in fundamental research, direct problem solving, and transition activities that directly benefit DoD organizations and its industry base. This benefit is derived not only by DoD laboratories, but across the defense acquisition, training, test, and sustainment enterprise.

3. **Leveraged use of unique infrastructure:** Georgia Tech maintains unique facilities with costs shared by its entire sponsorship base and the State of Georgia (e.g., classified labs, information sharing services) designed to support and accelerate transition to the defense community and to other markets.

4. **Accelerated transition:** An aspect of the strategy and work described in this testimony include collaboration and partnering with the defense industry to accelerate the transition of research results into use.

[19] http://www.cardiomems.com

5. **Amplified and leveraged funding:** Commercialization activities afforded by the Bayh-Doyle Act results in significant investment by the private sector to mature and apply technologies that can be required at less cost and at reduced time cycles by the DoD. A recent report from the Office of the Director of Defense Research and Engineering highlights this benefit.[20]

6. **Global engagement:** Faculty and graduate students participate in research on a global stage and thus understand trends. This "casting the net wide/crowd sourcing" is an important approach to bring innovation to research and to leverage funding.

7. **Educated workforce:** Lastly, Georgia Tech conducts research, transition, and commercialization activities to enhance its ability to provide a quality education to its undergraduate, graduate, and continuing education students. The next section briefly summarizes some unique educational offerings that directly benefit the DoD and which illustrate the use of innovation best practices.

Related Education Offerings

Beside its well-known, high quality traditional degree programs at the undergraduate and graduate level, Georgia Tech has introduced several innovative offerings to both meet the need of the defense sector and to bring innovation to experimental and problem-based learning across its educational enterprise. A brief summary of some of these offerings follow.

1. **Professional Master's Degree:**[21] A professional masters in applied systems engineering was introduced two years ago. It is taught by faculty in the College of Engineering and GTRI. It is offered in an executive education format and is tailored to the application interests of each cohort. To date, 11 class sections have been offered. The program has proven very popular and the investment cost for developing it was "paid back" in two years. Courses are offered at the main campus and Georgia Tech's 13 field offices throughout the United States. A distance learning version is being developed.

2. **Defense Electronics Program:**[22] Georgia Tech's continuing education department offers a well-known program tailored to the professional education needs of the defense sector. Currently, over 90 courses and 10 certificate programs are offered. The program is one of the largest of its kind in the country and is continually updated to reflect research results and needs of the defense sector. Significantly, the courses offered here, and through the before mentioned SENSIAC program, are taught by subject matter experts (i.e., the faculty engaged in underlying research and its application).

3. **The Contracting Academy at Georgia Tech:** To support nontraditional companies who want to provide services to the DoD, Georgia Tech established specialized training and consulting support two years ago.[23] The academy also provides continuing education opportunities for acquisition professionals located in the southeast. The Contracting Education Academy at Georgia Tech was recognized by the Defense Acquisition University (DAU) as an official equivalency provider of DAU course work.

4. **Competitive games in support of problem-based learning:** In addition, Georgia Tech is increasingly using competitive games, a proven means in industry to discover disruptive

[20] http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA526521&Location=U2&doc=GetTRDoc.pdf
[21] http://www.pmse.gatech.edu/program
[22] http://www.pe.gatech.edu/defense-electronics
[23] http://contracting.academy.gatech.edu/2011/06/georgia-tech-now-offering-advanced-government-contracting-program

innovation, as a means to support problem-based learning. Student teams, under the guidance of a faculty member (and often with an engineer from a sponsoring government or industry organization), seek a solution to a wicked problem in the span of a semester. This approach has been used for many years in the Aerospace Systems Design Lab (ASDL) in the School of Aerospace Engineering.[24] More recently, companies like General Electric have sponsored competitions to solve hard problems related to the smart grid.[25] Industry practices for support of disruptive innovation have cited the benefit of a neutral site for exploration and experimentation outside standard business units. Routine results, realized by Georgia Tech's industry sponsors are rapid generation of new IP and patent filings. Significantly, Georgia Tech has embraced this approach in its defense related work too. A team of engineers from Georgia Tech finished second in the well-publicized DARPA Red Balloon Challenge in 2009.[26] In addition, GTRI currently has three ongoing projects in support of the Navy and the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) applying competitive games with teams of students in areas spanning signal intelligence, autonomous systems, and space application. Sometime referred to as "DART" experiments,[27] these efforts provide outstanding experimental learning opportunities for students and provide a means for rapid assessment and discovery of innovative approaches for solving hard problems for sponsors. This work has been further developed into a Georgia Tech wide competition for entrepreneurs called InVenture Prize[28] and an accelerator for spinouts called Flashpoint.[29]

Georgia Tech Role in the Ongoing Public Discussion on Innovation

Public service and collaboration are core values of Georgia Tech. Georgia Tech has played an integral role in framing the public dialog on innovation policy and best practices. Its president, G.P. "Bud" Peterson, was selected by the Secretary of Commerce to serve on the National Advisory Council on Innovation and Entrepreneurship (NACIE), which has been charged by the Secretary to "identify and recommend ways we as a nation remain the source and home of paradigm changing innovations and the companies that deploy them." The four university presidents who are members of NACIE co-authored a letter to the Secretary of Commerce that was signed by 141 university presidents and pledges greater efforts to advance regional and national economic growth. Dr. Peterson was also appointed to the steering committee of the Advanced Manufacturing Partnership, a coalition of leading experts on advanced manufacturing from industry and academia brought together to chart a path toward deciding how our country should invest in the emerging technologies that will create high quality manufacturing jobs and enhance our global competitiveness. Georgia Tech has also hosted national and regional meetings on its campus on behalf of the Department of Commerce to develop recommendations from the private sector on how to enhance innovation and industry competiveness.[30] At the June 2010 event, the Secretary of Commerce commented on the thought leadership provided by Georgia Tech both through its research and economic development programs as well as its leadership at the national level in the ongoing public-private discussions about innovation and entrepreneurism. Other senior administrators and faculty have participated in advisory boards on similar topics (such as the testifiers own service in leading related studies for the DoD). These are just a few of the recent examples of how a major research university has taken a proactive approach toward our economic development work while trying to maximize impact.

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[24] http://www.asdl.gatech.edu/
[25] http://site.ge-energy.com/about/press/en/2011_press/012011.htm
[26] http://www.gtri.gatech.edu/casestudy/red-balloon-darpa-challenge
[27] http://www.wired.com/dangerroom/2009/02/blue-dart/
[28] https://inventurprize.gatech.edu/
[29] http://flashpoint.gatech.edu/
[30] http://www.commerce.gov/news/secretary-speeches/2010/07/15/remarks-deputy-secretary-david-hayes-university-innovation-promote-economic-

Innovation in Defense Research Now Paramount

At a time of potential budget cuts for defense research, there are significant lessons learned from history during times of unprecedented change. A "think piece" – a national strategic narrative[31] – was written by two forward looking officers serving under Admiral Mike Mullen, who recently retired as the Chairman of the Joint Chiefs of Staff. The document calls upon America to observe that we are living in a period of rapid change in all aspects of our lives and that our country will face new threats in the future. The document explores classes of threats we will face that are unprecedented and not related to a Cold War philosophy which still dominates much of our national security policy. We no longer have the luxury of waiting to be surprised by the use of new technologies against us. Only through research and coupled programs in technology transition and innovation can we hope to retain a competitive edge. That is, we must be creative in how we shorten the time between understanding a future threat and responding with a suitable response. One only need look at a few past military examples where innovation was not embraced, even though results from defense research had matured to the point of commercial application. A fascinating book entitled *Military Adaptation in War*[32] by Williamson Murray recounts numerous examples from military history where fundamental change and applicable innovations have been ignored. Murray goes on to state that those military organizations that can best adapt to the "fog of war" are those that embrace innovation during peace. A culture of experimentation and competition involving research organizations and the rest of the defense enterprise (e.g., war fighters, acquirers, trainers, testers, sustainers) is critical. Innovation practices for inculcating such in organizations have been codified.[33] Initiatives such as the Chief of Staff of the U.S. Army's Strategic Studies Group are commendable and should be encouraged. Venues outside of traditional organizational units have proven useful for fostering such exploration. Research universities, such as Georgia Tech, are well poised to provide this kind of support.

Summary

In summary, defense research and associated technology transition and innovation programs are vital for ensuring the United States retains a competitive advantage in its national security posture. As shown time and time again, the fruits of defense research seed economic development, helping to accelerate new technologies to market; those technologies are available for use in defense systems at a fraction of what they would otherwise cost (and at much reduced time scales). There have been many instances in the past where we have missed a fundamental change or ignored the potential of a new innovation, but our country has relied on time and distance from adversaries in order to rebound. As the world has continued to shrink and the quality of global research has improved, our country must respond faster and more effectively. Lessons learned from innovation have been codified into best practices and can be applied to ensure continued relevancy of defense research and to facilitate faster maturation and transition to use. Significantly, such practices also provide new insight and understandings into the challenges our country will face in the future and thus provide insight and guidance for enabling research.

Thank you for this opportunity to provide testimony to this important panel. I look forward to your questions.

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[31] http://www.facebook.com/pages/A-National-Strategic-Narrative/220785844603507,
http://www.nytimes.com/2011/05/04/nyregion/a-strategy-for-national-security-focused-on-sustainability.html
[32] http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA509781
[33] http://www.[illegible]/sab/sys_level_experimentation_[illegible]

BIOGRAPHY OF DR. STEPHEN E. CROSS

Dr. Stephen (Steve) E. Cross is the Executive Vice President for Research of the Georgia Institute of Technology. As such, he has the responsibility for Georgia Tech's research strategy with direct oversight of 10 interdisciplinary research centers, applied research, technology transition, economic development, and research administration. He also holds faculty appointments as a Professor in the College of Engineering, School Industrial and Systems Engineering; and as an Adjunct Professor in the School of Interactive Computing, College of Computing; and the College of Management. Before joining Georgia Tech in 2003, he was the Director and CEO of the Carnegie Mellon Software Engineering Institute in Pittsburgh, Pennsylvania (USA). He is retired military office with his last posting as a Program Manager at the Defense Research Projects Agency. Through current service on the Defense Science Board and previous service on the Air Force Scientific Advisory Board, Dr. Cross has led studies on the topics of disruptive innovative and adaptive organizations. He received his PhD from the University of Illinois at Urbana-Champaign, his MSEE from the Air Force Institute of Technology (AFIT), and his BSEE from the University of Cincinnati. Dr. Cross is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE). He received his Professional Engineer certification from the State of Ohio in 1978. He has published over 60 technical papers and book chapters on application of artificial intelligence and technology transition. A past Editor-in-Chief *of IEEE Intelligent Systems*, he is currently the Associate Editor of the *Journal of Information, Knowledge, and Systems Management*.

**HOLD UNTIL RELEASED BY THE
HOUSE COMMITTEE
ON ARMED SERVICES**

TESTIMONY OF

MR. NORMAN WINARSKY, Ph.D.

VICE PRESIDENT, SRI VENTURES

SRI INTERNATIONAL

BEFORE THE UNITED STATES HOUSE

COMMITTEE ON ARMED SERVICES

DEFENSE BUSINESS PANEL

January 23, 2012

**HOLD UNTIL RELEASED BY THE
HOUSE COMMITTEE
ON ARMED SERVICES**

The Defense Industrial Base: The Role of Independent Nonprofit Research & Development Organizations

Mr. Norman Winarsky, Ph.D.
Vice President, SRI Ventures
SRI International

Chairman Shuster, Congressman Larsen, and Members of the Panel:

Thank you for the opportunity to submit written testimony on the contributions of independent nonprofit research and development organizations to the defense industrial base.

I am Norman Winarsky, Vice President for Ventures of SRI International, a nonprofit research and development organization with facilities in Menlo Park, California, and other locations across the United States and internationally, including Princeton, New Jersey; State College, Pennsylvania, and Tokyo, Japan.

SRI International, founded as Stanford Research Institute in 1946, performs sponsored research and development for governments, businesses, and foundations. SRI is known for world-changing innovations in computing, health and pharmaceuticals, chemistry and materials, sensing, energy, education, national defense, and more.

We bring our innovations from the laboratory to the marketplace through technology licensing, new products, and spin-off ventures. Our innovations have created entirely new industries, billions of dollars in marketplace value, and lasting contributions to society.

We have started more than forty spin-off companies to leverage our technologies in new commercial applications. For example, SRI's artificial intelligence project for DARPA, called CALO, led to the technology underpinning Siri, the virtual personal assistant in Apple's new iPhone. My role in Siri was co-founder and board member.

Our staff, which now numbers more than 2,100, has won nine Emmys®, an Academy Award®, and DARPA's Award for Sustained Excellence by a Performer. SRI inventor Douglas Engelbart was awarded the National Medal of Technology for the invention of interactive computing and the computer mouse in the 1960s, which led to tremendous contributions to the U.S. economy.

Almost four billion dollars in research and development has been sponsored at SRI in the past decade alone. Customers have also licensed hundreds of SRI patents. Government clients, primarily the Department of Defense, fund approximately ninety percent of our work.

However, I am not here to talk about my organization. Instead, I would like to inform the members of this panel about the important role nonprofit research institutes such as SRI International, Southwest Research Institute, Research Triangle Institute, Midwest Research Institute, Southern Research Institute, Sanford-Burnham Institute, and others play in keeping our armed services strong and ready.

Let me begin by thanking the members of this panel and the entire committee for including in the report accompanying the 2012 National Defense Authorization Act the requirement that the Assistant Secretary of Defense for Research & Engineering brief the members of the Armed Services Committees on DoD policy regarding nonprofits. Our community was encouraged to learn that the members of this committee are concerned that departmental policies may be inhibiting the Services and DoD agencies from accessing the capabilities that independent nonprofit research and development organizations possess. Since we are neither universities nor for-profit corporations, we are sometimes overlooked when procurement policies are established.

Because we are chartered, pursuant to Internal Revenue Code section 501(c)(3), for charitable purposes, nonprofits possess unique advantages over other organizations. For one, we have no shareholders. That means we can focus on providing the warfighter with the best possible solution, being unconcerned about bottom-line considerations such as profit margins, share price, and shareholder satisfaction.

Being independent means we can be impartial. Nonprofit research and development organizations are not affiliated with any government agency, or corporate entity, nor do we endorse products or services. Our goal is to provide independent, impartial, and objective analyses, assessments, recommendations, and advice to the Services and DoD agencies we serve.

Nonprofits maintain a moderate fee structure that we use to improve our inherent capabilities, which results in greater value to the DoD. Our net income is used for new facilities,

advanced scientific equipment, and internally sponsored research. This reinvestment allows nonprofits to remain at the leading edge of developing technologies and fulfills our charter to develop and further advance technologies.

Governments and industry organizations around the globe rely on American independent nonprofit research and development organizations to provide them the tools they need to better serve their citizens and clients. This exposure to extremely diverse technologies and applications enables nonprofits to apply nontraditional and innovative concepts to DoD programs such as hybrid ground vehicles, unmanned aerial vehicles, low-earth orbit satellites, intelligent transportation systems, fuel cell design and development, hydrogen storage, containment of complex hazardous materials, and deep-space science missions.

Nonprofits perform basic and applied research as well as development and, in some cases, limited production in a large number of technical areas, including, but not limited to, the following:

- Advanced materials and structures
- Aerospace electronics, systems engineering and training
- Chemical and chemical engineering
- Cybersecurity
- Energy and environment
- Fuels research
- Information and computing
- Medical and surgical devices

- Persistent surveillance
- Pharmaceutical discovery and development
- Robotics and automation
- Space science and engineering

Again, independent nonprofit research and development organizations are not universities, and they are not for-profit corporations, but DoD acquisition officials treat them like for-profit manufacturers. While universities, Federally Funded Research & Development Centers (FFRDCs), and government laboratories receive sole source contracts, in most cases nonprofits must compete with manufacturers.

Frequently, this means that nonprofits are at a disadvantage because they cannot take the product that is developed and sell it commercially. Our manufacturer competitors can, on the other hand, factor the profit to be realized by the subsequent commercial sales into their bid. More importantly, DoD's failure to use the Competition in Contracting Act exception that allows non-competitive procedures to establish or maintain an essential engineering, research, or development capability is contrary to the intent of Congress. It is clear from the plain language of the statute that Congress authorized sole source awards to nonprofts because it recognized that they, like universities, FFRDCs, and government laboratories, exist to provide a public service, and maintaining their capabilities is in the best interest of national defense.

The current DoD policy of awarding Indefinite Delivery/Indefintite Quantity (ID/IQ) contracts to multiple vendors and then competing each task order issued by the customer among

the selected vendors is costly and time-consuming. For nonprofits, the process can be cost-prohibitive. The goals of giving the warfighter a technological advantage, restraining costs, and maintaining the research and development base would be better served by including nonprofits in the same procurement category as universities, FFRDCs, and government laboratories.

My colleague, Mr. Walter Downing, the Executive Vice President of Southwest Research Institute, recently told me about a conversation he had with a senior DoD official who complained about what he described as a "not invented here syndrome." What the official was referring to is that manufacturers refuse to use the research done by universities, FFRDCs, and government labs in favor of their own parallel research. Consequently, DoD pays for the research twice: once when it pays the university, FFRDC, or lab, and once again when it buys the final product from industry.

There are several reasons why industry may be hesitant to use university-, FFRDC-, or government laboratory-generated research. One is certainly the challenge of transitioning laboratory research into a product that can be manufactured. Nonprofits such as SRI excel at transitioning products from the laboratory to the assembly line. We have a lot of experience with both government agencies and industry. Nonprofits understand the needs of both. Transitioning technology is an important service nonprofits can provide to universities, FFRDCs, and government laboratories. More importantly, it is a service that will benefit the warfighter and the taxpayer.

The nonprofit R&D community would like to have the opportunity to participate in

programs such as the University Affiliated Research Centers (UARC), from which we are currently excluded. If nonprofits were given the opportunity to be designated as UARCs, they could then better support the defense department's mission to support science, technology, engineering, and math (STEM) education. Many of our organizations already provide internships to graduate students and welcome the opportunity to train more.

CONCLUSION:

In his recent testimony before this panel, Mr. Brett Lambert, Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy, stated:

> "The United States depends on a robust and capable defense industry to develop, field, and maintain high quality equipment and services that provide the warfighters with unsurpassed technological advantage. Whenever possible and appropriate, the Department allows market forces to create, shape, and sustain industrial and technological capabilities, but we must recognize that the Government's programming and budget decisions have a major influence on key portions of the defense industrial base. Consequently, we must consider the effects of our decisions on competition, innovation, and essential capabilities in the industrial base."

We hope this panel, and the full committee, will continue to urge DoD to consider the effects of its policy, contrary to the intent of Congress, of treating nonprofits as though they were for-profit manufacturers. Continuing to do so in an era of constrained budgets is counter-

productive, since it results in unnecessary costs and needless delay of product delivery to the warfighter and could result in a shrinkage in the research and development base that is detrimental to our national defense and our national treasury.

On behalf of the independent nonprofit research and development community, we appreciate the role Congress is playing in facilitating a discussion between all sectors of the industrial base and the Department of Defense as to how to best serve the warfighters and the American taxpayer. We look forward to reading this panel's report.

Thank you for the opportunity to appear before this distinguished panel.

Norman Winarsky
Vice President, SRI Ventures

Norman Winarsky leads SRI Ventures, which includes SRI's venture and license development, SRI's Commercialization Board, and nVention—SRI's partnership with the venture capital community that develops early-stage investment opportunities. He is a founder of SRI's venture process, including venture and license incubation, seed funding, and the Entrepreneur-In-Residence (EIR) program. Winarsky works with SRI's business units to identify and develop SRI's highest-value commercial market opportunities from initial concept through commercialization as a license or venture. Prior to joining SRI, Winarsky was Vice President of Ventures at Sarnoff Corporation, an SRI subsidiary that was fully integrated into SRI in 2011. He is also a Visiting Scholar at Stanford University, conducting research on regions of innovation.

Winarsky has helped found approximately 30 ventures, holds three patents and several pending, and has given invited talks, lectures, and presentations throughout the world. He is a founder of the National Information Display Laboratory (NIDL)—a center of excellence for the government in information processing and display technologies. The NIDL is known for establishing a new model for government/industry technology development and commercialization. The program grew to become the National Technology Alliance, run by the National Geospatial-Intelligence Agency and hosted at SRI and SRI Sarnoff.

Winarsky has served on numerous boards, and currently chairs SRI's Commercialization Board and Venture Board. He was co-founder and board member of Siri, an SRI spin-off company acquired by Apple in April 2010. Winarsky was also a member of the National Academy's Committee on Forecasting Future Disruptive Technologies.

Winarsky received his B.A., M.S., and Ph.D. degrees in mathematics from the University of Chicago. He graduated summa cum laude and Phi Beta Kappa in 1969. Today, he volunteers as Chairman of the University of Chicago's Visiting Committee for the Physical Sciences Division. In 2011, Chicago recognized his service leadership with an Alumni Service Award. He was a National Science Foundation Fellow from 1969 until 1974, and an invited member of the mathematics department of the Institute for Advanced Study in Princeton, New Jersey. From 1974 to 1976, he was an Assistant Professor of Mathematics at the State University of New York (SUNY) at Albany.

Winarsky and his team received an Emmy® Award in 2000 from the National Academy of Television Arts and Sciences for outstanding achievement in technological advancement "for a unique technology to predict how viewers will perceive the quality of digitally processed TV images or still pictures." Winarsky received more than 10 RCA awards, and in 1984, received RCA's highest honor, the Sarnoff Award, for "development of the physical understanding and computer software for simulating electron trajectories in picture tubes."

He is a member of the Association for Computing Machinery, the Institute of Electrical and Electronics Engineers, Phi Beta Kappa, and Sigma Xi. Winarsky enjoys boating and hiking as his primary hobbies.

DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(4), of the Rules of the U.S. House of Representatives for the 112th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Armed Services Committee in complying with the House rule.

Witness name:____**Norman Winarsky**_____

Capacity in which appearing: (check one)

___Individual

_xx__Representative

If appearing in a representative capacity, name of the company, association or other entity being represented:_____SRI International_____

FISCAL YEAR 2011

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
	Dept Commerce	$94K	R&D
	Dept of Ed	$14.533M	R&D
	Dept of Energy	$12.1M	R&D
	Dept of Homeland Security	$5.05M	R&D
	Dept of Interior	$38K	R&D
	Dept of State	$87.5K	R&D
	Dept of HHS	$62.9M	R&D
	Dept of Defense	$344.9M	R&D
	IARPA	$16.9M	R&D
	Independent Agencies	$11.9M	R&D
	Multi-Client	$428.9K	R&D
	NASA	$5.2M	R&D
	NSF	$20.8M	R&D
	Prime agency unknown	$4.2M	R&D

FISCAL YEAR 2010

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
	Commerce	$37.6K	R&D
	Ed	$14.2M	R&D
	Energy	$3.4M	R&D
	Homeland Sec	$4.2M	R&D
	Interior	$31.6K	R&D
	State	$194.2K	R&D
	HHS	$49.1M	R&D
	DoD	$253M	R&D
	Ind Agencies	$5.9M	R&D
	Multi-Client	$10.5K	R&D
	NASA	$4.7M	R&D
	NSF	$20M	R&D
	Prime Agency Unknown	$1.7M	R&D
	Postal Service	$25.4K	R&D

FISCAL YEAR 2009

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
	Commerce	$314.2K	R&D
	Ed	$14.9M	R&D
	Energy	$3.8M	R&D
	DHS	$3.8M	R&D
	Interior	$43.7K	R&D
	Justice	$33.5K	R&D
	Labor	$51.6K	R&D
	State	$40.8K	R&D
	HHS	$38M	R&D
	DoD	$236.6M	R&D
	DoT	$6.1K	R&D
	Ind Agencies	$154.9K	R&D
	Multi-Client	$52.8K	R&D
	NASA	$3.9M	R&D
	NSF	$19.5M	R&D
	Prime Agency Unknown	$3.6M	R&D
	Postal Service	$212.8K	R&D

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2011):_____1015_____;
Fiscal year 2010:_____455_____;
Fiscal year 2009:_____676_____.

Federal agencies with which federal contracts are held:

Current fiscal year (2011):_____;
Fiscal year 2010:_____;
Fiscal year 2009:_____.

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2011):_____R&D_____;
Fiscal year 2010:_____R&D_____;
Fiscal year 2009:_____R&D_____.

Aggregate dollar value of federal contracts held:

Current fiscal year (2011):_____$498.3M_____;
Fiscal year 2010:_____$356.7M_____;
Fiscal year 2009:_____$325.4M_____.

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2011):_____;
Fiscal year 2010:_____;
Fiscal year 2009:_____.

Federal agencies with which federal grants are held:

Current fiscal year (2011):_____;
Fiscal year 2010:_____;
Fiscal year 2009:_____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2011):_____;
Fiscal year 2010:_____;
Fiscal year 2009:_____.

Aggregate dollar value of federal grants held:

Current fiscal year (2011):_____;
Fiscal year 2010:_____;
Fiscal year 2009:_____.

Testimony of
Stephen Huffman, Ph.D.
Vice President and CTO, The MITRE Corporation
to the
U.S. House Committee on Armed Services
Panel on Business Challenges within the Defense Industry
on the subject of
"Doing Business with DOD: Getting Innovative Solutions from Concept to the Hands of the Warfighter"
January 23, 2012

Chairman Shuster, Congressman Larsen, Honorable Members, thank you for the opportunity to appear before your panel. My name is Stephen Huffman, and I am the Vice President and Chief Technology Officer of The MITRE Corporation. Our company's 53 years of experience, contributions, and accomplishments have given us a perspective that I believe is highly relevant to today's topic of "Getting Innovative Solutions from Concept to the Hands of the Warfighter."

The U.S. military's superior operational capabilities of today were enabled by decades of substantial investment in research and development of advanced technology systems. The current fiscal environment requires the DoD to make significant reductions in spending without jeopardizing national security. To maintain superior military capability, the DoD must explore creative ways of rapidly developing new capabilities in an affordable manner. Achieving this objective will require the best innovative thinking of the DoD, government and private research institutions, and suppliers in the Defense Industrial Base. As a part of this effort, Federally Funded Research and Development Centers (FFRDCs) are well-positioned to contribute to transitioning innovative technologies from concept to fielded capability.

The FFRDC Role

The MITRE Corporation is a not-for-profit organization chartered to work only in the national interest. MITRE manages FFRDCs and applies its expertise in systems engineering, information technology, operational concepts, and enterprise modernization to address our sponsors' critical needs.

An FFRDC is a unique organization that assists the U.S. government with scientific research and analysis, development and acquisition, and/or systems engineering and integration. FFRDCs address problems of considerable complexity, analyze technical questions with a high degree of objectivity, and provide creative and cost-effective solutions to government problems.

FFRDCs operate as long-term strategic partners with their sponsoring government agencies. To ensure the highest levels of objectivity, FFRDCs are organized as independent entities with limitations and restrictions on their activities. This unique standing permits special access to government information and provides a long-term perspective. Since FFRDCs are prohibited from manufacturing products, competing with industry, or working for commercial companies, both industry and government confidently provide them with sensitive information. As private entities, FFRDCs have greater flexibility than the government in recruiting and managing a highly skilled technical workforce. Working in this environment, FFRDCs are able to support their government sponsors across a full spectrum of planning and concept development, research and development, and systems acquisition. Developing long-term relationships with their sponsors enables FFRDCs to achieve a deep understanding of their sponsors' evolving roles, issues, and challenges, as well as to provide an institutional memory.

The role of a systems engineering FFRDC is analogous to that of the traditional building architect whose job is to serve as the client's trusted agent, ensuring that the final structure meets all needs and requirements. It encompasses a wide-ranging set of responsibilities, including translating needs into requirements, defining capabilities sufficiently to enable contractor development, conducting evaluations and cost-capability tradeoffs, and exploring and assessing alternative ways of meeting a difficult objective through prototyping. The ultimate goal is to ensure the sponsor's highest-priority needs are met within the constraints imposed by available technology, funding, and time.

In addition to directly supporting our sponsors, MITRE also conducts an independent research and development (R&D) program that develops new technologies and innovative uses for old technologies to solve our sponsors' problems in the near-term and in the future. The objectives of MITRE's R&D program are to:

- Focus creative minds on tough technical challenges,
- Encourage ground-breaking thinking about future potentially transformational technologies,
- Prove that solutions work through rigorous modeling, simulation, prototyping and testing.

As a not-for-profit corporation working in the public and national interest, our R&D model differs from those of most for-profit companies. Our program serves as a resource for our sponsors, and our R&D strategy directly reflects their needs. Some of our internal R&D projects address current operational problems while others advance the understanding of a particular field. Additionally, we investigate emerging technologies—some so new their parameters remain undefined. Our metric of success rests not on creating shareholder value but on helping the government achieve its mission objectives. This gives us the freedom to explore technologies that may become game-changers in the future but that also carry a high risk of failure.

Because it is our mission to create value for the government and the public, we disseminate our findings as widely as possible—when there are no security restrictions—through technical

society conferences, publication in peer-reviewed journals, participation in standards bodies, and symposia sponsorship. We also actively seek opportunities to transfer the technology we develop to commercial companies so they can turn our discoveries into supported, affordable products for the government.

Rapid Capability Development

MITRE has supported numerous rapid capability development programs that address urgent operational needs. In our experience, there are three keys to success:

1. Work closely with operational users to understand their needs,
2. Adapt mature technology and build operational prototypes to prove the concept and get user feedback,
3. Acquire operational capability through an agile acquisition strategy.

Operational users have the best understanding of the capabilities they need. However, they rarely have the in-depth technical knowledge necessary to conceive a solution. FFRDCs are well-equipped to bring technical knowledge to the end users and work closely with them to solve problems.

Whenever possible, MITRE deploys staff to the field to study firsthand the special challenges our end users, including warfighters, face. For example, a group of MITRE "ship riders" lived aboard the USS PELELIU in mid-2010 to learn about the Navy's unique command, control and communications issues. The team became immersed in the workflow and systems of entities such as Landing Force Operations Centers, gaining knowledge for future research and design efforts. For the Army, MITRE engineers frequently visit Afghanistan to contribute their technical expertise to intelligence, surveillance, and reconnaissance system challenges faced by U.S. and coalition troops.

One of the most effective ways to engage users in the rapid development of solutions is to provide them with an operational prototype whose design can be rapidly iterated in response to their feedback. Often, readily available technology can be adapted to quickly deploy and evolve capabilities. This approach can be combined with an agile acquisition strategy to deliver needed capabilities in months, rather than years.

Agile acquisition is a strategy for providing multiple, rapid deliveries of incremental capabilities to the user for operational use and evaluation. The incremental deliveries can be made every few weeks or every few months, and each iteration is built with continuous user participation and feedback. Even when the final system requirements aren't clear, an agile acquisition strategy can quickly deliver some capabilities to the users rather than making them wait for the final system.

The advantages of this strategy are that: 1) development can begin immediately, without the time and expense needed for development, refinement, and approval of functional requirements; and

2) significant user involvement during development guarantees that the capabilities delivered will meet the users' needs and will be used effectively.

An example of the successful application of an agile acquisition strategy is the Battlefield Airborne Communications Node (BACN), an innovative solution that uses commercially available components to provide communications gateways in the air where warfighters need them most. MITRE serves as the lead systems engineer on BACN for the Airborne Networking Division at the Air Force's Electronic Systems Center. These airborne gateways significantly shorten command and control response times by enabling machine-to-machine transactions, data-link translation, and voice bridging. By the end of 2010, the BACN team had deployed five aircraft carrying the new node to the operations theater. The aircraft provide continuous, uninterrupted coverage over a wide area.

FFRDC Interaction with Innovation Sources

In addition to directly supporting government capability development and conducting their own R&D, FFRDCs play a valuable role in interacting with other sources of innovation and channeling them toward government needs.

FFRDCs often serve as brokers for interactions between government and industry on technical issues. For example, in the not-too-distant future, soldiers will routinely use smart phones with situation-specific mobile applications—ones that may save their lives. It is not difficult to imagine the existence of a robust industry ecosystem supplying the DoD with various mobile applications through the DoD's own "app store." To bring that moment closer, MITRE created the Government Mobile Application Group, which includes participants from commercial companies (such as Apple and Google) and a number of government agencies to discuss how industry can help the government. Dozens of representatives from government and industry meet quarterly to discuss the DoD's special needs (e.g., for security) and how to lower barriers to quickly fielding products.

FFRDCs also interact with industry to transfer the practical results of FFRDC work to the commercial sector through such methods as cooperative research and development agreements, technology licensing, open source participation, and contributions to industry standards. In addition to contributing to the nation's economy, the transition of technology to the commercial sector often provides a direct benefit to the FFRDCs' sponsors.

For example, taking advantage of the latest in situational-awareness technology for civil aviation can be challenging for small-aircraft owners. Equipment compatible with the Federal Aviation Administration's (FAA's) new Automatic Dependent Surveillance-Broadcast (ADS-B) system is larger and more expensive than many owners need or can afford. To solve the problem, MITRE developed the Universal Access Transceiver (UAT) Beacon Radio, which allows low-altitude aircraft to maintain air-traffic awareness using smaller and less-expensive equipment. The UAT Beacon Radio, which was the product of collaboration between MITRE's aviation and defense

FFRDCs, started as a research project in 2007. The portable, battery-powered system is about the size of two decks of cards and supports multiple broadcast data services. It also has potential applications for emergency management operations and search-and-rescue missions. Because it transmits messages compatible with ADS-B, it fits the FAA's blueprint for the NextGen Air Transportation System and will be valuable in the integration of unmanned systems into civil airspace. MITRE successfully transferred the radio technology to commercial manufacturers, which are developing production systems based on our design.

In addition to working closely with government laboratories, academia, and industry to develop and transfer technology, FFRDCs can help expand their sponsors' sources of innovation by providing new mechanisms to discover and connect nontraditional suppliers to government needs. For example, MITRE created a series of open competitions called The MITRE Challenge™. The challenge was developed to encourage innovation in technologies of interest to the federal government. Open to academic institutions, commercial companies, government laboratories, and individuals, the first challenge focused on multicultural name matching. This technology is a key component of identity matching, which involves measuring the similarity of database records referring to people. Uses include verifying eligibility for Social Security or medical benefits, identifying and uniting families in disaster relief operations, vetting persons against a travel watchlist, and merging or eliminating duplicate records in databases.

During the nine months of the competition, 140 people registered from across the globe. In total, 40 teams submitted results to the challenge. One of our main goals was to foster a spirit of collegial competition. This happened throughout the challenge as teams saw how well their competition was doing and improved their own scores over time.

MITRE believes that approaches such as the MITRE Challenge offer exciting and inventive ways to rapidly provide a broad set of ideas and solutions to the government. We think that using this type of real-time experimentation venue can dramatically reduce the time from development to application in product development.

Conclusion

The current fiscal environment requires significant reduction in DoD spending without jeopardizing national security. I believe that with the best innovative thinking of the DoD, government and private research institutions, and suppliers in the Defense Industrial Base, the DoD can maintain its superior operational capabilities even in an austere fiscal environment. Federally Funded Research and Development Centers play a unique role in addressing this challenge, working with government, academia, and industry to transition innovative technologies from concept to fielded capability.

Dr. Stephen Huffman

Vice President and Chief Technology Officer

Dr. Stephen Huffman is vice president and chief technology officer (CTO) of The MITRE Corporation. As CTO, Dr. Huffman is responsible for the direction of MITRE's research and development program. MITRE's research program explores emerging and enabling technologies and their application to critical national problems. Dr. Huffman develops MITRE's corporate strategic technology plan and works across MITRE to ensure corporate-wide collaboration in the execution of the program.

Dr. Huffman joined MITRE in 1988 and has held a variety of positions in support of the corporation's work for the Department of Defense (DoD). He served as vice president of the Washington Command, Control, and Communications Center (WC3), where he was responsible for oversight of technical activities for a 1,200-person technical organization and more than 150 DoD projects. He also served as chief engineer of MITRE's Enterprise Systems Engineering Office, which is focused on ensuring integration and solving complex technical and operational challenges across the DoD.

He was previously the chief engineer of WC3, where he was responsible for oversight of technical program quality, technical skill centers, and laboratory facilities. He also served as technical director of MITRE's Center for Innovative Computing and Informatics, associate technical director of the Navy Systems and Technology Division, and director of the Signal Processing Technical Center.

Before joining MITRE, Dr. Huffman was director of research and development at M/A-COM Linkabit in Vienna, Va., where he developed anti-jam and low-probability-of-intercept communications systems, error-correction coders, speech store-and-forward systems, satellite communications, and signals intelligence systems. From 1978 to 1983, Dr. Huffman was supervisor of the Signal Processing Section of the Center for Systems Engineering at the Research Triangle Institute (RTI). At RTI, he developed and evaluated algorithms for underwater acoustic signal processing, radar signal processing, radio navigation, atmospheric monitoring, and spread spectrum communications. Dr. Huffman has also served as an adjunct assistant professor of electrical engineering at Duke University, teaching communications theory and digital signal processing. He is an instructor for the Armed Forces Communications Engineering Association (AFCEA) course on Military Satellite Communications.

Dr. Huffman is an expert in communications theory, error-correction coding, communications networking, Internet protocols, satellite communications, anti-jam and low-probability-of-intercept communications, spread spectrum, digital signal processing, detection and estimation theory, modeling and simulation, large-scale software development processes, and the design and analysis of hardware and software systems.

Dr. Huffman received his bachelor's, master's, and doctoral degrees in electrical engineering from Duke University and is a graduate of the General Management Program at Harvard Business School. He is a member of the IEEE and has published numerous papers. He is a member of the IEEE Military Communications Conference (MILCOM) Board and served as technical program chairman for the 2001 MILCOM conference. Dr. Huffman is also a founding member and past chairman of the IEEE Computer Society Industry Advisory Board and a member of AFCEA's Technology Committee.

DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(4), of the Rules of the U.S. House of Representatives for the 112th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Armed Services Committee in complying with the House rule.

Witness name: Dr. Stephen D. Huffman

Capacity in which appearing: (check one)

___Individual

_X_ Representative

If appearing in a representative capacity, name of the company, association or other entity being represented: The MITRE Corporation

FISCAL YEAR 2011

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
2	DOD	934,335,591	R&D
1	DHS	86,330,219	R&D
1	FAA	154,642,179	R&D
1	Dept. of Treasury	126,639,144	R&D
3	VA	60,571,158	R&D
2	Department of State	2,189,406	R&D
1	NOAA	1,432,558	R&D
1	NASA	136,543	R&D
1	NSF	14,481	R&D
1	Administrative Office of the United States Courts	4,650,480	R&D
1	Undersecretary of Defense - JASONS	4,940,629	R&D

FISCAL YEAR 2010

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
2	DOD	916,969,182	R&D
1	DHS	59,803,132	R&D
1	FAA	141,978,500	R&D
1	Dept. of Treasury	142,905,285	R&D
2	VA	27,036,785	R&D
2	Department of State	1,942,284	R&D
1	NOAA	2,350,237	R&D
1	NASA	383,748	R&D
1	NSF	119,143	R&D
1	Undersecretary of Defense - JASONS	5,698,003	R&D

FISCAL YEAR 2009

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
2	DOD	932,591,729	R&D
1	DHS	6,027,031	R&D
1	FAA	125,429,054	R&D
1	Dept. of Treasury	164,205,480	R&D
2	VA	17,209,961	R&D
2	Department of State	599,065	R&D
1	NOAA	2,181,493	R&D
1	NASA	389,615	R&D
2	NSF	207,369	R&D
1	Undersecretary of Defense - JASONS	4,588,575	R&D

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government,

please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Fiscal year 2011: 15
Fiscal year 2010: 13
Fiscal year 2009: 14

Federal agencies with which federal contracts are held:

Fiscal year 2011: See above
Fiscal year 2010: See above
Fiscal year 2009: See above

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Fiscal year 2011: R&D
Fiscal year 2010: R&D
Fiscal year 2009: R&D

Aggregate dollar value of federal contracts held:

Fiscal year 2011: $1,375,882,388
Fiscal year 2010: $1,299,186,299
Fiscal year 2009: $1,253,429,372

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Fiscal year 2011: 1
Fiscal year 2010: 1
Fiscal year 2009: 2

Federal agencies with which federal grants are held:

Fiscal year 2011: NSF
Fiscal year 2010: NSF
Fiscal year 2009: NSF

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Fiscal year 2011: Collaborative R&D
Fiscal year 2010: Collaborative R&D
Fiscal year 2009: Collaborative R&D

Aggregate dollar value of federal grants held:

Fiscal year 2011: $14,481
Fiscal year 2010: $119,143
Fiscal year 2009: $207,369

DOCUMENTS SUBMITTED FOR THE RECORD

JANUARY 23, 2012

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U.S. House of Representatives

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ROBERT L. SIMMONS, II, STAFF DIRECTOR

December 14, 2011

MEMORANDUM FOR PANEL ON BUSINESS CHALLENGES IN THE DEFENSE INDUSTRY

FROM: HASC Staff

RE: Summary from Industry Roundtable – Mount Laurel, New Jersey

On December 9, 2011, Members of the Panel of Business Challenges in the Defense Industry traveled to Mount Laurel, NJ to meet with members of the local defense industry.

The Panel held a roundtable discussion at the Burlington County College with representatives from the local defense industry (see Appendix A for a list of participants). Burlington County College (BCC) was founded in 1966 and is a comprehensive community college serving approximately 14,000 students with facilities Pemberton, Mount Laurel, Mount Holly, Willingboro and also has a presence at Joint Base McGuire-Dix-Lakehurst (JB MDL). Following the discussion with local defense industry, the delegation met with senior officials from the JB MDL and toured facilities to include the Air Force Expeditionary Center, the Battle Lab and static displays of aircraft stationed on the base. JB MDL is home to the 87th Air Base Wing, which provides installation management support for 3,933 facilities with an approximate value of $9.3 billion in physical infrastructure. More than 44,000 Airmen, Soldiers, Sailors, Marines, Coast Guardsmen, civilians and their family members living and working on and around JB MDL contribute to the economic impact for the state of New Jersey.

Members in Attendance

Chairman Bill Shuster
Ranking Member Rick Larsen
Mr. Bobby Schilling
Ms. Colleen Hanabusa
Mr. Jon Runyan
Mr. Frank LoBiondo*

*Non-panel member, invited to participate

POINTS OF DISCUSSION

- **Procurement Technical Assistance Centers –** The Procurement Technical Assistance Program (PTAP) was authorized by Congress in 1985 in an effort to expand the number of businesses capable of participating in the Government Marketplace. Administered by the Department of Defense, Defense Logistics Agency (DLA), the program provides matching funds through cooperative agreements with state and local governments and non-profit organizations for the establishment of Procurement Technical Assistance Centers (PTACs) to provide procurement assistance. A roundtable participant indicated that local PTACs need to be resourced to advertise their services so that companies seeking to do business with the Department of Defense can be made aware of the assistance the local PTACs can provide. More about PTACs can be found at http://www.aptac-us.org/new/index.php.

- **Large Contractors and Impact on the Local Workforce –** a participant indicated that, particularly in base services contracts, the base often contracts with large contractors that are not from the local area. He felt that these contractors often bring in their own workforce and should do more to use local workers.

- **Veteran's Transition Assistance –** a participant advocated for programs such as the "Helmets to Hardhats" program to help service members gain apprenticeship training so that they can successfully enter the workforce. He suggested that there should be some requirement for companies that contract with military facilities to participant in these programs. You can learn more about "Helmets to Hardhats" at http://helmetstohardhats.org/.

- **Security/Workforce Access to Military Facilities –** one participant indicated that base security processes were an issue for workers performing on contracts for the base. He suggested that there should be a system in place, such as the issuance of standard identification card for contract employees, to facilitate access to the base and reduce wait time for the workforce to process through base security.

- **Technology Development and Transition –** a participant indicated that DOD was doing a lot "right" and stated that of TIME Magazines "50 Best Inventions" of 2011, seven were attributable to defense investment. However, he also noted that "fast track" contracting methods are not working. He felt that the acquisition system is too complex and that a great deal of experience is needed to learn the Federal Acquisition Regulations. As a result, he contends that everyone is just trying to find "workarounds" in the system to get the warfighter what was needed.

- **Multiple Award and Indefinite Delivery/Indefinite Quantity (IDIQ) Contracts –** one of the participants indicated that he believed that DOD's approach to using Multiple Award and Indefinite Delivery/Indefinite Quantity contracts is increasing costs for the government and is detrimental to industry.

- **Contracting Officials –** one of the participants indicated that he felt there was an inherent lack of trust between contracting officials and small businesses. He believed that contracting officials were more inclined to contract with a large, foreign firm than with a local small business because they felt there was risk that the local small business would not perform. He

felt that more needed to be done to require contracting officials to credit small businesses based on past-performance. Another participant stated that its "hard to get in the door" and that decision makers perceive risk in small businesses that is unfounded. He also articulated that Congressionally-directed funding is critical to transitioning technologies developed by small businesses.

- **Defense Logistics Agency (DLA) Contracting Actions** – a participant indicated that DLA does a poor job of notifying the public (and specifically interested contractors) when solicitations are cancelled. He expressed frustration that time, effort and resources were put into a bid proposal and they did not receive notice that the solicitation was cancelled. He also felt that DLA was failing to meet the minimum targets for contracting with Service Disabled Veteran Owned (SDVO) companies.

- **Bundling of Contracts** – a participant stated that DOD contracting officers have no visibility into discussions between prime contractors and subcontractors. He indicated that once a small business was rolled up into a large or bundled contract, contracting officers have no visibility on the fact that large primes pressure subs to cut prices, only to increase profit for the prime. He felt that the government should benefit from cost savings through direct contracting, and should not be bundling contracts.

- **General Services Administration (GSA) Contracting** – one of the participants expressed frustration with GSA contracting processes and encouraged the panel to also look into those processes.

- **Preference for the Original Equipment Manufacturer (OEM)** – a participant stated that he felt contracting officials had a preference for OEM parts and tend to require parts be provided through a sole-source arrangement with the OEM. He argued that this preference is damaging the industrial base and leaving the nation reliant on foreign suppliers.

- **Mentor-Protégé Programs** – a participant from a large business indicated that more needs to be done to reduce the negative perception of doing business with a small business and in particular, SDVO businesses. It was articulated that the Mentor-Protégé Program is very important and more should be done to expand program.

Appendix A

Industry Roundtable Participants

Digital Systems Group, Inc. -Mr. Joseph T. Mc Carrie, *Director of Sales and Marketing*

Located in Moorestown, NJ and Warminster, PA, Digital Systems Group, Inc. is a leading provider of financial management solutions for federal agencies.

Drexel University - Mr. Brian Keech, *Senior Vice President and Executive Director, Office of the President*

Drexel University is one of America's top 100 national universities. Drexel has 23,637 total students, 8,996 employees with four Philadelphia campuses (University City Main Campus, Center City Hahnemann Campus, Queen Lane Campus and The Academy of Natural Sciences of Drexel University), a Center for Graduate Studies in Sacramento, CA and Drexel Online.

Dynamic Defense Materials, LLC- *Robert A. Lipinski, President and CEO*

DDM has evolved over the past five years from an R&D company in several various technologies to a supplier of its unique, patent-pending portable armored wall system, McCurdy's Armor.

L-3 Command and Control, Systems, and Software- Mr. John Allen, *Director of Business Development and Legislative Affairs*

L-3 is a prime contractor in Command, Control, Communications, Intelligence, Surveillance and Reconnaissance (C^3ISR) systems, aircraft modernization and maintenance, and government services. L-3 is also a leading provider of a broad range of electronic systems used on military and commercial platforms.

L-3 Communications, Communication System-East (L-3 CSE) – Mr. John Tierney, *Vice President of Operations and Strategic Initiatives*

L-3 CSE provides a broad range of innovative communications solutions to domestic and international military users and intelligence community customers. The company is part of the L-3 Communication Systems Group.

Lockheed Martin Corporation Mission Systems and Sensors (MS2): Moorestown NJ operation: **-Mr. Phil Goslin,** *Subcontract Program Management Director*

Lockheed Moorestown provides innovative products and services to the DOD and allied governments in key areas such as radars, naval combat and mission systems including ballistic missile defense systems and renewable energy systems. The Lockheed Moorestown operation employs approximately 4,600 highly skilled engineers, technicians, and support personnel and is the largest employer and manufacturer in Burlington County NJ.

MCFA – Mr. Jon Nehlsen, *Chief Financial Officer*

Located in Haddonfield NJ, MCFA is a 45-person energy and infrastructure consulting firm that assists Department of Defense clients in executing public-private partnerships. MCFA's core competency is helping DoD clients execute alternative financing programs such as Energy Savings Performance Contracts (ESPC), Utility Energy Services Contracts (UESC) and Enhanced Use Leasing (EUL) to build and improve their physical infrastructure.

Melton Industries- Mr. Kenneth B Fairchild, *Director, Government Affairs*

Since 1949, Melton Industries has been providing support to the Department of Defense and our nation's military. Melton has a quality reputation as an industry leading remanufacturer of drive train components (engines, transmissions etc- as well as complete overhaul of the vehicle).

NetIDEAS, Inc. – Mr. Joseph Iannacone, *Co-Founder and Vice President*

NetIDEAS Inc. is the Premier Cloud Computing Provider for Product Lifecycle Management solutions. They offer a wide range of deployment options that suits companies of all sizes, budgets, and deployment complexities. Their services include business process consulting, implementations, migrations, upgrades, and a 24 x 7 x 365 help desk.

New Jersey Institute of Technology (NJIT), Dr. Donald H. Sebastian, Ph.D, *Sr. Vice President for Research and Development*

NJIT is New Jersey's science and technology university, founded in 1881. Located in Newark, the university enrolls roughly 10,000 undergraduate and graduate students in 46 Bachelor's, 56 Master's, 19 doctoral programs offered by its 6 colleges. NJIT closed FY2011 with over $100M in research expenditures placing it in the top 10 of all polytechnic universities in the country.

New Jersey Technical Procurement Assistance Center at NJIT (NJ PTAC)
- Ms Dolcey E Chaplin, Esq., *Statewide Director*

The NJ PTAC at NJIT has provided free government procurement assistance to 20 of 21 counties in NJ for more than 25 years.

Northrop Grumman – Ms. Gloria Pualani, *Corporate Director, Socio-Economic Business Programs/Government Relations*

Northrop Grumman, headquartered in Falls Church, Virginia, is a leading global security company providing innovative systems, products and solutions in aerospace, electronics, information systems, and technical services to government and commercial customers worldwide. NGC has approximately 75,000 employees in all 50 states and 25 countries.

Sea Box, Inc. – Mr. Robert A. Farber, *Director of Contracts and Counsel*

Sea Box, Inc. was founded in 1983. The firm designs, modifies and manufactures steel shipping containers - those very large containers typically seen being loaded on, or offloaded from, massive ocean-going cargo vessels.

SMH International, LLC -Ms. Carol Hunt-Miller, *Vice President for Business Development*

SMH International LLC is a Service-Disabled Veteran-Owned Small Business focused on fielding and integrating engineering solutions to unique problems presented by current and emerging threats and the demands of a dynamic defense environment in support of the warfighter. Activities include development of armor structures for lightweight force protection, rapid prototyping, reengineering of small arms parts and other mission repair parts, military facility and range design and construction, R&D, and training.

Specialty Systems, Inc. - Mr. Emil Kaunitz, *President & Chief Operating Officer*

Specialty Systems provides system development and support services to the Army and Navy. With 65 employees, the firm has been instrumental in reengineering aircraft carrier flight deck management for improved sortie rates, developing a prototype unmanned aircraft combat control station, providing RF Distribution control software for maximum aircraft/ship communications effectiveness and performing technology insertion into existing systems to reduce long term ownership/operating costs.

SRI Sarnoff – Mr. Mark Clifton, *Vice President, Products and Services Division / General Manager, Princeton*

SRI International is an independent, nonprofit research institute conducting client-sponsored research and development for government agencies, commercial businesses, foundations, and other organizations. SRI also brings its innovations to the marketplace by licensing its intellectual property and creating new ventures. SRI International Sarnoff delivers vision, video, and semiconductor technology innovations that empower government and commercial clients to see/sense, understand, and control complex environments.

Temple University- Dr. Ken Blank, *Senior Vice Provost for Research and Graduate Education*

Temple University is a comprehensive public research university in Philadelphia, Pennsylvania, United States. Temple's research enterprise is comprised of more than $136M in expenditures and includes many significant DoD funded programs. In addition, the University has significant relationships with industry partners including several DoD prime contractors.

Trade Unions –Assemblyman Wayne DeAngelo, *President of the Mercer and Burlington Counties Building and Construction Trades Council, Representative in the New Jersey General Assembly*

Based out of Trenton, NJ, IBEW Local 269 provides a skilled electrical workforce to Central New Jersey, as well as Bucks County, PA.

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Ve Source, LLC – Mr. Christopher R. Neary, *CEO*

Ve Source, located in Shrewsbury, NJ, is a Certified Service-Disabled Veteran Owned Small Business with the goal of producing garments for all divisions of the United States armed forces. Started in 2010, Ve Source's mission is to create jobs for veterans and allocate resources to design, develop, and produce apparel using state-of-the-art technologies.

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COLLEEN HANABUSA, HAWAII

ROBERT L. SIMMONS, II, STAFF DIRECTOR

January 19, 2012

MEMORANDUM FOR PANEL ON BUSINESS CHALLENGES IN THE DEFENSE INDUSTRY

FROM: HASC Staff

RE: Summary from Industry Roundtable – Santa Clarita, California

On January 8, 2012, Members of the Panel of Business Challenges in the Defense Industry traveled to Santa Clarita, CA to meet with members of the local defense industry.

The Panel held a roundtable discussion on January 9, 2012 at the Santa Clarita City Hall with representatives from the local defense industry (see Appendix A for a list of participants). Following the discussion with local defense industry, the delegation met with Air Force officials, and toured facilities at Air Force Plant 42, a government-owned/contractor-operated (GOCO) facility managed by the Air Force. Plant 42 is the second-largest employer in the Antelope Valley, after Edwards Air Force Base, and consists of an Air Force operated airfield and 3.2 million square feet of contractor operated industrial facilities which are leased via separate agreements to Boeing, Lockheed-Martin and Northrop Grumman. The plant has a replacement value of $1.1 billion and is involved in manufacturing, maintenance, modification and testing of military aircraft such as the B-2, F-22, F-35, U-2 and Global Hawk.

Members in Attendance

HASC Chairman "Buck" McKeon
Panel Chairman Bill Shuster
Panel Ranking Member Rick Larsen
Ms. Colleen Hanabusa

POINTS OF DISCUSSION

- **Defense Contract Audit Agency (DCAA) –** several participants expressed frustration with DCAA's failure to close out incurred cost audits in a timely manner. One company was last audited in 2005 and the audit was still open, costing the company an estimated $3-4 million in lost business over the last six years. The participant noted that the contracting officers requested indirect rate audits but DCAA was non-responsive and the company was prohibited from moving forward from a successful Small Business Innovative Research (SBIR) Phase II contract because the audit was still open. It was suggested that the panel should consider mandating maximum turn-around times for audits such as 60 days for rate audits, and 6 months for incurred cost audits. It was also suggested that contracting officers should be allowed to issue letter contracts so that they can proceed with a contracting action while an audit is still open and make adjustments, if necessary, after the audit is closed. Another participant felt that turnover and inexperience with DCAA auditors was part of the problem. It was stated that every year they get a new auditor and they have to start all over because the new auditor uses different processes and has different audit requirements. In order to address this issue, it was suggested that DCAA should be required to report performance metrics in order to highlight regional shortcomings and more uniform [military member] involvement at DCAA was needed to balance the inexperienced civilian workforce.

- **Technology Development and Transition –** a participant noted that the SBIR program was a wonderful program but there is no system to help a small business get to production. The participant posed the question "How do we get to the guys that want to buy our product when FFRDCs [Federally Funded Research and Development Centers], universities, and the primes are all shooting at us?" It was also suggested that the Rapid Innovation Fund[1] (RIF) is not being successfully implemented and that more funding was needed and the panel was cautioned that "if you cut these budgets you're not going to see innovation" because the primes will suck up the [research and development] money and go on life-support. A participant went on to say that "with the elimination of earmarks, more innovative technologies will have a tougher time getting across the "valley of death". As a result, significantly more funding at the RIF [development] phase and more importantly funding focused on the "qualification" phase is required. This qualification phase falls between the two programs [science and technology and acquisition funding programs] really and can also cost more money than is typically available under either program."

- **International Trafficking of Arms Regulations (ITAR) –** many of the participants expressed issue with ITAR and export licensing. It was stated that ITAR is "very detrimental" because other companies will not even consider you for [partnering or subcontracting] if you have to maintain ITAR compliance. It was also stated that European companies are not buying US products because of ITAR issues, but they can sell their products here. It was noted that while ITAR itself has not been changed recently, it really began being enforced in the last 3-4 years. It was stated that many of the big primes have been fined, as have individuals. It was suggested that in any reform being considered, ITAR

[1] Section 1073 of the National Defense Authorization Act for FY2011, Public 111-383, and the 2011 Defense Appropriation Act provide the Department of Defense with authorities and funds to facilitate the rapid insertion of innovative technologies into military systems or programs that meet critical national security needs.

should be applied by product line. An example was given that on a particular contract to provide DOD air conditioners, that the [basic] air conditioner was required to be ITAR compliant simply because DOD wanted it to be painted with chemically resistant paint. A participant also expressed frustration with the process and stated that there is no avenue for business to understand how to navigate the ITAR processes. Software was also raised as an area of major concern for ITAR certification. A participant suggested that the panel should consider recommending that a company should be certified as "ITAR-compliant" rather than requiring certification by individual product lines.

- **Access to the Customer –** a participant stated that one of the major problems is getting to/through the program offices. A participant noted that small businesses are often not invited to participate in shows and conferences because program managers want to go with the incumbent or other "trusted agent" such as a large prime. It was acknowledge that small business fraud is still a problem. Another participant referenced an Army initiative to have a two-stage proposal process. In this program a "pre-proposal" would be issued that gives industry insight in to what DOD wants, and allows industry to submit a 1-2 page response. At that point, DOD can determine which companies should be invited for full proposal. This approach was lauded as saving industry time and resources and as being good for small business because they can find out they are not suited for the procurement before wasting resources to complete a full-proposal.

Appendix A

Industry Roundtable Participants

AeroVironment, *Tim Conver, Chairman and CEO*

AeroVironment is a provider of efficient energy systems (EES) which help companies operate more efficiently and reduce their impact on the environment. The company also specializes in producing unmanned aircraft systems (UAS) for military customers.

ADI, *John Cave, President*

Aerospace Dynamics International, Inc. (ADI) provides large complex machined parts and assemblies to the aerospace industry. Having recently achieved a tier one status, ADI is a provider of major structural components on virtually every commercial and military aircraft program.

Advatech Pacific, *Jay P. Ebersohl, P.E., President and CEO*

Advatech Pacific is a provider of integrated modeling and simulation software tools and partners with industry, government, and academic offices.

Applied Companies, *Joe Klinger, Regional Business Director*

Manufacturer of military air conditioners, environmental control units, power generators and pressure vessels. Applied Companies has produced thousands of custom designed, military mobile ruggedized commercial-off-the-shelf and military standard environmental control units for shelter and other rapid mobility battlefield electronic enclosure applications.

Arcata, *Tim Wong, President*

Arcata Associates Inc. is an engineering services, information technology, program/acquisition services and multimedia company that works with government agencies and commercial clients.

Circoil, *Howard Lind, President and CEO*

Circoil specializes in flat cables made from silicon rubber used on the space shuttle, to the F-15 fighter jet, to high performance semiconductor equipment.

Crater Industries, *Matt Donaldson, President*

Crater Industries has served as a manufacturer of custom aerospace components including high performance linear and rotary actuators while serving as the motion systems integrator for several large aerospace companies in the region.

Delta Scientific, *Harry Dickinson, Senior President*

Delta Scientific Corporation is the world's leading manufacturer of vehicle access control equipment. Delta Scientific has been engineering and manufacturing vehicle access control equipment since 1974.

Electricore, *Ilker "Ike" Bayraktar, President and CEO and Deborah Jelen*

Electricore, Inc. is a non-profit technology consortium established in 1993 in response to a request by the Defense Advanced Research Projects Agency (DARPA). Electricore partners with private and public sector organizations such as federal and state agencies, corporations, small businesses, universities, research institutions and other non-profit entities to produce breakthroughs in the field of Energy, Transportation and Electronics.

Exquadrum, *Eric Schmidt, VP Engineering*

Exquadrum specializes in assembling and leading teams of in-house and associate personnel from around the world to overcome the most demanding technical challenges in order to design, build, and test highly effective systems. Exquadrum provides a variety of projects such as space launch vehicle design, propellant development, gas-generator design, propulsion system testing, test facility design, non-lethal munitions development and development of systems to neutralize chemical and biological weapons.

Quallion, *Paul Beach, President*

Quallion, LLC has the broadest and deepest understanding of lithium ion chemistry and has a long history as a primary and rechargeable cell battery manufacturer for use in the medical, military and aerospace industries.

Semtech, *Charles Harper, Senior Vice President*

Semtech Corporation is a leading supplier of high-quality analog and mixed-signal semiconductor products. Semtech Provides technology in power management, circuit protection, timing and synchronization, touch interface, high-performance optical transport equipment (SerDes), high-reliability military products, low-power wireless RF, and digital sensor/signal conditioning ICs.

Senior Systems Technology, *Tim Morrissey, President/CEO, Senior Systems*

A leading Electronic Manufacturing Solutions (EMS) provider, Senior Systems specializes in high-reliability, high-cost-of-failure assemblies. Senior Systems provides products used for medical, military, and commercial use.

Triumph, *Bill Boyd, President*

Triumph Group, Inc. supplies and overhauls aerospace systems and components. Operating in 64 locations, Triumph designs, engineers, manufactures, repairs and

overhauls a broad portfolio of aerostructures, aircraft components, accessories, subassemblies and systems. The Company serves a broad, worldwide spectrum of the aviation industry, including Original Equipment Manufacturers (OEMs) of commercial, regional, business and military aircraft and aircraft components, as well as commercial and regional airlines and air cargo carriers.

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ROBERT L. SIMMONS, II, STAFF DIRECTOR

January 19, 2012

MEMORANDUM FOR PANEL ON BUSINESS CHALLENGES IN THE DEFENSE INDUSTRY

FROM: HASC Staff

RE: Summary from Industry Roundtable – Honolulu, Hawaii

On January 9, 2012, Members of the Panel of Business Challenges in the Defense Industry traveled to Honolulu, HI to meet with members of the local defense industry.

The Panel held a roundtable discussion on January 10, 2012 at the State Capitol building with representatives from the local defense industry (see Appendix A for a list of participants). Following the discussion with local defense industry, the delegation received briefings from the Commander, US Pacific Command, and from the Commanders of the Pacific Fleet, Marine Forces Pacific, and Pacific Air Forces. In addition, the delegation received a briefing on submarine operations in the Pacific and toured the USS Texas (SSN-775), a Virginia-class submarine. The delegation also toured Pearl Harbor Naval Shipyard and discussed the role of private industry in the shipyard operations.

Members in Attendance

Chairman Bill Shuster
Ranking Member Rick Larsen
Ms. Colleen Hanabusa

POINTS OF DISCUSSION

- **Small Business Innovative Research Program (SBIR)** – several participants commented on the SBIR program:
  - A participant stated that the SBIR Phase III[1] needs to be restructured and that contracting officers do not know how to execute a Phase III. It was suggested that there should be a central point of contact or ombudsman for SBIR to help educate contracting officers. It was also suggested that a percentage of the defense budget, drawn from acquisition programs, should be set aside solely for Phase III.
  - Another participant stated that after successful completion of Phase I[2], they waited 9 months for the Phase II[3]. It was remarked that program managers are not graded on moving from Phase I to Phase II and that small business are often told to just go find a large prime to transition technology. It was suggested that there should be a mechanism for measuring transition performance in the SBIR program.
  - Another individual commented that program offices appear to be risk averse and there is no motivation to develop SBIR topics. It was also stated that only those companies physically located near the program office can influence SBIR topic development and unless you are already an established part of a bigger program there is no opportunity and no ability to transition.
- **Acquisition System/Processes** – several participants commented on the acquisition system and processes:
  - One participant stated that small businesses are not equipped to deal with the bureaucracy of the DOD acquisition system. It was suggested that there needs to be a middleman in order to connect small business to requirements developers.
  - A participant referenced an Army memo regarding sole-source contracting and believes it is being misinterpreted by contracting officers and needs to be clarified or rescinded. [Note: the committee obtained a copy of this memo and is investigating the issue.]

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[1] **Phase III** is the period during which Phase II innovation moves from the laboratory into the marketplace. No SBIR funds support this phase. The small business must find funding in the private sector or other non-SBIR federal agency funding. To commercialize their product, small businesses are expected to garner additional funds from private investors, the capital markets, or from the agency that made the initial award. The availability of additional funds and the need to complete rigorous testing and certification requirements can pose significant challenges for new technologies and products developed under SBIR awards.

[2] **Phase I** grants essentially fund a feasibility study in which award winners undertake a limited amount of research aimed at establishing an idea's scientific and commercial promise. The 2012 reauthorization legislation standardized Phase I grants at $150,000.

[3] **Phase II** grants are larger—typically about $1,000,000 (previous to the FY12 reauthorization it was $750,000) at DoD—and fund more extensive R&D to develop the scientific and technical merit and the feasibility of research ideas.

- It was stated that a program manager remarked to a participant that they "don't do" sole source contracts and it would take at least 18 months to implement even a very small contract.

- It was also stated that DOD's preference for "low price/technically acceptable" solutions is not good for the warfighter.

- One of the participants commented that contracting officers are often overruled by the lawyers. It was suggested that an ombudsman at the COCOM [Combatant Command] level was needed to address these issues.

- Another participant remarked that the government is becoming more risk averse than industry and an acquisition system driven by cost, schedule and performance drives low-risk approaches. The participant went on to say that the if the proposed budget cuts are put in place, core acquisitions and the government labs will preserve themselves and cut all external activities.

- A participant stated that some in the DOD have the view view that "you're a small business --- take a small role."

- Another participant commented that large contracting vehicles like the Navy's Multi-ship Multi-Option contract for ship repair can enable large businesses to provide overhead and cost accounting for the small businesses on the contract.

- A participant applauded the work done by Lt Gen Thiessen, Commander, Marine Forces Pacific (MARFORPAC), for his efforts in reaching out to small businesses, specifically through the MarForPac Experimentation Center (MEC)[4]. It was stated that they [MARFORPAC] have a great model that is not currently replicated anywhere else.

- One participant remarked that it is very hard for a small business to find out about partnering opportunities with foreign companies and noted that, based on their location in the Pacific, there are opportunities for Hawaiian companies to partner with foreign firms.

- A participant recounted an experience negotiating with DOD on a commercial service and even after submitting their "best and final", the contracting officer came back to them wanting a break out of each line item in order to negotiate the price. It was remarked that the negotiations take time and money, and are unnecessary for a procurement of a commercial service.

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[4] The MarForPac Experimentation Center (MEC) is an operationally focused center that helps the technical community help the warfighter The MEC provides venues, tool sets, and coordination planning and execution for exercises, experiments, demonstrations, and military utility assessments. The MEC facilitates access between the technical community and the warfighter allowing the warfighter to provide operational feedback to the Science and Technology and Research and Development process This feedback allows the technical community to better understand the warfighters' needs and is obtained with minimal intrusion on the operational forces The MEC also provides theater security cooperation support in the form of Science and Technology collaboration with Thailand, the Philippines, Singapore, Indonesia and potentially other PACOM areas of responsibility

- Several participants articulated that testing and evaluating their technologies with the customer was critical for developing the right product on time and on budget. Part of the innovative technology "valley of death"[5] is due to lack of test and evaluation funding.

- **Disruptive Innovation –** one participant cited the failure of the Kodak Company and advocated for new capabilities in manufacturing. It was noted that manufacturing is very difficult, but companies need to look to the future and new methods need to be created and the government needs to make sure we retain this critical capability in various parts of the country. It was also stated that there is no incentive for disruptive innovations. Another participant remarked that innovation occurs one of two ways: 1)by accident, or 2) because of a champion with a passion. The system is not set up to incentivize innovation.

- **Technology Development and Transition –** a participant commented that DOD field activities, such as SPAWAR [Space and Naval Warfare Systems Command], accomplish work when it could be given to small businesses. It was alleged that some of these activities are competing with industry to sending letters to state agencies saying they are the only provider of a service.

- **International Trafficking of Arms Regulations (ITAR) –** several participants addressed various challenges experience with unnecessary ITAR restrictions and burdensome processes. They all commented that ITAR needs to be reformed.

[5] "Valley of Death," has come to describe the challenging transition when a developing technology is deemed promising, but too new to validate its commercial potential and thereby attract the capital necessary for its development. Lacking the capital to develop an idea sufficiently to attract investors, many promising ideas and firms perish.

Appendix A

Industry Roundtable Participants

Aina Kai Environmental (AKE), *Mun-Won Chang, President & CEO*

AKE provides environmental services and renewable energy solutions for state entities such as HECO and Hawaii State Civil Defense as well as federal agencies such as the EPA, DOE, DHS, and the Department of Defense (DoD). AKE provides environmental services and renewable energy technologies throughout the Pacific.

BAE Systems, *Alan Hayashi, Support Solutions Director of Public Relations and Policy Advocacy*

BAE Systems delivers a full range of products and services for air, land and naval forces, as well as advanced electronics, information technology solutions and customer support services. BAE Systems, with more than 105,000 employees worldwide, had 2008 sales that exceeded $34 billion. In Hawaii, BAE Systems has over 1,000 employees serving various branches of the military and the DOD on all of the islands.

DreamHammer, *Larry Osborn, Executive Vice President and Chief Strategy Officer and Member of the Board of Directors*

DreamHammer is a commercial information technology firm with offices in Honolulu, HI, Santa Monica, CA, San Diego, CA, and Arlington, VA. For the last several years, DreamHammer has been executing a strategic plan that is transforming the company from a professional services provider to one that also develops and delivers commercial-off-the-shelf (COTS) command and control (C2) software products to commercial and government customers. The result is a product suite that allows developers to integrate existing hardware and software components into a single software environment.

General Atomics, *Dr. John Parmentola, Senior Vice President for Energy and Electromagnetic Systems*

General Atomics and its affiliated companies provide high-technology systems ranging from the nuclear fuel cycle to electromagnetic systems, remotely operated surveillance aircraft, airborne sensors, and advanced electronic, wireless and laser technologies. In Hawai'i, on the island of Kauai, General Atomics has an algae biofuel facility that has demonstrated numerous leap-ahead technologies that make realization of promising options for production of secure, affordable, domestic and sustainable biofuel for the DoD and the U.S. commercial market.

Hawaiya Technologies, Inc. (HTI), *Paul Schultz, President and CEO*

As a prime contractor, HTI provides technology solutions to the Department of the Navy, the Department of Homeland Security, Hawaii State Civil Defense/Public Safety, and State of Hawaii Department of Transportation Harbors Division, by developing Command and Control Systems that focus on advanced communications technology, systems engineering, design

development, sensor integration, and implementation of spiral technologies for complex surveillance systems, and delivering and developing FEMA certified courses. HTI employs over twenty professionals in the areas of program management, engineering, architectural design, electronics, software, networking, communications, mechanical engineering, and disaster awareness and preparedness training.

Ke'aki Technologies, *Philip Kahue*

Ke'aki Technologies offers a full spectrum of solutions to improve the performance and operational effectives of the Department of Defense. Services include base and range operations, biomedical defense support, telecommunications, and IT services. Ke'aki Technologies designs synchronized solutions to improve performance, increase efficiency and decrease cost.

Matson Navigation Company, *Vic Ancogo, Senior Vice President-Pacific*

Matson provides ocean transportation service to Hawaii, Guam and Micronesia, and is a key component of the distribution systems for island businesses, and serves to replenish inventories from distribution centers located on the U.S. Mainland. Matson was awarded a contract to provide for ocean and intermodal transportation of Defense Transportation System (DTS) cargo in support of Department of Defense and military shipper services continuous resupply to and from overseas destinations.

Oceanit, *Pat Sullivan, President and CEO and Jan Sullivan, Chief Operating Officer*

Oceanit, founded in 1985, is a self-funded research and development technology incubator that today employs over 160 scientists, engineers and professionals, providing innovative solutions in the fields of aerospace, engineering, information technology and life sciences. Oceanit has created cutting-edge innovations in the fields of aerospace, bio-photonics, neurotoxin detection and optics, as well as technology for missile defense, managing space debris and environmental applications that are the subject of numerous reports, patents and research programs.

Referentia Systems Incorporated, *Nelson Kanemoto, Founder, President & CEO*

Referentia Systems is a developer of advanced cyber security and network enterprise solutions for the Federal government and DoD. An applied R&D company, Referentia provides certified and accredited enterprise solutions. Referentia is headquartered in Honolulu, HI and employs nearly 100 employees in Hawaii, California, Virginia, and at military installations throughout the world.

University of Hawaii at Manoa, *Dr. Jim Gaines, Vice President for Research*

In July 2004, the U.S. Navy proposed the University of Hawai'i at Mānoa as another University Affiliated Research Center (UARC); a strategic DoD research center associated with a university. UARCs were established to ensure that essential engineering and technology capabilities of particular importance to the DoD are maintained. Although UARCs receive sole

source funding under the authority of 10 U.S.C. Section 2304(c)(3)(B), they may also compete for science and technology work unless precluded from doing so by their DoD UARC contracts.

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ROBERT L. SIMMONS, II, STAFF DIRECTOR

January 19, 2012

MEMORANDUM FOR PANEL ON BUSINESS CHALLENGES IN THE DEFENSE INDUSTRY

FROM: HASC Staff

RE: Summary from Industry Roundtable – San Diego, California

On January 10, 2011, Members of the Panel of Business Challenges in the Defense Industry traveled to San Diego, CA to meet with members of the local defense industry.

The Panel held a roundtable discussion at the Admiral Kidd Club, Naval Base Point Loma, CA, on January 11, 2012 with representatives from the local defense industry (see Appendix A for a list of participants). In additional to the roundtable meeting with local defense industry, the delegation toured General Dynamics Marine Systems' NASSCO shipyard and boarded USNS Medgar Evers (T-AKE 13), a Lewis and Clark-class dry cargo ship that is nearing completion. The delegation also boarded USS Freedom (LCS-1), the lead ship in the Freedom-class of littoral combat ships and also toured the trainer facilities and simulators used to prepared crews for LCS operations. The delegation concluded the visit with a tour and briefings of Space and Naval Warfare Systems Command (SPAWAR). As one of three Department of Navy major acquisition commands, SPAWAR focuses on information dominance and is engaged in acquiring, installing, delivering and maintaining advanced information technology capabilities to the fleet, regardless of platform, to keep warfighters one step ahead of adversaries.

Members in Attendance

Chairman Bill Shuster
Ranking Member Rick Larsen
Ms. Colleen Hanabusa
Mr. Jon Runyan
Mr. Duncan Hunter*
Ms. Susan Davis*

POINTS OF DISCUSSION

- **San Diego Advanced Defense Technology Cluster** - a participant commented that the Cluster, funded through the Small Business Administration, works to aid small business in transitioning technology and helps to grow small businesses. In its second year, it is working with 30 companies in the San Diego area. It was remarked that it is a very good program to support SBIR transition.
- **Finances** – a participant noted that the 15% holdback [retention on 15% of contract value for a stipulated time to ensure contract completion and payment of all parties] on profit is really hard on small business.
- **Defense Contract Audit Agency (DCAA)** - a participant commented that DCAA is underfunded and is very slow to close out a contract. It was also stated that waiting nine months on DCAA [to complete an audit] can put a small business out of business.
- **Small Business Innovative Research (SBIR) Program** - one participant remarked that there needs to be a structured and resourced Phase III program to provide companies resources to field technologies. Participants cautioned the panel about the inclusion of venture capitalists in the SBIR program and expressed concern that venture capitalists could take technology developed through the SBIR program and sell to foreign entities. [Note: The Fiscal Year 2012 National Defense Authorization Act re-authorized the SBIR program for 6 years and authorized the participation of venture capitalists in the program.]
- **Congressionally-directed Funding** - a participant commented that Congress has a responsibility and is abdicating it by not allowing earmarks. It was stated that losing it [ability to direct funding] has a huge negative effect on small businesses. The participant stated that without earmarks, DOD does not know what [technologies] are out there. Another participant remarked that there is a need for Congressionally-directed funding, particularly in this tough economic time.
- **Technology Transition** – one participant remarked that it is not just a need for money for development, but also to support getting a technology fielded. It was suggested that start-up money for these areas in the high-technology sector can assist a lot of laid-off people. Another participant stated that the primes are still being allowed to act as systems integrators when small business could be involved in manufacturing given the opportunity.
- **Contracting Vehicles** - a participant expressed frustration about a program they had met requirements and objectives on, but the program office as unable to obtain a contracting vehicle. It was stated that you cannot become a program of record until successful completion of an operational evaluation and you can't do that if they can't provide a contracting vehicle. Another participant noted that their company would not subcontract, but noted that typical procurement officers want to use existing contracting vehicles to "pass through" work to the small business. It was remarked that this was being done because it simply takes too long to go through the normal acquisition process. Another participant

commented that on one particular program the government asked a company to purchase $10 million in radios via an existing contract [for other work] because it would take 9 months to get a contracting vehicle in place to procure the radios and the capability was needed in 6 months.

- **Intellectual Property** – a participant stated that the large primes don't want small businesses to innovate and another participant stated that anyone that wants to do business with you wants your technology. Both agreed that more needs to be done to protect the intellectual property of small businesses.

- **Access to the Customer** - a participant commented that small businesses are isolated from manufacturers and they can't talk directly with the person with the problem. Another participant suggested that small business needs a structure that allows business to go directly to DOD. A third participant noted that he had to get direct assistance from Congressman Hunter to get invited to participant in the acquisition process. This participant described the acquisition process as being ineffectual and not sympathetic to small businesses.

- **International Trafficking of Arms Regulations** - one participant stated that it seemed individual opinions often drive licensing decisions, making it an inequitable system, and that the export controls are very complex and hard to navigate. Another stated that there were no major issues with ITAR, while a third commented that companies are restricted from selling their technologies so foreign partners are just buying the technology elsewhere. Another participant remarked that the time to get through the process is very long and it compromises the ability to get the mission done. A participant also commented that ITAR negatively effects universities [doing research for the government] as well and remarked "we're tying ourselves in knots for nothing."

- **DOD Culture** - a participant commented that innovative or creative program offices can "get slapped upside the head by leadership". It was implied that more flexibility needs to be given to program offices in order to deal with many of the issues in the acquisition process.

Appendix A

Industry Roundtable Participants

Allylix, *Seth Goldblum, Vice President of Business Development*

A renewable chemicals company that develops terpene products and their derivatives for the flavor and fragrance, food ingredient, pharmaceutical, agricultural and biofuel markets.

Aurora Aerospace, *Myles Newlove, President & CEO*

Currently, Aurora has three employees and is working on a contract with DoD which could raise employment to over 100. Aurora's ARES Unmmaned Aerial System (UAS) is an all composite structured UAS that was specifically designed and built from the ground up for the Special Operations Community, based upon their specific mission requirements.

Cubic Corporation, *Mike Kelly, VP, Strategy & Development, Cubic Defense Applications, Inc*

Cubic Corp. has three major business segments. Cubic Defense Systems has 1,300 employees world-wide. Cubic provides realistic air and ground combat training systems for national military and security forces. Cubic is a key supplier of communications and signal intelligence equipment, and information assurance solutions for cyber security.

Digibeam Corporation, *Mike Zani, CEO*

Digibeam Corporation is a research and development company that has been working with DARPA and other agencies to develop semiconductors.

East County Economic Development Council, *Jo Marie Diamond, President & CEO*

The San Diego East County Economic Development Council is a non-profit organization of leaders committed to a healthy, vital economic climate and quality of life in the East County region. Founded in 1984, the East County EDC is an alliance of key representatives from business, government, and education working together to promote successful business activity in the cities of El Cajon, La Mesa, Lemon Grove and Santee, and in the unincorporated communities of Alpine, Lakeside and Spring Valley. The currently represent approximately 1500 contractors in the San Diego area.

ES3, *Teri Sgammato, CEO*

ES3 is a high-end engineering firm specializing in: engineering and design of aircraft components, systems, and subsystems; advanced material coatings for aerospace applications; specialized metallurgical, hydraulic, and mechanical custom testing;

computational methods for structural dynamic analysis; and development of environmentally preferred material processes.

GET Engineering , *Greg MacNeil, CEO*

GET Engineering Corporation has at any given time 25-30 employees and was founded in 1982. It is a privately held corporation that qualifies as a small business and woman owned. GET provides commercial off-the-shelf (COTS) data systems and signal conversion products.

JCI Metal, *Marcel Becker, CEO*

JCI has at any given time 200-300 employees and is a full service sheet metal company specializing in the fabrication, installation, modernization and repair of shipboard engineering, habitability, joiner and ventilation systems for the Military marine industry. JCI has provided Navy shipboard repair work throughout the Pacific and East Coast for almost 25 years.

NSM Surveillance, *Andy Berdy, President*

NSM has 34 employees and is a leading supplier of Covert, Overt and Remote Wireless Surveillance Systems and products to US Federal Agencies, State and Local Law Enforcement, and the US Military. NSM's system in Iraq was assessed by the Army's Training and Doctrine Command to be so capable that they recommended its fielding Army-wide.

Port of San Diego Ship Repair Association, *Derry Pence , CEO*

Established in 1982 to increase industry cooperation and cohesiveness and create greater public awareness and understanding of the industry's issues, the Port of San Diego Ship Repair Association represents more than 100 San Diego-area companies engaged in ship repair, conversion, overhaul and modernization. Approximately 70 percent of the work performed is on United States Navy and defense contracts.

Sapphire Energy, *Tim Zink/Denise Gitsham, Vice President of Corporate Affairs/Director of Corporate Affairs and Legislative Counsel*

Sapphire Energy was founded with one mission in mind: to change the world by developing a domestic, renewable source of energy that benefits the environment and hastens America's energy independence. Since 2007 they have been seeking to create the perfect biofuel, by integrating the principals of industrial biotechnology.

San Diego Advanced Defense Technology Cluster (SDADT), *Lou Kelly, Program Director – San Diego State University*

As part of the Entrepreneurial Management Center at San Diego State University, SDADT advanced defense technology management team and its partners and

stakeholders, collectively, have established training, education, consulting, and other key business development resources and relationships with additional regional organizations (law firms, federal agencies, etc.) to meet the needs of the small businesses in the San Diego cluster.

San Diego Composites, *Rob Kolozs, President*

San Diego Composites has 30 employees and provides next generation materials, structures and manufacturing technologies to benefit aerospace systems. In early 2003, SDC won three Phase I SBIR programs to develop carbon-carbon optics, micro-heat pipes for high heat flux electronics applications, and a high temperature polymer control surface for a high speed missile. Since then, SDC has won numerous Phase I SBIR programs and has transitioned most to Phase II and Phase III programs.

San Diego State Research Foundation, *W. Tim Hushen, Associate Executive Director, Research Advancement*

Established in 1943, SDSU Research Foundation is a non-profit, auxiliary organization chartered to further the educational, research and community service objectives of San Diego State University. SDSU Research Foundation is currently administering approximately 1,000 active grants and contracts, and annual revenues approaching $160 million. With 157 central support staff and 2,450 grant and contract project employees, it is the largest auxiliary within the California State University (CSU) system.

San Diego Supplier Development Council, *Paul Hollenbach, Chairman, Corporate Development Committee*

The Supplier Development Council and its member organizations are committed to improved procurement and subcontracting through programs that attract emerging and underutilized small businesses.

Scripps Institution of Oceanography, University of California-San Diego, *Bruce Applegate and Kathleen Ritzman*

Scripps is America's oldest and the world's largest academic ocean, atmosphere, and earth science institution. It was founded in 1903 and joined the University of California in 1912. Scripps performs hundreds of research projects in more than 60 nations and is a leader in the study of climate change, earthquakes and other natural disasters, drug-resistant diseases, water shortages, saving marine life, energy alternatives, pollution. Scripps currently operates 4 research vessels for worldwide ocean exploration.

Smart Electronics and Assembly, *Yvonne Johnson*

Smart Electronics and Assembly, Inc is a small disadvantaged business that works in the defense and aerospace industry. They employ about 100 employees. Smart Electronics has a highly skilled workforce that has continually been subcontracted by various high-profile companies but needs assistance in identifying more programs they can be involved in.

University of California – Irvine, George Peavey, *Director of the Medical Free Electron Laser Program*

With nearly 28,000 students, 1,100 faculty members and 9,000 staff, UCI ranks among the top U.S. universities in the number of undergraduate applications and continues to admit freshmen with highly competitive academic profiles. Orange County's largest employer, UCI generates an annual economic impact on the county of $4.2 billion. UCI has a National Fuel Cell Research Center that is dedicated to development and deployment of fuel cell technology to the Department of Defense.

University of California-San Diego , *Byron Washom, Director of Strategic Energy Initiatives*

Leads the university's efforts to establish a highly innovative energy plan that will not only ensure that UC San Diego is able to meet both its current and future energy requirements in the most environmentally sustainable, cost-effective manner, but also serve as a premier example to institutions internationally.

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