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PARTICIPANTS:

PANEL 2: THE PRESENT AND POTENTIAL FUTURE OF THE NATIONAL SECURITY INDUSTRIAL BASE:

Moderator:

PETER SINGER
Senior Fellow and Director, 21st Century Defense Initiative
The Brookings Institution

Panelists:

THOMAS DAVIS
Director of Strategic Planning for Homeland Security
General Dynamics

DAVID BERTEAU
Director, Defense-Industrial Initiatives Group
Center for Strategic and International Studies

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P R O C E E D I N G S

MR. SINGER: Let's go ahead and begin now. Our final session is on the questions that surround the present and potential future of the national security industrial base. And after the invitation letter went out a friend in the DOD e-mailed back to me and he said, "My first reaction to what will our defense industrial base look like in 2030 is I don't know, ask the Chinese." (Laughter) "With luck they'll have a foreign military sales program for us." (Laughter)

So we'll have to wait and see on that, but the joke does connect to the fact that there are some very serious, very tough issues to wrestle with that connect the health of the industry to broader national security objectives, but also broader geopolitical and geoeconomic trends. And some of the questions that we're hoping this panel today are going to touch on are assessing the current state of the industrial base. What are the critical challenges and questions moving forward that it faces?

And then finally, what's the likely impact of the various budget and debt-reduction proposals on the industrial base itself, not just purely the DOD budget side, but on the industry itself?

And so in answering that question we have assembled two incredible panelists for this. One's David Berteau, who's senior advisor and director of the Defense Industrial Initiatives Group at CSIS. He's served in the Defense Department under four different defense

secretaries, including his four years as principal deputy assistant secretary of defense for production and logistics. Prior to joining CSIS, he held executive positions with Clark & Weinstock, Syracuse University's National Securities Study Program, NSAIC. And he also serves as a professor at Georgetown, a director of the procurement roundtable, and as a fellow the National Academy of Public Administration and the Robert Strauss Center at the University of Texas.

And to my right is Tom Davis, who's vice president for strategic planning at General Dynamics. He had a distinguished military career beginning with attending West Point. During his following career in the Army he commanded an artillery battalion during Operations Desert Shield and Desert Storm. Served as a program analyst, taught at West Point, and also is military assistant to the Secretary of the Army. But in addition to his military and corporate experience, Tom's also a very prolific writer. He's authored studies by CSBA and BINS as well as numerous articles in military and defense journals. But perhaps most important is that in 1997, he served as the Army federal executive fellow here at Brookings, so this is a welcome home as well.

And so we're looking forward to hearing both of you weighing those questions laid out of the state of the industrial base right now, the challenges that it faces, and what you see the impact of the current deficit/debt-reduction proposals. So I'll turn to Dave first.

MR. BERTEAU: Thank you, Peter. I should note that I feel rather inferior here. Not only was I never a fellow at Brookings, and I can guarantee you I never got a royalty check from Brookings or anybody else for that matter, so I feel quite out of my --

MR. SINGER: Don't worry, I've never gotten a royalty check from Brookings either, so. (Laughter)

MR. BERTEAU: I started out this morning with three key points, but by the time I finished the first panel and Dr. Carter's remarks, I'm now up to seven. That is going to require me to actually look at my notes. I can remember three, but I can't remember up to seven, and so forgive me as I look here.

I think the first key point, and actually Ash Carter touched on a little bit, the challenge of aligning our defense industrial base with our current and future needs requires us actually to be able to answer the question of what those are. And you actually, I think, heard Ash Carter say almost explicitly, we don't really know how to do that right now. Especially looking at -- and I like your 2030 timetable, Peter, from your friend at the Pentagon who thinks that's the Chinese demarcation line chronologically.

What do we need this military for in 2030 and what do we expect it to do? I think more than in our lifetimes and perhaps in the lifetime of the country we don't know how to answer that question, but that

does not mean that we can't figure out what kind of defense industrial base we need. It just makes that job a whole lot harder. Being able to actually say that we need clearly a more flexible and a more responsive defense industrial base, not just in terms of the rapid response to emerging war fighter requirements or the rapid response to next month's budget drill, but, in fact, the need to be able to respond to a future we know we can't predict. But it does not mean that we have to have an industrial base that's ready for everything because we know we cannot afford that. So we need a way to identify risks. We need a way to quantify those risks and vulnerabilities. And we're pretty good at identifying risks, we're really bad at quantifying them because that actually allows us to make choices. And we need a way to prioritize the resources accordingly.

I think it's also really critical to recognize that the defense industrial base is much more than the platform manufacturers, and we tend to think of it in those kinds of terms. As Carter uses his numbers, I break mine down a little bit more discretely than that. In FY '10, in FY '10 dollars, we spent -- under contracts DOD spent about $170 billion on products, about $165 billion on services. And unlike Dr. Carter, I break out separately from that R&D and I make R&D a third category.

The federal system and the rules for recording and allocating contract dollars between products and services counts R&D as a service.

That means that the largest service contract in the U.S. Government is for the Joint Strike Fighter. I don't perceive the Joint Strike Fighter as a service in the same sense that I perceive food service in Kandahar as a service. So we break that out into a third category of R&D.

Public data, say there's about $42 billion worth of contracts in R&D. There's actually about 65 billion because the classified contracts don't go into the public database. So that's really where we spend our money under contracts. And the fact of the matter is the industrial base you get is the industrial base you pay for under contract. That is what you're going to have.

The third point is that it's really important to recognize that the industrial base today, notwithstanding the fact that the defense budget is at near record levels, that base is actually smaller and more concentrated in a relative sense than it's been in nearly a century. There are only four pure defense firms in the Fortune 100; 20 years ago there were seven; 40 years ago there were 12. All right. The global Fortune 100 has way outpaced what happens in national security and defense. In addition, the percentage of revenue in that Fortune 100 company that go to defense has been cut in half in the last 20 years. So I think it's important to recognize that. As big and as powerful as it looks, it has not kept pace with the growth in the global economy, which gets to the fourth point: that the defense industrial base itself is much more global.

Dr. Carter mentioned this in a number of ways, but I think the most significant point to make there today is our policies have not kept pace with that. Our policies with respect to export controls still fundamentally presumed that all new good ideas and new technology will be developed first in the U.S. by a U.S. defense company and that we will be able to control the dissemination and distribution and application of that technology. The fact of the matter is in the platform world that's largely still true, but in the world of communications, in the world of electronics, in the world data management, in the world of sensors and data fusion and integration that is no longer true. Much of the new technology is being developed not even for defense, but for commercial communication purposes globally. And the challenge we have is eventually somebody says I'm sorry, U.S., you're not getting that because you won't then let me sell it to anybody else. And you're no longer a big enough customer that I'm willing to pay that price.

In addition, our processes for encouraging foreign investment in U.S. companies are a bit dichotomous, if you will. Under CFIUS we say we encourage acquisition and then we set up procedures that make it virtually impossible for those companies to bid and win contracts on a level playing field with everybody else. And so we fail to recognize and accommodate that sort of thing.

That gets me to the fifth point. For that I have to turn my

page. You can see I didn't leave room but for the original three. All right, so we've got some challenges out there. From DOD's perspective and from the way we look at DOD, their knowledge base and their overall industrial policies are not keeping pace with what we're going to need to have to manage this. In terms of what our requirements are, in terms of where technology's coming from, in terms of the global marketplace, in terms of the cycle times for technologies we don't really know what we have versus what we need. And you particularly see that once you get past the prime contractor level into the subcontractors.

We don't know what our critical vulnerabilities are and we have virtually no capacity to decide where to spend our marginal protection money until a company has fallen off the cliff. And we've got very good rescue mechanisms once they've fallen off the cliff and that deludes us into thinking that we're okay.

The sixth point is that actually, coming back to Dr. Carter's budget wars, the defense industrial base can actually save us a lot of money, but the vast majority of those savings in the life cycle costs, that 70 percent of post-procurement that Ash Carter talked about. But the time value of money in DOD is infinite or perhaps negatively infinite, right. A dollar today is actually worth a dollar. A dollar in 2020 isn't worth a damn thing. We won't spend that dollar today to save a much larger number of dollars down the road because, in fact, today has such a high reliability

cost, if you will.

And that gets me to my seventh point which is really we've done this before. This is not the first time that we've faced a budget drawdown that's going to affect defense and the defense industrial base. In fact, the history of defense spending in the U.S. is exactly those kinds of cycles. So if you look at the lessons from the last drawdowns, and we've done four big ones since the end of World War II, those lessons with respect to the industrial base are really quite clear. When you have to take money down, you tend to take more of it out of your investment accounts than you do out of everything else, and then you tend to regret that a lot later.

Now, the last drawdown in particular, the 1990s, we had a cushion, we had an insurance policy, because we actually spent the Carter-Reagan buildup on acquiring more inventory. And so we had a large inventory base from which we could draw as we went through those drawdowns. We just had a big increase in military spending and defense spending in the last 10 years. We did not spend that increase on building up our inventory. In fact, our inventory now in almost every category is substantially lower on a proportionate basis than the reduction in forces that accompanied the end of the Cold War. Almost every platform, basically we're down 35 percent in terms of active duty military and strength today; about to come a little bit lower. Almost every platform if

you go back to the 1988 levels at the end of the Carter-Reagan buildup, almost every platform is down substantially more than that 34 percent.

Now, that discounts a lot of things like, you know, cyber information technology, unmanned systems, et cetera, that weren't part of the 1988, so I can't really compare. But across the board in the major force structure drivers we're down way below the proportional level of reductions.

By the way, that military that's one-third smaller today than it was in 1988, in real dollar terms costs exactly the same amount as that larger force did in 1988, which sets up the real dilemma point of view, and this is kind of my final point. The need for savings in all the debates and drills that are going on today are in FY '12 and FY '13. The potential for savings in force structure and in personnel is in 2014 and beyond. That means, almost inevitably, that the investment accounts which sustains and supports the industrial base is going to suffer a disproportionate share of cuts in the next two years notwithstanding what you just heard DOD say.

So with that, sir, I've got a rosy picture I've painted and we'll turn it over to Mr. Davis to rescue us from oblivion here.

MR. DAVIS: Thank you, David. David and I have studied each other for many years and I'm not sure either one of us have learned a thing. (Laughter)

I've got an unusual perspective in that there's an old Judy

Collins song, for those of you old enough to remember Judy Collins. It was called -- she had the verse it in, “I’ve looked at life from both sides now.” I’ve looked at life from both sides now. I was in the Pentagon during the drawdown and the recalibration of the force and so forth we did in the early ’90s, at least from the Army perspective. And now I’m an industry person, so I’m looking at it from the other side. So I often start out by saying I have, like Judy Collins, looked at life from both sides now. But someone reminded me at one time you probably ought to drop that because the next verse says, “It’s life’s illusions I recall. I really don’t know life at all.” (Laughter) So I think you have to be cautious about throwing that out there.

And I would like to agree with someone’s comment, after all my years in the Pentagon that I think Ash Carter’s discipline in medieval history’s probably more useful than the physics. But it is a partnership that I’ve discovered that exists between the military services and the defense industry, and it’s a partnership that is important and it’s a partnership that increasingly is self-reliant, reliant on one another, and that’s the challenge that we’ve got going right now.

I always like this comment that Mark Twain made once that it’s not the things that you don’t know that causes trouble, it’s the things you do know that are wrong. I had an article I just got out. I actually haven’t written too much lately because basically some people in my

company don't like me writing all that much because I might be quoted on having written something, but I got an article out recently. It's in the *Joint Forces Quarterly*. It's entitled "America's Endangered Arsenal of Democracy," and it talks about the defense industrial base. And the purpose of the article is to try to highlight the things that people know that, in many instances, are wrong.

I co-authored it with Nate Fick. I learned from Mike O'Hanlon years ago when I asked Mike one time how is it that you produce all these books? And he said, oh, I use the methodology that John McEnroe does when he wins all those Wimbledon championships in doubles: you go out and you find a good partner. So I called Nate Fick at CNAS -- many of you know Nate, a young -- upcoming young analyst, CEO down there -- and congratulated him. I had picked him as my partner, and we got the book out. Of course, that gave a perspective that exists both on the academic side and on the side that I'm representing currently.

The real point that we had out there is we wanted this to sort of coincide with what was going to be, I thought, an event that would catch a little bit of attention, which was the 50th anniversary of President Eisenhower's farewell address, January 17, 1961, a speech that was many months in making. The President wanted a comprehensive speech that was visionary, that laid out where he thought the country and where

he thought the country was going. But in the modern era it's a speech that, as someone once said, is condemned to be frequently quoted and infrequently read. The thing that's quoted about it is this phrase, "the military-industrial complex." And Eisenhower, being who he was and where he came from, it was a thing that really caught everybody's attention because you wouldn't have expected this rather strong criticism of avoiding the influence, sought or unsought in the councils of government, about the military-industrial complex.

Interestingly enough, that's one of the most remembered presidential speeches. The next most remembered, which is actually probably even more remembered, occurs three days later when President Kennedy gives his Inaugural Address. But both these speeches have a lot to say about the status of the country and both of them have a lot to say about national security, the Kennedy Inaugural being almost exclusively on national security.

But the point about that is, is that the national security complex, the national security industrial complex that President Eisenhower was talking about in 1961, as was implicitly mentioned a couple of times today, is not what you have today. That complex was large. It was quite large. David mentioned the scope a little bit in one dimension, but in another dimension it consumed about 9 to 13 percent of GDP. It was the largest industrial manufacturing sector in the U.S.

economy. It was larger than oil. It was larger than automobiles. It was larger than steel. It was something that was unusual in the American experience and it's something that President Eisenhower wanted to call attention to.

That national security industrial base is not there anymore. The current size of the national security industrial base is about 1 percent of GDP. Over the years, for various reasons -- some of them understandable, some of them perhaps a little less understandable -- this industrial base and this complex has gone through an incredible metamorphosis, and I was part of it back in 1990 in my previous life from the other side of the fence. And the reasons we made a lot of decisions we made in 1990 were exactly as David described them. From the perspective of the U.S. Army in those days we had a large capital stock that we had built up in the 1980s. Many of you may recall that the Army's campaign back in those days was built on we have to have the big five: the Abrams tank; the Bradley Fighting Vehicle; the Apache helicopter; the Black Hawk helicopter; and the fifth seat kind of rotated a little bit, some days it was the Patriot, some days it was the MLRS. But these were major modern systems that the Army had to have. They were articulated, they were understood, they were easy to mention to Capitol Hill. And basically I always thought it was the highly successful approach because the Army got all five of them.

We debuted them very successfully in 1991 in Desert Storm. They did quite well. That campaign lasted, depending on whether you're an Air Force guy or an Army guy, somewhere between 37 days or 4 days. (Laughter) But anyway, four days of combat in Iraq is not a lot to deplete a lot of that capital stock. I think in my division we lost four MI tanks. The exchange rates that we had on that were quite favorable to us.

So what does that mean? Well, we come out of that with a lot of equipment and we make the decision that we're going to draw the force down and we take it down by about a third. We cut procurement by 70 percent between 1986 -- 70 percent in real terms -- and 1997. We ask the defense companies to take a look at what's going to happen here with this downswing and restructure themselves, and they did that. They got together with very little guidance, looked at their own financial circumstances, their own requirements that they saw going forward, the sustainment necessities that existed out there, and basically between 1990 and 2008 you saw an industrial base contract rather markedly. I've got a chart that I show frequently that says somewhere in the neighborhood of 30+ major companies became 5. David has a chart in his study at CSIS which I think is even more pronounced: 134 companies collapse into 4.

When we say that happened, took over a lot of the companies, that doesn't mean that we took them over lock, stock, and

barrel; that they went from one person to another. A lot of facilities went away, a lot of jobs went away, a lot of capabilities went away. And the things that were believed to have an enduring requirement and were an enduring need in the military were the things that stayed.

I thought it was kind of interesting, I pulled this up because I wanted to see if it was illustrative of what I'm saying. I lot of discussion lately over the fact that the last space shuttle is up, went up, is going to come down in a few days, and that's going to be the end of that program. And a lot of op-ed pieces have been out there, several written by astronauts, including Neil Armstrong who very frequently gets involved in such discussions about where are we actually going with the space program. And when I was a young person I was really fascinated with the space program. I thought it was something that was just magical. We all knew who the astronauts were. They were national personalities.

But as a young person back in the '60s, you know, I thought all those things that we saw going into space were built by NASA. But the fact of the matter is they weren't. They weren't built by NASA at all. If you take a look at the equipment that was the signature equipment of that era, the *Mercury* capsule built by McDonald Aviation; the Redstone booster was built surprisingly by Chrysler Corporation; the Atlas booster was built by a company called Convair, which General Dynamics used to own at one point in time; the *Gemini* capsule also built by McDonald. They won

that competition; the Titan booster was built by a quaint company called Glenn L. Martin Corporation; the *Apollo* command module built by North American Aviation; the famous Lunar Lander which was so well known in *Apollo XIII*, both in the actual event and the movie, built by Grumman.

So what do all those companies have in common right now? None of them exist. None of them exist. They have, in some cases, been absorbed by other companies, Grumman, of course, being the Grumman of Northrup Grumman. Chrysler Corporation basically has exited the defense business. Many others have done the same thing. So what's the point? Well, the point is that the defense industrial base or the national security industrial base that Dwight Eisenhower was talking about in 1961 is enormously different than the one you have today.

I see Army officers all the time. Once a year I go up to the Army War College and give a discussion about General Dynamics and how we see things and how we think of things. And by and large, I find -- since it was mentioned that you have enduring images out there -- that people in the Army who probably have a better interest and a better perspective of such things than most still have this image that somewhere out there, there are these long assembly lines that they've seen the picture of that has tank after tank, you know, coming out of some building, people loading it on a car, and sending it over.

What are they seeing? Well, they're seeing an old picture

from about 1943 when the Army made M4 tanks at the Chrysler Corporation facility in Detroit. They armed -- equipped it initially, powered it initially with a V8 engine from Ford; made 40,000 of these, sent 30,000 of them to Europe where they faced off against about 1,600 German Tiger and Panther tanks. Now, the Army doesn't like a fair fight. That's not what you'd call setting things up for a fair fight. Even though the Tigers and the Panthers were technologically superior and more advanced than the tanks, it's very hard for 2,000 tanks to take on 30,000. But we cranked that out. The Willow Run factory that made the B-24 Liberator bomber, at one point in time, about 1945, they were producing a bomber every 55 minutes.

Well, these serial runs or these long production runs just don't exist any more. So I'd like to say the defense industry is no longer like Ford. We're Ferrari. We make highly sophisticated pieces of equipment and we make them almost one at a time. My colleague John Gifford, sitting over here, and I were just in Switzerland on Monday, taking a look at one of our facilities and one of their products. And this is a company, going to David's point about globalization, that we bought a few years ago. It was part of General Motors Defense, which wanted to exit the defense business. They make combat wheeled vehicles. Looking out on the factory floor there were 10 Piranha vehicles under production -- 10 -- which were being made, intriguingly enough, for 4 different countries.

That's not what you'd call a major serial production, but that's more or less how we do it this day.

So what is the point I'd like to leave you with? One, the defense industry that you have right now is a much smaller operation than it used to be. How do we know that? Well, among other things, the -- in addition to what David mentioned about who's who in the Fortune 100, the top five defense companies' total revenue, and that would include Boeing's commercial aircraft, which is about half of their operation, the top five total revenue equates to about half the annual revenue of Walmart. Now, Walmart's number one these days, so that is picking a big target, but that's an interesting evolution right there. There are, in fact, as he mentioned, only 4 companies in the top 100. The base has shrunk down rather considerably and we are facing as a result of that a real dilemma and the dilemma is how much smaller could it possibly get?

So then we get to the question of the budget circumstance and the circumstance we're in right now. So I mentioned in the 1990s, it was a pretty easy decision. We decided to take most of the risk and make most of the cuts in the Defense Department and in the Army on the investment side. Why did we do that? Well, we could because we had, as I mentioned, a huge capital stock leftover. You don't have the capital stock now. The capital stock has largely been used and used very heavily. One of my lieutenants who's now a senior commander over in

Iraq recently told me that every wheeled vehicle the Army has at this point is pretty much grossed out and maxed out. They've welded armor on it, setting down on the axles and so forth. They've been used a lot. Some vehicles over there that are -- we used to program 800 miles a year for a vehicle to drive and we thought that that was sufficient to train the crew and exercise the equipment. Some of these vehicles are being driven 100 miles a day. This is a rather heavy consumption rate and something's going to have to be done about it.

Which gets back to Michael's point, which is assessment of risk. Clearly there's going to have to be an adjustment in what the defense program is going to wind up being. The President has already strongly signaled that with his speech back on April 13th, when he said forget what I just turned in. We're going to have a budget going forward over 12 years. That's at least $400 billion less.

So the question is where do you want to take the risk? And I think Michael O'Hanlon framed it pretty nicely. There are some risks that you just don't want to take. We have to give some serious thought as to how much risk we're willing to take in the industrial base. The industrial base has shrunk considerably already. We do live in a globalized market. We do have challenges right now attracting the engineering talent that we'd like to have. In days gone by, in the days of the space program that I referenced, pretty much everybody who was getting a degree in

engineering wanted to be involved in that. That was the cutting-edge thing. That was the place to be.

If you've ever seen the documentary on the flight controllers at the LBJ flight facility, most of those people who were there, sitting there with the white shirts and the thin black tie, the pocket protector with the 6 or 7 pens, they were all 26, 27 years old, straight out of school. How do we attract those people to come in to a very small business with an engineering requirement that requires them to be involved in cutting-edge things?

The last comment I just wanted to make is Dr. Carter mentioned that we have to do what we can to enable the force. What does he mean by that? Well, what he means by that is, in essence, this: We have gone through a philosophical inversion in our military structure and in our military context. It's not really spoken about. I don't think I've ever even seen it written down, but we basically have.

My father-in-law was in the best division to be in in World War II. I think it was the 78th Division. It was the best division to be in because he was at the site of all the major battles in Northern Europe after the battle happened. (Laughter) He went across Normandy Beach in August. He got to Bastogne after Patton had relieved the 101st from the seizure. He went across the bridge at Remagen after the bridge had fallen in and they had the temporary one up there. It was a great thing to

be in.

I was talking to him one time and I said, you know, by the way, all those months of campaigning out there, what sort of equipment did you have? And he laid it out. He said, well, I had an M-1 rifle. I had a duffel bag with an extra change of clothes in it. I had a helmet. I had some load-bearing equipment. I think I had two canteens. The helmet, of course, was a steel pot which could easily be stamped out. It had a little liner in it, you pulled the liner out, the steel pot also became a washtub. I had a mess kit, a first-aid pouch. Had leggings, he didn't have boots. They were a lower level division so they had low-quarter shoes, which you put leggings over to keep the mud from getting into the shoe. That was what passed for boots for them.

So I kind of tabulated that up and that meant we sent Ken Capin to war with about $200 worth of equipment. Any young soldier that walks out of an operating base in Iraq or Afghanistan today, and Mike has seen them all, they're going to walk out of that base to go on patrol or climb that hill or hit that valley with about $20,000 worth of equipment. You've got a Kevlar helmet. You've got integrated body protection armor. You've got a cooling system, probably a rather sophisticated backpack. You've got the M-4 rifle, which is actually a pretty good rifle that's been updated quite a bit. You've got the night vision device. You've got the squad radio that allows you to send digital messages back on what you're

seeing. You may even have something which is a camera that allows an image to go back through a RPV or something else.

Why are we doing that? Well, because when you've got a force of 1.3 million active each one of those soldiers, sailors, airmen, marine is a valuable, valuable asset. And as we've heard today, they're expensive assets. We've got to enable each and every one as best we can, so you can do more things, see more things, cover more space, react to more circumstances, be more mobile around the battlefield.

Where do you get that? Well, your defense industry provides that. We provide it as based we can and we have to look very seriously as we go forward on where we're going to need these enablers that Dr. Carter is talking about. Which are the ones that we're going to have to have and which are the ones that we think are probably just nice to have?

MR. SINGER: Thank you. Well, both of you have spoken to the shrinking size of the industrial base, whether it's in number of firms or whether it's in percentage of the economy. But that, in a sense, looks at the industrial base just through sort of a revenue or number of companies or often how it's talked about in Congress as jobs in certain localities. But one of the things that perhaps differentiates the industrial base in terms of its impact is the ripple effects that it has on the broader economy, particularly when it comes to innovation, which is one of these things that

we all claim to like and support. And so, you know, no national defense industrial base. It's not just you don't get the *Saturn V* rocket, you don't get the Internet, you don't get whatever next thing. So I want to press you, though, on that point.

The first is prediction. What do you think will happen that R&D slice, both for the government, but also for industry? So far we've seen in the last couple of budgets both cutting -- R&D had gotten hit worse than other sectors, even though it has a larger impact. Will that trend continue?

And then maybe, Tom, you can also weigh in on the fact you talked about how businesses have to think about risk-taking as well. How will companies respond to these cuts? Will they, in their portion, will they seek to protect existing lines or will they take risk and spend perhaps more on R&D out of their own hide with the idea that that might set them well up in the future?

And then the second question is, that somewhat connects to this, is, yes, there's a shrinking number of sort of defense-only companies. What do you think the defense firms will look like, say, 5, 10 years from now? I mean, as an example, on the drive in this morning I heard a radio advertisement for Lockheed Martin. I'm not going to mention General Dynamics, but from Lockheed. And it talked about their work in energy innovation. Or you mentioned, you know, how there were companies in

the past, like Chrysler decided to exit the sector. Do you think companies will respond by exiting or do you think we're going to see more companies that are mixed or are there going to be a smaller number of primary defense layers? What's your prediction in terms of the look of these companies themselves?

MR. BERTEAU: You want to go first, Tom?

MR. DAVIS: Yeah, I'll try it first and then I'll be curious to see what you have to say (inaudible), whether it's reinforcing or rebuttal.

A couple points on that. On R&D, R&D right now in its current portion of the defense budget is actually unusually high over what it has been over the last several years. It's beginning to come down. It's sloping down to some extent. But overall, it's been unusually high.

Well, why is that? Well, I'm not quite sure. I've asked that quite a bit myself. I think a lot of it is because the department over the last few years has had a difficult time making the leap from development into production. And when you would normally see this leveling out and flattening down of R&D as stuff went into production, you haven't seen that as much lately. I thought the report that General Lou Wagner and Gil Decker released recently, or was out at least recently, that said that, you know, the Army has cancelled like $3.2 billion worth of programs a year because as you get to the point where it's time to buy it, they've got budget pressures. So RDT&E has kept a lot of things going. To some

extent the level that it's at is almost an indice [sic] of indecision and ability to get to the risk assessments that we've had.

Second point, frankly when I got to industry I was somewhat surprised at the modest amount of individual research and development that's available out there to put in various programs. There's this image that exists out there that it's a huge, huge amount. The fact of the matter is it's really not all that large. Do we invest it? We do.

Which leads to my third point. The defense industry is largely reactive. I'd like to say we're very proactive. We go out there, we see the next thing that's coming, we're going to go jump on that right away. But the truth of the matter is we're largely reactive to the customer. When the customer -- be it the Army, Navy, Air Force, Marine Corps -- you know, says I kind of think I'd like to have a capability to do this, then we'll quickly go out there and try to assess what's available to do that. We do stay close the technologies that are current, that are coming. People like myself and other people who work for me try to translate technology into military capability that is going to be needed. I know the Army said this, but what they really meant was that. That happens to no small extent. But it's a rather reactive industry all things considered.

What it'll look like in a few years, I think you're probably -- and this is just speculation on my part -- I think you're probably going to see two things. One, of the top-tiered defense companies there will

probably be an effort made by all of them to diversify to some extent into other things. How far will they go? Well, probably not as far as some people expect. Norm Augustine used to have a famous line that says efforts by defense companies to diversify into commercial activities is a story unblemished by success. (Laughter) Well, there have been a couple of successes now. I think you'll see some diversity going on so you'll begin to get some protection against what may be a coming cyclicality in the defense market.

The second thing I think you're likely to see is at the lower tier. If you take the top 50 companies that do business with the Department of Defense you'll find that the top 5, maybe the top 6, the total revenue of those top 5 is equal to the revenue of the next 45. So there's a quick drop-off down there. I think there will be some consolidation down there and it'll probably be consolidation around some technologies that are believed down there to be the ones that are going to have the greatest possibility of success.

And the last part I'd throw out there is a lot of talk -- David mentioned it -- about how we're all identified with platforms as opposed to technology. I think you'll see some of the platforms that are out there right now are going to have greater endurance than we might have otherwise expected. I mean, we're already at a point in life where people are talking about the grandsons of B-52 and tanker pilots will be flying those

airplanes. But the enabling ability of the plane or whatever the platform happens to be will probably be greatly enhanced with the communications, survivability, and maybe a few other things we can do for it.

MR. DAVIS: Briefly, Peter, because I those are both very good questions and actually I think they're kind of related to one another. In R&D, the models that we've relied on for the last 50 years are essentially gone. The first one of those models was one where, from the Defense Department's point of view, companies would invest their own money in R&D with the expectation and the track record of making it back in production. R&D costs now, which proportional to long-term production run costs, are now disproportionately equal. So you no longer have a model that says I'll invest now and I'll make it back in production. Production's just not there. There's just not enough.

The second way in -- the second model that was there is DOD actually bought and paid for research itself, you know. A lot of contracts investing directly, DARPA being the best example. Look at where we're spending our basic research money today, 6.1. It's almost all universities. It's not in companies that are actually going to turn those -- that research into development application. Tom's right in the sense that a lot of our R&D is disproportionately high, but if you break it down and say there's the D part of it -- development application -- and then there's the real R part of it -- the 6.1, 6.2 funding -- it's actually not

disproportionately high. And with respect to the challenge, it's probably painfully low and inadequate.

Now, there's a third model that's still perhaps viable, and that is that smaller companies tend to innovate more rapidly and tend to fill these gaps, if you will, than the large companies do. It's hard to measure that. We actually had a Defense Science Board a few years ago that tried to take a look at that. You know, there's this theory that the little companies innovate and then as soon as they get really good, they get bought by the big companies and innovation stops. Couldn't document that. Can't prove that. It's too tough a challenge. Nonetheless, the image is still out there. But to the extent to which it is true, it's a bit threatened because the overall share of the defense market and the overall share of the defense research and development market that is occupied by mid-tier companies -- let's assume there's some equivalence between innovation and size of company -- is shrinking on a percentage basis.

Which gets me then to your second question, what does it look like? Because I don't really know whether that shrinking means anything or not. It's just a correlation of data at this point.

What does that industry look like five years from now? You know, when we were at this point, basically two years past our peak -- let's say 2008 or '09 was our peak; two or three years past that peak -- when we were in that point in the early '90s, we were getting up to the Last

Supper. Right? Or as some like to call it, the “Only Supper,” where it clearly kicked off a spate of mergers and acquisitions. And it was already underway really. It just got a little more visibly blessed. Companies today are at an all-time high in terms of available cash. What are they going to use that cash for? Well, they could invest it in what DOD needs except that nobody’s quite sure what that is and what that, you know, revenue stream is that would be associated with that. So it’s a little less attractive to invest it in the R&D that we’re talking about here.

They could invest it in buying new companies, but how do you tell which companies you want to buy given the fact that the future market is so uncertain? So maybe what you do instead is you actually divest. And I think the very real question that sits here today in terms of what the companies look like five years from now is how much is acquisitions, using that cash on hand, and how much of it is actually divestiture so that you focus on where you think the future revenue stream is going to be.

I don’t think companies know the answer to those questions yet because, in fact, that depends on, you know, what happens between now and August 2nd or whatever you D-Day is with respect to -- you know, D-Day’s taken on a new meaning, right? It’s Default Day now. And I don’t know when we get to Default Day, but I’m pretty sure that I want to have more cash on hand then than I do now.

And I think that the question of what it's going to look like, we actually did wrestle with this before. I actually had the privilege of running in 1992 and 1993 a DOD effort called the Defense Conversion Commission where we looked at what should industry do in the face of this lower demand, lower budgets, you know, different kind of technology future, et cetera. And while many of the conclusions and recommendations were probably unique to that time, one of the most profound ones was by no means should you wait for the government to tell you what to do because if the government were that smart and it were that easy, we'd all already be rich. And, you know, clearly we know that's not the case.

So there's a lot of ambiguity and uncertainty there and I think the real question is what are the factors that come into the decision-making? And there are a lot of signals that the government needs to send, that DOD needs to send, but they don't know what they are or how to send them right now.

MR. SINGER: Mm-hmm. Let's open up to questions out here. So right here.

SPEAKER: Good morning. George Nicholson from Strat Corp. A question both for you, David, and yours, Mr. Davis.

You talk about companies' investment. You look at what Jeff Pino has done at Sikorsky with the X-2 helicopter, which is flying right now

and I understand completely developed on their own dime. Faster than 250 knots, a thousand-kilometer range, being able to rapidly offload it and onload on a 130, something that's been a huge deficiency out there. Again, from what Pino has done with Sikorsky, would you like to comment on that?

MR. BERTEAU: That's a very great example, George, and, in fact, I think what you do is you illustrate a huge hole in the discussion we've had today so far. When we talk about the defense industrial base from a platform point of view -- and Tom sort of alluded to this with his Chrysler plant and tanks, et cetera -- for the most part the similarity between what gets built for defense and what gets built for the rest of the world is a gap that widens every year. In the world of rotary wing, though, that's not quite the case. I think both from a production point of view and a technology development point of view there's actually a potential for a greater coalescing of both technology and production for national security purposes and for global uses, if you will. It's one of the reasons why you see actually in a lot of rotary wing areas the Europeans are actually ahead of the Americans because they're actually thinking in those kinds of terms.

So some of what Sikorsky has done is, in fact, not driven by defense and national security needs, but by their desire to stay competitive in the global market, which is more commercial than it is military. You know, can you translate that experience into success for

shipbuilding, for tract vehicles, for, you know, faster-than-the-speed-of-sound aircraft? I don't think so. So I think there's a very real limit to what that is. But could you do it at lower tier levels or at some of the newer technology levels -- unmanned vehicles, for instances -- that potential may well be there. I think that remains to be seen.

MR. DAVIS: Yeah, and I'd say that, you know, there's -- what General Atomics has done, largely on their own dime, which is -- I mean, it's part of the language right now. Four or five years ago, if you had said the word "predator," most people would think you were talking about the movie.

MR. BERTEAU: *Jurassic Park*.

MR. DAVIS: Yeah, now it's you hear it every night on the news, you know, Predator strike and so forth, you know. And that was largely done on their own dime.

You know, one of the things that, you know, as David has pointed out and I was making with my comments about this idea that we now make very sophisticated, specialized, specified things that, at least in the defense industry, that don't have a lot of commonality with stuff that's going to go on in the commercial sector, at least what we do. We try to incentivize our business units to look at things like that by -- when we get one that's a small innovative company, we basically try to leave them with enough autonomy that they're keep thinking in those terms and then they

have to -- often have enough capitalization to go pursue it on their own.

You know, one of the things that I've -- when I was growing up, one of these little toys you used to get -- some of you have probably seen them -- you got a little black dog and a little white dog. They were magnets and it was how you entertained yourself. You know, you could take the one magnet and drag the other one along and you could turn it around and all that. But one of the things that kind of comes out of that experience is that the one magnet won't affect the other one if you get too far away from it. You're outside the force field and nothing's going to happen. That's one of the things that our people who are engineers are always kind of wrestling with. You know, you've got to stay inside the force field, so to speak, of what the customer really is interested in because if you get too far away from it, then they have a hard time relating to it, they have a hard time operationalizing it, and they have a hard time kind of seeing how it might fit in. And it may be very hard to fit in. And change in a military organization, given all of the factors that go into that, can be quite daunting.

MR. SINGER: Right here in the front. You can wait for the mic.

SPEAKER: So what's the -- the name is Dave Onstrock, civil engineer, DOD. What's the possibility of going with cheap civil weapons like the Russians use, like the AK-47, instead of the M-4 rifle or

something like that to see -- you know, weapons that may not be as technically advanced, but are easier to maintain and -- cheaper to manufacturer, easier to maintain in terms of savings?

MR. BERTEAU: You know, Secretary Gates actually, when he rolled out his reduced budget back April 6, 2009, and all the cut programs, et cetera, one of the key points he raised in there is the distribution of expenditures in DOD on the spectrum of complexity of systems. And I think the most lasting legacy of Bob Gates is he has taken the word “exquisite” and moved it from a positive word in my list of important words to use and moved it over into the negative category. But the fact of the matter is he said, look, about half of our money today is spent on stuff that’s still fighting the Cold War. About 10 percent is spent on stuff that’s really for the kind of war we face today and about 40 percent is both. And he said I’m going to focus on that 10 percent.

Now, what’s intriguing about that is he was the Secretary of Defense, you know. In a sense, he’s getting on the seesaw and trying to tip it one way or the other. But in his role, he’s actually the fulcrum, right? If he wants to change the balance, he can change the balance by moving the fulcrum and changing the weight. He doesn’t have to get on the seesaw. He can redefine the seesaw.

And I’ve always wondered -- and this is my response to your question -- why instead of focusing -- I’m going to focus on that 10

percent, why he didn't say the real important part here is that 40 percent that's useful for both. I want to expand that 40 percent to be 80 percent. Right?

Now, part of that cheap and reliable. Part of that is the 70 percent or 60 percent solution. Part of that is changing the tradeoff dynamics of cost and engineering so that you actually get the benefits of those kinds of tradeoffs. These are all doable, but they're not doable one program at a time. They're only doable if you build the budget that way and the overall leadership buys into it.

MR. DAVIS: Yeah, and I guess just going back to my comment about this implicit change in the philosophy by which we manage and equip our forces, I don't have anybody out there clamoring to give them an AK-47. You know, one of the things that's interesting about what David just said about Secretary Gates' commentary that, you know, we have to get away from exquisite systems, and, you know, we'll be happy with the 80 percent solution. Okay, that -- as an old boss of mine used to say that sounds good when you say it fast.

So you sit down and you start going through the list of, okay, what's the 20 percent that you don't want to have? Do we want to get rid of some of this expensive armor so that, you know, the tactical and strategic mobility is up, but, you know, survivability is down? Well, no, we're cautious about that. You know, survivability is very important.

Okay, do we want to get rid of a lot of the camo equipment so that communications are going to be quite simple and quite straightforward, but you won't have access to a lot of the external ISR systems that are out there. That generally doesn't work very well either.

Getting -- I think it goes back to what Michael was talking about during the first session this morning. Getting a real clear assessment on what the risk-benefit, the cost risk-benefit, how far down are we willing to go to save cost and how much risk are we willing to take on any particular system?

That's a tough conversation. It's a real tough conversation. And my experience has been is when you get into it, you know, a fellow said it well the other day who was in the government after we were having a discussion like this, he said, well, you know, what we really want is the 100 percent system with the 80 percent price. (Laughter) That, also, is hard to do for obvious reasons.

MR. BERTEAU: I'm going to push back a little bit o this, but -- and use actually one of the great figures that you pointed out, though. There's another way of looking at this, which is, you know, saying that we went from spending $200 to $20,000 per combat infantryman sounds like a lot except when you look at it in reverse: combat infantryman in Afghanistan, we faced a foe whose main aim is not to win, is to strategically -- their strategic defeat of the U.S. is mainly through wearing

us out and by raising casualties. And yet you could compare the per spending on that combat infantryman versus the per spending on pretty much every other specialty, be it Air Force fighter pilot or whatever it is.

And so we have another way of looking at risk where our investment ratios and the amount that the defense industrial base spends on may not be where it's most important to national defense strategy. Or another way of laying this out is you used that example of the Sherman tanks or the B-24s, essentially a quantity versus quality narrative. And we've shifted towards quality side. But that's part of a broader defense policy question. You know, is the goal to have 11-10 carriers that are of exquisite capability or, you know, it's anathema to say, well, why don't we have 20 of 60,000 tons that maybe don't give you as much fighting punch per each? But what I'm getting out is these are questions that we don't like to talk about because it means looking at the framework differently.

MR. SINGER: No, I absolutely agree with that. And, you know, one thing I have to tell a lot of people, every now and then I'll get a call from someone and they say, gee, what do you think about the need for, you know, more infantrymen or, you know, that tradeoff you're talking about? You know, should we have a fleet of more numerous smaller ships as compared to very expensive, large capital ships?

My quick throwaway answer is, you know, we're not in the requirements business. Somebody out there represented by the policy

shop, Michele Flournoy's people, Ash's colleagues, you know, that's where a lot of those policy decisions have to be made and those tradeoff functions have to be arrived at. You can have a very fulsome, wholesome debate among very well-informed, educated, experienced people.

And going back to Art Cebrowski in days gone by, you know, Art had one decision -- I mean, one conclusion that he had reached from that. It never quite seemed to be the same conclusion that the institutional Navy reached. Did we have a role in that? Not really. If you want a fleet of small ships, tell us how you want them and when you want them and what you want to spend for them, and, you know, we'll give you the best shot to come up with a design that'll do that. We've done that recently, the Littoral Combat Ship, which is a story that some people laud and some people don't. But we'll try that for you.

But that gets back to, I think, the discussion we had earlier. You know, at some point in time, there has to be an industrial policy to determine the capabilities we really need that is aligned with the national security policy on where we want to have presence and where we want to have capability and how we want to try to protect the national interests. That's a dialogue that really should lead heel-to-toe.

And I think if any of you are bored on a night and want to read any of my previous writings, you know, you'll find out that I think 15 years ago I wrote on the same topic and said that one of the things that

the department has a hard time with, back in the olden days of PPBS, you know -- planning, programming, budgeting, and system, you know -- the first P is always the challenge. There's a lot of second P and there's a lot of BS. (Laughter) But the first P is always the challenge.

MR. BERTEAU: Peter, I have two sentences on that. I think your point is actually absolutely correct. And I think while from industry's perspective you say we can't go after the requirements. From the government and DOD's perspective we can no longer afford to pretend somehow that requirements are not part of the overall situation. And we've got a dynamic today that's fundamentally discontinuous. The people who set requirements won't give up those requirements in order to get something faster and cheaper because they think they get nothing back if they give it up. All it means is they get less. They have no incentive to give up -- to reduce requirements.

The folks who own the budget say, man, if I give up requirements I've just cut my part of the budget, so I'm now screwed not only this year, but forever, right, because I'll never get that money back. And the company that produces it says, okay, I just lost revenue and profit and market share, and I'll never get any of that back. It's not hard to see a scenario in which, in fact, you reverse all of that, requiring the war fighters in order -- in looking at the cost-effectiveness of the requirements, actually get more net capability than they do by holding firm on any given

requirement on any given system. The people who own the budget by being able to get more capability actually end up with a better budget over time and a more sustainable budget over time. And the companies, to the extent to which they can respond to that, actually protect their market share, potentially protect their revenue. And if you believe one part of Ash Carter's better buying power, they'll be allowed to make a profit because they're giving us better cost. I'm not quite sure I'm ready to accept that yet, but we'll see how that plays out.

But there's still one big catch in there. There's a JROC and a JCID sitting up here that is sacred and you can't touch it. Right? The minute that requirement says I don't need as much, somebody else -- and remember, the JROC is four vice chiefs and one vice chairman -- somebody walks in, the other four say we got a better use for that extra money than you do. So until you kill JCIDs and reform the JROC, you won't get there. So that's my motto for the final comment at the end of the equation. (Laughter)

MR. DAVIS: I would add to that no comment. (Laughter)

MR. SINGER: Okay. We're getting to witching hour and I think it's a good ending point as well. I was pulling back and thinking about the series of panels and also the speech is that really what's been the thread that connects us all is a narrative of risk. It's risk for the nation as a whole if we continue along this pathway of basically, I would argue,

fiscal insanity. And that this -- what we usually look about as a fiscal issue is becoming a national security issue. Then as Mike O'Hanlon raised, there's an issue of risk in whatever cuts you do. And those risks will -- you know, you will be juggling different national security priorities.

Then you have the risk that Ash Carter raised and almost sort of the goal/frustration that DOD has said, where we're the ones accepting most of the risk in development and we want to move that to the industry side. And then you've got the risk that this panel was wrestling with as well is what does that mean for the individual firms in the industrial base itself? Are we the ones that accept the investment risk or not?

And the problem that comes out of it, the absence of -- whether it's Mackenzie Eaglen saying we have a QDR that really provided no strategy. And, I mean, I think a good evidence of that is when the President comes out and says I need a commission to look at strategy, you go, well, wasn't that what the QDR was just supposed to do? But then you turn to the same folks who did the -- whatever. But the point being is whether it's that point (inaudible) Tom raising the absence of the all-important P. In the absence of that kind of guidance what we're left with right now is either the -- I call it the *Waiting for Godot* model or the *Field of Dreams* model. So either we sit there and wait for someone to tell us what to do and basically get stuck in inaction or you take a risk -- if you build it, they will come -- fingers crossed that they actually will come. And

so that's where -- to me, this dilemma of risk sort of encapsulates where we are right now.

So thank you both to our individual panelists up here who've really yielded a great discussion, but also to all of you who've been part of this as well as the people who helped put it together. So thank you.

(Applause)

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