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NATIONAL ADVISORY COUNCIL ON
INNOVATION AND ENTREPRENEURSHIP (NACIE)

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MEETING

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THURSDAY
AUGUST 24, 2017

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The Advisory Council met in Room
72015, U.S. Department of Commerce, 1401
Constitution Avenue, N.W., Washington, D.C., at
1:30 p.m., Melissa Bradley and Stephen Tang, Co-
Chairs, presiding.

PRESENT
MELISSA BRADLEY, AU Center for Innovation in the
Capital, Co-Chair*
STEPHEN TANG, University City Science Center,
Co-Chair*
REBECCA BAGLEY, University of Pittsburgh*
ESTHER BALDWIN, Intel
HEATHER BOESCH, IDEO
TREY BOWLES III, The Dallas Innovation Alliance;
The Dallas Entrepreneur Center
SCOTT FREDERICK, New Enterprise Associates
RICHARD JOHNSON, Kentucky Science and Technology
Corporation
DAVID KENNEY, Oregon BEST  
PRADEEP KHOSLA, University of California, San Diego  
MIKE NEMETH, S3 Planning  
ANDREW REAMER, George Washington University  
EMILY REICHERT, Greentown Labs  
SUE GRIFFITH SMITH, Ivy Tech Community College  
WHITNEY SMITH, JPMorgan Chase  
TIFFANY STEVENSON, Sephora USA, Inc.*  
ERIC TOONE, Duke University  

ALSO PRESENT  
CRAIG BUERSTATTE, Office of Innovation and Entrepreneurship; Designated Federal Official  
DAVE BUCHANAN, First Responder Network Authority (FirstNet)  
T.J. KENNEDY, President, First Responder Network Authority (FirstNet)  
CAMILLE NELLANS, First Responder Network Authority (FirstNet)  
PHIL SINGERMAN, Associate Director for Innovation & Industry Services, National Institute of Science and Technology (NIST)  
JENNIFER SHIEH, Small Business Administration  
BRITTANY SICKLER, Small Business Administration  
ERIC SMITH, Office of Innovation and Entrepreneurship, Department of Commerce  
JOHN WILLIAMS, Small Business Administration  

*via teleconference
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MR. BUERSTATTE: All right, good afternoon, everyone. You all know who I am, Craig Buerstatte, and for the record, I am the designated federal officer. And we will begin our fourth quarterly meeting today.

So welcome. Thanks for coming.

Thanks for being flexible in our newish space.

The library is under renovation at the moment, so the lovely grand ceilings and the pillars are getting a little love this month. So, we aren't able to meet in there, obviously.

But speaking of construction, the library isn't the only thing under construction right now. Steve, I won't put you on the spot. I know you're a little bit under the weather at the moment but Steve had some emergency dental work today, unfortunately. So he literally just got out of the chair. So, a little drugged up. So, I know he's dialed in but thanks for joining us, Steve.
And regrettably, we are two for two today. Melissa is stuck in the airport up in New York. And Melissa, I believe we've got you live right now. Correct?

CO-CHAIR BRADLEY: I am. How are you all?

MR. BUERSTATTE: Great. Do you want to kick things off with some of those remarks?

CO-CHAIR BRADLEY: Sure, I'd be happy to. And I'm actually not in New York. I'm in Martha's Vineyard. I was here for a family vacation and I was going to fly back today and then come back tomorrow and drive the family back. But I know it is going to be hard to believe, but I can honestly say I would rather be there with you than be here in Martha's Vineyard, only because I know Craig, and Steve, and myself, and Eric have been having several conversations and I think that all of us have been patient, and are fired up, and ready to go, and I think that we're going to make some progress on this meeting.
And so with that, I just want to kind of get us grounded and then pass it off to Steve as well. But as you all know, we've been working on four priorities which, luckily, I am happy to say are beginning to nicely align with where the administration is headed with infrastructure, apprenticeship, manufacturing, and deregulation. And I want to acknowledge our chairs and co-chairs of those committees, who have been working hard over the past couple of months to keep that momentum going.

So the good news is is that we're going to have some visitors, and opportunities to interact, and kind of share where we are, which I think nicely aligns with moving forward. And if anything, I see that there is maybe some tweaks and some adjustments but certainly not having to start anything over but, if anything, hopefully ramp up and bring our local expertise and credibility to the table to be able to continue to influence and have some strategic alignment with the administration.
I would be remiss in saying that we
have lost some folks and I think that that's
expected, as we acknowledge the first time we
met. This is the first time there has been a
transition between administrations. And so it
has been slow, and challenging, and rocky. And
as someone who has served in two administrations,
I've spoken to a couple people offline and they
said does it really take this long and I can
honestly say it does. It is a patient process.
So, I want to reiterate my thanks to everyone for
their patience and I want to say that the folks
who have transitioned will be missed but we are
left with a group of people who certainly have
the right experience, the right background, the
right, I would say influence to really help us
move this agenda forward. And so we respectfully
say goodbye to them and hopefully, for many I can
personally say, will continue to keep in touch
with them and hope that there may be some ways to
leverage and still bring their work to the table,
even if they're not there. But I am also quite
confident in the folks we have sitting around the
table, literally and figuratively, that we will
be able to now move forward and get some things
done.

So over the next two days, I want to
acknowledge Craig and Eric, who have been
stalwart in this process and certainly have been
probably the most flexible and nimble folks I've
ever met in getting us to this point. And so the
next two days have been very purposely developed
to be able to get us aligned and in front of
folks so they can hear what we do but, more
importantly, get us in our groups and really
figure out what have we already brainstormed that
can be advanced and moved forward and where are
some areas that we can continue our great
thinking so that we can, indeed, make sure that
entrepreneurship remains a priority in this
administration's agenda.

So, again, I am grateful and thankful
to all, particularly because it is summertime and
for those of us who have kids, I know they are
heading back next week or the week after. So thank you, again, for making the trip there. Thank you for so many of you also for just being honest and reaching out and checking in over time. That is a role that Steven and I take very seriously and so we are always here, regardless, to listen, to share, to be a communicator, or a bridge.

And again, I want to extend my thanks to Craig and Eric for their patience. I want to also appreciate Rebecca, who is joining us, whose mom is recovering from surgery as well. Again, we all appreciate family first. So I want to, again, thank everybody for being there.

And I do look forward to participating remotely and getting engaged and figuring out how we can get thoughted up and get ready to go. So, thank you.

MR. BUERSTATTE: Awesome. Thanks, Melissa. So, as she said, highlighted infrastructure, manufacturing, deregulation, and apprenticeships. If we've seen the news this
summer, unless you were hiding under a rock, those shouldn't be too much of a surprise.

And then she said we've started to dive into a lot of that already but with the guidance that we've gotten over the summer and especially with some of the new initiatives that we'll hear about today, things are, I think, really starting to align nicely in those four verticals. And really, we just want to show how the council can support those efforts and be a part of the administration's new policies and programs.

So with that being said, a quick logistics item. Everyone's got their agendas. It's pretty straightforward. Our fourth time around, I think things are pretty clear.

Just down the hall and down to the right are both men's and women's restrooms, as well as a drinking fountain. There is a break room on the fifth floor with coffee, soda, snacks, if you need any but we're going to go straight through until about 3:30. We might even
beat that target, if things go smoothly.

So any questions on the run of show today?

All right. First off, and speaking of new initiatives, I think we're pretty lucky to have T.J. Kennedy, the President of FirstNet with us today, not just because he's a really experienced executive but they just announced a $6.4 billion public-private partnership. So FirstNet's a little busy, to say the least. And I think it's unique because -- you need time to talk with them because as they start to formulate their strategy for this public-private partnership, they're looking for new ideas. How can we build a modern FirstNet ecosystem of first responder applications and technologies? So this is what some of your pre-reading was about. Hopefully, you took a quick glimpse. T.J.'s going to talk about that but just for your awareness, I think T.J.'s got over 30 some years in the first responder business both as a practitioner, paramedic, firefighter, led public
service work for Raytheon for a number of years as well. So please take advantage of T.J. while he's here, ask questions and hope that not only his information or his insight will be helpful to us, but also, as always, a two-way dialogue.

So, T.J., thanks for coming.

MR. KENNEDY: You bet. I'll just give a few highlights and really hope it's a good dialogue and I don't have to talk for too long and I can answer your good questions.

But I think the point that Craig made about when I was at Raytheon running the public safety business, one of the things that we all knew then was this entire technology landscape for public safety needed to change. It had been 25 years since really we had changed the kind of technology that police officers, firefighters, and paramedics use. And I had been on the technology side about 10 or 15 years by then and it wasn't happening.

And public safety went to Capitol Hill and said we need to spur this through a couple of
things. One, we need to be able to free up some
spectrum. Spectrum is gold. We need to find a
way to get public safety the spectrum we need.

We also need some funding.

And Congress did something they've
never done before that I'm aware of in that they
gave us some spectrum to sell. They weren't
quite sure of the value and said if you do a good
job of selling this with the FCC, you can keep up
to $7 billion. Anything else goes to pay down
the national debt. Nice seed market, if can pull
it off but nobody was quite sure.

And they gave us two other assets.
And it's important to understand the three of
them because this was the strategy we had to
figure out to build a business that would make
this work. And the second two pieces were
actually harder than the first one. So the
second piece was we're going to give you 20
megahertz of spectrum in the 700 megahertz band,
which is really good. I call it Superman
Spectrum. It goes long distances. It goes
through walls. It leaps tall buildings, all good things. But you need to use it for the next 25 years but you also can lease it. If you can figure out an arrangement that has never been done in government before, good luck with that.

The third part to that was you can charge user fees to public safety but they can't afford very much. They're not used to paying it. So, you have to really find a good way to do well on the first two points. Long story short, our auctions raised over $50 billion. We were able to get our $7 billion down payment, which did two things. It gives us the ability to get into a public-private partnership with cash up-front. The second thing that it did is it allowed everyone else who was a part of this from both sides of the aisle to realize that the rest of that money went to pay down the debt. Everybody was happy. It was a good news story, overall.

The second piece to that is it gave us the ability to get into a public-private partnership with the second part, the spectrum
that we had that was most important. So we
really focused on the strategy of how do we get
people to come to the market. We actually went
to Wall Street. We held analyst calls. We told
people about the time value of the money that we
had because you could actually get the spectrum
and pay for it over a period of time. So, a lot
of different unique ways of looking at this.

Long story short, we had a great
competition. AT&T won that public-private
partnership in March of this year. They
committed to invest an additional $40 billion as
part of that. And we now have a public-private
partnership that is the largest I am aware of in
the U.S. Government and I'm not aware of anyone
else either who has one larger.

This ensures the sustainability of
both building, deploying, maintaining, operating
not the 4G LTE market but also 5G and 6G into the
future and that's built-in over the 25 years.

That's a good start but the really
great part of that is we've built a new platform
for public safety and the new platform is going from some commercial networks that aren't mission-critical and don't do what they necessarily need to do every day and a land mobile radio system which, in the past, was mission-critical, two-way walkie-talkies, if you think about that. In looking at public safety, so the police officer, the firefighter, the paramedic that would respond to your home if you dialed 911 having the same tools that we all have but creating things on those tools, applications, different services that will allow them to take advantage of the internet of lifesaving things. And they've never had that capability because they've never had a mission-critical broadband network.

When we all go on our way every day, we see fire engines, we see ambulances, you see police cars going by you, lights, and sirens, those kinds of things, it is probably the most mobile 5,000,000 to 14,000,000 people we have in this country. Almost everything they do, they do
from a vehicle, a motorcycle, a mountain bike, a helicopter, some kind of outdoor vehicle to go do something and they actually haven't been mobile. Their entire technology ecosystem has been client-server based, it's been dispatch-centered based. It's in a police station. And all they've had is a radio to try to get over-the-air communication to deal with that.

And so now what we have is that new platform for innovation, which is based on international standards, 3GPP Release 13 is our baseline. So really, going forward with the most modern LTE technology and a guaranteed upgrade path for the next 25 years. So if we look at wireless being around for about the last 25 years, that's not a bad path to be on. The other thing is the rest of the world is pretty much copying what we've done and going down the same path. So for those in the technology industry who want to build applications for law enforcement, it's not just us. The U.K. is going down the same path. Sweden, Finland, Germany,
others will be going down the same path. Canada is copying us almost exactly what we're doing. And so everyone else in the world is going to want to leverage this new ecosystem.

So long story short, what we're trying to do is really try to drive on the entrepreneur side that we're going to have standards, many of which we've already published and more to come, and we want to drive that application interface. We want to drive the fact that there is a fair competition and playing field for everybody to be able to take the old things that would happen for public safety and bring them forward in an application sort of way. Or in the future, it may not even be an app on a device. It might be hands-free. It might be embedded. It might be done in many other different ways.

So I could talk about that for probably eight hours. I'll kind of just pause there. And actually, some of you around the room who have been down to Dallas, we are trying to reach out to entrepreneurs and really spend time
telling them about this new platform, letting
them understand how they get involved with our
apps team. We have an apps team in Boulder,
Colorado; that's where our technology
headquarters is. We actually have a full lab
that will have a full production system in
Boulder, Colorado and we can bring folks into
there and really make sure that they are
understanding what we're doing that is different.

This network, if you think about it in
its simplest way -- and I just pull out my phone
because it's easier. Does everyone have a phone
on them? Look at your phone and look in the
upper left-hand corner of your smart device, if
you happen to have one of any sort. And you
probably see something like five bars. And you
probably see one of the four major U.S. carriers
and you probably see the words LTE next to that.

Well, mine says five bars, FirstNet,
LTE. So our network, our dedicated public safety
broadband network is a different network. A lot
of the infrastructure might be the same. It
might run across fiber and it might run across
cell sites and have things at the same location
but the reality is, this network has priority
today. It will have preemption before the end of
the year. It will have a dedicated encrypted
core network going across the entire country by
March of next year. And it will allow for not
just great security and encryption but also the
ability to have a public safety applications
ecosystem that has yet to be built.

And so we get to design this new
applications ecosystem for public safety in the
U.S. but also you're going to be designing it
worldwide. And you can be a part of that.

It's a new vertical, a new platform
for a lot of companies to look at. And I think
what is interesting, and I will pause after this
and we can just get into dialogue, but really,
when I talk to technology leaders and I talk to
CEOs and Board members of key technology
companies, look at what you can do with your
technology in this particular unique space that
will bring your technology to new levels, things that public safety do, they do it much harder, much faster. They drive at faster speeds. They are very difficult wet, hard, nighttime environments, you name it. And if you can make it work for that, you can make it work for the consumer very well.

And I will give you one quick anecdotal example. Los Angeles Police Department about two years ago went to the three major car companies in Detroit and said come meet with us to design the next generation in police cars. And all three of them kind of did, kind of didn't. Some showed up better than others. The first one came and went. The second one came in and did okay but didn't really invest. And the third one came and they literally hunkered down for six months and brought in some designers and they listened and they went on ride-alongs and they understood what they did.

And at the end of the day, Ford realized that there were about ten technology, I
won't say car innovations, technology innovations that needed to be in the next generation police car. So, think of the most obvious: a laptop on a pedestal is in most police cars today. One, we need to get away from laptops; that's one issue. But two, that's a projectile for the airbag to hit you in the forehead, right? Most cars don't come with a laptop on a pedestal in the middle of the front seat. And so we needed to get rid of that.

And so Ford said why don't we take a little computer about this big and put it under the hood in the in-car computer and you can use the touchscreen on the backup camera to be your police computer? And that's what people now do and plus, make everything hands-free and you don't need to type anything. So, that was one of the ten inventions, as an example, and many others that were part of that.

But if you think about it, the cool thing for Ford wasn't the fact that they built the best new police car that most police officers
in the U.S. are more likely to buy the SUV
version, the car version because of that but
seven of those ten inventions are going into
every new Ford car next year because of what they
did with one police department, LAPD.

And so that investment and a little
bit of time in solving a public safety problem
created a business solution for the rest of the
world because Ford's not just selling that in the
U.S., they are selling it around the world.

So, that's a bit of my pitch about why
it matters in the public safety marketplace, even
if you're not there today and why I think it's
really good for business and I think our public-
private approach to it is also very unique.

So, with that --

MEMBER JOHNSON: I have two questions.

MR. KENNEDY: Sure.

MEMBER JOHNSON: The first one is what
are your coverage goals and a cost to the U.S.;
how many towers do you need; and how long will
that take to build out?
MR. KENNEDY: That was a bunch of questions but I'll --

MEMBER JOHNSON: Those are all related.

MR. KENNEDY: Yes, they are related.

They are related.

MEMBER JOHNSON: And then I have one more.

MR. KENNEDY: Okay. So on that one, we did a very different approach to coverage because coverage is really unique and it's not as easy as just a percentage. I can talk about percentages in a minute.

We went out and we asked all 50 states in the five territories and the District of Columbia what is the public safety coverage you need. That is a different question than what we've been answering for the last 30 years, which is where is the population that can afford a cell site.

So we went out and said where do you have 911 calls; where do you have police
responses? And almost every one of them, 55 out of 56 gave us a timely response and we eventually got the last one. And so we took all that data and we put it into a portal that went out to all the bidders that literally said here's the coverage objectives, objectives instead of a requirement, for everybody who was bidding. And everybody bid how far they would go.

And so we have 56 state and territorial plans that have been presented to all the states. They went out on June 19th and that's what governors are reviewing and they have a deadline to opt in by the end of December.

Right now, we have 15 states that have early opted in. They don't even have to start until September and more will be coming over the next week.

So, on coverage, it's different for every state. It's not a nationwide coverage.

MEMBER JOHNSON: All right, I'll talk to my head of Homeland Security.

MR. KENNEDY: Okay.
MEMBER JOHNSON: The second question is how is this different than the Next Generation First Responder Apex Program?

MR. KENNEDY: The Next Gen DHS Science and Technology Program?

MEMBER JOHNSON: Yes.

MR. KENNEDY: Right. So they're looking at individual inventions and looking five to ten years out. We're building the backbone network that everything will ride on, including probably any invention they would come up with, number one.

Number two is we're driving innovation just in the open competitive marketplace. We have $300 million dedicated to R&D over the next five years, totally separate from anything DHS is doing and that $300 million is going to be heavy on both challenges and grants. We just released the first $38 million worth of grants this year, went to a lot of research and other universities and technology companies.

MEMBER BOESCH: This is, I think a
question related to that. So, I'm Heather. I work at a design company.

MR. KENNEDY: Hi, Heather.

MEMBER BOESCH: So we work with lots of companies that have new technology that are trying to find product markets in the world. And like we run Tim Hackett's Greenfield Lab. So I can understand on the Board side. But like I, for example, right now I'm working with a small business that has kind of an automotive machine, learning a machine solution that's looking for security applications.

So like how does someone like that kind of get involved or what resources are for them if they want to start considering this in the market?

MR. KENNEDY: Sure. So, a couple of things. One, on our website, if you go to firstnet.gov/business, forward slash business, we have a way for those kind of companies to link directly to my Chief Technology Officer Team, our CTO shop out in Boulder. They can literally put
in a request to either talk about what they're
doing, learn about standards, other things that
they need to have and those requests are all
responded to within 24 to 48 hours. So,
literally, they can reach out to them.

Our website is also a good place to
go, showing what we're doing and where publishing
standards and other key things are.

And we help forums every year. A good
example is every June we have a big forum with
our partners NIST, who are part of the Department
of Commerce as well for our Public Safety
Communications Research Lab and that's all about
really trying to drive the new technology. And
other folks like Science and Technology at DHS
all come to that, even though it's hosted. And
most of that has been really focused for the last
five years on what's going to happen on the
FirstNet network.

MEMBER BOESCH: So how can we talk to
people about like the potential market size
opportunity? Because like Ford is perfectly
happy to invest in a car that will sell
technologies that can happen later --

MR. KENNEDY: Sure.

MEMBER BOESCH: -- but if I've got a
cash flow problem, I can't. So, how do I sell
this to them?

MR. KENNEDY: That's a great question.

I think one, you have to look at the current
marketplace. This is a valid question and when I
ran the Raytheon public safety business I had
make my quarters, too. So, I understand it.

Today, you have companies, very large
ones, which I don't want to get into individual
names but who make $8 billion a year selling
radios to public safety. The reality is the
future is going to be on devices that look
different than that. So you have the fact that
police, fire, and EMS agencies today are spending
somewhere $10 and $14 billion a year on
technology but like I said, most of it has gone
to the fire station or to the police station.
It's going into a dispatch center. It hasn't
gone mobile.

So you have this revolution of mobile coming. And if you think about it, if we all think back to our first iPhone ten years ago, and when you first pulled that up instead of a Blackberry that I carried for the eight years or whatever it was before that, you didn't quite know exactly everything it was going to do. And today we trust it to do banking. And so the same network that is a partner of ours who is building a public safety grade network also handled my banking when I go to my banking app and go through there.

So what are all the apps for lifesaving things? So if we think of a firefighter going into a burning building, we're talking about IoT on their airpack that is going to tell you how much air is in that pack and do they have 22 minutes left to live or 25 minutes left to live. That three minutes matters.

It's also going to tell us the heart rate of that firefighter. It's also going to
tell us the level of humidity. It's going to
tell us what's going on inside and outside of
their fire turnout gear. It's going to give them
a heads-up display in the future because they go
into dark buildings. I used to do it. You can't
see your hand in front of your face. So, you
need to know go ten feet, turn right. If you can
do that, in addition to running your hand against
the wall, it's pretty darn helpful, especially if
you know where somebody is down because we're
able to realize that.

So, all of these things are things
where it's going. In the marketplace, the money
is there to invest but it has to be done in a 4G
LTE broadband applications environment for the
next few years. And that may change into 5G and
other things that we're going to. But the
reality is, we now have a standardized
environment. And instead of selling to one
police department, there are 18,000 police
departments in this country. With the FirstNet
network, they can sell to all 18,000 by putting
it in the FirstNet app store.

There are 60,000 total public safety agencies in the U.S. from two people to 56,000 people that are part of those departments. And today, everybody sells to them one at a time.

And even if you go to the City of New York, you are going to go meet with the fire department and then you are going to go across and meet with the police department. They are not even in the same borough in where you need to go. You go to Brooklyn for one and lower Manhattan for the other.

And so the reality is all of them will have an ability across the country to be on this one platform. So for those who are inventing things, for those who are bringing products to market, one set of standards, one network, one app store you can bring it to to get access to all of them. I think that is the biggest draw.

MEMBER JOHNSON: So along those lines, what if I had a company that had a bridge technology that was available now within this
group, would FirstNet consider working with them?

MR. KENNEDY: You mean a bridge between the old technology and the new technology?

MEMBER JOHNSON: No, I mean something that is available right now that can be implemented but at much lower bandwidth during disasters.

MR. KENNEDY: So, I mean one, that can all happen. We're trying to get folks that are going to be on the FirstNet broadband network. We're not against anything that's going to go out on any commercial network today. It's just not going to have that priority.

MEMBER JOHNSON: It's different. It's a UHF network. So it already exists.

MR. KENNEDY: Yes, all good things. And I think VHS would be more like -- we're not going to invest in that but we think it's a good thing. We would encourage it, absolutely.

MEMBER JOHNSON: Yes, I'm just talking we would have something you can offer today.
So, back to Heather talking about cash flow for the startups.

MR. KENNEDY: Yes. No, I mean the reality is, people can be on the network today. The 15 states who have opted in are able to sign up for services, provide services today. So, they can also apply applications today.

You have a question down here?

MEMBER FREDERICK: Yes. Is the app store up now? Do you have any examples of that?

MR. KENNEDY: It's going to be up September 30th, we'll have the initial app store stood up. There is still a lot to be done on what other standards. And one of the things that our app required was following open standards. And that may not sound like a lot but if you think about it, that's been part of the issue in public safety. We haven't always followed open standards. And so we're going to be required to follow open standards. And that's obvious for 3GPP but you can think of the many other parts, if it's computer-aided dispatch, if it's mapping.
You know there are lots of other areas that
can drive from that app store. And really our
team is very focused on those standards that will
drive that going forward.

MEMBER FREDERICK: Now the open
standards in this network, prioritized network,
make a ton of sense. I'm just from the venture
capital world.

MR. KENNEDY: Sure.

MEMBER FREDERICK: I've seen a lot of
app stores get stood up and then --

MR. KENNEDY: Nobody goes to them.

MEMBER FREDERICK: -- your buyer is
not used to buying from an app store. It doesn't
matter that it's there. They're never going to
log in and get to it.

MR. KENNEDY: Sure.

MEMBER FREDERICK: So it doesn't
necessarily solve the --

MR. KENNEDY: So at the agency level,
and I know exactly what you're talking about, one
of the things is we're going to see that a lot of these will be agency purchases, which is different than you and I just going to the app store tomorrow, although there will be that as well. And so agencies, and they'll be able to push, they'll be able to have mobility management.

One of the first things we're putting up in the app store is mobility management for this network. So, if you're a large thousand-person police department, you could easily say well, I want to add a certain mapping tool. I want to add a certain computer-aided tool that is going to all of my officers. It all gets pushed out. It's all managed centrally by the department. So, that's how agencies like to work.

And at the same point, there's a million volunteer firefighters in this country who are going to be single device users. We also want to be able to service them. They are more likely to buy it from a public safety certified
app store.

MEMBER FREDERICK: And are there need or kind of almost a priority list. You know like the apps you mentioned, oxygen sensors, things like that, obvious once you said it; wouldn't have been obvious to me like that's what should be done.

MR. KENNEDY: Sure.

MEMBER FREDERICK: So one, is there a way that these needs requirements get posted out to the public so that they can try to invent against it?

MR. KENNEDY: That's exactly where we're going. I'll admit we're not done yet. One of the things we've done just in the last three months is we've gone and met with major law enforcement at the mid- and big-level agencies and said if you could have any kind of app, what would it be. And we've done this as a market research effort. We're going to publish all that and we're going to publish it publicly on our website, Firsnet.gov. And literally, we'll brag
about it. We'll put it out there so you guys know it's posted. We've done the same thing with the fire chiefs.

And our goal was to drive the innovation and literally to have -- you're not wasting your time. And eventually, we'd like to get it down to you know out of these top ten, can you rank from one to ten what's important to you that you're missing today?

And we're doing this at every engagement we go to. Dave Buchanan, who is with me in the back, who is going to spend some time with you this afternoon, he knows. How often do I beef this up?

MR. BUCHANAN: Three times a day.

MR. KENNEDY: Three times a day. So, our job should be to give away the market research so that you have the ability to know what's most important to police, fire, and EMS, and we're going to do it.

MEMBER FREDERICK: That's great.

And then who decides what apps are
appropriate for the network? Because the whole idea with prioritized network is incredibly powerful. And something like an oxygen sensor, you know that's a slam-dunk within the four corners. But I mean I can make some stretched arguments on like banking apps and things like that. Who draws the line?

MR. KENNEDY: So good or bad, our Act, the law that created FirstNet was an act of Congress, which is a very big deal, and in that Act it drew the line. So it drew the line on what was public safety.

And actually, they used two definitions. They used a Homeland Security Act definition and a Telecom Act definition. And the Venn diagram covers both.

But the long story short is the primary users are your police officers, firefighters, paramedics and then also include the dispatch community, which are known as public safety communicators today, and also the emergency managers.
So, if you have a hurricane headed towards Texas today, those emergency managers should do that. They are a part of it. So, that's the primary. A very obvious group that's there.

There is the ability for what we call extended users. And so I'll give you an example of that to go to your point. If you're a snowplow driver in Park City, Utah, where I was a firefighter many years ago, and we would get a heart attack call at 3:00 in the morning and it snowed 22 inches since last night, sometimes hard to get the fire engine there, right? So we would reach out to our public works folks to say we have a heart attack at this address; let's plow; and let's get there. And we would get there.

Of course in that situation, that plow driver would be really helpful for the fire engine to get there. They could be an extended user who could be given priority in those unique circumstances.

Also remember, you have to have an
overload situation before that priority is needed. So day in and day out, it may not be an issue for public works. Hurricane going on in a southern state against the Gulf Coast, yes, you're going to need that. Does that make sense?

MEMBER FREDERICK: Yes. No, it makes a lot of sense.

MEMBER REAMER: What questions do you have for this advisory council?

MR. KENNEDY: Well one, and actually I think it just got hit on a little bit down there: What else can we do besides publishing standards and publishing our market research for what police, fire, and EMS want to help you drive that innovation, to help you drive people to be willing to invest in the technology that will go on this new platform we call FirstNet but, around the world, public safety broadband? What else would you want us to do? What would help you?

Go ahead.

MEMBER BOESCH: So, because I'm in Cambridge, we have a lot of these events that
happen, like all the challenges and hackathons and things that come around.

So, the other weekend, I was judging one that was with MD5 and the Advanced Functional Fabrics of America. Everybody has got communications with the fabrics, right?

So I want to encourage like are there ways that we can start to combine these ecosystems into one? Because everyone is stretched really thin and haven't had individual talent and grants, where ultimately we'll bringing these things together is where it's going to be most important.

So I was thinking how do we hook into the kind of existing networks that are working in these areas locally, rather than having standalone events. Because it is always like I constantly get calls from people where they are like can you get everybody to come to our like BioSuit thing.

MR. KENNEDY: No, that's a great point and I think when it comes down to you know let's
say safety fabrics or other technology and other
internet of lifesaving whatever, we should try to
pair up so that we're not putting too much stress
on the local infrastructure to do that.

That's a great suggestion. Yes, we'll
do that.

MEMBER BOESCH: I'm happy to tell you
what those things are.

MR. BUERSTATTE: Heather, real quick,
that reminds me. Camille and I did a similar
kind of pilot event in Austin, Texas. Camille,
you want to talk about that one at all? All
right, just kind of some of the lessons learned
and highlights.

MS. NELLANS: Sure. Just essentially
getting developers together, along with Craig's
group, EAs normal office down in Austin,
FirstNet. Who else was there? Oh, Dallas
Innovation Alliance, Austin Technology Incubator,
basically just bringing people together and we
have a group very small, it's about seven to ten
of us and we have this kind of dialogue on the
developers who were actually three developers
that are already in the public safety realm. So
Mobility, which is a police department app in
over 100 cities in the U.S., HAAS Alert, which is
a communication system in cars to alert drivers
there is an emergency vehicle coming through.

We should really sit down and talk
about barriers to entry, things that we should do
to increase access to the marketplace, and how we
can amplify this great opportunity.

MR. BUERSTATTE: And it was really
well received and I just wanted to offer the
anecdote because I think it's exactly what you
mentioned, at a smaller scale level but I walked
away with clear validation that this is an
important conversation to have. But the question
of how to elevate it at a macro scale. What
partnerships, what organizations?

MR. KENNEDY: One other thing we are
doing, and we'll go to that, is we also, when it
comes to CES, Consumer Electronics Show, we also
have paired with them and we're holding events.
I think we have half a day scheduled next January there as well. And the same thing; we're trying not to get people to go to a different place to see you know an entire new vertical of technology. And some of the same companies we all know have pieces that do public safety and then do home IoT, or do public safety and build televisions, or do public safety and build smart devices.

And so it's trying to get to where people are at so it's also easier; you don't have to go somewhere else to be able to talk about it and see it and have discussions on it.

I think here and then --

MEMBER KHOSLA: Several questions. About six or seven years, Vint Cerf and I led a group at NIST. We were both part of the same committee, which basically argued that instead of making it point-to-point network, which is the way it was before, we had a lot of public groups coming and talking to us. We argued for an LTE.

At that time, I remember the argument
against an LTE by the users was it is not 100 percent failsafe. And they wanted us to convince them. How would you make it 100 percent failsafe. So that's the question. And I'm glad you went with LTE because that is the right thing to do.

MR. KENNEDY: Thank you. A couple of things. I mean one, the original way they went about it back then is that they did the opposite of what we did this time is we didn't want to make the same mistake twice. They actually put out all these requirements, 10,000 requirements for 100 percent failsafe for a network. We put out 10 megahertz of spectrum back then and nobody bid and it failed. It was called the D block back then.

Anyway, all good efforts, great things that were done but when we flipped it around said we have these 16 public safety objectives, we need to have a secure network. And obviously, we can get all into the details of what does that mean but we said how far can you go and still
make this a sustainable public safety partnership
world? Instead of saying we're going to cover
100 percent of the geography, we said let's cover
all the public safety priorities and objectives
and, therefore, it's sustainable but, at the same
point, going further than we go today.

So, it was flipping it around into an
objectives-based partnership, rather than a
requirements-based contract and so that
partnership would have that ability to get
different, varying ways to address the problem.

The other thing is I think LTE has
become very robust in the last seven years.
You've got the ability to prioritize video,
voice, and data. You have the ability to do
things we haven't done before. And then you're
also seeing in-building has changed a lot. A lot
of the public safety issues have been in-building
in the past. And so having that ability, in this
case, to even have a network partner who has a
lot of in-building solves a lot of that. Because
even in the radio world, going back to land
mobile radio, when you get in buildings, it was often very tough. You know the basement of this building, for instance. So now when we have a lot of infrastructure that's built into larger buildings, in addition to the outside, it's helped make that a lot more failsafe.

MEMBER KHOSLA: So a quick follow-up. What's your business model? How does it work? Twenty years from now?

MR. KENNEDY: Yes, so well, long-term what it works is that the spectrum obviously has a lot of value.

MEMBER KHOSLA: Right.

MR. KENNEDY: And that's additive to that.

The second thing, though, is that the public safety user base, you know if you put 60,000 agencies on one network, all of a sudden you have people all investing in technology. So just like the idea question, if you could have one inventor come up with a great idea but they can sell it to 60,000 agencies, that 99 cents or
a couple -- all of a sudden, that becomes very viable. If you're trying to do that and you have to go out and meet with each department one-off to do that, it's very hard to do.

So, it was flipping it around to one platform and have everything run on a standards-based platform where it's much cheaper to build things to be on there but, at the same point, it's standardized. So that's really the biggest change to the model.

MEMBER KENNEY: A lot of solutions, especially when they're new, are dependent on proprietary hardware and software combination kind of thing. So starting an app doesn't work if it doesn't talk to anything. And dispersed oxygen sensors and some of the big companies will develop a sensor and the interface and the app. And to just have an app store, it doesn't help them unless they have a way, through you, to also deploy the whole solution. And over time, standards get developed and then it becomes interchangeable.
I'm just wondering if you have a response for a company that wants to address the hardware piece as well.

MR. KENNEDY: We do. And so one thing is it's almost a little easier because our partner happens to be a bigger telecom player that is going off telecom standards for most hardware, most wireless hardware today. They also have a testing regime and we have a certification regime. So it has the ability that testing is very standard for a device to get on the network. And they've published that to anybody who wants to get a device that's on the network.

And so when it comes to those sensors, whether it's IoT, it's a smart phone, it's a WiFi hotspot, MiFi, whatever it happens to be, those kinds of things, the reality is those standards are published for what gets on the network today. And then our standards related to, as well as the software development kit and the standard pieces for priority and preemption, some of the unique
features that will be allowed on this network will also all be published.

MEMBER KENNEY: Do you help actually sell to 18,000 fire departments the sensor piece as well?

MR. KENNEDY: So as an example, I mean we, as FirstNet, won't necessarily be the sales people doing that but our partner might and they certainly would be interested in doing that, I would imagine, as well as they have a number of partners. So they have a number of teammates and others who are into services on the network, devices on the network, and other pieces. And they have an ecosystem of stores and other things to do that with. So that's all there. I don't want to necessarily do it for them in our role but the reality is I think there are many ways for a small company to get into that ecosystem and license it, or have other ways to get it out there.

MEMBER KENNEY: So the last question is when you're collecting the what ten apps would
you want, how specific are the requirements you get? And just, again, IoT companies are looking at a lot of different fields; should I be in agriculture; should I be in mobility; should I be in emergency services. You know each have a niche and they are trying to figure out is this particularly a good opportunity for firefighters. Would we be providing enough in detail about what does the sensor need to do. There has to be an oxygen sensor that needs to be able to put this many data to this level of granularity, and this frequency of data collection, all of that. Is that part of the requirements gathering you are doing?

MR. KENNEDY: It is. And the question I flip around is how much do you want. And I've gotten both answers. Like some is don't be so specific that it only allows one solution. Two, don't be so high that we don't understand what the performance requirements are going to be to be able to build the product to really be production ready.
So, I also would look to you guys to give us a little bit of feedback on that, too. Does that make sense?

MEMBER KENNEY: Yes.

MEMBER REICHERT: Can I suggest a different framing, which is what are the problems versus --

MR. KENNEDY: Yes.

MEMBER REICHERT: -- we need an app to do X. So let the entrepreneurs come up with a way to solve the problem.

MR. KENNEDY: Agreed. And actually, that is the biggest thing. We are asking what is the problem you are trying to solve, number one. And when we ask them if you could have any kind of app, what would it be, it is not for the technical solution at all at the operational level. It's for if I didn't have to did this to solve this problem, that's what I need. And then we'll have technical folks try to flesh that out only to the point of giving enough data to let the entrepreneurs find about how to get there.
We don't want to design how to get there. We're not going to design any apps. FirstNet's goal is not to be out building the apps. Our job is to really be sharing that data so that the entrepreneurs can build those apps. Does that make sense?

MEMBER NEMETH: Can you talk more about maybe creating the ecosystem of the early adopters of the technology? Because like the oxygen sensor example reminds me of like here I am launching my first release of my new oxygen sensor app. Well, who is going to be the first person to use that one and give it the one star rating that it didn't work and I ran out of air?

Like it reminds me of some other critical failure marketplaces that are tough for entrepreneurs, aerospace, military. Like how do you get the early dockers?

MR. KENNEDY: No, great question. And two thing. One, I am going to pick on the air sensor for a minute. So, firefighters, this is one of those weird little things, they just
breathe room air, the same room air that we
breathe. So I won't say oxygen. It sounds like
a little thing but it's important for them. So
in case anybody's listening out there on the
phone.

The main thing, though, is I would
start with the non-mission critical, like non-
life-threatening first but it's mapping,
something that we all use today and public safety
uses today. Do you think mapping matters if
you're driving 100 plus miles an hour to a call?
And that might be a slightly different mapping
application than what you all need to use every
day.

What if you could turn all the lights
green? Well, the maps get different, right, and
there are devices today that allow fire engines
to turn all the lights green. There are traffic
operations centers that do that today. So, it's
a different environment.

So mapping, you know it may not be the
air that you breathe as part of that but it is a
really critical thing for first responders. The other thing is there is some in technology that do it well. Uber doesn't do mapping too bad. I mean Google doesn't do mapping too bad. There are different people who are out there. So, we're looking for different things. There are also ones who do it horrible and you end up six blocks from where you need to be or you go down a road that has been closed for six months. So what I'm saying is all these things matter. And a good example, too, is public safety often invests a lot in mapping. And if you go to the building department of a city, amazing mapping in the building department. Is that always at the fingertips of the person driving the fire engine to the scene? Not necessarily.

And another thing is sometimes you need mapping and current traffic conditions on the right side of the road. Anybody ever been in a big city and seen a fire engine on the wrong side of the wrong? Okay, if you go to New York or even downtown D.C., if the right side is
blocked, guess what? We drive over the median to the left side and go down the other side. So, it's also important to know both directions of traffic, not just the one you're supposed to be on.

So these are things that you may not think about but they're also there. So I think that I agree. You know critical lifesaving features sometimes take more investment to get there. But like Heather's idea, I mean the reality is reflective clothing is something that's a big deal to public safety but also knowing, for instance, headlights hitting reflective clothing at night for an officer standing in the middle of the highway, there might be something that's safety-related but, at the same point, they also have to have their ability to look around and be safe. Do you know what I'm saying?

MEMBER NEMETH: Yes, but are there any departments that are sort of like or --

MR. KENNEDY: Leading the way? Yes.
MEMBER NEMETH: -- is there an opportunity to say like hey, you want to launch an app on the FirstNet network, the following six departments get it and they are our playground.

MR. KENNEDY: Yes, so our team, we have 50 people spread across the country right now that are our outreach and consultation with public safety. And they can help give people advice. And I don't want to give out individual agencies on here but I even have a huge northeastern big city that they're one of the first ones going with IOT Centers on Airpack because they want to lead the way. And it's actually what you wouldn't think of. You would say well, this is a big old-fashioned fire department but you know what? They know it's going to save lives so they want to do it.

At the same point, sometimes your mid-sized departments are the most innovative because they don't have all the bureaucracy of the bigger departments and have to get through 16 approvals. They also let that fire captain, battalion chief,
or that police captain who has a great idea run
with it. And so the mid-sized department,
especially in law enforcement, are often very,
very inventive. And they all are. I don't want
to downplay anybody but we're more than happy to
and Dave and his team was here today, they can
give advice to anybody looking to get into the --
you know who right now is on the leading edge and
the early adopters to make that happen. And we
have them.

And to some degree, one of the things
we're doing is we're doing what are called IPAs
or interdepartmental agreements to take some of
those early leaders and bring them into FirstNet
so that they work with us for six months to make
sure we stay on that front edge and then send
them back into the field to bring back the
FirstNet knowledge for exactly that reason.

MEMBER BOWLES: Is there an education
process by which you're taking these agencies and
educating them on the fact that they're going to
have change their budgeting process and they're
going to have to allocate -- either reallocate funds or allocate new funds and currently -- because I think to Scott's point, one of the things is getting in there and showing that people would actually have the knowledge to buy it and two, where is the money coming from.

MR. KENNEDY: No.

MEMBER BOWLES: And how are you addressing that?

MR. KENNEDY: We are. I mean we're addressing it right now. We're seeing the first wave, which is buying services on our network because that's a change for people. There hasn't been a nationwide public safety network available in the past. So, that's a different buying behavior than just go to the major carriers and get a bid. So if you think of a lot of cities and counties, that's the way they would.

The same thing is going -- we're already seeing this when it comes to mobility things because the way that people typically purchase that is not big agency-wide.
And so we are. I would say we haven't figured it all out yet but we're continuing to try to find ways to make that simpler.

The other thing is the major state and local, which is 90 percent of public safety in this country, purchasing organizations and there's a bunch, are working with us to get things on their purchasing contracts that allowed this to happen.

So, I'll just give you a couple of examples, if you've heard these in the government space, but WSCA, the Western States Contracting Alliance, NASPO is the National Association of State Purchasing Officers. These groups all have contract vehicles, like GSA, if you think about it at a federal level, but they are more regional- and local-based. The Western Fire Chiefs Association has a contracting vehicle. And so they try to get this stuff on those vehicles because the agencies already can buy off of it. And so the same thing would go for the devices, the technology, the services that are on
there for the bigger purchasers, definitely
trying to change it.

But to your point I think the days of
always going out for RFP in the contracting sort
of way doesn't work if you're selling an app.
So, it is getting purchasing officers to come
into 2017 and do it differently and we're trying
help push that as well.

MR. BUERSTATTE: So real quick, I
notice, given the four of you online, this is a
really active Q and A right now but Melissa,
Rebecca, Tiffany, or Steve, any questions on the
line?

If not, no big deal, we'll -- go
ahead.

CO-CHAIR BRADLEY: Sorry. This is
Melissa. First, I just want to say thank you for
joining us. This was very helpful.

Are there any specific things, I know
you're still getting acclimated in kind of our
role, but are any specific things, based on the
conversation, that you need from us or you would
like us to do, as you all continue to think about
implementation?

MR. KENNEDY: No, I mean I think we
hit on some of that earlier. I think the biggest
thing is just knowing what's best. I think you
know Emily's comment about you know describe the
problem that you're having that you want solved
is a really good point and we always have to
remind ourselves of this because you jump right
to the app. But that insight is so important, as
we kind of go through this.

And I think it's also interesting that
what we might think is a technological solution,
let's say, it might be a hardware solution.
There might be another way of going around it and
I think it's really important that we come out
with what those problems are that police
officers, fire fighters, paramedics need, and
really have the forum -- and this is what I'm
looking for to Melissa's question: What are the
forums? I got Heather's idea; let's combine them
and not have another forum but what are the
forums we should be leveraging? And then what
would you want us to bring? Is it just bring the
problems we have? Is it bring the problems plus
the grants or challenge money to go with that?
Is it the problems but access to the market and
the timing of buying? Is it bring the problem
and the contracting vehicles that you would go to
to sell your product? Do you know what I mean?
Like which of those pieces resonates most with
all of you?

MEMBER KHOSLA: Can I make a comment?

MR. KENNEDY: Sure.

MEMBER KHOSLA: So I think a resource
you could use very effectively are these
undergrads and grads from across the whole
country. So I can imagine, if you're in San
Diego, like opening up UC San Diego and -- I'm
serious now. These are good kids, creative kids
that are looking for good ideas, good
opportunities. And this would open them up to
working the real world on a real problem that
helps the country and society.
MR. KENNEDY: No, I agree. And I got my MBA at Hopkins and we leveraged a lot of computer science students and others.

MEMBER KHOSLA: Right.

MR. KENNEDY: And it's amazing if you talk about public safety, and I did this on something that I was doing, it's amazing how they love the fact it's a great mission plus it's technology. And those two together --

MEMBER KHOSLA: So if you have somebody in San Diego, I'm happy to access UC San Diego.

MR. KENNEDY: Great. We'll reach out to you. I've got your card. Thank you very much.

And if others want to give me their card, I'm happy to do that, too. We'll share with the team and get it out there.

MR. BUEHRSTATTE: Yes, we will have time to dig deeper soon. Please keep it short so we can enough time for our next subject, manufacturing.
But yes, Whitney, please.

MEMBER W. SMITH: Just in response to your forum question, you probably know that there are major initiatives locally around securing cities and building resiliency. So, I work at JP Morgan Chase. We have something that generally we are now working on securing global cities. Rockefeller has funded a hundred resiliency officers across the globe in cities. They are trying to bring together not only the innovators and the finance folks, and the police, et cetera across stakeholder groups to solve a number of issues. I feel like if you got the word out and maybe --

MR. KENNEDY: I've met with the director of the Rockefeller Resilient Cities up in Manhattan.

MEMBER W. SMITH: Okay.

MR. KENNEDY: So we're definitely trying to leverage those kind of groups to get the word out. We're doing a number of smart city initiatives and there is everybody from --
MEMBER W. SMITH: If you want to meet with the director of Security Global Cities at JP Morgan Chase, I'm happy to do that.

MR. KENNEDY: Okay, that would be great. We'll accept that for sure.

Any other questions?

MEMBER BALDWIN: I'd be interested in knowing -- you know we applied innovations where you get a fast result and higher ROI. So I would be interested in knowing what's been done to identify what already exists that's almost meeting the needs. I mean oxygen sensing is not a new technology.

MR. KENNEDY: No.

MEMBER BALDWIN: But what already exists that's close where that could be adapted to between usage and a needs use problem solving, instead of inviting entrepreneurs to go up and reinvent the wheel or start from scratch.

MR. KENNEDY: Sure. No, that's a great point. One of the questions we've been asking that's along those lines and maybe we
should expand it -- and my team I can see taking fast notes back there -- is we have asked are you using a tool today that's just a common tool but you're using it because it's close enough.

So a good example, there's an EKG heart center monitor that cardiologists are sending patients home if they have A Fib and they use it at home. Well, there's EMTs and paramedics out there using it because it's close enough. It's not public safety, necessarily, ready but the reality is it's just a few modifications to that tool could take it to the next level, exactly what you're saying.

And so we were looking at those things that where people are using common off-the-shelf technology apps, others today, sensors, or sensors in this phone to do things, and what are they doing so that we can just take it to another step, push it further or talk to those companies and see if they'll go there.

So, I think we're doing it a little bit but I think we should expand that even more.
That's a good point. It's really good.

MR. BUERSTATTE: All right. Thanks, T. J.

MR. KENNEDY: Sure.

MR. BUERSTATTE: That was awesome.

That was a real lively discussion. You can tell the team is interested and we'll have some time to dive in deeper later.

MR. KENNEDY: Great.

MR. BUERSTATTE: Thank you.

MR. KENNEDY: Thank you.

MR. BUERSTATTE: As we know, we've been touching on manufacturing for some time now and I think, thank you, Emily and Sue, for kind of leading that workgroup. And over time there has been a natural progression to kind of three categories of ideas when thinking about manufacturing. One is capital and I think Emily I think maybe not coined the term but frequently uses patient capital and how hardware and manufacturing is more focused on patient capital needs. Two, the talent, and we've had the
workforce discussion many times now talking about apprenticeships. And again, in the news we've heard all about the priorities coming down from this administration. And number three, just thinking about better ways to commercialize what we have, whether it's in the federal labs, universities, and how can we get that hardware out into the market.

So I just wanted to provide that as a small refresher of kind of where we've been. And today, we're lucky to have Phil Singerman with us.

Quick survey: Who knows Phil here?
Okay. Okay, not as many as I thought.

MR. SINGERMAN: I used to be a famous person but not anymore.

MR. BUERSTATTE: So Phil's been working with us in this --

MR. SINGERMAN: I gave away money when I was famous.

MR. BUERSTATTE: That's right -- for 35 years now, is it, in tech-based economic
development, formerly in early years with Ben Franklin Technology Partners, Maryland PEPCO, and even with EDA before his time over at NIST. So, Phil really knows this space.

In front of you, you should have two presentations around NIST's MEP, Manufacturing Extension Partnership Program, as well as Manufacturing USA. Feel free to pull those out. And Phil, lucky to have you. Thanks for coming.

MR. SINGERMAN: Thank you. So first of all, Craig, thanks. And thanks to Dennis Alvord for inviting me. Dennis is traveling to the Galapagos today. So he's not able to call in, I don't think.

And I want to recognize Steve Tang. Steve's on the phone?

MR. BUERSTATTE: Yes.

MR. SINGERMAN: So, as Craig mentioned, I've spent most of my career on your side of the table, working for state and local, and nonprofit organizations in tech-based
economic development.

I've had two stints at Commerce. In the '90s I was the head of the Economic Development Administration, Assistant Secretary. And for the past few years, I've been back at NIST as the Associate Director for Innovation in Industry Studies.

You met with one of my colleagues, I believe, earlier this year, Carroll Thomas, who is the head of the Manufacturing Extension Partnership Program. And today I'm pleased to be joined by my colleague, Mike Molnar, who's the head of the Advanced Manufacturing National Program Office.

So what I thought I would like to do, what might be useful is share with you a little status of the Advanced Manufacturing Program, particularly at NIST, although they are also multi-departmental.

Mike and I will be with you in the breakout session later, so we'll be able to explore some of these issues that you've raised,
in terms of capital, talent, and commercialization in greater detail.

I think there is a great opportunity for this body to provide guidance to the administration in Policies and Programs. And at the end of my preliminary remarks, I'm going to suggest some specific venues for doing that. So you have that to look forward to.

So sort of background in terms of concepts, I think the major conceptual breakthrough in the prior administration was the recognition that manufacturing is key to our national innovation ecosystem and that without a strong manufacturing base, we are unable to maintain our leadership in technology development and implementation. And that led to a variety of programs to advance that concept, including the Manufacturing USA Innovation Institutes.

And this administration has also recognized the importance of manufacturing, linking back to trade and to employment, in a way that I don't think the prior administration made
that connection as explicitly. And this is, perhaps, symbolized by the creation of the Office of Manufacturing and Trade Policy -- Trade and Manufacturing Policy. It's a White House office. It's headed by an economist, Peter Navarro. Dr. Navarro and Secretary Ross wrote a paper in the fall on the incoming administration's, or the forthcoming administration's economic policy. I think that's a valuable piece to review because many of the concepts that were laid out there provide a framework for what the administration and certainly the Department is doing.

And Peter's been in the paper and spoken publicly about that. So I would refer you to that.

Let me take a minute to talk a little bit about NIST. How many people are familiar with the National Institute of Standards and Technology? Excellent. And if you want to really know about it, talk to Pradeep, who is on our Visiting Committee and a leader on that Board.
So just let me remind you that NIST is our National Metrology Institute. It is a billion dollar research institute. As you know, precise measurements are fundamental to worldwide industrial standards and NIST is the world leader in measurement science. We have had four Nobel Prize winners in physics in the last 20 years.

If you've been on a DOE campus or any major university research institution, you would feel right at home at NIST. We have two major sites, one in suburban Maryland, one in Boulder, Colorado. The site in Maryland has over 500 acres, 60 buildings, 3.2 million square feet of laboratory and support space; 3,500 federal scientists and technicians; and an equal number of non-federal guest researchers who come for a day, a month, a year.

NIST's research budget is approximately $700 million and this year NIST is spending about $160 million in the laboratory programs in smart manufacturing, advanced materials, nano manufacturing, biomanufacturing.
So, it is a major research enterprise.

In addition, NIST has extramural programs supporting and funding companies and universities. That falls within my directorate and those are the two programs that I would like to turn to.

I'm not going to take you through all of the slides but I just want to highlight --

MR. BUERSTATTE: Yes, these are the same presentations that should have been in your pre-reading, too. So hopefully, they will look a little familiar.

MR. SINGERMAN: Right. So for those of you -- how many of you are familiar with MEP, the Manufacturing Extension Partnership? Well, let me just bring you up to date because the program has gone through significant reform and reinvigoration in the last five years. It's a national network with technical assistance centers in every state. The program is $130 million federal, matched by at least that amount by non-federal sources. So, it's about a $300
A million program, which funds 1,300 technical staff. The centers are run by non-federal agencies, universities, some state governments, mostly nonprofit organizations that are set up specifically to work with manufacturing, small manufacturing firms. This is a major sector of our economy.

There are approximately 290,000 small manufacturing facilities that's under 500 employees. That's about 99 percent of all manufacturing facilities, represents approximately two-thirds of all of the standard counted manufacturing employees. So that's about eight million employees in those facilities.

And the MEP program you can think about as kind of a national nonprofit franchise of McKinsey services for the small manufacturing sector. So, it's a technical consulting business, if you will, which requires a business-like approach because the centers have to raise cost-share to support the funding. So it's basically a reimbursable program. We pay a
dollar for every two dollars that are expended by
the center. So this requires the centers' staff
to be very tightly aligned with the needs of the
small manufacturing community and to service
those in collaboration and coordination with
local partners, universities, state economic
development organizations, and so forth.

Let's see what's useful here to know.

So we serve in excess of 8,000 firms a year.
These are firms that pay for the services. It's
not a free program. It's analogous in its reach
for the Small Business Development Center
Program, which some of you may be aware of but we
have to charge for the services in order to both
meet the financial requirements and also meet our
public policy objectives.

Significant impacts, what I think
distinguishes this program from others that I've
been familiar with is that it has a very
rigorous, as you would expect at NIST,
measurement approach to its impacts. So every
quarter, Fors Marsh, which is an independent
surveying company, surveys clients that have been
served within the last year, so this is
independent of the centers, and looks at the
impacts in terms of job creation and retention,
cost savings, investments, new products. And the
results are in the billions of dollars and the
tens of thousands of employees. And I think that
is interesting.

I want to make a point about that.

Although there are significant job impacts from
the program, the program is basically a
productivity and competitiveness program, helping
small firms be more competitive in the
marketplace and particularly in the international
marketplace.

The program is modest-sized, as I
mentioned, compared to our competitor nations.

So Canada spends twice as much money as we do on
a similar program and every major, major
manufacturing country in Europe, Canada, Far
East, has a similar program, has similar programs
but typically funded in orders of magnitude
greater.

The program has a lot of stability. So some of the directors of these centers have been in place for decades. Most of the -- many of the staff, if not most of the staff, are former manufacturing executives and personnel who bring their expertise to bear in a consulting environment to work with firms that they worked with in the past.

So that's kind of the basics of the program. I want to make a point, and it's the very last slide in your slide deck, that goes through the question of workforce.

Is anyone here familiar with Manufacturing Day? So for those who are not, this is now in its I think its fifth year, and it is basically bring your daughter and son to the factory floor. That's the concept. It was actually started by some colleagues of mine at MEP and the Fabricators and Manufacturers Association that's located in the Chicago area and it's really blossomed and gone viral. It's
not a public program. It's been embraced by the private sector and the National Association of Manufacturers have taken it over this year. And it's going to be a signature initiative of that organization.

It's been widely successful.

Thousands of firms have opened up their plant floors for tours for high school students and middle students, their parents, and their teachers. It is intended to really transform the image of manufacturing for young people before they decide on their academic careers.

It's been embraced by elected officials -- a couple of years ago, I sat next to the Governor of Oklahoma for Manufacturing Month in Oklahoma -- and mayors, congressmen, senators.

It's not just Manufacturing Day. Many states have Manufacturing Month.

So there's a website, manufacturingday.com. This is an interesting network. If you're interested in workforce issues and want to get connected to those in the
private sector and the educational sector in your communities that are working in this space and have demonstrated an interest, I would recommend that you look it up and get connected. It's easy access, easy entry, and people come away with great -- very powerful, positive feelings.

The Discovery Channel was a major sponsor two years ago. I'm not sure if they're a sponsor this year but there's been a lot of free publicity for those participants in the program.

So, that's Manufacturing Day. That's MEP.

So now let me briefly talk about Manufacturing USA, the Innovation Institutes. Can I see a show of hands? Does anybody know anything about these? Okay, you're marketing is working.

So this was a major initiative of the prior administration which has been embraced by this administration. And I'll share with you some of the numbers but, basically, there is funding for this program -- the funding for this
program is secure through the various agencies into the future. In fact, the President sent a congratulatory note to the Regenerative Medicine Innovation Institute on its grand opening at the end of July in New Hampshire.

Dean Kamen, who many of you may know that name, the inventor of many things, including the Segways, I think. So, he is the Chair of the Board of the Regenerative Medicine Innovation Institute in New Hampshire.

This program came out of a several-year process of policy development that was led by an analogous body to this, the President's Council of Advisors of Science and Technology, the PCAST. And the concept that was developed -- and Mike's shop was very heavily involved as, if you will, the secretariat of this process. And the concept that was developed was that there was a market failure in the applied manufacturing technology space. There had been an underinvestment in manufacturing technology in contrast, for example, to our major investment in
medical technology and, on the DoD side, in electronic technology. But in manufacturing technology, we had fallen. We had not invested proportionately.

Mike's shop tried to do a survey a few years ago and we came up with, across the government, single digit billions in investment and manufacturing technology generously defined. And that really put us at a disadvantage with our international competitors. And so this program was designed as a response to that problem and, obviously, to the outsourcing of -- outsourcing is the wrong word.

MEMBER BALDWIN: Offshoring?

MR. SINGERMAN: I'm sorry?

MEMBER BALDWIN: Offshoring?

MR. SINGERMAN: Well, it's more than offshoring. Well, offshoring is part of it, too. But no, we lost a lot of our basic manufacturing over the last 20 or 30 years to low-labor countries. And what we learned, to our dismay, was that R&D follows it. You all know this. In
the early stages of R&D, you need to be aligned
with a shop floor to develop new products and new
processes. And if the shops are in Asia, then
the R&D is going to follow that. And that's
what's happening in major sectors. And Mike has
various slides that painfully display this.

So this program was intended to be a
response to that. And in order to get it
jumpstarted, at a time when there was, as there
is now, a conflict between the Congress and the
President, it was decided to fund the program
with current authorities through existing
agencies and appropriations.

And so DoD and DOE were tasked and
asked to conduct competitive solicitations in
sectors where they had a mission-driven
responsibility to stand up these Innovation
Institutes.

So they went through competitive
solicitations. The model was that in order to
attract private sector interest and engagement,
there would be a minimum investment, a federal
seed investment, a one-time capital infusion of
at least $70 million, which would have to be
matched by at least that amount by the non-
federal sector, industry, state governments, and
other parties. And so that was kind of the
genesis of the program.

Just about five years ago in 2012 the
first Institute in Additive Manufacturing was
established in Youngstown, Pennsylvania. And
subsequently, there have been a total of eight
institutes that have been funded by the
Department of Defense, five institutes by the
Department of Energy, and most recently one
institute by the Department of Commerce.

The Department of Commerce and, in
particular, NIST has two specific roles in this
program. One, to coordinate the activities of
the institutes, working in partnership with our
sister agencies on a robust interagency basis and
with the institutes themselves. Those of you who
are familiar with the NSF National Nanotechnology
Initiative of 15-20 years ago, this is analogous
to that; a government-wide effort to focus on a particular area of technical challenge.

In 2014, in part as a result of the success, the early success and the promise of the program, and its strong conceptual design, Congress passed legislation creating the program or creating the network of the program, authorizing this to oversee the network function and authorizing NIST to stand up its own institutes.

We received funding in 2016. And in 2017 we announced one institute in biotechnology that is headquartered at a nonprofit at the University of Delaware.

As I mentioned earlier, the institutes are generally -- certainly the agency is funded through the life of their activity. The notion -- so some of you may be familiar with the Fraunhofer Institutes in Germany. We're not allowed to say that we copied the Fraunhofers but we really did. So many of us had it in mind. The key difference is the intention here was
these institutes would become self-sustaining
after the initial infusion of federal money;
whereas, the Fraunhofers continue to receive
ongoing federal, and regional, and actual
European Union funding, as well as private sector
funding.

If you turn to slide 5 in your
package, it's a map. And I think this is an
interesting slide. This portrays the institutes
that have been created and their technical areas
of focus.

This program has legs. After the
initial awards, there has been a gravitational
pull of companies and universities to join the
institutes. So these institutes all have very
strong membership programs, as well as focus on
their research and development activities, cost-
sharing with industry. They function, in a
sense, as mini NSFs. So they fund collaborative
R&D projects in particular areas but they have a
nonprofit governance structure. They have very
broadly based technical committees that oversee
and drive the program.

I sit on the, as I mentioned, the Fabrics Center in Cambridge at MIT. I sit on the Board of Advisors. It's a national program and has connections across the country, with means across the country. States are very engaged. In Philadelphia, the Drexel University, which is a neighbor of the Science Center, is one of the key sites for fabric development that is associated with the Fabric Institute. And that's an example of the kind of connection.

I want to make two points about the institutes. If you turn to slide -- bear with me -- slide 14, formation of regional clusters. So this is a page that comes from an independent study that was conducted by Deloitte. It's a fabulous, comprehensive report. All of the material that I'm referring to and other documents are on manufacturingUSA.com, that's our website, also manufacturing.gov. So two websites that get you through -- this has been a very transparent process and the information is widely
available through the website.

So if you are interested in finding
out more about this program, I would refer you to
those websites and, of course, to us.

The point I want to make about this
slide is that there is a dual function for these
institutes. One is that they are supposed to be
National Centers of Excellence that are
internationally competitive. Secondly, they are
also intended to build regional innovation
clusters. And so there is, obviously, a dual
function. And interestingly, even though these
are national centers, they have had very strong
regional and local impacts. And that's an
interesting model for programs of this sort.

The other point I'd like to make has
to do with workforce again. And if you turn to
slide -- sorry -- nope, you'll have to back up.
Sorry -- 12.

So, not surprisingly, as these
institutes have reached out to their corporate
sponsors and asked what do you need, they say we
need workers who are trained in these emerging technologies.

So although this is part of the legislative requirement, it was really not part of the business plans or a major thrust of the business plans at these institutes. These institutes have to raise dollars to support their activities and they have to build a sustainability model that will sustain them after the federal funding ends. And so they have, naturally, been gravitating, in my opinion, towards sources of capital, which is corporate sponsors in membership and R&D projects that can be collaboratively funded. But workforce is forcing its way onto the agenda and these institutes have now prided themselves on the workforce activities that they've been able to stand up in coordination with local organizations. And this has also become a major focus of activity of our network systems. The most, I would say, active inter-institute work stream has been on workforce development, and
education and training.

So for those of you who are interested in the connection between technological development and associated workforce activity, I think this is an area to watch.

So let me -- I promised that I would give you some tips on how to effect administration policy. So I do not represent NIST in these remarks or the Secretary of Commerce.

So we are going through a transition, a governmental transition, Presidential transition. Transitions are always slower than we expect, even from one party, the same party, even from one President to a Vice President, people of the same administration. This transition has been a little slower but I think quantitatively maybe not qualitatively or qualitatively and maybe not quantitatively. But I was reflecting about what would be useful to share. I think the dynamics, particularly at Commerce in the appropriations process that is
working with Congress, are remarkably similar to the past. And by that I mean there is always a tension between administrations and Congresses, the legislative branch.

Under the prior administration, there were major increases in programs proposed by the administration and Congress, typically, did not go along. In this administration, there have been major decreases that have been proposed and Congress has not gone along. And so there is -- you know in my experience, Congress deals in the appropriation process incrementally. Each year, you start with the base. You don't start with zero base budgeting. You start with last year's budget and you increase some things by a little bit and you decrease some things by a little bit. And if you have a big infusion of capital from some other source, then you're able to launch some initiatives but we haven't seen that.

And in fact, both EDA, and MEP, and MBDA Commerce programs are all funded -- fully funded in the fiscal '71 budget and well-funded
in the Senate mark that actually the Appropriations Committee, headed by Thad Cochran from Mississippi and the subcommittee by Richard Shelby of Alabama. So, that's kind of true to form in terms of past practice.

There's another similarity that struck me and that is the prior administration used Executive Orders and Presidential Memoranda to govern in the context that it found itself, as is this administration. And so you've seen many of those come out of the administration. That's one of the opportunities because that is one of the places where policy is being developed.

Earlier this year, the Commerce was tasked by the President to look at a study of deregulating -- deregulation for manufacturing facility construction and streamlining processes. So the Department went through a major review and a major request for information, which elicited nearly 200 responses. The report is not out yet but I believe the responses are still online. They were online during the time of the report on
regulations.gov. So there is a lot of rich data from peers like you, as to the impact of federal regulations on manufacturing facility site.

And that process was very influential in the recommendations that have been drafted by the Department and by the administration. So we were very involved in that. NIST was really kind of the technical support for that. I didn't know what to expect at the end of it but I think the data drove the result.

There is a recent Presidential Executive Order that's looking at the DoD's defense industrial base and supply chain. And this is important both intrinsically -- it's an important issue -- but also because the Department of Defense, under any scenario, is slated to get a large surge of dollars. And for those of you who are interested in DoD's programs across the Board, everybody is touched by them. So for those of you who are interested in that type of activity, I would encourage you to maybe do a group of alerts so that when the Department
of Defense issues some statements or asks for
comment, that you are prepared to do that.

So that's one area. I think in an era
of activity driven by Presidential Memoranda and
Executive Orders, in contrast to Congressional
legislation, new program development, which I
don't think we'll see a lot of, that's an area
where I think people should pay attention.

In terms of substantive areas, there
are two issues that we're particularly interested
in, which perhaps I hope we can talk about later.
One is kind of the need to kind of restore our
supply chains. Because as we outsource our major
corporate manufacturing facilities, the supply
chains which are global, in any case, gravitated
there. And now we find that when companies are
returning to the United States, they ask about
two things: first, about talented and available
workforce; and secondly, about qualified
suppliers. That's also been a market that we
have underinvested in our supply, in our small
manufacturing supply chain tiers 2 through 6 that
existed in all industrial sectors.

And so it's not clear what the federal role should be because most programs, most federal programs -- EDA, MEP, MBDA -- work on a company-by-company basis. They are either geographically or regionally oriented. But supply chains span the nation. They cross-cut geographies. They're global. So we need to think about how to effectively engage in that space. What is the role for the public sector, if any, and how can that -- what tools are needed in order to advance them?

The other area that, of course, is very important and salient these days is cybersecurity, which is a major problem of course. NIST has an important technical role in that through our cybersecurity framework, which serves as the basis for civilian cybersecurity standards. The Baldrige National Quality Award Program has also developed a strategy document for companies to assess their cybersecurity weaknesses. And MEP has developed, is working to
develop a special program for small manufacturers, particularly those that are in the DoD supply chain, which will, by the end of the year, have a requirement to meet cybersecurity standards. And as you can well imagine, small firms neither have the capacity nor the resources to meet the cybersecurity challenge. So, this is a major issue that I think has not fully emerged in the national debate but I think it's very important and one that we would benefit from your knowledge.

And I guess my final thought, having again been on your side of the table most of my career but now on this side, is the importance of the role of the states in economic development activities and aligning the state economic development strategies and your regional economic development strategies with the mission-oriented strategies of the federal agencies so they cross-cut. And all too often, those things are not aligned or they don't intersect in a positive way.
EDA had a program called Investing in Manufacturing Community Partnership, IMCP, which was really kind of a recognition program of best practices in regional efforts to advance manufacturing ecosystems. No money was involved from EDA but communities took advantage of the opportunity to get nationally recognized by a federal process and by their peers.

In that way there was an alignment, a multi-agency review process. So an alignment to federal agency goals with regional economic strategies.

Final point. In terms of manufacturing, in terms of all of these programs that I've mentioned, the states are not at the table. Governors are not represented in this space. To some degree, governors speak about workforce and they all have workforce programs but the governors, as a collectivity, do not speak with any sort of resonance at the federal level in terms of workforce or in terms of manufacturing policy. Yet, the states are often
looked to or expected to provide matching funds for many of these programs.

I make this pitch to every group that I have an opportunity to speak to. I think there is a real -- and the states, of course, are part of our constitutional network so they have a connection in many programs, transportation and health, for example, to carry out federal policies and receive significant funding to do so. I think the states and their subunits can also play a major role in advancing these policies.

So, that's another, I think, opportunity for this body and for you as individual organizations to engage within the federal policy development process.

MR. BUERSTATTE: That was great.

We're a little tight on time.

MR. SINGERMAN: Sorry.

MR. BUERSTATTE: But I'm going to squeeze some room out of the next portion --

MR. SINGERMAN: Did I run over? No,
I didn't.

MR. BUERSTATTE: -- so we can have some time for Q and A to Phil. That was such a great number of insights, I didn't want to stop you.

So, some questions for Phil?

MEMBER JOHNSON: Phil, real quick.

MR. SINGERMAN: Yes, sir.

MEMBER JOHNSON: You said that for small manufacturers NIST MEP had an outline with what requirements small manufacturers are going to have to meet with cybersecurity.

MR. SINGERMAN: Yes, we're developing that.

MEMBER JOHNSON: So it's not done yet?

MR. SINGERMAN: I'll find out the status. I just got an update on it today.

MEMBER JOHNSON: Okay, thank you very much.

MR. SINGERMAN: But there's been a lot of outreach working with the Procurement Technical Assistance Centers, the PTACs. So,
they're the ones that have direct connection with
your DoD contractors and suppliers.

MEMBER JOHNSON: Yes, I run the PTAC
and I'm not aware of any.

MR. SINGERMAN: Okay so then --

MEMBER JOHNSON: But we also are
receiving an Office of Economic Adjustment --

MR. SINGERMAN: Right.

MEMBER JOHNSON: -- grant to implement
just that.

MR. SINGERMAN: Terrific.

MEMBER JOHNSON: So any help --

MR. SINGERMAN: Well, we're very
connected with that program so we should talk
offline.

MEMBER BALDWIN: So Baldridge has that
already?

MR. SINGERMAN: So Baldridge does have
that. Baldridge has -- I forget what they call
it. So NIST has the cybersecurity framework and
Baldridge has, they take -- if you're familiar
with the Baldridge program, it is a very detailed
program for how you assess your quality. And so they've created a special document on cybersecurity.

So I'll double-check to make sure that's available.

MEMBER REAMER: Two unrelated questions on MEP. What's the -- how big is the universe of small manufacturers? You say the system works with 8,000. I'm curious how big the universe is, how big the potential pool is.

MR. SINGERMAN: So the potential pool, if you look at just small manufacturing, I used the number 290,000 small manufacturing facilities. So some of those facilities are owned by large corporations. Another metric is there are about 250,000 small manufacturing firms under 500 employees and mostly privately owned. So, that's our universe. And I'm sorry I don't have the percentages with me but 80 percent of those are under 20 employees. So, they're very small.

So the real sweet spot for our program
are those firms in the 100 to 250 plus employees
because they have capacity and the resources to
innovate. And that's our marketplace.

MEMBER REAMER: The second question
has to do --

MR. SINGERMAN: Is that responsive?

MEMBER REAMER: Yes, thank you.

MR. SINGERMAN: So we have very
significant penetration in those sectors. We
have penetration in some of the like 250 to 400
we serve 30 percent of the marketplace over a
two- to three-year period. That's a very
profound penetration. Obviously, in the one to
20, which are a couple of hundred thousand firms,
you know we serve 5,000. It's a very small
percentage. But in those firms that are the
target market, we have a high penetration.

MEMBER REAMER: Great. On
Manufacturing USA you were saying how this
administration is supportive of this effort.

MR. SINGERMAN: Right.

MEMBER REAMER: In terms of the budget
request for the institutes for FY18 and '19, there is no significant decrease in the budget requests?

MR. SINGERMAN: So DoD is fully funded through the life of their various institutes. Remember, the institute is a TAP in terms of years and dollars.

DOE was not but the Senate has fully funded them, in accordance with whatever parameters they have. So I think some of them are fully funded. Others are funded into their third or fourth year and the Commerce Institute is funded for next year.

MEMBER REAMER: So how would you characterize individual Senators and Members of the House, their understanding of and appreciation for Manufacturing USA?

MR. SINGERMAN: I couldn't begin to -- sorry. I wouldn't dare to characterize it.

MEMBER JOHNSON: So with the very small manufacturers, the areas to entry, as I see, are having a D-U-N-S Number in the fees
charge. Have you ever thought about having some
sort of program to get them sort of hooked and
then, when they get to a certain size, then start
paying the fees?

MR. SINGERMAN: Well, right. So you
know, as I mentioned, first of all, this is a
very -- it's a big country, a lot of variations.
So we allow a great deal of flexibility in the
operation of the MEP standards. And so what
works in South Dakota doesn't work in South
Carolina or Southern California. So, there's a
lot of variation. They all do some of the same
things but they are very different sizes because
the funding is proportional to the density of the
manufacturers, number of manufacturers in the
region.

So they are businesses. So, they do
free assessments. They do small projects --
$5,000 and for more robust clients, they'll have
multiyear projects in the hundreds of thousands
of dollars. So, there is -- and it varies. We
don't dictate how they do it. We have certain
standards that they have to meet.

But if you work at all with our MEP Centers in Kentucky --

MEMBER JOHNSON: Yes, I do. I use sites -- I came to Kentucky on a NIST E Card but Scott Broden (phonetic) but he's not very adventurous; not really a visionary.

MR. SINGERMAN: I've got 51 children that I've lost touch with.

MEMBER KENNEY: To follow-up on Rick's question, quickly, and Emily's organization and mine both -- sorry, Craig -- both work with our local MEPs. And in our case, we have carved out some of our funding. We mostly fund R&D projects with startups but we've carved out some specifically for startups to work our MEP, where we subsidize the company's cost. And our MEP got a grant to subsidize part of it as well. So the company still has some skin in the game but it's only about a third of the normal expense of the project. We've done a couple of those successfully, one is a design of manufacturing
for a company, basically designing their first
to manufacturing and
another case, designing the layout for a new
manufacturing facility. These are like nine-

MEMBER REICHERT: That's really

interesting to me that you figured out a way to
do that because the problem -- we work quite
closely with Mass MEP. I'm based in the Boston
area. And an issue for us has been that the MEP
is not incentivized to work with startups because
it doesn't match their metrics.

MR. SINGERMAN: That's right.

MEMBER REICHERT: And so I mean I'd

love to see some innovation around how do we
incentivize the MEP, which has amazing
capabilities, expertise, that would really help
early stage businesses but the metrics don't
allow them to do that.

MR. SINGERMAN: That's correct because

they have to raise a cost-share. But there is a

very interesting -- I don't know. Heather, are
you from Boston?

MEMBER BOESCH: Uh-huh.

MR. SINGERMAN: So, did you mention Greentown Labs in your earlier remarks?

MEMBER BOESCH: Yes, she runs Greentown.

MR. SINGERMAN: You run Greentown.

Okay. Did we meet when I visited you?

MEMBER REICHERT: Obviously.

MR. SINGERMAN: So well you know there is a program that you had with SBA and state funding, right?

MEMBER REICHERT: Yes, we did.

MR. SINGERMAN: So this was to connect startup companies that had a manufacturing prototype need with existing manufacturers who could supply that need. I'm sorry, they go to the venture capitalist and they say well, you've got to go to China; there's nobody around.

So the SBA funded a program, I think the state funded it, to basically embed an MEP person to work in this space. And low and
behold, there were suppliers galore and the contractors in the Boston area that could do a lot of work that these startups wanted to have done.

Did I get that right?

MEMBER REICHERT: That's pretty much correct.

MR. SINGERMAN: And so but the key there was money. The key was an extra special source of funding that allowed -- so we didn't charge for that. I don't think we charged.

MEMBER REICHERT: No, you didn't charge for that but it's hard for the person to do that work because they can't get credit for it.

MR. SINGERMAN: I see, okay.

MEMBER REICHERT: That's the issue.

MEMBER REAMER: Hey, Emily you designed that program and you developed the term patient capital, too. Amazing.

MEMBER REICHERT: I could see credit for the first one but not the second one.
MEMBER REAMER: Wrong term. Wrong term.

MEMBER BALDWIN: So you mentioned the Manufacturing Day.

MR. SINGERMAN: Yes.

MEMBER BALDWIN: You know I work for a manufacturing company and we heavily support Engineering Day -- Engineers Day.

MR. SINGERMAN: When is Engineers Day?

MEMBER KENNEY: Every day.

MEMBER BALDWIN: And so I'm wondering if there is any level of collaboration been thought about because parents want their kids to go to college; they want them to become engineers.

MR. SINGERMAN: Right.

MEMBER BALDWIN: And now we have Manufacturing Day. How do we bring those two messages together? Because we have a lot of Ph.Ds. in our manufacturing world.

MR. SINGERMAN: So go ahead and do it. Where are you located? Where is your -- you're
everywhere.

MEMBER BALDWIN: Our headquarters is in San Jose but I'm in Oregon. But it's more how do you bring the programs together?

MR. SINGERMANN: So, as I said, this has gone by -- talk to NAM. This has always been a private sector-led initiative. It was stimulated with some thinking from the public sector.

MEMBER S. SMITH: And SME is part of that NAM.

MEMBER W. SMITH: So, in addition to Manufacturing Day, which is great exposure, it's great to get particularly young people aware of manufacturing jobs and what facility we have.

I thought there was a big push in the last several years to get MEPs to do more consulting with small- and medium-sized businesses on their talent needs because, of course, as you said, that's one of the big barriers to growth.

But I've been maybe not on the ground
enough to conclude that the capacity-building among the MEPs to really do that in a meaningful way has been underwhelming. So what could the Department do or what could we do to build the capacity of MEPs to really get into the game?

And I want to just say one other thing. I see you want to respond to me.

Four of our pillars are manufacturing -- two of our pillars are manufacturing apprenticeship. Thinking about could the MEPs be a vehicle -- and apprenticeship works for some and not others. So that's just one talent model. There are a lot of other talent development models.

MR. SINGERMAN: So where are you from?

MEMBER W. SMITH: I work at JP Morgan Chase. I'm based in Chicago. I work with IMEC, which I think is one of the better ones.

MR. SINGERMAN: Yes. So, we have --

MEMBER STEVENSON: This is Tiffany. I'm calling in remotely, trying to merge in. On Whitney's question, I think my question building
on that is are there topics within the advanced
technical space so when you look at some of these
categories that you think we could be seeding
also from an education perspective? Are there
some that maybe cut across or could be sort of
the new core curriculum that we maybe we focus on
or are they all weighted equally?

MR. SINGERMAN: So there are some MEP
centers that have been very forward-leaning in
terms of workforce development activities but we
have been reluctant, as a system, to move in that
direction. And the reason is we have a positive
reputation because we're very specialized in what
we do and we're not viewed generally as
competitors with lots of others. The reason the
program has been around for 30 years because with
the Kinseys of the world, this is not their
marketplace. There's a void.

But the workforce space is very
crowded and competitive. And when some of our
MEP centers have tried to engage in that space,
there's been a lot of push back -- I'm not being
critical -- understandably because there are community colleges and state universities. Everybody is in the workforce game. And the question is is there room for a new entry.

So, I don't think that this is an MEP capacity issue. I think this is a federal issue that requires a higher level of collaboration between the Department of Commerce, to the extent that there's a role for Commerce, the Department of Labor, and the Department of Education. We spend an enormous amount of money on workforce training and education and I think there is a widespread feeling that the public sector investments in this are not efficient and effective because we're not training people for -- I mean we have all this money, all these institutions but all of the companies are complaining they can't get qualified workers. So there's a real mismatch.

So, I think this is a great issue for this body but I don't think this is an MEP issue.

MEMBER REICHERT: We have a great
model in Massachusetts, actually where the MEP has been involved in workforce development, MACWIC, that they set up and they have involved the community colleges and actually have run out of people to train. They have been so successful --

MEMBER W. SMITH: So I don't even know that model but I was going to say the value add is that the MEPs are talking to manufacturing.

MR. SINGERMAN: Yes, absolutely.

MEMBER W. SMITH: They hear what technologies are. So they have metal working companies that need however many positions in the C&D, whatever. Then they go to the community college on delivery.

MR. SINGERMAN: Right, that's in our legislation. We're required to do that, which is a positive thing.

What's different in Massachusetts is the state has designated the MEP as a service provider for education and funds them, much to the consternation of some of the community
colleges and other providers. You know why are you -- why aren't you giving -- they are very powerful lobbyists for their own interest.

MEMBER BALDWIN: It's competition. I believe we have an issue with we have a lot of training that's delivered to employees, skills training, knowledge base training and the employees want some kind of certification to go with that so that it's fundable.

And it's actually easier for me to take that training to Europe and get it certified for college credit in Europe that can then transfer back than it is to go to any of the colleges here to get them certified for college credit.

MR. SINGERMAN: So man NAM created the Manufacturing Institute, which was -- Emily DeRocco, who was the major figure in the Bush administration Department of Labor, was involved in that I think subsequent to that administration and that was intended to work on this stacked certification. I'm not an expert at this. So
NAM is the body. They have an interest and a capacity to work on this.

But I'm sorry I'm not helpful on this but, as I said, it's a bigger problem than kind of the bureaucratic tools that are available to us but it is a very -- have you had Labor people speak before the body this year?

MR. BUERSTATTE: Not this year.

MR. SINGERMAN: So you should get the Labor people in here and grill them on this stuff because I think there's a real opportunity here for this body to make a difference in this sector.

MR. BUERSTATTE: We'll have some good time just around the hour to dig into this a little bit deeper with Phil, and Mike, and a few others. Andrew Steigerwald from DOE will be joining us. We've met with him before.

So, I hate to cut it off, but I do need to keep us on schedule.

And with all that dialogue happening and the questions, I'd like to throw a question
back at the team here and think about as we move
into the second half of our day think about two
things. One, what is it that we can do near-term
as a body to help Phil and team in our
manufacturing efforts here at Commerce, as well
as T. J. and the FirstNet team.

So again, what is something near-term
we could do, whether it is help FirstNet advocate
and amplify the opportunity at a few universities
and a few cities? What does that look like? And
two, with that in mind, how can we leverage that
activity or that support to build toward a
broader initiative, something where we really
should be operating and will be. But I want to
set a 50 meter kind of target that we can hit,
less risky, something that we could immediately
take action on while building momentum toward a
policy initiative and some more awareness,
whether it's the workforce piece in
manufacturing, you name it.

So those two things I think will set
us up for success in the second half of today.
Melissa, I'm not sure if you're still hearing us -- and she just dropped off.

So, that's it for my formal closing remarks. But I did want to open up -- Operator, at this time, I want to open up the call for public comment, if there are any members of the public on the line.

OPERATOR: If you would like to make a comment, please press *1 and record your name at this time.

MR. BUERSTATTE: All right, is that no public comments, operators?

OPERATOR: That is correct, sir.

MR. BUERSTATTE: Great. Thank you so much.

All right, absolutely. So we have a government comment. Jennifer, one of our partners over at SBA from the Office of Investment and Innovation who we'll be hearing from or participating in some dialogue with with more of her team members later but Jennifer has got some awesome updates with what they've been
working on, which I know is going to be relevant to a lot at the table here. Jennifer?

MS. SHIEH: Yes, thanks.

Hi, everyone. You might have met me briefly at the February meeting. I'm the Chief Scientist Senior Technology Policy Advisor for the SBIR STTR programs. And so I'm just going over a few really brief updates on what's been going on with our programs and then if you have questions about them, John Williams, the Director of our office, and Brittany Sickler will be here for the breakout session later.

But so one is that we made 21 FAST, the Federal and State Technology Partnership awards that are going to start September 30th. I know there are a couple of awardees here actually at the table. So and these are for organizations to increase the SBIR participation and there is only one per state.

We will be announcing 20 additional Growth Accelerator awards to existing growth accelerator companies in October.
We just released the FY14 SBIR annual report. We're trying to catch up. So the FY15 annual report will hopefully be out relatively soon. But on SBIR.gov, if you want to take a look at the annual report that talks about the SBIR program, the numbers of applications, awards, how it breaks down for women-owned small businesses, socially/economically disadvantaged small businesses, HUBZones, that's all there.

And then the report for FY15 isn't out but you can actually go to the dashboard for the annual report data for FY15 is there. So you can also take a look at also state breakdowns, if that's something you're interested in.

We'll be continuing our SBIR road tours in California and Hawaii in September. So, if you're out on the West Coast, maybe come visit. There's five cities that we'll be hitting in California.

And then the thing I really wanted to say is also we are still really very actively working on developing our strategy for creating
an inclusive innovation ecosystem through the
SBIR program and increasing the participation for
underrepresented groups. And so I, personally,
am very -- if you know of programs or
initiatives, people that would want to talk to me
about this, yourselves included, please contact
me and I'd love to work with you.

MR. BUERSTATTE: And you'll be hanging
out for the afternoon.

MS. SHIEH: I'll be here the
afternoon. I'll probably come tomorrow morning,
too.

MR. BUERSTATTE: Great! Awesome.

MEMBER JOHNSON: Just for everybody
around the table, these tours are great. You
just have to sign up in advance but you should
get all your technologists to go have these one-
on-one meetings. They are fantastic.

MS. SHIEH: Yes, thanks. So the road
tours are basically we literally bring a busload
of agency representatives, all the program
managers that run the SBIR programs at all the
different federal agencies come do one-on-ones.

We talk about high level --

MEMBER JOHNSON: They have $3 billion they're trying to give away.

MR. BUERSTATTE: We call them awards.

We don't give it away. They're awards.

MS. SHIEH: They're earned. They're applied for.

MR. BUERSTATTE: They're earned, yes.

MS. SHIEH: I guess I'm going to throw a little bomb in here. Just in case you don't know, also there's a change in the definition for Research and Development for development. There is a congressional research service report, if you're interested in learning more about how that may affect R&D funding.

MR. BUERSTATTE: We'd love to hear more.

Okay, we are five minutes ahead of schedule, which means you get a longer bathroom break.

At this time, I'm going to adjourn the
formal portion of today's public meeting. So, Operator, please close down the line.

PARTICIPANT: Craig, can I ask a question first?

MR. BUERSTATTE: No.

PARTICIPANT: Okay, sorry.

MR. BUERSTATTE: Please close the line.

(Whereupon, the above-entitled matter went off the record at 3:25 p.m.)
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This is to certify that the foregoing transcript

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