

U.S. DEPARTMENT OF TRANSPORTATION

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RESEARCH AND INNOVATIVE TECHNOLOGY
ADMINISTRATION (RITA)

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INTELLIGENT TRANSPORTATION SYSTEMS PROGRAM
ADVISORY COMMITTEE (ITS PAC)

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THURSDAY
MAY 24, 2012

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The Advisory Committee met in room E37-302, U.S. Department of Transportation, 1200 New Jersey Avenue, S.E., Washington, D.C., at 8:00 a.m., Robert Denaro, Chair, presiding.

COMMITTEE MEMBERS PRESENT

ROBERT DENARO, Vice President, Nokia, Chair
 TERESA ADAMS, Ph.D., University of Wisconsin-Madison
 STEPHEN ALBERT, Western Transportation Institute, Montana State University
 SCOTT BELCHER, President and CEO, Intelligent Transportation Society of America
 ROGER BERG, Vice President, Wireless Technologies, DENSO
 JOSEPH CALABRESE, CEO, Greater Cleveland Regional Transit Authority
 JOHN CAPP, Director of Global Active Safety Electronics, General Motors
 PAULA HAMMOND, P.E., Secretary, State of Washington Department of Transportation
 SONNY HOLTZMAN, ESQ., The Holtzman Group
 STEVE KENNER, Global Director of Automotive Safety, Ford Motor Company
 J. PETER KISSINGER, President and CEO, American Automotive Association Foundation for Traffic Safety
 HANS KLEIN, Ph.D., Georgia Institute of Technology

SCOTT McCORMICK, President, Connected Vehicle Trade Association
RAJ RAJKUMAR, Ph.D., Carnegie Mellon University
BRYAN W. SCHROMSKY, Director, Federal Government and Public Safety, Verizon Wireless
TON STEENMAN, Vice President, Intelligent Systems Group, Intel Corporation
KIRK STEUDLE, P.E., Director, Michigan Department of Transportation
GEORGE WEBB, County Engineer, Palm Beach County, Florida

ALSO PRESENT

GREGORY WINFREE, Deputy Administrator, RITA
SHELLEY ROW, Director, ITS JPO
SHEILA ANDREWS, American Motorcyclists Association
ROBERT ARNOLD, FHWA
JOHN AUGUSTINE, Managing Director, ITS JPO
VALERIE BRIGGS, ITS JPO
BRIAN CRONIN, ITS JPO
SHANNON DULANEY, Honda
STEPHEN GLASSCOCK, ITS JPO
SAM LAMAGNA, Intel Corporation
ANDREW MEESE, Metropolitan Washington Council of Governments
DANA SADE, ESQ., NHTSA
MIKE SCHAGRIN, ITS JPO
MICHAEL TRENTACOSTE, FHWA
MARK VALCICH, Intel Corporation
CARLOS VELEZ, Citizant, Inc.

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P-R-O-C-E-E-D-I-N-G-S

Welcome and Opening Remarks

8:12 a.m.

CHAIR DENARO: Welcome, everyone. I hope you appreciate that we have a nice cozy room here.

MS. ROW: Our conference center is not particularly slick.

CHAIR DENARO: Right. This building has always been a challenge for us, but it is --

MS. ROW: It is what it is.

CHAIR DENARO: -- what it is. Yes, yes. So, Shelley, would you like to start out with any comments?

MS. ROW: Sure. Greg Winfree, who is the Deputy Administrator for the Research and Innovative Technology Administration for US DOT, will be here shortly to say a few words of welcome, as well. But I will just kick it off since Greg is running a few minutes late to say welcome. We are so pleased that you all have agreed to be part of the ITS Advisory Committee. We're not going to belabor you with a lot of the roles and responsibilities. We did some of that on the phone call. But we do just want to reiterate that this is your committee. We are here to help you help

1 us, so we take what you share with us and the thoughts and
2 the ideas that you have about the program, things that we
3 can do, things that we can change, we take that very
4 seriously, and we look forward to your comments.

5 There is, I think, a lot of the time at the end
6 of the agenda, we think it's a lot of time. We'll see.
7 There's never enough time. But there's time at the end of
8 the agenda for Bob to lead you all in a conversation about
9 how you all want to work, where you want to focus your time
10 because you have a lot of choices and it's your choice.

11 We have taken the liberty, however, to take today
12 and tee up some topics that we are particularly interested
13 in. You don't have to choose to focus your energies on
14 these. We're going to be talking about the connected
15 vehicle. That's probably no shock to anybody. That's
16 where, if we were completely selfish, we would love to have
17 your input. You get to choose, however. So if that's not
18 where you want to focus your time, you can choose
19 differently.

20 I'll say a few words about the rest of the
21 program later in the agenda, but, for now, just welcome and,
22 please, it's participatory. There will be some

1 presentations today. We don't know any other way to do
2 this. The presentations are intended to be discussions, so
3 the staff who will be leading that have been clearly
4 indoctrinated to understand that this is a conversation. So
5 please feel free to speak up, ask questions if it's not
6 clear, provide comments during those, quote, presentations
7 because we do want it to be a conversation with you today.
8 That's it.

9 CHAIR DENARO: Thank you. Thanks, Shelley.
10 Well, I'm Bob Denaro, and I will add my welcome also and
11 also my thanks for your volunteering. All of you were
12 selected because of your background and your experience,
13 your expertise, and so forth. That probably means you're
14 all very busy people, and we respect that. So we really
15 respect the fact that you volunteered and you're willing to
16 help. And the diversity and the breadth of experience that
17 we have here is really one of our strengths.

18 I'm just going to go over a couple of thoughts I
19 have. This is my third round on these committees, you know.

20 I think, you know, after this stint for these two years,
21 they need to take me in the alley and shoot me, you know.
22 Is this being recorded? Yes, it is.

1 Anyway, it is an interesting process. I feel
2 it's really, really important. I think, you know, given
3 where all you are working, you know, in your jobs right now,
4 I think you know how important this technology is to the
5 future of ITS. And if we can be part of, you know, ensuring
6 that this really does get deployed and really does save
7 lives, I think we can all feel good about that.

8 Let me just go over a couple of thoughts for you
9 because I know, I mean -- by the way, I think we have seven
10 returning people. We tried to keep some amount of
11 continuation on the committee so we have a little connection
12 to where we've been. And then about two-thirds of the
13 committee are new. So most of you are new people, let me
14 just tell you, because I know when I first came to this,
15 what do we do on this committee? You know, what are we
16 trying to do, what's our purpose? So let me give you some
17 thoughts, my thoughts anyway, on that. These are probably
18 more just Bob Denaro thoughts.

19 First of all, if you look at these meetings, you
20 know, if you think about a purpose of processing a product,
21 the purpose, our charter, which you heard on the phone call,
22 we'll talk more about that, but our process is really these

1 meetings, right? Let's be honest, okay? We're not all
2 going to go back to our day jobs and spend hours and hours
3 working on this, okay? So we really got to get done the
4 essence of what we're going to do in these meetings and the
5 deliberations and the discussions we have.

6 We will have extensive interaction with the JPO
7 end, Shelley's staff as well. She's got a very talented
8 team, in my opinion. And I hope all of you get to meet the
9 key members there who are working on different aspects of
10 this whole project.

11 There will be some interim work between this. I
12 mean, we've got, at the very least, the RITA ads, I would
13 hope. We'll talk a little bit more about some ideas I have
14 for how we can keep the continuity because I know I
15 struggle. I mean, if we're going to have two or three
16 meetings a year, which is typically what we talk about, you
17 know, we have this meeting, we get really engrossed in it
18 and we're embedded and everything else, and then we go away
19 for a while, and the next meeting comes up and you go what
20 were we doing there, you know, what was that all about? So
21 we've got to come up with a way to keep some consistency
22 there and some involvement.

1 And then we really need to focus on a product.
2 Our product is an advice memorandum to the Secretary, and I
3 want to keep us focused on that. As we're going through all
4 these discussions, we'll get off on tangents and different
5 paths and so forth, but, at the end of the day or the end of
6 our term, we're going to write a memo, and that's very
7 important, giving advice saying, hey, here's things you're
8 doing great, keep doing it, here's some things we think you
9 need to change a little bit and here's maybe some things you
10 didn't think about that, from our background, are really
11 essential to this coming to fruition. So let's keep that
12 memo in mind as we work through this and say how is this
13 going to come together in advice eventually and what's
14 important?

15 I'll say this. I'll just say this once in this
16 meeting. It is an honor for each of us to be selected for
17 this. But this is, in my opinion, not an honorary position.

18 This is a working committee, okay? We need to do work. So
19 I really implore you to please try to attend the meetings.
20 No way is everyone going to be able to attend every meeting.

21 I understand that. We understand that. But work your
22 schedules as best as possible. We'll give as much advanced

1 notice as we can, and, you know, try to be here because, as
2 I said, the work will get done here, not in between.

3 When we get to the memo writing stage, which is
4 probably in the second year, more in there, there will be a
5 little bit more outside work because, obviously, you're
6 drafting things. I don't know about you, but trying to
7 write something in a committee, like you're inside a
8 committee room, is difficult. So we'll have assignments
9 outside, so expect some outside work at that point.

10 And, again, our purpose is to review the program
11 and advise the JPO. And one way I like to look at these
12 kind of things is kind of a negative view, but it's to say
13 if this were to fail, if this doesn't get deployed, and we
14 don't have communicating cars or solutions of ITS that are
15 saving money, what would have been the cause of that? What
16 got in our way? And our job in this committee is to figure
17 out that ahead of time. Let's figure out what those
18 barriers might be, what those risks are, and then how, based
19 on our collective experience, expertise, backgrounds, how
20 can we advise the JPO to get past those hurdles? That's the
21 way I look at it. So we're looking for the unknown right
22 now of what could really cause us not to deploy.

1 A few guidelines in the meetings. My preference
2 is that there be no spectators allowed. And I don't mean
3 our visitors, I mean the people at this table. I want
4 everybody to contribute. And, you know, I understand
5 personalities. Although I'm sitting here speaking, I'm an
6 introvert. No, no, no, I'm introverted, so I'll tend to be
7 quiet. So I'll do my best, as your chair, to pull out
8 comments from people. I often find at meetings like this
9 it's the person sitting real quiet who has a zinger, you
10 know, when they finally talk, yet, you know, maybe everyone
11 is talking over them and so forth. So I do really ask you
12 to speak up and let's hear from everybody because everyone
13 has, based on your backgrounds, a tremendous amount to
14 contribute to the discussion.

15 If you do miss a meeting, you have to miss a
16 meeting, please try to catch up. You know, we have meeting
17 minutes, we have the meeting materials and what we handed
18 out, so please try to catch up on that so when you come to
19 the next meeting we don't have to have the same meeting all
20 over again.

21 So what's my role? Yes, I'm the chair, but this
22 is a committee, okay? I don't dictate where we're going

1 here. My job is to figure out how we can come to a
2 consensus and pull that together.

3 I will say, and you'll get to know me, that I'm
4 not just a facilitator. I have opinions, and I have trouble
5 keeping quiet about that. So I will express my opinions,
6 but I'm expressing those as an equal member to all of you,
7 as well. And, you know, we'll have our debates and have our
8 discussions.

9 So, I mean, other than that, I mean, let's have
10 fun, okay? I think there's a lot of good that we can do
11 here. Let's get to know one another, and let's not get too
12 carried away with our importance, our individual importance.

13 But let's pull together and create a product. Like I said,
14 people were chosen for different fields they came from and
15 so forth, so really looking for your field of expertise,
16 where you might be coming at a different slant on what
17 you're seeing, and that's going to be the strength of what
18 we pull together.

19 So, again, thank you for being here and welcome.

20 So let's see. What do we got on the agenda here?

21 Are there any questions, by the way?

22 MR. MCCORMICK: I have a suggestion.

1 CHAIR DENARO: Yes, sure, Scott.

2 MR. MCCORMICK: Why don't we invite some of the
3 people to the empty seats that are not filled?

4 CHAIR DENARO: Well, Greg is going to be here.

5 MR. MCCORMICK: Okay.

6 CHAIR DENARO: And Peter is going to be here.

7 MR. MCCORMICK: Okay.

8 **Introductions by Committee Members**

9 CHAIR DENARO: And we will do some introductions,
10 and we actually allocated quite a bit of time for this first
11 meeting because we want to try to get to know one another.
12 And we'll also introduce because we do have some visitors
13 and we'd like to get to know them also.

14 So Greg is going to join us, but maybe we can
15 move into the introductions and then we'll just break when
16 he gets here?

17 MS. ROW: I think that's a good idea.

18 CHAIR DENARO: Okay. All right. So we'll break
19 when he gets here because we'd sure like to hear his
20 comments. But what I want to do is spend some time going
21 around and, you know, if you would, just give a little
22 background, three or four minutes each. If you can talk

1 about three things maybe: what is your role in your
2 organization and your involvement with ITS? So let's focus
3 down. I'd like to understand, I think all of us would like
4 to understand where are you coming from, so what is your
5 direction in ITS? And then a second question would be, what
6 are your expectations for work in the committee? What do
7 you hope? You volunteered for this thing. You probably
8 have some expectations, and I'd like to hear what those are.

9 And, in general, what do you hope yourself to get out of
10 this committee, your involvement?

11 So rather than jump to the first person who's now
12 on the spot because they have to do that, I'll give my
13 example first so all of you can think about answers. I've
14 been involved with ITS for, like, 30 years. That's painful
15 to say that, but I have. I started out in GPS and fleet
16 management, then in telematics solutions. I was involved in
17 the first OnStar program, that sort of thing, while I was at
18 Motorola.

19 Most recently, I've been involved in digital
20 mapping for about the last ten years and NAVTEQ and now part
21 of Nokia. And that includes the emergence of the smartphone
22 and things like that.

1 As far as my expectations, kind of what I said
2 earlier, I hope we find a way to mine the expertise that
3 we've got in this room and the diverse backgrounds,
4 experience, and, frankly, the wisdom that you all bring to
5 the table in this area and insight into the critical issues
6 that we've got. And really, you know, I would like to see
7 us make a measurable impact on the success of this program
8 and helping the JPO move forward. They've got their
9 problems. We're going to hear about that. We're going to
10 look at that. We might think that there are a few problems
11 that they don't know about yet, and, you know, we need to
12 pull that together.

13 And, you know, what I want to get out personally,
14 I look forward to, frankly, learning from all of you. I've
15 found these meetings in the past two committees that I've
16 been involved with very stimulating. I've learned a ton.
17 It's kind of interesting when you get people with such
18 diverse backgrounds. It forces you to kind of consider
19 things you hadn't thought of. And so I hope that you'll
20 expand my horizons and help me understand all this better.

21 So with that, Teresa, would you like to go next?

22 DR. ADAMS: I'll keep it short. All right. I'm

1 Teresa Adams. I'm at the University of Wisconsin-Madison.
2 My background is in civil engineering. Currently, I direct
3 our university transportation center. We're one of the ten
4 Tier Ones in the country. We're the Center for Freight and
5 Infrastructure Research and Education, so we're focused a
6 lot on freight.

7 My own background related to ITS is I've done
8 some work and followed, ever since the beginning of the
9 first ITS architectures and stuff I can remember sort of
10 doing class with helping students understand what some of
11 that was all about. But then, you know, AVL and then a lot
12 of GIS stuff, so that's kind of some of the different areas
13 that go into this mix.

14 I don't have any ongoing projects right now, per
15 se, in ITS. Our center looks at things that are related to
16 freight and the connection with the economy, and so I can
17 see lots of relationships there and the importance of ITS
18 and helping the freight movement safely.

19 I guess my expectation here on this panel is I
20 like to think about stuff. This is kind of fun for me to
21 get in a group like this and to be able to participate in
22 the discussion. And then for my own center, of course, I'm

1 watching for ideas and to be able to help direct, in my
2 role, the research so that it's relevant.

3 CHAIR DENARO: Great. Thank you.

4 MR. BELCHER: I'm Scott Belcher. I'm the
5 president of the Intelligent Transportation Society of
6 America. We're the chief advocate for the use of technology
7 to address transportation problems. I've got a couple of
8 board members, and then actually most of you guys are all
9 members of ITS America. We work very closely with the Joint
10 Program Office and with each of you.

11 I've been on the committee for a couple of years
12 now, and I think it's been good. I think last year we
13 highlighted a couple of important issues that I think we
14 need to continue, at least a couple of important issues that
15 I'll continue to bring to the forefront, and part of that
16 has to do with standards harmonization. It's a very
17 important issue, especially as we become a more global
18 industry. And we face some challenges abroad, as different
19 regions of the country try to take primacy in this area. So
20 that's an area I feel strongly about.

21 Another area which I'm sure will be part of the
22 discussion because it is every year is that tension between

1 research and deployment. For those of you on the deployment
2 side, you'll be very frustrated because RITA is a research
3 organization; and for those of you on the research side,
4 you'll be very frustrated with the folks who want to deploy,
5 at least that's what we've been through every year on this
6 committee and it's the right tension to have. It's the
7 tension in any organization right now, quite frankly, that's
8 in the ITS space. Whether you're in Intel or whether you're
9 in Michigan DOT, that's the ongoing tension.

10 And so my warning and I think the good thing is
11 I'm sure we'll grapple with that tension and I'm sure, at
12 times, we'll all be frustrated. But that's okay.

13 And what I look to get out of this is really just
14 to meet new organizations and new individuals who are
15 thought leaders in the area so that we can try to bring them
16 into the work of ITS America and try to think of other ways
17 to help give them an opportunity to help shape and support
18 the work that the ITS Joint Program Office is doing.

19 CHAIR DENARO: Thanks, Scott.

20 MR. CALABRESE: My name is Joe Calabrese. I'm on
21 my second tour of duty. I run buses and trains in Northeast
22 Ohio. I think I'm here to represent the public transit

1 industry. Public transit is doing well. Ridership is
2 strong, very strong. The younger generation is really pro-
3 public transit. We see that growth continue. They're very
4 concerned about the environment and really concerned about
5 and love that urban life. So I think my role here is to be
6 sure public transit is not forgotten, which it quite often
7 is.

8 In my life, my agency, because safety is number
9 one for many of us around the table. We've invented some
10 very low-tech anti-collision systems, primarily with people,
11 buses with people, trains with workers on the wayside, and
12 those systems have really been commercialized, so that's a
13 good example of how those things can come to market.

14 Public transit has a number of issues, but I
15 think it has a number of opportunities to include public
16 transit in the mix here. Again, you'll hear me pretty
17 active in saying that because we always get lost and fall
18 off the end of the table at the end of the day. But I think
19 any system that is designed to avoid collisions should
20 include buses where you have 50 or 60 people that could be
21 on that bus or trains where you could have several hundred
22 or a thousand people on that train. Again, I think it's a

1 good test market for this product because it's controllable,
2 it's finite. You have municipal agencies that are amenable
3 to these things and interested in safety. And if there is
4 an accident in public transit, which there is rarely, it is
5 catastrophic. So I think that needs to be part of the mix.

6 Thank you.

7 CHAIR DENARO: That's why we wouldn't let you go,
8 Joe. You're the voice for transit.

9 MS. HAMMOND: Good morning. I'm Paula Hammond.
10 I'm the Secretary of Washington State Department of
11 Transportation, and we've been fortunate in our state to
12 have so many technology companies that the innovation
13 essence is all over our state.

14 Early on in our investments in ITS, we started
15 with active or transportation management centers, meters,
16 those kinds of things, so we've got a lot of involvement in
17 this area for WSDOT. We have now morphed into having
18 deployed active traffic management. We have HOT lanes now.

19 We have all electronic tolling on one of our corridors with
20 variable pricing. So we're trying out different things and
21 have seen a lot of success and public acceptance there.

22 We're also moving towards now, in a collaboration

1 with Oregon and Nevada, looking for the pricing transference
2 to technology, now thinking about mileage-based user fees
3 and starting to think about, if our nation can't do it as a
4 whole, us West Coast states are willing to start, and we're
5 working on some pilot projects. Oregon is ahead of us.
6 Nevada has tried some things. But we've decided to form a
7 collaborative where we can test and share amongst each other
8 to try and advance the state of our collecting fees from
9 users differently than just gas tax. So you'll see more of
10 that from us, as well.

11 Personally, I'm here to learn, get to know
12 people, and hopefully contribute to US DOT's decisions and
13 policies as they start thinking about what will work best
14 for our state's infrastructure and our country's
15 infrastructure. Thank you.

16 MR. KENNER: All right. Good morning. I'm Steve
17 Kenner. I work at Ford Motor Company. Some of you may have
18 known Jim Vondale who was on this committee, and Jim is very
19 happily retired. Some of you may not know that. So I
20 replaced Jim starting last August. We had a nice
21 transition, so it was really, you know, really helpful. One
22 of the best transitions I've actually either not just

1 experienced but seen.

2 And so one of the things I wanted to mention
3 about the role, even if you knew Jim, is I'm the global
4 director for automotive safety at Ford. And with that is
5 primarily three areas that I work on. One is, you know, we
6 set the safety policy for the global Ford Motor Company, and
7 then also we work on advanced regulations across the globe,
8 as well. So we try and, again, bring data and information
9 so that we can try and make a decision that's consistent
10 with improving real world safety.

11 The second part of what we do is we work really
12 closely with product development to make sure that the cars
13 and trucks that we're designing and engineering, testing,
14 and developing today are going to meet all the requirements
15 and expectations and policies that we have, you know, four
16 and five years from now, which, in some cases, is a little
17 difficult because you need to sort of forecast where you
18 think things are going. And as you know, that's not always
19 so easy to do.

20 And then the third part of what I do is the
21 investigation side of things globally. So whether it's a
22 government investigation of an alleged safety defect or our

1 own internal investigation, you know, I'm responsible for
2 that, as well.

3 I'm a little different than Jim in terms of
4 background. You know, Jim was a lawyer, I think a lot of
5 you know. I'm an engineer. As a matter of fact, I've spent
6 my entire career in product development, so I've been
7 designing, developing, engineering, testing cars and trucks
8 for my whole life and it's really my first staff job. But
9 it's really been helpful because that interfacing
10 relationship with the product development team is really
11 important, and I know and understand the processes and have
12 great relationships with the leadership team in product
13 development. So it's turned out to be a very useful
14 background.

15 My last job, I should mention because sometimes
16 it's interesting because you'll hear me say things that
17 might seem a little odd, but I spent almost four years in
18 South America. I lived in Brazil, and I was in charge of
19 engineering for Ford South America. So we have a group down
20 there, GM and others. I had about 1200 or so engineers, so
21 it was a fairly, you know, big group and they had global
22 design leadership for B-cars that are not only for South

1 America but global. So it was a great experience for me.

2 In terms of ITS involvement, as Scott mentioned,
3 I am now a new board member for ITS America. Ford's
4 involvement in both the Crash Avoidance Metrics Partnership
5 (CAMP) and the Vehicle Infrastructure Integration Consortium
6 (VIIC), some of you know Mike Shulman from Ford on the
7 research side and Mary Wroten who works in my organization
8 who's the vice president of the VIIC. So we're very
9 involved and committed because we really believe in the
10 technology. And so we want to try and work through some of
11 the issues that would be barriers to implementation.

12 So, certainly, that's my expectation is that we
13 would address what we think are the biggest issues. I agree
14 with Scott in terms of harmonization. You know, it's a huge
15 issue if there's not harmonization. Certainly, everyone
16 thinks of lack of harmonization between, for example, the
17 United States, Canada, and Mexico, so you have seamless
18 there.

19 But for automakers, it goes away beyond that
20 because if we have a Ford Focus that we build in nine plants
21 across the globe, we would like to be able to have a common
22 set of hardware and software to a large extent as possible

1 to be able to prove out the system and then have it work,
2 you know, throughout the globe. So it's really important to
3 the automakers.

4 It's a huge burden if we have to do duplicate
5 tests because the tests aren't the same, the standards
6 aren't the same, and all that. We already put up with a
7 certain amount of that in terms of, for example, historical
8 crash test standards and so forth, you know, where we have
9 to do different tests to meet different country
10 requirements.

11 So the harmonization is something that I'm
12 passionate about, and then the security issue which we're
13 going to talk about some because I do believe that that's a
14 huge obstacle right now. I believe we can overcome all
15 these things, and we need to be part of that, but I think
16 working on the hardest issues is really what we need to be
17 doing.

18 In terms of what I get out of it, for me,
19 learning a diversity of perspectives is great. Joe, you
20 mentioned about public transit. I think if you heard Robert
21 Brown and ITS America, and he had the Bill Ford just little
22 video. Transportation is going to become more integrated.

1 People are not just going to think about driving to the West
2 Coast, they're going to think about hopping on a plane for a
3 little while, maybe driving for a little while, maybe taking
4 rail. And so it's going to become just an interconnected
5 network, and the automobile will be one piece of that but
6 not it.

7 So I'm really interested in the other
8 perspectives and that vision of how is transportation
9 changing and what are the trends. I agree with what you
10 said about the trends in terms of people under 25 that own
11 automobiles is at a record low right now, so it is
12 fascinating and we need to think beyond just GM or Ford in
13 terms of vehicles talking to each other but then even the
14 whole transportation network working together, as well.

15 MR. CALABRESE: My trip down yesterday was a car
16 to the bus, to the train to the plane, to the bus to the
17 train, to the bus.

18 MS. HAMMOND: And you walked.

19 DR. KLEIN: And did you have adequate information
20 along the way to figure out the schedule?

21 MR. CALABRESE: Almost.

22 DR. KLEIN: My name is Hans Klein. I'm at the

1 Georgia Tech School of Public Policy. I'm here as an
2 institutions and a networking or internet guy. I'm a social
3 scientist. I have a PhD in political science. I do have my
4 bachelor's degree in electrical engineering, computer
5 science, so I do have an engineering background, as well.

6 I've been involved in ITS for 25 years now. I
7 worked with Joe Sussman at MIT starting in late 80s with
8 Lyle Saxton and others who started the IVH program, IVHS
9 program at the time. And I worked with them. They were
10 taking mostly an engineering perspective. I worked with Joe
11 on policy issues and institutional issues. I looked at
12 things like, frankly, early on in the program, the political
13 process and the coalition building that built it the way
14 that looking at technology development, in terms of the
15 players, their roles and responsibilities, and even their
16 interests as they came together to design an overall system.

17 I looked at challenges to implementation, the federal -
18 state boundary and how that, in the American political
19 system, creates difficulty sometimes to take a project at
20 the federal level and carry it over to the users and the
21 operators.

22 Since then, I actually, since the late 90s, I

1 switched and got involved in internet issues: internet
2 governance, the design of institutions for making rules and
3 regulations, for making standards on the internet, the
4 dynamics by which networks advance and diffuse. So it's
5 been really until about six months ago I wasn't involved in
6 ITS or I was involved very little.

7 I got called up to the Volpe Center about six
8 months ago. They were looking at internet governance for
9 models on what was going on in ITS and thinking about it in
10 those terms, so I had the opportunity to get back involved
11 then. Then at some point, I got somewhat of a surprise
12 invitation to serve on this committee. It was welcome.

13 And I see myself here again as bringing, A,
14 knowing at least the deep background on ITS and IVHS, not
15 always the latest things but I'm coming up to speed now, but
16 bringing some of that internet perspective to this kind of
17 federal development program. And it's quite interesting.
18 There are significant similarities, and there are
19 significant differences between the two. I think, in some
20 ways, the internet has evolved very rapidly and it offers
21 some lessons, its learning curve, some of the lessons
22 learned there can be brought over here in terms of

1 institutional design for implementation operation I think is
2 a big one, in terms of the surprises that happen when you
3 develop networks and they're open to lots of newcomers who
4 want to use the networks and you thought they were going to
5 do this and it turns out they start doing that and is it a
6 good thing or a bad thing?

7 You know, the internet was designed, right from
8 the get-go it was designed for different things than it was
9 ever intended than actually turned out. Email was sort of a
10 byproduct, and it turned out to completely dominate. The
11 communication part turned out to completely dominate that
12 network.

13 It evolved very rapidly. There was a strong user
14 role in the diffusion and ongoing evolution of that network.

15 I think the ITS program connecting with the user is a very
16 important thing and thinking of strategies and institutions
17 that bring users and developers as close together as
18 possible. I do believe in market perspectives. I think
19 it's terrific to get as many OEMs and networks and even
20 small dot-coms involved as possible. I think they'll do a
21 lot to make a system like this a success.

22 At a personal level and sort of an intellectual

1 level, I've been doing research on systems development for a
2 long time. And through participation here, I see two of my
3 research interests coming together. There really are sort
4 of two paradigms for how to develop a system. One is the
5 systems engineering process that we see quite strongly here
6 in the world of ITS. Federal systems, planning, long-range
7 perspective, working through the public system, and
8 integrating public/private partnerships is one perspective.

9 It's well-established. The US federal government has been
10 doing it very well. The Department of Transportation has
11 been doing it well for decades, mostly the post-war period.

12 The peer-to-peer, the other system development
13 paradigm is this peer-to-peer way of creating networks.
14 It's very different. It's not well understood. I like to
15 think that I understand it about as well as others, but I'm
16 not sure anyone really gets and fully understands the way
17 the internet has diffused laterally and brought enormous
18 social change and enormous benefit in being always connected
19 to the user, very little central control, very open to third
20 parties getting in and bringing ideas to the table, very low
21 barriers to thresholds for entrepreneurs and for new market
22 initiatives.

1 And I think those two paradigms are really coming
2 together in this program. And as I was saying to Steve, I
3 think they're kind of coming together in the dashboard of
4 our car, and it's going to be really interesting to watch
5 what happens in our vehicles when the world of internet and
6 peer-to-peer networks comes together with the world of
7 transportation and planning and industry players and the
8 kind of work that this group has done. So I'll be thinking
9 about that and writing about that as time goes on.

10 **Welcome by RITA Deputy Administrator, Greg Winfree**

11 CHAIR DENARO: Thanks, Hans. Before we go with
12 Raj, remember that we stopped with you, but Greg is here
13 with us right now, so thank you very much for coming. And
14 we invite you to make new comments, if you'd like.

15 MR. WINFREE: Well, absolutely. And the first
16 thing I'll say is I certainly could have used an intelligent
17 vehicle this morning. I could have used that or the Google
18 car or somebody needed to be driving that vehicle. But
19 great to be here with you all. Again, to say, personally, I
20 know we spoke over the phone, but thanks so much for the
21 contribution of your time and service to this important
22 endeavor. As many of you've heard me say over and over,

1 it's game-changing technology and it's one of the things
2 that we at RITA really get excited about as we work with our
3 partners at Highways and at NHTSA and FMCSA and across DOT.

4 It's the kind of impactful move that will take the
5 transportation system to the next generation and beyond, as
6 we heard Deputy Secretary Porcari state yesterday.

7 So I don't want to take up anymore time since I'm
8 a little tardy but just glad we're all here. Welcome to the
9 RITA quarters here at DOT. Glad we could all fit. And I
10 look forward to a productive session. Thank you.

11 CHAIR DENARO: Thanks, Greg.

12 MR. WINFREE: My pleasure.

13 CHAIR DENARO: Are you going to be able to spend
14 a little time with us?

15 MR. WINFREE: I am.

16 CHAIR DENARO: Great. Good. Well, we're just
17 going around and I asked everyone to tell us a little bit
18 about how they come at ITS based on their day job and a
19 little bit of their expectations for our committee and then
20 personally what they hope to get out of this. So we're
21 going to continue our round and get to know everyone. So,
22 Raj, I think you're up.

1 DR. RAJKUMAR: Good morning. I'm Raj Rajkumar, a
2 professor at Carnegie Mellon University. We do research
3 that facilitates rubber meeting the sky, I guess in terms of
4 rubber meeting the road. I play multiple roles at Carnegie
5 Mellon. First of all, I co-direct a collaborative research
6 lab that is sponsored by GM on vehicular information
7 technology or technologies for inside the automobile since
8 2000. It's been substantial productive long-term
9 relationship since then.

10 We focus on multiple things about intricate
11 systems and software within the vehicle with the biggest
12 area being vehicular networks, V2V and V2I. We look at all
13 layers of the system, including the fiscal layer, protocols,
14 large-scale assimilations, and emulations of deployments in
15 big cities. So we have substantial presence there. It's a
16 very well motivated, lots of interest from General Motors,
17 and we have John from GM.

18 Then in 2007, our team from Carnegie Mellon won
19 the 2007 DARPA open challenge for autonomous vehicles. We
20 won the DARPA \$2 million prize driving 60 miles in less than
21 six hours autonomously, in open like traffic conditions,
22 obeying traffic rules and such. Thanks to that success,

1 autonomous vehicles are no longer science fiction. And then
2 I guess GM basically started a second collaborative research
3 lab focusing on autonomous driving, per se. They're working
4 at the next generation vehicle. We expect that we will see
5 this vehicle later this year. The Google Car, for example,
6 one of the key guys is one of our key guys on our team. So
7 Google is borrowing our expertise, I think.

8 I think you will see what we can offer later this
9 year. I can promise you it will be a really nice-looking
10 car, much better than Google Car.

11 CHAIR DENARO: What's your point, Raj?

12 DR. RAJKUMAR: And in terms of corrective
13 maintenance with autonomous driving, something like the
14 autonomous driving is much, much easier and much faster. We
15 hope to show that later on this year.

16 So the next role that I play is that I did a
17 large project within the cyber-physical systems program in
18 the National Science Foundation where we look at the basic
19 components. The software that goes in the connected
20 vehicles and into autonomous vehicles is very complex. You
21 need to test a lot. You can test all you want, you can
22 never be sure about the correctness of the software. So we

1 look at basically some basic challenges there. We have a
2 person working on the team, as well, looking at the
3 correctness of these systems, the correctness of the
4 protocols and such. So that's a third role that I play.

5 A fourth role that I play is that I'm the
6 director of a new industry transportation center at Carnegie
7 Mellon which is joined with the University of Pennsylvania,
8 about 16 faculty members across the two institutions, one on
9 the western side of Pennsylvania and one on the eastern
10 side. We believe we are two world class universities and
11 looking at five different areas technologies within the
12 vehicle, technologies in the infrastructure. We're looking
13 at collecting data and doing large-scale mobility data.
14 We're looking at the interface between the driver, the
15 users, and the technology.

16 And the fifth area that brings those pieces
17 together is the public policy component. So that started
18 earlier this year. Just last week, we actually had a kick-
19 off for UTC consortium. The UTC is called Technologies for
20 Safe and Efficient Transportation. That's going to be T-
21 SET. So this T-SET consortium comprises about 28 or so
22 entities from the private sector, from the non-profit

1 sector, and from the governing sector of the local level,
2 city level, and the federal level. We just had a really
3 nice kick-off, lots and lots of interest. And we actually
4 like to use the term we do R&D&D, where the last D is
5 deployment. So we really actually want to basically take
6 from the rubber that meets the sky all the way to rubber
7 hitting the road and basically actually deploy in. So at
8 Carnegie Mellon we take pride in basically coming up with
9 great concepts with nice properties but then show that this
10 is not just stuff that we can publish, we can actually take
11 it public with the deployment, and we take a lot of pride in
12 it.

13 With respect to my expectations, Bob, we actually
14 have a strong passionate belief that ITS will actually play
15 a major role in decreasing accidents, injuries, minimize
16 traffic condition, and, therefore, improve the quality of
17 life and society as a whole. And we would love to basically
18 facilitate this actually happening sooner rather than later.

19 CHAIR DENARO: Thank you, Raj.

20 MR. STEENMAN: I am Ton Steenman, Intel
21 Corporation. I've been with the company for about 30 years.
22 I grew up in the Netherlands and spent some time in the

1 Netherlands first for Intel but then moved to Germany, moved
2 to the U.S., spent about three years in Asia between
3 Malaysia and Hong Kong, and I'm back in the U.S. now. For
4 the company, I own all of our embedded businesses, so it
5 goes everywhere from retail to communications infrastructure
6 to healthcare, energy, and automotive, as well, are the
7 markets that is under my remit, as well.

8 About five years ago, we got approached by the
9 automotive industry and a couple of very large automotive
10 OEMs, and they wanted our help and they were really
11 struggling with the notion of how do I extend the digital
12 lifestyle of consumers into the vehicle and how do I deal
13 with the fact that consumer expectations are just evolving
14 so rapidly because of consumer devices and how do I keep my
15 vehicle competitive with that?

16 So about five or six years ago, we started to do
17 a lot of research at BMW on that, and we've done some
18 publications and some public announcements around the work
19 we've done with BMW. And lately you've probably seen some
20 of our announcements of the work that we've done with
21 Nissan, with Toyota, with HKMC in Korea, and companies like
22 that. So that's kind of a little bit of background.

1 We have a deep interest, we've kind of really
2 built deep interest in automotive over the last five years.

3 If you go back into corporate history, about 20 to about 10
4 years ago, we were deep in brake control systems and engine
5 control systems. We left that about 10 years ago, but we
6 re-entered the market about five years ago as we saw this
7 intersection of consumer electronic devices, anything from
8 PCs in the vehicle.

9 So from my perspective, what I'd like to get out
10 of this committee personally, of course, interfacing and
11 building relationships in the industry broadly I think is
12 very important for Intel. Secondly, Intel has a
13 tremendous amount of resources. As a \$60 billion company,
14 we have like a large cadre of PhDs. Intel Labs is a part of
15 the company that interfaces very significantly with academia
16 but also does a lot of deep research. I don't think we are
17 well connected into the automotive industry and the
18 intelligent transportation industry enough yet, and I think
19 we, as a company, have a lot to offer there probably, from
20 the perspective of research and technologies.

21 From an ITS perspective, of course, as a company
22 and me, personally, I'm extremely interested in improving

1 safety as that is good for everybody. I'm also equally
2 interested in how can we use some of these technologies to
3 really give people a better experience with transportation,
4 how can we make the overall experience of particularly
5 multimodal transportation a more interesting experience for
6 consumers?

7 As a company and I think as an industry, there
8 are a lot of things we can do. On the safety side
9 particularly, of course, a tremendous amount of testing is
10 necessary to succeed, but, if you think about it, on the
11 other side of kind of the experience, efficiency, we can
12 probably involve ecosystem. When I heard this week at the
13 ITS conference that the government, which I really applaud,
14 has made available so much data, like just to the public. I
15 think if we form an ecosystem around that. We've been
16 trying to do some of this with the announcement of our \$100
17 million Connected Car Fund that we announced a few weeks ago
18 as a company with the goal to really stimulate an innovative
19 ecosystem of developers that can be brought to bear. And I
20 think, as a company, we have a lot of experience in bringing
21 open platforms to market that really stimulates a very open
22 industry and a broad set of developers in an ecosystem that

1 can just be immensely innovative.

2 So, you know, these are kind of the different
3 aspects that I will be interested in discussing here.

4 CHAIR DENARO: Thank you, Ton. George?

5 MR. WEBB: I'm George Webb. I'm county engineer
6 for Palm Beach County. We're located down in Southeast
7 Florida. Delray Beach, Boynton, Boca Raton are some of the
8 names you might know and hopefully have visited down there,
9 nothing to take away from Miami and Sunny, but we like our
10 county and encourage you to come visit.

11 I've had the pleasure of being county engineer
12 there for over 20 years. I've seen rapid growth in our
13 county. We were absorbing about 25,000 people a year for
14 about 15-plus years so a lot of growth and a lot of things
15 has happened. We're very proud of what we've done on the
16 transportation side of things because we've actually kept
17 up. Our road network right now functions, probably about 95
18 percent of it, to our desired level of service or above. So
19 with that kind of growth, it's been amazing to see happen.

20 We've had a lot of investment in transportation
21 because of that. My county is also invested, we have about
22 a thousand traffic signals under our control. We have a

1 traffic management center. We probably have somewhere in
2 the neighborhood of 400 to 500 miles of fiber optics in the
3 ground, which I think about regularly when I sit and talk
4 about ITS and how this thing is going to function and how
5 all this is going to work together and so forth.

6 My other role is that I have served on the
7 National Association of Counties Transportation Steering
8 Committee for probably 15-plus years, and I will tell you
9 that it's been an interesting experience to report as a
10 liaison about ITS back to that committee and to see a blank
11 stare from most of the people on the committee. Please
12 understand that most of the counties are rather small,
13 rather rural. And when you talk about the technology
14 involved here and what we can do, a lot of times it's like
15 I'm not interested, and we have a real issue regarding the
16 priorities in counties because right now, and I'm looking at
17 two state directors who can understand what I'm about to
18 say, you know, there's a real issue about our infrastructure
19 aging and the cost to potentially try and keep it up and/or
20 replace it. I have seven drawbridges in my county.
21 Replacing a drawbridge is a \$40 million hit.

22 So it's a big, big issue about where to spend

1 what appears to be a very limited pool of transportation
2 dollars both at the federal level and the local level. So
3 we have that issue as far as trying to make that happen.

4 I've had the pleasure of being selected as the
5 National Association of Counties' representative to serve on
6 the VII working group, so I've had that as we've evolved
7 from that to IntelliDrive and to now connected vehicles.
8 I'm also, as part of the pooled fund study that AASHTO is
9 working from, as far as the local representative on that.

10 So my expectations on this is, with all this, I'm
11 an engineer, I'm dealing with ITS from an engineering
12 perspective, one of the frustrations that when we sit down
13 and talk it's always been, well, what's going on outside,
14 what are the car companies really doing, what are the
15 communication guys doing, and so forth, so I'm very
16 interested in understanding and listening and broadening my
17 perspective as far as understanding and opening up and
18 getting maybe a different, more cohesive vision of ITS,
19 particularly how it might be applied at the local level. So
20 I think I did my hope and expectations in the same one.
21 Thank you.

22 CHAIR DENARO: Thanks, George. Kirk?

1 MR. STEUDLE: I'm Kirk Steudle. I'm the director
2 of the Michigan Department of Transportation, and I'm this
3 year's AASHTO president, as well, so I get the great
4 opportunity to represent Paula and our colleagues around the
5 country.

6 Michigan has a long history in ITS. We put up
7 one of the first what's called a SCANDI system, which was in
8 the 1960s. It had ramp metering, it had monitors, had a
9 whole bunch of stuff. I joined the agency in the mid 80s,
10 and there was always a tour. You had to go work in the
11 SCANDI system so that you knew what was going on.

12 After that little tour, I spent most of my time
13 as a deployer. I was in road and bridge construction, so I
14 was on the front end of building things.

15 I've been in the executive office for about ten
16 years now as a chief deputy and then as director. I'm in my
17 second administration, which is always interesting to
18 transfer from one to another and see how things are set up,
19 see what the priorities are. In the current administration,
20 I have a current governor who used to be the chairman and
21 CEO of Gateway Computers, so he's an IT guy. He understands
22 it, although that's good and it's bad. He understands it

1 because when you tell him we're going to do this, then he'd
2 say there's too many implementation problems, don't waste
3 your time. Okay, then we won't.

4 I've been very involved in the last ten years
5 with ITS. Michigan has a number of test beds, many funded
6 through RITA, many funded with Michigan funds, as well, to
7 just advance the whole program. There was a couple of test
8 beds that we felt so strongly that we said this is where we
9 need to go, put Michigan money in it to do it, and I think
10 dragged a couple of other folks along the way. It's been
11 tremendous.

12 I really look towards the future, and I really
13 see connected vehicles as the way that we get cars to not
14 crash. That's my ultimate vision is zero fatalities from
15 cars that don't crash. I think there are just so many
16 opportunities that come from that. And whether it's
17 autonomous or vehicles that are just smart, there's a lot of
18 other real smart people who figure out how to do that, but I
19 really think that that is where the future is going to be.

20 I am on Scott's ITS America Board of Directors.
21 I think I just started my second term there. That's been
22 very interesting for me, as will this committee, to

1 understand different people's perspectives. Just the
2 introductions of all of your backgrounds, and I know a
3 couple coming up here, I think is tremendous. And the
4 ability to look at all those diverse ideas I think will help
5 tremendously.

6 Having been on this committee once before, I saw
7 the diverse opinions come out. Interesting discussion at
8 times. And I think we ended up with some good advice for
9 Shelley and the team here. So I'm looking forward to a
10 great interaction with all of you and getting to know some
11 other folks with some different backgrounds.

12 CHAIR DENARO: Thanks, Kirk. Bryan?

13 MR. SCHROMSKY: Hello. My name is Bryan
14 Schromsky. I'm with Verizon Wireless. I've been with the
15 company for 12 years now. My background has been with
16 public safety, public utilities, telematics. I mentioned
17 before, AVL fleet management, that was my expertise. I
18 mean, we originally connected the first vehicle for usually
19 law enforcement, public safety, public utilities, you know,
20 retrofitting the vehicles.

21 Our big growth obviously is meant to be for under
22 25s. I'm the last year of Gen X, so I am old. Mobility,

1 everything is about mobility. And one of the things that's
2 nice when I look through the pack here and my goals in this
3 committee is a lot of things that Verizon does is try to
4 enable not only from the vehicle but to infrastructure, to
5 logistics, and, you know, really is enabling the platforms
6 so all of those different components can take advantage of
7 it, right? So that's one of my -- and my personal goal, and
8 thank you again for the honor to serve on this committee, is
9 to understand the problems not only technology speaking but
10 also with the real problems from state/local interacting
11 with the fed. We see that, obviously. And also the
12 connection not only in taking the vehicle itself but, you
13 know, if you didn't have navigation in your vehicle, could
14 you use your smartphone, and how does that talk, and the
15 vehicle pulls up and obviously, a lot of work that we do
16 with OnStar, you know, does the vehicle then talk to the
17 infrastructure or, if it doesn't have connectivity, does it
18 talk to the home when it gets home and data dumps, and how
19 that all ties back in and security.

20 Now, selfishly, coming from a law enforcement
21 family, obviously vehicles and losing a family member in the
22 line of duty from another vehicle strike, my uncle in the

1 line of duty, for a routine traffic stop, what can I use
2 that technology to improve public safety not only from
3 vehicle crashes but high-speed chases? Can I shut the
4 vehicle down remotely to deter that, or can I manipulate the
5 infrastructure to allow public safety in real time to do
6 what they need to do? So that's one of the areas in
7 particular that I'm really interested in. So thank you.

8 MR. MCCORMICK: My name is Scott McCormick. I
9 believe I know most of you here. I have sort of a long
10 sordid history in this environment. Back about 12 or 13
11 years ago, all 12 automakers got together and formed a
12 consortia to develop all of the specifications for how
13 devices can communicate inside the vehicle, for antitrust
14 reasons they can't be in charge of themselves so I was the
15 executive director of that organization. And we developed
16 about 3500 pages of standards that, because I'm a member of
17 the technical advisory committee, moved that to all the
18 world standards organizations. Most of those products you
19 use now in the vehicle environment. The common message set,
20 for example, was developed by that organization.

21 At the end of developing that term, Scott Andrews
22 and I, another individual in this space, proposed to the

1 automakers the idea of communicating outside the vehicle.
2 He and I wrote a cooperative agreement for them with the
3 United States government. And I incorporated a new entity
4 called the VII Consortium, for which I was the first
5 president of, and then after about nine months the
6 automakers realized that, although they historically don't
7 like to have their suppliers organized, there was a lot of
8 industries that needed to be involved and an entire
9 ecosystem in order to bring to fruition all of these plans
10 and architectures.

11 So I incorporated a new entity called the
12 Connected Vehicle Trade Association, which was started with
13 12 founding directors, of which Intel's Director of Strategy
14 was one of those founding directors. And we've been in
15 place now for over seven years and have involved ourselves
16 in a number of activities, everything from the Connected
17 Vehicle Proving Center to the Mackinac Bridge Project to a
18 lot of international activities.

19 I also have a second role as chair of the Global
20 Telematics Forum, which is the heads of the trade
21 associations from North America, the trade associations in
22 this space from North America, Australia, China, Europe,

1 Japan, Korea, and Taiwan. And so I have a lot of activities
2 with those other world organizations to help harmonize and
3 move these environments forward.

4 Because we have 17 different industry sectors and
5 representative trade associations, we were hoping to bring
6 to the table some things that we feel are of importance and
7 to take back to them those areas that they're less developed
8 on that they need in order to help this environment. We're
9 about enabling growth in this environment, and safety is our
10 prerogative, as well.

11 CHAIR DENARO: Thanks, Scott. Well, Peter is not
12 here yet, so let me tell you about my friend Peter. Just
13 kidding. We'll let him introduce himself when he's here.
14 Sonny?

15 MR. HOLTZMAN: I'm Sonny Holtzman. I'm an
16 attorney. I've been practicing for about over 50 years.
17 I'm from Coral Gables, a beautiful place. If you don't
18 care, stop in Palm Beach County.

19 Most of you are engineers and scientists, and you
20 are known to be creating the pie and attorneys are generally
21 known as taking a slice of the pie here. I think we have a
22 better role than that, and I think it might be that we bring

1 to the table maybe our financial, our professional, and our
2 political experience to help navigate everything through the
3 process. That's what I've been doing kind of in the toll
4 industry.

5 ITS is interesting. I heard Greg speak the other
6 day. It's a learning curve for me. I always think that the
7 toll industry is on a parallel track to ITS. They don't
8 seem to come together, and I think there's a lot of
9 integration. I don't know whether it's fault or whether we
10 just haven't done it yet, and maybe it's there and I don't
11 know it, but that's something I'm looking forward to.

12 So my expectations are perhaps we can look at
13 that and see what comes of it as we go forward. I'm anxious
14 to give to the committee whatever I can in that regard.

15 CHAIR DENARO: Thanks, Sonny. John?

16 MR. CAPP: Good morning. My name is John Capp.
17 I'm with General Motors, and I'm in Detroit. I've been with
18 GM for 27 or 8 years. Went to General Motors Institute up
19 in Flint. It's part of who I am.

20 Mostly, it's safety. I've worked in the
21 regulatory part of safety back when we started the first
22 side impact regulations with some of the people here at

1 NHTSA and some of that. Then I've been in product
2 development most of my career. I worked on airbags and
3 restraints and body structure crash stuff. I spent a couple
4 of years in Opel in Germany where we were trying to get
5 comment on some of our safety approaches on vehicles.

6 Then about five years ago, I was asked to
7 transition more to the electronics side of safety, advanced
8 safety, and then wearing two hats since then. One is to
9 plan our advanced technology work in the area of safety.
10 Most of it's electronics, including technologies like this,
11 but also active safety, driver-assisted systems. And the
12 other hat that I wear is actually more mainstream, an
13 engineering hat of executing this stuff, so I have to live
14 with some of the problems that I create.

15 And I've got folks that are working on some of
16 the systems that are being deployed on GM cars today with
17 collision-imminent braking systems and camera radar systems
18 and things like that. The software team, too, is a part of
19 my team.

20 So what's nice about that is I've got the chance
21 to kind of do some of the planning for technology for the
22 company when it comes to these technologies but then also

1 the practical side of implementing them. And that was done
2 on purpose so that we can connect the advanced to the
3 reality and the practical side. And at our company at
4 least, the idea of throwing stuff over the wall from the
5 research side to the product side, that wall is getting a
6 lot shorter. And jobs like the one that I have are intended
7 to kind of make that wall go away, so we're working on
8 advanced stuff that we're serious about doing.

9 So that kind of gets to my expectations of being,
10 you know, part of this. I mean, this is a technology that
11 we believe in. It's going to happen someday. Safety is a
12 huge reason for it to happen, but there's also going to be
13 other conveniences. I don't think anybody is in dispute
14 that it will happen, certainly not in my company, although
15 it's taking a long time.

16 So my own expectation and interest is I really
17 see a lot of these stars beginning to align. I see real
18 momentum, and I think over the last couple of years the JPO
19 projects, the time lines that exist, the NHTSA date for
20 2013, all of these things have had a profound effect, I
21 think, just over the last couple of years on focusing
22 people's efforts. And as such, I mean, the challenges are

1 still there, but we know what those are now. And Steve
2 mentioned earlier the security. That's probably one of the
3 biggest remaining ones that we see as an impediment from a
4 technical standpoint.

5 But then the challenge of getting technology on
6 vehicles gets beyond the technical impediments. There's
7 really a few ways that we end up putting technology on
8 vehicles or features in general. And sometimes it's just
9 somebody in the company is just passionate about and is a
10 champion of it and they've got to have it. You don't see as
11 much of that these days because our business is so practical
12 and competitive, but, occasionally, you see a car that's
13 wildly styled or something, and it's just got personal
14 passion, somebody who went to the mat and was able to make
15 that happen.

16 But most things happen more from a practical
17 standpoint, that there's a need. Now, we know there's a
18 safety need, but there's also got to be a customer need
19 because it's competing with other stuff. I mentioned some
20 of the other technologies that I'm involved with. I can put
21 technologies today on vehicles that have one cost point that
22 people can afford to pay for it and it gives them value

1 today.

2 We know this technology is going to add value,
3 too, but it's in this chicken and the egg state of how do we
4 show ourselves that it's got this value? How do you show
5 customers? Somewhere there's got to be money moving around,
6 right? That's how everything happens, in this country at
7 least.

8 But the other way sometimes things happen on
9 vehicles is through regulation. This one has a potential to
10 eventually go down that path, too. You can make part of it
11 fairly easy. I tend to think it will probably be a
12 combination of those in the interim period or else it will
13 take a long time again. So I'm hoping we get to the point
14 where we see, we get these technical impediments behind us,
15 like security, things like that, and we can start to see
16 enough of the other players. We talked yesterday with some
17 of the state folks also seeing the reality, agreeing on
18 which technology it's going to be, how it's going to do, so
19 that this recipe will live for a while because people who
20 buy cars don't want to find out two years later that it
21 doesn't work and we were just kidding and there's a new
22 technology.

1 So the more we start to all see the same basic
2 recipe that's got some future in it, the more likelihood
3 that people are going to invest, states, our companies,
4 everybody else, on behalf of our customers. So I'm
5 encouraged that I think there's progress being made there,
6 and I'm glad to be a part of this to maybe help get us a
7 little bit closer to that.

8 CHAIR DENARO: Thanks, John. Roger?

9 MR. BERG: Good morning. My name is Roger Berg.
10 I'm with DENSO Corporation. We're an international world
11 leader and Tier One automotive supplier to -- everyone
12 thinks of the Detroit 3, but there's actually 20 or 30
13 different car companies that we supply parts to.

14 When Bob was talking about his introductory
15 remarks, he was saying, yes, we'll leave this meeting and go
16 to our main jobs, and I thought to myself, well, my job is
17 much like kind of a vision of this committee. The names and
18 the faces are different, but the people that I go and talk
19 to are very passionate about this, connected vehicles and
20 the impact it can make on not just our business but on
21 society. And I think that the three ways I look at that
22 are, you know, learn from some of the past mistakes we've

1 made, execute, you know, today's programs to kind of move
2 this thing forward. And, third, I think about what kind of
3 future society we will have when intelligent transportation
4 systems become such a great part of our lives.

5 So DENSO is not one of the, you know, jump on the
6 bandwagon kind of ITS companies. We -- I wouldn't say
7 invented, but we built an electronic power train car in the
8 1950s. We were one of the companies that had the first
9 deployment of commercial connected vehicles on the Mayday
10 system in Japan. And so that's to say we have a long
11 history in ITS, but it doesn't mean we know everything. In
12 fact, as of today, we know basically nothing.

13 So the second kind of pillar to that is, you
14 know, executing today's programs. So DENSO has a huge
15 investment in the connected vehicle program. We've been
16 developing early feasibility studies of how wireless
17 technologies can work for intelligent vehicles to, you know,
18 developing product and implementing it, putting it into
19 field trials, and learning all those lessons about what
20 works and what doesn't. And that has kind of given us
21 lessons for how we might be able to formulate the future of
22 what a connected vehicle society looks like and how it can

1 be impacted by the work that everyone in this room does.

2 So in terms of my expectation for participating
3 in this industry and a committee like this is I have this
4 vision that in my lifetime I'd like to see at least one day
5 where nobody dies in the transportation system in the United
6 States. And that's kind of like a first, you know,
7 threshold. And once that occurs, everyone will be happy, of
8 course, but that just kind of sets the next goal. So let's
9 make two days in a row where nobody dies, and then after
10 it's two days in a row it's a week, and then after it's a
11 week it's a month. And soon this lofty goal of zero
12 crashes, zero fatalities starts becoming a reality by taking
13 it step-by-step. So, hopefully, the work that we're doing
14 in this committee and in this industry will get us to that
15 kind of a vision where traffic crashes or transportation
16 system crashes and people actually losing their lives is
17 something that was in the past and not in the future.

18 CHAIR DENARO: Thanks, Roger. Steve?

19 DR. ALBERT: That's hard to follow. My name is -

20 CHAIR DENARO: Not for you.

21 DR. ALBERT: My name is Steve Albert. I'm the
22 director at the Western Transportation Institute in Montana

1 State University. This is my third term on this committee.

2 I generally kind of be the rural guy, but my background
3 really kind of stems from the early 1980s and starting the
4 ITS program in Houston, Texas, coming to Washington, D.C. as
5 a consultant and starting a lot of the ITS programs across
6 the country, and then realizing Montana is not a bad place
7 to go and I don't have to lock my doors, and started a small
8 transportation research center there that now we're doing
9 work in almost every state and about 16 countries, some of
10 that relating to ITS but many in other areas.

11 I have held a variety of leadership positions
12 through ITS America either being on the board or head of the
13 state chapters. I'm the past president, and you've heard a
14 number of professors talk about the University
15 Transportation Centers Program, I'm the past president of
16 that organization. And I think, you know, in Bob's charge,
17 what do you want to see out of this committee, I've
18 provided, I don't know, three or four congressional
19 testimonies, and, when I think about what happens at these
20 meetings, one of the things I'd like to remind you of is if
21 you think of the United States as a big piece of Swiss
22 cheese -- there's an image, huh? And the holes in the Swiss

1 cheese are predominantly urban areas. If we're going to
2 achieve a national system, we're going to have to think
3 about the areas outside of those holes, which are
4 predominantly rural. And when you find that 60 percent of
5 the fatalities are in rural areas and 70 percent of the road
6 miles are in rural areas, if all this does is help you get
7 around the beltway in your urban area, we're missing the
8 bigger opportunity. And a bigger opportunity to save lives,
9 quite frankly, is in a rural area. So we're discussing the
10 issues of roll out and deployment. Don't just think about
11 the holes in the Swiss cheese, think about the whole Swiss
12 cheese.

13 CHAIR DENARO: Thanks, Steve. And I suspect
14 that's not the last time we'll hear you talk about the rural
15 --

16 DR. ALBERT: I will try not to be, oh, there's
17 that rural guy.

18 CHAIR DENARO: Well, thank you all for those
19 introductions. I think you can see now why I was excited
20 about this team. We've got -- two things that struck me by
21 what all of you said. A, we've certainly got the diversity
22 I talked about. But, secondly, look at the passion for ITS

1 in this room. So I think we've got the right team, so
2 that's pretty exciting.

3 What I'd like to do, I'll go over the agenda in a
4 minute, but let's just do a quick introduction of the other
5 guests we have in the room and staff members and so forth.
6 If you would just give your name and what part of the
7 organization you're involved with, or, if you're not within
8 the staff here, what your involvement is. I don't think we
9 have the time to go through all your background and
10 everything, but if you give a quick introduction I would
11 appreciate that.

12 So would you like to start?

13 MS. DULANEY: Sure. Hi, I'm Shannon Dulaney.
14 I'm a federal affairs analyst for Honda in our government
15 relations office here in D.C.

16 CHAIR DENARO: Great, thank you.

17 MS. BRIGGS: I'm Valerie Briggs with the ITS
18 Joint Program office, and I lead the policy research team.

19 MR. MEESE: I'm Andrew Meese from the
20 Metropolitan Washington Council of Governments. We're the
21 regional planning organization for Washington, D.C. and
22 vicinity. I'm sitting in as an observer for Ronald Kirby,

1 who is joining the committee and regrets that he had out-of-
2 town commitments and could not be here. I know that he
3 would bring a lot of perspectives to this committee. You
4 know, we're very interested in urban congestion issues that
5 we have to deal with.

6 One of the things that I think he might bring to
7 the discussion, he's very interested in demand management,
8 in addition to supply management. And we are very involved
9 with that in our region.

10 Does everybody know what this is, this key fob?
11 This is a Capital Bikeshare key fob, and in two years we've
12 gone from zero bike-sharing to hundreds of trips a day in
13 this region of people who are creating this new transit mode
14 of bike-sharing. So it's an exciting place to be here.
15 We've got a lot of interesting things going on.

16 I personally do have over 15 years of work in
17 ITS, you know, in our perspective, and hopefully Ron will be
18 able to join the future meetings and bring his perspective.

19 Thank you.

20 CHAIR DENARO: Thanks for representing Ron.
21 Appreciate that.

22 MR. TRENTACOSTE: Good morning. I'm Michael

1 Trentacoste with the Federal Highway Administration. I'm
2 the Associate Administrator for Research Development
3 Technology and also get to be the director of the Turner-
4 Fairbank Highway Research Center. So Jeff Lindley, who's
5 the Associate Administrator of Operations, and myself are
6 really the co-leads in FHWA for the ITS program. You all
7 know Joe Peters and Monique Evans and Carl Anderson. They
8 report to me.

9 MR. ARNOLD: I'm Bob Arnold, Federal Highway,
10 Office of Operations. I'm the director of Transportation
11 Management, which has a lot of the strategies that deploy
12 and need ITS.

13 MR. LAMAGNA: I'm Sam Lamagna from Intel
14 Corporation. I'm chief of staff with Intelligent Systems
15 Group, all those things that are embedded in communications
16 like Ton Steenman spoke of earlier.

17 MR. SCHAGRIN: Hi. I'm Mike Schagrin with the
18 ITS Joint Program Office, and I'm the program manager for
19 connected vehicle safety.

20 MR. VALCICH: Hi. Mark Valcich with Intel
21 Corporation. I manage Intel's relationship with Department
22 of Transportation and focus on federal enterprise solutions.

1 MR. CRONIN: Good morning. I'm Brian Cronin with
2 the ITS Joint Program Office. I'm our team leader for
3 research.

4 MR. GLASSCOCK: Stephen Glasscock, your liaison
5 for administrative logistics, and I will take responsibility
6 for the cramped quarters. I promise next time it will be a
7 lot more comfortable and better.

8 MS. ROW: You guys should know Stephen will make
9 your life much easier.

10 MR. VELEZ: I'm Charlie Velez. I'm with Citizant
11 Incorporated, a JPO support contractor.

12 MS. ANDREWS: Hi. My name is Sheila Andrews, and
13 I'm probably the fly in the ointment here. I'm actually
14 with the American Motorcyclist Association, so we actually,
15 just for context, represent individual riders, so we are the
16 end users, the individuals that are impacted by the research
17 and deployment of ITS technologies. We know that, you know,
18 motorcyclists tend to be a little slow to develop things
19 like ITS because of our wonderful nostalgic love of our old,
20 you know, clank-around motorcycles, but we want to make sure
21 that our voice is, if not at the table, at least in the
22 room.

1 CHAIR DENARO: Thank you. Greg, do you want to
2 make some comments?

3 MR. WINFREE: Actually, a very good segue. I'm a
4 passionate motorcyclist and AMA member, so motorcycle
5 interests are at the table. So that's certainly one of the
6 interests that I have, as the team has heard on several
7 occasions. And like Steve being the rural guy, I tend to be
8 the motorcycle guy, so we'll tag team you that way.

9 MS. ANDREWS: Well, I won't have to show up then.

10 MR. WINFREE: You're always invited. You're
11 always invited. But just real quick, importantly, the main
12 reason we're here is the number 32,788, right? And we see
13 that as a static number, and those are individuals who,
14 unfortunately, have perished on our roadways. But one of
15 the things we don't really talk about, and I think I
16 mentioned it in the ITS America video opportunity, is really
17 that's 32,788 families that lost a breadwinner, that lost a
18 mother, have lost a father, have lost a sister, a brother, a
19 twin who perhaps had that bond severed. So these are
20 impacts that will last for months, will last for years, will
21 last for the rest of a lifetime of these families. And
22 these are folks, you know, if you only come at this from an

1 economic perspective, who are not as productive, but more
2 from a safety perspective, which is what we're passionate
3 about.

4 You know, like Brian, I also have, and who in
5 here hasn't had someone in the family taken from them in a
6 needless vehicular accident? So that's the main reason why
7 we're here, to get that number down. Thirty-two thousand
8 seven hundred eighty-eight is unacceptable for a country as
9 sophisticated as the United States. We can do better, we
10 must do better, and we look forward to working with you on
11 helping drive those numbers down. As we said, the quest for
12 zero, towards zero. That's where we need to be looking at.

13 I really appreciate Roger when he said, you know, one day
14 without fatalities, two days, and let's start to piece
15 together that story because that is achievable. So thank
16 you.

17 CHAIR DENARO: Thanks, Greg, for nailing that
18 down for us. I agree. All right. I just want to talk
19 about the agenda for just a second, so if you have that or
20 you don't necessarily need to look at it. But what we're
21 going to be doing, we just went through the introductions
22 and so forth. Shelley is going to talk to us and just give

1 us a quick overview. We had an overview in our phone
2 meeting, but we'll get a quick overview from her here also.

3 We'll take a break. I think we'll go ahead and let Shelley
4 do that. It's only 15 minutes, and we'll delay our break by
5 another 15 minutes.

6 And then we're going to get some more briefings
7 from Shelley and the team in terms of the program, some of
8 the key issues that they're working on, what's current, and,
9 frankly, it's going to bring me up to date, as well. We'll
10 break for lunch. And then after lunch, a continuation,
11 actually, of the presentation by the JPO and getting to some
12 of the implementation issues.

13 And then as Shelley said earlier, we'll close out
14 in the afternoon with a couple of hours of discussion. I
15 want to start this discussion with how we're going to focus.

16 I mean, I'm sure seeing what your jobs are, that every one
17 of you struggles with focus in your job. We're going to
18 struggle with that here, too, and we're not going to succeed
19 unless we find that focus. Focus means two things: we've
20 got to find a manageable set of things to work on and,
21 secondly, hopefully the most important things that we're
22 going to focus on.

1 So I don't know if we'll reach conclusions yet
2 because I'm not sure we'll have enough information, but, as
3 far as we can get, that will be good. And then that will be
4 it. And we will talk a little bit about the time line of
5 the other meetings. We'll get your input on when might be
6 the right timing, how many meetings do we want to have, how
7 we see that going, and so forth. All right? Are there any
8 questions at this point of where we are? All right.

9 MR. MCCORMICK: Did everyone show up that's on
10 the committee? Was everyone able to make it? Are we
11 missing anyone that's --

12 CHAIR DENARO: Peter and Ron, I believe.

13 MS. ROW: That's very good.

14 CHAIR DENARO: Which is superb.

15 MS. ROW: That's very good.

16 CHAIR DENARO: Keep it up. Shelley?

17 **ITS JPO Overview**

18 MS. ROW: All right. Okay. So I am genetically
19 unable to be in a room with an empty flowchart. I'm going
20 to help Mark out and get him out from behind the flowchart.

21 CHAIR DENARO: By the way, Shelley, there was
22 some mysterious document that did appear in front of us on

1 the table, too.

2 MS. ROW: Yes.

3 CHAIR DENARO: This guy right here, which got
4 interesting.

5 MS. ROW: Yes. And so I'll just mention that.
6 We can bury you in paper, so this is our brand new strategic
7 planning document. It is available or going to be available
8 electronically if it isn't already posted.

9 CHAIR DENARO: Two days ago.

10 MS. ROW: Is it posted?

11 CHAIR DENARO: Yes.

12 MS. ROW: Excellent. Thank you, Valerie.

13 CHAIR DENARO: I found it.

14 MS. ROW: Yes. So this is a summary of the
15 entirety of the program. We started doing this I guess in
16 2010. It's a four-year horizon, so we're up toward the end
17 of it. It lays out the vision that we saw in 2010 and then
18 gives you a snapshot of where we are on that research today.

19 But it covers the entirety of the program which you will
20 not hear about today. So this is available to you. If you
21 don't want to take the big document, that's fine. We
22 understand that. It is available online.

1 So I'm just going to take a few minutes and just
2 try to give you an overview because, as Scott said, there
3 are a number of things that have come up every time. So we
4 want to just position you to understand that, and maybe it
5 will make it a little easier for you to decide how you want
6 to use your time.

7 So the thing that I wanted to share with you is
8 this little diagram. It's not perfect, but it's okay. It's
9 the best we've got. So this is the way the -- ITS in the
10 department works, and I think many of you in technology
11 organizations, you understand it. You go from research here
12 to implementation, right? And so that's what Scott rightly
13 pointed out has always been a discussion point here.

14 So what I wanted you to understand about the ITS
15 program, which is what you're here to advise us on, the ITS
16 program is in this part. So this is the ITS Joint Program
17 Office role, and it spans across this area, what you'll hear
18 us refer to as technology transfer.

19 When you get over into implementation, you begin
20 to get our modal partners, like FHWA who's here with us,
21 FTA, Federal Motor Carrier Safety Administration, clearly
22 NHTSA, so a lot of the organizations that we work with. And

1 so they have a much bigger role than we have when you get to
2 the implementation side. So we share a lot of work here in
3 this technology transfer piece. You'll hear us talking
4 about our professional capacity building program. Each one
5 of our research programs has a technology transfer
6 component, and we try to focus the research with
7 implementation in mind, begin with the end in mind.

8 So we wanted you to understand that it is going
9 to be a push/pull in your conversations because, clearly, we
10 all want to be here [implementation]. It's just that our
11 role has been here [research], and we just need to position
12 it to get to implementation.

13 The other thing that I would say, if you heard
14 any of our presentations over the last weeks, Scott has kept
15 us very busy, the connected vehicle part of our work is
16 moving from research into implementation. And so now a lot
17 of those things that we're working on, several of you talked
18 about the security system, some of those things, they're,
19 yes, kind of researchy, but they're in this research to
20 implementation. It's literally is it going to work, can you
21 build it, is it automotive grade, is it going to literally
22 work in a deployed environment? So that's where the program

1 is, and that's where we would like to have your assistance
2 in some of those particularly tricky items that are going to
3 get this into the deployment side.

4 The other thing that we wanted you to just be
5 aware of is in the research arena for US DOT we get \$110
6 million a year, and that supports this work that we do here.

7 The modes, like FHWA, NHTSA, they have some other money.
8 It's actually not as big as this for ITS because it's spread
9 across, like, in highways. They do research on pavement and
10 bridges and roadway design and safety systems and all kinds
11 of things. So they have a little bit of ITS money that's in
12 this area, but not as much as what we manage out of the ITS
13 Joint Program Office.

14 When you get all the way over to implementation,
15 though, that's where you see a lot of our partners here in
16 the room. We have two leading state DOTs. We have several
17 local government agencies, transit properties. We included
18 in your package a recent report that we did that looked at
19 deployment, and this is typically the traditional ITS
20 deployment: cameras, signs, message signs, fiber, transit,
21 AVL, electronic toll collection. That research shows us
22 that there's about an average of \$1 billion a year being

1 spent by state and local agencies on the deployment of ITS.

2 It's been growing, and so that's about the average over the
3 last I think ten years or so that we've been measuring it.

4 So the deployment is really happening by those of
5 you here in the room, and this doesn't even come to close to
6 capturing what those of you who are companies are doing. We
7 don't have an eye on that, except for the work that ITS
8 America did two years ago, three years ago.

9 MR. BELCHER: About a year and a half ago, about
10 \$48 billion a year in the private sector.

11 MS. ROW: Okay. Forty-eight billion in the
12 private sector. So that's where all of this is happening,
13 so we try to just see that. What else did I want to share
14 with you? So in our \$110 million, we do, the vast majority
15 of this is in research. And in this particular case, it's
16 in connected vehicle research.

17 So just to clue you in on the code, in the
18 connected vehicle program you'll hear V2V, vehicle to
19 vehicle; vehicle to infrastructure, V2I; V2P, vehicle to
20 pedestrian. And, in general, we'll talk about V2X, so V to
21 anything else like motorcycles, for example. We don't
22 forget motorcycles.

1 The other things that I just want you to be aware
2 of because you get to choose where you want to focus your
3 energies, right? These things, this kind of V to
4 everything, it's all about safety in this particular
5 context. We also have a mobility program. We call it DMA,
6 dynamic mobility applications, mobility being the operative
7 word. So there's a lot of work on how you use connected
8 vehicle information for mobility applications.

9 The safety work is centered around DSRC,
10 dedicated short range communications, because it's the only
11 thing that will work for the imminent safety crashes. DMA,
12 we want to look at can we use an evolutionary path from the
13 safety applications that would enable mobility applications
14 through DSRC, but also we recognize that that, too, could be
15 done through cellular, it can be done through other ways, as
16 well. And we don't want to not consider that because we
17 think there's a lot of potential there.

18 The other thing you'll hear us talking about is
19 AERIS. That's our cleverly named -- it's Latin for what,
20 Brian? Air something? I don't know. I didn't take Latin
21 ever. This is our environmental work. Cloud? Is it cloud?
22 Okay, thank you. So this is our environmental work. Same

1 idea. How do you use connected vehicle systems to enable
2 environmental kinds of applications? This work is the
3 farthest out in time of anything that we're doing. We're
4 looking at applications that we don't even know if it's
5 possible to see if it's something that's there. That's part
6 of the work that we do.

7 And then we have a data part of the program.

8 DCM, right? Thank you. I can't remember our own acronyms.

9 So the DCM program, and Ton mentioned interest in the data,
10 we, too, believe that data is a huge enabler. It can be
11 huge. This work is where we're doing a research portal for
12 research purposes where we're going to be collecting and
13 have collected data from freeways, arterials, transit. We
14 are going to get data from the connected vehicles when we
15 have that data, and we're going to make that available on
16 this research portal in order to try to, many of you are in
17 the academic community, to enable that kind of research and
18 what could you do if you had this kind of robust multi-modal
19 data. I don't know yet how that's going to evolve over
20 time. We're pretty clear that we in DOT don't want to
21 always run a data portal, so we're going to do this for our
22 research situation and then kind of see how that moves and

1 does it work as an enabler.

2 The other thing that I would just briefly mention
3 that began to cross over into this area, architecture. We
4 do maintain the national architecture. We just completed a
5 core systems architecture that looks specifically on how the
6 connected vehicle fits into the overall architecture. One
7 of the main things about that is it helps identify the
8 interfaces because the other big part of that are standards.

9 That's a huge thing, so we've spent a lot of time and a lot
10 of money on the standards program, developing a standards
11 that support all aspects of the connected vehicle work.

12 And, increasingly, we're working in the international
13 community. Because of some of the things that Steve said,
14 we do recognize and we hear from our automotive partners how
15 important that is for them, for their manufacturing. The
16 reason we care about that at the federal level because if it
17 enables them, DENSO, enables you all to be efficient in your
18 manufacturing and keeps the cost down, that's important to
19 the U.S. consumer. So that's why we care about it. We've
20 had really some remarkable success particularly working with
21 the Europeans. The Japanese were at the table with us, as
22 well. We're working on a memorandum of agreement with the

1 Koreans, as well.

2 This is an area several people have pointed out.

3 The previous committee did a lot of work here. And one of
4 the things I wanted to share with you, the previous
5 committee split up into subcommittees. And you all talk
6 about this later whether you choose to do that or not. They
7 chose to split up into subcommittees. There was one
8 committee that worked specifically on standards because it
9 was such an important thing for them.

10 We were able to have US DOT staff as not members
11 but participating with those subcommittees. We got benefit
12 from this before we ever got the memo from you all. So I
13 want you to know that, even as you do your work, before you
14 put pen to paper and before you give us a final memo, if we
15 are able to work alongside you and hear your discussions, we
16 will get benefit from it even while you're still working.
17 And we actually made changes in the program and moved some
18 things forward as a result of some of the things that were
19 discussed in this committee, particularly on standards. So
20 it was very helpful, very helpful.

21 The last thing I would mention is our
22 professional capacity building program. That is clearly in

1 this technology transfer area. We work very closely with
2 the Federal Highway Administration, Federal Transit
3 Administration, to take what we learn here, marry it with
4 what we see the interest being in the deployer community,
5 and provide training and educational experiences there. So
6 we're conscious of that and trying to help make this flow
7 smoothly. It's hard. It's hard to break down that wall and
8 get from research into a deployable implementable system
9 that meets everyone's needs.

10 So I wanted you to have that overview. You get
11 to decide where you want to focus your energy. I said to a
12 couple of you this morning or yesterday we've stacked the
13 deck today. Because this is your first meeting, we chose
14 for you today because if we had our choice, and it is not
15 our choice, we would have you focus your talents on some of
16 these difficult issues that we're facing now to get the
17 connected vehicle work into implementation, research to
18 implementation. So you're going to hear discussions today
19 and participate in discussions today that are going to seek
20 to take you from understanding at a high level to
21 understanding it at a more detailed level because we believe
22 that's where your talent can help us. So hang on. It's

1 going to be a lot of information, but that's where we feel
2 like we could use the talent in this room.

3 Again, you don't have to choose that, but we're
4 going to talk about the vehicle-to-vehicle program. Mike
5 Schagrin is going to lead that conversation. We're going to
6 talk about vehicle-to-infrastructure for safety. Brian is
7 going to talk also a little bit about the mobility side of
8 that. And we're specifically going to talk about the
9 security system because that's where we've got a
10 particularly difficult problem. Again, it's a discussion.
11 Feel free to participate in the discussion as we go through.

12 The last thing I'll say, you're going to see some
13 of the JPO staff in these conversations. I believe we have
14 some other people coming in to join us. We inherently work
15 multimodally. We are a very small office in the ITS Joint
16 Program Office. We sit in RITA, which is inherently
17 designed in DOT to work across modes. We do that. We
18 really try to walk that talk. Our modal partners are here,
19 and you can ask them when we're not here.

20 But, consequently, we do have a very talented
21 staff in the Joint Program Office. I am so proud of them.
22 They're awesome. We also have a very talented staff in the

1 Federal Highway Administration, in NHTSA, in Federal
2 Transit, Motor Carriers, in those other modes, and so you'll
3 get to meet some of them. Our job is to bring to you the
4 people, the resources, the documents that you need to
5 deliberate, discuss, and then feed us back what your best
6 advice is to us.

7 So any questions for me about kind of where we
8 sit, what we do?

9 CHAIR DENARO: Just to underscore that, Shelley,
10 how small are you?

11 MS. ROW: We are 18 people, and that includes our
12 support staff, by the way. So it's even smaller than that -

13 CHAIR DENARO: Just looking at your RITA heads
14 and this document in front of us and everything else, these
15 are 18 very busy people.

16 MS. ROW: We are busy. Our modal partners are
17 also very busy. So one thing I didn't mention, too, that
18 running across this, we have a program management office, so
19 we have a series of contractors and a series of electronic
20 systems that help us keep track. This \$110 million, 80 or
21 90 percent of that goes out in contracts, so there's a
22 tremendous contract management thing that goes on in our

1 office because many of you are the recipients of contracts
2 that we issue in this office. So we have a lot of staff
3 just to make sure that, support staff to make sure that we
4 can keep track of all the contracts and how that's going.

5 And we have a website. Valerie's team manages
6 the website and trying to make sure that we have good
7 communication with all of our stakeholders.

8 Any other questions, comments, thoughts?

9 DR. KLEIN: Do you have any scenario in which
10 implementation would be an order of magnitude bigger than
11 anything you have put here in which it's driven by adoption,
12 by consumer demand in which this system just takes off and
13 gets hot, it's all the rage, it just explodes? And is there
14 anything, is that a scenario that you've thought about at
15 all to try to, what would make that happen? So not how can
16 we get over the finish line, but how do we just make it
17 explode?

18 MS. ROW: That's a good point. We think that
19 there's a lot of potential in the mobility side and
20 eventually in the environmental side, and a lot of that
21 might be driven by apps. You know, if you can do some of
22 that data and provide some robust data, then there's a lot

1 of you in the room that could take that and be very creative
2 and innovative. We talked to Ton the other day about the
3 number of creative developers that are out there. So we
4 think there's some potential there.

5 The role that we see for the federal government
6 is how do you bring together enough data to make it worth
7 their while? And then the other role that we have is, while
8 we believe that there's a lot that you're already seeing in
9 terms of consumer apps there, one of the things that we
10 serve are our stakeholders in the public sector. It isn't
11 completely clear to us that that market is big enough to get
12 applications developed that will serve their unique needs.
13 Maybe it is; we don't know. But that's another area that we
14 pay attention to make sure that what they need is different
15 from what a consumer needs, and we want to make sure that
16 that market gets served, as well.

17 The only other thing I would say is on this
18 safety piece, because we're working across the automotive
19 platforms and with a lot of Tier One suppliers and others,
20 what they've told us is that the federal government serves a
21 unique role there because we can help them work together,
22 and that's very awkward, difficult, sometimes illegal for

1 them to do if it's not in a pre-competitive environment. So
2 we are very clearly focused there, and they tell us when
3 we've gotten outside of that circle and now it's gone into a
4 competitive environment, and that's where our role ends
5 there and they have to go and do their thing.

6 MR. BELCHER: Shelley, just one thing. For those
7 of you who don't know, the U.S. Department of Transportation
8 has partnered with the White House on a new website called
9 safety.data.gov, which they placed over 700 safety data sets
10 going up to 1,000 by the end of the month, as well as a
11 number of tools and apps, with the idea of trying to seed
12 the market in the safety sense so that app developers and
13 companies start to match up the different data sets and
14 provide new products and services.

15 And they're driving towards a major meeting in, I
16 guess it was 100 days last week when the White House
17 announced it, so 96 days, where they'll be bringing a whole
18 lot of folks. They brought together a bunch of apps
19 developers, hackers, and others to look at these data sets,
20 and they're going to then do what they call a datapalooza in
21 100 days or 96 days or something. And that will be a really
22 unique opportunity to just see the kind of thing that

1 Shelley is talking about, stuff that we can do in this space
2 but that's being done in the safety and transportation
3 space. So that is kind of a fascinating exercise.

4 MR. VALCICH: If I may, I think one of the things
5 a couple of years ago when we were creating the strategic
6 plan and laying out our program, you talked about sort of
7 what's the point when there's that explosion, and I would
8 say that we determined that the V2V research and sort of
9 getting that requirement of equipment in vehicle that's
10 going to enable safety is that jumping off point. And so
11 sort of all of our eggs are really, maybe not all but 90
12 percent of them are in that basket of trying to get to that
13 NHTSA 2013 decision. And when that happens, we think that
14 is an explosion point.

15 CHAIR DENARO: Why don't we take a break? We'll
16 come back and continue the discussion. The Department of
17 Transportation has generously provided a mountain of
18 chocolate and sugar over here. But I understand that in the
19 southeast sector of Washington the calories don't count, so
20 enjoy.

21
22 (Whereupon, the foregoing matter went off the record at 9:54

1 a.m. and went back on the record at 10:12 a.m.)

3 **ITS JPO Briefing and Group Discussion**

4 CHAIR DENARO: All right. We're going to get
5 started with some presentations from now by the JPO. Mike
6 is going to kick off, I believe. We've got a little bit of
7 a logistics issue. Paula and -- what I'm saying is I think
8 Mike is going to stand over here, so if it's more convenient
9 for you to slide your chairs around or whatever, feel free
10 to do whatever you need there. Visibility-wise I think
11 we're okay. All right. I think we're on.

12 MR. SCHAGRIN: Good morning, everybody. Once
13 again, my name is Mike Schagrin with the ITS Joint Program
14 Office, and I'm the program manager for the safety program
15 for connected vehicles. And so under my portfolio, I handle
16 vehicle-to-vehicle communications for safety, vehicle-to-
17 infrastructure communications for safety, safety pilot,
18 driver workload, and also some work on the international
19 harmonization activities.

20 The beginning of the talk is simply about
21 vehicle-to-vehicle and safety pilot programs, and Brian is
22 going to talk to you about the vehicle-to-infrastructure

1 program. And as part of this discussion, I want to kind of
2 frame where we are with everything with the research.
3 You'll hear this recurring theme, if you haven't picked up
4 on it already, research towards implementation. That is a
5 major thrust of where we are. After several years of doing
6 research work, we are actually at a point I think, as
7 Shelley pointed out, little pieces of the triangles where we
8 are making the transition now into early adoption and
9 completion.

10 So let me talk about the vehicle-to-vehicle
11 program, the whole idea to create connectivity. Now, as you
12 heard earlier, the safety for crash imminent situations, the
13 technology that we're talking about is dedicated short range
14 communication. And I'll get in to some more of that detail
15 about how that works a little bit later on.

16 Dedicated short range communication is based on
17 wi-fi technology. It has to be able to work at a very low
18 latency, ten times per second, very secure environment, and
19 is the only technology that we have today to address the
20 safety crash imminent situation that we're talking about.

21 So it's about connectivity. It's about all
22 modes, so we are looking at cars and trucks and buses

1 initially. To those in the room that care about motorcycles
2 and bikes and rail, it can all be extended, but the initial
3 thrust is on cars, buses, and trucks. We're also looking at
4 things like after-market devices and connectivity to
5 infrastructure. One point to make, though, is that on a
6 previous slide was it's all about creating a greater
7 situation of awareness with safety, mobility, on
8 environmental issues, and having greater situational
9 awareness of the environment to help address those issues.

10 So the opportunity for safer driving, the idea
11 with this technology is to create a 360-degree situational
12 awareness to be able to allow your vehicle to see things
13 that you can't see, whether it's a blind spot issue or
14 something else that you're not paying attention to. And the
15 idea is to issue advisories or warnings or, at some point,
16 even have control elements in the vehicle. We are doing
17 research in all of those areas, but our initial thrust for a
18 decision next year will be on primarily the awareness
19 element, but we are looking at factoring the control
20 element, as well, in terms of what kind of benefits can we
21 achieve.

22 There's this 80-percent number that we've been

1 talking about, how connected vehicles have the potential to
2 address 80 percent of vehicle crash scenarios for unimpaired
3 drivers. That doesn't mean that it's going to be 80 percent
4 effective. What it means is, out of all the crash scenarios
5 that are available to us, this technology can address 80
6 percent of those. Now, we still have to look at how
7 widespread deployment is and how effective this technology
8 is in the operations, and so we're trying to get that data
9 that will feed into our decision point next year.

10 CHAIR DENARO: Mike, could you flesh out a little
11 bit for us what you mean by awareness and the difference
12 between, say, advisories and warnings?

13 MR. SCHAGRIN: Sure, yes. And by the way,
14 everybody, this is meant to be interactive, so, like Bob
15 just did, feel free to jump in.

16 CHAIR DENARO: I'm just trying to set an example,
17 Mike.

18 MR. SCHAGRIN: So an advisory might be more of
19 kind of a heads up. Maybe there's an icy road ahead, and so
20 maybe there's a vehicle whose traction control kicked in,
21 you know, because of an icy spot or something that's going
22 on that's down the road a ways. That can be communicated

1 back to vehicles where it's not a crash imminent thing.
2 It's not going to happen the next second if you don't take
3 action, but it kind of gives you that advisory, that heads
4 up.

5 A warning would be more like if somebody slams on
6 their brakes in front of you and you have a half a second to
7 react or you hit something, that would be more of a warning.

8 You have to react immediately in order to avert something.

9 And then, of course, a control is let's say you still don't
10 do it. The vehicle could possibly take over and help you to
11 mitigate that crash situation.

12 MR. STEENMAN: Mike, what's the range? How far
13 back or forward does it transmit?

14 MR. SCHAGRIN: So the technology that we're
15 talking about operationally works at 300 meters line of
16 sight.

17 MR. STEENMAN: So anything beyond that, we will
18 have to look for a different method, like through the
19 infrastructure or something like that?

20 MR. SCHAGRIN: Right. That's a really good
21 point.

22 MR. SCHROMSKY: So by passing it back --

1 MR. STEENMAN: Hopping.

2 MR. SCHAGRIN: So we're not doing hopping right
3 now. That is a concept that is being explored here and in
4 Europe, but we're not doing the multi-hopping yet.

5 MR. STEENMAN: That's not part of the initial
6 specification -

7 MR. SCHAGRIN: Right. It's one vehicle to
8 another vehicle, not past the block. However, Scott is
9 right, future concepts would have that, as well. And as far
10 as other technologies go, yes, if you're thinking beyond the
11 300-meter range, remember we're doing kind of the crash
12 scenarios, you might look to an LTE type of situation where
13 --

14 MR. STEENMAN: Yes, because you have plenty of
15 time.

16 MR. SCHAGRIN: Because you have more time. You
17 know, stopped a queue of cars that are further down --

18 MR. STEENMAN: That's a mile down the road.

19 MR. SCHAGRIN: Right. You could get them warned
20 the other ways --

21 MR. SCHROMSKY: I equate it to installing wi-fi
22 in your house and deciding to go outside. So it's short

1 range, and it has wi-fi and it can't hop between the two -

2 CHAIR DENARO: So hopping is not part of the
3 design right now, but there is a possibility of a cellular
4 link also being part of awareness?

5 MR. SCHAGRIN: Oh, absolutely. Absolutely.

6 MR. STEENMAN: And then the data would be exposed
7 in the vehicle, and this is part of the standard that it
8 could just end up in a different environment than just --

9 MR. SCHAGRIN: That's right. And I think you'll
10 probably hear me and Brian talk about this some more in
11 terms of how we could offer vehicle data, to somebody or
12 about environment, you'd have to transport it back down to
13 other vehicles or ranges around. But what I'm talking about
14 right now is that's here, point to point, that vehicle-to-
15 vehicle communications right now.

16 MR. KENNER: So it's my understanding that
17 there's a lot of applications, even the security ones, if
18 you talk about downloading security certificates and so
19 forth, that you would be able to go vehicle to cloud back to
20 vehicle no problem. It's really the imminent crash
21 situations where, at least today, with what we know today,
22 the vehicle to cloud to vehicle just isn't fast enough to be

1 able to work.

2 MR. STEENMAN: But not deterministic enough.

3 MR. KENNER: Right, right, right. And then the
4 second part is, if you saw some of the pre-reading where we
5 talked about the basic safety message, too, there are other
6 elements as well that don't have to be on the DSRC either.
7 So I think the short answer to the question is, absolutely,
8 the cellular communication or to the cloud will be a huge
9 part of this. It's really the crash imminent part that, at
10 least at this point, we need to have the vehicle-to-vehicle
11 DSRC in order to be able to accomplish I think.

12 MR. SCHROMSKY: It would be faster. It would
13 probably be like putting, register your car and then
14 transmitting it in milliseconds. I mean, they could do it
15 on the back haul, but they get the information back and
16 forth. It just wouldn't be feasible.

17 MR. STEENMAN: Is DSRC pretty much, is it
18 already, did you find out that that's the only technology
19 that we have to zero in on?

20 MR. SCHAGRIN: Yes. We've been looking at it for
21 several years and considered all of the options, including
22 the 4G, and clearly, for the crash imminent situations, LT

1 is fast, 4G is fast, 5G will be even faster. We're still
2 not quite there yet, and DSRC really is the only technology
3 that supports our requirements.

4 MR. STEENMAN: And it works.

5 MR. SCHAGRIN: And it works very well.

6 MS. ROW: Yes, I just wanted to make sure that
7 you all understood and make sure that this is an accurate
8 statement that the research that we're focused on is on the
9 DSRC safety applications, and so you're talking about, you
10 know, the handoff with cellular and the potential for
11 cellular. We completely agree with that. Our research
12 right now is focused on the safety applications, and that
13 might be an area for further discussion.

14 MR. MCCORMICK: Do you have my cube drawing?

15 MR. SCHAGRIN: Yes, we do. Yes, we do.

16 MR. MCCORMICK: I think that will kind of bound
17 everything.

18 CHAIR DENARO: So the safety pilot does not have
19 any cellular applications in it right now?

20 MS. ROW: Not cellular apps. Some of the
21 security we're looking at.

22 MR. SCHAGRIN: We're looking at a security

1 standpoint looking at cellular --

2 CHAIR DENARO: Yes, yes, yes, yes.

3 MR. SCHAGRIN: -- that's not a millisecond
4 realtime, you know. But for V2V, vehicle-to-vehicle, very
5 clearly there's a box around DSRC. Absolutely. And I also
6 want to pick up on this performance issue and talk about LTE
7 and what it can do and stuff like that. For DSRC, not only
8 is there a 300-meter line of sight range, the value in this,
9 because they'll be built like autonomous systems like radars
10 and camera systems, which I'm sure it eventually would, the
11 DSRC can actually outperform radar and camera system for the
12 scenarios we're talking about. It can see around cars,
13 around trucks. It can see around blind corners. We saw
14 this in the demo where you had a blind intersection where
15 there was a truck that was impeding your vision. Instead of
16 going through the intersection, you stop for the cross-
17 traffic and he t-boned you, right? And you saw that in the
18 electronic emergency brake light application where a lead
19 car may be braking with another car in between, and you're
20 the last car, you could have warning before that middle car
21 brakes.

22 So it has this performance capability but well

1 beyond what radars and camera systems can do. It doesn't
2 mean they won't be complementary to each other, but it can
3 outperform some of this other technology.

4 MR. KENNER: The other quick comment I wanted to
5 make, and it doesn't necessarily need to be addressed by
6 this team, but I wanted to at least make sure that I've at
7 least made the comment. For the 80-percent number, I think
8 it's really important between now and the end of next year
9 that we have, you know, data experts on crash data to go
10 through each one of the scenarios that are inside of that 80
11 percent and, first of all, make sure there's alignment on,
12 yes, this is definitely something that would benefit from
13 it, so that when we speak we speak with one consistent voice
14 and maybe have a refined version of that.

15 The second reason I want to do that is because I
16 want to make sure that in the applications that we're doing,
17 even in CAMP, that we're actually addressing all of those
18 scenarios. We do the demo with, you know, four or five of
19 the scenarios. But I'm not sure until we go through that
20 process that we're actually developing the algorithms for
21 every one of those scenarios. I'm not sure.

22 So going through that I just think would, ah,

1 help us speak with one voice within a common, let's say
2 refined data; but then, B, make sure that we're working on
3 all those scenarios in the software so that we're actually
4 capturing every one of those to maximize the benefit we get,
5 as well.

6 MR. SCHAGRIN: I think we're actually doing that
7 as part of the analysis as part of the decision that comes
8 out. We attempted exactly that so.

9 CHAIR DENARO: Okay. Mike, we're going to get
10 you off chart two.

11 MR. LAMAGNA: Well, I just had a question about
12 the DSRC. Is it being utilized in any of the industry as
13 they start thinking about security, deterministic behavior,
14 privacy aspects of it? Any place else, machine-to-machine,
15 is DSRC being utilized?

16 MR. SCHAGRIN: Well, Scott said yes, but, I mean

17 --

18 MR. MCCORMICK: The Air Force.

19 MR. SCHAGRIN: Can you expand on that a little
20 bit?

21 MS. ROW: And also toll tags.

22 MR. MCCORMICK: And the Air Force. The Air Force

1 has been using it for quite a long period of time. They
2 turned into utilizing it this way for programming the secure
3 version of wi-fi, if you will, so they're not building using
4 the DSMC standard, but they have a lot of interest in this
5 spectrum. They would like to see anything not used turned
6 over to them, so I think it's critical, you know, we show
7 the viability of it to protect that spectrum.

8 MR. SCHAGRIN: And the electronic tolling for
9 years has used an earlier version at 915 megahertz. In some
10 cases, it's 2.4 gigahertz. But 5.9 is the next evolution of
11 that. And Europe, Europe using 5.8 for tolling and 5.9 for
12 other applications, so it's actually worldwide where we're
13 looking at this technology.

14 MR. BELCHER: If I could, Mike and Bob, this is
15 probably for the later discussion, but I think we need to
16 make a marker here. There is a very, to your point, there's
17 an important study that's going on by NTIA about whether the
18 5.9 gigahertz spectrum that we've had set aside for this
19 program can allow unlicensed uses because there is a desire
20 out there to use this spectrum for other purposes. It's a
21 big pipe, can send a lot of data short distances, so it's a
22 really interesting application.

1 And so over the next 18 months, kind of
2 consistent with the time frame in which US DOT is going to
3 make a decision about a regulatory stance on connected
4 vehicles, NTIA is going to come out with or the FCC is going
5 to come out with a decision about whether this spectrum
6 should be allowed to be shared. Really critical to the
7 future of this program, and so this is something, Bob, I'd
8 like to make sure we put on the table for later discussion
9 because it may be something that this program advisory
10 committee can, in its memo to Congress, advise about the
11 importance of this and the importance of not putting the
12 spectrum at risk. I'm not saying it can't be shared. I
13 don't know. I don't know. But it is a very important issue
14 and not one we should lose sight of.

15 CHAIR DENARO: Please bring that up again when we
16 talk about a focus --

17 MR. BELCHER: I will.

18 MR. STEENMAN: You're mainly probably concerned
19 about interference?

20 MR. BELCHER: Yes, yes. And interference one
21 time is enough to make the difference.

22 MR. STEENMAN: Right.

1 DR. KLEIN: The connected vehicle has been
2 described to me as wi-fi on the car or for the car. It can
3 be a planned with a safety orientation. Will there be other
4 applications allowed to run over this? And also do you
5 anticipate there will be a parallel network reaching the
6 car, possibly LTE based, mobile phones, reaching the car, so
7 within the car, there might be two networks going on?

8 MR. SCHAGRIN: We have car company reps here, and
9 I don't want to speak for them, but I'd suspect there would
10 be a suite of different communication technologies.

11 DR. KLEIN: Because if there's a consumer driver
12 for network adaptation, I'm wondering if maybe some of that
13 positive energy lands over on the LTE network and then DSRC
14 and connected vehicle might not benefit from that motor
15 drive of consumer investment.

16 MR. MCCORMICK: Well, I can kind of just
17 interject something. There's been literally tens of
18 millions of dollars in research on determining which
19 communication protocol and which spectrum. It's which need,
20 based on the latency, based on the desire of use, of how
21 they're going to use it and the type of functionality occurs.
22 And I'm not sure that that's where you want to go with your

1 presentation. I think that's an important topic that we
2 should break out for this afternoon on when we have a
3 discussion, but I think we're covering ground that they've
4 spent years already covering, if I can just, we can go to it
5 later.

6 MS. ROW: I did want to just make a point. Hans,
7 you asked about having other applications run alongside the
8 safety applications. Valerie is going to talk later about
9 some of our US DOT principles. We are trying to look at
10 this as a way to be an enabler for private industry, so we
11 felt like it was important for US DOT to understand what we
12 care about. One of the principles that she will share with
13 you is that we have said that we are okay with other
14 applications running alongside the safety applications as
15 long as the safety applications take a priority and nothing
16 else interferes with the safety applications.

17 So in our thinking, we've allowed for that to be
18 because we think it could be a big enabler. But we've got
19 to protect the safety applications.

20 MR. SCHROMSKY: So when Progressive puts in a
21 sensor up on an open two port and there's safety in certain
22 diagnostics of the car, there's a commercial application

1 that they'll give you a cheaper insurance --

2 MR. STEENMAN: Actually, that's not safety.

3 MR. SCHROMSKY: Okay. But a similar concept.
4 Certain standards are put in a car that you can take it for
5 --

6 MR. MCCORMICK: Right. It's actually a
7 requirement about how the bandwidth was allocated by the FTC
8 that said you really can't do anything on it for which
9 there's a commercial implementation on another system
10 either. So you can't run email, for example.

11 MR. SCHAGRIN: In case anybody doesn't know this yet,
12 research towards implementation. Now, what's important
13 about this site, I'm actually going to dwell on this for a
14 second because it drives home some points, we are on the
15 tipping point, if you will, the tipping point of going from
16 that research to implementation. We don't want to kid
17 ourselves and go in with something that isn't fully fleshed
18 out. And so I think the value of this committee is to
19 really point out the real world issues that perhaps we
20 haven't thought about yet.

21 Now, we are going to be doing some real world
22 testing coming up, and that will help flesh out some

1 additional things that we need to take care of. But, you
2 know, the idea is to really move this into the real world,
3 into implementation, make it a deployment across the nation.

4 And so if there are pitfalls, kind of land mines along the
5 way that you can think of, that would be very helpful in
6 terms of finding those out.

7 Okay. So this is about all vehicles, all road
8 users talking to one another. So it could eventually
9 include pedestrians, as well, in terms of maybe when this
10 wi-fi technology that's been adapted for this automobile
11 environment is cheap. It's wi-fi chips, and they're very
12 cheap. So at some point when things come down small enough,
13 they could actually be applied to bicyclists and pedestrians
14 and anybody who is on the road in terms of being a potential
15 safety issue.

16 Okay. So to help us focus, here are some key
17 program objectives in the area of safety. There's this 2013
18 decision we've been talking about that NHTSA has teed up
19 next year. And what they are going to do is make a decision
20 on this technology, and it could be anything from we need
21 more research to let's regulate, or it could be anything in
22 between. So all options are on the table, as they say.

1 But, ideally, what we're looking for and why we're doing all
2 this and why we're investing so heavily on all this stuff is
3 to try and get towards a regulation so that all this
4 technology is going to be in each and every vehicle in the
5 future. That's where we'd like to get to.

6 We have a similar milestone in 2014 for heavy
7 vehicles, class 8 trucks. And then in 2015, we're looking
8 at infrastructure implementation guidance. Not only is this
9 about vehicle-to-vehicle communication, but it's also about
10 vehicle-to-infrastructure communications. So we want to be
11 able to enable information from the infrastructure and back
12 to the infrastructure in terms of things like signal phase
13 and timing information that could help with safety and the
14 ability.

15 And so, Brian, like for safety, it may not be the
16 crash imminent millisecond scenario, but it could be
17 broadcasting this information by way of LTE, for example.
18 You could help with tuning out the flow, the green wave
19 issue which helps mobility, it helps environmental issues.
20 So there's a lot of opportunities here.

21 MR. WEBB: Mike, just a question. When you use
22 the term just technology, we are talking about DSRC?

1 MR. SCHAGRIN: Well, for the vehicles, for
2 safety, crash imminent safety, we're talking about DSRC.
3 For the NHTSA decision, it's DSRC. For that last item I was
4 talking about --

5 MR. WEBB: Right, understand.

6 MS. ROW: Just to clarify that, Mike, to make
7 sure this is correct, if NHTSA were to choose to pursue a
8 regulatory path, they would be looking at specifying the
9 standards and the performance requirements, right? Around
10 some of the apps?

11 MR. SCHAGRIN: Absolutely.

12 MS. ROW: So it's, yes, DSRC, but it's actually
13 broader than that. It's what that regulatory environment
14 might look like. Is that fair?

15 MR. SCHAGRIN: Yes. And I don't know if they
16 actually call it DSRC by name. It would be performance
17 requirements. But if something else came along that met
18 those performance requirements, NHTSA does performance-based
19 regulation, and so they would have in there performance
20 requirements for the technology and for some of the
21 applications.

22 MR. LAMAGNA: Do you believe that to be the goal,

1 the 2013 goal for new vehicle deployments or also
2 retrofitting cars, as well?

3 MR. SCHAGRIN: Okay. So let's talk about this
4 for a second. Yes, it's about new cars, and NHTSA has said
5 they also have the authority over, you say retrofit, I'll
6 say aftermarket, things that are brought into the vehicle
7 that have a safety functionality. So we are looking at
8 aftermarket systems, pneumatic devices being brought into
9 the vehicle that can, without being integrated into the
10 vehicle. Okay. So without being hooked into the OBD port
11 or anything else, it's like analysis is brought in on your
12 dashboard, so you don't have vehicle sensor data but you
13 have GPS and the DSRC communications. And with that, you
14 can enable certain safety applications, so we're looking at
15 that, as well, but NHTSA says they have the authority to
16 oversee and regulate that area, as well.

17 MR. MCCORMICK: And just so there's some clarity,
18 2013 is when NHTSA makes a decision if they're going to
19 begin a rulemaking process, which could last a couple of
20 years. Given that that puts until 2015, and Peter Pell is
21 no longer in place but if we ask him do you think they'd
22 make a decision in advance of the 2016 election and he said

1 probably that's unlikely that they would make the decision
2 mid 2016 and give the implementation period of about two
3 years.

4 MR. SCHAGRIN: Can you save that, because I have
5 a slide? Okay. So in terms of the remaining research in
6 support of this 2013 decision, you know, we're looking at
7 interoperability standards that include data, that's an SAE
8 standard, communications, and security. Those are all part
9 of the standards the interface document or specification
10 that's going to be part of whatever regulation or decision
11 takes place.

12 We have done driver clinics, and I'll actually
13 talk more about that. We've done driver clinics designed to
14 get user acceptance data for these safety warning systems,
15 which has been very positive.

16 We have a deployment, which I also talked about.
17 But the idea there is to get effectiveness data that can
18 demonstrate real world capability to show that here's what
19 we're talking about, here's how it works with real drivers
20 in the real environment. And you really need that to say,
21 hey, yes, it does work. That's real proof that it is
22 successful in terms of being operational.

1 We're also looking at device certification. We
2 don't want devices coming in that haven't been fully
3 certified and conform to operational specifications or
4 requirements that are to ensure safety. We don't want, you
5 know, our big thing is, you know, driver distraction. You
6 don't want to have devices that are brought in that distract
7 drivers in a negative way. The distraction has to be
8 positive. In other words, bringing your eyes back to the
9 road. So there are certification requirements that need to
10 be established, so we're going through that, as well. And
11 then there's policy implementation issues, and Valerie will
12 be talking about some of those later on.

13 CHAIR DENARO: Mike, on a model deployment, and I
14 guess talking to Shelley's overlapping triangles there,
15 clearly testing is hugely important to this. Does that --
16 is somebody going to talk more about that, both the pilot
17 and maybe other tests that are going to be done?

18 MR. SCHAGRIN: Yes.

19 CHAIR DENARO: Okay.

20 MR. SCHAGRIN: Yes. This is an advisory.

21 CHAIR DENARO: No, no, I'm saying, I mean today.
22 Are we going to hear more in-depth about -- okay, great.

1 Thank you.

2 MR. SCHAGRIN: Okay. Let's go to the next slide,
3 please. Okay. In terms of outstanding technical issues,
4 security, which you'll hear about both from a technical
5 policy perspective, as we mentioned earlier, is one of the
6 big nuts we have to crack and we're putting an awful lot of
7 resources into trying to figure out how to solve that issue.

8 And congestion mitigation, when you have several hundred
9 vehicles in the operating environment and there's a chance
10 for interference and collision of the communication
11 messages, we just have to make sure that we have that
12 strategy in place that allows for safety communication of
13 the communication messages so that congestion does not
14 become a problem. So we're working on that, as well. The
15 other part are the two big technical issues that are still
16 being worked that are very solvable.

17 MS. ROW: He says with great confidence.

18 MR. SCHAGRIN: Okay. Let me talk about the
19 associated technology from an operations standpoint. Okay.

20 So what is it? It's a wi-fi product. It's called 802.11p,
21 for those that are technical and know what that means. It's
22 a wi-fi standard that's been adapted for a highly-mobile

1 environment, and it's very cheap to produce in quantity. So
2 unlike radars and camera systems which are more expensive,
3 this is a technology that can be put on each and every
4 vehicle of all classes, in all of the vehicles, not just the
5 high-end vehicles.

6 How the technology works. It generates messages
7 at ten times per second. Just imagine how fast that is.
8 It's what we need for this crash imminent situation.
9 There's a basic safety message, which is an SAE standard.
10 It has to deal with the vehicle size, the position, the
11 speed, and so on, so it gives basic information about a
12 vehicle, if that information is available, to transmit to
13 other vehicles. So there's a basic part one element, which
14 is transmitted ten times per second.

15 There's also something that's called part two,
16 which is an event-driven sort of message, so that if you're
17 traction control comes on, it's not going to generate it ten
18 times per second, but if an event happens it would send that
19 flag out to the other vehicles. As I said, the operating
20 range is 300 meters line of sight. It's necessary for crash
21 imminent situations, and the benefit of the technology is
22 the cheaper price, the higher performance capability, you

1 get less false alarms because of how it operates, and its
2 accuracy and robustness. It can outperform some other
3 technologies that are currently on the market.

4 The drawback of the technology is that both
5 vehicles need to be equipped. So in order to have
6 communications, both vehicles have to have the technology on
7 them. That doesn't mean that we have to have 100 percent
8 deployment with vehicles in order for us to get benefits.
9 If we were to equip ten percent of the fleet, you could
10 always start getting benefits, early benefits. Now, you
11 equip more and more of the fleet and the benefits increase.

12 So it's not an all-or-nothing. It's a gradual progression
13 of benefits as more and more market penetration exists.

14 Yes?

15 DR. ADAMS: Can you clarify for me what that
16 means, line of sight versus, then you say it can communicate
17 around vehicles and blind intersections? What does that
18 mean?

19 MR. SCHAGRIN: Yes. So let's say we're on a
20 straightaway. Picture -- where's the rural person? Steve.

21 So if you're on a rural road and this truck in front of you
22 is kind of slow, and you're getting impatient and you want

1 to pass them, right? So you start your maneuver to head out
2 into the lane, and another car is coming at you 300 meters
3 away line of sight. It will operate in that kind of range.

4 So a straightaway line of sight, you can see each other,
5 and it will be operating at 300 meters. It actually
6 operates further than that, but from our standards, our
7 performance requirements, that's all you need is 300 meters
8 as a max.

9 Now, if you're at an intersection let's say, and
10 you're stopped. And I assume you did not hear the V2V
11 demonstration. If you're at an intersection and you're
12 stopped, and you make your legal stop, and then you want to
13 start proceeding. But with cross traffic, somebody decides
14 just to blow through. It happens, it happens all the time.

15 Let's say you can't see it because of an obstruction or
16 something, it will warn you about this other vehicle before
17 you can see it and before there's a line of sight
18 capability. Anybody can go around corners because we can
19 actually see around corners.

20 DR. ADAMS: The intersection of the line of
21 sight.

22 MR. SCHAGRIN: Yes.

1 DR. ADAMS: Okay.

2 DR. RAJKUMAR: If there's a barrier between the
3 sender and the receiver, the signal does not travel as far.

4 DR. ADAMS: Right.

5 DR. RAJKUMAR: Because you should be able to see
6 across intersection but not as long as 300 meters. So the
7 distance is shorter if there are barriers or pollution in
8 between.

9 DR. ADAMS: Right, okay. But is it just the
10 signal has to intersect somehow? Is that --

11 MR. SCHAGRIN: I'm sorry. What was it?

12 DR. ADAMS: I'm still kind of trying to picture
13 the ways in how it would sort of, and what this means, like,
14 around the corner. Anyway, I don't want to --

15 CHAIR DENARO: Basically, every car that's
16 putting out a message and all other cars are receiving it,
17 and any car that's receiving it just needs to figure out
18 whether they care or not about what they're hearing. And if
19 it happens to be a crossing vehicle, oh, I care about that.

20 DR. ADAMS: Oh, that's what we mean about --
21 okay.

22 MR. MCCORMICK: It's spherical.

1 DR. ADAMS: Right. And so you just need to
2 intersect those spheres. Yes, okay, all right. That makes
3 sense. Okay.

4 DR. KLEIN: And don't confuse the line of sight
5 meaning that --

6 DR. ADAMS: Yes, I keep thinking it's --

7 DR. KLEIN: -- only if you see the other car does
8 this work. That is not --

9 DR. ADAMS: That's what's confusing me. Okay,
10 all right.

11 MR. LAMAGNA: Mike, has there been any studies on
12 the effects of weather on the quality of service?

13 MR. SCHAGRIN: It has no effect on the quality of
14 service.

15 MR. LAMAGNA: So rain, it doesn't affect it at
16 all. Excellent.

17 CHAIR DENARO: Somebody said at the conference,
18 and it's anecdotal, but somebody said that there was a
19 terrible rainstorm, I think it was in Florida or something,
20 and they said they were having problems with DSRC. I assume
21 that you guys or your contractors have done a lot of
22 testing on that and that's not --

1 MR. SCHAGRIN: Yes, we probably had a problem
2 with intense -- seeing the people -

3 CHAIR DENARO: Yes, right.

4 MR. SCHAGRIN: -- but it does have no effect on
5 the technology at all. And I'll tell you an area where we
6 actually had a little hiccup regarding the technology: solar
7 flares. Solar flares actually disrupt GPS, and that's where
8 we get into a bit of a problem. It doesn't affect DSRC
9 communications, but it affects GPS, and the two fundamental
10 technologies that support our safety scenarios is GPS and
11 DSRC.

12 DR. RAJKUMAR: Mike, can you talk about the
13 accuracy of GPS that would be mandated?

14 MR. SCHAGRIN: I won't talk about specific
15 mandates. I can talk about GPS, the accuracy that we're
16 talking about in these crash scenarios. There's only two
17 types of accuracy in this discussion. For vehicle-to-
18 vehicle, we're talking about relative position. You don't
19 care exactly where you are in the road, you care where you
20 are with respect to the other vehicle. And the technology
21 is very accurate to lane level. What I mean by that is if
22 you are traveling in the same lane as somebody, you will get

1 a warning if it's necessary. Let's say the car stops,
2 brakes suddenly. Let's say a car is in the adjacent lane
3 and it brakes suddenly. You will not get a warning because
4 it is outside of that area of concern, so it is that
5 accurate to a one level accuracy for the vehicle-to-vehicle
6 and relative to --

7 DR. RAJKUMAR: Sub-meter or plus/minus two
8 meters?

9 MR. SCHAGRIN: No, it's not sub-meter.

10 DR. RAJKUMAR: It is plus/minus two meters?
11 Okay.

12 MR. SCHAGRIN: For a vehicle-to-infrastructure,
13 like at intersections, you care where you are on the road
14 with respect to that intersection, so that is considered
15 absolute accuracy.

16 CHAIR DENARO: Mike, what studies have you done,
17 contractor, however you've done it, to verify that accuracy,
18 relative accuracy you're talking about? I mean, have you
19 done research in that area?

20 MR. SCHAGRIN: Oh, yes, absolutely.

21 MS. ROW: I know we've done some with the Turner-
22 Fairbanks to check on the accuracy and measure it actually

1 at ground truth. But the other thing that I was going to
2 offer to the discussion, Raj, and I think I'm not completely
3 sure where we are in the testing on this, you know, we did a
4 proof-of-concept test that pre-dates what we're doing in Ann
5 Arbor. That I was told used the highest grade GPS receivers
6 possibly known to man, and that was great. What we're doing
7 now is using automotive grade GPS receivers, which is not
8 the highest thing known to man, but it's automotive grade.
9 And they're testing that, and they're also testing with
10 different manufacturers because there's an issue with the
11 correction -- you're going to know way more about this than
12 I'm going to know -- the difference with how they handle the
13 corrections, and that's what's being tested right now to
14 understand if we can get the relative positioning that Mike
15 is talking about to do the crash imminent situations.

16 CHAIR DENARO: So you're saying that is part of
17 the safety pilot is actually evaluating the GPS accuracy?

18 MR. SCHAGRIN: Yes.

19 MS. ROW: Yes. Actually, I think it's some of
20 the pre-testing that's being done before we ever go out
21 there.

22 MR. SCHAGRIN: We're doing that right now.

1 DR. RAJKUMAR: So while at FHWA, I was basically
2 doing this study because they're supposed to give certified
3 devices to the Ann Arbor contractors.

4 MS. ROW: That's right.

5 DR. RAJKUMAR: So it pre-dates the safety pilot.

6 MR. SCHROMSKY: Just autonomous GPS, no AFLT or
7 A-GPS integration used, as well, or no?

8 MR. SCHAGRIN: Those are acronyms I don't know.

9 MS. ROW: I don't know that one.

10 MR. SCHROMSKY: So each carrier, similar to E911
11 services when you dial 911 from a cellular device, I have to
12 try and locate you from the cell site to tell where you are,
13 so we're getting a big push from GPS companies, as well as
14 app developers, to get access to the cellular
15 infrastructure, not just us, all the other carriers, so your
16 time to first fix is greatly reduced and also the accuracy
17 of those particular elevations, as well. So you use a
18 combination of not just using the autonomous GPS looking at
19 24 birds in the sky, you're also using the cellular
20 infrastructure and you're using both. So you see, actually,
21 Google does a lot of this.

22 MR. SCHAGRIN: Okay. So we are not going to be

1 dependent on a cellular connection. Those guys are actually
2 ranging off the cellular towers and things like that and to
3 fill in those spaces, but it's not going to give you this
4 kind of accuracy that --

5 MR. MCCORMICK: Well, actually, they all do. I
6 mean, for a number of years, for CAMP I hosted a
7 differential correction server because, once you get the GPS
8 signals down, then you have to correct it for the local
9 magnetic variation before you push it out to the Nokia
10 network. There's an algorithm that adjusts for that in
11 every major metropolitan area basically on the planet.

12 MR. SCHAGRIN: But let me just say if there's a
13 high technical discussion, maybe we should take -- if
14 there's more experts in here, I'd be happy to do that but --

15 MR. MCCORMICK: I'm just curious. I mean, I'm --

16 MR. SCHAGRIN: Yes, but we've done a lot of work
17 in this area to make sure we have the performance
18 requirements that are acceptable for this imminent crash
19 situation.

20 CHAIR DENARO: This is an area of concern for me
21 because there are some conditions under which GPS, the two
22 receivers tracking different satellites, and your assumption

1 about relative performance breaks down. And so I'm just
2 trying to understand the research you've done there and, if
3 not enough, you know, whether that's going to be done going
4 forward because that's a serious vulnerability in my
5 opinion. You know, I did the drive, and I've done it
6 before, and there's nothing like going on that drive. It
7 really cements how important lane-level accuracy is. If you
8 don't have lane-level accuracy, you've got missed alarms,
9 you've got false alarms, you've got a nightmare. That's
10 really got to be nailed down.

11 MR. KENNER: I'll just try and say it real brief,
12 but, originally, when we had the vehicles and the demos,
13 even the ones that were done at the world congress, you
14 know, had the more precise GPS. The ones that we drove now
15 do not. They are automotive grade, so when I talked to the
16 research team they said they've already completed the
17 research that gives them the confidence to do the model
18 deployment in Ann Arbor, and then they're really just doing
19 sort of the validation in Ann Arbor of the research they
20 feel is already done and is right. So they're confident,
21 and that's why people are working on the automotive-grade
22 devices, you know, for the model deployment in Ann Arbor.

1 CHAIR DENARO: My other point is getting good
2 satellites out there on the plateau, you know, and at the
3 show here where I've got about a two-degree mask to the
4 horizon versus doing it where I live in downtown Chicago.
5 That's going to be a whole other field with GPS and
6 expecting it to work.

7 MS. ROW: One point before you leave this slide,
8 Mike, that I wanted the group to be aware of. On the
9 drawback to the technology that both vehicles need to be
10 equipped, two points there. They both need to be equipped,
11 but they don't have to be identically equipped. So for
12 example, with this safety panel that Mike is going to talk
13 about, we will have the fully integrated vehicles that,
14 those of you who rode in them, that's what you saw. We will
15 also have some aftermarket safety devices that will have
16 lesser capability, and then there's also several thousand of
17 the vehicle awareness devices that are simply basic devices
18 that are just sending out a more limited basic safety -- is
19 it even the full basic safety message? It is. So it's
20 integrated into the vehicle then to do that.

21 MR. SCHAGRIN: No, not the second part, just the
22 first part.

1 MS. ROW: Okay. And I do understand, though --
2 this is what happens when they let me out of the building.
3 I get to talk to the engineers. It's really exciting. And
4 so they told me on the drive over here they got to test some
5 of the positioning and the antenna placement on the vehicle
6 awareness devices, you know, because they're going to be
7 retrofitting those in regular people's cars. And so they
8 learned a lot from what was going to work, what wasn't going
9 to work. It didn't work as well as they had hoped, and so
10 now they're going back and examining some of that. So those
11 are other different kinds of positioning issues that they're
12 grappling with.

13 MR. SCHAGRIN: When we went and did these driver
14 clinics that I'll talk about, we did them around the
15 country, six different locations around the country:
16 Virginia, Texas, California, Florida. We weren't doing the
17 clinics with the actual real drivers. At night, the
18 vehicles would be out doing performance testing, and the
19 idea was to get a better understanding of how the vehicle
20 would perform in different geographical environments: urban
21 canyon, rural road, and so on. So we actually had gotten
22 thousands of miles of data associated with performance

1 testing of the technology just recently.

2 Okay. Safety pilot. Safety pilot is a program
3 that's really meant to give us that real-world appreciation
4 of how this technology works. There's really two major
5 elements. One are the driver clinics, as I said, around the
6 country, over 100 drivers in each location who got to
7 experience the crash scenarios in a very controlled
8 environment, a raceway, parking lot, where they weren't in
9 danger. We had them drive and experience how these safety
10 warnings work, how the technology works, and then you got
11 the feedback on that.

12 The second part is the model deployment that's
13 going to take place in Ann Arbor, Michigan with, roughly,
14 3,000 vehicles: cars, trucks, buses. And that is currently
15 going through that pre-model deployment stage. We're
16 ramping up and getting ready. But on August 21st, we
17 actually started that launch. We started collecting data,
18 and that data will be collected for a year, and that data
19 will be used to help assess the effectiveness of the system
20 to the real-world operating environment, and that will feed
21 into that NHTSA decision.

22 The driver clinics, what we get from that is the

1 user acceptance data: how well the systems work, would they
2 buy it, how would you change things? And the driver clinics
3 came back with a very, very positive response.

4 So with safety pilot, it is about safety. It is
5 about V2V and V2I. It is about aftermarket devices, as well
6 as integrated, embedded systems. Cars, trucks, and buses.
7 We're actually exercising the security solutions to make
8 sure that everything has integrity. A vehicle that's
9 operating in a bad way, a sensor goes out or something, how
10 do you pull that vehicle off the grid in terms of the data
11 that it's communicating? So we're exploring all that as
12 part of our model deployment.

13 CHAIR DENARO: Mike, maybe you're going to get to
14 this, but let me just ask it. I'm not clear exactly on
15 what's being measured in the model deployment. We don't
16 need to go over all that detail right now, but one question
17 I had is, will it look at unintended consequences. George,
18 maybe the story you told me last night at dinner about the
19 lady who rented a car and had a Mercedes run into the car.
20 Would you tell that story?

21 MR. WEBB: Sure. I mean, it's somewhat
22 anecdotal, but it was the lady supposedly had a Mercedes, a

1 regular driver. She went somewhere and she rented a car,
2 driving along the freeway, and changes lanes and almost has
3 an accident because she was used to the systems in her car
4 notifying her on lane change execution, and that's what she
5 had gotten used to. It only took the one experience to wake
6 her up that she can't do that in the rental car, but, again,
7 it's the system expectation of the drivers and how they
8 respond or not, which I think is where Bob was going.

9 CHAIR DENARO: So my question is will the safety
10 pilot even get at things like that?

11 MR. SCHAGRIN: We'll document, we're going to
12 have a lot of research, a lot of data that's going to be
13 captured. We have these data collection systems that
14 collect not only the communications data but, for the
15 integrated vehicles, we have video collection, as well, so
16 I've seen what's going on with the drivers when things are
17 starting to happen.

18 MS. ROW: I don't know they're specifically
19 designed to capture that. In fact, that came up to one of
20 the Senate staffers that rode in the cars. That was the
21 question that he had, as well. So, yes, I mean, yes, it's a
22 good question.

1 CHAIR DENARO: And there are even, if you will,
2 nefarious consequences. I mean, I heard when radar-based
3 braking systems came out for adaptive cruise control where
4 it would actually slow you down that there were kids who
5 thought it was great sport to go out there and try to set
6 the system off. So they would race into the back of the car
7 and say, oh, cool, look, and set it off. So do you end up
8 causing more accidents because stupid kids, in this case,
9 are doing things like that? I mean, at the end of the day,
10 this is one of the things that wakes me up because are there
11 things we don't know about that could create a public
12 impression of this that's bad?

13 MR. BELCHER: So the connected vehicle program is
14 going to be able to deal with stupid kids?

15 (Laughter.)

16 MR. BERG: I want to say something else. There's
17 also the other side of it. So I took a ride in this Google
18 vehicle, right? And I asked the guys who have been riding
19 100,000 miles in these cars demonstrating it to everyone, I
20 said, well, what did you think what's different now after
21 the 100,000 miles than the first day you were in this car.
22 And they said, well, I've really become aware of how stupid

1 people act on the road, because that they would never have
2 thought about driving a regular car. But now they're in
3 this car and looking at the surroundings, and they're much
4 more observant and much more aware of what's going on around
5 them.

6 So I think, you know, you can almost look at it
7 the opposite way, as well. So there may be some unintended
8 consequences that are not so good, but there may also be
9 more awareness when people have these things. MR.

10 LAMAGNA: Another aspect there is Tom and I observed when we
11 were on these test rides is, there will be some of those who
12 will want to have some freedoms over the adjustment of
13 sensitivity of these systems and how much sensitivity are
14 you going to give the operator versus how much will be fixed
15 from the factory?

16 MR. SCHAGRIN: It will probably be up to the
17 OEMs.

18 MR. SCHROMSKY: Question. More of a policy side,
19 though. I mean, is there a CALEA aspect to this at all from
20 a law enforcement --

21 MS. ROW: No, no.

22 MR. SCHAGRIN: We're not doing enforcement.

1 MS. ROW: Yes, we've not designed the system to
2 be an enforcement tool.

3 MS. BRIGGS: But that's not what you're asking.

4 MS. ROW: Oh, is that not what you're asking?

5 MS. BRIGGS: You're asking about telecom law.

6 MR. SCHROMSKY: Exactly.

7 MS. ROW: Oh, oh, I'm sorry.

8 MS. BRIGGS: So we'll talk about that later.

9 MR. SCHROMSKY: Okay.

10 MR. SCHAGRIN: Good answer.

11 MS. ROW: Good, good.

12 MR. SCHAGRIN: So with the safety pilot, what we
13 tried to do is get out of the user acceptance data, so both
14 the clinics and the actual mod deployment would give us user
15 acceptance data. The safety system effectiveness values
16 will feed into the ultimate benefits assessment that will
17 support the 2013 decision, how a system operates in a real
18 world both for the applications and security solution, and
19 the role aftermarkets can play in accelerating benefits.

20 And so at this point, I actually have a couple of
21 questions for these people who haven't been talking very
22 much. So the questions I have teed up for this group that I

1 would like to get feedback on is do aftermarket devices have
2 the potential to accelerate benefits for safety?

3 Now, what we know is that safety doesn't sell as
4 much as other things do. People will pay for parking
5 information, weather information, traffic information before
6 they'll probably pay for safety. And so while this is about
7 safety, you know, and we're looking at aftermarket devices
8 as part of safety pilot, do aftermarkets really have a
9 potential for accelerating benefits for safety? That's one
10 question.

11 And then if DSRC is mandated for safety, what is
12 the growth potential for that enabling technology, or is
13 this anticipated to be a niche market for safety only? So
14 there's no DSRC out there now, but will DSRC be this
15 enabling capability that goes beyond just safety? We need
16 it for safety and, once it's in place in the vehicles, it
17 can be leveraged for other purposes. So these are two
18 questions that I would actually like to get feedback on.

19 DR. KLEIN: Well, do you guys have a strategy
20 such that, the strategy such that aftermarket devices will
21 accelerate benefits for safety?

22 MR. SCHAGRIN: Well, our strategy is to look at

1 it as part of the safety pilot model deployment. We have
2 gone out and had some development contract issue, and our
3 plan is to have multiple vendors with their products mixed
4 into the safety pilot along with those embedded systems, and
5 so we look at how they operate in that environment. See,
6 the problem, the issue is that with the turnover of new
7 cars, which I think is now up to, is it 14 percent?

8 MR. MCCORMICK: It will be 14.4 million this
9 year.

10 MR. SCHAGRIN: But it came up, I think it's
11 increasing now, and you guys are having the best year in a
12 few. I think it's like 14 percent or something. But even
13 with that, you only turn over so many vehicles each year.
14 We've got 250 million-plus vehicles on the roads today.

15 MR. KENNER: The average age right now is right
16 about 11 years, I think.

17 CHAIR DENARO: Really?

18 MR. KENNER: Yes, 11 years. It's the oldest I
19 think maybe ever.

20 CHAIR DENARO: Wow.

21 MR. SCHAGRIN: Yes. So how do you, you know, we
22 don't want to just wait for new car turnover. We want to

1 get the existing fleet equipped somehow, even if it's just
2 that device like a toll tag that generates this basic safety
3 message that lets other people, other vehicles with the more
4 equipped systems pick them up, you know. So that is a part
5 of our, what we're looking at in terms of strategy.

6 CHAIR DENARO: Hans, what did you mean by your
7 question of strategy? What do you mean by strategy?

8 DR. KLEIN: Well, people are going to buy
9 aftermarket devices. If I was told that, by regulation, I
10 had to spend \$200 on a safety device, I'd be pissed off.
11 But I've somebody in my backseat who demands Netflix, and
12 I'm going to spend \$200 no matter what. There I have no
13 choice. So if I have to invest \$200 in the backseat
14 anyways, maybe that could satisfy all these tech specs for
15 the safety devices, and I don't even know I'm paying for
16 safety. You tell me we're giving you safety for free, and
17 I'm like, wow. Thank you, DOT. This is incredible.

18 MR. SCHAGRIN: Wait, wait, wait, wait, DOT is not
19 providing these devices.

20 DR. KLEIN: Okay. Well, I'll thank the
21 regulator. Thank you, regulators who made this happen. I
22 don't know how it happened, but I just got safety for free.

1
2 DR. ADAMS: So as I understand it, though, we're
3 trying to keep that dedicated, the DSRC, dedicated for the
4 safety. So within that, the aftermarket I can think of
5 right away, you know, as a parent of teenagers or something
6 like that, that extra layer, would that be considered
7 safety? You know, like the graduated licensing and all
8 kinds of things? I'd want to know where my kids are. I'd
9 want to know -- so there's some security issues, a little
10 more control over passengers or, you know, younger people or
11 fleets. So are those considered safety? I'm sure you guys
12 have thought about this.

13 MR. SCHAGRIN: I mean, we've talked about --

14 DR. ADAMS: I'm sure you guys have thought about
15 this, yes.

16 MR. SCHAGRIN: The thing with the DSRC and this
17 technology, it's wi-fi technology. It's shorter range than
18 cellular, and so to communicate with the vehicle you have to
19 be within range of -- well, for V2V, you're within range --

20 DR. ADAMS: Oh, yes, so that would be --

21 MR. SCHAGRIN: -- vehicles. If you're talking
22 about getting off the vehicles and into some kind of cloud

1 environment --

2 DR. ADAMS: You have to pass that -- yes, okay.

3 MR. SCHAGRIN: -- you have to pass that through
4 either an infrastructure unit or you switch over to a
5 cellular type of capability. So I think what you're talking
6 about, more of a kind of general safety for your kids, is a
7 little bit different than we're talking about for safety for
8 crashes.

9 DR. ADAMS: Yes.

10 MR. SCHAGRIN: But this technology could be
11 leveraged for those purposes, though, but you have to have
12 the connection.

13 DR. ADAMS: Oh, you'd have to have that
14 customization kind of thing where, you know, as a younger
15 driver with the buffer zone.

16 MR. SCHAGRIN: Well, that gets back into the
17 other comment about sensitivity.

18 DR. ADAMS: Yes, yes.

19 MR. SCHAGRIN: The car companies may or may not
20 want to talk about that. You know, like with some of the
21 adaptive cruise control, you can program that to be one-car
22 length, two-car lengths, and maybe a second, a second and a

1 half, or two seconds distance between you and the other
2 vehicle. I assume you can do something like that,
3 leveraging --

4 DR. ADAMS: Yes, yes.

5 MR. SCHAGRIN: -- this technology, as well.

6 MS. HAMMOND: So if everybody on the highway, if
7 there's one person who doesn't have this whatever, the
8 warning device, it doesn't work? I mean, is that --

9 MR. SCHAGRIN: No, you may have missed that
10 conversation. If a vehicle does not have the technology,
11 they will be not part of the capability. It doesn't mean
12 the system breaks down.

13 DR. ADAMS: So you can still sense them, they
14 just can't sense you.

15 MS. ROW: No. If they're in your blind spot, you
16 won't know it because you're --

17 DR. ADAMS: Okay.

18 MS. ROW: -- communicating.

19 MR. MCCORMICK: When you look at adoption curves,
20 I mean it wasn't until 2002 that OnStar actually had two
21 OnStar-equipped vehicles have a head-on collision. They
22 actually thought there was a problem, a glitch in their

1 system when it occurred because the likelihood that you were
2 just going to pass another car with OnStar, let alone have a
3 head-on collision, it would show the same accident, the same
4 air bag deploys.

5 So the issue is really when we look at the
6 adoption curve of how many do you have to have population-
7 wise before you get real benefit? In your rural areas,
8 you'll probably never pass anybody until you get 90-percent
9 adoption. In Chicago, in Detroit, in D.C., depending on the
10 level of adoption in that area, you may be as low as 40
11 percent. It may be as low as four years, and that's
12 probably the good thing about people keeping their cars
13 longer because a decade ago when we looked at this everybody
14 was keeping their car for five years. It was like who wants
15 to buy the first fax, right? Now it's like, well, people
16 are having this car longer, they're having mature
17 technologies, they're figuring out ways to pair it with
18 other capabilities so you're not having to update your in-
19 vehicle electronics.

20 In general, five years after everyone starts
21 putting it in, there will be definite realizable benefits.
22 Will there be some in the first year? Yes. It will be rare

1 and anecdotal. Will it be --

2 MS. HAMMOND: But won't the driver become
3 complacent thinking he's going to get his warnings around
4 him and --

5 MR. SCHAGRIN: I like to think of it like a horn.
6 You don't wait for somebody to honk their horn to make you
7 a safer driver. This system does not come on unless it's
8 absolutely needed. It's a safety net of sorts. So think of
9 it like a car beeping a horn at you because you're
10 distracted or something. This comes into play -- one of the
11 things they're very sensitive about and we have to make sure
12 are minimized are what's called nuisance alarms. You don't
13 want to be warning people before they need to be warned.
14 And so the timing issue, we've done a lot of research in
15 that area to make sure that we're not waiting too long but
16 we're not warning too early either.

17 CHAIR DENARO: Well, related to that, though,
18 there's also the missed, I mean the false alarm where you're
19 alarming somebody and there wasn't a problem. And people
20 are going to get really upset. They're going to take their
21 car back, I'm going to take my Ford back and say fix my car,
22 it doesn't work, and you're not going to be happy about

1 that.

2 MR. MCCORMICK: The human factors people have, is
3 that they know that 20 percent of the drivers do nothing
4 when they're given an alarm, an alert that says your oil is
5 hot. Twenty percent of the people just ignore it, and
6 that's not just in the U.S., that's worldwide. They just
7 ignore it. And if it ever comes on, they're kind of like,
8 well, I'm going to drive 20 miles and then maybe I'll call
9 and figure out what it is or pull over and look at my
10 manual. So those 20 percent of the people are going to end
11 up being the ones that are the most critical, and that's why
12 you have to get to a more times driving scenario where the
13 car will brake for you or keep you in your lane.

14 MS. ROW: If I could just go back for just a
15 moment to the aftermarket discussion because some of the
16 things that you guys just pointed out is the reason that
17 we're so interested in understanding if that has some
18 potential because it gives us benefits quicker and, you
19 know, it just helps. But if you start thinking about that,
20 you don't have to think very long before you begin to run
21 into some dilemmas. So first of all, why would, after
22 somebody who's making something that you can carry in a

1 vehicle, why would they spend the extra money to make theirs
2 capable of communicating? Why would someone buy it for
3 extra money? You know, how do they see the value
4 proposition? But at the same time, you also have to have a
5 relationship with the automotive industry because it only
6 works if you're going to be able to give out some amount of
7 information coming from the vehicle, or you only have access
8 to a part of the basic safety message that you can get from
9 an autonomous piece of equipment, like this is riding in a
10 car. So then what kind of applications can you get out of
11 that? Does it make a difference?

12 MR. SCHROMSKY: I mean, my own personal use is I
13 look at it like a navigation system. My vehicle at the time
14 didn't have a navigation system, so I bought a Garmin or
15 TomTom. You know, I didn't want my wife to get lost and, my
16 perceived safety, this is what I want to do. I like your
17 point is it's a little bit more that I have to talk to the
18 vehicle, not just the eyes in the sky, so I do think there's
19 a large aftermarket for that if there is a perceived need,
20 value slash safety. So I think it's -- or if I just bought
21 something and then GM or Ford comes out with something great
22 next year and I bought my car last year, I might want to

1 have an aftermarket that they want to offer that I can take
2 advantage of and buy it and hook it into it, right?

3 MR. STEENMAN: People probably pay for efficiency
4 and obtaining experiences. I think the key here is that if
5 we can make the data that comes out of it anonymous and, as
6 a result of it, you have an opt-in and say if you buy this
7 and you opt into these things and you get it for free, but
8 you get all these other great benefits back, like, you know,
9 you get like real realtime data updates on traffic because
10 now we know throughput and to get you from A to B, we know
11 how to accurately reroute you. There's probably a whole
12 bunch of other things you can do if you can make the data
13 anonymously available outside of the vehicle.

14 MR. MCCORMICK: That is kind of the fundamental
15 problem when you deal with aftermarket is that no one does a
16 very good job of articulating the value proposition. Until
17 they do, safety is not going to drive the application.

18 MS. ROW: Right. It's packaging it with
19 something else.

20 MR. MCCORMICK: Personal experience or personal
21 benefit does.

22 MR. STEENMAN: They're the people who are willing

1 to pay for it.

2 MR. LAMAGNA: What are the ancillary benefits of
3 putting this in your car? I think there's a certain
4 percentage of the population that will expend the money for
5 safety's sake. I don't think that's the overwhelming
6 majority of the population, but if you can find other, what
7 Hans was saying, what else do I get, you know. Perhaps it's
8 a break on insurance premiums, perhaps it's a break on
9 registration for the cost of the vehicles. What are those
10 secondary benefits that I would get for deploying this in an
11 aftermarket? That's where I think you start to get people
12 to cross the chasm of does this become mainstream or not.

13 MR. MCCORMICK: But you're absolutely right. I
14 mean, there are applications you can put on your phone that,
15 you know, you pay for it and it detects if you're going more
16 than five miles an hour, it disables texting. I talked to
17 the guys that run those companies. A hundred percent of
18 their clients are parents putting it on their kid's phone,
19 not their phones.

20 CHAIR DENARO: Will this aftermarket device have
21 GPS in it, or is it expecting to get that from the vehicle?
22

1 MR. MCCORMICK: This could be the aftermarket.

2 CHAIR DENARO: I understand. But your concept
3 here, are you talking about a device that actually would
4 have, it would be the GPS --

5 MR. MCCORMICK: Yes. Unless your car already has
6 it. If your car has it and you're connecting through the
7 OBD, too, you could use its --

8 CHAIR DENARO: Assuming a device is designed that
9 way. That's why I'm asking.

10 MR. MCCORMICK: But that may be a choice that the
11 automakers choose to say I'm going to make this port
12 available or not.

13 CHAIR DENARO: Well, but, see, now I have a
14 problem. If I have an aftermarket device that's kind of
15 free-floating its own GPS, then maybe the operational, the
16 specs break down of how this thing is supposed to work.

17 MR. STEENMAN: Well, you can guarantee it. It
18 would almost have to have GPS in it to guarantee the
19 capability because, if you have to borrow the GPS from
20 something else, you don't know what you're borrowing.

21 CHAIR DENARO: True. But, back to Shelley's
22 point, now that it's aftermarket and I stick that in my

1 dashboard or where I choose to pick it, its performance
2 might be severely degraded and it doesn't meet the spec here
3 of how it needs to work. So I don't know.

4 MR. CALABRESE: I just want to ask if you've done
5 any market research. I mean, I may be the odd one in the
6 room, but I think people would pay for it if the price is
7 reasonable. Have you done any market research to see what
8 is the price point? I mean, market this to mothers with
9 young kids and of teenagers and everyone is going to say
10 I'll take it if the price is reasonable.

11 MR. SCHAGRIN: The short answer is no. The long
12 answer is we're focused on enabling the safety capability,
13 but then we also have to think about this aftermarket
14 strategy to some extent. We're not into the marketing.
15 That's industry. But I think the answer to the question is
16 if you aftermarket this you've got to determine what the
17 demand is going to be.

18 MR. CALABRESE: It's a no-brainer that it should
19 be an aftermarket product. If the price is reasonable, I
20 think it will sell. But I think market research strategies
21 would help you get --

22 MR. STEENMAN: There's probably analogies, right?

1 I don't know if airbags were ever an option that you could
2 actually mark off on your buying criteria for a car and how
3 many people actually bought it, where if it was only the
4 adoption might have been, like, you got installed.

5 MR. BERG: Put them in another package. To be
6 honest, the value might come from another feature in that
7 package.

8 MR. CAPP: It's hard to believe optional airbags
9 never sold very well.

10 MR. STEENMAN: Right, okay. So I think that's a
11 really good adoption indicator for this safety technology.
12 People would not pay for it.

13 DR. ALBERT: Just a reflective comment for a
14 moment. You know, the only thing that's really been
15 deployed nationally, I would guess, in ITS has been 511 and
16 are ubiquitous across the United States when you pick up
17 your phone and you dial 511 to get information. And the
18 assumption in deploying 511 was, oh, everyone is going to
19 want it to know about congestion and improve mobility. What
20 we generally found was that 511 was predominantly used when
21 there were weather events, when weather was the problem. We
22 all went into the 511 thinking, oh, yes, people are going to

1 want this. So I guess my point that I'm making is let's
2 make sure we understand what people are going to use things
3 for before we go out and try to deploy them.

4 MR. SCHAGRIN: Just to get back to your marketing
5 question, we did sort of the embedded systems, as part of
6 our driver clinics, ask questions about price points. We do
7 have some data, but it's not for aftermarket, it's for those
8 embedded systems that was part of the class. And we
9 actually have that data. It's all being distilled. There
10 was a presentation this week that talked about some of that
11 data. If you want it --

12 MR. CALABRESE: How well did the OnStar
13 aftermarket thing work if there was ever a price point issue
14 --

15 MR. CAPP: I'm not certain how well it's doing.
16 It's a new product. I actually don't know how well it's
17 doing. But we honestly believe that there's interest,
18 right? We believe that there's interest because it's a lot
19 of work to, the commitment it takes to integrate these new
20 technologies into a vehicle. It also takes a lot of
21 investment to create something that's an aftermarket quality
22 and whether it's an OEM aftermarket or whether somebody else

1 decides they're going to sell them, you know. But to Mike's
2 question, do aftermarket devices have the potential to
3 accelerate benefits for safety, we're going to prove that,
4 but I think all of us think, yes, they do have potential.
5 We have to think of different ways of how do you make people
6 want that aftermarket device because its benefit will be
7 limited. It may be reduced from the integrated system, and
8 it will be not much at the beginning of the cycle. Somebody
9 is going to have to invest something to make people want
10 those devices.

11 CHAIR DENARO: It's like buying the first fax
12 machine. Who are you going to fax to?

13 MR. CAPP: Sure.

14 DR. KLEIN: Some aftermarket devices, maybe many
15 of them, will only be truly useful if they can be integrated
16 with the onboard network and get some vehicle data, as well.

17 And there's, I'm sure, technical questions there of
18 compatibility. There's market questions: are the two
19 parties, do they have incentives and a business plan to get
20 them to link together? In the world of telecommunications
21 and telephony, they found sometimes that the different
22 networks did not have incentives to interconnect. In fact,

1 the FCC, at some point, stepped in and said there's
2 mandatory interconnection in order to get full
3 functionality. Has that scenario ever been considered of
4 incentives for interconnection, standards for
5 interconnection? Would we have an FCC-type scenario where,
6 in order to get the public benefits, you'd almost give
7 everybody a little push to interconnect?

8 MS. ROW: I don't think we're quite there yet,
9 Hans. Those are good thoughts. I just don't think we're
10 quite there yet to understand what that might look like and
11 what's needed.

12 MR. MCCORMICK: Yes. There's so many different
13 ways to achieve the functionality that you're talking about,
14 whether it's combining -- some automakers, a number of
15 automakers are looking at trying to figure out if they can
16 contact them here and there so it does that. Others are
17 looking at Nokia's -- what do they call it? The connection
18 between -- yes, terminal modem. It's now called --

19 CHAIR DENARO: MiraLink.

20 MR. MCCORMICK: MiraLink, yes. They're looking
21 at MiraLink which is a mechanism where you put a device,
22 embed a device in the car, and then the phone has the

1 ability to act as a passive transceiver; therefore,
2 eliminating your need to have two cell chips and everything
3 else. So there's a whole number of different ways to
4 implement. The question is what is it that you want them to
5 be able to accomplish by the spec, rather than define a
6 technology requirement which could be obsolete in a matter
7 of months. So I think the way they're going is actually the
8 safer route than to worry about, you know, certified by
9 performance, not by physicality.

10 MS. ROW: And one just quick thing to put on the
11 table just because you're advising the federal government,
12 we are looking at the federal role in that. So we don't
13 ever expect to be manufacturing anything, of course.
14 Wouldn't that be a scary thought? You know, so there's a
15 limit to what market research we would do, but we are trying
16 to be a catalyst to help all those creative, inventive
17 people who are making consumer devices, who are thinking
18 about where's the value, how do you bundle it, to be able
19 to, what do we need to do to help that along, like your
20 example with the FCC. And so that's one of the things, as
21 you guys are pondering this and thinking about it, that's
22 the frame that we're coming at this is how can we be an

1 enabler to that industry.

2 MR. SCHROMSKY: One thing, going back on the chip
3 and that technology, one of the things that we face as we go
4 into machine-to-machine and all the carriers in telecom is
5 that chip is going to cost. So standardizing on a
6 technology slash chip would greatly benefit both the OEM
7 side and also aftermarket because that's one of the things
8 about LTE, it's not us, it's an IEEE, 3GPP standard. It's
9 going to what GM and Ford is going to put in their vehicles.

10 That's also what LMR is going to use for the public safety
11 radio network. That's also going to be used for, you know,
12 if LG wants to make a refrigerator. All those chips that
13 cost will be greatly reduced, no different than what Intel
14 did with wi-fi and everything else, that I like the idea of
15 picking that standard technology for your field because I
16 think that will prove both the OEM adoption, as well as
17 aftermarket, if there's one standard to build off of because
18 that would greatly increase the adoption because I can tell
19 you chips that cost, that is one of the biggest hurdles.

20 MR. BERG: Over a billion wi-fi chips were sold
21 last year, and in 2015 I think it's up to five billion or
22 something. So it's even more prolific than the cellular

1 phone industry.

2 CHAIR DENARO: These discussions are great, by
3 the way. And you're right, Shelley. We did not have to
4 worry about that. Let me suggest, we're going to have our
5 focused discussion in the afternoon. Let's bring these
6 points up, but let's not get too deep into the discussion.
7 We can defer that to later. However, I would like anyone
8 who brings up something to capture that because these are
9 potential focus items for us to think about. So I'll use
10 Hans as an example: this whole idea about maybe we need to
11 extend this concept of what the aftermarket thing is and
12 maybe it will enable it to do other things, as well, as part
13 of the strategy for an aftermarket device. You know, let's
14 capture that and let's let you be the proponent for that.
15 This afternoon, let's bring that back up and have a little
16 more discussion. But I'd like to get through and make sure
17 we get all the information from the JPO folks so we can get
18 through that, okay? So please do capture your thoughts like
19 that and bring them back up later, and I'm trying to do the
20 same.

21 MR. SCHAGRIN: All right. So, quickly, these are
22 the applications that we've been looking at in the driver

1 clinics. Forward collision warning: a car on a highway has
2 slowed down suddenly or stopped, and you don't want to rear-
3 end it. Things like emergency electronic brake light when
4 somebody does slam on their brakes, and maybe it's the car
5 in front of you or several cars in front of you, you get
6 this communications data that they slammed on their brakes
7 and it warns you. And there's other applications of that
8 that we talked about, as well. So this is vehicle-to-
9 vehicle, and it's also a vehicle-to-infrastructure type of
10 application. We have curve speed warning or possible red
11 light violation warning.

12 Okay. So this is an example of some of the DVIs,
13 or driver vehicle interfaces, that we --

14 MS. ROW: You can make the sound, Mike.

15 MR. SCHAGRIN: Beep, beep, beep, beep. Actually,
16 I was thinking about showing how they differ in some cases.

17 They warn the driver with either audible -- they all have
18 audible. They all have audible. They may even all have
19 visual, and the visual could be something that's embedded in
20 the dashboard or it could be like up here where you have
21 like this heads-up display that you've seen on production in
22 some of the Volvo type stuff.

1 And there's also the vibrating seat. It's
2 actually directional, so if a car at an intersection is
3 coming from the left-hand side, it will vibrate on the left-
4 hand side. If it's coming on the right-hand side, it will
5 vibrate on the right-hand side. So there's audible, visual,
6 and haptic warnings, and sometimes a combination of those,
7 that help to warn the driver.

8 Okay. These are locations of the driver clinics
9 I have mentioned a number of times. We did them in
10 different parts of the country to gauge different driver
11 preferences and get feedback from these different types of
12 populations. And like I said, we also did performance
13 testing of technology when we weren't actually having the
14 clinics taking place.

15 Okay. The model deployment sites, the 3,000
16 vehicles. Ann Arbor, Michigan, we're doing ramp-up right
17 now. We'll be kicking it off on August 21st and collecting
18 a year's worth of data. We got roadways instrumented with
19 infrastructure. We've got, roughly, 3,000 vehicles,
20 including cars, trucks, buses, integrated vehicles. We
21 actually are working with eight of the car manufacturers as
22 part of a consortium of CAMP VSC3. I don't know if you

1 people know what that is or not, but it's a car consortium,
2 eight manufacturers. We'll be supplying 64 vehicles with
3 integrated systems as part of this. We'll have 300 vehicles
4 with aftermarket safety devices, and the remaining will have
5 these like toll tag type of devices. They simply generate
6 an auto message. They don't receive anything, and they
7 don't interact with the driver at all. And the idea is to
8 create a highly concentrated environment, so we do have the
9 vehicles that are equipped with technology crossing or
10 coming into contact with one another during this one-year
11 period. And many of those vehicles will have very extensive
12 data collection systems that we talked about earlier for
13 collecting data that will be analyzed in terms of helping to
14 assess the effectiveness of the systems.

15 All right. Let's go to the next slide.

16 MS. ROW: I'm sorry. Would you also just briefly
17 mention, as I segue to the next one, the exercising of the
18 security options as a part of safety pilot?

19 MR. SCHAGRIN: We will talk about security more
20 later, but what we're looking at is how do you enable the
21 security capability, that is, each of these devices need to
22 have a certificate so that it becomes a trusted source, so

1 that when you're getting information from one vehicle to the
2 other that you can actually trust that it is a legitimate
3 message. So what we're looking at are the options for
4 security that include -- there's a couple of different
5 options we're looking at. There's a vehicle-to-
6 infrastructure DSRC link. That doesn't have to be realtime.

7 That's just a way of getting information from a
8 credentialing back-end office to a vehicle, and what it can
9 do is going to revoke the certificates, too, and take them
10 off the grid, basically. It's not disabling the vehicle,
11 it's disabling the vehicle to be able to generate bad
12 information, okay?

13 So we're looking at DSRC link from vehicle-to-
14 infrastructure. We're looking at cellular, and we're
15 looking at possibly another option, as well, in terms of
16 certificate and credential management. I think, Val, you're
17 going to talk about that more this afternoon, right?

18 MS. ROW: My point here is that in the safety
19 pilot we're going to be doing a DSRC example, and then
20 you're also going to be testing the cell example. Yes. So
21 that's also part of what we're doing in safety pilot, and
22 that's a big thing.

1 MR. BERG: Mike, have you modeled the mean of
2 number of interactions you expect in this environment?

3 MR. SCHAGRIN: Yes. Okay. That's a really good
4 question because it's good background. So before we
5 actually went and started, the very first thing we did when
6 thinking about the safety pilot model deployment was, well,
7 how big does it need to be? What do we need for
8 interactions? And so we actually did a very rigorous
9 analysis up front to determine how many vehicles we needed
10 to have, what kind of interaction rate we needed to have.
11 And so the safety pilot model deployment was spec'd out
12 based on that analysis by Volpe in connection with this.

13 MR. BERG: So do you know how many interactions
14 are expected?

15 MR. SCHAGRIN: Yes, we have projections on, we
16 actually have that data in terms of our projections on what
17 we expect to get with this size of a vehicle fleet.

18 MR. WEBB: Mike, I kind of want to pick up on
19 that because I'm sitting here trying to think of either the
20 accidents or the number of adrenaline-rush situations that I
21 could recall or my family has been involved in in their
22 driving over the course of the last year. So I think that's

1 sort of where we're, I was trying to get ahead because I'm
2 trying to understand what the driver expectation is on these
3 systems, you know. Seat vibrating or voice talking or
4 whatever, if it pops up once every 18 months, you know, the
5 driver is, well, I bought my car, I don't know necessarily
6 because I'm not going to experience it. It's different than
7 having the GPS in your car or whatever that you're
8 interacting with at all times.

9 So I guess that's what I was interested, too, is
10 for how, for a regular driver in the course of a 12 or
11 15,000 miles a year, would they get into some of the safety
12 situations that these devices are intended to --

13 MR. SCHAGRIN: So one thing is we don't expect
14 there to be a crash during this time period. You know, we
15 really don't because of the short period of time, one year.

16 Three thousand vehicles were selected if a crash actually
17 occurred. But the analysis was done with things like near-
18 misses and other scenarios where you can get data without
19 actually having a crash occur. And so like I said, Volpe
20 did that analysis, and so it's that data we'll use to help
21 check.

22 We also have data based on other trials that

1 we've done. There's actually modeling simulation that will
2 be taking place, as well, based on other field trials and
3 other data. So it will all feed into our projections in
4 terms of all this.

5 MR. WEBB: But I guess my basic question is what
6 kind of numbers do you, the studies have indicated that the
7 average driver, if there is such a thing, could expect?
8 That's what I'm saying.

9 MR. SCHAGRIN: If you want that data, I'd be
10 happy to provide it. I don't have the numbers off the top
11 of my head, but we do have numbers and what our projections
12 are, given this kind of an environment, what we can foresee
13 in terms of things like near-miss situations and where the
14 alerts would actually go off.

15 MR. CAPP: There's knowledge, too, I mean, even
16 though this whole pilot that Mike is talking about is
17 talking about using DSRC and a little bit of cellular as the
18 sensor for doing these features. In the field, we have some
19 experience already with people that have features that do
20 some of the same thing, these different sensors. And so we
21 have knowledge on how people respond to some of these, and
22 some of that knowledge has been collected the same ways,

1 through field studies where you collect their responses with
2 other cameras and data in the vehicle and understand the
3 customer only sees this, or driver, once every couple of
4 years, are they going to know what to do?

5 So some of the benefit, Mike showed some of the
6 driver interfaces there, it's already benefitted from some
7 of that work that's been done. We've found in industry some
8 effective ways to help alert people without bothering them.

9 We're trying to find that balance, and so this is building
10 on that with this new sensor.

11 MS. ANDREWS: I may be a step down the line, but
12 will there be data collection as far as interactions with
13 types of vehicles? So I encountered a motorcycle and this
14 is what the system gave back to me, or I encountered, you
15 know, a Class 8 heavy-duty vehicle and this is what the
16 system gave back to me.

17 MR. SCHAGRIN: Right. So the only data that will
18 be collected, it kind of goes back to that other question,
19 is both vehicles have to be equipped, so there's no
20 motorcycles as part of this model deployment, so it won't be
21 interacting with motorcycles. But if a car and a light
22 vehicle, a car and a truck talk to each other, we'll have

1 that data. So we'll know whether it was the car or the
2 truck or the bus. But for those that are not part of the
3 actual system, they won't be part of that data collection.

4 MR. STEUDLE: Hey, Mike, if I could add, to
5 increase the potential frequency of interactions for this
6 pilot study, U of M has selected kind of the northeast
7 corner of that area where people are going to be going into
8 the same spot. So they're not taking a broad, you know,
9 everybody lives around an area of a 20-mile radius. They're
10 pinpointing people that live in this spot that commute on a
11 daily basis to increase the interactions that could occur.

12 MR. SCHAGRIN: Let me build off of that. So the
13 area we're talking about, you know, this is downtown Ann
14 Arbor and this is the area that we have as our area of
15 concentration that we're trying to create. And so what
16 we're doing right now is trying to solicit drivers, and what
17 we don't want are the drivers that just go into work at 8:00
18 in the morning and then the car sits all day and then they
19 go at 5:00 back home. We're looking for flow, continuous
20 flow. So we're trying to find drivers that are coming in
21 and out of that area and going through the area throughout
22 the day. So we're trying to get as much continuous flow as

1 possible.

2 MR. STEUDLE: They said the way you did it,
3 there's a hospital right in the middle which has 24/7
4 operations, which was part of that. And then they targeted
5 the school, there's a big high school right there, to get
6 that interaction, as well. And actually the uptake of
7 people volunteering has been pretty significant.

8 MR. SCHAGRIN: It's been phenomenal, actually.

9 MR. STEUDLE: They came up with a creative way of
10 saying we will donate some money to the school's athletic
11 fund or something if you sign up in your name. So the
12 principal thought this was a great thing, and he got all
13 kinds of parents to sign up.

14 MR. SCHAGRIN: We had, roughly, 1,000 people sign
15 up in the first couple of days. So we actually started two
16 weeks ago or a week ago, and within like 48 hours we had
17 1,000 people signed up. The incentive was we would give
18 \$100 to the parent, but if you'd like to donate that to your
19 school, you know, \$100 doesn't mean much to an individual,
20 but when it's the parents of a kid, that means you get
21 \$30,000 or \$40,000. That's why there's so much incentive by
22 the principal.

1 All right. Next slide, please. Okay. So this
2 is about the agency decision. Right now, in that left-hand
3 box, the pre-model deployment is ramping up. August 21st is
4 our start date, and we'll have a year of model deployment
5 testing. And we'll do evaluation in parallel and have that
6 data pulled together to support that 2013 decision. As I
7 said earlier, all options are on the table in terms of
8 what's being considered, but the decision will be based on
9 the data that we get both from the safety pilot, from the
10 driver clinics, and from other previous field trials that
11 have been done that are helping with modeling simulation.

12 MR. BELCHER: Mike, for those of us who aren't as
13 familiar, can you talk about what the range of options are?

14 Because there are other options besides just a rulemaking.

15 You can't? Okay.

16 MR. SCHAGRIN: I've been counseled by NHTSA.
17 It's the standard language now that all options are on the
18 table.

19 MR. BELCHER: All right. I apologize.

20 MR. SCHAGRIN: Can we see what is in the section,
21 which is --

22 MR. BELCHER: It said the same thing in the

1 section.

2 MR. SCHAGRIN: All options are on the table.

3 Now, what I can say, because it was said before, is that we
4 are -- and I was corrected for it, so it my opportunity to
5 get back here. Is that it is about, the safety pilot is
6 about warning the driver. There is no control element in
7 here. There's no automatic braking, there's no automatic
8 steering. However, we are doing research in the control
9 area beyond safety pilot. The consideration for the
10 decision point will take everything that was on the table,
11 including warning and control in terms of contributing to
12 the benefits that support a decision. So that's what was
13 talked about.

14 So it's the full range of more research to
15 regulation. The vast majority is about warning, but there's
16 data on control elements, as well, that will feed into that
17 decision, consideration. I hope that helps, Scott. I'm
18 sorry to be vague.

19 MR. BELCHER: I apologize for the question.

20 (Laughter.)

21 MR. SCHAGRIN: Okay. So --

22 DR. RAJKUMAR: Mike, when do the CAMP vehicles

1 get delivered?

2 MR. SCHAGRIN: When do the CAMP vehicles get
3 delivered? They're already going through the pre-
4 deployment. I mean, CAMP is in Michigan. Ann Arbor,
5 Michigan is the deployment site. They're there within close
6 proximity to each other. They're doing pre-mod
7 interoperability testing now. They will be delivered
8 physically onsite before the start date of August 21st.

9 DR. RAJKUMAR: Excellent, excellent.

10 MR. SCHAGRIN: Okay. That's it. Any other last
11 questions or -

12 MS. ROW: Oh, could you very quickly talk about
13 scalability?

14 MR. SCHAGRIN: All right.

15 MS. ROW: See, you put them in front of me. You
16 should have known better.

17 MR. SCHAGRIN: All right.

18 MS. ROW: You can skip the other ones, but if you
19 could just mention this one, just mention this one.

20 MR. SCHAGRIN: That one?

21 MS. ROW: Yes, just that one.

22 MR. SCHAGRIN: Okay. So scalability testing.

1 What we're doing right now is it has to do with the
2 congestion issue. What happens if you have a whole bunch of
3 vehicles communicating at ten times per second? Huge. So
4 if we have our vehicles, you know, the red dots are the
5 stationary objects that are generating ten times per second.

6 And then we have vehicles, which are the green dots,
7 running around the track trying to clog up the system,
8 basically.

9 And then we ramp up some more, and we've got more
10 dots, moving and stationary. And we've got, what do we do?

11 50, 200, in preparation for the model deployment of 3,000,
12 although in the model deployment not all 3,000 will be in
13 the same communication area. And so we just keep ramping up
14 with more and more. DR. RAJKUMAR: What is the distance
15 from left to right?

16 MR. SCHAGRIN: Is this, actually --

17 MR. BERG: The ones on the right can't hear the
18 ones on the left.

19 MR. SCHAGRIN: Do you know how far they can hear,
20 how far the range is to this site? Do you know --

21 MR. BERG: It's about 500 meters, I think.

22 MR. SCHAGRIN: So it's a little bit outside of

1 the range.

2 So that's what where we're going for the
3 congestion testing to make sure that we have no problems.
4 We actually go to the field trial. This is really, this is
5 really stressing out the system a bit.

6 MS. ROW: Because it's actually, I think the
7 point is it's probably less about Ann Arbor and it's more
8 about if you were on a congested freeway segment and you got
9 all these vehicles in one spot all communicating ten times a
10 second.

11 MS. HAMMOND: But I don't see any vehicles
12 merging in with the other flow traffic. They all look
13 independently operating.

14 MS. ROW: They are.

15 DR. RAJKUMAR: Detecting the left and the right.

16 MS. ROW: Paula, this is message congestion.

17 MS. HAMMOND: Oh, I see.

18 MR. SCHAGRIN: It's not about the actual vehicles
19 merging.

20 MS. HAMMOND: So it is not warning them of a merge

21 --

22 MR. SCHAGRIN: What we're trying to do is break

1 down the system of having too much communication taking
2 place, and we actually got very good results on that.

3 DR. RAJKUMAR: So you don't see any problems,
4 Mike?

5 MR. SCHAGRIN: No. I mean, they're tweaking it,
6 but they know how to operate it very well.

7 MR. STEENMAN: Do you know when it that breaks?
8 Does it break at 5,000 vehicles, at 10,000 vehicles?

9 MR. SCHAGRIN: We don't know yet. We haven't
10 really --

11 (Simultaneous speaking.)

12 MR. SCHAGRIN: Okay. Let me tell you about
13 congestion strategy real quickly. We're working with the
14 Europeans on this. I mean, we're actually doing a lot of
15 work between U.S. and Europe on this harmonization of things
16 like security, congestion, data sets.

17 On the congestion, our approach has been to look
18 at ten times per second and then maybe draw it back if we
19 need to on the number of messages. The Europeans start at
20 two times per second and throttle up as they need to, okay?

21 So there's some of that going on.

22 The other thing is if it's so congested that

1 nobody is moving, it doesn't matter, right? When you have a
2 parking lot on the freeway and all these vehicles are there,
3 it doesn't matter really if they're communicating or not,
4 from a safety perspective. They don't need it. There's a
5 point where you hit the threshold where you still need it,
6 there's so much traffic, you're slowing down, and you don't
7 really need it anymore. So we haven't really broken the
8 system yet in terms of the volume.

9 DR. RAJKUMAR: So I believe, if you take the
10 total bandwidth of DSRC, look at I guess the size of each
11 piece and the basic safety message, the size of this
12 message, I think the raw number of vehicles can be -- the
13 range is 250 vehicles at the max. But there will be a bunch
14 of optional stuff on top of that and, basically, I guess
15 that's only the useful data and the header information and
16 so on. Practically speaking, we are probable at about 100
17 vehicles or less in a range of, at these --

18 MR. SCHAGRIN: I don't know that the numbers are
19 substantiated. When you talk about the 100 vehicles or 250
20 vehicles, I don't think that, you know, we've actually
21 exercised it and have been very successful at the roll out
22 with those kinds of numbers.

1 MR. MCCORMICK: You've got to understand. You're
2 not parked. It's not like having 100 vehicles in a 300-
3 meter diameter. They're moving, and the theoretical number
4 that they came up with a number of years ago, this was back
5 when AT&T was getting into WiMAX, Everybody went, wait a
6 minute. That's divisible bandwidth.

7 When we looked at it, the number is somewhere
8 close to 20,000 vehicles. That's presuming they're moving
9 and presuming they're only sharing the information that's
10 relevant. And at the time, it wasn't all ten data pieces.
11 They were assuming you were using, you know, two channels to
12 do a handshake and do a validation. So it's yet to be seen,
13 but that's the importance of this test is to find out
14 exactly what is the load.

15 DR. RAJKUMAR: Is it 11 megabits per second?

16 MR. BERG: I think so. Or six.

17 DR. RAJKUMAR: Six? I see.

18 MR. STEENMAN: If you're in LA and you have,
19 like, two intersecting 12-lane highways that are going at 30
20 miles an hour, a pool of traffic, that's a lot of cars --

21 MS. ROW: That's a lot of cars.

22 MR. STEENMAN: -- in a small area.

MR.

1 SCHAGRIN: Yes. No, you have to deal with the elevation
2 thing, too, because, you know, if you're on a bridge or
3 overpass and somebody is coming, you don't want to send out
4 a warning when you don't need it, so that's all part of
5 this.

6 DR. ADAMS: So when you did this, you actually
7 had cars equipped and ran around --

8 MR. SCHAGRIN: Yes. We had two --

9 DR. ADAMS: -- and drivers and rental cars and --

10 MR. SCHAGRIN: Yes. How much rental cars we had
11 to do to -- we put stuff on the vehicle, and those vehicles
12 are all going.

13 MS. ROW: Yes, but the red dots are stationary.

14 DR. ADAMS: Right, right, right. But they were -

15 MS. ROW: They were transmitting.

16 DR. ADAMS: Wow.

17 DR. RAJKUMAR: So, Mike, how many vehicles are
18 there?

19 MR. SCHAGRIN: That number says 200 vehicles,
20 stationary and moving. Yes, we scale it up from 50 to 100
21 to 200. And then the last slide, the last back-up slide is
22 just to represent that performance testing that we did as

1 part of the clinics. And even before the clinics, there
2 were -- you know, because recognizing that Chicago has a
3 different environment than Nevada.

4 CHAIR DENARO: This is the performance of what?

5 MR. SCHAGRIN: Of the communication, how well it
6 communicates between vehicles. GPS is part of that. Yes.
7 with all the multipath and everything, yes, to be sure it
8 operates everywhere, that it can operate on plateaus.

9 MR. BERG: And they even used it for GPS devices
10 in each car.

11 MR. SCHAGRIN: Oh, yes, that's another thing.
12 That's a good point, Roger, is that, as part of the safety
13 pilot, we put it in their deployment to have multiple
14 vendors. So it's not a single vendor talking to itself.
15 You know how that goes. You have to make sure that
16 interoperability is key, and we found out a lot of
17 information based on the fact that we had multiple vendors
18 operating with one another. So that's a huge hurdle, and
19 we've actually been able to specifically navigate through
20 that for the infrastructure and for the aftermarket devices.
21 And then, of course, with the CAMP vehicles, there's nine
22 different models, eight car manufacturers.

1 (Simultaneous speaking.)

2 CHAIR DENARO: So time check. So that was only
3 V2V?

4 MS. ROW: That's right.

5 CHAIR DENARO: Who's going to talk about network
6 security? You are? Lunch is outside. One suggestion is a
7 working lunch. Is anyone opposed? You guys mind singing
8 for your lunch? Valerie? Do you mind talking through
9 lunch?

10 MS. BRIGGS: Oh, I can talk through lunch. I
11 don't get lunch anyways.

12 MS. ROW: We don't let her eat lunch.

13 CHAIR DENARO: We're learning a lot. Okay. Why
14 don't we take, you know, 15 minutes to get lunch, get back
15 in here. We probably need to clear some of our stuff off
16 here, and we'll go ahead and work through lunch.

17

18 (Whereupon, the foregoing matter went off the record at
19 11:49 a.m. and went back on the record at 12:13 p.m.)

20

21 CHAIR DENARO: All right. Some of you have
22 finished lunch already, but for the rest of us we'll have a

1 working lunch. And Valerie is going to present for us.
2 Good discussion, by the way, prior to lunch. Let's keep
3 that up. That's great. Scott had a great suggestion.
4 Let's let it flow, and I agree.

5 MS. BRIGGS: So as I mentioned earlier, I'm the
6 policy person here in the JPO doing the policy research. So
7 yesterday I found myself at the ITS America annual meeting
8 doing a very similar presentation on the cyber security
9 experts from the auto industry, both GM and Ford. You know,
10 they were talking about all of these concepts, and I thought
11 how on earth did I get here? I never thought I'd be giving
12 presentations on cyber security, but it is actually, at
13 present, our biggest challenge in public policy, and you'll
14 see why as we go through this. And we really need some good
15 solutions in this area.

16 So the challenge in this arena, traditionally
17 when we think of security, at least I think of someone not
18 being able to attack my system. But in this case, security
19 is not just defense against attacks, but we also have to
20 recognize that we have a bunch of competitors, I mean
21 vehicle manufacturers who are competitors, as well as just a
22 lot of different players who need to communicate with one

1 another. And not only do they need to communicate, but they
2 need to be able to send messages that are going to be the
3 basis for vehicle safety applications that could save
4 someone's life.

5 So these vehicles need to make sure that those
6 messages are legitimate, that they're real, and that they
7 can trust them before they take an action based on the
8 messages. And so the real challenge in terms of security
9 here is that trust and enabling a trust network.

10 Layer on to that the fact that you have vehicles
11 in an environment and people don't want their vehicle to be
12 able to be tracked. People want to have relative privacy as
13 they move through the system. And so there are not a lot of
14 systems out there that we're aware of where you're going to
15 create an anonymous, private, secure system. And if we put
16 those together, it really makes for a complex environment
17 because some of those goals are generally conflicting. They
18 also work together, to some degree.

19 And, of course, you can design any system, but
20 then is it really implementable? And that's kind of our
21 challenge is how do we make something that can be
22 implemented, as well as just thought about on paper?

1 And so if you want to jump in, George, you can
2 jump in.

3 MR. WEBB: Just very quickly that, I mean,
4 invariably, every time I get in front of the county
5 commissioners sitting in the transportation committee,
6 privacy is the number one issue as far as this future
7 system. They've got the concept, vehicles talking to each
8 other, whatever, but privacy comes up in their minds as the
9 number one issue as far as the concern. So I just want to
10 relay that to the group.

11 MS. BRIGGS: Right, right. And so this is the
12 challenge here. We had a number of -- well, okay, next
13 slide. We've been working with the auto companies and a
14 number of security experts on looking at this problem
15 because you really kind of have to understand the vehicle
16 environment as well as understand the security environment
17 to address it. And so this group of security experts and
18 automakers have really looked at all different ways of doing
19 security, and they decided that the best way to do security
20 is through a PKI system because it's the most secure way to
21 do it. And this basically involves a secret code that is
22 generated somewhere, and then there are certificates that

1 are generated based on some aspect of that code and sent out
2 to all of these vehicles. Vehicles have these certificates,
3 and then they basically sign them and they send them to
4 other vehicles. And then since the other vehicles know that
5 basic element of the root code, then they're able to know
6 which vehicles are trusted. That's probably about as much
7 as you need to know. That's about as much as I know.

8 So it's based on this exchange of certificates.
9 Well, the other challenge that we have is with that privacy
10 through the system. We've been looking at how long can a
11 certificate be because you don't want someone to be able to
12 kind of identify, you know, be able to track certificates.
13 And so people have, these security experts just came up
14 with, well, maybe certificates should only be five minutes
15 long. And so a vehicle should have many, many, many, many
16 certificates because each certificate only lasts five
17 minutes. Well, you also have to then look at how you manage
18 that many certificates.

19 Today, the biggest certificate management system
20 out there, we're told by our consultants, is the DoD federal
21 bridge system, and it has generated about 103 million
22 certificates in its lifetime. We're talking about 250

1 million vehicles times five-minute certificates here, right?

2 So it's just an incomparable scale to anything else that's
3 out there if we look at that kind of scenario. So while
4 that might make sense, we also have to think about whether
5 that's really implementable.

6 And so the security experts are continuing to
7 look at this issue. And there are a number of papers out
8 there, for those of you who are techies because we got quite
9 a few of you here on the committee. I'd be happy to point
10 you to those papers that tell more about this. But I think
11 that's about as far as we need to go today.

12 So next slide. So, basically, you need three
13 parts.

14 MR. STEENMAN: Is the JPO doing a lot of research
15 in this area?

16 MS. BRIGGS: Yes, it's a big area, and we're
17 still doing a lot of research.

18 MR. STEENMAN: And they have a lot of security
19 experts that are part of that?

20 MS. BRIGGS: Yes. In fact, I think they've, it's
21 the auto companies who are leading it, and they've worked
22 with I think eight different security experts. So they

1 didn't want to just go to one, one firm and say solve our
2 problem. And so they've been working with a range of
3 different security experts and also talking to the Europeans
4 and how they're doing it.

5 MR. STEENMAN: I assume that DoD must have a lot
6 of expertise in that area.

7 MS. BRIGGS: The DoD does. And, of course, you
8 know, the contractor community that does DoD work also does
9 other federal work. And so, yes, there is a lot of
10 expertise out there, but this is a hard challenge, you know.

11 So -- yes?

12 MR. MCCORMICK: If I could add something to Ton,
13 Kevin Rushton, he's no longer with Intel but he was with the
14 architecture group. He was part of the contract that worked
15 for Intel on the VII architecture that addressed some of
16 this security, so at Intel we did not have -- from the very
17 beginning.

18 MR. STEENMAN: Okay. Post the McAfee acquisition
19 we did a year ago --

20 MR. MCCORMICK: No, they're not. And that's
21 something --

22 MR. STEENMAN: -- get involved --

1 MR. MCCORMICK: Yes, you really should.

2 MR. LAMAGNA: I'm sorry. What was that name
3 again?

4 MR. MCCORMICK: Kevin Rushton.

5 MR. LAMAGNA: Okay.

6 MR. CALABRESE: What's the main privacy issue?

7 MS. BRIGGS: Well, you don't want someone to be
8 able to trace a vehicle through the system. And if someone
9 can figure out the certificate code for one vehicle, you
10 know, if they could read that, then you don't want them --

11 MR. CALABRESE: I thought, I thought my vehicle
12 was communicating with your vehicle.

13 MS. BRIGGS: Right.

14 MR. CALABRESE: Where is it going beyond -- if
15 it's no further than 300 feet --

16 MS. BRIGGS: Right. These are open standards
17 and, basically, part of a basic safety message. So it's
18 your vehicle sending off a message ten times per second.

19 MR. WEBB: But I can put a device on the side of
20 the road and pick up a signature from your vehicle, and I
21 can put another device a mile away, and if I read that same
22 signature, I know that you have traveled that mile. So it's

1 being able to track that by not necessarily vehicle-to-
2 vehicle but vehicle-to-infrastructure discussion.

3 MR. MCCORMICK: That's one of the personal
4 privacy issue. The security issue actually has four legs to
5 this. One, you don't want bad actors. You don't want bad
6 programming in the system to deploy an airbag when he needs
7 to turn on the radio. You don't want that. You don't want
8 anything malicious. It could be a 14-year-old, it could be
9 al-Qaeda. We don't want anything malicious occurring on the
10 system that has a pervasive effect on the system.

11 And because you have to have trust in the system,
12 if you can determine that an invalid signal is coming for
13 whatever reason, you have to have a means of getting rid of
14 that certificate or getting rid of that vehicle from
15 communicating in the system. In other words, neutralize it,
16 neuter it so that it doesn't do any of those things.

17 And then, lastly, you have the personal privacy
18 of which they address in this system, but you really have to
19 have a data and privacy policy first before you figure out
20 how you're going to implement it. And that's what Valerie
21 is chartered with is the whole policy. MR. CALABRESE:

22 So it's beyond Scott and my vehicles communicating to each

1 other. And Scott doesn't know who I am, and he goes there's
2 a vehicle 200 meters away. The concern is beyond that.

3 MS. BRIGGS: Yes. The basic safety message that
4 Mike talked about earlier is totally anonymous. But if
5 you're going to link it to security certificates, then you
6 have something that is linked to the vehicle. So that's the
7 whole challenge of this.

8 MR. STEENMAN: And then we connect the data to
9 the infrastructure or to the cloud, and it gets all exposed,
10 right?

11 MS. BRIGGS: Right.

12 MR. STEENMAN: Anybody could use it anyway,
13 certificate management --

14 MS. BRIGGS: So they're kind of mutually opposing
15 goals. So --

16 MR. WEBB: Valerie, I'm sorry. These are all
17 going to be delivered to my vehicle's DSRC?

18 MS. BRIGGS: Well, that's a good question,
19 George. We're going there. They don't have to be. So you
20 basically need three elements of that security system, with
21 a PKI system. You need a network for communicating those
22 certificates to the vehicle, and you can't, you probably

1 can't load them all on the vehicle in a batch. And you have
2 to do things like be able to have revocation of non-
3 functioning equipment, as Scott mentioned. And then you
4 have to be able to tell the other vehicles which vehicles
5 are malfunctioning.

6 So there's some back and forth that's needed,
7 whether that's on a daily basis or a monthly basis or an
8 annual basis. We're looking at all of that. But you do
9 need some communication with the vehicles on a regular
10 basis, and you don't want that to have to be pulled, you
11 want that to be a communication push, not a communication
12 pull, because there may be a handful of us who would do it,
13 update our security credentials, but I would bet a lot of us
14 would forget.

15 And so the other thing that you need is, of
16 course, a back office function to manage all of this, and
17 that does need to be a centralized function. And so, you
18 know, how is that done? Who owns/operates it? Who does it?

19 Where does the money come from? That's where the big
20 policy questions start to come in because there's no easy
21 answer to that.

22 And then the final question is, we talked about

1 the fact that there's infrastructure desire for many of the
2 applications. Well, how does the infrastructure for the
3 applications fit in with the infrastructure for security?

4 Next slide.

5 And that's a big question and one we're looking
6 at, whether they're and how they're related, if they are
7 related. So just to put this in perspective, you have the
8 communication network among the vehicles. You have
9 communication back to a central authority for certificate
10 management processes. And that communication is needed for,
11 basically, the certificate processes, revocation lists, and
12 other management functions. We're currently looking at
13 various ways to do that, but cellular and DSRC seem the most
14 promising.

15 If you go on to the next slide, the question
16 becomes then how does infrastructure fit in this and what
17 does that mean for infrastructure? This, of course, is very
18 important to our folks in the room. Is infrastructure part
19 of the means of delivering the communications needed for
20 security, or is infrastructure simply one of the elements on
21 the system, just like a vehicle, that needs certificates in
22 order to communicate but isn't key to delivering the

1 certificates back to the vehicles. And that's an
2 outstanding question.

3 Regardless, we think that we need to figure out
4 what that means for the infrastructure, for the traffic
5 signals and for the public sector, and so that's something
6 that we're looking into too, what it means.

7 Okay. So next slide. We've broken down the
8 communications needs into communications needed for the
9 vehicle-to-vehicle safety applications, so the applications
10 that Mike talked about this morning; those needed for
11 vehicle-to-infrastructure applications. There are vehicle-
12 to-infrastructure safety applications that have similar
13 needs to the V2V safety applications. You need the low
14 latency if you're doing crash avoidance applications.

15 There's a whole host of vehicle-to-infrastructure
16 applications that are mobility based that don't require that
17 low latency communications, many of which are starting to be
18 delivered in various ways today. And then there's the
19 certificate management functions on top of that. And so
20 they're each distinct and have distinct communications
21 needs, so we're looking at, you know, what those are and
22 whether it makes sense for them to be combined or separate.

1 CHAIR DENARO: When you say one size fits all,
2 you mean one network or one --

3 MS. BRIGGS: Well, because they have different
4 needs.

5 CHAIR DENARO: Yes, no, no, is that what size --

6 MS. BRIGGS: Yes.

7 CHAIR DENARO: Different networks potentially?

8 MS. BRIGGS: Yes.

9 MR. MCCORMICK: Different protocols.

10 MS. BRIGGS: Different protocols, different
11 media.

12 MR. WEBB: Valerie, just to go back again, you
13 said one certificate is only good for five minutes. So
14 potentially it's not --

15 MS. BRIGGS: Well, that's still on the table.

16 MR. WEBB: Fair enough. But whatever that is,
17 that's not a communication every five minutes because I also
18 heard the idea of potentially downloading a group of
19 certificates at a time so that I'm going through --

20 MS. BRIGGS: Exactly.

21 MR. WEBB: -- certificates, depending on how long
22 I drive my car or whatever. So it's not --

1 MS. BRIGGS: And it's like a monthly batch of
2 certificates, something like that. You download a whole
3 batch.

4 DR. ADAMS: You get them validated, and then
5 whenever you get a message from that certificate, you're
6 good with it. You don't have to --

7 MS. BRIGGS: Right.

8 DR. RAJKUMAR: This comes to about 10,000
9 certificates per year, so they're downloading I guess 1,000
10 certificates per month. And then you basically pick up one
11 from your 1,000, use it for five minutes, throw it away,
12 pick up the next certificate and use it for five minutes.

13 MS. BRIGGS: And the other thing you have to know
14 is, your vehicle has to know is which of the other vehicles
15 it should listen to. So you have to have a process to tell
16 your vehicle which certificates are no longer valid, so
17 that's the other thing that has to be communicated.

18 MS. ROW: So this is hugely important, so I just
19 want to make sure everybody is following on this. So you
20 have to have, however often we download the certificates,
21 and there's some wireless connection from wherever you get
22 the certificates to the vehicle. Then there's some kind of

1 periodic wireless connection to revoke a certificate, should
2 it be necessary. So first you've got to detect the
3 misbehavior, then you have to communicate with the vehicle
4 to revoke it. So there's clearly a wireless system that has
5 to come into being that's managed by someone. And as
6 Valerie said, they all need money.

7 MR. MCCORMICK: That's the issue.

8 MS. ROW: And so there is the -- what is the
9 wireless media that's going to manage that? Who is going to
10 manage that? And where is the revenue source that's
11 sustainable that would manage all of that type of
12 communication?

13 So the balance that's Valerie is talking about
14 between privacy and security is that the more private you
15 make it the more frequent the security certificates are
16 updated, right? But the more communication you potentially
17 have to have, so the cost goes up then. So where is that
18 balance point between whatever the communication media is,
19 the appropriate level of privacy that we can protect, and
20 something that is affordable from some kind of financial
21 model from somebody somewhere. So if you guys just fix that
22 for us --

1 (Laughter.)

2 MR. MCCORMICK: I think this is a very
3 appropriate topic for a subgroup because seven years ago for
4 Bill Jones I held the first security workshop with William
5 White and all of the automakers and everything else. And,
6 unfortunately, it's gotten to a point where everyone talks
7 about the certificate authority. Well, that's a concept
8 that was brought into play by a number of beltway companies,
9 all of whom revealed to me that they thought they could be
10 this certificate, and I'm not sure that there's not a more
11 appropriate way to do this that doesn't require a
12 centralized authority that could be done more autonomously
13 for that.

14 And I don't want to get into it here, but I think
15 also, between what you said and what your comment was about
16 being able to have the latent information, that one of the
17 things this subgroup might want to look at is getting a
18 little more intelligence into the infrastructure side of it
19 that would allow it to do those things. And I think, since
20 you brought it up, I'm going to say I don't necessarily
21 think we ought to kind of fix the scenario or refine it. I
22 think we ought to look at the whole model and question

1 everything.

2 MS. HAMMOND: I have a question. What are the
3 variables that cause the need for the re-certification over
4 some span of time?

5 MS. BRIGGS: Because you don't want someone to,
6 you don't want someone to be able to identify your vehicle
7 associated with that certificate. And so the certificate
8 basically has the same, is the same message, and it's sent
9 out ten times per second. So if someone puts a reader over
10 here and another reader a block down the street and can tell
11 where you're traveling, if they were to --

12 MS. HAMMOND: And that's the issue is someone
13 might learn where you're driving?

14 MS. BRIGGS: Now, whether that someone knows that
15 that's you, I mean there are a lot of issues here.

16 MS. HAMMOND: I'm putting it on my Facebook all
17 the time.

18 MS. BRIGGS: Well, that's true, too. This really
19 comes into play if it's not an opt-in system.

20 MR. STEENMAN: Because there's a lot of corporate
21 secrecy issues, right? I don't want to know that I am
22 flying to whatever and go meet the GM, right? I don't want

1 my competitors to know that. So there's, you know, outside
2 of personal privacy, there's a lot of corporate privacy
3 issues.

4 MR. CALABRESE: Can there be an on/off switch?

5 CHAIR DENARO: It gets very complicated on the
6 privacy because we've seen this in navigation, you can infer
7 a lot of stuff. You know, it's really scary when you get in
8 and analyze. If you see somebody at the same spot on the
9 road everyday, you know, you can infer that they're always
10 going to be away from their house at that time. If you look
11 at just a short path or whatever, it's easy to eventually
12 infer where they came from, so where their home is.

13 There's just a whole lot of scary scenarios like
14 that that people have looked into and discovered, so it
15 really is an issue, an important issue.

16 DR. ADAMS: But aren't the certificates
17 themselves coded? Aren't they encrypted, the
18 identification?

19 MR. MCCORMICK: No.

20 MS. BRIGGS: It's a public certificate.

21 DR. RAJKUMAR: You just need to compare it to
22 certificates including for messages that are identical they

1 get from the same source.

2 DR. ADAMS: But my question is, how does somebody
3 know the source?

4 MS. BRIGGS: They wouldn't necessarily know that
5 it's you. They would just be able to know that someone
6 traveled that route.

7 (Simultaneous speaking.)

8 MS. BRIGGS: And they still have to figure out
9 who the certificate belongs to.

10 MR. MCCORMICK: This a very interesting
11 conversation because we do have an awful lot of privacy if
12 we use this, and the fundamental question that nobody is
13 asking is how much more we're giving up by putting something
14 in the car.

15 MS. BRIGGS: And what's acceptable, what's
16 acceptable.

17 MR. MCCORMICK: So it's one of those things that
18 says, well, if you're in the car, you have it. Well, if you
19 have this, I mean I personally don't care if people follow
20 where I go, but apparently, people do.

21 MS. ROW: While we all recognize that that's true,
22 we all carry cell phones, if you look at what's going on in

1 the VMT discussion, the miles-based user fee discussion,
2 there is amazing amounts of concern about trackability.

3 MS. HAMMOND: Well, even with our tolling
4 transponders.

5 MS. ROW: That's another one.

6 MS. HAMMOND: But it's, you know, the more the
7 public has been exposed to this and the more they know about
8 what their cell phones give away, I think, I almost think
9 it's a generational thing.

10 DR. KLEIN: It's clearly a generational thing.

11 CHAIR DENARO: There's a wall you climb over
12 that's tough. If I buy a phone and I opt in to all kinds of
13 stuff, that's one thing. If the government makes me put
14 something in my car and it has even the slightest chance of,
15 you know, invading my privacy, then that's not so good.

16 MR. SCHROMSKY: I mean, every time you download
17 something on your phone, which people forget to realize,
18 there's called what's an end user license agreement. And
19 the number one thing that you'll notice that pops up is
20 location information is the number one thing you consent to.

21 So you're consenting to whoever developed that application,
22 and you might not care.

1 But where you bring in the government piece and
2 where law enforcement, where I would be nervous is, you
3 start putting passive infrastructure for speed. I've got
4 100 officers from my department, I can't patrol the streets,
5 so I'm going to put remote speed cameras that are passive, a
6 lot cheaper than putting a Jeep with cameras and a person in
7 there. I can put a lot more, in the great state of
8 Washington, a lot more places --

9 MS. BRIGGS: That's been a long fight in the ITS
10 industry. And from the beginning, we've put firewalls in
11 ITS and said ITS cannot be used for speed enforcement
12 because of that reason, because people would not use ITS.
13 And so while we can say we don't think it's a good idea, I
14 mean, ultimately, what's done and how it's done is up to the
15 system operator. Andy?

16 MR. MEESE: At the opposite end, when you want
17 the system to know that this is a police car or a transit
18 bus, I mean, what's the consideration there when you don't
19 want them --

20 MS. BRIGGS: Yes. We actually have, and Brian
21 might talk about, Dynamic Mobility Applications is doing
22 research on applications for public safety, specifically

1 those sorts of things, applications to tell people when they
2 should move over because an emergency vehicle is coming,
3 things like that.

4 MS. ROW: But, Valerie, I think, too, what Andy
5 is getting at is if you are a fleet owner, and some of you
6 have fleets, then you could choose to make that non-
7 anonymous. I mean, you could certainly choose it.

8 MR. MEESE: I mean, emergency vehicle, a
9 preemption of traffic signals, you know, a transit bus, you
10 know, things like that where you want to know.

11 MS. BRIGGS: Yes. And, actually, Maricopa
12 County, Arizona has been testing a lot of those on its own.
13 There is testing in that area.

14 MR. WEBB: Valerie, before you get back to that,
15 I just want to understand, Raj was throwing some numbers
16 out, and I got my thousand numbers coming to me. But is
17 also I'm getting 500 million certificates that other people
18 are good? So how am I checking what I'm getting from
19 somebody else, whether that's coming from a certificate?

20 DR. RAJKUMAR: The major question, Valerie, I
21 think, is how big is a certificate and how big is the
22 encrypted message now?

1 MS. BRIGGS: So all of that is in that paper
2 that's in there. There's two papers in there that have a
3 lot of that, and we're about to get another more detailed
4 one out.

5 DR. RAJKUMAR: Okay, thanks. I think we could
6 reduce the number of vehicles that can be -

7 (Simultaneous speaking.)

8 MR. WEBB: I was just trying to understand just
9 how the system worked because I thought I understood it's
10 one thing for me to get mine, and then I'm broadcasting, but
11 am I checking --

12 MS. BRIGGS: You are checking. You actually are.

13 MR. WEBB: -- everybody else's --

14 MS. BRIGGS: I think you are.

15 MR. WEBB: -- so I've got to have the databases
16 of what good that everybody else has been delivered?

17 DR. RAJKUMAR: Imagine that you're talking to all
18 the people in the room. Each one is sending you ten
19 messages. You've got to basically decrypt each of those
20 messages.

21 MR. MCCORMICK: It's one of those, I validated
22 that you're a real car and you sent me real information.

1 There's no hard drive on the car that's storing this
2 information.

3 DR. ADAMS: Oh, so you validate it on the time --

4 MR. MCCORMICK: Yes.

5 DR. ADAMS: Okay, all right.

6 MR. MCCORMICK: Because, you know, it asks you, I
7 don't care about you anymore. If you're ahead of me, I
8 don't care about you anymore. So it's a very informal
9 construct that we're looking at.

10 MR. SCHROMSKY: Who monitors? For instance,
11 would the states be mandated to actually monitor to keep
12 this or --

13 (Laughter.)

14 (Simultaneous speaking.)

15 MS. BRIGGS: That's a good question. That is a
16 good question.

17 DR. ADAMS: How do they validate it?

18 MS. BRIGGS: What? The certificate?

19 MR. MCCORMICK: Think of it as sending your
20 remote control signal and the TV validates that you want to
21 go to this channel. It doesn't store that information.

22 DR. RAJKUMAR: Your browser, for example, has

1 built in identity information from VeriSign, for example.

2 So this device, DSRC, would have the identity of the
3 certification manager, CME.

4 DR. ADAMS: Okay. So that's the interoperability
5 again.

6 DR. RAJKUMAR: Yes, yes. What John was saying
7 earlier that there is going to be a private entity managing
8 this, there is going to be a public entity, or a
9 combination. That's the question that the DOT faces.

10 DR. ADAMS: Or the vendors.

11 MR. MCCORMICK: Or neither.

12 DR. ADAMS: Or neither.

13 MR. MCCORMICK: Or something else. Certificate
14 management entities are the huge problem. That's where the
15 huge cost comes in, and I think that's the thing that we
16 need to revisit and provide some different thinking around.

17 DR. ADAMS: Well, we would need this certificate
18 management even if we weren't so concerned about all this
19 privacy.

20 MR. MCCORMICK: It doesn't require building in
21 people --

22 DR. ADAMS: That's right.

1 (Simultaneous speaking.)

2 MS. ROW: It's a trust issue, you know. Steve
3 had to leave, but Steve is going to be communicating with
4 John's vehicles, and there are different makes and models of
5 vehicles communicating with Roger's equipment as a Tier One
6 supplier, and they've got to be able to trust that each
7 other have a valid message and that they can continue to
8 read each other's ten-times-a-second messages.

9 DR. ADAMS: Right. But you want to keep al-Qaeda
10 and the 14-year-olds out.

11 MS. BRIGGS: And that's the other part of it.

12 (Simultaneous speaking.)

13 MS. BRIGGS: So it's our goal to be advancing the
14 bar in transportation safety and security. It's not our
15 goal to be advancing the bar in cyber security. All right.
16 That's a good point.

17 (Simultaneous speaking.)

18 MS. BRIGGS: So let's go to the next slide.

19 So this is one that you all probably know a lot
20 about. We have looked at all sorts of different
21 communications capabilities, WiMAX, satellite radio, all
22 sorts of different communications capabilities, but continue

1 to come back to these three, cellular, wi-fi, and DSRC,
2 being the most plausible and really cellular and DSRC being
3 the most plausible. But we're not throwing out wi-fi, and
4 I'll tell you why in just a minute.

5 For the security communications, cellular, the
6 problem with cellular -- the good thing about cellular, it's
7 out there, really out there. And the problem with cellular
8 is it's made for point-to-point communications, as opposed
9 to broadcast communications. And my understanding is that
10 that makes it much more inefficient to do some of the
11 communications needs that we have, also requires IP
12 addressing. So, again, that goes back to you have a way to
13 identify that device on the vehicle again, and we're trying
14 to avoid that. And so there are those two problems with
15 cellular. The auto companies and their security experts are
16 looking at whether those are things that can be addressed.

17 The wi-fi. It is a potential because many people
18 park in garages that might have wi-fi, and you may be able
19 to download certificates from that. But, again, that would
20 be a pull mechanism, rather than a push. Wi-fi is not
21 ubiquitous across the transportation system. It couldn't be
22 used alone for security.

1 DSRC, of course, is the other thing we're looking
2 at. Because we need DSRC for many of the other
3 applications, it doesn't make sense to piggyback the
4 security communications on a DSRC base. And, of course, the
5 problem with DSRC is that it's not out there. And so we'd
6 have to have a DSRC network in place to use it. Yes?

7 DR. KLEIN: I was talking to a bunch of cell
8 phone people at ITS America on the exhibit floor, and they
9 were telling me all the ways they could trace me based on my
10 cell phone. I was actually unaware that my Bluetooth
11 feature gives off a little MAC address wherever I go. Maybe
12 you didn't know either. So if I say I've got a certain
13 level of privacy when I'm driving in my car right now, and
14 it might be much lower than I know, but that's the
15 baseline. If we didn't implement security on DSRC, I would,
16 in fact, drop below that very low baseline, or would I just
17 match that baseline? Because I already don't have privacy.

18 So if you give me super privacy, my phone will still --

19 MS. BRIGGS: You don't have privacy because you
20 choose to carry a cell phone and you have signed an
21 agreement and checked the box that says it's okay for my
22 cell phone company to track me. And so you basically opted

1 to give away your privacy, whereas the problem here is if
2 it's something that's mandated on every vehicle then it
3 becomes a whole different issue than something that you
4 basically opted to allow people to track --

5 DR. KLEIN: Okay. So the government mandate is a
6 big issue. But let's say, I mean, hypothetically, this
7 system would work with 60-percent penetration and 60 percent
8 of the driving population would give away their privacy
9 because they know they already did it over there, and we
10 could avoid this complex certificate issues, would that --

11 MR. BELCHER: No, because there's two issues.
12 There's the privacy and there's security.

13 DR. KLEIN: So security comes in.

14 MS. BRIGGS: Security does come in.

15 DR. KLEIN: Security comes in. Especially if we
16 get into automated vehicles, we're all terrified of
17 security. Initial DSRC does not have an automation that's
18 information --

19 MS. BRIGGS: Well, that's not our focus right
20 now.

21 DR. KLEIN: But we have a pathway for automation.
22

1 MS. ROW: But I think there's another piece of
2 this, and I'm not sure that we've completely communicated.
3 So let's say there's three parts to this security
4 conversation. There's a privacy component, there's a
5 hacking/cyber security component, there's a trusted network
6 component, and that's the one that I don't think we're
7 getting a complete picture on here. That is, actually, the
8 one that we are -- Privacy is probably going to be a
9 cost/benefit, what's an acceptable kind of a tradeoff? But
10 the trusted network for the automotive industry to function
11 within and a traffic signal, by the way, to function within
12 has to be established. And that doesn't have anything to do
13 with privacy. If we had no privacy issue at all, we still
14 have to have a trusted security network for all of these
15 people to work and play in. So that's the piece that, you
16 know, you have to understand that part, too.

17 MR. SCHROMSKY: It's almost like a credit card
18 network. You're creating, trust between merchants and
19 suppliers and --

20 MR. MCCORMICK: Except your there's a number
21 changes.

22 MR. SCHROMSKY: But, I mean, the same concept.

1 MS. BRIGGS: So I wanted to acknowledge our team
2 here. We really are multimodal, and, actually, Bob Arnold
3 is leading this part of the project. Do you want to say
4 anything, Bob? He didn't know what he was getting into.

5 Okay. Next slide. So we're having our
6 contractors look at various scenarios of how you can combine
7 communications capability to suit various needs. And
8 they're looking at the technical aspect: what would it take
9 to build out a network using these capabilities or to
10 leverage existing networks, what would be the costs?

11 And they're also looking at potential business
12 models. Now we are going to -- this is -- I have got my
13 contractors looking at potential business models. We've got
14 to start somewhere. And so we're looking at potential
15 business models of what are ways to do this, and this is
16 just one scenario we're having them look at. We've already
17 said the DSRC is necessary for the active safety
18 application, so all of them use DSRC for the V2V and V2I
19 communications. We're having them look at a scenario that
20 uses cellular for the others, assuming there's no DSRC used
21 for certificate management or for the mobility needs for the
22 system: what does that look like? And so that's one

1 scenario.

2 Another scenario is you take advantage of
3 whatever is out there scenario. So this is, again, using
4 DSRC for the safety apps but using cellular or DSRC for the
5 mobility apps, meaning you can take advantage of either.
6 And then using whatever is available for the certificate
7 management, and this is where Wi-Fi might come in. You
8 know, you could use your garage or you could have various
9 others used for the certificate management functions. Next
10 slide

11 MR. STEENMAN: Whatever is their refresh rate
12 really determines all of this, right? Because if the refresh
13 rate is only once a day then it's easier to solve than when
14 it's like every half hour.

15 MS. BRIGGS: And that is how it all becomes so
16 iterative. I mean, because you can make various assumptions
17 and you can do analysis and modeling around those.

18 MR. STEENMAN: You get a bit of the cost because
19 the more certificates you need to store the more storage you
20 need to have in the car, which makes the system more
21 expensive.

22 MS. BRIGGS: Yes. So we are making some

1 assumptions and doing some cost analysis.

2 MR. STEENMAN: I mean, I like the idea of
3 certificates like stored on servers. I think it would be
4 great.

5 MS. BRIGGS: So then the third scenario is an
6 all-DSRC scenario. What would that look like? And so
7 that's what we're looking at, this analysis, and we're
8 looking at the technical aspects, cost modeling, and what
9 might be potential business models.

10 So this slide just tells, you know, kind of what
11 we're doing. We're exploring private and hybrid models,
12 primarily. I don't think I put in here the slide that says
13 -- oh, that's in the next presentation. We are focusing on
14 private and hybrid models because I think all of you who are
15 in state and local government realize, you know, the
16 situation that the government is in and the likelihood of
17 the government running something like this. And so we're
18 focusing our research efforts on, you know, what are some of
19 the private sector or public/private models. We're
20 evaluating the technical aspects, as well as the costs, of
21 these models.

22 CHAIR DENARO: And when you say you're

1 evaluating, what you mean is you've got contractors working
2 on doing a study?

3 MS. BRIGGS: Yes, yes, we have contractors
4 working on a study.

5 CHAIR DENARO: When will this kind of information
6 be available? What's the rough schedule?

7 MS. BRIGGS: Good question. This fall. The
8 results are all due in the September time frame. We're
9 planning a late September public workshop, so we should be
10 able to announce the results --

11 MR. MCCORMICK: Is that going to be made
12 available to the --

13 MS. BRIGGS: Oh, yes, absolutely.

14 MR. STEENMAN: I want to go back to that one
15 question I asked earlier about without was involved. I just
16 want to make sure that you have the best and the brightest
17 in the industry involved. Like, incidentally, I was at
18 Stanford University two weeks ago, and I was talking to the
19 security expert, and he brought this subject up. And he
20 said, "I have all kinds of creative ideas." He's their,
21 like, encryption security guy. And so I was just, like, do
22 we have like academia, like the best and the brightest

1 involved maybe, to your point, to solve the problem
2 differently, instead of using something that we just --

3 MS. BRIGGS: Well, you know, I would like to say
4 I hope so. I certainly hope we have some of the best and
5 brightest involved. We are government and government
6 contracting themes and requirements, so, you know, we have
7 access to who we have access to, to some degree. But we,
8 you know, that is a challenge, but we do have a number of
9 experts involved in this, many of them working through the
10 auto companies on looking at this issue.

11 MR. SCHAGRIN: We always could use more eyes on
12 the problem, and so one of the things we do want to do is
13 have what I call independent or peer review of what we're
14 trying to do. So if, for example, you have experts in this
15 field that you think would be able to contribute to making
16 it a more practical and, you know, employable solution that
17 meets the requirements, that would be helpful, very helpful.

18 MR. STEENMAN: That's definitely something --

19 CHAIR DENARO: Well, let me just say a process
20 item that one of the methods we can use as a committee is we
21 can form into subcommittees and look at these things and so
22 forth. We can call in experts ourselves and have them talk

1 to us or together with JPO or whatever, but if we can look
2 at the list that they've got and say, well, between us,
3 we've got some other ideas. If we want to call an expert,
4 have a review, have a briefing and a review and so forth, we
5 can do that.

6 MS. ROW: One thing that, and this is one of the
7 reasons that we wanted to tee this subject up for all of you
8 is because we struggle with how to even tackle this because
9 we are the government. We do have certain contracting
10 requirements that we have to go through to hire people to
11 support us in these areas. It doesn't always lend itself to
12 getting exactly who we'd love to have because also, if we go
13 do what we call a full and open competition, it takes six
14 months or something to get a contract out the door. So it
15 then pushes us into some of the contractual ranges that we
16 already have in place, so we may or may not be able to get
17 exactly what we want.

18 The other thing is that inherently in this work,
19 as Valerie was saying, you know, there are so many options,
20 permutations, and combinations of how it might balance in
21 terms of how much communication is there, how frequently are
22 things updated. And there's so many different options,

1 we're not sure that we are going to ultimately be the ones
2 to solve it. It's more likely to be whomever it is that
3 might, in fact, will not operate it, that they are probably
4 going to be in a much better place to understand how to make
5 those tradeoffs from a business perspective.

6 MR. STEENMAN: Yes, and that's a whole different
7 issue from the technology again, right?

8 MS. ROW: Yes.

9 MR. ARNOLD: There may be technology out there
10 that is on the horizon we just don't know about. I think
11 that part of this exercise is to find a path that works. It
12 might not ultimately be the path used, but we know there's
13 at least one way to do it.

14 MS. ROW: And so, consequently, because we're the
15 government, we're not well suited to, you know, even sort
16 some of this stuff out. So this is another area that you
17 all can think about if it's --

18 MR. STEENMAN: As I asked, I think, earlier, is
19 the DoD and the NSA involved? I mean, they have like some
20 of the best security experts in the world.

21 MR. MCCORMICK: Some of the contractors, like
22 William White, has a crypto analysis. They do a lot of that

1 work for the DoD.

2 MR. SCHROMSKY: Solving security I think is the
3 encryption. The operation is really where the day-to-day.
4 I mean, I've got visions of the D block all over again
5 because, seriously, that was one of the big challenges,
6 right? Who was going to maintain this and build this
7 network, and nobody bid on the spectrum because they didn't
8 want regulation. There was no guaranteed customer base.
9 There was no funding. There was only a million -- but
10 there's got to be this private/public partnership. That's
11 the only way it's going to work. I mean, I also think that
12 if you did come up with security, you solve that problem of
13 who's doing the accreditation that validates, whether
14 maintaining that is being -- you know, I envision almost
15 like an NCIC and CJIS kind of aspect, if you're familiar
16 with the Criminal Justice Information System and background
17 checks and everything else. They do an accreditation to all
18 the states to make sure they're compliant, but that's a
19 government-run facility. That's not doing the day-to-day
20 stuff, but it's doing accreditation.

21 MS. BRIGGS: You should read our paper. We have a
22 lot of that in there.

1 MR. MCCORMICK: And there's questions that have
2 come up just as recently as a couple of weeks ago. It took
3 Germany several years to get Google to show them what they
4 actually harvested when they drive through. They're not
5 just taking pictures of the property. They're harvesting
6 emails and text messages and passwords and credit card
7 information. So there's always an issue that when you put
8 in a system a management agency and an ability to harvest
9 that information, there's always the question of whether or
10 not that could be abused, not whether or not that's the
11 intent.

12 MS. BRIGGS: And that's something I didn't go
13 into. The other project that we're doing right now is
14 really looking at the structure of that certificate
15 management entity and how you divide out all those functions
16 so that you can't combine the information, and that's the
17 other aspect that turns out to be somewhat complicated and
18 different than the systems out there today.

19 MS. ROW: And that paper is in there, too.

20 MS. BRIGGS: It is. They're both in there. So I
21 wanted to introduce Dana. Dana is from NHTSA, and Dana is a
22 legal counsel from NHTSA, and she's been leading our legal

1 team that's looking at all of these issues from a legal
2 standpoint, and it's a team of lawyers across the
3 department.

4 MS. SADE: Lawyers and policy experts.

5 MS. BRIGGS: That's true.

6 MS. SADE: It's legal policy, so we've got
7 terrific lawyers and also seasoned policy experts from all
8 the modes and from OSD.

9 MS. BRIGGS: So we're glad she could make it.
10 Feel free to ask her questions, too.

11 MS. ROW: And so one final thing before we move
12 on from this, just so, again, so you all are aware, in order
13 for NHTSA to make an agency decision in 2013, this has to be
14 doable, this security system. So to Bob's point, we have to
15 know that there is some way to do this in the same time line
16 that we're doing all the technical work with the vehicles.
17 So, you know, we've got to be able to see way forward and
18 actually, in fact, NHTSA needs to be able to reasonably
19 quantify the cost of it because that will go into their
20 cost-benefit analysis that they have to do for the vehicle
21 side, and that factors into their decision making. So
22 that's why this has become the big focal point for so much

1 of our activity, someone called it the mountain that we're
2 trying to climb, because it's on the same time line as all
3 the other work.

4 MS. BRIGGS: And it started a lot later.

5 MS. ROW: And it started later.

6 MR. KISSINGER: Can you just expand on the last
7 bullet a little bit? I mean, a little bit --

8 MS. BRIGGS: Yes.

9 MR. KISSINGER: -- how much --

10 MS. BRIGGS: Sure.

11 MR. KISSINGER: -- is in all these uncertainties?
12 How much can you test in the field?

13 MS. BRIGGS: They are testing the system, a
14 prototype system, that's based on a PKI system. It is, I
15 think they're testing both DSRC and cellular for
16 communications, and they're looking at what protocol, what
17 processes, how many servers, what do you need to do it, and
18 what lessons learned can you get from standing up a certain
19 security entity for the model deployment.

20 MR. MCCORMICK: You have a listener up there on
21 the program, don't you? You have a listener on the roadway
22 to see what they can harvest?

1 DR. RAJKUMAR: Valerie, a quick question. I
2 understand the message signing process for the certificate.

3 Can you say how the revocation process is expected to work?

4 MS. BRIGGS: That's a very good question, and I
5 think that's one of the most unclear parts of it. And, you
6 know, frankly, I don't know that I can say a lot more about
7 it. We know that we think it's necessary because, you know,
8 you'd need to be able to get bad actors off the system. But
9 how it works, you know, we're not sure yet.

10 DR. RAJKUMAR: I see.

11 MS. ROW: And that's an area, too, all of this,
12 we can bring in other people. If this becomes an area of
13 interest for the committee, then we can bring in other
14 people who've done the actual technical analysis, who've
15 looked at it at several more layers down. Happy to do that.

16 MR. MCCORMICK: It's an embedded three-character
17 field that, if a broadcast goes out to say, you know,
18 destroy any sequence carrying these codes in this field,
19 then it just wipes them out.

20 DR. RAJKUMAR: I understand the end result. I
21 want to know how one gets to that step.

22 MR. MCCORMICK: It's broadcast, and that's part

1 of the reason when they get into talking about
2 infrastructure why you, at some point, have to have
3 infrastructure because somebody may not, somebody doing
4 something to violate the system, intentional or
5 unintentional, is doing it while they're traveling. They're
6 not sitting in their garage doing it. So part of the
7 question is I have to have some mechanism either in my codes
8 to recognize it as an invalid code or pass an infrastructure
9 to do it. Either way works.

10 DR. RAJKUMAR: Yes. I believe we need to have a
11 subcommittee to look at the details.

12 MR. WEBB: But as part of this system, and I
13 think heard, Shelley, you say it, if we find a track that
14 can show that it would work, but I think I've heard the car
15 companies talk and say this thing needs to be in place at
16 the same time we're rolling out.

17 MS. ROW: It does or a migratable system.

18 MS. BRIGGS: That is something that we'll talk a
19 little bit more about.

20 MR. WEBB: I understand. I just want to put on
21 the table simply because that track, though, then has to be
22 somebody's determination cost affordable. You can develop a

1 track and say, yes, we can do this for \$10 billion and run
2 it for a billion dollars a year; it's doable. But the idea
3 is then is it feasible is another question.

4 MS. ROW: Right. And I think I probably
5 overstated because I don't want to step on what NHTSA is
6 going to be doing, but, yes, we do need to know that there's
7 a way forward, but I think we need to -- what's that? Yes.

8 MS. BRIGGS: Okay. That's it for this.

9 CHAIR DENARO: Thanks, Valerie.

10 MR. STEUDLE: I have a general comment about this
11 whole piece, and it kind of gets to your open discussion at
12 the end, and I'll keep it on my notes. But there was a
13 statement earlier that Shelley made that said, you know,
14 they were learning as the last committee was even writing.
15 And it appears to me that this issue is so urgent it can't
16 wait until we write a report two years from now, that it
17 does need this subcommittee to bring in those additional
18 experts that you all know who they are. I would suggest
19 that that's probably an early action item and bring them in
20 soon because 2013 is getting here, and you need to make a
21 decision.

22 MR. MCCORMICK: Why? Do we need to wait until

1 the end of the two years? We can give these periodic
2 recommendations --

3 CHAIR DENARO: Yes, yes. I mean, we're engaging
4 with the JPO. They can farm, if you will, you know, mine
5 what we're saying along the way, earlier than we publish a
6 formal memo at the end. We may end up saying in our final
7 memo that we're gratified that a lot of these things are
8 already underway based on our deliberations that are going
9 on, and that's fine.

10 But, no, you make a good point. I don't think
11 it's only the security issue, given the decision in 2013,
12 which is kind of before the end of our -- I think there's a
13 lot you can and should do prior to that point to help that.

14 MR. STEUDLE: Yes. In this last discussion,
15 somebody said about additional experts looking at it. It
16 would seem like a small group --

17 CHAIR DENARO: Yes, yes, yes.

18 MR. STEUDLE: -- here's our broader vision.

19 CHAIR DENARO: So one thing we want to discuss at
20 the end is, as we said, how we're going to organize in a
21 timeline. I'm kind of a fan of saying, okay, if we want to
22 think about six meetings or whatever, what do we think we're

1 getting done at each one? What's our milestone schedule, if
2 you will? And if we've got a couple of, you know, hard
3 points, like a 2013 decision, we may want to put that in
4 place as a milestone and back up from there saying what does
5 that imply about our meetings leading up to that?

6 Brian, you up?

7 MR. CRONIN: This is the rest of the program in
8 some short amount of time. I don't know, let's say five
9 minutes or less. So --

10 CHAIR DENARO: That's about four seconds a slide.

11 MR. CRONIN: Next slide. We're going to talk to
12 V2I, and we have both safety elements and mobility and
13 weather and environment sort of all dealing with this V2I
14 world. And so on the right side --

15 CHAIR DENARO: Let me just interrupt. Can you
16 put it into perspective for us? Because you've got some
17 priorities and sequencing of your program, V2V and V2I, can
18 you give us that topdown just so that we understand where
19 this will fall and how and when?

20 MR. CRONIN: So we're working on it now in this
21 same time. I actually have a slide on that at the end of
22 this. But V2V, first, and we made some funding decisions,

1 like pushing the safety pilot, and kind of altered some of
2 this. But, actually, that's a very big question of we
3 probably can't slow too much, and so that's one of the
4 things we'll talk about. But running in parallel there's
5 various resources.

6 So on the right side, we've been talking this
7 morning and the first half of the afternoon about V2V, about
8 data flowing to DSRC. And there's the basic safety message,
9 but SAE has also created this J 2735 message that has a
10 whole bunch of other data that's presumably available on
11 vehicles, and I say presumably available because how we
12 define available I think is important.

13 So that data could be there. It's not there in
14 all vehicles yet, but there's data that would be core to
15 enabling the safety applications. There's some part two
16 data that might come when triggered, there's some additional
17 data. But there's all kinds of other data on vehicles that
18 might be available. And so the program has been operating
19 in this environment about, if we can get access to that
20 data, we might be able to manage the transportation system
21 more effectively from an operator perspective, or the
22 traveler might have a better experience from some certain

1 way from the private sector. So we had data from vehicles,
2 and then there's, wait, we have communications to travelers
3 all the time so we can start sending them messages like
4 you've got parking spaces available; or, hey, you drive 35
5 instead of 55, it actually will get more capacity out of
6 this system; or there's fog ahead; or your train is coming
7 in five minutes; or all these safety applications. So we're
8 fundamentally balancing infrastructure messages and data
9 messages and how do we use this, how do we pay for it, what
10 do we need?

11 So just think about that as we go. So Mike had
12 the number about 80 percent for safety and the types of
13 accidents we can do, and we're working hard to try to figure
14 out. And Greg was asked by the press this week what is that
15 number around mobility and V2I safety, and the problem is
16 there's a lot of numbers, and so we really can't put it into
17 one.

18 So the safety line is the number of accidents and
19 crashes. That's fact. That's based on the data we collect
20 and so forth. And so the second slide, the bullets in the
21 back, are we've looked at intersection crashes, we've looked
22 at runoff road crashes, we've looked at different things

1 like that. And that is our sort of sum of the information
2 we have there.

3 On the mobility part, so from the TTI study,
4 that's the information we get on the way and congestion.
5 The other bullets under that are simulation analysis we're
6 starting to get at, starting to look at the opportunity. So
7 the first one is cooperative adaptive cruise control. We
8 talked earlier, I think this group over here during lunch
9 was saying, you know, if we had automated vehicles running
10 on freeway lanes, that's facing like this. All of a sudden,
11 the capacity of the freeway has expanded tremendously.
12 Well, cooperative adaptive cruise control looks at using
13 connected vehicle technology and your cruise control to do
14 that. And so we could do that, and so we're looking at that
15 application.

16 We're looking at things like signal system
17 improvements both from transit authority, emergency
18 vehicles, and just better signal control and see how we can
19 reduce the delay at intersections. Things like transit
20 connection, if we have better enhanced communication.
21 Transit already communicates with their vehicles. They
22 already have that, but they have bandwidth constraints, they

1 have issues, they can't always communicate with their
2 travelers. How do we connect that further?

3 Incident response, freight delivery. How do we
4 reduce deadhead truck delivery? How do we improve
5 information to freight operators so they have shorter trips,
6 less time? Weather: how do we have to put less salt on the
7 roads? Global warming may solve that, but what can we do?
8 Steve, how do we get better information in the rural areas?

9 And then environment. So there are a lot of
10 things we can do on reducing fuel use. Ecodriving. How do
11 you get reduced idling at intersections if you had better
12 information on you're going to be sitting there for two
13 minutes, which, hopefully, you won't be doing. But that's
14 kind of the things we're working on, trying to put that into
15 a succinct message that we can deliver that talks about why
16 we need infrastructure and what type.

17 MR. LAMAGNA: Do you have a goal where we can eke
18 out X percentage of efficiencies to be adequate for all
19 this?

20 MR. CRONIN: So that's one of the things we're
21 looking at. We don't have the same kind of data that we
22 have in sort of the safety data sets. Just to fundamentally

1 say that, nationwide. So as we talk about V2I, I wanted to
2 put up sort of some of the assumptions we've been looking at
3 in the program and some of the questions. We can talk about
4 this for two hours if you want, but I think some of these
5 things will be some of the things we talk about or you guys
6 choose to talk about in the afternoon.

7 We've been assuming that vehicles have DSRC at
8 some point in life and that penetration rates would climb
9 and vary over a 20-year time to refresh the vehicle fleet.
10 However, there are cell phone-based applications out there
11 now that are improving the travel experience. Now, whether
12 those cell phone-based applications are helping the State of
13 Michigan operate their transportation network or Joe operate
14 his transit fleet more effectively, a little bit but maybe
15 not as much as we think we could do if you have a connected
16 vehicle environment. But they're coming in. They're
17 increasing. There's a lot more going on there, and we
18 definitely can leverage that.

19 We have a connected vehicle core system
20 architecture, which I don't want to do a whole course about
21 that. But that is guiding a lot of our connected vehicle
22 work and how we think this rolls out.

1 So some of the questions is where do we need
2 DSRC? Where do we need the technical capability of that
3 versus let's just use cellular or another infrastructure.
4 How would the benefits equation change as penetration rates
5 of infrastructure or vehicles with different kinds of
6 communications capabilities change and evolve? How
7 would a cellular-based solution actually improve to a public
8 sector agency if the cellular solution is really a customer
9 that's in my cell phone provider?

10 We haven't done a lot of work. There was a
11 comment earlier about networks, and so there is a DSRC-based
12 network and then there's this cellular network. Where and
13 how do they merge, and what does that change in terms of the
14 business relationship? So there are issues there. Yes?

15 DR. KLEIN: This is kind of on a previous slide,
16 but the vehicle data, this is an absolutely strict legal
17 question: who owns that data according to a court of law?

18 MS. SADE: The answer is that we don't have an
19 answer right now. The best example I can give you is
20 NHTSA's EDR rulemaking, our black box rulemaking. We did
21 not make a determination from a legal perspective in that
22 rulemaking about who owns the data on the box. Various

1 states have regulated in that area that it's the individual
2 who owns the car at the time an accident occurs.

3 But, you know, it's funny, we were just meeting
4 with the auto companies this morning and talking about, this
5 is one of the issues that kind of was on the table. And I
6 think it's going to depend on a lot of different factors.
7 It's something that we might weigh in on, we, NHTSA, if we
8 decide to a rulemaking. It will be dependent on state law.

9 It's also something that the federal government, you know,
10 Congress has been very interested in lately, privacy, you
11 know, who owns data. And I think really, a lot of it is
12 going to depend on, you know, A, whether the Hill legislates
13 in this area; B, who ends up owning the system, you know;
14 and just kind of how the whole system evolves.

15 So the short answer is there's not an answer, and
16 that's one of the policy areas that we're going to be and
17 have actually started already really going into. It's a
18 little bit further down the road than what we're working
19 right now. But it's really complicated.

20 MR. MCCORMICK: I mean, there's more than one
21 piece of legislation on the Hill right now about privacy,
22 and they're written by legislators, litigators, and the

1 consumer privacy advocates. And my analogy is that if I buy
2 a TV that comes with a remote and I change my channels and I
3 don't want the guy I bought the TV from or my wife or the
4 government to know what channels I'm watching, that doesn't
5 necessarily give me the rights to that piece of information
6 that's being beamed out of there because a lot of that is IP
7 and the company. There are over 42 networks in the average
8 car, over 200 sensors. Much of the data, and if you took a
9 typical vehicle running for a year, it generates an X amount
10 of data. The X amount of data that has almost none of it is
11 personally attributable or, rightly, the ownership of the
12 individual because that's IP that the Tier Ones and the
13 automakers have in order to drive your control and the
14 operating systems.

15 So the first question that has to be asked that I
16 have yet to see asked yet is which pieces of data are we
17 talking about? The little bit of answer that I get out of
18 anybody studying the question is that it comes back to me
19 as, well, you're not talking about data then, you're talking
20 about metadata. I'm talking about --

21 MS. SADE: When we're talking about the data,
22 when you're talking about what the suppliers and the auto

1 companies own, they own the IP and the software. They don't
2 necessarily own, you know, own the data that's being
3 collected. I mean, the auto companies have taken the
4 position, many of the auto companies have taken the position
5 that it is their data that's generated, but I think that
6 that's, you know, that's really not legally viable.

7 MR. MCCORMICK: Providing there's any of the
8 other answers that haven't been focused.

9 MR. BELCHER: Well, let's ask it maybe a little
10 bit more simply, and maybe, John or Roger, you guys can
11 help. The basic data that comes off of the OBD port when
12 you take your car to a service station, who owns that data
13 from your perspective?

14 MR. CAPP: I don't think that we know.

15 MR. BELCHER: You don't know?

16 MR. CAPP: No.

17 MS. SADE: And it may be that the, consumer
18 that's, you know, purchasing the vehicle has entered into a
19 contract to give up rights to the data. For example, OnStar
20 data, you know, there was that whole issue. That's because
21 the contract in accepting the service agreement, the
22 consumer was giving up rights to the data. I think that a

1 lot of these issues, in the context of services and apps,
2 you know, you give rights away to the developer. I think in
3 the context of this system, it really hasn't fleshed out.

4 MR. BELCHER: And what about as, I mean, there
5 are an increasing number of apps that have been developed to
6 pull data off of the vehicle. And this is being done in a
7 vacuum? I mean, there aren't fights going on between the
8 OEMs or the Tier One providers and the app developers and
9 the consumers that are using this data or pulling it off of
10 the vehicles?

11 MR. MCCORMICK: Depending on how you get it off
12 may invalidate your warranty.

13 MR. CAPP: Well, it's still happening, though. I
14 mean, we're not necessarily providing open access to the
15 vehicle systems, you know, keys to how the software and
16 things work, to anybody else to write apps. Because of
17 these issues and others, all kinds of things can go wrong.

18 MS. ROW: So one thing that you guys, as Brian
19 proceeds through his discussion here about mobility and
20 other applications and now that Dana is here, too, keep in
21 mind that if we look at the V2V applications, there's a
22 certain set of data that is needed to do those safety

1 applications. If NHTSA were to choose to pursue a
2 regulatory path, they would be looking at some amount of
3 data that's necessary for that. But there's a whole lot of
4 other data that is not part of what NHTSA would be doing
5 because they only have the authority to look at safety
6 situations, right? But so while Brian is going to be
7 talking about all this other data and all these other
8 applications, it's not necessarily that we, the government,
9 are going to be enabling all of that stuff to just magically
10 appear.

11 MS. SADE: I think it's important just to point
12 out that NHTSA's authority is based on certain statutory
13 language that has to do with regulation of motor vehicle
14 equipment. And, you know, the language, as it applies to a
15 lot of these kind of developing technologies, ends up with
16 some fairly interesting results such that, you know, for
17 example, you were talking about apps that pull data off the
18 car. There are also apps that send information and
19 communicate with the car that interact with the systems,
20 like turn on your car remotely or unlock it.

21 Our position is that we have the authority to
22 regulate those apps because they're there, and that's not to

1 say we'll necessarily do that but it's within the four
2 corners of what we're allowed to regulate. And I think,
3 Shelley, when we talked about the message with the
4 regulatory authorities -- I'm not one, by the way. I'm a
5 general person. You know, they did take the position that,
6 pretty broadly, what is communicating into the vehicle and
7 the onboard equipment and out, a lot of that would be
8 covered. So I think that --

9 MR. STEENMAN: Would it stand up in court if we'd
10 be challenged?

11 MS. SADE: I think that we don't move forward
12 unless everyone, you know, Justice and OSD is happy with it.
13 I think it probably would. You know, it all has to do with
14 a very narrow definition or, you know, a very specific
15 definition of what motor vehicle equipment is.

16 MR. STEENMAN: It's going to be an interesting
17 field, and it will probably move around a lot over the next
18 several decades --

19 MS. SADE: Yes, you know, and --

20 MR. STEENMAN: -- as devices get brought in and
21 the cars get integrated, they have apps, they collect data,
22 collect data from the car, what's regulated and what's not,

1 and what's the ownership of the owner of the car and the
2 citizen and what's not.

3 MS. SADE: Interesting. Interesting way to
4 characterize it and, you know, challenging qualities from a
5 regulatory standpoint.

6 DR. KLEIN: Right. But to get some systems to
7 fully realize their benefits, including their public
8 benefits, you want the network to be interconnected so data
9 exchange can take place, and you want the crucial data
10 that's being, wherever it is on the system, to be freely
11 shared and then, boom, you've got a functioning system. But
12 different entities own or control or regulate different
13 aspects of the system, and they might feel that it's not at
14 all in their interest to interconnect or not in their
15 interest to share the data, even though it might be in the
16 public interest to do so.

17 MR. HOLTZMAN: It seems to me that you have a
18 vacuum here where you need a lot of, there are a lot of
19 unanswered questions on these legal issues. And someone has
20 got to do that and really bring something to our table, as
21 counsel for DOT or somebody, because we're going to be
22 sitting behind the time line if we don't have something in

1 advance. You've got to take your what-ifs, what if, what
2 if, what if, and provide some answers. There's no answer as
3 close as you can to what might be a cogent legal thing.

4 MR. MCCORMICK: Well, part of the problem is it's
5 exacerbated by the fact that the automakers are polarized in
6 terms of what they believe and their native policy versus
7 another company.

8 MR. HOLTZMAN: That's another issue to take up.

9 MR. MCCORMICK: So you don't get consensus out of
10 that critical industry, so, I mean, that's difficult.

11 MR. HOLTZMAN: Good point.

12 MR. CRONIN: Let's go to the next slide. This is
13 illustrative, and so it's not based on any facts at the
14 moment, but it's not so far off.

15 You have a graph showing the bottom line is a
16 potential V2V curve. 2018, NHTSA has done something, and
17 all of a sudden there's vehicles doing safety with DSRC.
18 And it starts with the new car fleet and maybe it bumps up
19 as aftermarket kicks in. So it's trying to show sort of how
20 you accumulate benefits from a safety perspective.

21 Now, let's say we're talking about V2I here. So
22 if there's vehicles floating around and they're not

1 interacting with other vehicles but they drive past an
2 intersection every day, there's some benefit both from a
3 safety or a mobility perspective that we can start to
4 accrue. So how do we handle that infrastructure line, and
5 what do we need? And so some of the things are do we need
6 DSRC, do we need cellular?

7 So let me paint a picture. Joe and 20 of his
8 other transit properties across the country say I want to
9 put in new VRT lines and I'm going to include transit signal
10 priority, connection protection to do bus transit light rail
11 connections. I'm going to use, in that case, Smart Starts
12 program, and now maybe I forget how big it is, but 25
13 million or so a property, maybe ten a year can actually get
14 access to that. And so that's going to paint a picture of
15 how you get some infrastructure in place for transit.

16 Paula is successful with Oregon and Nevada and is
17 doing a mileage-based user fee and decides she wants DSRC
18 points across those states to get that information flow, to
19 get that data about how many miles. You have some
20 infrastructure. George says I've going to upgrade my
21 traffic signal control system now because I want to keep up
22 90 percent of your effectiveness, and so you've upgraded

1 your signal system. And Kirk says, well, you know, the
2 trucks, I've got to do my inspections, so I'm going to
3 enhance my Smart Roadside, I'm going to look at my border
4 crossing with Canada and do some stuff at the bridges there.

5 And so that's going to be one infrastructure build-up
6 model, and that's using existing resources maybe.

7 Ton says, you know, if I've got this DSRC data,
8 you know, I might make a business out of this, and I'm just
9 going to stick DSRC units all over the country. I don't
10 know how much that costs, but you're a large company and
11 maybe you'll find a need. But you say I'm going to do DSRC,
12 so I'm going to stick that all out there and maybe that
13 happens overnight and maybe five years. Or Brian says, you
14 know, you don't actually need DSRC for all those
15 applications, and Verizon can do this today. That's the
16 conundrum we're in, and we're trying to figure out where do
17 we need DSRC, how do we get it out there, what are some of
18 the market forces? So that's what I'm trying to show there.

19 MR. CALABRESE: Even for vehicles, the cars have
20 to be receivers.

21 MR. CRONIN: So you need cars, and that needs to
22 come up, but you need infrastructure, too.

1 MR. CALABRESE: Yes. The infrastructure could be
2 the quicker point, but if it's not in the cars to transmit
3 that you still have no system.

4 MR. CRONIN: Right. And so you've maybe put it
5 in because you're going to communicate with buses. So
6 there's some issues there of timing and how do we improve
7 benefits and how do we make all this happen.

8 So this is the core system architecture, the V2V
9 world. It goes with this piece and coming in to here for
10 security. And the whole rest of the picture starts to deal
11 with everything else, and that's it for the core system
12 architecture. But I wanted to throw it out there because
13 it's a big piece of work that we've been doing.

14 So we have a V2I safety program. There's a big
15 track on enabling technology and communication systems,
16 communications positioning. The major thing we've been
17 working with is signal phase and timing. This is connecting
18 in with your traffic signal and putting out what is the
19 signal: green, yellow, red, how much time before it changes.

20 That will enable safety applications, mobility
21 applications, environmental applications. That's why we
22 went to the high priority message for us. And then

1 developing sort of the prototype roadside equipment that
2 would enable this sort of work, and it's in the safety
3 program but it's crosscutting.

4 Then we're looking at different applications, so
5 we've been working with AASHTO, we've been working with the
6 transit industry, with the trucking industry, and created a
7 variety of applications that are of high interest and
8 potentially high value on that work. And so we're working
9 on developing those different applications with the concepts
10 of operations. Then we look into prototype testing and
11 development and then creating the implementation guidance,
12 the standards, the functional specifications, this sort of
13 thing to actually implement and do.

14 MS. HAMMOND: Well, I was just going to comment
15 that with the big issue for state and local agencies is
16 that, as Congress is on its what? Ninth or tenth extension
17 of re-authorization, no hope for future additional funding,
18 how we take care of the assets we have and then think to the
19 future about our ability to put these kinds of things on the
20 infrastructure is really going to be a big challenge and a
21 tradeoff. So the more we keep the money issue and the
22 investment issue for infrastructure in our minds I think the

1 better.

2 MR. CRONIN: That's one of the reasons why we're
3 trying to figure out where do we need DSRC versus we could
4 just use cellular or something like that. But I also think
5 it's easy to say just use cellular. It's not clear to me
6 that it's as simple as my phone. There's a lot more going on
7 there.

8 MS. ROW: One of the things that would be
9 particularly helpful for us to help you is to understand the
10 kinds of things that you'll need to know to take into
11 account so that you can make investment decisions. So we do
12 the best we can to get the information that we think a
13 public agency would need. So if you can help us understand
14 how you made that investment decision, then we'll work it
15 from that side.

16 MR. CRONIN: So at the end of this summer, we
17 should have concepts of operations and some requirements
18 that will help us understand how these different kind of
19 applications are going to work, what data they actually
20 need, and sort of how they need to be, how the communication
21 needs to work.

22 DR. ALBERT: Question, Brian? I'm surprised that

1 road departure or lane departure isn't one of the big areas.

2
3 MR. CRONIN: And that's the curve speed warning
4 but --

5 MS. ROW: But that's a good point, though. To
6 make that work, you'd have to put in infrastructure. So
7 where would you choose to do that? How would you make that
8 decision? Traffic signals are the easier one to
9 conceptualize, but where would you choose to, in the middle
10 of a rural area, put in a --

11 DR. ALBERT: Hot spots.

12 MS. ROW: Yes.

13 MR. STEUDLE: That's been the conversation on the
14 infrastructure side is hot spots where there's known --

15 MS. ROW: Known problems.

16 MR. STEUDLE: -- known problems, you know, just a
17 spot out in the middle of rural wherever.

18 MS. ROW: Yes, an electronic rumble strip.

19 MR. STEUDLE: We're working on wireless.

20 MR. CRONIN: So these are just pictures of some
21 of the applications. I think I'll just go through this
22 quick, and we'll look at it later. But there's roadside

1 infrastructure, and it has to communicate. So this is the
2 big message in the infrastructure because you need
3 additional hardware out there, and so how do we do that?
4 This is a stop sign. That's another one.

5 So to kind of wrap up this V2I safety, a couple
6 of the big things, what specific DSRC-based applications do
7 we need in order to benefit and when and how does that
8 accrue, given we're not going to go out and, overnight, have
9 every intersection equipped with DSRC. So what are the hot
10 spots? What are the ones that are needed?

11 We have good information that we can work with
12 the states and others, so I'm trying to pull that together.

13 So we're working on that.

14 We talked a little bit about this morning: How do
15 we cost effectively get absolute positioning for
16 intersections? We've mentioned for V2V you need relative.
17 So far the discussion for V2I-based intersection that you
18 need absolute positioning, and so that's more stringent.
19 That's potentially more costly, so how do we do that? Maybe
20 we do leverage the cell tower network. And so we actually
21 have some positioning work that we're doing out of Turner-
22 Fairbanks, and there will be more to come in trying to

1 figure out what do we need to do there.

2 We started talking about how equipment
3 installation would actually occur and where we really need
4 that. And so the question Shelley just asked is, you know,
5 what information do we need to help you decide to invest in
6 a DSRC infrastructure?

7 So on the mobility, it's a very similar
8 structured program as V2I safety in terms of what
9 applications do we need that are going to have value and
10 then prototyping them and deploying testing. The big part
11 up-front is we have a whole data program, and so this is
12 taking into account that there are existing sources of data
13 out there that sensors, radar, cameras, your cell phone that
14 are being used in various different ways and help with some
15 aspects of traffic management and transportation management.

16 We can't do everything, so how do we layer in connected
17 vehicle data to enhance that? So there's going to be a
18 whole huge thing about managing, storing, and using, and
19 just maintaining these large data sets and what do we need
20 to do. And so then we have a whole track then on the
21 applications that would use both the data and the
22 communications and what's the benefit from there and then

1 implementation guidance.

2 So we have specific resources towards weather-
3 based applications and solutions and environment and just
4 because of time I'm just not going to talk about all of
5 that. But it's very similar.

6 So this is just some pictures that don't really
7 show the applications but just to highlight we are working
8 on freight-related applications. We're working on speed
9 harmonization and cooperative cruise control kind of things,
10 intersection applications, transit applications, incident
11 management of safety-related. And then on the bottom left
12 is enabling traveler information, so there's a lot of
13 private sector travel information, companies and providers
14 out there, we're not trying to step in and take over their
15 business. We want to enable that, and so we're looking at
16 what else do we need to do to help enable those kind of
17 activities.

18 So I wanted to take a few minutes to talk about
19 data and how critical it is and some of the key issues. And
20 so this isn't the, I'm not a graphic artist, so the next few
21 slides aren't the best showcase of graphics. And so there's
22 one of the note slides of Mike's, the last slide of Mike's

1 presentation that we never really got to was a little bit
2 more about the basic safety message and the safety message
3 in general. There's part one, which Mike did: speed,
4 heading, position. There are seven or eight different data
5 elements that come through ten times a second. And then
6 part two is if an event happens and you hit your anti-lock
7 brake, that's going to generate some additional data. And
8 so different applications might use that and it might
9 trigger some other data every now and then into some of
10 these messages.

11 And so the question is, from a mobility or V2I
12 safety or AERIS, what data do we really need? And the
13 reality is also we don't need it ten times a second, and if
14 we collected it ten times a second I don't know that we have
15 the data storage for that. But it's coming, I guess.

16 So let's talk a little bit about this. Let's
17 take sort of the baseline and some I added to your slides.
18 So today we have existing probes, existing data sources from
19 GPS readers. You read the congestion report that just came
20 out that supposedly we all have less congestion. I guess
21 that's because less people are working is what they say, but
22 supposedly I'm wasting less time in traffic. So there's

1 some data from our sensors and systems that we have now.

2 Now, if we had the basic safety message and only
3 communicating via DSRC, we can do some applications. Some
4 of the mobility applications are actually V2V, this cruise
5 control. We could identify the hot spots and do queue
6 warning and do some other applications that would do stuff.
7 Next slide.

8 Now, if we had the data in the basic safety
9 message part two so that part two is only sent when
10 something happens, so if nothing ever happens that data is
11 not available. Let's say I wanted to know that my
12 windshield wiper was on. I don't need to know that ten
13 times a second, but I sure would like to know it's raining
14 out all of a sudden or it's icy or various different things
15 like that. And so there are various other applications that
16 we can enable with this additional type of data. And if
17 it's at DSRC and at a regular interval, maybe not ten times
18 a second but once a minute or something like that, we could
19 do that. And then, finally, if we had this data but all of
20 a sudden now we're linked in and we can find a cellular
21 solution to get that data off our vehicles, we think we can
22 enable a variety of more applications.

1 So we need to look at sort of how we bring all
2 that together, how we make that environment. So right now I
3 can bring my cell phone into my 1998 car and I don't get
4 much of anything because it doesn't connect and so forth.
5 But in my 2012 car and I have Bluetooth that I can do this
6 and I can get other data and information, maybe there's
7 things I can do. But it's a little unclear. We were in a
8 conversation yesterday, and I'm pretty certain the car
9 companies said that the DSRC communications connection to
10 that data is not the, well, I'm just going to say OnStar,
11 but the cellular that a lot of cars are starting to have
12 cellular built in, that's not necessarily connected to the
13 same data network that we're connected to. And so it's not
14 as simple as it's connected. They've got to do work, so
15 there has to be a value to add that connection in. So we
16 need to paint that picture and explain that value. Next
17 slide.

18 So kind of summing it up is what specific data do
19 we actually need? It's great that there's this laundry list
20 of data elements that people said, wow, that would be great,
21 but do we really need it and how do we justify the auto
22 industry making it available and the public sector using it?

1
2 How often do we need it? What are going to be
3 the benefits? How do we get it? Right now, one of the
4 things, the basic safety message, there's no storage. It's
5 just broadcast. It's not being stored on the vehicle. It's
6 not really even being, you know, there's no storage in the
7 vehicle, and we had to put infrastructure out there, and it
8 could go to that and then someone could connect there and go
9 to the cloud or go somewhere. But right now there is no
10 storage of the basic safety message. So that would need to
11 happen on vehicles if we wanted to send it out, you know, in
12 a variety of ways. And so think of the cellular, too.

13 I put an infrastructure hot spot. I'm only
14 getting the data in that 300-meter range. And so everything
15 you did between the last time you passed and that time, I
16 have no idea. And so were you stopped for 30 minutes on the
17 freeway in that time? I don't really know. So there are
18 some issues there. I think they meant how do we leverage in
19 the fact that there is cellular out there, people are using
20 it, people are sharing data. And so how do we leverage
21 that?

22 MR. STEENMAN: But the key here is, it might be we

1 need to create a platform that you can innovate. I mean,
2 when Apple came out with the iPhone, they had no idea what
3 kind of applications people were going to come up with.
4 They just created the platform and they created an ecosystem
5 around it to go innovate on, and they just made stuff
6 available. You don't have to sort all that out.

7 CHAIR DENARO: So what you want to do is, first
8 of all, create the platform for access. Secondly, make the
9 data available. And then maybe do some EPIs in there
10 potentially, but, beyond that, let them figure out what they
11 can do with it. Look at all the things that are being done
12 with accelerometers on phones now that, you know --

13 MR. STEENMAN: The most creative stuff.

14 CHAIR DENARO: -- probably Apple never thought of
15 that.

16 DR. KLEIN: You're totally cool with that? Let
17 chaos reign on the vehicle.

18 MR. CAPP: Because I'm also cool with it when
19 it's --

20 MR. SCHROMSKY: When OnStar pays a wholesale rate
21 for connectivity, the business model has changed to a more
22 usage model, at least for the costs. That's really what's

1 going to happen, so who's going to pay for all that data
2 usage out there so you're actually starting to see the
3 business model change again where app developers will start
4 paying for the usage that you buy the app and that also
5 includes the data. So the cellular networks can actually
6 aggregate the data that's not being used with this app, if
7 that makes sense. You can actually separate the two, but
8 that's a big issue because, to your point before, every
9 manufacturer in the world that I know of is putting some
10 kind of cellular connectivity into a vehicle, whether it's
11 automotive, truck, and all the carriers competing to put
12 their technology in there now. The good thing is with LTE
13 it will be a software-based radio to make it a little bit
14 easier. But right now the build -- he's paying for it so
15 where he makes money, concierge services and everything
16 else, is the value add for them offering those services that
17 give the diagnostic.

18 MR. CAPP: And so maybe Verizon is going to offer
19 the free --

20 MR. SCHROMSKY: There you go.

21 MR. CRONIN: That helps the traveler. And then I
22 think the question on top of that is then how does impact

1 for our public sector agencies who manage and operate the
2 system?

3 MR. STEENMAN: I wasn't meaning that we create an
4 open safety platform that would innovate on. If you expose
5 the data somewhere in the car or in the infrastructure, and
6 you can do it in the car today. There's a lot of innovation
7 going on on secure partitions for kind of this type of
8 innovation for consumers and vehicles that could not mess
9 with your vehicle at all, or you could innovate in the
10 infrastructure and then provide mobility applications.

11 MR. SCHROMSKY: On a positive note, there is
12 precedence, for instance, recently with the CMAS commercial
13 message alert system where all carriers opt in, that going
14 back to your 511 earlier, Steve, is if there's a weather
15 condition there's a way to broadcast from the cell sites to
16 anybody in the general area that there's a tornado, a
17 hurricane, whatever it may be. So there are mechanisms to
18 actually do a broadcast. It has not, so you're not the
19 pioneer when it comes to this. And that's really the FCC
20 coming in almost like the Emergency Broadcasting System. So
21 there are avenues. It just hasn't been updated because now
22 there's so much more that you want to do, right? So when I

1 hear weather, I'm like you can do that today, right? So
2 there's --

3 MS. ROW: You say so we can do that today, but
4 the weather we're talking about is with the data coming from
5 the vehicle.

6 MR. SCHROMSKY: Correct. But there's a way to
7 broadcast, but there's a precedence there that's really
8 doing it one way. It wouldn't take much to do it the other
9 way. There's probably some privacy and some other issues,
10 but, you know, there are mechanisms there.

11 MS. ROW: Particularly for the public sector
12 folks, and I think anyone in the public sector who's here
13 today probably understands this, but if we've got these
14 messages for safety that are flying between the vehicles, as
15 Brian said, they're not stored, they're just flying between
16 the vehicles. So if Kirk wants to be able to use any of
17 that data for mobility solutions, he's got to put something
18 somewhere out here to suck the data up and then be able to
19 figure out how to process it and all of that. So --

20 MR. STEUDLE: But it would seem to me that the
21 value for us is those safety messages are going between
22 cars. That's where it's got to be. We're going to see the

1 result then of, you know, them colliding or not colliding
2 with the backup that we're going to get from the rest of
3 them that are going to fill into the system. I don't know
4 that we would ever be in the middle of, okay, there's two
5 cars about ready to crash because that would make so many
6 roadside --

7 MR. MCCORMICK: And it really takes until you get
8 hopping so that when an incident occurs and it hops to
9 wherever that post is, every ten miles apart or something,
10 you know.

11 MR. WEBB: The basic safety message, there's two
12 parts, one and two, right?

13 MS. ROW: Right.

14 MR. WEBB: And so one is the core, you know, and
15 is that the part of discussion when NHTSA is going to look
16 at stuff and two becomes starting to be real optional, and
17 there won't be a regulatory potential decision regarding the
18 number two information? And then if you can even answer
19 this, are there anymore costs to separate one versus two or
20 combine that data coming out? So whether you send five
21 pieces of information or 25 pieces of information that
22 you're already collecting in the car anyway, it's no real

1 additional expense to the car companies --

2 MR. CAPP: -- message sets.

3 MR. WEBB: Yes, absolutely. Absolutely. As I
4 just said, one, a message set, two or whatever. But I have
5 the understanding that --

6 MR. CRONIN: Dana and Mike might answer better,
7 but some of the safety applications use the part two data,
8 yes.

9 MR. WEBB: Oh, they do? Okay.

10 MR. CRONIN: It's part of the process. But sort
11 of from a mobility perspective, if you were going to say
12 I've identified five pieces of that part two data that I'd
13 like to have and none of the current triggers happen to get
14 that data, then they're not flowing. But that data is still
15 there and available. The question is what does available
16 mean?

17 MS. SADE: And I also just want to point out that
18 NHTSA's authority isn't necessarily limited to part one
19 either. You know, it has to do with two things. One is is
20 it safety related, which clearly would be the highest. The
21 other information is weather, etcetera. And, two, you know,
22 the extent to which it's being sent out or received in the

1 car may also be a basis for encompassing that into the
2 regulation.

3 MS. ROW: So one of the things, just to build on
4 what Dana said, is one of the things that we're seeking to
5 understand when Brian says what data do you need, and the
6 "you" in that case particularly in our mind are public
7 agencies. What data do you need to operate and manage your
8 systems better, and is it already included in the basic
9 safety message part one or part two or not? Because if we
10 can't make a safety-related argument with NHTSA, that's
11 where their authority lies, and so we would like to be able
12 to know what it is that you think are going to be, quote,
13 killer apps and what data elements that they would require,
14 and are we going to have those data elements that you could
15 even get access to some how?

16 CHAIR DENARO: Right.

17 MR. CRONIN: So, Bob, this is more or less my
18 last, I mean there's some other slides. Now, this is just
19 another caveat here. I thought there might be a timing
20 question issue, and it just so happens the VIIC put some
21 slides together for a presentation they gave us yesterday,
22 and so this was their slide. And so this is not NHTSA's

1 slide, this is not a definitive thing, but it does paint a
2 picture, which is if NHTSA makes a decision in 2013 it's
3 going to take some time, there's going to be some sort of
4 processes. And if it's a positive direction of what the
5 program is hoping for, then, at some point out there in '18,
6 '19, '17, '20, somewhere around there, there's going to be
7 vehicles with this equipment.

8 And so the question is in our V2I research, if we
9 follow the path we're in right now, we're going to be
10 prototyping and developing these V2I safety and mobility
11 applications and weather applications, and we might have
12 some prototypes, which you've done some testing on, done in
13 the 2014 time frame. Now, these won't be prototypes that
14 have been operationally tested. So a transit signal
15 authority application, you could test that. You need one
16 bus and one intersection. A freeway-based application
17 that's relying on 40-percent penetration, you could test the
18 communication works and some things, but you're never going
19 to operationally test that in the very near term.

20 And so we're kind of dealing with that and what
21 do we do. So we can do some prototype development and some
22 application work, and so we're targeted on that, and we're

1 around the 2014 time frame. And then we have a decision: do
2 we need to do pilot two, which is all the safety and
3 mobility and kind of things and applications and so forth or
4 not? And then even sort of before that is if we decide to
5 go this sort of cellular solution, do we need to be building
6 and prototyping all these DSRC-based applications?

7 And so that's sort of where we are right now.
8 We're moving down the path. The mobility work is not
9 predicated on DSRC, so we are looking at a variety of things
10 and we're trying to figure out from all of our applications
11 that we would build and test are ones that are in the public
12 sector, so we're not doing all the private sector kinds of
13 applications and so forth. But that's where we are.

14 MS. ROW: The other timing thing I would just
15 point out on this slide, too, is if you're looking at,
16 particularly in terms of the public sector folks, if you
17 have any kind of infrastructure footprint at all, then for
18 V2I safety application, like curve speed warning or a
19 traffic signal application, those could be spot safety
20 improvements that work from day one. So it works really
21 nicely for John's cars that are coming out, and those are
22 really nice things to have on day one, particularly at an

1 intersection because those crashes seem to be very severe.

2 So if you're looking at a time line of where,
3 and, again, this is the VIIC's picture, if they postulated
4 cars coming off the assembly line in like 2019 or something
5 like that, that means, from a public sector point of view,
6 we would need to be working with you guys to start getting
7 stuff out in the field in advance of that or in that time
8 frame. And, of course, the state and local governments have
9 a planning cycle, as well, just like everybody else, and so
10 that needs to be backed up a little bit, as well. And so
11 then we need to understand what it is that you need to
12 understand in order to put it into your plans.

13 So it looks like it's a lot of years in there,
14 but when you back all of those numbers up, it's not a lot of
15 years. And just so you know, in government time, 2013 is
16 tomorrow. I know that's not it in technology time, but in
17 government time that's tomorrow.

18 CHAIR DENARO: Or never.

19 MS. ROW: It's still tomorrow.

20 DR. KLEIN: If, in some ways, there's two
21 parallel trajectories going on, the public sector
22 development project and a private sector, currently probably

1 OEM-led, automaker-led project going on, do you feel
2 confident that you know what's happening in the private
3 sector and what kind of networks the automakers will be
4 putting in their cars so when it comes time on your schedule
5 to put your stuff in, will the automakers have leapfrogged
6 others and maybe some of the hardware you were planning on
7 putting in is already in the car and stuff like that?

8 Because that's pretty competitive information. I assume
9 it's absolutely, there's trade secrets, there's competitive
10 advantage, there's all kinds of stuff going on here, and
11 it's very difficult for you to be able to plan when the
12 infrastructure is being done in parallel and possibly with
13 very little publicity until it's ready.

14 MR. CRONIN: Yes. So we, our partnerships with
15 this group called the VIIC and campus and a pre-competitive
16 nature, so we can't really talk to them about cellular and
17 some of the solutions there. And so one-on-one
18 conversations, we know some. But, no, I would say I don't.

19 MS. ROW: But the other part, and Hans, please,
20 you guys, jump in, what we look at is how to enable a
21 capability for an application for safety. How the
22 automotive manufacturer chooses to implement that in their

1 vehicle systems, that's their call. So they're figuring out
2 the engineering. They know however their systems are
3 evolving their suppliers, so they're the ones who I think
4 are thinking about those issues that you were just
5 articulating. We don't have to do a lot of that. As long
6 as we're working hand-in-hand, they know kind of what we're
7 thinking and we know what their capabilities are, and
8 they're figuring out the engineering that proprietary to
9 them. Is that true?

10 MR. CAPP: The protocol, these message sets,
11 security. As long as that's kind of known as something that
12 will work, then, yes, then we can go and design special
13 boxes with suppliers and talk to other systems we have in
14 the car.

15 CHAIR DENARO: Complicating this also is, besides
16 just the OEMs, you've got considerations like IBM doing a
17 smart city solution or whatever, you know, and Nokia doing
18 an industry-wide solution, and so forth. So does it evolve
19 first within the auto companies? Is there some other entity
20 that does it like that? And then you've got other
21 applications like we talked about vehicle miles traveled and
22 tolling, but then there's also this whole insurance, which

1 has tremendous incentives for doing that. And maybe that
2 evolves, which gets GPS and data into vehicles and out of
3 vehicles and so forth. So there's a lot of moving parts
4 here in terms of how this might evolve.

5 DR. KLEIN: I mean, it would be wonderful to do
6 all these standards and then open the newspaper one morning
7 and discover the General Motors car is offering everything
8 on the car. At least our standards work paid off.

9 MR. CRONIN: There's some test beds out there.
10 There have been states, locals working on the technology.
11 We're working with them. Interoperability is a key. Trying
12 to get them to use the same equipment and have
13 interoperability will be something we're working through.
14 This is just Mike's slide from earlier, as I said. It's
15 about connecting both vehicles and the infrastructure. So
16 that's it.

17 CHAIR DENARO: All right. How is everyone doing?
18 Just a check on the agenda, we've got principles and
19 concepts. I think you said those are pretty brief
20 discussions; is that right?

21 MS. ROW: What I would suggest is I don't know
22 that we need to go through the US DOT principles. I think

1 we can explain to you what it is, and you can read those.
2 It's a really short document, and you can get it like right
3 away. So my suggestion would be that we do just a little
4 bit on the concepts document that Valerie did because it's
5 going to piggyback on exactly what we just talked about.
6 Now, you can decide if you want to do that before or after
7 the break, but I think that's a pretty short, we've talked a
8 lot about it, but just to kind of bring it home, I think.

9 CHAIR DENARO: So I want to keep the energy level
10 going. We only have two hours to go here, gang. So let's
11 keep engaged here. Do we need a little coffee break right
12 now maybe to -- okay. Let's take our ten minutes.

13
14 (Whereupon, the above-entitled matter went off the record at
15 1:56 p.m., and resumed at 2:14 p.m.)

17 **Implementation Approach Discussion**

18 CHAIR DENARO: All right. So what we decided
19 before the break is we're going to skip the principles. It
20 is in your read-ahead, if you had a chance to look at that.
21 We're going to talk about these implementation scenarios
22 briefly, and then we'll get into our focus discussion and

1 finish up by four.

2 Valerie, are you going to lead us through this?

3 MS. BRIGGS: I am.

4 CHAIR DENARO: Okay, great.

5 MS. BRIGGS: Okay, next slide. So we basically
6 just wanted to get you guys talking because we were afraid
7 you wouldn't be talking very much. And so we wanted to talk
8 about some things related to the implementation model: how
9 do we do this, how do you enable security, how do you enable
10 this environment to get started?

11 So, A, how do you get started? And when you
12 start, is it the same, you start the same way that you end.

13 Are they one in the same, or do you start somewhere and
14 migrate somewhere else? So from where we start, are there
15 transitions that have to take place? To some degree, you
16 know, what is the private sector's role? So those are all
17 questions on the table and ones that we'd be interested in
18 hearing your thoughts on.

19 MR. MCCORMICK: Just a question on that last one.

20 What do you mean by partnership? I mean, largely,
21 historically, there aren't really many public/private
22 partnerships. There are a lot of contractor/contractee

1 relationships that are friendly.

2 MS. BRIGGS: We're not talking about
3 contractor/contractee relationships.

4 MR. MCCORMICK: I know. So what do you mean by
5 partnership? How do you envision that happening?

6 MS. BRIGGS: Well, how has something like this
7 been done before? I mean, I think this is a new realm, a
8 new era, and we've got to think about how it could be done.
9 That's the question on the table.

10 MS. ROW: We don't know is the answer. We don't
11 know.

12 MR. MCCORMICK: And it's a difficult question
13 because, you know, people claim that someone has been, you
14 know, is the favorite son if they get chosen to be part of
15 that partnership.

16 MS. ROW: Yes, it's tricky. And Valerie, too,
17 mentioned that third one on here of where's the value, and
18 that's one of the things we're interested in.

19 MR. STEENMAN: Interesting idea, you know.
20 Largely, what you need to be able to do to start with is all
21 passive, right? So you can draw an analogy with PNDs, you
22 know, personal navigation devices, and you could arguably

1 say they may drive safer because you didn't need to have a
2 map on your steering wheel and all this other good stuff.
3 The adoption of PNDs was actually pretty good in the
4 marketplace as a consumer device, and there was some real
5 inherent value.

6 So why couldn't we treat this or look at this the
7 same way? You make it an aftermarket consumer device that
8 has some value beyond warnings that would pop up about
9 crash impact and things like that, and you try to drive the
10 adoption by the consumer device. And if you look at the
11 automotive market today, and you can probably comment on it,
12 as well, John, is because of PNDs I think the car OEMs are
13 actually selling more integrated navigation devices because
14 people start to recognize the value of, you know, having it
15 in my car is actually a lot better.

16 MS. BRIGGS: Does anyone want to comment on that
17 idea on the table?

18 MR. MCCORMICK: Well, the problem is that all the
19 PND companies are collapsing because you can do it on your
20 phone. But the point he's making is valid. If you had a
21 device, in terms of phone or PND or whatever, that would
22 incorporate that technology, and that was really what they

1 were looking to try to do with the mobile link, that gives
2 you that early adoption without being, gee, I got to go and
3 have somebody install this box in my trunk kind of thing.
4 So I think that's going got be the difficulty with adoption.

5 If you want consumers to adopt it, it's got to be consumer
6 grade. I'll put it that way. It's got to be something that
7 has perceived value. I mean, and think about that.

8 MR. STEENMAN: And it needs to, but, hopefully,
9 and this is probably an industry discussion, can it do a
10 little bit more than just the safety features? Because we
11 had the discussion earlier about people don't want to pay
12 for just safety, and then you have to go give them away, and
13 that doesn't work either.

14 CHAIR DENARO: What I struggle with is, you know,
15 on one hand, for this safety requirement, we've got this
16 requirement for low-latency communications, so it's got to
17 be DSRC. And safety has all kinds of things that have to
18 come with it, like all the certificate and security and
19 trusted and all that kind of stuff. On the other hand,
20 you've got some consumer things that could be cool if you
21 just had access to the data, and that would be good. I can
22 envision those things being completely separate, no

1 connection whatsoever, or potentially there could be some
2 crossover, in which case your model starts to work in that
3 we get adoption because of some other features and we drag
4 safety along with it. I'm struggling with where that
5 connection is really. Where is it needed? We could
6 probably envision, oh, you could do this, but, you know,
7 where is it really compelling that you need to do it? And I
8 don't know that answer myself yet, and that's maybe
9 something we need to explore because I love your model. If
10 we could find a way that adoption would be viral and pull
11 this in place, you know, we're done. I mean, that could
12 happen. But I just struggle with a lot of that.

13 And, you know, for example, I was talking
14 earlier, you mentioned the aftermarket device. I just
15 struggle with the robustness of that device in terms of its
16 positioning and things you need for this application. So
17 that is possibly an area for discussion for us.

18 MR. STEENMAN: Yes. Scott and I were talking
19 about, like, if you look at the time lines, we are going to
20 sit here in 2019, and we maybe got some things in the car.

21 That's the end of the century. I'm not going to be around.

22 I'm not going to be sitting on the committee. I'm going to

1 be in Hawaii.

2 MS. BRIGGS: So as we're thinking about this,
3 there are some real challenges, as you all have already
4 figured out in thinking through this. Our first priority at
5 DOT is to enable crash-avoidance safety applications, so,
6 certainly there's a lot of cool stuff that could be done.
7 Ultimately, we're interested in getting to those safety
8 applications.

9 You would not have an opt-in scenario, no user
10 choice or ability to disable. This was something that was
11 part of the principles, and I hope you will read the
12 principles. Let me step back and tell you what the
13 principles are. The principles that you have in your packet
14 were put together by RITA, our office, NHTSA, and the
15 Federal Highway Administration. And they're meant to kind
16 of put out there on paper what we see as our bottom line in
17 system implementation. So that factors that we are basing
18 our research decisions on right now in terms of getting to
19 research implementation.

20 But we thought it was important to actually write
21 those down because we need to be able to go back to them and
22 point to them. And they've been helpful already in --

1 MR. STEENMAN: And I'm still struggling a bit
2 with, you know, be careful what you say here because, like,
3 saying safety is not important is like saying beat your
4 child. But it seems to be, like, this one-sided drive
5 versus the most important, as well, is to make society more
6 productive and efficient. You know, the other numbers that
7 we talked about in the infrastructure piece, and we always
8 go back to safety is the only thing we're really interested
9 in.

10 MS. ROW: That's a valid point. And it's not the
11 only thing we're interested in. It has been, clearly, the
12 focus, and it's been easy. And part of it it's been easy to
13 make a compelling case for it.

14 MR. STEENMAN: Well, probably for the DOT.

15 MS. ROW: For the DOT.

16 MR. STEENMAN: Not so much for private industry.

17 MS. ROW: That's true. But there's nothing that
18 says, and that's why you guys are here, there's nothing that
19 says that maybe there's some bundling thing that doesn't
20 want to happen here. And so the other thing I was going to
21 say about the principles along that line is one of the
22 reasons we felt it was important for DOT to write down these

1 principles is because, as we look toward the future and
2 what's implementable, we think it's highly likely it will go
3 a very private sector-driven route. And so if that happens,
4 we don't want to lose the part that's valuable to us, right?

5 So that's why we wanted to do the exercise of writing down
6 the things that we care about in a box, and that's what's in
7 those principles. So we are anticipating that, as more of
8 you all get engaged and you see some value there, that as
9 you begin to go down that track, we're able to say, great,
10 go, as long as we get these things.

11 MR. STEENMAN: Maybe a clarifying question, as
12 just a charter and an area of interest, is the DOT
13 interested in eliminating gridlock on the highways and in
14 cities?

15 MS. HAMMOND: And we aren't under a gag order, so
16 we can say --

17 DR. ADAMS: So would something like this possibly
18 be accompanied with some incentives for early adopters? I
19 mean, like what happened with the hybrid car vehicles, you
20 got a tax credit, you were able to use HOV lanes, I mean all
21 that kind of stuff. Has that been discussed?

22 CHAIR DENARO: Good question.

1 MS. BRIGGS: I mean, there are a lot of things on
2 the table for discussion. And we, again, are a research
3 organization, so, you know, our authority is to do research.

4 But we are doing research into possible paths.

5 MS. ROW: I would hold that thought.

6 CHAIR DENARO: Well, let me append Valerie's
7 statement, too, and this is where maybe we go beyond
8 answering Shelley and Valerie's questions. They've got some
9 naughty issues they're dealing with as a research
10 organization. We're a separate committee. If we want to
11 say some things that we think, forget about JPO right now,
12 DOT, we're talking with you guys, you need to have some
13 incentives in place. It's not their authority to do that,
14 but we want to go beyond these guys and say that, we can say
15 that. So those kind of thoughts -- and, again, I will
16 suggest we keep it within the domain of we want to do
17 things, we want to recommend things that are going to
18 maximize the probability of deployment of this kind of
19 system. But to do that, we may come up with some things
20 that are beyond the scope of responsibility for the JPO.
21 And as far as I'm concerned, that's fair game.

22 DR. KLEIN: What if we recommended an industry

1 consortia and forget the public sector?

2 MS. ROW: Recommend away.

3 MR. BELCHER: A procedural question. So we write
4 a report at the end of the term of this advisory committee,
5 and the report goes to DOT, but it also goes to the Hill.
6 If we were to write an interim report or interim reports, do
7 those also go to the Hill or do they just stay at DOT?

8 MR. GLASSCOCK: I don't believe --

9 MR. BELCHER: So just one?

10 DR. RAJKUMAR: So Valerie discussed the no option
11 and substantive fees, so does that mean that the CME has to
12 be supported through fees on non-core safety features? I
13 think that's what I mean.

14 MS. BRIGGS: Well, that is one way to interpret
15 it. If this is mandated, you don't want people to have to
16 pay a monthly fee for their, you know, safety features. And
17 so that's what that gets down to. Certainly, there are
18 other ways to structure. Nothing is free. I mean, no one
19 is pretending that something happens for free.

20 MR. STEENMAN: You can make consumers pay for
21 their license plates. I pay a lot of money for my license
22 plate.

1 MS. BRIGGS: This says no optional subscription
2 fees, right? You don't have an option, or, you know, most
3 safety features today are built in with the price of the
4 vehicle. You pay for them; you just don't realize you're
5 paying for them.

6 MS. ROW: I mean, 911 service, there's a fee on
7 your phone bill. So there's a lot of different ways to do
8 it. It's just that this is the one that, from US DOT, we
9 can't do this one.

10 MR. STEENMAN: You mean you cannot enforce it as
11 the DOT?

12 MS. ROW: No, this is the one that is
13 unacceptable to us. It's in our principles that we
14 understand there's nothing free, it has to be paid for
15 somehow, and so the only fee option that is unacceptable to
16 DOT is an opt-in subscription fee.

17 MR. STEENMAN: Completely separate, you get a
18 bill at home just for this.

19 MS. ROW: Just for safety.

20 MR. STEENMAN: Okay, okay.

21 MS. BRIGGS: Okay. So adequate protections need
22 to be in place for privacy. Controlled environment is

1 necessary for systems that interface with vehicle
2 electronics, so that means, you know, of course we don't
3 want someone to be able to get in and tell your steering
4 wheel which way to go or brake your car.

5 MR. BELCHER: Are you also considering an opt-in
6 scenario, a non-mandated --

7 MS. BRIGGS: Are we considering a non-mandated
8 scenario?

9 MR. BELCHER: Yes.

10 MS. BRIGGS: Dana, do you want to take that one?

11 MS. SADE: NHTSA has not made a decision with
12 respect to what direction we're going to be going. There
13 are a number of options on the table. One would be more
14 research. Another would be going into, you know, a
15 rulemaking. So --

16 MR. BELCHER: Okay. So it could be a non-
17 mandated where you opt-in and --

18 MS. SADE: This is research so --

19 MR. BELCHER: Okay, thank you.

20 MS. SADE: -- it will tell us what our options
21 are.

22 MR. BELCHER: Okay. Thank you. That's helpful.

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MS. ROW: Let's go to the next slide.

MS. BRIGGS: Dana, this is yours. Do you want to comment on this one?

MS. SADE: Sure. Well, we did a pretty thorough analysis of the department's authority with respect to the system currently. Each of the different modes analyzed their own authority. NHTSA did a thorough analysis of our authority. OSD did a thorough analysis of JPO's authority, and what we basically determined was that we do have sufficient current legal authority to regulate or otherwise support many critical aspects of this environment, including equipment in new vehicles, the aftermarket devices, and also the security system. And I think, to be clear, parts of the security system would be subject to regulation as motor vehicle equipment and other parts might just be something that we can support through non-regulatory means, as we are a government authority, you know, a government agency with inherent authority to do certain things.

One of the other things that seems to be really important in terms of implementation options is that, you know, we have also determined that we do not have legal

1 authority to require states or other entities to install the
2 roadside infrastructure, and that was actually something
3 that we were surprised to hear and the auto industry really
4 didn't have a good sense of until we did this analysis. And
5 it certainly, you know, it certainly kind of interplays with
6 a lot of the different implementation options.

7 DR. KLEIN: And that's all conditional on safety,
8 or are there other core regulatory functions? Probably
9 safety is the big one, is it?

10 MS. SADE: Are you talking about the --

11 DR. KLEIN: The legal authority derives from a
12 safety mandate.

13 MS. SADE: The legal authority actually derived
14 from the Motor Vehicle Safety Act and it derives from the
15 definition of motor vehicle equipment. There's different
16 authority in different modes. The two that are primarily
17 regulatory are FMCSA and, you know, with respect to FTA and
18 some of the other modes, they have programs that will
19 support states' implementation, but they don't have direct
20 authority that's regulatory. And then the last bullet
21 really relates the most to Highway's legal authority or lack
22 of legal authority to require states to implement certain

1 roadside, you know, roadside units or DSRC.

2 MR. HOLTZMAN: It's made to appear that if you
3 did have state authority, it would be full speed ahead, but
4 that's not entirely accurate, is it?

5 MS. SADE: No. I mean, absolutely not. Frankly,
6 the last legal bullet is almost, I mean it's, you know, we
7 still need the money to fund it, and so --

8 MR. MCCORMICK: What do you mean by support
9 implementation? I'm not clear on the meaning of that
10 phrase. You say regulate or support implementation. Does
11 that mean you can require the implementation?

12 MS. SADE: Well, the reason I worded it this way
13 is because of the distinction in the security system area
14 between what we would regulate and what we might be able to
15 support or facilitate through like a no-cost contract or
16 public/private partnerships. The definition of motor
17 vehicle equipment is broad enough so that I think it clearly
18 covers equipment in new motor vehicles and lots of
19 aftermarket devices that are relevant to, that are part of
20 this system. The security system parts of it, you know,
21 parts of it that adjust, you know, all the security systems
22 within the vehicles, obviously.

1 MR. MCCORMICK: I guess what I'm saying is I'm
2 not reading that you can require implementation.

3 MS. SADE: That's the last bullet?

4 MR. MCCORMICK: No.

5 MR. WEBB: No, second to last.

6 MS. SADE: We can't require implementation. What
7 we tried to identify or figure out was what authority do we
8 have that would support implementation? We obviously have a
9 lot more authority with respect to the OEMs, and that's a
10 huge part of this to be able to actually have the equipment
11 in the vehicles and the aftermarket devices working together
12 and working in a way that will, you know, that will create
13 this connected vehicle environment. But that doesn't work
14 without a security system, so the security system is, you
15 know, the support of implementation is meant to operate the
16 fact that it's not necessarily subject to regulation but
17 it's something we can support through our regulator or --

18 MR. WEBB: Just real quick on the second bullet,
19 I see this slide being used in the future. Is maintenance
20 also something that you cannot regulate? So I want to say
21 for the slide to install or maintain --

22 MS. BRIGGS: No. I mean, I think I wish I had a

1 Highways lawyer here. No, what I'm going to say is we don't
2 require them to put it in, but, to the extent that it's
3 already there, I think it would be subject to the normal
4 rules that apply to --

5 MR. WEBB: Careful with this question. Another
6 entity installs the stuff. Can US DOT then tell the
7 maintaining agencies that they have to maintain it?

8 MS. BRIGGS: If another entity installs it?

9 MR. WEBB: As in a private entity or whomever to
10 install the equipment?

11 MS. BRIGGS: No. I mean, that's, you know, I
12 think, you know, like you have clear --

13 MS. ROW: Clear up on the slide is what you're
14 saying.

15 MR. WEBB: Yes.

16 MS. ROW: Got it.

17 MS. BRIGGS: -- I mean, you have certain
18 standards that, you know, are kind of a common level of care
19 in terms of how safe, but it's their own --

20 MR. WEBB: So let me address where I'm headed in
21 this. I understand in a lot of the discussion on the re-
22 authorization public/private partnerships, okay. So if, in

1 fact, a public/private partnership was and Verizon says, you
2 know, I'm going to fund putting out all this infrastructure
3 out there, but I don't want to maintain it, you know, I'm
4 going to leave it up to the feds to figure out how it's
5 going to get maintained. So that was where the gist of the
6 question is coming from.

7 MS. BRIGGS: Yes. I mean, this comes down to, I
8 think those of you in state agencies who are used to dealing
9 with this world know, basically, where the authorities are.

10 But people outside that don't necessarily, so this was to
11 communicate to others that we can't just say make it happen
12 and you guys --

13 MR. STEUDLE: I think that the biggest
14 misconception is the interstate highway system is owned by
15 US DOT. It's not. It's owned by 50 states, and we have
16 coordinated the standards so that it all looks and feels the
17 same, but it is owned by 50 different agencies. And US DOT
18 can't say you will do this, and they can't say you will
19 install this and, once it's there, you have to maintain it
20 forever because, at some point, it will become too costly
21 and some will say, "Forget it, I don't have enough money.
22 Federal government, you're not giving me enough money to

1 take care of this. Private partner, you've walked away.
2 We're turning it off." So that's what that slide is really
3 to say is that there is a point of how far US DOT can go.
4 That's really what you were trying to get at.

5 CHAIR DENARO: Right. But on that highway, they
6 can say, but if you put up a sign it needs to look like
7 this.

8 DR. ADAMS: There could be standards for this
9 infrastructure.

10 MS. SADE: That's correct.

11 DR. ADAMS: But only if you guys help pay for it
12 or --

13 MS. SADE: The standards are part of the MUTCD,
14 to the extent that it's fizzling, and that's a really
15 interesting debate --

16 MS. ROW: Communication standards are not part of
17 the MUTCD.

18 MS. SADE: What?

19 MS. ROW: Communication standards are not part of
20 the MUTCD.

21 MS. SADE: No, the communication standards
22 wouldn't be, but it could be viewed as creating, you know, a

1 --

2 DR. ADAMS: I guess it's just kind of missing off
3 the chart.

4 MR. STEENMAN: Is there any research available
5 that shows the differential between the adoption of
6 regulated technology versus open market unregulated
7 technology?

8 MS. BRIGGS: Oh, that is such a good question.
9 Shelley probably has one somewhere, but we didn't it on
10 these charts.

11 MR. STEENMAN: It really might be interesting to
12 see.

13 MS. BRIGGS: We do have adoption curves for ITS,
14 and, of course, there are a million adoption curves for
15 various technologies. I mean, we do have a tortoise and a
16 hare slide that has, you know, public sector adoption,
17 private sector, and you can probably guess which is which.

18 MS. ROW: Did you hear the question?

19 MR. MCCORMICK: No, but I gathered about the
20 adoption curve.

21 MS. ROW: No, no, is there a different adoption
22 curve for regulated equipment versus --

1 MR. MCCORMICK: Yes.

2 MS. ROW: Yes, is it different for regulated
3 versus --

4 MR. MCCORMICK: And your best example is really
5 commercial vehicles, because interstate commercial vehicles,
6 the federal government has the authority to solve. They
7 turned on texting ban in vehicles. The adoption curve for
8 commercial vehicles, for transit vehicles, or trains, all
9 those things, is much, much more rapid because it's a
10 smaller body of vehicles for one thing, and it's not
11 governed by the number of changes that occur by platform
12 year over year that allows the automakers and the motorcycle
13 people.

14 Their problem changes, their improvements, their
15 technology, etcetera, etcetera. So the adoption curve is
16 much, much slower, but the thing is is that there are
17 disruptive changes that occur. CTS was a perfect example.
18 When it came out and when it comes out in 2013 with Q and
19 the haptic seats, we'll probably hit another adoption curve
20 phenomenon that will also drive the competitors.

21 MR. STEENMAN: It might just be something to look
22 into longer term for, particularly, the memo that needs to

1 be written because it could influence the position we should
2 take or the perspective of should you regulate this or not.

3 DR. ALBERT: Also, the organizational or business
4 model you want to enter into. So it would be nice to know
5 that up-front I think.

6 MR. STEENMAN: Well, yes.

7 MS. BRIGGS: Great. Let's move on. So we
8 already covered this public/private. Fully public I think
9 is pretty unlikely. So getting started, this is just a
10 slide, I'm not going to go through the details, but we are
11 working on how you simplify the security structure to look
12 at what can be done quickly versus, you know, and so the
13 OEMs and the security experts are working with us on that,
14 and I only get a few details on that.

15 Next slide. So then the question becomes, you
16 know, you start out with the thing is it the same solution
17 from the beginning and the end, or is there some transition?

18 What does the end state look like? You know, is there a
19 role for public infrastructure or not?

20 MS. ROW: And one of the things that I do want to
21 mention about here, we talked about the security system, if
22 it used DSRC for the security certificates, if it used

1 cellular. We didn't talk about a model that the OEMs are
2 studying right now, which is an early adoption model.

3 MS. BRIGGS: That's what that last slide was.

4 MS. ROW: This one is?

5 MS. BRIGGS: The previous one.

6 MS. ROW: Oh, the previous one. Well, I think
7 it's just a short, I think now it's short, but they're
8 studying an option that would require either no
9 infrastructure or very little infrastructure because you
10 would just pre-load a lot of the certificates on the
11 vehicles. They think it would work while there was low
12 penetration but probably would not work for a sustained
13 environment. So that gets to one of these transition
14 things. Would it make sense if you could start that way
15 just to get rolling and then have something that you could
16 evolve into that's a more sustainable model over time? And
17 we don't know.

18 DR. ALBERT: Question. Is the roll out for this
19 anticipated to be kind of a national roll out all at once,
20 or is --

21 MS. BRIGGS: That's in the principles, yes.

22 DR. ALBERT: That's in the principles.

1 MS. BRIGGS: Ultimately, you want a system that's
2 interoperable nationally and that extends nationwide and
3 even across North America. But none of us are under the
4 illusion that it's going to happen overnight across the
5 nation.

6 MR. STEENMAN: But you'll probably get most of
7 the immediate benefit locally because how many people --

8 MR. MCCORMICK: Yes.

9 MR. STEENMAN: -- are driving long distance,
10 right? There's few.

11 MR. MCCORMICK: Yes. I mean, the average person
12 only spends 350 hours a year in their car, and 95 percent of
13 that is local.

14 MR. STEENMAN: Yes.

15 MS. BRIGGS: What's local to one of us is not the
16 same as what's local to another one of us.

17 MR. STEENMAN: But you could roll it out by
18 metropolitan area.

19 MR. WEBB: You'd have to talk to the car
20 companies about that. But, again, you know, they're selling
21 nationwide --

22 MS. ROW: Right. So it's the same system. It's

1 the same system nationwide, but you could start it in
2 metropolitan areas, for example.

3 MR. CAPP: So the discussions earlier on having
4 some infrastructure show up to give these people the ping
5 for this new technology in the cars for benefit, that could
6 be very localized.

7 MR. WEBB: Right, right.

8 MR. CAPP: And easily aftermarket.

9 MR. STEENMAN: I was thinking like, initially,
10 when the penetration is really low, you would think that the
11 few people that have it would benefit greatly from having
12 some infrastructure there, like traffic lights having it,
13 because then they get the benefit of that. So that's where
14 the sequencing of doing V2V first and then doing V2I later
15 doesn't make immediate sense to me.

16 MR. MCCORMICK: That's actually the history of
17 5.8 in Germany because Mercedes came up with the entire plan
18 to use that, a much smaller spectrum, about one-fourth what
19 we have, and they said, basically, we're going to do this
20 until we get all the cars. And when they asked them, well,
21 who gets this, they said, well, it would only be in Mercedes
22 because that's all the bandwidth there is. At that point,

1 the government started working on --

2 MR. STEENMAN: That works in Munich, but nowhere
3 else.

4 MR. SCHAGRIN: In your comment, you said the V2V
5 versus V2I, that this is where it breaks down and it doesn't
6 make sense to you. Is that what I think you said?

7 MR. STEENMAN: Yes. You wouldn't think the V2I
8 would be so much after V2V.

9 MR. SCHAGRIN: Right. So by having this V2V
10 decision point next year, that breaks the cycle. And once
11 we have that indication of where we're going then the other
12 can come into place, too. Before we had that decision
13 point, we were going back and forth. I mean, we started off
14 with original vehicle-to-infrastructure model, right? And
15 we were just kind of like just going back and forth. That
16 causes all sorts of things to happen.

17 MR. STEENMAN: But really good enforcement
18 function in place.

19 MS. ROW: But what we think is possible is that,
20 again, we'll go into pretend land, so let's pretend that in
21 2013 NHTSA makes a decision to start pursuing regulation,
22 right? So then that triggers a multi-year cycle. They have

1 to go do their notice of proposed rulemaking, they have to
2 have a phase-in period. So you've got, I don't know, some
3 number of years before it actually has to start coming off
4 an assembly line. But the minute that NHTSA made a decision
5 like that, then people like Roger, the equipment starts
6 stabilizing --

7 MR. CAPP: Nobody is saying there has to be a
8 regulation to do this. The process of starting your
9 regulation starts to show everybody the seriousness of the
10 rules, the stability of it, so that you're willing to start
11 investing. And a whole bunch of people need to see enough
12 of it to start investing --

13 MS. ROW: And so if they start manufacturing it
14 and it's stable, and the standard is stable, then we're able
15 to turn around to Kirk and George and Paula and say, okay,
16 here's literally what it means to you for your traffic
17 signal system, right? Now, they've now got a five-year
18 window in there to say where are my hot spots, where do we
19 need to do this? And right now we're working with the
20 controller manufacturers so that the future controllers that
21 they're going to purchase anyway are easily adaptable to the
22 technology. So we think that while they're lagging, that,

1 if NHTSA makes that decision that we'll be able to bring
2 these guys into the mix in time that it kind of comes
3 together about the time the --

4 MR. MCCORMICK: There's at least two auto
5 companies that are planning on putting it into their vehicle
6 several years in advance so that they can turn it on once
7 the regulation comes out.

8 MS. ROW: And, see, that would be even better.

9 MR. MCCORMICK: It's better for them because it
10 helps them sell more cars, depending on if they have the
11 ability to market the viability of it.

12 MR. STEENMAN: But if NHTSA makes a decision in
13 '13, could there be an aftermarket in 2014?

14 MS. ROW: There could. Again, it gets back to
15 the stable technology, stable standards, stable technology,
16 and we think that if NHTSA made that decision then, you
17 know, GM and Ford are not the only ones who are going to be
18 energized.

19 MR. CAPP: It's going to start a chain reaction
20 of other people willing to make another bet, right?
21 Everyone thinks NHTSA is going to get the momentum going.

22 MR. STEUDLE: And then on the infrastructure

1 side, that same thing will happen because there will be a
2 whole bunch of private companies that will say I can help
3 you, I can help you make this, I can come in with a private
4 venture, you know, and a concession deal for ten years, and
5 I can advance all these things for two. There's a whole
6 bunch of stuff that will pop when we know that's gone.

7 MS. ROW: And it's stable.

8 MR. STEUDLE: And it's stable, right. And, you
9 know, all the radio guys, they've built two radios, right?
10 A radio and a receiver, so they've got to sell one on the
11 other side.

12 CHAIR DENARO: I think we're struggling here
13 with, you know, safety, which is necessary, but who wants
14 it, I mean who wants to buy it; and the other sexier
15 applications, which consumers may want to purchase. But I
16 think something that probably there's--also a political
17 reality, okay? If we stay focused or they stay focused on
18 safety, then there's a lot more success of surviving
19 multiple years through appropriations and everything else.

20 I don't know if anybody else was involved in the
21 earlier days of GPS, but the only reason we have GPS here
22 today, and this is absolutely true, is because it was a

1 system designed to guide ICBMs in a test program. That's
2 the only way it survived multiple congressional hits. It
3 was for Navy Trident missile systems, and it was actually a
4 number one priority and couldn't be canceled. And it
5 survived through, otherwise, what cuts were there. Of
6 course, that was never the real reason.

7 So this is a win if this thing starts out with
8 V2V safety, but it's much bigger because of all these other
9 ancillary applications that happen. That's a win. That
10 wasn't a bad decision. It was a good thing. MS. ROW:

11 And so that brings us full circle back to we've got to
12 solve the security system problem.

13 MR. WEBB: I was going to say that parallels --

14 MS. ROW: Yes. And so part of that conversation
15 that was in this implementation scenarios piece is that,
16 again, we're kind of beginning to think it's not going to be
17 a DOT-operated system, right? We're not going to operate
18 it. There was a vision long ago that the states were going
19 to somehow magically operate it. We don't think that's
20 going to happen. So that leads us to a public/private
21 option or to a fully private option.

22 So Valerie's been trying to tee up some research

1 from the government. You'll love this. The government is
2 going to research where the private sector might find
3 value. You like that?

4 MS. BRIGGS: Aren't you going to tell us a better
5 way to do it?

6 MS. ROW: Yes. Tell us the answer. So that's,
7 you know, that's another part of the puzzle.

8 CHAIR DENARO: Mark Zuckerberg thought he was
9 building a college yearbook online, so the consumers told
10 him it was something else and, boy, were they right.

11 MR. SCHROMSKY: I think the safety aspect is, I
12 mean, but if you're looking from private company, you
13 mentioned one thing, those sexy apps, right? So, A, where
14 am I going to park today? I've got a parking meter. You
15 know, do I got a spot at BWI? There's going to be a
16 company, companies already out there, that are going to go
17 into different data sources and say, "You know what? Give
18 me your Michigan information from your MDOT cameras. You
19 know what? I'll pay you a fee. Give me your screens that
20 you have out there," and you probably would say, "Okay. You
21 know what? I'm going to go to AccuWeather and I'm going to
22 get your data streams there, and I'm going to host all this

1 stuff. And I'm either going to develop an app that you're
2 all going to pay for, or I'm going to sell that information
3 and be the front man to other app developers and say, okay,
4 what do you want because I've got every hooks into
5 manufacturers and everything else out there. Oh, by the
6 way, if you want the safety, I've got that."

7 It's already being done today, and I can do so
8 much on the phone, right? So industry will figure out a way
9 to monetize it and figure that out there or some of the
10 automotive -- you know, GM could do the same thing and offer
11 that as a service --

12 MR. CAPP: The app stuff, yes. The security
13 piece is the question. The business model for who wants to
14 run this bank. Who wants to run this security bank and
15 handle all these certificates? And Valerie talked about it,
16 go around and pick up all the pieces of paper from the old
17 ones when they're used, who wants to do that? What's the
18 business model for that? That's the bottom line she's
19 asking for ideas on. Because the way you said it, I think
20 it's clear there's money to be made when you're handing out
21 services, but this --

22 MR. SCHROMSKY: But, I mean, I'm transferring

1 those services, I'm getting it today already, right? I
2 mean, you're transmitting --

3 MS. ROW: So will any of those services subsidize
4 that security thing?

5 MR. SCHROMSKY: Yes.

6 MS. ROW: And is that a model somewhere in there
7 that wants to happen?

8 CHAIR DENARO: And the only way I'll get the data
9 is if I take on the banking job.

10 MR. MCCORMICK: You have to understand, too, is
11 we tend to look at very linearly at this situation. Back in
12 1976, I was doing graduate work, and I utilized the
13 internetworking protocol to transfer information over 110
14 mod line to another university as part of ARPANET allowing
15 us to use the beginning of the internet. And no one could
16 foresee what it evolved to over the next 37 years now, and
17 there were points of explosion that occurred when Berners-
18 Lee developed the HTML code, when they were able to
19 incorporate images, when they did chat.

20 We're going to see this is going to be a very
21 similar implementation. What we create here probably won't
22 exist in five years, you know. We'll have evolved past

1 that. And when you look at that implementation time line
2 and you look back at what the ramp is of technology, there
3 are processor improvements, there are technology
4 improvements, there are communication improvements that are
5 going to occur over time.

6 What I think part of what we have to do is make
7 sure that we've created a path that says before the JPO, if
8 you're going into this for federal highway, if you're going
9 to do a research program, here's what you have to keep in
10 mind from the viewpoint of industry and from the public
11 entities in terms of here's what changes and how and how you
12 can manage your program going forward without us, you know,
13 without anybody else.

14 MR. STEENMAN: That's a very interesting point
15 because now we might be fretting over storing, like, 500
16 million certificates in a car, but in five years from now
17 that might not be a problem at all. It might be like no
18 issue because the technology just evolves so quickly.

19 DR. ALBERT: Sounds like we need a subcommittee -

20 **Committee Focus Discussion**

21 CHAIR DENARO: Okay. Let me just do a time check
22 here. We can chat, but there's two things I'd like to

1 accomplish before we leave in 66 minutes, and that is, the
2 first one is I'd like to make some progress in terms of the
3 focus issues. I took some notes, and I've got some
4 suggestions, but I want to see if we can make some progress
5 on narrowing this down to some focus issues that we think we
6 want to deal with. Secondly, I want to make sure before we
7 leave that we have a discussion of how we want to structure
8 the rest of our meetings: how many meetings do we want,
9 roughly when, and how are we going to do that? And that
10 latter discussion, be mindful of some milestones that we
11 have, like a 2013 decision and so forth, and how do we align
12 with those milestones. So is that good for everyone that we
13 get to that?

14 DR. RAJKUMAR: So you're speaking October 2013,
15 right? That's the --

16 CHAIR DENARO: Yes, I think so.

17 MR. SCHAGRIN: Just late in 2013. In order for
18 input from here to be useful to them, you need it sooner
19 than October. October 30th isn't useful to them. And input
20 to the process, you know, in getting our safety pilot data,
21 the safety pilot model deployment includes August of next
22 year. But we're also incrementally getting data out, so

1 we'll be doing our analysis throughout the process to the
2 very end.

3 DR. RAJKUMAR: I thought that data goes to Volpe.
4 Will it be available to this committee, for example?

5 MR. SCHAGRIN: You want to do analysis of the
6 data?

7 DR. RAJKUMAR: If the data set goes to Volpe I
8 thought or --

9 MR. SCHAGRIN: No, we're not going to make this
10 data available to the committee. There's no reason for
11 that.

12 DR. RAJKUMAR: Oh, I see, I see.

13 MR. MCCORMICK: I don't think that's what our
14 function should be.

15 MR. SCHAGRIN: No, no, there's no reason for
16 that.

17 MR. MCCORMICK: There are people that, a lot of
18 really smart people dealing with that.

19 MR. SCHAGRIN: Your previous question, though, on
20 when should you tee up some kind of input, to be able to
21 affect the process and the decision, I would think by the
22 summertime of next year.

1 MR. MCCORMICK: I would like to offer another
2 idea. I think there's two people in here, I'll call them
3 the technology/industry people, that can provide some input
4 on some of the burning issues they've got with regard to
5 looking at the security framework, with looking at the items
6 we talked about with how different could we evolve the
7 infrastructure side of the architecture to obtain more
8 benefit, that literally, I think, within a few months we
9 could either -- and it may not be that we're providing a
10 recommendation to JPO. We may just be connecting them with
11 the right people. I would like to see that subcommittee
12 formed, and I think the players of that will be obvious. I
13 think it needs to be bounded by the automakers, and it needs
14 to have tier. I'd like to see Ton on it.

15 CHAIR DENARO: Okay. Well, what I'm proposing
16 doesn't conflict with that. So, I mean, I want to decide on
17 focus issues, and one of them is probably already sitting on
18 the table. So that's fine. And the organizational question
19 is how do we want to organize to attack this. It sounds
20 like I'm hearing subcommittees. If that's the way we go,
21 then we can name that person and get launched.

22 MR. MCCORMICK: I'd also like to suggest that the

1 technologists don't necessarily need to physically meet in
2 order to accomplish what they need to accomplish. We can
3 Skype or WebEx or email a lot of that background contact as
4 a matter of efficiency for all --

5 CHAIR DENARO: That also was a part of the
6 discussion when I said lining up our meetings and so forth.

7 I didn't necessarily mean physical meetings. However, as
8 Stephen will remind me, we have to be very mindful of our
9 FACA status. And there's starting to be a lot more
10 scrutiny. I mean, this is a public meeting right now. It
11 had to be announced in the Federal Register and all that
12 kind of stuff. People are invited. Our subcommittee
13 meetings largely will be of that nature, too, potentially.

14 MR. MCCORMICK: But you can hold a WebEx that you
15 can have participants --

16 CHAIR DENARO: I agree, I agree. I'm just
17 saying that 30 days ahead you have to have a Federal
18 Register announcement and that sort of thing. There might
19 be some level of meeting that doesn't require that if it's
20 not truly a meeting because you could be doing some research
21 work, but, anyway, I just want to point that out.

22 MR. MCCORMICK: But as a subcommittee doing a

1 working session, is that something that needs to be
2 publicized?

3 [Simultaneous speaking.]

4 MR. GLASSCOCK: It comes down to doing committee
5 business, and that's a very fine line and there's no wider
6 issue. If you're doing research, you're talking amongst
7 yourselves, you're passing ideas, that's okay. It's where
8 someone would look at your work and say, if you're doing
9 something you're going to vote on or something major like
10 that, but you can do research and contribute to the main
11 committee. I guess the main objective would be, you know,
12 the main committee has to agree, concur with whatever
13 recommendations that you're bringing to the committee,
14 right?

15 MR. MCCORMICK. Understood.

16 MR. GLASSCOCK: So research, communication with
17 each other, talking offline, that's okay. But --

18 MR. MCCORMICK: But if you form let's say a
19 subcommittee, at the end of this discussion there's
20 subcommittee one, and it's you, you, and you, subcommittee
21 two, you, you, you. And subcommittee two says, okay, we're
22 going to do a teleconference call and chart out what are the

1 focus areas, that would be a meeting. But if you said I'm
2 going to pick up the phone and call individually some
3 members on the subcommittee and say, "Here's what I'm
4 thinking. Do you share that idea? Great. I'm going to
5 call Paula and see if she agrees. Yes, she does, too,"
6 that's informal. But if the committee, the subcommittee
7 says let's meet to decide and make a decision, I think
8 that's where Stephen's guidance kicks in. You have to
9 publicize that.

10 CHAIR DENARO: But I think I heard a distinction,
11 Stephen, correct me if I'm wrong, that if we do not
12 authorize any subcommittee to make any decisions, the only
13 thing they're authorized to do is bring recommendations to
14 the committee, at which point we make that decision, does
15 that relegate their meeting to not be a meeting?

16 MR. AUGUSTINE: I would agree with you.

17 MR. GLASSCOCK: Yes, it does. It does. I just
18 would caution that the subcommittee issue has become
19 elevated, so, you know, we need to be cognizant of that and
20 remember that.

21 MR. MCCORMICK: But let's say -- I just want
22 clarity on this because I think it's important. If we have,

1 let's say, six people on a subcommittee, and I throw up a
2 document repository where we can share information, ideas,
3 whatever, and we have an email group that we communicate
4 with each other.

5 MR. GLASSCOCK: That's perfectly fine.

6 MR. MCCORMICK: Thank you.

7 CHAIR DENARO: And the role that I just stated
8 where I don't think any of us want to delegate a decision to
9 a subcommittee. We want them to do work and bring
10 recommendations. But then we will jointly make that
11 decision here, which is a public meeting. So by definition,
12 they're doing research. So we'll just be clear about the
13 marching orders we give to subcommittees. Hopefully, that
14 will help us with your guidance. Okay. All right. That
15 was easy.

16 So what I want to do now is, I'll be a scribe
17 here, is I want to collect suggestions for some focus areas,
18 and I'm going to cut off the discussion in 30 minutes. So
19 if we want to continue that discussion in our next meeting
20 or afterwards and so forth, that's fine, to come up with
21 other focus areas. But, frankly, in terms of workload, you
22 know, if we're going to break up into subcommittees and deal

1 with focus areas, those committees are going to be two
2 people each, we're not going to have anymore than three to
3 five, at most. So let's see if we can reach some kind of
4 consensus on what the major issues might be.

5 MR. MCCORMICK: I think the CME entity issue,
6 security issue is an important one.

7 CHAIR DENARO: Give me how --

8 MR. MCCORMICK: I would say, CME, the certificate
9 management entities.

10 MR. STEENMAN: And the whole security framework.

11 CHAIR DENARO: Security framework?

12 MR. MCCORMICK: Yes.

13 MR. BERG: And what's the objective?

14 DR. ADAMS: Review the technologies that are out
15 there, the options.

16 MR. MCCORMICK: Understand the ways of looking at
17 how that could be managed.

18 CHAIR DENARO: By the way, let me say something,
19 too, about what our mission is. Our mission is not to solve
20 problems, solve the problems for them that they've been
21 struggling with for three years, and we're going to show up
22 and, you know, with our tremendous wisdom, we're going to

1 solve it for them. It's a continuum. It can be as simple
2 as we're just teeing up, hey, here's an area where you guys
3 need more research, and here's some places where you might
4 go because we know some people in the industry and so forth.

5 Beyond that, and, by the way, here's where we think it
6 might lead and so forth.

7 So anywhere along there we could operate, okay?
8 But it's not likely that we're going to solve problems, and
9 I don't think we should expect to solve problems as a group.

10 So really our recommendations are to direct work in certain
11 areas and hopefully bring some suggestions on how to get
12 that done.

13 DR. RAJKUMAR: Bob, I'm feeling like we should
14 have a high-level macroscopic framework of what the
15 different areas would be.

16 CHAIR DENARO: Exactly.

17 DR. RAJKUMAR: Examples would be, for example,
18 technology. This will go under technology. There are
19 clearly policy issues, and maybe a third could be business
20 issues.

21 CHAIR DENARO: I agree with that, and I want to
22 do that, but I think what I would like to do is do it maybe

1 bottom-up because we've had some good discussions here.
2 Let's jump on a couple of things that we want to focus on,
3 and then we can step back and see if there's a framework
4 above that.

5 DR. RAJKUMAR: Okay, fair enough.

6 DR. KLEIN: I would suggest something along the
7 lines of market-based deployment on a networks model.
8 That's not a very eloquent way of putting it, perhaps. But
9 conceptualizing this as information networks coming inside
10 the car and consumer market-drivenness, how will that whole
11 model affect DSRC --

12 CHAIR DENARO: You used the word before, too,
13 strategy. And I hear the word model, so help me write that
14 down because I like that, but how would you describe that?

15 DR. KLEIN: Maybe strategy to facilitate, ways to
16 facilitate market-driven, consumer-driven network services.

17 DR. ADAMS: Is it adoption or marketing? And is
18 it just --

19 MR. MCCORMICK: Well, the adoption is a result of
20 good marketing. I mean, there might be issues of who owns
21 the data, for instance. A market model might need to know
22 what the property rights are in the system and what other

1 systems connect and whether you need to put policy in place
2 to encourage network interconnection to promote deals among
3 private actors who will build the system.

4 CHAIR DENARO: Okay. We'll come back and assign
5 subcommittees to these. We'll let them flesh this out to
6 make sure we're, quote, on the same page.

7 MR. MCCORMICK: Would this include incentive
8 strategies, as well?

9 CHAIR DENARO: Yes. I like that one. Any
10 others?

11 MR. MCCORMICK: Communication. I have
12 historically read about how they really need to develop a
13 better communication strategy. To understand--

14 CHAIR DENARO: You mean publicity or --

15 MR. MCCORMICK: Well, I don't know if I -- well,
16 yes, you could characterize it as publicity, but, I mean,
17 there's a lot of work that's gone into this program, there's
18 a lot of new companies coming into this environment that
19 know nothing about it, and there's a lot of things to get
20 your head around here. And I think that kind of would help
21 feed the bullet you just wrote, but I think there needs to
22 be a communication strategy better than I posted 8,000 pages

1 on the website for you to download. We need to --

2 CHAIR DENARO: You're talking about new groups --

3 MR. MCCORMICK: Yes. Shelley has got her
4 Twitter, and you could have your blog, but it really needs
5 to be, there needs to be a strategy put together that says
6 we're going to move forward with this, we've got several
7 years in front of us to figure out how do we get to the
8 point where we can implement that marketing strategy.

9 CHAIR DENARO: Yes.

10 DR. ADAMS: So communicating to -- okay. It's
11 outreach, not, not --

12 MR. MCCORMICK: Well, outreach is what you do in
13 a communication strategy once you've developed it.

14 CHAIR DENARO: Not to be confused with
15 communication technology.

16 DR. ADAMS: Correct. Okay.

17 CHAIR DENARO: Scott?

18 MR. BELCHER: I've got two things just to add
19 here for discussion. One is continuing the advice of the
20 committee on standards and global harmonization, and then
21 the second would be -- and I don't know if this is the right
22 committee, this is the right place to do it, but it would

1 certainly help the cause, and that's to consider whether
2 this committee has the capability to have an opinion or
3 provide input to the FCC on unlicensed uses of the 5.9
4 gigahertz band.

5 CHAIR DENARO: Is that related to this point?

6 MR. BELCHER: No, no, it's completely separate.
7 It's a different issue, but I'm not sure, I don't know if we
8 can do it, but if we could it would be very helpful.

9 MR. MCCORMICK: Maybe what we can do is develop a
10 framework for how they can engage the right stakeholders to
11 get input to it, which many of us are.

12 MR. BELCHER: This is unlicensed uses of the 5.9
13 gigahertz spectrum, which there's 75 megahertz --

14 DR. KLEIN: That's the spectrum for DSRC that has
15 restrictions proposed on it by the FCC.

16 MR. BELCHER: But right now it's set aside for
17 connected vehicles. The NTIA and the FCC are doing a study
18 to determine whether that spectrum could be shared and
19 unlicensed uses could be used, and there are concerns by the
20 OEMs. We don't know at this point whether that could
21 happen, but if it did happen and it started to be shared and
22 then we deployed this program and it threatened the safety

1 of the users, that could be a real issue. But it's been
2 underutilized for the last eight or nine years, so that's
3 the challenge we face.

4 MR. MCCORMICK: I think there's an important
5 public entity topic, if I can. We instituted a smart
6 intersection and bridge, and when you look at it you had to
7 deal with the local entity, the county entity, the state
8 entity. You had to deal with how you would put that
9 physically into the existing hardware that was on the
10 roadway, where that implement should go to. I think there's
11 a real need for a framework to help all of the public
12 entities, you know, understand what the scope of
13 implementing infrastructure would be.

14 DR. ADAMS: Yes, I think that's a good one, too.

15 MR. MCCORMICK: Because, I mean, we went on this
16 nine-month voyage and discovery with frustration everyday
17 because we didn't know something because now you're dealing
18 with companies that, there are different kind of companies
19 that are working with the infrastructures, even if they were
20 partnered with the civil engineering firms that work for the
21 state. There was a merging there that I think there s a lot
22 of things that you guys all know how this has to happen, and

1 the technologists really don't.

2 MR. STEUDLE: So that could be, that's another
3 form of communications. What I'm hearing is it's a
4 communications geared towards governmental agencies and
5 technologists to implement this.

6 MR. MCCORMICK: For infrastructure build out is
7 what I call it.

8 DR. ADAMS: Yes, it could be part of that.

9 MR. MCCORMICK: I just know that that's something
10 that doesn't exist and it would be real useful to have.

11 DR. ADAMS: Are we done with that one? I think
12 we just put that as a dimension of the outreach; is that all
13 right?

14 MR. MCCORMICK: Okay.

15 DR. ADAMS: Okay. So one that I would throw out,
16 it's been in some of the side conversations I've had with
17 folks, but that's sort of the transferability to some of the
18 other modes. We talked a little bit about how does this
19 interface with even some of our rail or the waterways,
20 whether it's on the rivers or --

21 DR. RAJKUMAR: Multimodal transportation.

22 DR. ADAMS: Yes. Sorry?

1 DR. RAJKUMAR: Multimodal transportation.

2 DR. ADAMS: Yes. Well, because it's mostly very,
3 very highway-centered, but I think some of the technologies
4 and the communication platforms and things, they might have
5 a role in some of our other transportation modes, as well.

6 CHAIR DENARO: Okay.

7 DR. ADAMS: That's good, yes.

8 DR. RAJKUMAR: Well, more of a question than a
9 suggestion here, I understand that NHTSA is the one making
10 the decision in 2013. I'm not sure that anybody in the room
11 actually is from NHTSA. I would love to hear from NHTSA the
12 questions that they would like to see answered, the risk
13 areas that they think ought to be addressed.

14 DR. ADAMS: Turn around. The woman behind you is
15 from NHTSA.

16 MS. SADE: But I'm actually not, I'm not the
17 risk-benefit person, so that would certainly be someone we
18 could hook you up with.

19 CHAIR DENARO: Okay. I'll just capture that as
20 something -- I was going to say that, too, that some of
21 these we might relegate to needing more information.

22 [Simultaneous speaking.]

1 MR. KISSINGER: What I'm suggesting is that a
2 subcommittee that would really pay close attention to the
3 field test and, as interim analysis or whatever, could
4 assist in independent review of that, as well as independent
5 recommendations about how it's feeding or could feed
6 eventually to that 2013 decision.

7 DR. RAJKUMAR: What does BFG stand for? BFG?

8 CHAIR DENARO: Briefing.

9 MR. MCCORMICK: The peanut gallery was getting a
10 little loose on this one. They're coming up with all kinds
11 of things of what BFG was.

12 CHAIR DENARO: Okay. I have one that I was
13 concerned about. And this might be resolved by just a
14 deeper dive, but I had some concern about the driver
15 research and maybe what's already being done on safety pilot
16 or what's been done up to now. The discussion we had about
17 potential unintended consequences, the driver complacency
18 occurring, and so forth, my concern is: are we doing enough
19 there to not end up with a problem on our hands at some
20 point in the future? So I'm just going to write that down
21 and talk about whether that's -- and this might be a deeper
22 dive. You did some clinics and everything else. Maybe we

1 just need a deeper dive of what came out of the clinics.

2 MS. BRIGGS: Do you want help with scribing and
3 stuff or --

4 CHAIR DENARO: Are you saying that my writing
5 looks like I do need help? Because you're probably right.
6 Thank you, thank you. Okay. Have we forgotten anything?
7 All right. I mean, we're not done. We've got more
8 meetings. We can come back to issues and so forth. I guess
9 my question now would be we've got a list of five here and
10 maybe three over there, eight. I don't see us having eight
11 subcommittees necessarily. How do we want to pare this
12 down? Or maybe a better way to do it, and, by the way, I'm
13 open to suggestions on processing, but maybe a better way to
14 start is I think there's a lot of agreement on this first
15 one.

16 MR. MCCORMICK: Well, the reason I think we ought
17 to have a technology industry subcommittee is that there's
18 probably a number of questions that come out of a variety of
19 these that could be pushed to that committee to clarify it.

20 CHAIR DENARO: Actually, that's where I was going
21 with this one, actually, because I've got some other areas
22 that I'm concerned about here, too. If you would just write

1 technology above that, Valerie. It includes the driver
2 research piece.

3 DR. RAJKUMAR: The last three seem to be just
4 briefings that we get from others, right?

5 CHAIR DENARO: Maybe. I don't know. They might
6 be issues. I mean, briefings might not resolve it. George,
7 did you --

8 MR. WEBB: Yes. From the standpoint of just
9 trying to get my hands still continue to be around this
10 thing, the ongoing how this thing is going to function and
11 who's going to pay, and I'm speaking from the maintaining
12 agency. I certainly don't have an idea of how to address it
13 at this point because you almost need -- chicken and egg
14 again, as we've heard. What is this thing going to be? I
15 mean, if it's all private, hey, locals do this. But from
16 the standpoint that you heard, a lot of this stuff we see,
17 particularly if there's going to be infrastructure out
18 there, it's going to be traffic-signal based, and between us
19 and the states, you know, that's what we do. So I'm not
20 sure where and how we deal with the money issue.

21 MR. MCCORMICK: We don't let anybody in traffic
22 signal cabinets, right? Nobody.

1 CHAIR DENARO: We might be able to broaden this
2 one in terms of --

3 MR. WEBB: That's what I was --

4 CHAIR DENARO: -- model it --

5 MR. WEBB: Yes, I saw that and I said, well,
6 that's just --

7 MR. MCCORMICK: Yes, I think we need to put in a
8 business model.

9 CHAIR DENARO: Yes.

10 MR. BERG: To me, that's a bigger question than
11 the security thing. Security can be solved. Who's going to
12 pay for it and how is it going to be sustained?

13 CHAIR DENARO: The biggest problem with security
14 might be the model.

15 MR. MCCORMICK: I think the security framework
16 issue is something we think we can probably provide some
17 guidance for relatively quickly compared to the larger
18 issues of the overall committee.

19 CHAIR DENARO: Right, right.

20 DR. ALBERT: Why can't security be put in the
21 technology group?

22 CHAIR DENARO: If we had more of a model --

1 MR. SCHAGRIN: Well, then the whole technology --

2 CHAIR DENARO: Yes. Well, there is two pieces of
3 it. Exactly.

4 MR. STEENMAN: Depending about security model,
5 what architecture you pick, then that will really limit what
6 kind of business model you can put around it. So you have
7 to kind of tackle that together.

8 CHAIR DENARO: Yes, yes, okay.

9 MR. CAPP: Since you created the list, you kind
10 of covered all of the aspects of this whole space, so it's a
11 good lesson in that regard. But I guess the question that
12 I'm going to ask now is do we need the help on everything,
13 or are there specific areas that Shelley's team highlighted
14 where they could use some advice or help or another set of
15 eyes. It seems to me that's where we might want to
16 prioritize because, you know, like the safety pilot stuff,
17 there are a lot of people working on that. I don't know that
18 they need any more sets of eyes, maybe just pare down the
19 list a little bit. The security business model we just keep
20 coming back to. Everybody is throwing their arms up on
21 that. We ought to help on that, if we can.

22 CHAIR DENARO: Right. And I agree with you.

1 Going back to what we said in the beginning, you know, what
2 I'd like to see us focus on is where do we see the
3 vulnerabilities? Where do we see the potential barriers?
4 And can we add some value in those areas that are the tough,
5 the risk areas, what are the big risk areas?

6 **Committee Organization**

7 So can we talk about, I think we said the
8 security framework is both technical and business model.
9 Can we look at volunteers here on the -- and, by the way,
10 are we all kind of in agreement that's maybe the way to go,
11 as opposed to doing everything here together?

12 MR. MCCORMICK: Yes, I would like to have that at
13 least be the first task of the technology subcommittee.

14 MR. SCHAGRIN: What is that actually trying to --
15 I heard a couple of things. Is that trying to draft a
16 solution, or is it about, as Ton said, bringing some other
17 eyes onto it, just kind of independent view or assessment?

18 MR. MCCORMICK: Two-thirds of the problem has
19 been solved. The certificate management entity is not
20 necessarily a robust solution, and I think that, in the
21 seven years you guys have been doing it, that's the one
22 piece that hasn't evolved. And I think there's some

1 alternate thinking that still meets the requirements that we
2 can bring to that.

3 CHAIR DENARO: So can we write some names down
4 there?

5 MR. STEENMAN: Put my name there.

6 DR. KLEIN: Well, how many committees do you
7 anticipate having, based on past --

8 CHAIR DENARO: No more than 20. How many would
9 you suggest?

10 DR. KLEIN: Four?

11 CHAIR DENARO: I would say three, maybe five max.

12 DR. KLEIN: Have people served on multiple
13 committees or --

14 CHAIR DENARO: I don't recall but that's not, I
15 have no problem with that. I think there's a model, this is
16 another model discussion. It's kind of the overview model.

17 Okay. So are we done here with people participating?

18 There's more opportunity, so don't jump on the first one.

19 All right. Market-driven adoption strategy, and
20 I think, Ton, this was your concept or suggestion of how
21 many consumer adoption -- okay. Yes. So, Hans, I assume
22 you'd like to be --

1 DR. KLEIN: Yes, I would like to.

2 CHAIR DENARO: Okay. Put Hans down. Who else?

3 DR. ALBERT: I'll join. I'll join Hans.

4 CHAIR DENARO: Great. Steve. Anybody else?

5 Going once, going twice.

6 MR. SCHAGRIN: Is this because folks don't want
7 to talk about potential business strategies or is there's
8 like an apprehension to?

9 MS. ROW: Or is it pacing because you're waiting
10 to see what other committees are coming?

11 MS. BRIGGS: Oh, that's a good point.

12 CHAIR DENARO: At this point, because these two
13 seem to have a lot of support, I'm going to now say what do
14 you think about these other areas? Which do you really want
15 as a focus item?

16 MR. MCCORMICK: Let me ask a question. On the
17 people that were on the last committee, was anyone here, was
18 Scott, on the standards and harmonization committee? I
19 think that would be useful to have. I would be useful to
20 see if he would want at least to be on that one since he
21 knows what went on and knows what was accomplished.

22 CHAIR DENARO: And Steve, his predecessor, Jim

1 Vondale, was very active in that one. So Steve would
2 probably want to be part of that.

3 MS. ROW: I'm sorry. I missed that part of the
4 conversation. Was there a sense that there was more work
5 needed in that area?

6 CHAIR DENARO: Yes, that was --

7 MR. CAPP: I don't think they've done the gap
8 analysis yet, have they?

9 MS. ROW: They're working on it right now.

10 MR. CAPP: Are they?

11 MS. ROW: I think so.

12 MR. MCCORMICK: And he made the comment when he
13 was here that he says he thinks there's work to continue
14 with that. And given the other things that we're talking
15 about, those all kind of feed into that as we go through it.

16 MR. BERG: I think he's afraid it will just start
17 to fall off if somebody says, oh, everything has been done
18 already.

19 MR. MCCORMICK: Right.

20 MR. BERG: I'll show these people I went over to
21 Germany and now everything is good.

22 MS. ROW: I can assure you we're not going to

1 Germany any time soon.

2 CHAIR DENARO: All right. We've got our
3 candidates here. Let's pick the next most important one,
4 you know, rather than assume we're going to do them all.
5 We've got outreach and communication promotion plan,
6 standards harmonization we just talked about, spectrum uses.
7 We have whether or not we do some kind of involvement with
8 safety pilot, a technology subcommittee which I would say is
9 part, this was my concern, and those are together.

10 MR. MCCORMICK: I think the technology
11 subcommittee is basically those people you're seeing in the
12 security framework task.

13 CHAIR DENARO: I'm sorry?

14 MR. MCCORMICK: People that are listed on the
15 security framework task are basically that subcommittee.

16 CHAIR DENARO: Ask them what?

17 MR. MCCORMICK: No, that those people working
18 that task are probably the technology committee,
19 subcommittee.

20 MS. BRIGGS: Those are technical people.

21 MR. MCCORMICK: Except your name is not up there
22 yet.

1 CHAIR DENARO: What's that?

2 MR. MCCORMICK: I said your name is not up there.

3 Be careful with the guy with the pen. He never writes his
4 own name.

5 MR. STEUDLE: I think, from a DOT perspective,
6 the communications promotion plan outreach stuff I think is
7 good. I had lots of conversations with Shelley about how do
8 we talk about this to certain audiences, but I think, you
9 know, there's additional questions --

10 CHAIR DENARO: So you think they need work.

11 MR. STEUDLE: Yes. And I would be a volunteer
12 for that.

13 CHAIR DENARO: Okay. Put Kirk's name. Anybody
14 else want to be a part of that?

15 DR. ADAMS: I'll go.

16 CHAIR DENARO: Great. Teresa.

17 MR. HOLTZMAN: I'll serve on that. CHAIR

18 DENARO: Okay.

19 MR. STEUDLE: How do we talk to the technology
20 folks? How do we talk to government, levels of government?

21 How do we talk to the people? What is that plan?

22 MS. ROW: If I might offer a thought, I know you

1 got the, I think that's supposed to be FCC down there on the
2 last one. I know Scott Belcher mentioned it just briefly,
3 but I'm not sure that we were very clear about that. So you
4 are clear that DSRC was a spectrum that was allocated for
5 this purpose, and that spectrum is under attack by a lot of
6 other users who want into that spectrum. There is currently
7 a study underway with NTIA that was mandated by Congress.
8 The study was mandated by Congress, NTIA is conducting it,
9 to see if we can share that spectrum with other users. It
10 has a very specific time frame. John, what's --

11 MR. AUGUSTINE: Eighteen months, but I think
12 they're going to try and get the bulk of the input by over
13 the next eight months. Yes, October, so -

14 MR. BERG: There was a lower band that was the
15 eight month thing, and then the DSRC band was 18 months.

16 MS. ROW: So just to be clear from a US DOT
17 perspective, and this is just our perspective, we are very
18 concerned about this and watching that study and
19 participating to the extent that we can in that study
20 because, while we want to look at if there's an option to
21 share the spectrum with other users, we are very cautious
22 that it's very early yet. I mean, we're researching six

1 applications, so we want to understand if there's any
2 interference possibility with those six applications, but
3 what are the other applications? This is an enabling
4 technology, and what are the other applications? And so we
5 don't want to be too accommodating too soon, even though we
6 don't really have the choice. It's going to be NTIA who is
7 going to have the say. But the rest of the industry will
8 have an opportunity to weigh in with the FCC actually easier
9 than DOT can. So if there is an interest in that, that is
10 an area that, again, it's sooner rather than later, but it
11 might be an area of very high leverage because if we don't
12 have that we can all go home.

13 DR. ADAMS: So what would the group do then?
14 Just try to provide information to make the argument --

15 MS. ROW: Well, you know what? I don't know, I
16 think, John, you were gone when we did the introductions.
17 This is John Augustine. John's the deputy director. He
18 does everything in the office, but he's also a key on our
19 spectrum stuff.

20 MR. AUGUSTINE: Yes. We don't know yet from NTIA
21 the process, so they're going to define the process on how
22 they're going to collect the data, what kind of modeling

1 simulation, what kind of technical parameters are going to
2 be used to issue the study. At some point, they're going to
3 have findings and be able to reach out to industry experts
4 to get their views. So if this committee would want to be
5 contacted by them or would have input to the NTIA, I'm sure
6 we could provide your name or they would contact you or you
7 could contact them.

8 The point is, the subcommittee, they want to look
9 at what they're studying and come up with some findings,
10 recommendations to NTIA to take into account when they write
11 their report. If they write the report without any input,
12 it could come out harmful to the DSRC band, and that would
13 be detrimental to the program.

14 MR. MCCORMICK: And CVTA submitted a letter
15 basically saying it needs to be maintained for this use and
16 why and signed by the entire board. So I think it would be
17 very useful if this committee becomes aware and understands
18 what the issue is and then can reach consensus on the
19 language that they would like to submit. I don't know that
20 it's a big study. I think it's more of we understand what
21 the issue is, we know what the risk is if we lose it, and
22 then we just draft the language either individually as

1 entities, which actually might have more impact, as well as
2 the committee.

3 MS. ROW: Well, that's an option. I just want
4 you to understand the issue more fully.

5 CHAIR DENARO: Okay. So I think that has some
6 potential high payoff, so I agree with you. Any volunteers
7 to work on that one?

8 MR. MCCORMICK: Scott Belcher.

9 DR. RAJKUMAR: That could be a plenary docket for
10 the whole committee, given its importance.

11 MR. MCCORMICK: Yes. I think really that may
12 just be having John provide us a briefing on what the
13 situation is, what the risks are, and then at the next
14 meeting or whenever it's appropriate have a discussion. I
15 think that's just homework we've got to do.

16 CHAIR DENARO: So one way to put it is we don't
17 know what to do until we get -- okay, okay. So we'll put
18 that one on the shelf.

19 MR. MCCORMICK: Who brought up the other modes?
20 I thought that was really valuable.

21 DR. ADAMS: I did.

22 CHAIR DENARO: Yes, that was Teresa.

1 MR. MCCORMICK: I'm not volunteering.

2 MS. BRIGGS: Do you want to combine that one?

3 DR. ADAMS: It was more just looking at how this
4 technology might transfer and do a little outreach on that.

5 It is a bit of an outreach, but there's other modes rather
6 than --

7 MS. BRIGGS: Do you all want a briefing on what
8 we do --

9 DR. ADAMS: That would be good. That would be
10 nice.

11 MR. MCCORMICK: Yes. We don't have to decide
12 today -

13 MS. BRIGGS: Yes, start with a briefing. That's
14 better, yes. Perfect, thank you.

15 CHAIR DENARO: How about this general technology
16 area? I think we need some more in-depth briefing, but is
17 that an area that you want to have a committee on?

18 MR. KISSINGER: I'm not sure I know what you mean
19 by that.

20 CHAIR DENARO: Well, again, we do have what the
21 program is and two examples that I wrote down in the notes.

22 One was the driver research. Are we adequately testing for

1 and understanding unintended consequences and things like
2 that? Second one was this whole question about positioning
3 and whether there's been enough testing there. Now, again,
4 a detailed briefing, they might say, yes, it looks like
5 there's nothing more that needs to be done there, but it was
6 a question in my mind.

7 MR. MCCORMICK: From some of the comments and
8 questions, I think what would be useful is for the entire
9 committee to be level set on what the history was; how we
10 got to where we are; what has been studied, analyzed,
11 investigated, and by whom; and then why you're on the path
12 that you're on. Everyone is level set, and then the
13 committee can sit there and go, well, we think you missed
14 something because your perspective or Ton's perspective or
15 somebody -- I think that is one of those, and we actually
16 have a presentation on the history of this space somewhere,
17 but that, I think, would be very useful because then people
18 aren't familiar with what happened on DSRC or what happened
19 with the automakers or why they're looking at boxes or
20 whatever.

21 CHAIR DENARO: So make that briefing --

22 DR. ALBERT: Scott, could you repeat those three

1 subheadings?

2 MR. MCCORMICK: Well, the history of where it
3 came from, you know, why they're --

4 DR. ALBERT: I'm saying so Valerie could write it
5 down.

6 MR. MCCORMICK: You've got the history, the what
7 was studied, what was done and why we're on the programs
8 that we have now. I think that will level set everyone to
9 say, okay, now I understand, you know, why you're doing what
10 you're doing.

11 CHAIR DENARO: I'm comfortable at this point that
12 we've got three areas we're focusing on for now, and there
13 are some other areas where we need a little bit more
14 information. And then when we get that, we might say, oh,
15 we really want to dive in here, or we might say it sounds
16 like you guys, you know, there's not much we can add. I'm
17 comfortable with us being at that point for our first
18 meeting, okay? So if we want to stop there, we can flesh
19 this out between now and the next meeting.

20 One thing I want to come back to is I would like
21 to, as Peter suggested, say who's going to take the lead
22 here in helping us organize this? So the security framework

1 and business model, do we have a volunteer?

2 MR. MCCORMICK: I'll be the convener.

3 CHAIR DENARO: I'm sorry?

4 MR. MCCORMICK: I'll be the convener of that
5 group.

6 CHAIR DENARO: Okay. So Scott. How about on
7 market-driven and strategy, Hans, do you want to --

8 DR. KLEIN: I'm happy to do that.

9 CHAIR DENARO: Great. And Kirk or Teresa on this
10 outreach --

11 DR. ADAMS: A group of two?

12 DR. RAJKUMAR: Three, three.

13 DR. ADAMS: Three. Okay. Who else do we have?

14 CHAIR DENARO: Sonny.

15 DR. ADAMS: Oh, good, okay. I can be the -- oh,
16 on that one? Do you want to be the convener, George?

17 MS. ROW: So let me help with some of this. So
18 if you get the people identified for these groups and we
19 have one point of contact we can just kind of have a
20 conversation with, we're going to do the legwork to send out
21 emails to your groups, to set up a conference call number.
22 I mean, we can help with all of that, so the logistics, even

1 if you raise your hand to be the convener, it's really just
2 us having a point of contact. But we will do the logistics
3 for you and, you know, help facilitate that.

4 CHAIR DENARO: Thanks for pointing that out.

5 MS. ROW: Yes.

6 MR. STEUDLE: Well, that was going to be my
7 comment when it was over, say, okay, Shelley, you setting
8 this up?

9 MS. ROW: Yes, yes.

10 CHAIR DENARO: And I personally agree with Scott
11 when he asked about standards and harmonization, but I think
12 we need to let him talk more about that.

13 MS. ROW: I'll go wrest him away.

14 CHAIR DENARO: Is that good enough for now for
15 where we are to get started?

16 DR. ADAMS: Is everybody on something?

17 CHAIR DENARO: Here's what I suggest, Teresa, is
18 we'll summarize this, send it back out to where we are, and
19 we'll ask that others, you know, then sign up, as well. So
20 we'll get this summarized out and fleshed out a little bit
21 more.

22 DR. ADAMS: All right. Paula is on ours. All

1 right. So is there anybody else?

2 MR. MCCORMICK: We made you vice chairman, Scott.

3 CHAIR DENARO: Scott, what we said was that we're
4 getting started with a couple of subcommittees and focus
5 areas. There are areas where we're not sure we want to
6 focus on that or not, so we'll get additional deeper dive
7 maybe in the next meeting, and we can always define another
8 subcommittee at that point. But one of them that we held
9 off on because you were the champion was the continuation of
10 the standards and harmonization effort. If you want to
11 volunteer to lead that one and get some other volunteers --

12 MR. BELCHER: I'll volunteer it with Steve. I
13 know Steve is very interested in that, yes.

14 CHAIR DENARO: Okay.

15 MS. HAMMOND: What do you mean by harmonization?

16 MR. BELCHER: So there's a whole effort underway
17 in terms of creating standards for all the stuff we're
18 talking about, and what's really important to the automobile
19 manufacturers and to the U.S. government is that those
20 standards be harmonized with other parts of the world so
21 that we're not creating different --

22 MR. BERG: Harmonization doesn't mean necessarily

1 they're exactly the same, but they can coexist in a --

2 MS. HAMMOND: Interoperable?

3 MR. BERG: Yes. Well, in a non-conflicting -

4 MR. MCCORMICK: I guess what would be useful to
5 know maybe at the next meeting is to get an update of where
6 you think there's areas left to complete on that because I
7 know that they're concentrated on the automotive side of it,
8 but this environment also involves communication and
9 computation standards and nobody is conversant on all three,
10 you know. And we have representatives of those industries
11 that can probably find the right people to weigh in on where
12 you're at and where you're going.

13 MR. BELCHER: But I think I would go back to
14 Bob's caution to us all. I mean, I think, when I think
15 about this, this is a tough and challenging area, and the
16 reason I kind of keep it on, I suggested it is I think this
17 committee, by paying attention to it, can support the JPO.
18 I mean, one of the big risks, one of the things we see is we
19 don't put as much resources behind this as the other parts
20 of the world do. And so this committee can inform, the DOT
21 can inform the White House, can inform Congress that this is
22 a very important issue for our ability to be competitive.

1 And I'm not a technologist, Scott, so I want to try to help
2 on the policy side where we can be supportive of DOT and
3 kind of keep pushing in the right direction. But Shelley
4 has got a staff person who can come and update us on kind of
5 where things stand.

6 MS. ROW: Be careful what you ask for.

7 MR. BELCHER: Okay. Maybe you can bring in
8 somebody else.

9 MS. ROW: No, no, it's not about that. It's the
10 subject matter.

11 MR. BELCHER: Yes, it's the subject matter.

12 MR. BERG: Before we leave this, I have maybe one
13 question. We've been talking about connected vehicle, but,
14 Shelley or Greg or somebody, have you thought about what's
15 after connected vehicle or what happens to the ITS community
16 if connected vehicle deploys?

17 MS. ROW: Yes, that's a really good point. And I
18 guess two things that we've just put this much thought into,
19 I think what we see, what we think we see is that if you
20 look at the automotive industry now you've got radars and
21 sensors and those sorts of things. We think that will
22 migrate to some combination with the connected vehicle that

1 will eventually migrate to something with automated
2 vehicles. So we started to look at a little bit with NHTSA.

3 NHTSA has got a lot of interest in the automated vehicle
4 realm. So we think that that's part of the future, so
5 there's that piece.

6 Separate from that, though, and we have done even
7 less thinking about this, other than we've contacted some of
8 the UTCs to say would you guys be interested in thinking
9 about it, it's what does transportation management begin to
10 look like in a completely connected world? So if everybody
11 does have a thing and if everybody has opted in to stuff and
12 there are ecosystems out there that are consolidating data
13 from a lot of places and selling apps to consumers and
14 operating agencies, what does that mean? So if everybody's
15 app tells us that the freeway is closing, to reroute on a
16 local street all at the same time, what is that like for
17 you? So that's an area that we have about done about that
18 much thinking in. But we feel like it's ripe.

19 And the other part of it, too, that I think is
20 exciting and no one really gets excited, my other one is
21 that, those of us in the transportation industry, we have
22 all kinds of models, right? We've got planning models,

1 we've got capacity models, we've got all these models about
2 how to optimize the system. They're based on an assumption
3 of sensor data, loop data. So they were designed originally
4 for the kind of data that we could get with that kind of
5 technology. Well, now the technology is fundamentally
6 different, so what does that mean to that whole community?
7 What does it mean to that whole environment? You know, trip
8 generation models, you know. Well, who's going to need that
9 anymore or how does that change? And I don't think we've
10 looked at that at all to see what might be possible.

11 MR. MCCORMICK: So what you might be needing in
12 the future, is that really --

13 MS. ROW: Yes, what's the whole world going to
14 look like?

15 MS. HAMMOND: We're seeing that now in a world
16 where the INRIXes of the world are capturing flow data but
17 not capturing capacity. So we're getting different kind of
18 data than what our loop detectors collect, and we're trying
19 to figure out how to integrate that for more knowledge and
20 then what do we do with that information?

21 MS. ROW: Right, right.

22 MR. BERG: Do you need any advice from this

1 committee on that type of thing, or is that farther out than
2 you're asking us to address?

3 MS. ROW: No, you're welcome to look at that. I
4 mean, we think it's kind of blue sky creative thinking, and,
5 quite frankly, we just don't have time right now.

6 MR. MCCORMICK: What's a really interesting idea
7 is that rather than have a, you know, death-by-PowerPoint
8 all day long is that we could have a breakout session for an
9 hour that just is an idea-generation topic around one thing
10 and get a tremendous amount of different viewpoints and
11 expertise in the room, you know, if you have a topic like
12 that. And it's also more energizing for a meeting if we're
13 not just sitting here the whole time. We can say, okay, at
14 10:30 we're going to go into this working, talking, you
15 know, everybody gets to throw out ideas and do a plussing
16 session, etcetera, etcetera. And just knowing that it's on
17 the agenda, you know, tell me what you think the future of
18 our computational assessments needs to be, you know, we can
19 survey a lot of people to think about that.

20 CHAIR DENARO: And that is the model, Scott.
21 We're paying some dues in this meeting because we wanted to
22 get everybody up to a consistent level, so we had the JPO

1 walk through this stuff before. Now, it's kind of on
2 demand. The command performance is, okay, we're going to
3 request where we want some depth. We may have outsiders
4 come in, as I said, okay? We're going to have
5 subcommittees. We're going to want to hear what they've
6 come up with and what they've done and so forth. So the
7 format of the meetings will be, I hope, quite a bit
8 different.

9 DR. ADAMS: So on that particular idea, I think I
10 read in some of the pre-reading that there was a sample data
11 set that you guys are going to put out.

12 MS. ROW: That's the research portal.

13 DR. ADAMS: Which would then sort of be some sort
14 of a platform or at least, you know, the sample data set
15 then would be made available and then researchers could try
16 to do some of the things that you're talking about, right?

17 MS. ROW: Well, that's the, well, there's two
18 things. There's two.

19 MR. CRONIN: There's data.gov, which an element
20 of that is safety.data.gov. And so that's a lot of,
21 generally speaking, static data that we're trying to make
22 available to the public to use in a variety of different

1 ways, and so the latest being the safety.

2 We're looking at it from the connected vehicle
3 world of we need to better understand what this data is
4 going to look like and how do we use it, and so we started a
5 path of looking at connected vehicle data. So we started
6 with, well, what is the existing data that's out there? And
7 so we got some data sets. Some of it does have some more
8 advanced GPS and Bluetooth data sets and other things, but
9 it also is fully integrated with existing data.

10 So we have that. We're trying to establish, and
11 we had established for a while and we took it down, a
12 realtime data feed on connected vehicle data to merge in to
13 sort of overlap that. And so we're doing that for this
14 research phase. Some of it might migrate over to data.gov.

15 Right now, data.gov can't handle realtime data, but we
16 don't have realtime data right now either, so we're still
17 looking at that. So there is a, in the next few years, sort
18 of, actually, it went up this week. So we have this
19 research data exchange.

20 DR. KLEIN: Where is it?

21 MR. CRONIN: Where is it? I'll have to get back
22 to you on it. I don't remember where it was. The data is

1 in the cloud, but, yes, I don't remember what we called it.

2 So there's some issues there. So we have version one, and
3 we're going to be adding different things. As we get the
4 safety pilot data, we're going to put it in there. But we
5 have a big question about timing, you know, so we're not
6 going to put the data in before NHTSA makes a decision, but
7 maybe there's some if it we can. So we're working through
8 that.

9 **Future Meeting Discussion**

10 CHAIR DENARO: Okay. We have about 15 minutes
11 left, so I'd just like to ask a little bit about our process
12 going forward and talk about our meetings, and I'd like to
13 get everyone on their way by 4:00 as we promised, myself
14 included.

15 So, first of all, let me just say with respect to
16 the subcommittees we'll send out an email that summarizes
17 what we're asking. But just as a header, what I'd like to
18 see from subcommittees is re-state the title, you know,
19 modify it as necessary, develop a charge for the
20 subcommittee that you're going to be working on, maybe some
21 discussion of what the process will be, whether there's
22 going to be outside help or what you plan to do that, and

1 that sort of thing. So we'll get that in place. And like I
2 said, that will be in this email that follows up here. And
3 we can coordinate a lot of other things through the emails
4 also. We don't have to do everything here.

5 What I did want to talk about, though, is just
6 understand what everyone's leaning is toward meetings. We
7 talked about the fact that we've got some rather short-term
8 milestones coming up. That would be great if we could get
9 some kind of deliberations before those hit. We can't do a
10 formal memo to the JPO and to the Secretary at this point,
11 but we can certainly make inputs to the JPO prior to that.

12 So given that, my suggestion would be that, you
13 know, we could go as few as two meetings, but I would prefer
14 we go about three meetings. Yes?

15 MS. ROW: May I just interject something?

16 CHAIR DENARO: Sure.

17 MS. ROW: So, yes, at the end of your term, you
18 will do a big report. But every year you will do a report,
19 so you can do something small of things that are in process
20 or whatever you want, or if you've got something that's in
21 the interim you can do that. We have to report annually on
22 the activities of the committee.

1 CHAIR DENARO: Okay. And we discussed that
2 before --

3 MR. GLASSCOCK: And last year, the last meeting
4 you did that. You provided the progress you were making,
5 what you were working on --

6 CHAIR DENARO: Yes, yes, yes --

7 MR. GLASSCOCK: -- and then we just relayed that
8 information.

9 CHAIR DENARO: Okay, great. That's good.

10 MR. BELCHER: Does it make sense to do something
11 with the safety pilot after it's launched?

12 CHAIR DENARO: I'm not sure what you're saying.

13 MS. ROW: At the meeting?

14 MR. BELCHER: Well, have the meeting, Kirk could
15 host the meeting, expose the committee to something more,
16 like, real, what's going on there, and then go from there.

17 MR. STEUDLE: I think it solves one of the, you know, a
18 little bit of a preview, a review just to get the committee,
19 here's what it is. I would suggest it not be on the launch
20 date. A little after. Let them get the bugs.

21 MR. BERG: What bugs?

22 MR. STEUDLE: You can have it at 1:05 because

1 everything will be done and launched by 1.

2 MR. SCHAGRIN: I would suggest September or
3 October. That way, we'll have a good operational
4 environment that folks can really kind of immerse themselves
5 in and see what the real operational value of this will be.

6 MS. BRIGGS: Before it starts snowing.

7 MS. ROW: And, Valerie, what's the timing of some
8 of the deliverables?

9 MS. BRIGGS: September.

10 MR. STEUDLE: And I'm sure he has a nice facility
11 that we've met in last that is at least twice as big as
12 this.

13 CHAIR DENARO: That's not saying much. I don't
14 see us having a meeting prior to September. It's already
15 June, for all intents and purposes. And summer is a tough
16 time to get everybody together, so do we all agree on
17 September? We can send a doodle out and look for times that
18 work. September-ish for our next meeting?

19 DR. KLEIN: When is that security framework
20 report due? That's a pretty interesting document that's
21 being prepared on that.

22 MS. BRIGGS: So there's actually two studies, and

1 those are the ones that are due September-ish. So I guess
2 what's going through my mind is we may get them in September
3 and, if we're happy with them, we can start talking about
4 them and stuff. But if we need to review them and send them
5 back, it may be more like October before we have a, you
6 know, good ability to talk about them here. So we also are
7 planning a public meeting, September 25th through 27th. So
8 given that there are only 17 of us, we may want to think
9 about what that means for us, too.

10 MR. MCCORMICK: That would be here?

11 MS. BRIGGS: No, it's in Chicago.

12 MR. MCCORMICK: Oh, Chicago.

13 MS. BRIGGS: So I guess maybe early October might
14 be better for us.

15 MR. STEUDLE: Before the 15th.

16 CHAIR DENARO: Well, I like the idea of being in
17 Ann Arbor, too.

18 MR. MCCORMICK: Yes, I do, too, because I can
19 drive there in 15 minutes.

20 CHAIR DENARO: All right. We'll sort that in
21 emails. But sometime, at least we've decided on the time
22 frame. We'll think about the location. And then we can

1 work on meetings after that. We've already said we want to
2 launch the subcommittees and get some work going there. In
3 emails, we get some more information out so we can start
4 working on things.

5 Possibility, we could also have a phone meeting
6 prior to a face meeting, so that's something to consider.
7 I'll basically query you for that in emails after we sort
8 together our notes and so forth and see if we want to do
9 that. That's usually a lot easier for everyone.

10 MS. ROW: Bob, the other thing that we can do
11 with the subcommittees is, if it's on the topic, then we can
12 have a phone briefing --

13 CHAIR DENARO: Yes.

14 MS. ROW: -- and get more background materials.
15 The only thing I do need to flag to everyone's attention is
16 that, because you are a federal advisory committee and, of
17 course, you're being recorded, that we can have
18 subcommittees. So, Stephen, how does this go?

19 MR. MCCORMICK: The one thing that I was going to
20 say is I think what would be useful, particularly on the
21 security one, is I'm going to get back in touch with you and
22 we'll decide on what material and reading it and give to

1 them, so that, when we do have a telecon or whatever,
2 everyone is level set.

3 MR. SCHAGRIN: Just one more point on the
4 security, on the technical side, actually the deployment
5 side, CAMP and VIIC have a deliverable to us in August. So
6 if we have a maturing of the thinking in the next phase, it
7 would be there in August, some more information.

8 CHAIR DENARO: Good.

9 MR. MCCORMICK: Well, I'll have John call them up
10 and talk to them because --

11 MR. BELCHER: Bob?

12 CHAIR DENARO: Yes.

13 MR. BELCHER: Can I make one -- part of the value
14 of the program advisory committee is the diversity of it and
15 having people from different areas of interest. And I was
16 listening to Scott talk about wanting to get all the
17 technologists together. I would recommend balancing the
18 technologists with people who think differently --

19 CHAIR DENARO: Good point.

20 MR. BELCHER: -- so people from the business side
21 of something else, because, you know, all the technologists,
22 we all have a tendency to talk to people like us. And so

1 having people not like us in the subcommittees is really
2 important.

3 CHAIR DENARO: Good suggestion. All right. Any
4 other comments, suggestions? George?

5 MR. WEBB: Yes, I've got one that I think is
6 really near term. The Secretary wrote a letter regarding
7 re-authorization and in that letter laid out an issue that's
8 on the table where the Senate put a recommendation on that's
9 being looked at that the 110 that we saw at the very
10 beginning, that pie gets significantly cut by half to take
11 that money and put it into deployment. So I'm not sure that
12 we can act as a committee. I'm not sure that we should act
13 as a committee. But I think it's an issue that, either
14 individually or taking it back to our roots or whatever, I
15 think that's a real bad mistake to do that. But, I mean,
16 the re-authorization guys are sitting at the table talking
17 to each other. So that's why I'm saying, from a time
18 critical standpoint, you know, I think it's really important
19 to make our positions known to the people sitting at that
20 table, and I'm not sure how best to do that, but I wanted to
21 put it out there because it is very time sensitive.

22 CHAIR DENARO: Yes. You know, commenting on budget is

1 something that we've typically steered away from mostly.

2 MS. ROW: You're coming on legislation.

3 MR. WEBB: I understand.

4 CHAIR DENARO: Right, yes.

5 MR. WEBB: And I'm raising that by having
6 everybody look at their own organization and see if, in
7 fact, you know, I'm going to take this back to National
8 Association of Counties and see if we want to offer a
9 position on that. Like I said, I just wanted to put it out
10 there and find out if there was a feeling that, potentially,
11 the other parties represented at this table might want to do
12 the same thing.

13 I know it's very sensitive. That's why I said it
14 may not be a committee issue, per se. But it's certainly of
15 interest to those of us sitting here as far as the future
16 activities that the committee may be looking at.

17 CHAIR DENARO: I completely agree with the
18 importance and everything else. My personal preference is
19 to not, as a committee, weigh in on that.

20 MR. WEBB: I understand.

21 CHAIR DENARO: But I appreciate you bringing it
22 up and suggesting that any organization do that.

1 MR. BELCHER: George, if NACO or any other
2 organization wants to coordinate with the other associations
3 --

4 MR. WEBB: Got it.

5 MR. BELCHER: -- and we can put together a
6 uniform strategy.

7 CHAIR DENARO: All right. Yes, go ahead.

8 DR. KLEIN: The final coalescing of various
9 committees is going to kind of happen online?

10 CHAIR DENARO: Absolutely.

11 DR. KLEIN: You're going to put out a call and --

12 CHAIR DENARO: Absolutely, yes, yes. This is
13 preliminary here. We're tired at the end of the day. I'm
14 tired, you know, so right, right, right. And I want to
15 leave some time for Greg and Shelley to say something also,
16 but thanks a lot for your work today. I think we had a
17 great discussion. I'm very pleased with the progress we
18 made. I don't know how all you feel, you know, and what
19 your expectations might have been. But I think we came
20 together real well and had some very important discussions.
21 So that was good.

22 You know, Kirk, you said something earlier when

1 we started about the mission of cars that don't crash, and
2 I've said something like that earlier. I went a little
3 further than that, and I said cars that can't crash. But,
4 you know, there couldn't be a nobler goal than that, and, to
5 me, I'm very motivated and very excited to be working on
6 that.

7 You know, if we think about what if, based on
8 this technology getting deployed and based on this committee
9 had some impact on this, what if in, pick a number, 2017 or
10 whatever, after some of these systems are on the road,
11 aftermarket and everything else, what if fatalities were
12 like half of where they are today? I mean --

13 MR. STEUDLE: What if in 2025 we get to Roger's
14 goal of --

15 CHAIR DENARO: Yes.

16 MR. STEUDLE: -- a day, a day of no fatalities.

17 CHAIR DENARO: Yes, what if Roger's dream, vision
18 is true, as well. I agree. And so I think it's really
19 important what we're working on. And the other thing I want
20 to say, too, and I'll say this for Shelley, I mean, and I'll
21 give you a little perspective from previous committees and
22 where we were. We've reviewed the JPO programs, and they've

1 had their concerns about this and that, and DSRC, but
2 there's other technologies and everything.

3 One thing I'm hearing now, which is very
4 interesting, and I think your principles helped a lot, is
5 I'm hearing conviction on the part of the JPO that, hey,
6 folks, it's safety, you know, if you're not on with that,
7 leave the room. And it's DSRC because we've studied this
8 and we know what we're doing and we're moving on. I am
9 really pleased to hear that amount of conviction. And from
10 that, I think that's contagious throughout the community and
11 the industry, as well.

12 I'm sensing the beginning of a tipping point here
13 where it sounds like this is going to happen. Two years
14 ago, I wasn't so sure, you know. But I'm sensing that
15 happening now, and I got that sense through the ITS America
16 meeting. So it's an exciting time.

17 And as we're seeing, you know, struggling with
18 the schedule here, we're struggling with the fact that we're
19 going to be here two years. Within two years, there's a lot
20 of decisions already made. You know, we've got to be faster
21 on some of these things.

22 So we're in a rapid evolutionary period for this

1 program, and that's the importance of what we're doing. So
2 Greg, Shelley?

3 MR. WINFREE: Well, I guess I would just say, and
4 to pick up on the point that Scott was making about getting
5 into the blue sky aspects. Shelley certainly hit on all of
6 the important points, but we should probably factor in what
7 our plenary session talked about yesterday from the
8 Department of Energy perspective as we looked at
9 electrification of the grid, alternative fuels. I mean, you
10 need to wrap all of thinking that in and maybe even broader
11 than our transportation focus. So please make it be as
12 outside the box, when you have those discussions, as
13 possible because that will help us all on the federal side
14 as we move these issues forward.

15 But just to echo what Bob said and what Shelley
16 said, thank you for your time, attention, and your service.

17 It really is an exciting point with where we are headed
18 with the transportation system. And I'll just keep it
19 simple. It's game-changing, and this is really exciting to
20 be involved with this at this level. So thanks so much.

21 **Adjourn**

22 CHAIR DENARO: All right. Thank you. We're

1 adjourned.

2 (Whereupon, the foregoing matter was concluded at 4:01 p.m.)