UNITED STATES DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRANSPORTATION
SAFETY ADMINISTRATION

ITS PROGRAM ADVISORY COMMITTEE

MEETING

WEDNESDAY
AUGUST 7, 2013

The Committee met in Salon F of the Crystal City Marriott at Reagan National Airport, Arlington, Virginia, at 8:00 a.m., Bob Denaro, Chairman, presiding.

PRESENT

ROBERT DENARO, Chairman
HANS KLEIN, Vice Chairman
TERESA ADAMS (via telephone)
STEVE ALBERT
SCOTT BELCHER
ROGER BERG
JOSEPH A. CALABRESE
JOHN CAPP
PAULA HAMMOND, P.E.
STEVE KENNER
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J. PETER KISSINGER
SCOTT J. McCORMICK
RAJ RAJKUMAR (via telephone)
BRIAN WAYNE SCHROMSKY
TON STEENMAN
GEORGE T. WEBB, P.E.

ALSO PRESENT

GREG WINFREE, Deputy Administrator, Research and Innovative Technology Administration (RITA)
STEPHEN GLASSCOCK, Designated Federal Official
JIM ARNOLD
SCOTT BELCHER
NATE BEUSE
BRIAN CRONIN
KEVIN GAY
KEN LEONARD
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MR. GLASSCOCK: I would like to welcome you. As a reminder it's being recorded. Please speak up and identify yourself when you're speaking. The restrooms are all the way down to the right. There will be coffee, juice, refreshments outside. Lunch is going to be brought in. If there are questions let me know.

There's a conference for Wi-Fi. If you need that, holler. And with that welcome again and I'll turn it over to Bob.

CHAIRMAN DENARO: All right, thank you, Stephen. And we have Greg here with us so I think we'll just let Greg give his introductory comments.

MR. WINFREE: Sure, I appreciate that, Bob. Good morning, everyone. It's always a pleasure to be with this group. As you know at RITA and certainly Highways and
NHTSA we look at the ITS JPO Program and effort and Connected vehicle as really groundbreaking, exciting technology. So it's the kind of enterprise that gets everyone's juices flowing at DOT.

You know, as we draw closer to the hourglass with the NHTSA decision looming large and getting larger, you know, the input from this assemblage is even more important.

So we thank you for your guidance over the years. Thank you for being not just ambassadors but the champions of this game-changing technology. And we're really excited about where we are from a progress perspective. And look forward to more to come. We're glad we've got DOT partners. So welcome back to Washington.

CHAIRMAN DENARO: Thank you.

Glad to have you here.

MR. WINFREE: A pleasure.

CHAIRMAN DENARO: And I'll extend my welcome also. And I'm not sure where my
intrepid vice chair but I'm sure he'll join us soon. Last I saw him we were having some Thai food and a bottle of wine last night so you draw your own conclusions.

(Laughter)

CHAIRMAN DENARO: So just, I don't have a lot of introductory stuff. I don't have a presentation to make. That's good news.

I just want to overview a little bit what we're doing the next 2 days. This is kind of a workshop for us. And it was my intention to make maximum use of our time together to get some things done while we're together. I think we're more productive that way than we are on the phone and certainly when we're not on the phone and off on our day jobs. So let's work hard these 2 days and get as much done.

The agenda is really structured around our deliverables that we agreed to. We agreed to five deliverables. We completed
one, the letter to the FCC where we commented on the plans for spectrum sharing.

And then the others we'll walk through basically in the 2 days. Today we're going to get an update on the JPO. I mean that's always good -- oh, here he is. Welcome.

We're going to get an update on JPO and the activities and progress they've made. We'll talk about that a little bit.

And then our first deliverable, the letter that we've been working on through the emails, a draft letter to NHTSA concerning their planned rulemaking sometime later this year.

We have a draft in place. We have a couple of versions of that right now. I really want to see if we can finalize that.

Now I hesitate because I know finalizing something by committee, by a large committee is not the most fun thing to do but
we'll see what we can do. If we can get the comments in there and get a final draft probably within -- my hope is within the next week or so I can send that out and get that done.

And then a second deliverable we had was, or the third one if you count the FCC letter, was Ken's request to us to look at this deployment incentives and what's there. So Hans is going to walk us through a discussion there, get some inputs from everybody. Let's see if we can pull the information together so basically he'll be able to put that report back together and then of course back out to you for approval as well.

And then another, the fourth deliverable we had again at the request of Ken was to look at the strategic plan and review that. Roger Berg, Ton and I volunteered to do that. We haven't made progress in terms of writing anything down at
this point but we've gone through the
document and have some comments. And we want
to solicit your comments.

To lead that off we will have a
presentation on that. So for those of you
who didn't quite get through all 195 pages of
that report we'll hear a presentation and get
to comment on that. So again, I'm looking
forward to that being a working discussion
where basically we pretty much get all of our
comments gathered while we're here and then
we can wordsmith those later on.

And then tomorrow we've allocated
the full day to our most important
deliverable which is our final
recommendations at the end of our term. Now,
actually our term I believe goes through
February or so but we have -- I'm sorry?

MR. GLASSCOCK: March 5.

CHAIRMAN DENARO: March 5, okay.

That's February-ish.

(Laughter)
CHAIRMAN DENARO: But we have a deadline to get our comments in at the end of the year which means getting them to the JPO. And we agreed at the last meeting that we would get our comments to JPO by I think it was December 1 or something like that, early December, so they have time to go through them and that sort of thing. So I want to stay on that schedule and so therefore we're spending the whole day on that.

What we're going to do since we broke into subcommittees is we'll start out and let the subcommittees break out and kind of refine their recommendations, get them in shape to talk to the group. Then we'll come back.

And the agenda really says from 10:20 to 12 report outs from the subcommittees. And then it says after lunch that we have discussion and discussion. I'm open to suggestions how we do that, whether we do one subcommittee and have a lot of
discussion on that and then the next one. So we'll go back and forth in terms of presenting from the subcommittees and having our discussion there.

But again, I'd like to -- us to come to consensus on what's being recommended by the subcommittees, but I'm also going to look to the whole committee in reviewing each subcommittee. So for example, I'm part of the Technology Subcommittee. If we've forgotten something, you know, let's get that on the table and get that out and we can work on that.

And Stephen, we didn't talk about will there actually be breakout rooms that we have?

MR. GLASSCOCK: Yes. There will be breakout areas. I'm not sure that there's rooms but we will make that happen.

CHAIRMAN DENARO: Okay. And we might keep that breakout theme going throughout the afternoon there where if a
particular subcommittee has some other recommendations coming in, things to work on, maybe they can step out of the room and refine that on their computer or whatever, come back with it and present it as well. So we can kind of iterate on this thing and make as much progress as possible.

Because again -- and we did -- Steve had mentioned that this might be our last meeting. We did talk about the possibility of a 1-day meeting prior to the end of the year, physical meeting. I'm open to that. Either way, if that doesn't sound necessary, or if we want to do that. I do think we'll at the very least have one or two phone meetings to finalize everything. So we'll figure that out tomorrow as we see what kind of progress we make through this.

But you know, let's just keep in mind that we've agreed to a deadline of December 1. So between now and then we've got to take whatever we have at the end of
this meeting and get that into final shape, get consensus and be proud of the result that we've got to deliver.

Any questions on any of that? Scott?

MEMBER MCCORMICK: At our last meeting we also had the advocacy recommendation for the commercial vehicle V2V and V2I that we drafted the language for. Is that in the recommendation or is that a second NHTSA letter?

CHAIRMAN DENARO: Yes, good question. To be perfectly honest I don't recall that discussion. So let's talk about that when we get to tomorrow's session. Any other questions? Comments? Ken, do you have anything you'd like to say?

MR. LEONARD: Well, I do have some remarks but I can save them --

CHAIRMAN DENARO: No, no, I don't have anymore. I'm out of words.

MR. LEONARD: You're out of
words? Shall we go to the update? Hans, did you have anything you wanted to say before we start?

VICE CHAIRMAN KLEIN: Not too specifically. I think just in general in the dynamics of committees we're getting close to the deadline which is always a salutary experience. So I think we'll be pushing towards deliverables in the coming weeks and months.

I know in some of the stuff on incentives and implementation we're -- some of that is -- we haven't discussed it too much. It's come up kind of a little later. So hopefully we'll have a productive ideas session later on this morning or at our meeting after lunch.

But in general we're approaching deadline time and I think that's a good thing.

MR. LEONARD: All right. Well I do have a couple of remarks I wanted to make
so we'll start on those.

And one of the first things I wanted to start with is just some general good news. You all have a package that we just put a few isolated clips of recent press articles. There are more than we could put in here so we just picked a few items on our strategic planning activity, on connected vehicles and automated vehicles, ESRC.

One I was particularly happy to see was NTSB Chairman Deb Hersman's support and comments on Connected vehicle and its potential for collision avoidance.

We also put in some -- just some new pieces of public affairs material that we created in the Joint Program Office on our training program and the research data exchange and just a general piece on Connected vehicle.

So I wanted to share some of that, the good news pieces that we have. And of course a lot of them are on our website.
but not everybody gets a chance to look through all of the things that are printed about intelligent transportation systems so we thought we'd share some.

There's another piece of good news. Of course we have a new Secretary and that's good to have that position filled. But a piece of good news I'm particularly excited about is Greg Winfree's nomination to be the permanent Administrator of RITA.

(Applause)

MR. LEONARD: So let's hope when Congress gets back from recessing they move forward speedily on confirmation.

MR. WINFREE: I'm sure I'm at the top of the list.

(Laughter)

MR. LEONARD: But there have been a lot of activities since we last met. I'm going to just very quickly run through a few of them. Scott's not here so I'll start with some of the ITS items.
The San Diego I-15 Integrated Corridor Management Project was a finalist in the ITS awards at Nashville. And of course ITS Nashville occurred. I've had some opportunity to speak at a number of ITS events in Boston and Europe. I'm sure Scott will talk more about all the ITS chapter events. We try and be well represented when we can at events like that and represent DOT's activities.

The Integrated Corridor Management demonstrations have kicked off in San Diego and in Dallas and those, we're looking forward to results from those research demonstration projects.

We had an excellent conference out of UMTRI on connected vehicles, broad participation from around the world. We released the first version of our research data exchange.

James is going to talk to you at great length about how we started our
strategic planning process. And you're going to get an opportunity to participate with us in that process gathering information in support of our development of the strategic plan.

And I can't overstate how important that is. The strategic plan that we're executing now, the focus was connection, connected vehicles. And that has been exactly what this program office has been implementing for the last 4 years.

And so the direction we set for that strategic plan really will guide us in where we go for the next 5 years. And of course you can imagine the connection and automation are going to be important parts of that future direction.

We're going to be reaching out to a number of communities, ITE, the National Rural ITS Conference in St. Cloud, IEEE and we have a Connected vehicle public meeting, previously called Chicago meeting. Under
sequester we're trying to keep government travel a little lower so it's going to be here in Arlington, Virginia. That's not as romantic a title as the Chicago meeting but it is now the Arlington, Virginia meeting. But it's a good gathering of people who are interested in Connected vehicle. And that's coming up September 24 through 26.

MR. WINFREE: We can still call it the Chicago meeting.

MR. LEONARD: We can call it that.

(Laughter)

MR. LEONARD: My concern with that is people are going to be calling in from Chicago thinking they're at the Chicago meeting. And go to the old, the Marriott in that city. It'll be a little bit of a problem for us.

We've also -- Marcia Pincus of our staff spent almost 2 months over in Europe on an exchange program through
European Union to communicate with them about our ITS program and also to learn a lot about what's going on in Europe, particularly in the energy and environment because they're doing some very interesting things over there.

We've had a change-out in our Japanese fellow. We've had a Japanese fellowship program ongoing and Ryo Watanabe went back to Japan after a 2-year stint here. And Shingo Mawatari joined us. And he'll be with us -- he just started last week. He'll be with us for the next 20 months. So we appreciate that ongoing relationship we have both with Asia and Europe.

We also met with a Korean delegation and signed terms of reference on sharing our research and outcomes. And of course they're very interested in intelligent transportation systems. With the upcoming Winter Olympics in Korea in a not very far time out when you think about all the systems
they have to put in place they're very interested.

And we're interested in learning how they apply intelligent transportation systems in the pilot that they're looking at which unlike our Safety Pilot, they may have an extra thousand vehicles and that 1,500 of those vehicles they plan on deploying will be buses. And so we're very interested in learning about the transit applications of ITS in moving large groups of people around and seeing if there are lessons we can learn there.

Of course we've had another round of demonstrations at RFK and of course we have good participation from NTSB and folks on the Hill.

Inside the program office we're having a couple of changes. Those of you who work in the transit area and knew Yehuda Gross he retired I think for the third or fourth time in his career.
(Laughter)

MR. LEONARD: He says he's really done being half retired this time. So he is -- his departure is a big gap for us but we are staffing this week. We're going out with an announcement that Bob Sheehan or Federal Highways is going to be replacing Yehuda in that position.

No sooner had we filled that position than Mike Schagrin has announced that he is planning on departing in October. He's going to retire and see what the private sector looks like. So we're going to be starting the process of making a replacement in that critical vacancy.

So all in all there is a lot going on. We're working with Connected vehicle reference architecture. I had the pleasure of briefing a group of Idaho and Washington STEM students, high school STEM students who were in an exchange program with the University of Idaho in Washington.
So there are just a lot of great things going on in the program office at all levels from briefing the White House on automated vehicles this week, to attending a House conference on automated vehicles, to talking to high school kids who are interested about science and technology, where intelligent transportation is going to take them in their future.

With that I think I'm going to stop talking about the progress of the ITS Joint Program Office and turn it over to Kevin Gay to give some more in-depth presentations on a number of topic areas starting with one that I think is going to be very important in our future and that's automated vehicles.

MR. GAY: Good morning, everyone. My name's Kevin Gay. I work at the Volpe Center. I'm leading a team of researchers there to develop an automated multimodal program plan for automation. That's being
sponsored by Mike Schagrin and ITS JPO.

So today what I'm going to do is talk you through the high-level progress we've made on this project. And let's start with the benefit opportunities.

First and foremost we see safety as the major benefit of vehicle automation technology. There's 5.3 million crashes a year and 90 percent of those have some element of human error in them. Certainly automation may not be able to resolve all 90 percent of those crashes but it's clear that some percentage of those crashes could be reduced, eliminated by vehicle automation technology.

Second, mobility. We know that there are vast amounts of congestion. You all live in the area -- some of you live in the area, some of you travel here a lot. There's a lot of congestion, a lot of wasted time.

Previous research that's been
done on cooperative adaptive cruise control allows vehicles to travel with shorter headways in lanes and also allows them to double the capacity of the lane in some cases. This is an area of further research to potentially reduce some of the congestion.

Another major benefit of automated vehicle technology is personal mobility. Fifty-four percent of Americans have some form of disability. This disability has the potential to limit their mobility options.

And transit agencies now actually spend a tremendous amount of money on paratransit trips. They're very expensive, very costly trips. And vehicle automation technology has the potential to fill the gap on some of this and provide mobility to Americans with disabilities.

Environmental or energy is another area where we see the potential for vehicle automation technology. There have
been field trials that have been done that shows a reduction in fuel consumption somewhere between 8 and 16 percent. One was SARTRE project that was done over in Europe and there was also a project done in Japan as well that showed similar types of fuel savings.

And an investment bank that's looked into this, done some research here as well, as they said, there is potential benefits in automated vehicle technology across all of these areas. And these are goals of the USDOT as well.

Okay, so the question is what's the role of the federal government in this. You're probably aware that there's automated vehicle technology coming to the road now. I mean electronic stability control is a level 1 version of it. Traffic jam assist is being replaced by Mercedes Benz in their model year 2014.

Some of that technology is being
released now. Industry is developing it. So what should the role of government be in that?

First, the government really should facilitate and develop the deployment of automated vehicle technology systems that are enhancing and allowing us to meet our strategic goals and to capture, recognize benefit opportunities.

And the way that we would go about doing that really is to identify what those opportunities are and also identify the gaps in the research that maybe is not being covered by the industry or areas where investment by the U.S. government would leverage the industry research that's already going on and allow us to further gain benefits from this technology. I'll give you an example of what I mean in a few slides down.

Other areas that you're well aware of is establishing motor vehicle safety
standards. I mean this is NHTSA's role. They've done this with stability control. They'll be doing this with other applications as well that they've talked about in their policy statement.

And then one thing that's also come up in our discussions is really, there's going to be a period of time where you have partly automated vehicles on the road, you have manually driven vehicles on the road. There's going to be this mixed environment for a number of years. So there's a potential for the government role in there to ensure a safe transition during that long period where you're transitioning from manually driven to more automated driven.

So the questions that we're asking now is where should the USDOT focus investments in automation. How aggressively should we move forward? And where will we see all the benefit opportunities? What can we realize?
One of the things we've done, and I'll talk about process on the next slide, is really we've talked to each of the agencies multiple times. What are your interests in automation.

NHTSA you're well aware has released a policy statement. They're looking to define safe levels of performance for automated systems. They're also looking to cybersecurity, safe, reliability.

FHWA is looking at the overall network performance, how do we reduce congestion, how do we improve mobility.

Motor Carriers is looking at the in-service operations of the carriers. That really is their role. And they're looking at ensuring that this technology increases safety during in-service operations.

FTA is focused on transit. They're focused on safe operations. So they're looking at operations of the buses, different applications that would improve the
efficiency as well as reduce damage to the bus and improve the overall operations of the transit agency.

We're also gathering industry input. Again, on the next slide I'll talk more about it but there was an RFI released. There's other ways that we've been going about that through input through expert interviews and through presentations at events like the TRB summer workshop we did.

All this is coming together into a multimodal program plan. And the goal is really to gather a wide amount of feedback across the Department and the industry, bring that together into a plan and understand what makes sense.

This is also going to feed directly -- the timing of it is perfect really in that we're getting this plan, this draft together and it will feed into the strategic plan for the USDOT that I believe will be talked about later today.
Okay, so this is really the process that we've been using to get to where we need to be by the fall of 2013. We've gathered it. We've done multiple interviews with the USDOT modes. We've done requests for information. We've had one-on-one interviews with OEMs and Tier 1s and other stakeholders in this.

We've done two workshops actually that we've participated in collaboratively with TRB. And then we had a listening session as well a couple of weeks ago at the TRB session where we took 2 hours to talk through what are the issues and challenges.

Finally, we're really -- the second step of the process is to synthesize the info. So we've heard all this information but what do we do with it? What are the benefit opportunities? What are the key challenges and issues? What are the things industry is working on? What are the things that industry is not working on? What
are the research needs that come out of that?

That whole process should actually allow us to get to the point where we understand what the DOT vision for automated vehicles should be, what is the DOT role and subsequently what's the program plan. What are the steps of activities we would do? What's the timing of those activities? The goal is to actually have this plan developed by the end of September of 2013.

One of the key things, and this is the example I was talking about. One of the key things that we've heard from all of our research, from all of our discussion is connected automation.

The technology that's coming out now that I referenced earlier in model year 2014, it's based on sensors that are not really connected to the vehicles around them. It's using radar, it's using LIDAR, other
types of sensors like that.

What we've heard is really the connectivity element of automated vehicles is an area where it would allow you to get further benefits from local as well as network performance. And let me talk a little bit about what I mean by that.

If you have strings of unconnected vehicles that are just using radar to try and keep up with each other or to stay in close proximity you have some points where they do not operate optimally. I mean they can actually reduce performance a little bit. California PATH did a study that showed that. So what we heard and what we're looking at is what happens when you bring vehicle-to-vehicle and vehicle-to-infrastructure communications into an automated sort of autonomous type vehicle that just uses radar and other autonomous sensors.

What we're hearing and what we're
starting to see is that you're increasing the performance. If you know what the car, or if you have information about what the car two or three in front of you is doing radar cannot see that. The test you are seeing is around cars.

If you know what is happening two cars to your left or two cars behind you, you can make better decisions about where you go in terms of moving, changing lanes, or other information that the vehicle may need to make better decisions and optimize its performance within the road.

Now, if you think larger than that the connectivity to the infrastructure allows you to see other things much further ahead. Radars can see 250 meters. What if it's a crash, or what if there's an event, an emergency event, a construction event, 1,000 meters away? You would want to know this information in the vehicle as far in advance as you could.
So using the infrastructure to transmit information to the vehicle is an area of research that we've heard from OEMs and from other entities that that could help, really help a lot. And so this is one of the major areas that we are looking at and are thinking about how does connectivity and automation merge, and what does it look like.

MEMBER WEBB: Definition question. MR. GAY: Sure.

MEMBER WEBB: Can a connected vehicle by itself or in the fleet be considered a non-automated vehicle? Or by definition it's considered part of the automated vehicle world because it's connected?

MR. GAY: A connected vehicle does not necessarily imply an automated vehicle.

MEMBER WEBB: Okay, thank you.

MR. GAY: The connectivity that we're using in this sense is more broad than
just 5.9 DSRC that's being used in the vehicle-to-vehicle trials and vehicle-to-infrastructure. There's cellular connectivity, there's Wi-Fi, there's other types of connectivity as well that we're considering in this. So it's kind of a broad net here.

But connectivity by itself does not imply automation. Automation means some level of the vehicle controlling aspect.

MEMBER STEENMAN: So is the goal to take all these different connectivity technologies together and develop the most comprehensive automation capability possible? Can we look at it comprehensively and not just at one element only?

MR. GAY: That is -- let me say it a slightly different way. We did not limit the connectivity because we want to ensure that you're using the appropriate connectivity to solve the problem or to provide you the information that you need.
MEMBER STEENMAN: At any point in time.

MR. GAY: At any point along the process. Maybe you need high-definition digital maps or something. You need 4G technology to get these ultra-precise updates to maps. Whatever it is. I mean that's just one example. But you would use -- you could use different types of connectivity in different situations depending on the information you need and what best suits what the vehicle needs to operate optimally.

MEMBER STEENMAN: Very good.

MEMBER KISSINGER: Can you just expand on the technical a little?

MR. GAY: Yes. What California PATH showed, they had a string of four vehicles that were connected. They did two experiments.

One was just radar. So it was using adaptive cruise control that's mainly a radar-based technology. And so they ran
these vehicles on a highway. They had four of them. And so what would happen is the lead vehicle would do speed changes. So it increased 10 miles an hour or dropped 10 miles an hour.

When it did that change there's a latency when you move when that information travels down the string because each vehicle needs to detect it. Two hundred milliseconds or something is what the latency is going to be. That adds up over time. So the last vehicle in the chain was getting very close to the third vehicle and then it would get very far away.

So you'd get this sort of accordion effect where the string does not travel like a train does. It actually -- the gap's large, they get large, they get small.

And then what PATH did is they connected all those vehicles using, you know, 5.9. And that way the lead vehicle, when it
slowed down, that information was almost
instantaneously transmitted to every other
vehicle in the string. And it could move
more as like a train, as more connected.
Yes?

MEMBER MCCORMICK: Sort of isn't
the historical information point -- when I
coined and trademarked the term "connected
vehicle" in 2004 the definition provided to
the U.S. PTO was all forms of communication
to all forms of vehicles. Vehicle was
defined only partially as land vehicles. It
didn't mean it had to be entirely for land
vehicles. So that -- we held that trademark
until 2010 I believe when we of course
abandoned it to allow IntelliDrive to migrate
over and for other people not to have the
connected vehicle solution.

MR. GAY: Okay.

MEMBER MCCORMICK: In terms of
automation, in terms of connected automation,
to my knowledge only Google is looking at not
being connected for autonomous. I have not found globally any other systems that, John or Steve, correct me if I'm wrong, I haven't found any others that are looking at not being connected in order to enhance both the safety and the interactivity with either the road or the driver. Communication to the vehicle doesn't necessarily mean you're communicating to the driver.

MR. GAY: Right.

MEMBER MCCORMICK: It could be that you're just communicating to another system.

MR. GAY: So, but I mean one key distinction is Google does download their map data over a cellular connection. So depending on how loosely you define connectivity they are pulling down in some, I don't know how frequent. They are pulling down some amount of data over a cell connection.

And then I completely agree with
you that if this information is out there, if these vehicles are equipped, and if autonomous vehicles can get more information by connecting up to other vehicles or infrastructure, I can't imagine why they wouldn't want that information. I think it's just they're trying to move ahead right now and to do that they're using a pilot system at this point in time but 10 years down the road they may make different choices.

MEMBER KENNER: I just wanted to encourage as you go through the process and make the recommendation definitions are incredibly important. You know, even the term "connected vehicles" has evolved from broad to narrow and anything in between.

And the definitions of levels of automation. I was really excited when we originally had the levels. I'm concerned as we changed the definitions, you know, frequently. So I think it's really helpful to really define what it means and to be
precise in the language that we define and precise in the levels of automation.

Because your vision of course, it needs to evolve from sort of the limited autonomy that one could argue exists in some features today to the very long-term vision of autonomy where you can have people that have physical disabilities, for example, because that would probably be the most challenging situation to have.

But I think when you do that not only does it open people up to understand the vision better with precise definitions, but then you can also focus the work in an appropriate way by having people focused on let's say the precise areas that you define.

So I just want to encourage that because it's really helpful I think to not just automakers but to the broader community not only to understand it but then to be able to figure out the right place and way to engage.
MR. WINFREE: Ken, to that point?

NHTSA is moving in a direction to call the connected vehicle work that we've done in ITS JPO as it becomes more public-facing, they're looking at V2V and V2I because they think that more clearly communicates what the 5.9 technology will do.

And just the nature of this conversation, you know, it's really bringing to bear the fact that connectivity is much broader as a concept than just 5.9. So I think that will provide some front-end clarity but obviously going forward we're going to really need to be precise about these definitions.

MEMBER MCCORMICK: My one suggestion on that is to have them consider a vehicle device construct. Because as we evolve the nomadic devices whether it merely acts as a carrying transceiver or it can be tethered to the vehicle both V2V and V2I don't incorporate that.
MR. WINFREE: The V2X is part of that also.

MEMBER MCCORMICK: The V2X would cover it. But I'm just saying in terms of the vehicle, the device function we see as of growing importance going forward, partly because of the need to manage the HMI issues.

MR. WINFREE: Absolutely.

CHAIRMAN DENARO: I'm very glad you've seen this chart. And I would like to encourage you also to extend into the sensor area.

So to me there are at least three levels. We got where we are today with advanced driver assistance systems using the sensors you talked about, cameras, LIDAR, radar, and so forth.

I've been critical of the Department and the JPO in the past saying things like you don't need all those sensors anymore because it's going to be a lot cheaper to put connected solutions onboard.
And I believe that's the wrong thing to say. So I would encourage you to open this integration concept if you will, sensors, connected vehicle and automation.

There are at least two reasons for that. One which you said very well is that the connected systems give the vehicle this predictive capability to look beyond line of sight of the sensors and that sort of thing.

But all three of those technologies, the sensors, the connected radios and so forth and the automation have a very important role that's not getting a lot of air time right now. And that's what's going to be required for fault-tolerant and failsafe operation of these vehicles.

Now, we had a workshop a few weeks ago, and you were there of course, up at Stanford with the Transportation Research Board. And that was one of the organizers of that.
We had some excellent presentations. And I would recommend that to the Committee, by the way. That website is vehicleautomation.org I believe. And all the presentations are there.

One of the presentations I'll point out was from Bosch. And of course Bosch is really expert in all this. And they were all over the requirement for fault-tolerant, failsafe operations and so forth and what that's going to require.

And I know the OEMs are doing that. They have to and they know that science as well. But it's not getting a lot of air time in communities where this is being discussed.

If you do pay attention to that, and I believe it's critically important, it drives you to you must integrate the sensors, the communication, the automation. All that needs to work together in concert, checking each other and everything else and coming up
with that solution. So that's an important
dialogue.

And I'm glad to see this start.
And my statement is please include the whole
sensor story in that too.

MR. GAY: Okay. That's very good
feedback. Again, what I have shown you here
is we've had detailed discussions with Bosch
and we have definitely identified that as an
issue or a challenge to ensure in the area to
recognize the full benefits of automation.

So I think that's one of the
areas that we're still chewing on. And I
think in September we'll have more
information about here are these areas that
USDOT should invest in. Here's the areas
that industry is pushing forward. But we
completely agree with you and we completely
agree that redundancy and safe reliability is
a key issue that needs to be overcome at some
point along the way.

CHAIRMAN DENARO: And I'm not
implying that you should do the research.

MR. GAY: No, of course not.

CHAIRMAN DENARO: I don't think you should. But I think you ought to be part of the message of the importance of that.

CHAIRMAN DENARO: Calling that out as a major measure. I absolutely agree.

VICE CHAIRMAN KLEIN: Kevin, one thing that's very exciting about this is the public-private interplay. I expect that's also one of the challenges of it. Can you describe a little bit the mechanisms by which the OEMs who are sort of -- they're doing it. They make the vehicles. They'll implement the technology. What are the mechanisms of coordination between the vehicle manufacturers who's doing the automation and the public sector with its plans and the mission for safety?

MR. GAY: I'll give you an example from the Safety Pilot the Connected Vehicle program. In Safety Pilot there's 64
vehicles developed by the OEMs that if we work with the consortium called CAMP, the Crash Avoidance Metrics Partnership, and the OEMs come together in a collaborative forum there, have developed the vehicles and developed technology that we deployed in a field test in Ann Arbor. So if you're asking about what are the ways that we can work together collaboratively with the private sector that's one example that we've used fairly successfully in the past.

VICE CHAIRMAN KLEIN: Or even at the high level of in September you've got the plan going and ready. Is there a counterpart among the OEMs on that? Who's your interlocutor? Is there an association? Or maybe I could ask John.

MEMBER CAPP: Well, the consortiums that Kevin mentioned are the primary way --

MR. GAY: CAMP.

MEMBER CAPP: At least for the --
with the connected, the V2V, V2I technologies, you know, which we're focusing on here. You've got that forum. There's another one called the VIC dealing with more policy type stuff. A lot of the same players on it. And a lot of collaboration and type of involvement in some of the projects that we'll discuss there.

You know, to try to comprehend all types of vehicle interactions can get pretty overwhelming. So to focus on the V2V and V2I, you know, let's get the standards in place, let's get the security profile in place. Let's enable it to be deployed. And then we'll all use it.

One of the ways we'll use it to is to -- oh hey, this is starting to show up on more and more vehicles. I can start to use it to augment my map data and other sensors and give consumers more features, right. This will grow as soon as we enable it.
But with this whole thing we've got to get past step one. Then we'll get one vehicle out on the road, when we get one piece of instruction on the road that has it. And then all this other stuff will come together. We'll all take advantage of it.

MEMBER ALBERT: Since everyone is kind of jumping in and asking questions throughout I will too.

(Laughter)

MEMBER ALBERT: One of the things I think to keep in mind maybe for the group, and Ken, for you, is much of the role that we talk about here in the presentation is either for the private sector or the federal government. But on the I side, the implements predominantly will be state DOTs or others. And I haven't seen anything in the presentations thus far that kind of defines the role of state DOTs in part of this rollout. And it would be real helpful to have that.
I'm hearing at least some pushback but it would be really nice to kind of hear what are the state DOTs' perspectives in actually implementing this since they're going to become more key. When we get down to the grassroots level they're going to become more of a key. And because the federal government doesn't implement anything.

MR. GAY: So one of the areas that we've heard a lot on is evaluation. What are the benefits to the state governments, to the state agencies. And I think that's really a key selling point of this technology.

If we identify, hey, your network is going to operate with less congestion and you're going to have more information, you're going to be able to better optimize your signals. If you can demonstrate benefits that can reduce their operating cost that's going to help sell this technology and sell
the implementation of that.

MEMBER ALBERT: I don't disagree with you, but I hear from many of them how much more data do we really need.

MR. LEONARD: Steve, I think you're onto a very important point. As part of the spinning up as the director here I've been to the MDOT traffic management center and just a few weeks ago to the Virginia -- as most of the traffic management centers I've been to before were at 30,000 feet so it was in a different environment.

And what I've heard very clearly from Virginia was we don't know that much about this connected vehicle stuff. Their problem is the 5 o'clock rush hour today, not when is the NHTSA decision going to happen, and automated vehicles, and the Google car. That is not what they are focused on right now.

And so I do think as this technology matures, as it starts to roll out
we are really going to have to identify a path and make it very easy for state and local organizations to say, okay, I -- this is not going to help you with 5 o'clock today, but 5 o'clock next week I've got to start thinking about what the impact of this technology is going to be and how I can use it for travel information, for dissemination of information, for rerouting, things that do affect the 5 o'clock rush hour.

And so I think in some states they're -- even the states that are very progressive about intelligent transportation systems, they are still very focused on what is going to happen today. We're going to have to work some ways to make it easier for them to adopt this technology.

MEMBER ALBERT: I believe they'll warm up to it.

MR. LEONARD: I think they're going to realize that this has tremendous capacity to solve the problem that is their
problem to solve which is moving people on a
day-to-day basis. But they're going to need
mechanisms that make it easy for them to
implement that and that they're committed to
doing because they're willing to take the
future investment it takes, whatever it is to
deploy the equipment and get value. Use the
data. But we're going to have to help
identify that path to speed this up.

MEMBER HAMMOND: And I would just
add it's going to about the money for initial
startup. It always is. And how some
demonstration states or something can capture
people's interest and enthusiasm.

Just like when we all got into
variable message signs and traveler
information. It grows once you start seeing
the benefits and the public then demands it.

MR. LEONARD: I've been asked a
couple of times in talking about ITS systems
so, how are you going to pay for this. The
answer is well, I already pay for this in
that Highways puts out $40 billion in grants. Now, they're formula grants.

So there's not -- I don't see Congress coming up and saying hey, I want to give you a lot more money for deployment on anything, in any segment of government.

MEMBER HAMMOND: Au contraire. It's going the other way.

MR. LEONARD: Right. But there are federal resources that are going out to states and I think part of it is making it easy for the states to say I've got a formula grant. I have a choice. I can lay X number of miles of concrete with that, or I can put in an ITS system and will that -- that will give me the same capacity.

We have to be able to tell that story. They need to be able to apply to write the proposals to do that work and have it pay off for them.

I think we're seeing some of that with integrated corridor management. I think
we will see the same thing with connected vehicle. But I think we have to identify that path for states. Because I think there are a lot of resources for them to tap. And at least my read of where we're headed in the next few years, I do not see a lot of new federal dollars to support any programs in transportation.

MEMBER MCCORMICK: I think we sent you the information from the last meeting. But I think it would be worthwhile to put that into the review. Because the recommendation that basically no one disagreed with was that we provided strong advocacy for the interstate commercial vehicle V2V and include V2I. Because that does a number of things.

For one, the process to get that vehicle class to have a regulation or requirement is a much quicker path.

Secondly, it doesn't just go to new vehicles. It would go to all vehicles.
This is similar to the texting ban that was up recently.

And more importantly it will create a flood of devices and systems in the market which within less than a year will all be crowd-ranked out in terms of which ones are useful and viable and which ones not.

Because now it's an incremental business decision for a company. I have to put some capability in the vehicle. I might as well add geofencing, or driver behavior monitoring, or trailer integrity, or whatever.

It'll also put an immediate load on the 5.9 spectrum which is and going to be under pressure from licensed devices.

And last, by having the public entities allowed to have some quid pro quo relationship with the truckers -- I don't need a lot of infrastructure. I can put one up where -- in Michigan where the expressway goes towards Toledo, and where another one
goes towards Chicago, and another one on the International Bridge. And because the signals can hop vehicle to vehicle I can as a public entity basically have my business model problem solved. I can sit there and harvest road and weather and traffic information all day long and learn what to do with it.

So I think that proposal which everybody who was at the last meeting agreed to, I think we ought to seriously consider it because that will accelerate an awful lot of awareness and adoption and discovery of the benefit at a very minimal cost for public entities.

MR. LEONARD: It is great to have a forward-thinking program advisory committee, so forward-thinking that I think we've gotten into the topic of discussion for the next two briefings.

(Laughter)

MR. LEONARD: So I'm going to try
to let Kevin get back to automation.

MR. GAY: This is all -- this was the last slide on automation. So if there are no automation questions then I will get out of the way here.

MEMBER CALABRESE: One quick question. You talked about FTA and transit and collisions. Any discussion about them -- I mean in Cleveland we had four bus-car collisions yesterday. Nothing major, body damage. And that's pretty typical.

The big expense items are the bus to pedestrian collisions. The million, $2 or $3 million claims and a lot of broken hearts.

Now, we talk about V2X or V to somebody's cell phone. Any discussion of that in the process?

MR. GAY: There is research and there is discussion in terms of vehicle to pedestrian. There is also, I mean, equipping these vehicles with the sensors like radar and things like that would also provide some
type of information that could be used to help avoid pedestrian collisions. So I think moving in the direction that this is going would give you the tools to have applications that would be able to better deal with pedestrian incidents than you can right now.

MEMBER CALABRESE: Yes, but right now we have the radar and all that stuff. We have actually buses announcing, "Get out of the way, the bus is coming."

(Laughter)

MEMBER CALABRESE: Which has helped tremendously. But some signals has to be coming back from the pedestrian.

MR. GAY: Do you want to follow up, Brian?

MR. CRONIN: Yes, so sort of two things. One is in the Safety Pilot one of the transit applications is actually a vehicle-pedestrian application. So it uses radar technology to detect if there's a pedestrian in the crosswalk and then will
send a message to the vehicle. So that
doesn't cover every vehicle to pedestrian
accident, but at least at major bus stops and
near crosswalks help to provide some
information.

We have also started this past
year a vehicle to pedestrian, sort of vehicle
to vulnerable transportation users,
pedestrians, bicyclists, looking at how we
detect that. And several entities are
starting to look at how you use cellular,
since most pedestrians have a cell phone, to
send messages, to provide alerts to all
vehicle types. So it is a part of the
program we're starting to look more into.

MR. LEONARD: And if I could just
add one more point on that. I haven't had a
chance to read his announcement but the
Secretary announced I think 2 days ago a $2
million grant to 22 cities with the highest
number of pedestrian fatalities to help
address pedestrian injuries. So if that is a
particular area. I don't know what the 22 cities are qualified -- there's a resource and I think there may be some technologies there.

AFFILIATED TEST BEDS

MR. CRONIN: Okay. So the next two parts of the presentation kind of go together. We've been talking a lot -- we started getting off the topic of automated vehicles and onto the topic of connected vehicles.

And you're all well aware of all the work with the V2V decision. And at the heart of that is this consortium called CAMP which we were just talking about which allows auto OEMs and NHTSA to work pre-competitively on some of the enabling research.

One of the challenges is on the V2I side there is no such body. And so you have states competing with each other, you have us working collaboratively but there's no collective force to share benefits and
lessons learned and sort of help move technology forward in a coordinated fashion.

So we had the connected vehicle test bed. Federal Highway and Turner-Fairbanks was creating a test bed capability at Turner-Fairbanks. California, Florida, several different states were starting to build their own test beds as world congresses popped up or different events.

And so we wanted to try to figure out how we could bring these entities together to share lessons learned and to help build the knowledge to improve the standards that will help us on interoperability.

Because one of the big things with connected vehicles, it needs to be interoperable nationwide.

So we've been looking at this affiliated test bed concept which is basically migrating all these independent test beds so that we have, as we build the next generation of technology we have
interoperable capability.

And so what we've done today, we're improving the test bed we have, that we operate in Michigan, but we're also trying to work with all the local agencies that have been implementing stuff to date to get to the same level of operating capability and have interoperable equipment. So the next slide.

MEMBER MCCORMICK: Quickly, can't AASHTO fill part of that role at least?

MR. CRONIN: They can do some of it.

MEMBER MCCORMICK: I mean I know they're doing their footprint analysis and all that.

MR. CRONIN: They can do some organization.

MEMBER MCCORMICK: Okay.

MR. CRONIN: So we're not -- what we're trying to do is not form a new organization, but form an environment in which people can share on a non-competitive
basis information and lessons learned so we can help improve standards, sort of the technology, foundation around V2I.

And so we have an agreement that we've drafted that is a legal document that talks about and sets the foundation up that you can share information with the Department and with other entities that allow us to move V2I information forward.

So we have long-term trying to get to the same interoperable state. In the near term what we started is as people are signing these agreements and just all the contractors we have onboard, we're having a weekly call that's open to share information and start sort of moving the industry forward in a meaningful way.

CHAIRMAN DENARO: So Brian, I didn't understand what you said about a legal agreement. Can you go over that one more time? What does that do?

MR. CRONIN: So we created a
memorandum of agreement. And this essentially is a document that talks about intellectual property. And sort of how you share information without giving up your rights as a company to a technology or something you're inventing. So that's --

CHAIRMAN DENARO: And who are the parties to that? Who are you talking to?

MR. CRONIN: It could be private sector companies, could be state agencies, anyone could sign it.

CHAIRMAN DENARO: And how did you identify them? How did you find them?

MR. CRONIN: We did an RFI, one. Two, we posted it, the agreement, and we've announced it. So anyone could come, look at it, read it. We're in the process of signing -- we haven't signed one yet. So we are in the process of sort of finalizing and launching it, a set of these agreements.

CHAIRMAN DENARO: So you went through some kind of jury process saying,
okay, here's 56 possible test beds that we can identify out there. These 10 probably are not in our area.

MR. CRONIN: So, one challenge is the affiliated test bed is maybe not the best word.

CHAIRMAN DENARO: Right.

MR. CRONIN: So there are test bed actual locations. Think Ann Arbor and our Safety Pilot. Think Michigan and the USDOT-funded one. Think California and New York. So those people could all sign this agreement.

But there's also vendors and suppliers of equipment that are the foundation for all of those test beds. Those are a lot of our target audience.

So if this is -- no money's being exchanged. This is an agreement to enable conversation.

CHAIRMAN DENARO: Okay. Yes, I think that answered my question.
MR. LEONARD: It's more like a CRADA, a cooperative research and development agreement, then the establishment of an --

CHAIRMAN DENARO: Yes. George?

MEMBER WEBB: Brian, from the standpoint of AASHTO on our conference call the other day we had a discussion about the test beds. And one of the comments was one of the best lessons learned is to tell Federal Highway to stop changing the standards because equipment that we bought a year or two or three ago now no longer fits in the current set of standards and so forth like that. We're having to make additional investments if we want to keep going as far as appropriate test bed stuff. So I mean it's going to be an ongoing challenge and issue for keeping those test beds up.

MR. CRONIN: Yes, and the reaction to that is it's a research program. And so we keep learning information. And so it's a challenge right now of do you make an
investment -- does someone have a question on the phone?

(No response)

MR. CRONIN: And so yes, as a state agency do I invest now or do I just keep waiting.

And so it's been a big challenge.

I think we're continuing to learn a lot. Federal Highway with the enabling technology's track of the V2I program is sort of in the lessons learned from Safety Pilot we're about to make another iteration of improvements. Hopefully they're not huge but I mean, we're continue to move forward.

CONNECTED VEHICLE PILOTS

So with that let me go to the next slide which ties nicely to Paula's comment. So we have a long history in the ITS program of doing demonstrations and pilots. We had the Model Deployment Program.

We were partnered with other agencies in the department on the Congestive
Initiative which ultimately was deployment and demonstration money around pricing and technology.

We just did the Safety Pilot which ends this first year in a couple of weeks. And so building on that and building on the NHTSA pending decision we're starting to set the program up of how do we do another round of pilots that will enable a broader connected vehicle implementation V2V and V2I.

And so we have multiple programs, the Dynamic Mobility Applications Program, the AERIS Program in the environment, data capture, the V2I safety program. They're all programs that are creating different kinds of applications that will need benefits information to enable implementation.

And so -- but they all rely on a common enabling technology. So we don't want to do a bunch of independent operational tests. But we need to look at how we bring that together, how we leverage resources.
And so we've come up with this connected vehicle pilot concept. So I just have a couple of slides to talk about it.

So really we want to look at how we are able through a pilot program to further the research, look at technology transfer and basically put the seed out there for a nationwide interoperable deployment on connected vehicles.

And so by doing that we would like to launch into a pilot concept. And so we think we can accelerate deployment. We can be positioned to better understand the benefits that will enable state and local agencies to implement long-term. And then continue to better understand the technology.

But also a big impediment for state and local agencies is having the skilled workforce to implement and maintain and operate. And so you're only going to be able to understand how that works unless and
until you implement and operate a system.

And so the AASHTO the footprint analysis that's going on right now is going to lay a strong foundation of where do we need to implement connected vehicle technologies and enable what kind of applications. How broad a set of technology is needed? Is it needed region-wide? Is it needed statewide? Rural? Urban corridors? What kind of location and implementation is necessary to enable a host of applications?

Real-world environments will be critical for this. We're going to encourage industry to participate. While we have been funding a lot of application development and safety and mobility and environment, we recognize those are not the only types of connected vehicle applications that will be implemented. So we want to encourage industry to work with these pilot locations and add in applications and technology that could also be tested and used.
So our intent is we have this concept. We've vetted it within the Department. Everyone is onboard to move forward.

We intend to put out a request for information to the industry to get your input on what you would like to see out of a pilot program. We're hoping to award multiple different sites and locations.

This could be substantial. It will be a significant investment. We need to look at ways to leverage resources. How can we do that. And ultimately we'll be integrating a lot of the different programs together into these implementations.

CHAIRMAN DENARO: Brian, I assume -- so, if I'm understanding this, you're going to pick a number of locations and AASHTO is part of that helping figure out where they are. These things might demonstrate different aspects of the whole problem but from where you're coming from.
there will be some level of interoperability designed in between all these. Do I have that right?

MR. CRONIN: Yes. So there will be an interoperable foundation that we would expect everybody to implement. But we might say -- a rural state might say I want weather applications and long-distance truck traveler information. An urban corridor might say I want transit pedestrian safety, arterial management and signal priority or emergency preemption. A region might say I want regional traveler information and freight movement and whatever else. And I want all the safety applications on top of it.

So we recognize there's a lot of different types of settings that we need to look at, and those will merge different types of applications that would be appropriate for those kinds of settings. That's what the AASHTO footprint is going to tell us. It's not going to tell us these three states.
It's going to say, you know, if we talk to the states and locals this is kind of what they're telling us in terms of what kind of locations, what kind of applications they really are most interested in and want to better understand the benefits from.

MR. BELCHER: Just a quick question, Brian. How are you implementing that plan for state input? You're going to have multiple stakeholders at multiple sites. How are you going to do that? And maybe the same stakeholders and representative states.

MR. CRONIN: For input from the -- it depends on how we develop classes or once we award sites. We'll do some input things at the beginning as we pull together what it is we want to put into a solicitation. It's way too early to figure out.

I mean it's -- we want to move the industry forward. One of the big goals of this is helping to move towards nationwide
implementation. So we're hoping not to say these are just one-offs, but these are helping take that first step.

The timing of this is the 2015-17 time frame. So depending on what actions NHTSA takes that will also have input into the pilots and what industry is able to do on their own.

CHAIRMAN DENARO: Brian, one of our discussions here and areas we're focusing on is outreach and how do you get the public to understand all this. This is a wonderful opportunity for that. So I hope I'll call it for want of a better word marketing or promotion of this is part of the plan, some publicity.

MR. CRONIN: Okay.

CHAIRMAN DENARO: Good.

DSRC UPDATE

and Development. I'm the DOT spectrum manager. I'd like to describe my role as I do all the spectrum management except for what the FHA does. The FHA has a shop of about 50 people. The rest of DOT has me. Interesting how that is.

So what's the matter with DSRC? I believe the last folks were here from LDI. At the same we had NPR and others come in. And I'm looking down at the five general categories, some examples there.

It's probably more interesting with the -- a little surprise from the Comcast.

COURT REPORTER: Could you stand closer to the mic?

MR. ARNOLD: I'm sorry, I didn't know there was a mic here. Okay, as I was saying it was a little surprising some of the comments that came in. The Comcast were very pro, let's get all the spectrum we can for Wi-Fi. Some of the device manufacturers, the
Ciscos of the world were saying we think we can do this but we want to make sure that we think of the incumbents. There was generally posed concerns, ITS America, USDOT. They said it might be possible, we need to absolutely protect the incumbents including DSRC.

The Fixed Satellite Service was adamantly opposed. And this seems to be actually affecting the implementers internationally to bring this to the board.

Weather radar manufacturers came in and said they're causing interference. Let's put a stop to it.

And the Association for the Advancement of Medical Instrumentation came in and asked for better access to Wi-Fi and protected zones around hospitals so nobody would interfere with them. So you have a Part 15 device user that has no protection looking for protection.

MEMBER HAMMOND: What does that
do for them? What's that protection?

MR. ARNOLD: What they're concerned about is interference to some of their medical devices within the hospital. They send a lot of data back and forth on Wi-Fi through their internal networks. Some of the devices are in fact Wi-Fi enabled.

MEMBER MCCORMICK: It's not very well publicized but the medical community has a massive problem right now with wireless pass between wireless medical devices. Dr. Phu at the University of Michigan, one of the leading researchers, is trying to fix that problem.

Because very much like vehicles when you have a bunch of wireless ad hoc self-limiting network of devices there's no server-side security. And so when something gets in I can send it to your device and can send it to your device and eventually causes corruption of data, causes corruption of how it works. So it's a very relevant problem to
what they're working on, very relevant to the solutions that we're looking at in this space.

MR. ARNOLD: And it's a very big issue. A number of the investigators are involved in trying to find solutions. None of them are finding anything.

With NTIA we have actually updated ITU-R M.1453-2. That was a document written I believe from 2007 that described some of the uses of 5.9 band. It was very, very much out of date and written from a European perspective. We provided an update to that.

I believe it was actually within USDOT. Just have a few folks to look over and make sure that we did it right.

We're looking at providing some focus scenarios for modeling. We've been working very diligently with NTIA to make sure that what they are going to model in fact reflects reality.
We've been helping to the extent we can with Model Development. NTIA sent a statement to the effect that they don't generally do any live testing for interference in these bands. They rely on modeling. We're hoping to change that a bit and provide other information as requested.

One of the interesting things we did -- I believe it's on this slide -- the demo back in July with the NTIA and FCC came out and I had an opportunity to ride in the car. And in fact I got to sit in the back seat while Karl Nebbia, the associate administrator for Office of Spectrum Management was driving the blind section with a car coming on the left. And frankly I was glad I was in the back seat and I saw it before it did actually happened. But he was quite impressed.

We had Julie Knapp from the FCC come out as well as some others. One of the Commissioners came out. I can never remember
her name. Thank you.

They were quite impressed by how the equipment worked. They were impressed by the ability for individuals to make sure that there was no interference with the DSRC. But this was very, very time and location-specific information that was related for a few seconds. And I think that point came across.

MEMBER MCCORMICK: Yes, I can add to that because Scott and I were both at the House Transportation Committee meeting back a month and a half ago. And there was kind of two important aspects of it brought up that we noted.

They said first of all, they said the testing that was done by the FCC was in the laboratory environment. They said, and we strongly advocated that they do much more research. Because when you have one device detecting -- an unlicensed device detecting whether or not it recognized a licensed
device and relinquishes the spectrum is a whole lot different when you have hundreds of devices hammering against it, many of whom are going to be sitting in the back seat of your car doing their thing with it. And so that it wasn't, you know, it wasn't statistically a robust enough analysis to look at it in the lab.

The second point that was made was one of the Congresswomen asked, well, what do Europe and Asia think about this. And basically I said they're confused and horrified by the thought that we would relinquish any of the bandwidth. And that was kind of news to them as well.

MR. ARNOLD: Yes, I was told by NTIA that in Europe at least there is already a mobile allocation there. So they're doing something about that to go ahead. I think they have worked out -- there's supposed to be some issues with actually how they do that.
MEMBER MCCORMICK: It's also very
country-specific.

MR. ARNOLD: It was interesting.
One of the comments into the NPR actually
came from the German telecom. They look at
our FCC saying if you're going to allow this
be very, very careful how you do it because
those devices can go from the U.S. to Germany
and cause them problems.

And I think we've seen the worst
of it with the internal Doppler weather
radars, a lot of the places in the country --
you could set them for different country's
region. I'll just set it for no country and
you can do anything you wanted to. And that
was one of the serious problems they had. So
lots of issues with that there. Next slide.

Yes, in looking at -- developing
obviously more defined operating parameters
for the DSRC is something we haven't spent a
lot of time on. My former role, I was with
Federal Highway until last March. I was the
communications person at the research center on the technologies team. And we did a lot of work just before I left in looking at communications and how we could -- what the parameters were that we had to operate within. So we did basically a first cut. And that report I believe is now available on the ITS website.

We are continuing to work to look at how we can develop efficient fuel test plans. We've had some discussions with some of the Wi-Fi manufacturers, very, very high level. A couple of people actually sitting in the room when the auto industry and the Wi-Fi manufacturers were talking, just basically listening in. And we're presenting to various groups as needed.

MEMBER STEENMAN: I don't see you mention security at all. Are you guys doing much research in this area, having people kind of figure out what the security gaps are? Hacking into it? Protecting mechanisms
and all those things.

MR. ARNOLD: I'm the spectrum guy, right? Though I have a background in security I try not to go there. It's this black hole and just, you know, you get in and off you go. There is more in security area within DSRC standards where the team is looking at some of the security issues and developing from a standard to address that.

MEMBER MCCORMICK: There's also a $10 million cybersecurity for in-vehicle electronic safety systems that's being done with a number of the automakers. It was about a $10 million, at least initially a $10 million research program.

MR. ARNOLD: I apologize, I only answered the security question.

MEMBER STEENMAN: Yes, it's an important area for DOT to really take a close look at. Related to these kinds of vehicles.

MR. ARNOLD: Next slide. Okay, so the one slide I think may have gotten -- I
thought there were four.

We are in the process of working with the Institute for Telecommunication Sciences which is the research lab of NTIA as well as we have a task order contract. And within those two efforts we plan to look at scenarios, do some real world testing, and take that real world testing and feed that into the modeling, the material that they're doing. And hopefully be able to provide some real world perspective on what they're doing.

One of the concerns that NTIA raised at a recent meeting we had with them is that they feel like they're out there doing this all by themselves. I'm not sure where they got that idea because we are working with them to make sure that as the modeling moves forward it is based on reality and we have enough data to support what the model will show. And with that I am at the end.

MEMBER WEBB: Time frame for all
MR. ARNOLD: NTIA is expecting to start their modeling effort in January or February of next year. We hope to have contracts in place with some prelim work done in -- by October-November. It's a very long effort with NTIA so we have to go through the process.

As one of the parts the federal government, NTIA is the present spokesman for spectrum work.

MEMBER WEBB: And over the last 2 months, 2 years?

MR. ARNOLD: That just comes out of clear. They expect to have results in for year 13 I believe by next summer. So at least preliminary data by I'd say April or May. The mention them, they were -- the level they were required to focus on the other bands that we've been working on for sharing with industry. That was much more than they expected. So this one has kind of
taken a back burner. And they want to make sure they do it right to show that the work exhibits, you know, resources.

CHAIRMAN DENARO: Jim, could you answer an NPRM? Remind me again what the NPRM said.

MR. ARNOLD: The FCC has suggested opening what are called the U-NII-4 bands, 5850 to 5925 for unlicensed devices.

CHAIRMAN DENARO: Okay. I wasn't connecting that that's the one we were talking about. Okay.

MR. ARNOLD: I'm sorry, I should have --

MEMBER MCCORMICK: They actually requested three different pieces of spectrum. One for the 5.4, one for the 5.9 and one for the --

MR. ARNOLD: Fifteen twenty-five, and 50 to 25 to 50.

MEMBER MCCORMICK: And so everybody else coming out with a
refrigerator, talking toaster will have some other spectrum.

(Laughter)

MR. ARNOLD: I think Comcast would go in that spectrum.

MEMBER MCCORMICK: Right.

MEMBER KIRBY: What is the state of the conversation about this topic? I mean is there a real possibility we're going to lose the spectrum? Where is it? It's kind of critical, right?

MEMBER MCCORMICK: I don't think there's a possibility of losing it. What they're saying is that we're not using the spectrum. So they want to allow unlicensed devices to use it because they can detect and relinquish a licensed device when it comes to it.

For the 5.8 and the lower 128 or whatever it was we said we didn't care, but we said that the FCC had to do more research, more robust research on the 5.9 to determine
at scale what the impact was. And we pointed out that we didn't even really know what the results of the Safety Pilot was yet, it hadn't been published. And you know, they collected 200 terabytes of data from those vehicles.

MR. ARNOLD: From a spectrum management standpoint if they simply say well, you're not using that, you know, oh well. We're just going to give it to these guys. That's probably not a reasonable approach.

Spectrum management is based -- there's a lot of investment in the residual bands. There's a lot of equipment and there's a lot of work. If the FCC suddenly gets a little crazy and says we're just giving this away now for no good reason that really upsets the whole spectrum management. Nobody would then be relying upon the FCC regulations to maintain fairness. So they don't want to do that.
They have stated very explicitly that they won't protect the incumbent and that's a good thing. The incumbents are both DSRC and the Fixed Satellite Service as well as military radar.

And military radars aren't that big of an issue. The Fixed Satellite Service is probably a pretty big issue both in the U.S. and internationally. DSRC could be a big issue.

Folks I've talked to at the FCC very informally have said they really like the concept of DSRC, they want to see it go forward. They want to make sure that we have the spectrum that we need, too. Including for automation.

MEMBER STEENMAN: What are some examples of Fixed Satellite Service, things that run in that frequency band?

MR. ARNOLD: In most cases they are in the band. We talk about satellite uplinks to geostationary satellite either
over the Atlantic or the Pacific. And so those stations are on the east or west coast and communicating with Europe, Africa.

MEMBER STEENMAN: So these are for things like collecting services or?

MR. ARNOLD: These are spectrumable, in the horizon.

MEMBER MCCORMICK: I believe another system uses it also, they just don't put them near roads so it's not a real big deal.

MEMBER STEENMAN: Right.

MR. ARNOLD: I couldn't tell you about that.

(Laughter)

CHAIRMAN DENARO: Is there very active testing going on right now?

MR. ARNOLD: Not quite at the moment, no.

MR. LEONARD: Back to the question that you asked, is this a problem if we lose the spectrum. Yes, this is a very
big problem if we lose the question.

Is there a risk if we lose the spectrum? The fact that there's an NPRM out is a very big risk to lose the spectrum.

DOT's position has been we can't allow spectrum sharing. That would compromise safety. So we can't say we wouldn't consider spectrum sharing. We'd want to be a good citizen like everybody else. But we have to insist on testing that would demonstrate that the safety functions that we are counting on, that the incumbents are counting on, are not compromised. And there is the very difficult problem.

For example, DOT's experience in spectrum sharing before with weather radars did not work out very well for DOT. DOT is in the process of moving its terminal valve for weather radar which among other things detects wind shear off of its -- that spectrum because of the interference that comes from other users in the spectrum-
sharing program. No one thought there would be interference.

FCC fines those people who interfere. Verizon, AT&T and Motorola periodically write checks to the FCC for $25,000. And the government will spend billions of dollars in relocating a radar system that can't work because of interference that people are paying small fines to have.

So we couldn't live with a situation like that. Or more specifically, 30,000 people a year can't live with that situation if it happens in a connected vehicle environment.

MEMBER MCCORMICK: I didn't hear what occurred or the result was in the Senate Transportation meeting on this. Were you there, Scott?

MR. BELCHER: Yes. I mean I think the important thing is to recognize that I think DOT and the auto alliance and
ITS America and the other stakeholders have done a really good job of kind of bringing NTIA and FCC back from the brink and operating at least from what they say what they do and as it is recorded.

And they will, you know, they're going to let this play out a little bit. They're going to do the research before they act. At least that's what we're being told both by NTIA and the FCC.

And that wasn't the case 6 months ago. So this is a real -- I mean this is real progress. But I mean I think we all need to realize that the Wi-Fi industry is a very powerful industry. The cable industry is a very powerful industry. It's very well funded and it wants this spectrum. And so the FCC and NTIA is one approach.

The other approach is on the Hill. And that's not as pretty. I mean the picture's not as clear as it seems to be evolving with NTIA and FCC, at least based on
the conversations that we've had. I think
the Senate Commerce Committee feels a little
bit like they've got their finger in the dyke
essentially. They're holding it off but if
there's not enough action moving forward they
may take action to open up the spectrum
sharing. And that's the risk we run. So
we've got to continue to be vigilant there as
well.

And I know DOT is working on
that. We're working on that. But they're
under a lot of pressure in the Senate. The
Commerce Committee is under a lot of
pressure.

MEMBER KIRBY: You know, it seems
to me just to tie it back to this whole issue
of communicating this to a larger power. You
were saying the state DOT was busy with
today's work. You know, we all are. We
don't see the immediacy of this potential.
It doesn't offer anything today or tomorrow.

So we turn our attention to other things.
There's some good money in Maryland and Virginia. We're looking at how to spend it. We're not thinking about this kind of stuff. But if we lose this capability we've lost a tremendous long-run potential here. And we need to be aware of that. Lots of people need to be aware of it.

And I think it's -- with my officials and citizens and state DOTs and transit agencies, you know, they don't know about all this. They don't know what the long-run potential is. And with a lot of the citizens and some elected officials it's not even what they don't know, it's what they know that just ain't so that they bring forward.

I saw this one bulletin here about doubling lane capacity. Whoa, that's what we want. We don't need to build anymore roads. And I heard that at my meeting a month ago. I said no, no, don't get too, you
know, it's not going to happen right away. So you know it's a real issue I think to take a very complex topic here and communicate the potential when it can happen and how important it will be and what we need to do now to make sure we have that opportunity going forward over the long run. I don't think we're communicating it all that well at this point.

MEMBER MCCORMICK: The other thing you ought to be aware of is that when you see Comcast on the list there, Comcast has a very long history in this space. In 2004 when I was the president of the VII Consortium after we incorporated it Comcast became aware of the program and came back and offered to Jeff Paniati at the time that they would pay up to $6 billion to build out all the infrastructure in the United States if they'd have rights on the spectrum. So this has been almost a decade long on their horizon of what they wanted to
get into. So it's not new to them. And they have been very strategic in how they're pursuing this. Unfortunately.

MEMBER KISSINGER: Realistically what's the earliest it's going to be developed? Do we, the community that's pushing this, owe NTIA anything? Are they going to need see more background information before they make this final decision?

MR. LEONARD: Well, as Scott pointed out there are really two tracks to this. There's, one, a technical responding to the rulemaking through FCC and NTIA. DOT has as part of the rulemaking process responded back. I'm actually flying out to visit the NTIA laboratory with Jim. We're going to have some discussions with them about their capabilities and potential testing plans.

Because when we do get down to a public debate on this, and I know people aren't quite there, we want to make sure that
the public debate is informed with facts and figures, lab tests and real world tests. And so we want to make sure that we work with NTIA on any testing program that's structured to make sure that it really protects the spectrum the way we need it to be done. And not that there's some surface-level.

On the political side DOT has government affairs people but we are limited to some extent in the actions we can take. As federal officials we cannot lobby. That is more than frowned upon by Congress.

(Laughter)

MR. LEONARD: So what we can do is inform the public debate and leave it to others to be more active in the political arena. We work with mechanisms we have politically. But one of the things we are working with NTIA to make sure that all the testing is done.

Just having read some of the comments. Comcast in particular was very
vocal, very adamant, very disparaging to the incumbent users and the automotive industry. And this is all a fantasy and it's not really happened. We could download streaming video to your living room right now if you would just let us use the spectrum. So, there is a tremendous pressure on this.

I think part of it is a communication issue that I think will get a little easier for the Department once the next decision can be publicly announced. It's a little early for us to get out and start talking about the benefits of connected vehicle and have people say so, what's your decision. And say stay tuned. There will be an announcement that's coming up. I think that will start in part the public debate.

MEMBER MCCORMICK: Well, part of the problem was that that rulemaking is going to take 5 or 6 years. It just is. I've talked to the OEMs and you can't require somebody to put equipment in a car that's not
been road-tested for a number of years.

But back to my point, you can do that on the commercial vehicle side of it and that's a very short process. And you'd get use on the spectrum. You'd discover what the benefits are. You'd get the correct press. Not, you know, it's like we won't even talk to Wired Magazine because they never get anything right anymore, you know. And you've got all the people coming out of the woodwork that did some other program and are now commenting on a space they know nothing about. And so we need to get the real press on and have people understand it.

And, okay, maybe it's the anarchist's view of how you approach it instead of Scott's two views. But it's like if we can get this out there we believe it will be a watershed moment when people will get their heads around it. Consumers will understand it. The automakers might be able to compress the time that it takes them to
discover the viability and the robustness of this capability. If you save a year, you save a year. That's 30,000 people, right? So I think there are things that can circumvent the process, or at least accelerate it and add real value both on the infrastructure side and to the transportation vehicle side.

CHAIRMAN DENARO: Scott, are you going so far as to suggesting that NHTSA should consider flipping the recommendations to the commercial vehicle first and passenger vehicle second?

MEMBER MCCORMICK: Now what occurs is the decision whether or not to pursue rulemaking.

CHAIRMAN DENARO: Right.

MEMBER MCCORMICK: Okay?

CHAIRMAN DENARO: Yes, right.

MEMBER MCCORMICK: That rulemaking process takes a long time. The decision to pursue rulemaking for interstate
commercial vehicles because it's the only class of vehicles for which the federal government can regulate nearly immediately, that can happen like it did for Texaco and such. How long did that take? Adding it could be 4 months I think, start to finish.

CHAIRMAN DENARO: Okay, but the current schedule as I understand it is notice of proposed rulemaking for passenger vehicle --

MEMBER MCCORMICK: Sometime in the fall.

CHAIRMAN DENARO: -- this year, and a year from now for commercial vehicle.

MEMBER MCCORMICK: My understanding was that it was the spring of next year that I would recommend we accelerate.

MR. LEONARD: It's 2014 and as Dan Smith likes to point out when -- we committed to fall of 2013 for the light vehicle decision. Fall does not end until
December 21. So NHTSA is working very
diligently on that decision for light
vehicles. They haven't set a specific date
for the `14 decision.

CHAIRMAN DENARO: So it could be
as much as --

MEMBER MCCORMICK: I can think of
all kinds of reasons why that should be moved
up.

CHAIRMAN DENARO: That's why I
was probing that, what you're suggesting.
Yes.

MEMBER KISSINGER: I mean
somebody has presented something that sounded
more like September or October.

CHAIRMAN DENARO: That was in my
--

MEMBER KISSINGER: I don't know
who that was.

MEMBER STEENMAN: And just for
the record I fully agree with Scott. I think
we need to find a way to get something out
much more quickly to gain momentum in the marketplace and have something real we can show for it.

CHAIRMAN DENARO: I agree.

MEMBER STEENMAN: And I agree, I think commercial vehicles, if you look at what other countries are doing, what China is doing, that's the path they are taking.

Because it is much more --

CHAIRMAN DENARO: You mean --

what path? Commercial vehicles?

MEMBER STEENMAN: Commercial. They do a lot of deployment of safety application of commercial vehicles first. Because they can regulate that. They can mandate it.

MEMBER MCCORMICK: Brazil and Colombia, China, Taiwan, Japan, every -- Saudi Arabia. Every country I've been to in the last 12 months, that's the quickest adoption. It's the -- let me put it this way. I have another company, right? A small
company. We have two Class A volumes. If I'm told I have to put technology in the car it's now an incremental business decision to say well, okay, I'll add geofencing, driver behavior and diagnostics. It's not the full cost that I'm having to justify. Now I'm just adding this to this.

And if I get a quid pro quo with the state of Alabama or Michigan or whoever that says, okay, I'll be glad to harvest weather and traffic information and I can pass that vehicle to vehicle. It doesn't matter that I don't have equipment everywhere because since the signals can hop in near-realtime I can travel 1,000 miles and only be a few minutes late getting that information to somebody going, okay, I care about congestion. I care about what's going to happen at 5 o'clock. That's fairly simple algorithms in order for me to determine what the trajectory of that traffic is, the vector of that traffic is going forward.
But more importantly, we'll put load on the spectrum. We'll see how resilient it is. We'll have people out there saying here, buy my stuff. And somebody will go, okay, that's garbage. Don't buy that. It doesn't bring me any value. So very quickly, within a year you've got this crowd-ranking of what's useful. You've got all kinds of press going on because everybody selling something now has a reason to go talk about it. Everybody that wants to create some blog about how bad it is can go off and do that.

And what you'll have is the ability to say okay, yes. I'm driving on an arterial but eventually I'll pass it to a vehicle that gets onto the expressway and what are the three points that are put up in the state. You're talking less than $100,000 worth of infrastructure for every state.

CHAIRMAN DENARO: And if you create those infrastructure it also opens up
the possibility of after-market products. If the information is useful there could be some innovative small companies who decide to create information, devices, or paths even onto a phone for after market.

MEMBER MCCORMICK: And understand that first year will be chaos because there will be all kinds of stuff going on that's out there. But it'll be a disruptive event for the people looking to take over the spectrum. You know, it'll be something that provides the OEMs with more information about how robust the actual communication capability is.

CHAIRMAN DENARO: You're talking about a two-prong strategy here. One is to do the adequate testing and make damn sure that that testing is really thorough and so forth to prove that the interference is not there. But in parallel to have this deployment there which is another weapon of defense there saying it is being used. So I
like it a lot.

VICE CHAIRMAN KLEIN: And are you saying that this all -- when you say China or Brazil, is it already happening?

MEMBER MCCORMICK: Yes.

VICE CHAIRMAN KLEIN: So there's already applications that are already showing function and they have benefits.

MEMBER MCCORMICK: Oh, Saudi Arabia, we go there, they've got 36,000 buses on Jeddah that take all the pilgrims on the hajj over a 3-month period. Second largest migration. They need to have information for situational awareness because of the tension. They need to have information about every bus company that owns 2,000 buses. They need the diagnostics. They need to have side view cameras because we're trying to do lane-keeping. We're trying not to run over pilgrims walking. So I mean there's all kinds of a reason for doing this.

The government of India, when I
met with the minister --

    MR. BELCHER: They haven't built
out a DSRC network which they're using 5.9.

    MEMBER MCCORMICK: No, they're
using standard Wi-Fi.

    MR. BELCHER: Right.

    MEMBER CAPP: And specifically
for the safety applications that we keep
coming back which has been the motivation
here. So the standard to get to is higher.
This is where we've all kind of gone back and
said look, NHTSA is going to have to lay out
the framework for security and things like
that or else you can push people to deploy a
bunch of devices but we won't have safety
benefits. We won't without that. We have to
have that first. So that's why the timetable
and the sequence of events is a little
different here because we're all hanging on
the safety factor. We could abandon that and
start deploying this stuff but we'll never
get that.
MEMBER MCCORMICK: There's no purpose to doing -- you might as well do everything on this. If you're going to abandon the safety benefit this is going to surpass the computational --

MEMBER CAPP: So it's not the same as those other --

MEMBER MCCORMICK: Correct.

MEMBER CAPP: -- those other deployments. It's not the same at all.

MEMBER MCCORMICK: But they're waiting to see where the U.S. is going largely. Because they don't have the resources to do this. When I talked to the -- the Joint Minister of Communication and Transportation for the government of India he says we only have five major roads.

We only have -- the only thing we care about is commercial vehicles because the other cars don't even have radios. In fact it may not be a car, right, in terms of what's traveling on the road. So they have
to look in terms of the goods and services that they're moving around the country, you know, of a billion and a half people. So their concerns are a little bit different. Safety for them is much farther down the road than it is for us.

We talk a lot about the 35,000 people that die. There's a million people a year that die on the roads. We have to lead that charge because we're the only ones capable of doing that.

CHAIRMAN DENARO: So what I hear you saying and us saying is that for want of a better term we have a serious threat here. And the direction we've been going, there's a lot of inertia behind that. And maybe we need some radical change in that direction in order to protect our future.

MEMBER MCCORMICK: I think it's our duty to do that, to say we ought to be doing this. You can come back and say --

CHAIRMAN DENARO: And --
MEMBER MCCORMICK: -- it's not possible to do it that way, or we have another plan, but our responsibility is to say how do we move this forward.

CHAIRMAN DENARO: Yes, I know. I hear you. Yes. And maybe we've got too much inertia and we're not agile enough to move to this new need which is a huge threat. Because we could lose everything.

MEMBER MCCORMICK: I'm completely confident that these two gentlemen will figure out what an adequate response to whatever our proposals are and make it, you know, it'll either fit within how they can make it work or it won't and then we'll have an appropriate response. But that follows our responsibility to say what we think the government should be doing in this space.

CHAIRMAN DENARO: Roger, you're into this pretty deep. What do you think of this thing?

MEMBER BERG: I think you don't
necessarily have to pull back on the light vehicle to do the commercial vehicle. So I think you should add on. It's not a zero sum.

MEMBER CALABRESE: If you want the deployment add more transit vehicles because then you've got a new player in the light vehicles.

MEMBER MCCORMICK: That or police vehicles. Or, you know --

CHAIRMAN DENARO: So Scott, this is going to what you brought up earlier and I pleaded ignorance about. But this is that whole discussion. I am remembering it now. And whether -- I don't know whether this is a separate document you're thinking about or whether this just becomes a strong recommendation section in our end of the year report. But it sounds like this --

MEMBER MCCORMICK: Well, I'll leave it to the chairman to decide what the appropriate -
MEMBER KIRBY: One way of looking at this is, and we're talking about the demonstration from the client which I focused on testing technology and so forth. We almost need a deployment strategy to communicate the importance to the public and the decision-makers like doing it on buses. Some strategy that convinces people of the long-run benefit here and the importance of protecting the spectrum and moving it along.

You know, in the public mind it's not safety that's really there. It's the Google vehicle running around and self-drive vehicles and, you know, little sound bytes like that which are a little bit off where we're really going.

And the critical thing is not out there in the minds of the people that when it comes to Congress need to be saying this is important.

CHAIRMAN DENARO: Well, and to the point earlier, the whole problem with
V2V, I mean we all love and want V2V but it just takes so long to get enough cars out there where you can actually -- the public will actually see the first news report of somebody went through an intersection and didn't crash because this other car stopped on time. That's going to take a long time. Whereas the benefits from something like this could be publicized a lot earlier too. Not only can you implement faster, to Scott's point, but you can also potentially publicize visible results faster on it.

MEMBER CALABRESE: One of the --

CHAIRMAN DENARO: And it --

MEMBER CALABRESE: -- is the much more -- bigger media event.

CHAIRMAN DENARO: That too.

MEMBER CALABRESE: The banker, the bus rolling over, those are big media. People remember those. Accidents happen with fatalities resulting.

MEMBER MCCORMICK: The legacy of
our work when we get done with 2 years of having this group of people should have provided some reinforcing directions of things they can't lobby for and try to accelerate the deployment with the justification that this is going to achieve the benefits that we all know it will.

CHAIRMAN DENARO: Or put it in less comfortable terms, if we go do all our recommendations, finish up and we all go back to our jobs after we're finished with this and this spectrum sharing thing ends up killing everything, what was the point for the last 2 years, right? So.

MR. CRONIN: Can I ask a question? As you get into your discussion. And so, I mean John and Roger identified, you know, for V2V we need security. There's a lot of technical detail that forms the foundation for nationwide interoperability.

And so we could turn around next week and issue a solicitation to say go
implement Connected vehicle, other stuff, but that's about what we could say. Because I wouldn't be able to specify all the technology for nationwide interoperability. Do we use security that V2V is doing? We haven't even developed it fully. You know, we have something that's working for Safety Pilot. So we're in this space.

And so I would love for the Committee to have comments regarding that where I don't want to tell Paula and Joe to implement all this infrastructure that they're going to have to pull out in 2 years. So that's part of the conundrum I think we're in of the V2I program and some of the other stuff is we could do things from the federal side to accelerate but we have to be careful of how much sunk cost that is.

The more you can add advice on what is it that we're trying to push. Because trucking agencies, or DOTs, or transit agencies could implement some
technology but I don't know that Cleveland
and Seattle and Fort Lauderdale would be
implementing the same thing.

MEMBER MCCORMICK: Well, it
doesn't have to be the same. That's the
point. If you say it's on interstate
commercial vehicles. If you look at the
state of Michigan you've got where I-94 goes
from Detroit to Toledo. You have -- or
excuse me, I-75, you have I-94 that goes
towards Chicago, and you have an
International Bridge. That's where we first
need infrastructure. You're talking three
towers. You're not talking one every 300
meters.

There's not a DOT on the planet
that needs realtime information to react to
something right now. I talked to Kirk
Steudle. I said what's the fastest you can
ramp up and get any information? He goes
probably an hour. I talked to Randy Iwasaki
who's out of California how fast for you? He
goes probably a day.

We don't need the infrastructure that was originally thought of 10 years ago that says we need one every 500 meters because we're going to be harvesting and passing along this information. There's a security aspect because we don't have the server side infrastructure without that. And so we need V2I for those things.

But we don't need populated security all through. Because if I know in harvesting this information from truckers, they're coming through Cleveland, they're heading to Toledo, they're going up to Detroit, they're going to the International Bridge, once they're on the expressway that signal hops vehicle to vehicle to vehicle. And Detroit will have it and Toledo will have it within a few minutes after it's gotten there.

It's not a lot of information. It's not the 200 terabytes that they're
collecting in the Safety Pilot. It's traffic is 12 miles an hour. It's dense fog. It's whatever those basic level things that a DOT needs to know in order to manage the macro flow of traffic.

And the point is of that, that has real value. All the other things that people talk about. That ITS New Jersey meeting last month and the deputy director pulls me aside and says we want to do something but we don't have much money.

And I said okay. I said this device has a really good three-dimensional accelerometer on it. I said it could determine with a simple algorithm the severity and location of a pothole when you're driving. I don't care if it's in your pocket, your purse, or your briefcase, or under your seat. And the guy standing me goes I'll write that app for you tonight.

And he said well, how will I get people to use it? I said you tell people
that I'm going to start measuring the
deterioration of my potholes and do a better
job and be more efficient in terms of fixing
the problems on our roadways. You'll have
thousands of people that download that app.
I said I'd download that app. If Kirk
Steudle put that out today, we have one
that's going to make our roads better and
tell you where the potholes are to avoid
them.

So you know, there are things
that can be done right now that say things
that don't require these guys to put stuff in
their cars, right? And it gives people --
that they have a much better accelerometer in
their wheels and might be able to use later
when we get around to being able to
communicate that. Okay. Or maybe we don't
ever need to bother that and open that
security gateway into their systems because
now you can, you know, you can use binary
technology.
CHAIRMAN DENARO: I just wanted to say, I would almost throw your question back at you in a sense. I think what we're saying, and I'll use since I'm more familiar with that a commercial private company example.

If my company is cruising along with a portfolio of products and everything else. All of a sudden I have a huge, unexpected competitive threat that comes from a direction I didn't know about, I don't have a product in that area, you know, if I've got budget allocation to make, you know, would I make -- the tough decision I make is you know what? We're going to put these two projects on hold because I need to move money into this area now.

As brilliant as our strategy was we now have a threat here that if we don't respond that strategy doesn't matter to us. So part of it is going back to what we're doing. And when I say about pushing back on
that is we've talked about "day one apps," quote unquote, for V2V, or V2X in general for passenger cars. We need that exercise now on commercial vehicles. Getting to some of the ones that Scott is throwing out off the top of his head. But what are those near-term benefits that could happen in a commercial vehicle environment.

And frankly I think there are tradeoffs. Your concern is a very real one about we're not ready with interoperability and standards and all of that. You know what? Maybe -- study it and see, all right, where can we make compromises. Where can we take the risk that yes, maybe we'll have to throw this away in 2 years. But we have a threat. You know, where is that happy medium?

If we keep going on the schedule we're going on this threat is too big and could end everything. So we need -- a summary of that is we need an analysis of
what are the, quote, "day one apps" in a commercial or transit application -- I think that's a brilliant idea of transit -- and what are the compromises. How can we accelerate the development of the architecture and where do we have to take some shortcuts and therefore accept some risk that we may change that in the future? Those are tough decisions but they have to be made.

MEMBER MCCORMICK: Or recommend that resources be given over --

CHAIRMAN DENARO: Yes, that's what I'm saying. Exactly.

MR. BEUSE: Hold on a second. Can I make my observations as like the guy who's actually ready to speak to this. I don't know where the thought came from about that we need to regulate commercial vehicles, like, tomorrow. The point that Brian raised is very real.

The other thing is those guys build vehicles to suit and they need time to
certify and the whole nine yards. So regulation drivers are not texting, it's not the same as regulation on a vehicle.

The second point is that it's not just NHTSA in that case. Now you're talking CSA and you're talking FMCSA who in theory want this thing to work but also be implementing that from CSR on the road side to make sure that the road side spectrum of the program is functional.

MEMBER MCCORMICK: And I've talked to FMCSA about this offline and they're fully supportive of going that route.

MR. BEUSE: I don't think the problem is the government.

MEMBER MCCORMICK: Right.

MR. BEUSE: Right? When you talk about commercial vehicles that is not like these nice two gentlemen who I know very well from the vehicle center. You're talking a wide open passage rule that they like, right?
They own about 50 or 60 percent of the trucks out there. That's the mom and pops. That's the ones who say 'I own a truck' guy. They're not going to be all excited about some huge government mandate that makes them login to some system and do X, Y and Z as the Department has seen on tape recorders.

Yes, you might be able to convince the Walmarts and traders of the world that this is a good investment. The OOIDA folks are different. So I would suggest that if the Committee thinks that this is a good strategy that you actually talk to at least some of those folks before you put something in writing and stir up an industry that will not be very friendly in this arena.

MEMBER MCCORMICK: I'm sharing feedback on that in the last 4 years and I brought this up at every one and I had no resistance to it. And I agree, you've got all those issues. But I want us to head
towards the restaurant. We're not going to satisfy the hunger.

MR. BELCHER: Can I re-frame this? I think, one, I think we don't want to talk about whether it's commercial vehicles or transit vehicles. We want to talk about being opportunistic. And there are going to be opportunities. Whether it is on certain freight corridors where those big companies see the value and are willing to do it.

There's going to be companies in -- there's going to be northeast Michigan that's going to be willing to deploy infrastructure because they want to be an early adopter. And there are going to be -- there are targets of opportunity. And I think what Brian was talking about with the pilots is just a different way of saying that.

I think if there's anything we need to be promoting through this it's the early adoption of after-market devices in
those targets of opportunity. Because --

CHAIRMAN DENARO: In fact --

MR. BELCHER: So that, if you want to go that way I wouldn't -- don't tell DOT to go commercial vehicles, or to go transit vehicles, or to go, you know, taxis. But give them the flexibility to go for targets of opportunity.

CHAIRMAN DENARO: That makes sense.

VICE CHAIRMAN KLEIN: The applications we're talking about, are these all DSRC? Because I'm hearing about a lot of apps that sound like they would run over other media. And the minute that's running over other media it will do nothing to protect 5.9 gigahertz. So the crucial thing is it's got to be 5.9 gigahertz and only 5.9 gigahertz. And how many apps are out there other than total safety everywhere? The grand vision needs DSRC. But the app tomorrow, the incremental, ready to go,
incremental benefits demonstrable tomorrow that must run over 5.9 gigahertz, how many of those are there?

MEMBER MCCORMICK: Originally there was 187 use cases that were identified by the automakers, by all 12 of the automakers, of which I believe 81, correct me if I'm wrong, if you guys know, originally it was 81 that were identified as the prime drivers. I actually made a presentation on that here. Some were vehicles. Some were --

VICE CHAIRMAN KLEIN: How close to market are those?

MEMBER MCCORMICK: Well, they aren't actually apps --

VICE CHAIRMAN KLEIN: -- on this stuff.

MEMBER MCCORMICK: They're not apps.

MEMBER CAPP: They're not. Because we're waiting to get DSRC V2V safety defined in a way that we can all deploy and
use it in a stable environment that will last for years and years. And those of us who have been involved with it, I think this Committee too agreed that the most likely chance on Earth we have for that to happen in the United States is some momentum behind this action that Defense is going to indicate their intentions later this year. I think we need to stay focused on that happening or else it's a complete change in strategy.

    VICE CHAIRMAN KLEIN: Is it a complete change in strategy? Or can you pursue the big game and as a defensive thing start feeding out some small apps that make headlines that demonstrate? And that possibly become obsolete in a couple of years.


    VICE CHAIRMAN KLEIN: That's the issue.
CHAIRMAN DENARO: Let's -- I don't know which breakout should deal with this, but let's kind of -- we've had several good comments and counterpoints and everything else. Let's try to bring together in tomorrow's discussion some draft language of what we'll do here. I think we've kind of covered a lot of different directions here. I think it's an important issue. I thought this was a great discussion. Let's try to craft that tomorrow and get it in front of us, and then we can have some more discussion with something that we're reading in front of us.

MEMBER MCCORMICK: This will come up in deployment incentives.

CHAIRMAN DENARO: Okay. Perfect. All right. Do we have anything else that you guys were going to present?

MR. LEONARD: No. That's our presentation, the update. I think we've had a pretty good discussion around it.
CHAIRMAN DENARO: Yes. We're literally at a breaking point. So --

(Laughter)

CHAIRMAN DENARO: Yes.

MEMBER WEBB: Just a question. One thing that I'm missing for an update is any discussion at all on governance and what's happening or whatever on that. And is that on purpose that it wasn't brought to us? Because it's been an issue. It's been on one of these, you know, sort of like the cloud, out there and we need to do something but the idea of where it's headed and what's going to happen on that is still an issue to me.

MR. LEONARD: Could you elaborate a little bit more on what you mean by governance?

MEMBER WEBB: Well, I guess the whole concept the way it's been laid out in discussions over time has been yes, you can have V2V, but then we have the security
issue, we have the transmission of information back and forth. Is there going to be this back office. And who's going to run the back office. And is it going to be private? Is it going to be government? Is it going to be some, you know, public-private partnership? Is there a vision as to how that is going to function or work or whatever? Or is that just no longer necessary because things have changed?

MEMBER MCCORMICK: Is this in terms of the public key encryption and all of those --

MEMBER WEBB: Yes.

MEMBER MCCORMICK: -- security certificate?

MEMBER WEBB: Exactly.

MEMBER MCCORMICK: I don't think anything's changed on that.

MR. LEONARD: I don't think we have an update since we briefed that at the last Program Advisory Board.
MR. CRONIN: We have the same situation. And you know, NHTSA is a part of the decision. So they have regulatory capability and they can enter into a contract to operate a security system. And we're running off of that. You know, where there's no new information about a big pot of money we're going to have, or that we're going to have to do that. So, you know, we're operating under the information of NHTSA could enter into a contract.

MR. BEUSE: It's more -- the correction is it's a contract or an agreement. Either one. So we've been looking at our authority to be able to do that. The government is not really the correct word. It's more like, yes, there's going to be security measures to be tested and the governments are for handing out certificates and that part of it. And then the question really is how does DOT interact with that. So we've looked at a couple of
different models. So there's a public-private partnership thing. But that would seem to require some sort of change in authority.

The other one is if some big pot of money came from Congress which is unlikely. And this third model is some sort of agreement or contract with this entity to run it. And so we've been looking at it from our authority perspective, what we have to do from a contractual perspective to implement any one of those three models and I can't say which one.

MEMBER WEBB: So I should put my governance word aside and now use security management system?

MR. BEUSE: No, I understand what you mean when you say governance.

MEMBER WEBB: I can appreciate it. I just want to make sure we're again from a semantics standpoint when we're asking and talking about something exactly narrowing
it down. We were discussing that earlier.

MR. BEUSE: But yes. I think the idea of a giant, you know, sort of FAA type organization is probably not out there.

CHAIRMAN DENARO: Okay, let's take a 20-minute break, so until about 25 after. And then we'll change gears.

(Whereupon, the foregoing matter went off the record at 10:04 a.m. and went back on the record at 10:33 a.m.)

CHAIRMAN DENARO: All right. We'll get started again. Just to put closure on a previous discussion, what we plan to do is we'll bring it up again when Hans talks about deployment initiatives this afternoon.

And then we'll probably, unless someone has a better suggestion, task his breakout to flesh out a strawman recommendation along those lines.

And then when he brings that back to the board or Committee we'll all kibitz on trying to get consensus on what we should say
on that topic. I know Hans took copious notes on everything that was said earlier so that will all work its way into that recommendation.

REVIEW OF DRAFT LETTER TO NHTSA

All right. So anyway, this subject, we're on review of draft NHTSA letter. And just as a background there what we talked about and why this is on the agenda. This is one of our deliverables we agreed last time and in fact even prior to that.

And what we said was that we thought it would be valuable for us to weigh in sometime in the August time frame which here we are. Although you could argue it's a little late. But anyway, for us as a Committee to send a letter to NHTSA really encouraging moving forward with the rulemaking process. So just the Committee weighing in. In my opinion it would be conspicuous by not doing so.
And it was a little late for us to wait till our formal recommendations. It'll be after they do whatever they're going to do. So we wanted to get something in before that. So that's the purpose of this.

If you look in your books on tab C. And thank you for all the inputs that we got, that I got from various ones. I tried to fold most of them in there. If I've neglected anything I'm sure you'll hurry to point that out to me.

I have two versions in here. The first version is what I'm considering the current draft that I'm proposing. And the second version which is a little longer captures some really thorough review we got from Steve Kenner and the team at Ford. So, and thank you, Steve and your team for that.

So let me walk you through that of what's in here and what's not and so forth. So, we're going to turn to the second one. Let's walk through the Ford one.
The first comment there. And by the way, a lot of the changes that they suggested was improving on my language. And frankly, I think they did a great job. So that's kind of in here. So the first one is changed from the initial version that you all saw.

But anyway, turning to that second one, the one I want to get your feedback on. And you know me by now. I tend to exaggerate the language a little bit to get people's attention intentionally. And not everyone agrees with that approach.

So the first one there is in the second paragraph. It says the ITS PAC in the version I'm proposing says, "We're intimately familiar with their contrasting research of V2V" yada yada.

A suggestion was to tone that down to say "very aware of." My preference is to stay with "intimately familiar" but I don't have a strong position on that.
Can I hear some votes on which one to go with?

MEMBER BERG: I'm fine with either one. Although in general I thought the Ford edits were really good.

CHAIRMAN DENARO: And most of them are in here.

MEMBER BERG: I'm good with them. And that one I'm okay with.

MR. BELCHER: There are varying levels of appreciation and understanding. So I think you don't want to overstate.

CHAIRMAN DENARO: All right. I'll defer to that, Scott. I'll go with "very aware."

All right. The next one there you can see. And this one's maybe a little more important. There was some pushback on the potential for how safe this will make it. And actually I stated it a little stronger than the Ford team recommended but I see the point. I used words like "It
has the enormous potential for making road transportation safer than it is today." I think in the initial version I said "it's a revolutionary change in the history of the automobile" whatever. People pointed out that, you know, seatbelts did a pretty good job too.

(Laughter)

CHAIRMAN DENARO: And someone else pointed out that since it's not automated, since it's requiring the driver to respond, you know, there may not be quite as much. And NHTSA themselves have been careful in their language. It says it can impact 80 percent. It does not -- clearly does not say based on prevent 80 percent of the accidents that happen for obvious reasons.

So the question then is which do we like. We believe that the implementation will contribute significantly which is what I actually put in the first version that I'm recommending versus the original terminology
I had. I'm sorry, I'm on the wrong sentence here.

We agree the technology has enormous potential. So it's the word "enormous." Or just eliminate "enormous."

"Has potential."

MEMBER BERG: "Enormous" is fine. I mean 15 percent includes enormous.

CHAIRMAN DENARO: That's good for me. We're going with "enormous." I've got to win one here. Okay.

And then I did change the wording, I was jumping ahead there. In the next sentence I said "contributes significantly to further reductions" in there. So I toned that down a little bit from what I had, maybe a little stronger than what Ford was recommending. If everyone is okay with that I don't see it as a big deal.

All right. I did want to maintain the -- and I know I'm talking format and stuff here, but I did want to maintain
the breakout of our key statement in here. "Therefore, ITS PAC urges NHTSA to proceed with a rulemaking process that will lead to widespread deployment."

Ford's recommendation, and I understand why, but it changes the meaning in my opinion. If you look at the second page, it says, "ITS urges NHTSA to complete the technical and policy research necessary to proceed with the rulemaking."

Well, yes, you need to do that. The italicized comment. And you look on the second page there's a longer version that was recommended that really deals with complete the technology and policy research. In the statement, there was a comment on the side of that saying they still do have to do a lot of research.

I realize that and I agree with that, but that was not the focus of our letter in my opinion. We wanted to come out and say fine, you've got to do all that
stuff, fine, but we're telling you go with the rulemaking process.

As, in the previous paragraph, as contrasted with either going with recommendations or NCAP ratings. So what NHTSA explained to us is they have several things they could do. NCAP, they can do recommendations. They can we're not ready to do anything. We're just going to do more research or we can go with proposed rulemaking.

But this letter is saying, guys, keep your mojo, go with proposed rulemaking. Get the dialogue going. Lots of good things will happen.

MEMBER MCCORMICK: Steve, can you talk about the italicized?

MEMBER KENNER: Yes. So there's a couple of things. And John, feel free to chime in.

But when it comes to the specifics of the vehicle-to-vehicle
communication we do in fact depend upon all
of the automakers putting the technology in.
And so trying to get us all to do that. I
think if we did it purely through an NCAP or
that kind of thing it's less likely to have
the penetration and benefit.

So that's where in an unusual
case -- we're not saying we want, you know,
unlimited rulemaking and please regulate us
in many ways. That's, you know. But in this
case, in this particular situation it is
somewhat unique. And in order to be able to
do that we're saying, yes, we really think
you need a rulemaking.

But you know, not expansive
rulemaking, but just to say that we want to
be able to have the technology in vehicles
that then allow the vehicle-to-vehicle
communication. We would want it to be, you
know, efficient and focused to be able to do
that and not expansive.

However, part of the thing is if
you look at the policy discussions. And you know, we had the question about security, privacy, reliability, those are still items that I would say are still under discussion and development. Those are not resolved issues. And so those aren't issues where we have it all worked out.

So part of what we're saying is we want to make sure that that gets progressed and we get those things done and agreed to. So we think that's a really important focus.

MEMBER BERG: Could you accelerate that if you start the NPRM process? I mean obviously there's stuff that still needs to be completed. But if you say well, I'm going to talk about this for another 6 months, that turns into 12 months, that turns into 2 years. Nothing really gets accelerated. Just we're doing more studies and more research. What we're trying to advocate is put the foot on the
gas, not coast. We've been coasting for 10 years.

MEMBER MCCORMICK: Rather than start it with "therefore" if we say, "The ITS PAC recognizes NHTSA needs to complete the technical policy research to proceed."
They're already doing that, right? And if we move that into the paragraph before, the previous paragraph where it says "The ITS PAC believes" I think it then says we recommend you doing this and you still need to do it, but our recommendation is still our recommendation. Rather than therefore being a recommendation.

CHAIRMAN DENARO: Say that one more time?

MEMBER MCCORMICK: Instead of saying "Therefore the ITS PAC" you say -- get rid of the word "therefore" and say "The ITS PAC recognizes NHTSA needs to complete the technical and policy research" blah blah blah blah. Take that sentence and put it before
The ITS believes a rulemaking approach offers. Now you've incorporated it as one stream, okay?

CHAIRMAN DENARO: Yes, okay.

MEMBER KENNER: So there's two sort of elements of it. If you proceed let's say to the rulemaking and we haven't worked out some of these things then all of our comments are going to relate back to how are we going to handle security, privacy, liability and so on.

So we think there's an element of making sure that that's to a point where the rulemaking process can be more efficient. And then doesn't go into the issues that we know are already under a lot of discussion and development. So that's an element of it.

And then the second part is the point I originally made which is I had to choose an NCAP route versus a regulatory route this may be one of the few examples where I would say I'd choose a regulatory
route in terms of mandating the technology in the vehicles. And again, that's -- so those are really sort of the two elements.

CHAIRMAN DENARO: Okay. So I think we're agreeing. And but what I was objecting to is the way it was worded here is leading me to conclude that this was recommending no, don't do rulemaking, do more research. And I don't want to do that.

So to Roger's point I want to say we want you to proceed with the rulemaking, get on with it, but you're making a good point. We need to complete -- accelerate and complete the research necessary to support that.

MEMBER CAPP: I think that that rulemaking can only proceed if some of these other loose ends, big loose ends are tightened up.

CHAIRMAN DENARO: Well, I'm not sure I agree. I think the notice of proposed rulemaking can start. The actual rulemaking
won't happen till the research is done. So let's get the NPRM out now, or ANPRM, whatever it's called.

MEMBER CAPP: Rather, the Department can't start with an NPRM because there are these open items, right?

CHAIRMAN DENARO: I don't know.

MEMBER CAPP: There's going to be a step taken forward this year that's going to indicate a desire to move in this direction. It will take some form of a structure. But it probably can't be a specific proposed rule because of these open items, pending research that needs to be finished up. I think Dan Smith as much as said that last spring.

MEMBER STEENMAN: And the process of rulemaking might actually uncover other things as well that, again --

CHAIRMAN DENARO: Yes.

MEMBER CAPP: Begin the process is the right thing. Maybe we don't need to
be specific about which part of the process. But by all means begin the rulemaking process in order to complete the research, get comments.

CHAIRMAN DENARO: Okay.

MEMBER KENNER: Generally before an NPRM comes out, right, there isn't a lot of discussion and information-sharing and gathering. That is -- lived it for years. And the great part about that process is the advanced rulemaking process, is we can have a lot of dialogue and discussion that's important.

And a lot of it is either generation or sharing of data, you know. In a lot of cases all of us have research data that we want to share because we want the advanced rulemaking discussions to move whatever proposal eventually comes out to be something that would achieve maximum societal benefit.

So a lot of us have research
that, hey, we think this is the way to go and here's the data and here's why. And we can have that open dialogue.

Once you get into the formal rulemaking then it's governed by a different set of communication protocols and requirements. So we want to make sure that in advance of the official rulemaking, the advanced rulemaking part where we can have that dialogue, we need to try and make sure we get the technical information done as well as these policy discussions so that at least we have the basic construct of something that would come out. Because -- go ahead.

MR. BEUSE: I was going to make the point, actually. I think it would be helpful if as you guys are talking about it because some of you are probably unfamiliar with the rulemaking process in general.

Whether it's an ANPRM or an NPRM it triggers the rules that Steve was just saying. So that's got to be clear. That's
the APA kind of -- Administrative Procedures Act kind of thing.

Where if the agency puts out a proposal, whether it be an advanced notice of proposed rulemaking or a notice of proposed rulemaking that triggers kind of what some people call secretive but it's really not. It's really meant to make sure that everyone has access to the same amount of information, that people aren't coming in to sway the regulators one way and not knowing that that other kind of -- the other side of folks don't know what's going on. So it all happens in kind of the public docket domain.

But I think for the purpose of the letter as some people know we normally don't have like kind of huge public discussions in advance. It's more technical discussions. So I think it would be good and helpful if you guys could separate that even in your own minds.

So policy issues kind of related
to is NHTSA going to govern this thing or is DOT going to govern this thing or not. It's kind of separate from the technical thing of how does this thing even work.

MEMBER MCCORMICK: My question is how is policy formed. I mean, what entities and what process does that go through? Because we had issues, we addressed this last time on data ownership and privacy, reliability and security.

But this encapsulates one thought. And if we commingle policy in that that's kind of not appropriate to the body that this is recommending work in my understanding. It might mean we want to have a second recommendation that addresses those policy aspects but -- and I think we ought to be considering doing that as well.

But I want to in my mind understand how the formation of policy occurs at at least a high level.

MR. BEUSE: Well, I mean
certainly it's informed by the technical work of course. And then there are policy decisions that get made either from the Administrator level or administration standpoint or from a government-wide standpoint.

For example, the DOT decides to own this SCMS, the security management system, then there are all sorts of federal rules that trigger about data ownership and stewardship and all this kind of stuff. Versus if we don't. So there's -- I don't know if I made that very clear.

MEMBER MCCORMICK: Yes.

MR. BEUSE: So the technical aspects inform some of the policy.

What I was reacting to here was that I think Steve was trying to make a point, I'm not sure it was well appreciated. I think what Steve was trying to say was there is some technical work that needs to be done, but I think what I heard him say was a
very narrow, focused rulemaking that got kind of confused with kind of the bigger issue of many different applications and V2I and all that kind of stuff. I think that's what I heard you try to articulate.

I think that would be helpful in the letter too even for you guys to work out in your mind what exactly are you recommending. Recommending rulemaking is one thing, but are you recommending a rulemaking that encompasses applications, the whole nine yards, or are you recommending a rulemaking that just focuses just on the very technical aspects to prime the pump?

MEMBER MCCORMICK: See, I think that gets way ahead of the question. The question before us is are they going to make a decision whether to pursue rulemaking.

MR. BEUSE: Yes.

MEMBER MCCORMICK: I think the purpose of the Committee should be to advocate towards -- to make that decision to
pursue rulemaking, not what the rule is. Because to your point there's going to be things to discover. To your point there's policy issues. To your point, you know, we don't know how it's all going to work. That's why it's going to take a multi-year process to do it.

So, the question is are we advocating for the decision to pursue rulemaking or something else. And I think the first step is to say they ought to be pursuing rulemaking. Whenever it starts, however long it takes to get to the point where you can actually do the rulemaking is a completely separate issue that's governed by a whole wide set of factors.

CHAIRMAN DENARO: Yes. So just to clarify now, and Nate, you presented to us, again, we understand that there are several directions that NHTSA could go.

MR. BEUSE: Yes.

CHAIRMAN DENARO: As I said, it
could be just recommendations, it could be NCAP and so forth. The intent of this letter is we're weighing in saying, okay, we vote for the rulemaking choice.

Now, I'm sensitive to what you're saying about steps that has to happen.

MEMBER CAPP: Maybe we can say that without being too prescriptive in saying that we believe that the rulemaking process is the whole --

CHAIRMAN DENARO: And --

MEMBER CAPP: -- want to result in --

CHAIRMAN DENARO: I like that. It's called a rulemaking process and we don't have to say whether that's an ANPRM or NPRM now.

And -- right. I don't want to make the decision of rulemaking versus another alternative contingent on the research, but I think it's a valid point to say accelerate the research. So let's use
Scott's recommendation, get that comment out there, that paragraph weighing in on that. But then still saying that proceed with the rulemaking process. That's a recommendation.

MR. BEUSE: Yes. And I think it's fine if you want to split it that way, but I think in the context of the conversation that the Committee was having earlier with kind of the need to get things out and show progress on this issue that that's I think -- Steve was kind of going that way with if you're too expansive and you want to solve everything then it takes a very long time. If you have a very narrow, focused rulemaking you can get that done not in 4 months but a lot quicker.

CHAIRMAN DENARO: Yes, okay. Well, this letter again is coming in early because we want to get it in in advance of you guys coming out with your statement, whatever it is.

In our recommendations, trust me,
we'll have a lot about that distinction in the recommendations that will come out at the end of the year.

MR. BEUSE: Okay.

MEMBER BERG: This isn't particularly for the decision.

CHAIRMAN DENARO: Exactly. Right.

MEMBER MCCORMICK: And that's why I agree with the last comment that says this paragraph on encouraging V2I should be a separate program.

CHAIRMAN DENARO: Yes. And that's why I respect that now. I think the V2I discussion, I completely agree with what you're saying here, Steve. But I believe that should not distract from the single message we're trying to get in this letter being V2V.

MEMBER KENNER: Yes. I have no argument.

CHAIRMAN DENARO: So we'll move that over. Again, if that's something we
want to put into our recommendations I'm all for it.

MEMBER KENNER: Yes. And that's the spirit of that comment.

CHAIRMAN DENARO: Okay.

MEMBER KENNER: And in line with the presentations that we --


MEMBER KISSINGER: To Scott's point about putting more emphasis on the commercial end of vehicle. I mean my sense is the intent of this was focused more on the personal V2V which is the anticipated decision.

So, you know, are we so comfortable with that and is that what this means? Or when we use V2V which could cover commercial trucking and transit buses, I mean are we trying to keep it generic and not be specific?

CHAIRMAN DENARO: No, this -- the
intent of this letter again was specifically addressing their decision they said they're going to make this fall which is on V2V light vehicle. All this other stuff we're talking about is hugely important. That needs to go into our recommendation letter at the end of the year.

And by the way, where did Scott go? He brought up the fact that of whether it should be a separate letter on that subject and everything else. I believe very strongly we should put it into our recommendations because that has a cool channel. That goes to JPO, it goes to the Secretary, goes to Congress. You know, so we get a really nice path for those recommendations to have them seen there. So that's what I'd like to see.

So back to the answer to your question, Peter. We want to keep this letter focused on the simple fact of the decision this fall and we're saying you can choose --
you said you've got several things to choose, recommendations, NCAP, rulemaking. We vote for you choosing rulemaking. And it's the rulemaking process, so yes, get all this other stuff done.

MEMBER KISSINGER: Well, I mean I'm perfectly okay with that because I think that's the intent of it. But I would argue that if by tomorrow afternoon if Scott convinces this group to sort of rearrange priorities, put more priority on the heavy truck end of things and transit, whatever, that this letter which is saying -- this letter is putting emphasis on personal V2V could look inconsistent.

CHAIRMAN DENARO: Well, I don't agree because I would vote for what Roger said earlier that they're not zero sum. They can be in parallel.

There's a huge, heavy train going right down the track in terms of this rulemaking. We're not going to stop and turn
that train in a different direction in my opinion. So I think that would be futile for us to go with a recommendation and say stop, don't do private vehicle, do something else. I don't think that's going to be.

So let's proceed with this, get this decision made. In parallel in our recommendations we're going to weigh in on you've got to accelerate this other stuff, guys. And whether it's after market, whatever, you know, you guys will figure out what that recommendation should say.

MEMBER KISSINGER: I'm fine with that.

CHAIRMAN DENARO: Okay. So here's what I propose. Why don't I tonight depending on how much wine I have at dinner --

(Laughter)

CHAIRMAN DENARO: Or maybe dependent on -- I'll go ahead and make these changes and then bring a clean version
tomorrow and if we're good to go, we're good
to go. All right?

MEMBER KENNER: And John, I just
wanted to make clear. So the perspective on
rulemaking versus voluntary. You're aligned
with that perspective relative to the
vehicle-to-vehicle?

MEMBER CAPP: Yes, I'd like to be
clear on that too. In the rulemaking
process, sometimes the ultimate mandated
system is just the most likely scenario to
get the kind of volume you have to have to
reap any of these benefits.

CHAIRMAN DENARO: I am thrilled
that you two guys are onboard with that and I
think that's wonderful.

You have also, one of you, or
maybe both of you made the statement that,
you know, DOT, you can do what you want but
we're going to do this anyway because it's
good for business and I think that's cool
also.
MEMBER CAPP: But even that's not possible without some --

CHAIRMAN DENARO: Absolutely.

MEMBER CAPP: We've been clear with that too. We hate to say that we can't do this without -- but in this case we really can't do it without some clarity around security oversight.

CHAIRMAN DENARO: Yes, we can understand.

MR. BELCHER: But John and Steve, just to be clear it has to be sooner rather than later. We need a strong signal quickly because it's going to be hard to continue to make the investiture without that strong signal.

CHAIRMAN DENARO: Yes.

MR. BELCHER: So we don't want to lose that.

CHAIRMAN DENARO: Don't lose that. Let's bring that back in our recommendations for sure.
MEMBER KENNER: One of the things we do inside the OEMs is we have to be able to sort of provide a forecast of whether we think the external environment including rulemaking or NCAPs or NPOs, you know, reflect. And so that's something we do. And then that helps us as large companies react.

CHAIRMAN DENARO: The sooner you have clarity the better.

MEMBER KENNER: Yes, that's right.

CHAIRMAN DENARO: Yes, I hear you.

MEMBER BERG: It's exactly the same thing, so the sooner you have it done --

CHAIRMAN DENARO: Yes, exactly, sure. Okay. So that's the plan. We'll do that. And I'll get you a new version tomorrow. Thank you all for your inputs. That was great. And we're an hour ahead of schedule.

(Laughter)
CHAIRMAN DENARO: So, Mr. Vice Chairman, or everybody, how would you like to use the next hour? We've got found time here. Say that again?

MEMBER BERG: Could we start on the next topic?

CHAIRMAN DENARO: I don't know. I'm asking the guy who's going to run the next topic.

VICE CHAIRMAN KLEIN: We could possibly get started on the next topic. In terms of, okay, so we've got this one deliverable almost wrapped up. It's clear our deliverable schedule. There's really no crafting of deliverable schedules between now and March, right? We could start.

MEMBER MCCORMICK: We have a number of topics that we're going to weigh in on. This is one of them.

CHAIRMAN DENARO: Are you talking about in the recommendations?

MEMBER MCCORMICK: The
recommendations from the last meeting and this one. Maybe it would be good to just kind of whiteboard what these are so we know where we're going. Because there's going to be a bit of work after this to get down all the language and then all the socializing and the background and everything else.

CHAIRMAN DENARO: Okay. The process that we were aiming at for tomorrow, and I'm not disagreeing with you, but the process we're aiming at tomorrow was the subcommittees being the source of all things go away, come with their recommendations, their strawman recommendations, and then we as a Committee spend all of tomorrow afternoon weighing in and changing that.

Having said that, one thing that your suggestion helps with is I worry about our subcommittees because I see certain individuals in this room that it would be beneficial to clone and have them on three different breakouts.
And so in reality what's going to happen is those individuals are going to have to choose where they go and therefore this other subcommittee will not have the benefit of their involvement. So maybe there is some value to what you're suggesting in terms of kind of surveying where we are there.

I'm just thinking out loud here. Maybe that's a good idea because that would be input then to the subcommittees to go take away. We can kind of assign them where do you belong.

MEMBER MCCORMICK: And so we'll know what it is that we're putting together.

CHAIRMAN DENARO: Yes. You want to do that?

MEMBER MCCORMICK: Hans?

VICE CHAIRMAN KLEIN: Yes.

Sorry.

CHAIRMAN DENARO: Okay. So he's suggesting that we kind of list the issues.

VICE CHAIRMAN KLEIN: Yes, the
deliverables.

CHAIRMAN DENARO: Okay.

MEMBER WEBB: That would be what we're expecting of each subcommittee.

CHAIRMAN DENARO: So when we break out, yes. Okay, good. Can I ask for a volunteer? Well, I'm going to tune out and do my little assignment here so you guys are in charge.

MEMBER MCCORMICK: How do you want to characterize what we just went over? Rulemaking? See if we can get consensus on rulemaking, the V2V, V2I for commercial vehicles.

MEMBER BERG: Do you remember what the other Scott said about maybe not commercial vehicles or transit per se but those that are opportunistic?

MEMBER MCCORMICK: Okay.

MEMBER BERG: I kind of like that approach.

MEMBER MCCORMICK: My only issue
with that is that, okay, we can do that but we ought to at least specify in there what those opportunities are. I don't want it to be too nebulous.

MEMBER HAMMOND: Such as. No, but we could say "such as."

MEMBER MCCORMICK: You could do it for transit vehicles. You could do it for the gateway cities type project which is the commercial vehicle to freight to ship freight. I mean there's a whole bunch of things. If we just say we ought to be opportunistic it's kind of like saying we ought to groove well or something. It doesn't carry any meaning to it. If we can't keep consensus that's fine too.

VICE CHAIRMAN KLEIN: I just want to emphasize that a lot of apps, a lot of applications and function of time, if you look at them closely it's not clear they need DSRC. DSRC is a super useful, powerful technology for our main application
which is total vehicle safety. But then you say, okay, plus give me some of these other ones. And so many of the other ones, there's a risk that I could actually show have a better opportunity. That's a very big challenge. We must not overlook or diminish that challenge. So many of the other apps seem able to implemented on another network.

MEMBER BERG: I am to the point that if that's the case then why aren't they there? Why are they on some list and not in someone's phone?

VICE CHAIRMAN KLEIN: There are development -- actually, I would guess that many of them are there and they're not using them would be one of my responses. It certainly applies to me.

But it's a challenge that's going to hit us hard which is the identifying those apps that are high benefit. We've got high benefit, et cetera, et cetera, only those in DSRC. Now we're looking for those short-
term, intermediate, incremental apps that also only run on DSRC. And a list -- I mean we should just have it instead of having demos of it.

MEMBER CAPP: Or do these necessarily need to only exist on DSRC?

VICE CHAIRMAN KLEIN: Well, we're justifying DSRC.

MEMBER CAPP: It could.

VICE CHAIRMAN KLEIN: Yes. I mean you can do email on DSRC. But.

MEMBER MCCORMICK: I created this cube to kind of help people get their heads around the entire mobile space. And this is kind of the subset of vehicular space.

There's three verticals. You have safety, mobility and what we call commercial services.

Safety is entirely the purview of the automaker. They're the ones that incur the liability and so things that are defined as safety, there's no such big or soft
safety, there's safety. And that is entirely the responsibility of the automaker.

There is mobility which is the purview of the transportation departments. They're concerned about the macro flow of vehicles, goods and services. Whether that's at an event, at a disaster, at a game, or just 5 o'clock rush hour.

And then you have everything else that's vehicle, that's commercial services. Whether somebody is obviously paying for it or not, it's just a commercial service.

We look at the personal and actually there's a bigger chart that includes satellite and AM/FM and et cetera, et cetera. You're familiar.

But basically you've got cellular, the public Wi-Fi and then the DSRC flavor of Wi-Fi.

And then you have functionally three types of implementations. It can be a nomadic device. It can be an app or a device
can be embedded. And realistically the V2V safety stuff are those two blocks in this cube.

Yes, 4G might eventually have low enough latency. Yes, some other version of Wi-Fi might eventually have enough security. But that's where it fits right now.

Things like personal navigation devices are up here. So I mean, something that's kind of out there, stuff that's on your tablet or your app, you know, the accelerometer example that tells you where potholes that was mentioned, that's over here in the mobility and nomadic, in the cellular. So it's way back in the middle of this cube on the back end side.

So you take this -- we can move it all around and pretty much everything fits. And if you want to go into a larger scope and address all things mobile rather than just mobile vehicle stuff this whole aspect changes over here.
This whole aspect is now whether or not it collects data, whether or not it processes it, or whether or not it communicates it. That then allows, when you do it that way then the Nike monitor that communicates to your iPhone fits in a particular category there. The wireless medical devices that are capturing the blood pressure, pulse, or whatever fits in another element of it. And automotive is still down in one -- it's spread out over that entire mobile space.

So I think the gap initially, and you guys can tell me if you think I'm wrong, but this part of it which is the part we care about in terms of the aspects that are going forward in the DSRC bandwidth for the time being, that's when our research has been done, and I incorporate the after-market in terms of an improved after-market by an OEM. That's how I'll characterize it. I'm not saying any after-market device. GM is
working on their own after-market devices for example.

That's pretty much the space that we're trying to deal with. There's always other issues that are out there. When we start getting into V2I, okay, yes. Mobility can be all of these and all of these. It's that entire center plane.

MEMBER HAMMOND: But Scott, there's an infrastructure connection to the safety box following what you're calling that. So when you say in terms of V2V safety is --

MEMBER MCCORMICK: But it's not realtime. It has to be nearly realtime to actually be safety. Acting as a land-side infrastructure that's going to take and pass that information you may harvest, okay, there's an accident, whatever, is a mobility function.

MEMBER HAMMOND: But what if it's sending a signal that there is something --
well, like traffic signals I guess. They can be -- vehicle to infrastructure.

MEMBER MCCORMICK: Right. What if that one says the light's going to change in 10 seconds.

MEMBER HAMMOND: Right. Is that not --

MEMBER MCCORMICK: That's mobility aspect. I would offer that in almost every case that I can think of the institution of an act of safety doesn't require the intervention of the driver. It senses that there's an accident over the head and it pre-charges my brakes.

It may warn me, but there are too many scenarios where the time it takes for an operator to receive a warning and be sure that he's going to get it and react to it, you know, is just flat too long.

MEMBER HAMMOND: Right.

MEMBER MCCORMICK: I mean we know that 20 percent of the people don't do
anything when an idiot light comes on, or whatever you want to call it, a warning light for oil pressure, or whatever, oil temperature. Twenty percent of people do nothing. So relying upon the human aspect for safety at 70 miles an hour is dead.

And again, this is just how I use it to describe the environment to people outside. And they're people trying to figure out where their piece fits in here, or what protocol they ought to be exploring, you know, who they should be talking to. So it's a trade association tool if you will. It's not meant to be definitional to the environment.

But for our purposes when we talk V2V it's primarily been in this space, but it can include that one. Can it include the handset? No. The latency between the handset and the vehicle doesn't exist. But could mirror late possibly advance that? Probably not. It could bring in diagnostic
information but that's not safety.

VICE CHAIRMAN KLEIN: That's because a handset is not DSRC, right? A DSRC handset would --

MEMBER MCCORMICK: Actually there are DSRC handsets.

VICE CHAIRMAN KLEIN: And that would add latency.

MEMBER MCCORMICK: Correct. The Nokia-built 10,000.

VICE CHAIRMAN KLEIN: So you could -- for instance you could have, forget about cost right now, but if you had DSRC -- if people, all of our phones were DSRC phones then we might be safer in testing a crosswalk.

MEMBER MCCORMICK: Well, and here's the actual reality of the physics behind that. The DSRC modules Nokia put in would communicate through mirror lake. So we're going to harvest information, use that as a passing transceiver to see if we don't
really need to upgrade the electronics every
year because I'm upgrading my phone every
year.

However, the purpose of that was
to capture information and send it off-
vehicle for diagnostics, for weather, for
local issues, for mobility and commercial
services. It wasn't put in for safety.

And the reason it can't be is
because of the liability. How would GM be
able to say yes, we can communicate with
Motorola, Nokia, Samsung phones yada yada and
it fails for some reason. They have no
control over the quality of that service.
They have no control over the testing or the
implementation of that. That has to be up
here primarily in commercial services even
though it may use that communication
protocol. If the bandwidth was available.

Safety, the key safety gurus on
the planet are here. Tell me that that's not
something that's only owned by the automakers
and is entirely your area of liability.

VICE CHAIRMAN KLEIN: So safety app, you take the applications. Not only are they more technologically demanding because they have to be really fast, but they're legally more dangerous because if you make a claim of safety you can be held to it as vehicle liability.

The safety area is both the driver of DSRC, the safety commands very little agency. And safety is a bit of a hodge-podge application area because of that.

MEMBER MCCORMICK: If I'm going to make a claim, if I'm an automaker and I'm going to make a claim that I'm using DSRC, right. If because of other reasons, it might be interference, if because of even not malicious, just bad programming, something doesn't occur, I didn't get the signal.

When you get a safety warning, okay, or a safety signal coming through somewhere the only thing that you know is
that something is being detected. You don't really know if there's something wrong. Because until everyone is communicating, until it's 100 percent reliable, or at least by the mass of players that you have, the mass of actors that you have on the field you never really know if you're safe. We only really know when somebody else -- some other thing can tell you you're not safe.

And so -- and ask yourself this.

Do I want to use lane departure cameras to determine whether or not I move into that lane or do I want to use a proximity sensor? Or do I want the other car to tell me? Well, once I know that other car has got it and it works, right, that incurs much larger liability than if I just encapsulate that in my vehicle. And actually I can do that much cheaper if there were lane departure cameras. China pulled 300,000 for somebody at six bucks apiece. And that's hard-wired into vehicles.
MEMBER KENNER: So let me just say just a couple of things. And again, John, feel free.

When we think about safety in the aggregate a lot of us use the Haddon matrix where we then talk about driver behavior, the vehicle technology and then the infrastructure. And then the other axis is, you know, pre-crash, crash and then post crash. So that's kind of the window we kind of look at these things.

And so while we're talking about wanting to put the technology to have the ability to communicate in our vehicles. And we are working on certain applications together that the automakers have agreed on.

We would certainly want to be in a position to say, you know, we're going to talk about the technology as being something that has to go into cars, but not necessarily the specific applications. You know, continue having the automakers agree on what the acts
are.

So when I talk about narrow versus broad focus there's an element of that where we would prefer the narrow focus that says, you know, put this technology in and that will be the enabler then for us to develop these things as an industry, right, that we're already doing together through CAMP.

The other part that you mentioned in there that I just want to point out is that all of the particular applications we're doing right now are in fact warning systems. None of them are automated.

And that's really important because depending on the state of the technology and everything we just want to make sure that whatever we automate, it becomes satisfying to the customers and doesn't become something that would cause them to be averse to the technology or give it a bad reputation. We want people to want
this technology, hear good things about it, and not that, wow, my car did something and I didn't want it to do that thing. It wasn't smart enough to do what I wanted it to do. So there's an element there.

So when we talk about it at 70 miles an hour, the way -- all the effort we have right now is that you get a forward collision warning and you're going 70 miles an hour, we're going to expect you to do something as the driver. So that, just to be clear. So that's an important element of it.

And then the other part of it is, yes, there's the liability part of it, but the way we do it needs to also be consistent with not having to have discussions with the other part of NHTSA which is the enforcement part that would say that whoa, you know what? The way you did this is maybe an unreasonable risk to motor vehicle safety relative to how you specifically implemented it. So we all have a shared interest in
making sure that that's the case as well.

There may not -- there's always some level of liability for everything we do. We get sued for not inventing it, we get sued for not rolling it out immediately on 5 million vehicles, and then we get sued because we did put it on the vehicles. So there's a certain element of that that's there.

And it's going to be a different environment as some of the plaintiffs' attorneys start looking at other people with deeper pockets. So I sincerely think that some of this, there will be an element that someone's going to figure out that may change the landscape. But the involvement of the automakers will not be changed.

It's not like we'll transfer it to somebody else. But I think maybe others may become a part of this more complicated system as we're depending on communications and especially to the extent that the
communications are, you know, let's say interfered with.

And in spite of what you said there, you know, if we were driving by a Starbucks and then the Wi-Fi from Starbucks in a shared spectrum scenario let's just say interferes with the signal and you didn't get it. You didn't get the warning and then you got into an accident, you know, someone would suggest that that interference was not anything to do with the automaker and it was something else which is why that first discussion we had is kind of important and has broad implications as well.

So I wanted to at least make a couple of those comments. John, I wasn't sure if there was any other thing?

MR. BELCHER: Could I just get one clarification? So right now as you think about this you're doing warning signals.

MEMBER KENNER: Right.

MR. BELCHER: But it's possible
that the OEMs will approach that in different ways in providing that warning. And some may in fact provide active intervention.

MEMBER KENNER: Well, we wouldn't -- I agree. We don't want that regulation.

MR. BELCHER: No, exactly, that's my point.

MEMBER KENNER: If you've done the demo of the vehicles you can see that we have radically different warning strategies.

Now, I know that the agency is working on a distracted driving guideline for the warning strategies, right, that will come out consistent with the distracted driving guidelines they have already published. They're going to move into what are the appropriate guidelines for these new technologies which is very important. So that's going to come.

But we would want the right to choose, you know, to say if I have a
completely different than GM warning system but consistent with the guidelines that should be okay. I wouldn't want it to be everyone has to have a particular exact warning.

And if someone said, you know what? I feel really good about my technology and I don't think I'm getting nuisance braking, for example, or nuisance steering if you move onto other applications. And so if some automakers choose to do that, great.

The other thing I would suggest is that I don't think there's any scenario that I can envision for any of the automakers where we would say we would use the vehicle-to-vehicle communication as a means to then not need any sort of camera/radar/LIDAR systems. We'll have to have some level of arbitration that says, hmm, if they both tell me something bad is happening, good. Do something about it. Warn them or do whatever.
There might be some others that we would expect where the vehicle-to-vehicle would say to do something that the other sensors don't warn you about because they can't.

And so I don't expect this to be something where you would see us abandon the need for radars and cameras or fused sensing systems in our vehicles and exclusively rely on nothing but the vehicle-to-vehicle communication DSRC. Because there's other things we do with that stuff as well.

So I see them as, again, working sort of together in harmony, in some cases having an arbitration between them that needs to be developed.

But again, it would be the automakers themselves that would decide what level of warning or intervention we would provide and then how it works together with the other technologies that we've already embedded in our vehicles. So hopefully that
kind of explains it a little more.

CHAIRMAN DENARO: That's what I was saying earlier when I said with having two dissimilar systems like that really increases fault tolerance. I mean we're talking about safety of life. And then especially if you get to automatic emergency braking or things like that you guys have got to be worried about sensor failure and that sort of thing.

MEMBER KENNER: We do.

CHAIRMAN DENARO: And having an extra layer of redundancy is huge.

MEMBER CAPP: The vehicle-level apps will have to design to work reliably or getting sued which is possible to make sure people like them, all those kinds of things.

CHAIRMAN DENARO: Yes.

MEMBER CAPP: We ought to take advantage of this technology. It's going to be a baseline level of a sensor for the masses when it gets out there. We'll start
with a warning stop. We'll integrate it into the vehicle and take as much advantage of it as possible.

Can't start any of that process, can't design any of it in if we don't get some basic framework set up about how is this thing going to work in a secure way so that I know. Because this algorithm is out of my control. I can't make sure that the person driving the Ford vehicle is a bad actor. I can't control that. So this is why we do this high-level thing.

MEMBER KIRBY: If I could just ask a question to the manufacturers. You're going to compete on some of these things, and do things differently and try to appeal to your consumers and so on. But to what degree is there a sense that there needs to be some standardization for the person that goes from one vehicle to another?

For example, just in the last week I've rented two cars. I've rented a
Ford Fusion and a few days later I had a Chevy Impala. I get in the Ford Fusion. I can't find the foot brake. I look down there, I crawled under there, there's no foot brake. I find a little button on the console which is the brake.

MEMBER KENNER: You mean parking brake.

MEMBER KIRBY: Parking brake.

MEMBER KENNER: Just to be clear.

MEMBER KIRBY: That's right.

(Laughter)

MEMBER KENNER: This is public, so.

MEMBER KIRBY: You guys took it away.

MEMBER KENNER: Parking brake.

MEMBER KIRBY: I had to pull off the road for 5 to 10 minutes to find that damn thing because I wasn't sure if it was on or not, whatever.

A couple of days later I get into
a Chevy Impala and there sure enough was the brake like we used to make. I put my foot and there it was.

You know, that's kind of -- people rent cars, moving from one place to another, get into a vehicle, you know, that they're not used to which can happen at any time. There's a certain degree -- and if these signals are different, coming from different places, making different sounds, meaning different things, you know, that could be a little problem.

MEMBER KENNER: Well, so let me tell you that we all recognize that. We in discussions with the agency, they recognize that. So I would say that if it was a parking brake that is something that you would want to set when you park your vehicle on a hill or something like that is a little different scenario.

But let's take something just hypothetically. If you have a forward
collision warning system and in one vehicle warned you by tugging on your seatbelt and then the next one warned you by projecting red lights into the heads up display in the windshield, but in both cases we're expecting the driver to rapidly apply his brakes that have already been pre-charged. So in other words, two different inputs that are really requesting the same driver response. I think your concern is valid.

And I think part of the guidelines and some of the discussions we have are aligned with, well geez, how can we still retain some level of flexibility for automakers to have their own DNA if you will but to be able to make sure that where the driver's in the loop and is expected to do something we're communicating that in a way that would maximize the potential that the driver would react as we want them to.

And I know in some cases -- I'll just say we've shared with the agency, for
example, the research that we did when we came up with the HMI for our forward collision warning system. We did a lot of research and driving simulators and other things that we feel was very compelling as to why we have it in there, why the lights are where they are, why they go in the direction they go and so forth.

It wasn't something that was just arbitrary, it was something very deliberate that a lot of work was done. And so we wanted to share that research with the agency so that we could say we think this is very effective and here's why. And we compared it against a bunch of other alternatives.

And so that kind of discussion is ongoing. And it is a concern that I think we all share as the proliferation of these technologies continues. And if we only had a forward collision warning system it wouldn't be as complicated as, okay, so now you have a blind spot warning. You have a lane-keeping
assist. And if they're all doing different things even inside one OEM you might confuse the customer if it's not intuitive. And then you have multiple technologies with multiple warnings and they're all different between automakers. So we certainly understand that and we're working on having that discussion.

And I don't know if you want to say anything else. But it's a valid concern. And it's something.

MEMBER KIRBY: For the moment it's all sort of voluntary, or it's just individual market decisions you guys make? Or do you coordinate on some of those things?

MEMBER CAPP: There's some work going on in SAE and places like that on standards, standardizing some things. But even the one you mentioned --

MEMBER KIRBY: Parking brake.

MEMBER CAPP: We have different locations. Some of our vehicles have the button because it's an electrified park brake
system versus the pedal versus the hand brake. I don't know that it's clear that those have safety implications.

Some of our vehicles have -- our wipers stop on the left side and some on the right side. Drives me nuts because I get in different vehicles a lot. But I don't know that that has safety implications. You might choose to like it.

So the agency regulates some control and display information. There's icons and locations of things. Some things are regulated. They're taking a look at are there other of new active safety, crash avoidance technologies that should be standardized or not.

But the automatic answer isn't necessarily yes. It's a function of a lot of driver behavior studies and human factors. All right, I give you this feature, I ask you to respond, do I get the response that I want, or does it result in a poor response.
Do you do something that's not in the interest of safety.

MEMBER KIRBY: Yes. And you may not know either. Because you could very well develop conflicting information on different vehicles.

MEMBER CAPP: We did quite a bit of research though before bringing these features out. Not to say that mistakes can't be made and you can't improve on them, but none of us at least are getting an idea on a Monday and then putting a new feature in production on a Friday I can assure you of that.

(Laughter)

MEMBER CAPP: I wish our business could go that fast.

MEMBER KENNER: My proposal was to have the agency require everyone to have a Ford vehicle in their driveway.

(Laughter)

MEMBER CAPP: Are you sure they'd
all be the same though?

(Laughter)

MEMBER KENNER: It adds a consistency.

MEMBER MCCORMICK: As long as you're providing them I'm good with that.

MEMBER KENNER: We'll make some more.

VICE CHAIRMAN KLEIN: So you can see it as an official safety issue that the NHTSA has gotten into, the standardization.

MEMBER CAPP: We're studying which aspects of these features would that be important for and which ones not. Because every feature on a car, it's not an automatic given that it has to be the same for it to be safe.

VICE CHAIRMAN KLEIN: The interface. All information technology, the standardization at the interface is one of the biggest issues which is why we have Windows and why we have Apple, small
MEMBER MCCORMICK: But even with that you have to be careful because in terms of SAE studies, one of them is they did voice technology. And when you're in a vehicle I think there was something like 22 different audio profiles depending on where you're sitting, what kind of road you're on, weather conditions, et cetera.

And as part of the whole design of the human-machine interface that each automaker has constructed -- some want certain commands to be voice because their demographic is comfortable with that, or an audio signal, or a light signal. And a light signal, there's very few of them that are actually standard. You know, engine temperature, fuel gauge, there's very few of those.

All the other warning lights that come out are really characterized around what's the look and feel that I have. What's
the method so that when you get in a car that
you're familiar with driving it makes a lot
of sense.

When you get in a car that you
rent, if it's not the model you rent it's
kind of, well, this doesn't make sense. Why
would they put it here? It's kind of like a
mattress for 30 days. You get used to it.

And they expand it across their
brands because that works. So there's never
going to be exact commonality. So if you
require it it might put an unreasonable
requirement on one automaker to change an HMI
feature that now doesn't work with the rest
of their human-machine interface, or doesn't
work as well.

MEMBER KENNER: But I would
suggest, as Nate said, there's been work
done. There's been a lot of dialogue and
good discussions. And certainly when you get
the warning you would want to get the right
response and you wouldn't want the warning,
for example, to be something that would further distract the person and then not have them respond in an appropriate way.

So not to disparage any of the systems out there, but one of the reasons why we have the one where it reflects in the windshield is because then you're still looking ahead as you get the warning.

If, for example, we had a warning where there was a red button in the center console that you would have to look down to look at and then see, oh geez, it's a picture of two cars hitting each other.

(Laughter)

MEMBER KENNER: So there's differences there. So I think a lot of -- so the notion that we want to be able to get the right behavior, not distract them, but in fact enable them to continue looking ahead and having their hands on the wheel when they did the appropriate response would be something that probably most people would
agree to.

And so as these are being developed I think you're going to see some level of harmonization that then hopefully still allows us to have the ability to generate a DNA that we all think is specific to the automaker.

MEMBER KIRBY: The reality is even if you're in your own vehicle, I mean there could be an unlikely event that occurs that sends a signal that you haven't seen before.

MEMBER KENNER: Right, right.

MEMBER KIRBY: So when that signal goes off you better know exactly what it is and what to do. No matter what vehicle you're in, right?

MEMBER KENNER: Yes.

MEMBER CAPP: It's a function of natural human behavior. A lot of human factors study, a lot of behavioral research on how do people respond. Because none of
these crash avoidance features -- it's different than how your radio works. The other cases are intended to be something you have to think about when it happens. A really well-designed system, you react intuitively. If it's hot, you move your finger. You didn't think about it. If it's well designed you need to do that. Does that need to be regulated to have that happen? It might be to have some features. But that's what needs to be looked at.

But you know, the regulation need to meet a need for motor vehicle safety, not a desire for commonality.

MR. KENNER: But in that case the approach of a guideline is an interesting approach as the first method of doing it. And maybe over time some of those things will become regulatory. Like some of the other display stuff are already in vehicles.

But I think it's a good approach and it allows us to get a lot of the
information, research, and have that dialogue without being in sort of a formal rulemaking process we were talking about before. So it's going on. But it's a great point, it's a valid one. And it also allowed us to then just talk a little bit about the context and some of the specific issues that were mentioned so far.

MEMBER KISSINGER: I just want to make two points. One, it is a big, complicated issue. And you can look at the proactive technologies that are out there right now and you can, like lane departure warning. There are systems that make you look down, your eyes off the windscreen, down at the dashboard. So I'm not saying they're not sensitive to it, there's not a lot of research, but it's a big issue now and it's going to be a bigger issue as we go forward.

On the bigger rulemaking thing, I have a hard time -- I mean I am sensitive to what you said and I'm basically supportive of
it. I have a hard time believing that NHTSA is going to preclude the possibility that at any point in the future they may determine that one of these proactive technologies that right now is voluntary should become mandatory.

And that at some point in the future that in this Connected vehicle space that at some point in the future they may decide some piece of it should be mandatory as well.

MEMBER CAPP: I don't think I said anything to preclude that.

CHAIRMAN DENARO: For my edification, what -- I don't know how far they want to make this. I mean, they need to comply, the vehicles that operate on the roads it needs to comply, or how does that work?

MR. BEUSE: In the U.S.?

CHAIRMAN DENARO: Yes. So what's the right -- I mean what if a vehicle is sold
in the U.S. that does not comply?

MR. BEUSE: You guys can explain it better than I can. That's an uncomfortable conversation and usually big fines involved.

MR. KENNER: That would be against the law and would violate the Motor Vehicle Safety Act from 1966.

CHAIRMAN DENARO: So if I'm a China dealer who wants to bring in a car, or SAIC or somebody, you know, wants to bring in a car, they've got a book they need to study on all the things that are necessary to comply.

MR. KENNER: So the FMDSS standards that apply that NHTSA then develops, they came all out of the Safety Act and are what you have to do. And then, so you would in essence have safety noncompliance with basically a federal standard.

And that -- if you know, if you
knowingly intend to distribute vehicles for sale and delivery to customers with that, that would be considered to be illegal activity.

CHAIRMAN DENARO: Okay. I just wanted to clarify that.

MR. KENNER: And I don't think there's any of the foreign automakers that are headquartered and based outside of the U.S. that sell vehicles here that are unaware of that.

CHAIRMAN DENARO: But it does help explain why you see some car, say in Europe or whatever that are not over here. And you ask why and that may actually -- they haven't bit the bullet yet to meet all the requirements.

MEMBER CAPP: Yes. All of the -- when you sell in different regions it gets really complicated. I mean one of the mantras we all make is, boy, wouldn't it be great to have all these rules harmonized.
CHAIRMAN DENARO: Harmonized, yes.

MEMBER CAPP: You could just put the vehicle on the boat and ship it to Europe, this and that. The reality of it is any vehicle going to a different region has to have some amount of change involved in it.

VICE CHAIRMAN KLEIN: Regionalization we call that.

MEMBER CAPP: Tons of logistics. But you need to comply with every country's rules.

MR. KENNER: So if you had to spend, you know, millions of dollars to develop the specific technology that you would implement in a market where you had, you know, you were selling 300 vehicles, you would make the business decision probably that that wouldn't be worth it.

And then the other issue, especially if you're not manufacturing them, you have the risks of currency and all that
stuff that are just huge issues. That combination of it is you really need to do a robust business case to try and decide what to do.

And this would be no different. So those that send vehicles here that then would require to have the ability to communicate with other vehicles would have to decide what the most efficient way to implement that technology is on vehicles they want to send over here. This becomes another rationale behind individual differences for vehicles sold here that would cause them to not choose to send vehicles here.

CHAIRMAN DENARO: Right, right.

Okay.

MEMBER MCCORMICK: Didn't you have one on GPS or something your technology committee was working on?

CHAIRMAN DENARO: Yes, it was on positioning -- testing, positioning capability. Performance.
MEMBER MCCORMICK: Hans, did your group have?

VICE CHAIRMAN KLEIN: Me? On the implementation issues and -- I think that's really what we're talking about here. Talking about this.

MEMBER BERG: What does it mean?

VICE CHAIRMAN KLEIN: What does it mean? Getting -- right. Good question. It's actually, it's a good question because it's a really important question and we should have an answer to that, right? So yes, what is this implementation thing anyway?

It is getting the technology -- stop thinking of it as technology and getting it out there as a useful functions to users, to users, consumers, travelers, and so on. And that -- it almost requires us to think -- is that a different perspective and what kind of perspective is it. What's the difference between developing a technology that works
and developing something that people are widely adopting, paying their hard-earned money to use, or allocating their scarce budgets to purchase. Those are the issues that are in the pipeline, hopefully ever nearer but are big issues.

CHAIRMAN DENARO: Scott, I had another one.

MEMBER MCCORMICK: And we had the privacy one we brought up last time about taking those 24 actual regulations and basically cloning it, declaring it free because we're never going to get funds for all of it.

CHAIRMAN DENARO: I had another one that actually I'm going to bring to the subcommittee, but it's on -- I call it sensor integration.

MEMBER MCCORMICK: Sensor integration?

CHAIRMAN DENARO: Yes.

MEMBER MCCORMICK: Fusion or
integration?

    CHAIRMAN DENARO: Fusion.

    MEMBER STEENMAN: Are you covering like big data and all of that in there as well?

    MEMBER MCCORMICK: Well, I think --

    MEMBER STEENMAN: Or do you want them separately?

    MEMBER MCCORMICK: I think we should do that differently. Data is big based on the velocity, the value, the volume, or the variety, the four V's of what makes something big.

    And this issue on privacy was more one of the United States does not have any comprehensive personal data privacy law and all we have are these regulations that are very industry-specific. And basically were all cloned off of the very first one which is breaking. And so they're all very fundamentally the same. And they're all
guidelines. They're not mandatory. It all recommends industry oversight.

So the purpose here was just to say, suggest to JPO a way to look at those 24 guidelines, clone one of their own and put it out there. Because that at least gives them a starting point. Because we're never going to get a regulation on it.

I'm not sure -- in terms of the whole data, big data issue, I think that would cloud it here. You know, I mean by disrupting. You know, the test that Toyota was generating 15 gigabytes an hour when it drives.

The mass amount of the actual data versus the infinitesimally small amount of relevant data are two different things. I'm not sure what the recommendation or the purpose of a recommendation on the data would be, other than the privacy aspect.

CHAIRMAN DENARO: Are you talking about data sharing? Is that where you're
MEMBER STEENMAN: I'm not sure if there is an opportunity to increase the value of what we are doing in Connected vehicle where we can take better advantage of the data that comes from vehicles. This is something that the JPO and the DOT should spend more time on. Because it potentially significantly increases the integrity of it.

MEMBER MCCORMICK: We'll bring it up.

CHAIRMAN DENARO: There is some treatment of it in your plan, but I think there's some additional opportunities there.

MEMBER MCCORMICK: The whole issue is that every OEM has a different idea of what data is public, what data is private. So it's a question of really saying -- getting above that. Taking it to a higher level and scratching. That gets us away from saying you said that you could have this and you said you can't. So we don't have to
worry about that.

MR. BEUSE: I'm sorry. And some of the data sits on the DSM or?

MEMBER MCCORMICK: No. This is data that comes off V2V. What I'm saying, it doesn't have to be DSRC data. It could be any data being received or broadcast by any one of a number of different communication protocols.

MEMBER STEENMAN: But I think -- you referenced this, Dan. Right? I think one of the report-outs was that the data discussion got quite a bit of interest about privacy and other things like that, consumer privacy.

So that's kind of a big one. I mean as the OEs know our recent rulemaking just to put BDRs on the last like 2 percent of vehicles has generated significant amount of negative reaction from the privacy folks.

CHAIRMAN DENARO: There's all kinds of things. I agree.
MR. BEUSE: But I think it also brings up the issue of cybersecurity which you guys haven't put on your list, but that is one that's real when you start doing that. Especially if you want to enable more after-market deployment.

MEMBER MCCORMICK: Well actually we have that as part of this. We may end up separating it out as a secondary issue, but we actually address it in the work we did last time.

CHAIRMAN DENARO: What else do we have?

MEMBER MCCORMICK: Are there any others that we should just put on a parking lot when we do the breakouts?

CHAIRMAN DENARO: Yes. I mean, do we understand which subcommittees are doing which issues?

MEMBER MCCORMICK: We're in the overall Committee on this one.

CHAIRMAN DENARO: Okay.
MEMBER MCCORMICK: And the Security Subcommittee is doing that. Technology Subcommittee is doing that. We characterize -- duration subcommittee. Sensor fusion.

MEMBER STEENMAN: Technology.

MEMBER MCCORMICK: Okay. Data probably ought to be under that -- well, it ought to be the combined one I would think. Because there's two sides to the data. There's the data that's generated by private vehicles and there's data that's generated by public vehicles.

CHAIRMAN DENARO: Well, let's ask Ton what subcommittee he's going to break out in and put it in that one.

(Laughter)

MEMBER STEENMAN: I'm in the security one.

MEMBER MCCORMICK: Privacy. Privacy I think ought to be the overall Committee as well. But I mean, I don't know
that there's an individual. I think the other three are probably more focused.

CHAIRMAN DENARO: Well, what I'll suggest, all these really need to be vetted in the overall Committee. That's what this is all about. What I'm suggesting is I would like to get a strawman that we can all look at on the subcommittee. So just if -- even if arbitrarily stick it there, which some of these deals won't apply till we write it up and that way we've got something to talk to. Composing in realtime as a committee is not my favorite thing to do.

MEMBER MCCORMICK: Well, I was going to work on this one. I guess I'm going to plug that one in, since it's more technical.

CHAIRMAN DENARO: What does that say again?

MEMBER MCCORMICK: This is the --

CHAIRMAN DENARO: The privacy issue.
MEMBER MCCORMICK: We already had a presentation on it last time we were here. I just, I didn't get an opportunity to be on an airplane. So I'm not sure --

CHAIRMAN DENARO: Okay.

MEMBER MCCORMICK: Maybe we ought to do that as a combined security/technology committee.

CHAIRMAN DENARO: Okay.

MEMBER KIRBY: Could I suggest we put something up there about communicating to the larger public the benefits of this? Outreach. In terms they can understand. Hopefully point to some examples.

MEMBER MCCORMICK: Who's doing that?

MEMBER HAMMOND: We have a subcommittee. I'm on it.

MEMBER MCCORMICK: What are they called?

MEMBER HAMMOND: Communications I think.
MEMBER MCCORMICK:

Communications, okay.

MEMBER HAMMOND: Joe's on it.

MEMBER MCCORMICK: Yes, Kirk was on it I think.

MEMBER HAMMOND: Kirk is the chair.

MEMBER WEBB: He was the chair. Oh well. There's five or six of us on there.

MEMBER BERG: Kevin this morning gave a presentation on the emerging automated vehicles. Are we going to just park on that issue?

CHAIRMAN DENARO: I'm glad you brought that up. I had the same thought, that probably we should not park on that.

MEMBER BERG: Should we wait and focus it only on the relationship with connected autonomous -- or automated vehicles? CHAIRMAN DENARO: Well, so I am going to address it in that sensor fusion thing.
MEMBER BERG: Okay.

CHAIRMAN DENARO: That was one place, at least part of it can be addressed there.

MEMBER MCCORMICK: Okay. But I think it's a separate -- this would be a separate line item in the report.

CHAIRMAN DENARO: Yes. We can figure out -- okay. That's fine.

MEMBER MCCORMICK: Scott, you were on the Communication Committee was it called?

MR. BELCHER: Standards.

MEMBER MCCORMICK: You were Standards. Okay. We have one on standards we want to -- we need to talk about. We'll try to go over what the -- list of what things are.

MR. BELCHER: I think so.

MEMBER KIRBY: And our -- you have an implementation thing, right? Communicate that. So don't put it there.
MR. KENNER: Getting back to the autonomous vehicles though, I think there's -- we need to be careful from a scope perspective.

I think if we said that we support the notion that vehicle-to-vehicle communication can enhance the implementation of autonomous vehicles in the future, something like that, I think that's helpful and that the agency should recognize that relationship or something is fine. But I think we've got to be careful not to go all the way.

CHAIRMAN DENARO: Yes. We really haven't had, you know, we're reviewing everything that JPO does and frankly we're even stepping outside the JPO. But, so automation could be on our plate. And to your point, we haven't had any discussion on that and so forth.

MR. KENNER: Right.

CHAIRMAN DENARO: So --
MEMBER MCCORMICK: And not really

CHAIRMAN DENARO: It's probably
not appropriate for us to go through all of
that.

MR. KENNER: Yes. Just
technology --

CHAIRMAN DENARO: And that's why
I'm sensitive to the fact, as I told Kevin I
was glad he brought that up because that's
precisely -- I actually already wrote a
recommendation that kind of says what he was
saying and goes a little bit further.
Anything beyond that I'm not sure what else
to say. So we'll have to discuss that and
see if we get anything else.

VICE CHAIRMAN KLEIN: Let's hold
on to your communication on that.
Communication on the one hand is how do we
tell the world about the program. But
communications, another word that comes under
communications which we talked about last
time, nomenclature. It is really hard even among the experts, what is an autonomous vehicle as opposed to an automated vehicle, as opposed to a driver-less vehicle.

What exactly is vehicle-to-vehicle communication? Is it a generic capability? Is it a specific application? What's a connected vehicle?

And this goes beyond telling the world. This is actually a very profound issue in the program that is a little bit worrisome.

MR. KENNER: Recommended is exactly it. So I think we should include a recommendation to use clear definitions. And I do think that when Greg mentioned that they're going to be more precise in the communication and say vehicle-to-vehicle and vehicle-to-infrastructure, you know, I think that's really helpful to be more precise. But it has to start with definitions.

And if you have all these
definitions then you can make sure you use
the correct term depending on the intent of
your communication. So I absolutely agree,
the recommendation and what I was suggesting
there about being very -- develop clear
definitions of what these things are. And
what's the difference between a connected
vehicle and vehicle-to-vehicle communication
--

VICE CHAIRMAN KLEIN: Almost to
the level of a strategic plan. I think this
would be actually quite appropriate at the
level of the strategic plan to make sure that
the program really, really knows what the
elements are.

MR. KENNER: Yes. The one thing
I had mentioned to some folks was I had the
opportunity to testify in front of the
Michigan Senate when they were considering
autonomous driving legislation. And it was
crystal clear to me that the fine group of
gentlemen before me did not understand the
difference between vehicle-to-vehicle communication and autonomous vehicles. They just didn't know.

And I'm not criticizing them. I think they're representative of the majority of policymakers and the general public. And so that's --

VICE CHAIRMAN KLEIN: Even the engineering community. When you say vehicle-to-vehicle communications, I'm not sure -- what is it. When I call up Bob on my cell phone and we're both driving, is that?

MR. KENNER: I agree, there's a broad distribution of understanding even inside the engineering community, even inside the engineering community that is in the auto industry. I agree.

MEMBER KIRBY: I've had some experience testifying before the District of Columbia City Council and same exact thing. And this is critical because this is out in the public domain. And people are thinking
about writing laws about it. And if we cannot communicate what we're talking about it can really hurt the long-term prospects.

MEMBER MCCORMICK: There are two elements in that. One is a definition of something concrete versus saying for the purpose of what NHTSA is doing next we define the connected vehicle as this.

Because to Steve's point earlier, the definition of connected vehicle has evolved and become refined. And in some uses may be very niche in terms of what they're doing.

You talk to the FM broadcast people and they go we're connected to vehicles because we broadcast to them. And it's like well, the term means -- it's defined as being by direction.

MEMBER CAPP: It's got to be in the context of something.

MEMBER MCCORMICK: So it's in the context of something.
MEMBER CAPP: -- some program. You have to have some context. We're not rewriting Webster here.

MEMBER MCCORMICK: Right. I don't want to define what the word is for the world. I want them to provide a definition for their publications, for their use. Because other users will have other definitions and we don't want to get into a contest over what it really means. We just want to provide a clarity to the information that gets published. From that source, whatever that source is.

VICE CHAIRMAN KLEIN: Let me follow up on that. I'm sorry, Steve. I think one thing that would be really useful is the open standards interconnect layered model for computer networks which sheds a lot of light on what's at the application level, what's at the connection level, what's at the media level.

Because once you realize that
when you're talking about DSRC or you're talking about safety those are clearly separable and it's a very well established conceptual model for understanding how networks are engineered. And it really allows you to understand some of the issues that we get into here.

So vehicle-to-vehicle communication, if there's a generic capacity for two vehicles to connect to each other that's at a low level and you get into is there a wire run between them. Is it certain frequencies and so on. It's completely different than an issue of, hey, is this going to improve safety in the vehicle.

So by what we sometimes say, you know, DSRC, it's that safety technology. Absolutely not true. DSRC is not a safety technology. DSRC is merely a generic communication technology upon which certain applications run.

And this fundamental conceptual
understanding, I'm not saying it's going to solve the issues but it will allow us to discuss the issues and understand them a lot better if we get clear on them.

MEMBER MCCORMICK: I kind of disagree with you. I don't think this Committee collectively has the capacity to provide that level of definition or to even recommend that.

VICE CHAIRMAN KLEIN: Not the Committee but the JPO or the strategic plan might want to reference this.

MEMBER MCCORMICK: Well, not --

VICE CHAIRMAN KLEIN: -- cars but essentially we're dealing with networks.

MEMBER MCCORMICK: I'm not faulting the talents of the JPO.

VICE CHAIRMAN KLEIN: Certainly.

MEMBER MCCORMICK: But that body is not technically capable to do that. The OEMs bodies that are doing it now, the standards bodies that are doing it now,
that's who they should go get the definition from, from all of the technical expertises that are there. Or at least be involved with understanding where they're going before they come up with a new definition. We've seen that in the past and it's never worked well.

CHAIRMAN DENARO: Okay, we are at -- it's after 12. Lunch has been clinking away behind me for 15 minutes. It's now ready. So I recommend we take our hour for lunch right now.

After lunch I have the draft NHTSA letter that we'll take a look at and decide. And then we'll get into discussion of Hans' discussion, deployment initiatives, and then after the break into the strategic plan update. All right? Yes, let's all be back at 1.

(Whereupon, the foregoing matter went off the record at 12:02 p.m. and went back on the record at 1:07 p.m.)

CHAIRMAN DENARO: Okay, so we'll
reconvene now. I think we've got almost everybody back. Maybe not.

At your place each of you got a copy of this letter that we discussed this morning. The only changes or edits that I agree to do is in the second sentence in the second paragraph where we bring the accelerate and complete the technical and policy research. And then the particular wording of the fourth short paragraph there in italics. So I'm looking for either additional wordsmithing or good to go. So last call.

MEMBER SCHROMSKY: I was going to say so paragraph 5, should that be two sentences or just one long sentence?

CHAIRMAN DENARO: Well, good question. It's a long sentence.

MEMBER SCHROMSKY: I saw where it said system. My guess is it repeats in two different sections.

MEMBER MCCORMICK: I would put a
period after system. Just say this leverages the years of research development.

MEMBER CAPP: You left the "therefore" statement in there.

CHAIRMAN DENARO: I'm sorry?

MEMBER CAPP: I thought we had talked about the italics phrase changing.

CHAIRMAN DENARO: The "therefore" was taken off of the part that was moved up to the second paragraph. The "therefore" in the italics refers to the previous paragraph that says the other two approaches are voluntary by nature. Therefore we urge, you know.

MEMBER CAPP: -- believes it offers the most promising approach. Okay, I thought that that was going to replace the "therefore" statement. That's the way I understood it.

CHAIRMAN DENARO: Okay. My understanding is that we're keeping that because we still want to say, the point is we
still want to say --

MEMBER CAPP: That's fine.

CHAIRMAN DENARO: -- proceed with the rulemaking process. And then -- but we want to get the point in about accelerating completing technology and policy research.

MEMBER CAPP: I would just change process.


MEMBER KISSINGER: Hey Bob? In the first sentence of the third paragraph we, the mandatory one. Is that a NHTSA term?

CHAIRMAN DENARO: I don't know where I got that. I know that's used. I don't know if that's a European term.

MEMBER CAPP: That's more of a European term.

CHAIRMAN DENARO: Is it?

MEMBER CAPP: NHTSA doesn't specify fit in grades anyway. If they regulate it it applies to -- sometimes the
rollout to get to 100 percent might phase in over a period of years or something.

CHAIRMAN DENARO: So what's a better word or way to say rulemaking for mandatory fit? Mandatory deployment?

MEMBER CAPP: You could just say mandatory.

CHAIRMAN DENARO: Mandatory rulemaking?

MEMBER CAPP: Just rulemaking, or mandatory -- where are you?

CHAIRMAN DENARO: It's the third paragraph, first sentence.

MEMBER CAPP: Oh yes. That works as it's written. That works.

CHAIRMAN DENARO: Okay.

MEMBER CAPP: It's fine.

CHAIRMAN DENARO: So are we good? All right. I'm going to take that and run. Thank you for your help on this.

DISCUSSION OF DEPLOYMENT INCENTIVES REPORT

VICE CHAIRMAN KLEIN: Okay,
ladies and gentlemen. Let's move onto deployment.

You can see that some of your ideas from the recent discussions have been incorporated in some of these slides here. So I want to talk about the big issue of deployment. Deployment of what. Gets us back into those technologies we're talking about which I've characterized here as DSRC and a vehicle-to-vehicle collision warning because I'm struggling with the nomenclature a little bit as well here. So I'm going to talk about some of the issues surrounding deploying the technologies.

CHAIRMAN DENARO: And this -- can you step back for us --

VICE CHAIRMAN KLEIN: And talk about the --

CHAIRMAN DENARO: Can you tell us what this is -- what is going on?

VICE CHAIRMAN KLEIN: Okay, there is -- a little background here. There is a
legislative mandate to Department of Transportation to do a deployment incentives report. Coming from which? Was it -- I guess the last piece of legislation. And it talks about the need for a report on deployment incentives.

It is generally a small -- the requirement is not greatly enumerated. Gives with incentives. Goes with deployment. And I would say that it's, as I'll talk about here, it's also a little bit problematic looking at deployment because in order to really get into deployment, incentives for deployment, we have to get into what exactly it is that's being deployed, what positions are there.

I have somewhat on the basis of this morning's discussions shifted attention. There's not that much -- there's less on the incentives part right now and it's more of a general discussion on deployment. Scott.

MR. BELCHER: Hans, I may be
wrong but I thought that a provision in MAP-21 was about -- it was a deployment incentives program generally, not about Connected vehicle.

VICE CHAIRMAN KLEIN: I would link it somewhat to -- you probably know the language better than me. I pulled the language actually from our minutes here from the last meeting.

MR. BELCHER: Yes, I just -- I didn't get the reference. Even if it is DSRC related, at some point can we talk about deployment more generally? Because we have spent most of the meeting on Connected vehicle which is -- I mean I realize it's the biggest program they've got, but there is this whole other world out there.

VICE CHAIRMAN KLEIN: No, that's fine. I have, in fact, made a great deal of effort to focus it on Connected vehicle which perhaps is -- your point is well taken. But I will focus on Connected vehicle here.
Roger earlier said what is this implementation deployment. It goes by lots of different names. Adoption, implementation, use. I'm sure there's a dozen others out there. People actually using the technology. It gets put out into the field and it's implemented and its benefits are being reaped and so on and so forth.

Now, deployment in general has some prerequisites. If you don't meet the prerequisites it's hard to talk about some of the deployment issues.

One is that the technology exists. And part of the discussion today has concerned that. The technology exists, i.e., the standards are set, the development is completed, it works functionally, it's showing -- the technology is showing benefits, and so on.

Without a clear identification of exactly the technology we're talking about it
raises some of the issues that are here. And clearly the challenge to JPO is that the technologies are not fully, particularly the DSRC and the vehicle-to-vehicle collision, are not fully identified, do not yet certainly work. They're still undergoing testing and field testing and so on. The benefits are still being shown.

I hasten to add that this is normal for early stage -- anyone doing technology development, this is normal for early to medium stage. But it does make the discussion of deployment somewhat difficult.

It's striking that we're still talking about technology issues here, right? So in some ways the program we're looking at is a little unusual in that we're simultaneously looking at fundamental technology development, what's the security of the network, how will certificates be managed and designed. And then we're simultaneously talking about deployment as
well. It's fine to do that but the deployment conversation will steadily increase over time as the technology is defined.

The technologies in question, this thing has continuously given me certainly difficulty in the program. I talked about this a little while ago. It comes up and heavily influences deployment concerns.

What are we talking about? What are the technologies here? Scott, your point. We're talking about broadly -- in this presentation I'm talking about relatively focused. But even if we focus on what we call DSRC it's -- DSRC isn't quite what we're talking about.

Really we're not talking about one technology. At minimum we're talking about two technologies. We're talking about a network technology and about an application that rides on the network.
We're talking about the network that uses a technology called DSRC, dedicated short-range communications, and an application that rides on that network that gives a safety benefit. So which is what we as transportation people care about. We care about safety. This is not a networking community, it is a transportation community. It's at the application level that we find transportation functions taking place.

So we're talking about not one but two technologies here. And when we talk about deployment we're talking about deployment of two technologies.

And there's different dynamics of deployment for networks and applications. And unpacking them gives us a little bit of -- it gives us I think some insights in here.

In general when we talk about networks and applications -- network technology generally they always come in pairs like this. You have a network and you
have the application.

    The network is just connectivity.

    It's just getting bits from what point to another point. We talk about Wi-Fi, cellular, ethernet, DSRC, that these are the famous types. They are fascinating technologically. Their function is actually not terribly interesting. They get bits from one spot to another spot.

    Those bits, they don't really in and of themselves help transportation. They don't help telephony necessarily. They don't help video unless you have the second part which is the application that uses the connectivity in order to do something useful. To do carrying voices, carrying video bits, carrying collision warning bits, carrying email bits, and so on.

    So you have applications and networks are separate and they have quite different dynamics. They even have different industries quite often. And they have
different applications. The networks and applications come together to some degree when different applications have different needs. Some applications need a lot of bandwidth. When you run television, video over a network you better have a certain kind of network that can handle that kind of bandwidth. When you have an application that requires what we call low latency, very high speed, you better have a network that matches the needs of that application. So there's a certain amount that the challenge is to match the network to the application.

That is an essential aspect of the program of the DSRC project. And that is that the needs of the application can only be satisfied with a certain kind of underlying network. In fact, it can only be satisfied with a network that doesn't exist yet.

That's why Department of Transportation finds it in the unusual situation, somewhat unusual of getting into
the networking business and developing its very own kind of network which will have the characteristics suitable to the transportation application for safety.

So DSRC is a generic network capability for moving bits from A to B. It has some good characteristics. It's very fast which is what -- the whole reason we entered development. What has to be developed is to achieve that low latency. So it's a good underlying network for applications that need a lot of speed, i.e., safety applications between moving objects where a delay of a second can undermine the application.

This particular network technology has some bad characteristics as well. It uses valuable spectrum, 5.9 gigahertz. That's what it's running over. And it turns out that there's competition for that resource. So this particular kind of network design has good operational
characteristics but it gets you into competition with other people, particularly networking companies. That's a little bit unfortunate.

MEMBER STEENMAN: The 5.9 is arbitrary, right?

VICE CHAIRMAN KLEIN: I would hesitate to answer that -- I would turn to Raj on that one.

MEMBER MCCORMICK: There's 75 megahertz of frequency that's allocated between the 5.85 -- it's a network.

MEMBER STEENMAN: If you want to implement a fast, low-latency network that is good for this type of an application 5.9 is just an arbitrary number. You could design a low-latency very fast network that delivers all these capabilities at 5.2, correct?

VICE CHAIRMAN KLEIN: Yes. Exactly.

MEMBER STEENMAN: Or 6.3 gigahertz, whatever.
VICE CHAIRMAN KLEIN: Or if someday other generic network technologies go faster which might be improved with better engineering.

MEMBER STEENMAN: Could be.

VICE CHAIRMAN KLEIN: Then we might be able to drive our safety applications on a different kind of network. As long as it was fast. Right now that alternative DSRC doesn't exist.

MR. LEONARD: Ton, I'm not an expert in this field by any means but my understanding of why 5.9 was picked was not entirely arbitrary. It was at the time an unused and unvalued piece of the spectrum. It was the length of the wavelength was suitable for the kind of mobility application that was being looked at for DSRC and not in demand by anybody else. So there were certain characteristics of the wavelength that made it attractive specifically for the kind of connected vehicle application.
That's not to say it's the sole frequency that could be used for that, but at the time of selection it was -- it met all the criteria that were required at the time. So it wasn't entirely arbitrary.

MEMBER STEENMAN: No, it wasn't arbitrary. I meant that the number 5.9. There is no hard connection to the capability.

VICE CHAIRMAN KLEIN: Right. Well, I think if you increase, you know, if you would go up the FM dial or something like that, aside from interference it might have different actual physical characteristics.

MEMBER STEENMAN: Someone is whispering in my ear this weekend about like issues in the spectrum that are great for understanding waves and whatever. I am not a radio specialist at all.

MEMBER MCCORMICK: The standing waves tend to overlap with either large message packets or long message streams,
small packets. Neither would see -- there's one other characteristic and that is what is the boundary requirements for the use that you're looking at. And so one of those, the size being low latency, it also had a distance. It was only going to go 300 meters. Yes, we tested it to miles from the top of the Mackinac Bridge, but there's no interference there.

So part of it was the actual packet size that they're looking at and the actual calculation of how much -- a car generates 55 gigabytes an hour but the actual amount of useful information they're estimating is probably 1 megabyte a month worth.

VICE CHAIRMAN KLEIN: Okay, I'm going to just keep it moving. So DSRC is one of the two technologies we're looking at here. It has some good characteristics related to fastness. It has some unfortunate -- it finds itself in competition with others
-- puts us in competition with others who want the same spectrum.

The application that rides on top of this. I'm actually not sure what the correct name for this application is. So, I've called it vehicle-to-vehicle collision warning which I believe is pretty accurate here. It's not collision avoidance. We've been careful to say that there's not automation going on. It is the warning. It's based on the underlying vehicle-to-vehicle technology.

Is there a very specific name for the application that we're talking about? I'll throw that out for one second.

MEMBER KENNER: There are several applications that are being tested in the Safety Pilot. There's collision warning. There's a lane change warning.

VICE CHAIRMAN KLEIN: Those are spectrum applications?

MEMBER KENNER: Yes.
VICE CHAIRMAN KLEIN: And what's the full suite called?

MEMBER KENNER: Well --

MEMBER MCCORMICK: Vehicle safety message is what it's been characterized at SAE. Now I don't know what VII is calling it.

VICE CHAIRMAN KLEIN: Doesn't quite sound like the application level.

MEMBER KENNER: Well, to me, if you said it's vehicle-to-vehicle communications that then are used to develop specific safety applications. So you have to have the enabling communication.

VICE CHAIRMAN KLEIN: DSRC.

MEMBER KENNER: That's the part -- what I was trying to say earlier is I would say is the regulatory requirement, or the regulatory -- well, requirement in order to get it in all the vehicles so they communicate.

And what I was suggesting is I
wouldn't say that we would necessarily want to start with though that regulation requiring any of those specific applications under development.

Over time it might be an NCAP thing where you get a checkmark for some of the applications and like stability control, some of the ones that prove to be beneficial to society then might be mandated. But I would suggest that that's how it starts.

So to me I would say it's vehicle-to-vehicle communication that allows the development of safety-specific applications.

VICE CHAIRMAN KLEIN: Right, but here is vehicle-to-vehicle communication. The generic capacity to move bits between two vehicles with very low latency, with high degree of security, with good privacy.

And then what do you do with that generic connectivity capacity? You put an application on top of it, one of which is our
suite of which our vehicle-to-vehicle collision warning. And that's coming out --

MEMBER KENNER: Well -- yes.

MEMBER MCCORMICK: It may be that.

MEMBER KENNER: But you can see, you know, collision warning.

VICE CHAIRMAN KLEIN: There's autonomous --

MEMBER KENNER: There are specific applications let's say, you know, but there's multiple applications. I think there's around 10 that we're working on. Is that right, John? In CAMP. But you know, there's a lot more that could be done, we just had to decide what were the highest priorities.

MEMBER CAPP: There's a perfectly good example of one that would have some safety benefit.

MEMBER KENNER: But then I would say, if you say collision I would maybe go
further and say, you know, collision warning, say this is -- well, I'm trying to remember. I have to look. Do you have the roster of the specific applications and what they're termed?

Yes, so what I would suggest is there is a list and it has the applications there. And whatever they describe that application as, that's what we should put where the words collision warning are. Maybe one of them says specifically. It might be more specific like forward collision warning or something like that. But if you want to just grab one example we'll just try and make sure we give you the right term.

VICE CHAIRMAN KLEIN: Okay. So I'm trying to use a fairly generic term with the vehicle-to-vehicle collision warning.

MEMBER STEENMAN: Because I think what you are getting at, Hans, is that there is the collision stuff, but are there others that we really need to structure both the
network and the application can only be done with vehicles.

VICE CHAIRMAN KLEIN: Right, I'll get to that.

MEMBER STEENMAN: Okay. Because that's what we were trying to ferret out.

VICE CHAIRMAN KLEIN: Which we kind of were talking about this morning. So I'm building on this morning's --

MEMBER STEENMAN: Yes, is there more than just this. That you couldn't do any other way.

VICE CHAIRMAN KLEIN: Yes. So this particular application or suite of applications, it cannot run on any existing network. It would be great if we already had high-speed inter-vehicle networks because then you'd just be installing an app, an application to run on top of preexisting network, which is what we do all the time with most of our network kinds of things.

In the case of this one
application area, collision warning, it can't run on any existing network. No existing network has the right characteristics. So a new underlying network is needed. That gets us into the DSRC development.

Notice that different industries tend to develop apps and develop networks. At the application level we find normally most transportation network activities are at the application level because it runs on generic networks that other industries put in place.

In this case to achieve a valuable transportation function, safety, Department of Transportation actually is going down and not only doing the application but doing the network upon which the application will run. So suddenly it's interacting with Comcast in a very direct way which I think is not a normal situation. It's two different industries.

So one characteristic of this
application is that it can't run on an existing network so it demands a new underlying network. And another crucial characteristic of this application is that it only works if, quote unquote, "all" vehicles use it. Ninety percent adoption, I forget the exact number, a high level of adoption.

I've heard that -- and Scott, I see you're shaking your head. Certainly this is common knowledge which is that you need a high level of adoption in order to achieve the safety benefits. And I think there's some charts that show as penetration increases safety increases. The number 90 percent, I don't stand by that number. I think 90 percent is perhaps an ideal.

The function of safety, at what point do we get high levels of benefit. Is there a percentage? Have you seen that chart?

MEMBER KENNER: I've seen the chart but the chart is the more vehicles, the
greater the benefit. It's basically a linear relationship.

MEMBER CAPP: Your point is good that it needs to be high.

VICE CHAIRMAN KLEIN: Relaxing that parameter would be hugely beneficial for deployment as probably one of the reasons people are looking closely at that parameter and said do we really need a very high degree of penetration. Can we get benefits lower.

MEMBER KENNER: As soon as two vehicles that can communicate with each other can talk you get a benefit. But if they all had it you would get the maximum benefit. And beyond that it's kind of linear and it's between two and three decades.

MR. BELCHER: That's why we framed the earlier discussion around targets of opportunity. You don't have to have 90 percent deployed to get benefits. You can have 90 percent of the fleet in a certain corridor, or in a certain fleet, or in a
certain area. And so you could get the same level of benefits with 10 percent of the fleet deployed as long as it's concerned.

VICE CHAIRMAN KLEIN: Or possibly there are other applications where 10 percent penetration is perfectly adequate to get the benefit. I mean that's where I want to sort of end up because I think that's a discussion that we can have here.

So this is the application level. We always deal with two levels, the underlying, the pipes, the network, and these on-top applications in the load and lock position. Warning which needs a fast network underneath it and which certainly increases, becomes more useful, has higher benefits as market penetration increases.

Now, so there's deployment challenges to the technology characterized. So if you assume the technology exists, it's working, the benefits are known. It's ready to deploy. That's a prerequisite.
deployment is the technology exists, it works and has benefits.

What are the deployment challenges? Well, the DSRC, there's this deployment challenge called getting, or at least securing the rights to 5.9 gigahertz, fending off competition from other network providers.

So right now essentially the big deployment issue is probably in the FCC arena as to who will actually -- once the technology has been fully designed who's actually going to use the necessary frequencies.

And another deployment challenge exists on the application level in the vehicle-to-vehicle collision warning, how do you get that 90 percent adoption, or high levels of adoption. And there the solution has been you look for mandated adoption. That gets us over into the NHTSA process for rulemaking. These are two arenas, two
crucial arenas for moving forward is to satisfy the needs of a required network. We find ourselves at the FCC. Satisfy the requirements of the application, find ourselves at NHTSA.

MEMBER KENNER: The other idea was that not just mandating it for new vehicles produced and purchased, but also to have the after-market device. That is an element that in many, many cases it's just not feasible -- it's not feasible for us, for example, to put a radar and forward collision warning system on a 10-year-old Ford vehicle. The electrical architecture and all kinds of things make it impossible to do that.

But the after-market device in this case is a way to in fact accelerate the adoption and get to a higher percentage faster. So I think that's an important element of that.

VICE CHAIRMAN KLEIN: It's huge.
MEMBER STEENMAN: It's easy to install in any historical car architecture.

MEMBER KENNER: So that's a neat way to go about it.

MEMBER CAPP: With varying levels of capability.

MEMBER STEENMAN: Right.

MEMBER MCCORMICK: Well, but at a simple level it could just be saying here I am. But that, knowing that you're there is enough to say you're on the expressway, but oops, you're stopped.

VICE CHAIRMAN KLEIN: So both the network imposes certain deployment challenges and the particular application we're looking at poses certain deployment challenges.

And then leads to the discussions we're having. Hey, this challenge isn't that hard to overcome, or the after market is a strategy. Or at the FCC level maybe we could use a different frequency. That explains why we're having some of the discussions that
we're having.

Now, there's a certain perception. This is sort of the extreme conclusion is that successful deployment requires both holding onto the frequency 5.9. If you lose it, you're in trouble. And successful deployment requires some mandate for universal adoption. You've got to get that NHTSA mandate through there.

And without these will deployment fail. I put a question mark there but these are -- right now we're seeing this is important.

MEMBER STEENMAN: I think we need from a deployment perspective. I don't know if you're going to get to a different angle as well. And I will use the example of what's happening in Brazil. I don't know if you guys from the auto industry have -- the tag. Because we've been working with that industry quite a bit. So they are putting tags on every car. But they get a big tax
benefit and efficiency benefits. So there is another large benefit that they are creating monetarily for the government and for consumers that actually incentivizes the government in this case to just deploy it and just give everybody a tag.

VICE CHAIRMAN KLEIN: So that kind of insight I think is really useful. Because this gets us to the incentives. Somebody has an incentive to put a lot of their money, even if it's the public sector in this case.

MEMBER STEENMAN: In that case the government. So they are not rulemaking, the government just says I am going to send you a tag for free and you just need to put it on your car.

VICE CHAIRMAN KLEIN: And it's cost beneficial for them to do that.

MEMBER STEENMAN: Yes, because of all the text tracking that they get.

MEMBER MCCORMICK: You know,
there's a couple of different ways to look at the question. I mean, when I look at those two, hold onto the frequency and let's go back to what Ton said. There's other frequencies you can use. There's testing right now being done on 4G to see if it has low enough latency which may completely -- the purpose of the Safety Pilot was to determine whether or not that was even a viable thing to put it on 5.9. So there's a number of -- so holding onto frequency. Yes, there was enough of a knee-jerk reaction by the appropriate parties that I think we can delay it until they do more research.

Mandate universal adoption. Well, that's one way to do it. If we were able to have everyone do a good job of articulating the value proposition so that people would know why I want this on the car just the same way that the insurers were able to do that with their technology then there becomes a pull by the consumer rather than a
push.

Will deployment fail? I'm always brought back to what --

VICE CHAIRMAN KLEIN: It's a big question. Let's consider that.

MEMBER MCCORMICK: -- to what Gandhi said. Everything we do is meaningless but we have to do it anyway. What technology is going to be existing 5 years from now is not going to look like this. Well, it was a paraphrase. It's not a direct quote.

But I mean the reality is look back 5 years ago at what you were doing. Look at what this thing was 5 years ago. There are capabilities that are out there that we're on a path to try to do something that achieves a societal benefit.

VICE CHAIRMAN KLEIN: Well, let me say the reason I've highlighted these is because these are the -- well, do we really have to hold the whole frequency or are there alternatives? Do we really need the mandate
or are there alternatives? So consider that.

MEMBER KENNER: I have to make sure I understand though. If you go to that last slide. Are you -- for successful deployment there's other road blocks and obstacles than just those.

VICE CHAIRMAN KLEIN: We have limited time here, yes, so I'm highlighting.

MEMBER KENNER: Okay.

MEMBER MCCORMICK: We're not solving world hunger, just who's hungry in this room.

MEMBER KENNER: Well, but I would say the security one is significant.

MEMBER MCCORMICK: Right.

MEMBER KENNER: That is probably the biggest of all. You saw the articles recently but it's happened years ago too where people take control of an automaker's vehicle with a computer and maybe there's a wire, maybe there's not. So that's pretty significant.
VICE CHAIRMAN KLEIN: Well, I don't know the answer to this, but do you know the answer to this? If we didn't care about low latency, if we could run over slow networks, could you get a degree of security over LTE that would satisfy the requirements of this?

So LTE -- another characteristic absolutely lacking in all other alternative networks is security?

MEMBER KENNER: I believe that's the case.

VICE CHAIRMAN KLEIN: We need that security and latency.

MEMBER SCHROMSKY: You wouldn't rely, just no radio transmission. Even DoD relies on the air interface to do their encryption. You know, that's just the medium. It's encrypted and decrypted on both ends. So you're not relying on the air length to do the encryption nor would I recommend that.
So to your point, Steve, I look at security -- we were just out at Congress last week and the now sitting but soon to be non-sitting FBI director said the next Pearl Harbor is a cyber attack. And this is moving infrastructure at this point.

So, I think one of the things that, Bob, I'll -- the original binder before I came down to this meeting is I think we talked about this before. Let's assume DSRC, we run over that frequency. Let's just table that. It happened, right?

But how do I verify that the box that Scott has is a valid certificate, it's working, it's a mutual trust. I need to know that's not a rogue device, that if he does something I react. So he may -- whatever it may be. I'd have to trust that it is a valid signal that's not spoofed or manipulated in any way.

And what I see right now is who does that. Who's responsible and maintaining
that. Granted the manufacturers, either OEMs or AFMA, whoever it is, they could build this fast. That's probably easy.

But they're not going to take the responsibility to make sure, well, how do I know when I'm sharing between Ford and GM you're sharing keys.

MEMBER CAPP: Exactly. That's why the states -- it seems like it's going to have to be the DOT. You can't think of any other entity to play that role you're describing perfectly.

MEMBER SCHROMSKY: That's what I see.

MEMBER SCHROMSKY: And then the other connectivity piece which was mentioned before is how will I rely, assuming DSRC is in there and that's using 5.9, how do I know I can communicate from this governing body that goes and hits that device and verifies. What network are they going to use to do that? For instance, are they going to rely
on the end user to plug up their ethernet
cable in the garage? Are they going to use
Wi-Fi? Are they going to use cellular?
That's not free air time in some cases, so
who pays for that.

MEMBER MCCORMICK: And you're all
assuming that even though -- let's say they
get to the point where they're required to be
put in all cars.

Eleven years ago I got a call
from two 18-year-olds that wanted to know how
they thought this DSRC would go forward. I'm
like, okay, why are you curious. They said
because we believe there's people that are
not going to want their car sending out a
signal so we're going to develop a box to
block it.

They're 28 and 29, now, right but
they were sitting there going here's a market
for this. So even though your car may be
required to have it because both of volition
and accidentally and environmentally you may
not be generating a signal.

So I guess my question is what are we trying to discover from this topic. I want to make sure I understand.

MEMBER SCHROMSKY: I think to your point on what you're getting at which I agree with is having a common platform. So if I take care of levels 1 and 2 and 3 to some extent. Six and seven you guys will figure out.

VICE CHAIRMAN KLEIN: I'm dividing them all by two.

MEMBER SCHROMSKY: What I'm saying is that OEMs will -- if it's OnStar or if it's Sync, whatever, I mean that's your value-add for your marketplace and how you dictate that. But for the common, if you break it down just from a collision or a vehicle safety, establishing DSRC which I think we're in agreement with we'll have frequency, having that underlying framework I think we're all in agreement, yes, that's
what happens. I think what we're missing is, okay, assuming that that black box, for lack of a better term, is built into every vehicle in the after market how do you manage that and make sure that the integrity is there, right?

I think solving the communication protocol, that, to your point, that's easy. But assuming there's a black box in every vehicle after-market OEM today, how do you manage that?

VICE CHAIRMAN KLEIN: Security.

MEMBER SCHROMSKY: Yes, exactly.

How do you manage that?

VICE CHAIRMAN KLEIN: Well, let me ask you, here's a question on security. If currently no existing network provides the security that we need to connect to a car that could be turned into a weapon. So if you're going to network cars heavily and you recognize that cars are dangerous things, therefore they need a very high degree of
security, does any existing levels 1 through
5 whatever, network, provide a sufficient
degree of security?

MEMBER MCCORMICK: Yes, FIPS 180
programming does.

VICE CHAIRMAN KLEIN: Because if
existing networks are deemed not to be secure
enough that's a strong argument in favor of
this program at the FCC. This is more than
just a safety network. Pretty much all
communications to cars should go over a DSRC-
like system. And therefore that increases
DOT's claim to its programming. Because it's
a general purpose secure network for cars.

MEMBER STEENMAN: There are
multiple layers of security. There are
problems with the DSRC protocol security
period. I've sent that to you and we'll talk
about that tomorrow. So there's still a
bunch of protocol security issues that need
to be solved. But they can be solved.

Then there's your issue, Brian,
which is how do you manage all that. Then you get the third issue, it's a moving target. What is secure today will not be secure a year from now. So that the structure needs to be flexible enough so that it can evolve with the changing needs of security. Because what was secure 10 years ago is not secure today. That's another big problem.

MEMBER KENNER: And well said. So I didn't want to derail it, but I wanted to just mention that in any discussion of roadblocks or barriers to deployment I think that is worthy of inclusion on the short list.

MEMBER SCHROMSKY: What I think though is security is V2V. It has to have that mutual agreement. It doesn't work unless it's there. That's where that security piece comes -- trust but verify. How do I know what you're telling me.

MEMBER MCCORMICK: How do I know
that you're not spoofing as a good actor.

MEMBER SCHROMSKY: Yes. Because I hate to say it, not that this would derail this, but if you're a nation-state and every car is connected and I can stop every car on a freeway by clicking a couple of mouse strokes that would be very important.

MEMBER MCCORMICK: Well, we tend to concentrate on malicious attacks. But it could be simply bad programming. It could be because of the complexity of the system of an unintended consequence.

So there's four different layers of systems fail, four different mechanisms by which systems can fail. And we tend to worry about whether or not there's somebody spoofing the network or in a bad car telling stop.

But that exists today. I mean when I used to drive home from the AMIC office, every one day of the week the same person would call in to report that I-696 was
shut down and was at a standstill. And I was usually on it at that time and it was going along fine. But he was just giving a random call in to keep people off the expressway so he had a quicker drive home. You know, that's going to happen. It's a question of the resiliency of the system.

VICE CHAIRMAN KLEIN: So yesterday, security. Your emphasis on security I think is -- not just latency, but security is crucial.

So, some of the questions I raise here, you know, the possible relevant to deployment. Does the application level, V2V collision warning, need DSRC? Ultimately we're really interested in about the application being transportation, in terms of our transportation application to the network, so we can be network-agnostic. So currently other networks are not fast enough and that's a claim. Other networks are not secure enough, are not private enough. But
it might be possible that there's other underlying networks. You can get that same functionality on top of a different set of pipes.

MEMBER MCCORMICK: Well, I think the real question is does V2V require only DSRC. Because the answer is there's a variety of ways to do vehicle-to-vehicle collision warning that don't require communication between vehicles.

VICE CHAIRMAN KLEIN: Right. And those ones that don't require DSRC are a hell of a lot easier and cheaper to deploy. They're easier to deploy because you don't have to build a new network underneath it. That's a crucial point. So you kind of shrink it down.

Now, it's not a null set. If you keep shrinking down the number of safety applications that can run on existing networks you never achieve zero. You need for the most -- a very valuable one, you need
DSRC underneath. So you cannot solve the DSRC problem by making it go away, but you could possibly shrink it.

This one has already been answered. Do we really need that 90 percent? Does the application need 90 percent adoption? Is an incremental approach possible? It allows achieving the safety sooner and achieving other benefits sooner.

I'm guessing that the -- well, maybe, maybe not. The openness to lower levels of penetration and highlighting the benefits of lower levels of penetration is attractive because you can get -- it gets into our communication strategy. We can begin highlighting those benefits the minute two cars are talking to each other.

And I think, Ron, you've been making this point. Already there at Ann Arbor two cars are talking to each other. Hundreds of cars are talking to each other. Maybe it's already possible to start
emphasizing that this technology has benefits and we should support continued development towards deployment.

Does DSRC serve only one application? Currently at least the more as you hear about it that seems to be the case. The reason we're developing this entirely new underlying network is vehicle-to-vehicle collision warning.

Well, maybe it's more useful than that. If there were more useful applications that could run on DSRC and that can only run on DSRC you can have a stronger case for DSRC. Hence my questions right now about security.

If we think of DSRC not as a low-latency network but as a high-security network, what's being built as a high-security infrastructure then that could be useful for a wide span of applications. Suddenly its popularity could rise considerably if there were more applications.
that were clamoring for DSRC security.

MEMBER MCCORMICK: Yes, but that -- I guess the question I have -- vehicle collision warning is just a very, very narrow way to look at this. I mean it's been defined for obstacle discovery, for lane change warnings, for warnings on entering or leaving intersections.

There are already a whole plethora of things many of which are on that list of 10 that said here's a subset of 10 that we can all agree on. There's literally hundreds of potential uses. I'm not sure why we're trying to characterize it as just a collision warning because that's only one of even those 10.

VICE CHAIRMAN KLEIN: Well, but I'm -- think of it more expansively off the top of my head. Let's say that watching Netflix in your car has been determined to expose your car to very significant risk of being hacked, and that even Netflix, if it's
in your car, it's got to be highly secure even if it's Netflix, even if it's Pandora. Well gee, that means even Netflix and Pandora have to run over a special high-security network. So by the fact that they're running in a vehicle you need to have a very high-level degree of security. Existing networks don't have a sufficient degree of security. Therefore, only DSRC offers that level of security. And therefore lots of applications are clamoring for DSRC.

MEMBER MCCORMICK: No, the problem with that analogy is that there's an average of, what, forty-two or three networks on the typical car, 150 sensors or something like that. That infotainment bus is not the vehicle chassis control in motorbus. There's no way one gets from one to the other unless you just engineered the car poorly.

So I mean, somebody wants to bring in -- add your Netflix to that example, yes, there's a way that you can corrupt
things and put malware in the CD player and
everything else. But that doesn't give you
control of the car because that's on a
different --

VICE CHAIRMAN KLEIN: So you're
saying categorically that these are separate
networks, separate systems on the vehicle.

MEMBER MCCORMICK: Yes. I mean
the one way that they have penetrated was
through the wireless tire pressure gauge to
get into the CAN bus. But the CAN bus
doesn't travel, unless you guys have changed
something all of a sudden, doesn't change
across the infotainment networks. You're not
carrying the same messages.

VICE CHAIRMAN KLEIN: So in this
case network security can -- those
applications that need network security, I
mean a high degree of security are in fact
separable.

MEMBER MCCORMICK: Yes.

VICE CHAIRMAN KLEIN: And the
vast majority of applications, it doesn't matter if there's viruses getting on your car. It might mess up your CD player, your DVD player. It's never going to get into -- never going to get into your --

MEMBER MCCORMICK: Well, yes. It was just published this morning about some study some researchers did with a Toyota and they were able to do things like blow the horn, you know, and leave the lights on, and not allow you to turn it on. But they couldn't make the air bag deploy or prevent you from braking.

VICE CHAIRMAN KLEIN: And never will be able to.

MEMBER MCCORMICK: Well --

MEMBER STEENMAN: Don't say never say never.

VICE CHAIRMAN KLEIN: I'm saying never.

MEMBER STEENMAN: I know because they are connected.
MEMBER MCCORMICK: There's a lot of smart people out there.

MEMBER STEENMAN: They are connected.

MEMBER SCHROMSKY: I just have a practical question. So let's assume we have DSRC, we establish the communication protocol. So between, John, you put DSRC, you put -- you have it in yours. And I want to do a collision avoidance application.

So granted DSRC and I'm just going to use the example of a black box. It's alone in whatever it is communicating to. Who writes the application? Because if you write your own application, and you write your own application you have to talk to each other regardless if it's DSRC or not. How do I know what -- who writes that application that says, okay, I'm writing a collision avoidance application and you have to build this application into your vehicle? I mean that's what I just told --
MEMBER MCCORMICK: I think we call your phone and it ain't the same phone.

MEMBER SCHROMSKY: That's a little bit different. I mean that's switching -- that's a little bit easier. But I mean you're talking about an application.

MEMBER BERG: It doesn't matter who writes the application or what the black boxes do. It's a certain predefined standardized type of information. And what one car company does with it could be way different than what another car company does with it. They just have to know what's the message coming in from all these other car companies.

MEMBER KENNER: So at this point pre-competitively we do as automakers tend to have a lead for each of those 10 applications. And so you just spread the work out in terms of workload across the OEMs.

MEMBER BERG: They don't even
necessarily have to be separate applications.

MEMBER KENNER: They don't.

MEMBER BERG: It's really just a scenario of a crash avoidance app.

MEMBER KENNER: Right. The key was we had to agree that if we were going to send the information of where am I, how fast am I going and all that kind of stuff is what we call the basic safety message, we've agreed on that. We've agreed on what it is and how it's communicated. And then we all do it differently. And in some cases we may attempt to argue that, hey, you know, one automaker claims we do it better than the other. And so -- the information --

MEMBER BERG: -- my question.

Just so we don't have the --

MEMBER KENNER: But then just to continue. So then the next part, you know, so in general we don't -- in general we don't want the agency NHTSA to tell us necessarily to mandate content in vehicles. We generally
would like to have them mandate a performance standard. And like a crash test, it has to perform this way. But don't tell us how to do it, don't tell us what we have to put in or not.

One notable exception to that was stability control where they mandated a technology. And so this is one more example where we're sort of embracing and saying, okay, given that we all have to have it for it to be effective we're saying this is maybe the one example where you say we do want you to mandate the technology.

But when it comes to the application, I mentioned that we didn't necessarily want them to regulate the application. We'd like to be able to do it as an industry. Maybe an endcap that could have a performance standard, and then perhaps it could then move into a regulation where they mandated a specific application. We would want it to be specified based on how it
performs and not the specifics of how to do it or what content to put in the vehicle.

VICE CHAIRMAN KLEIN: I want to put it on Brian's space a little more. What if I -- I know a couple of 29-year-olds who are eager to do app development for your cars.

MEMBER KENNER: Yes.

VICE CHAIRMAN KLEIN: And so is that environment closed to app developers?

MEMBER KENNER: It's open, right?

We've got Ford.developer.com. So we have open platforms. We have all the information. You want to know what our vehicle is doing, what information you can receive and work on apps? Well, come on down, we're interested.

And so we have a website where we get developers and we open them up. We have the open XE platform that we've talked about with the White House. So we're doing that. I think GM is doing similar stuff.
MEMBER SCHROMSKY: We do. We do the same thing. We have an open platform. So if you want to make any device that goes on my network.

VICE CHAIRMAN KLEIN: And do you worry about malicious people? They respect security, they respect privacy and I'm limiting my ability but the app itself does that by design.

MEMBER SCHROMSKY: Well, we still, you know.

MEMBER KENNER: We control whether it makes it into our vehicle or not.

MEMBER SCHROMSKY: Yes, we -- and we, from our side of the device we look at layer 1 and 2 and make sure it's -- adversely affects our network. And we still have the right to refuse the device if we -- adversely affects other customers.

MEMBER STEENMAN: There's a certification process, right?

MEMBER SCHROMSKY: Yes.
MEMBER STEENMAN: A qualification, certification process.

MR. BELCHER: So what are we doing? What are we trying to accomplish here? I mean it seems like we're kind of going around a bunch of stuff we've already been talking about. And so I'm just trying to --

VICE CHAIRMAN KLEIN: Well, ideally we're getting somewhat -- look at the stuff we talked about this morning, conceptualizing it, and then I've let the discussion go forward but we'll make closure soon. And then it finishes off with this mandate and we can talk about the specifics of the mandate, of incentives.

MR. BELCHER: So I did look at the language. The language is about deployment. It's not about connected vehicles.

VICE CHAIRMAN KLEIN: So it is about -- yes, deployment, and it's broader.
MR. BELCHER: Yes. It's about the traditional ITS stuff. They want to make sure we have that conversation either today or tomorrow. Because I think we're spending a lot of time on Connected vehicles which is huge but I think we need to also spend some time on deployment because that's the kind of stuff that solves Joe's problems and Paula's problems and our other problems.

MEMBER KIRBY: I've got another problem.

(Laughter)

MEMBER KIRBY: Just listening to this conversation, malicious people and things like that, and making points out. I wonder if there's potential consumer resistance here from people being frightened by a malicious message coming into their vehicle and making their vehicle do something even if it's only sounding a horn or a warning or something like that.

I mean right now if you buy your
own vehicle you're self-contained. It's only what you bought coming in. But if you've got a device in your vehicle that's designed to receive a message from another vehicle which however well regulated and intended, so forth, if there's potential for hacking this and that message could come in and make your vehicle do something you don't want it to do I wonder whether that could be a basis for oh, wait a minute, I'm not sure I want that. And maybe the whole thing becomes somewhat questioned.

MR. BELCHER: It's not just vehicle-to-vehicle communication. It's any communication.

MEMBER KIRBY: I know. That's what -- sure.

MR. BELCHER: And so most OEMs already have routes of communication to their vehicles where they're pulling data off of them. So they're all hackable now.

MEMBER KIRBY: But it's a fear --
actually make something happen to your vehicle. I mean it's one thing to -- but to actually send a message or make something happen to your vehicle that could be -- cause you to do something that might put your life in danger or someone else's life in danger.

MEMBER MCCORMICK: You know, I'm not worried about that.

MEMBER KIRBY: You're not worried about that?

VICE CHAIRMAN KLEIN: Well, wait till your Pacemaker does it, right? The MOOC that you go to take an online --

MEMBER MCCORMICK: Because if his car can be hacked and corrupted and his can't guess who's going to get more sales all of a sudden, and guess who's going to be heavily working on fixing that problem immediately?

VICE CHAIRMAN KLEIN: Until the next hacker comes along.

MEMBER MCCORMICK: Yes, but that's how we keep programmers --
VICE CHAIRMAN KLEIN: Okay, so anyway, moving forward. So, we do have more discussion time left at the end. Just the idea how many applications must have the DSRC specification. If there's a large number of applications that must have DSRC then there's more demand for the DSRC and it helps overcome the competition problem which is playing out in the FCC for that limited frequency.

Safety applications are about the best we've seen that really benefit from a low-latency network that demand low latency. But they're a two-edged sword. On the one hand they need a new network to achieve the high speed so they need DSRC. On the other hand safety applications are a problematic application area because they create liability. If safety is not delivered you could be left holding the bag. I think the point is made.

Automakers are keenly sensitive
to this. So commitment to DSRC is simultaneously commitment to a risky application area. That's potentially a big issue that when we talk about DSRC we're often talking about safety because that's the application area and watch out for safety apps that can get you in trouble.

So what would aid deployment? We're looking at how to advance deployment. Applications that do require fast network to justify DSRC, to go beyond safety if there's other applications that do more than safety we have less of a liability disincentive. And applications that don't need the high adoption. So it's possible to get immediate benefits, get an incremental adoption strategy.

So deployment would benefit from these certain class of applications. Non-safety, high benefits with low levels of adoption, and that demand low latency and demand DSRC.
So a near-term strategy to support a long-term strategy. This is what we talked about this morning. We've got technologies that exist, that work, that have benefits and that use DSRC today. To find stuff that uses DSRC today so that the problems with spectrum and of achieving adoption which require time and backing.

Deployment incentive report. I actually quoted our minutes so this is what we talked about in the minutes of our last meeting. Ken stated the report would be developed in the next year. This is a report not for this Committee, it's a report to which this Committee can contribute, that the ITSPAC Committee's input on the ITS deployment incentive reports come from a very broad perspective. So that was Scott's point with the broad perspective.

Some of the incentives on this, looking at how do you incentivate deployment, how do you make deployment move forward.
Through markets, through intellectual property, through various tax incentives. And whether it's the consumer, the commercial operators, OEMs. What is it that incentivizes the states and localities and so on? Those are the broader picture.

I have obviously focused mostly on DSRC in this talk but the broader question of incentives applies to other aspects of the program as well.

Again, those parts of the program that are more incremental, that the benefits are known, that can be -- would not concern so much of a technology development as about getting them out and adopted and putting to use, those are easier to talk about in terms of deployment.

MEMBER CALABRESE: There may be some additional incentives for municipalities where maybe the public share might be different. They only have so much money but if one project is 90 percent, another project
is only 80 percent, I'd make my decision
where it might develop a little easier.

VICE CHAIRMAN KLEIN: Yes, and I
think some of this is pretty straightforward.
The fact that there's even a match or a
variable match is a well-known mechanism for
increasing it. And you can get a list of
them, of the different incentive mechanisms
that have been in use that can also be
applied here as they've been applied in other
areas.

So the focus here, with the focus
on DSRC and look at this idea of developing
and expanding the number of applications that
are out there that offer near-term benefits
that are incremental. You can use them in
the short run, useful right off the bat and
that is DSRC-based.

Having a big list of these
applications would definitely contribute and
accelerate deployment of DSRC and support the
continued development of DSRC.
MEMBER MCCORMICK: Can you go back to slide 15 for me? See, the problem I have with this is that I don't agree with any of that.

(Laughter)

MEMBER MCCORMICK: Other than the fact that it's deployment, again, we've already talked about it could be network-agnostic, that it goes beyond safety.

VICE CHAIRMAN KLEIN: Network-agnostic is not -- then you're not going to deploy DSRC. DSRC deployment will be facilitated by applications that need DSRC. That's a crucial point.

MEMBER MCCORMICK: Say that again?

VICE CHAIRMAN KLEIN: If most applications don't need DSRC because they could run on other existing networks then the deployment of DSRC is not going to be facilitated.

MEMBER MCCORMICK: Yes, we
definitely need the security or low latency
then it does need to be on DSRC.

But it goes beyond safety. I
kind of use safety as the pinnacle, that
nothing goes beyond safety. Everything else
is kind of less important, in addition to.

VICE CHAIRMAN KLEIN: Beyond,
alongside.

MEMBER MCCORMICK: And that don't
need high adoption. Well, you know, if we're
going to find something that 12 people can
use, and it's entertainment, and it's not
safety, and they can do it on their phone,
why would we care anyway?

So I mean, the next step is,
okay, we need to find incentives. I think
this doesn't help getting us to that. I
don't think those aid deployment at all. I
think those are --

VICE CHAIRMAN KLEIN: The
deployment -- again, keep in mind this dual -
- the network could consist of two things.
So we're looking at deployment of DSRC. Essentially deployment of DSRC will be accelerated by demand for DSRC.

Well, who need DSRC? Applications that require fast networks, possibly applications that will be on safety so they're less liability. And applications that are adoptable without that 90 percent threshold. Those will create the demand for DSRC which will facilitate DSRC.

MEMBER MCCORMICK: We're not asking the programming community to create a bunch of apps. There are 10 that they've identified already that they're trying to build and test and work out.

So now if you go down to your slide 20 that says, okay, we're talking about near-term incremental, useful, DSRC-based, that's what those 10 are.

VICE CHAIRMAN KLEIN: And it would be great to have 10,000.

MEMBER MCCORMICK: I don't think
so. See my problem is that this network is defined for safety message sets. Who defines what those are are these two companies and Roger over there. Those kinds of entities that are sitting there going this fits the demographic of our customer, this fits the needs to promote safety, this is how we assure and certify. We're not asking the community to go out and develop a bunch of apps.

VICE CHAIRMAN KLEIN: Scott, maybe I can ask this to you. Was there -- I think it was Shelley maybe two meetings ago said, hey, we've already got a company that has an app for DSRC. We're not able to talk about it yet but we'll be revealing it. Do you remember that? I remember that conversation. What was that?

MEMBER STEENMAN: Well, my board member. I know who they are.

VICE CHAIRMAN KLEIN: And has it been -- what is it? Can you tell me?
MEMBER STEENMAN: It's part of 1 of the 10.

VICE CHAIRMAN KLEIN: It's 1 of the 10?

MEMBER STEENMAN: Yes.

VICE CHAIRMAN KLEIN: I thought it was an additional app that she was not yet ready to talk about but it was again using the underlying network.

MEMBER MCCORMICK: Well, I think we're talking about two different things. One here is are we talking about -- is developing more apps something that anybody needs or wants at this stage in the game, or --

VICE CHAIRMAN KLEIN: The answer is yes.

MEMBER MCCORMICK: Or is getting the incentive to deployment. I don't care if you've got one app or a million, is that the issue that we're trying to deal with.

MEMBER STEENMAN: I think what
Hans said too, in his defense, that he's trying to bring up, like to highlight how do we make DSRC more relevant quicker.

VICE CHAIRMAN KLEIN: Since there's an FCC hearing in motion. Amongst other things.

MEMBER STEENMAN: And it's true that with the safety applications it's a slow process. So how can we make it more relevant more quickly. If you look beyond the current what we're going to use it for there might be opportunity there.

VICE CHAIRMAN KLEIN: Yes, yes. Because most of the world is looking at the technology and says what's it do for me now. And it would be great to say I'll tell you what it does for you now. Here, it does A, B, C and D now and 5 years out it does a lot more, and 20 years out it brings accident rates way, way down.

But to say in 20 years it brings accident rates way, way down, but what does
it do today? Well, that's --

MEMBER STEENMAN: Not much.

VICE CHAIRMAN KLEIN: We want to be able to answer what it does today in the positive.

MEMBER MCCORMICK: Neither did the first fax.

CHAIRMAN DENARO: So, I'm a little bit losing track of where we're going with this. I mean, it sounds like we need to, what, brainstorm. We've already got a list there that we already saw on the minutes from last time. There are tax incentives. There's intellectual property incentives. There's potential things and commercial vehicle. Is what we want to do today expand that list?

VICE CHAIRMAN KLEIN: Well this, the top tier can focus on -- specifically on DSRC. And its talk about the need for near-term -- making DSRC more relevant.

And how do you make DSRC more
relevant? You show that it exists, it has

benefits.

CHAIRMAN DENARO: Well, I see

that as a separate issue. And we talked

about that this morning. I think that's an

I'm thing to do. Because of our paranoia

about the FCC issue we want to accelerate the

adoption. But the way it was asked to me

says something a little different. Just in

general what are the incentives that will

pull this into the market.

And it's bridging that problem of

since the Feds are not the ones to go

implement it what can the Feds do such that

it results in implementation. In other

words, create incentives at the state and

local level.

MEMBER CAPP: What will happen

assuming the rule gets promulgated and it

takes 20 years to turn the fleet over. Once

we get a hearing that is what are ways to

speed that up.
CHAIRMAN DENARO: I'm pushing back on that a little bit. I agree with the importance of the rate. And we talked about that this morning.

But to me when I first read that before I came to this meeting and was worried about the rate of deployment I was just worried about the probability of deployment. The fact that if we don't have incentives this thing may never go anyplace.

So the first level is what incentives are needed for this to happen at all, at any rate. Secondly, once you do that, oh, you know, it would be nice if we could do that faster. And maybe there's two answers to that.

MR. LEONARD: Well, I just want to refocus everybody a little bit on specifically what drove the ask. So I'm going to read from the MAP-21 language on deployment incentives and on ITS adoption. On the innovative technologies and
strategies.

They said, "The Secretary shall encourage deployment of ITS technologies that will improve the performance of the national highway system in areas such as traffic operations, emergency response, incident management, surface transportation network management, freight management, traffic flow information and congestion management by accelerating the adoption of innovative technologies through the use of demonstration programs, grant funding, incentives to eligible entities, and the other tools and strategies or methods that will result in deployment of innovative ITS technologies."

So a lot of the ask is those original categories that I mentioned, traffic operations, emergency response, incident management. Not just DSRC although I think that DSRC addresses each of those problems in some respect. But it is not -- this discussion was not meant to be solely about
DSRC.

And we've already identified, or the legislation has even identified for us demonstration programs, grant funding, incentives. And any thought this group has on ways to implement those I would be very interested in hearing, but also specifically other tools, strategies, and methods which I think is pretty much wide open instruction from Congress to, well, we're bright people, go figure it out. And so that's -- that's the ask.

MEMBER ALBERT: So Ken, by that what the ask is, that means this group should be helping to define what a pilot program might look like, or the types of demonstrations that might take place? That would aid incentive programs.

MR. LEONARD: To the extent that you think a demonstration program is necessary as an incentive, as a deploying incentive. I think there are other --
MEMBER ALBERT: I'm just making one up.

MR. LEONARD: Ton gave a great example. Brazil is giving away a tag to everybody. That's an incentive for use. We need sometimes an incentive.

MR. CRONIN: It's also a lessons on what the report is about. Because read the next.

MR. LEONARD: Okay, to carry out this section the Secretary shall develop a detailed, comprehensive plan to carry out this section -- to carry out this section that addresses the manner in which incentives may be adopted as appropriate through existing deployment activities carried out by surface transportation modal administration. So -- what's that?

MEMBER MCCORMICK: Can you share that with us?

MR. LEONARD: The language?

MEMBER MCCORMICK: No, the thing
you were supposed to mention.

    MR. CRONIN: That's the part at the end. But the point being they're asking between the Federal Highway, FTA, Federal Motor Carrier and NHTSA, looking at the funding programs available through those agencies how can we use those.

    MR. LEONARD: I would include state and local in that as well.

    MR. CRONIN: Yes.

    VICE CHAIRMAN KLEIN: And this is a major deliverable to Congress from the Department.

    MR. LEONARD: Yes. To which we will contribute.

    VICE CHAIRMAN KLEIN: Yes.

    MEMBER MCCORMICK: You have three kinds of incentives. You have an incentive for the automaker. John, if they gave you an extra star in your star ratings if you had this technology in your car is that an incentive?
MEMBER CAPP: It's an incentive.

MEMBER MCCORMICK: It's an incentive, right? And so the question is then to the consumer, what about the consumer. Well, if I'm a consumer it's a well-articulated, well understood value proposition for why this is in there. And because almost every entity involved in this space is business to business they already talk to consumers. Even car-makers, they market to consumers but they sell to dealers.

The question is if the consumer understands what the value is, we can communicate that effectively, then maybe the value is long-term I'm going to save a life, not I'm going to save you five bucks on your fuel this week. Whatever that is, you know, or maybe it is we will be able to save you fuel because it will give you a better trajectory through traffic.

And then you have the incentive for the public entities in terms of who's
going to be doing -- whether or not they're going to be deploying infrastructure or support resources.

It's not just putting in power. These guys now have to bring into their traffic management control systems new programs, new people that can analyze and utilize this information to extract real value out of it. So, when we talk about incentives, right, the question is is that a specific thing we're looking to say they need to do, or do we need to say that they should be pursuing all of these avenues to incentivize both the understanding and the adoption and the value of this activity.

CHAIRMAN DENARO: My interpretation of what we can do and what we should do is to brainstorm and find a way to expand the list.

So we've got some start of things like tax incentives, intellectual property, stuff that was in there. Hearing the
language, and Scott was right earlier when he said that this goes beyond just V2V. So we need to look at all ITS. And what I see is let's help Ken with some other ideas of what could be in there.

I think we heard one this morning. I think what Brian described this morning about these set of pilots that address widely varying scenarios done in a harmonized manner stay in place and get publicity I think is brilliant. So I think that's a great one. Unfortunately he already thought of it. Or the team thought of it.

So I think our job is to do that. As opposed to what Steve asked which was should we get in and try to define a specific pilot project. I don't see us having the ability to do that and the time to do that.

MEMBER KIRBY: Ken, could you just interpret that language in one respect for me? Are they -- is Congress asking for ideas from you on how to use your existing
programs that are already in MAP-21, or are they asking for ideas on new program initiatives that might be put in a subsequent authorization that you don't have right now but might have a lot of language. Is it clear?

Because they're two very different things. I mean if you accept the existing program structure as you and I talked earlier today, you know, funds are -- you don't have much discretionary money lying around anymore. There's no more earmarks. Funds are allocated by formula.

They're all in lots of little pots. It's very hard to do innovative things if the funding doesn't fit an existing pot. You've got to pull it out of pots that are committed to other things.

And that's a huge problem in responding to that general request of all kinds of ITS applications. A lot of us are looking at those kind of things and you run
into the fixed pot kind of problem.

So are they looking for -- are
they interested in funding new demonstration
programs with new money and new things? Or
is that not what they're asking for?

MR. LEONARD: I don't think
Congress is offering up new money. I think
specifically the language, the last sentence
here, the development of detail -- to carry
out this section addresses as may be
appropriate through existing deployment
activities carried out by the surface
transportation modal administrations. I
think that is specifically referring to
existing resources.

MEMBER KIRBY: Better ways of
using existing resources.

MR. LEONARD: That's the FMC's
Vision program, that's the Federal Highways
grant programs. And I don't believe there's
any grant program that cannot be used for
ideas. So I think every grant program in the
Department can be used for ITS activities. I think we've got that flexibility. Can be. Puts out a lot of moneys.

But as we've discussed before there are parties that have ideas about how to spend the existing money already. So sometimes these are choices, and very often they're choices made at the state level.

MEMBER KIRBY: Right.

MR. LEONARD: Not at the federal level, particularly on deployment incentives. There are a few programs that grantees have to apply. C-vision is one. So I think that part is very specific, that there aren't new resources.

At the same time, I think Congress is asking us to be imaginative. I think they recognize that the ITS Joint Program Office has resources and to some extent those resources, while we are a research program, they also have the capacity of providing technology associate.
And, which you can interpret to some extent and not as being able to go out and do widespread deployment, but doing deployment associate which is what I would describe the research we're doing, for example, I see in San Diego and Dallas right now. That is research that is really going to illustrate to anyone who's interested in using that technology to solve their local problems, how to do it, how to implement.

And I view that as an incentive, a deployment incentive by proving to people who may have a problem that the technology works. And it's a risk reduction.

So I think it's really asking for us to come up with some innovative ways without getting a new budget just for deployment, come up with innovative ways to help people deploy ITS.

There's been a 20-year investment in ITS, ITS resources and development activity. And many of them are in existence.
James is tracking 75,000 pieces of ITS deployed equipment around the country. And we're not tracking all of it. So clearly things are getting out and Congress is saying can we get more out, can we get it out quicker, can we get it out in more imaginative ways.

MEMBER HAMMOND: With safety being the number one priority I believe of USDOT and if you're able to have an opportunity to continue Tiger-type grants, couldn't the agency decide to focus one year or one round of Tiger grants towards deployment or implementation of technology to improve safety on the highways?

MR. LEONARD: That would be a good example of deployment incentive. We could report back to Congress. And obviously it would go through the Secretary, so if somebody in the Secretary's Office wasn't crazy about that --

MEMBER HAMMOND: Right. I mean
for awhile it was about livable communities and that's kind of come and gone a little. But I would think you could maybe focus something like that and say let's just spend a year on safety.

MR. LEONARD: That's a good example. And it could -- and I don't know if Tiger is limited to safety but --

MEMBER HAMMOND: No, it's not. It's really a lot about integrated kind of transportation solutions.

MR. LEONARD: But one idea could be here -- brainstorm ideas, would be to devote an existing body of grants to ITS deployment or to ITS safety deployment. But we wouldn't have to limit it to safety.

MEMBER HAMMOND: Right.

MR. LEONARD: Just mobility in the environment. I'm trying to get away from the environment because I really think it's energy and efficiency and economy and that's where we get the unknown on this. But it
could be any of this.

MEMBER HAMMOND: Sure.

MR. LEONARD: So focus on something like the Tiger grants, that would be an example. And that also fits with the second piece of language which is use existing resources.

CHAIRMAN DENARO: So let me suggest, we've got 5 minutes. We've got 5 minutes left in this session before a break and then we do have something else to do after that, namely talk about the strategic plan. We're going to get a briefing by JPO. This clearly needs a lot of work yet. I guess the best thing for us, my recommendation at this point is to come up with a process of how from here to whenever we think this is ready we can develop some answers to this question.

MEMBER KISSINGER: How about Communications takes this on?

CHAIRMAN DENARO: Works for me.
And what does that mean? What does that look like, Peter? It means that you guys would -- literally tomorrow you're talking about?

MEMBER KISSINGER: Yes.

CHAIRMAN DENARO: Okay. That's a good start.

MEMBER KIRBY: One specific suggestion I have would be trying to make more out of the demonstration. Because you have vehicle-to-vehicle communications on the road. And it doesn't get played and I think it could. And maybe I'll add some bells and whistles to that, demonstration of relatively modest cost that could demonstrate to people or help answer questions that they might have about should consumers be fearful of this, is it reliable. All these issues that we've been raising. You have an operation on the ground there now. I think you could get a lot more out of that.

CHAIRMAN DENARO: Great. Brian, were you going to say something?
MR. CRONIN: I was just going to say the context of some of this language. In TEA-21 we had a $100 million deployment program. That went away in SAFETEA-LU. It was part of MAP-21 as $50 million out of the $100 million research program. We successfully talked with Congress and they removed that because we said it would severely slow down our research program.

And so as a result of that they said well now tell us how ITS is going to get deployed. Because state and local agencies have to make choices and they're not always choosing technology. So that's a part of that context of why we have the language.

CHAIRMAN DENARO: Very good point.

MR. LEONARD: I think one of the things we want to be careful is, at least as the director of a research program I want to be careful about Congress getting a message saying stop doing research and start doing
deployment.

Because when I think about from the perspective of the program office $100 million towards deployment from an agency that's spending over $40 billion on deployment doesn't make as big a difference as $100 million on research in an agency that's not spending $1 billion on research.

CHAIRMAN DENARO: Good point.

VICE CHAIRMAN KLEIN: Is there an inventory of existing funding on incentive mechanisms where you can have a snapshot of where today's situation and then some of these adaptations of an existing mechanism and focusing it on ITS? Does such an inventory exist of existing incentives essentially?

MR. LEONARD: I think we asked the internal of this, the steering group of associate administrators to help us identify that. We do not -- I don't believe we have a list of incentives. It's conceivable that
some of the state organizations there may already be existing incentive programs. There are a lot of ways that incentive programs are established. And so, and you may have some in your own organizations that are applicable to the kind of problem we're trying to address here. We should encourage deployment of research.

MEMBER KIRBY: You know, facilitating peer-to-peer communications and things can be quite helpful sometimes. Because we do things because we saw someone else. It's like us, and if we don't do it someone's going to ask us why we're not doing it. I know that happens between the states where they look across the state boundary. We've got to do that. And it can be done at relatively low cost.

CHAIRMAN DENARO: All right, so we are at a break point. I think we should take that break for 20 minutes, come back here at 10 of when we'll get an update on the
strategic plan. Then our job is to have a discussion after that about the kind of comments that we want to make and suggestions we want to make on that.

And I don't know, Tom, you have some suggestions? Roger, you've either done your own or commented on Tom's. I have a couple. I don't think we need PowerPoints necessarily. If you have it, fine, but we don't necessarily need that.

But I think if you guys would jump in and offer those suggestions and then we'll use that for all of us to talk about. And we'll see if we can get a collection of a starting place there that we can work on.

And then with respect to this topic that we're just finishing up in terms of deployment incentives, the communications group will take that tomorrow and bring us some ideas out of that.

MEMBER KIRBY: I just have one more. The floor of advertiser programs.
People might be interested in it. You know, see how it's been produced, try to eliminate and all that.

The other thing that's happened is there's been pressures that are distributed all around. Again it's to get in there and try to prioritize it for one thing. It's difficult to do.

And one thing that's already happened is a quarter of the funding has been set aside for rural communities. And in the news morning I just picked up there's a new bill that would -- it's entitled Tiger Cubs bill introduced.

This bill would set aside 20 percent as a special Tiger funding specifically for smaller cities between 10,000 and 50,000. So we've got 25 percent to rural and then everybody else. Well, now we've got so-called Tiger Cubs, 10,000 to 50,000, 20 percent for them. You can see where this is going, right?
MR. LEONARD:  So you're telling the formula grant.

MEMBER KIRBY:  Well, I mean -- no, it's more the formula thing. I mean it's getting spread around. The size of the projects now are so small they're not even submitting on it. If you don't have -- you're not asking for something less than $10 million and you aren't more than double matching. Because that's what they fund. Anyway, they're looking for high-leverage stuff. They put up a little.

I'm not saying it's bad but that's the way the program is going. But it doesn't lend itself to focusing on a specific set of strategies.

CHAIRMAN DENARO:  Okay. We're on break. Thank you.

(Whereupon, the foregoing matter went off the record at 2:32 p.m. and went back on the record at 2:53 p.m.)
PLAN UPDATE

CHAIRMAN DENARO: All right. We're ready to reconvene. So again, just to say what we're doing here right now is I asked for a presentation on the strategic plan. We can all read it and hopefully some of you have. But I thought this would be a very efficient way to get an overview of it. And then what I'd like to do is have a discussion on areas where we would make some suggestions about it.

This is separate from our final year recommendations. This is something that Ken asked specifically from us. And as I said earlier also Ton, Roger and I will have a few comments to start the discussion but we're looking for everybody to input as well.

So, James?

MR. POL: Thank you very much. Again my name is James Pol. I'm the team leader for program management and evaluation at the ITS Joint Program Office. And I'm
pleased to be involved again in developing the strategic plan. I was involved in the creation of the last strategic plan for 2010 through 2014. And what I'm going to talk about today is some of our initial work in casting the next strategic plan for the 2015 through 2019 cycle.

So just a little bit about time line and just very 100,000-foot level view of what the process is aimed at. There is the draft themes document which was released by the ITS Joint Program Office late last year. And we articulated three broad draft themes. And they have to do with further hardening the connected vehicle -- or strengthening the connected vehicle technology, funding connected vehicle implementation approaches and then also being able to connect with the broader environment which was kind of a very lofty term that was meant to focus on a whole range of options of considering legacy systems, being able to integrate with other
types of systems that are used for managing metropolitan areas, rural networks. Could be things such as schools and libraries as well as sewer and water maintenance systems, a variety of things like that.

So those are just theme documents, theme items, rather, that were intended to be an element of providing some kind of scope and also a launching point for a discussion in the broad community.

So we actually released this. We published it again at the end of last year. And we also made it available through an online tool that we have for communicating with the community called Ideascale.

And we've received -- we've generated a lot of traffic but perhaps not as much discussion itself. It was widely viewed because we could see that through the Google Analytics metrics of Ideascale but relatively few comments were actually made on it.

Interestingly enough the majority
of the views came from California, Michigan and the Washington, D.C. area. Go figure.

So since the end of last year we have worked on starting the strategic plan development. And basically that launched at the time that we were able to launch a task order for Booz Allen. We ended up hiring Booz Allen Hamilton for providing support and guiding us through a lot of the mechanisms and mechanics for being able to gather information from stakeholders and try to take that kind of input and mash it into a usable form. Again, leading up to an actual document.

Following the kickoff meetings that we had we worked on designing our stakeholder engagements. There are a number of JPO sessions that we conducted, DOT sessions that we conducted late in July.

We just had earlier this week our first public information meeting concerning the next ITS strategic plan. That was over
at the Connected Vehicle Task Force meeting over at ITE. And just to provide George some comfort, this is not exactly the same presentation I heard him say on Monday afternoon.

But we also held a series of webinars to engage a variety of different communities and also to solicit input. And that has actually been the most effective mechanism. I'll be able to talk a little bit about the metrics that we've been able to establish from those webinar discussions.

All throughout all of this discussion we're working on compiling and analyzing inputs. And even though over here we have a box that's kind of lined up with October it's the drafting of the strategic plan is actually beginning now in a very sketchy form. We have worked on an annotated outline which I'm still in the process of reviewing. I need to socialize that with the other staff in the Joint Program Office.
And so we're actually working on writing the document as we're gathering all this input through the various webinars, public information meetings and then a forum like this to be able to solicit and draw input on what should be included in the strategic plan. The aim of all this is to be able to actually release the strategic plan as an external viewing product by TRB in January.

So before going into anything about the strategic plan we need to actually set some parameters for ourselves and MAP-21 did much of that job for us. And this helps give us a springboard for being able to craft the guiding principles and then the focus areas for the plant.

So, again, many of the things that we're all familiar with, encouraging the deployment of ITS technologies, the national highway system. Has surface transportation efficiency especially focusing on modalism.
Emphasis again on the safety aspect of it for decreasing number and severity of collisions. A combination of the needs of all users of surface transportation systems.

And an emphasis was added here which is rather unique for MAP-21 which was pedestrians, including individuals with disabilities. And so this has helped give some momentum for focusing on new research programs that are being launched now including accessible transportation technologies, vulnerable pedestrians, to help be able to address the challenge of the nearly 7,000 fatalities that occur a year for pedestrians. Yes?

MEMBER HAMMOND: How many of these areas of focus were in the last strategic plan?

MR. POL: Nearly all of them, but there were some modifications -- in the strategic plan. I'm sorry, I thought I heard for a moment the authorizing law.
In terms of the strategic plan we did focus on safety, mobility and environmental. We created goal areas that spanned all of those.

There was an element of the last strategic plan that had to do with pricing and coming up with alternatives or looking at technologies related to alternatives to the fuel tax from a technological perspective, not the policy development of course.

That's probably a little bit of a departure from what we see here for the authorizing law. But overall they overlap very, very well. So we've been consistent in the past with SAFETEA-LU and so we're working on designing the strategic plan to be consistent with MAP-21. Yes.

MEMBER CALABRESE: Could you define the national highway system as it's referenced here?

MR. POL: There is a definition that's provided in the law itself and I'm
trying to remember exactly the scope of it. But it's essentially all U.S. designated routes including the interstate highway system. I think it's everything that's designated above one of the Federal Highway categories for roadways. And I can remember for what but it's at a level above the collective roads is considered to be part of the national highway system. Principal arterials.

MEMBER MCCORMICK: On the last strategic plan had at the very end an appendix of acronyms. And one of the things that we discussed earlier this morning was probably the need for a set of definitions as well rather than just the acronyms as an aside.

MR. POL: Correct. And actually I think that was Hans that started that discussion a little bit about having the definitions, a glossary if you will, and to which I kept muttering to myself.
Because one thing it does that I've discovered, especially having these discussions with stakeholders is that often we all speak English but we're not talking quite the same language. And that's been a challenge all throughout.

In our very first webinar we asked a question related to Connected vehicle and three or four people immediately started typing into the chat box what do you mean by connected vehicles. Because it again means so much to so many people.

And that's something of a persistent problem that we recognize. That's something that I think we're going to start trying to address as I go through later on in the slides. But ultimately it does need to be worked out over the course of executing the program.

MEMBER MCCORMICK: Well, and my point would be I don't think you need to look for something that would be -- and the
example of Connected vehicle, something that would be universally accepted as that's what's the definition is, but what it is so that people know what you're talking about when you talk about connected vehicles.

    MR. POL: Correct.

    MEMBER MCCORMICK: Or other terms.

    MR. POL: Correct. Yes.

CHAIRMAN DENARO: Back to Joe's question. Why is it limited to national highway system?

    MR. POL: This is just what MAP-21, the authorizing law, says about what the scope of the ITS program should be about. And I think that that's just an element of everything else. I think that with -- they do include elements of intermodalism and then of the range of other surface transportation consumption that could be done.

    MEMBER CALABRESE: I was just trying to differentiate from the interstate
highway system. How is that related to pedestrians and how do bicycles relate. That is much broader than the interstate highway system.

MR. POL: The national highway system is much broader, yes. By an order of magnitude almost.

MR. LEONARD: I don't see this as a limiting statement so much. One it says encourage. It doesn't say you are limited to.

It also says improve the performance of the national highway system. So if I think there's some gravel road someplace that if improved would improve the performance of the national highway system even though it's not a part of the national highway system I could make the argument that it improved the performance to the highway system. So I don't see that as a terribly limiting --

CHAIRMAN DENARO: It just struck
me as an insult to local communities or something.

MR. POL: No, no, no. Actually quite the opposite. I think that by encouraging deployment across the national highway system it does encourage getting to the local communities.

CHAIRMAN DENARO: Okay.

MR. POL: Putting my evaluation hat on, one of the things I do is I measure deployment. And I do economic analysis of how deployment has progressed over time. Clearly the area with if you will the most bang for the buck is investment in arterial. It's where there is the most deployment opportunity there is and I think where the greatest gains could actually be.

MEMBER MCCORMICK: It covers all the users of surface transportation and it's agnostic as to what type of surface transportation.

MR. POL: So that's just from the
authorizing law just to be able to build a little bit of a framework for what could be within the scope of that.

We did start with our first session on talking about the ITS strategic plan and we did that with limited to ITS JPO staff. And we conducted an exercise, it was a word wall if you will. I gave everybody three Post-it notes and I said I just want three words that articulate what your sense is about the connected vehicle environment. Because that was a lot of the focus of the draft release document which kind of led into this discussion. It was very connected vehicle-centric. But we wanted to see once something is deployed what that environment would look like. What would be the words that would be conveyed to you.

Obviously safety looms very, very large but I want to point out some other things. Freedom. Choices. Capability. Personalization. We have fun but perhaps
that's an element that would actually encourage from a personal consumer perspective buy-in for this kind of environment in the future.

Convenience obviously. And then the internet of things. And I think that that's some of what the discussion was turning towards. I think it was Hans that was leading a little bit earlier about the DSRC network as a platform. And I'll leave it there for a moment. I'll return to the concept of DSRC network having a platform in and of itself.

CHAIRMAN DENARO: This was people in general?

MR. POL: This is internal. Yes, yes.

CHAIRMAN DENARO: Interesting.

MR. POL: This followed a similar exercise that we conducted at the Chicago workshop last year.
attendees.

MR. POL: With the attendees,

yes.

CHAIRMAN DENARO: And did it look
different?

MR. POL: Safety was still the
biggest word.

(Laughter)

CHAIRMAN DENARO: Okay. I think
you just answered my question.

MR. POL: So through discussions
we arrived at a draft mission vision
statement. Research development, education,
facilitate the adoption of information
communication technology. This is a specific
term for those of you who were familiar with
USO standards to enable society to move
intelligently.

And then the vision statement,
transform the way society moves. We wanted
to have something that would be very brief,
something that would be a bit more memorable
and that would be a little bit more captivating. That was the aim for having this kind of mission and vision statement.

But the reason why I have highlighted in blue research, development and education is that they actually set up the guiding principles for what the next strategic plan should be about.

So again, taking a little bit more of a deeper dive on research, development and education there is planning, gathering information, assessing ideas, developing a network, looking into ITS technology and looking at opportunities for deployment, development of new technology.

And then there's development itself in which we're looking at to minimize technological risk. Transforming the ITS technology into a useful transportation product. In other words, it's actually bridging the gap from what is something that is to be studied to something that is readily
more implemented. There's a reason why we
don't do research on dynamic message signs or
for those of you from California, changeable
message signs.

There's -- again, different
language. So, there's a reason why we don't
do much research in that. We research the
utility of those signs and what kind of
mission products could be done on that, but
not on the signs themselves. The technology
has already made that transformation into
something that is a readily useful product.
Then it becomes research into the utility of
the product itself, or enhancing the -- or
perhaps enhancing the capabilities.

In other words, it's not
something that is new technology that we
would have to compel agencies through
establishing a value proposition for them to
go ahead and implement. That's something
that is already -- something that is ready
for adoption or ready for further
implementation.

   Education is a bit of a departure from our last strategic plan. And this is reinforcement over the development. This is actually focused on outreach, communications and training, building the understand and buy-in. In other words, explaining the benefits in a very complete way but yet in the way that would enable, for instance, an elected leader to be able to express this to voters.

   Why would the elected leader make a decision or vote towards building a $100 million transportation management center versus building a couple of high schools or a stadium or something like that.

   It's being able to express that value proposition to the voters. Once you can actually make that connection for the elected leader to make that value proposition to the voters it becomes much more complete in terms of being able to express the value
to everyone involved.

It comes down ultimately to what's a premium factor. There is a value that has to be achieved in a lot of what we do for the individual consumer. And in the past it's always been for the individual traveler.

A clear case example of that is electronic toll collection where you have near-universal deployment of electronic toll collection technology across America. Because you have an equal balance of the what's in it for me factor. You have a high-value proposition for the end consumer who actually places the toll tag because she gets the convenience of it being able to go through the low toll lane, or being able to stop and go through a toll plaza more quickly.

For the toll agency the value proposition is that you no longer have to pay for a pension for a toll booth operator. You
don't have to, you know, lower liability because fewer vehicles have to stop at the toll plaza. There are fewer crashes that occur. So you have a high equal value of that.

This is something that, again, I've been able to observe through deployment tracking. And this is something that I think that we can focus some attention on as we develop the strategic plan further into figuring out what programs need to be done in order to better express that balanced value proposition for the end consumer that expresses why the products that we work on in terms of research that we want to bring into the implementation space, why that is going to be of value for them.

And some of the discussions from the stakeholders so far has actually given us some insights into ways or opportunities that we might be able to take advantage of to approach them.
Let me pause here for a moment and see if there were any questions. I'll continue.

VICE CHAIRMAN KLEIN: Actually, one thing. We have a Communications Subcommittee and the education function, a lot of that is education of the broader public, right? Because that's really been the focus of that.

MR. POL: Well, there's education of the broader public but there is education also at various levels. There's education of ourselves.

I'll give an example. We talked a little bit earlier about automated vehicles from a presentation earlier this morning. And we focused on it in terms of what it could do for urban travel and such.

But what about some other residual effects of it? Suppose for instance with automated vehicles that starts increasing the value of land in rural America...
that suddenly makes a 4-hour commute from far
distances to, say, Boston possible. Because
presumably you roll out of bed one day -- if
you have a fully automated vehicle, roll out
of bed, sleep in this vehicle, arrive at your
office in Boston and there you're just done.
So it makes actually long-distance commuting
possible. So it could actually start
elevating the price of land in areas which
are -- have so far been economically
underdeveloped. Does that cause any kind of
social justice issues as a result? So these
are the kinds of things that need to be
considered over time, over the course of our
program on the consequences. It's not just
the technology, it's what the technology
impacts to society could be and what is it
that we're looking to get society to accept.
And this also factors a little
bit into developing cost models and benefit
models as well. Because you need to consider
a variety of different scenarios in terms of
being able to express the justification for making investments like these.

MEMBER ALBERT: James, it always seems to me that -- and we probably are all a little bit frustrated by it, but American society takes transportation as a given without really understanding the complexities.

And I'm wondering if one thing that should be maybe emphasized even more is the idea that what we're talking about here in transportation and technology is really an enabler for getting things done maybe in a different level than what we've done before.

And the whole idea of enabling can take a lot of different directions, whether it's increasing land use values in rural areas because you have automated vehicles or whatever. It seems to me it would be a very sellable theme, maybe more than what it's been in the past.

MR. POL: Absolutely. I mean,
you don't know what you've got till it's gone. So says an eighties pop song. So I think that's what often perceived is everyday people experience transportation, experience ITS people. Millions of Americans experience ITS each and every day. They're completely unaware of it because it works. It's when it doesn't work, when the transportation is not there in one shape or form, that's when the angry calls start happening.

So yes, so I think it, again, it goes back to the what's in it for me factor and being able to regard it from the perspective of the end traveler and also what the end traveler is perceiving from it as a result of everything that's being deployed. Yes.

MEMBER KIRBY: I noticed you have notes here and you've got research, development and education with no demonstration in here. It gets back to Ken's discussion earlier. You guys have decided to
be -- somehow you're a research organization and we see you sort of getting into major demonstrations or deployments as kind of a distraction I guess from research.

I mean, I think the thing you have to be reminded of is you have to be careful not to get too separated from your final customers. And there is -- and I've worked in the research community. I've worked in the factory community.

And there is a tendency sometimes in the research community to get sort of consumed by research for its own sake and to invent solutions in search of a problem. And you know, then they come down to us as practitioners and we're going there's just no benefit to that. It's nice but it's not useful to us so we're not going to do it.

Meanwhile we've got a very practical problem over here. How about looking at that. And it's like well, that's not a very great research interest so we're
going to go back to our research and just
drawing it.

And what could be a concern here,
and I would encourage you all to keep good
communication with the people you ultimately
hope will deploy these techniques because you
might get a little too insulated from them.

MR. POL: Of course. And by no
means was I suggesting an exclusion of field
operational tests or deployment
demonstrations. But it's within the realm of
both research and development. And actually
we describe it a little bit further among the
eight different focus areas that we have
defined.

We -- it's part of a broader
range of elements. You'll notice here, and
this is coming from the person who oversees
all the federal ITS evaluation, the
evaluations I didn't specifically note here
because it's something that is pursued
throughout all of these different core
functions of everything that we do. So it's not -- the intent here was to not stratify it into something specific as a discrete element that kind of stands on its own. It needs to be built into the program element. It's an attempt at removing the stovepipes as much as possible so that way when we get to executing the strategic plan we can actually consider all of the components of research, development and education as a continuum, again, focusing on what the needs for the deployer community are.

MEMBER KIRBY: I use for example a variable message sign. Okay, the technology is there. Now it's a question of are they being used effectively and so forth.

You know, it occurred to me there's also this issue of are there some institutional obstacles that are standing in the way of getting some of these technologies on the ground. And I'm wondering if you're
looking into those.

I mean, it's conceivable, for example, that it might be good to have another program category in the federal transportation law that would provide funding for discretionary grants to do the funds. So let's just put that out as a hypothetical proposition, right? Personally I think that would be very good to have. And that might be one of the reasons some of these techniques that you have actually operating in a test mode or a pilot mode are not getting out to widespread adoption.

I've seen a number of cases where ITS grants earlier when there were deployment and so forth, we got some things that allowed us to get something started. They worked and then we got after mainstream funding, applied to keep them going.

But without that initial impetus of a special pot of money to get the thing on the ground. It's very hard to go around and
say look, we need to take your money you've been using for this because we've got a great idea. And we don't know if it's going to work but we want you to put your money, try it. And that's something we deal with on a regular basis. So I just throw that out as something you might want to consider.

MR. POL: No, and I fully agree. I think that let's actually go ahead and look at the different focus areas which can start, really start the formation of the goals for the strategic plan themselves. And some of that is touched upon there.

I agree with you there are issues related to procurement and contracting rules, for instance, which actually curtails some innovation from the vendor community from being able to be introduced into deployment space as well.

And those are things that are going to happen to you over time especially as we consider a connected vehicle.
environment or a connected automation environment in which there are going to be a variety of tools that are going to have to be supported by a wide range of vendors that have to somehow conform within the context of the procurement elements of a number of publications of these vehicles to that.

So again, it doesn't just come down to technology. There really is an institutional dimension that needs to be focused all throughout the process.

So, in terms of -- and let's explore that theme as we go through this. With interoperability, again sort of a different focus here. The plan as shaped from the discussions that we've had within the JPO, with DOT and also with stakeholders up to this point, that the first focus area that rose to the top was interoperability. Being able to have vehicles, devices, infrastructure and applications that are able to be communicating with one another
regardless of where they happen to be implemented. A number one challenge.

Consider again the example of electronic toll collection. As universally deployed as electronic toll collection is we still have a standing challenge in America that there is no national toll interoperability which represents an impedance for mobility, especially when you consider goods movement.

So we have millions of users across America with toll tags that are incapable of moving out of certain regions of America with their toll tags and until recently not even within California to be able to overcome that kind of challenge. So that is one example of interoperability that would need to be overcome.

It would be some may make the claim and some may actually say that would be fair that in order for connected vehicles to be a potential the interoperability
challenges that exist today need to be overcome. And so that's a major component over there.

And again, it's not technologically challenging, it's also an institutional. It has to do with procurement rules that are applied in different states. So it could be guidance on bids. It could take a variety of different forms that need to be done.

And again, a lot of it in the realm of education and development that we talked about is the core functions of the ITS program.

Automation as a major focus area of the program. Again, there's a lot of mode of force behind bringing automation into the consumer space. And one of the reasons why is because it's very captivating. It's something that the consumers themselves are responding to very highly.

So market force really takes a
lot of shape in what happens in deployment. And so we need to consider about what kind of impacts that there may be and how to begin addressing them so that way there aren't any unintentional barriers that rise up that would somehow blunt the ability of automation from actually being implemented or deployed.

Big data and data management. And this is related to interoperability in many ways. But this is again focused on the data environments. And this is something that I spent quite some time in a past job focusing a lot of my attention on which is a lot of data are collected or developed specifically for single-purpose applications.

So, data that were collected for arterial management is virtually unusable for a variety of other purposes. So, in this future realm that we're looking at for connected vehicles and connected automation what kind of data would we be able to
leverage off of that, to make it consumable, on demand for a variety of purposes but yet uniformly available to suit the needs of a variety of applications and consumers as well.

So it addresses a lot of issues related to data ownership. It also addresses a lot of issues of being able to secure intellectual property of data that are generated if they are enhanced somehow by a third party provider. We need to -- there are a range of issues that need to be explored as subject research focused in this area.

CHAIRMAN DENARO: What is the time frame of this plan again?


CHAIRMAN DENARO: ‘15 to ‘19.

MR. POL: Correct. The element that I'm leaving out of this are objective statements of what we're going to achieve by when. Because that, even though the research
may be something that is launched during this
2015 through 2019 cycle some of those
objectives may have time thresholds that
extend beyond that period. So I think that
that's important to note at this stage.

That doesn't mean that everything
that I'm describing here has to be completely
achieved and fully solved by 2015 through
2019, especially considering that many of the
elements probably wouldn't be deployable
until after that time.

But that -- the incentive of
being able to describe all these different
focus areas is for developing the range of
potential goals that would guide the
development of programs for the ITS program
to execute.

MEMBER CALABRESE: Is one of the
things you're going to research, maybe you
already have. I wasn't concerned until a few
minutes ago.

(Laughter)
MEMBER CALABRESE: My current 12-mile and 20-minute commute, I'm saying this would be great because my 12-mile commute might be -- that 20 minutes might be 10 minutes with better ITS technology.

My concern is if there's better ITS technology am I going to move uptown? Where I have a 24-mile 20-minute commute. Enhanced sprawl. It has to lead to more lanes. Generate more pollution. Use more foreign oil. I mean, all the things that we're trying not to create as a country I think. Some of us are.

Many of us are trying to create more dense, compact, energy efficient developed areas. What would the -- do we know through your research or will we know what the consumers' reaction will be to I can get there quicker so that now I can be farther out and enhance sprawl versus reduce sprawl?

MR. POL: Well, I don't have the
answer for that. That would be the aim of
some of the research that would be done.

MEMBER CALABRESE: I think that
would be an important thing to know, how will
this change travel patterns and residential
patterns and development patterns.

MR. POL: Well again, it goes
back to the DOT, the Department-level goal of
livability and sustainability.

MEMBER CALABRESE: This would fly
in the face of it.

MR. POL: Or it could work
towards it. I mean, it depends on how it's
aimed ultimately. The question I was talking
about with Steve Albert a little bit earlier
is what is going to be the society of America
for 2050. So my kids will be a little bit
older than I am right now by 2050 and will
they have the same quality of life that I do.
Will they be able to have a similar commute
and work-life balance that I enjoy right now.
And is this kind of an expectation that we have for other Americans. Is what we're doing enabling it? If it's approached the wrong way it could certainly not enable it and it actually could be a counterbalance to it.

Again, as evidenced from what Jim Arnold talked about earlier this morning about coordinated cruise control based on -- purely on physical sensing there's limitations to the performance of that where it could actually damage or otherwise retard the performance of the highway system and actually cause not just mobility problems but safety problems if it's approached the wrong way.

So in that instance, having the logical connection of vehicles to other vehicles and to the environment helps enable a more perfect operation, that kind of virtual train of vehicles to operate with one another.
In the instance of what automated vehicles could do for sustainability or livability we would need to give that some thought as well through modeling and simulation, and also through some policy development. What is going to be the nature of land use. What are the economic dynamics of income ratio to proximity to central business districts. Land use patterns. Land use patterns as reflected by availability of transit sites. There's a lot of transit-oriented design that's proceeding right now.

There's a new urbanist movement that's getting a lot more traction year by year. We would have to consider a lot of the impacts in the context of what those communities are looking at as well. Yes. Oh Ton. Oh my gosh, I'm sorry.

(Laughter)

MR. POL: As you can see, you get engaged in these discussions and it goes quite somewhere.
So smart cities and digital society. I mentioned this a little bit earlier. This is about being able to focus on being able to integrate what we do with intelligent transportation systems as a platform with other platforms that are used for a variety of urban and rural management systems including waste water management, things like that.

Resilience. Being able to overcome and address unexpected conditions without catastrophic failure. And this could be from a variety of -- some kind of logical intrusion or something to the scale of a Hurricane Sandy or the Sendai earthquake in Japan.

Cyber-physical systems. And this is something that is what we are working on right now. This pretty much sums up the history of ITS. And it's focusing on the intersection of information technology and tangible assets.
The tangible assets so far have been the infrastructure itself. But now we're actually introducing that at the vehicle level. And so there is a much more direct human interaction with that. And so this area addresses a lot of the human factors components of how the human is going to be expected to respond to technology enabled for a variety of transit services, personal vehicle movements or even other concepts such as mobility as a service itself.

Emergent technologies. Again, looking at being able to look at potential technologies from -- that are developed outside of the ITS space that we're accustomed to.

Consider for a moment Google Glass. This is something where you have wearable computing. What could be the impact of a wearable glass on everything that we do in terms of transportation system delivery?
And then enabling technologies and innovative deployment. There we'd be able to kind of focus on what are going to be the elements, the testing phases. This I think addresses a lot of Ron's comments before about being able to transition from the research into working with the deployment community to be able to focus on developing benefits that can be best extrapolated so that way they can be conveyed to other consumers.

And this has been a continuous challenge because one of the things that I hear in discussion about a .gov conveying the benefits from evaluations is that there's often a distrust from a geographical level even within a state.

Within Washington State I had someone tell me that a deployment in Seattle is not going to be trusted in Walla Walla because Seattle is Seattle and Walla Walla, Washington is Walla Walla, Washington. So
what is it that we need to be able to do to overcome that.

I think that goes a bit to what Brian spoke about earlier this morning about a variety of connected vehicle pilots that enable a broad geographical range. Yes.

MEMBER KISSINGER: In the context of those two bullets can you go back to page 25 which is the second where you had development?

MR. POL: Yes.

MEMBER KISSINGER: You talk there about taking technology and developing usable products which, I mean, I sense I know what you mean but that sounds more like a private sector function than a government function. Are you actually -- I mean, it sounds like -- I mean, I think of the government role more as facilitating, serving as a catalyst, doing the demos, doing things that expedite deployment. I mean, is that what that means when you're talking about transforming into a
usable transportation?

MR. POL: No, that bucket -- I'm glad that you stated that and I think that we'll work on correcting that kind of language. It's not -- that definitely isn't speaking to having the shrink-wrapped boxed product, but a product in the vein of 501.1 or integrated corridor management as a product. So it's a composition of various components or elements into something that deploying agencies would be able to perform. But that's not at all intended to compete with a purchasable end user product.

Now, we would work with the private sector that may actually end up developing as a consequence of it, and this has happened in the past, as a consequence of the research that leads to the creation of actual tangible products that make it into the consumer space. But no, the aim of that is not for a direct-to-consumer delivery. Thank you for noting that, I appreciate that.
MEMBER STEENMAN: I read the report, the draft report, and you are addressing a lot of the things that I had some comments about. The only thing that I'm missing is any statement about security.

MR. POL: In terms of cybersecurity?

MEMBER STEENMAN: Yes. The different levels. Because this is a very broad, flowing realm that has many different aspects.

MR. POL: Right. Well, there's ongoing research right now and I think that the research for both resilience and cyber business systems would be where the program on security would actually take place.

MEMBER STEENMAN: Okay.

MR. POL: So right now there's research that's ongoing about a security credentialing management system. Depending on a variety of factors, many of them external.
We do have the NHTSA decision of course, but there are external factors that may come about. It could be a review from other governmental agencies. It could be a review by Congress. It could be future authorizing law that may actually introduce other elements that inform the security discussion or otherwise affect the security discussion. And that may actually be the genesis for a new program of research into different tracks of security itself. And that probably would take within these two different focus areas or goal areas --

MEMBER STEENMAN: Yes, I would just think that in your main focus area for your strategic plan you would have that cost.

MR. POL: Well, again, the challenges -- what we want to avoid is -- I definitely hear your point and duly noted. Security is a critical aspect of everything that we're doing.

The challenge is that in
developing a strategic plan what you want to avoid is creating a partitioned or somehow stratified element or component that stands off on its own.

Security is a component that even though it will reside primarily within these two different goal areas it's a responsibility of everyone. It is a responsibility of all the different goal areas as they're concerned. So that's the intent of not confining a specific element of a lot of the work that we're doing right now as a specific component. Because often what occurs to that is that it affects downstream the dynamics of executing the program in terms of our available resources.

Because we are a limited number of staff and we do have a lot of departmental support but even then there's so much work that can be performed among them. And so we don't want to resources constrain -- it's an attempt at not resource-constraining ourselves by
confining a topic area in a way that doesn't help with making sure that it flows throughout all the different programs.

It just complicates the dynamics of coordinating among all the different program members. So if you actually make that an element for everybody then everybody participates more.

I mentioned before that we conducted webinars. We had over 300 registrants for the webinars that we held back in -- actually it was mid-July, not mid-August. And we had about 175 attendees, industry professionals. We had one aimed at transit, another one at state and local transportation representatives.

We're still working at compiling the information. Even though the webinar was a nearly silent experience we got a lot of detailed involvement and engagement among the participants in that.

One thing that we did receive as
comments back. Greater than 65 percent among
the three different groups that we interacted
with, they wanted more emphasis on connected
vehicles which is interesting to note.

I think that one way to interpret
that is they see the potential of what
connected vehicles can do for their
particular agency. So I think that that is
helpful in terms of it gives us an
opportunity of capitalizing on that, on
describing the value proposition for their
respective agencies.

The transit community expressed
that they have not been significantly
impacted by ITS programs to date. So this is
an area that we might have to focus a bit
more attention on so that way there's more
explicit view and opportunity for them to
participate, especially in future connected
vehicle and automated vehicle research.

Overall though the end stream
publications to communities that did
participate, aside from the transit community, did feel that the ITS programs were very relevant to them.

Other comments that came in had to do with funding. And they did focus a bit of attention on what are approaches that could be meaningful for them to actually secure the funding that they would need for deployment. And it's common to hear that. But I think that they're also looking for alternative means to be able to make that case.

It's the consistent potholes versus ITS argument that we've heard for 20 years. And that's not going to be going away. We just need to see about what it takes to overcome that argument.

We've released a plan input announcement. We have a URL in which we can engage the public. That was re-framed recently to be able to encourage more dialogue.
And we are continuing our public information meetings. We're going to be at the National Rural ITS Conference at the end of August in St. Cloud, Minnesota. We'll also -- we just did one on Monday over at the ITE annual meeting in Boston.

We'll be at CBTA at the middle of September. And then we're going to be at the USDOT Connected Vehicle Program meeting which is going to be at the end of September over here in Arlington and not in Chicago.

And apart from that I think that's -- where we're going after that we should have a full draft of the external plan in draft form towards the end of October. Components of that are probably going to be placed onto Ideascale again for socializing it with the stakeholder community and to engage further comment.

And then we'll be going through our internal USDOT review through -- release by TRB. And we're -- while we're doing the
review we'll also begin developing some of the program proposals and plans starting in the fall, probably going into 2014 to begin to take shape over what were the different goals and objectives that were defined through this stakeholder engagement process that we're in right now.

MEMBER HAMMOND: What's the distinction of the term "external" plan?

MR. POL: The distinction really is formed primarily by what the federal acquisition regulations will allow me to do with the contractors working on developing the strategic plan. And that is a continuing dialogue that I'm having with our legal office and our contracts office into what is considered general information and then what becomes procurement-sensitive or competitive advantage.

MEMBER HAMMOND: But it is the strategic plan.

MR. POL: It is the strategic
MEMBER HAMMOND: It's called the external plan.

MR. POL: Yes, we call it the external plan because it's really developed up to a point where we may have some -- well, we will have the goals and objectives defined, and we will have the high-level elements of programs defined.

Now, going into development of road maps, development of what kind of specific work activities may be created for that strategic plan, that's something that is possibly, again, depending on the time of day with the chief counsel's office, that's something that needs to be worked out with them before I can continue working with the contractors. And then I would have to switch over to other resources to be able to finish that.

CHAIRMAN DENARO: Okay. We have about 55 minutes.
MR. POL: I have one more question.

CHAIRMAN DENARO: Well, no, I'm not releasing you yet.

(Laughter)

CHAIRMAN DENARO: We have about 55 minutes before we're done. And what I'd like to do then if you can -- you can have a chair if you like. You don't have to stand up.

MR. POL: I'm comfortable standing.

CHAIRMAN DENARO: Okay, all right. MR. POL: I'm probably better at thinking on my feet.

CHAIRMAN DENARO: What would be valuable for me and if it works for the rest of you as well is to basically -- there's some things I didn't hear. But that doesn't mean they're not in here somehow and so forth.

So, what I would like to do, and
I'm suggesting everyone else do is test certain questions for you. And then that way we'll probe where we think there are gaps. Like Ton already asked about security and it looks like there could be something more that we want to recommend there. So that's what I would like to see now from everybody. So Peter.

MEMBER KISSINGER: Well, I just had a timing question. Presumably a subset of this is connected and a subset of that in terms of vital research and activities necessary to support what we hope will be a rulemaking that will start sometime this fall. I mean, can I assume that this plan is being closely coordinated with that so that timing-wise we'll all be on the same page if you will? And if so, is it far enough along that you can talk about what that out date is?

MR. POL: Well, I can't anticipate exactly what NHTSA's decision is
going to be and what their next steps are
going to be after that.

What I can say is that a lot of
the work activities that we're doing right
now under our current strategic plan cycle of
2010 through 2014, many of those activities
are likely to continue into the next plan
cycle as well. And we'll articulate that as
a component of the strategic plan.

Because many of the research
that's ongoing is highly beneficial, very
valuable and just because we're starting a
new strategic plan cycle doesn't mean that we
just slam the door shut on some of the
research activities that are going on right
now.

Now, they may be re-composed in
some new form. So, and again I think that
that may be an element of refocusing on some
new goals to make sure that we're better
aligned with the goals of the Department and
also with what we hear as expectations from
among the stakeholders that we use to define and shape what the goals and objectives are.

I know that doesn't sound like a very satisfying answer to you. I mean, the short answer is research that will go on to support the -- whatever the outcome of the NHTSA decision not only for 2013 but also for 2014 is going to go on and will continue as part of the strategic plan. That's just mission critical for what we do in the Joint Program Office and for the ITS program overall.

MEMBER KISSINGER: Well, I guess a related question which is sort of central but I mean at some point if it appears as if the research necessary to support the rulemaking is taking longer than scheduled, than perhaps this Committee might like, I mean do you have the flexibility to sort of readjust, maybe speeding some of that up, maybe slowing up some of the other non-connected research?
MR. POL: Perhaps that's a question better asked of Ken.

MEMBER KISSINGER: I guess, I mean is that a topic that we could comment on? And maybe it's too premature at this point.

MR. LEONARD: Well, is your question do we have flexibility in how we structure our research, or are we -- are we using the NHTSA decision to guide what we put into the strategic plan?

MEMBER KISSINGER: Well, I guess both. I mean, I guess I'm asking can we be assured that like NHTSA is fully taking advantage of where you are and what your research plans are in terms of laying out their sort of initial expectations for the rulemaking? And at some point when those plans get more defined, you know, do you have any -- at that time will you have the flexibility to adjust priorities at all? If necessary to let's say expedite or speed up
the completion of the rulemaking process.

MR. LEONARD: Well, without saying much about what NHTSA is going to decide because they're in this deliberating process right now. And in fact, to me it almost doesn't matter what the NHTSA decision is. Unless they say it would be a waste for the government to continue even investigating connected vehicle then it almost doesn't matter what they say.

I think that connected vehicle is going to be a part of our strategic plan whatever NHTSA announces this fall. We are actively engaged at NHTSA and other modes in talking about research gaps, needs, unanswered questions, security.

There are complex issues that involve connected vehicles and don't involve connected vehicles that we talk to all over the whole Department. And we ask -- we work with all of them together, input on our budget priorities and the strategic planning
process. As the director of the Joint Program Office I have a fair degree of flexibility in working with the staff to come up with what we think is the best plan.

We then work with a strategic planning group of all the associate administrators across the modes. They brief their principals, the administrators of all the modes. I take the plan, our budget plan and the strategic plan into a management council that's chaired by the Deputy Secretary and brief him and all the modal administrators on our strategy and on our specific budget plans to execute that strategy. And they either endorse it or they make suggestions which as a director I give very serious consideration.

So I think we have a lot of flexibility. We get a lot of help from a lot of people. And we appreciate all the help we get. I don't know if that answers your question.
MR. LEONARD: The only problem is isn't that still -- are you looking for input from this group in that regard in terms of sort of that question?

I mean, you know, simplistically I could argue that let's say you have $20 million and you're spending $10 million on connected vehicles and $10 million on everything else. And if you went to $15 million to connected vehicles perhaps you could speed the implementation of the rulemaking up by 2 years. Just, I mean I'm just throwing hypotheticals out.

And presumably that would be something that this Committee could legitimately comment on. We think that's a good idea. Or we think it's a bad idea. Or we leave that to your judgment.

MR. LEONARD: As an advisory committee you can advise on almost anything you want. I don't think getting into the specifics of what percentage of our budget
should be spent where, that's not something I'm looking for.

But if -- but kind of underweight/overweight guidance, you know, the program is too heavy on connected vehicle, you're neglecting corridor management or arterials or pedestrians. That kind of guiding advice. Or we don't see enough going on in automated vehicles. We think there should be more, we think there should be less. Or we think there's an area where we're not looking into, something that we hadn't thought about, we haven't talked about. Those are the key things I would be looking for rather than we think you should spend $1 million on this and $5 million on that.

I think within the resources we have in the Department we can determine what contract vehicles to use. And that has a lot to do with what license we'll address.

I think at the detailed execution
level I really would not look to a program advisory committee. And I really wouldn't look for that in a strategic plan. This is meant to be a level above execution.

So from a strategic perspective if you think there's advice you could give us that would have impact on the NHTSA process, okay, I'd listen to that. It's hard for me to imagine right now what that would be that would change the path that NHTSA is on right now. But you might have a great idea.

MEMBER WEBB: If NHTSA says there needs to be more study in this particular area in whatever before we get into rulemaking, who does that? Is it NHTSA? Is it you guys? Who will produce that information?

MR. LEONARD: So, the way things work now and the way they'll work next year and the year after that is that collectively we talk -- NHTSA comes to us and says we have identified an area we need some research.
And they may or may not be doing some research in their budget. Highways may be doing some research in theirs.

But they come to us and say we've identified an area that needs some research. We don't have it in our budget. We'd like the ITS Joint Program Office to provide $3 million on research and $2 million on cybersecurity and $1 million on DSRC interference issues.

We look at their proposals. We work with them to develop them. We might fund them through an interagency agreement with NHTSA. We might fund that through other contractual means to get the answers to those questions.

So in a lot of cases modes come to us, ask for resources, we give the money to the modes. In some cases we fund research elsewhere and give the answers to the modes. So it really depends on the question and what the best --
MEMBER WEBB: So essentially the high-level direction would be if NHTSA needs something, provide it. That's about --

MR. LEONARD: If it's consistent with our strategic goals we help them in trying to achieve. So it's, again, we have spent a lot of time in this meeting talking about connected vehicle. And it is an incredibly important area. From a strategic planning perspective I do not want people in this room to forget that there is a lot more to intelligent transportation assistance research and deployment than connected vehicle. So I really want to get the strategic guidance to think about that breadth.

Now, it may be that at a certain point there just aren't enough resources in our budget to fund all this. But if that's an issue I'm willing to identify my own resource gaps to whoever will listen, to whoever is the appropriate audience.
MEMBER KISSINGER: Well, I certainly respect that, but I guess strategically it strikes me that like a logical question to say strategically is implementation of a rulemaking on connected vehicle one of the agencies or the Department's highest priorities. And if it is it seems like that should be reflected in the strategic plan. And perhaps it is. I mean, I'm not saying it isn't. I'm not questioning that. I mean obviously you're putting a lot of priority on this.

But in the context of this morning's discussion about how to speed things up, you know, it just seems like a logical --

CHAIRMAN DENARO: You're talking about implementation tools. That certainly is one implementation tool.

MEMBER KISSINGER: Yes.

MR. LEONARD: And on a practical basis the coming NHTSA decision, it has, and
I don't know if we've addressed the vehicles involved. A lot of people in the Joint Program Office, a lot of people at NHTSA and other modes meet daily. We have two modal administrators who meet on a weekly basis with those staffs. I have not seen -- I've worked some large programs before. I have not seen one that had such tight intermodal cooperation as this connected vehicle program.

And the reason is because no one mode can do this by themselves. NHTSA cannot do this on their own. They can issue the regulation but we don't get to a connected vehicle society just with the regulation. There are other pieces of this that have to fall in place. The other modes have to get involved in order for this to work in the long term.

CHAIRMAN DENARO: Let's go to Steve. I think he had a question.

MEMBER ALBERT: Thanks, James,
for the presentation. You did a good job, you and Booz Allen. I thought it looked really nice. But it was kind of like wrapping on a present. I don't really know what's inside.

I'm really excited to hear, Ken, that you brought up the idea that it's more than connected vehicle and it's ITS. I think the Committee has been from my perspective way too focused on connected vehicles. I understand why because of the rulemaking.

But I wonder in the timing of the strategic plan and the timing of the end of our Committee, by the time the strategic plan is coming under development we don't have a lot of time to comment. And that is really — I'm more interested in commenting on the non-connected vehicle stuff.

And I'm wondering have you done any type of gap analysis as part of your strategic planning beyond connected vehicles that we might be able to digest and look at
so that we could move more quickly in the remaining months that we have?

    MR. POL: As an artifact that's available now, not really is the answer. Because we're still going through the stakeholder engagement process. And we don't really complete that -- we'll have a very strong sense of that towards the middle of September, but even then we're still working towards our final stakeholder engagement process even then.

    What I can say is that, and you may notice this as the draft focus areas of the plan. Connected vehicles isn't mentioned once.

    MEMBER ALBERT: I thought I was going to fall down.

    MR. POL: And well, you know, that's intentional. Because it's supposed to fit within the context of everything else.

    There's -- and I think that there's -- there's an intent here -- and
again, based on what we've heard from stakeholders that we needed to recognize that there's, oh, about $19 billion worth of investment in legacy ITS systems, and that's a conservative estimate.

That's not going -- you know, some of that may get phased out over time but it's not going to be a discrete moment switch off from that immediately into a connected vehicle world. Even considering the time frame for vehicle fleet turnover that's going to take quite some time.

We're talking potentially about a 22-year span for a full vehicle fleet turnover. And even with some infrastructure you're going to get some very good gains in terms of value from connected vehicles. But still, it has to be complemented with all of the legacy assets that are out there as well.

Again, this is based on what we're hearing from the stakeholders and talking to the different program managers as
well. So we can't ignore that. That's something that has to be recognized as part of the portfolio of research which is we've gone through this current cycle of developing the connected vehicle technology and we're working very quickly towards the agency decision which can go in a variety of different ways.

But going back to an earlier question about what is the definition of connected vehicle, period. Well, it exists in so many different forms.

One can make the claim that it exists right now just simply by you carrying a mobile handset that has the ability to generate data and produce data and transmit data and receive data. And actually affect your behavior. That is the ultimate intent of ITS which is to affect user behavior on mobile options, time shifting, to be a safer operator, vehicle operator. To be a better transit consumer. It's all about ultimately
just altering the behavior of travelers.

So, given that kind of context we have to consider the range of existing assets that are available today in order to be able to secure that future environment that is focused and based on connected vehicles.

CHAIRMAN DENARO: So, Steve, one comment I would have for you is this is not our formal recommendations that are going in our end of year memo. This is a separate document and we're doing it for Ken. In my opinion we can be more open loop about this.

So, for example, if you have a bunch of things that you feel pretty passionately need to be covered in here, the fact that you don't know if it may be buried in there, inside the wrapper or not, maybe doesn't matter. Let's write those down and get those to Ken. And he can say, all right, we're doing one and two but these other three, you know, thanks.

MEMBER ALBERT: I think it's one
thing to come to a group like this and
collectively think of ideas rather than be
able to come to this group with some
quantifiable information are two different
subjective processes.

CHAIRMEN DENARO: I agree.

MEMBER ALBERT: And so that's why
I was asking --

CHAIRMEN DENARO: Yes.

MR. LEONARD: So keep in mind we
have some folks here from Booz Allen Hamilton
who are recording ideas. They've been going
out to these strategy sessions and this is
one of our outreach sessions. The mode we're
in right now in case you didn't realize. We
have people recording so we can have some
ideas, specific -- I don't know if they're
focus areas or specific program areas.

I would say this is an
opportunity for the advisory committee to
make suggestions. To say, you know, Ton is
saying where is security in this list of
focus areas. I have concerns about security. Where is it in this list. And that's a very legitimate question.

If you have concerns about rural ITS applications, where is it in this list. And are we addressing it.

And so I would ask the group, for all of you to draw on your backgrounds and expertise and say do you think we have --

MEMBER ALBERT: Well, I'll convene a committee for the National Rural ITS group to kind of provide some response.

MR. LEONARD: Right. And that is one of our outreach sessions later on.

MEMBER ALBERT: I chair the committee. I chair the conference.

MR. POL: Yes, but even prior to the session that we have separate and read as Steve and I talked. And I'll join the committee and have a discussion.

MEMBER ALBERT: Thanks.

MEMBER MCCORMICK: Scott Belcher
has been unknowingly mentoring in the art of
shameless plugs. So what I -- you know, Greg
Winfree at the summit on the state of the
connected vehicle Greg Winfree is giving the
opening keynote and Leonard is giving the
afternoon keynote. And they're both talking
about things that really haven't been talked
about before, right, getting updates and
things like that.

And then we're having a jam
session which is an internet session with the
entire participation so that you don't have a
room full of silent people and we're
structuring that ahead of time.

If you're not coming and you want
stuff to get into that make sure we know.
We'll make sure that it's incorporated in the
body of comments that are brought.

CHAIRMAN DENARO: Any questions?
Comments? I have some inputs to make. In
the spirit of recorders.

So, in a 60,000-foot down view
what I would like to see is you acknowledging
the big trends in society and mapping how
what you're doing appreciates that or this
doesn't matter, we don't care, but at least
acknowledging it. So, ideas.

Automation is coming, like it or
not. You've got it in there. I saw it. Two
points.

Leaving connected vehicle out. I
don't think that you intended that as not in
there but I'll just say don't leave connected
vehicle out. For the very reason that the
time frame of this thing is 2015-2019. You
know, you're just getting going in that time.
If there is rulemaking it's kind of going to
squeak out with the end of this period
actually.

MR. POL: So would this be
exclusive of it?

CHAIRMAN DENARO: Yes.

MR. POL: Okay.

CHAIRMAN DENARO: That's why it
is Ken's what's going on and ask in cellular phones and all. Okay? And I'm not getting -- I don't have a lot of great insight here. I'm just doing this -- I did this 60 seconds ago.

MR. POL: Very relevant. Renault has an app store. Renault the French car maker.

CHAIRMAN DENARO: And my point about apps is so what does that mean to you. This is here and now and it's going to continue to grow, especially through this period. Are you -- what is your relationship to that? If it's nothing maybe that's okay, but maybe that's scary that it's nothing. So anyway.

Next one. Electric vehicles and electrification. And I don't mean the fact that, all right, there's a couple of electric vehicles out there. They're kind of cool.

I mean electric vehicles when you start getting some volume are going to change
everything about transportation. And that's it.

Here's a big ride share. You know, this is coming on. And that gets into social profiles of people, you know. Millennial generation says I don't give a damn about owning a car. Ride-sharing is good for me. What that means to you is we start getting 90 percent utilization of cars instead of 5 percent, all that kind of stuff. That changes the entire grid and so forth.

And in this time frame, I mean I'm not that familiar with it. I'm saying I know about it. But I understand in some cities it's starting to get some traction. And in 2015-2019, I mean there's a little scenario planning implied here. What if this ride-sharing really, really gets big in that time frame? What does that mean about what you're doing?

This one, maybe not related, or maybe it is. The whole social networking
thing. I know it's related to what I just said ride-sharing. I know one of the reasons for ride-sharing by that demographic is because they don't care about their personal presence, their personal image being dependent on what kind of car they drive. They're more, you know, that's being done through their social networking so transportation is becoming a commodity to them. And my generation it's not. So there's a tie-in to the social networking thing in there.

But the social network thing also goes to this whole communicated car. I mean, I can get specific. There are going to be things that people like LinkedIn and Facebook and so forth do that are going to be transportation related. In fact, I know for a fact that Facebook is doing things in transportation.

And then kind of closely related to that is the whole crowdsourcing thing.
You know, the world has gone crazy over crowdsourcing.

So Shelley Row is up there, presented at the Boston thing also. And she talked about navigation. She never mentioned any of the navigation things that we've all been using for the last 10 years. She only talked about Waze.

MR. POL: I was really proud of her because I showed her Waze a year ago.

CHAIRMAN DENARO: Is that right?

So, I think that's fine but I found it amusing -- I'll use that word -- that she focused so much on Waze. She must have said Waze 10 times there.

And you know what. One reason I kind of reacted to that is I used to be in the nav business as you all know and damned if my kids wouldn't keep telling me about Waze and how great it was. And I kept telling them, you know, because I worked for a navigation company that they were all
wrong. But maybe they were right.

And that gets into the
crowdsourcing thing and the power of the
crowdsourcing thing. So this crowdsourcing
thing is so powerful. What does that mean
about your business?

MR. POL: Okay, very good. And
let me augment -- it's not a recall. It's
just augmentation onto this.

Related to social networking and
crowdsourcing, one element of Waze that a lot
of people seem to skip over is gamification.

CHAIRMAN DENARO: Is who?

MR. POL: Gamification.

CHAIRMAN DENARO: I agree.

MR. POL: So it is earning
points. And it's gamification in which end
user is rewarded not necessarily in the
vehicle or in the transportation service. It
could be points for like miles on United
Airlines or something like that. So this
gamification can be played out in a variety
of ways. It doesn't have to be instant
gratification delivered to the consumer.

CHAIRMAN DENARO: Gamification
has become a pretty good focus of some of the
deco apps for example.

MR. POL: Correct. Correct. And
I definitely see that as an emerging program
area. I'm testing some waters with some very
sketchy research hopefully soon if I ever get
time to finish writing my scope.

I love the element of Apps World
because there definitely is a big trend in
that. If there's an opportunity for growing
a new market area especially in Detroit this
is the big economic opportunity. This was
the focus of a multi-page article in the New
York Times not too long ago about the growing
apps labs in Detroit. People are leaving
California for Detroit to get into the apps
creation.

I witnessed this directly by
attending South by Southwest the past couple
of years actually. There is an enormous amount of energy that's going into this kind of thing.

Electric vehicles. Admittedly I don't know why it didn't come out. So we'll definitely make sure that we get that more explicitly stated in there.

The ride-sharing and social networking. Some of the comments that I'm hearing and some of the discussions that I'm having with the team is focused around mobility as a service or transportation as a service. And you have elements of that.

And I think that goes a little bit to what you were talking about before on the social dynamics of vehicle ownership, that the concept of car ownership or vehicle ownership as we understand it now is altering in a variety of different ways. So what is it that we need to do to help the taxpayer or help accommodate where things are going.

Things that I'll say -- this is

I mentioned to Steve Albert, I made peace long ago. I'll never retire.

The concept of what the impacts are for rural America in terms of creating mobility that enables new employment in rural America. Again, right now oftentimes if there is manufacturing or if there's a chicken processing plant.

I heard a really interesting example of a chicken processing plant in central Georgia where a rural transit service was almost taken away. They had to couch it in terms of, well, you're going to lose all of these jobs because the chicken plant is going to dry up. Nobody's going to be able to get to work. So, you know, the mobility was reintroduced there.

So what happens for being able to
deliver socially and economically disadvantaged rural America to employment centers that are not necessarily located in the big urban areas but for manufacturing.

The other thing is, and Brian is going to roll his eyes as soon as I say this, is micro manufacturing. I keep thinking about -- or saying this.

You've heard of 3D printing, right? It's actually the ability to produce anything and you can produce it on a device that would actually fit on top of this table.

You can actually 3D print food. So what are going to be the impacts on freight movement, goods movement as a result for that.

Does this mean that we start shifting the balance towards more of the mom and pop trucks that Nate Beuse talked about a little bit earlier? What occurs there? So those are some of the other trends that we've been hearing about that weren't explicitly stated but came up.
CHAIRMAN DENARO: Okay, just to follow up on that and leverage that a little bit but then go on too because you made me think of some things.

I hear what you're saying about micro manufacturing and locations outside. But then there's another huge trend about populations moving back into cities.

MR. POL: Yes.

CHAIRMAN DENARO: And suburbia is going to dry up and blow away. What does that mean? I mean, if urban now is too. I don't know, I'm just making this all up.

On the one hand, you've got all these people living downtown. On the other hand, we're creating public transportation. We're not driving anymore. We're not really in cars. I don't know what all happens but that is a trend that maybe affects your business.

And then the other one, and you started getting to it in terms of micro
manufacturing. It's the whole online shopping thing which is only going to get bigger and bigger and bigger.

And what does that mean? To me that implies -- I'm just amazed at how cheaply I can get stuff delivered. How cheaply and fast stuff gets delivered to me. I mean, I ordered 100 pounds of chlorine blocks for my swimming pool. The next morning they're out on my front step and I didn't pay for shipping. Obviously I'm paying too much for chlorine.

But the whole business model of shipping has changed while I wasn't watching and will continue to evolve. And for you that maybe creates problems because of all the trucks on the road, so that's trucks and planes not doing -- whatever. Another example.

MR. POL: Perhaps. Perhaps.

CHAIRMAN DENARO: Okay, I'll shut up.
MEMBER BERG: I wanted to dovetail on what Bob was talking about. Major social trends is something you should really consider when you're looking at a strategic program. And not some of the little individual things.

You're going to have an automated network, aging society. And not --

CHAIRMAN DENARO: What was the first part?

MEMBER BERG: Automated network, aging society.

CHAIRMAN DENARO: Okay.

MEMBER BERG: So I agree with your major social trends. And that will affect how people live, how people work, how people use any transportation network, whatever will be there. It's not going to be your father's transportation network, that's pretty clear.

MR. LEONARD: So that would become ANAS, automated network, aging
society.

(Laughter)

CHAIRMAN DENARO: You heard it here. We really needed another acronym, Ken.

MEMBER BERG: The other question, or maybe a comment I had, is if I look at the last strategic plan that was pretty much summed up in one word, connectivity, and how that influences your safety -- would you call it mobility? Which I call efficiency and environment.

And when I look at all this I see basically nine different things. So it might be hard to convince people that there's a strategy behind it when you're here, here, here, here.

In the other case it was easier for me to see all the stuff below was, all that meant connected. That's how it leads to connectivity. Where I don't see that in what you presented today.

MR. POL: Okay.
MEMBER BERG: So that might be --
I mean the structure might be there, it just
might be advice for a better way of
communicating that you have a cohesive
thought, cohesive pattern.

MR. POL: Definitely noted. The
vision statement that we said before,
transforming the way that society moves.

MEMBER BERG: What does that
mean?

(Laughter)

CHAIRMAN DENARO: That's why it's
a vision statement.

MEMBER BERG: Before you get off
on that too much, one more thing I wanted to
make a comment on. And you kind of touched
on that. But concrete measurable time-bound
goals instead of, oh, we want to enhance the
ability of connectivity and transportation.
That really means nothing to people and it
doesn't really incite any action. It's like
okay, yes, that's good. What's next?
MR. POL: And we're working on developing those objective statements. They just haven't been formed yet.

MEMBER BERG: But measurable outcomes. Just like measurable deployment outcomes for ITS. I think you should have measurable research outcomes for ITS.

Like here's what we need to do to get to half as many accidents. Here's what we need to do to improve the efficiency by 10 percent. Here's what we need to do to reduce CO2 by this much in this time period.

MEMBER HAMMOND: Linking to that, I think it's important to measure success on what you accomplished from the previous strategic plan. Which was where I was asking how different is this one from the last one. What's been accomplished since then? It just seems to have been connect and build on the performance of the last one.

MR. POL: Okay.

MEMBER HAMMOND: Because I think
there's been progress.

MR. POL: There's been enormous progress.

MEMBER HAMMOND: I think there's been great things to talk about.

MR. POL: Correct. Correct.

CHAIRMAN DENARO: So you're saying metrics.

MEMBER HAMMOND: Yes. And performance report or a report card on the previous strategic plan. That some of these things do something.

CHAIRMAN DENARO: You bet.

MR. POL: So long as that qualitative metrics are also possible. Because in the last strategic plan, again, going back to the one keyword of connectivity that was when we initialized the concept of having an agency decision in 2013.

And we've worked at being able to do that. So from a qualitative perspective, yes, we provided an enormous amount of energy...
and resources in order to be able to get to the lead-up to an agency decision.

And a variety of other things have emerged as well. Our understanding of environmental value and benefits from a connected vehicle environment are far better understood now than they were before.

We've described a range of mobility applications. So yes, I think that in hearing this, and I'm sorry I'm thinking out loud. It really is Bob's meeting, not mine. I just kind of live here.

I think that having a component of this new strategic plan that kind of revisits the key successes from the past. We've articulated that through program plan updates from our most recent one in 2012. So I think we would be featuring some elements of that as kind of a preliminary statement going into the strategic plan.

MEMBER BERG: Two paragraphs of that rather than 128 pages.
MR. POL: That's the challenge in all this is finding this actually brief.

MEMBER BERG: I think I've passed the recent years of my career trying to simplify things for people who don't get it. It's tough. I understand.

MR. POL: Right. Yes.

MEMBER BERG: But as my boss would say, do it anyway.

(Laughter)

MR. POL: I can relate to that.

(Laughter)

CHAIRMAN DENARO: Other comments? Yes, one question I had also is maybe it's time to revisit the whole safety, mobility, environment. I mean, they're good words but are they still -- if you take a look at everything we just wrote down or whatever, are they still reflecting that?

One specific question I had which somehow dropped off because we used to say it was efficiency. And that kind of maybe
brought the commercial vehicle guys back in, you know, a little bit.

And you do talk about intermodalism which really impairs that. So what about efficiency? Is that -- does that need to be promoted to a visible tag on the thing too? I don't know.

MR. POL: My immediate response is we need to think about that, how to actually bring that in.

Again, the challenge is that we've got the safety, mobility, environmental, you can call it efficiency also. And then we have the different focus areas of the automation in a full integration over here, et cetera.

And being able to design programs that map and touch upon many of these major, more DOT goal-aligned components including livability and sustainability while at the same time being able to develop that address the things that are going to be more priority
that are most priority for having a fully effective and fully realized ITS research program.

So in a perfect state where everything that we research actually makes it to the deployment state, the Shangri-La model, if all of the different focus areas would be realized. But they would be realized in different forms with respect to safety, mobility, sustainability, livability.

And that's the element that we're still working at developing which is beginning to cast programs that tie across different elements of those DOT goal areas.

CHAIRMAN DENARO: Yes. And you could argue with me that if you just do safety, mobility and environment that efficiency will result. You might be right. But if you give it visibility like that then it kind of forces you and everyone else to, all right, what is specific about automation
and efficiency. And you know, it gets promoted because there's a little more visibility.

MR. POL: Well, I mean consider the issue of, again, going back to interoperability. We've got the word "infrastructure" up there.

CHAIRMAN DENARO: Yes.

MR. POL: State of good repair is a stated DOT goal. We're working in a context of an aging infrastructure and we're working on maximizing the utility and the life of the infrastructure that we have. Replacement -- there's going to have to be very, very judicious review before any investment is made in terms of replacing a bridge, interchange, whatever.

CHAIRMAN DENARO: Sure.

MR. POL: So how does the -- how does ITS figure in that in terms of -- and how do we design programs in ITS that contribute towards making the infrastructure
last and as durable as possible into the future. And that could be a variety of things. And you can marry that up with resilience.

So, consider an area, consider it in the context of just my conjecture, not saying a departmental position, say global warming. And that there are going to be urban areas that are going to be more prone to flooding. How does ITS in terms of measuring flow rate and culverts and other areas that the water assets that help keep the roadways as dry as possible, but yet there are going to be events in which they're going to fail.

And how does that actually translate into actions that are conveyed to people further downstream or upstream to avoid the area? And also through smart cities to be able to convey to departments of public works that there is some kind of wattage that's actually occurring as a result
of some kind of debris or whatever.

CHAIRMAN DENARO: Back to Waze again.

MR. POL: Exactly. Well, the things that -- it's more than just going back to Waze. You can't run a city entirely on Waze. I mean it's a great product but --

CHAIRMAN DENARO: No, no. I was being facetious.

MR. POL: But you know. So that makes the consideration in terms of how do we -- make the program as interrelated to everything else that's going on and being able to address a lot of the challenges that consistently the infrastructure is facing. So that's one of the things that we're trying to think through.

CHAIRMAN DENARO: That's why strategic planning is hard.

MR. POL: Yes, the strategic plan is hard and it has a short shelf life. And I'm sure after the first 2 years I'll look at
it and go ugh. But it gives us a starting point to be able to migrate to.

MR. LEONARD: Just one issue I wanted to put back out to the group. I think Roger really hit on an important point. When you look at these different focus areas the last plan, I think the title was "Transforming Transportation Through Connectivity." So there is a unifying theme.

And I like that theme. I mean we could almost say, well, that's a good theme for the next 5 years too because we're going to be continuing that at NHTSA. But in some people's mind it excludes other elements of ITS. You can argue that.

Is there a more comprehensive, unifying theme that catches everything we're doing, that captures a lot of these issues? And I'm pretty sure it's not "Culverts for a Drier America." So it can't be too specific.

It's got to be broad and yet it can't be so broad that it's happiness.
MEMBER ALBERT: I'm sure with a bottle of wine we can come up with something.

(Laughter)

CHAIRMAN DENARO: "Transformation for a Changing Society." I mean that's always been true but a lot of the things we're saying, we're going through a lot of change right now. A lot of change.

MEMBER KIRBY: I can't say it in a few words but the thing that strikes me as this conversation kind of responds to it, but it all hasn't been brought up. One part of all this is what is the responsibility and role of the government and the public sector in making IT'S A success.

When full-throttle ITS things are taking off through the private sector, things you don't. I mean we thought at one time realtime travel, we were going to have to do that as a public sector thing. Well, it's just -- the private sector is just doing it. We don't -- cars and they've got their own
people. They're moving track records and all kinds of things like that.

And things like car-sharing and bike-sharing. The private sector has just leapt in there and our job is to find a park and allow them to park somewhere. And then the whole technology has enabled those systems. You couldn't find where the car today was, you couldn't do it. Same with the bike-sharing. So the technology has enabled a new thing which the private sector has come in by and large and supplied it.

There's been a public sector supporting role there. In some cases it's pretty minimal. In all of our connected vehicle discussion we think there's a very significant public sector role here in terms of connected vehicles because you've got to have this system, this network, and NHTSA, and security, and all those things. Well, this is not going to happen, you know, the automakers are here because they're not going
to do it on their own. There's a critical public sector role.

I think that question is a good one to ask of a lot of these other ITS areas. Where's the niche there that there's a critical public sector role that you need to work on as opposed to things the private sector is going to do on their own.

MR. POL: That's an excellent point and I think that -- the point that you were also making there is that it does take industry, academia and the public sector working together to realize all of this. It's not -- no one community can do this entirely on its own because it is so broad and so spanning and pervasive.

Again, it goes back to quality of life. Whose responsibility is quality of life? Well, there's the individual, but then there's the rest of society and all the different industry. And the government.

MEMBER KIRBY: The type of
program and the thought that crossed my mind earlier, I can't resist doing it. You know, there is the question at some point of is the government getting too much in your business. And I'm thinking back to requiring seatbelts. There was controversy. If we get in with this connected vehicle system and we're starting to require people to have their car listen to other vehicles no matter what they're -- and so on, there could be an issue there.

I was driving down my neighborhood street in Alexandria today and an old beat-up truck crossed in front of me. And it had a big Indiana license plate on it. And on the back of the truck was "You are not free" and various other slogans along the lines of, you know, government is too much with us, et cetera, et cetera.

And there's a line of thought out there, pretty prevalent, more so in some parts of the country than others, that we
don't want any more government than we absolutely need sort of thing. That might be something here as well. At some point that could be an issue. It's something to think about.

MEMBER MCCORMICK: Well, that's a valid point. Because I think it was '73 that GM first put seatbelts in a car and they had a drop in sales because people didn't like sitting on them. And so it wasn't government mandated in seventy-four and five. Then everybody had to have it. Then it was like you're not supposed to sit on it, you're supposed to wear it.

MEMBER KIRBY: Now you have to wear it.

CHAIRMAN DENARO: Well, I meant that all goes back to the question of the public versus private appropriate roles. And maybe more things are going to happen on the private side and then maybe that implies that the government side is doing different kinds
of things to support that. But regardless, you're working in that context.

You know, thinking back to your question, Ken, about -- I don't know what the right theme is, but there is a concept overlying a lot of what we're talking about here, and that's one of the need for agility which the transportation industry hasn't typically been known for.

And that's just recognizing that things are changing so fast. And you said it yourself a minute ago that you do this plan and 2 years from now you look at it and say what were we thinking.

And I'll just throw out one. I don't know what's going on with this thing but I'm hearing all about the next -- unless Apple does this they're toast and that is wearable computing. And we're talking about pedestrians. How do we bring them in? Well, that seems to start getting connected. So what's that all mean? So, but I don't know.
The point is we need to find a way within our strategic plan, and when we do to be agile to adapt to these different trends and have the right thing we need at the time we need it.

I mean certainly the auto companies are going crazy with that, with the way electronics is moving into the car, and the necessity to move apps into the car and all that. I mean it's just a discord of that.

MR. POL: Yes, it's successive waves of disruptive technology.

CHAIRMAN DENARO: I mean I'm not saying anything very profound here because we all know that technology is moving faster than it ever has. In the last 5 years more has been invented than in the previous history or whatever. I mean we always hear those kind of statistics. But it is a factor. And how the heck do you operate in this environment?
MEMBER KIRBY: I mean it's pretty hard to deal with for some of us.

MR. POL: But at the same time you can certainly look and if you take a long-range view of the outcome of the availability of technology. And they have profound impacts on creating whole new industries.

So, taking for example France Telecom in the nineteen eighties created Minitel. It was a device at the home that enabled -- and the thing that was unique about Minitel was that it was a unique, direct to the home data connection.

Subscriptions they serviced. You had a little device, a Minitel device, and you interacted with it for getting information about restaurant reservations, movie times, train information, you know, booking airplane tickets and whatever.

Of course, in the early nineties once HTML came out and the World Wide Web was
available everybody ridiculed Minitel as a huge ridiculous venture. But I look at it actually as a major success. Because the thing that HTML did but it didn't do that Minitel did was that it established data connection to the home as a viable business proposition. HTML was just something that was created for the scientific community. They never actually imagined that there would one day be booking.com or online casino gambling and so forth.

So consider for a moment the establishment of a platform and the residual industries that stem from creating that that are far afield from what the original platform's intent was.

MEMBER KIRBY: Better have a dynamic strategic plan.

MR. POL: Yes. Well, that's now.

MR. LEONARD: Well, we do update it every 2 years, right?

MR. POL: Yes, we release a
program update on the strategic plan. We've talked about -- actually the last program update was almost an app. Remember that, Mike? We struggled with that for a little bit.

CHAIRMAN DENARO: So, did we give you some ideas?

MR. POL: Yes. Actually, first of all, you affirmed a lot of things. You also gave me what is possibly the kernel for a new vision statement, one that kind of better captures things. But that doesn't mean that we'll have to revisit. But I really like the word "agile." In fact I love it. I think it's the best thing anybody has said all day.

And then in terms of the discussion, clearly being able to express concepts in the context of some of the research program areas is where we're getting some good input.

I think that considering what an
aging society needs vis-a-vis an automated
network, that's very important input that we
haven't had before.

I think that in developing the
strategic plan narrative we're actually going
to have to feature some focus on what are
going to be some of the big societal trends
that we may not necessarily have written into
the design of the programs but is something
that we'll acknowledge as ventures that --

CHAIRMAN DENARO: It's the
context.

MR. POL: Right.

CHAIRMAN DENARO: And it's your
customer. It's who you're serving.

MR. POL: Right. So we need to
make sure that we keep that in there.

I think that we need to bolster
the discussion of how security is pervasive.
And so physical systems and also in
resiliency.

We need to I think bolster a
little bit more about maybe not leave it all
the way at the end but the discussion about
the transitioning research into field
operational tests which of course is critical
to everything that we do. I'll probably
bring that up a bit so that way it doesn't
seem kind of like as the last element of it.
And so yes, we definitely got a lot of
input.

Electric vehicles is something
that nobody really has given us much input
about. And we need to see about what we can
do to develop this a bit further. So
hopefully what we'll do is as we go into the
public meetings with the remainder of the
public meetings we'll try triggering
discussion on electric vehicles.

MEMBER MCCORMICK: Have you
talked to the utilities about that? Because
there's quite a bit of discussion going on
through NextEnergy and others because the
utilities aren't sitting there going, dude,
there's going to be 100,000 hybrid and electric vehicles coming into downtown. First thing you want to do is charge up. The last thing they want you is sucking energy out of the grid at high usage periods.

So they're looking at the fact that, look, I'm going to give you a special rate if you can tell me when -- you can communicate with -- by the person with the car can tell me about when you're going to need the car so that I can time and plan your recharging.

And in the meantime I'll suck all the energy out of those cars and use it and replenish it on the off-peak periods, or off-peaks during the day, micro off-peak periods. So, there's a lot of stuff in terms of communication.

It's more end-to-end communication rather than person to --

MR. POL: Yes.

MEMBER MCCORMICK: But that is
very much of concern to them because when you have 2 volts it's not a big deal. When you've got General Electric ordering 25,000 it becomes a big deal.

MR. POL: Right. Right.

CHAIRMAN DENARO: And I spent some time in the San Francisco Bay area and everyone was telling me how Tesla is the new Porsche. And boy, every place I looked there's another Tesla. I haven't seen one in Chicago yet.

MR. POL: They opened up a store. They don't have show rooms, they don't have dealerships in Virginia, but they have a store over at Tyson's Corner Mall. And it's a hit. It's, well, it happens to be sandwiched between the Apple store and the Microsoft store. And they have two cars right there on display. And there's constantly -- you can't get past the crowd going in there.

CHAIRMAN DENARO: You know,
there's -- I mean I'm sure you guys do this but in great uncertainty like this how do you do any strategic planning if you don't know whether EV is going to be relevant or not in 5 years. And I don't know, you know. So there's this whole concept of scenario planning where you identify various features.

And the whole purpose of scenario planning is not a game to write cool narratives about the future, but it's to decide on what are the leading indicators that would indicate that's the way things are going. So you look at this future and say what if there's a world by 2020 or whatever where there's a huge population of EVs on the grid. So you've got all the implications of that.

Okay, what are the early indicators that it's going there? One of them is Tesla shows up in Tyson's Corner Mall or whatever. But whatever they are. And then you use those early indicators to kind
of help you in your agile plan to zig and zag as you need to because you're now predicting the future a little better.

MR. POL: I like that. Okay.

Yes. And again, going back to the issue of interoperability. And we heard a little bit before about the importance of mapping.

And mapping, we found a lot of great X and Y axis but not Z axis. And Z axis is substantial for electric vehicles. That's recharging opportunity for being able to extend your range. So that could be things that help augment, that matter how information from electric vehicles can integrate with smart grid. So this is something that we could actually build up a discussion of smart cities, smart grid. And I can't recall what else we called smart city. But there's definitely a connection to other platforms beyond just transportation. And that's the essence of what we're trying to establish here.
CHAIRMAN DENARO: Okay. Anything else? Everyone getting worn out like me?

We're about on time here for wrap-up. And Hans, do you have anything to say for wrap-up? Ken, anything you want to say? Okay.

(Whereupon, the foregoing matter went off the record at 4:48 p.m.)