

U.S. DEPARTMENT OF COMMERCE

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NATIONAL TELECOMMUNICATIONS AND INFORMATION  
ADMINISTRATION (NTIA)

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MEETING OF THE COMMERCE SPECTRUM MANAGEMENT  
ADVISORY COMMITTEE (CSMAC)

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WEDNESDAY,  
MAY 19, 2010

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The Committee convened at 9:00  
a.m. in Room 4830 of the Herbert C. Hoover  
Building of the U.S. Department of Commerce,  
located at 1401 Constitution Avenue, N.W.,  
Washington, D.C., Dale N. Hatfield and Bryan  
Tramont, Co-Chairs, presiding.

MEMBERS PRESENT:

DALE N. HATFIELD, Co-Chair  
BRYAN TRAMONT, Co-Chair  
LARRY ALDER (via telephone)  
DAVID E. BORTH  
MICHAEL C. CALABRESE  
MARTIN COOPER  
MARK E. CROSBY

DAVID L. DONOVAN  
GARY EPSTEIN  
BRIAN FONTES  
ROBERT M. GURSS  
JULIUS KNAPP  
JAMES ANDREW LEWIS (via telephone)  
MIKE MARCUS

MARK A. MCHENRY  
DARRIN Mylet  
RICHARD REASER, JR.

MEMBERS PRESENT (Continued):

GREGORY ROSSTON (via telephone)

R. GERARD SALEMME

JENNIFER WARREN

DANNY WEISNER

JULIE ZOLLER

ALSO PRESENT:

LAWRENCE E. STRICKLING, Assistant Secretary of  
Commerce for Communications and Information

PHIL WEISER, Senior Advisor to the National

Economic Council, Director for Technology and  
Innovation

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

9:12 a.m.

CO-CHAIR HATFIELD: I'd like to welcome everyone to the Commerce Spectrum Management Advisory Committee. We've got a pretty full agenda, as I said a moment ago, that we need to get through. So, we'll go ahead and get started right away.

Bryan, you want to say anything?

CO-CHAIR TRAMONT: No.

CO-CHAIR HATFIELD: Larry?

ASST. SEC. STRICKLING: Just a couple comments.

Good morning and thanks to all of you for attending today's CSMAC meeting. I guess this is our first meeting since the FCC's Broadband Plan was released, so I think everyone, while we appreciate and thank you all for how busy and how diligent you all have been up until now, I think the Broadband Plan and some of the ideas that the FCC has raised for consideration are only going to increase

1       certainly our workload here at NTIA, and then,  
2       because of the things roll, your workload as  
3       well. And I'm glad to see already that you're  
4       starting to do subcommittees today with the  
5       Unlicensed Spectrum Subcommittee and the  
6       Sharing Subcommittee.

7               Sharing is, as you all will know  
8       if you've had a chance to read through the  
9       spectrum chapter of the Broadband Plan is  
10      going to become very important in terms of  
11      meeting our future spectrum needs. So, the  
12      work of this committee is just going to become  
13      more and more important as we continue to  
14      navigate our way through the growing and the  
15      explosive need for additional spectrum for  
16      commercial mobile broadband purposes.

17              So, thank you all for what you've  
18      done so far and thank you in advance for the  
19      continued work we're looking forward to  
20      getting from you all as things proceed.

21              What I would like to do though is  
22      take this opportunity to announce the addition

1 of three new members to the committee. One is  
2 here today. She's been fully enrolled and is  
3 a full-fledged voting member with all rights  
4 and privileges of the committee, Julie Zoller,  
5 sitting over between Jennifer and Gerry.

6 Also, and I think he may be on the  
7 phone, Larry Alder has joined us.

8 DR. ALDER: Yes, I'm on the phone.

9 ASST. SEC. STRICKLING: Welcome,  
10 Larry.

11 MR. ALDER: Thank you.

12 ASST. SEC. STRICKLING: And our  
13 third new member will be Susan Crawford.  
14 She's not here today, but hopefully she'll be  
15 a full participant by the time of our next  
16 meeting.

17 So, welcome to all three of you.  
18 Thanks for your willingness to serve in this  
19 committee. And so, we're always looking to  
20 get new folks added who can bring new skills,  
21 new perspectives. I think we're now at full  
22 membership, so we don't expect any new

1 additions going down the road. But I think  
2 we've got a very strong team put together now  
3 and I certainly look forward with working with  
4 the new members just as much as our continued  
5 work with those of you who have been a part of  
6 the process so far.

7 So, again, thanks to Julie, Susan  
8 and Larry for their willingness to serve, and  
9 I will pass the mic back to Dale.

10 CO-CHAIR TRAMONT: Just one. For  
11 the benefit of the folks on the phone, we  
12 probably should go around the table and have  
13 everyone indicate that they're here, and then  
14 also let the folks on the phone identify  
15 themselves.

16 So, with that, I don't know if,  
17 Mark, you don't mind starting us off so we can  
18 go around the table.

19 MR. MCHENRY: I'm Mark McHenry.

20 MR. REASER: Rick Reaser,  
21 Raytheon.

22 MR. SALEMME: Gerry Salemme.

1 MS. ZOLLER: Julie Zoller.

2 MS. WARREN: Jennifer Warren.

3 MR. MYLET: Darrin Mylet.

4 MR. CROSBY: Mark Crosby.

5 MR. KNAPP: Julius Knapp.

6 ASST. SEC. STRICKLING: Larry

7 Strickling.

8 CO-CHAIR HATFIELD: Dale Hatfield.

9 CO-CHAIR TRAMONT: Bryan Tramont.

10 MR. WEISER: Phil Weiser.

11 MR. CALABRESE: Michael Calabrese.

12 MR. DONOVAN: David Donovan.

13 DR. BORTH: David Borth.

14 MR. COOPER: Martin Cooper.

15 MR. EPSTEIN: Gary Epstein.

16 MR. GURSS: Bob Gurss.

17 CO-CHAIR TRAMONT: Excellent. And

18 who do we have on the phone?

19 MR. ALDER: Larry Alder.

20 DR. ROSSTON: Greg Rosston.

21 CO-CHAIR TRAMONT: Anybody else on

22 the phone?

1 (No audible response.)

2 CO-CHAIR TRAMONT: Okay. Great.

3 Thanks, Greg, for joining us by phone.

4 With that, turn it over to Dale.

5 CO-CHAIR HATFIELD: Yes, I'd like  
6 to welcome our new members as well and we sure  
7 want to put you to work.

8 Okay. And Brian Fontes just  
9 joined us, right?

10 We're going to start today with --

11 CO-CHAIR TRAMONT: Who's that,  
12 please?

13 DR. LEWIS: Jim Lewis.

14 CO-CHAIR TRAMONT: Oh, great, Jim.  
15 Thank you.

16 CO-CHAIR HATFIELD: Oh, thanks.

17 CO-CHAIR TRAMONT: And Brian  
18 Fontes just joined here live.

19 CO-CHAIR HATFIELD: We're going to  
20 start with three presentations this morning,  
21 and the first, it's a real pleasure to me of  
22 course to introduce my former colleague at the

1 University of Colorado, Phil Weiser.

2 Phil Weiser, as many of you know,  
3 is at the Justice Department and recently  
4 moved over and is now senior advisor to the  
5 National Economic Council where he's director  
6 for technology and innovation. So, without  
7 further ado, Phil, I'll turn it over to you.

8 MR. WEISER: So, when people say  
9 if someone asked you to jump off a bridge,  
10 would you do it, generally the answer is no,  
11 but I think if Dale Hatfield asked me to jump  
12 off a bridge, I would do it. And when Dale  
13 asked me to come here today, it wasn't hard  
14 for me to say yes.

15 I have a habit every time I'm with  
16 Dale to embarrass him by acknowledging him and  
17 his leadership. It's easy to do on this  
18 occasion. Those who know Dale, know that for  
19 him his level of public service and  
20 willingness to make sacrifices to try to  
21 achieve good results is extraordinary. I've  
22 been privileged to work with him on previous

1 occasions and one of the parts of this job  
2 that I am looking forward to is being back in  
3 the world of spectrum policy and having a  
4 chance to learn more from Dale.

5 And Dale, with Bryan's help and  
6 now with Larry Strickling here, Secretary  
7 Locke, others at Commerce, really have an A  
8 team. You guys are an unbelievable group of  
9 minds and your willingness to spend time is a  
10 great service to the government.

11 One of the challenges in this sort  
12 of body that I am very aware of but I know you  
13 all are up to is to transcend your company  
14 hats and backgrounds and to engage on the  
15 merits in an intellectually honest fashion.  
16 Dale is very good at facilitating such  
17 discussions, as is Bryan and Larry, so I know  
18 that will help. But I also think this effort  
19 can only work in such a format. Different  
20 standards bodies that Dale has taught me about  
21 work when you get engineers talking, you know,  
22 to engineers as it were, and that's the ethos

1 that Dale I know is bringing to this effort.

2 I would agree with everything  
3 Larry Strickling said. Spectrum policy is  
4 getting more and more important. The earlier  
5 decisions about spectrum started from premises  
6 that spectrum was in plentiful supply and  
7 didn't take as much necessary time, care and  
8 rigor to think hard about how do you get this  
9 resource used most efficiently? We need that  
10 hard thinking that you all can help to advise  
11 the Commerce Department on. The Broadband  
12 Plan obviously sets out a lot of ambition that  
13 the administration is working through. Larry  
14 was being a little modest. He is co-chairing  
15 a committee with Scott Harris on behalf of  
16 administration thinking through how the  
17 administration responds to the Broadband Plan  
18 and its proposals, and obviously spectrum is  
19 a key part of that.

20 I would also just say that we  
21 really are looking for good ideas, and this  
22 body is well suited to help come up with them.

1 I'm very new to this position, but I'm not new  
2 to spectrum. The issues here are ones that I  
3 know are important and thus this is going to  
4 be a serious part of my time working at the  
5 National Economic Council.

6 So, I think that tees up a little  
7 bit what I'm doing and I'm here to listen for  
8 a little bit and to learn from your  
9 discussions.

10 CO-CHAIR TRAMONT: Thanks very  
11 much, Phil.

12 CO-CHAIR TRAMONT: And, Phil,  
13 thanks for taking the time. It's great to  
14 have you and great for the government to have  
15 you in service. Very lucky for the country.

16 With that, in prior CSMAC meetings  
17 we've had presentations from NTIA. Carl did  
18 a great job giving an overview of federal  
19 government spectrum use. Today we sort of  
20 have a bookend presentation. Juli Knapp from  
21 the FCC, a face familiar to all of us, was  
22 willing to come over and spend some time with

1 us this morning and talk a little bit about  
2 what's happening on the commercial side and  
3 public safety, as well as a little bit of an  
4 overview of the FCC's activities on spectrum  
5 following up on our preview last meeting of  
6 the National Broadband Plan.

7 So, with that, Juli, I think it's  
8 all yours.

9 MR. KNAPP: Good morning and  
10 thanks for inviting me to be here. I'm going  
11 to try to run through quickly a bit about  
12 what's going on with the Broadband Plan and  
13 the pieces of spectrum that we're focused on.

14 Just to set a groundwork, things  
15 really haven't been quiet on the spectrum  
16 side. There's been a lot going on for a  
17 number of years; I won't go through everything  
18 on the list, and I'm sure most of you are  
19 familiar with them. The 90 megahertz of  
20 spectrum that was made available for AWS-1,  
21 the DTV transition where we recovered spectrum  
22 for commercial mobile and public safety, 800

1 megahertz re-banding, on and on.

2 I thought a little bit about  
3 trying to compare this with what Carl did.  
4 There's no way I could go through the spectrum  
5 and talk about everything that's there. I  
6 have had in the back of mind wouldn't it be  
7 fun to just draw kind of a color-coded slide  
8 showing what's been going on in every band.  
9 It would be very busy.

10 I'm going to focus on the  
11 Broadband Plan, and particularly chapter 5  
12 talks about spectrum. The predicate here is  
13 that the devices themselves are getting  
14 hungrier for spectrum and the applications are  
15 expanding. The Plan talks about national  
16 purposes, where broadband can support civic  
17 engagement, telemedicine, public safety and  
18 the smart grid. It's kind of a new phenomena.  
19 In the last few years we turn on devices and  
20 we're accessing app stores. I mean, just two-  
21 three years ago, that was not something that  
22 we really did.

1                   Jumping to the next slide, and  
2                   without going into detail, we have increased  
3                   the supply of spectrum in the last few years  
4                   by about a factor of three. The challenges  
5                   that the devices themselves compared to what  
6                   they had done just a few years ago are  
7                   consuming about 30 times the amount of data  
8                   that they had before.

9                   In the Plan, it focuses on a  
10                  number of issues: First, the lack of  
11                  transparency in the allocation and utilization  
12                  of spectrum, that the allocation and  
13                  utilization data is largely unattainable and  
14                  often esoteric. If you try to work with the  
15                  universal licensing system, unless you're an  
16                  expert, it's hard to extract the useful  
17                  information about who is doing what and where.  
18                  There are relatively few spectrum reallocation  
19                  tools. You know, the traditional ones, you  
20                  take from one service and give to another, or  
21                  you share. We've done some things with  
22                  secondary markets, but it's still a limited

1 set. There's an insufficient capacity for  
2 broadband at the rates that it's growing right  
3 now. We're already seeing the signs of strain  
4 on the networks and if the smartphones expand  
5 the way we anticipate they were, that's only  
6 going to exacerbate the problem unless we do  
7 something about it.

8 Backhaul, it's kind of in the  
9 background, which is a key for getting from  
10 the cell sites into the network itself.  
11 There's a growing need for that as well, and  
12 the options have been limited so far.

13 The access models are limited.  
14 We've only dipped out toe into the water  
15 relative to cognitive radio and it's  
16 possibilities, and so that's another thing  
17 that is worth exploring.

18 And the policy scope is too  
19 bounded. There's no framework for identifying  
20 future spectrum requirements and how we're  
21 going to deal with them, and how we're going  
22 to coordinate both domestically and

1 internationally.

2 But the Plan laid out a framework  
3 for dealing with those recommendations. To  
4 ensure greater transparency, our first step  
5 was the spectrum dashboard. You probably know  
6 that congress has been very active in  
7 developing legislation. If that legislation  
8 passes, it certainly is going to give us  
9 specific guidance on the things that the  
10 commission will need to do to provide better  
11 transparency on the use of the spectrum.

12 Secondly, to expand the incentives  
13 and mechanisms available to reallocate or  
14 repurpose spectrum, we talked about incentive  
15 options. That is going to take legislative  
16 action and spectrum fees which would also take  
17 legislative action.

18 To make more spectrum available,  
19 the Plan set a pretty ambitious target:  
20 Within 10 years to make 500 megahertz of  
21 spectrum available in total for wireless  
22 broadband, and the bands that are under

1 consideration we'll talk about in a few  
2 minutes more; I won't go into it now, to  
3 facilitate deployment of spectrum for wireless  
4 backhaul, to examine more flexible rules for  
5 the fixed services, to expand opportunities  
6 for innovative spectrum access models, to  
7 identify a new unlicensed allocation or new  
8 spectrum for unlicensed, to provide for  
9 opportunistic use of the spectrum. In a  
10 separate entire chapter we talk also about  
11 promoting research and development, working  
12 together with the National Science Foundation  
13 to be able to develop and test these  
14 techniques. And lastly, to increase the  
15 comprehensive of our spectrum policy working  
16 with NTIA, address tribal issues and  
17 coordinate in advance our views  
18 internationally.

19           There are some specific actions.  
20 We looked at the Plan as kind of the first  
21 step in a process going forward. We  
22 identified some specific actions. These are

1 all rule makings to modify the rules for the  
2 wireless communication service to facilitate  
3 the introduction of mobile broadband and make  
4 available 20 megahertz of that. There's an  
5 item on the commission agenda scheduled for  
6 tomorrow where that issue will be taken up.

7 For the Advanced Wireless Service  
8 2 and 3, it recommended that we work with the  
9 NTIA to consider whether the AWS-3 spectrum  
10 might be paired with spectrum in the 1.7  
11 region, and we've been actively engaged with  
12 NTIA in doing that.

13 Talked about the D Block and  
14 public safety and recommended auctioning the  
15 D Block.

16 Providing more flexibility in the  
17 mobile satellite services to introduce  
18 ancillary terrestrial services, and we counted  
19 that for 90 megahertz.

20 And then probably the item that  
21 gets the most focus is providing access for TV  
22 broadcast spectrum and making available 120

1 megahertz there. And we laid out a schedule  
2 for these things in some detail.

3 Now, these are detailed slides. I  
4 just pulled it out of the Plan itself, because  
5 if I change a word, I know I'll change  
6 something significant. But anyway, we're  
7 planning to address the TV white spaces  
8 reconsideration and database opinion, we said  
9 in the third quarter. So, we've got that  
10 scheduled.

11 To identify continuous spectrum  
12 for unlicensed use, which is a challenge as  
13 well. We started talking to folks in  
14 industry. As most of you know, it's not as  
15 simple as it sounds. There aren't vacant  
16 blocks and you have to think about things  
17 like, well, how much spectrum? Where in the  
18 spectrum? How might that match up with things  
19 internationally and so forth? So, we've  
20 already begun some work on that.

21 For opportunistic use of the  
22 spectrum, we're planning to initiate an Notice

1 of Proposed Rule Making and I think we've got  
2 that late in the third quarter. And what is  
3 interesting there, this is not just about  
4 sensing of the spectrum. I think one of the  
5 ideas that grew out of the TV white space  
6 proceeding is that and what's new. Now,  
7 you've got devices that have some  
8 intelligence. They know where they are.  
9 They've got a way to feedback to a database  
10 connected to the Internet. You can have that  
11 database have some knowledge about what is  
12 supposed to be there, compare it with the  
13 readings it's getting back from the device,  
14 and perhaps develop policies that allow you to  
15 make more efficient use of the spectrum. So,  
16 we are planning to explore that later in the  
17 year.

18 And then also a Notice of Proposed  
19 Rule Making on experimental licensing. We've  
20 got a process in place and, you know, I think  
21 on the whole, although at times we've had  
22 delays, it's functioned well. But there are

1 probably things we can do to improve that. So  
2 for example, are there bands of frequencies  
3 that we could make available? For instance,  
4 we put them up in an auction, but nobody bid,  
5 could we make that spectrum available for  
6 experiments?

7 On the transparency front, the  
8 spectrum dashboard. So, we've introduced the  
9 beta version of it. Earlier, I guess it was  
10 last week, we had a session that was open to  
11 the public to get ideas on how we can improve  
12 it. We thought we got a lot out of that. And  
13 again, that would be informed if legislation  
14 passes. We'll be modifying this to address  
15 those things.

16 And sometimes buried down in all  
17 this, because there's so much focus on the  
18 specific proceedings, a really important point  
19 is we talked about developing a strategic  
20 spectrum plan and a triennial assessment of  
21 spectrum needs and how we're going to address  
22 them. And we would be working together with

1 NTIA in that process so that their efforts and  
2 the FCC's efforts are marching in lockstep.

3 We created a Spectrum Task Force;  
4 rather the chairman did. It's co-chaired by  
5 myself and Ruth Milkman, who's the chief of  
6 the Wireless Telecommunications Bureau. It  
7 includes the bureau and office chiefs that  
8 have responsibilities in the spectrum area.  
9 The primary focus is the implementation of the  
10 National Broadband Plan, but that's not the  
11 only focus. The Plan really; you know, we've  
12 said this several times, was a beta version.  
13 And the task force really provides a vehicle  
14 for the bureau and office chiefs to address in  
15 a coordinated way the issues that come up and  
16 also to explore new ideas as they arise.

17 And I'll just say a few words  
18 about the federal and non-federal  
19 coordination. The IRAC process which meets  
20 every couple of weeks, and the FCC sits as a  
21 liaison on that, we coordinate the spectrum  
22 actions through the IRAC under a Memorandum of

1 Understanding. There's really routine  
2 contacts that go on every day between the  
3 staff on spectrum issues and folks like Carla  
4 and myself coordinate our particular topics  
5 and issues. And when we can find time in our  
6 calendars, we always have as a goal to try to  
7 meet regularly. Sometimes the spacing is not  
8 as close as we'd like it to be, but the desire  
9 is always there.

10 We participate in the Policy and  
11 Plan Steering Group of the federal government  
12 and we work with NTIA in the federal agencies  
13 to study potential availability of particular  
14 spectrum bands.

15 So, that's a 50,000-foot overview.  
16 And I'd be happy to take questions if you have  
17 them.

18 CO-CHAIR TRAMONT: Juli, one of  
19 the things that comes up is sort of  
20 opportunities for sharing, which means federal  
21 government users, commercial users and public  
22 safety users. FCC --

1                   COURT REPORTER:  Sir, I need you  
2                   to get close to the mic.

3                   CO-CHAIR TRAMONT:  Oh, sure.  
4                   Juli, one of the things that our folks have  
5                   been looking at is ways in which FCC  
6                   regulatees can share with federal government  
7                   users, and when they see potential  
8                   opportunities for that, what's the best way to  
9                   work with the FCC and NTIA to find those  
10                  opportunities and more constructively get them  
11                  done in a timely fashion.  Based on your  
12                  experiences, what are some of the things that  
13                  you'd point to in that process that work well  
14                  and how people should approach it, and maybe  
15                  any ideas you would have about how to  
16                  facilitate additional opportunities for  
17                  sharing?

18                  MR. KNAPP:  The things that are a  
19                  little easier are some of the things that  
20                  we've done before and we know about.  So  
21                  geographic sharing, for example, is pretty  
22                  straightforward.  Time sharing gets to be a

1 little bit more problematic because there's a  
2 trust issue. You know, if somebody has  
3 critical safety or defense needs and they need  
4 to be sure they're going to get on whenever  
5 they need it, there's always a concern that if  
6 we allow somebody else in, is that really  
7 going to happen? And so, I think that's an  
8 issue to be examined as we go forward.

9 The issues relative to dynamic  
10 spectrum access as well; and we've had some  
11 experience, it's still very early in the  
12 process. And I think before agencies,  
13 including I think the incumbents on our side,  
14 are willing to accept the viability of some of  
15 these things. There needs to be confidence  
16 building and testing and so forth. And that's  
17 where the R&D piece comes in and is so  
18 critical. People need to be convinced that it  
19 actually is going to work. And I think what  
20 I've seen is both the federal agencies and the  
21 non-federal are approaching it with a positive  
22 attitude, but also that there's a lot of work

1 that needs to be done.

2 CO-CHAIR TRAMONT: On the  
3 geographic sharing part where you said there's  
4 been more success, is there a sense of scale?  
5 Has that become more prevalent in recent  
6 years, or is there any sort of trend line? Is  
7 there a certain process that has worked most  
8 effectively to facilitate geographic sharing?

9 MR. KNAPP: I don't know that  
10 there is a trend line. What I do know is that  
11 it's pretty straightforward where, for  
12 example, we'll have a federal operation and  
13 then we want to use that same spectrum in a  
14 different location. The engineers I think  
15 from both sides are pretty good about -- we  
16 cranked through the propagation requirements  
17 and the protection levels that are needed.  
18 So, I think that works pretty well.

19 MR. WEISER: Juli's being modest.  
20 He's talking over his own --

21 MR. KNAPP: Over what?

22 MR. WEISER: This is for you,

1 Juli, all your government service.

2 MR. KNAPP: Just let me know when  
3 I should duck.

4 Marty?

5 MR. COOPER: Juli, is there a  
6 mechanism in the Broadband Plan that requires  
7 recipients of this reallocated spectrum to use  
8 the spectrum in the most efficient manner?

9 MR. KNAPP: First of all,  
10 improving spectrum efficiency is a core goal,  
11 I think, of the overall plan. What I can say  
12 is the ways the commission has approached this  
13 in the past where we've had auctions, there  
14 are incentive mechanisms, if you spent money  
15 for the spectrum, to be efficient. And as we  
16 look to the next generation of technologies,  
17 whether it's LTE or WiMAX and so forth, they  
18 all have the hooks in them, for example, for  
19 smart antennas and so forth. Where in the  
20 past; and I don't think we've done this in  
21 awhile, we've tried to do things like define  
22 bits per hertz per unit area, that's always

1       been difficult to do. And I think, you know,  
2       your point is a fair one. How do you make  
3       sure that all of the services are using their  
4       spectrum efficiently, and I think that's going  
5       to be an area of focus ongoing as we progress.

6                     Yes?

7                     MR. REASER: Juli, if you'd go  
8       back to that slide, it shows this growth  
9       thing. That's a little bit interesting. And  
10      then it goes back to this question of  
11      efficiency. Because obviously we're not --

12                    MR. KNAPP: Which one?

13                    MR. REASER: That one there.  
14      That's a good one. We're not obviously  
15      incentivizing anything about being efficient.  
16      We're allowing everything to be unconstrained  
17      and eventually you will run out of hertz to  
18      actually do anything. So, it seems to me like  
19      any efforts to promote efficiency aren't  
20      really going -- we're allowing things to go  
21      unbounded in some ways. Like what kind of  
22      incentives or what kind of regulation are we

1 putting in place to make sure I don't have 4  
2 billion apps on my iPhone that operate  
3 simultaneously in the background when I don't  
4 even use them, things like that? Because  
5 there's a lot of things that go on in everyday  
6 life that happen in the background that  
7 require incredible amounts of resources which  
8 actually provide no value to anybody, except  
9 possibly the person that you're paying to  
10 provide them.

11 MR. KNAPP: I wouldn't agree that  
12 it's unbounded. First of all, in my  
13 experience an incumbent service always feels  
14 that they're using the spectrum efficiently  
15 and the others aren't. The real challenge  
16 here is we want to accommodate all these  
17 things and not tell users, well, you can't use  
18 these apps or those apps because there's not  
19 enough spectrum. You know, I think as we look  
20 at the different services, whether on the app  
21 side you could make the apps more efficient,  
22 I don't think is a question that really has

1       come up relative to how that translates to  
2       spectrum utilization. But on the RF side,  
3       what I see is that there's a lot of motivation  
4       for trying to squeeze every bit out that you  
5       can.

6                   MR. DONOVAN: Juli, just in  
7       general, I mean for years, and even when I was  
8       there, the concept of auctioning spectrum,  
9       there's been an assumption that in the  
10      marketplace when an entity purchased spectrum  
11      at auction it would be the market itself would  
12      drive it towards efficiencies.

13                   MR. KNAPP: Yes.

14                   MR. DONOVAN: There's always been  
15      this residual question of warehousing in the  
16      background, but, you know, essentially it's  
17      been a market-driven process. Are we saying  
18      then now that apart from simply just getting  
19      spectrum at an auction there's also going to  
20      be sort of this continuing oversight to make  
21      sure the entity that has purchased spectrum at  
22      auction will use that spectrum efficiently?

1 I mean, how do those two theories meld?

2 MR. KNAPP: Yes, I do think  
3 there's going to be continuing oversight. One  
4 of the things that the commission has tried to  
5 do, the way we've tried to get at that in the  
6 past has been the build-out requirements.

7 MR. DONOVAN: Correct.

8 MR. KNAPP: And, you know, you  
9 want to get service out there. At what point  
10 does that make sense economically as well?  
11 So, I think that's one of the areas that we  
12 continue to examine as we go forward.

13 As far as, you know, the  
14 efficiency of the use, I'm pretty well  
15 convinced that the bands like the cellular  
16 bands and the PCS bands are pretty heavily  
17 used. I think we all know; we're all using  
18 them. Can they continue to grow? I know that  
19 looking at what the carriers are doing, they  
20 continue to introduce technologies to try and  
21 make it more efficient.

22 As far as bands that were

1        auctioned but not built yet and the issue of  
2        warehousing spectrum, I think that comes back  
3        to the build-out requirements.

4                    MR. DONOVAN:    So, it's not sort of  
5        an ongoing second check at the market to say,  
6        well, you're putting in this technology but we  
7        think you could improve the efficiencies if  
8        you use something else?    You're still going to  
9        rely on the marketplace for the efficiency  
10       aspect?

11                   MR. KNAPP:    I think the  
12       marketplace is going to continue to play a  
13       major role in this.    I don't see us going back  
14       to the day of micromanaging the technology.

15                   MR. DONOVAN:    Fair enough.    Thank  
16       you.

17                   MR. KNAPP:    Gerry?

18                   MR. SALEMME:    Yes, thanks, Juli.  
19       I want to kind of approach this from a little  
20       different perspective, because I think that  
21       we're all looking for spectrum efficiency,  
22       optimizing the bit throughput and, you know,

1 taking off my current hat and looking at it  
2 from a different perspective, because I would  
3 be in the position of wanting to maximize bits  
4 as possible and spectrum efficiency. I think  
5 that in the pre-auctions it was always a  
6 concept of highest and best use which said  
7 there were some social benefits. Even though,  
8 for instance, satellite spectrum may not be  
9 the most efficient use, it reached an area of  
10 the country or provided certain services that  
11 weren't being provided by basic terrestrial  
12 services. I'm not doing this for Jennifer,  
13 though she did let me borrow her pen, in full  
14 disclosure.

15           You know, and it's the same thing  
16 with microwave. I know in past practices  
17 there was an effort to reallocate spectrum  
18 away from microwave services. I think the PCS  
19 band, if I remember right, was taking spectrum  
20 away from providers of microwave services.  
21 And now we're recognizing that wireless  
22 microwave may be an important element of

1 building an efficient network and important  
2 for other issues. I'm a little bit concerned,  
3 but I think one of the things we just have to  
4 be wary of is to just always look at  
5 throughput bits, what's maximizing efficiency,  
6 and not going back to almost this pre-auction  
7 concept that there are a balance of uses. And  
8 in some cases a certain amount of spectrum has  
9 to be reserved for practices and services that  
10 are really at core either to these networks or  
11 for other social purposes.

12 MR. KNAPP: I don't think there  
13 was a question there.

14 MR. SALEMME: No.

15 MR. KNAPP: I do agree with --

16 MR. SALEMME: Welcome to the  
17 CSMAC.

18 MR. KNAPP: Thank you, Gerry.  
19 Gary and then Bob?

20 MR. EPSTEIN: Thanks, Juli. You  
21 know, I've thought about this issue for, you  
22 know, a long time, as everybody else in this

1 room has, and I always thought there were like  
2 three concepts that we tend to mush together  
3 a little bit. The first concept is, you know,  
4 allocation of spectrum. What is the spectrum  
5 used for? You know, is it satellite spectrum,  
6 is it terrestrial spectrum?

7 The second mechanism was rules.

8 Okay. You have specific rules for the use of  
9 the spectrum, and that is are they efficient?  
10 And that's where your efficiency and  
11 potentially your use of bits come through.

12 And the third thing that you do is  
13 you have to figure who gets it and the  
14 licensing. And the commission used to have to  
15 have, as Gerry says, comparative hearings and  
16 then there were wonderful lotteries for  
17 awhile, and then ultimately, you know, the  
18 commission or the U.S. Government hasn't  
19 figured out a better way to do this other than  
20 auctions.

21 And we tend to mush those things  
22 together I think, and I don't know whether

1       it's helpful or not to try to think about the  
2       decision making in the spectrum area that way.  
3       And maybe you could get the twin goals of  
4       potentially efficiency and utilization. In  
5       other words, just because you bought the  
6       spectrum in an auction doesn't really mean  
7       that you have complete unfettered use of the  
8       spectrum.

9                   MR. KNAPP: Right. I mean, just  
10       in response to the last two points, I think  
11       it's fair to say we need a diverse array of  
12       services and I don't believe that we're headed  
13       down a track of just purely based on the  
14       economic value. There's a mix today and I  
15       expect there will be a continued mix between  
16       some spectrum that, for example, is private  
17       mobile, some spectrum that is point-to-point  
18       microwave, some spectrum that is satellite;  
19       because they each meet different areas of  
20       needs, and how we blend this in a way -- I  
21       think one of the challenges in evaluating  
22       spectrum efficiency is just that, is that if

1       you try to do just bits per hertz, it doesn't  
2       tell you the whole story.

3                   MR. GURSS:  Yes, just quickly to  
4       follow up on your comment and Gerry's.  I used  
5       to practice law in a firm where I was a  
6       telecom lawyer and most of my colleagues were  
7       real estate lawyers, and they always asked me,  
8       well, what do you do, and I described it as  
9       zoning the airwaves.  And I think it's a good  
10      analogy because we zone land and airwaves, you  
11      know, with the intent that there are certain  
12      things like parks and schools and police  
13      departments that we want to set aside land  
14      for.  You know, I know there are cities in the  
15      Southwest where we have no zoning and, you  
16      know, they're not very nice places.  And so,  
17      you know, we want to be careful of that.

18                   But I guess the question in that  
19      is, and it's certainly something in public  
20      safety we always have to deal with, is how do  
21      we encourage the efficiency that we want in  
22      those areas where there's not the economic

1 incentives, the federal spectrum, the various  
2 pieces of FCC spectrum where there's not a  
3 revenue generation out of it that leads to the  
4 economic incentives? That's I think a harder  
5 thing to deal with than just, you know,  
6 auctioning them and assume people will make  
7 the best use for economic reasons.

8 MR. KNAPP: I think one of the  
9 challenges is is it's gotten harder, not  
10 easier, because in the past we might take a  
11 service that covered an area -- and let's say  
12 we had two services covering the same area,  
13 one we could say with so many bits per hertz  
14 per area and another, and we compared them.  
15 Now we have other factors like, well, how many  
16 cell sites are there? Are you using smart  
17 antennas or not? So, I think it is a  
18 challenge as we go forward to try and figure  
19 out, well, when we efficient, what is  
20 efficient? We've tried things in the past;  
21 narrowbanding comes to mind, that have been a  
22 challenge and haven't always been as well

1 received. And I do think that's something as  
2 we go forward we're going to have to try to  
3 figure out. How do we define efficiency aside  
4 from, you know, that we say this spectrum is  
5 being used efficiency versus not?

6 MR. GURSS: Yes, and then what is  
7 efficient means different things.

8 MR. KNAPP: Yes.

9 MR. GURSS: I mean, you know, you  
10 don't want -- the fire department, the trucks  
11 just sit there. It's not very efficient.

12 MR. KNAPP: Right.

13 MR. GURSS: But you kind of like  
14 that.

15 MR. KNAPP: Right. Jennifer had  
16 her hand up, then I'll get to you, Mike.

17 MS. WARREN: And talking about  
18 markets, I hear you speak about secondary  
19 markets and looking at expanding the list, if  
20 you like, of bands or FCC licensees that could  
21 engage in that.

22 MR. KNAPP: Right.

1 MS. WARREN: I was wondering if  
2 that would fall under triennial or that's not  
3 really something that is part of what's near  
4 term for you all?

5 MR. KNAPP: It is a part. At the  
6 point that the Plan went out, I think what we  
7 said in there is that we would be taking a  
8 look at how effective our secondary markets  
9 policy has been. So, some of the folks back  
10 at the commission right now are looking at  
11 this more closely to decide what steps if any  
12 are the next things we should do. Should we  
13 modify the secondary markets rules in some  
14 way? Should we expand it to other bands?  
15 It's absolutely part of our thinking, but I  
16 don't think we were quite far enough along in  
17 the process to know exactly what we might do.

18 Michael?

19 MR. CALABRESE: Yes, Juli, the  
20 National Broadband Plan, at least the way we  
21 interpret it, you know, as far as spectrum  
22 policy, the real emphasis is very short term;

1 one to four years, and whereas, you know, the  
2 items that pertain -- you know, in other words  
3 pushing spectrum out in reaction to today's  
4 business models and not really looking ahead,  
5 that those business models aren't going to be  
6 able to meet the nation's need for pervasive  
7 connectivity in 10 years from now. And the  
8 items that are more longer term are very vague  
9 and de-emphasized.

10 And, you know, I think what we've  
11 heard for example from Larry at the outset  
12 here is that NTIA seems to be increasingly and  
13 more vocally committed to more, you know,  
14 spectrum sharing and new technologies. And  
15 I'm wondering if you feel from the National  
16 Broadband Plan or otherwise that you have a  
17 mandate to actually be pursuing those sort of  
18 more longer term approaches. I mean, I know  
19 you mentioned that there's a couple in the  
20 hopper that kind of are putting a toe in the  
21 water, but are we really going to be able to  
22 move fast enough on sort of dynamic spectrum

1 sharing and getting access to, you know,  
2 what's really 80 percent of the available  
3 bandwidth rather than just the 20 percent that  
4 would meet today's business models?

5 MR. KNAPP: Michael, you know,  
6 because of the text in the item, it conveyed  
7 and impression that we're more focused on the  
8 specific short term. That wasn't the intent.  
9 I think we're in lockstep with the federal  
10 side as far as examination of the new  
11 techniques and the technologies. We both have  
12 big challenges ahead, because the federal  
13 agencies aren't sitting there saying, gee,  
14 we're locked into our spectrum forever. We're  
15 not going to have any more needs either. So,  
16 they've got a challenge just as well as the  
17 non-federal side in figuring out, well, how  
18 are we going to squeeze more capacity out of  
19 this?

20 For the long term planning, I  
21 think absolutely. That's why I talked about  
22 this statement. And it seemed like it was

1 buried, it gets lost in all of the focus on  
2 these near-term specific projects, but it's  
3 there. And I think there's a commitment both  
4 on the part of the commission and NTIA and the  
5 federal agencies to address this whether we  
6 talk about near, mid or long-term needs. We  
7 recognize we're going to have to be able to  
8 get a process in place that works to do that.

9 Yes, Darrin?

10 MR. MYLET: Relative to a fact-  
11 based data-driven policy making, going back to  
12 decisions on assumptions that the commercial  
13 carriers are using spectrum; just using it,  
14 I'm not saying using it efficiently, but just  
15 fundamentally using it across multiple  
16 jurisdictions whether it be, you know, urban  
17 areas, suburban areas or rural areas, I mean,  
18 do you see that we might move towards  
19 requiring commercial carriers to disclose how  
20 they're using their spectrum at a tower level,  
21 at a height level, at a power level? Or would  
22 you like to see or do you see that spectrum

1 measurements could actually give you the data  
2 that would allow you to analyze if there's a  
3 merger or an acquisition, how that might  
4 effect the use of the spectrum by those two  
5 entities?

6 MR. KNAPP: That's a rich question  
7 there. There's a lot of topics in there.

8 First of all, I think both the  
9 goal of our transparency process is to make  
10 more information known about spectrum and its  
11 use. The pending legislation also has that  
12 as, more than goal, a requirement for the  
13 federal and non-federal agencies to gather  
14 information so that it is understood. I don't  
15 know that that goes down necessarily to the  
16 tower level. I don't necessarily have to know  
17 where every tower is to understand whether the  
18 spectrum's being used.

19 The other thing you brought up is  
20 the spectrum measurements, which was also in  
21 here, and it is a challenge. Because I think  
22 what people want to is, all right, you're

1 showing me what the zoning map looks like,  
2 you're showing me who you've granted building  
3 permits for, but now tell me what's been built  
4 and if it's being used. And it's something  
5 that is important to do, but it's not as easy  
6 as it sounds because of the diversity of the  
7 services out there. You really have to  
8 understand how to make these measurements to  
9 be in the right place and so forth, which is  
10 not to say it shouldn't be done. It's just  
11 that if you're an incumbent service, you want  
12 to understand that this is being done  
13 correctly so that things aren't missed.

14 CO-CHAIR TRAMONT: Let's do one  
15 more question and then we need to wrap up.

16 MR. KNAPP: I needed a longer  
17 presentation, clearly.

18 Go ahead, Mark.

19 MR. CROSBY: Juli, is it safe to  
20 assume that the spectrum dashboard is also  
21 sort of like a beta initiative for spectrum  
22 inventory?

1                   MR. KNAPP: The question was is  
2                   the spectrum dashboard a beta for the spectrum  
3                   inventory? I don't want to link the dashboard  
4                   necessarily with what comes out of the  
5                   legislation. The legislation, if it passes,  
6                   is going to have very specific things it wants  
7                   the commission to do. I think this was  
8                   something on our own. Just hearing from  
9                   people that there was a need to have a better  
10                  understanding of the usage was something that  
11                  we felt we needed to do and it was our first  
12                  crack at it.

13                  MR. DONOVAN: Thank you, Juli.  
14                  Just to add onto what Darrin said, given the  
15                  complexities involved and actually looking at  
16                  actual usage, but also given the importance of  
17                  the issue, do you anticipate that the  
18                  commission will move forward with parts of  
19                  that Broadband Plan, whether it's reallocation  
20                  or we're using various bands of that spectrum,  
21                  prior to conducting a full spectrum inventory  
22                  of the type envisioned by congress?

1 MR. KNAPP: When we laid out the  
2 specific steps that the commission it would  
3 take --

4 MR. DONOVAN: Right.

5 MR. KNAPP: -- I think we're still  
6 committed to that plan.

7 MR. DONOVAN: Okay. Thank you.

8 MR. KNAPP: You know, obviously  
9 whatever congress may direct the commission to  
10 do is what we'll follow.

11 MR. DONOVAN: Okay. Thank you.

12 CO-CHAIR HATFIELD: Juli, you have  
13 another commitment though, don't you?

14 MR. KNAPP: Seriously, I have a  
15 10:00 meeting on the open Internet, but I have  
16 somebody pinch hitting on the chairing for me.

17 CO-CHAIR HATFIELD: All right,  
18 Marty, wrap us up.

19 MR. COOPER: Juli, first of all, I  
20 really appreciate your presentation, because  
21 you really gave me a whole new perspective on  
22 what the Broadband Plan is. So, I want to ask

1 a non-question, really make a suggestion.

2 When I look at the history of what  
3 happened in LAN mobile, which is the only  
4 thing I know anything about, I think about  
5 what happened with cellular at the beginning.  
6 People talked 30 minutes a month and then they  
7 found out the value of being able to talk  
8 mobilely, and now we talk 3,000 minutes.  
9 That's 100 times. The same thing is going to  
10 happen with data. So, it's clear that adding  
11 100 megahertz to the 250 that exists now is  
12 not going to solve the problem. And I think  
13 you know that and that's why you talked about  
14 R&D.

15 MR. KNAPP: Yes.

16 MR. COOPER: And I only want to  
17 suggest that there be more emphasis in the R&D  
18 area. There are in fact spectrally-efficient  
19 ways of using LAN mobile spectrum, and I  
20 realize it's a very narrow area, that exists  
21 in the field today in other countries and  
22 other systems. I don't believe; that's the

1       only thing you said that I don't believe that  
2       are existing, people are using the most  
3       spectrally-efficient techniques now, because  
4       they're not motivated to do that.

5                   MR. KNAPP:    Yes.

6                   MR. COOPER:   So, I would urge you  
7       in this broadband process to put a little more  
8       emphasis on R&D and more spectrally-efficient  
9       techniques.

10                  CO-CHAIR TRAMONT:  Thank you,  
11       Marty.  And thank you, Juli, very much for  
12       your time this morning speaking to us and we  
13       appreciate it very much.

14                  MR. KNAPP:    Sure.  Thank all of  
15       you.

16                                (Applause.)

17                  CO-CHAIR TRAMONT:  And thank you  
18       for your tremendous service over the years to  
19       the leadership on these issues.

20                                With that, we are going to move  
21       onto RADAR 101.  There had been a conversation  
22       over the course of the last few meetings about

1 the role of RADARs and the way they use  
2 spectrum. And there is a groundswell of  
3 interest among committee members in better  
4 understanding RADAR technologies and getting  
5 a better sense of how the spectral resources  
6 were utilized for the RADAR. So, we tapped  
7 into the expertise on the CSMAC itself, and  
8 Mr. Weiser has agreed to provide us with an  
9 overview of some of these issues. There may  
10 well be a deeper dive in some of the  
11 subcommittees related to these issues, but we  
12 thought it was worthwhile to spend some time  
13 as a full group with an overview of the RADAR  
14 issues.

15 And with that, I will turn it over  
16 to Rick, and who is getting his deck ready.

17 DR. ROSSTON: Is there a way to  
18 see the decks for people on the phone?

19 MS. WARREN: Yes, the Webcast,  
20 apparently.

21 CO-CHAIR HATFIELD: If you could  
22 turn into the Webcast, then it'll be focused

1 on the screen.

2 DR. ROSSTON: Is there a link or  
3 something? I don't know if I got that  
4 information. So, could you provide that for  
5 me right now?

6 CO-CHAIR HATFIELD: If you got  
7 NTIA's main Web page, [www.ntia.doc.gov](http://www.ntia.doc.gov), the  
8 link is on our main page.

9 DR. ROSSTON: Okay. Thank you.

10 CO-CHAIR TRAMONT: But there's,  
11 you know, thousands of people around the  
12 country who are tuning in, so it may be hard  
13 to get on. My family at home, for example.  
14 Nothing says party like a little CSMAC online.

15 Okay. We're ready to go. Rick?

16 MR. REASER: Well, now that Gerry  
17 or Julie has taken up all my time, I think I  
18 only have 17 slides. But now for something  
19 completely new, I think it's going to be RADAR  
20 .101. I'm not sure how long you want me to  
21 talk. I have 17 slides. I don't know if you  
22 want me to -- okay. All right.

1                   This is really something  
2                   different. The word "RADAR" appears three  
3                   times in the National Broadband Plan, and it's  
4                   in the context of sharing with RADAR under DFS  
5                   and also about providing full-motion video of  
6                   RADAR weather imagery, which is what it's  
7                   talking about. So, this is something that's  
8                   probably quite a bit different.

9                   And what I want to do is talk  
10                  about some of the spectrum issues, a little  
11                  bit about RADAR. I was going to show a bunch  
12                  of equations and get a RADAR range equation  
13                  and how do we image processing and all that  
14                  stuff, but I'm not going to do that. I'm  
15                  going to talk about much more basic stuff.

16                  So, basically I'm going to talk  
17                  about what is RADAR? How is it different?  
18                  How does it work? What frequency are we  
19                  talking about? How's it used? How's it  
20                  regulated? What are some of the trends?  
21                  Because just like we see this growing, you  
22                  know, exponential need for spectrum to do

1 things that the National Broadband Plan is  
2 concerned with, I think you're going to see  
3 that in just about every service. And the  
4 question I was trying to poke at with Juli  
5 was, you know, is that really something we  
6 want to do maybe for all services? Do we want  
7 to allow unconstrained growth? Because  
8 eventually you are going to run out of  
9 spectrum and you might run out of RADAR  
10 spectrum as well.

11 So, RADAR is an acronym, and I'm  
12 sure you know, back in World War II is kind of  
13 where the Navy came up with this thing RADAR,  
14 radio detection and ranging. And that was  
15 sort of the original context of RADAR. The  
16 RADAR has actually gone far beyond what it  
17 originally did back in World War II. In World  
18 War II they were trying to answer the  
19 questions are the Germans coming, and  
20 especially in terms of bombing the U.K.. And  
21 where are they now? So, where are the planes?  
22 Where are they at right now? How long do I

1       have to react, to do something? Do I send  
2       people to bomb shelters? Do I send out the  
3       fires to go get them, you know? And how long  
4       do I have to deal with that?

5                   And then we got into things later  
6       as we found out more and more about what could  
7       be done with RADAR. I can actually tell what  
8       things look like. I can take pictures of  
9       things with RADAR. I can tell what things are  
10      made of by RADAR by using some of the  
11      different kinds of things that RADAR offers to  
12      us as we've sort of gotten more and more  
13      sophisticated than complex in the way we are  
14      able to do things with RADAR. So, that's kind  
15      of what RADAR is.

16                   So, I want to talk a little bit  
17      about in the world of spectrum speak, because  
18      most of you deal with a world of spectrum.  
19      And so, RADAR has its own specific particular  
20      language that it uses within the world of  
21      spectrum. And so, in the ITU and in the FCC  
22      rules and NTIA rules, RADAR is basically

1 talked about as being a radiodetermination  
2 system that compares a reference signal with  
3 radio signals that are reflected or  
4 retransmitted; and we'll talk about the  
5 difference between the two, from a position to  
6 be determined.

7           So, in the original context of  
8 RADAR it was to do radiodetermination. So it  
9 had primarily two kinds of RADAR, primary  
10 RADAR, which is one where I send a signal out,  
11 it bounces off something and I look at what is  
12 returned back; and then secondary RADAR, which  
13 is one that's like a transponded RADAR, where  
14 a signal goes out, a receiver receives it,  
15 then sends something back, you know, with  
16 another transmitter. So, there are two types  
17 of RADAR in the world of spectrum.

18           So, then you ask, well, what's a  
19 radiodetermination system? Of course, the way  
20 this works is it's a giant tree of things in  
21 terms of RADAR speak, and if you go through  
22 the ITU rules and the FCC rules, there's a

1 whole family of different kinds of  
2 radiodetermination. Two basic families. One  
3 is radionavigation. Those are RADARs that are  
4 used to navigate and for obstruction warnings  
5 so you don't crash into things. And so, they  
6 have a whole bunch of services; and these are  
7 the kind of things you see on the NTIA chart  
8 and in the ITU rules, the Aeronautical  
9 Radionavigation Service and so forth, Maritime  
10 Radionavigation, used primarily for  
11 navigation. And on the other side you have  
12 radiolocation, which are primarily things that  
13 -- it's everything else. And so,  
14 radiolocation is basically everything else.  
15 It could include things like weather RADARs  
16 and possibly imaging RADARs and so forth, and  
17 a whole bunch of different families.

18 So, when you get into the world of  
19 spectrum, we have specific language that we  
20 use. And you notice the word "RADAR" I think  
21 appears like once or twice within the ITU  
22 rules or within the FCC rules and we use these

1 other words. So, don't get confused if you  
2 don't see the word "RADAR" too often in terms  
3 of the world of spectrum, because it has its  
4 own language.

5 Now, RADAR is really fundamentally  
6 different than most other radio services that  
7 we have. Most radio services like the ones  
8 you have, like your BlackBerry, your cell  
9 phone, they're used to actually communicate  
10 information and transfer information back and  
11 forth. And RADAR uses actually a different  
12 whole series of principles. RADAR is  
13 essentially sensors used to collect  
14 information or gather information. It doesn't  
15 really communicate information at all. It  
16 communicates information to an operator or to  
17 some person after they do something with the  
18 signals it processes. And then that's another  
19 series and we use regular communications to do  
20 that.

21 The other things that makes RADAR  
22 a lot different than other kinds of systems,

1       although broadcasting systems are similar to  
2       this, it has very, very high-powered  
3       transmitters and uses very, very sensitive  
4       receivers. So, that's because when you think  
5       about it we send a signal out and the  
6       reflected return is very, very weak, so I have  
7       to have a fairly sensitive receiver and  
8       usually a very sophisticated processing and  
9       receiving techniques to try to figure out what  
10      that signal is that I'm receiving. So, that  
11      means that RADAR doesn't necessarily share  
12      very well with other services.

13                 Now, there are some exceptions to  
14      that and there are some ways that RADAR can  
15      share. But in a general sense, to a radio,  
16      RADAR just sounds like noise. It's a horrible  
17      thing. And it's fairly high-powered, because  
18      if you get close to one, you know, you can  
19      kind of cook yourself even. But it will also  
20      cook your receiver. So, typically RADAR  
21      doesn't share well, although that's not always  
22      true. There's probably some ways to do that.

1           The other thing that's important  
2           to remember is RADAR generally isn't a  
3           consumer item. Now, some of you have  
4           microwave ovens. That's kind of RADAR, but  
5           those operate on different RADAR bands than  
6           regular RADAR and it uses RADAR techniques.  
7           Some cars have RADARs now, and there might be  
8           RADAR in the future when we get intelligent  
9           highways, but essentially it's not really  
10          consumerized. So, it's something that's sort  
11          of off the RADAR in terms of a normal  
12          everybody's, you know, kind of thing. You  
13          know, you have your cell phone, you have your  
14          TV set, those of you who still use broadband  
15          TV, and those kinds of things, but you don't  
16          really have your -- you know, you don't pack  
17          up the family RADAR and go on a camping trip.  
18          That doesn't really happen too much.

19                 Now, the thing that RADAR does  
20                 have in common with other services is, just  
21                 like everybody else, it needs more spectrum.  
22                 And basically, it needs more bandwidth to

1 provide it more benefit, just like you need  
2 more bandwidth to be able to do full-motion  
3 video while you're driving; you know, of which  
4 I'm not sure why we allow these things to  
5 happen, but we need more bandwidth to make  
6 RADAR operate the way it wants to.

7           So, how does RADAR work? And as I  
8 said, my guys put together these slides with  
9 all these equations and all that kind of  
10 stuff, and a range equation and false targets,  
11 and I thought that was just -- you know, I  
12 have 17 slides here. But RADAR is a lot like  
13 shining a flashlight at something. When you  
14 shine a flashlight at something, the light's  
15 reflected back to your eyeball or to your  
16 sensor and you see the object, right? And  
17 that's typically how most objects like an  
18 airplane or a ship or a person even, they'll  
19 reflect radio waves just like they do light.  
20 It's just a different frequency. Light is  
21 much higher frequency. RADAR operates at a  
22 lower frequency.

1                   And one of the things that's  
2           interesting about RADAR, some of the  
3           frequencies RADAR uses, and RADAR uses a lot  
4           of frequencies, have very special properties  
5           that allow you to do certain special things  
6           that you can't do with a normal flashlight.  
7           And some examples are this: You know, RADAR  
8           or radio waves are essentially -- the  
9           atmosphere is sort of transparent to them.  
10          So, you can actually look through things like  
11          clouds and see the thing being reflected back  
12          through the cloud. You can see through a  
13          cloud, or see through fog and see through all  
14          sorts of kinds of things that you normally  
15          couldn't see with a flashlight.

16                   The other thing is that some  
17          RADARs -- and we know a lot about this, Julie  
18          and I know a lot about this from when we were  
19          doing the ultrawideband proceeding. But some  
20          RADARs actually see through objects, like  
21          solid objects. And we talk about ground-  
22          penetrating RADARs, and see-through-the-wall

1 RADARs. But that's sort of a fascinating  
2 property of radio waves, that you can actually  
3 see through objects. And there a lot of other  
4 things you can do with RADARs that have  
5 special frequencies or special things. Like  
6 you do with HF, you know, RADARs can be made  
7 to bounce off the ionosphere and bounce around  
8 and do different things and do some very  
9 clever things to allow you to sense and get  
10 information about something you normally  
11 wouldn't have access to for a variety of  
12 purposes. You know, for weather purposes, for  
13 traffic control, for military purposes, many  
14 different kinds of purposes. So, there are  
15 some special things about how RADAR works.

16 The basic idea, and the original  
17 RADARs were pulse RADARs where you sent out a  
18 pulse, it hits something, comes back and then  
19 by calculating the time it took for the signal  
20 to go and bounce back I could tell things like  
21 that something was there and then maybe how  
22 far away it was. And then as we got more

1       sophisticated, we could actually do a whole  
2       bunch of other things like tell maybe what it  
3       was made of even. Is it metal? Is it made  
4       out of rock? Was is it? We could tell how  
5       fast it was moving. We could tell lots of  
6       different kinds of pieces of information, even  
7       take a picture of it in some cases. So  
8       basically that's the basic principle.

9                       And as RADAR became more  
10       sophisticated, what we would do is we'd add  
11       modulation to these pulses so we could  
12       distinguish them from other pulses. Because  
13       if you think about it, the RADAR receiver is  
14       kind of wide open. It's listening to  
15       everything. You know, if it's wide enough,  
16       including your cell phone and your broadcast  
17       radio and any kind of out-of-band emissions  
18       that are going to get into that receiver. So,  
19       it has to be able to distinguish all these  
20       different things to find the return that it's  
21       really looking for. So, we do clever things  
22       with modulating these pulses and adding

1 different kinds of pulse characteristics so we  
2 can distinguish things and also pull out  
3 different kinds of information about what goes  
4 on with RADAR. So, that's the basis idea of  
5 how it works.

6           RADAR design, and the reason why  
7 you don't see RADARs operating at a single  
8 frequency is a whole series of tradeoffs of  
9 things that you have to consider, and most of  
10 them are frequency-dependent. And so, they  
11 have to do with, you know, the lower the  
12 frequency, all these things happens and the  
13 higher the frequency, all these things happen.  
14 And remember, we have RADARs on all sorts of  
15 different kinds of things.

16           We put them in your bumper, right?  
17 And so, you know, if you want to have a little  
18 tiny RADAR, it's probably going to have a much  
19 higher frequency and maybe a lot shorter  
20 range, like if you're backing in; because some  
21 cars have little RADARs in their bumpers and  
22 so forth.

1                   If you want to see something a  
2                   long, long ways a way, you see these huge  
3                   installations of gigantic RADAR antennas that  
4                   look for ballistic missiles or incoming  
5                   aircraft or those kinds of things, and they're  
6                   big RADARs that take a lot of power and  
7                   they're very long range and have different  
8                   kinds of characteristics.

9                   If you want to put a RADAR on an  
10                  airplane; and we put RADAR on all kinds of  
11                  airplanes, on all sorts of airplanes including  
12                  civil aviation airplanes, those are going be  
13                  generally smaller at a higher frequency  
14                  because I can't fit all that stuff on an  
15                  airplane and I'm just going to generally  
16                  operate at a higher frequency. So, there's a  
17                  whole wide range of tradeoffs that go into  
18                  achieving what you want to do in a RADAR, most  
19                  of them based on frequency.

20                  So, what that means is there are  
21                  radiolocation allocations all over the  
22                  spectrum, you know, all the way down to low.

1 And this is sort of just a table we put  
2 together for a different reason, but you can  
3 see that there's places that RADAR happens  
4 either in a primary or secondary allocation  
5 all over the spectrum. And there's reasons  
6 for that, and it goes back to the other chart.  
7 Because to achieve certain kinds of benefits  
8 of RADAR, I have to use different frequencies  
9 just because of the physics, size constraints,  
10 power constraints and other kinds of things.

11 The other thing you could take off  
12 this slide is a similar problem that you have  
13 in just wireless. You'll notice that there  
14 are very few solid bars, or everything's all  
15 the way to the same color the whole way. So,  
16 you have basically the U.S. obviously up at  
17 the top and then all the different regions of  
18 the world. And they're all doing different  
19 things when it comes to RADAR, just like  
20 they're doing with regular cellular  
21 communications and your cell phone and  
22 everything else. So, there's real no harmony

1 anywhere in it. So, RADAR has exactly the  
2 same kinds of problems that we have with just  
3 wireless communications. So in that respect,  
4 RADAR is very much the same as everybody else.  
5 But you can see that there's no real harmony  
6 here, and it also operates just about every  
7 frequency band there.

8 So, let me talk about in a couple  
9 slides going through what the various  
10 frequencies do and what the uses are for  
11 RADARs across the various bands. And so, we  
12 go all the way down to the very low  
13 frequencies and those are typically your over-  
14 the-horizon backscatter RADARs. And those are  
15 like HF RADARs and basically you take a RADAR,  
16 bounce it off the ionosphere and look at a  
17 target, it bounces back and see where things  
18 are going and see things out there.

19 We also use it for ionospheric  
20 sounding itself. So, we use RADAR kinds of  
21 systems to determine how high up, you know,  
22 the ionosphere is and so forth, and for

1 different kinds of measurements in terms of  
2 weather and those kinds of things.

3           Then the next band is the VHF  
4 band. Lots of different things. Long-range  
5 surveillance is one of the primary things we  
6 do with that band, and space tracking. The  
7 current space tracking operates in this band.  
8 A lot of environmental monitoring goes on.  
9 And foliage penetration works very well at  
10 this band. If you want to see through things,  
11 this is a great band to see through trees and  
12 foliage and so forth to find out what's going  
13 on in there in terms of, you know, border  
14 protection or defense purposes and so forth.

15           UHF RADAR is another common band  
16 we use. That's also used for long-range  
17 surveillance in submarine launch, ballistic  
18 missile detection. We use it for space to  
19 track things in space. Airborne. A lot of  
20 your airborne early warning RADARs and stuff  
21 like. The Navy and the Air Force use that  
22 particular band because it's a fairly long-

1 range band and you can see airplanes a long  
2 ways a way and what's going on.

3 L-band is another frequency band  
4 we use. Primarily air traffic control and air  
5 defense-kinds of RADARs. Missile tracking is  
6 also done in this band.

7 S-band, lot of maritime RADARs in  
8 this thing. This is also where a lot of your  
9 wall penetration RADARs are, in terms like  
10 fire departments, you know, when buildings  
11 cave in and stuff like that, or maybe law  
12 enforcement wants to see through walls and so  
13 forth. That's a lot of work goes in there.  
14 We do some space things in there, but  
15 primarily maritime RADARs are used in that  
16 band.

17 Missile tracking is used in the C-  
18 band. Lot of discussion. This is where some  
19 of the DFS stuff came into play about sharing  
20 some of those bands with wireless LANs. Fire  
21 control RADARs operate in this band.

22 A very, very common popular kind

1 of band is the X-band RADAR, which is probably  
2 one of the most highly populated and highly  
3 subscribed RADAR bands, and that's typically  
4 8.5 to 10.5 gigahertz. Also, there's a  
5 radionavigation band in there, 9.0 to 9.2, and  
6 that's used for a wide variety of things,  
7 because that's the band that fits best on  
8 airplanes, because it's small, low-power and  
9 small antennas and so forth. So, lots of  
10 things going on in this band. And that's  
11 where we start to see some of the advanced  
12 applications like synthetic aperture RADAR,  
13 which is used to take pictures of things. So,  
14 we use this band to actually take RADAR images  
15 of various things off of maritime aircraft and  
16 fighter aircraft and so forth. Lot of  
17 precision at location, lot of other maritime  
18 uses are using this band. It's one of the  
19 most popular aeronautical bands for RADAR.

20 Ku-band is also a popular  
21 aeronautical band used primarily for imaging,  
22 synthetic aperture RADAR and also ground

1 moving target indicators, so you can see  
2 things moving on the ground, like ships and  
3 tanks and people and things like that.

4 The next band is Ka-band. That's  
5 starting to take on a lot more application.  
6 Obviously a smaller wavelength and a higher  
7 frequency. And where a lot of missile seekers  
8 operate in terms of missile things.  
9 Autonomous landing systems are done in this  
10 band.

11 And then up in the V and W-bands,  
12 we're starting to get a lot more. Obviously,  
13 it's a little shorter range, but we're using  
14 that for missile tracking as well, a lot of  
15 imaging things.

16 And then you probably have heard,  
17 we have things that are like 94 gigahertz  
18 where you can use it for like riot control and  
19 crowd control, where it actually causes a  
20 RADAR technique used to cause people to feel  
21 uncomfortable so that they leave the area when  
22 you do that. There are some automotive

1 applications.

2 My company did a project. You can  
3 read about it in the paper about it. But it  
4 was an interesting thing about riot control,  
5 for crowd dispersal.

6 Then there are some automotive  
7 applications like there's talk of using it for  
8 sensing so that when you back up you don't hit  
9 things and so forth. So, lot's of things.

10 Now, since many of you are  
11 regulators or former regulators, I think an  
12 important thing to talk about is we don't  
13 allow RADAR to just go unfettered. It  
14 operates under the same kinds of rules and  
15 regulations that any other radio service does.  
16 And the principal way to regulate RADAR, which  
17 is different than other things, is through  
18 something called RADAR Spectrum Engineering  
19 Criteria. And these rules or these criteria  
20 are based on the ITU out of this SM-1541-2,  
21 which has to do with out-of-band things.

22 Because essentially, if you think

1 about it, as I mentioned, RADAR is typically  
2 a very high-powered device, which means the  
3 higher the power and depending on what you do  
4 with the modulation, the bigger the sidebands  
5 or the bigger the sidelobes are going to be.  
6 So, RADAR has a special set of rules it  
7 operates under which are different than normal  
8 rules about how things operate in and out of  
9 bands. And this has to do with, you know, the  
10 whole issue of sharing with RADAR.

11 So, it has this thing RSEC, which  
12 is sort of a relaxation of the conventional  
13 band limits, and I'll show you how that works.  
14 And basically what that does, it balances the  
15 trade between adjacent band services and then  
16 the fact that RADAR does actually have to work  
17 to be useful. And so, we watch that very  
18 carefully in the NTIA. We turn in these  
19 things called LCID now; which someday we need  
20 to talk to Carl about all the problems in LCID  
21 with RADAR since it doesn't deal with phase-  
22 coded RADARs at all, even Version 6. But

1 basically what happens is we do regulate RADAR  
2 to make sure that it doesn't have problems  
3 with adjacent band services to the level  
4 within the rules. And if you don't do that,  
5 then you can't turn your RADAR on in other  
6 countries. In fact, you can't turn it on in  
7 this country either.

8           So basically what we have is these  
9 curves and there's different criteria. And I  
10 think Ed drew these curves right back in the  
11 days of the slide rule. And so we have  
12 different criteria, but basically I just  
13 wanted to let everybody know that, yes,  
14 RADAR's regulated just like everything else.  
15 So, we have a whole series of things we got to  
16 do and we got to fit within these curves,  
17 depending on what kind of RADAR it is and it's  
18 a real pain, just like it is getting your  
19 products certified. Getting a RADAR certified  
20 is equally obnoxious at times, but a good  
21 thing because we all want to be good stewards  
22 of spectrum and share appropriately. So, this

1 is sort of the sharing criteria.

2 The thing to remember though is,  
3 since this is all kind of relative, if you're  
4 next to a RADAR there's going to be some  
5 spillage underneath this curve obviously, but  
6 there's going to be some things to deal with.

7 So, where is RADAR going? Well,  
8 we saw from Juli's chart that basically the  
9 need for broadband communications is traveling  
10 unbounded exponentially. I was trying to plot  
11 out where we're going to be in 2014.1, and I  
12 think we're going to be up at the 100  
13 gigahertz level in terms of needs. But we  
14 have the same kind of issues here in the world  
15 of RADAR, because there's lot of trends going  
16 on in terms of what we're doing.

17 One of the things that's going on  
18 is we're building multi-function systems.  
19 What that means is we used to build like a  
20 RADAR that would just sort of detect if  
21 something was out there and maybe track it.  
22 And then we'd build another RADAR to be able

1 to launch a missile at it. We'd build another  
2 RADAR on the same airplane that would do the  
3 weather, because we had to see where the  
4 clouds were so we could fly around them, where  
5 the storm cells were and so forth. And then  
6 we'd build another RADAR to take pictures of  
7 the ground so we could see where it was going.  
8 Another RADAR to take a look how far we were  
9 from the ground in terms of an altimeter kind  
10 of a thing. Well, those are going now into  
11 multi-function systems where I basically have  
12 one RADAR do all these things, right? Using  
13 all the different techniques, processing  
14 power, different frequency bands and so forth  
15 to do that out of one box. That means we got  
16 to operate across more bands and have more  
17 spectrum access.

18 We also want to take better  
19 pictures were RADARs because we want to be  
20 able to see through clouds, we want to be able  
21 to see what's going on with respect to the  
22 weather. And so, that means we need to have

1 wider instantaneous bandwidths, you know, in  
2 terms of what we do. We want to detect  
3 smaller targets at a long range with more  
4 power. We want to be able to operate through  
5 foliage and things like that and see through  
6 those. That means lower frequencies, as I  
7 sort of talked about earlier.

8           And then we want to be able to put  
9 little tiny, tiny RADARs on little tiny little  
10 airplanes to fly around and do things.

11 There's a whole process now you probably read  
12 or heard about with NOAA and so forth. And  
13 NEXRAD is the -- WSR-88 is our weather system  
14 that does all the nice weather cloud pictures  
15 you see. Well, that was put in, you know,  
16 like back in the '80s. Thing's getting  
17 frightfully old, so you're saying well let me  
18 replace these big huge RADARs with a bunch of  
19 smaller RADARs and change the frequency and so  
20 forth. So, there's lots of work going on with  
21 that. In terms of air traffic control there's  
22 been lots of ideas about how that goes.

1                   So basically RADAR does a lot of  
2 really important things and it needs more  
3 spectrum just like everybody else.

4                   So, let me just sort of summarize.  
5 RADAR is sort of fundamentally different than  
6 most radio services. It's probably more  
7 similar to radioastronomy than it is to other  
8 things, although radioastronomy does try to  
9 communicate with people from other planets I'm  
10 told, but it does some communication. But  
11 RADAR is different.

12                   It's used to collect rather than  
13 communicate. It doesn't really share well  
14 with other services. There are some  
15 exceptions to that. Systems that can handle  
16 pulse interference typically can share well  
17 with RADAR, and that's why GPS shares  
18 reasonable well with RADAR.

19                   It supports a wide variety of  
20 missions: Aviation, defense, public safety,  
21 environmental things in terms of weather  
22 monitoring and natural resource-kinds of

1 things.

2           It's not a consumer good, like I  
3 said, so it's really off people's RADAR, and  
4 it's typically the domain of governments and  
5 typically that's because it's done for the  
6 good of everybody. It's not really something  
7 that individual consumers deal with, so that's  
8 why you don't see the word "RADAR" except  
9 three times in the National Broadband Plan.  
10 It's not something that people are typically  
11 concerned. But they do actually use it  
12 everyday. I mean, I used RADAR a whole bunch  
13 of times as I was flying here from LA to  
14 Washington last night. And thank God I did,  
15 because I'm here in one piece, a little bit  
16 tired, but I'm here in one piece.

17           And then of course the last thing  
18 is RADAR has a diverse and growing set of  
19 spectrum uses just like everybody else, every  
20 other radio service. And I want you sort of  
21 understand that you can see the great tension  
22 there is between the radio services. And

1       there's more things to worry about than just  
2       whether I can get 4 billion apps on my iPhone.  
3       So, I also want to be able to do RADAR as  
4       well.

5                       So with that, that's a very sort  
6       of top-level view of RADAR. I have backup  
7       slides. If you want to get into the range  
8       equation, if you want to figure out about  
9       image resolution, we can get into that.

10                      CO-CHAIR TRAMONT: David Donovan  
11       wants to talk about that with you privately  
12       afterwards.

13                      MR. REASER: Okay. We can do  
14       that.

15                      MR. DONOVAN: Being to speak  
16       publicly.

17                      MR. REASER: So, if you have any  
18       questions or comments, that concludes my --  
19       yes.

20                      MR. COOPER: Is there a category  
21       of RADAR that has an opportunity for  
22       reallocation; namely, for identifying objects

1 as an example? And RADAR's got to be  
2 extraordinarily inefficient, right, because  
3 you're lighting up the world and you're only  
4 looking for one bleep? And today you can use  
5 GPS for that and get a much more precise  
6 picture.

7 MR. REASER: There are projects  
8 that do that. But remember, let's talk about  
9 9/11. The guy turned that thing off. You  
10 know, that transponder is actually a RADAR.  
11 A secondary RADAR is what that's called. So,  
12 there's a spinning dish that sends out a  
13 signal to that airplane and then it sends  
14 something back. And that's how most  
15 cooperative targets are being used. And  
16 that's going to be replaced eventually by  
17 something called ADSB, automatic dependent  
18 surveillance broadcast system, where GPS is on  
19 every platform it sends you a location.

20 Remember, not everybody wants to  
21 know where they are. I'll give you two  
22 examples. My twin 17-year-olds, they don't

1 want me to always know where they are. I'd  
2 love to strap a GPS on those two high school  
3 seniors, but I'm going to have to you use  
4 RADAR. And I'm sorry, it's just the way it  
5 is.

6 But see, that works on cooperative  
7 things. And remember, a tornado or a storm or  
8 some of these other things, they aren't  
9 cooperative. They're going to happen where  
10 they happen. I'm going to need to use the  
11 frequencies that best detect that and report  
12 that back. And then I'll use my wireless  
13 system to communicate that full-motion video,  
14 just like it says in the National Broadband  
15 Plan, back to some consumer on their iPhone.

16 But I guess the point is depending  
17 on what the size of the target is, where it  
18 is, whether it's cooperative, what it's made  
19 out of, I need a whole wide range of  
20 frequencies to actually detect and do that.  
21 And that's sort of the unfortunate thing. In  
22 terms of the bits per hertz, there are no

1 bits. Most of these things are what they call  
2 PON. For those of you in the world of  
3 emission designators, they're pulse  
4 unmodulated. There's no information on that  
5 pulse at all in many, many respects, so the  
6 bits per hertz is zero.

7 MR. COOPER: I take it your answer  
8 is no?

9 MR. REASER: PON. Right. Yes, go  
10 ahead.

11 MR. EPSTEIN: Thanks, that was a  
12 terrific help in the presentation. It really  
13 was.

14 This is a transparency question.  
15 When you want more spectrum and you have more  
16 uses, what's the mechanism you use? How do  
17 you get it? Do you got to NTIA, or is there  
18 FCC proceedings? You say it's not commercial.

19 MR. REASER: Unfortunately, it  
20 goes back -- and Juli knows this better than  
21 anybody. It goes back to this slide. The  
22 problem is you really have to kind of go to

1 the ITU. And that's kind of how we deal with  
2 these kinds of things. Because first you got  
3 to go to the ITU. Remember, RADAR is long  
4 range. It doesn't go out of my one cell site  
5 to another. It goes to other countries,  
6 right? And so, we need to have some  
7 uniformity in terms of how we operate, and  
8 typically there is in a lot of RADAR bands.  
9 Not all of them, but in some of the principal  
10 ones there is.

11 So, one of the things that  
12 happened at one of the recent works is we  
13 tried to say, hey, listen, a RADAR is a RADAR  
14 is a license. Why can't radiolocations share  
15 with radionavigation in the 9.0 to 9.2 bands?  
16 So, that was one of the things that was done.

17 There are some other things in Ku-  
18 band where we're looking at how we can share  
19 better with RADAR itself, because  
20 radiodetermination or radio has its own issues  
21 of sharing, about safety services versus non-  
22 safety services. So, typically we start with

1 things like the ITU.

2 You know, most RADAR bands, if you  
3 look at the FCC chart, they're blocked bands.  
4 They're shared bands anyway, because they can  
5 be used for non-federal and federal uses. Not  
6 that many, you know, cool commercial RADAR  
7 uses now, but when we get to things like  
8 intelligent highways and so forth, you're  
9 going to see a lot more RADAR uses as sort of  
10 a tracking system in addition to things like  
11 GPS. But you're going to see a lot more  
12 things like that in the future.

13 MS. WARREN: Can I just add  
14 something to that?

15 MR. REASER: Sure.

16 MS. WARREN: You know, we as  
17 manufacturers, other than for experimental  
18 testing, we really don't do anything with the  
19 FCC with respect to that. It's the federal  
20 agency, whether the FAA or DoD or whomever  
21 that goes to NTIA both for support for  
22 additional allocations or specifically for

1 assignments for those RADARs.

2 MR. REASER: Yes, manufacturers  
3 don't get involved with that, realizing it's  
4 a domain of government anyway.

5 MR. CALABRESE: That's, Rick.  
6 That was very informative and helpful. Great  
7 overview.

8 Yes, my question is, you know, the  
9 military has been willing to share certain  
10 RADAR bands on I guess what you could call a  
11 passive basis; in other words, where they  
12 could just continue doing what they're doing,  
13 but through sensing and dynamic frequency  
14 selection. Some uses are able to work around  
15 them such as in the upper five gigahertz band  
16 with wi-fi backhaul and wi-fi in general.

17 So, I'm wondering, as these  
18 technologies become more advanced so there, as  
19 you said, is more sophisticated processing  
20 techniques, maybe better receivers, maybe  
21 directed antenna rays; I'm not sure of the  
22 combination of elements, but if a more sort of

1 proactive stance was taken, could the RADARs  
2 filter or program the receivers to ignore  
3 certain transmissions that they're not  
4 interested in?

5 MR. REASER: Yes, they do that  
6 today. There's limits to what that is,  
7 because you get into the things about what the  
8 noise floor is, because in any receiver, you  
9 know, ultimately the noise floor is going to  
10 generally -- and I mentioned there like the  
11 lower the frequency you go, unfortunately what  
12 the problem you have with the natural noise in  
13 these lower frequencies, which are really good  
14 for long-range, those are the ones where  
15 you're going to have issues with that.

16 Yes, there are things that can be  
17 done in terms of directivity, but it gets back  
18 into, you know, coming up with a kind of a  
19 sharing arrangement that really works for all  
20 parties. And obviously there's a lot of  
21 things that can be done. Unfortunately, it  
22 comes down to the most -- you know, we think

1 the spectrums are a scarce resource. The  
2 biggest scarce resource is money. Now, if you  
3 had a lot of money, you could probably do  
4 incredible things in terms of sharing and  
5 technology, to have RADARs share with  
6 radioastronomy in fact. You could probably  
7 have that happen. Don't quote me on that one.  
8 But, you know, the point is given enough time  
9 and money you can do anything. The question  
10 is what's the driver and whether you're  
11 willing to invest in those kinds of things.  
12 We could do a lot more, as Mark knows, down at  
13 DSA and DFS and these kind of technologies if  
14 people were willing to expend the money to go  
15 make them happen and just turn the crank. But  
16 that's kind of what it gets down to.

17 The other thing is you got to  
18 realize a lot of these people, you know, you  
19 think the military's bad about hanging onto  
20 stuff, there's some FAA stuff that should just  
21 be put out of its misery that's so old in  
22 terms of RADAR technology. I mean, it's

1       amazing that we still have it around. But it  
2       all comes down to money. Does somebody want  
3       to go back and retrofit all the ARSR-4 --  
4       ARSR-4 came into existence when the NEXRAD  
5       came into existence back in the early '80s.  
6       And that system is incredibly old and it's  
7       always using incredibly old technology.

8                       But does somebody want to go back  
9       and pay to have that stuff retrofitted with  
10      modern, you know, phased array, actively  
11      scanned arrays that do incredible processing?  
12      Does somebody want to spend the money to go do  
13      that? And the question is, well, maybe that  
14      could be thrown on the table as well and say,  
15      hey, listen, if you're ready to go implement  
16      the National Broadband Plan, why don't we go  
17      fix NEXRAD, ARSR-4, JSS, all these RADAR  
18      programs that are in need of being replaced as  
19      well maybe with some new technology and so  
20      forth and modernize those as well? I mean,  
21      that's sort of the trade. The ultimate  
22      limiting resource is going to be money, and

1 time.

2 MR. CALABRESE: Goes back to the  
3 incentives.

4 CO-CHAIR TRAMONT: Okay. Thank  
5 you very much.

6 CO-CHAIR HATFIELD: Yes, Rick,  
7 that was terrific.

8 (Applause.)

9 CO-CHAIR HATFIELD: Okay. So,  
10 should we try and do the first committee  
11 report, or first couple committee reports now,  
12 or take a five-minute break now with the idea  
13 that we'll sprint through to the end if we  
14 take one now?

15 (No audible response.)

16 CO-CHAIR HATFIELD: I'm getting  
17 the one now. All right. So, let's come back  
18 at realistically 20 minutes of and we'll  
19 reconvene then and start with Mark and  
20 Jennifer's reports.

21 (Whereupon, at 10:35 a.m. the  
22 above-entitled matter went off the record and

1 resumed at 10:45 a.m.)

2 CO-CHAIR TRAMONT: We're back on.

3 So, we're now going to move to the  
4 subcommittee status reports. We have two  
5 reports that are ready for adoption today,  
6 presuming that that's the will of the  
7 committee.

8 Recall that the final reports are  
9 adopted with editorial privileges, so there's  
10 a brief editorial period after the meeting  
11 that allow folks to do final cleanup, and then  
12 they would be published in final form on the  
13 Web site.

14 We then have a first draft of  
15 David Donovan's committee report on Adjacent  
16 Band and Dynamic Spectrum Access Subcommittee.  
17 And then Michael's going to update us on where  
18 we are on Incentives.

19 I know we have two new scope of  
20 work proposals that we want to get launched  
21 and get our two new committees fully  
22 volunteered for, sort of get our teams

1 together.

2 So, with that, let's start with  
3 Mark and Jennifer who will give us an overview  
4 of the final report from the Spectrum  
5 Inventory Subcommittee.

6 MR. CROSBY: Thank you. I'll say  
7 a couple things quickly and I'm going to have  
8 Jennifer and the other subcommittee members  
9 weigh in.

10 This was truly a collaborative  
11 effort. Can't do this without cooperation and  
12 participation and passing, which we had lot of  
13 at moments. So, Michael Calabrese, Marty  
14 Cooper, Gary Epstein, Bob Gurss, Mark McHenry,  
15 Darrin Mylet and of course Jennifer. It was  
16 excellent and it was great working with you  
17 all on this.

18 Since the last version in March,  
19 we received editorial assistance from Gary  
20 Saleme. Kevin Kahn, as promised during the  
21 last meeting, wrote a piece on -- he said some  
22 of the new technologies will be smart they'll

1 be able to monitor the spectrum usage on their  
2 own, so we added that, his suggested edits to  
3 a future consideration segment in the report.

4 I want to thank UTC and Prudence  
5 Parks for editorial additions regarding be  
6 careful how much information you share where  
7 water intake and utility grids and things are.  
8 So, those edits were incorporated in the  
9 document.

10 And Mark McHenry kept on hounding  
11 me on certain things on some incongruities on  
12 the benefits of spectrum monitoring, and we  
13 removed hopefully an remaining discrepancies  
14 in the text regarding the merits of spectrum  
15 monitoring.

16 We also received some substantive  
17 changes that I believe that Bryan will bring  
18 up. We looked it and we submitted it, much of  
19 them, or virtually all of them, to the  
20 subcommittee and we didn't receive feedback  
21 necessarily pro or con and given the lack of  
22 time, we opted not to incorporate that at this

1 time.

2 But I think we're in reasonably  
3 good shape with the document where we are and  
4 at this point I'd again thank everybody and  
5 have Jennifer and the other members of the  
6 subcommittee, if they're so inclined to,  
7 comment. Thank you very much.

8 MS. WARREN: Well, I actually  
9 don't have much more to add than what Mark  
10 said. I think this is very similar but for  
11 the changes that were identified by Mark from  
12 what was presented to the committee last time  
13 and with the enhancements made by the members'  
14 contributions.

15 I think that it's structured in  
16 such way that we've tried to set this up so  
17 it's very clear what our advice is, the  
18 context for it, and then the recommendations  
19 so that again it's easily extrapolated from  
20 for Larry and his team to understand. We got  
21 a lot of feedback from this committee on that,  
22 as well as members of Larry's staff. So,

1 hopefully this is also a good template for  
2 future reports as well.

3 With that, I think one last thing  
4 is we did try to reconcile where there were  
5 some inconsistencies in language that both  
6 Mark and Michael raised, and I think that's  
7 been reflected to everybody's satisfaction.

8 And we do have the two appendices  
9 which should be looked as well. One is an  
10 illustrative list of spectrum inventory  
11 elements and then again the potential use of  
12 spectrum measurements and how they might be  
13 useful.

14 And I think with that, opening it  
15 up to the subcommittee and full committee for  
16 questions and hopefully for putting it forward  
17 for adoption.

18 MR. CALABRESE: I would just, you  
19 know, comment that I think an important theme  
20 in the inventory report that might -- I don't  
21 know if it goes against conventional wisdom,  
22 but it's worth noting, is that we tried to

1 emphasize that the inventory should be  
2 designed not primarily as a means to  
3 reallocate spectrum, to redistribute spectrum  
4 rights from one party to another, which seems  
5 to be some of the assumptions about why an  
6 inventory might be being done on Capitol Hill,  
7 but that actually it's greatest utility, if  
8 it's done well and done with these metrics  
9 that we're recommending, is to provide kind of  
10 a tool for policy makers to increase spectrum  
11 efficiency and sharing. And so, that's going  
12 to be in the longer term, the greater use of  
13 this. And we should really keep that in mind  
14 in creating a richer inventory, as far as the  
15 sort of engineering metrics and so on, and not  
16 a more two-dimensional static thing that's  
17 just about redistributing rights in the short  
18 term.

19 CO-CHAIR TRAMONT: Now, I mean, on  
20 that score actually, so there were two  
21 concerns I have about the tone of the  
22 introduction part of it. The inventory stuff

1 I think we have a broad consensus. There were  
2 two elements early in the draft that I had  
3 concerns about.

4 One is the -- actually it's a  
5 notion just touched on. It's obviously true  
6 that one of the goals of the inventory is to  
7 identify spectrum that's underutilized, and  
8 then to respond to that with some policy  
9 response, one of which could be build-out  
10 requirements as a way to get more efficient  
11 use. One could be looking at additional  
12 technologies, facilitating additional  
13 technologies.

14 Another could be reallocation.  
15 And I was concerned that the draft seemed to  
16 not acknowledge the important role that  
17 reallocation has played traditionally in  
18 spectrum management. Where as demand has  
19 ebbed and flowed in different services,  
20 government has repeatedly reallocated in an  
21 effort to adapt to those needs. That's  
22 certainly how we ended up with additional CMR

1 spectrum. That's why the government decided  
2 that we were going to take some spectrum from  
3 broadcasters. It's how new defense systems  
4 are built. We make decisions about how to  
5 reallocate spectrum.

6 So, I was concerned that it didn't  
7 adequately describe the role of reallocation  
8 as a potential tool in adapting to changing  
9 environments, particularly in a world in which  
10 a lot of the spectrum management is via  
11 command and control. So, I was concerned  
12 about that.

13 The second thing I was concerned  
14 about is at some points it seems to suggest  
15 that a mandate of a particularly technological  
16 approach or a particular efficiency would be  
17 appropriate. And as Juli pointed out this  
18 morning, I'm not convinced that a technology  
19 mandate or an efficiency mandate is  
20 appropriate for all bands, or maybe even for  
21 any bands and I would want to be more cautious  
22 about the description of technology mandates

1 and efficiency mandates, to make it clear that  
2 that's one tool that might be appropriate, but  
3 that's not sort of a broad policy point, or a  
4 broad policy mandate that should be adopted by  
5 the committee.

6 I bring these up. I don't think  
7 they go to the core. The core of the report is  
8 about the inventory itself, and I think those  
9 recommendations are an area of wide agreement.  
10 This is sort of what the purposes of the  
11 inventory are. So, I don't view it as sort of  
12 at the core of it. It's more the tone of how  
13 the inventory results are presented.

14 So, those were the two concerns I  
15 had about the draft.

16 Gary?

17 MR. EPSTEIN: Yes, these edits  
18 came in kind of late and there is an amazingly  
19 respectful but wonderfully spirited series of  
20 emails that went on over the last couple of  
21 days. And ultimately I think it's almost a  
22 little bit of wordsmithing and religion, and

1 not with a real big difference in concept. I  
2 actually come out a little bit more on  
3 Bryan's. We're a little bit too stark I think  
4 in the report on this issue talking about  
5 reallocation being based upon flawed  
6 presumptions and things like that. So, I  
7 don't know if this is acceptable to the  
8 subcommittee, but I would vote for the report.  
9 I think the conclusions are right, but if  
10 there could be, you know, a little working  
11 group to just maybe massage that language,  
12 that could work. Or if not, you know, again  
13 I basically agree with the thrust and the  
14 conclusions in the report. I didn't see a  
15 real need for that push.

16 MR. COOPER: Actually our  
17 difference is not a fundamental one; it has do  
18 to with emphasis. And the fact that we  
19 emphasize the use of technology rather than  
20 reallocation I think is valid and I would not  
21 want to compromise that at all. Yes, there  
22 ought to be reallocations, but to start off

1 with an assumption that's going to solve the  
2 problem is just a red herring and we --

3 CO-CHAIR TRAMONT: Which I don't  
4 support either. I mean, it's not the only  
5 answer to the problem, absolutely.

6 MR. COOPER: Yes.

7 CO-CHAIR TRAMONT: But it is one  
8 answer, I guess.

9 MR. COOPER: But I tried to make  
10 the point that we've got a hundred to one  
11 difference. And to put them with equal weight  
12 I think is a distortion.

13 CO-CHAIR TRAMONT: That's where we  
14 disagree.

15 MS. WARREN: I did go back to try  
16 and look at this in the interim between the  
17 start of this meeting and now, so it's a very  
18 short interim. And I did try to kind of check  
19 some of this and, you know, obviously it's in  
20 the eye of the beholder, but if you look at  
21 the introduction section -- and I will try not  
22 to use too much time here, because we're not

1 really looking at the advice, we're looking  
2 at, as you said, Bryan, the introduction and  
3 the context. If you -- and this pains me to  
4 do it this way, but the fifth line. It says,  
5 "The purpose of an inventory should be to add  
6 to the policy makers' tool kits in efforts to  
7 enable and promote more intensive use of  
8 existing allocations and assignments, rather  
9 than solely for the reallocation or re-  
10 purposing of spectrum." That suggests that  
11 reallocation and re-purposing is definitely  
12 part of the policy makers' tool kit, yet  
13 should not be exclusive. That is not the  
14 balance that you're seeking?

15 CO-CHAIR TRAMONT: That is the  
16 balance I'm seeking. It's the page 2 part  
17 where we say that the fundamental precept of  
18 redistribution needs to be challenged. Page  
19 4. It says, "Reallocation cannot have a  
20 significant impact on long-term need for  
21 spectrum." And my point is I agree with Marty  
22 that the amount of improvement that we need in

1 capacity over the next 10 years is tremendous.  
2 And if you were to take today's technology and  
3 add 100 megahertz to it, it will not solve the  
4 problem. It's the combination of the two.  
5 It's more spectrum combined with more  
6 efficient technologies that gets us there.

7 So, the concern I have on page 4  
8 and then the related concern on page 5 is the  
9 nature of the discussion which seems to  
10 suggest that we shouldn't be focused on  
11 redistribution, because I think it's a very  
12 important element of how we're going to get to  
13 where we need to be, whether it's for CMRS or  
14 for other uses.

15 MS. WARREN: I think you're  
16 raising a fundamental challenge though, that  
17 when we look at the various sources of demand  
18 for new spectrum, redistribution and  
19 reallocation can't solve everybody's problem.

20 MR. EPSTEIN: Nobody's saying  
21 that.

22 CO-CHAIR TRAMONT: That's right.

1 MS. WARREN: I realize that. I  
2 think it's suggesting here going forward that  
3 given that you have competing demands that may  
4 be inconsistent unless we come up with sharing  
5 that it's going to be a ping pong back and  
6 forth. How do you satisfy all the different  
7 sources? Redistribution of useable spectrum  
8 may be quite a challenge to meet all the  
9 different sources. And I understand we need  
10 to find a balance there. You're not saying  
11 it's all one way and no one's saying it's all  
12 the other. It's just how to use that.  
13 Because when you go up above, it says,  
14 "Potential results may include redistribution  
15 of existing assignments."

16 MR. EPSTEIN: Right.

17 MS. WARREN: I suppose we could  
18 say there "of existing spectrum assignments"  
19 and could we say "allocations?"

20 MR. EPSTEIN: Look at page 4.

21 MS. WARREN: I am.

22 MR. EPSTEIN: It would take about

1 three word changes.

2 MS. WARREN: Right, and what would  
3 be the three word changes? I mean, because we  
4 have to adopt this.

5 CO-CHAIR TRAMONT: Right, the  
6 question is could this be worked out and  
7 edited. Is there a real problem that would be  
8 something that people need to just read about  
9 and have a separate document, or is it  
10 something on which we can find a common  
11 ground? I suspect it's common ground. That  
12 has been my aspiration on this. And it is  
13 that first paragraph.

14 And to your point about  
15 reallocation being a zero-sum game, I mean,  
16 that's what we've done for 30 years. I mean,  
17 we reallocated repeatedly to meet changing  
18 demands when we've had lots of different  
19 people who wanted spectrum, whether it's the  
20 federal government or commercial or public  
21 safety. So, that is the nature of the  
22 exercise. And at some level, as long as we

1 have command and control, government is going  
2 to be forced to make decisions about the  
3 evolving needs of the regulatees that they  
4 address, so about the uses they regulate.

5 MS. WARREN: I don't disagree with  
6 that. I think the entire sentence is a little  
7 bit more nuanced than that. But perhaps we  
8 can work it.

9 CO-CHAIR TRAMONT: Yes, it would  
10 be the first few sentences of page 4 and then,  
11 as I said, the discussion on page 5. Those  
12 are the two places where I was most concerned.

13 CO-CHAIR HATFIELD: Marty, do you  
14 have any rebuttal?

15 MR. COOPER: Well, I assume we're  
16 going to look at that. You know what, we'll  
17 work out your first --

18 CO-CHAIR TRAMONT: Very good. I  
19 mean I think --

20 MR. COOPER: -- possibly. But  
21 your second comment, I must tell you that I  
22 think we have a disagreement.

1 CO-CHAIR TRAMONT: About whether  
2 there should be technology mandates?

3 MR. COOPER: About whether market  
4 forces alone will in fact solve the technology  
5 problem of spectrum efficiency. Did I  
6 mischaracterize what you said?

7 CO-CHAIR TRAMONT: I think our  
8 characterizing each other's views slightly  
9 differently. On page 5, "It's crucial that  
10 licensees are obliged to use advanced  
11 techniques to increase spectrum capacity. I  
12 am not comfortable with the idea that the  
13 subcommittee or that the full committee would  
14 recommend an efficiency mandate all services.  
15 I think it may be a tool that is appropriate  
16 for certain types of services, but I'm not  
17 comfortable with the idea to say that  
18 licensees are at large to be obligated to  
19 that, because it's not clear to me that market  
20 forces don't work. That may be an area where  
21 we disagree. But I think a lot of the  
22 experience in the CMRS bands demonstrates that

1       there is a market place incentive for people  
2       to become more efficient.  That's how we've  
3       made the progress we've made for the last 25  
4       years.

5                   MR. COOPER:  Yes, except that  
6       that's where we disagree.  But I have to look  
7       at the all services.  In the CMRS there's no  
8       question in my mind that performance has been  
9       very poor.

10                  DR. ALDER:  Can you speak into the  
11       microphone, please?

12                  MR. COOPER:  I'm on the  
13       microphone.

14                  Yes, the performance of CMRS has  
15       actually been extremely poor compared to what  
16       should have been done, and maybe that argument  
17       alone is worth stirring up some --

18                  MS. WARREN:  Could I offer a  
19       solution?  Perhaps we could just simply say  
20       it's crucial that regulators consider whether  
21       it's appropriate to oblige licensees to use  
22       advanced techniques.  Could we do that.

1 CO-CHAIR HATFIELD: It goes back  
2 to the incentives, right? In some cases  
3 you've got strong commercial incentives to be  
4 more efficient. In other situations there may  
5 not be any economic pressure to be more  
6 efficient. And therefore, to me, in the one  
7 case you can rely on the market place and in  
8 the other you may need to be a little bit more  
9 proactive.

10 MS. WARREN: I'm trying to avoid  
11 the philosophical divide between using market  
12 forces or not using market forces, because  
13 that seems to be at the heart of what I hear  
14 to be the divide, as opposed to just saying  
15 that the regulators consider whether it's  
16 appropriate, you know, and then let the  
17 regulator decide the market discussion,  
18 because that's where I hear the philosophical  
19 divide between the --

20 CO-CHAIR HATFIELD: And I wasn't  
21 saying you countered it.

22 MS. WARREN: Okay.

1 CO-CHAIR HATFIELD: Yes.

2 MS. WARREN: Would that be all  
3 right? Would that be all right, Marty?

4 MR. COOPER: I suppose.

5 MS. WARREN: Thank you.

6 MR. COOPER: The answer is yes,  
7 but insofar as there's a record of the verbal  
8 part of this thing that we have created a  
9 system that motivates people, if they have an  
10 opportunity to get more spectrum, to actually  
11 be spectrally inefficient. And that's the  
12 only point that I was trying to get at in this  
13 document, and I obviously did a lousy job.  
14 But there is something in the system that is  
15 broken in that regard and I was hoping the  
16 committee could at least make a statement that  
17 identified that for people to work on.

18 CO-CHAIR HATFIELD: I think  
19 there's a little bit of a burden of proof here  
20 issue as well, because I could take the same  
21 evidence, I think, and look at the efficiency  
22 gains since I started in the business and

1 where we are now, and I could make a pretty  
2 persuasive argument, I think, that we have  
3 made. We may not have achieved as much as we  
4 could have, but I think it's mis-  
5 characterizing the record to say that there  
6 hasn't been enormous efficiency gains compared  
7 to back to the old IMTS days, back when I  
8 started in this business.

9 MR. COOPER: No, I'm taking all  
10 the credit for the good efficiency gains.

11 Since then there haven't been an awful lot --

12 CO-CHAIR HATFIELD: Yes, at least  
13 in my, as recently as yesterday, as talking  
14 places on the market place, I see the carriers  
15 today desperately looking for ways to be more  
16 efficient now by doing things like picocells,  
17 getting more intense frequency reuse and so  
18 forth. And some of the issues like smart  
19 antennas and so forth, you get into the issues  
20 of zoning problems and stuff like that, how  
21 big that antenna structure is and so forth.  
22 So, you know, I'm pretty convinced there's

1       been good progress and I'm pretty convinced  
2       right now that carriers are looking pretty  
3       hard at ways of handling this data explosion.

4               MR. COOPER:  Yes, but we do have a  
5       severe disagreement there, because I have  
6       specific evidence, and we are not going to  
7       cover that here, of carriers not doing things  
8       they could have done to get the order of 10  
9       times improvement in spectral efficiency.  So,  
10      yes, they've made some progress and --

11              CO-CHAIR HATFIELD:  But that comes  
12      back -- and, Marty, I can't argue with you  
13      here; you're too well regarded, but there are  
14      other issues.  If a person hasn't done it,  
15      there are issues like zoning.  Some cities you  
16      can't do certain things with large antennas,  
17      you know?  There's high-mobility applications  
18      where you have issues.  And so, I don't think  
19      you can say condemn a group without going back  
20      and looking at how much would it cost were  
21      there barriers, zoning barriers to doing some  
22      of these more sophisticated systems and so

1       forth.

2                   MR. COOPER:   Well, we're  
3       absolutely not going to solve that problem  
4       today.

5                   DR. ROSSTON:   This is Greg  
6       Rosston.  It may not be economically efficient  
7       to put in the most technically efficient  
8       system at this point in time.

9                   MR. COOPER:   That's what I was  
10      trying to say.

11                  DR. ROSSTON:   -- technical  
12      tradeoff.

13                  MR. COOPER:   But a solution is not  
14      a technical solution if it's not economic.

15                  CO-CHAIR HATFIELD:  Gerry, do you  
16      have something else?

17                  MR. SALEMME:   I was going to  
18      amplify what Dale said.  I think the real  
19      world, the cost and some of the other barriers  
20      to providing some technologies does have a lag  
21      effect.  But I'm satisfied with the solution  
22      that has been recommended by Ms. Warren.

1 CO-CHAIR HATFIELD: Jennifer, you  
2 have some language?

3 MS. WARREN: Well, while you  
4 continued to disagree, I went back to the  
5 first point to see if I could --

6 CO-CHAIR HATFIELD: Respectfully  
7 disagree.

8 MS. WARREN: Respectfully  
9 disagree, yes. I went back to the first point  
10 because I think there would probably be a high  
11 level of comfort if we just had this document  
12 finalized rather than massaging this  
13 afterwards. So, I thought to try and address  
14 the point that Bryan raised on page 4, and I  
15 put this to everybody. The sentence that  
16 begins, "Concerning the first approach," if we  
17 softened this so that, "We respectfully  
18 suggest that the fundamental precept of  
19 redistribution can be challenged, revisited  
20 and that while an audit may offer some small  
21 short-term results, it may not have a  
22 significant impact, blah, blah, blah." And

1       then, "The concept of redistribution is based  
2       upon a presumption;" delete the word "flawed,"  
3       and then leave that as is. And we could --

4               MR. EPSTEIN: You could delete the  
5       sentence that says "not true," although I want  
6       to be careful how we --

7               MS. WARREN: I hadn't gotten to  
8       deleting that. I was trying to delete I think  
9       some of the absolutes.

10              MR. EPSTEIN: Why don't we delete  
11       the whole paragraph? I mean, it's not  
12       relevant to the rest of the --

13              MS. WARREN: Because I think it.

14              CO-CHAIR HATFIELD: Right.

15              MS. WARREN: Well, but I think it  
16       raises questions that some people were very  
17       comfortable with in the subcommittee about  
18       whether or not it's an absolute truth going  
19       forward as opposed to raising questions.

20              CO-CHAIR TRAMONT: I guess I'd be  
21       more inclined to do so if it's open. It  
22       should say something like "redistribution

1 alone cannot solve the long-term  
2 infrastructure." That to me seems to be the  
3 point.

4 MR. EPSTEIN: We have a minor  
5 subcommittee over here.

6 MS. WARREN: Okay.

7 MR. EPSTEIN: But Marty hasn't had  
8 a chance to look at it yet though, so I --

9 COURT REPORTER: Microphone.

10 MR. EPSTEIN: Let me just try this  
11 and see if it works again. "Concerning the  
12 first approach, we respectfully suggest that  
13 the fundamental precept of redistribution  
14 needs to be challenged. It alone cannot be  
15 the sole answer on the long-term need for  
16 spectrum. The effective size of spectrum is  
17 not fixed and unchanging." And then just  
18 strike "this is not true." I think that makes  
19 the point.

20 CO-CHAIR TRAMONT: That sounds  
21 good.

22 MR. EPSTEIN: It's up to Marty.

1 MS. WARREN: Could you repeat it  
2 one more time? It's actually up to the --

3 MR. EPSTEIN: It's up to the  
4 subcommittee, but --

5 MR. CROSBY: And then if everybody  
6 wants to bless it, that's fine, but it's up to  
7 the subcommittee. We're not blessed.

8 MS. WARREN: Could you just reread  
9 it one more time?

10 MR. EPSTEIN: Sure. Let me be  
11 more precise and tell you what I struck and  
12 what I didn't. "Concerning the first  
13 approach, we respectfully suggest that the  
14 fundamental precept of redistribution needs to  
15 be challenged," and then strike the rest of  
16 the sentence. Now begin with the end of the  
17 sentence, "It alone cannot be the sole answer  
18 on the long-term need for spectrum." Then  
19 strike "The concept of redistribution is based  
20 upon the flawed presumption, which is that"  
21 and begin, "The effective size of spectrum is  
22 not fixed and unchanging," and strike "this is

1 not true."

2 MR. COOPER: Why did you strike  
3 "this is not true?"

4 MR. EPSTEIN: Because it's an  
5 absolute. We're trying to be more nuanced on  
6 it. I do say it up here. What we say up  
7 here, that redistribution alone is not the  
8 answer. That's the same thing as saying --

9 MS. WARREN: Or redistribution is  
10 not the only option. I think that's the  
11 point. It's not whether it is the option plus  
12 other things, whether it is an option, not  
13 necessarily part of the option. I mean, not  
14 necessarily part of the solution. There's a  
15 difference.

16 CO-CHAIR TRAMONT: I'm sorry, what  
17 was your proposed change?

18 MS. WARREN: That redistribution  
19 is not the only option.

20 CO-CHAIR TRAMONT: That would be  
21 appear to be a harmless --

22 MS. WARREN: The question is

1       whether we're deleting the part of the  
2       sentence that says "an audit may offer small  
3       short-term results." I don't recall quite  
4       honestly whether or not we've made that point  
5       elsewhere in this document, and therefore it's  
6       a throw-away there. I would have to quickly  
7       look and see, because I think that's a point  
8       we --

9                   MR. CALABRESE: It's awkward  
10       because we're not talking about the audit  
11       itself here. We're talking about what you do  
12       with the results.

13                   MS. WARREN: Right. That's true.

14                   MR. CALABRESE: So, we should  
15       strike that anyway.

16                   MS. WARREN: I think we've got the  
17       point about the value of audits later, Marty,  
18       so we'd probably be fine if that's okay with  
19       you.

20                   MR. COOPER: And this thing about  
21       the effective size of the spectrum?

22                   MS. WARREN: That's there. That

1 stands.

2 MR. COOPER: What do you mean?

3 You just exactly reversed it.

4 MR. EPSTEIN: No, no, I didn't  
5 mean to exactly reverse it.

6 CO-CHAIR HATFIELD: We need to  
7 help the court reporter here.

8 MS. WARREN: Gary, make sure you  
9 speak into the mic.

10 MR. EPSTEIN: I'm sorry. Your  
11 point was that if the flawed presumption is  
12 that it is fixed and unchanging. I just took  
13 out the inflammatory words "flawed  
14 presumption," but kept your thought, which is  
15 the effective size of spectrum is not fixed  
16 and unchanging. I didn't mean to change your  
17 concept.

18 CO-CHAIR HATFIELD: Oh, I didn't  
19 see the word "not" in there.

20 MR. EPSTEIN: No, I put "not" in  
21 there.

22 MS. WARREN: Thank you.

1 MR. EPSTEIN: But I truly hesitate  
2 to --

3 CO-CHAIR HATFIELD: Look, I really  
4 need to one more time, just so the record's  
5 clear.

6 MR. EPSTEIN: I will. Just as a  
7 preface, I truly hate to even engage in the  
8 discussion with somebody who'll be on 60  
9 Minutes this Sunday on cell phones.

10 CO-CHAIR HATFIELD: That's the  
11 reason I was hesitant.

12 MS. WARREN: Do you want to reread  
13 it again, Gary?

14 MR. EPSTEIN: Do you want me to  
15 give it to you?

16 MS. WARREN: Would you, please?

17 MR. EPSTEIN: Yes.

18 MS. WARREN: Okay.

19 CO-CHAIR TRAMONT: So, can we read  
20 it aloud for the record one more time, and  
21 then we'll be done with that?

22 MS. WARREN: "Concerning the first

1 approach, we respectfully suggest that the  
2 fundamental precept of redistribution needs to  
3 be challenged. Redistribution is not the only  
4 option. The effective size of the spectrum is  
5 not fixed and unchanging. There has been a  
6 continual growth, blah, blah, blah."

7 That is what between the two of us  
8 we talked about as the final package. Is  
9 everyone comfortable with that?

10 MR. CROSBY: You say the spectrum  
11 is not fixed or fixed?

12 MS. WARREN: Is not fixed. The  
13 effective size --

14 MR. CROSBY: "Effective" is the  
15 key word there, right?

16 MS. WARREN: "Of the spectrum is  
17 not fixed and unchanging."

18 MR. CALABRESE: Deleting "it is  
19 not true," but adding "not fixed."

20 MS. WARREN: Yes, deleting "this  
21 is not true." I didn't read all the  
22 deletions. I read it as it reads.

1 CO-CHAIR HATFIELD: I will say  
2 it's the effective size, but you do begin to  
3 run up against Shannon's Law here at some  
4 point. There is some fundamental constraints  
5 that you bump into.

6 MR. COOPER: No, that's not --

7 MS. WARREN: Microphone.

8 Microphone, Marty.

9 MR. COOPER: -- some place.

10 Aren't we in effect creating more spectrum?

11 CO-CHAIR HATFIELD: But there's  
12 limits to how far you can go in terms of  
13 frequency reuse, because you run into problems  
14 like you're in the middle of a national  
15 cemetery and it's kind of difficult to put a  
16 cell site in the middle of that. And that  
17 tends to constrain, I think, sort of the  
18 minimum cell sites. Plus, and you know this,  
19 but when you're traveling at very high speeds,  
20 at 70 miles an hour, if you're going through  
21 cells at the rate of several hundred per  
22 minute, I think there's an interesting

1 technical challenge. Help me out, Dave.

2 DR. BORTH: Yes, so that's  
3 definitely the case. And we're kind of  
4 glossing over all of this; and I mean there's  
5 other people on the committee that can talk  
6 about this also, but, you know, certainly  
7 there's been a Shannon theory that's been  
8 developed for kind of what we call the static  
9 and fixed-antenna mode. In other words, a  
10 follow on to this that came out with smart  
11 antennas. And these were all very well  
12 adopted and very well understood mechanisms  
13 and that's really driven forward this whole  
14 smart antenna concepts.

15 But you're right, we'll eventually  
16 hit these limits and so it's not we can do  
17 this forever. It will stop. And then there's  
18 this other little point you brought up about  
19 crossing cell boundaries and doing hand-offs  
20 all the time. We realized this a long time  
21 ago at Motorola that this is a fundamental  
22 problem. You can't just hand off altogether

1 the -- even if it's all IP-based, it'll  
2 collapse at some point in time. So, your  
3 point is very well taken.

4 MR. COOPER: I just have to argue  
5 with you. Of course the generalities that you  
6 state are true, Dale and David, but the  
7 reality is that there are systems and  
8 operations today that operate at a 100  
9 kilometers per hour that have huge increases  
10 in spectral efficiency using smart antennas  
11 and they are cost-effective systems. And  
12 that's why I suggested to Juli that perhaps if  
13 the FCC looked at these things and started  
14 dealing with facts instead of these  
15 generalities that maybe we could be urging  
16 people to use new and better technologies.  
17 So, and that was my biggest problem with the  
18 congressional action. They're using  
19 reallocation as an excuse, as a red herring,  
20 as a way of not promoting the importance of  
21 technological improvement of spectral  
22 efficiency.

1 CO-CHAIR HATFIELD: Well, I think  
2 we've got the issue teed up pretty well at  
3 this point.

4 MS. WARREN: So, does that mean we  
5 can leave the language as I last read it?

6 CO-CHAIR TRAMONT: You own it,  
7 yes. So we adopt it with editorial privileges  
8 to do what we need to do and any other  
9 cleanup. And then ideally it would be posted  
10 on the Web site within a week to 10 days kind  
11 of thing. That's fine.

12 MS. WARREN: This is the deadline  
13 to get this to whomever we need to get it to  
14 cleaned up.

15 CO-CHAIR TRAMONT: Yes, a week to  
16 10 days. I don't know the date specific.

17 Okay. So with that and the  
18 amendments, all those in favor of adopting the  
19 report as amended, please signify by saying  
20 aye.

21 (Chorus of ayes.)

22 CO-CHAIR TRAMONT: Those opposed?

1 (No audible response.)

2 CO-CHAIR TRAMONT: Excellent.

3 Good work by the team.

4 All right. One down. Mr. Mylet,  
5 of course, much less controversial.

6 And, Darrin, the Transparency  
7 Subcommittee final report?

8 MR. MYLET: Well, Dale did not  
9 tell me to jump off a bridge. I would like to  
10 see Phil jump off a bridge into the Potomac  
11 though. That might be a YouTube classic.

12 But nonetheless, he did ask me to  
13 try to get this done, and I think we were able  
14 to get this done. Great contributions by most  
15 everyone on the committee and those outside  
16 the committee.

17 Obviously, transparency was the  
18 number one issue topic today. We heard from  
19 the FCC. They appear to be making progress  
20 with regards to the spectrum dashboard, which  
21 I think is a good first step. Personally I  
22 think it has a long way to go, but they're

1 working on that. And I think based on the  
2 recommendations here and when leadership gets  
3 a chance to digest these recommendations,  
4 hopefully it will inspire more dialogue, more  
5 question and more work with NTIA. NTIA has  
6 been very helpful in reviewing the document  
7 and trying to educate us on spectrum  
8 transparency within NTIA. Obviously we're a  
9 bit in the dark when it comes to understanding  
10 how spectrum is managed within NTIA, but we  
11 certainly learned a great deal over the past  
12 several months from NTIA staff.

13 And we hope to take this document  
14 and identify some of the good things that are  
15 recommended and hopefully Larry might be able  
16 to come back to us and say we really like a  
17 few of these and maybe our group would expand  
18 upon digging a little bit deeper and coming up  
19 with even better suggestions and  
20 recommendations. And hopefully those are  
21 applied and we move forward.

22 CO-CHAIR TRAMONT: Feedback on the

1 transparency draft?

2 (No audible response.)

3 CO-CHAIR TRAMONT: Okay. Hearing  
4 none. Any comments on the phone?

5 (No audible response.)

6 CO-CHAIR TRAMONT: Okay. With  
7 that, move for adoption with editorial  
8 privileges with the idea of posting it on the  
9 Web site in seven to 10 days, all those in  
10 favor, signify by saying aye.

11 (Chorus of ayes.)

12 CO-CHAIR TRAMONT: Opposed?

13 (No audible response.)

14 CO-CHAIR TRAMONT: None. The ayes  
15 have it. The item is adopted.

16 We will now turn to David Donovan  
17 who is presenting the first draft of the  
18 Adjacent Band Dynamic Spectrum Access  
19 Subcommittee draft.

20 MR. DONOVAN: Thank you, Bryan.

21 What you have before you again is the first  
22 draft of a report that covers frankly a broad

1 scope, including both interference and also  
2 discussion of at least the leading dynamic  
3 spectrum access proposals. We also discuss a  
4 number of issues regarding enforcement and  
5 also make some recommendations regarding  
6 receiver standards.

7 But let me start by thanking the  
8 subcommittee, and in particular David Borth  
9 and the Motorola team, including Brad Hibben,  
10 Janice Obuchowski and Mary as well. Thank  
11 you. Brian Fontes, Dr. Mark McHenry, Neville  
12 Ray and the T-Mobile team. Gerry Salemm, Bob  
13 Callett, Dale Hatfield for your contributions  
14 as well. Dale, Pat Welsh, Joe Gattuso and the  
15 NTIA team as well.

16 What we tried to do in this  
17 document and what you have before you is first  
18 to try to isolate the major types and forms of  
19 interference that one may encounter. And in  
20 particular, we discuss issues regarding co-  
21 channel interference, the concept of inter-  
22 channel interference, which is interference

1 among channels, and included within that are  
2 issues regarding out-of-band emissions,  
3 adjacent channel interference, spurious  
4 responses, inter-modulation and receiver  
5 blocking and overload. We also discuss in  
6 particular questions regarding the  
7 interference, discuss interference scenarios  
8 including the transmit/receive scenarios and  
9 near/far scenarios. By and large a lot of  
10 this is focused on the mobile aspects as well,  
11 which I think is most appropriate given the  
12 nature and scope of this committee.

13           Having discussed the sources and  
14 types of interference, we make some  
15 preliminary recommendations regarding various  
16 interference mitigation techniques.

17           But before I get into that, we  
18 discussed as a group; and I think this is  
19 important, the question of whether or not  
20 there is interference. In many respects it's  
21 a policy balance a policy question. For some  
22 services the question is whether or not it is

1 harmful interference. In other contexts it's  
2 talked about in terms of disruptive  
3 interference. So, rather than redefine or  
4 create a universal definition for what is  
5 harmful interference or disruptive  
6 interference, or what is inappropriate  
7 interference, that's really going to depend  
8 and vary from service to service. It's also  
9 going to vary from the types of services that  
10 are going to share spectrum. Certainly those  
11 analyses; for example, if you're sharing with  
12 public safety, may turn out to be vastly  
13 different than if you're sharing in a classic  
14 commercial context. So, I want to make that  
15 statement up front.

16 The document itself, we started  
17 the document by saying harmful interference  
18 throughout and figured out that that really  
19 was inappropriate. So, when you read the  
20 document, you will see the term  
21 "interference." That should not be  
22 interpreted as sort of any interference.

1 Impute over that term whatever would be the  
2 appropriate legal definition of "harmful" as  
3 you go forward. And we say that right up  
4 front in the executive summary. So, rather  
5 than trying to redefine it as we go forward,  
6 I think that is an issue. It may be an issue  
7 that needs further work. Whether interference  
8 is harmful really is going to depend on  
9 service-to-service analyses. And I think if  
10 we tried to define a uniform definition, we  
11 would be here probably forever.

12 So, with that sort of notion up  
13 front, let me go forward I think with the  
14 major interference mitigation techniques that  
15 we looked at and some basic recommendations.

16 First, with respect to guardbands,  
17 guardbands in many respects are a time-honored  
18 and effective way of reducing interference.  
19 They've been used both by the government and  
20 by private entities as well. We recognize it  
21 as an interference mitigation tool. It would  
22 be appropriate to use that on a going-forward

1 basis. I think the policy question that we  
2 try to address here is, okay, if it does work  
3 as a technique, where should it come from? In  
4 other words, if you have a new service that is  
5 sharing, should the guardband on the spectrum  
6 to use that guardband come from an incumbent  
7 service or from a new service?

8 I think it was the consensus of  
9 the committee that when a new service is  
10 coming in and either sharing spectrum either  
11 adjacent to or within band, it would be easier  
12 for the new application and the new service to  
13 make adjustments. As a result, the consensus  
14 of the subcommittee was that the guardband, if  
15 any, if that is an appropriate mechanism,  
16 should come from the new service that's  
17 entering rather than extract from the  
18 incumbent or the old service.

19 That certainly is a policy cut.  
20 It's a policy cut that the full committee I  
21 think really needs to discuss. But I think  
22 imbedded within that is the concept that if

1       you are trying to create incentives for the  
2       development of communication systems there has  
3       to be at least some certainty with respect to  
4       how much spectrum you have. This issues crops  
5       up again in terms of expectations regarding  
6       interference avoidance down the road. So,  
7       that sort of is a fundamental concept. You  
8       see it right up front in the guardband  
9       recommendation.

10               There was also an issue; and in  
11       fact I want to thank NTIA for some of its  
12       contributions in this -- is that there appears  
13       to be, particularly if you're looking at  
14       guardbands with respect to out-of-band  
15       interference, that the current definitions and  
16       applications that are often used in which  
17       you're applying out-of-band interference  
18       standards that the commission has used, may  
19       not be applicable in all circumstances. And  
20       so, that really needs to be revisited almost  
21       on a case-by-case basis and updated. You just  
22       can't take the current standard or the current

1 standards that's in Part 15.209 and uniformly  
2 apply them across the board. That actually  
3 maybe created some issues. So, I think that  
4 was one of the cores of the recommendations.

5 We also looked at frequency  
6 coordination recommendations and we noticed  
7 again that frequency coordination has been an  
8 appropriate and an effective tool going  
9 forward, used both by private entities and by  
10 the government. We do recognize however that  
11 on a going-forward basis, since the demand for  
12 spectrum will be greater, that you are more  
13 likely to have essentially heterogeneous or  
14 disparate services trying to share spectrum,  
15 and that may make the task far more difficult.  
16 Also, it may be more difficult if you're  
17 trying to share spectrum with an unlicensed  
18 entity to the extent that unlicensed device is  
19 "un-tethered" or not connected to an accurate  
20 spectrum database or other management system  
21 controls. So, I think special care has to be  
22 looked at if you're trying to share in an

1 unlicensed band.

2 To the extent that there may be  
3 more government/commercial sharing and sharing  
4 among very disparate industry groups, you may  
5 need more government oversight in the context  
6 of that sharing. However, we also recognize;  
7 and I want to thank Dale for this contribution  
8 as well, and candidly we've been using it in  
9 broadcasting for years and didn't mention it  
10 in the first draft, which amazes, is that the  
11 private sector in terms of doing frequency  
12 coordination, whether it's negotiated  
13 interference rights or things of that nature,  
14 is an important and valuable tool and should  
15 not be neglected on a policy basis going  
16 forward.

17 We then looked at dynamic spectrum  
18 access recommendations and we really looked at  
19 essentially two of the major approaches that  
20 are being discussed today. One is cognitive  
21 radio and spectrum sensing and the other is  
22 sort of a geo-location/database approach. We

1 reached the conclusion that dynamic spectrum  
2 access may offer new opportunities to increase  
3 spectrum sharing options. But it also may  
4 have certain limitations, depending on what  
5 you're trying to share with. What we believe  
6 is that sound spectrum policy requires a  
7 realistic assessment of the interference  
8 avoidance mechanisms of the various DSA  
9 techniques; and this is important, through  
10 additional testing evaluation, including  
11 NTIA's ongoing Test Bed Initiative. But if  
12 there is one key thing to be gleaned from this  
13 recommendation, is that the government really  
14 does need to devote more sources, both to  
15 testing, particularly field testing, and  
16 research of dynamic spectrum access  
17 techniques. That is vital. I think these  
18 will be important tools sharing going forward  
19 and additional resources really need to be  
20 devoted.

21 Bryan, I don't want to go on  
22 forever. I'll just hit some of the highlights

1 and not every bullet here; they are rather  
2 extensive.

3           Again, cognitive radio will be an  
4 important tool. We do believe that NTIA and  
5 government entities responsible for spectrum  
6 management with respect to cognitive radio and  
7 spectrum sensing should look at some basic  
8 things.

9           First, I think we do need to  
10 establish specific procedures and ongoing  
11 testing particularly when you're involving  
12 sensing and using different system  
13 architectures when you're trying to share  
14 spectrum.

15           Secondly, with respect to sharing,  
16 it's important to look at the parameters of  
17 the devices on which you're sharing with so  
18 that any spectrum sharing comports or at least  
19 assumes or looks at the interference and the  
20 characteristics of the devices on which it's  
21 sharing. This may call an application for a  
22 case-by-case basis for each radio device as

1 the technology becomes available. You may  
2 want to even exclude certain bands from  
3 dynamic spectrum sharing such as police bands  
4 or safety of life issues. But again, I want  
5 to say may. I mean, that certainly doesn't  
6 mean all.

7           Again, further field testing is  
8 necessary and we do believe and make  
9 recommendations that you should focus on some  
10 specific areas. First of all, is the overall  
11 efficacy of the device to protect fixed,  
12 mobile and portable devices. The potential  
13 for interference to a DSA device that may be  
14 due to the hidden node problem. And, you  
15 know, I can go into discuss that further if  
16 you want, but essentially if you have a  
17 sensing device out there that is trying to  
18 sense its surrounding environment and it  
19 happens to be behind a mountain or behind an  
20 area and that device is now sensing at a level  
21 that says, no, that channel is unoccupied, you  
22 may run into problems with that approach.

1 Now, there are solutions to that. They  
2 certainly need to be explored, but if you're  
3 going to do testing, I think the hidden node  
4 problem is an issue.

5 The other question is essentially  
6 is how low would your sensing ability take  
7 you? And I think that is an absolutely  
8 critical issue.

9 Another point, which is the false  
10 alarm problem. You can create a device that  
11 is so sensitive that it always registers as  
12 channels being occupied. But that's really  
13 not an effective device and it certainly isn't  
14 a device that will work in the marketplace or  
15 a device that one would share with. So,  
16 further work on that we think is important.

17 I think the other thing is that  
18 when we're testing, we have to really look at  
19 the device in the context of the entire  
20 ecosystem with which it's going to exist  
21 rather than you just can't simply rely on a  
22 lab report. You have to look at how the

1 device is going to be used; for example, how  
2 is it going to be used with the antennas and  
3 how the antennas function on the ability of  
4 that device to sense?

5 We did get very, very specific  
6 here. I do think that this can serve as a  
7 guide for further testing and evaluation on a  
8 going-forward basis. But again, I do want to  
9 emphasize that we need a concerted effort for  
10 more resources to be devoted at the federal  
11 level to begin to work through these issues.

12 The second set of issues involves  
13 database and geo-location approaches. At the  
14 outset I think the subcommittee certainly  
15 approached the idea that you need a database.  
16 An inventory is a good start from a policy  
17 standpoint. But more importantly, if you're  
18 going to use a database approach, it's  
19 absolutely critical that the government  
20 conduct a very, very thorough inventory of the  
21 spectrum upon which sharing is going to take  
22 place. If you have a comprehensive database,

1       you can move beyond sort of the spectrum  
2       planning tool and actually use a geo-  
3       location/database approach as a very effective  
4       sharing technique. In looking at that and as  
5       we begin to drill down on that, there are a  
6       number of issues that we believe NTIA and  
7       other government entities should take a look  
8       at.

9                   The first is that if you're going  
10       to use it as a spectrum tool, depending on the  
11       devices that are going to be shared, that  
12       database ought to be able to operate and react  
13       in real time. This is especially if you're  
14       trying to share with cellular devices that may  
15       be on or may be off. I know in the  
16       broadcasting realm we have run into it in  
17       terms of using licensed environment  
18       microphones in real time in spectrum sharing.  
19       So, that database to be used as an effective  
20       tool really has to develop and move towards  
21       that approach.

22                   The other issue is maintaining

1 administrative control over the database and  
2 who should do that. One of the issues that  
3 you run into with a database is looking at the  
4 government's ability to maintain and operate  
5 a database. And while the spectrum dashboard  
6 is a step in the right direction, those of us  
7 who have used the FCC's database over the  
8 years realize that there is not a broadcast  
9 station licensed to the middle of the Atlantic  
10 Ocean. What that calls for in many respects  
11 is using a private entity to help manage the  
12 database, particularly in real time.

13           Once you make that or cross the  
14 Rubicon, then the question really becomes one  
15 of control and how much control should the  
16 government or oversight have over whether it's  
17 a database administrator a database provider.  
18 And we believe; at least there was a consensus  
19 on the committee, that the entity, if that is  
20 delegated out to a private entity, that the  
21 government has to maintain direct oversight  
22 over all aspects of database management,

1 including information distribution to the  
2 database administrators, spectrum managers and  
3 devices relying on the database information.

4 The next set of questions comes  
5 forth. On using a database, who can access  
6 it? Because obviously we don't want a  
7 database administrator, you know, opening up  
8 from Kazakhstan and just with absolutely no  
9 responsibility to the United States whatsoever  
10 creating problems or allowing devices to be  
11 turned on that shouldn't be turned on. I  
12 think the bottom was is that there was a  
13 consensus that access to the database to use  
14 that type of system should be limited to  
15 devices that have in fact been certified or  
16 approved by the FCC or the relevant government  
17 entity involved. It may be NTIA with respect  
18 to government spectrum. Moreover, that before  
19 the device is necessarily turned on, they  
20 ought to receive appropriate authorization, an  
21 authorization code from the database or the  
22 administrator before transmitting on a

1 frequency.

2           The importance here -- and I'm  
3 going to stop because I could go on forever,  
4 Bryan, on this. But the importance here is to  
5 get end-to-end security so that you're not in  
6 a situation where the system is being spoofed  
7 and that technical security of the database  
8 and of the devices being used is critically  
9 important. We also ought to look at the  
10 ability to have remote shut-off capabilities  
11 to the extent there is a problem in a  
12 particular device may in fact be interfering.

13           Again, I think the idea is,  
14 depending on how you're sharing will depend on  
15 what DSA technology you want to use. In some  
16 instances, you may need both, which is both  
17 sensing and/or using a database approach.

18           There are other approaches to  
19 spectrum sharing, and this certainly didn't  
20 intend to focus on all of them, but those were  
21 sort of the leading ones that have been  
22 discussed recently and so we decided to focus

1 on that.

2 Am I going too long?

3 CO-CHAIR TRAMONT: Yes, just for  
4 437 maybe we could have a brief overview.

5 MR. DONOVAN: We also looked at  
6 the idea that in order to facilitate that  
7 harmonization of spectrum is really important.  
8 And also, in allocations decisions sharing  
9 like services and mixing disparate services,  
10 sharing like services is better if you can  
11 achieve it.

12 We also looked at equipment  
13 recommendations. And let me focus on this,  
14 because this again is a very, very complex  
15 issue. The subcommittee believes that if you  
16 are truly going to focus on spectrum sharing  
17 or spectrum efficiencies in the long run you  
18 have to start looking at equipment and that  
19 the government right now is not truly prepared  
20 to focus on equipment as a form of spectrum  
21 efficiencies. And so, whether that is in the  
22 form of equipment standards or -- importantly

1 we recommend developing a process for the  
2 wide-ranging evaluation of devices to arrive  
3 at that approach. I think it's going to vary  
4 from service-to-service, but we do need to get  
5 that process started. And historically there  
6 have been tradeoffs between spectrum  
7 efficiency and consumer cost, which is why  
8 additional work from the government is  
9 important.

10 There are specific recommendations  
11 regarding filters in here and what could help.  
12 I think one of the policy issues which we  
13 would like to put forth before the committee  
14 is if I have developed a service based on a  
15 particular technology that I am now providing  
16 to consumers, that is being designed to  
17 operate in an environment as it exists at the  
18 time that I am providing the equipment.

19 Question: Should the device that I'm providing  
20 consumers and manufacture anticipate future  
21 sharing? Should it build in the margin down  
22 the road? I think there was a consensus, at

1 least at the committee, that that may be  
2 inappropriate at this stage of the game, that  
3 to try to avoid in a consumer device  
4 interference for which you're not sure what it  
5 will be, either from a fixed or from a mobile  
6 device, what are necessarily increase the cost  
7 of equipment.

8           Having said that, there's a  
9 balance. You don't want to simply protect bad  
10 or old equipment, you know, forever. And I  
11 think one of the points that we looked at was,  
12 well, let's take a look at the turn rate in  
13 any one particular industry. How often are  
14 consumers turning over their equipment? And  
15 perhaps that could be a key in looking at  
16 future sharing.

17           The other issue I think which is  
18 important is that in future auctions we think  
19 it is important that if you're buying spectrum  
20 or being allocated spectrum, you really do  
21 need to know what's around you. And so,  
22 creating a clearinghouse of information

1 regarding the equipment that is around would  
2 be very beneficial on going forward and help  
3 folks plan accordingly.

4 The final; and I will wrap it up,  
5 is enforcement. I think right now there was  
6 a consensus in the committee that the FCC and  
7 the government entities managing spectrum,  
8 that there are significant enforcement  
9 problems with respect to monitoring  
10 interference, with respect to handling  
11 interference, to resolving interference  
12 complaints in a timely fashion. We recommend  
13 a shot clock. We also recommend that in  
14 certain contexts perhaps a sort of model of a  
15 temporary restraining order be put into place,  
16 and those balances are explained further in  
17 the recommendations.

18 And with that, Bryan, I want to  
19 thank you.

20 CO-CHAIR TRAMONT: Terrific.  
21 Actually a lot to chew on there.

22 Any reactions to David as you all

1 are sitting around the table, around the phone  
2 today? This is the beginning of the dialogue.

3 MR. DONOVAN: Yes, and this was  
4 drafted by committee, so each section reads a  
5 little bit differently.

6 DR. BORTH: It's a two-staple  
7 document, too.

8 CO-CHAIR TRAMONT: Yes, it is. We  
9 should note that. David has taken us to a new  
10 level. Apparently the stapler could not go  
11 all the way through the 71 pages, so we have  
12 a one through 50 --

13 MR. GURSS: Bryan, for those of us  
14 who are not part of the group, if we have  
15 comments, we just send them to you, Dave?

16 MR. DONOVAN: Yes, please.

17 MR. GURSS: Okay. Just sort of  
18 scanning one section on frequency  
19 coordination, I had some thoughts, so I'll  
20 pass those --

21 MR. DONOVAN: Okay. Thank you,  
22 Bob.

1 CO-CHAIR TRAMONT: So, I would  
2 urge folks to try and get, you know, edits to  
3 David during the course of the next few months  
4 before our next meeting with the idea that at  
5 the July meeting, which we'll talk about  
6 scheduling later, we would do a final and  
7 adopt it.

8 MR. DONOVAN: Just please make  
9 sure all your edits are consistent with each  
10 other.

11 CO-CHAIR TRAMONT: Yes.

12 MR. REASER: You know, one of the  
13 things that you mentioned at the end about  
14 this issue of technology mandates; I know that  
15 Bryan hates that, but in reality, you know,  
16 I'm not allowed to drive my horse and buggy on  
17 the freeway anymore. There's a technology  
18 mandate. I got to have a car. And in fact,  
19 I can't ride my bicycle on the freeway.  
20 There's a whole bunch of technology mandates  
21 out there. And why is it that we are so  
22 afraid to do that here? We got to look at

1       what the market turn is. You know, at some  
2       point, you know, I'm sorry, my DOS --  
3       Microsoft has mandated that the C colon prompt  
4       doesn't work very well on my Windows 7. And  
5       all these DOS programs I have -- now, they  
6       mandated that; that wasn't the government.

7                        But the point is, I think at some  
8       point you touched on this. You said new  
9       options need to look at what's around you.  
10      And maybe new options and new things need to  
11      look at, okay, I got to upgrade to Windows 3.0  
12      now, you know?

13                      And so, I think that needs to be  
14      -- because the other thing I applaud you on,  
15      you mentioned about receiver specifications  
16      and standards as something that's long  
17      overdue. This is causing all sorts of issues;  
18      certainly in RADAR, I'll be honest with you.  
19      We're protecting things that should have been  
20      thrown into the heap.

21                      MR. DONOVAN: I agree with you. I  
22      guess what we were trying to balance -- I'll

1 let others in the committee speak, because I  
2 think that there is a maybe a continuum of  
3 opinion on this, is that -- and it does depend  
4 on the service. And I can speak from a  
5 broadcasting standpoint. I do have right now  
6 based on certain technologies and certain sort  
7 of planning factors -- you have \$109 billion  
8 worth of consumer equipment that is based on  
9 over-the-air digital televisions and the 34  
10 million converter boxes that consumers just  
11 purchased. Do I within six months or seven  
12 months or ten months develop a sharing  
13 proposal that may render a lot of that  
14 equipment obsolete? And so, what you really  
15 do have to balance of course is stranded  
16 investment.

17 Now, that's on the broadcast side,  
18 and frankly, that investment has been made by  
19 the consumer electronics companies. It's not  
20 a subscription-based service. The ability to  
21 flip equipment out is more complicated. But  
22 if I, for example, sold, you know, hundreds of

1 millions of dollars of police radios to  
2 various jurisdictions across the country, it's  
3 little solace to them to say, oh, we've got  
4 something better. Go to the city council.  
5 Raise local taxes and just have the police use  
6 those devices for paperweights. I mean, you  
7 have to try to find the right balance. Maybe  
8 we found it here, maybe we didn't, but I think  
9 you really just have to be careful just  
10 saying, okay, let's go to the next, let's go  
11 to the next, let's go to the next.

12 CO-CHAIR TRAMONT: You have to  
13 take into account externalities. I mean,  
14 roads are a commons, right? And so in  
15 commons, in spectrum commons we have  
16 technology mandates, which I'm much more  
17 comfortable with, and the notion that -- you  
18 know, I think we've done pretty well with the  
19 marketplace adopting cars; that seems to have  
20 worked out well. So, you know, I'm pretty  
21 comfortable with the idea that the market has  
22 incentivized participation in the commons and

1 I think a similar approach to spectrum makes  
2 sense.

3 The externalities that David  
4 talked about are real and any technology  
5 choices we make we have to be very conscious  
6 of what the externalities that are caused by  
7 our decisions are. And to me, that's what  
8 interference is. It's a way to internalize  
9 the --

10 MR. DONOVAN: Let me just add one  
11 more thought, because we did discuss this.  
12 Because if you look at this long term, and I  
13 look at investment in communications  
14 technologies, and I'm putting a lot of money  
15 up front, why would I do that if five years  
16 from now I may have to complete -- the devices  
17 may receive interference or I may have to roll  
18 out devices? What you do over the long run is  
19 actually dis-incent some of the investment.

20 Now, it may be good for the first  
21 step. Okay, the first guy and then I get more  
22 advanced. But even that more advanced guy in

1 step -- you start at step A, then you go to  
2 step B. Well, that step B guy five years  
3 later is going to have a C one that could jump  
4 in on him, then a D, then an E. And when you  
5 step back and look at it, you may actually  
6 reduce the certainty for investment in your  
7 services. And again, I don't have solid  
8 answers here. It's not a black or white  
9 issue. But frankly we're trying to figure  
10 that out.

11 MR. REASER: My only point was it  
12 might be worth looking at whether the old ways  
13 of thinking about this still apply given the  
14 rapid turn. Because I'm going to tell you,  
15 try to go to Blockbuster about a year from now  
16 and rent a VHS tape. I mean, that's --

17 MR. DONOVAN: Yes, I think --

18 MR. REASER: Yes, because who  
19 would have thought? I mean, gosh. In fact,  
20 if you look at how much Blu-Ray there is at  
21 Blockbuster now.

22 MR. DONOVAN: But even if I go to

1 Blockbuster today for example in the  
2 television business and buy the brand new  
3 thinnest new huge wonderful set, the  
4 parameters to which it has been built may not  
5 have changed, so you have to begin to look at  
6 -- and the same thing is true with any radio  
7 equipment. And so, it's a touchy -- I  
8 apologize.

9 CO-CHAIR HATFIELD: I'm getting  
10 worried. There's another meeting right behind  
11 ours. And since this particular document is  
12 still open to further discussion and so forth  
13 -- I don't want to discourage you, but I'm  
14 getting nervous about the fact that there is  
15 a meeting right, right after ours. So, I need  
16 to be conscious of that. We need to be  
17 conscious of that.

18 Danny, if you want to --

19 MR. WEISNER: I'll pose a very  
20 quick question on Larry's behalf.

21 Thanks. Congratulations on first  
22 draft and I think the issue is worth a double

1 staple; it's important. I just wanted to  
2 relay one question on behalf of Larry. I'm  
3 Danny Weisner. I run the policy shop here.

4 I think that you raise a very  
5 comprehensive set of issues and possible work  
6 items for NTIA, for other parts of the federal  
7 government. I think it would help, I think we  
8 could use the committee's help in  
9 understanding a little bit about what the  
10 benefit would be on the other side of  
11 achieving, of implementing all these steps  
12 that you propose. Obviously the kind of for  
13 it's-own-sake benefit, it would help us to  
14 have a little bit of a picture of what happens  
15 if we devoted five times more resources than  
16 we have currently on spectrum test beds, for  
17 example, for DSA, what would we get from that?  
18 What would the country get from that?

19 This may reflect the fact that  
20 we're in the process of wrapping up our fiscal  
21 year '12 budget requests, but you should take  
22 that seriously because I think that if you

1       could provide the benefit side of this  
2       equation, it would really help strengthen the  
3       case that I think you're trying to make.

4                   CO-CHAIR TRAMONT:  With that,  
5       David, thank you very much.  As I said, an  
6       excellent draft and I think we have a lot to  
7       work on for July.

8                   So with that, Michael, talk a  
9       little bit about where we are on the  
10       Incentives Committee and then we'll do the  
11       chief scopes of work, and then open it up for  
12       public comment.

13                   MR. CALABRESE:  Okay.  The  
14       Incentives Subcommittee; and this can be  
15       relatively brief since, you know, our work is  
16       at a much earlier stage even than David's  
17       subcommittee, you know, we essentially got  
18       going since the last CSMAC meeting.  We met  
19       four times since then.  Oh, and there is a  
20       little handout here with an update and an  
21       outline we're pursuing.

22                   So, the discussion to date is

1 focused first on defining the policy purposes  
2 of incentives. You now, what are we actually  
3 trying to achieve? And you can read those.  
4 They're not too surprising. You know, promote  
5 more efficient use, expand access, ensure that  
6 spectrum-based solutions are actually even  
7 required, because there could be alternatives,  
8 and ensure the protection of systems that  
9 serve important public needs.

10           And then we got into -- you know,  
11 there's both what you might call sticks and  
12 carrots. And the sticks are along the lines  
13 of mechanisms based on internalizing  
14 opportunity costs. And so, one way to do that  
15 is spectrum fees. And so, we talked about  
16 what would be the economic framework of that?  
17 We had a very useful discussion with William  
18 Web from Ofcom who heads research and policy  
19 for Ofcom since they have now a 10-year  
20 history of phasing in an administrative  
21 incentive pricing system in the U.K.. And,  
22 you know, and we heard a rather mixed report

1 on the impact that, but it was very useful.

2           Although, you know, we're able to  
3 kind of nail down our goals, this notion of  
4 spectrum fees, who they should apply to? In  
5 other words, what users and incumbents in the  
6 federal government? You know, what sort of  
7 feasible means are there to internalize market  
8 evaluation considering the constraints and the  
9 purposes of agency use of spectrum? And all  
10 that's still under discussion. We haven't  
11 really reached a consensus on that.

12           We also have been able to talk  
13 about OMB Circular A-11, you know, which  
14 requires agencies in the procurement process  
15 to take account of the evaluation of spectrum  
16 in considering alternative systems. And we  
17 talked about, you know, the general sense that  
18 we have is that that's not really taken  
19 terribly seriously; it's not enforced. And  
20 so, we were talking about how to modify and  
21 strengthen the A-11 process. So, for example,  
22 should the circular be revised to require more

1 analysis and accountability with respect to  
2 the cost benefit of proposed spectrum use?  
3 You know, so we talked about an option being  
4 the certification process itself could be  
5 strengthened by bringing in expert third  
6 parties' opinion to bear. Or another  
7 possibility is self-certification but with a  
8 checklist that makes transparent sort of a  
9 required regime of analysis so that NTIA  
10 and/or OMB could see at least that the thought  
11 process was followed through.

12 And then we'll turn; and we  
13 haven't yet, to I think what will be a more  
14 pleasant discussion about, you know, the  
15 carrot side. In other words, mechanisms based  
16 on reimbursements, revenue, subsidies for  
17 efficiency. So, there could be positive  
18 incentives for spectrum relocation. The  
19 Commercial Spectrum Enhancement Act with its  
20 spectrum relocation funds is an example of  
21 that facilitating the clearing of federal  
22 bands for the 2006 AWS auction. There are

1 proposals pending in Congress, for example, to  
2 streamline that, and we'll be talking along  
3 those lines.

4 And then finally, positive  
5 incentives for spectrum sharing. How can we  
6 perhaps expand on the CSEA concepts and also  
7 look at things like secondary market  
8 transactions and details under that?

9 So, those are the categories. And  
10 I would welcome new members, any additional  
11 members, particularly among our three new  
12 CSMAC members. If you're interested in these  
13 important issues, it's always good to have  
14 more perspectives and expertise at the table.

15 CO-CHAIR TRAMONT: And committee  
16 volunteers, just let Joe know that they want  
17 to be included in a subcommittee.

18 Jennifer?

19 MS. WARREN: Yes, I think Michael  
20 did a great job of summarizing. I think we  
21 have one transmission error. This isn't the  
22 final version that you sent to Joe last night.

1 MR. CALABRESE: Right.

2 MS. WARREN: So, this is not  
3 actually the document that should have been  
4 distributed or made public. Perhaps we can  
5 make sure that the actual document that was  
6 the final version is the version posted as  
7 opposed to this version.

8 MR. CALABRESE: Okay. I don't see  
9 Joe. Where's Joe?

10 MR. COOPER: Michael, is it  
11 implicit in your committee charter that  
12 incentives are required, or that there should  
13 be a change in the system?

14 MR. CALABRESE: Well, we could  
15 reach the conclusion that the incentives are  
16 perfectly aligned right now and that we don't  
17 need any change.

18 MR. COOPER: Okay.

19 MR. CALABRESE: We're just going  
20 through a list of possible incentives, as I  
21 said, what you might call sticks and carrots,  
22 and deciding which may be more or less

1 feasible.

2 MR. COOPER: Do you object to  
3 having a trouble maker on the committee?

4 MS. WARREN: Always welcome more  
5 trouble makers.

6 MR. DONOVAN: Speaking of trouble  
7 makers, tacking onto what Gerry said earlier,  
8 in the idea of creating incentives, and sticks  
9 and carrots, and to Dr. Cooper's point, is  
10 there any differentiation made between the  
11 types of services? For example, the decision  
12 that one needs to incentivize, either public  
13 safety or broadcasting, is premised on the  
14 notion that -- or some value structure, that  
15 that use for the spectrum ought to be changed  
16 or different? And it comes into the fact  
17 where you're saying you're looking at,  
18 particularly with respect to spectrum fees,  
19 that you're optimizing. So now, if you go to  
20 optimizing value, how are you considering the  
21 sort of public good value of public safety or  
22 other types of services, and how does that

1 enter into your calculation in terms of  
2 creating in particular the stick?

3 MR. CALABRESE: Right. So, we've  
4 talked about that a lot, which is why one of  
5 the four purposes that we mentioned was to  
6 ensure the protection of systems and services  
7 that are serving important public needs, which  
8 basically takes those into account separately.  
9 We heard as well from the U.K. that for now  
10 they're treating broadcasting different, for  
11 example, than they do other uses. They treat  
12 public safety differently, but probably  
13 different than we will, or we could, because  
14 they actually require public safety to buy  
15 their radio services from the private sector.  
16 So, anyway, we have that in mind.

17 CO-CHAIR TRAMONT: Bob's taking  
18 his chair for that. That was very impressive  
19 actually. Okay. We're in the early stage of  
20 this one as well, but let's -- yes.

21 MS. WARREN: Just a quick comment,  
22 because I think you raised a point that we're

1 still on despite it saying tentative  
2 consensus, which really what is the  
3 opportunity cost and do we define it at the  
4 economists would, or do we define it in a  
5 different way? And there's vibrant discussion  
6 going on about that, which I'd welcome you to.

7 CO-CHAIR TRAMONT: Excellent  
8 attitude.

9 MR. DONOVAN: I think I may join  
10 on that point.

11 CO-CHAIR TRAMONT: Excellent.  
12 Looks like we'll have robust participation in  
13 Michael's committee going forward.

14 So, our goal here is to produce a  
15 draft report for the next meeting in July, so  
16 this will be a very time for the new  
17 committee.

18 So, with that, thank you. No  
19 action required on that report.

20 We next turn to the two new  
21 subcommittees. So, we've adopted two final  
22 reports, so now we're going to create two new

1 subcommittees. And Gerry is going to present  
2 the scope of work document for the Unlicensed  
3 Subcommittee.

4 MR. SALEMME: Thank you, Bryan.

5 We have a draft scope of work that should have  
6 been included in the packets, and it really is  
7 a first draft. We have some information and  
8 some feedback from Michael, Bryan and a few  
9 others. But it's really an effort to build on  
10 what NTIA and the FCC has done with the  
11 allocation of spectrum for both licensed and  
12 unlicensed service in a fashion that is really  
13 to optimize spectrum efficiency, consumer  
14 benefits, U.S. productivity and market  
15 competition.

16 So, specifically the scope of work  
17 plans to: Examine past spectrum allocations,  
18 technologies and practices in the U.S. and  
19 internationally; to study available related  
20 research and interview experts in government  
21 and industry; to answer the questions that the  
22 scope of work tees up about the different

1 technologies; what's the most appropriate; how  
2 do you ensure that you have a service that is  
3 able to be used both by multiple users and  
4 targeted areas and in wide areas; what are the  
5 right technologies that are best suited for  
6 unlicensed allocations; to recommend rules and  
7 power levels that really work within a band;  
8 and, to be able to, I think, build on a lot of  
9 the work that's being done in the other  
10 subcommittees. Because there's always  
11 interdependence on these and hopefully we'll  
12 be able to look at that and build on some of  
13 the final reports and the ongoing studies.

14 You know, finally we tried to tie  
15 back to the National Broadband Plan. The  
16 Broadband Plan is recommending 500 megahertz  
17 of spectrum to be utilized. And the question  
18 is how much of that spectrum do we recommend,  
19 or does the subcommittee recommend, or this  
20 group recommend for unlicensed services and  
21 technologies?

22 So, as a first step we want to

1 look at it, look at the benefits, look at the  
2 costs and make a determination as best we can  
3 from the available information to come up with  
4 a recommendation on that. And the proposal  
5 would be to have a subcommittee selected as  
6 quickly as possible so we can get the meeting  
7 started, get more feedback, have a final work  
8 plan available by the end of the month. So,  
9 June 1st have something ready, begin the full  
10 set of meetings and have a first draft by  
11 August and then a final report by September.  
12 And that would be the objective.

13 And I'm desperate for more  
14 assistance. And, you know, since everybody's  
15 freed up and all the controversial issues are  
16 dealt with with regard to inventory, I presume  
17 we can find some trouble makers.

18 CO-CHAIR TRAMONT: So, in light of  
19 that very compelling presentation, a show of  
20 hands for folks who would like to work with  
21 Gerry? Any volunteers at the moment who want  
22 to take on this subcommittee? Oh, nice. All

1 right. A little competitive. Sure, we'll  
2 volunteer on the -- all right. Very well,  
3 Gary. Go ahead. Have at it.

4 So, Gary will now present the  
5 Sharing Subcommittee's scope of work and then  
6 we'll have a showdown on the scopes of work.

7 MR. EPSTEIN: I really too will be  
8 extremely brief on this, because we're just  
9 getting starting, and we happens to be me so  
10 far.

11 You heard the word sharing  
12 mentioned only; and I was counting,  
13 approximately 962 times in the last couple of  
14 hours. And in some sense I think the mandate  
15 of the Sharing Subcommittee will be to take  
16 the good work of all of the other  
17 subcommittees and try to synthesize it and  
18 come out with a -- incentives apply, all of  
19 the dynamic interference stuff applies,  
20 transparency applies. And so, I think sharing  
21 is maybe one of our ultimate end goals and may  
22 be a good thing to be able to recommend to

1 NTIA and the administration on some specific  
2 recommendations on sharing.

3 The work plan is very general  
4 because we don't really have a subcommittee  
5 yet, and it's based upon the fact that about  
6 a week ago I desperately called Bryan and Dale  
7 and I said what should be in the scope of  
8 work? And so far it's very general. It  
9 seemed to me the very first thing that we need  
10 to do is really define what we mean by  
11 sharing.

12 Some of it's pretty obvious. As a  
13 matter of fact, July mentioned it. He talked  
14 about geographic sharing and time division and  
15 dynamic spectrum, but it could be a lot  
16 broader. What about infrastructure sharing?  
17 Is that part of sharing? And what even the  
18 concept in the Broadband Plan of broadcast  
19 spectrum? Is that sharing or reallocation?  
20 I don't know. And so, a really important part  
21 of I think the first task of this subcommittee  
22 will be to define a taxonomy of sharing. What

1 do mean?

2                   And the second thing I thought we  
3 would need to do is, okay, we got a lot of  
4 expertise in this group. Let's not reinvent  
5 the wheel. Let's figure out what are some of  
6 the examples out there that really worked in  
7 the past. And let's figure out if there's a  
8 difference between sharing between government  
9 agencies or sharing between government  
10 agencies and commercial entities. And of  
11 course, what do you do about public safety  
12 entities when you're talking about commercial  
13 and public safety entities? So, we would be  
14 looking for particular examples which would  
15 provide a good way to analyze what sharing  
16 works and what doesn't.

17                   And then ultimately we really do  
18 want to come out with specific  
19 recommendations.

20                   The schedule that Gerry mentioned  
21 I think would really be the same schedule for  
22 this subcommittee. I think we're moving

1 towards the same.

2 And we don't want to reinvent the  
3 world again. I looked over a little bit of  
4 the prior CSMAC; or I think as Bryan is trying  
5 to make us say CSMAC, work in the past and I  
6 think there's some good work there. There's  
7 good work with respect to the reports that  
8 have been produced by this particular group.  
9 And I think we need to look at the literature  
10 that's out there and need to draw on the  
11 expertise of committee members and interview  
12 and get involved with government, academic and  
13 commercial entities.

14 And so, that's really where we are  
15 right now.

16 CO-CHAIR TRAMONT: Great. So,  
17 volunteers for -- where should we start -- for  
18 Gerry's committee? Anybody ready? Marty's  
19 in, Jennifer, Michael, David.

20 And anyone on the phone,  
21 unlicensed?

22 (No audible response.)

1 CO-CHAIR TRAMONT: Hearing none.

2 All right. I think we can start volunteering  
3 people in their absence.

4 And for Gary's committee?

5 Excellent. Oh, wow. I'm going to read these  
6 for the record. Mark, Juli, double Mark,  
7 Darrin, David. All the cool kids are doing  
8 it. David and Marty and Bob. I'm sorry.  
9 Some of the cool kids are doing it. Sorry.  
10 At any rate, we have a robust --

11 MR. EPSTEIN: Can I get a list at  
12 some point?

13 CO-CHAIR TRAMONT: Yes, and I read  
14 it. Hopefully it will be part of the record  
15 and Joe and others will correlate that and  
16 send it around. And also, we do have a number  
17 of committee members who were not able to be  
18 here today, so we will obviously open up  
19 membership for them as well so that we will  
20 have even larger subgroups working on those  
21 two things.

22 All right. With that, thank you

1 both very much for agreeing to co-chair  
2 committees for the coming term. This is no  
3 easy undertaking, so we appreciate it very  
4 much.

5 All right. So with that, we will  
6 open it up for public comment. Jim Snider and  
7 then I know -- I think you need a microphone.  
8 I think that's the only particular requirement  
9 on where you are.

10 MR. SNIDER: Jim Snider from  
11 iSolon.org. I'd like this committee to  
12 consider the incentives that may discourage  
13 public participation in this meeting. I think  
14 my comments very much consist with the Obama  
15 administration's Open Government Directive and  
16 the NTIA's commitment to those principles and  
17 this committee's also commitment to the  
18 principle of transparent government.

19 So, five quick observations. A  
20 meeting time posted on the Federal Register  
21 was 9:30, which is the reference people are  
22 told to go to find out when this meeting

1 meets. The agenda posted shortly before the  
2 meeting was 9:00. So, if you came at the  
3 official posted time, you would have missed --  
4 a minor point.

5 Video. There's a listing on the  
6 Web site for three videos for the three past  
7 meetings. The first one, when you click on  
8 it, looks like there's a link, doesn't work.  
9 And the other two have no video. I'm  
10 interested in watching these meetings from my  
11 office and not coming in. The lack of trust  
12 and time, video and other things, is a serious  
13 problem. I hope you will address that  
14 problem.

15 The transcript. The transcript  
16 looks great. No spelling errors. The grammar  
17 is decent. But the actual quality of the  
18 transcript seems to be awful. I'm just  
19 curious. How many people here have read the  
20 transcripts? Okay. Lots of problems. I  
21 would recommend that you either consult with  
22 the company and get them to improve the

1 quality of the transcripts or you find another  
2 transcript company. They're very expensive.  
3 I think maybe you should get your money's  
4 worth. That's also part of transparency. If  
5 we don't have a reliable transcript, what's  
6 the point?

7 Minutes. They're consistently  
8 late posted on the Web site. I believe  
9 there's one that's close to a year old with no  
10 minutes. That's your official record. I  
11 think under FACA you're obligated to do that;  
12 I could be wrong. But whatever it is, if you  
13 want to be transparent, you got to get your  
14 minutes up. You've got to get them up there  
15 in a reasonably timely fashion.

16 Public notice. Citizens are told  
17 to go to the Federal Register, which is an  
18 incredibly inconvenient thing to do to find  
19 out when, because these things don't --  
20 meetings meet periodically. Find out. They  
21 have no email notification of the Federal  
22 Register. At the last meeting I think it was

1 posted on your Web site within 24 hours of the  
2 meeting and no notice even of when it was  
3 actually posted. This time it was posted in  
4 a timely way. It was posted basically at the  
5 time in the Federal Register. That is  
6 incredibly inconvenient to force members of  
7 the public to constantly be checking at the  
8 Web site to find out when your next meeting  
9 is. You should have an email list. I've  
10 requested for more than six months to be put  
11 on an email list so I don't have to go look at  
12 the Web site. This is obvious. It's a simple  
13 thing to do. I would go even further. I  
14 would like to receive all notices that all the  
15 members here get. I don't think that's going  
16 to happen, but I do think that's actually  
17 quite consistent with the Open Government  
18 Directive. But at a minimum I should have  
19 easy access to email notifications of these  
20 meetings so I don't have to go through that  
21 hassle.

22 And lastly, I was disappointed

1 with the committee's decision that standards  
2 of academic integrity would not be a priority  
3 if they were inconvenient for the committee.  
4 I don't think that's necessarily unusual for  
5 government advisory committees, but this is an  
6 expert advisory committee and I would  
7 encourage you to rethink the relevance of  
8 standards of academic integrity to your work.  
9 I think it's an important value and again I  
10 would encourage you to rethink that stand.  
11 Thank you.

12 CO-CHAIR TRAMONT: Thank you for  
13 your contributions. We're going to take that  
14 under advisement. There's a number of things  
15 that I feel like we can be responsive to  
16 working with our colleagues at NTIA to be more  
17 transparent to the public and make your job  
18 easier in participating in our proceedings.  
19 So, obviously that's very important to us.

20 In that vein, Mr. Marcus, I know  
21 that you had a presentation. And we have some  
22 handouts we're passing now.

1 MR. MARCUS: Thank you. Five  
2 minutes is a reasonable time?

3 CO-CHAIR TRAMONT: That would be  
4 great.

5 MR. MARCUS: Great. Okay. I have  
6 a handout here. It's widely known that  
7 federal spectrum is used very widely in space  
8 and in time and there's great potential for  
9 increased civil spectrum use if it can be on  
10 a non-interference basis. The key thing is  
11 that civil spectrum use not only increases the  
12 civil communication industry, the  
13 manufacturers and the carriers, efficient  
14 wireless communication helps the whole GDP.  
15 And the European Commission has made quite  
16 clear that efficient communication is very  
17 important for economic growth, not just for  
18 the corporations that are referenced in this  
19 room.

20 Since what's good for the GDP is  
21 also good for the national security community,  
22 because the IRAC membership in the national

1 security community uses of four to six percent  
2 of GDP and the only way we can afford to spend  
3 money on national security is to keep the GDP  
4 growing, because congress seems to be  
5 unwilling to keep its expenditures beyond the  
6 four to six percent point. Thoughtful  
7 spectrum sharing will improve GDP and national  
8 security.

9 Now, the realistically passive  
10 sensing of federal spectrum for sharing isn't  
11 going to work. Why? Because most spectrum  
12 decisions of federal government are  
13 realistically made by the IRAC, not by the  
14 NTIA staff. That's a pragmatic observation  
15 from 25 years in inspector management. And  
16 there's no incentive for the IRAC members to  
17 do this given the risks that they see  
18 associated with it and the lack of economic  
19 gain.

20 The point I've been trying to make  
21 here and the presentation I went for a  
22 previous meeting was if you rely on passive

1 sensing, if you look at the graph there, the  
2 fraction of usable spectrum that can be used  
3 is going to be negligible if you insist upon  
4 zero chance of interference. Much more  
5 constructive is inter-system cooperation that  
6 is not possible with present systems which  
7 were not designed with sharing in mind. If  
8 you look at the five megahertz dynamic  
9 frequency sharing, it's the best that could be  
10 done with a system that wasn't designed for  
11 sharing. It's really a crummy system. A few  
12 of the false alarm rates are much too high  
13 unless you come up with very, very liberal  
14 interpretations of what is now a treaty  
15 obligation of the United States.

16 So, the key issue is can we get  
17 federal users to design systems that  
18 facilitate sharing? For example, in LAN  
19 mobile trunk systems along the lines of the  
20 original D Block Sharing Proposal, which  
21 failed not because it was a bad technical  
22 idea; it failed because the business aspects

1 of that NPRM were atrocious and made you  
2 wonder did anyone with an MBA ever read the  
3 NPRM before it was issued, but also with RADAR  
4 systems. And all due respect to Mr. Reaser,  
5 a key issue of RADAR systems is most RADAR  
6 systems rotate. And when they rotate, they  
7 point this way, they point that way. Not all  
8 RADAR systems. Most RADARs systems rotate.

9 And I was involved on the Friends  
10 of the XM-Sirius Merger, and the thing that  
11 fascinated me about that was the sudden  
12 realization was XM-Sirius does not have 1,000  
13 millisecond per second access to that  
14 spectrum. Why? You go under underpasses.  
15 And yet if you have XM-Sirius in your car, it  
16 works. You don't notice that little detail.  
17 But growth for spectrum demand these days is  
18 not for two-way real time voice. The growth  
19 for spectrum demand is in packetized data,  
20 usually one way. But generally, packetized  
21 data, in using intermittent available  
22 spectrum, one can provide useful services of

1 packetized data. And therefore, I believe  
2 strongly that you can design new types of  
3 RADAR systems; not existing RADAR systems, new  
4 types of RADAR systems to share with users on  
5 an intermittent basis taking advantage of  
6 rotation intervals. And I think this should  
7 be a high priority of the committee.

8 Now, it was said previously that  
9 harmful interference is something we don't  
10 want to go into. Let me disagree with that.  
11 If you read Title 3 carefully, five different  
12 places in Title 3 the word "harmful  
13 interference" is mentioned. Whether that's a  
14 good idea or not, I won't say, but congress  
15 has incorporated it in Title 3 in five  
16 different places, usually dealing with  
17 federal/non-federal sharing or reallocations.  
18 So, it's key what really is harmful  
19 interference. And I'd like to remind the  
20 committee that the IEEE USA sent a letter to  
21 both Assistant Secretary Strickling and  
22 Chairman Genachowski two weeks ago; NTIA has

1 a copy; you can also look on my Web site on my  
2 blog to find a copy, saying how important it  
3 is to clarify, not define, clarify what is  
4 harmful interference.

5 Because let's assume the inventory  
6 gets done tomorrow. Let's assume we have a  
7 huge stack of paper here that lists every  
8 transmitter in the United States, their  
9 technical characteristics, the exact minutes  
10 and seconds they turn on each day and their  
11 location. What would you do with that  
12 information? I would argue as a veteran of  
13 both the AWS-3 proceeding and the Northpoint  
14 proceeding 10 years ago that if we knew where  
15 every transmitter in this country was, and had  
16 complete information; which we will not in any  
17 case, we would just trigger dozens of AWS-3  
18 and Northpoint decisions that will keep the  
19 industry tied up in knots for years and result  
20 in no access to spectrum. So, some sort of  
21 clarification and faster adjudication of  
22 harmful interference issues is critical for

1 translating inventory into real spectrum.

2 Thank you.

3 CO-CHAIR TRAMONT: Great. Thank  
4 you very much and we'll incorporate your  
5 submission into the record, and I think it has  
6 some informative points for some of the  
7 subcommittees' work going forward.

8 Other public comment?

9 (No audible response.)

10 CO-CHAIR TRAMONT: Okay. Seeing  
11 none. We are almost prepared to go to  
12 calendars to figure out our next date; we're  
13 not quite there yet. So, we're going to work  
14 with Assistant Secretary Strickling and come  
15 up with some proposed dates and circulate  
16 those. We are shooting for July. We'll try  
17 and see what we can do in light of people's  
18 vacation schedules and other issues, but we're  
19 shooting for July/August and then obviously  
20 another meeting in the fall. So, we will send  
21 those around forthwith.

22 Dale, anything else?

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CO-CHAIR HATFIELD: No.

CO-CHAIR TRAMONT: Anything else  
for the good of the order from the committee?

(No audible response.)

CO-CHAIR TRAMONT: All right.  
Thank you all very much. We're adjourned.

CO-CHAIR HATFIELD: Good job.  
Thank you.

(Whereupon, the above-entitled  
matter was adjourned at 12:17 p.m.)

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