U.S. DEPARTMENT OF COMMERCE

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COMMERCE SPECTRUM MANAGEMENT
ADVISORY COMMITTEE (CSMAC)

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MEETING

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TUESDAY
JANUARY 28, 2020

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       The Committee Law Offices of Morgan Lewis & Bockius, LLP, 1111 Pennsylvania Avenue NW, Washington D.C., at 1:00 p.m., Charla Rath and Jennifer Warren, Co-Chairs, presiding.

MEMBERS PRESENT

CHARLA RATH, Co-Chair; Independent Consultant
JENNIFER WARREN, Co-Chair; Vice President,
     Technology Policy & Regulations, Lockheed
     Martin Corporation
CLAUDE AIKEN, President and CEO, Wireless
     Internet Service Providers Association
AUDREY ALLISON, Vice President, Global Spectrum
     Management, Boeing
MARY BROWN, Senior Director, Spectrum and
     Technology Policy, Cisco
MICHAEL CALABRESE, Director, The New American
     Foundation, Wireless Future Program (by
     telephone)
MARK E. CROSBY, President and CEO, Enterprise
     Wireless Alliance
THOMAS DOMBROWSKY, Jr., Senior Engineering
     Advisor, DLA Piper LLP

H. MARK GIBSON, Senior Director, Business
        Development, Comsearch
DALE HATFIELD, Senior Fellow, Silicon Flatirons
        Center for Law, Technology, and
        Entrepreneurship
CAROLYN KAHN, Principal Economics and Business
        Analyst/Group Leader, The MITRE
        Corporation -- Center for Acquisition and
        Management
PAUL KOLODZY, Consultant, Kolodzy Consulting,
        LLC
MARK LEWELLEN, Manager of Spectrum Advocacy,
        John Deere Intelligent Solutions Group
JENNIFER MANNER, Senior VP, Regulatory Affairs,
        Echostar
MARK McHENRY, Founder and President, Shared
        Spectrum Company
WAYNE PHOEL, Independent Consultant, Previous
        MIT/LL and DARPA (by telephone)
CARL POVELITES, Assistant Vice President of
        Public Policy, AT&T (by telephone)
RUTH PRITCHARD-KELLY, Vice President Regulatory
        Affairs, OneWeb (by telephone)
MARK RACEK, Senior Director of Spectrum Policy,
        Ericsson
DENNIS ROBERSON, Research Professor of Computer
        Science, Illinois Institute of Technology
        Andrew Roy, Member
STEVE SHARKEY, Vice President, Government
        Affairs, Technology and Engineering
        Policy, T-Mobile US, Inc.
MIRIAM SOROND, Vice President Technology
        Development, Dish Network LLC
BRYAN TRAMONT, Managing Partner, Wilkinson
        Barker Knauer, LLP
CHRISTOPHER WEASLER, Global Head of Spectrum
        Policy and Connectivity Planning,
        Facebook, Inc.
ROBERT WELLER, VP for Spectrum Policy, National
        Association of Broadcasters

ALSO PRESENT

DAVID REED, CSMAC Designated Federal Officer
CHARLES COOPER, Associate Administrator, Office
      of Spectrum Management, NTIA
DOUG KINKOPH, Associate Administrator,
      performing the non-exclusive functions and
      duties of the Assistant Secretary of
      Commerce for Communications

C-O-N-T-E-N-T-S

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

(1:02 p.m.)

MR. KINKOPH: Good afternoon. Thank you very much for joining us today. I want to welcome everyone back and wish you all a belated happy new year. Since we last met, many of you spent time in Egypt as I did at the World Radiocommunications Conference. With your help, the United States had a successful conference. We emerged with outcomes that reinforced U.S. leadership 5G and enabled investment in new satellite technologies.

In other spectrum updates, regulatory work on the 3.5 gigahertz CBRS band is nearly complete. As you probably are aware, yesterday the FCC announced that it has certified four spectrum access administrators paving the way for a full commercial operation in the 3.5 gigahertz band. This will allow for full commercial use of the critical mid-band spectrum for broadband connectivity in 5G. New operations in the band will create tremendous value for our country and

further strengthen U.S. leadership of wireless technologies. We are eager to see new commercial services that will emerge in this key mid-band spectrum.

Another significant spectrum of development came with our release yesterday of a key technical report, about 34.50 to 35.50 megahertz with band directly adjacent to the CBRS band. Our report points to the possibility of real time spectrum sharing in the band that would provide both sufficient protection to incumbent operations and attractive opportunities for commercial businesses. I'm grateful for the NTIA engineers that worked on this. As well, the staff and the Department of Defense and various military services for their work on this report. Thank you. There's more to be done before we can move forward, but this is a promising start to this new sharing technology.

My colleagues -- my colleague, sorry, Charles Cooper -- Sometimes I think there are more than one Charles -- will have more wide ranging

update on spectrum issues later this afternoon here. I know this committee has been busy since our first meeting in October. I'm eager to hear about all the progress that's been made. CSMAC has laid out an ambitious agenda this cycle, taking on some big questions, thinking through issues that are fundamental to the future of spectrum management.

This committee's perspective has always been extremely important to NTIA. I'm confident that as you work through the issues that we've teed up, we're going to have a greater understanding of our challenges and some potential solutions as we work towards more effective spectrum policy making and spectrum management.

With that, I'd like to once again recognize our CSMAC co-chairs; Jennifer Warren and Charla Rath. We are grateful for your leadership and all the time you've put into this initiative and the important committees. I'll now turn it over to the co-chairs. Thank you.

CO-CHAIR WARREN: Good afternoon,

everyone. Welcome and it's nice to have such a full table. It's great to see so many people here in-person. Can everyone hear me now? Okay. So we just want to do, you know, the traditional taking of attendance for those here for the record. And we will basically -- I think should we just call and make sure, that those are on the phone, are on the phone? I think we can validate those who are here sitting behind their tags, that we don't need to validate that you are here. But also want -- So let's start with that. Michael Calabrese, if you're on the phone, please say yes.

MR. CALABRESE: Hi there. I'm on.

CO-CHAIR WARREN: Great, thank you. Donna Murphy? Please remember to go off mute when you respond. Ruth Pritchard-Kelly?

MS. PRITCHARD-KELLY: I am here.

CO-CHAIR WARREN: Great, thank you. Kurt Schaubach, not here. Wayne Phoel?

MR. PHOEL: I'm here. I'm here.

CO-CHAIR WARREN: Thank you, Wayne. Is there anyone else on from the CSMAC that we should

--

MR. POVELITES: Carl Povelites.

CO-CHAIR WARREN: Thank you, Carl. You were down as being on the telecom and I missed you. Thank you. Okay, I think then we've done our official roll call. And Doug, I just want to thank you for the task that you and Charles have given us. As you can see as you go through the subcommittee reports, everybody's been very active except for Committee 4 who was supposed to wait.

(Simultaneous speaking)

CO-CHAIR WARREN: You were supposed to wait until January, post WRC to start. So even you have been busy for your timeframe. So thank you for that.

Just one of the things we wanted to re-state, which we re-state kind of term of the CSMAC is that we're all here in our individual capacities. We're not here representing our companies, our institutions, our clients, our whatever. We're here in our individual capacities bringing the expertise that we have behind each

of us gathered throughout our careers. So as we speak, and that's also for the press, again, we are here in our individual capacities as special government employees during the period of our work here. So just a reminder on that. Charla?

CO-CHAIR RATH: Just a couple of things also, welcome to the several government folks here in the room and thank you. And while you're not sitting, you know, on the committee itself, I know several of you have been incredibly helpful to the subcommittees as they've gone through their work. I also like Jennifer, am in awe. I don't think I've seen this many people in a long time sitting around the table. This is actually great. It's nice to see all of you here.

And then finally I add to Jennifer's comments a sincere thank you to all the committee members. The subcommittees have been very active. And Doug alluded to it, this is despite the fact that I know many of you were very actively engaged in the WRC. And yet I see -- you know, I've seen a tremendous amount of work that's been done. And

you know, we hit the ground running. So again, you know, I'm in support of what Jennifer was saying. Thank you all very much. And now we get to the hard part.

(Simultaneous speaking)

CO-CHAIR WARREN: Now we get to the hard part, Charles. Over to you, Charles. Thank you.

MR. COOPER: Is this okay?

CO-CHAIR WARREN: Yes.

MR. COOPER: So thank you, Charla for the introduction. And thanks to everyone for being here. It's an exciting time to kick off the next year and really the new era for CSMAC.

Fulfilling my customary role as Associate Administrator, I have a few things to talk about in my Spectrum Policy Update before we get to the heart of the meeting, listening to the subcommittee reports and discussion. At the end of my remarks, I'll have an opportunity for questions.

The key policy issues for this year, not only for NTIA and for Congress and the FCC and

federal agencies is the urgency to make more mid-band spectrum available for 5G wireless services. This is an effort we've been working on actually for many years. In fact, much of what we've been doing has been a result of investing time and resources over the past decade to develop sharing approaches and dynamic spectrum management techniques. We are now able to begin appointees as the Federal Communications Commission moves to allocate and make available many of these key middle bands.

As Doug mentioned earlier, on the 35.50, the 36.50, what we call the Citizens Broadband Radio Service, CBRS, NTIA has been working closely with the FCC throughout the past year to fine-tune the technical parameters to allow a vibrant commercial broadband service while protecting the vital defense radars in the band. With a final exchange of letters this past week, the process is essentially complete and the way is clear for commercial rollout and eventual CBRS auction in June of the priority access licenses

in the band.

This is an important milestone in making this mid-band spectrum available. And it's also important for the future development of sharing among federal and non-federal users. NTIA has worked hard, along with the Commission and the Department of Defense and industry groups to lay down a firm foundation for spectrum sharing. The approach will incorporate for the first time, dynamic protection areas that will utilize spectrum access system and environmental sensing capabilities to provide a flexible dynamic sharing environment for commercial operations.

One remaining matter related to the CBRS band has been DoD's request to receive funding through the Spectrum Relocation Fund for the transition to band sharing. DoD has submitted a transition plan. The technical panel approved that plan in late December just before Christmas. And it has been sent to Congress, the Commission, and the Government Accountability Office as statutorily required. The DoD Transmission Plan

will soon be posted on the NTIA's website. We wish

the FCC a good auction and the industry and CBRS

operators, the best of luck as they roll out the

service with the regulatory work coming to a close.

Another key band NTIA has been

considering is the 31.00 to 35.50 megahertz band.

 We are reviewing the entire band, which is a

critical band for DoD radars that are in turn

critical for national defense. These high-powered

defense radar systems operate on ground base,

shipborne, and airborne platforms making this band

pretty complex in terms of sharing analysis.

The DoD systems operate nationwide and

off the coast, as well as in a large number of bases.

 NTIA has identified the top 100 megahertz of the

band, the 34.50 to 35.50 megahertz band as the best

possible candidate to explore additional spectrum

sharing. We are focused on this band for a more

intensive feasibility study. The technical report

of that study, which was released to us yesterday,

indicates a spectrum sharing may be possible within

this 34.50 to 35.50 megahertz band subject to

further information and analysis while studying

the utility of time-based sharing mechanisms.

We are preparing a report to Congress

on the entire 31.00 to 35.50 megahertz band. This

report is presently under internal review. We

expect further discussion with Executive Branch,

the Commission, and Congress as we move forward

on it. Related to these issues is NTIAs ongoing

technical work to explore innovative spectrum

sharing and point advanced network processing for

time-based sharing. Some federal operators

operate intermittently and only in certain portions

of the band. This use can be available according

to mission requirements. Focusing on the timing

of the actual use could open up opportunities for

sharing when geographic or frequency-based sharing

criteria may be impractical or more problematic.

We call this approach 5G incumbent informing.

The NTIA is creating a working group

to research how such a 5G incumbent informing would

be implemented and operated in the 34.50 to 35.50

megahertz band. If successful, this approach

ideally could be employed in other spectrum bands to facilitate sharing with non-federal 5G systems.

While the 3 gigahertz band is our top priority at the NTIA, we are also looking at potential ways to make spectrum available in other bands. This includes the ongoing sensor program, which is proposing to take a set of aging long and short range radars operated by various agencies and replace them with a single system. And in the process free up spectrum within the 13.00 to 13.50 megahertz band for auction for commercial wireless users.

In addition to reporting on the mid-band, NTIA will also be reporting to Congress on potential federal spectrum incentives. The MOBILE NOW Act requires us to report on potential isolation for regulatory measures that would provide incentives for federal agencies to use spectrum as effectively and efficiently as possible. Potentially making more spectrum available for sharing or other repurposing. We

expect to discuss an approach of allowing federal
users to lease spectrum to non-federal entities,
an idea included in NTIA's budget proposals for
fiscal year 2019 and 2020.

The Secretary of Commerce last year
submitted to President a document outlining a
National Spectrum Strategy for the nation. To
support that effort, NTIAs initiating some near
term actions to prepare for the eventual
implementation. For starters, NTIA is developing
this connotation plan for the strategy --

For those on the teleconference line,
you need to be muted.

CO-CHAIR WARREN: Maybe another voice.
 Everyone on the phone, please go on mute. It's
actually interrupting here the flow of Charles'
report. Thank you.

MR. COOPER: For starters, NTIA has
developed an implementation plan for the
strategizing and working for the federal agencies
to build a policy and institutional framework for
implementation. One example of this is seeking

to formalize the Policy and Planning Steering Group, what we call the PPSG, an advisory body that brings together high level department and agency officials to discuss spectrum policy issues. The PPSG has been the principle form for intergovernmental discussions of the spectrum policies and strategies. Members include the federal agencies and the Commission.

And of course, today's question number one and CSMAC directly addresses that effort. Specifically CSMAC is developing recommendations for reforming the governance model for spectrum management.

I'll turn now to the WRC Conference in Egypt, which concluded in November resulting in positive outcomes for the U.S. WRC19 produced gains in providing sufficient, globally harmonized satellite allegations, paving the way for next generation systems such as a new non-geostationary orbit constellation to be built by many U.S. companies. WRC19 also provided harmonized wide-band spectrum identifications for 5G and teed

up possible further identification for WRC23 and demands.

On a practical note, NTIA is already moving to set up the IRAC Working Group known as Ad Hoc 206, which will examine the WRC19 final acts and determine how to implement them in U.S. regulations, including the NTIA manual.

Before turning the meeting back over to the CSMAC Chairs, I want to thank you for all the thoughtful work you've been put into this cycle. Your contributions are vital to our work at NTIA. The questions you are working on are far reaching and really are central to the future of spectrum management in the U.S.

The subcommittee on spectrum strategy governance for example has a significantly open and broad scope for considering how best to organize spectrum institutions and approaches. The group already has launched a work effort to consider the merits of fundamental changes we could institute in the way we determine spectrum policies and carry out spectrum management.

The other committees are working on key issues including non-federal spectrum use, interference detection and prevention, and spectrum or unmanned aircraft systems. These are tough questions. They have important and potentially high stakes implications. And they will require a great deal of consideration. So I thank you for taking on these issues and for your persistence and hard work. As always, please let me know how best we can assist you on this ongoing process.

I think it would be appropriate to take a few moments to acknowledge the recent loss of two individuals who have contributed so much in the development of the spectrum-based industries in the U.S. throughout their service both inside government and in the private sector.

We remember Charlie Rush, who was a member of our own family here at the NTIA. Charlie was a proud graduate of UCLA with a PhD in Atmospheric Physics. University of Colorado with a Master's in Public Administration. And Temple

University with a Bachelor's in Physics. He had a successful career in a top NTIA leadership position serving as a chief scientist and later as an associate administrator of NTIAs Office of International Affairs and Acting Associate Administrator of NTIAs Office of Telecommunications and Information Applications.

He went on to the private sector and spent more than 20 years as an independent consultant for numerous organizations as an expert in the communications industry. Charlie served on many international delegations and always gave us the benefit of his intellect and experience. Charlie passed away on January 3rd, but we will always remember the impact he made in our community.

We also remember Diane Cornell who passed a few days later on January 7th. Diane served twice at the FCC where she was a legal advisor and counsel to two chairmen; Reed Hunt and Tom Wheeler. Between her stents at the Commission, she also worked at CTIA and Inmarsat. Throughout her career, she was an ever present force in

Washington for her policy making skills and her leadership. We will miss them both. And we will try to follow the example they have set forth with great dedication and professionalism in their careers.

I'd also like to honor Julie Knapp who retired from being with the FCC, Chief of the Office of Engineering and Technology. Julie has been an important model for me, both when I was in the private sector and here within federal employment. She effectively managed and engineered a based-spectrum organization. Best wishes to you, Julie, in your retirement.

I'll take this opportunity to open the floor for any questions.

CO-CHAIR RATH: Any questions from CSMAC members? Okay, maybe during the course. Because you went over a myriad of things. There was a lot that you all have been doing. And thank you for sharing all of the -- that was a quite a laundry list of details, so thank you very much. We hope you're still happy that you're the Associate

Administrator. It's been very productive.

CO-CHAIR WARREN: -- And just a quick comment to the people on the phone, please make sure that you're muted. We continue to get some interference here. Thanks.

CO-CHAIR RATH: So with that, absent any questions for Charles, we will go to the Subcommittee Working Group reports, starting with Working Group 1, co-chaired by Mary Brown and Jennifer Manner and I'll turn it over to you two.

MS. MANNER: Thank you. Can you guys hear me?

CO-CHAIR RATH: You may need to turn it on.

MS. MANNER: Okay. Can people hear me. I'm the only New Yorker who's this soft spoken -- only at times. So thank you so much on behalf of Mary and I --

CO-CHAIR WARREN: Is there any way to mute people on the phone, if they won't mute themselves?

(Off-mic comments)

CO-CHAIR WARREN: Okay, so Michael or Wayne or Donna, Ruth, Kurt, could you please -- you all go on mute. I don't know where the interference is coming from -- where the noise is coming from. But if you could all do that, that would help us here. Thank you. Jennifer, back to you.

MS. MANNER: So thank you so much on behalf of Mary and myself, we want to thank you for having us present today. I think we've made significant progress, at least the first step of significant progress I should say on our task. If you go to our mandate -- And before I start, I do want to thank all our members. And our members are called out at the end of the presentation in the Annex. And I specifically -- Mary and I specifically want to thank Chris who's our liaison at NTIA for all the help there too, as well as the NTIA staff.

So starting with our mandate, we were really -- as you can see it's on Page 2 of the document, which should be the U.S. Implementation

Structure or governance model for the National

Spectrum Strategy. Okay, can folks hear me better

with this?

CO-CHAIR RATH: Yes.

MS. MANNER: Okay. I'll speak up.

How's that? Okay, so sorry. So we were actually

given a mandate around the National Spectrum

Strategy, which of course has not been released

yet. So we spent a lot of time as a group

determining what to do next. And I'm not going

to read you that mandate. But I want to share with

you on Page 2, the initial view of the working group

on the mandate. And this is something I think we

all subscribe to and I think is important as we

go through our presentation and the different

options we're presenting today, that folks take

this into view.

So there's a general agreement among

the working group that our country's current

approach for managing the use of spectrum is no

longer effectively serving the needs of the entire

stakeholder community and would benefit from

reform. Moreover, with the increased use of
spectrum by all stakeholders, we agree that issues
around spectrum sharing and band adjacencies will
need to be handled with both speed and skill to
ensure that the U.S. is making the most of its
critical national resources.

So when we were given this mandate to
work in the group, we sat down and we've all pretty
much gotten around this. And you'll the work that
Mary and I are going to present today really focuses
on this mandate and stems from that. So before
I turn this over to Mary to walk through the broad
options that we've talked about -- and she'll walk
through the process and how we decided on those
and what they mean in next steps, we have held six
meetings since October 10th, though it seems like
a lot more. But they've been very long and very
substantive meetings.

We've reviewed key parts of existing
statutes and regulations to ensure a common
understanding of the current environment. And I'd
like to call attention in Annex A or the first annex,

to some work done by Dale Hatfield's students at the University of Colorado at Boulder who put together a really nice short piece on the history of spectrum management. Just a history, it's very short and very concise. Our group didn't have time to review that, but that's something that Dale and his students submitted into the group.

We solicited contributions from all the members of our working group on governance ideas with a goal of developing a reasonable -- or I would even say a broad array of available governance model options for consideration. And that's what we're presenting today. We invited a very distinguished guest speaker, Peter Tenhula from NTIA to talk to us about IRAC operations, which was really critical to some of our evaluations. I've already thanked Dale, so I won't do that again. But we can never thank him too much.

And we decided on operational rules for this phase of the investigation, which is really our first step here. But in the absence of a final National Spectrum Strategy, we put forward our best

ideas for improving governance -- spectrum governance. And our initial focus was really domestically. We do think that international needs to be studied as well, but we didn't think we could get there until we focused on the domestic cases. So with that, I'll turn this over to my Co-Chair, Mary.

MS. BROWN: Thank you, Jennifer. Can everyone hear me? Okay. This is going to fall off. Do you want to try again?

CO-CHAIR WARREN: So once again, for those of you on the phone, so Wayne, Michael, Kurt, Ruth, Carl, we really need you to go on mute.

MS. PRITCHARD-KELLY: So my phone shows myself as muted, I unmuted myself to say this. So I'm going to mute again, but I hope it's not me.

CO-CHAIR WARREN: Thank you, Ruth. We've just learned that actually it's open mic to everybody who's dialing in. So folks probably aren't paying attention, so okay.

MS. BROWN: Okay.

CO-CHAIR WARREN: We need to fix that going forward.

MS. BROWN: Okay. All right, so there are a number of ways to approach problems with spectrum governance or taking a look at options for spectrum governance. And what the committee decided to do was first, gather up a set of options that we could all look at and evaluate. We felt that getting sort of concrete ideas out on the table would be the fastest way to get to an answer in response to the mandate, which we understood we had somewhere between six and nine months to come up with an answer.

So what we're going to do today is just walk you through the six options that the committee has looked at to date. And at this point, I want to stress, we're just listing options. The committee has not evaluated these options in the sense of discussing pros and cons at this point. Many of you will probably have opinions on what's good and what's bad about some of these options, I'm sure. But understand the working group hasn't

had that conversation yet. All we have been
focused on is making sure we have a credible list
of options that we think represents sort of the
full spectrum, if you will, of choices that should
be evaluated. And then in our next phase of work,
we'll be going to discuss what are the pros and
the cons, the benefits, and so forth. And we'll
have a slide on that at the end.

So we have just listed them here, not
in any particular ranked order, but just for
identification purposes. And let me just go
through the six. And then we'll go through the
six sort of in more detail. But this is just to
help orient you around what we're talking about.

The first option listed here, Option
A is a new Full Service Spectrum Agency. So this
would be an entirely new entity that would gather
underneath its operations all of the spectrum
activities that the NTIA currently performs and
all of the spectrum activities that the FCC
currently performs from the beginning of setting
policy and allocation, all the way through rules,

through equipment authorization, everything that is related to the wireless ecosystem would be handled by this new agency. So we call this the Full Service Spectrum Agency. So that's the first option, Option A.

Option B for lack of a better marketing moniker right now, we're calling the Unity Agency. And it is also a new entity, in addition to NTIA and FCC. But unlike a full service approach, which would take you through everything that's wireless, this one would be focusing mainly on spectrum policy and allocation. So those functions from NTIA and those functions from FCC would be located in this new Unity Agency.

There's obviously not a great deal of difference between B and A and there's a lot of discussion on the committee about the future of these two options. But for now, we're keeping these separate since one involves taking everything spectrum-related out of two agencies. And one is more policy and allocation.

The third Option C, is a new FCC. The

NTIA would remain, but the FCC would expand its authority over spectrum allocation, spectrum management, spectrum policy. And the FCC would have responsibility; therefore all stakeholders, not just commercial stakeholders. And of course the flip side of the coin is a new NTIA. Both agencies remain, but the NTIA would absorb all of the policy and allocation decision making under its wing.

And then we get to two options that I would say are less novel in terms of what we're proposing. The first is a new research and development forecasting function, which could fit in with any of these other options. But basically trying to put some funding and emphasis on both research and development that could go to propagation models. It could go to sharing mechanisms, et cetera, et cetera.

And then last but not least, FCC and NTIA today operate within a memorandum of understanding. And so we looked at the option of enhancing that memorandum of understanding between

the two agencies. And trying to create a stronger

discipline around it, if you will. So those are

the six that we'll go through.

And with that, let's move to Option A,

the new Full Service Spectrum Agency. So this has

been envisioned and discussed in the group as a

new independent commissioned style agency. So

there would be a Board of Directors or

Commissioners, if you will, that would perform all

spectrum policy management planning, licensing

authorization, equipment functions including

sharing and enforcement. So everything would go

under this new Full Service Agency.

Those existing functions performed

today by the FCC and NTIA would be divested and

assigned to this new entity. The new entity

therefore is responsible to all stakeholders for

all types of spectrum. Not just commercial, but

also government. And there is -- we discussed a

heavy emphasis here on domain knowledge by

Commissioners and staff. Really trying to create

an agency that has expertise specifically focused

on wireless concerns. And we have simply noted for the record, that we think this obviously requires some legislative action. This would be -- this would be something we would need to get Congress' agreement to. So that is Option A.

Option B, the Unity Agency is still under active development. This could either take the form of a new independent commission or it could be an independent executive branch agency with functions and leadership to be determined. All right? So if you think of -- I think the example we used in our discussion of the Environmental Protection Agency being an independent executive branch agency, that would be something like the vision that has been talked about here.

The function of it as we have discussed, primary spectrum policy, allocation, and planning. There has been some discussion in the working group about broader functions and where do we draw the line between what this new entity would do and what the existing NTIA and FCC would do. And what is the leadership model? You know, an EPA has an

Executive Director, the FCC has a Commissioner. So there are pros and cons to that, that are being discussed. And again, this one we think would require legislative action.

The third, Option C, is new FCC. So as I said, the FCC would absorb all of the policy making and allocating, planning, decisions, in addition to their existing portfolio. We've flagged some issues with that. Obviously there is currently at the FCC, a Defense Commissioner. And we're asking the question, you know, given the national security issues that would have to be absorbed by the new FCC, should the current role of defense commissioner be expanded or revised? And what additional capacity would the FCC need to manage these additional stakeholder issues?

Much of the NTIAs current spectrum work would transfer to FCC. And the question is how would these functions be absorbed operationally and managerially? We have noted that the new FCC is going to have to lead us through engineering excellence and their ability to drive consensus

in spectrum management issues.   We've asked
the question, should there be a residual role for
the NTIA to act in some way as an Inspector General,
if you will, to ensure that federal stakeholders
needs are being addressed?   So that's an open
question. And again, this option would obviously
require legislative actions. So it is an option
that would have to be laid out in some detail.

And then Option D, the flip side of the
coin, the new NTIA. NTIA would absorb all of these
duties from the FCC. And we think that as a
consequence of all the additional activity that
NTIA would have to perform and in recognition of
the importance of the allocation and spectrum
management role, we're talking about elevating NTIA
within the Commerce Department structure to ensure
that the Agency receives the attention and the
prominence that this new role would reflect.

So we need to talk about specifically
what functions would move from the FCC. We need
to talk about how these would be absorbed into NTIA.
We've talked about the issue of transparent

administrative process. Those of us on the commercial side are well used to the FCC's ways in which they make their processes transparent and open to stakeholders. NTIA, because it has focused on government stakeholders, doesn't have those same traditions. So we've talked about how would we introduce -- ensure that, that is introduced into NTIA decision making. And again, recognizing the new NTIA would have to lead through consensus building and engineering excellence. So again, this one also requires legislative activity.

So let me move to the final two options, which are less breathtaking in scope, but nonetheless extremely important. A new research and development forecasting function, which could be added to a new entity. It could be added to the NTIA or the FCC. It doesn't really matter.

But one of the issues that has been a big topic of conversation is the fact that now with an increased need for more spectrum by all stakeholders and the rising need to focus on sharing, we need to have some way within our

spectrum management process to focus on engineering questions. And these would include -- are not limited to things like how do we develop better propagation models to really inform our decision making. And how are we going to continue to develop sharing mechanisms as time goes on and evaluate sharing mechanisms to ensure they're getting better and more efficient over time?

We have said that those investigations -- it can perform those investigations itself, the entity can. It can enter into memoranda of understanding with other entities. And Dale has pointed out some of the other entities that exist in this space. It can sub-contract. And in fact, this new R&D forecasting function itself could exist if we chose to do so as an entity that's a subsidiary of one of these other options or simply as a federal contract matter. This is likely to require legislative action to expand the mandates of whatever agency is assigned this work. But also to ensure there's a funding screen because this is going to cost money.

And then finally the enhanced memorandum of understanding between the FCC and the NTIA. There is an existing MOU that dates from 2003. And the idea is to revise it to both expedite decisions and strengthen decision making capacity. We're recommending that the MOU be updated now and that it go through a cycle of update every two years to make sure that it's performing as intended.

Among the other things that it requires is -- and which appears to be honored for the most part -- is that routine items between the agencies are coordinated in a specific period of time. It's the non-routine items that somehow can take some time to coordinate, which different sides of the coordination process creates uncertainty. Right? So the idea would be to try to specify timeframes for non-routine items or agree to an escalation process or and agree to an escalation process. And consider the participation of interested agencies.

We need to formalize the development

of the governance structure in light of the National
Spectrum Strategy and provide guidelines for
spectrum management decision making between the
two agencies. How issues will be raised, how
conflicts will be resolved. We're recommending
and discussing providing Congress with an annual
report on joint spectrum planning activities,
future spectrum requirements, spectrum allocation
actions necessary to accommodate those uses, and
any other actions to promote the efficient use of
spectrum.

We need to be able to highlight areas
where consensus cannot be found. We need to
identify the evaluation and possible
implementation of technologies that enhance
spectrum utilization and efficiencies and utilize
the Spectrum Sharing Innovation Test-Bed for
collaborative testing of such technologies.

The group has also talked about holding
a joint workshop to discuss spectrum research and
coordination activities and explore new spectrum
sharing and management techniques and approaches.

It would be a wonderful thing if a common set of metrics could be agreed upon to predict potentially harmful interference. And to create and co-chair a federal advisory committee on spectrum planning and usage imposed to both federal and non-federal stakeholders to develop collaboration and planning strategy. We do not think in all of that, that legislation may be required, but we do think it is time to look at a refresh of the enhanced MOU.

So those are the six that we've looked at. And next -- now that we've -- now that we've put several ideas out on the table for consideration, the next step here -- And I'm not going to read through all of these, but I invite you to do so as you wish -- is to sort of pick them up one by one and look at them and decide what's good about them? What's bad about them? Is there a unique benefit that we can associate with each of these ideas that would merit coming back to you all with at the next meeting? Right?

So we're trying to take all of the various facets that we can think of to evaluate these ideas.

And ask those questions and come back with more
of a substantive evaluation of what we think of
the individual ideas. Obviously we may have to
reevaluate this at the point at which the National
Spectrum Strategy is released. Because we need
to make sure that we're doing here is relevant.
But that's sort of our next phase of work.

And so with that, I will conclude. And
I don't know if you guys want to take questions
now.

CO-CHAIR WARREN: Thank you very much,
Mary and Jennifer. I'm going to say that it's been
a very robust discussion that you guys have led
in this working group and very engaging. And
people have brought a lot of passion and ideas and
thought to this. So I think whatever the ultimate,
you know, we may have as recommendation, it won't
be that they were lightly developed.

And again to emphasize that what you've
just outlined are just ideas. These are again,
not recommendations or things we're going to --
And I think it's important that each of these ideas

is intended to try to provide --

(Telephonic interference)

CO-CHAIR WARREN: Is somebody trying
to break in with the okay? Anyway, so ideas on
the table that are intended to advance the general
view that you highlighted at the beginning on
reform.

I think another point to emphasize
before opening up, it's not exhaustive. Right?
If folks have brilliant ideas, these ah-ha moments,
one idea can develop into another. We've had that
explicit discussion, so that's another value of
having so many of us as you'll see from your list
of CSMAC participants all talking and working
together to see where this moves out.

And so the other point that I wanted
to reemphasize is that part of the discussion is
to figure out what are the international policy
implications as discussions go forward? Because
we all know the international aspects of this are
very important as we talk about harmonization and
World Radioconferences and Standards and the like.

So with that, let me open it up for any questions. So many of you have been part of this working group that --

CO-CHAIR RATH: Dennis is reminding us that if you want to speak, put your tent up please.

CO-CHAIR WARREN: Dennis, just please state your name for the recorder.

MR. ROBERSON: This is Dennis Roberson. A very quick one that actually follows exactly on what you were just talking about. In the list of things to look at, it seems it would be appropriate to look at what other nations are doing in their management of their spectrum resources. Because that's evolved over the years in different countries around the world. So we have lots of people to look at. And where it's been successful and where it's not been successful. And coming off work, there's even personal relationships that might be exploited or utilized effectively to help with the evaluation.

MS. BROWN: Can I just ask Dennis, if
you have any specific countries at the back of your
mind that you want to push forward to us on email
or something, that would be extremely helpful.
And that goes to anybody at the table. Thanks.

MR. ROBERSON: Yeah, delighted since
I know some of those people as do most of the people
around the table.

CO-CHAIR WARREN: Other questions,
comments, observations? I think I see Dale's card
going up. Dale?

MR. HATFIELD: I just -- Can you hear
me okay?

CO-CHAIR WARREN: No, you need a
microphone.

MR. HATFIELD: There we go. I just
wanted to thank Peter Tenhula, our distinguished
guest speaker, who really was very helpful --

CO-CHAIR WARREN: Your microphone's
not on. Just a moment. Sorry, Dale.

MR. HATFIELD: What I wanted to do is
thank Peter Tenhula, our distinguished guest

speaker who really helped the two students of mine, Kehinde Winful and Rachel Anderson in preparing the document that was the attachment, because without him, sort of, giving us some guidance we would have had a hard time getting started.

MR. HATFIELD: And gave us some guidance. They had a hard time getting started.

CO-CHAIR WARREN: Yes, thank you. I think the whole working groups echoes the thanks to Peter Tenhula. Others? Otherwise, we will move to Group 2. Again, we invite you all to participate in Working Group 1. If you haven't joined yet, it's the place to be.

CO-CHAIR RATH: If you look at the list, it's pretty much everyone. Okay, so Subcommittee 2. We have Mark Gibson and Bob Weller who are going to report on non-federal current and future spectrum requirements, so over to you.

MR. GIBSON: Okay. This probably will be briefer than the last one. The committee has gotten started in earnest, but we've had a couple of SNAFUs, not the least of which was work got in

the middle of this. And we have haven't met as

much. So I'm going to present at least what we've

done. And Bob and I will tag team this.

The list of the committee members is

on the second page. I'd like to call out -- I didn't

put Bruce's name on here. I think Bruce serves

in sort of an ex officio role, but Bruce Jacobs

has been very helpful as well.

(Telephonic interference)

MR. GIBSON: Bless you. So anyhow and

if I speak any louder, I'm going to defeat the

purpose of the microphone, so anyhow.

So the question -- our question is on

Slide 3. And I won't read that. But basically

what the NTIA is asking this subcommittee to do

is essentially look at the feasibility of working

within the commercial spectrum users and trying

to find if there's a way to determine what the future

and current uses of spectrum will be. And then

recommend approaches on obtaining that.

As we typically do in our CSMAC

committee is we broke this down into tasks, which

are provided on Slide 4. And so we thought these tasks build on each other. The other thing is -- so in the first task, we started looking at and exploring the feasibility of requesting this information. NTIA wanted the future and then current and that was intentional. We figured it was probably easier at least to start with current usage. And then build on using those modalities and methodologies to work on future use. So we inverted a little bit and we got their approval as well. So we thought that would be our first task.

The second task would be to identify the information that's available. Looking out there, casting far and wide, work that's been done in CSMAC and in other areas. And we put a list of references at the back of the working documents that we're using. And that's not by any means exhaustive. So we felt like, you know, looking at -- trying to find the information that's already available. And then lastly, looking at -- recommending approaches on the future

spectrum requirements.

And so that's how we broke it down into tasks. Now as soon as we got into this, there were some concerns that we -- given that the CSMAC members are, by definition, industry, there were some concerns about how this information would be used. So we were working really closely with the NTIA people. And again, Charles was involved, they were involved. And so again, on behalf of the committee, thank you very much for your help and guidance.

So what you see on Slide 5 is really a little bit more guidance and depth to what they're looking for in the context of this question. And a lot of this is to say look, you know, we're not looking to get this information, per se, we're looking to try to find out of this information is available. And if so, how might we go about getting it? But the committee's task is not to go out and survey and try to find this information. And while we figured that, that was part of it, that was at least letting us a little bit off the hook as trying

to, if you will, eat the elephant all at once.

So their guidance was primarily -- you know, they wanted to just be able to know, you know, how does the industry look at defining or dividing the spectrum needs? And this is across all industry. And again, one of the things that we found a little daunting was, you know, all industry comprises, I think if you look at -- and one of the things we did is we looked at Part 2 of the Commission's rules. I think it's 2.109, which lists services. And there's several dozen services that are listed. And while that's not -- you know, it may be somewhat orthogonal to the effort, at least it gives you some listing of IT recognized services. And we figured that was pretty broad. So we figured that we needed to whittle this down a little bit and NTIA helped a little bit with that as well with some of their guidance. And they also wanted to do -- they wanted to look at the way industry looks at these, again, modalities and efforts to compare that with the way they do things to see if it makes

sense, you know, with the way we do it in industry with the way they do it. A lot of what they do in terms of this effort is defined by statute or at least by regulations. And to some extent, industry's is as well. But they wanted to see to the extent those were congruent.

They also wanted to know what are the trends? You know, what is industry seeing in terms of trends of spectrum usage? And again, this is across all industries, not just wireless per se or commercial wireless -- probably not amateur, but other services that are similar.

And then they wanted again, a description of the needs -- what needs to be done? And then describe what the limitations are. So what do we see out there as ways to do this? And what are the limitations? What works and what doesn't work? And as you can see, these build up to help answer the question about what is the feasibility of doing this and the availability of this?

And then finally, define the categories of data in terms of what is the geographic use?

What's the timing and what not? And this is particularly interesting in light of the report that came out yesterday. And Charles talked about this in his comments. Looking at using dynamic spectrum sharing techniques to extract the time component of spectrum usage. So that was the additional information that we got. We got this out of interactions with him about two or three weeks ago. The committee hasn't met win earnest since then. And so we're kind of eager to get started and going on that.

Our meeting schedule you will see in front of you is on Slide 6. We've had four meetings to date. Again, we kind of got waylaid a little bit in the middle with the work. We have a meeting coming up on Valentine's Day and then -- bring your love to the committee. And then we have six or seven more meetings going. And we're hopeful that by the end of -- by July timeframe -- or before that, we'll have our recommendations going.

And so that's the report. You know, sort of off the record, I would like to again thank

the members of the committee. This has been a
challenging question. As Charles said in his
comments, you know, the questions that we typically
get are challenging. I kind of feel personally
this has been one of the most challenging
questions --

(Telephonic interference)

MR. GIBSON: Again, gesundheit. And so
we appreciate the guidance that the NTIA has provide
in helping us answer the questions. And so with
that, I'll give it to Bob and he can add any color.

MR. WELLER: Thank you, Mark. I would
just -- I would just add that the data that we're
looking at is widely varied in terms of breadth
and in terms of depth. So I don't think we're going
to come up with kind of this -- a consistent level
of reporting for every single service. And
similarly, some of the information is not knowable
to some degree or another. And in terms of future
trends, I think there's a wide variety of
predictions that are out there. And we're going

to have to be very careful that we're not putting
our finger on any particular methodology.

MR. GIBSON: Thanks. Okay, any
questions or comments? Any comments from the
Chairs? I think Charla --

CO-CHAIR RATH: No additional comments
from me.

MR. GIBSON: Okay.

CO-CHAIR RATH: I think we've had
enough from me earlier. So any comments though,
any questions from anyone either on the phone or
around the table? You know, and I know this has
been extremely difficult and has required a lot
of back and forth, so I appreciate everything that
you and the committee members have been doing to
move this forward. Although Jennifer and I were
just wondering how you do anything off the record
in a CSMAC. So just curious.

MR. GIBSON: I should have known that
in light of some of the recent events, but yeah.
It's not written down, so to speak. Yeah.

CO-CHAIR RATH: Yeah, as former chair.

Right? Dale has a question, it looks like.

MR. HATFIELD: This is sort of a techie question. But when we talk about the usage as it includes the effects of core receivers and so forth -- or requirements for large guard bands and so forth. I mean it seems to me if you're really going to look at opportunities and going to look at how the spectrum is being consumed, you would need to address that.

MR. GIBSON: That's a good question. You know, I would say that right now, that's probably a second order question. What we're looking for is determine the sources of spectrum usage. And you know, certainly the receiver characteristics enters into that. So I think, you know, we'll attempt to do that as well. At this stage, what we're trying to do is just determine the feasibility of even gathering that information. If we get to the point where we can answer that question and then maybe what type of information can be provided, perhaps receiver statistics can be included, even interference susceptibility,

which is a subset of that. So that's a good question. So we'll keep that in mind.

I think right now, we're just trying to sort of get to the ability to answer the top level portion of the questions. But that's a good thing to keep in mind.

MR. HATFIELD: Thank you.

MR. GIBSON: Thank you. Any other questions or comments? Yeah, Dennis?

MR. ROBERSON: Dale as usual triggered a thought for me. And that is the different characteristics of the use of the spectrum. Because what jumped to my mind is point-to-point. Point-to-point is clearly use of a spectrum, but it's a narrow geographic use of the spectrum. So some of these -- the use is not created equal is the whole point. So getting down to that level, I understand your first point of getting anything is really important. But getting to the next level, dealing with -- since Jennifer's sitting next to you, satellite is very different from terrestrial is very different from point-to-point.

It's very different from radar. It's very different from ...

MR. GIBSON: That's a good question. And when we first started looking -- when we first started looking at this, we were looking at possibly trying to characterize this in terms of the types of spectrum usage maybe for the different types of services. So you're talking about microwave service. One of the clarifications we got from NTIA, I think along those lines is the last bullet point, was the categories of data. So the geographic usage.

So for example, with microwave usage, which is certainly germane to this gigahertz discussion, you have the narrow beam nature of that. So how do you characterize that usage? Certainly the usage are not the same at the back of the antenna as it is at the front of the antenna, which would be a similar situation for any sort of highly directional type of antenna. So we can take that into consideration. Again, I think as with the receiver question, that may be a second order.

What we're looking for right now is to just see
if this is doable and at what level of detail.
So that and the receiver question, we can certainly
keep in mind. So that's good to know. Thanks.
Yeah, Andrew?

MR. ROY: Does this work? There we go.
Andrew Roy. Question about how you look at usage
from the perspective of redundancy as well. So
a system may have a primary and a secondary link.
On the service, that secondary may never really
be used from the service. But if the primary goes
down, the secondary is definitely needed. So how
does the consideration work from that perspective?

MR. GIBSON: That's another good
question. So you're on the committee. Right?

Okay, good.

Okay. So yeah, I mean in light
of -- Okay, good. In light of the question that
Dennis had. So it's not used as much anymore.
But a lot of microwave links used to use frequency
diversity as a mitigation against frequency
selective fading. And so you know, you could go

back and look at that type of a characterization

and other situations, and so yeah. But you guys

are getting down into the next level. And I think

Dennis is the only one that's on this committee.

So you're more than welcome to be a part of this

discussion.

CO-CHAIR WARREN: Dennis isn't on there

anymore. Neither is Dale.

MR. GIBSON: Dennis isn't? Okay, so

this -- please.

CO-CHAIR WARREN: Are you on the

committee, Bryan?

MR. GIBSON: Bryan's not a part

of -- Bryan, actually I think you are part of the

committee.

(Simultaneous speaking)

MR. GIBSON: Your name's at the top of

the list under mine.

MR. TRAMONT: So I guess my question

is when we think about the theoretical utility of

this information, is the thesis that since so many

federal systems are subject to longer procurement

deadlines and public procurement deadlines, since there might be arguably more -- some predictability on that side, that we try to bring that same "predictability" to the commercial side. And then see if there are opportunities for sharing between the two sets of systems? Is that the fundamental thesis?

MR. GIBSON: That's not a fundamental thesis, but this is part of it. I mean I think that's absolutely what we heard when we were trying to dig deeper with them is you know, try to align some of the procurement cycles, the procurement, you know, ideology, if you will. So yeah, I think that's part of it. Of course, yeah.

MR. TRAMONT: And then the challenge being that obviously there's not centralized place for commercial demand. And then it's different across each industry sector. But in an idealized world -- once again, I'm just free associating here -- like the wireless industry would come up. The terrestrial wireless broadband issue would come up with a number with what's going to happen

in five years. And then the amateurs would do the same. And the public safety would. And you'd be able to try to figure out what the overall demand case is. Is that about it?

MR. GIBSON: I was with you until you said amateurs. I'm not sure --

MR. TRAMONT: Understood. Understood.

MR. GIBSON: Yeah, that's exactly right. And again, I think the challenge is, so as you well know, there is not a lot of consistency among the diversity in the services.

MR. TRAMONT: Right.

MR. GIBSON: And so what we're trying to is sort of tease out of where can we find some consistency? And where are the departures from that consistency? And help them find that as well.

MR. TRAMONT: I think Mary's new research agency would be excellent at figuring this all out.

MR. GIBSON: Yeah.

MR. TRAMONT: So when can we have that

stood up?

CO-CHAIR RATH: Yeah, and also just a side comment. Mark's comments were not to suggest that we would be excluding a look at the amateur use. But we can give them your email address.

MR. GIBSON: No, no, no. The amateurs -- well, I am one of them so -- and I know Dale's an amateur.

CO-CHAIR RATH: Yeah.

MR. GIBSON: Yeah, so me and Dale will take all that incoming. Any other questions, comments? Okay, who's next?

CO-CHAIR RATH: So the next is -- Bryan and Miriam, if you want to talk about interference, prevention, detection, and resolution.

MS. SOROND: All right, can you hear me? Okay, perfect. So first of all, thank you Bryan for doing a lot of good work, the subcommittee members and also Bruce, who was critical in his feedback and Dale and Mary. So calling out a few folks and there was definitely other contributions

to this. But basically this subcommittee -- okay,
the person who just coughed is not on mute. So
if that gives you any guidance, I thought I'd call
that out.

So the actual question that we had was
on interference, prevention, detection, and
resolution. Well the question really was to see
how we could do unique identifiers as a part of
interference, prevention, detection, and
resolutions and what are the barriers in doing so?
There's a lot of good work done, some literature
review and everything and we had a few calls.
Here's where we landed after the calls and the
documents that were passed along to the
subcommittee.

So first of all, I think there's no
question that from an administrative perspective
and path, there's definitely ways of doing this
within the FCC and NTIA's equipment authorization
rules. So there's no barrier to that from an
administrative perspective. And it could be
band-by-band or it could be, you know, and several

ways this could be done. However, I think the issue
is with how this is done and the one size fits all
sort of solution ubiquitous across every band is
probably the challenge.

So therefore, you know, sort of there
are likely bands and use cases where a unique
identifier may be a viable solution and basically
could be implemented. But all across is definitely
a challenge. So the subcommittee at this point
is recommending sort of looking at this on a
band-by-band or use case approach as opposed to
a broad brush process. Those are the preliminary
recommendations.

You know, some of the key questions --

CO-CHAIR RATH: Mary, not to interrupt,
but just to -- can you clarify that? Is that sort
of guidance -- internal guidance for your working
group moving forward and not for us to be
considering here.

MS. SOROND: Correct. Correct.

CO-CHAIR RATH: Okay.

MS. SOROND: Yes, it's internal.

Thanks for clarifying that.

So obviously, unique identifiers are currently being used in terms of mission designators and several other forms within the industry. There are lessons to be learned on bands that have actually implemented this. There's a list of these bands on the second bulletpoint. So we can look at those on how some of those bands have worked, how some of them, they didn't. So we can have a lessons learned path on what has been done so far. And whether there's alternative ways of doing this as opposed to picking out a specific band or specific use case is that, you know, looking at industry consensus and standardization or sort of voluntary approaches to doing this by industry or band or use case.

Then on Slide 5, the potential barriers to unique identifiers, I think which was a key part of the question. And you know, there was some comments about how a barrier is implying a negative connotation, but it was the question. Basically there's definitely the technology enhancement and

development. Because this is not just about having a unique identifier. It's having a unique identifier, such that you could do interference, prevention, detection and resolution. Right? So we're not just stopping at the unique identifier part. So it is definitely to include technology changes. It's going to include radio enhancements and devices all over, across different industries to do that. So that's one thing that we need to call out.

I think device capabilities goes hand and hand with this technology barrier sort of on whether it's signaling or sensing or how it's done, so that the next step -- Again, after the unique identifier transmission is done, we go to the IPDR. There's obviously security concerns. I mean when there is sort of this mechanism to identify something, there's always hand and hand with that, a security concern on whether it's an external hack or whether, cyber security threats on these types of systems are definitely one of the things that we'll need to kind of pay attention to. Privacy

is also the other thing on people generally having concerns around having this kind of information, which is acceptable, transmitted. And it could potentially have an impact on innovation and investments and future technologies.

So as the next step, as we highlighted in the beginning, we are proposing to engage with a more sort of technical outlook in an engineering community to gather information on where the use cases or the specific bands we pull out to look at. So we are definitely recommending to narrow this down in such cases that the subcommittee will identify.   And then we will have a final recommendation and draft the subcommittee on those.

Bryan, did you want to add something?

MR.   TRAMONT: Nothing   really substantive. I just want to mention that for purposes of what the paper is going to look like, it's going to be the document that we'll produce for the next cycle. We have a literature review. That's a fairly straight forward look at when these unique identifiers have been utilized and what the

track record has been.

The hard part, if you will, is identifying when, if ever, unique identifiers should be deployed and what the gating criteria are for that. And then once we have that, then some of the issues that Miriam just described about cyber security, privacy, and all those issues. So that's the structure we're roughly trying to come up with.

There is a wide variation of opinion on the subcommittee about the role of the identifiers. If you have a strong view about where this should be used, we would appreciate your inputs. Or if they should never be used ever, we would appreciate that input too. But that's where we are. And Miriam gave the overview, but I just want to stress that getting to that tangible, where they should be used fact pattern, has been a challenge thus far.

CO-CHAIR RATH: Before we go to questions, I actually have -- it's more a comment. It may be -- it may be implied in your paper, what

the policy goals are. But nowhere do I see from

the outline. I mean the question is very basic

and then they're on -- I don't know which slide

it is because they're not numbered. But there are

alternative paths to accomplishing the policy goals

with fewer barriers. It would be really good to

state what the working group thinks those policy

goals are. And then actually then go to show what

the barriers are.

MR. TRAMONT: And I think -- I was going

to say, we did have them numbered. But I think

the place where you'll see what you just described

and that section is "What are the unique

identifiers? And why do we have them in the first

place?

CO-CHAIR RATH: Okay.

MR. TRAMONT: And so I agree with you

that it's essential. And we do have some language

around that.

CO-CHAIR RATH: And I thought it was

implied, but I just wanted to make sure that the

committee was going to be, you know, taking that

into consideration.

MR. TRAMONT: Agreed.

CO-CHAIR RATH: So questions? Mark.

CO-CHAIR WARREN: Someone give the man
a microphone.

MR. CROSBY: I think you can hear me
okay. So listen and I say it and I'm not on our
committee, so don't taken any umbrage.

CO-CHAIR WARREN: Mark, you actually
do need one.

MR. CROSBY: Under barriers, were you
going to comment or at least address perhaps the
influx of devices, many of which are not subject
to certification presently? And they come into
this country by the millions. And so you could
do great stuff with stuff that's certified, but
there are millions of devices entering the country
that are not certified that are sold through a
variety of things. And they are a pretty big threat
for some of the bands. So I mean I think it's just
a -- I don't know if there's a solution to it, but
if there's a note that this is an issue that needs

to be addressed at some point, that would be awesome. Thanks.

MR. TRAMONT: U.S. compliance with unique identifiers will not get us anywhere. They can dump millions of products in and we have no enforcement mechanism. So duly understood.

CO-CHAIR WARREN: Dale.

MR. HATFIELD: I would just like to comment that I think almost all communication devices have identifiers in the sense that if I have a defibrillator and it's talking back to the cloud someplace and the cloud then talks to my defibrillator and tells my heart to do something different, you have to have an address. Without an address, you wouldn't know where it came from and without an address, it wouldn't know where to send it. So when I look at it conceptually, it's just a matter of how much address information we release. And that to me, then the fundamental question is that creates a trade-off. And I think you sort of already touched on that. A better reinforcement and resilience versus privacy and

secrecy. So I think that really is what we're

getting to. But I had a sense that people didn't

think there was addresses already out there, but

they're very much part of any communication system.

CO-CHAIR WARREN: I was going to say

from the IoT perspective --

(Simultaneous speaking)

MS. BROWN: Can everyone hear me? No,

this is not working.

CO-CHAIR RATH: It is on?

MS. BROWN: Yes.

CO-CHAIR RATH: Just move it closer.

MS. BROWN: You guys can hear me. Can

people on the --

CO-CHAIR RATH: Yeah, yeah, yeah.

MS. BROWN: So one of the problems still

at least in the unlicensed world is that there are

not static addresses. That used to be the case

sometime back in the day. But because of privacy

issues, a lot of the unlicensed community has moved

away from static addresses. So that's again, just

one of the challenges I think the committee is

looking at in light of the unique identifier component.

CO-CHAIR RATH: No other comments?

CO-CHAIR WARREN: Then we will transition to Subcommittee 4, Caroline Kahn and Andy Roy. I think you guys get the prize for the longest question perhaps. And again, as I said at the beginning, it was agreed that this question would start after the beginning of the year and we had work through the World Radio Conference, which UAS issues were central agenda item question at least for the future agenda. So Andy, Caroline, over to you.

MS. KAHN: Great, thanks. Can you hear me okay? So our subcommittee just recently started as Jennifer mentioned. So we're looking at unmanned aircraft spectrum. So Slide 2, our subcommittee members, I want to thank, Co-Chair Andy and also Dave Reed for helping support this and the subcommittee members for participating in this.

Slide 3 is our question, which gets at:

the FAA is responsible for integrating safely UAS into our airspace. And spectrum is needed to support in particular command and control operations, which is critical. And so our questions are looking at appropriate models for ensuring timely and safe and secure access to frequencies to support the UAS C2 requirements, what governance characteristics are important, what are the liability issues that need to be considered? For instance, is a third party frequency coordinator an appropriate model? And what is the potential need for an entity to support and collaborate across the different federal advisory committees and other who are addressing UAS? Are there other mechanisms in governance structures that could help as well?

Slide 4, so we're looking to scope this question. We are taking an initial broad scope. There's a lot of activity going on here and we do not want to duplicate any of that. We want to add value and to complement the work that's going on. So we are focused on spectrum to support C2

operations as is in the study question. So looking

at different types of spectrum options and

solutions. And looking at it broadly, but also

looking at how to focus and scope our work within

the subcommittee.

So Andy's going to talk about some

potential focus areas.

MR. ROY: Hello? Great, okay. If

anyone needs a spare microphone, we've got the

spares for some reason.

So as Carolyn said, obviously we're

fairly new starting out on this. We've only had

one subcommittee meeting before this meeting. So

really just have a couple of initial thoughts and

just see where we might want to go, going forward.

For those of you who are involved in

UAS or at least have certain knowledge of it, you'll

know that it is an expansive subject where I think

from the co-chair perspective, worried that if we

start going out there, it's very easy to grab big

handfuls of stuff. And in the end, we're going

to have such a big pile of data to wade through, that we're never going to get anywhere with it.

So one of the ways we thought may be a good vehicle to break it down a bit was to try to break it into headline areas and then subsections of those. And I'll talk through those in a second at a high level. But really the main area is trying to figure out UAS spectrum access mechanisms and then the Federal Advisory Committee's out there as well to figure out what options we've got there in terms of what exists at the moment and what could be recommended towards them as well.

But before we get to those two bullet point or the major bullets on third and fourth down, we understand what UAS is. And so there's a lot work, I think we'll have to do at the start to figure out from our own perspective -- like I said, there's a lot of variance in knowledge in different areas on this subject, to understand what it is we're trying to deal with. And what it is, even UAS thinks it is as well.

So from my perspective, on the manned

aviation side, we look at UAS as this ball of activity that one week it's in one area and the next week, it's in another area. It's a very dynamic environment. There's lots of ongoing activities. And therefore we want to try and understand that at a better level and baseline it.

And certainly some of the areas where we need to consider areas, we're not going to consider. Like we're not going to deal with a certain area because that's just a lot of work we can't deal with now. Maybe come back to it at the end if we have time. Or maybe need to make a recommendation to say we deliberately didn't address this area, but maybe something we may want to look at in the future.

Just going down, overview of the environments and the various areas of complexities -- and there are a lot of them. Classes of systems, the existing standards, the standards coming out, and ongoing efforts, as well as the baseline. And more fundamentally, the

CONOPS for the systems as well. So the concept of operations. What are the U.S. classifications? What other operations, C2 functions, command and control, and the spectrum options for them?

And one of the suggestions are our first subcommittee was to create a big chart to try and figure it out for ourselves and visualize it and see, you know, what are the aspects of classifications? For example, where are they used? How are they used? And so forth. So we're considering that at the moment as an initial intent. And we'll see how that develops as we go through.

Then on the spectrum access -- frequency access models -- the governance of any potential frequency access coordinator, security/interoperability. Those could be in conjunction. They could be fighting against each other. Liability issues and licensing. For those of you unaware, there is ongoing activity or FAA Section 3.74, at the moment called the FAA reauthorization. That's focusing on two specifics

bands primarily, but looking at others as well. How do we deal with if there's a joint FCC and NTIA ownership of those bands and the licensing considerations for those going forward? So that's some examples of what we really want to do.

And then from the Federal Advisory Committee process, scope out what different pertinent bodies there are out there. What could be available. The two major ones we've seen so far, there's a FAA Drone Advisory Committee, which we think is a good point of contact to look at. And as mentioned possibly previously, but in the subcommittee as well, the FCC TAC obviously recently did a lot of work on drones as well. So maybe go and talk to those two groups and see what they have. See what they advise and where they've been. And then from there, start looking further as well. What could be out there going forward?

One of the suggestions as well was maybe we don't have to reinvent the wheel for some of this. Maybe other systems have had spectrum access

mechanisms that we could borrow, steal, use as a

basis and apply in certain parts or as a whole to

these sort of systems and see what happens. So

that's just an idea of where we're going. I don't

think we have much more information beyond this

to answer too many questions in depth.

But moving forward then to Slide 6 on

initials plans. So as I said, characterize the

complexities. Make sure we get a better handle

of where we sit on UAS. Go through the Federal

Advisory Committees. What other bodies may be

relevant? There are a lot of other industry groups

out there as well that may have relevancy we want

to speak to, getting their perspective, and other

activities of relevance.

Conduct interviews. I mentioned FAA

and FCC, NTIA, as well as the key ones. And then

from there, what else do you want to -- who else

do you want to speak to? And what other information

may be relevant to us going forward?

Then when we have all of this information,

hopefully have some form of analysis that can make

it into a coherent pile we can provide some actionable data from. And then lastly, develop the summary findings.

And the last slide then gives a timeline. The end headline is March 2021 hopefully to have a draft report and recommendations to the committee. But a significant portion of this year at the start is going to be trying to develop that basis for us to start working on what are our guard rails to ensure we are focusing the work and not being distracted into different tangents or rabbit holes that could slow us down. And that's a very -- what is an expensive subject to very limited timeframe.

And that's pretty much it, I think. I would clarify one question that may come up is that we have asked about whether this work ties into Section 3.74, which is obviously ongoing at FAA and FCC at the moment. And this does not deal with Section 3.74 at this moment in time. Purely on spectrum aspect and the mechanisms and the Federal Advisory Boards. So we are not dealing

with that. And I know there's a lot of activity elsewhere on that at the moment. Unless there's anything else I've missed?

MS. KAHN: That was good.

MR. ROY: Then we're good. Thank you.

CO-CHAIR WARREN: Thank you, Andy and Carolyn. So I think your scoping exercise is a really important one as you said. There could be so much brought into this. And the idea of leveraging others work is obviously an important aspect of that. I also think the inclusive approach you're taking to looking at various altitudes, sizes, et cetera of UAS is an important element so that it's kind of an inclusive approach to the UAS technology market as opposed to just pieces of it.

I think it's great that you have a timeline for producing, you know, the substantive output. Perhaps there may be opportunities as you continue to scope to do bite-sized pieces that could be delivered along the way. So as you're doing the scoping, maybe see if there's any thoughts.

But that would be my only comment. I think this

is a really good outline of the path forward. So

thank you very much for the work and having started.

Let me open it to CSMAC members. I see Mr. Gibson.

MR. GIBSON: I'm a member of the

subcommittee, so I apologize, I missed the kickoff

meeting, so if I ask questions that you guys dealt

with, forgive me.

One question is, you know, with the FAA

redoing the National Airspace System to accommodate

these, how much does that influence the work we're

doing? Because I should think for example with

Next Gen coming on and use the ADSB and whatnot,

you know, although those frequencies are defined,

there may be other aspects of that, that might enter

into this. And so, are we thinking about that at

all?

MS. KAHN: Yes. I mean that's part of

the complexities. It's a complex environment.

A lot of activity. Things are moving fast. So

that's all a part of it. But we are looking kind

of broader and what more we can do to help advance.

MR. GIBSON: Okay, cool. And the second question was, are you going to look at -- or I should say are we going to look at like representing organizations like AUVSI and AOPA and others like that to get some sense as to how there advocacy figures into this as well? Is that part of the interviews that we're going to do?

MS. KAHN: So there's a lot of stakeholders involved in here. So we're developing lists and then we're going to prioritize and kind of see how much we can get through. But we want to kind of look at everything fairly, so we're going to kind of bucket them and go from there. So that we're considering.

MR. GIBSON: And when's our next meeting?

MS. KAHN: We'll be scheduled --

MR. GIBSON: Okay.

MS. KAHN: -- soon.

MR. GIBSON: All right. Okay, thanks.

CO-CHAIR WARREN: You're on distro.

Mariam, do you have a question? You have a microphone, I know.

MS. SOROND: I certainly do. Is this turned on? Oh, okay. So I was just kind of curious about the scope. Is this going to be just a visual line of sight or beyond visual line of sight? I assume it's beyond visual line of sight if you're going to focus on command and control.

MR. ROY: So yes, basically I say all categories. One of the questions that has come up is oceanic as well, as a brief line. That is a question about whether or we address that or not because it will be a bit more different role from terrestrial networks. So I would say the initial focus -- and again, my thought when we're addressing the subcommittee would be to look at just the terrestrial component and maybe some of the SATCOM component of the mainland. And then after that, we'll see where it goes. But yes, from almost everything we can think of initially just to put it all down, assess it, and then figure out where we go from there.

CO-CHAIR WARREN: Mark, did you have another question?

MR. GIBSON: Me, no.

CO-CHAIR WARREN: Okay, just checking. Does anybody else have a followup? Introduce yourself please.

MR. KOLODZY: Paul Kolodzy here. You indicated you're only going to work on the command and control links, which are generally lower data rates and lower duty cycle. Are you planning on trying to characterize what kind of requirements you're actually building towards? Because I think a lot of the other groups that are putting out for spectrum access are also including a lot of other data links associated with it to get more information back. So the question is, is where's your balance that you're going to try to take between the amount of usage you really need? Because that will really impact what kind of data spectrum access you really need.

MS. KAHN: So we're going to start with C2. And that's how, as the question is framed.

But as other, you know, spectrum and links are impacted, we'll consider that as well. So we'll be discussing kind of those elements in the subcommittee meeting.

CO-CHAIR WARREN: Does anybody else have questions for Carolyn and Andy? No, okay. Great. So I think -- Oh, I'm sorry.

CO-CHAIR RATH: No, I just want to say -- Sorry, want to back up to Working Group 3. Sorry.

(Simultaneous speaking)

CO-CHAIR WARREN: We just realized that the other working groups talked about schedules and if you would address that, that would be great.

MR. TRAMONT: Yes, we will have a schedule. Yes, we will continue with call. Yes, we are working on a draft. I think we have appointments in place to talk to some additional subject matter experts and we'll have another call in February. What more detail, I don't know. What more detail would be useful, Madam Chair?

CO-CHAIR WARREN: Just generally what

you think you -- will you have a --

MR. TRAMONT: We should have a draft at the next meeting, yeah.

CO-CHAIR WARREN: That's all I needed. Thanks. So we will wrap up this portion. And say thank you to all the co-chairs. I think we can all be proud of the amount of work that this CSMAC has already undertaken and the progress that we're making and the discussions to get to the answers to the task questions that NTIA has put to us.

This is our opportunity now to open up for public comments. So we'll take this opportunity if there's anybody in the room or on the phone that has any questions, this is your moment in the light.

(No response)

CO-CHAIR WARREN: Now the coughing has stopped. So not hearing any pressing questions or any questions at all, we will move then to closing remarks.

CO-CHAIR RATH: No, that sounds good.

As Jennifer mentioned at the front of the meeting, I just wanted to make sure that you all didn't have any questions for NTIA. As she said, there was a lot put on the table and to the extent that any of the members are, you interested in those questions before we wrap up. I just wanted to remind -- and other than that, you know, I echo Jennifer's comments, I said at the beginning too.

Thank you, all. I really do appreciate all the work that's going into it and look forward to our next meeting in Aprilish timeframe. Do we have a specific date yet?

MR. REED: Can you hear me? Okay. We don't have a specific date, but my goal is to shoot for the end of April, about three months. And there's a reason why I want to have it in April before May. Because if they go into May, then you'll have to fill out those forms again before we meet again. So I'm trying to --

CO-CHAIR WARREN: We'll have to fingerprint again.

MR. REED: Excuse me?

CO-CHAIR WARREN: Will we have to fingerprint again at that point because the forms are fine.

MR. REED: I don't think so. I think this was just because the new cycle started.

CO-CHAIR WARREN: Okay.

MR. REED: I believe that's the case. But sometime after our meeting in April, I'll be sending those forms out again. I'll try to make it as easy as I can on you all. I know it's so painful. But anyway, so look for an announcement soon, but we'll probably have it towards the end of April.

CO-CHAIR RATH: Do you also want to mention something about ISART?

MR. REED: Yes. So the next meeting after that will probably be in coincident with ISART, which is July, I forget the dates --

CO-CHAIR RATH: It's August.

MR. REED: No, August -- early August. So it will be in the August timeframe. After that, I don't know.

CO-CHAIR WARREN: So unless there's any other comments, I think we can adjourn and everybody can have back a little time. Thank you very much, everyone.

(Whereupon, the above-entitled matter went off the record at 2:33 p.m.)