HEARING TO RECEIVE TESTIMONY ON

DEPARTMENT OF DEFENSE SPECTRUM POLICY AND

THE IMPACT OF THE FEDERAL COMMUNICATIONS COMMISSION’S

LIGADO DECISION ON NATIONAL SECURITY

Wednesday, May 6, 2020

U.S. Senate
Committee on Armed Services
Washington, D.C.

The committee met, pursuant to notice, at 3:05 p.m. in Room SD-G50, Dirksen Senate Office Building, Hon. James M. Inhofe, chairman of the committee, presiding.

Committee Members Present: Senators Inhofe [presiding], Wicker, Fischer, Cotton, Rounds, Ernst, Tillis, Sullivan, Perdue, Cramer, McSally, Blackburn, Hawley, Reed, Shaheen, Blumenthal, Hirono, Kaine, King, Peters, Manchin, Duckworth, and Jones.
OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM OKLAHOMA

Chairman Inhofe:  Our meeting will come to order.

Before starting the agenda, since a quorum is now present, I ask the committee to consider a list of 2,807 pending military nominations. All these nominations have been before the committee the required length of time.

Is there a motion to favorably report them?

Senator Reed:  So moved.

Chairman Inhofe:  Second?

Senator Shaheen:  Second.

Chairman Inhofe:  All in favor, say aye.

[Chorus of ayes.]

Chairman Inhofe:  Opposed, no.

[No response.]

Chairman Inhofe:  The ayes have it. And I do not have a pen. So I have to sign this. Thank you.

Before the opening statement, let me just observe something here, and this comes from the heart. I have been around here a long time. I served in the House for 8 years. I started in the Senate and was on the Senate Armed Services Committee starting in 1994. And I do not think I have ever seen a more impressive group of witnesses on a specific subject who are better qualified than this in all that time. And I really mean it.
I mean, we talk about Mr. Deasy, who is the Department of Defense Chief Information Officer. He was also the CIO of J.P. Morgan Chase, the British Petroleum Company, and General Motors. I mean, we have not had one like that before.

And Dr. Griffin. Certainly he knows this issue as well as anyone anywhere. He has been our NASA Administrator.

Then we have Admiral Thad Allen. He has been the chairman of NASA’s Space-Based Positioning, Navigation, and Timing National Advisory Board. That is GPS. So he is the authority on that.

And then, of course, obviously the chief of our space operations, General Jay Raymond.

So it is just a privilege to have you guys here, to have this much quality here, this much authority because what we are going to be talking about is an issue that could be really damaging to our country if something is wrong.

So I would say good morning to the committee and say good afternoon, and I appreciate your being here.

Now because of the unusual circumstances, there is a new, little required thing that we have to go through. So bear with me.

Before we begin, I want to thank all of you for being here.

It is required that we are abiding by guidance from the
Office of the Attending Physician, Sergeant at Arms, and Rules Committee as we hold this hearing today. Many steps were taken to minimize the risk to our members, our witnesses, our staff, and the public. That means we are all 6 feet from one another. You have also got cleaning supplies at your seats. And if maintaining 6 feet of separation becomes a problem, then I encourage you to use your masks. That we are here today under these circumstances underscores the importance of the subject that we are addressing today.

And what we are going to do, we are going to have our opening statements and then proceed on with 5-minute questions. And we are going to have a second round of questions too.

This is a complex issue, but it ultimately boils down to risk. And I do not think it is a good idea to place at risk the GPS signals that enable our national and economic security for the benefit of one company and its investors.

After extensive testing and analysis, experts at almost every federal agency tell us that Ligado’s plan will interfere with our GPS systems. This will certainly affect our warfighters who rely on GPS for navigation, logistics, and precision guided munitions, whether in training or on the battlefield.

But this is about much more than risking our military
readiness and capabilities. Interfering with GPS will hurt the entire American economy. We will have some good witnesses talk about that and elaborate on that. Our farmers rely on GPS to harvest their crops. Our truckers and airlines rely on GPS to move supplies and people. Our banks rely on the GPS timing function. Every American uses GPS every day. And at the end of the day, economic security is national security.

Now, we all agree that we need to compete with China in the 5G development. No one is disputing that fact. We have been working on that for months with the Department of Defense and the telecom industry cooperating with each other and accomplishing that very thing. That is not the issue.

Ligado’s proposal is not tied to that work whatsoever. Now, we are talking about the 5G, the competition with China. They have tried to conflate their proposal with other mid-band spectrum sharing discussions, but in reality, these two issues are completely separate, completely separate from each other.

In answering the argument that GPS would be disrupted, the FCC says Ligado will be forced to pay for any disruptions its service causes to GPS. Now, the reality is that the FCC order only requires Ligado to replace government-owned devices. That does not accomplish -- if it were doable. Ultimately, the burden of mitigating harmful
interference will be placed on the Department of Defense and
the American taxpayers would end up, as normally is the
case, having to pay for it.

A few powerful people made a hasty decision over the
weekend, in the middle of the national crisis and against
the judgment of every other agency involved, and without
cluing the President in on any of this. And I have had
conversations with him, and I can assure you that is the
case.

The FCC may not be in this committee’s jurisdiction,
but the effects of its decision really are. And I think we
all understand that. I hope our witnesses will speak to the
enormous risk this decision has for everyone who relies on
GPS in America. With the technical and important nature of
this topic, we will structure this hearing with a
consolidated opening statement from the three Department of
Defense witnesses, followed by the fourth witness. This
will allow a detailed explanation of the national security
implications of the FCC’s decision and what steps the
military will need to take to mitigate these effects.

The Department of Defense has provided materials to
accompany their statement that are available in front of you
and on display for the public view.

Now, this is very significant because some people are
familiar with this organization and some are not, but those
who are know that this is where all of the defense people are.

I plan to submit for the record a letter I received from the National Defense Industrial Association, which is made up of 1,700 businesses and 70,000 individual members, stating their strong opposition to Ligado’s proposal, along with a list of 71 companies and associations that are opposed as well. And also, the FCC was fully aware of this. They received the letter from this organization a week before their weekend vote.

So you must believe that it could not get worse, but it is. Ligado took over a bankrupt company in 2015 and has been trying to obtain FCC licensing ever since. They waited until the whole world was distracted by the virus, and when everyone was looking the other way and unannounced to the public -- and it was not announced -- in total secrecy on a weekend passed the most controversial licensing bill I think in the history of the FCC. And I say this because the federal agency opposition was unanimous. You never see that. We had all organizations, all federal agencies opposing this, not just the military, but all of government and the private sector, including the airlines, the farmers, the truckers, the maritime manufacturers, opposed the licensing and the FCC knew it. And hence, we had the weekend rushed vote.
Senator Reed?
STATEMENT OF HON. JACK REED, U.S. SENATOR FROM RHODE ISLAND

Senator Reed: Well, thank you, Mr. Chairman. I also want to thank the witnesses for appearing here today. This is a critical issue for the Defense Department and our nation, and it is important that we learn from these witnesses.

We are holding this hearing in unusual circumstances. There has been a great deal of discussion about whether we should be here in person with risks not only to Senators, but to all the support personnel who are needed to keep this institution running. In addition, the compelling point is made that if the Senate is in session, its predominant focus should be combating the pandemic. But this is a hearing I think that is essential.

I want to commend Chairman Inhofe for establishing and holding a weekly call so that committee members can be briefed by Defense Department officials and ask questions regarding the coronavirus. The chairman ensured that we were able to conduct oversight even in difficult circumstances. But phone calls cannot replace a hearing, so when we plan future hearings, as consideration of the annual defense bill allows, I would certainly request that we consider these hearings in the context of both physical and virtual participation. And we also should focus on the
effects of the pandemic on the Department of Defense and on threats that face the nation.

Let me now turn to today’s hearing about the decision by the Federal Communications Commission, or FCC, to permit the company Ligado to operate a land-based network that by its own admission will interfere with DOD GPS systems, as well as those in other federal agencies and the civilian sector.

Over 10 years ago, Ligado’s predecessor, LightSquared, applied to the FCC to permit a satellite-based 4G system with a secondary land-based network in areas where satellite reception could not be obtained. The application was denied because of interference with the GPS system, and LightSquared was forced into bankruptcy.

LightSquared and its spectrum license was then bought in bankruptcy and reorganized as Ligado. In 2016, Ligado resubmitted an amended licensing application to the FCC to build a new ground tower-only transmission system. Ligado’s switch to a system of closely spaced, powerful ground tower signals threatens to interfere with GPS. Despite jeopardizing GPS and ignoring the scientific view of many federal agencies, the aviation industry, and GPS-dependent companies, the FCC granted the license without a public rulemaking to change from a satellite-based network to one that is totally land-based.
I believe the FCC’s decision to grant the license is problematic for several reasons.

First, the Commerce Department’s National Telecommunications and Information Administration is supposed to form a consensus among executive branch stakeholders like the Defense Department and FCC, an independent commission. In this case, the Department of Defense and other executive departments, like the Department of Transportation, objected to the application because of the interference with the GPS signal. Yet, no consensus was reached before the license was granted.

Second, the FCC license does not recognize the complicated nature of the Defense Department’s weapon systems. Ligado maintains that DOD can simply replace affected GPS cards. But there are hundreds of thousands of GPS chips embedded in DOD weapon systems, and each chip is not only tuned to GPS, but embedded with interconnected electronics, each tuned to each other. Replacing a GPS card will also impact other features of a weapon system. How many weapon systems are affected, how they can be fixed, and the time and cost of the remedy is unknowable at this point, but the process will be lengthy and expensive.

For a sense of what the FCC’s decision could mean, we have a real life example. In 1992, an FCC spectrum repurposing decision eliminated the B-2 radar band for DOD.
Moving that radar to a new band took 30 years and $3 billion due to depot cycle rescheduling and operational demands.

While the FCC order states that the onus is in Ligado to fix problems, in reality the burden is actually on the Defense Department to find which weapon systems are affected, how severe the impacts are, and then negotiate with Ligado to get them fixed. Clearly, such a process will compromise military readiness.

The Defense Department is working on a new set of hardened GPS chips called military grade user equipment, or MGUE, which are jam-resistant to the power levels of the Ligado towers. However, these chip sets will not be installed in our weapon systems until the 2030s. The best course of action for national security would be to stay the license application and periodically review it until such time as the new chip sets can be installed in critical weapon systems.

Finally, I have only discussed the problems the Defense Department is facing as a result of the FCC decision. I have not discussed the myriad of problems that will be faced by literally everyone who uses GPS. I do not believe that the FCC’s decision to grant this license is in the best interest of our national security or our nation.

I look forward to today’s discussion about the issue.

I again thank the witnesses and my colleagues for
appearing at this hearing in these unusual and demanding times.

Thank you, Mr. Chairman.

Chairman Inhofe: Thank you, Senator Reed.

We are going to have opening statements by our witnesses. Before we do, without objection, I will ask unanimous consent that we enter into the record the National Defense Industrial Association. I have already referred to that -- the industry coalition letter with 68 signatories that strongly oppose it, the Aerospace Industry Association letter on behalf of 300 leading aerospace and defense manufacturers and suppliers who oppose the FCC’s decision, the Air Line Pilots Association International letter asking the Senate Armed Services Committee, this committee, to take action and stay this FCC ruling, and the Transportation and Construction Coalition letter stating that they oppose Ligado’s proposed network, and of course, the letter from Ligado. Without objection, they will be made a part of the record.

[The information referred to follows:]

[COMMITTEE INSERT]
Chairman Inhofe: We will start with our opening statements, with you, Mr. Deasy. You have been a great contributor to everything that we do around here and that we stand for, and we appreciate your taking the time to be here and really getting involved in this issue. You are recognized.
STATEMENT OF HON. DANA S. DEASY, CHIEF INFORMATION OFFICER, DEPARTMENT OF DEFENSE

Mr. Deasy: Thank you, Mr. Chairman, Ranking Member, and members of the committee. Good afternoon. I am Dana Deasy, the Department of Defense Chief Information Officer.

Sir, as you stated in your opening, with me today on behalf of the Department are Dr. Griffin, the Under Secretary for Research and Engineering; and General Jay Raymond, Chief of Space Operations, United States Space Force.

In place of reading individual opening statements, we have prepared a short overview where Dr. Griffin will briefly explain the technical issues associated with FCC’s ruling to allow Ligado to repurpose spectrum. Next, General Raymond will then explain the military mission impacts of that order on the Department’s operations. And I will briefly cover 5G and what actions the DOD is taking to leverage this important technology, as well as cover briefly how we are pursuing sharing mid-band spectrum. Finally, I have a chart where I will summarize the key takeaways.

With that, I would like to turn to Dr. Griffin to begin.

[The prepared statement of Mr. Deasy follows:]
Chairman Inhofe: Dr. Griffin?
HON. MICHAEL D. GRIFFIN, UNDER SECRETARY OF DEFENSE
FOR RESEARCH AND ENGINEERING

Dr. Griffin: Thank you. I would like to take this chart in clockwise order and first key off of the point Senator Reed made, which is that GPS is, although designed originally, developed, deployed, and sustained by the DOD, that GPS is now a public utility. It services, of course, our national security needs, as General Raymond will address, but it also services the requirements of first responders navigating to a particular address. Every time you use an ATM machine, you are using the GPS timing signal. You are not asking where the ATM is. You are using the timing signal that is provided in order to conduct an encrypted transaction. Civil aircraft, military aircraft, commercial shipping, our deployed troops, credit card swiping machines, all of these things are, in one way or another, dependent upon GPS.

It is forecast to be a $140 billion-plus industry by 2025. It is over $100 billion today in economic value. A Department of Commerce study estimated -- and it is cited in my testimony -- $1.4 trillion of economic benefit generated by GPS since the system was first deployed. So that is what is at risk.

How is it at risk? If you go to the upper right quadrant, you can see on your chart that the fundamental
aspect of the GPS infrastructure, space and ground, the
totality GPS infrastructure, was designed under the assumption
that GPS radio navigation systems would be placed in a very
quiet band of the radio spectrum, that ground-based
transmitters would not be allowed in that spectrum because
they would drown out the very weak signals that come from
satellites.

At this point with the FCC’s decision, the goalposts have been moved. Now receivers meant to detect the extremely weak signals from satellites have to cope with very loud signals in the band next door.

The practical effect of this, irrespective of who pays for the changes in equipment that would have to occur -- and again, I will make Senator Reed’s point for emphasis, that the Ligado proposal proposes only to fix federal receivers, whereas by far the majority of use is in various aspects of the civil and commercial sector. The replacement of that equipment, regardless of who pays for it, provides a market niche opportunity, a refreshing of equipment, that will be available to our competitors. So rather than the installed based of U.S. equipment holding sway, our competitors who have their own global navigation satellite systems will be arguing why, since the United States has damaged its own system -- why should we not buy from China or Russia. That is not an argument I want to have.
Moreover, today GPS is the world standard for satellite navigation. If we damage our own world standard, earned through decades of investment and hard work, we should only expect that users worldwide will find other standards. That will not be to our benefit.

It is very difficult to give you an accurate technical comparison of just how loud the Ligado signal is in comparison to GPS, but on the lower right, I have tried. So the decibel scale is what we use to measure loudness, if you will, whether radio noise or acoustic noise. So the quietest possible sound that can be heard might be represented by rustling leaves, which are quoted at 0 to 10 dB in the literature. On the other hand, a jet taking off will create a sound 140 to 150 decibels. If you are standing right next to it, it will blow out your eardrums. So if 0 decibels is barely audible and 140 or 150 decibels is a jet takeoff, then what we are trying to do with GPS is to hear the sound of leaves rustling through the noise of 100 jets taking off all at once. And that is a comparison that is actually favorable to Ligado. I could not put more than 100 jets on my chart. That is what we are trying to do here.

Finally, in the lower left quadrant of the chart, moving clockwise, there are a number of myths that have been promulgated in the media about the Ligado proposal. I chose
three of them to debunk, the first of which is the claim that Ligado -- a recent claim -- is critical to the build-out of U.S. 5G. In fact, my number here is not quite right. In fact, Ligado has about 3.5 percent of the sub-6 gigahertz spectrum in use today, if we count that portion of the spectrum allocated to the Citizens Broadband Radio Service, CBRS. 5G is about capacity, latency, and scale. The Ligado proposal has absolutely nothing to do with latency and scale, and its capacity is on the order of 3.5 percent of the total spectrum capacity. Ligado’s existence, plus or minus, makes absolutely no difference to the involvement of U.S. in the so-called 5G race.

Second, the myth is that the Department of Transportation testing, which is quoted in I think all of our testimonies -- the myth is that that testing was flawed, that it did not assess receiver performance against the Ligado transmitter. That is true, but that is not the right test. The right test is the test to determine whether the band for satellite navigation has been protected, and the DOT testing addressed protection of the assigned GPS band in the most thorough manner I could have imagined. We will talk more about that later. But it protects the entire band and not just one transmitter and one receiver in an artificial scenario.

A third myth that has been bandied about is the Ligado
stations are like a 10 watt light bulb. How can they possibly interfere with GPS? Well, in case my jet noise analogy did not get across, let me talk to you about something for which I used to be responsible, the Hubble Space Telescope. The Hubble Space Telescope was designed to detect extraordinarily dim objects, so dim that on my decibel scale, a 10 watt bulb is 350 decibels brighter. If you shined a 10 watt bulb down the barrel of the Hubble Space Telescope, it would see nothing. It would be completely blinded. That is exactly the situation that we have with the GPS receiver trying to listen to GPS signals that are 170 decibels weaker than this 10 watt bulb. That is not a game that we can win in GPS. We will have to redesign and redeploy equipment, and the cost will be hundreds of billions of dollars and decades of deployment time.

Thank you.

[The prepared statement of Dr. Griffin follows:]
STATEMENT OF GENERAL JOHN W. RAYMOND, USF, CHIEF OF
SPACE OPERATIONS, UNITED STATES SPACE FORCE, AND COMMANDER,
U.S. SPACE COMMAND

General Raymond: Chairman Inhofe, Ranking Member Reed,
and members of the committee, it is a pleasure to speak
before you today on a matter of national importance: the
protection of the GPS signal for use by our joint and
coalition forces and the whole nation.

As both the Chief of Space Operations for the United
States Space Force and as the Commander of the United States
Space Command, I have the responsibility to the Secretary of
the Air Force for organizing and training and equipping
forces to provide GPS for the world and to the Secretary of
Defense for operating, integrating, and protecting GPS for
our nation. I am proud to represent the airmen, soldiers,
sailors, marines, and space professionals who conduct these
missions with such expertise.

The very first GPS satellite was launched in 1978, and
it was integrated into warfare for the first time in
Operation Desert Storm. You all remember in early 1990s,
1990-1991 the left hook. That was enabled by a GPS
constellation that was not even fully up and operating at
the time. How do you navigate through a featureless terrain
at night in the desert? You do it with GPS.

Now today -- 25 years ago last week, it became fully
operational. And today it represents the Department of Defense’s largest constellation where 31 satellites operating over 12,000 miles above the earth’s surface provide precision positioning, navigation, and timing services to 4.5 billion users and warfighters globally. And it is three times more accurate than it was when it was first launched in the late 1970s.

However, this critical capability is irrelevant if the signals coming off the satellite cannot be processed by the receiver on the ground. These signals, after traveling 12,000 miles from space to reach earth, arrive very weak, less than a millionth of a billionth of a watt. It is hard to get your head around that small of a number. For receivers to be able to pick up such faint signals, these signals have to operate in a noise-pristine environment in that part of the spectrum. For those that ride the Amtrak train -- and I experienced this last year -- it is the quiet car. It is where people do not talk. It is where emitters do not make noise because that signal is so faint.

It is recognized globally as a zone reserved for satellite signals coming from space, not for emitters operating on the ground approximately a billion times more powerful than the GPS signal. These ground emitters will interrupt, reduce the accuracy of, or jam the GPS signal. We must preserve this spectrum for space-to-ground signals.
It is the global standard, and it puts our space capabilities, which are the gold standard, as Dr. Griffin talked about, at risk.

As we compete with China and Russia, we should not cede our operational advantage.

Because of the magnitude of the power overmatch between the ground antenna and the GPS signal, the mitigation steps the FCC has required will not retire all of the risk. Specifically, the 23 megahertz buffer zone will not mitigate all the risk of interference. We have a buffer zone today. It is the mobile SATCOM services band at which this ground emitter is being placed. And what this 23 megahertz buffer zone really implies -- it is about a half of the buffer zone that we have today.

I have spent most of my military career integrating GPS and other space capabilities into everything that we do as a joint force, and today there is absolutely nothing that we do as a joint that is not enabled by space and specifically GPS. In the Department alone, we have over a million GPS receivers. They are integrated into our space launched vehicles. They are integrated into our aircraft, our tanks, on ships, on communication networks, and on our most important weapon system, our people. GPS allows us to shoot, move, and communicate with speed, precision, and over great distances. It has revolutionized military operations,
and it is employed in every step of the kill chain to defeat our adversaries.

Some might ask what is the impact on the force if the emitters are only located in the continental United States. In my opinion, the impact is significant and it is unacceptable. DOD mission areas that would operate under increased risks include our most important mission, homeland defense. Assured GPS is critical to homeland defense. It could impact military and commercial space launch. We use GPS to safely launch those rockets, and if they go astray, we blow those rockets up to protect public safety. We do most of our training and building or our readiness in CONUS to be able fight the fight overseas. And most specifically, in our defense support for civil authorities, like we are doing today with Covid or like with wildfire suppression or hurricane relief or earthquake relief, our forces rely on GPS to accomplish that critical mission. These ground emitters could have multimodal impacts to transportation hubs, airfield, seaports, and airports. Finally these emitters could impact overlapping defense critical infrastructure and key resource sectors like the defense industrial base, transportation, emergency services, energy, and communications.

The best advice I could give is to strongly oppose the use of this spectrum that is reserved for space signals for
terrestrial emitters. In doing so -- if we do not, we increase the risk to our ability to conduct our critical homeland defense missions, we erode the gold standard of our space capability, ceding advantage to Russia and China, we set a dangerous precedent for repurposing this spectrum reserved for space signals, and we go against the volumes of testing that has been done, which indicate that these ground-based emitters will impact the GPS signal.

I will now turn it over to Mr. Deasy to talk about the spectrum.

[The prepared statement of General Raymond follows:]
Mr. Deasy: I am going to start by saying that DOD fully supports the U.S. needing to be leaders in 5G. And there is a right way we can go about it and there is a wrong way.

Ligado does not provide a 5G solution. It is not offering a solution to be a 5G leader in America. The band in which Ligado operates is not even part of the FCC 5G fast plan, which is the commission’s blueprint for advancing U.S. interests in 5G. The non-continuous bands that Ligado could bring to market are both fragmented and impaired.

DOD clearly recognizes the huge value of 5G not only for commercial use but across the U.S. military as well. As you will see up here on this chart, we are getting ready to undertake a number of experiments to learn how best to utilize this technology. If you start on the far right of this slide, I point out some of the experiments we are getting ready to work with: augmented virtual reality, distributed training, smart warehousing and logistics, and eventually in a future phase, we will even start looking at how to make smart ports and bases.

The part of this chart I really want to draw your attention to is in the middle. We have established a dynamic spectrum sharing pilot and are examining methods to facilitate sharing between 5G and DOD airborne radars in mid-band spectrum. Let me simplify this for you.
What we need to be able to do in 5G is to ensure that when civilians are using their car for 5G or in their home or using it in the factory or an individual person is carrying it around, that the work we do and the operations we run in the military will not interfere, and vice versa. So that is what the 5G experimentations are all about. We will be doing these experimentations in conjunction with the National Spectrum Consortium, which is partnering with government, industry, and academia.

Finally, the last most important thing is one of the most important areas of 5G is what is called the mid-band spectrum. And what is important here for all of you to understand is how do we need to learn how to share that spectrum and make it available for both DOD use as well as commercial use.

Next, in front of you on your very last chart, you have what I like to call the key takeaways. If there is the one chart today that you should keep with you to fully appreciate what we have all shared with you, it is this chart.

First of all, Mr. Chairman, as you stated, this is about risk. This is risk to the resource that America’s economic engine and the vital nature of it for national security. The repurposed license is a classic case of bait and switch. FCC and Ligado want to move the goalpost by
following terrestrial transmitters in a space communications band despite unanimous and unambiguous federal opposition.

DOD and DOT both performed extensive testing and studies evaluating the potential impact to 80 military and commercial GPS receivers. Those studies concluded that Ligado’s solution will cause harmful interference to both.

The stringent conditions imposed by the FCC are inadequate to protect GPS, impractical, and could never be employed in real practice. The required guard band and reduced power levels do not sufficiently protect GPS receivers, as you have heard today from Dr. Griffin and General Raymond. Coordination requirements are simply impractical. There are millions of mobile GPS receivers in use, and there is no way to protect those from their mobile operations. Notification of the event of interference simply does not work. None of you would even know in this room today if Ligado disrupted your individual GPS device, nor would you know what to do if they did. FCC expectation for Ligado to repair or replace affected receivers is unreasonable and could never be employed in practice.

The American public and military rely on GPS to support a wide range of critical applications and missions from protecting our national security to our economic prosperity. We have always been world leaders in GPS, and we never want to see our country be forced to turn to foreign GPS
providers.

As General Raymond clearly articulated, the FCC decision will impact warfighter exercises, testing, training, and homeland defense.

GPS must remain a reliable service and always be available when you need it most; a simple example we can all appreciate: emergency services for a 911 call.

Ligado and 5G simply do not go together. They portray their solution to be 5G. This is not how the U.S. will lead in 5G. They only target a small subset of the 5G specifications.

In the next several months, DOD will be executing on important 5G experiments with government and industry.

I will close by simply saying it is clear to the DOD that the risk to GPS far outweighs the benefits of this FCC decision, and the FCC needs to reverse their decision.

Thank you for your time. We look forward to your questions.

Chairman Inhofe: Thank you very much, Mr. Deasy.

We now recognize Admiral Allen for any comments.
STATEMENT OF ADMIRAL THAD W. ALLEN, USCG, RET.

Mr. Allen: Mr. Chairman, Ranking Member Reed, and members of the committee, thank you for the opportunity to provide testimony today with my distinguished colleagues from the Department of Defense. My full testimony is submitted for the record.

I am testifying today in my private capacity as a citizen and the views expressed are mine. They are not intended to represent any government agency or private firm. My testimony is based on publicly available information. My views represent my concerns and those of GPS civil users. I will try not to repeat points previously made.

I have been involved in radio navigation and operations and policy for more than 50 years. 45 years ago, I was the commanding officer at Loran Station, Lampang, Thailand as the war in Vietnam ended. 10 years ago as the Commandant of the Coast Guard I personally turned the switch that decommissioned the final Loran C operating chain in the United States.

My fellow panelists have presented a unified testimony regarding the impact of the FCC order and authorization to allow Ligado Networks to deploy a low-power terrestrial nationwide network and the associated impacts on the Department of Defense and national security. I endorse their recommendations.
My purpose here today is to speak on behalf of the hundreds of millions of civil users of GPS. From the timing of financial transactions to power generation, synchronization of telecommunications, high precision agriculture, intelligent transportation systems, and air navigation and airspace management, GPS has become vital to the nation’s general welfare and common defense.

The risk to military systems, so clearly stated by this panel, is also shared by civil GPS users. However, unlike our military forces who have the ability to reduce risk through encryption and other tools, civil users are a separate user segment with greater receiver diversity and fewer risk reduction options. The single point in government where the interests of the civil GPS users are integrated with the Department of Defense and brought into a consensus process is through the position, navigation, and timing, PNT Executive Committee and its supporting PNT Advisory Board. The PNT Advisory Board approach for reducing risk to the civil users has been a three-pronged strategy: protect the signal, toughen the receiver, augment GPS with backup or complimentary PNT services.

The impact of disruption or loss of a GPS signal varies with the type of receiver. This could manifest itself in anything from an ATM malfunction to the loss of navigation in an intelligent transportation system, interference with
an unmanned aerial system, or disruption of electrical power
distribution. The uses of GPS range from a simple FITBIT to
the provisions of coarse timing for highly refined, parsed
timing services for financial transactions.

While there are a host of issues raised by the FCC OA,
my written testimony addresses them specifically. I wanted
to hit five things here today.

The administrative process for this decision has never
been made public to gain comment on the allocation of
spectrum of the ancillary terrestrial component of the
service or the earth-based transmitters.

The lack of a transparent process to look at the
competing criteria as to how to measure disruptions in the
GPS adjacent band.

Third, the density of terrestrial antennas and the
impact on mobile devices moving through those fields.

Four, the OA shifts the performance burden to the
receiver rather than protecting the spectrum, as has been
stated.

And finally, the assertion that the Ligado plan will
significantly accelerate or enhance the deployment of 5G
technology. There are no 5G standards for the spectrum as
it has not been used for 5G anywhere else in the world.

The concept contained in the OA that the impacts of
adjacent band interference can be measured and identified by
Ligado as they occur and then mitigated in a timely and effective manner without prior testing strains credibility. Tests that were utilized by the FCC were funded by Ligado, were not conducted in a transparent fashion, and not widely supported.

Further, the failure of the FCC to accept the standard floor for tolerance of noise that was used by the Department of Transportation in the adjacent band compatibility study is equally quizzical and its summary dismissal is troubling. This is a neutral guardrail for the spectrum. This approach rejects the concept of first do no harm and replaces it with consequence management after the event has occurred.

In closing, I would like to use the words of those close to this issue in the air and on the ground. My good friend, Captain Sully Sullenberger, and I spoke this morning about the concerns of the aviation community. He said putting the narrow commercial interest of one company ahead of our national security and the needs of the country is wrong-headed and dangerous. Wishful thinking and hoping that things will work out is not an effective strategy and cannot repeal the law of physics.

Closer to earth during a visit to my wife’s family in Illinois, I spent some time talking to corn and soybean farmers who depend on GPS services for precision navigation. I asked what happens when you lose GPS. I got a two-word
response: we quit. While you can reboot and begin planting
again, if you are flying a medevac helicopter or responding
to a wildfire, it is a much different problem. Spectrum is
a national asset, a precious asset, and it should be
protected, not subject to arbitrary and capricious
decisions.

I look forward to your questions.

[The prepared statement of Mr. Allen follows:]
Chairman Inhofe: Thank you very much, Admiral.

We are going to have a 5-minute round. Senator Reed and I are going to recommend a second round of questioning because there is a lot of stuff to cover here. And I am going to take my first 5 minutes with Director Deasy and General Raymond and Admiral Allen and then save my other question for Dr. Griffin for the second round.

Now, Director Deasy, the reason I bring this up is this is the one thing that is mentioned more than anything else when they are trying to defend what happened in the action of the FCC. So I would ask you, even though it has been touched on, can you describe the interagency process that caused the Department of Defense to conclude that Ligado’s proposal was likely to interfere with GPS, and did the FCC consult you and did they take your concerns seriously?

Mr. Deasy: So, sir, the way I would start that is when a company, in this case Ligado, wants to repurpose the spectrum, they submit that request to the FCC. The FCC, in turn, turns it over to the NTIA. Sometimes those go through what is called the Independent Radio Advisory Committee, the IRAC, which has 19 members. In the case of evaluating Ligado’s request for repurposing the spectrum, it was turned over to the PNT EXCOM which is made up of nine federal agencies. I co-chair that along with the Department of Transportation.
The EXCOM -- what they did was they, in turn, asked the Air Force to conduct a series of independent studies and testing to determine whether or not the request that Ligado had put forth was reasonable and could be accepted. The testing took place and was completed in about April of 2016, as I had mentioned in my opening remarks. What that testing did was take a number of commercial and military receivers, approximately 80, and they tested them over a long, extensive period of time, and they tested them to determine the levels of noise in which they would see interference. They used the requirements of what Ligado was specifying as acceptable, and in running those tests, they clearly indicated that the results of the tests caused interference in all cases.

So what was done with that information? In turn, that then was turned back over in a form of a letter that I co-signed with Department of Transportation in December of 2018. That letter clearly cited the testing that was done by the Air Force. In that letter, we say that it was unambiguous and unanimously agreed across nine federal agencies that this could not move forward.

Given that there was still concern raised and the fact that our letter was not being acknowledged, we felt compelled to follow up with four additional communications. One was back in June of 2019 from then-Deputy Secretary
Shananan to the FCC stating the opposition. Secretary Esper in November of 2019 forwarded a letter also stating our concerns and opposition. The IRAC sent to the NTIA on February 20th a letter from 12 agencies that were signed expressing concerns. Dr. Griffin and myself furthermore sent an additional letter to NTIA in March of 2020. And finally, Secretary Norquist sent a letter in March of 2020, of which the final letter went from NTIA to the FCC on April 2020. Each of those letters made clear and cited the testing that was done by the Air Force that this could not be accepted, nor should it be recommended to move forward, sir.

Chairman Inhofe: And then the second part of that question was were you consulted by or asked by the FCC for your opinions, and did they take them seriously?

Mr. Deasy: Sir, I will tell you that historically we have had a very good working relationship with the FCC when it comes to collaboratively studying requests like this. In the case of this particular request, no, sir, there was not a give and take, a back and forth that we typically go through. And at the end of the day, we were completely caught off guard when over that weekend in April the decision was taken by the FCC to go ahead and move forward.

Chairman Inhofe: Thank you, Director.

And then lastly, General Raymond, you did touch upon
this in your opening statement. Is there anything you
wanted to add in terms of the impacts on the warfighter?

General Raymond: Thank you very much, sir.

The way I couch GPS, it is the DNA of our way of war.
It is systemic in everything that we do. And it is clear,
without question, that putting a ground emitter in with the
space signals will cause an eruption. I think that will
increase risk to force and risk to mission. And I outlined
in my opening statement the mission areas of homeland
defense, our most critical mission, defense support of civil
authorities, and building the force, the training and the
readiness that we need. And I think it is a risk that we
should not accept.

Chairman Inhofe: Thank you, General.

Senator Reed?

Senator Reed: Well, thank you very much, Mr. Chairman.

Let me first commend all the panelists for their very
cogent and coherent and compelling testimony. Thank you
all.

Mr. Deasy, following on a thread that Admiral Cochran
introduced, under the Administrative Procedure Act, as I
understand it, is a significant action by a government
agency must be accompanied by a public rulemaking, which
includes a public comment period, response to those
comments, and a publication of an order, which is then
subject to judicial review. And I consider the repurposing
of the satellite program initially licensed to LightSquared
for a satellite spectrum and then changed to a land-based
system to be a very significant public action.

Was there any kind of rulemaking proceeding prior to
the Ligado license of only a land-based network?

Mr. Deasy: No, sir. As I stated earlier, typically,
as you point out, something of this nature -- there was a
very formal process that the FCC goes through. It is a very
good process, and they have used it for years. And in this
particular case, we did not see that process being followed.
As a matter of fact, I would go so far to say that to the
best or our knowledge -- and I have talked to many people
inside the DOD about this -- we think this is the first time
ever where the FCC has taken an arbitrary and independent
decision where it unanimously and unambiguously opposed by
multiple federal agencies.

Senator Reed: Well, thank you.

And I think, as you have pointed out, the National
Technical Information Administration, the NTIA, objected
numerous times to the decision. Three Secretaries of
Defense, Secretary Carter, Secretary Shananan, and Secretary
Esper, have all written about their opposition using the
spectrum as the order directs.

So, Mr. Deasy, you would say this is a very unusual
Mr. Deasy: I would go as far as to say that it is unheard of and the first precedent of its kind.

Senator Reed: Thank you.

Admiral Allen, you know the civilian sector very well. From your perspective, you would also describe this as highly unusual or, as Mr. Deasy said, unheard of?

Mr. Allen: I would concur with his remarks. The original process should have been the allocation for the mobile satellite service spectrum. If it was reallocated to terrestrial antennas for re-broadcast, that should have been subject to a notice of proposed rulemaking and public comment.

Senator Reed: Thank you very much.

One of the concerns that I have, because the spectrum is always in play, if you will, is that this will set a very dangerous precedent; i.e., as we look at 5G in the mid-range spectrum, if the FCC operates in the same way by disregarding expertise within the Federal Government, we could have a situation where, instead of trying to reach a consensus, we have the FCC basically assuming and determining everything according to their own intuitions.

Admiral Allen, could you give a comment on this process, this consensus process, which up until now worked but seems to be breaking down?
Mr. Allen: Well, the current relationship is based on an MOU between the FCC and NTIA.

I would just offer this comment. The FCC was created -- their remit goes back to the 1920s and 1930s regarding radio and television spectrum. We moved into a vast new era of technology, and now there are decisions being made that impact on spectrum and space operations and so forth. Independent regulatory agencies were created to create an unbiased representation and make decisions in the public interest.

The process we have right now is guided by National Security Presidential Directive 39 that requires that the equivalent of a deputies meeting, which the EXCOM is, to be subordinated to the Department of Commerce and NTIA for transmission to the FCC. And I would submit to you that process needs to be looked at.

Senator Reed: Thank you.

And just finally, General, as I understand the FCC order, Ligado must provide an 800 number to call and have a stop button once severe damages are detected. That is the remedy. So what does a warfighter in the middle of a war zone do when he discovers his system is going down? Does he get on the phone and dial an 800 number and make a complaint?

General Raymond: Sir, the warfighter is the 800 number
that the nation calls for us to do our nation’s business.

We do not want the warfighter to have to call an 800 number
to report interference as they are doing our nation’s work.

Senator Reed: I concur entirely. But I think this
might underscore the absurdity, more than anything else. If
this is the remedy that the FCC is proposing for
interference, which would impact thousands and thousands of
men and women deployed overseas, this is -- we will just
stop it. It is highly unusual and probably ineffectual.

General Raymond: I agree, sir.

Senator Reed: Thank you.

Chairman Inhofe: Thank you, Senator Reed.

Senator Fischer: Thank you, Mr. Chairman. And I would
like to thank you and the ranking member for having this
hearing today and also compliment both of you on keeping
this committee informed and active during the past several
weeks. So thank you very much.

Mr. Deasy, there is a number of mitigation proposals
that are included in the FCC order, and it is my
understanding that the Department has expressed quite a few
reservations on them. There is a process that is being, I
think, contemplated where Ligado is going to work with
agencies to identify potentially affected devices for
upgrade, repair, or replacement.

Can you walk us through some of the practical steps of
how this is going to work? And I would also ask Secretary Griffin and General Raymond to jump in on this question too.

To get it started a little bit, if you could maybe address what sort of time, resources, personnel are going to be needed to carry it out? Do you see any classification restrictions or limits on proprietary data being an issue? And are GPS devices easily removed or replaced? And are these integrated systems? I am asking you to generalize on these, but if you could maybe walk us through some of this and how you see it working or the challenges that it would face?

Mr. Deasy: I will be happy to start. Then I think Dr. Griffin is well placed to carry on this conversation.

I think the easiest way to break this down is to look specifically at the order that FCC issued and, quote, the stringent requirements they put in place. And there are really four that I would like to call out, and I think, Senator, these touch upon what I think you are trying to get after.

The first one is what they call the guard band. It is this 23 megahertz. And the idea is so Ligado has always recognized that they know that their solution does cause interference. I mean, I think that is something I think we cannot lose in this conversation, which is why they have continued to figure out how to lower their power and why
they have created what is called this guard band. They state because they are 23 megahertz away that that in itself clearly should be sufficient to allow them to operate. I think Dr. Griffin gave some compelling testimony today that clearly showed it simply will not work and the noise that will be created.

The second thing they talk about is lowering the power. Now, if you go back to the original LightSquared to the early days of Ligado, they have continued to lower the power, and they are doing that because they know that their solution will cause interference to GPS. They tried to make this, quote, 10 watt light bulb sound so insignificant, but I think Dr. Griffin’s comment about the Hubble telescope was really quite compelling. So it is unrealistic to think that they are ever going to get to a power level that would make ground-based terrestrial communications acceptable.

And they talk about coordination. Now, what they are really saying there is that as they stand up their terrestrial based solution, they are going to, quote, coordinate and that if we say there is a problem, they will address it. Well, this is how you tell if there is a problem. They install a terrestrial ground-based solution. They turn it on, and then we have to report back to them what that interference is, where that interference is causing problems. Think about the civil side of that. How
will that coordination actually take place? On the military side, we will have a difficult enough time given the millions and millions of GPS receivers. And to your point, when you start to talk about embedded receivers and assets that we have inside the military, it is not like you can pull that asset out and simply install a new one that will not cause interference. This will cost -- I cannot tell you specifically, ma’am, what the dollars or the people requirements would be because we would have to look at that on an asset-by-asset basis.

And then finally remediation. Simply put, if you read the order carefully, the burden is actually on the Department of Defense. We have to call out what the problem is and then, quote, once we clearly identify the problems, they will remediate. Well, remember, many of our assets are highly classified, and so the very point of being able to go in and articulate what those problems are and how they should go about remediating them is simply not practical.

Senator Fischer: Mr. Secretary, do you or the General have anything to add?

Dr. Griffin: I will be brief. What is not being addressed when one talks about repair and replace, even among the federal receivers which Ligado promises to replace, is the expense and the down time of doing so. Let me give you a comparison.
Aviation-grade receivers are designed, because of the cruciality of those -- and, Senator Inhofe, like you I am a pilot. The aviation-grade receivers in my airplane cost $10,000 or so apiece. They are much more cumbersome. They are larger. They consume more power in order to produce a hardened design to just this type of interference. The GPS receivers that go on someone’s tractor or first response vehicle or in the automotive navigation system in your car or in a routine piece of military hardware are not hardened like that, and the expense of introducing new designs to make them so is not even being discussed. It should be.

Senator Fischer: And also, we are talking about disruption, but we are also talking about national security, which is a definite threat that there is not time to address. Thank you, sir.

Chairman Inhofe: Thank you, Senator Fischer.

Senator Shaheen?

Senator Shaheen: Thank you, Mr. Chairman. And thank you to you and Senator Reed for holding this timely hearing. And I appreciate the testimony of all of our experts today.

I guess this question is for you, Mr. Deasy. Was DOD surprised by the FCC decision?

Mr. Deasy: The simple answer is yes. We had been in communications with FCC back and forth over this matter for some time, including the NTIA. Along this whole journey, if
you kind of go through that timeline I gave earlier, we are clearly of the belief that they understood. They had received our letters. They had received the NTIA letters and clearly knew that there was a unanimous view across federal agencies not to move forward. So I have to admit when I first read and heard about this, I was very surprised, and as I talked to other senior leaders across the DOT, likewise they have been just as surprised.

Senator Shaheen: So reports had suggested that the FCC was actually moving in a different direction, that they were going to deny Ligado’s request. Was that your expectation before the turnaround?

Mr. Deasy: Yes. The head of C3 inside of my organization, a gentleman by the name of Mr. Fred Moorefield, has been in constant communications over a number of months, actually years on this with both the NTIA and FCC. One of his responsibilities was to give me weekly updates as to how the conversations were progressing with FCC and NTIA. And every time we had the conversation, it was all FCC and NTIA clearly understand our position, and at no time did he suggest that he had an indication or belief that it was going to move forward.

Senator Shaheen: And the decision, as you have described and as I have read, was made very unexpectedly, very hurriedly without the kind of process that Senator Reed
raised that is usually expected. Is that correct?

Mr. Deasy: Yes, ma'am.

Senator Shaheen: So what do you think the motivation of the FCC is in making this decision? You must have some speculation about that.

Mr. Deasy: Actually I do not. I would not have been surprised if I had felt I clearly understood what the motivations were because I frankly did not see this coming.

Senator Shaheen: Admiral, do you have any thoughts about why the FCC would have made this decision so unexpectedly?

Mr. Allen: It is quizzical. If you look at the order that was issued -- I think it is 74 pages long -- you do not write that overnight. It had to be in preparation for quite a while. The footnotes are extensive. You can agree or not agree with the report. What astounded me was that had to be in the works for quite a while and it happened suddenly. In my view, that was a breakdown of communications and building a consensus around proper rulemaking in a regulatory agency.

Senator Shaheen: So how does a decision like this happen? When you have got virtually every other federal agency that is concerned about this issue saying this is the wrong direction to take, how then does one agency -- and I appreciate it bills itself as independent, and there are certain agencies that we want to view as independent within
government. But one would also hope that we are all trying
to move in the same direction as part of government. So can
anybody speculate on how this happened and why this agency
would have taken this position given that, according to all
of the research you all cited, they are not a significant
part of an effort in this country to move to 5G?

[No response.]

Senator Shaheen: Nobody has any ideas.

Mr. Allen: It would appear to be a good topic for the
committee of original jurisdiction.

Senator Shaheen: I would certainly agree with that.

So the next question is then what would you like to see
happen. What would you like to see this committee do, and
what would you like to see Congress do to address this
decision which seems clearly against the interests not just
of the Department of Defense but of all of the commercial
interests that are involved here?

Mr. Deasy: I will start by simply saying it is on my
key takeaway chart. It is the last bullet that said that
FCC needs to reverse their decision.

Senator Shaheen: But has that happened before, and how
realistic do you think that is that the FCC on their own
motivation will reverse their decision?

Mr. Deasy: There is a petition that NTIA can file
requesting that the FCC go back, revisit that decision. We
would need to, obviously, present for the NTIA the necessary information for that petition to be filed, but there is a process that one can go through for them to reconsider their decision. And I believe we do need to go through that process.

Senator Shaheen: Well, thank you.

Mr. Chairman and Senator Reed, I look forward to joining you on your letter.

Chairman Inhofe: Thank you, Senator Shaheen.

Senator Rounds?

Senator Rounds: Thank you, Mr. Chairman. Let me also add my thanks to you and the ranking member for organizing and allowing us to stay informed during the time in which we were in our work periods at home. And thank you also for organizing this full committee discussion on the issue of spectrum and in particular the issue in front of us today concerning the Ligado application.

Mr. Deasy, I would like to spend my time with you today focusing on the other spectrum issues that we have got.

Last year, in the National Defense Authorization Act, this committee had proposed section 214, which has become popular all by itself in terms of the fact that it was not operational by the time we got done. It had to do with allowing for spectrum sharing. And we recognize that DOD has a critical need for spectrum and that only on an
organized effort can we allow for sharing of that mid-level
of the spectrum.

This brings to light an area in the lower spectrum, but
most certainly the rest of the spectrum is also at risk as
well. We had proposed creating a tool last year -- and we
did not realize the type of opposition we would find --
creating a tool so that we could fairly share spectrum which
was critical in our national defense.

Can you discuss a little bit with the committee the
need for a tool that would allow us to appropriately share
and at the same time safeguard extremely critical portions
in geographic locations as well, but basically an
opportunity to share what is a very, very valuable resource,
and that is that mid-level spectrum?

Mr. Deasy: So I would start. I will be happy to
comment on section 214 and then possibly Dr. Griffin to talk
about what it is we are doing as far as moving forward with
5G from experimentations.

You know, you make a very good point on section 214.
The Communications Act was passed back in 1934. There have
been all kinds of addendums to that act. And yet,
throughout this, if you look at the policies, the processes,
the tools that have been used where we go through in
government to look at repurposing spectrum, they are
antiquated.
One of the reasons I was so excited about 214 was the opportunity for these processes, these procedures, and the tools to be updated. We need these tools because not only does it help us to look at how do you repurpose spectrum, but allows us to manage and incorporate how you actually have to operate the spectrum.

For us to get to faster spectrum repurposing decisions -- and the key word there is “faster” -- we cannot do that without moving towards dynamic spectrum sharing. To do that, 214 provided us the opportunity to modernize the tools, to modernize the processes on how we go about doing this, sir.

Senator Rounds: In terms of national defense, would you say that this particular discussion concerning the Ligado application is perhaps just a shot over the bow as to how serious these issues are and the need to revisit what we were trying to do in 214 last year?

Mr. Deasy: I would say when it comes to the discussion of national defense, I would defer to General Raymond to discuss the views on that.

Senator Rounds: General Raymond?

General Raymond: I am not an expert on 214, but I will tell you the use of spectrum is critical to our force. It is our maneuver space. It provides us strategic operational and tactical advantage. When you look at what kind of
capabilities we have, we have to be able to operate in that spectrum. We have to be able to detect, characterize, and geolocate interference. We have to be able to operate in that spectrum that we train to do so every day, and it is absolutely critical to our joint force.

Senator Rounds: Thank you.

General, one more question. With regard to the amount of data that we are collecting right now with the platforms that we already have within our system today, we are collecting huge amounts of data, and the need for 5G is critical. Would it be fair to say that the Department of Defense is looking at 5G as a way to collect and to make our platforms even more capable than what they are today and that the Department of Defense is very interested in the deployment of 5G and not trying to stop it, but rather, it is necessary and it just simply has to be done correctly?

General Raymond: I agree wholeheartedly. You know, I go to work every day, and the folks that I am privileged to lead go to work every day trying to implement the National Defense Strategy that says we are going compete, deter, and win. That is what we do, and 5G is going to be critical to us. But I will also tell you GPS is also critical to us in being able to compete, deter, and win.

Senator Rounds: Yes, sir. Thank you.

Thank you, Mr. Chairman.
Chairman Inhofe: Thank you, Senator Rounds.

Senator Hirono?

Senator Hirono: I would like to ask a very brief, non-Ligado question because we do have the DOD’s Chief of Information Office here.

So DOD has seen a significant spike in cyber attacks and misinformation directed at service members and personnel as the Pentagon shifts toward telework during this pandemic. Mr. Deasy, what additional measures are being instituted in the Department to combat the increased phishing and hacking that has occurred during this current Covid-19 pandemic?

Mr. Deasy: So a couple things on that. You know, we actually measure how often our network is probed, how many spams we get, how many types of interference we get on our network. We have clearly seen an uptick. One of the upticks we have seen most is spear phishing, and that is specific Covid-related emails that are coming in where the adversary is trying to take the opportunity to use Covid as the topic to get people to actively engage on.

However, with that said, when we look at other types of activities that U.S. Cyber Command sees -- I have a task force where we meet every week, and in that task force, we discuss the very things that you are bringing up -- we are not seeing an abnormal amount of other types of activities that our metrics would suggest go above and beyond what we
normally see other than specifically in the spear phishing area. We are seeing an uptick specifically related to Covid.

So what have we been doing? Because now we have moved to teleworking and we are using technology known as VPN and other types of tools that allow people to communicate from home, I would say a couple things have been really important here.

Within the first week after we started moving to teleworking, my office issued a letter, a memo that went out to all employees. It included a small card -- I do not have it with me here today -- that actually clearly listed the dos and don’ts of what you should do from your home when you are teleworking and what were the additional things to be thoughtful and mindful of now that you are working from home.

Additionally, U.S. Cyber Command did stand up additional task force teams to specifically look at the network and traffic activity that was occurring because of teleworking, ma’am.

Senator Hirono: So have you been able to identify whether the spear phishing and some of these other cyber attacks are emanating from any particular country?

Mr. Deasy: All I would say is to get into specifics of where those attacks are coming from and what the motivations
are probably go beyond the classification of this discussion today.

Senator Hirono: That is right. I understand.

So let us move on to some of the questions that are relevant to this hearing.

The National Advanced Spectrum and Communications Test Network, NASCTN, a multi-agency charter partnership that seeks to provide a neutral forum for testing, modeling, and analysis, performed a study to determine the impact of Ligado’s proposed networks on GPS. The FCC relied on the results of this study in approving Ligado’s application. I understand that DOD takes issue with the NASCTN study. As an initial matter, Ligado claimed in a filing made with the FCC that the tests it commissioned at the NASCTN were done at the request of the DOD Chief Information Officer’s office. Is that true?

Mr. Deasy: There was a test and request made from my predecessor that asked to look at what Ligado was proposing at the time, and at the time, that testing was based on the assumption that Ligado was still going to use satellite-based communications towards the earth and only on exception would they use terrestrial-based. So when we agreed to that, it was agreed on the premise that their solution was still going to be a primary satellite-based solution and not a terrestrial ground-based solution.
Afterwards, the expression we have used today is they changed the goalpost. They said they now wanted to go to a terrestrial based. So basically the rules changed in the process of how that test was originally conducted to what Ligado wanted to do going forward, ma’am.

Senator Hirono: So in your view with the goalpost being changed and the tests that NASCTN did were really not on point to the giving of the license.

Mr. Deasy: I guess you would say they were on point for what was assumed at the time, but where we are today was no longer on point.

Senator Hirono: So you say that the FCC needs to reverse its decision, and there is a process for asking for reconsideration or reversal. Has that process begun?

Mr. Deasy: So what we have done from the DOD standpoint is we have had communications on a regular basis with the NTIA. I am actively getting engaged with the NTIA making a formal request for them to do a file for re-petition.

Senator Hirono: What is the time frame for reconsideration or reversal by FCC?

Mr. Deasy: I, ma’am, would have to get back to you with the specific dates. I do not know what those dates are.

Senator Hirono: Anyway, you are not going to let that
time expire before you take action.

Mr. Deasy: Absolutely not. I believe it is somewhere towards the end of May that we have to have communicated that re-petition.

Senator Hirono: Thank you.

Thank you, Mr. Chairman.

Chairman Inhofe: Thank you, Senator Hirono.

Senator Cramer?

Senator Cramer: Thank you, Mr. Chairman and Senator Reed as well. I just echo everyone’s sentiment about what a great job you have done keeping us engaged and involved and communicating.

And thanks to each of you. I am sitting here a little bit -- well, I am curious. It is a good place to sit when you are curious when you have four really smart people to ask questions of. But some of the questions I have you are going to have to speculate about because I want to ask you about what people that support this, why they would have supported it. And that may seem a little bit unfair, but you are all I have.

One thing I want to get straightened out because I have heard it said that the NTIA objected, but I have also read that the NTIA did not recommend or could not recommend. Is there a distinction there between not recommending and objecting, given the NTIA’s authorities? And I do not know
which one of you -- maybe, Mr. Deasy, you would know the
answer to that. I used to be on the Energy and Commerce
Committee in the House. I was a communications telecom
regulator for 10 years. So I think there is a distinction
there. I just want to be sure.

Mr. Deasy: Yes. I am not sure I could legally tell
you what those distinctions are, but I will say that clearly
what NTIA’s role is is to represent back the agency’s view
on this. So in this case, you have a Position, Navigation,
Timing EXCOM, which is made up of nine federal agencies.
Their job was to take our view, put that in a formal letter,
and then submit that view back to the FCC. So I can tell
you that their job in that case was to submit the view of
the PNT.

Senator Cramer: Does the NTIA ever recommend a yea or
a nay to the FCC?

Mr. Deasy: I will have to ask other colleagues if they
know.

Senator Cramer: Does anybody know? All right. We
will find that out. I am curious about it because it does
seem to me here the process matters. You are all too smart
for me to ask technical questions of, so I am going to focus
on process a little bit.

The other thing that sort of perplexes me a little bit
is that, first of all, somehow five commissioners came to
some version of the same conclusion. That is another thing
that just because they either voted yes or did not object,
it does not necessarily mean they have the same degree of
enthusiasm for a decision. But nonetheless, it was 5 to 0.
My reading tells me NTIA did not object, nor did they
recommend. I think they can recommend.

But there are some other fairly important
administration folks that are concerned about national
security that seem to have supported the decision unless
they have changed their minds. And that would be, of
course, Secretary of State Pompeo and Attorney General Barr.

Does anybody know if they have changed their minds or why
they feel differently?

[No response.]

Senator Cramer: Okay. I will ask them. I guess that
would be the best thing to do.

The one other process question I have is how long was
this application in. Does anybody know when the application
was made? Because my sense is that there are volumes and
volumes and volumes and hours and hours and hours dedicated
to this. And we know about yours obviously. And I would
just be interested. It just helps me to satisfy my
curiosity. I have no doubt that everything you have said is
absolutely 100 percent accurate and true. Do not get me
wrong. But it does help me balance my thinking when I hear
a little more from someone else. I know that is not your objective, but it is just kind of mine.

So with that, Mr. Chairman, I will ask some questions other places. Thanks for doing this. It is really important information. What is really important is that other people hear it.

Chairman Inhofe: Let me shed a little light on that. They took over that bankrupt company in the year 2015. And I have reason, having looked at this quite a bit, to believe that they had been working on their licensing for quite some time, and while they have been looking at it, none of us that I know of were aware that that was going on. So I just think there is a level of security that they had among themselves. I am saying that as nice as I can.

Senator Cramer: I understand, and I am sure you are right.

Chairman Inhofe: Yes. Thank you, Senator Cramer.

Senator Kaine?

Senator Kaine: Thank you, Mr. Chair. And again, I echo my comments that I said to you personally yesterday. This was the only committee that I serve on -- I serve on four -- that had weekly telephone conferences during the time we were away, and they were really valuable. And we had some spirited debate, and sometimes I got an answer to a question I liked and sometimes I did not. But this was the
only committee that was doing that every week, and I really
applaud the leadership of the chair and ranking for that.

Chairman Inhofe: Thank you.

Senator Kaine: You have made some really persuasive
points, but you have not persuaded me. And the reason you
have not is we have only heard one side of the case. I
tried a lot of cases in my day before I got into this line
of work, and I would never make a decision and agree, yes,
the FCC needs to reverse their decision when the FCC is
right in town and could have been at this hearing or Ligado.
If Ligado knew that we were concerned, they would want to
come and make their case. All of the questions and concerns
and the speculation is completely unnecessary. There are
two sides to this. The FCC reached a unanimous decision,
which is not that common for that body on matters of
controversy. And they would have something to say about all
these questions. And because of your testimony, which has
been great testimony, I would have really tough questions
for them. But it is hard to convince an Armed Services
Committee member to reverse a decision based upon the
presentation of one side of the case.

Let me ask you a couple of questions. My understanding
from the timeline is that the EXCOM -- is it the PNT EXCOM
-- looked at testing that had been done beginning in 2016
and made a recommendation in March of 2018 to oppose the
Ligado proposal. Is that basically right, that the PNT EXCOM unanimous decision opposed the proposal that was made in March of 2018?

Mr. Deasy: Sir, I am personally not familiar with that particular date. I am familiar with the date of December of 2018 in which we formally documented to NTIA the view of PNT.

Senator Kaine: I am reading from materials that have been provided by the DOD. But it looks like testing was earlier. The PNT EXCOM reached a unanimous decision in March, and then it was communicated, Mr. Deasy, as you say, in December.

Was the proposal as tested and as opposed in March of 2018 and then communicated in December of 2018 -- was that exactly the same proposal that the FCC ruled upon on April 20th?

Mr. Deasy: Throughout this process, there have been multiple amendments to what Ligado had to propose.

Senator Kaine: And you mentioned a couple. You mentioned the idea of the buffer that they created and lowering power. So my surmise is that the objection that was done in 2018 was based upon a version of the Ligado proposal, but the FCC approval in April of 2020 was based upon a proposal that had changed in some ways. Is that correct?
Mr. Deasy: Well, the proposal, as far as I know -- and, Dr. Griffin, maybe you can speak to specific testing was done. The proposal in 2020 that was just recently approved with those restrictions, when we go back and look at what was done on the testing against those restrictions, nothing has changed.

Senator Kaine: Well, but that is not my question. So my question is a real precise one, which is, is the proposal that the FCC ruled on the same proposal that the PNT EXCOM unanimously decided to approve -- disapprove in March of 2018, or were there changes? You were suggesting to me that there were changes along the way.

Mr. Deasy: There have been changes along the way of which we have continued to communicate and evaluate those. The letter of 2018 -- I have to go back and --

Senator Kaine: Okay. Let me ask this. The April 2020 ruling of the FCC had some conditions in it. Now, that was 16 days ago that they reached that conclusion. Have you with the significant testing capacity at your disposal -- have you gone back and rerun tests against the version of the FCC -- that the FCC approved with the requirements, the, quote, stringent requirements they put on it? So have you done any more testing since April 20th?

Mr. Deasy: I am not aware of any specific tests that have been done, and I think the reason is those particular
guard bands, power levels, coordination, and remediations were all the same that we had looked at previously.

Senator Kaine: Okay. I will want to get that in writing because I want to make sure that the opposition in March of 2018 in fact applied to the proposal as it existed and was approved in April 2020.

Senator Cramer indicated that he thinks the Attorney General and Secretary of State are now in support of the Ligado proposal before the FCC. Is that correct?

Mr. Deasy: That is what I had heard in the public.

Senator Kaine: Have you then sought to find out why that would be the case?

Mr. Deasy: I have not personally, no, sir.

Senator Kaine: Are either of those members of this nine member PNT EXCOM are State and DOJ, or are they not members of that nine member task force?

Mr. Deasy: They are. The Department of State is a member of that.

Senator Kaine: And how about the Department of Justice?

Mr. Deasy: The Department of Justice is not a member of that.

Senator Kaine: All right. I have exceeded my time.

Thank you, Mr. Chair.

Chairman Inhofe: Thank you, Senator Kaine.
Senator Cotton?

Senator Cotton: Thank you, Mr. Chairman and Senator Reed. I want to add my voice to what Senator Kaine said. Thank you for your commitment during our long break from Washington during this pandemic for holding regular weekly conference calls, and thank you for putting together this very important hearing.

I will associate myself with Senator Kaine’s remarks again, the second time, in that I think you make a pretty compelling case. I have read through all these materials that we have had for the hearing. But it is really important that we hear from the unanimous FCC and from Ligado as well for us to make a reasoned conclusion.

I will associate myself with Senator Kaine for a third time. He is probably beginning to get anxious about this.

[Laughter.]

Senator Cotton: About the Attorney General and the Secretary of State. Senator Cramer has asked this. Senator Kaine has asked this. Let me just ask Mr. Deasy and Dr. Griffin directly. What do you see that Attorney General Barr and Secretary Pompeo do not see? You oppose this proposal. They support the proposal. So what is it that you see that they do not see?

Mr. Deasy: Sir, you know, as a technologist for almost 40 years now, I see the science. I see the studies. I see
the results of what has been done, and the science clearly shows everything we have talked about today in terms of the interference. So that is what I see. I cannot speculate on what Secretary Pompeo or Secretary Barr see.

Senator Cotton: So Senator Kaine raised this as well about the testing. Has there been specific, realistic testing done under the conditions proposed by the FCC in last month’s order? I have read a lot of the materials here. I have got Secretary Esper’s letter here, and there are a lot of conditional verbs in that letter. There are a lot of conditional verbs in the other material I have read here, things like “may jeopardize the effectiveness and reliability of GPS.” It has the potential to disrupt commercial GPS receivers. Has there been testing on specific, realistic conditions of the FCC’s order that we can say, yes, it will interfere?

Dr. Griffin: There has not been any testing since the order was issued 16 days ago. The testing that was done was done not by the Department of Defense but by the Department of Transportation, and it is as exquisitely well done as anything that I think I have ever seen. They tested 80 receivers. They tested them against the power levels that Ligado is claiming today to use, and in answer to Senator Kaine’s question, the power level is the most significant single attribute against which one would test.
The DOT tests, as I said in my earlier testimony, were designed to elucidate what was necessary to protect the GPS band. The issue of testing one transmitter against one receiver and substituting one receiver after another in specific scenarios is frankly a fool’s errand. I can always put together a different geometry, a different scenario, and then ask the question again, would Ligado interfere with that? That is not the way to go about it. The way that the Department of Transportation did in its adjacent band compatibility test is the way to go about it. Those results were unambiguous and they were compelling. At the power levels that Ligado chooses to put forward for its ground-based transmissions, GPS receivers broadly speaking will be compromised.

Senator Cotton: I have one final set of questions here, and Dr. Griffin, I will direct these towards you. They are on a related matter.

In January, numerous media outlets, to include the “Washington Post” and the “Wall Street Journal,” reported that the Pentagon was going to block a set of rules that would have limited the export of semiconductors, computer chips, and other kinds of advanced microelectronics to Huawei. Is it correct that the Department of Defense initially “non-concurred,” to use the technical term, with these rule changes?
Dr. Griffin: I do not know if the Department of Defense non-concurred. The Research and Engineering Under Secretariat, my organization, non-concurred. We do not believe that those particular restrictions were going to be beneficial and we believed that they would hurt the U.S. semiconductor industry more than they would hurt China. If the goal is to damage China, that is not the tool to use.

Senator Cotton: But Secretary Esper did not agree with that.

Dr. Griffin: That is correct.

Senator Cotton: So this is just another concern that I have, is that the Department of Defense could have an exaggerated sense of scientific and technological certitude that is not appropriately balancing the strategic imperatives or the geopolitical challenges we face. I am not saying that that is the case, but in light of that decision and in light of the case I see here in front of me, much of which is contingent, I think we at least need to continue to explore that.

Thank you.

Chairman Inhofe: Thank you, Senator Cotton.

Senator King?

Senator King: Thank you, Mr. Chairman. And again, thanks for the work during the break and the time that we had talking about the coronavirus response at the
What was the power level that was used for the DOT testing please?

Dr. Griffin: DOT provided results for the original Ligado power level I believe of 1500 watts and specifically to the present case in the present FCC order, 10 watts.

Senator King: Can you put that in terms of dBW?

Dr. Griffin: dBW would be 10 dBW for the 10 watt transmitter --

Senator King: So Transportation did -- so the study did include the 9.8 dBW analysis.

Dr. Griffin: Correct.

Senator King: And then that did find clear evidence of interference.

Dr. Griffin: Exactly so, sir. In fact, they published carefully the power levels required to cause the suite of receivers that were tested to lock up.

Senator King: Could you supply that data to this committee?

Dr. Griffin: Absolutely.

Senator King: I would appreciate that.

I share some of the concerns that have been raised. The FCC is -- they are capable people. I do not always agree with them. It is one of the few unanimous orders I have seen them undertake. It is a 74-page order with 444
footnotes. It strikes me that some serious thought went
into it.

They have two concerns, as I understand the order. One
is the development of the Internet of Things. That is an
important part of the future development of 5G technology
and, indeed, the technology of the country. The second is
efficient use of spectrum.

What is the shadow cast by the GPS band? In other
words, how much spectrum are you seeking to tie up beyond
the band that is now specified as the GPS band?

Dr. Griffin: Neither the Department nor any federal
agency, of which I am aware, is asking for any additional
spectrum to be set aside for global navigation satellite
systems, of which GPS is one. What we are saying is that
the spectrum already set aside for those functions should be
left for those functions and not repurposed for terrestrial
transmitters.

Senator King: How wide is that? Because the chart
that was with my background shows a band between, it looks
like, about 1552 and 1610.

Dr. Griffin: It is 1559 to 1610 megahertz, sir.

Senator King: Okay. So that is the band that you --
that is the inviolate band that you want to protect.

Correct?

Dr. Griffin: Correct, sir.
Senator King: But the band that Ligado wants is, it looks like, about 1522 to 1530. That is not within the band you just defined.

Dr. Griffin: It is within the larger mobile satellite services band, and this is the point --

Senator King: Well, that is my question. What is the, quote, larger mobile services band? Because you told me a few moments ago that the band you were interested in was 1559 to 16-something. Which is it?

Dr. Griffin: In order to protect -- it is both. I am sorry. I am not trying to obfuscate. There is a specific radio navigation satellite services band that is housed within the larger mobile satellite services band.

Senator King: And what is that?

Dr. Griffin: I do not have that in my head.

Senator King: I am not trying to be argumentative. I am just trying to understand this because I start with the premise that an independent agency that reached a unanimous conclusion on something that has been extensively litigated had some basis for doing so. And if your chart here of trying to hear rustling leaves over 100 jets taking off is accurate, I just find that hard to believe that they would have issued such an order if that is in fact what we are talking about.

Dr. Griffin: I find it hard to believe too, which is
why we are here.

The reason that the satellite services are grouped together is because all of the radio signals coming from satellites in space are quite weak. So all of the weak signals are grouped together. Not all of them are navigation signals. Some of them are mobile satellite services of other kinds, but they do not interfere with one another. If you put a ground-based transmitter in the middle of a mobile satellite services band, it has the capability of interfering with other services. In this case, we are here talking about the interference with navigation.

Senator King: Well, I think it is important that you specify for us how wide the band you want to protect really is because that then becomes a major policy question about access to scarce spectrum. In other words, I accept your statements and realize how important this is to the country and particularly to the Department of Defense, but I just want to understand the policy decision that we are being urged to take here in terms of how much bandwidth are we being asked to protect. If you could submit some response to that for the record, that would be --

Dr. Griffin: I will give you those specific numbers, but broadly speaking, we seek to protect the services reserved for satellite communication.
Senator King: And I understand that, but that goes beyond the band that is defined, the 1559. And the question is how much of a buffer do you need to protect yourself from a relatively low power terrestrial signal. And we can talk about the physics. But I want to know how much bandwidth you want us to protect. That is all. And I am not saying you should not do so, but I think we need to understand that in terms of what it means for other potential uses of that bandwidth.

Dr. Griffin: We will provide that number for the record.

[The information follows:]

[COMMITTEE INSERT]
Senator King: Thank you. I appreciate it.

Chairman Inhofe: Thank you, Senator King.

Senator Perdue?

Senator Perdue: Thank you, Mr. Chairman.

And I appreciate your forbearance, guys. It is a big committee and a long afternoon, but I appreciate it.

General Raymond, as I understand it -- and I want to be sure I am clear on this -- the GPS receivers are designed to tolerate interference from space systems in general, but they are not designed to deal with interference from terrestrial systems, which by nature is generally much stronger. Is that correct?

General Raymond: The signals come down from space, and they reach the ground at a very low power level. And what is critically important on this, as was just discussed on this, what I called in my opening statement the quiet car, that having that noise-pristine environment is to allow the GPS receiver on the ground, whether it is handheld or in a weapon system, to be able to pick up that faint signal and process it.

Senator Perdue: Right. And this Ligado system is some 10 billion times stronger at the 1530 megahertz spectrum.

So the follow-up on that question is it looks to me like 1559 to the 1591 megahertz spectrum is what has been allocated for GPS, but it looks to me like just commercial
purposes bleed over from as low as 1475 all the way up to 1675, that people are getting signals outside of the band of GPS just by the nature of bleeding of the GPS signal. Is that correct?

General Raymond: Again, as Dr. Griffin stated, that mobile SATCOM services band is designed specifically for signals that come from space to the ground. And it is not just GPS. It is commercial communication satellites and other types of satellites that bring signals down, and that buffer is meant to allow those signals that have to travel from space to ground to be able to process by receivers.

Senator Perdue: But again, the point I am trying to make is it is a broader spectrum that we are actually using in GPS than what has been allocated just by the nature of the signal. Is that correct?

General Raymond: Where you are using the GPS spectrum, part of that spectrum, but the critical part of that is where we embed that into the mobile SATCOM services to provide the buffer needed to be able to protect the receivers to be able to pick up that faint signal.

Senator Perdue: So if a commercial land-based terrestrial emitter can cause this sort of interference that would cause imprecision, as well as maybe even the loss of signal -- and I fully appreciate when you have precision weaponry that are using GPS coordinates, those have to be
precise. I get that. So the question is, do we have defenses against an adversary? If a commercial user can cause this sort of imprecision, obviously an adversary can do the same thing with a land-based emitter. I know this is not a classified environment, but if the answer is classified, then I will accept that and take it offline and we will try to do that.

General Raymond: I would say that we train for this. We plan for this. We have tactics, techniques, and procedures to be able to respond to this. In a combat environment, we can drop a bomb on a receiver. There is a whole spectrum of things that we can do, and in another room, I would be happy to share that with you and provide more.

Senator Perdue: Yes, sir. Thank you.

Secretary Griffin, how do you propose maintaining our technological edge that we have got today? I think most of us believe that militarily. But how do we then compete with -- and let us talk about it -- China in terms of the technological leadership that they are beginning to develop in 5G, given that their immense investment in this, their vertical nature between their commercial and their military development over there, their lack of privacy requirements and so forth, and obviously, Huawei’s recent advancements in developing 5G networks around the world? How do we balance
those two together? I mean, I think that is the real
question here, even bigger than this Ligado decision.

Dr. Griffin: Well, sir, I will start out by saying I
do not think we as Americans will prevail by trying to
become more like China.

Senator Perdue: Agree.

Dr. Griffin: We are the nation that other people want
to come to, to send their students to. We are the nation
from whom others are trying to steal intellectual property.
And we got to this position by being the best innovators, by
being the people who knew how to get innovations into the
marketplace.

We, the DOD, are, as Mr. Deasy pointed out earlier,
conducting a wide range of experiments at a variety of
military bases designed specifically to help advance the
technology of 5G in company with our commercial
telecommunications providers by unleashing the market to do
what they do best. I believe that in the long run the
United States will prevail in 5G.

Senator Perdue: I concur.

Thank you, Mr. Chairman. Thank you.

Chairman Inhofe: Thank you, Senator Perdue.

Senator Duckworth?

Senator Duckworth: Thank you, Mr. Chairman.

Mr. Deasy, at the conclusion of the 2017 U.S. Air Force
white paper on the 1 decibel standard, it states that the 1 decibel interference protection criterion is the only appropriate IPC for protecting GPS and other global navigation satellite system receivers. Does the Air Force stand by this conclusion?

Mr. Deasy: I am probably not the expert to answer that particular question. Yes, Dr. Griffin?

Dr. Griffin: Thank you for that courtesy.

Senator Duckworth, the 1 dB, so-called 1 dB carrier to noise standard, is the appropriate standard and, in fact, was recognized as such by the FCC itself back in 2003. I can quote from that if desired. Well, actually no. I will just take it for the record. The point being that the FCC itself endorsed that standard in multiple rulings back in the early 2000s as the appropriate way to protect radio navigation systems.

Senator Duckworth: Thank you.

Dr. Griffin: The point was made earlier that the Communications Act of 1934 began in a world of radio and TV, not in a world of satellite navigation services, and the same methods which are used traditionally to protect existing licensees from a new service are not applicable in a world of radio navigation. So the 1 dB criteria is the one that I would endorse.

Senator Duckworth: Thank you.
Mr. Chairman, I request unanimous consent to include this white paper for the record.

Chairman Inhofe: Without objection.

[The information follows:]

[COMMITTEE INSERT]
Senator Duckworth: Thank you.

Mr. Deasy, Secretary Griffin, General Raymond, stakeholders who support Ligado’s efforts have suggested that as early as 2016, the FCC -- this is following up on the chairman’s question earlier. Following the conclusion of this hearing, can you provide me in writing a timeline and list of correspondence the Department submitted to the FCC and/or NTIA on the Ligado case?

Mr. Deasy: Yes, we can, ma’am.

Senator Duckworth: Thank you.

This next question is for all the witnesses. What are the potential national security implications if Ligado decides to turn around and sell their spectrum band to another company? And to what extent will the Department be able to weigh in with its future concerns? And this is for the entire panel.

Mr. Allen: I will start. It is not a matter of spectrum. It is a matter of the power. We keep talking about spectrum. It is what you do inside the spectrum. I am a simple sailor. I am not a technical person. If you have a ground transmitter, it is a matter of how much power is transmitting and whether or not it is going to affect the adjacent spectrum. So I do not know what the intended use would be if there was a resale. Right now, the intended use is to rebroadcast from a terrestrial antenna at power that
will bleed over and affect GPS. It is not the spectrum. It
is the power in the spectrum. But I would defer.

Senator Duckworth: Thank you.

Anyone else?

General Raymond: I agree. It depends on how the
spectrum would be used.

Senator Duckworth: But they could sell it.

General Raymond: Yes, they can sell it.

Senator Duckworth: And how does that affect your
ability to weigh in on this in the future?

General Raymond: It would depend upon the proposal
which is made, as my colleagues have said.

The more compelling concern, though, in that regard is
that if this is approved for Ligado, then what is to stop
its approval from other companies seeking to repurpose
spectrum that they own that would be in these satellite
communications bands, which are reserved, as we have said,
so that all of the weak signals are grouped together. If
Ligado is permitted to do this, why should another company
be denied?

Senator Duckworth: Thank you.

Finally, Admiral Allen, DOD has publicly stated that an
assessment of 80 GPS receivers conducted by nine departments
and agencies concluded that Ligado’s proposal would, indeed,
cause harmful interference to military and commercial GPS
users.

How do you determine an acceptable level of risk for the commercial expansion of spectrum bands adjacent to the GPS spectrum used for military operations, emergency services, and by commercial users? And in your assessment, is that level acceptable in the Ligado case? And I guess this goes back to the power issue that you were talking about.

Mr. Allen: Again, I am not going to try and get technical here. There is a tension between the acceptable power level and trying to protect the spectrum. Each individual receiver will react differently based on the power that is being transmitted. The position Ligado is taking is let us see what the power transmission does and how we might mitigate that. The presumption of the PNT EXCOM and the folks who have been involved in this is we need to protect the spectrum, not an individual receiver. And that is the dynamic that has to be resolved.

Senator Duckworth: Thank you.

Mr. Allen: I would ask for comment.

Senator Duckworth: Thank you.

I yield back, Mr. Chairman.

Chairman Inhofe: Thank you, Senator Duckworth.

This does conclude our questions from those who are here. We have a second round, so we will make time for
Senator Blumenthal when he gets here. I thought we would go ahead and start a second round while we are waiting for Senator Blumenthal.

The question I was going to ask you has already been adequately answered, but I do have two questions that have come from the Ligado spokespeople that I just would like to throw out maybe to you, Director Deasy.

The first would be they state that the NTIA submission relies on irrelevant and misleading data to support their claims. Could you respond to that?

Mr. Deasy: So for them to make that claim would suggest that the process that has been used for a very long time on evaluating all repurposing requests is at fault. And simply put, it is not. It is the process that has worked. It is the process we have used for years in repurposing. So I am not sure why all of a sudden now the process that has served the agencies well, FCC well, and NTIA well, would suddenly now be in question.

Chairman Inhofe: All right.

The other question that has come from the other side with some frequency is they state that the FCC order does not impact DOD or federal spectrum. Would you agree with that? This is what they have stated.

Mr. Deasy: No, clearly disagree. I mean, by the fact that we are sitting here today and you have General Raymond
here representing the military --

Chairman Inhofe: I understand that.

Mr. Deasy: -- would clearly suggest that it definitely impacts the military operations.

Chairman Inhofe: That is good.

Senator Wicker, we have finished our first round, but you are here in time for the first round and the second round if you want.

Senator Wicker: Okay. Well, as you know, I have been one floor up chairing a Commerce Committee hearing, and I did not know if I would be able to make it or not. I appreciate the witnesses sticking with us this long.

Let me ask -- is it Mr. Deasy? Where are you? Did I pronounce that correctly?

Mr. Deasy: You did, sir.

Senator Wicker: There has been some discussion about a test that was conducted by the National Advanced Spectrum and Communications Test Network. I suppose, Mr. Chairman, we have had some discussion about that already today. I will try not to cover too much ground that has already been covered.

This is a network that is administered in part by the Department of Defense. Is that not correct, sir?

Mr. Deasy: When you say “administer,” I assume you are meaning that we are users of that and have a responsibility
to coordinate our use of that with civilian. Yes.

Senator Wicker: Okay.

And apparently this NASCTN network has come up with some data that is at least to an extent supportive of the FCC’s action. Is that fair to say?

Mr. Deasy: I particularly cannot comment on that. I am not sure if others here on the committee can.

Senator Wicker: Okay. Well, let me just ask the question for any member of the panel. It has been suggested that this National Advanced Spectrum and Communications Test Network, NASCTN -- it came up with a flawed conclusion. And so I just wondered. Does anyone on the panel suggest that this network is somehow compromised by the fact that the FCC is the one that requested the study and that Ligado paid for the study? Does anyone make that claim?

Mr. Deasy: I think I can go back and answer your earlier question.

Senator Wicker: Okay, all right.

Mr. Deasy: It was similar to a conversation earlier that we had.

So there was a request that the former CIO made for the study to be done in conjunction with Ligado. At the time that that study was done, Ligado’s primacy was that they were still going to be primarily a satellite-based solution with only on an exception as an as-needed basis a
terrestrial based solution. So under those assumptions, the
study said that if indeed you are going to communicate from
satellite down to earth, we could see where we could work in
acceptable solutions.

What changed was Ligado then changed the rules and said
actually what we want to do is not be primarily from out of
space satellite, but instead we want to move to a primary
terrestrial based solution.

Senator Wicker: At what point was that?

Mr. Deasy: I, sir, would have to take that for the
record and get back to you with what specific point that
was. I do not happen to have that in front of me. But it
was when that change occurred that that then changed the
fact that we obviously no longer could say their solution
was acceptable based on testing that had been done.

Senator Wicker: Okay.

Is it your opinion, sir, that there is such a thing as
harmful interference on the one hand and an acceptable level
of interference with GPS on the other hand, or is all
interference unacceptable in your view?

Mr. Deasy: Simply put, all interference is
unacceptable because you do not know at the point in time
that the interference occurs, the nature of that receiver
that is impacted. If the nature of that receiver impacted
at the time of that interference is one that is used for
emergency services, for example, I think we would all say
that is completely unacceptable that emergency services
could not be always dealt with in a reliable manner. So the
nature of your question is it depends on what it is we are
talking about and the type of receiver.

Senator Wicker: Well, there is a term that is used by
the experts called “noise” in this regard, and it has been
likened to me if I am on an airplane and I am listening to a
movie on my tablet, if I hear a buzzing from the fan or some
other noise that I can hear but still listen to the movie,
that that is an example of non-harmful interference. Am I
getting anywhere? Does that make any sense to you? Is that
an argument that carries any weight at all?

Mr. Deasy: I think the analogy that Dr. Griffin used
earlier describing the 100 jets and the rustling leaves is
going at to what you are pointing out. Sir, did you want
to cover that?

Dr. Griffin: I think the point being made is the level
of the noise. So if the level of the noise is a fan
overhead while you are trying to listen to a movie and the
movie is comparable to or louder than the fan, yes, you can
hear the fan but it is not going to ruin the movie for you.

Senator Wicker: Is there such an analogy in this
subject?

Dr. Griffin: Yes, sir. And the analogy I gave earlier
while you were up chairing the Commerce Committee hearing --
and I understand that -- is the levels we are talking about
here is listening to GPS is quite literally like listening
to the rustle of leaves through the noise of 100 jet engines
at takeoff power. So in this case, the noise is enormously
stronger, incomparably stronger than the signal we are
trying to hear, and so the noise must be kept out of the
band we are trying to protect, which is the navigation
services band.

  Senator Wicker: Well, if it is that level of
intensity, I would agree.

  Let me ask you. If these issues could be resolved
between the FCC and DOD to your satisfaction, is there
something to be said for our economy, for our society in
having the use of this L-band of spectrum for low power 5G
network, or are we talking about something that basically
would be of no service to the public?

  Dr. Griffin: Well, sir, all spectrum is useful.

  Senator Wicker: So we can resolve this in a way that
would be sufficient to you, that would be satisfactory to
you --

  Chairman Inhofe: Senator Wicker, I am going to
interrupt for a moment because we have one member who has
not had his first turn.

  Senator Wicker: Okay. I am sorry. I thought I was
the last show.

Chairman Inhofe: We will get back to you.

Senator Wicker: That concludes my questions, Mr. Chairman, and I appreciate the indulgence of the chair.

Chairman Inhofe: Thank you, Senator Wicker.

Senator Blumenthal?

Senator Blumenthal: Thanks so much, Mr. Chairman. I apologize for my absence, but I was at the same committee hearing that our colleague was chairing.

And I have just a few questions, and I think I can probably lay claim to the perhaps most layman-esque, I think is maybe the most charitable way to characterize them.

But I am thinking as a member of the Commerce Committee where we have just been having a hearing, and normally the FCC is considering consumer issues. And so to come here and find that the FCC has approved a license for a system that you regard as a grave national security threat leads me to wonder, well, the Russians and the Chinese do not need FCC licenses. Do they? So is this discussion not a sign that our GPS system is hugely vulnerable to malign interference if something as obvious as the Ligado application approved by the FCC poses this grave danger? Are there not other dangers?

General Raymond: If you do not mind, I will jump in on this one.
I think there is a full spectrum of threats to space capabilities, everything from low-end reversible jamming in this case all the way up to high-end direct ascent ASATs. And as the U.S. Space Command Commander responsible with the UCP mission of protecting and defending those, we are concerned about all those.

And as I mentioned earlier -- and I would be happy to take this offline and come talk to you in another setting -- we have tactics, techniques, and procedures that we use to be able to mitigate the risk and to fight through this in certain conditions. And I would love the opportunity to share that with you.

Senator Blumenthal: Well, I would welcome that opportunity. Thank you, General. Because I will tell you just as kind of the layman here I am wondering how the FCC can open this grave national security threat, and yet the Chinese and the Russians have access to the same kind of technology and they do not need anybody’s permission to interfere.

Let me go to the next question. Why are you here? What do you want? I know that others on the panel have asked General Raymond and others. Senator Shaheen asked the question. Let me just put it very bluntly, what do you want us to do? I understand the FCC can reconsider its position. I will tell you from my many years of experience with the
FCC, that kind of reversal would be highly unusual. But anyway, we cannot petition for reconsideration. So maybe you can tell us what you would like us to do and why.

General Allen?

Mr. Allen: Just repeating what I said earlier, recognizing this is not the committee of original jurisdiction, it would be a referral to them to consider appropriate action.

Senator Blumenthal: A referral to the --

Mr. Allen: Commerce.

Senator Blumenthal: To the Commerce Committee. I am on the Commerce Committee. You have the chairman sitting here. I do not know that you need a referral. We are both hearing you. But there would have to be legislation. Is that what you are saying?

Mr. Allen: Again, I am with you as far as being a layman on some of these things. It occurs to me that it is either a reconsideration, a court action, or legislation.

Senator Blumenthal: So you are not asking that we have an amendment in the NDAA.

Mr. Allen: Oh, no. I am just raising the possibilities. That is all, sir.

Senator Blumenthal: Of an amendment in the NDAA or something in the Commerce --

Mr. Allen: I am not here to represent the Department
of Defense. I am here to represent the civil --

Senator Blumenthal: I understand.

By the way, thank you for your service, your wonderful service in the Coast Guard and all of your service.

But I do not know, Mr. Chairman. I am kind of at a loss, assuming that we are alarmed and outraged, where do we go from here. An amendment in the NDAA?

Chairman Inhofe: I can answer your question. Since you mentioned my name, it is perfectly appropriate to do so.

You talked about something being unprecedented in terms of the FCC, and that may be true. But also unprecedented is a decision that was made, brought to the FCC by Ligado in a form that was immediately objected to by everyone -- everyone, without one exception -- coming to the military, to DOD, and we are addressing those who are responsible for this. All of them objected in a very strong way. We have a letter with 19 Senators’ signatures that objected the same way after they had heard the evidence. This thing -- and this is unprecedented too.

The decision that was made by the FCC was made on a Sunday night. I went back and checked. I have never found a case at least in the history that we could find of the FCC, number one, that has been done on a weekend. It has never been done on the weekend before. And number two, that was done without any public participation or knowledge that
it was being made. To be specific, I took the initiative to
find out why to make sure that no decision would be made
until we got back into session. On a Thursday, there was a
letter that came from the group that represents all of the
defense industry a week before and the weekend before all
this happened. And yet, they went ahead and did that. That
is unprecedented. And I talked to the administrator on that
Monday after it happened and pointed this out to him.

So in answer to your question, what I would want to do
from what I have heard -- and I have been in this issue for
quite a while and certainly for all the time that Ligado
since 2015 became involved because of their purchase of --

Senator Blumenthal: LightSquared?

Chairman Inhofe: Yes. That we wanted to get this
thing reversed. And I am absolutely convinced that we do.

So they came, after they had been invited by this
committee, to come and review the decision that was made and
the comments by not just -- this is interesting -- not just
DOD but also the private sector, airlines and others coming
forth. I covered this in some of my opening statements.

But that is the genesis of the presence of these witnesses.

Senator Blumenthal: Well, I appreciate that, Mr.
Chairman. And I do not want to prolong the hearing. But I
look forward to talking to you about the potential remedies
and how we square them with the license that has already
been issued by the FCC. But I do understand and appreciate
the national security difficulties that have been raised
here, and I think that a bipartisan approach here is well
merited. Thank you for having this hearing.

Chairman Inhofe: This has been bipartisan I want you
to know. You were not here but it has been, equal numbers
on each side.

Senator Blumenthal: I followed it from afar, and I
actually heard your opening statement. So I thank you.

Chairman Inhofe: Very good. Thank you.

Now, we did announce at the very beginning that we
would have a second round of questions, which we will do and
we will get to you again, Senator Wicker. But I have
already had my second round of questions. Senator Reed?

Senator Reed: Well, thank you, Mr. Chairman.

Again, I think we have reached a point where we have
explored practically everything, but just a point that I
keep coming back to is that had the FCC followed what is the
norm, which would be to publish a proposed rulemaking under
the Administrative Procedure Act, that would have given
every stakeholder the opportunity to comment on the
mitigation proposals, question the science, indeed suggest
by doing some testing that their scientific conclusions are
wrong. Is that accurate, Mr. Deasy?

Mr. Deasy: Yes, sir. That is accurate. The process
is clearly one of give and take. The public has a chance to weigh in. Agencies can weigh in. I think it is really important. Though we keep talking about the DOD here, this is all agencies that are sharing this view just not the DOD.

As I have studied this and have asked the question, how does this typically work -- so you have what I said earlier. You have the request that FCC makes over to NTIA that involves federal agencies’ equities. In this case, obviously Ligado clearly does. And then we have a chance to work with the various agencies to express our views. We have the science that we bring into it. And then there is typically a give-and-take period back and forth between FCC and the various agencies that are impacted by this to try to reach a conclusion. That give-and-take period has not taken place.

Senator Reed: And another way to look at this. You had some clues that something was happening at the FCC. I presume that. But you did not have, before you even in sort of an informal information-only sort of -- the substance of the proposal and the timing of the decision. That was a complete surprise to you -- not just you. When I speak of “you,” I speak of every federal agency. Is that accurate?

Mr. Deasy: Yes. As I stated, I had been tracking this literally every week inside of my own organization who has been in constant communications with both the FCC and the
NTIA. And the last what I had heard was it was still under review but no final decision had taken place until it became announced publicly.

    Senator Reed: The final decision was taking place.

    And again, as you point out very appropriately -- this is DOD-focused obviously, but the impacts go to the banking community, go to FITBIT users -- I do not want to go too far beyond my technological base, which is very narrow. But we are talking about most citizens are so totally dependent upon GPS that they do not even think about it any longer. The directions from the cell phone as they are driving to someplace they have not been before, all that is GPS-related. And that could be affected.

    Mr. Deasy: Yes. It is interesting. I just happened to write down just a few of the industries just to give you a breadth, that are impacted by this: aviation, safety and operational problems, satellite communications providers, defense providers, FedEx, UPS, Iridium, weather information companies, ability to use helicopters, low/high altitude aircraft, UAS devices. So the list goes on. And I know that the week of that decision when it was released was the same week that a very large number of companies inside the transportation and aerospace industry had written their objection as well. But yes, to your very point, it is very broad number of industries that are impacted by this.
Senator Reed: Just a final point of clarification too. As I understand it -- again, I will be happily corrected -- the real impact will come where they place their towers, which the plan would be principally the United States unless they go overseas. This will not have an affect on areas outside the United States basically. Is that fair?

Mr. Deasy: Yes. The proposal was to repurpose CONUS or inside of the United States.

Senator Reed: Right. So for the specific warfighter effects, which would be located in the United States, but this is where we train. If systems do not work here, then what is the sense of deploying them anyplace else? Is that a fair statement, General?

General Raymond: Yes, sir.

And I would add one other thing. We have talked at length about the spectrum and the quiet part of that spectrum. This is a globally recognized standard. I mean, across the globe, countries do not put ground-based emitters in that part of the spectrum. So the other thing we need to be concerned about is the precedent-setting that this might have, and if other countries then go do that, it could have more global impacts.

Senator Reed: Thank you very much.

Thank you, Mr. Chairman.

Senator Blumenthal: Mr. Chairman, just one more
question if I may?

Chairman Inhofe: Well, yes. I know that for a second round --

Senator Blumenthal: Oh, I am sorry. I apologize.

Chairman Inhofe: -- Senator King has made a request to be heard.

Senator Blumenthal: I apologize.

Chairman Inhofe: And he is here.

Senator King: Thank you, Mr. Chairman.

Will autonomous vehicles -- is GPS what tells autonomous vehicles where they are and who they are passing and where they are on the road? Is that a GPS function?

Dr. Griffin: Yes.

Senator King: So a minor perturbation in GPS could have catastrophic consequences for an autonomous vehicle. Is that correct?

Dr. Griffin: As autonomous vehicles are developed, yes. They would want to be completely certain that GPS was not being interfered with.

Senator King: It would not take much of an interference to go from one lane to the other at a bad moment.

Dr. Griffin: It does not.

Senator King: Additional question about the testing.

The testing showed actual interference. In other words,
this is not the precautionary principle at work. It is not
we are worried about interference. We found interference.
Is that correct?

Dr. Griffin: The Department of Transportation testing
to which I referred examined the level of power that would
actually cause receivers to lose lock. So yes, sir. That
is interference. It is not hypothetical. It is not
propositional. It is they actually lost lock.

Senator King: And they lost lock at 9.8 dBW.

Dr. Griffin: Or no, much lower levels. The only
receivers tested which did not lose lock were those that go
in cell phones for a couple of reasons which are interesting
to note. First of all, the cell phone transmitter
frequencies that are -- the cell phones themselves are
located in different bands. But the filters in cell phone
receivers are very narrow-banded for what they want to do.
So it is a special design that does not exist in most of the
rest of the installed base. You have asked a very good
question there.

The certified aviation receivers that one buys, when I
was talking earlier, the $10,000 receiver that you buy for
your certified airplane -- those were just barely capable of
dealing with the 10 watts. For all the other classes of
receivers, the common, garden variety receivers that were
being discussed a moment ago that are in your automobile,
those die at factors of 100 or more below the 10 watt level.

Senator King: As I read the order, did the receiver manufacturers not end up expressing that they were all right with this decision? Did Ligado not effectively make concessions that they ended up getting a sign-off from those companies?

Dr. Griffin: Ligado says that they got that sign-off, but when you talk to the companies, the companies are on the list of those that Dana Deasy was just providing that have objected to this order. So none of us, of course, have been in the deliberations between these various companies and Ligado, but I think it says something when they have together and separately objected to this decision.

Senator King: Thank you.

Mr. Chairman, I suspect because this is an adjudication and not a rulemaking that the Congressional Review Act would not apply, but I do not know the answer to that.

Chairman Inhofe: I have heard suggestions that it might and it might not, and I do not have an answer to that.

Senator King: I assume somebody has appealed, has requested reconsideration before the commission. Is that true?

Mr. Deasy: Yes, that is what we are currently discussing with NTIA. They are the ones that would have to issue the appeal, and there is a date that that has to occur
by. And that is a current conversation we are in with them
is that process and what is it that they will need to put
that appeal into effect.

Senator King: Thank you.

Thank you, Mr. Chairman.

Chairman Inhofe: Let me suggest where I think we are
right now. Senator Blackburn has not been heard. Senator
Blackburn, we have all been through the first round and we
are on the second round now. Is that all right if she goes
ahead? Why do you not go ahead on your first round?

Senator Blackburn: Yes. Thank you, Mr. Chairman. I
had to go preside.

And I was disappointed to have to leave the hearing
because this is something that I have followed. The
LightSquared/Ligado issue is something that I followed since
I was in the House. And I do think it is a decision that
the FCC lingered with for a longer time than we had
expected, and we may not all agree with where they arrived
at the decision.

And I really wish, Mr. Chairman, we had somebody from
them here that would provide us a little bit of insight into
this. LightSquared started on this years ago. So this is
not a new issue, and it was an issue that I think they
almost fought their way to a resolution on it. And I do
wish we had heard from the FCC today.
I think there are a couple of things that are significant as we look at this issue. As we had the NDAA conference committee last year and as I handled and worked with Chairman Wicker on the section 214 language, we looked at how we move forward. I think we would all agree or I would certainly agree -- you all -- General Raymond may disagree with me -- I do not think that DOD needs more spectrum. I will tell you that. I think you have plenty of spectrum. Indeed, I think that you need to give some of that back for commercial entities.

And I think we need a reconsideration of how you work with commercial entities as we talk about how you develop uses for 21st century approaches for 5G, for supercomputing, for artificial intelligence. As we talk about the Space Force and the utilizations that are going to be there, it is going to require an enormous amount of partnership. And it is going to require brain power that we are going to need to bring in from the outside to complement what we have. So we have to be very attentive to this.

With that said and as we look at the transition of what was LightSquared and all their baggage and issues that they brought with them into Ligado, my question -- and, Mr. Deasy, I guess it is best coming to you. Do you trust Ligado? Do you trust them to keep their word? Do you trust that they are not going to interfere with GPS? Do you trust
that they are going to fly below your system and not be a
source of interference?

Mr. Deasy: So trust in this case all comes down to the
FCC order and the mitigations.

Senator Blackburn: Do you yourself? Do you at DOD
trust that Ligado is going to be true to what they have told
the FCC?

Mr. Deasy: I have seen no evidence that they will be
able to achieve what is in the FCC order.

Senator Blackburn: So you look at the legacy of
baggage that they have had throughout their history and feel
that it will affect what we have to have work. We do not
have room for error when we talk about 21st combat systems.
Would you agree with that?

Mr. Deasy: I would.

Senator Blackburn: And making certain that this works
appropriately is going to be an imperative. It is not an
option. It is an imperative. Would you agree with that?

Mr. Deasy: I would.

Senator Blackburn: Thank you. I yield my time.

Chairman Inhofe: All right. Thank you, Senator
Blackburn.

Let me just make a comment here. It has come up, you
know, why were not other people invited? It is quite
appropriate. First of all, the FCC is not in our
jurisdiction, but what is in our jurisdiction, something that is called to our attention that is a real threat to our nation. I mean, that is what we do here. So it is very appropriate to have people who are experts analyze the threat and inform us so that we can get answers.

Now, the proper jurisdiction is the committee that is chaired by Senator Wicker, and he may decide to have a hearing and that would be a different type of hearing altogether. We are here analyzing the threat to our country, and that is what I think we should be doing.

Now, we have gone through now -- and I know that there has been a request from Senator Blumenthal to be heard and you are recognized.

Senator Blumenthal: Thank you, Mr. Chairman.

Just very briefly. I noticed looking at the parties on one side and the other, there are private parties who oppose this license and the decision by the FCC. And from what I have heard from my colleagues, there are serious questions about the regulatory propriety. In fact, listening to the chairman, the procedural legality of how this license was granted, and I sort of had a flashback to my days as a State attorney general when I actually did some agency challenges. One went all the way to the United States Supreme Court, and I recall well arguing that this rule was adopted in the dead of night without the proper comment period.
And I guess my question is, is it not likely that this action by the FCC will be challenged in the federal courts based on possible procedural questions if it was adopted with all of the kind of irregularity that has been cited here? And I can tell you from my own experience when there are challenges in the courts, they take years sometimes to resolve. So are we here somewhat prematurely?

Mr. Deasy: I would say this. I cannot speculate what industry will do in terms of whether there will be lawsuits pursued out of this. I can tell you that there is a process that I understand we need to follow in objecting to this, which is done through the NTIA. I cannot speak personally. I am not an expert enough to know the legal approaches that would need to be taken here outside of our approach to go back and get this appealed through the NTIA, sir.

Senator Blumenthal: Are you aware of any groups or companies? I mean, I presume they would be aggrieved. They would suffer a harm. They would have a legal right to be heard. And since they were not given a comment period or any other previous right, it seems to me they would have a pretty colorable case in court. So I wonder whether you have heard about any effort in that regard.

Mr. Deasy: I have only heard that there are companies that also provide other forms of satellite communications that come up against the spectrum here that we are talking
about that have reached out and expressed concern that if
this request goes through, that it will cause harm to them.

Senator Blumenthal: Thank you.

Thanks, Mr. Chairman.

Chairman Inhofe: Others? Senator Wicker?

Senator Wicker?

Senator Wicker: Thank you, Mr. Chairman.

Let me just say I think Senator Blumenthal and Senator
King and Senator Blackburn have at least raised a number of
issues that need a further look.

I have information here that this has been pending for
some years at the FCC and that in April of 2016, the FCC
asked federal agencies with concerns about the proposal to
submit specific technical information to support those
concerns and that a draft order was provided to all
concerned by the FCC in mid-October of last year. So we
need to find out if that is a fact.

We need to look at this guard band, 23-megahertz guard
band between the proposed Ligado band and the GPS band, and
see if that is helpful, if it solves a problem. We need to
look at the fact that Ligado reduced its power levels by
over 99 percent to get to this stage of the game. And
Senator King is right. I believe that some folks have
signed off on this. My information is NovAtel, TopCon,
Leica Geosystems, Hexagon, Deere, Garmin, and Trimble have
notified the FCC that they did not oppose the granting of Ligado’s application to modify its license.

I think this panel consists entirely of Americans of good will. I have to believe the unanimous decision of the FCC was arrived at by Americans of good will. And to me this has been a very valuable 3 hours, Mr. Chairman, but I would agree to the extent that other members have said that there are some things we still need to get to. And unlike Senator Blackburn, who was involved heavily in this in the House, this is a matter of fairly recent -- that has recently come to me. I do not recall having wrestled with this in the past.

So I would just make those observations. If anybody on the panel wants to respond to the statements that I have made, I would be happy to hear that. But I would just make that observation, Mr. Chairman.

Chairman Inhofe: Okay. There has been an invitation for comments from the panel. Let me make a couple comments first.

Senator Blumenthal, when I was making my comments, I had never looked to see what rules and laws the FCC operates under. I was talking about past history and talking about what is normally appropriate. When an organization such as the National Defense Industrial Association with 1,700 businesses, 70,000 individual members, and they have strong
opposition to the proposal, along with some 71 companies, and then all of the groups -- we have a long list. I do not have it in front of me. I was looking for it -- of all the airlines and everybody else who is objecting to this, with that type of objection, it seemed to me, as the chairman of this committee and as just an individual, that the FCC was adequately warned of this opposition, this strong opposition -- I have never seen such united opposition to any proposal -- that they would not go ahead and do something and particularly do it on a weekend. This has not happened before.

So I was thinking really of what is right and what is wrong, not what is legal and what would stand in court. To me that was just a no-brainer. It should not have happened. And I told that to the director of the FCC when I was surprised to find on a Monday morning that it had been done on the weekend.

Now, Senator Wicker, I have said several times this is not our jurisdiction. It is your jurisdiction in the Commerce Committee, and I think you have voiced a lot of things. This is not a hearing on this. This is in response to the threat that has been posed and become obvious to us. But obviously, if you want to hold a hearing on this, it would be certainly within your purview to do that.

Any other comments? You know, we could wear ourselves
out on this thing.

Senator Blumenthal: I would just comment, Mr. Chairman. I was not in any way questioning your version of what happened here. I was just thinking that it sounds like a court challenge waiting to happen, and I guess it is on us to try to ask some of these questions of the private parties. And that was the reason for my question.

Chairman Inhofe: That is very fair, very fair.

If nothing else, we are adjourned. I wanted to go ahead and get adjourned before somebody else came in.

[Laughter.]

Chairman Inhofe: But let me just say to you folks and make sure -- I ask unanimous consent it be on the record. I thank you very much, all four of you. You offered a level of expertise that I do not think many of us really understand. I know I do not.

But I do know that when you get so many people in opposition to something with the veracity of that opposition, it is something that does concern me. There is nothing more important going on than a threat to this country. You know, I have got 20 kids and grandkids that are going to be here a lot longer than I am that are equally concerned.

So thank you so much for the time that you have taken and thank you for being here.
[Whereupon, at 5:44 p.m., the hearing was adjourned.]