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House Armed Services Subcommittee on Strategic Forces Holds Hearing on Global Positioning Systems and National Security

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| **LIST OF PANEL MEMBERS AND WITNESSES** |

TURNER:

Good morning. I want to welcome everyone to the Strategic Forces Subcommittee's hearing on sustaining GPS for national security.

I was planning to make the usual statement of appreciation to the witnesses for their appearance here today, and to those witnesses who took this issue seriously enough to be here.

General Shelton, Ms. Takai, Mr. Nebbia, Mr. Russo and Mr. Knapp. I do want to thank you for taking the time to be here and your -- your testimony.

That said I have the unfortunate responsibility to inform the subcommittee that the Federal Communications Commission's Chairman Genachowski refused to appear today. I must also make clear that I consider the chairman's failure to show up today to be an affront to the House Armed Services Committee.

Further, it appears to be symptomatic of a disregard by the chairman to the consequences of the FCC's January 26 waiver to LightSquared. You know -- I also have -- I -- we've heard that perhaps even the chairman was even in this very building today. We'd like to know that from the chairman, whether or not he even came so close to this hearing as to be in this building and still not appear.

At no time did the chairman offer an alternative time to appear. We're unaware of any issue of this being merely a scheduling conflict. And the chairman did say that he was concerned about prejudicing the process about what he might say here in the hearing.

Personally, I believe this is an absolute effort by the chairman to avoid the oversight questions by Congress, to avoid the responsibility of the issue of how this will affect GPS and that the FCC's processes appear to be irregular as to how this manner is moving forward.

So I -- I'm very concerned that the chairman not -- has not appeared and has not given us really a very good understanding or a very good reasoning as to why he is not answering these questions.

Now, I do appreciate that the chairman is apparently willing to provide personal responses to written questions to the record submitted by the subcommittee, according to staff. The chairman's priority should be the same as the subcommittee's: Sustaining GPS for national security.

Now, we all understand the difference between written questions and in-person testimony. You don't have an ability to ask a follow-on question. No one else gets to hear the aspect of his question, to have them follow a different take. This is -- I think makes the -- the -- the ability of the subcommittee to get to the bottom of these issues and to -- to, more importantly, advance the issue of sustaining GPS for national security more difficult.

And with that out of the way, I wish to introduce and express my appreciation to the witnesses who are here. General William Shelton, commander of the Air Force Space Command. I know this is General Shelton's second appearance before this subcommittee in as many weeks. Either the general really likes us (inaudible) or he was working to accommodate his -- his (inaudible) a very strong basis.

Ms. Takai, chief information officer for the Department of Defense; Mr. Nebbia, associate administrator, Office of Spectrum -- excuse me, Officer -- Office of Spectrum Management, National Telecommunications and Information Administration; and Mr. Anthony Russo, National Coordination Office, Space-Based Positioning, Navigation and Training, National Oceanic and Atmospheric Administration.

Mr. Julius Knapp, chief of the Federal Communications Commission Office of Engineering Technology. Mr. Knapp, I want to thank you for being here and I wanted to be clear that either I nor my colleagues have anything other than gratitude for your service. Our concerns are with the chairman's lack of appearance. We certainly appreciate the information that you're going to provide him -- provide us today, but we do believe that the chairman has additional questions that he needs to be answering.

I want to thank all of you for being here.

Now, why are we here this morning? General Shelton, you might remember this question. It was asked by a member of the subcommittee during the classified briefing you provided all of us last week on LightSquared GPS test results.

A brief recap of -- and that question is -- is "Why are we here?" I mean some -- to some extent this issue seems relatively clear and yet we're still facing a process that is moving forward. And so that's why we're having this hearing today, which is to try to get some light on the issue of LightSquared and GPS.

A brief recap of how we got here to the point of this -- this hearing. On January 26th of this year, the FCC granted a conditional waiver of its own rules allowing LightSquared to establish a terrestrial broadband network and be freed of certain gating requirements which were designed to keep any potential terrestrial surface from overwhelming the satellite spectrum that LightSquared held.

As we now know, this network would operate with over 40,000 base stations operating at a frequency adjacent to that long used by Global Position System known as GPS, at almost 5 billion times the power of the GPS system.

The chairman of the FCC knew that there were concerns about the proposed waiver for LightSquared, as he received a letter from Deputy Secretary of Defense Bill Lynn on January the 12th, two weeks before the waiver was issued. The deputy secretary wrote to Mr. Genachowski that, quote, "There is strong potential for interference to these critical national security space systems," close quote, referring to GPS.

The -- this letter also asked the chairman pay personal attention to this matter.

Without objection, this letter will be made part of the record of this hearing.

We also know that the National Telecommunications and Information Administration Assistant Secretary Lawrence Strickling wrote to Chairman Genachowski recommending that the FCC not go forward with the LightSquared waiver request. Many have observed that the FCC followed an irregular process on the LightSquared waiver.

First, the National Legal and Policy Center stated in -- in a February 2nd, 2011 letter to the chairman and ranking member of the House Government Oversight and Reform Committee that, quote, "Over the course of the past year, a series of odd decisions, questionable meetings and procedural anomalies at the Federal Communications Commission and the White House, highlight Mr. Falcone's growing influence in the hallways of government." Mr. Falcone is the CEO of the hedge fund, Harbinger Capital Partners, which owns LightSquared.

Without objection, this letter will be made a part of the record.

Additionally, in a March letter to Chairman Genachowski, the deputy secretary of defense, joined by the deputy secretary of transportation noted that, quote, "The DOD and DOT were not sufficiently included in the development of the LightSquared initial work plan and its key milestones." This letter again sought the FCC chairman's personal attention.

Without objection, this letter will also be made a part of our record.

And just yesterday, the Center for Policy Integrity released a report detailing, and I quote, -- quote, "E-mails -- e-mails show wireless firm's communications with the White House as campaign donations were made," close quote.

In my capacity as a member of the House Committee on Government Reform and Oversight, I will be asking Chairman Issa and Ranking Member Towns to promptly investigate this matter.

We cannot afford to have federal telecommunications policy, especially where it affects national security, to be made in the same way that the White House has parceled out a half billion dollars in loan guarantees to the failed Solyndra Corporation, a large political campaign contributor of the president.

While there is clearly concern about how the FCC has conducted this process, those concerns are within the purview of the House Committee on Energy and Commerce and the House Committee on Oversight and Government Reform.

Also, aside from the scope of today's hearing, but of significance and concern nonetheless, is the impact to GPS receiver manufacturers like Trimble Navigation in my home town of Dayton, Ohio, which manufacturers GPS receivers for the agricultural sector, and heavy machinery producers like Caterpillar.

But this subcommittee's main purview is national security. And the national security consequences of the LightSquared network are significant. As I mentioned, the concern in this case is that LightSquared's proposed network of 40,000 base stations around the U.S., which broadcast at an adjacent signal frequency to that used by the GPS system, but at 5 billion times the signal strength, will render or may render useless the DOD's GPS receivers.

I think General Shelton will be telling us today that it does. General Shelton, commander of the Air Force Space Command, informed the House Strategic Forces Subcommittee members in last week's briefing that quote, "Tests show LightSquared signal causes significant interference to military GPS."

Simply put, if the FCC gives LightSquared the final go-ahead to build out this network, I fear that the DOD's training activities in the United States may come to an end. This cannot be allowed to happen. As the members of the House Armed Services Committee know, before U.S. troops are deployed, they conduct extensive real-world training, which includes the use of GPS for orientating U.S. forces, locating friendly forces and locating enemy forces, conducting search- and-rescue activities, targeting of precision-guided ordnance, and calling in close-air support.

None of these activities are possible without DOD's high- precision GPS receivers, which would be most affected by the LightSquared network.

As a member of Congress, I can think of no higher responsibility than making sure our U.S. military forces are fully trained and equipped before they are deployed overseas to Afghanistan, Iraq, or any place in harm's way. Likewise, and this is something in all of our minds close to the 10th anniversary of the 9/11 attacks in the United States, significant harmful interference to the GPS system would be a tremendous liability to our defense of our homeland.

General Shelton, I recall you making this point and I -- I look forward to your comments on that today.

The Armed Services Committee's position as articulated by the Turner-Sanchez amendment to the National Defense Authorization Act of F.Y. 2012 is that the Federal Communications Commission should not grant LightSquared final approval of the conditional waiver granted to the company on January 26, 2011 until the commission has dealt with potential harmful interference to the DOD's GPS receivers.

LightSquared itself has no apparent objection to -- to this provision. LightSquared has been making a vigorous case for its $4 billion investment in its proposed network build-out of a new nationwide broadband service. There is a bipartisan policy objective to encourage more nationwide broadband service and more competition as -- as a policy is not in dispute -- at least not before this committee.

The question for the subcommittee today is how to evaluate the harm identified by the Department of Defense to its $34 billion investment in GPS, GPS ground stations, and DOD high-precision military GPS receivers. Again, more important than how much this costs is the issue of what is the effect upon the warfighters who rely on this technology for safety and their technological edge against adversity.

And let me state that harm to GPS once again very clearly, quote, "Tests show LightSquared signal causes significant interference to military GPS," close quote.

As my colleagues know by now, on Tuesday of this week, the FCC apparently came to the same conclusion, and issued a public notice that, quote, "Potential for harmful interference meant that additional targeted testing is needed," close quote.

I consider that the under -- this to be the understatement of the decade. But, we need to know what this public notice actually means for DOD GPS users. This may very well be an effort to push matters off merely a few months under the assumption that the Congress will be distracted. I look forward to the testimony of the witnesses to get to the bottom of this matter.

And with that, let me turn to my ranking member, Ms. Sanchez, who's done some excellent work on this -- this topic and has been a great defender of our GPS system for the Department of Defense.

SANCHEZ:

Thank you, Mr. Chairman, and thank you to the witnesses for being here before us.

You know, I am not -- I am not really concerned, Mr. Chairman, about Chairman Genachowski not being here before our committee today. I think that you and I had a very good meeting with him last week. And he stated some of the reasons why he really didn't want to be before our committee today, if you will.

And he also sent a letter, I know to you, which I would like to put into the record so that everybody can see what the chairman of the FCC has said with respect to this issue at this point.

I would like to say that it seems to me that this is really a fight brewing -- a fight brewing after between commerce, if you will, and the civilian issues that we face every day with respect to communicating between people in particular and information sharing, et cetera and our military security.

And if that's the case -- if this is going to be sort of a battle between commerce and our national security, I think that you and I would agree, Mr. Chairman, that I think national security is going to, you know, be on the top player for -- not only us and not only the Congress, but for Americans if they are faced with that -- with that one or the other solution.

So what I think this process is about is to see if there is an accommodation that allows our commercial aspects to move forward in order to make our country as competitive as it can be. And yet, at the same time, continue to allow us the type of national security that we all have worked so hard towards.

And you know, those types of -- of pushes and those types of fights, if you will, are really what this Congress is about and -- and it's really about policy issues. So it's -- and really, it's -- it's about Americans and what they decide that they want.

And that's why it's important that we have these types of hearings and -- and that that we have things pretty out in the open as much as we can so that Americans can also see not only the type of work that the Congress does, but what is really at stake.

So, I -- I -- I do -- and I -- and I wanted to take note that in the Congress in particular, there are always these jurisdictional types of issues. Energy and Commerce, as a committee, of course, is pushing to see more jobs come forward, to seeing new technologies come forward, to have communication happen. We on the military committee, it's our job to ensure that our -- our national security is at its best.

So, I look forward to this hearing for that reason because we have heard from a lot of sides. There are a lot of people walking the -- the halls of Congress, trying to -- to speak to these issues.

GPS assets, I want to say, are critical to our national security and to our way of life. And so, I actually support the increase and the improvement of broadband service, but not at the expense of national security, so I just want people to know that.

Again, I don't know that it's one or the other. There might be accommodations. But here's the issue, the issue is that we are in a time of limited budgets, and that we have a deep investment by our military and by our taxpayers with respect to the -- to the programs that we already have, to the devices that we have.

And so, anybody trying to do something from a commercial aspect will have to show us that it doesn't affect our national security and that if there is mitigation to be done that -- that should not necessarily fall on the taxpayer.

But then again, that's what public policy is about, that's what votes are about, that's what elections are about. And as we move forward. I -- I would like to say, Mr. Turner, you and I have worked very well on this committee and I -- I don't think that we need to point fingers or politicize or really call into question people's intent or -- or what their motives are. I hope that's not the case in some of -- some of the harsher language that I heard right now in -- in your -- in your opening statement.

You know -- you know, I want to do the right things, and members of Congress want to do the right things. I hope that this hearing will give us a better understanding for several key issues.

I also want to say another thing before -- before I get into the specifics of this. A lot of questions are being placed on whose intent, whose motivation, et cetera, including to our military men and women, you know? And I think, it's right to question, but I do not want to see anybody smeared in this about what their motives or intents are, especially not our military people.

So I just want to say that to -- to our general sitting there, I -- I think it's important to have this discussion.

This hearing -- I hope will provide us the opportunity to better understand key issues that we need to understand in making decisions. First of all, the risk and the impacts of LightSquared's proposed terrestrial 4G (ph) network plan and how that interference will affect our weapon systems; the level to which our military depends on GPS assets; whether the interference can be mitigated and whether the fixes would require recertification of our weapons programs; what the impact is to the mission and what those costs could be.

It bears no (inaudible), I think Mr. -- the chairman put that forward that our investment from the taxpayer's standpoint is almost $35 billion. And if there is to be further testing, what that would like and what the timelines would be for something like this; what the FCC's process is for deciding whether to allow implementation of LightSquared's proposal; and what consultations are ongoing with other agencies; and whether those agencies in -- their consultation, is that being taken seriously by the FCC.

I think that's an important point because, you know, some would think that it's -- that -- that -- that they're not listening, and how the interagency process will ensure that our national security issues are considered and resolved satisfactorily.

I think those are the important issues and I look forward to -- to this. And again, I am glad that it is out in the open, so that we can do away with whose intent, and who is the winner and loser, and really focus on our national security and our communication for the future for -- for America.

Thank you, Mr. Chairman. And I'll submit my testimony -- my written testimony.

TURNER:

Thank you, Ms. Sanchez.

Without objection, that letter you referenced will be made part of the record. Although I know that -- I do believe that it is nonresponsive and ambiguous in many key respects to the questions that we had asked.

I will be submitting additional questions to Chairman Genachowski that he has indicated that he will accept personally.

As we are turning to our witnesses, I just want to reiterate the central purpose for this hearing. We are currently in a situation where DOD says that LightSquared -- their system affects GPS and our national security. We are looking at this information in light of the fact that the FCC has already in part proceeded with LightSquared in a manner of which would affect our national security.

And we still understand that there's a process going forward at the FCC that -- that ultimately this could go forward. So we are in the context of understanding its effects on national security and -- and I think with the understanding -- and I'm looking forward to General Shelton's testimony of the clarity -- that this is not ambiguous, that this affects national security and affects our GPS.

With that, General Shelton?

SHELTON:

Mr. Chairman, Representative Sanchez and distinguished members of the subcommittee, it is an honor to appear before you today alongside these other witnesses as the commander of Air Force Space Command.

Our command is the DOD lead for the global positioning system constellation of satellites responsible for developing, building, launching, and operating GPS to deliver precision positioning, navigation and timing services to billions of military, civil, and commercial users.

Although GPS is a military-procured and -operated satellite constellation, it is recognized as a global utility serving users around the globe. In fact, its use is so ubiquitous here at home, I would put GPS in the category of critical infrastructure for the United States. And for our military, GPS has become an essential capability for a host of applications in joint operations.

Today, I appear before the -- at the subcommittee's request to discuss the testing conducted thus far for the proposed LightSquared terrestrial broadband network. The test we conducted in concert with the FAA was robust, with over 100 receivers from 24 different organizations and it spanned the military, government, aviation precision (ph), agriculture, automotive and general use communities.

It is important to note that the testing was conducted using an actual LightSquared transmitter, broadcast filters and antennas which would be used in their network. In addition to providing their equipment and setting it up to ensure an accurate test, LightSquared personnel reviewed our test plan to ensure it was consistent with their originally planned network deployment.

The test results showed LightSquared signals operating according to their originally filed deployment plan interfered with every type of receiver in the test. These results were compiled within a report submitted through the National Telecommunications and Information Administration to the FCC on July 6th of this year.

LightSquared has since proposed an alternative deployment plan which involves lower-power broadcast and the use of only the lower 10 megahertz of their assigned frequencies. We conducted only limited testing on broadcast in the lower 10 alone. The precision receivers and even cell phones were still affected. Further testing would be required to fully characterize the potential interference with this lower 10 plan.

As we move forward under NTIA's direction in evaluating the latest LightSquared proposal, Air Force Space Command remains open to ideas and mitigation strategies, but we must ensure we continue to lead the world in PNT services and reliably support our users worldwide.

In summary, based on the test results and analysis to date, the LightSquared network would effectively jam vital GPS receivers and to our knowledge thus far there are no mitigation options that will be effective in eliminating interference to essential GPS services in the United States.

I thank the committee for your continued support of Air Force Space Command and the capabilities we provide this nation. And I look forward to your questions.

Thank you, Sir.

TURNER:

Ms. Takai?

TAKAI:

Good morning, Chairman Turner, Ranking Member Sanchez, and distinguished subcommittee members, and thank you for the opportunity to testify regarding the importance of GPS to our national defense capabilities.

My testimony today will focus on the importance of GPS reliability to the Department of Defense in ensuring that our warfighters and allies have the critical positioning, navigation and timing, or PNT, capabilities that they require.

As Chairman Shelton said, we believe that GPS stands as the cornerstone of the DOD PNT capability and is integrated into almost every aspect of our U.S. military operations. To give you a few examples, GPS signals are used to ensure the accuracy of precision- guided munitions, to guide troop movements, to synchronize communications networks, and to enable battle-space situational awareness and to conduct search and rescue missions.

DOD is committed to sustaining and modernizing GPS to maintain and improve our military PNT capabilities. Several GPS innovations are scheduled during the next 10-plus years, including three new civil signals, enhanced encrypted military signals, and a new constellation operational control segment, which are scheduled to come online by 2018 and then be implemented system-wide into the GPS receiver populations over the succeeding five or more years.

As DOD's chief information officer, I have a collateral duty as the co-chair of the Executive Steering Group of the National Executive Committee for Spaced-Based PNT, along with my counterpart from the Department of Transportation.

The role of EXCOM is to advise departments, agencies and the Executive Office of the President regarding strategic policies, requirements, and security of all PNT infrastructures including GPS.

In response to the January, 2011 Federal Communications Commission order that conditionally allowed LightSquared to unbundle their ancillary terrestrial component restriction in the mobile satellite services band adjacent to GPS, the PNT EXCOM tasked the National Space-Based PNT Engineering Forum, or NPEF, to perform testing to ascertain the potential interference. As General Shelton mentioned, that testing was performed at White Sands missile range and Holman Air Force Base in New Mexico.

That report was completed on June 15th of 2011 and then submitted to NTIA for their review and transmittal to the FCC. The test data indicated that the proposed LightSquared terrestrial operations would cause harmful interference to GPS operations. GPS receivers of various types and manufacture operated not just by DOD, but by the U.S. Coast Guard, the Federal Aviation Administration, the state of New Mexico, public safety, commercial aviation, and precision farming systems showed varying degrees of degradation of GPS accuracy, interruptions of GPS signal acquisition, or total loss of GPS tracking and positioning.

None of the parties cognizant of the NPEF testing dispute that the LightSquared terrestrial network plan that was tested by NPEF caused unacceptable levels of harmful interference to GPS. The testing also showed a source of interference that was due to the combined effect of the LightSquared dual-channel signal.

This intermodulation product was generated on top of the GPS L1 signal in its GPS band, interfering with GPS receivers. This IMP was caused by the LightSquared dual-channel choice and its design, and not by the designs or filtering limitations of the GPS receivers.

Subsequently, LightSquared and the GPS industry filed their Technical Working Group report. That report also does not contest the NPEF results, nor does it offer a mitigation solution of the IMP interference. Instead, as been -- as has been mentioned, LightSquared proposed to the FCC a recommendation of an alternative terrestrial network that was not in the test plans of either the NPEF or TWG tests and was not tested to any extent comparable to the dual-channel tests.

LightSquared's modified proposal recommends launching commercial services initially in only the lower 10 megahertz. DOD at this time has not received a sufficiently clear and complete description of a LightSquared lower 10 megahertz deployment plan to professionally analyze its new aggregate interference environment.

In addition, we're evaluating the effects of LightSquared terrestrial transmissions on the military's use of the Inmarsat satellite systems for data and voice communications. The LightSquared terrestrial system will likely interfere with the usage of Inmarsat if appropriate mitigation actions are not taken. We're diligently working with Inmarsat to identify mitigating techniques for reducing the potential interference for military land, maritime, and aeronautical missions and communication requirements.

The department will continue to work with its administration partners and NTIA, as well as with Congress, to address long-term solutions regarding the balance between federal spectrum requirements and the expanding demand for mobile broadband services.

We look forward to working with the FCC, NTIA, and LightSquared to ensure that all further proposed mitigations or alternatives for the LightSquared terrestrial network are thoroughly tested to ensure no harmful interference to GPS receivers or other military spectrum requirements. The ability of GPS to operate without harmful interference remains of paramount importance to the department.

Thank you for your interest in the department's efforts in this area. I would be glad to answer any questions that you have.

TURNER:

Mr. Nebbia?

NEBBIA:

Chairman Turner, Ranking Member Sanchez and members of the subcommittee, thank you for the opportunity to testify on behalf of the National Telecommunications and Information Administration, the president's principal adviser on telecommunications and information policy and manager of federal use of the radio spectrum.

As associate administrator for the Office of Spectrum Management, I oversee this critical spectrum function. I am pleased to discuss NTIA's efforts to ensure that critical uses of GPS continue without interference.

In November of last year, LightSquared proposed to modify its authorization for a mobile satellite service auxiliary terrestrial component previously understood to be a satellite service gap filler. This proposal requested authorization to deploy, on a wholesale basis, a nationwide terrestrial network with handsets that do not connect to the satellite system. These operations would occur in two spectrum bands on either side of the GPS range, with two signals within each of these two bands.

This proposal represented the potential for increased mobile broadband capacity and choice for all Americans. However, LightSquared's proposal generated concern from the GPS community that the network would cause interference to GPS receivers. These concerns did not arise from LightSquared's emissions spilling into the GPS band, but from the fact that some GPS receivers would not adequately filter LightSquared signals outside of the GPS band.

Also, some other GPS receivers, including precision receivers, improve their accuracy by extending into the MSS band. On January 12, NTIA advised the FCC that the federal agency concerns warranted a full evaluation. On the 26th of January, the commission granted LightSquared a waiver conditioned on consultation with NTIA and the resolution of GPS interference concerns.

Between January and June, a technical working group co-chaired by LightSquared and the GPS Industry Council, NASA, via the Jet Propulsion Lab, RTCA on behalf of aviation interests, and the Executive Committee for Space Based Position Navigation and Timing, the EXCOM, all conducted tests of GPS devices in the presence of LightSquared signals. These tests were based on LightSquared's original plan to transmit two separate 10 megahertz base station signals within the band just below GPS.

On July 6, NTIA submitted the results of the EXCOM test showing that LightSquared's proposed operations would cause interference to both government and commercial GPS users. NTIA recommended that the FCC continue to withhold authorization to commence commercial operations. The report of the technical working group reached similar conclusions.

As a result, LightSquared proposed to modify its plan and use only the lower 10 megahertz channel. This change came too late for full testing and evaluation by federal agencies and raised concern about applying critical resources to an evolving proposal.

NTIA and the -- and the federal agencies have been reviewing the test data to determine whether the use of the lower 10 megahertz would eliminate interference to general navigation and cellular GPS receivers and whether additional testing and analysis are needed.

Everyone agrees that some timing and precision devices will receive interference, even if LightSquared uses only the lower 10 megahertz. Therefore, for those applications, some other mitigation technique will have to be developed and tested.

Last week, NTIA requested that the EXCOM work with LightSquared to develop a test plan to study by November 30th remaining concerns for general navigation and cellular receivers. And we have provided that document as an exhibit within our testimony.

Meanwhile, LightSquared is pursuing the design and manufacture of a filter to mitigate impacts to precision receivers. With respect to timing receivers, LightSquared has identified the (inaudible) with filter characteristics that may provide a possible solution.

LightSquared has agreed that it will not commence commercial operations until the federal agencies test these techniques and conclude that they prevent interference without degrading the performance of the receivers.

The administration intends to protect critical and national security-relevant GPS services. Due to the need for additional spectrum for mobile broadband, we will try to resolve these interference issues to maximize use of the band. We will, in coordination with the FCC, work to complete the required testing or analysis and determine what strategies can provide workable solutions.

We await LightSquared's delivery of a filter for the high- precision receivers and will seek prompt agency testing and analysis of that solution when it arrives. LightSquared has submitted a new proposal to the commission seeking to protect GPS operations based on an agreed signal level on the ground. We will also review this approach as we move forward.

In coordination with the federal agencies, we will provide thorough and expert input to this dialogue so that the American public can extract the greatest possible benefit from the radio spectrum.

Thank you again for the opportunity to testify and I'm pleased to take your questions.

TURNER:

Mr. Russo?

RUSSO:

Chairman Turner, Ranking Member Sanchez and distinguished members of the subcommittee, thank you for this opportunity to appear before you.

The global positioning system has grown into a worldwide utility whose multi-use services are integral to our national and homeland security. Services dependent on GPS information are now an engine for economic growth and improve both the safety and the quality of life. The system is essential to first responders and a key component to multiple critical infrastructure sectors.

Since 1983, the United States has had a multi-use policy in place for GPS. This policy has had strong bipartisan support and each successive administration has strengthened the interagency participation in the program. In 2004, President Bush issued a policy establishing a deputy secretary-level Executive Committee or EXCOM to advise and coordinate on GPS issues.

Last year, President Obama signed a comprehensive national space policy which left this EXCOM structure in place, but added emphasis and additional guidance in four key areas related to GPS and specifically addressed the issue of GPS interference. This policy also directs the identification of impacts to government space systems prior to any reallocation of spectrum for commercial, federal or shared use.

To execute the staff functions of the EXCOM into a system ensuring implementation of the president's policy objectives, a National Coordination Office was established with representatives from every department or agency with major equities in GPS. I'm the director of this interagency office.

On the 26th of January this year, the FCC approved a conditional waiver for LightSquared's high-powered broadband network that the Executive Committee had warned might cause significant interference to GPS applications.

And with the permission of the Executive Committee, I tasked an interagency working group called the NPEF to conduct modeling, simulation, analysis, bench testing, chamber testing and live sky testing to evaluate the effects of LightSquared transmissions on GPS receivers. The group was co-chaired by leaders in the FAA and the Air Force, but with supporting technical representatives from across the interagency.

And despite the numerous limitations and constraints that I've listed for you in my -- in my written testimony, the NPEF was able to complete the job they were asked to do. They evaluated a wide range of representative receivers against all three phases of LightSquared's proposed deployment.

The answer is definitive. LightSquared's proposed system will create harmful interference. The NPEF could not identify any feasible option that would mitigate harmful interference for all or even most GPS users and still allow LightSquared to meet their system requirements.

And when the FCC granted the conditional waiver, they directed the creation of a LightSquared-led working group to conduct tests and resolve the interference concerns that EXCOM had raised. The FCC highly encouraged participation from the government, so 10 of our best technical experts from across the interagency participated in this Technical Working Group or TWG, along with strong representation from across the diverse GPS industry.

The test results connected and analyzed by this TWG were consistent with the results of the government NPEF test.

On June 29th, LightSquared submitted their TWG report acknowledging the harmful interference their system would create. And simultaneously, LightSquared submitted a separate recommendations report outlining a proposed three-part solution. The LightSquared recommendation report was not reviewed or evaluated by the TWG and all 10 of the government participants disagreed with assertions it makes about the TWG results.

LightSquared's three-part proposal is very constructive and involves both lower authorized power and re-phasing of their deployment so that the channel further -- further from the border of GPS comes first. This would decrease, but not eliminate the number and extent of initial impacts to GPS devices and allow more time for the development of mitigation methods.

This new initial phase was not tested by the government since it wasn't proposed until after we had submitted our results. But yesterday, I did receive permission from the Executive Committee to begin a new round of testing focused on this new signal configuration.

In LightSquared's new proposal, they offered a standstill for operating their second higher frequency channel which does impact all classes of GPS receivers. Now, just when do we need to use the second channel was undefined. However, LightSquared testified to Congress they were seeking a glide path to using it within two to three years. Therefore, any necessary mitigation measures would have to be in place by that timeframe.

Further study is needed and in progress on the most recent LightSquared proposals, and my office will support these studies.

I thank you for this opportunity to speak on this issue of great strategic importance to the nation and to over a billion worldwide users of GPS. I look forward to your questions.

TURNER:

Mr. Knapp?

KNAPP:

Good afternoon, Chairman Turner, Ranking Member Sanchez, and members of the subcommittee.

My name is Julius Knapp and I am Chief of the Federal Communications Commission Office of Engineering and Technology where I've been an engineer for 37 years. OET is the commission's primary resource for engineering expertise and provides technical support to the chairman, commissioners, and the FCC's bureaus and offices.

I appreciate the opportunity to testify on behalf of the commission concerning the process for working with other agencies to resolve spectrum interference issues and on LigthtSquared.

The FCC has managed America's commercial spectrum since 1934, although our predecessor agencies have -- were operating since 1912. We have nearly 100 years of accumulated experience in governing the airwaves and ensuring that the services using our nation's valuable spectrum do not cause harmful interference to one another. This work is central, part of our core mission.

As you are aware, the FCC and the NTIA share responsibility for managing the radio spectrum. While the FCC is responsible for use of the spectrum by the commercial sector, as well as state and local governments, the NTIA is responsible for use by the federal government, including the Department of Defense. The FCC and NTIA have coordinated use of the spectrum by various services and prevented and resolved harmful interference under a memorandum of understanding that has worked effectively for more than 70 years.

My written testimony provides historical background on the development of rules for the ancillary terrestrial component service of the Mobile Satellite Service. There are two brief points I'd like to make. First, the provisions for terrestrial service were first adopted in 2003 and affirmed in 2005 in an open rulemaking in which GPS interference issues were considered. A second (inaudible) authorization was granted to LightSquared's predecessors in 2004 to offer ancillary terrestrial service in the LBM spectrum adjacent to GPS.

The commission in January 2011 granted LightSquared the conditional waiver of the rule requiring an integrated satellite and terrestrial service. Under this conditional waiver, customers of LightSquared's wholesale Mobile Satellite and Terrestrial Service could themselves offer stand-alone terrestrial service at retail, provided LightSquared itself offers only a fully integrated terrestrial and satellite service.

The waiver did not alter any of the provisions governing LightSquared's terrestrial network and continued to require LightSquared to provide a robust satellite service consistent with the launch of its new satellite last November.

After LightSquared submitted its request, the GPS industry, the NTIA and other federal agencies raised strong concerns that LightSquared's base stations operating adjacent to the GPS band would cause overload interference to GPS receivers. This was a new issue that had not come up previously.

Accordingly, the conditional waiver stipulated that LightSquared could not provide commercial service until the commission, in consultation with NTIA and working with the agencies, is satisfied that the concerns about potential or harmful interference to GPS have been resolved.

The conditional waiver also directed LightSquared to organize and participate in a GPS interference technical working group in which interested parties could work directly with LightSquared to resolve potential GPS harmful interference concerns.

LightSquared filed the final report of the technical working group on June 30th and the public comment period on that closed on August 15th, although it continued to meet with all of the parties.

Based on the results of the working group's testing, LightSquared submitted its recommendations to address the interference problems. LightSquared, recognizing that the upper portion of its band significantly interfered with GPS receivers, proposed to operate only on the lower portion of its band farthest away from GPS.

Earlier this week, the commission's International Bureau and the Office of Engineering and Technology released a public notice which reflects the commission's determination, in consultation with the NTIA, that additional targeted testing is needed to ensure that any potential interference to commercial service from commercial services offered by LightSquared do not cause harmful interference to GPS.

In closing, I would like to be absolutely clear that, as Chairman Genachowski has said and I believe it's in his letter as well, the commission will not authorize LightSquared to begin commercial service if its operation would cause harmful interference to GPS.

The commission and its staff would never take and have never taken an action that would threaten the safety or security of America's citizens. We will continue to work closely with the NTIA, the Department of Defense, and the federal agencies to assess LightSquared's latest proposal and determine the viability of technical solutions that would enable both services to coexist.

We'd be certainly happy to keep the committee informed of our progress and I look forward to answering any of your questions. Thank you.

TURNER:

Thank you so much, Mr. Knapp. I appreciate your statement of that commitment. That's why, of course, we're having this hearing and we have four witnesses before you who said that this system absolutely affects our national security and our GPS, on which we're reliant.

And so, as we said before, we're certainly looking forward to this being resolved so we can all have that confidence that the FCC will -- will recognize the clear and unambiguous statements of the four people that spoke before you.

General Shelton, you've been just incredible in helping this committee to try to understand this and to come up to speed on it. As we look to -- to GPS, the operations of our military, you know, we look to you, the technical experts, to come and tell us in balancing these issues of our capabilities. You know, is there an impact to our national security and is there an impact to the GPS on which we rely?

We appreciate your -- your very clear statements and your adjudication in looking at testing and engineering requirements so that when you provide us your conclusion that we can all be confident.

In your prepared testimony, you state, quote, "testing showed unacceptable interference to all 33 high performance receivers, as well as certain military receivers tested in the vicinity of the LightSquared low-band transmitter."

Now, in our classified briefing, you provided us with some slides that are unclassified, and I have those here. And I appreciate this representation showing the interference that is coming from the terrestrial system upon the GPS' frequency. And I ask that this slide be included in the record of today that shows that this encroachment or interference is really the area of where we start to see the problems in the operations for GPS.

And then also on slide 11, which comments on the -- the proposal of the lower-10 channel. Your statement on this slide is "not acceptable," based upon initial test results from both the engineering forum and industry council reports. And then you say more tests are needed.

I note in your written testimony, you say, you said similarly, clearly, this affects GSP even at the -- of their proposal of the lower-10.

So with that, knowing that with your testimony on the slide, there's the statement of additional testing needed. Could you please tell us going forward what would be the path for evaluating this option of the lower-10 as proposed by LightSquared?

And from what you've seen so far, is there, you know -- what is your opinion as to whether or not this is at all even a realistic option, as you continue to test it? General?

SHELTON:

Mr. Chairman, as we looked at that under the previous testing, we saw certainly interference at -- even with the lower-10. The TWG saw the same thing. They saw interference in certain types of receivers, not all, but certain types of receivers.

The latest direction from the NTIA, and Mr. Nebbia may want to talk more about this, but the latest direction is to not test the high-precision receivers and the timing receivers just yet because there are some mitigation options that have been proposed, but aren't quite yet ready for prime time. That is filters on the high-precision receivers and a special antenna on the timing receivers.

We...

TURNER:

Now, before you go forward, I want you to finish. Don't lose your thought process there. But now to clarify the issue of the filters, that the filters are something that you would have to do, not that they would have to do. Right? I mean, it doesn't go on LightSquared on your system.

SHELTON:

It -- it does. LightSquared has proposed that they could develop these filters.

TURNER:

And then you'd have to -- you'd have to put this in everything?

SHELTON:

Absolutely. Every -- every precision receiver would have to be retrofitted. How that might affect the overall platform that it's on is an unknown.

TURNER:

And -- and the concepts of any time that you're -- you're modifying these systems, there is -- you add the issue of vulnerability to the systems and all the type of unintended consequences that we can't be certain of, and including the enormous cost that you would be facing.

SHELTON:

The enormous cost, time, integration and testing to thoroughly wring out these filters, if they're technically feasible. And even with that, because there's a difference of opinion, technical difference of opinion here, but we believe that the precision of those receivers would be impacted even in the presence of that filter.

There's -- without getting too technical here -- there's a center frequency and then there are harmonics off that center frequency. It's those harmonics that go out among other frequencies that are important for the precision of those wide-band receivers, if you will. Clipping off those harmonics decreases the accuracy of the receiver. If there's something else magic out there, we don't know about it.

TURNER:

And then that's an interesting point because, certainly, you're very aware of the existing engineering -- the technology that -- that's there. So to summarize for a moment, what we have here is your -- your unambiguous statement that LightSquared system interferes, but two options have been proposed. The lower-10 is one that does not ameliorate the interference and the filters, both of which at this point seem to be unacceptable options from -- from your testimony.

And then I have to ask you a question that is I think a little bit amusing, and I'd like your -- your thoughts or reactions. We're going to go a little bit from the technical.

As you know, while we were sitting in the classified briefing, one of the members brought with them this giant ad in Politico by LightSquared and this ad says, "Excuse me? You're in my space." And in this picture, they've got these two guys on a train and one guy is leaning over on the other guy's space.

I think the guy who's infringing on the space is supposed to be DOD and commercial users. I think they're trying to indicate, General, that this may be you on the train going into LightSquared space. And this -- it was odd in the tone of the ad because, again, it's not that it's an issue of technical clarity. It was an ad of blame. And so I have some questions for you.

LightSquared argues that in this ad, they say, quote, "They're causing the problem. They've ignored government standards for eight years. They're taking advantage of an $18 billion subsidy."

General, can I have your thoughts on these allegations? I know you've seen the ad, too, in the -- and I think it's just very curious and I'd just love your response.

SHELTON:

OK. Mr. Chairman, the frequency band that we're talking about here has, by FCC rulings in the past, has always been intended to be a, quote, unquote, "quiet neighborhood"; that GPS could coexist with other signals of the same magnitude. GPS is a very weak signal coming from space. It's a spread spectrum signal. It takes very special processing by receivers to pull that signal out of the background noise.

If you have signals of a similar strength to GPS, that's not a problem for the receiver. However, if you put a rock band in the middle of that very quiet neighborhood, it's a very different sort of circumstance.

Does that reach into the spectrum that LightSquared was assigned? Absolutely, it does. But that was intentional and the design of the GPS receivers to, again, take those harmonics that stretch out.

So to say that the manufacturers aren't adhering to a standard, if you look at what we think they're considering to be the standard, that standard is about broadcast from the satellite, not about receiver design.

TURNER:

Well, I just want to point also then my interpretation of -- of this -- this graphic picture here, because I think what's happening is -- is not just that it's actually DOD and GPS users that are being pushed away with LightSquared system, according to current testing. No one else will be allowed on the bus. So we're not even trying to share space. We're having one completely block out the other.

I have additional questions, I know other members do, but I'll turn at this time to the ranking member.

SANCHEZ:

Thank you, Mr. Chairman.

Thank you, again, to the witnesses.

General, could you elaborate on the impact of redesigning, manufacturing, testing, integrating, modifying, cost and time on everything that would be affected if you -- if you -- if there was -- if there was a technical solution to this?

And if there was a prototype that actually worked and you were convinced it worked, what would be the timing and the cost, in your opinion, to DOD, to fix just our stuff that needs to work, continue to work?

SHELTON:

We have not estimated cost. However, I think it would be very safe to say that the cost would be in the B's -- billions of dollars. We believe that the timing would probably be a decade or more to accomplish all this. And the reason for that is there are probably a million GPS receivers out there in the military, maybe -- maybe even more than that.

But again, it's use is so ubiquitous in weapons and in high- performance platforms and in timing of computer networks. And all those sorts of applications that we take advantage of the GPS signal, we would have to install this filter. Again, if it's technically feasible, we would have to thoroughly test it. We might even have to do software modifications to accommodate it.

I mean, there's just a whole bevy of questions that are unanswered at this point.

SANCHEZ:

Thank you. Thank you.

Mr. Knapp, would the FCC be the one who addresses the question of who would pay for all of this fix?

KNAPP:

Well, the -- the first focus is on do you have a fix that works and how could it be implemented and is it viable. And certainly, the judgments relative to the military systems would have to be by Department of Defense. Whether there's a way to pay for that and the timing of it, we would have to be working with the parties to see if there is a viable solution.

SANCHEZ:

Mr. Nebbia, given the technical complexities, and as you probably can tell, the political sensitivities that are rising, can you ensure this committee that you and your colleagues have the right ability and the right process to effectively analyze and resolve this issue? What's your comfort level? Because this is going to come to a head here sometime.

NEBBIA:

Thank you, Ranking Member Sanchez.

We certainly have an ability within NTIA to work with the federal agencies, including the general's team, who are experts in dealing with GPS issues. There's quite a number of agencies, including experts within the Department of Transportation, NASA and others, and certainly under the coordinated effort of the EXCOM. We have a significant resource there to delve into these issues.

It's critical for us. I really can't speak to the political issues in that sense, but that we work through the factual and technical issues and that's what our team can do. We can look at the technical problems that have arisen from this proposal and we can work through that through real testing, through analysis, through modeling, to come up with answers.

So I think in that process, we have certainly adequate involvement of various federal agencies. We have done a lot of consultation back and forth with the commission. We have the interdepartmental radio advisory committee, a committee of federal agencies that support us, in addition to the EXCOM, that has provided able inputs.

So I think the ability is there to work through it and to look for what solutions are in fact available in the end.

SANCHEZ:

Thank you.

General Shelton, according to the FCC and LightSquared, neither DOD nor GPS raised any concerns during the multi-year process. Will you take this opportunity to fully explain why it took so long for the department and GPS to respond to the significant terrestrial network?

SHELTON:

Yes, ma'am. I -- I don't know that it's totally accurate to say that there were no concerns. I think this was a very different business plan that was put forward and I do believe we were caught a bit off-guard.

The network proposed originally was a space-based network, then it was space-augmented by ground, and then it became principally ground, a very significant shift; 40,000 transmitters out there is a very different business plan than just a few augmentation transmitters.

SANCHEZ:

And when did you really kind of start sticking your foot into it and "wait a minute" or "something's wrong here" or "we need to be involved here"? At what point in this eight-year...

SHELTON:

About January 2011 and January and February timeframe this year is when we really started to get concerned.

SANCHEZ:

And the last question, I know there are plenty of members here who have questions. We're very well-attended here. The question I have for all of you, very quickly: Do you all, each individually feel that your agencies have the ability to work through this and that the interagency communication and listening to each other is happening? Or do you think there's breakdowns?

SHELTON:

I think we've got good representation.

TAKAI:

I would agree with General Shelton. I think it's important to note that the PNT EXCOM has really been the focal point for all of our discussions and we've done that very deliberately because it does include representation from all of the parties. And I think being able to work through that committee, it enables us to look at all of the interests.

And I think one of the interests that we haven't talked about a lot here is our partnership with DOD, with DOT and making sure that we have the FAA concerns adequately registered as well, because we're very dependent upon the commercial and it is very important that we have them included.

So I think using the PNT EXCOM and then having the close cooperation with NTIA and FCC gives us the ability to have the open dialogue that we need.

NEBBIA:

I agree. I think I already gave an answer along this line so I'll just pass on to Tony and put him in the hot seat.

SANCHEZ:

Thank you.

RUSSO:

Well, I concur with the other speakers. We do have a very strong participation from all of the departments and agencies that are affected and at very high levels. We've had, you know, assistant secretaries, undersecretaries, deputy secretaries personally working on this issue.

One area of caution I would have is that the technical expertise on this mostly resides with General Shelton's folks. We have a lot of people that are users of GPS, but don't necessarily understand how the black box works. So they can tell you how important it is to their operation, but when it gets down to the very detailed technical discussions with LightSquared we need help from the Air Force.

KNAPP:

And I feel very confident in the process that we have in place. What we've tried to do is engage all of the experts on this. We've had many tough problems before and I know in my career many times they've seemed unsolvable. And you work through it, you have a debate and wherever the chips fall based on the engineering is where we'll come out.

SANCHEZ:

Thank you, Mr. Knapp.

And thank you, Mr. Chairman. I yield back.

TURNER:

Mr. Scott?

SCOTT:

Thank you, Mr. Chairman.

General, Madam, Mr. Russo, Mr. Knapp, thank you for your statement that you would not allow anything that would interfere with national security to come through with the FCC.

I want to get back to this letter.

Mr. Nebbia, is that correct? Is that how I say this? I'm somewhat -- I've read this letter and just briefly, but I want to read one of the sentences. "Without waiting for the interference issues to be resolved relating to high precision and timing receivers, we would like to move forward to reach resolution of any remaining federal agency concerns with respect to the cellular and personal and general navigation receivers."

Now, this is from -- and it says to contact you with any questions, signed by Lawrence Strickling, who I don't know.

But I've been in politics for 14 years, and I have never seen an agency advocate so strongly for something like this unless there was pressure from above or a relationship that was not being disclosed. And I guess I would like for you to explain to me why your agency is advocating with the strength and going to the lengths that you are in advocating for this private company when you've got a general sitting there, and you're a graduate of the Naval Academy, as I understand.

You've got a general sitting there saying that what these people are doing will affect national security, and yet we've got a federal agency that's advocating on behalf of a private business. Why should the taxpayers be paying to prove these things? Why shouldn't that private company be bearing the burden of the expenses?

NEBBIA:

Thank you. Certainly in this case, there is an effort on both sides to come to a resolution. I would not characterize NTIA's efforts on this part in any way as advocacy of one side or another, but in fact to move the proper people into place to work on the issue. We've had to bring together agencies on our side, get together with the commission, talk to the GPS industry council, work with LightSquared and so on.

In this particular case, the situation we have is that we know that there has been a proposed fix for a certain number of the categories of GPS uses that will not be available for some time. Our purpose here was to try to move the ball forward on the other parts that we felt could be worked on at this point, as opposed to waiting until some later date and getting back into it.

So we still have that difficulty ahead of us. The precision uses, the timing uses will still have to be dealt with in the time to come, but it seemed like an opportunity before then for us to work specifically on these issues.

(CROSSTALK)

SCOTT:

Can you give me another example of where your agency, the agency that you work for, has advocated on behalf of a company that the Department of Defense has said that this particular issue affects national security?

Can you give me another example of where your agency has written a letter with similar language without waiting for these issues to be resolved, that you want the other agencies to move ahead with licensing this? Can you give me another example of another company that you have advocated for to that level in ensuring?

NEBBIA:

Actually, the letter does not ask for us to move ahead with licensing. It's moving ahead in this process of testing. The NTIA regularly deals with difficult situations and looking at new commercial interests and demands for radio spectrum and the fact that in some cases we have to be looking at spectrum currently occupied by the military. We are engaged in that at this time. We've been engaged with it in the past.

In this particular case, the fact that it involves one company in this band, I can't say whether that's usual or unusual. We generally are dealing with issues of -- broad issues and broad policy.

SCOTT:

So the letter reads, "move forward to reach resolution of any remaining federal agency concerns." I have never seen an agency, a state agency or a federal agency, advocate that strongly on behalf of any private company unless somebody's wheel was getting greased. I mean, this is -- the fact that we're even here having this discussion I think is absolutely ridiculous.

And Mr. Knapp, I just -- I want to thank you for the commitment that the FCC will not allow the licensing of anything that will affect our national security.

And General, I want to thank you for the work that you've done on this to protect America.

I yield back.

TURNER:

Thank you.

Mr. Garamendi?

And Dr. Fleming also would like to go before the votes. And if that is the case, then we will do it if these two gentlemen can complete in the time which we need to go. We will conclude the hearing and we will submit the remainder of our questions for the record.

Mr. Garamendi?

GARAMENDI:

Perhaps the best way for me to proceed is to -- not to ask a question, but to rather state what I believe to be the situation.

We have a very, very important system in place, the GPS system. It involves all types of activities, all of which have been mentioned here. It is therefore extremely important, in my view, that that system and all of its various ways be protected.

And this goes to you, Mr. Knapp. It's not just the national security through the military. It is the economic security and the personal security of Americans and others around the world that are at risk here.

And so, I would suggest in every way I can that you look way beyond just the national security. My questions would go to that area.

Secondly this is going to be a very expensive process of testing. We have a new company entering space occupied by others. It seems to me that that new company ought to bear the full cost of proving that it is not harming others. It appears to me that is not the case.

I have not heard anything from any of you that the company is paying for the testing. That, it seems to me, is going to be both extensive and expensive. And I would like all of you to comment in writing about what your costs will be and where in your budgets you have that money, or whether it is best that the new company occupying -- that wants to occupy this space should pay for the testing.

The subsequent question is: If the testing proves that certain things can be done, antennas or filters, who then pays for putting those into effect? And I'd like to have a written response from all of you. Thank you.

TURNER:

Mr. Garamendi, thank you very much for your brief statement.

Dr. Fleming?

FLEMING:

Thank you, Mr. Chairman. I'll try to be brief also. I came in a little late because I had another House meeting that overlapped with this one.

What I basically would like to -- to know in a nutshell is (inaudible) how did we get here on this?

I know General Shelton made reference to the fact that the company originally was going to be primarily space-based and not terrestrially-based, but it -- it reversed over time. Perhaps engineering science led us to go in that direction. So can you give me a better explanation to encapsulate how did we get here?

And we've got engineers, we've got representatives from both sides. So I'm open to anybody who might want to...

RUSSO:

I think I can add a little to that.

FLEMING:

Sure.

RUSSO:

Since 1971, the band below GPS has been allocated for mobile satellite services. We have no problem coexisting with that neighbor. And in the -- in the orders you heard about earlier, you made -- sir, I missed the oral testimony earlier -- they talked about adding an ancillary terrestrial component.

That was done for a very specific reason: to give the mobile satellite services operators additional flexibility, and specifically talked about a filling capability for gaps in coverage inside buildings and in dense urban (inaudible). That's actually written into the FCC orders on this and that's what the company at that time applied for, to give them some extra capability to cover places where it might -- might do or might have a problem with -- with coverage.

They also talked about, in answering complaints about this new authority, they talked about the fact that they would be limited in what they could do by a self (ph) interference, or else they're required to have handsets that talked to space and terrestrial systems. And, therefore, the company itself argued that that would then limit what power they could put out and how many stations because they'd be interfering with their own service.

So what we're talking about now is to a series of orders and amendments and mods (ph) and reconsiderations and waivers over time that foundation the assumptions that were made changed. And we find ourselves now in a situation that's different.

FLEMING:

Could we not have contemplated this? Was it just something that morphed gradually without anybody really being able to contemplate it down the road, that all these changes and amendments would eventually get us in trouble?

RUSSO:

Sir, I think there -- there are pieces of this that there could have been more discussion of along the way. But the big piece was this last piece. This last piece changes it from a space-based system with an ancillary filling capability to a primary terrestrial system. And that's this last waiver and that's what that does.

FLEMING:

I see. Well, was it -- was it not possible to stay with the original plan on a space-based system or did the company just find out that that wasn't going to work as planned?

KNAPP:

I -- I would largely agree with Mr. Russo, but I would also say that things evolved on both sides with the evolution of GPS and the expanded capabilities over time. This is something that I think your description was fair. It slowly came about.

The important thing is when we all understood that there was a problem there, we put the brakes on the deployment until we get it fixed. So, even I think with what we've learned here, the number of base stations if each one were to have caused interference to 22 miles, I think everybody would agree, that wouldn't have been acceptable anyway.

FLEMING:

Right. Sure. OK. Thank you very much.

TURNER:

Mr. Lamborn?

LAMBORN:

Thank you. And I'll only ask one question for the sake of time and with votes pending.

And this will be to you, General Shelton. Thanks for being here. You may have addressed this earlier. Please accept my apology if you have because I was chairing another subcommittee, so I was not able to get here until a little bit later.

But -- and this is a little more general -- general a question. What are your concerns from a command-and-control perspective should GPS signals be somehow impaired?

SHELTON:

Congressman, if you're talking about the broadest sense of command and control, clearly we count on GPS precision as one of our key tenets of command and control. Knowing where our forces are, knowing where the adversary's forces are, very precise locations -- that's just fundamental to everything we do in command and control in modern warfare. So without GPS, I think -- I think we'd back up quite a bit.

LAMBORN:

And even in the U.S., not a global, but just a U.S. focus on this?

SHELTON:

Yes, sir. We train the way we -- we prepare to fight. And if you take us back in training, you take us back in the way we fight. So we -- we have to be as realistic as we can in training. And if you change the training environment to that degree, I think it's -- I think it's a fundamental step backwards.

LAMBORN:

OK.

Thank you, Mr. Chairman. I yield back.

TURNER:

We want to thank all of our witnesses today. We appreciate your participation and we look forward to the chairman of the FCC providing us with additional answers to our questions.

Thank you.

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List of Panel Members and Witnesses PANEL MEMBERS:

REP. MICHAEL R. TURNER, R-OHIO CHAIRMAN

REP. TRENT FRANKS, R-ARIZ.

REP. DOUG LAMBORN, R-COLO.

REP. MO BROOKS, R-ALA.

REP. WILLIAM M. "MAC" THORNBERRY, R-TEXAS

REP. MIKE D. ROGERS, R-ALA.

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REP. SCOTT RIGELL, R-VA.

REP. AUSTIN SCOTT, R-GA.

REP. HOWARD P. "BUCK" MCKEON, R-CALIF. EX OFFICIO

REP. LORETTA SANCHEZ, D-CALIF. RANKING MEMBER

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REP. MARTIN HEINRICH, D-N.M.

REP. JOHN GARAMENDI, D-CALIF.

REP. C.A. DUTCH RUPPERSBERGER, D-MD.

REP. BETTY SUTTON, D-OHIO

REP. ADAM SMITH, D-WASH. EX OFFICIO

WITNESSES:

GENERAL WILLIAM SHELTON, COMMANDER OF THE U.S. AIR FORCE SPACE COMMAND

TERESA TAKAI, CHIEF INFORMATION OFFICER, DEFENSE DEPARTMENT

JULIUS KNAPP CHIEF, OFFICE OF ENGINEERING AND TECHNOLOGY FEDERAL COMMUNICATIONS COMMISSION

KARL NEBBIA, ASSOCIATE ADMINISTRATOR, COMMERCE DEPARTMENT OFFICE OF SPECTRUM MANAGEMENT, NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

ANTHONY RUSSO, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S NATIONAL COORDINATION OFFICE, SPACE-BASED POSITIONING, NAVIGATION AND TRAINING



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