

MR. DOYLE: If everybody would take their seats please. I want to thank again, all the people that braved the crowd and stood up and gave us a few comments on their reflections on this whole discussion. Again, to reiterate this is the first step in a very long trail that we have to take so we know there is a lot of discussion that needs to go on and we are anxious to get this started and to make sure that we are moving in the direction in which we are providing, obviously, the best not only practical and fundamental reference frame, but as Lou pointed out, we are a science agency and dedicated to the best interest of international collaboration, cooperation and positional integrity.

We heard a lot of good comments this morning, so we have a panel of NGS folks to come up and highlight some of the elements raised by the various speakers this morning. So the panel will be Juliana Blackwell, the Director of the National Geodetic Survey, Dru Smith, Chief Geodesist, Gerry Mader in charge of the lab. Bill Henning who is our kinematic real time networks provider, and Dr. Giovanni Sella, who is the CORS program manager, Renee Shields who is the Height Program manager and Mark Howard who is our FAA liaison. I hope we have enough chairs for everybody. Oh, Juliana gets the last word. I guess that cuts me out. We have Richard in instead of Juliana. I think you told me that. Senior moment. I get to do that.

Dru since you are the lead guy, why don't you kick it off.

DR. SMITH: First of all, thank you very much. As Dave said to everybody this morning who gave us your feedback, we put together a panel of people who we thought could address the primary issues that we heard this morning. And then, so each one of us will say a little something first. And then, once everybody has had a chance to speak, then, we will go into a Q & A with the audience, trying to answer questions as best we can. And it looks like we will have an early day. We will have lunch provided again once we are done here and so as soon as the Q & A is done, Juliana will have closing remarks and we can have lunch.

So let me open up with some things I heard this morning and I would like to address. I think three things I want to specifically mention. The first was whether or not there were convincing arguments to go to a new datum. Certainly, there are difficulties in conceiving of this change to begin with. There is work to be done. The convincing arguments were in the White Paper written and distributed and they are not my convincing arguments but the convincing arguments of NGS and took weeks and weeks and weeks for that information to get gelled into a form where we really realized that what we put in the ten year plan which was that we were going to be replacing these Datums that we had thought very hard about what needed to be done and we put the very best and most convincing arguments we could in that White Paper. And I find myself convinced, not because of anything more than what I think is a very strong logic laid out in that White Paper. However, it does not mean this will be an easy change; it does not mean it is undertaken lightly in any way.

The other convincing argument that is not in there is that eventually, much like the 27 to 83 conversion and much like the 29 to 88 conversion, these things are on the horizon, the FGCS will come together to discuss why and how and the schedule, and eventually, Federal Register Notice (FRN) coming from all of our partners in the geodetic community through the FGCS will be issued and will very much likely to be talked about when we have a timely transition to the new data.

That is a convincing argument because NGS when they issued those FRNs with the FGCS last time, that was the point at which NAD 27 and NAVD 29 ceased to be supported in software and projects submitted to NGS. The convincing argument is that this change will occur and we hope that by moving to this, and if you choose not the change to, that unfortunately there comes a point we will not have the people, resources to put into supporting the older datums. So this is why it is not happening tomorrow, why it is happening many years hence. And so, I think if there are people who are truly not convinced, I really do welcome further conversation. My opening feeling on this is laid out well in the White Paper itself and both myself and anybody else now stands firmly behind that as to why we would change the datums.

The second point I wanted to address was the concept of tools and the transformations being available ahead of time before datum change is made. I think this is critical. Obviously, you can't put out a new product, a new service unless you're fully ready to support it and there are a number of transformations that already exist, a number of tools being built. As I mentioned, we are already putting in the OPUS extended output, effectively a GNSS based, orthometric height tool based on the best gravimetric geoid that we have today. It is not perfect but it is the sort of thing that will show you what will the product look like ten years from now and effectively, it will be very much like that. A GNSS survey will occur giving you an ellipsoid height, a gravimetric geoid will be removed and that will be the orthometric height in the official datum. So slowly, we are building these things but I want to mention what I said yesterday and other people as well, if you don't tell us what tools you want, we will build the tools we think you want and that could cause a disconnect.

That finally leads me to the third and most important point that I have not driven home yet. That is, pilot projects are going to be the way we learn how you work and how you need to work in the future. We have proposed changing the datums. What we must do is sit down with people who make flood plain maps at FEMA, people who are surveying in the Corp of Engineers, people who are creating topographic maps in USGS, having the working level people - I make maps. I'm a geodesist, we're sitting together at a table and seeing where the data enters into your process today, what your future projects look like, how we can make sure that we build tools necessary to transform your operational procedures in the future. I encourage all of you who are interested in making sure this a smooth transition, contact us, let's talk about putting together pilot projects where we can actually do this and that's going to be the best way for us to see where there are gaps, what tools that need to be built and we will work from there.

With that, I will pass it on to Richard.

DR. RICHARD SNAY: May I have the power point slide for Snay. Do you want to skip and come back to that?

MR. DOYLE :I suppose at the very end, we will come back to Richard lower the screen and why don't we skip over to Mark.

MR MARK HOWARD: I don't have a lot to say. I work along with the FAA liaison, supporting FAA to make sure the data they are using in air space, the NEXTGEN is tied to a reference system.

George touched on most of the topics. I'm pleased to see FAA people here attending because we are doing that first step, getting together to discuss it. And I think George as well as the gentleman from the National Park Service mentioned, it is a matter of looking back and forward. There is an immense amount of data on previous datums and primarily, my program, what we do and we actually assist, collect data or ensure the data the FAA is using is good. So, it's imperative that the FAA knows what it is they are working with. And I think we are taking steps down the right road.

DR. GERRY MADER: I wanted to mention a few words about those of you concerned that all your coordinates may be changing over time. For some time now, the positions of the CORS stations that we've quoted have not just been the X Y Z but included the velocity as well and epoch date for which that data is valid.

So when you submit data to OPUS, it looks at the date of the data and moves all reference stations that it is using to that date and time. So this is a well understood practice. If you think it is a concern that gee, I may have to worry about what day I want my coordinates quoted on, if you were really precise, you would be worried about what time of day because we have the earth's pole is moving. If you are at the North Pole and you put the position of the axis of the earth each day and find that over a year or two, the moves by tens of meters and has a great spiral. You have earth tides and you have ocean loading, Lou. Which earth tide, I know it's small but if you worry about those things, the earth is very dynamic, once you are able to measure those meters and centimeters you find the earth is a dynamic place. There are all sorts of changes going on. If you're worried about these things and begin to worry about them, it opens up whole new applications not the least of which is monitoring the position of structures in addition to earth processes, but they would be used for knowing the positions of the airplane that you're using to do your laser mapping and all these sorts of things.

So, it's important, it's not just neat science, it's the neat science that got you through to centimeter level in the first place. I guess to be consistent, you should be computing your coordinates in the same way that the orbits are computed. You don't want to work in a different datum than the orbits and the IGS orbits is, I think what everyone is using for precise work we're obviously, one of those analysis centers -- I forget the exact number but there is about 150 global GPS stations that the analysis center traditionally use as the fundamental set of stations and we may add more stations on top of that.

But that is what really defines the ITRF for us and all these motions and things have to be accounted for every day for every orbit that you're using. And you could neglect them with no practical effect on your work perhaps but I don't think that's what you want to do, ultimately. I want to thank Jim Garster for giving a plug to OPUS, and OPUS Database, he one of the driving forces for us getting that involved. I think we have -- the motivation there of course was to enable our users to have access at the centimeter level to the NSRS in a timely way and I think we have accomplished that.

The next step with the database was for those of you doing good work through OPUS and most everyone is, if you care to, you can share the results of that through that database feature of OPUS which is now up and running. One of the early requests that I remember hearing about is why can't I do networks with OPUS; I said, because it is too hard, too much interaction. We have a very bright gentleman, Mark Schenewerk, who has solved that problem. I hope this summer, we will begin to see -- it's been operational for a while but not quite a beta process but maybe an alpha process. But I think we will go operational this summer with OPUS Projects and it will be able to do network processing as well. And the results of all this stuff going into OPUS database.

So I think that exhausts most of which I wanted to say.

MR. BILL HENNING: I want to first thank all those speakers this morning. You made some excellent points. And we are aware of a lot of other users beside surveyors and engineers and I think by the time the new geometric datum comes out it, the primary access vehicle to the national spatial reference frame will be real time networks. So our goal at the NGS is to make sure that the real time networks are aligned to the national spatial reference system at a certain level. The real time networks have to be very precise. They do not have to be aligned to the national spatial reference system at that level of precision but a certain level of accuracy has to be maintained in order for everything to fit together for a number of reasons including emergency management.

In the ten year plan, there's a couple of interesting things. One of the statements that the NGS will somehow validate or confirm or sanction or whatever word you want to use, real time networks. Again, the bottom line is the alignment to the national spatial reference system. We don't know how we are going do that yet for sure. Also, there will be -- the plan is for and Dru, please correct me if I'm misstating something but the plan is for a foundation CORS network, a critical infrastructure network of CORS stations, so if the 200 plus users in the United States decide not to maintain their CORS station, we still have a infrastructure. As part of that foundation CORS, the plan is to stream real time one-second data. So that is an issue we have deal with in the coming years, how do we do that so as to make sure there is no perception real or perceived we are in some way competing with private networks. The question is, we need your input on how we are going to do this, support this alignment to the national spatial reference system through real time networks. And through our own efforts, we have an operational prototype right now where we are streaming data from maybe 15 stations. No guarantees about anything. We are just sort of playing around with it to see which way we are going to go, what works, what doesn't work. We feel that maybe with 122

foundations CORS, it would only require maybe a half of a T-1 line to maintain that data stream, as far as the real time part of it. So the resources are not an issue.

In addition, the tool that Jerry mentioned, OPUS Projects, will be a great tool to establish coordinates on a real time network because you can understand that you can have 24 hour data sets of ten days or however many days you want. Plug it into OPUS Projects which is a tool and you get a bunch of coordinates spit out and whatever datum, hopefully, the new datum.

Other advantages of real time network, is that once this datum transformation is done, if the Administrator has handled that at the network level, the user can seamlessly access the new datum, another big advantage of a real time network. So the user does not have this burden of now looking at a different datum either geometric or gravimetric and trying to understand how it makes that conversion, the Administrator has already handled that. I don't see why the Administrator could not stream old datum and new datum or whatever format. So there is a burgeoning number of real time networks and their use will only increase I think as we go forward especially for the new datum.

MS. RENEE SHIELDS: Thanks, Bill. Since we started out this morning with Lou, I'm going to start out with Lou. Lou is real proud of the South Carolina capability of getting one centimeter heights with his real time network -- okay, 2-centimeters - if you didn't have the height benchmarks all over your state, I would not be getting that. So if we had a few billion dollars, we could do that across the country. We would be good to go but that's part of the problem and what we have to do at NGS is looking at the national scale of this. Because of the fact that we don't have the resources to put into that and because of the fact that does not address the maintain-ability of that datum because of the dynamics of the country, that's one of the things that pushes us into this new direction, the maintain-ability and we have not really talked about that but that is something big that I push on.

We heard from the Weather Service, Corp of Engineers, USGS. NGS has been doing a better job of working with all of these agencies within NOAA and outside of NOAA to find ways to improve our products, to identify where the problems are, to help them improve their products. Even within NOAA, we have to educate as to the importance of the right datum, an updated datum. Weather Service is expecting stream data information from USGS, datums are mixed, and we are making a lot of effort to try to unify all of this data onto one datum. And that of course would increase as time goes on.

The same with FEMA, we made some efforts to work with the FEMA folks. Started out with a liaison, years ago which we have not quite replaced since Ronnie has taken on other duties. But one of the concerns that people had early on with FEMA, the map modernization program is that they were not addressing the issue of maintenance, how to maintain these maps. And now, they have the Risk Map Program so we will try and gain, increase that cooperative collaborative effort with FEMA to make sure everybody is on the same page here.

There was concern expressed over resources and the cost of making this transition. We are talking ten years down the road. I think as time goes on, more and more of all of our products and services are going to be provided in a digital format, a format that is a little more easy to transition over. More and more people will be using GPS and real time to access the network so the natural progression of that is to use the systems that it belongs in, the global system.

The role of height modernization is to straddle the past and the future. Height Mod started fifteen years ago. It was driven by State needs. It was funded by state by state funds from Congress. We are looking at nationalizing that program and this is one way to do that. The height Mod effort will still go forward to address the current needs of the states because a stronger NAVD 88 now will enable a better transformation tool as we get to the new datum. So Height Mod's focus will be this transition period.

And implementation is a big part of going to the future to the ten year plan. This summit is the first step of that implementation. We have not always done a good job of implementation. Sometimes it's been years before that transformation tool was available. But we are starting now to work toward that goal in ten years, 8 years whatever it ends up being and all of you are part of the process. So I want to thank you all for coming here and helping us as we look forward and being part of this process and we will continue to do these kind of meetings down the road.

So Richard?

DR. RICHARD SNAY: I'm going to stand. The power point that I had up there yesterday if you can go to that that. What this talk is about is just about five minutes and it's about releasing new coordinates for the CORS and we are aiming to do this in the fall of this year. And I wanted to give a some background on that. I meant to do it yesterday during my talk but, we were running into lunch and I figured that was more important, at least to me. I had to leave early and I understand Giovanni did give you some points on this. I wanted to give a little more formal presentation and there are several people on the team here and I'd ask them after I speak if they want to add anything to add on to what I say, I would invite them to do so.

I was pleased to learn yesterday at lunch, we sent two people over to Vienna where the Europeans had their Geophysical Union meeting last week and the ITRF 2008 solution has been adopted which means within a few weeks, it will become official, the ITRF 2008. So we have been gearing up for this for the past few years. In particular, all the IGS analysis centers, there's 8 of them or so. What they wanted to do was to reprocess all the GPS data from 1994 to the present using the latest technology, latest systematic errors and so forth. And NGS was one of these 8 or so. And we submitted our solution to then over a year and a half ago to the IGS with the others and that was the basis for the GPS solution that went into creating ITRF 2008.

In addition to reprocessing all the IGS data, there is about 400 stations or so, we processed all the CORS data and there's over 1500 stations, some of them are no longer in existence but we had to process even the ones no longer there. So we reprocessed all GPS data from the CORS network from 1994 to the present.

So, the main driver for this recalibration was the calibration of the GPS antennas, the recalibration of them in terms also of absolute. So we both recalibrated the antennas that transmit the signal from the satellites, and the antennas that receive the signals from the – on the ground.

So with 2008 going into effect, one of the things we have to do is change our software to take into account these new recalibrations of antennas from relative antennas where we reprocess every antenna relative to one standard to an absolute antenna.

There are several other minor systemic areas changing and I'm just going to mention a few of them. One was ocean loading. We included a new ocean loading model in our processing as did all the analysis centers. And solar radiation pressure. The pressure on the wings of the GPS satellite as formed by the sun. And I'm not really an expert on this but there are probably a half dozen systematic errors that we refined our processing software over the past four years so that we would be ready to reprocess all this data in a consistent manner.

Now, what we will do is use these results to get ITRF 2008 compatible positions and velocities for all of the CORS stations, even the ones that no longer exist. So, we will be publishing those ITRF consistent, or compatible coordinates hopefully in the fall.

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And then, we will use the ITRF coordinates to compute equivalent NAD 83 coordinates and we are thinking of calling this NAD 83 (CORS 96A). So these will just be applying a transformation to go from ITRF 2008 to CORS 96A. We want this CORS 96A to be defined so the transformation will make it consistent as possible with CORS 96. So if you look at the best 14 parameter transformation between CORS 96A, and CORS 96, it will be the identity function. And the reason for this is we want these coordinates to be consistent with the coordinates for the passive reference stations as much as possible, the ones we derived in 2007 in the NSRS 2007 adjustment. Also we want them to be as compatible with the Geoid 09 which was derived using the passive reference stations so the conversion from CORS 96A to NAD 83 using Geoid 09 will be as close as possible as the conversion from CORS96 to NAVD 88. We're trying to maintain this consistency.

Nevertheless, there will be differences.

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And this is the reason why there will be differences: We are using more data than last time when we computed CORS 96. We are using in some cases, as much as 8 more

years of data, of GPS at that time, using more rigorous computational procedures and using more accurate models for the different systematic reports and so forth. And so we are hoping that this will become available in 2010. I expect that the numbers will actually be available within a couple of months but the implementation part is going to be the bear. And as was pointed out here, you really want to have all your ducks in order before you release these coordinates because OPUS will be giving you coordinates and ITRF 2008 and then, NAD 83(CORS 96A). And also, we have to update HTDP so it contains the transformation from 2008 to the other reference frames. We have to work on that and there is a lot of work. I planned about 3 months, but I think I might have been a little optimistic. We are – still have this target date of the Fall.

Now, why are we revising the CORS coordinates? The last time we revised the CORS coordinates on a wholesale manner was back in 2002 when we adopted ITRF 2000.

Since then, the CORS coordinates have wandered and you can see that in the OPUS runs. If you look at the peak to peak errors in OPUS, most of that peak to peak error is due to errors in the CORS coordinates and not to your data, the errors in your data. So we want to get the CORS more consistent with one another. Also with moving to as Bill Henning and Lou Lapine point out, moving to a different way of accessing the NSRS and that's through real time networks, there are about 80 of them in the United States alone and over 150 or so throughout the world. And this is the future. And so, you want to Coordinates of those real time networks, the base stations to be as accurate as possible. So you don't want them based on old coordinates, the best that you can get. So this is the other one, other main reason why we're going to this. We will be having CORS users forum in the fall as we always do. It will be in conjunction with the Institute of Navigation (ION) meeting with the Civil GPS Service Interface Committee. Write down this date, September 20, 2010 and it will be in Portland, Oregon. Hopefully, many of you will be able to go there, not just for the CORS forum but for these other meetings I spoke about. The ION meeting is probably the biggest GPS meeting in the world. That's why we try to hook up with them.

So, I would hope you go there. And let me ask my colleagues if they want to add anything? They are shaking their head no. That's okay. That means I did my job. Thank you.

MR. SMITH: Well, at this point if hunger is not gripping you too hard, we have a panel up here that will take any further questions that have come up. We have a half hour until lunch. I know Juliana want to make some closing remarks but I would ask Dave to come up here and moderate the melee and we will until he gets here. I will call on my good friend, Jeff Oyler.

MR. JEFF OYLER (CO-OPS, NOAA): For those of you who don't know me, my roots are with NGS, started with NGS many years ago and I'm now with Co-Ops, Center for Oceanic Operational Programs Sister Agency to NGS and my responsibilities are the International Great Lakes Datum and those aspects thereof.

And I -- one of my other hats is I sit on coordinating committee for hydraulics and hydrology where we try to ensure governments are doing (inaudible) on both countries so as these waters are international waters, the charts are -- have a fixed value on them and there's many of them, thousands of them throughout the area. And as we move forward, we are in dynamic heights, derived from NAVD 88. And thanks to Dave Zilkoski, sitting on that committee, and understanding of the international aspects - the Great Lakes, eight states, two provinces more coastline than the East Coast and the Gulf Coast combined.

So now as we move forward, especially in the international areas, Canada is thinking about moving quickly to a Geoid model and coming up with dynamic heights from there. We are later in the series what model are we going to be using what exactly causes the difference in those heights. As we share the water, the measurements are for treaty requirements set up by International Joint Commission and these waters have to be measured the same on both sides. We have to think about that and be able to come up with the same geoid model so we are all measuring the same. So I would like to hear a little bit of your comments about that.

MR SMITH: The current region schedule is that the IGLD data will be updated 2015. There is some question how well we will keep to that schedule but certainly, we are well aware of that. And so, from our side, the GRAV-D program had originally not had the Great Lakes prioritized to meet that schedule. That has since changed and when we are done working in Alaska which is to be some time next year, we begin on the east and west coasts of the United States as well as the Great Lakes region itself. And I would venture to guess and I would defer to Vicki Childers on the exact schedule but I would say the Great Lakes is likely to have very high priority to meet the IGLD schedule. We made sure that when we drew the flight plans for that particular region, that it considered international aspects of the entire Great Lakes region and well deep into Canada is planned to be flown for GRAV-D so there is no stopping at the U.S. Border if you will. The idea is that GRAV-D would support a geoid over that entire region that would be consistent for both countries. That does not necessarily address the idea of Canada going to a geoid based vertical datum before IGLD 15 and before GRAV-D flies and I know my Canadian counterparts are in this room somewhere and ought to add to this conversation. So at least from the standpoint of getting there in many years time that IGLD 15 update and ultimately, a well more than North American geoid computation covering both countries and then some. If you want a picture, it's pole to the equator, Hawaii to Newfoundland. That entire region would be covered with a single geoid computation in which GRAV-D data would be made available. That is the joint goal of Canada and the United States all of that region would be one single computation, it would be directly related to the IGLD 15 as well. But the Canadian step of going to a geoid based vertical datum before IGLD 15, I don't feel I can speak for my Canadian counterparts so Mike or Mark ought to take a microphone and add to what I just said.

MR. MARC VERRONEAU: Mike, I mentioned yesterday we plan to move to a geoid base datum by 2013 so roughly, 2 years and a half before the first code would be coming in.

And naturally, there are always be a challenge which amount to use for the Great Lakes shared between the two countries. But I believe by the time with GRACE information, GOCE information, we will exchange the data between Canada and the USA, we can arrive to a geoid model or two geoid models, one from NGS and one from GSC that will be maybe not identical but the difference will be within the error estimate of the geoid height value for the region. So basically to me, identical models within the error, so that's what we plan. But both agencies in Canada we plan for a geoid model that goes from South of Florida and all the way to the North Pole, will , extend all the way to Hawaii and way east of Newfoundland also. So hopefully, and already our models are converging quite well with the latest USGG 2009 and the CG 2005. I can't remember the number but we are within a decimeter in most of the regions without exception. But, I think within the next five years, we will be down to within a decimeter all across the country and I'm sure, like outside the mountains, down to within a few centimeters and that's about it. So I think each country can use either model and within the same datum, I would say.

MR. DAVE ZILKOSKI: I did a lot of work with the IGLD 85 and I hear what our Canadian friends will be doing. And I would urge NGS, Dru and others, maybe Dan, spending time going up to these meetings because I went up 2, 3 times a year talking to the committees for almost ten years because in the beginning they didn't want anything to do with what we were trying to make with one datum. At least one set of geopotential numbers is what we really ended up with and the international datum will not use multiple geoid models. If you go to this one system, they will say if you're in the International Great Lakes, you use this information. Not if you're Canadian, you use this and if you're in the US you do this, so I would urge you to go there with the Canadian counterparts because I believe Mike Cramer of Canada is active. So someone like you Dru or others need to make time in this process over the next couple of years to get involved with that so you understand how the Great Lakes community sees us and what they need.

And I don't really need a response, just something I would urge but I do have a comment and a question about what several individuals in NGS has said that they want input. And I said then myself when I was up there that all did want input so it is good to hear you are saying you want it.

Can you say a few words on what you're currently doing to get input, what kind of things you are looking in the future to get more input and I guess more important, is how can these users sitting in this room hold you accountable for giving input and responding to it? It is great to get input but if you take the input and never hear anything back, then, that's not useful to them.

So, do you have plans in place to be able to respond to some of their input? I'm not saying you have to do everything they ask for but do you have plans of how you are going to respond?

DRU SMITH: I'll begin. And the answer is only vaguely. And this part of it is hearing what people have to say here. One idea that somebody mentioned, it might have been you Dave yesterday, the idea of regular updates and that is feeding out of information. I see it on the NGS web page, [click here to give us feedback](#), [click here to see the latest quarterly report](#) and what the status is. And that ought to be contained right there very obvious information with direct link into NGS. That's missing so I made a note we need to build some links like that. But that's very not difficult and that is an opening idea. I know that Renee has already long established with the height Mod meeting she has direct back and forth with the constituents that work with her. Maybe you can take that and run with it, I don't know what else...

RENEE SHIELDS: I do have that. I've got a monthly meeting pretty much open to the public. As much an exchange of information as anything else, I try to find ways to make it more valuable to our users and of course, we have regular outreach forums with our Height MOD partners and with interested states to exchange information, get information to find out what people's needs are. But within NGS, we also are starting a concerted effort at a stakeholder feedback plan. I think we have a committee put in place with representatives from all our divisions to gather and to evaluate and assign different actions or suggestions that we are getting from our public. I don't know if Juliana or Ronnie or Steve Vogel back there might want to say something -- I'm not involved in that directly. I just know it exists. Steve, do you want to offer a couple of concepts of how that is going to work?

STEVE VOGEL: As you were saying, the committee itself is just getting off the ground. We are starting to look at mechanisms for how we are going to incorporate need back into decision making and we do have a group meeting biweekly to develop that mechanism and we are developing that process.

DRU SMITH: Ultimately one other thing that I wanted to make sure we mention is that NGS is currently looking at, who is going to run this transition, a single a project manager who's going to run the transition on the geometric or geopotential or perhaps both. We are desperately trying not to say horizontal or vertical -- I do agree with you there. Geopotential and geometric are two different sides of one coin, if you will. And so whether or not a single project manager herds us together into one, or we need two people, ultimately, that person is not somebody who just needs to make sure that numbers are cranked out and that the machine is running. They need to have an outreach plan. They need to have the pilot projects running, the scientists doing research so the project manager in charge of these hopefully will be named before the year is out. And when that happens, all of these components have to be there including how will you listen to people and take into account, how often will you meet with them, and how will they hold you accountable?

So, Dave, I'm sorry to say we don't have a concrete answer on how we are going to do it except to say that we have every intention and you know what they say, the road to ... is paved with ... and all that.

JULIANA BLACKWELL: If I could just -- you guys did a great job of answering that question. And we are taking those first steps. This is again an opportunity to start filling out that strawman that we internally on how we need to gather feedback and provide information to the broader community outside NGS about the new datums.

As Dru said and Steve said, we've taken some initial steps. You probably don't know about the things that we have done internally about our stakeholder feedback action plan but we do have one. We have taken a few items off that plan to accomplish this year. It is in peoples' performance plans, it is in my performance plan. We are going to continue to be asked to be held accountable and we are not going to be successful 100 percent of the time but we will strive to be successful 100 percent of the time and it is a dynamic plan just like everything else, hearing what people have to say and revisiting what we need to do to convince you or to change our minds about how we are doing things is why we are having this type of meeting today.

It will be followed up with additional forums, summits, workshops, input sessions, in order to get a different audience also at the table, over and over again. It is a iterative process. It is a process to begin with. Naming somebody to lead this is a big challenge. And if anybody in this room wants to take that challenge on, let me or Dru know afterwards and we will put you through some tests to see if 20 years from now, you can be up on stage talking about what you did and giving lessons learned for the next generation coming through.

I think one of the biggest challenges is while we have gotten in all this information is making it available to others to build on. And this is kind of down in the weeds a little bit but trying to use our website, trying to use Internet, trying do things that at least can be a dynamic way of sharing information, pros and cons about what is being said and done at NGS in support of this process for the new datums. That is something we need to develop and start with. So using our website to get updates, to our external stakeholders, just not internally to our workforce is something that we will start getting in place before the end of the year.
Thank you.

GIOVANNI SELLA: With regards to the geometric datum under Richard's leadership, approximately nine months ago, we put up the beta site for our analysis and all of our results were out there immediately and they continue being out there openly available. It doesn't mean we've published the velocities which everybody wants and there is specific reasons but all the results were there and up to almost five months ago if you looked at those results, there was a big bug that was in there. The results looked pretty ugly and we had people contact us back and forth. Richard has been holding meetings open to the public for the last six months, telecons roughly every 3 weeks, and we had a whole series of feedback from different people. Mike Londe is one of the

people that has given us feedback on some of the changes we propose. And that is ongoing.

As we are getting to having some robust final results and getting down to the nitty-gritty of how we will define that new frame tag, that's where a lot of discussion comes in but that has been an ongoing process from our side that we continue doing both through a website and through roughly, every three weeks or so, it varies, teleconference. Those are fully open to anybody, so email to me or anybody on the CORS team to get on that email list. Prior to that opening up, those meetings were held strictly internally because much of the discussion was simply on technical aspects of rewriting software to meet our IGS standards. We didn't feel we needed that much impact directly from the public at large then because we weren't re-defining coordinates and things like that. We had obviously outreach to various analysis centers to give us that information.

DAVE ZILKOSKI: This is all great stuff. And one of my reasons for asking the question was for you to talk a little bit about it so people knew that. Saying that, the people know now that are sitting in this room, I would urge to you figure out a way of putting something simple on your website that advertises these maybe it's telecons open the public. Like, Renee, you meet once a month, on a Thursday, and it's always the same. If you have to change it you should feel like just because it's on the web you can't change it. People have to understand that because it is your internal schedules but opening that up and letting people know the ones that are open would be a good idea.

DRU SMITH: Speaking of open meetings to the public as well, the FGCS, unless very sensitive topics are being discussed such as proposed budget for next year, something like that which is not public information between ... if the agencies are just discussing methodologies and changes and this sort of thing, they can be and should be open the public. And on my own personal list of To Do things for this year, on my white board in my office, I know you've seen it, Dave, make the FGCS relevant again. And nothing is more relevant than what we've been discussing here for the last two days which is if you're going to change the Datums, the FGCS, everybody has to be actively involved in the discussion at the table talking about the pros and cons and the hows and whys. And I don't think -- if you read the FGCS charter, it does not talk about just the feds. It talks about the adoption of geodetic standards for feds and non-feds. And there is no way we can get that information in-house unless the public is there as well listening and hearing and talking. Unless it is a sensitive closed meeting generally, they should be wide open to anyone who wants to be there as a guest to provide their opinion to us. And, so I think what you will see, in fact, I can guarantee what you will see is regular FGCS meetings of relevance occurring well -- and you will hear about them, well in advance, the agenda, date, time, everything, six months in advance. I fully agree we couldn't have this roomful of people here if we had not had months of advance notice, save-the-date, it's coming, that's how we have to run FGCS from this point on until these datums are changed. You will be able to get all the relevant and interested parties in the room discussing it.

KNUTE BERSTIS (Internet monitor): We have some e-mail comments for the panel. Sure. Okay, I have it now.

-Okay, first comment, we would like there to be a mechanism to transform or convert from the current datum or datums/reference frames to the new ones and vice versa. We would like to see NGS make all potential revisions available for public comment, a standard list-serve would seem to work well. And you want me to go to Comment 2?

DRU SMITH: Let me address that. We did say and we will provide transformations between the existing datums and the future datums. So that will be done. What was the other one list? List-serves that's fine. In fact, list-serves exist that NGS does not make use of and so a note to ourselves that we need to make sure people subscribe to it and we push information out through that and so that is a relevant comment that is easily adopted.

MR. DAVE DOYLE: I would like to make a comment on that as well. Certainly, I mentioned that's one good way. We have a very active program working through AAGS American Association of Geodetic Surveying of American Congress of Surveying and Mapping every year, that is another avenue that we have. If there are other ways in which we can do this, other forums that people are aware of that we're not touching base with, please let us know so we can evaluate our participation in those exercises to make sure that we are getting this information out to as many people as possible so they can evaluate our procedures and give us feedback.

KNUTE BERSTIS: Going to comment two. Consider setting fixed days for releasing revisions so all users would know when to check for potential changes that might affect their work. We would need adequate lead time to prepare for changes, i.e, prepare specs, new policies, new state legislature, et cetera. We would like NGS to consider using individual absolute antenna calibrations if they are provided by the CORS system managers. Our concerns are primarily based on our need to provide practical positioning solutions for a multitude of applications. The system must be able to be utilized and understood by the vast majority of individuals using positioning technologies. Our proposal would be to create an ITRF datum time stamped with a specific epoch date of approximately, every two years. I can't tell who made the comment. We don't have the author listed here.

DRU SMITH: The date – somewhere between 8 and 12 years from now, using absolute antenna calibrations, NGS is going to -- and then, from operational absolute calibration on the following date... Gerry?

GERRY MADER: Just yesterday, I got an e-mail from Andrea (Bilich) that showed excellent agreement with other absolute calibrations. So I think we will have Corbin up and running within the next few weeks. We promised NGA some antenna calibrations for quite some time now and we are just about to deliver but we have some checking and procedures that we need to go through, visa vie, the IGS and they are underway, so very soon.

KNUTE BERSTIS: Next comment (read from internet): Dave, we need more of this in the GIS community. I just returned from the K.C. Conference and there was no discussion at all about datums or the like. It is all about pretty flex applications. Please come to Nebraska GIS/LIS, April 20-11 exclamation point. Scott Robinson engineering.

MR. DAVE DOYLE: I know who that is from. GIST is one of the conferences we have targeted for as we discussed this whole program, we sort of broke it down into the federal component which is what we are doing here but GIST is one conference that reaches out to the vast majority of state DOTs particularly on the highway side. We have had a modest presence there in the past usually from our state geodetic advisors, but it is our intention to have a more robust presentation in the future with not only our advisors but a variety of us from headquarters to speak on exactly these topics. So it's on the plan, if not my particular plan to give a presentation, we can guarantee somebody will be there talking about the ten year plan at next year's conference.

KNUTE BERSTIS: And the last question, NCGS performed a pilot project, a geodetic leveling project to a CORS ARP. When will the results of our pilot project be released by NGS? We don't know who the author is?

MR. DAVE DOYLE: I don't know. Do we know who's processing that data? Julie, you're smiling. It is not you. Do we have anybody here who received that data? Anybody from NGS? Joe, do you know anything about that?

DRU SMITH: Then, I will encourage whoever made that comment to at least submit the question to Mark Eckl, certainly in his division, that would be processed and the question of a level that will be processed, project to a CORS ARP. It's being worked on.

MR. DAVE DOYLE: Okay if Julie says if it is there, it will be processed soon. Whoever made that response, if they would as Dru said make that directly to Mark Eckl. So you can respond to that. Knute, do you have any more. First over here, George and then, Hassan, and that will be it and we will have our closing remarks.

GEORGE: Thanks, I have a state specific question and so sorry, Lou, not about South Carolina. Also, before I go on, that I was real pleased to hear from the United States Geological Survey and the revitalization of the topographic map. For 18 years, I made visual flight rules in air navigation charts and I have seen and touched most of those 54,000 topo quads. So related to that, the state specific question is in the State of Alaska – in Alaska they have a very limited ground transportation infrastructure, there's only so many roads and so many railways. The way predominant commerce is conducted there is it is done by general aviation aircraft which they are dependent upon air navigation products, goods and services from city centers to the hinterland. And I know mark and company has done -- performed a lot of surveys up there for us and they are going again this summer, the way that I understand or somebody is going again this summer. But I also understand in the topographic map versus geodetic portion, there is a lot of poor mapping done up there, the last 60 years or so. So what I

would like to know is what geodetic surveying efforts statewide is going on there and in collaboration with maybe USGS, is there any plan to remap Alaska?

DRU SMITH: I'll start a little bit and give it to Mark and ask USGS to kick in. Alaska is probably, the worst, if not one of the worst mapped states in the nation. There is very little geodetic control on the vertical side. The leveling lines for NAVD 88 are predominantly circle the Seward-Anchorage region and go up toward the regional north slope, nothing in the left. So how a map is tied to NAVD 88 in that state is a question I'm not going to answer but it seems a bit difficult. Recognizing that, when we proposed GRAV-D, the first place we said we were going is after we've tested the system is and we'll stay there till the job is done. And so that's a hope for the future. But so that's from the vertical side and I don't want to say too much more on that. I'll turn it over to Mark if there is more.

MARK HOWARD: There will be a bunch of surveys, airport surveys not by NGS but through the Airport Surveys program. And when we have done surveys out there, it's always been a challenge because Alaska just does not fit the mold. There's just not enough control up there. We always want to meet the requirements FAA has out there which we usually provide in writing. But we have had to make allowances for surveyors trying to meet the geodetic control requirements when doing a survey up there and we are now starting to allow GPS derived orthometric heights, which is not something, because there is just no benchmarks around. So we are starting to go that way already that we're talking about when we get a better geoid up there. And other than that.

DRU SMITH: And then, real quick, Geoid 06 was put out as a hybrid where we attempted to use GPS on benchmarks but we extrapolated from Central Alaska, hundreds of kilometers west across the state to allow for an 83 to 88 conversion to run the entire state. But let's be honest, extrapolation is a wildly inaccurate process and so it is difficult to know that we provided a useful tool to people. We provided it because you cried for please, something to get us to GPS-derived 88 heights in the rest of Alaska. We did the best we could but the better choice is to get to vertical datum based on the GPS and the geoid no matter where you are, not depending on where we level to.

MARK HOWARD: We say they are "determined using the best available at the time."

RICHARD SNAY: About two months ago, we added about 20 CORS stations in Alaska. And also, thanks to Renee and the Height Modernization Program, we will put out a contract later this year to develop a crustal motion model for Alaska.

DRU SMITH: Larry, did you want to mention anything else at all from USGS, about the Alaska region?

LARRY MOORE: I think there are two things there, one is that we are committed to mapping of all the same areas that the original topographic maps covered. The non-CONUS areas will include Puerto Rico, Virgin Islands, Alaska, Hawaii and all the Pacific territories that I can't tick off, off of the top of my head. We didn't have a specific

schedule for those areas but some time in 2012, there will be a lot of pressure on us to get non-CONUS maps going.

The second thing is that these maps are derived products from other people's GIS database. The days of the geological survey going out and doing our own field completion and surveys are over and not coming back. So the content and the accuracy pretty much depends on what we get from other sources.

MR. DOYLE: We have a comment on the phone. Mike. Go ahead.

MIKE LONDE (on phone): Question on -- comment on the outreach. I realize NGS does a lot of stuff with ACSM and others but I got two specific requests. One is on the NGS web site is to make it more browser friendly to find some of these results that Giovanni mentioned being posted. Sometimes it can be a real -- take a lot of time to find the information. So, I think based on the browsing structure needed to be refined to make that more friendly.

And the second is there is a lot of Government outreach but a lot of it seems to be directed at certain agencies. But there's a lot of other agencies that I think would benefit from being in contact and being able to provide input. So besides this meeting it would be very helpful how if a further outreach mechanism, the list serve or other mechanism could be done to draw in all these other agencies to solicit input and ideas.

MR. DAVE DOYLE: We are always looking for better ways to enhance our outreach activities. We currently have our outreach manager, Erika Wilson who I think is doing a fabulous job on moving us into some new areas. Certainly, we've done a lot of things with webinars, 2- 3-hour webinars, we'll continue to do that taking topics like this and enhancing them. One of the nice parts about those webinars is that they are captured on the website and anybody even if you don't attend it, you can go and download them, put it on your Ipod, listen to it in the car. That's a little creepy but you can do that. But Mike if you would be so kind as to drop either me or Erika Wilson a note to make sure we are capturing your thoughts on this, I appreciate it. We had our last question over here from Mr. Abdullah. Please.

MR. ABDULLAH: My final comment, I really appreciate the opportunity. I mean, this is fabulous opportunity for us. Thanks for all of you for inviting us definitely. The nice thing I found really open mentality was the assurance because we thought we were in an elusive situation and don't know where to voice our voice. So my suggestions is to continue at least for the time being your website will be a great tool for us. I mean, if I have a hard link for Dru, for Renee, for all of them, it would be really nice. The people who are leading the many programs so I can just click and send him a note, maybe a chat if at all possible because we have a lot of questions come up every day and would be nice if we have that channel. I suggest you have all these scientists and PhDs and they are the greatest of the greatest in this country. If we can publish a book, a book where collection of these technical papers about data, projections, NAD 83, gravity, it can be a good reference for all of us.

There is no such thing -- if you don't think you have the time maybe for it, maybe you can sponsor a couple of the people from University and to publish it through the ASPRS or ACSM or something like that. The other things, I know too many people harp on you on it. We need to modernize online tools you have on the web site, make it user friendly to serve the bigger community. I would have an opportunity to -- all of us now represent so many agencies and the private sector. It would be nice if we can create a group on Yahoo or where we call them, the "friend of the NGS," any update, like Renee's monthly meeting, where it is published. I never heard about it. That's a thought, website, or e-mail. If you do webinar, it is the greatest thing because it does not cost me from my office. I can dedicate an hour to listen to you without driving. You need to have an access to the professional organizational mailing list because that's how these sells people I gets plenty of junk mails. From shoes to other things and I'm sure they buy it from this organization so it would be nice like ACSM, ASPRS, just get their list so we will be ... this is a huge community. You have thousands of thousands of people concerned. If we get updated e-mails on your activity, it would be great. And finally, I see Dave's concern about accountability. I could see where he going.. not like we not trusting your seriousness about it but I been in federal --the USGS guy is going to be made at me - the USGS National Lidar conference, huge, a beautiful discussion and representation. And we walk away and nothing happened, so, it would be nice at the end of this if Juliana, the group, summarize what is their understanding what your clients want and put it on the web. This is what we understand. We need our direction to be there. We can put detail later, for her meeting but at least, we all be assured, you understood our concerns and needs and whatever. Thank you very much again.

MR. DOYLE: Thank you. I very much like your idea of geodetic spam. We can do this. One point of the modernization of the Tool Kit... next week, we will host our convocation, own internal bloodletting but one of the issues we will address again, I mentioned Erika Wilson, our outreach -- I guess she is our outreach coordinator, we've been debating the idea of little webinettes or Youtube kind of approaches. We would like to see every tool in our tool kit have like a little 2- or 3- minute webinette so someone can walk you through what it means and other things as OPUS will be five minutes or lead you to a larger 2 hour, 3 hour web tool. So we are looking at a whole range of ways we can make those not only more accessible but more understandable not to just surveyors and geodesists but anybody who comes to our tool kit. That is a big element for us. That's the last for today. Oh, do we have one more email, okay.

KNUTE BERSTIS (internet moderator): The White Paper states, as NGS updates the geoid model so that it continually fits a changing sea level, users will eventually notice that even in areas where subsidence is not occurring the heights will change. This reflects the reality the vertical distance separating at a given location and the global sea level is decreasing. This is information that should be properly conveyed to the public particularly in coastal regions. For an agency such as USAC, that uses two elevations, orthometric and MLLW on the same project monument, it will be important to know what change in ortho elevation is because of earth movement and what is relative to changing sea level, also because the use of VDATUM is critical for the USAC mission, it will be realizations to the VDATUM program. Because of that, I recommend a working

update version of VDATUM be available on the web instead of downloads of the latest version. By Ray Williams, USACE, Norfolk.

DRU SMITH: Thank you very much for that comment from Ray. Let me quickly address that issue. The White Paper was predominately a discussion about why we felt the datums should be changed. There was some How the Datums would change, and that was one example that was thrown out there. This is a point of very serious negotiation between the United States and Canada as far as will the geoid which is conventionally tied through its definition to global mean sea level. Will it change as sea level changes? And the question is, you get rid of the convention and allow them to diverge from each other or you keep the convention and allow the geoid to move as sea level changes. And quite honestly, I will not tell you what the right answer is. I think because I wrote that sentence, I think that's the right approach, that if something literally is not subsiding and yet, sea level is keeping up into their backyard, you ought to let them know their height is shrinking and shrinking and shrinking and eventually they're at sea level. That is my opinion and not fixed in stone by any means. If that is the direction we go, that has to be, I agree, incorporated in all the tools and properly documented. So let me just complete clarity on that point, that is a singular opinion that is not a policy and certainly deep in the discussions with the geoid teams between both countries because ultimately, the goal is that this single geoid based datum be done exactly the same way and until both parties agree that should be taken as just one opinion at this point. If Mark wants to add to that, recognizing the discussion on going.

MARC VERRONEAU: One question we want to solve in Canada before we adopt a new datum by 2013, which equipotential surface will be used as the datum and naturally, we want to take a surface to be close or geoid exactly but we do not know where the geoid is exactly. We want to pick an official value but group A, B, C will come up with different values. IAG will come up with a value also but this value will change in time. And the question of which value do we pick. And also, when we realized the geoid model ...on the potential, we might be off by one centimeter, two centimeters because we may have systematic errors in our solution, we don't know. So even with time, we want to stay with a geoid because our realization could change, we don't have a perfect solution yet but hopefully error will be minimized. What I'm thinking to do is for Canada or also for North America, is whatever we compute first and we always keep it consistent height in the future. But still, when we have this height, what will be the actual geoid value from the latest research. So there are 3 options and I had a presentation with me in case this was necessary to explain the three of them but I think there are three kinds of options in the way to maintain our datum in the long term to be close with the geoid or to be at the geoid actually. So but each have advantages and disadvantages, naturally.

MR. DOYLE: Okay. Do we have any more? No, anybody out there on line on the phone. Ask the last question? All quiet. All right, quiet is a good thing. My last remarks before Juliana comes up. A couple of things to remember, we will have the survey monkey on the web page for this summit hopefully by next week and one of the items

on there of course will be when should we do this again? So I would encourage you to make a little note to yourself, come back to the website and give us your comments. Also, go back to your respective organizations and talk to other people, get their feedback, let them give us some feedback on this as well.

So following Juliana's closing remarks, lunch is served and the folks of us from NGS that are all part of, we are making ourselves available to anybody here who wants us around for a little bit more face-to-face contact for some of these discussions in the Science Center next door. With that being said, Juliana Blackwell, give us our -- close it up for us.

MS. BLACKWELL: Thank you Dave, and thank you panel members. You guys did a great job. I got a whole notebook full of stuff that I been listing out so we are going to will be busy when this is over . We had a great team that worked together to put this event on. And in addition to that team, the other individuals within NGS who play a role in the future which is all of us are going to have some work to do to be able to take what we heard today, start that written conversation that will be available for others to review and to use and to check up on us. And again, this is just a first step in a long process.

I think what we need to do is to continue to think about what I heard earlier today from some of our one minute speakers, is that we are preparing for the future. We are preparing future generations to be ready and enabled with positioning information with the accurate geodetic controls that are going to take us into the future. We probably aren't even able to envision what's that going to look like not only in 10 years but 20 years from now because certainly when we create something, we don't want it out of date as soon as it is created. So thinking about the future and what the possibilities are, intelligent vehicles, transportation systems, things like you saw in cartoons as a kid, the Jetson's flying around everywhere. That is a stretch but thinking about possibilities that we did not necessarily focus on here in the last few days but when you start thinking about what is it really going to look like, not only in 10 years, but 20 years when our children and grandchildren are using this type of information like second-hand, like they have grown up with it and they expect ease of information and accuracy of information. And how do we play that role in providing this basic framework for the nation.

So it's a big challenge, not a job we take lightly. Hopefully you will hear that from any one that's here with NGS. We have about 210 federal employees plus some contractors. It's not a huge organization. We fit into the bigger organization of NOAA and one thing I would like to highlight is some of the things that we are talking about and being able to tell our story to our own mother organization about how important it is to have this accurate basic infrastructure in place to be able to provide that layer of foundational information regarding positioning, sea level heights as well as geodetic heights, to be able to answer questions and provide information related to sea level change, climate change, things that the bigger organization are focused on. We did talk about that a lot here because that is part of our job within NOAA too, to convey that. But in talking about Alaska and the Artic, one place that is certainly visible in the bigger scheme of things is the fact that there are navigation channels opening up that

will require a lot of infrastructure and mapping and positioning information in areas where we have not been. So, that's the -- the limelight is being shown in the Alaska area and the Arctic. So we're at the table there are trying to ensure that our organization knows that we need to be there first. We need to get GRAV-D flown and get the positioning done. We need to get our water levels in place. We need to be able to be ready to provide that basic infrastructure for everything else that's going to go on. So enough about that.

Another point I wanted to make without taking you too far away from lunch time here, the partnerships that we have in place and we continue to hope to grow even more, our international colleagues that are here, the fact that we want to continue to engage in other international endeavors not only with Canada but being able to interact with folks at the international conferences like the one in Vienna that was mentioned earlier, getting our scientists together, getting our leaders together to talk about these things because it is, these are international global issues that we are dealing with. It may not be what everybody is thinking about but it is something that we need to think about and be prepared for. So I want to thank those partners that are here from other countries, for those folks that are online that weren't able to join us in person. I think it is important to have opportunities to open this up in a variety of ways so people can hear and be heard.

I certainly have a huge number of federal agencies that are here today and I want to thank them and want to say that the continued growth and support between our organizations - the Army Corp of Engineers, the FAA, a lot of the individuals that we heard from, from NGA working together on things regarding geopotential and datums and geoid development... I'm going to miss some but USGS and all the components of these bigger organizations because we realize that just like with NGS, there are other parts of NOAA that we need to get at the table. So having Weather Service and Co-ops and Coast Survey here, it is important to get those different -- down into the different components of the organization together.

Glad we're able to hear from a variety of the other organizations like BLM and FEMA. A also want to thank folks who have supported the GRAV-D initiative thus far and say that as you heard yesterday, it's going to take a while to get this done. So the more we can work together, bring our resources together to accomplish our missions and be as efficient is only going to make things better for the entire nation. That's our job. So we have had partnerships at demonstration project level with GRAV-D and I want to thank those organizations that have been a part of that.

I heard the need for continued and improved education and outreach, I think we have addressed that in a lot of the conversations but we need to show you. We can talk about we need to show you what we are doing. We need to show you what the plans are and we're not going to get it all done overnight. We have to be realistic but we need to continue to make progress. So some of the things like stakeholder feedback, what's necessary and what we have set out to accomplish this year and the future years, those are the types of things that we put them out there and if we don't do them, we want to

hear you hold us accountable for that. And you can email me any time too that you want to.

One other comment from early on today, there are things related to even in my opening remarks, the fact that we are dealing with providing service and science. It is not one or the other. It is finding the right mix of our resources and our time to be able to provide both to the best of our ability. So it is not -- it is about science or about service. It is about getting the big picture and having you here is what helps us see the big picture, not just one individual looking at their handful of constituents that they deal with on a daily basis. It's being able to take our scientists - and we have lots of good internal struggles within NGS about the science and the service and doing things for whatever reason - We need to keep this scope broad so that we can hear from everyone that we are serving and make the right decisions.

We talked about several times, the FGCS meeting starting 8:30 tomorrow morning. You can see one of us afterwards if you are interested in attending, as we said, there is no way that we are going to grow and then, progress if we don't recruit some new blood and initiatives into that subcommittee. So keeping it to the current member list will not accomplish what we need to accomplish especially with these future Datums coming our way. If you're interested, please see one of us at any point in time or email us about getting anyone in FGCS.

I also heard about the importance of having a plan for when these next events will be out and making sure we have dates established and we communicate that to folks so they can do their own planning to be able to attend.

I'd also like to say, we talked about this is eight to ten years out, hopefully no longer than that, and we realize it's going to impact every organization differently and there are going to be costs associated with converting information into a new datum. I'd say just to my federal colleagues is that you all have a planning cycle, a budgeting process, don't miss the opportunity to think about that in whatever phase you are, and the out years, the fact that what do you need to be able to convert information? Start thinking about those initiatives that you are going to need to get in place in your own agencies to be able to make those types of things do-able for you in the future.

I'm sure I'm missing some things here because I wrote too small. I want to thank you all for being here and for taking the time and for getting up in front of the camera, getting up on stage and telling us what you think because having one person say something nice is fantastic. It makes you feel good. But for every nice thing that's been said and every kudos you get about what you're doing, I'm sure there is anywhere between one and ten things that are being said than are not so positive. And we don't get anywhere, we don't make progress or change unless we know there are issues and concerns, first of all, know they are there, identify them, accept them, take the steps to make the improvements necessary. That's what we are saying we are going to do and we are dedicated to doing that. And 's not going to be me saying that, but it's going to be the group of people that you saw here in the last couple of days that have been doing this

on a daily basis. They've made this happen. And we will continue to make progress and to show you what we are doing along the way and continue to get your feedback. So enough of me. Thank you again, invite you to have lunch, thank our sponsors who were able to make the food possible.

And thank you all for participating.

(Whereupon, the Summit was concluded)