NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE

AN INTERVIEW WITH LOUIS W. UCCELLINI
FOR THE
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INTERVIEW CONDUCTED BY
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Greg Romano: Good afternoon. It is Monday, October 25, 2021. We're conducting an oral history with Dr. Louis Uccellini. We are at Weather Service Headquarters for the first time since we started this in Silver Spring, Maryland. The interviewers are Greg Romano and Mary Fairbanks.

So to kick us off, Louis, with -- when we talked at the last session, we ended with your arrival at the NWS as Director in February 2013 and your first conversation with the employees that included your focus on the NWS becoming a science-based service organization and the adoption of the Weather-Ready Nation Strategic Plan. The NAPA review about the 2011 events also came out in 2013 and even endorsed the Weather-Ready Nation Plan, saying you can't do it alone and the need to restructure the NWS starting with headquarters. Walk us through this and the problems with the NWS' then-budget structure and process and the reorganization that followed.

Louis Uccellini: Yes, so -- you should start, I guess, with respect to the budget structure because that is the first thing we got focused on. But I remember coming here into this office in February 2013 and realizing that we were going to have to make major changes within Headquarters from a budget-structure perspective, from the structure of Headquarters itself, since we had offices that were, I would couch, as being disenfranchised, I think that was the word I was using. They had responsibilities, but they really weren't connected to the budget structure much at all, especially as it related to the field, the field needs, the forecaster needs. And, I reflected on that immediately. That would be something I would have to do. That was actually before the NAPA report came out. I knew that they were doing a review, of course, of what we would have to do with respect to our strategic plan. They were reviewing that, but also reviewing the nature of the budget difficulties, management difficulties that the Weather Service had prior to my taking over.

You know, I was part of the corporate board for 14 years. I was aware of the difficulties that my predecessor Jack Hayes was facing in the 2011 into '12 timeframe. I didn't realize the magnitude of the violations of the appropriation laws that I -- from what I read of the situation -- was initiated by the CFO at the time to try to cover the costs and basically, create some creative ways of waiting until October 1 [the new fiscal year] to be able to pay the bills. So I -- there were two things that crossed my mind as I sat here in those first couple days. One, they still hired me to do this job, even though I was part of the corporate board and trusted the members of the corporate board, who very emphatically said, "We really did not know what was going on." Because there were also no governance structures in the whole decision process. You had some decisions [that] were made at meetings, but then changed. And then you'd find out a month later about the changes. So it was not, was not a good situation that I knew it had to be changed. So that was the one item that confronted, confronted me here.

The other was on the plus side. There was the Sandy Supplemental [which] was sort of all the plans related to the Sandy Supplemental and the extra money we were getting and, or would get. That was on the table. So that was sort of a good news thing because the other priority I had in my head at the time that we definitely needed to deal with was something I brought from

NCEP was our computing capacity was really low, paltry. You couldn't even fit the High-Res Rapid Refresh on the computer at the time, and it had been sitting there waiting for transition for almost five years, and we still couldn't fit it on. So it was that kind of a mix that I was confronted with and sort of a balance as we went into the first week.

GR: Okay. And the NAPA commented that they did not know of another example of an agency completely restructuring their budget and headquarters in developing governance that SESers signed. Talk to us a little bit about that, and what --why was that important to make sure that all of the members of the leadership team signed that? And, and I would add that NAPA also recognized that later that you were able to complete the restructuring with DOC, OMB, and Congress in two years. So tell us a little bit more about that.

LU: One of the things besides having the budget mashup, for lack of a better word, it was also pretty clear that the field felt -- was rudderless, in a sense, and they were looking for leadership. They were looking, actually, for us to act on a strategic plan of Weather-Ready Nation that a team of us came up with in the 2011-'12 timeframe, but then got shelved because of all the other problems. So the very first thing I wanted to do and did with the all-hands meeting the first Monday I was in this position was to emphasize two things. One, we are a service-based, I mean, a science-based service agency. And that we would, we would change, we would move forward, we would address the challenges, we would address the opportunities from a science perspective, from a well-managed science perspective. And, of course, that would apply to algorithms that are going to be put on a computer, brought to AWIPS, whatever, but also the technology aspect as well. So with that in mind, I also then said, "And we have a strategic plan that we're going to work towards that will drive everything we'll do." I was reading what the NAPA team was working with. I got a chance to be interviewed by them briefly just before they went to final press. I said, "This will drive us forward."

And I know from feedback I got that that really sat well with many people out in the field. Not everybody, of course. But even with the ones it sat well with, it was like, "Okay, now show us. You know, we've heard this before." So we come back to this need to deal with the infrastructure and the budget in terms of what we needed to do. And I became committed to this need for a budget structure that could be followed logically and easily by people at Headquarters, by people in the field. And that the people in the field would see how it would affect them, how it was directed towards their needs. That last part, you know, directed towards their needs got me into how -- the governance aspect and the reorganization of Headquarters to map one for one into the budget categories that we would come up with. But that governance was something that was playing in my head almost the same -- in the same breath as the budget structure in the Headquarters. And the reason I wanted the -- all the SESers to sign it was that it would become their budget-planning process. It would become their budget execution and the planning that went along with it, and that there would be no end runs around that. Because of I -- it's not that everybody would feel, "Okay, I've signed it. I'm not going to do an end run." But you would also have the other SESers who would catch an end run and say, "No, that's not following the governance and we've got to get this done. We all signed up to operate this way." And oh, the other thing is, is that they would sign the annual operating plans

too, so that they have the foundation of the way we act together signed, or they're not an SESer in the National Weather Service. They would sign off on the annual operating plan, so they know what we're doing, they know what their role is in what we're doing, and fundamentally, there is no end run. Because that was -- that was also going on during the 14 years I was the Director of NCEP was that there were people out in the regions that would go directly to the CFO with budget deficits in the summer. And basically say, "You've got to give me the money, or we're going to go under," kind of thing. So this kind of -- and yet they were spending money on other things that nobody really knew about. So we were close to -- we were like 900 million in that range when I took over in 2013. That's close to a billion-dollar agency, and we were getting -- we weren't getting what we needed to get done, focused on the field needs especially, and yet, we had close to a billion dollars coming in. So we had to deal with all this. And, and quite frankly, it was the only way I knew that I could gain the trust of the Hill was to show them that first of all, I understood the depth of the problem and that I was willing to address it.

GR: Excellent. Mary?

Mary Fairbanks: Yes, so I want to kind of switch gears a little bit and talk about the World Meteorological Organization. And you currently serve as the US representative to the WMO. What do you feel are some of the key achievements of the WMO during your tenure?

LU: What's interesting is when I first came in here as the Director of the National Weather Service, I should have immediately taken on the role as the permanent rep, which I didn't do, because I was so focused on looking inward and solving these problems. So I just want to emphasize that one of the main advances of the WMO that happened in the first couple of years of me being the Director of the Weather Service actually occurred with me not being a permanent rep. But it's worth noting because they - it was during that period, up through the Congress of 2015, that they established the Climate Services part of the WMO which has been a big, a big deal. And Laura Furgione was Deputy Director of the Weather Service at the time, and she took on the role of the permanent rep while she was the acting [Director], prior to me getting this job. And I decided to keep it that way into the next -- into the next Congress, which was in 2015 timeframe. Yeah, it was in June of 2015. So that was an important thing that happened. And I'm emphasizing that also because what I started, and became the permanent rep in the -- on the 2016 going into 2017 timeframe. And, it was during that period that David Grimes, in his second term as President of the WMO, was really pushing the whole restructuring of the WMO. It was very -- WMO at the time, as I came in 2016 was, I'd say -- I think they had eight commissions, very stove-piped. I had some experience in the WMO as a member of the Commission on Atmospheric Sciences. I couldn't mention the word "climate" because the climate was in the World Climate Research Program. And when we were evaluating models, I couldn't say the words, "Hey, let's -" -- I did, I did mention climate and had a lot of flags go up for people to intervene and remind me that I couldn't talk about climate in the Commission for Atmospheric Sciences. And then I -- there's a working group on numerical experiment, or it's WIGNE, w-i-g-n-e. As part of the -- of the Commission of Atmospheric Sciences, or CAS as we called it, they had these model reviews, and I said, "Boy, we ought to review the ocean models, too, because we're starting to see the coupling of the ocean [and atmosphere]." "Oh, no, you

can't talk about the ocean models. That's done in JCOM." So they had these very stove-piped components of the WMO which just slowed everything down and to the point where people really didn't want to be part of the WMO. They -- we couldn't deal with those issues. Well, David Grimes, who I believe will go down as probably one of the most influential presidents of the WMO ever, really saw the opportunity - and the need and the opportunity - to restructure the WMO, and this was going to be done with Earth System Science being a basis for that. And, then having from an Earth System Science perspective where you have the atmosphere, ocean, land/hydrology, cryosphere, biology, chemistry, all considered equal components essentially, drive the weather/water climate linkage aspect that these communities would link to the services.

I remember coming into the first couple of meetings, Executive Council meetings leading up to the Congress in 2019 where I could see that there was a large number of other permanent reps that weren't getting it with respect to the Earth System Science perspective, and the need, the absolute need to do this. They were arguing, "Well, maybe we should go from eight to four commissions rather than two, you know?" We wound up going from eight to two, ”Infrastructure” and “Service”. That's it with a board looking at the research needs. I was, I was caught in that initial swirl in those meetings. I was listening. I was trying to catch up from not ... But it really struck me that what David Grimes was pointing to. And I remember at an EC meeting, one of the -- maybe the second EC meeting I was at, and it was still potentially going off the rails. They will -- they were still trying to sell this, this two-commission structure, “Infrastructure”, which is the way we move data around, the way we observe, setting standards, and then “Services”, because the member states, really a lot of the member states around the world, they want a more solid foundation for the services they provide. And I remember intervening and just saying, Look, the Earth System Science part is something that we are now teaching at universities. This has been introduced in the curriculum since the 1990s. We are already seeing the future, our future, the people who are coming up through the universities,more in an Earth System Science framework -- interdisciplinary -- than what we grew up in. And I -- this should be a given. In terms of the two, the two commissions, I said, "We're debating what to call them." We're resonating with infrastructure. They were resonating with services. But I believe we really need to build the weather, water, and climate infrastructure. We need to show that linkage in there and in both the infrastructure and the services and have that drive.

Then the strategic plan, which was being developed during a similar time, was being developed in parallel. And we grabbed that. They grabbed that, and that really helped. The climate and the weather communities actually jumped on board pretty quickly. It was the hydro community that, they just -- they've been suffering for so long from the lack of attention from their own governments that they were really afraid to lose their identity in that, but we brought them along. We just went through an extraordinary Congress two years later here in 2021, just finished it last week. They had a special session on hydro, and they basically got the recognition they needed, they got the declaration they needed, but they're still, to move it forward, they're still built into this infrastructure, which is really key because it turns out -- I believe this -- that the water cycle is probably the linkage between weather and climate. So, you absolutely need to have the hydrology community. Anyway, we've made it work, and the WMO is now two commissions.

Things are moving rather rapidly, including even the way all of this is relating to addressing the service needs at the regional levels. I think it's really working well. And it's going to be fantastic.

MF: Two years ago, about two years ago, you ran for president of WMO. Can you tell us why you ran as well as your thoughts on not winning the election?

LU: I was asked by the political team here at NOAA. So I considered it, and I thought that I didn't -- I didn't think that I could win, quite frankly, because it was very clear that, outside of NOAA -- I mean, Neil Jacobs really was sticking to a science-based service-type organization. And I believe he believed very much in the sciences. I also believe he thought he could influence that at a higher level. I don't think he had much influence on that. When push came to shove top-down, the science was not part of the equation. But he felt that it was important that I tried, and they game-boarded and felt like I could, I could win that election. Based on not only the science-based service aspect. Remember, this is all developing. David Grimes was encouraging me to be a major spokesperson on this, on these topics. And I could tell he was appreciative of the work I was doing. So I had that sense that we could garner support, but not his outward support - the countries don't advertise exactly how they're going to vote. But that I was in line with what needed to be done. Gerhard Adrian, Professor Gerhard Adrian from Germany was the only announced candidate at the time, and basically having another candidate would be helpful to the organization. So that whole dynamic was, “Okay, I'll give it a shot."

But I think the other part of the political interest in me doing this was that I was articulating the public-private relationship. Because I believe in it. And I believe the importance of the private sector across the whole value chain. We can't -- we can't do it alone. And building a Weather-Ready Nation, we can't do it alone even realizing our own mission. We need the larger enterprise working with us, not competing with us, but working with us, and we working with them, providing the basics of what they need without having to tell them what to say, because we can't do that. They need to see the realization that, working together, we can serve this country better than working against each other, which is where I've been trying my whole career within the Weather Service in terms of working with the private sector. So they saw that, and they thought that I could articulate that really well. We were working towards this declaration, the public-private declaration in the WMO at the same time. It wasn't just restructuring the WMO, it was also having this kind of a declaration and getting the member states to embrace the private sector, which we did, ultimately in the Congress in 2019.

So I agreed to do it, and I put everything I had into it. But I also -- one of the people I called up when I decided I was going to run was Gerhard Adrian. And I told Gerhard that if I lost, I'd be the first one to be down there shaking his hand. And I would work with him to accomplish the agenda that he has to oversee, which is the decisions of the Congress. So I wasn't going to approach this from a disparaging perspective. It was a matter of trying to bring what I could to it. At the same time as I was running, I was also asked to co-chair the effort to create this Joint Collaboration Board with the word "collaboration" in there between the ocean and the atmospheric communities, the weather, and climate communities and with the word

"collaboration" to replace this JCOM. We did that across the whole value chain. We had this incredible love fest, I would call it, between the ocean and atmospheric communities, and the working teams were really phenomenal. The leaders of each one of the teams, one from the International Ocean Commission, the other one from the WMO. Once they - I mean they all realized the need to work together. I have Craig McLean's bumper sticker, "If you like your seven-day forecast, thank an oceanographer." And I think it's just right behind you over there on the -- on the shelf. That I -- like your seven-day weather forecast, question mark. Yeah, thank an oceanographer. So we really, really were doing tremendous work in there, and that did bring attention. I mean, David Grimes specifically pulled me out into the hallway at the -- in Geneva and said, "I want you to lead this collaboration team for the WMO because you really believe in collaboration. And I believe you can make this work." We made it work. So I had this activity going, and I decided that I would give it a shot. And then I lost. [Laughs]

So the one thing, one thing I should, I should note that I did say to Neil Jacobs and Taylor Jordan that I thought I would lose. Right at the first day that they asked me. In fact, I told him I wasn't going to do it at first. I said, "You know, there's no way the permanent rep from the United States, no matter who they are, is going to win this election." Because at the same time, President Trump had already pulled us out of the Paris Agreement. He was spinning up other people in Europe and in South America, to be anti global warming. It was -- it was a crusade to shut down global warming. I literally was having trouble figuring out how I would do this. But Neil and Taylor convinced me that oh, they'd provide the top cover, Well, you saw what, what happened there with -- in the fall of 2019. So the thing is, I didn't go into this with the expectation that I would win. But as I campaigned and went around the world, and I've got to tell you, it was, looking back on it, I'd do it again because I learned so much from going to different parts of the world, talking to the members. Having again, literally getting a better understanding of their needs. I went to the Caribbean. I went to South America, went to the Arctic meetings. Went to Asia. I'd been in these individual countries before as part of bilaterals or whatever. But this was different, and I learned a tremendous amount.

I actually started thinking we could win. And right up to the Tuesday of the week of the election -- the election was held on a Thursday -- the way votes were being estimated, you can't really count. And it looked like I was going to win. The feedback we were getting from Africa, especially, the African countries, the French-speaking countries. And the very strong English speaking. There was more dispersion, let's just put it that way. But you know, if you don't win Africa, you don't win. I got 85 countries, 85 voting members. But we, we had meetings with them and Gerhard seemed to be aloof. But by Thursday, that vote was at two o'clock. They closed the doors. Everybody's in there that should be in there at two o'clock. By that time, the folks from the State Department who were next to me were saying, "Uh-oh, uh-oh," and I can explain what was involved there. But the point is we thought going into Thursday that we're going to pull this off. And then the numbers were just completely opposite of what our people were writing down we would get, and it involved the flip of 35 votes from the African nations.

GR: Do you feel clearly this, as you've acknowledged, this is probably more members voting against the administration, and not against you personally?

LU: I was told that. No, no, and people came up to me later, diplomats came up to me from -- the European bloc was strictly for Gerhard Adrian. We had already kind of wrote that off. But we didn't write off Africa; you can't write off Africa. And by 35 votes flipping, it was just the opposite numbers than we had. But the diplomats from Europe came up to me and said, "This was not a vote against you." David Grimes, and [Petteri] Taalas (WMO Secretary-General) came up to me later and said, "This, this was not a vote against you." And even the German -- I would say the German handlers of Gerhard, you know, we had dinner. We had dinner at the same restaurant, and I went over to their table, sat down, and we just chatted, and they were with Gerhard sitting there at the table. And I don't think Gerhard expected to win. But the international wall was, as I was reflecting later, the international wall was always lurking right there, right behind the curtain or right under the surface and emerged at the right time. And the reason that the diplomat said, "Uh-oh," was that in a number of the African countries, it wasn't the permanent representative that sat behind the mic for the -- for the country which means they are holding the voting. It was the people from the embassies. So they got their marching orders from the leaders of the country. "This is who you're going to vote for." And they knew that, and the German delegation was loaded, and they were all smiling. So they knew -- they knew the -- I would say they sensed that the fix was in.

Now, one other last story about this. I had my phone -- we weren't supposed to have the phones on, but I had my phone on with a message ready to send to Susie. Either way, alright? And this was probably the only thing, only adventure in my professional life that she wasn't all in on. She saw this as a major -- it would be a major disruption in our family life. And it was also getting near to the point where I'd be retiring and we're older. I mean, Gerhard's 10 years younger than me. Yeah, 10 years younger. Now, he's -- I'm sorry, he's about eight years younger, that kind of thing. But still, he -- he'd be forced to retire right now if he wasn't the president of the WMO, and I'm still doing this. Anyway, she was not in for this. So when I texted her, I texted her, "It didn't happen." I swear, she got back to me faster than any text message I've ever sent to her. [Laughter] And it wasn't, "I feel so bad for you." It wasn't it -- wasn't that, I could tell you. And I was relieved. I was relieved for her and for me in a way because I reflected on two things. That it wasn't going to work. All the interaction I was having with folks in South America, especially, I would say maybe I got 50/50 in South America, even though they thanked me profusely for the South American desk which we spun up in NCEP under my initial watch back in the mid-'90s and the Caribbean desk. I felt very strongly about the Caribbean countries, in Southeast Asia, but you know, it just was like it wasn't going to work. The South Americans, the permanent rep from Peru kept on coming back me. "How are you going to handle the global warming aspect of this? There's no way you can handle this." I mean, he was very -- the handlers for me were [...] reacting to him. Like I was -- give it up, you know? "Stop, stop asking him the same question over and over again." But I, he was one of the first people I thought about. He was actually right. I could not have handled this. And it would have been a major impact on the home front. It is -- there's no question about it, so I was somewhat relieved.

But I looked around me, the folks from the international group we have here, Courtney Dragon and her entire team. They put an incredible effort into this. They were sitting around me, and I

could see that they were dejected. Neil Jacobs was dejected, and he was very supportive of me during this whole period and even afterwards. He got more engaged in the kinds of things that we were trying to promote within the Weather Service with Weather-Ready Nation. He's very supportive. He was very dejected. And maybe he was reflecting as well on what this meant, within the political realm of NOAA because it was clear that it was a vote against the President and the administration writ large. So I felt, I felt bad for them. But I was relieved for myself and the family. There's no question that it would have had an impact. But it was funny. I talked to Susie, my wife, that evening. It would be evening here. It was late afternoon there, and I, we talked it, we talked it through. She says, "Well, how do you feel?" I said, "I'm fine." She said, "No, really?" I said, "No, I'm fine." I said, "Your response, your quick response, helped -- actually helped the situation."

So yeah, that was a great experience all around. And quite frankly, it helped -- it helped me within the WMO because it really, I brought more ... and the IOC (International Ocean Commission) and WMO JCB was still going on. I was supposed to only have to do that for another six months, but I wound up doing that all the way through this, this extraordinary Congress. I was treated, I thought, well by the IOC in part related to the fact that I did run for president. I met a lot of people that I wouldn't have met. And, and I think back here, it helped the Weather Service because we got more support from Neil and Taylor Jordan after that. And certainly, they saw that my feeding into one of their major priorities for building this linkage with the public-private, and not only here in the United States, but around the world, was very important to them, and that I was all in on that. So it did help in that regard. Up until Dorian, but we'll talk about that later. [Laughter]

MF: So the WMO has adopted Weather-Ready Nations.

LU: Right.

MF: As a result, there's obviously hazardous weather, including heat across Europe and in other countries. So the question really is, are these countries -- Europe, in particular -- lagging behind the U.S. in adopting --?

LU: Yeah, so the Weather-Ready Nation initiative was becoming better known within the WMO, and there were some folks there who really -- and as part of my going around the world and speaking to myself -- about myself running for president, I still gave talks on the WMO initiatives with respect to the restructuring, but also on what we're doing here in the United States, and what I would bring forward. That our job doesn't end with the forecast warning services. We have to link to decision makers. That program actually got started through USAID in the State Department working with us. They liked what we were doing here as something that we could bring, and it actually started in the Caribbean area with some immediate successes like Ecuador. I'm sorry, not Ecuador -- El Salvador, El Salvador. But other countries in Central America were also resonating with it and in the island countries in the Caribbean. We started what -- what it involved was training the people in the weather community in how to interact with the people who are making decisions, how to start the process of developing the trust in

relationships. What would be needed to take you beyond the forecast and warning is knowing their key decision points, the fundamentals. Making it work. And in some countries, it's taking off -- like I just pointed out, you got Sri Lanka, you got Southeast Asia. There's work going on in Indonesia. They actually talk about it in Indonesia. The permanent rep there now talks about Weather-Ready Nations when she's making interventions on other aspects.

They picked Croatia as the first European country. That didn't go well [laughter]. My understanding is that it didn't go beyond the first meeting. Okay. There's -- I haven't seen the embrace of it in Europe that we have seen in other, in other areas. Varley -- Rob Varley was the UK Met CEO when we started off. He's no longer the UK Met CEO. But he actually walked around with a draft of our papers. And the paper I wrote with John Ten Hoeve. He walked out with drafts of that as consultants for Australia and other countries in Asia with that paper at hand. I mean, he was really all in. So there was -- there was some flashes in Europe, but really not, not the follow through.

We've seen situations with extreme events with this rainfall aspect. This year, now with Europe, Asia, United States, and the one in Germany, especially. A lot of finger-pointing about -- the forecasters are saying, "Hey, we gave them the forecast. How come they weren't preparing for this?" And the people who got wiped out in the floods of this will say, "There was nobody, no boots on the ground to prepare or to deal with the situation. They were very late in getting to the places that were affected by the floods". So, yes, Europe has some work to do in that regard. But in a very real sense, with these heavy rainfall events that we've had in the United States, it's with the Weather-Ready Nation, with the trusted relationships. When you have events that you've never seen before like 3.15 inches of rain in one hour in New York City. They're setting a record two weeks prior to that at 1.9 inches. The impacts are so large and perhaps -- and I want to be a little careful here, perhaps the infrastructure is not able to deal with those rainfall magnitudes; that we might be in a whole new territory with this. So even if you're ready and responsive, if you get these types of events you've never seen before ... your infrastructure can't handle it. Europe, us, Tennessee, right? It looked like a tsunami hit that -- those communities along those river basins with their flooding rains that they had this year. And how do you convince people to take action [for an event] that they've never seen before? Especially in New York City. We had a flash flood emergency for the first time ever for the whole city of New York -- all five boroughs and Nassau County, northern half of Nassau County, Westchester County to the north. It's stunning. How do you get people to respond to that? Well, they went back in their houses. So the thing is it's a big problem for all of us. But from a Weather-Ready Nation perspective, there are components of the globe that are really starting to embrace this concept of going beyond the forecast and warning. Dealing with your decision makers in a way. You treat them as equal partners, you practice with them, you know their key decision points, and you ensure that people are ready for and respond to the impending, the oncoming event. That's gaining traction. I suspect that over the next two, three, four years, it will be even more so. We do work through the WMO in doing this, and the WMO was helping to coordinate that, especially the way they do in terms of helping us with countries that actually want to do it. But this is an initiative that started here, and it's still basically managed here, but I suspect it's going to grow through the WMO.

MF: So one more question before we wrap up discussion of the WMO. What do you think their biggest challenges are?

LU: They have a -- I would say the data issue. One of the things that just came with the new Congress, we, we really focused on the data and the data from the Earth System Science perspective. Not just working by ourselves in the atmospheric domain. But ensuring that that data is flowing to the modeling centers is really important, so that's now going to involve dissemination. We certainly need to deal with the -- what I would call the size of our distribution pipes. Not only within the country, but how we tap into the world centers because we are one of the world centers in running our models and making that [data] freely available. So we have those issues.
We've just in this extraordinary Congress in October of 2021, just passed Resolution 42 to replace Resolution 40, with the free and open exchange of the -- all the data. Not just the atmospheric data, but the data based on the Earth System Science framework. Executing that, getting the resources to do that is going to be a big challenge. And that's something that the WMO is working with the larger UN to get member states that can provide money to support the developing countries is something that's now being looked at. So those are the kinds of challenges. It's to execute these plans that we've now been working on for four to six years, the major decisions that have been made from a WMO programmatic and policy perspective. As we're reminded, every decision that the WMO makes, you can't tell a member state what to do. You can advise, you can encourage, you can -- you can try to show the benefits that they will gain from doing this free and open exchange, but it's still a matter of the country's policies and laws. So it's a -- this is going to be a long haul in doing that. So I think those will be the biggest challenges.

Capacity building is still a challenge. Our training desks are remarkable. That's another one of the remarkable achievements I've been, I think, proud to say that I've been involved with, like the South American desk, the Caribbean desk, the African desk, all three desks within NCEP. The Pacific desk that is run out of Honolulu. A tremendous asset for the rest of the world. The capacity building that's needed for the member states to improve the services is facilitated by the fact that the permanent reps of -- from around the globe now have been through our training desk. They've been around for 20-30 years. So we have a number of permanent reps that have been through these training desks. And that's going to be, I think, a shining star for us into the future as it -- as it actually is today. And I'm proud to have been associated with those.

GR: Shifting gears, March, middle of March 2020, you and I were sitting in a bookstore near your home in Columbia, Maryland, reviewing a paper as the swirl around the COVID-19 pandemic was exploding. I remember you were checking your phone all day. [Laughter] And of course, by the end of the day, we are all making plans to telework full time. Here we sit more than a year and a half later. And while the world's - at least the country is largely vaccinated, but there's still many risks. Even as we do this, we're wearing masks. And we're staying socially distant as we do this interview in-person. The first time we've been -- I've seen you since March.

Tell me about -- please reflect in your thoughts of when the pandemic hit your top concerns for the agency and yourself and a little bit about what are the lessons learned?

LU: Well, of course, you plan for a continuity of operations. You plan for a primary backup for each station. But you don't -- we hadn't planned, and probably I think it's fair to say hadn't wrapped our heads around the notion that something could happen that could shut the whole system down. So as March was unfolding, it was very clear that things were happening rapidly. There were a few cases out in Washington State. And then there were a few cases in New York City making the news. And then there's a few cases in Northern Virginia, which is right across the border from us here. This is getting close. And of course, at the time, some of the top politicians, including the President of the United States, was making it seem like this is just, these are just a few cases. We'll isolate these, and there's no way this is going to break out even as the World Health Organization was speaking to the pan -- this will grow into a pandemic. In other parts of the world, you're seeing accounts of people dying from this thing, within days of -- so the fear factor is going up.

Right after that, Greg, I actually remember that conversation with you. There was, "Are you even going to get back to Phoenix?" I mean, it wasn't - are you walking or driving? [Laughter] You know, because everybody else is starting to rent cars, right? To drive. So the thing is, I was getting the sense very quickly that we were going to go into a mode where we were not going to be coming into work. And the big fear that we all had, I believe within the Executive Council, is that the -- we could shut down. So completely. I remember coming back here that week. We had a meeting of a NOAA tag up of all the NOAA leadership teams. We were going to do a test of whether we could even work from home. We did something like that on a Thursday of that same week. You were here at the beginning of the week, I believe. And the test was, "Hey, we could work from home." I remember coming in to the NOAA tag up on Friday. And they said, "Well, what's the next steps?" I said, "Well, the next step for me is “I'm working from home”. Because you know, I'm in this, in this category (age) that's at risk." I'm over 70 years old. I'm not going to mess around with this. But we've just shown that it works. Test is over as far as I'm concerned, and it turns out that John Potts (was thinking the same thing)-- I was -- I sort of practiced this with EC; everybody at the EC was thinking the same thing. John Murphy was now polling the regions on what to do, what they wanted to do. He very quickly as the chief operating officer saw that there were regional directors who had ideas on what posture we should take in a way that we could keep on going. What would we need to do? There, there were things that we could do from home. There were things we couldn't do from home because we didn't have an AWIPS-like system that people could work on from home and do that at that time. But you had other things that could be done from home. So you could start depopulating the office, and then you could figure out how to do a shift change without meeting, keep the shift separate from each other. Strict enforcement of masks, this kind of thing. So that discussion was going on by the time I came in here on Friday morning. I was getting, "Hey, we're already testing things" that week. So when I went to the NOAA tag up, I said, "Test is over." We -- oh, there were cases now being reported in Silver Spring. In fact, hotspots in the DC, Silver Spring area, which we're right on the border. We're like two blocks away from the border. I said, "We -- I'm not -- we shouldn't be coming back here on Monday. We should use the weekend to spin up capabilities."

The other AAs were all in. I know Ben Friedman was all in as well. He's the Deputy Undersecretary for Operations. So that's what we did.

It was really remarkable to see how creative and flexible the field was. And determined, by the way, because everybody felt like they were dealing with an unknown situation. To get this set up where people worked from home, we started doing backup of offices. Not just primary backup, but secondary and tertiary back up because we were now coming into the severe weather season as well. And hurricane season isn't too far behind. It was some people saying, "Hey, you know, this may get into June and July. We may get into the hurricane season with this, right?" Well, we were operating from the point of view that in about a half a year, we'd be back. But still, that gets into hurricane season. So we had to do all of this. And I have to say, we did it. We -- they came up with ways of operating, two people per shift. That working socially distance apart with masks. No visitors to the forecast offices. Shift changes that go through different doors of the office, so there'd be no interaction between [shifts]. They have within the forecast office, they have about a half-hour overlap where the new shift is being briefed by the folks. The new shift was in their cars being briefed on the phones. So we never shut down.

I've got to tell you, the OMB and the Hill were very concerned about us because they wanted special calls, like week one or week two into the shutdown. "What are you doing? What can we do to ensure that you're not being shut down?" So we all, you know, had to do a half-hour brief to all these phone calls that Mary and I, working together, doing the briefings with John Murphy and Kevin Cooley. Infrastructure service, just like the WMO by the way, earth system science-based, weather, water, climate linkage, and I was already all wired in for the WMO. So there was a period of time we had, we had to rapidly get new laptops out that had more capacity for AWIPS-like-type functions. That took some time. So Dave Michaud at Central Processing, we got special buys in, orders in. Got them wired up, got them out within a month or so. It was really remarkable how things happened. So when I was briefing these folks, we would always start. "We've never closed. We haven't shut down. We've got primary, secondary, tertiary, quad [backups]." We went all the way around. And that served us well in the hurricane season because Hurricane Laura hit Lake Charles. Their backup station was backed up by other stations. We had three or four people. Because we're now in this virtual world, three or four different offices taking on the responsibility of Lake Charles with hurricane landfall, and that station took a direct hit, was knocked out. We didn't miss any products to the Lake Charles County Warning Area during the pandemic.

So that and then we had projects going on. We had contractors. We had to work, you know, differently -- we kept the contracts going. We kept some major things going like [installing] the next generation computer for our models. We had to get that all done by December 31,p. I think we got that done about eight o'clock pm on December 31. Because we had supply chain issues and things like that. We had to alter our procurements of, of the systems and things like that. Got done at eight o'clock on New Year's Eve, had four hours to spare. But everybody -- it was incredible. Everybody pitched in across NOAA and AGO, legal, all the way up through Commerce, OMB, to the Hill, everybody was on standby on the morning of the 31st. Everybody worked together to get through these, these points, the constriction points during this pandemic,

so I think we have a lot to be proud of, and our performance really hit. We really performed well in these severe weather outbreaks. Hurricanes, we had the fires, heatwave-type things, snowstorms in the northern Midwest. We were hitting on all eight cylinders.

Now, I would say that the stress level's gone up, and I predicted this. The social fabric of decision making is fraying. So how does that represent itself? You know, the collaborative forecast process, is this more -- there can be more tension. There's more tension in the decision making within headquarters. So you don't want to operate this way all the time. And I could see it now.

And the other thing is we didn't stop hiring. There was a notional thing put forward that we would stop hiring. The university people were going nuts because private contractors, they stopped hiring because they didn't know if the money was going to flow or not. But we kept the hiring going. And thank God we did. But now we have a bunch of new people coming in -- hundreds and hundreds of new people we've hired. Where do they get that collaborative spirit from, that sense of belonging in the day-to-day interactions within the forecast offices? So for a lot of these people, they've met with their MIC. But they're basically dealing with the rest of the office through the screen and all that, so that -- that's a problem that we, that we see. So you don't want to continue this. It'll be more hybrid as we move forward. But we were flexible, safe, flexible.

GR: And you were flexible, too. I mean, I know this was a very different way for you to work. What do you see as your greatest personal challenges over the last year and a half or so?

LU: I would say it was the lack of personal contact. I thrive on the personal contact. I love walking the halls. I know it annoys the structure, the management structure. Bumping into people, talk with them, go to a different floor. You know, we've had some major challenges with our dissemination systems. It's probably, we didn't really define -- maybe we need to get back into the defining our, our budget structure and how we made that work. But the dissemination aspect has been a challenge. Because we didn't have a national dissemination system when I took over. You just don't make that out of wool cloth. I would just show up on the fifth floor in Michelle Mainelli's office and say, "Okay, give it to me straight. What's working here, what's not working? I've been thinking about this, or I've been thinking about that, and this is crazy." Or, so what are you seeing from the cloud perspective? We got this new cloud document. I mean, things like that I thrived on. Couldn't do it. It's got -- I don't even know how to set up a link that automatically pops up everybody on the Google meet or something.

Everybody's always -- so if I'm setting something up, everybody knows, right? I have lost that, that sense of freedom. But more importantly, it's just the social fabric of talking a problem through, reading the room. I can read a room. Hey, this isn't going well with Person X or Person Y. They say they're on board, but that's not what their body language is telling me. So I've stopped meetings. Now, tell me what's really going on. Or why -- you say you're for this, but you're not. Are you really for this? Or are you just doing it because you want to make me happy? I can't do that over the screen. I can't read a room. So that's the social fabric of decision

making. Education, we saw it in education. Management skill development is missing in this. That was my biggest problem. I have handlers, so I was able to get through the technical challenges. But you know, I wouldn't be able to do that without my XO. I keep on telling them, "What am I going to do when I retire? I don't have an XO anymore." So that, that wasn't really a problem. I could see we were advancing. After six months, we were definitely advancing. We were doing well during hurricane season. So I relaxed on that part. But it was that social fabric aspect that really, really bothered me.

GR: You didn't learn to edit on Google Docs. So I mean, this was -

LU: -- yeah, and remember to do it in the suggesting mode. [Laughter] Yes, that was a how do, how do they get those things that show up, you know? [Laughter] I had to be told about four times, "Yo, hit the pen first." [Laughter]

GR: From my perspective, it works. Reflections on your leadership of the NWS. You've been the director for nearly a decade, and you recently announced your retirement at the end of this year. So it's, it's appropriate that we end this session on your reflections about this time and your hopes for the future.

LU: One of the things that I want to get back to is that budget restructuring and headquarters restructuring in the governance. The budget structure was important, that we were following the forecast process. It's like the budget structure we had was 30 different elements that nobody could really even remember why we had like three budget categories and NOAA weather radio. By the way, you can't move money between the others. So if you don't have enough money for leases, you can't take it out of the development. That was - it was like there was no logic to this. And when I was in here, reflecting on it, I said, "Well, we've got the forecast process. We've got observations, central processing, Analyze Forecast Support, We've got to connect with dissemination. That's it! Four budget categories. It's a forecast process, then Science Technology Integration. We're a science-based service agency. We've got to fix it. We've got to improve it. We've got to advance it. We've got to work with the academic community. So you got to have STI, and you've got to house it -- Facilities, six. I could defend [the budget categories] anywhere. I know what the highest priorities are for each.

I was challenged at the very first meeting by Jim Lee. I rolled this [budget and HQ restructuring] out for the field at the very first AMS annual meeting in 2014 that we could actually go to. And I laid all this out and how important it was going to be, not only for us at Headquarters, but for the folks in the field because it would give them a chance to influence the budget process. People were asking questions, and they seemed interested. I could tell you that when we developed this in two years, which is a whole discussion in and of itself, we had about 200 people involved in this, most of them from the field, actually. It is, it's just a lot of -- in every regional office, they saw this as something they could make work, right. But Jim Lee got to the mic as the MIC and said, "How do you know when this is a success? How do you know? How are you going to measure this as a success?" And quite frankly, I wasn't ready for that question. I remember looking around, and it just popped into my head. I looked back because he was looking right

through me. Jim Lee's a great guy. But you know, he's, he's had experience in Headquarters. He knows that it can be BS in Headquarters. They say something, and the next year they can't remember what they told you. So I just looked at him. And I said, "When it's serving your needs. When we're advancing this organization because it's serving your needs, I will know that this has been successful."

So we get to your question today and reflecting back, I think right from the get-go that restructuring and headquarters reorganization that made the budget-planning process over three years focus on field needs -- [remember] the right side of the organization structure is Analyze Forecast Support, supporting the Chief Operating Officer and the Mission Delivery Council. They drive the needs and the other portfolios under Office of Planning, Project Planning for Service Delivery -- **for Service Delivery.** I put -- I didn't care that was a long name. I wanted that in there. The [HQ Restructuring] locked-in the three-year planning cycle; and the year we're moving into covered by the annual operating plan has now been cooked [into the HQ offices] literally over a two- to three-year period. And now we're in and everybody's signing off on it (The Annual Operating Plan) for service delivery. I think it's working. I think it's worked.

I think at all the office visits that I was having, people could see [that this budget structure and HQ support was working] -- I'll never forget this. I had like three or four offices. I walk -- including Birmingham. The thing that they wanted to show me when we were walking around the office was the OPL wanted to show me the drawer….. full of radiosondes, the balloons and the instrument package, that this was the first time he could remember a sustained full drawer of supplies for the radiosondes. It was always like, "Well, we got 10 more left. I hope they send us -- I hope that new shipment's coming in." That's the way it used to be. And I told them that would -- "The reason you've got those supplies is because we've got an office of observations with the observation budgets they have responsibility for." And upper air is one of their main components. You're it. So I feel really good about that. We have not had a project go over budget in the eight plus, almost nine years now. It'll be three months shy of that now. So by the time I retire it is like four or five weeks shy, right? We've never had a budget go over. We have -- we spend what we have to within several $100,000. That's what we give back after that two- and three-year cycle on the different budget categories. With budgets that have gone from .9 billion to 1.3 billion. That's a $400 million increase. Why do we get that money? Because Emergency Management communities came to the Hill and said they need this to help us prepare communities. And the Hill has confidence in what we're doing now that we will actually budget to what we're given, and we'll budget to the plan. And they see it serving the field. So I feel really good about that. And we've made progress in each one of those portfolios that we can be proud of. Whether it's the NEXRAD SLEP which is almost done and will now have NEXRADs operating to 2040. The autosondes in Alaska Pacific Region, eight down here showing that this is a viable way to go. And it frees up resources for people to focus on providing IDSS.

This is all working to the point where we've just decided to include impact-based decision support services [into the NWS mission statement], with the embrace of the field, by the way. They were all in. This was a really a great strategic plan, Weather-Ready Nation, they bought

into, but it's now written into the mission statement. That it's providing observations, forecast and warnings. This is the weather, water, climate. Well, observations, data, forecasts and warnings, and [now] impact-based support services for the protection of life and property. It's a recognition that we absolutely need that to meet our mission. I mean, this is terrific. It took almost nine years to make it happen. But it's happening, and we're seeing the results of it. Fewer people dying in hurricanes. I think four out of the last five hurricanes that made landfall, there's only been a few lives lost in the surge. That used to be the main killers. Yeah, we had a problem in New York City with that heavy rainfall. Turns out, was it five out of the six? It was only six apartments that flooded basements. But the point is, this is essential because people are seeing it's positioning us for the more extreme events.

The fire -- the [forest] fires burn hotter, faster. So the whole preparation and response to fires is changing because they're evacuating communities days before a fire is projected to come into that community, not when it's coming over the ridge. And then the firefighters have to focus on evacuating people. Now, all the evacuations? Well, that's more IDSS. It's more agencies involved. We are right there in the middle of the whole intergovernmental decision process, giving them a consistent and accurate set of information forecasts, giving them confidence levels and the like that they make the difficult decisions on when to start evacuation. It is saving lives and protecting property. And I'm really proud of that.

GR: You've said in the past that one of the great things about the Weather Services is the Weather Service has bipartisan, bicameral support. You've got the trust of the Hill above you, to sustain change, grow and improve, and under your leadership, the Weather Service has absolutely demonstrated that. At the same time, we -- you mentioned it earlier. We had Hurricane Dorian and “SharpieGate,” which sort of threw that trust under the bus, for lack of a better term. So what were your feelings, what were your actions in the aftermath of that?

LU: It was very clear, and my interactions with Craig McLean, who is the OAR Director and sits on the Research Board and was the acting lead for the Research Board, that this was a scientific integrity violation as well. And we have very -- the political leadership of NOAA does not interfere with the forecast process. What we found out is that the Department of Commerce, who we report to, doesn't have such -- at the time it doesn't have such a commitment to the scientific integrity. So I found myself very upset and confused. Confused about not, what they did was wrong. But why would anybody even do that and sense that that would be a good thing to do. Alright, so there was just, this moment, when I first saw the appendage put onto the map, I [was sitting] in this office. That was like on the Monday or Tuesday of that week. Late in the day, my chief of staff, George Jungbluth came in and was holding up a phone. He said, "Have you seen this?" And I couldn't -- he's standing by the door walking towards my desk, and I didn't really see it until he got right to the desk, but he was saying, "This is not good. This is not good." And it was the picture of the President holding up -- and was like, Well, yeah, you're right. This is not good." But it was also at a time, that Monday or Tuesday, when it was for sure. I mean, it was already happening that the storm was going up the coast. So Alabama wasn’t in. Again, you know, that confusion. Why? Why are we retreading this anyway? This is something that apparently happened over the weekend. And his first statement about Alabama being in [the

cone] was over the weekend. And then he shows this on Monday or Tuesday. So this, this whole thing is like being dragged out. Why? I mean, that's what was going through my head. So of course, at that point, we were hoping it would go away. There's no sense confronting the White House if it's going to go away.

And then we got into Friday. And what's interesting about Friday, there was some other things going on with respect to the budget discussions that I needed to talk to Neil (Jacobs) about. I had written him an email and Taylor Jordan email about this budget item. I can't remember what the budget item was now. But I really wanted to talk to him by -- before I went home on Friday, I wanted to sort of get this -- at least get my views to him on this before I left. So about three o'clock Terri comes in and says, "A call has been set up for you for 4:30 by Neil." I said okay, so I waited around. You know, Friday afternoons, the traffic around here is pretty bad. I was saying to myself, "Well, if it gets much later than 4:30, I might as well plan -" I texted, Susie and said, "Well, I might be home like at six because I don't like driving into the main thrust of the traffic here on a Friday evening." So then I'm waiting, I'm waiting, and the phone call finally comes in. And I got everything laid out for me, you know, on the desk on the budget. And I can tell you right now that I can give you sort of a blow-by-blow description, but Taylor is the one that initiates, started the call. He said, "Neil is held up a few minutes, but stay on the line. When Neil comes on, we have -- we have something to talk about." So I wait on the line. And about 10 minutes later, Neil gets on. And it was basically started by saying, "Well, this is the way it's coming down." And I said, "What do you mean?" My reaction was, "We haven't even talked about the budget thing I wanted to bring up." How this could -- and he said, "No, no, no, this is something else. I've spent the whole day since three o'clock this morning working on a statement from the White House about the Birmingham office contradicting the President of the United States." I said, "Okay," [and] just pushed everything else away and listened very carefully. I'm hearing this for the first time. And he says, "This message will come out in about 10 minutes. I wanted you to hear about it from me first." So he reads the message out. And I immediately realized this is not going to end well. And that I couldn't -- I couldn't accept what they were doing. I literally, try - he -- Neil had this thing about deterministic versus, you know, you can't make a deterministic statement. I immediately thought to myself, well, if you're looking through the lens of physical science, you might come to that conclusion. But if you're looking through the lens of social science that we've been training our people now for how many years? Now six years, five, six years, not just in Birmingham, but across the whole -- the whole US that this is exactly what they need to do. This is exactly the way they need to message. In this case, to stop this rumbling that could have just turned into a panic kind of thing. This was on that Saturday or Sunday, whenever that -- I guess it was Sunday around noon when the President made that comment. So I wasn't buying that part of it. I wasn't confronting him. He was still reading, but I immediately thought that's not right. And then he got to the Birmingham office. He literally called that out. So I said to Neil, I said, "You know, I don't really agree with you on this deterministic bit because for -- you know." I says, "But, you know, I can understand where that could be debatable. But the point is you're calling out a single office. I'm not -- I think you're making a fundamental mistake there." So, and I didn't say, I didn't tell Neil, "and I'm not going to stand for it." But I said, "You're going to make a fundamental mistake." And Neil said, "Hey, I'm going to need your backing on this." And I said, "I think it's a fundamental mistake." I didn't

answer his question. "I think it's a fundamental mistake that you're singling out an office." It turns out that Stu Levenbach was on that call. He's the chief of staff. And he started arguing with Neil, and Stu called me up later on his way home to say that he didn't know anything about it. So it was Neil then, did say that he was in contact with the White House the whole day. And that his theory was, "Well, if you think this is bad, you should have seen what I had to start with at three o'clock in the morning." But I said, "Still, it's not going to end well." I said to him, I said, "It's not going to end well for you if you call, calling out these offices like -- this office like this." He says, "Oh, it's Friday afternoon. It'll blow over by Monday. It'll be a non-story." I said, "I don't think so. I think you've got a problem here."

So I got done with that. The door was closed. I walked out. George was there and Mary because they're waiting for the budget information. Mary Erickson. I said, "This wasn't about the budget." So I went into Mary's office. I close the door. I said, "We need Susan Buchanan here." Communications. Mary looked at me. I said, "We got some --." I tried to explain everything that I just heard on the call. Of course, I didn't. I hadn't even seen the statement. It was read to me. But I told them what was happening. So our first goal was to get Susan in. Let her know what was going on. As that was happening, we needed to trace the -- trace down where the MIC was. And other management of the office because I wanted them to hear it from me. I didn't want them to hear it from [the media]. So it took about 15 minutes to track down the MIC of the Birmingham office, mainly because he had stopped answering his government phone because from Sunday on, he was getting threats. The whole office was getting threats. So I can tell you this, and it's important because that -- we were talking to him and explaining what was going on when the message came out. And so we read it together, and I told -- Chris Darden also was involved with this, this whole pulling, trying to pull this together from the Birmingham office, and we just read it together, basically, seeing it for the first time.

I understood this was going to be a leadership issue that I couldn't accept. This was certainly going to be a mark on my ability to lead this organization, that I would lose the workforce. But I also had no hesitation to [not accept this statement]. Because I realized this was wrong. This was just flat out wrong whether it was a scientific integrity effort, issue or whatever it was. It was flat out wrong. So what I told Mary -- I was working on a talk for the NWA. I had the keynote opening address scheduled for Monday. I told Mary that I would adjust this on the keynote. I -- then we talked a little bit with Susan about some immediate things we would have to -- because the Washington Post was all over this right from -- and the whole media thing just blew up. I went home on that Friday, knowing that I'd be giving a speech that I would not be giving my slides [about] Weather-Ready Nation. I would be writing that speech on my own. I didn't want anybody associated with that speech but me. So they would have plausible deniability, because I really thought I was going to be let go. So that was a -- that was a sleepless weekend for me.

GR: For our listeners, I will, I would also mention that I flew into that - that meeting was in Huntsville, Alabama, just up the road. And I flew in that Sunday night. And you told me exactly what you just said that you will be giving a speech and you're writing it. And you were not sure what you were going to say. But when you did give the speech, the entire room gave you a standing ovation for backing the Birmingham office. I was probably never so proud as a

Weather Service employee to see our director standing by us. So I, I felt proud even though I had absolutely nothing to do with it.

LU: Well, well, thank you for those comments. And it does, I think, put the perspective on. One of the things I should note ... I've mentioned having an executive officer with me. Allie was, was my executive officer. And I remember her coming - up until Friday, four o'clock in the afternoon, she did leave about four because we had put together a draft of the slides I was going to be -- and she was going to work on those over the weekend. We'd meet on the plane on Sunday. But she left. She got on the plane on Sunday. And I handed her my first draft of the speech on the plane. And I said, "This is what I'm going to be giving. Type it up. And don't show it to anybody." So she was the only one that knew. We got to Huntsville -- we got -- we landed in Atlanta. We went over the typed version. I said, "You got most of the words right." I have a habit of writing. It goes into a straight line. But they worked with me long enough they can even read those. [Laughter] So I said, "Look," I said, "I'll -- we'll work on this when we get to Huntsville. But like I said, don't worry about the slides." We got to Huntsville at about two o'clock on Sunday. Between two and midnight we were working on that. So we -- they had a business section room down in the lobby with a glass door. And I would -- I would work up in my room and write. We'd meet down there in the business room, or I'd go over -- she would print out the new version after what I'd written on the first iteration. And then, I went up to my room and wrote. We'd come back to the business [center]. I'd show her what I did. And then she would go back up to her room and type. I'd be just walking around not trying to talk or just go up to a room and watch the football game or something or whatever, whatever was on then in September, so it was probably football. Just because I was trying to relax at the same time because by that time, I knew this is what I was going to do. And a speech was going to hit that from the point of view that, it is a science-based service organization. And this is what I came to the Weather Service for, and this is what happened along the coast. And this is what happened inland. And they were both right. And then I really focused on the Birmingham office. But I had to do it in the context of this being a science-based service organization, and they were doing the right thing. Well, Allie was real quiet. I mean normally, she's not very talkative like I am. But she, she was very sober in a way. She understood. I think she understood the gravity of the situation. She didn't say anything to anybody. There were people from the Weather Service walking past those with glass doors looking in. You know, asking us what we were doing as we came out. And I said, "You'll find out tomorrow morning." And Allie didn't say a word to anybody. You know, God bless her. So, I, and when I got done, when I walked up to that podium, I was probably the most relaxed individual in the whole room. And don't forget, it was James Spann ... Yeah, he was in the audience. And he was cutting right through me at the breakfast in the morning, that same morning about what happened down there. And what are you going to do about it, kind of thing? I just said, "Wait for the speech." So anyway, I knew what I was walking into. [Laughter]

GR: Sometimes you're at peace when you know what you're walking into.

LU: And know what you have to do. I mean, I really did feel what I had to do. And one of the things that I heard right away, coming off the podium, you know, Joe Friday sent a message out and said, "If you want to hear one of the really complimentary -." I mean, I forget exactly what he

said. You know, "the finest piece of leadership I've seen," or something like that, "listen to the last five minutes of this." And I thought, because Joe hired me in. He was part of the hiring process and me coming into the Weather Service. And when I did good work, he'd say, "You did good work." If I screwed up, he said, "You screwed up." I mean, it was no sugar coating or whatever. But I really felt good when I saw that. And then I waited to see how the hammer would fall, which it didn't.

GR: Nor did it for Neil the next day.

LU: Yeah, yeah. He had a rough time of it, though. He was -- and he had a rough weekend. The calculations that he was doing, obviously, didn't pan out. He got caught up in forces that were much bigger than all of us. And I'm not making excuses. And I certainly wouldn't -- I would like to say that I would have not done that. I think he thought if he left, it would have been worse. And he might be right. But that's for history to judge. I would not have called out an office like that. I wouldn't even have -- I would have just done it from a social science perspective. I don't think I could have been part of that whole writing exercise because I knew what they did was the right thing. Right from the beginning, there was no question in my mind that they [the Birmingham office] did the right thing. This was not a politically expedient thing from my perspective. It was, this was not right, what happened (to the Birmingham WFO).

GR: So looking to the future?

MF: Yes. So you just illustrated one of the many examples of why you have rockstar status in the whole meteorological community. And really, when you go to these conferences, and I remember when I was an undergrad, and you were coming to Millersville. And that was really why I came into the agency and have been here, how many years? People come up to you at conferences or meetings, and they want pictures with you. So we're all curious, who are your giants? Who are your rockstars that you look up to? Your personal heroes?

LU: Well, I can say, as you know, I've been involved in a lot of the historical papers. I've written chapters in books and things like that. And I got to meet some of the giants, you know, [inaudible], Dick Reed, Fred Sanders. My PhD advisor Donald Johnson, John Dutton with him. Chester Newton. I actually got to meet Sverre Petterssen. I wish I would have spent more time with him. He spent a month at the University of Wisconsin, and I read the book that was translated in, you know -- his memoir, is really phenomenal, to understand that the reason the Norwegians really got interested in meteorology with a sense of urgency was because they were losing so many fishermen out fishing in the North Sea. It was societal driven. So to read the material from the '30s, '40s and '50s, and the insights that these people had. The Palmén and Newton book, the Petterssen book, Sutcliffe's ‘38 article, Dick Reid and Sanders, Johnson and Dutton, Dutton and Johnson. I mean, the insights they had without having the numerical models just laying all this out for you in this -- in the way we were able to do in the '80s and the '90s with the models, the output. We used them as databases to try to, and I think successfully, peel apart the atmosphere and how it operated between the physics [and dynamics].

And so I've got that. With respect to my personal well-being, obviously, my parents, because, you've got to understand I was -- my brother, my older brother, Walter, said that he thought I was a nerd, with this talk about weather all the time. You know, it kind of annoyed him. Well, yeah, he's a pilot, and later, he thought I was the coolest guy in the neighborhood. So, I really do appreciate the fact that my parents saw this, and my Uncle Louis worked airplanes and understood physics and things like that. He got involved with me, although nobody knew that meteorology was applied physics and all that. So I really look at that, the roots.

But, you know, I just, I got lucky in meeting people along the way like at Syracuse. I went to Syracuse my freshman year because I didn't apply to other schools in time to get accepted. But I had Professor Hammond for a Geography course) who was really well known in geography. I mean, he is, and that's where the only weather courses in Syracuse were in geography. And I took the basic course in geography with him. And he just, and they saw me doing the maps with colored pencils on the test, getting 110 because I did the 10 -- the only one that got the bonus question right? And so the TA came up to me after the first exam and said, "What's, what's going on here?" And I told them what I wanted to do. And he said to me, "You've got to go to Wisconsin." Well, I'd heard that from a visit to the forecast office in Garden City, Long Island back when I was in high school. First place they mentioned was Wisconsin because of Vern Suomi. So the next day, I got invited to [Professor] Hammond's office, and he said the same thing. Well, it turns out, they just came back from a sabbatical (at the University of Wisconsin). And he didn't mention Suomi's name. He mentioned Lyle Horn, who I'd never heard of, and many people haven't. But it says, "They're building a new building, they got a really dynamic department, they got this whole spectrum of German scientists, you know, really famous German meteorologists, and new people coming in. That's the place you want to be." And he wrote a letter for me. I got a scholarship to go to Wisconsin. I paid $100 my first semester. Like, can you imagine? It's my sophomore year. I'm sorry for saying that. [Laughter] But she (MF) has kids going to college.

So the thing is Hammond saw that. I go to Wisconsin, and I, finally, you can't get into the meteorology [program] until your junior year. So my sophomore year, I'm doing -- still not into meteorology. I get into meteorology. And Lyle Horn, who is the chair of the department, I could see right away he worked with students. He was always in the fax room with students. I started -- I discovered the fax room. It was like going to heaven. These maps. Real-time maps. You don't have to buy a newspaper to see a weather map. I couldn't get enough meteorology courses but took my core course my first semester junior year with Charlie Anderson. And then he says, "You know, you did really good, You did really great in this course. You got an A. And why don't you take cloud physics next semester when you're taking the second core course?" So I did. I didn't realize it was a graduate level course. But I got an A in it. And then I took micro with [Professor] Lettau, and I got a B. That was the only B I got. It was a graduate level course. I didn't even have the equations of motions yet. So here I am working on equations of motions with...

Well, (after the Cloud Physics course) Charlie Anderson taps me on the shoulder and says, "You know, you're really doing well here. What's your plans?" And I said, "I'm going to be --

maybe I'll be a forecaster in the Weather Service," and I was just enjoying myself, right? I didn't really think about it. It's the end of my junior year, and he says, "Like hell you will. You're going to go into research. You're going to get you're -- going to be a research assistant for me. Don't apply anywhere else." So I got all the -- he got me the applications. He made sure I got them in time and all that. And he gave me the complete freedom to do the gravity wave. I got that from the fax room just seeing people, people started talking about these crazy waves that must be gravity waves. You can't explain it any other way. So I started studying gravity waves and wrote a paper on it. And then I got with Don Johnson, just an amazing individual, and the people who got their degrees under him. It's like John Zillman, from Australia. Rick Anthes. You know, Chuck Wash becomes a dean out at the Naval Postgraduate School. I mean, Bob Gall, the head of M-cubed at UCAR, at NCAR. I mean, it's, you know, one after another. You can't get luckier than that.

But I decided to go to the [NASA] Goddard Laboratory for Atmospheric Science. This is spinning up while I'm finishing my PhD. Fritz Hassler comes out and says, "You know, people are interested in you. You may really want to consider this new lab, freedom, all this." And I wind up with Joanne Simpson for 10 years, you know. Dave Atlas for five years as the head of the laboratory. Joanne's head of the branch. I tell you, they focused on me and provided a foundation, trust in me, got me involved in projects that I wouldn't otherwise be leading.

And then I come over to the Weather Service, there's Bill Bonner and Ron McPherson, with Joe Friday, pulling me up, putting me in charge of a forecast office, the largest Forecast Office in a Weather Service, without one day experience in operational meteorology, much less running a forecast office. You know, where'd that come from? And then, and then they nurtured me. Joe brought me up through headquarters. Jack Kelly has his interesting way of doing business. But the fact is, I learned things from him what to do, and other things, what not to do, especially in the way some of the people were treated, but he -- he selected me for NCEP and supported -- I convinced him and supported the building, as others, as we needed to move up the line. And then after that, I have to say that Kathryn Sullivan -- I didn't get to work directly for her. Jane Lubchenco who actually selected me for this job (Director of the NWS). But I very quickly got to work with Kathryn Sullivan, who became the acting when Jane left, and then finally became the Administrator of NOAA. You talk about a disciplined approach to problem solving. And in this whole science-based service, the embrace of that and what it meant for the Weather Service. I was like, wow. So you look at that whole lineup. You know, Kathryn Sullivan, I mean, the first American woman to walk in space, right? Starting all the way from my parents through that.

I know they say you make your own luck. But you know, there was really this aspect of it that I still pinch myself about. There's no question about it. And I do say that having that experience and developing the patience, because as a New Yorker, you know, we don't normally have much patience. But, when I came here in 2013, I was thinking about this the other day, looking at Bob Dufrane's -- We got this, these charts that we're charting the number of people that we actually have working in the Weather Service, from about 2008 or '09 all the way through what happened in '12 and '13, the crash down to losing 500 positions, and then a slow build up. I saw -- we -- I told the folks, "Put markers on that chart to remind us what we went through."

Sequestration, that sequestration and the -- the budget uncertainties associated with that, those literal uncertainties where you might not be able to get to the end state if they actually put that in place went on through 2014. It wasn't until the end of 2014 that we got through that. Then you got -- there was in 2014, fiscal year 2014. On top of the sequestration was the shutdown. Then we've got the complete collapse of the hiring.

And, but we've got a budget structure. Now we've been really focused on that. We got that, but now getting the resources into that, especially for the dissemination which we knew was our weakest link. We didn't have dissemination (an Office of Dissemination). We didn't even know how much money the Weather Service was putting into dissemination. So then you get into 2016 and '17. And the President's budget just gets slashed. And there's another hiring freeze. And you say, "Well, it was only 90 days." People say, "Oh, it was only 90 days." Everything that was in that pipe when we went into that freeze was gone. People laughed. They went off to some -- now you've got to spin up all over again. So it was literally a whole year freeze. So you got a freeze. That's 2017.

Then you've got this continued battle between the President's budget and the Hill budget, working all the way through with a slow recognition that we need more people in our forecast offices, that we can actually start building the budget up for that, and that we have a dissemination plan that needs to be supported. It all happened in the 2019-20 timeframe. That's a lot going on in that, and it's just now that I think we'll see what happens with the 2022 budget. We have to get that budget. We still don't have that nailed down. But it's really important to understand the stress points that we were going through. If I didn't have those giants in the science arena, and then in the management of me and my career ascent through the good fortune of the people that I had to work with, I'm not sure I would have been able to deal with all this. And not only -- from a science point of view I could. I became a fairly good manager. I got things done. “Vision, Plan, Follow Through”, by the way, the mantra I learned from, from folks that I worked with. Charlie Anderson and Don Johnson, Joanne Simpson: follow through! Get that done. Write those papers. Don't just do the great work and walk away from the paper. Follow through. I - I'm not sure I'd have been able to get through that maze. So science-based service management. I had some tremendous help along the way with the people I worked for, the giants I worked for.

GR: One last question. When you look back, when we look back on your career, five years from now, what do you hope your legacy will be? What should we remember you for?

LU: Legacies are usually developed over decades. And the view of people on what it means over that period of time, I would say that I've left a tremendous foundation, that in the Weather Service, in terms of the management and budget infrastructure that can be used to take the Weather Service wherever it has to go. They'll have that foundational aspect. And if they manage the budget correctly, they'll have the support of the Hill, because we are, at the end of the day, we're a service agency that touches every county every day. So they'll have that. I believe that the Weather-Ready Nation aspect, we're only at the front end of that. And that by putting the impact-based decision support services in the, in the mission statement and getting

that into every station duty manual will bake that into the -- into the genetic code of this organization such that as the service needs develop, we'll be there to meet those service needs. And they'll have to be done on a local, state, federal level. And I put local first because what the estimate is -- there are different ways of estimating this. Well, let's say about 95% of decisions that are made for public safety are made at the local level. You can't do that even from the state level. We see that in Texas during Laura either going in or not going in, or Harvey going in and you know, state agent state people saying, "Well, they should evacuate Corpus Christi," but Corpus Christi with their IDSS has it figured out how they can do it without doing a mass evacuation. Gutsy call, okay? But they, they were right.

So I believe that's going to be something that the Weather Service will take with it as it moves forward. And that as we wrote, John Ten Hoeve and I wrote in a paper that was published in the BAMS 2019, that we were at an inflection point in our history. Because by just looking at the physical science and technology, and everything we brought forward from the historic modernization, and it was a historic advancement for the Weather Service. But we had to take this next step. Because we proved that in 2011. We lost almost the exact same number of lives in a tornado outbreak that looked just like 1974, that the modernization was thought about in those days, "We got to be able to deal with a tornado outbreak of that magnitude." The number of lives lost were about the same. We just went through a whole bunch of exciting weather on the West Coast. We had tornadoes last night. As of this morning -- I asked at the tag up this morning, the stand up, "Any reports of lives lost yet?" And the answer was no, I haven't seen anything yet. I'll come in. Today, there might have been some lives lost. It was an overnight tornado. But I'm just saying is that it's making a difference, and people are going to build off of that. I don't think people are going to walk away from it. And I feel really good about that. And then I've done some science things that could survive [laughter] but we'll see. You know, you never know.

Every time I do these history papers for the science aspects, and how advanced meteorology is, it's amazing to me, and this is, these giants I was talking about in the '20s, '30s and '40s and 50's. The insights they had on how the atmosphere was working based on a very careful analysis. On practically everything I worked on, you could go back into the papers, that there's a hypothesis laid out in those papers. And it's not like I'm finding something for the first time that people didn't know about. They kind of knew about it and did associations with, but we were able to lay out more specifics, and hammer home maybe some of the implications and cause and effect, you know, with what we were doing in the '80s and '90s from a research perspective. But it just amazed me what these people saw in the atmosphere based on all the work they did. Berknes .. Like I said, the whole -- the whole list of folks. It still amazes me today.

GR: No better place to end it there, Louis. It's been an honor talking to you about your history with the Weather Service and your legacy. And I look forward to talking to you again in five years and say, "So how we'd do?" So with that, thank you, Louis. I greatly appreciate your time today and the other sessions and I look forward to talking to you more.

LU: Alright. Thanks.

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