

Dorothy Spears-Dean, Ph.D.:

Thank you, and good morning, everyone. I was asked to present on Virginia's efforts to modernize our geospatial mapping and analysis regarding public safety services. So in my presentation, I'm not going to be using any slides. I wanted to focus on five key areas that I think will resonate with our participants in the presentations today.

The first is the partnership between 911 and GIS. The second is GeoData and the public safety ecosystem. The third item is GeoData as a communications tool. The fourth is GIS as a force for good. And last is to touch on next generation 911 and artificial intelligence. And public safety is laden with acronyms so I'm going to try to stay away from the acronyms and make sure that I'm identifying things by their full names and terms so I don't lose anyone in the presentation.

So within Virginia, with next generation 911, there is a critical role between 911 and GIS. Call delivery is front loaded with GIS information, so we need to make sure that we have the necessary GIS resources in place in order to deliver a call in a geospatially enabled environment. So within Virginia, the 911 state program and the statewide enterprise GIS programs are co-located within the 911 and Geospatial Services Bureau within the Virginia Department of Emergency Management. And this has been the case, now, for about three years. We were previously with the Virginia Information Technology Agency, and this has really been a tremendous opportunity for us to leverage 911 and GIS in an emergency management environment.

The reason we are co-located and have, historically, been co-located is because in Virginia Code, there is a citation that requires the 911 services program to develop a comprehensive, single statewide electronic addressing database to support geographic data and statewide base mapping data programs. That co-location of services has been in code, now, for about 20 years, but Virginia has always been very proactive, and this has served us well as we've rolled out NG 911 throughout the Commonwealth.

We all know about NG 911, Next Generation 911. It is, in a nutshell, replacing analog infrastructure with IP infrastructure, and this has given us an opportunity to do many new things, but at the end of it, it enables to serve our citizens better by providing a faster call set of time and faster response. It also gives us a level of redundancy that we did not have in the analog world. We're about halfway through our deployment process in Virginia. We have 124 separate cuts to make, but we have had tremendous support from the 911 and GIS communities in those efforts.

I want to just touch on the role of emergency management. So as I said, now that 911 and GIS is part of the Virginia Department of Emergency Management, we have a vested role in supporting the agencies planning for, responding to, and recovering from disasters. And what we do in 911 and GIS helps to support the agency's mission. There's a natural synergy between these three disciplines, and I'll expand upon that point as I continue on in the presentation.

What I want to do, now, is talk about GeoData and the public safety ecosystem. So the use of GeoData is interwoven throughout our daily lives. Personally, I'm a big fan of Google Maps. I multitask all the time. I'm driving and I'm on phone calls, and if it wasn't for Google Maps, I probably wouldn't end up where I'm supposed to because the navigation is telling me when to turn and when I'm going to arrive. So that's always going on in the background. But for NG 911, it's a little bit different. It's about the ingestion of or ingesting address points, I should say, into the spatial interface for 911 call delivery.

In the world of emergency management, do your data provides situational awareness. I recently had an opportunity to participate in a planning exercise that was based on a radiological release and how we needed to think about the impacted areas and respond to that. In the [inaudible 00:57:37], we can conduct this exercise, not just looking at the impacted areas, but also thinking about the outages that may occur within local 911 centers, and rerouting calls, and what to do and the potential outcome if we

have to evacuate a 911 center. So that's a layer that we can add onto our emergency response capabilities, and GeoData plays a role in that. So that exercise was very illuminating for me.

We also, the IP backbone, the emergency Services IP network, also known as an ESI Net, is critical to supporting 911 communications, but it is also a tool and resource that can be leveraged in emergency management and facilitate the sharing of geo data. Our emergency communication centers utilize Computer Aided Dispatch, CAD, that is rich with GeoData and the ability to share that information, not just in the midst of a disaster or responding to it, but in a proactive posture, as well.

So the potential of leveraging 911 and GIS in Next Generation 911, supporting NG 911 also in an emergency management framework, that's part of our vision. That's what we're working through, now. We are mandated by code to complete the deployment of NG 911 by December, 2024. So as we're looking, in terms of what we do next in Virginia, figuring out the integrated role of 911 GIS and emergency management is forefront, and the use of geo data is critical to that because those three disciplines are part of the public safety ecosystem, and geo data is used throughout the public safety discipline.

Before I move on to discussing GeoData as a communications tool, I just want to spend a moment talking about how public safety disciplines are becoming more interconnected. And that's really facilitated by GeoData, not just from an information sharing perspective.

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Data, not just from an information sharing perspective, but as I move on to the next topic, it's really about... It's a communication tool. So our public safety disciplines are, as I said, becoming much more interconnected and interdependent and they're the swim lanes in the ecosystem. They're distinct, they have separate missions, but there's also a very integrated approach in many things that they do, which has a number of touchpoints between and among those disciplines.

So moving on to geodata as a communications tool. We're all familiar with the expression, "A picture is worth a thousand words." So in my mind, then location becomes an extremely valuable tool and an address point has tremendous value. Public safety disciplines are defined by missions. Our government agencies focus on tasks and other initiatives. But oftentimes, there can be confusion. Geodata can be a common communications tool because of its precision if geodata is accurate. And that's the real key here. Within NG911, data maintenance is absolutely critical. In Virginia, we have a great partnership with our localities. Localities provide data to the Virginia Geographic Information Network. That is VGIN. That is the group within the 9-1-1 NGA's Spatial Services, also known as NGSB. That focuses on enterprise GIS and supporting the mission of NG911. But that relationship with local government partners is critical in our ability to support NG911 deployments. But it's also critical in maintaining accurate address points, which is a geospatial dataset.

The individual within VGIN, the geospatial program manager who's responsible for NG911 support has an entire onboarding process for NG911 GIS data. So it starts with the development of provisioning and PSAP boundaries and ends with call when geospatial call routing is achieved. This onboarding process is used in each of those 124 deployments that I mentioned. It involves not just the localities and NGSB staff, but our vendor partners are critical to the success of that onboarding process and deployment of NG911.

So that's a lot of the background in terms of NG911, geodata, how we function in terms of NGSB within the Virginia Department of Emergency Management. I want to take a more macro view right now and talk about GIS as a force for good. So in public safety, we are generally the ones running towards the disaster or the event, not away from it. But when you look at the power of GIS harnessing all of those

applications, you can really achieve significant good. And personally, I believe that GIS can make a significant contribution to quality of life.

GIS is also a powerful analytical tool. You can use it in terms of helping to solve problems, but it has a transformational capability as well. So I'll give you a practical example of that within the realm of NG911. GIS is helping to transform what we have previously called the local 911 sounders. They have historically been referred to as public safety answering point. That is a telephony term because they were tied to a phone system, not an IP network. Now that the local emergency communication centers or the local nine one centers are part of an IP network, they're part of a transformational process. They are able to transition from just facilitating call processing to information processing because now they're becoming more information based. And the benefit of this paradigm shift is increased situational awareness. This will enable not just the Virginia Department of Emergency Managers, but others that operate within the public safety ecosystem to better protect life and property. And this all leads to an enhanced and increased quality of life.

You could carry out that same exercise within the health profession and other areas to see how GIS is truly transformational. I am not a GIS practitioner by trade. My background is public safety and I'm grounded in public administration. But I see the benefit of GIS. I utilize it every single day. It has significant transformational powers and opportunities. So I really want to, as we move forward with NG911 in Virginia, really focus on how we can use that transformational aspect of GIS in our future planning.

One of the other areas that I wanted to touch upon while I have some time left, and I do want to leave some time for questions, is Next Generation 911 and artificial intelligence. Many of the participants in today's forum are GIS practitioners. You know that artificial intelligence and machine learning can be used to accomplish a number of things. The things that immediately came to mind and examples were classifying land cover, detecting changes over different systems and applications. It can be used to identify anomalies and forecast scenarios based on spatial data. It can also be used in software for predictive models.

For NG911, artificial intelligence, the conversation is not necessarily focused on GIS right now. It is focused on how artificial intelligence can be used to assist with staffing shortages to take those routine tasks and offload them to be able to do some preliminary triaging with calls through artificial intelligence. But if I look at the intersection of 911 GIS and artificial intelligence, there's many things that we can do for the good of the community and to increase the quality of life, but there is the potential for operational interruptions. So part of our internal conversations and discussions within NGSB and VDEM is looking at what happens when you can't trust 911. And this is where the GIS piece really comes into play here because we have experienced attacks that can be denial of service, telephony denial of services, but you also have bad actors spoofing and swatting.

So spoofing is giving the appearance that a call is coming in from a different number than it actually is. And then swatting is when you try to instigate a significant response when none is needed. Those are two occurrences and threats within the 911 community right now. These are illegal activities, but they occur mostly on the telephony side. So what happens when a bad actor can manipulate your geodata to do harm? And the result can be to divert resources from where they're actually needed or cause first responders to take erroneous actions.

So that exercise that I participated in regarding the radiological release, if somebody can manipulate the systems, first responders could be evacuating or going to areas that they didn't need to or potentially putting them in harm's way where there may be more contaminants present than it is safe for them to be in. They may not have the right protective gear as a result of that. We may be evacuating individuals that don't need to be evacuated. And at the end of the day, what happens is the community is going to

lose faith and confidence in first responders and 911. So that is even a worse outcome than having resources not used appropriately.

As a proactive measure, the 911 Services Board, which is a governance entity in Virginia for 911 has task NGSB staff to convene a cybersecurity work group. And we will be looking at those types of occurrences, looking at the intersection of artificial intelligence, 911 and GIS, both from a positive application standpoint and how do we make sure that localities are operating appropriately and safely so they don't have issues? And how we can proactively posture and protect our emergency communication centers if we do have bad actors and the inevitable happens. I know I have a couple of minutes left, but those are the areas that I thought would be of most benefit to talk about today as part of the presentation on Virginia's Next Generation 911 deployment and how GIS is a strong partner to us in deployment efforts. So I'm open to questions.

Carten Cordell:

Excellent. Thank you, Dorothy. And I think you've touched on a lot of this, but I can imagine that this data level and also the technologies that are coming online, thinking about AI, ML that updates to the information 911 centers are receiving, such as, like we talked about with Dan, topological changes, if you have a natural disaster like a tornado, the upload of that new information is going to be essential as well.

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So in addition to the VGIN group, we also have a GIS division within the area that focuses on the Emergency Operations Center, and there is a team in there that are doing those GIS projections on the fly, and they're also putting together the GIS scenarios based on potential recommendations. So there's a group that's triaging that and providing realtime responses.

Carten Cordell:

Excellent. Well, I don't see any questions right off the bat, but we can circle back a little bit later. But for right now, we'll continue with a session from Jonathan Porat, State Chief Technological Officer, Technology Officer, I should say, at the state of California. Jonathan, over to you.