Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Establishing the Digital Opportunity	)	WC Docket Nos. 19-195 and 11-10
Data Collection; Modernizing the FCC	)	
Form 477 Data Program	)	
	)	

REPLY COMMENTS OF THE PRECISION AGRICULTURE CONNECTIVITY ACT STAKEHOLDER ALLIANCE

The Precision Ag Connectivity Act Stakeholder Alliance ("PAgCASA") appreciates the opportunity to provide these reply comments in response to the Commission's Third Further Notice of Proposed Rulemaking ("Third Notice"), adopted July 16, 2020, for *Establishing the Digital Opportunity Data Collection; Modernizing the FCC Form 477 Data Program*.[1]

INTRODUCTION

On behalf of PAgCASA, Garland T. McCoy and Peter F. Harter are filing these reply comments to provide our perspectives on other comments that have been filed and to place into the public record a copy of a presentation that we have made to the FCC's Precision Agriculture & Connectivity Task Force (created by the 2018 Farm Bill), the American Broadband Initiative, the USDA, the NTIA, the FCC, Congress, industry, academia and stakeholders at the state, county and local levels of government. Biographies for McCoy and Harter are available at the end of this document as Attachment A. The presentation is available as an additional item filed alongside this reply comment. This presentation compliments the Accurate Broadband NOW: "The Map to Closing the Gap" proposal included in the comments filed on September 8, 2020.

Our reply comments focus on specific statements made by entities that relate to elements necessary for smarter and more accurate broadband mapping. The following provides excerpts from the comments of others led by an indication of which element or elements the comments support. A summary chart is included as an info-graphic.

[1] https://docs.fcc.gov/public/attachments/FCC-20-94A1.pdf
https://www.federalregister.gov/documents/2020/08/18/2020-16356/establishing-the-digital-opportunity-data-collection-modernizing-the-fcc-form-477-data-program

REACTIONS TO COMMENTS BY OTHERS

ACT (The App Association)

***Agree;* on latency reporting.**

"The Commission proposes to require all fixed broadband service providers report latency data by indicating whether the network round-trip latency associated with the service offered by each technology and each maximum speed combination in a particular geographic area is less than or equal to a particular threshold, using 100 milliseconds (MS). Our members will need latency data when deciding where to find new customers and encourage more investment into their products, especially for those servicing rural communities. Latency data will play a key role for our members because latency data will help to determine both a total available market (TAM) and a serviceable available market (SAM) to their investors. Both TAM and SAM are critical for our members to evaluate and seek investors; this is particularly true in the precision agriculture and connected health IoT space. As latency data will be essential to determine what available resources exist, especially when that resource is broadband, we appreciate and support this proposal by the Commission. We oppose the alternative offered by the Commission to limit what providers would provide such information to the Commission." ACT comments at p.4.

NCTA

***Agree;* customers should report as part of their challenge that they have attempted to subscribe to the highest speeds offered or are a subscriber to the highest speeds offered when filing a complaint or challenge.**

q"Data that is based on speed test results or that includes information from customers who may not subscribe to the fastest broadband speed tier available will not improve the accuracy of the Commission's broadband deployment map. Instead, data based on these methods will show a skewed view of broadband service availability that will not reflect the service speeds that customers can obtain within a geographic area." NCTA comments at p.5.

"A consumer should have to provide other evidence to support the claim that the speed reported by the broadband service provider is not available at that location. For example, a consumer could provide documentation demonstrating that the customer attempted to subscribe to the service speed reported by the provider and was unable to do so." NCTA comments at p.6.

Next Century Cities (NCC)

***Agree;* on transparency, and one portal for data submissions/posting and challenge.**

"These tiers would not adequately account for the difference between speeds advertised versus what is actually delivered to households, often resulting in access to slower speeds than those advertised. In West Virginia, for instance, residents pay high prices for slow internet speeds. It has become such a crippling issue, that Senator Manchin led a campaign for residents to collect their own speed tests to correct FCC mapping data." NCC comments at p.6.

"While informative, a tiered approach will not give the Commission the granular data it needs to tailor funding or programmatic decisions towards expanding broadband access for the communities with the greatest needs. Thus, the Commission should require that providers report the speeds and cost of the fastest offering in a given area as well as the speed and cost of the package with the highest number of subscribers. This should be the requirement regardless of whether the speed falls above or below the minimum 25/3 Mbps broadband requirement set forth by the Commission." NCC comments at p.6.

"Showing which speeds are available to consumers in a given market and the actual speeds that users experience is a critical part of the analysis to identify gaps in broadband access. It would also help to identify which areas urgently need network upgrades." NCC comments at p.6.

"Transparency benefits unserved and underserved communities while injecting competition into the market." NCC comments at p.7.

"The Commission's proposal to use the same portal that it proposes to use for crowdsourced submissions is useful as it will not require entities that wish to either provide data or a challenge from needing to juggle multiple portals. Keeping these similar data submissions together will also reduce the number of cross-postings of data and minimize confusion as to where to submit speed test data regardless of whether it is related to a challenge." NCC comments at p.12.

"Furthermore, implementing a consumer challenge process, while statutorily necessary, also provides a much-needed check on ISP-reported data. The challenge process should be easy for public stakeholders to submit their own data as there is an overarching benefit when interested parties are able to verify the accuracy of Form 477 data." NCC comments at p.12.

NRECA (National Rural Electric Co-Op Association)

***Agree;* unique identifier for each unit in a MTE, binary response on latency, and consumer challenge (once a customer files a challenge, while the initial showing should rest on the challenger, the ability to submit data demonstrating its service meets the reported speeds lies uniquely with the service provider).**

"NRECA has a strong interest in developing a systematic, broadband mapping approach that discloses either actual or planned broadband locations, principally in rural areas." NRECA comments at p.3.

"NRECA recommends the Commission require service providers to report data on residential and small business customers to which the service provider offers Broadband Internet Access Service (BIAS). The concept of BIAS is central to the Commission's implementation of the Transparency Rule adopted in the RIF Order providing an established framework for broadband reporting." NRECA comments at p.4.

"Regarding Multi-Tenant Environments (MTEs), NRECA supports the approach used in the CAF context, in which a residential location is based on the definition of a housing unit. NRECA supports each unit in a building being assigned a unique identifier. While it is unlikely that a provider would not offer service to all the units in an MTE, considering each unit as a unique broadband serviceable location would allow for the most granular depiction of broadband availability. Each residential unit represents a prospective broadband customer. Similarly, because it would be rare that a provider not to extend service to all units in an MTE, it is unlikely that this requirement would create an undue burden." NRECA comments at p.4.

"NRECA believes a binary response on latency should be required. Fixed broadband services providers should be obligated to advise whether their services meet the RDOF Phase I auction low latency metric of ≤100 milliseconds. As the Commission reduces the low latency metric in connection with future auctions, such as the RDOF Phase II auction, that threshold should be reported either in lieu of or in addition to ≤100 milliseconds." NRECA comments at p.5.

"The Commission sought comments on whether the burden of proof in the challenge process should rest on the challenger. NRECA supports the obligation that persons filing a challenge provide a reasonable basis for the challenge. While the initial showing should rest on the challenger, the ability to submit data demonstrating its service meets the reported speeds lies uniquely with the service provider. For this reason, NRECA recommends that once a challenger raises a legitimate challenge or question regarding the reported service availability, the burden should shift to the provider to demonstrate the challenge is unfounded. This would provide the relevant information in the most efficient manner for resolution. NRECA supports the "preponderance of the evidence" standard in resolving disputes." NRECA comments at p.7.

Verizon

***Agree;* just one tier reporting, you provide the FCC's standard 25/3 or you are not providing broadband coverage.**

"Verizon thus agrees that broadband Internet access service offered only at speeds slower than that benchmark should be designated as such on-coverage maps. But there is no clear benefit, especially looking forward, to requiring additional granularity for these lower speed services beyond that: either the available services meet the Commission's minimum benchmark for advanced telecommunications capability, or they do not." Verizon comments at p.7.

Central Texas Telephone Cooperative, Peoples Telephone Cooperative and Totelcom Communications

***Agree;* data must distinguish between residential and business.**

"The overall purpose of the Broadband DATA Act is to collect more granular data on service availability so that the Commission can remedy the lack of access to broadband and connectivity issues that are currently pervasive throughout the United States. The collection of "business-only" polygons as distinct from "residential" or "business-and-residential" polygons will allow the Commission to pinpoint the areas that may be served for businesses and anchor institutions but are unserved for residents or vice versa." Central Texas Telephone Cooperative (CTTC) et al comments at p.4.

"By distinguishing business data from residential and residential and-business data, the Commission can better understand where anchor institutions may have access to broadband (through the assistance of the E-Rate or RHC subsidies), but the residents lack access causing what is commonly called the "homework gap." The homework gap problem is becoming glaringly apparent during this COVID-19 pandemic and if the Commission does not require providers to distinguish business broadband from residential broadband data, the Commission will miss the opportunity to fully define the breadth of the homework gap." CTTC et al comments at p.4.

"In order to combat the wasteful subsidized overbuilding in USF, it is essential to collect "business-only" data and use it in the administration of the E-Rate and RHC program. Accurate maps, along with changes proposed by the Texas Carriers to the E-rule rules will go a long way to ensure that existing unserved schools and libraries receive critical E-Rate funds, bringing the power of the Internet and broadband services to the most rural and underserved portions of the United States." CTTC et al comments at p.5.

SHLB (Schools, Health and Libraries Broadband Coalition)

***Agree;* all broadband providers to CAIs, Community Anchor Institutions (Schools, Libraries, Health clinics), should be included in the mapping data.**

"We are requesting all services to CAIs be included in mapping whether provided by contract or mass market service. To reiterate a key point above, CAIs are within five (5) miles of 95% of households, and therefore represent a good indicator of the broadband health of the area. Creation of another potential data gap in the collection of broadband information (by not including CAI data) may lead to erroneous conclusions about the health of broadband services for an area (as was the case with the assumption that if one household had broadband access then the whole census block was considered served). We cannot continue to have data gaps in our

mapping based on false assumptions, while the broadband problem continues to exist for millions of Americans." SHLB comments at p.6.

Connected Nation Inc.

***Agree;* latency round trip ping tests home or business modem/router to Internet Exchange point (IXP) and return, and one portal for challenges and mapping data submission/posting**

"The Commission should collect round-trip latency information, as proposed, for all fixed, wireless, and satellite services, but should define the points on the network between which latency is measured. Latency is an extremely important measure of network performance—particularly as it pertains to the functionality of two-way video, augmented reality, and a myriad of other IoT applications and services." Connected Nation comments at p.3.

"We believe the Commission should define the points on the network between which latency is measured—for example, in a residential context, between a subscriber's modem at home and the location(s) where the service provider exchanges traffic with other networks, such as an Internet Exchange (IX) Point. We believe this standardized method of measuring latency should be employed regardless of service technology type (including all satellite and wireless services), so that it is possible to compare latency in a consistent and meaningful way across networks and service delivery methods." Connected Nation comments at p.3.

"We also strongly agree that individual consumer and bulk challenges should be received online via the same mechanism, and that the mechanism should be integrated with the public-facing mapping platform, as the Broadband DATA Act requires." Connected Nation comments at p.7.

Connected2Fiber

***Agree;* importance of latency locational data and need to consider adequacy of 3Mbps backhaul as sufficient to handle traffic in the new pandemic environment and coming demands of the precision ag world.**

"Connected2Fiber aggress with the Commission's proposal to required fixed providers to report latency data by indicating whether the network round-trip latency associated with the service offered by each technology and each maximum speed combination in a particular geographic area is less than or equal to a particular threshold and the Commission proposes to use a 100ms threshold which is based on the Low Latency tier." Connected2Fiber commentspage3.

"Commission requires geographic coordinates, provide a graphical example the process of opening a map application on a phone, then putting a "pin" on your location which then generates the latitude/longitude in the application." Connected2Fiber comments at p.5.

"Given the increased use of video (i.e. Zoom, Ring Central, Slack, to name a few) and livestream services for virtual webinars, etc., consumer grade broadband services may not fully support the bandwidth required to handle such increased dependence on these types of services used by small businesses." Connected2Fiber comments at p.8.

NSGIC

***Agree*; importance of accessing multiple sources to establish Broadband Serviceable Location Fabric, on open standards (open source) data submissions not proprietary data submissions.**

"The Fabric is based primarily on Address Points and other public records. NSGIC understands that a variety of data sources are needed to determine all locations suitable for broadband deployment. Our understanding of the Fabric as used in the US Telecom pilot project is that the data sources include address points from one or more commercial sources, tax assessment roll data from a commercial source, land parcel boundary data from a commercial source, building footprint data released openly in 2018 by Bing (Microsoft), and aerial imagery from a commercial source. These data were processed to identify the single building on a land parcel most suitable for broadband (i.e. presumed to be the building with the highest assessed value) if more than one building exists at the same address on the same land parcel. We further understand that additional processing rules were applied to eliminate address points at vacant land parcels and other locations where broadband would not be suitable." NSGIC comments at p.3.

"Further, NSGIC believes that the Commission should promote the use of open geospatial standards for the submission of data rather than proprietary data formats." NSGIC comments at p.7.

NTCA

***Agree;* commission should require reporting by "business-only" providers, as well as the submission of data depicting service to anchor institutions.**

"NTCA supports the proposal for "business-only" providers' submission of coverage polygons reflecting their service offerings, to ensure that the DODC offers policymakers a clear window into residential as well as anchor institutions' access to broadband." NTCA comments at p.16.

SUMMARY OF RELEVANT COMMENTS

In addition to seeing much common ground with other commentators, PAgCASA also sees patterns of agreement that are worth noting. Based on the Broadband DATA Act and our

work on precision agriculture connectivity, rural broadband, and smarter mapping issues the past two years we believe that there are at least nine key factors to consider:

Challenge: All parties should be transparent, customers should report as part of their challenge that they have subscribed to the fastest speeds offered or have attempted to subscribe, and the final burden of proof should be with the service provider**.**

Latency: Home or business modem/router to IXP and return ping test.

Transparency: Data must distinguish between residential and business/commercial**.**

Fabric: Should include unique identifiers for each unit in an MTE.

One Tier: For Delivered Speeds for Broadband Map: Service provider delivers 25/3 i.e. Broadband or they don't.

One Portal: One Portal for the posting of Data and challenges.

CAIs: Community Anchor Institutions (Schools, Libraries, Health facilities) Broadband service to CAIs should be included in Mapping Data.

Data Submission: Multiple sources should be accessed and used to establish serviceable location Fabric, data submissions should be open source not proprietary.

3Mbps: Will 3Mbps backhaul be sufficient to support emerging demands such as; work-at-home, remote education and healthcare, as well as the demands of the multitude of deployed sensors which are the core components of Precision Ag?

In addition to the commentators summarized above we've included several others in a chart that illustrates the weight of common agreement focusing in on these nine factors:

	Challenges	Latency	Transperancy	Fabric	One Tier	One Portal	CAI's Included	Data Submissions	3 Mbps Sufficient
Top Filing Entities									
ACA Connect									
AT&T Inc									
CCA									
Connected Nations Inc		Agree				Agree			
CTIA									
NCTA	Agree								
NTCA							Agree	Agree	
US Telecom									
Verizon					Agree				
Others of Interest									
ACT/ The App Association		Agree							
Aderant									
Central Texas Telephone Cooperative et al							Agree	Agree	
Connected2Fiber		Agree						Agree	Agree
Hughes Network Systems									
INCOMPAS									
Next Century Cities	Agree		Agree			Agree		Agree	
NRECA	Agree	Agree						Agree	
NSGIC								Agree	
Peoples Telephone Cooperative									
SHLB Coalition							Agree		
Totelcom Communications									
T-Mobile USA Inc									
WTA									

CONCLUSION

The Commission should take immediate action to ensure that real and accurate broadband is available to every person in America, no matter where they live and work, and should consider PAgCASA as a collaboration partner. PAgCASA can act now to engage citizen and sensor surveys to begin unlocking the local, granular data needed from crowds to truly improve the accuracy and meaningfulness of broadband maps.

Respectfully submitted,

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Dated: September 17, 2020

ATTACHMENT A

Biographies for Garland McCoy and Peter Harter of the Precision Ag Connectivity Act Stakeholder Alliance (PAgCASA)

Garland T. McCoy currently serves as President, Technology Education Institute and Co-Founder and Executive Director of PAgCASA (Precision Ag Connectivity Act Stakeholder Alliance). He has over three decades of communications network experience spanning the transition from the Telco's heavily regulated analog 'Nortel" signal switching system to the digital packet Internet routing/soft switching platform. Highlights of his activities during this time would include; being a member of the team that brought the first undersea fiber cable to East Africa, organizing and hosting unique workshops at the annual UN Internet Governance Forum (IGF) for 12 years and contributing to the UN IGF's "Policy Options for Connecting the Next Billion" intercessional work, he is a member of Department of State's Advisory Committee on International Communications and Information Policy (ACICIP), he participated in workshops and proceedings as part of the FCC's E-Rate Modernization Program for Schools and Libraries filing Ex Parte Presentations and Comments under the FCC's NOPR specifically addressing the FCC's prohibition on non-traditional voice telecommunication service companies participating in broadband buying consortia preventing innovative public/private partnerships which would allow dual use of private parties leased or owned broadband fiber assets such that private entities could donation access to schools and libraries in proximity to their fiber cable, he is also "Father" of BITAG (Broadband Internet Technical Advisory Group), chief organizer of 15 Aspen Summit conferences focusing on Internet policy, the sponsor and organizer of educational tours for Congressional Staff, Administration Officials, Embassy Officials, etc. for tours of Visa's NOC (Network Operations Center), Equinix's Global Peering Center, Verizon's NOC and other data centers, and in recent years he has studied licensed and unlicensed spectrum technologies and their applications in such areas as managing the sensor data traffic needed for precision agriculture. As Precision Ag needs robust broadband access to function he has become involved in broadband mapping methodology with standards, crowdsourcing, ground-truthing, sensor data, and open source platforms being key elements of his focus.

Peter Farrington Harter bridges the ecosystems of technology, policy, business, law, politics, and entrepreneurship. As the Founder of The Farrington Group, a privately held consulting firm, Peter provides advice to management, boards and investors on political, legislative, and regulatory risk. Areas of focus are patents, cybersecurity, data, and precision agriculture. Peter co-founded Markup.Law to modernize the workflows of lawmaking. Markup harnesses AI, machine learning, natural language processing and other data techniques to automate the analysis, comparison, and collaborative composition of laws and regulations. Peter is a board member of the Open Source Election Technology (OSET) Institute, a Palo Alto, California based non-profit working with election officials globally on the specifications and code for a new election administration and voting technology framework and to develop solutions. Peter's career began in 1993 as an Internet lawyer in his home town of Bethlehem, Pennsylvania where he helped to build a community Internet service provider. He broadened in Silicon Valley as head of global government affairs for Netscape and EMusic.com and in business development and

The Case For Sensor Based Mapping

Building An Agricultural Facing Broadband Mapping Methodology ©

Presentation Before
The USDA
American Broadband Initiative Federal Funding Workstream Mapping Subgroup

February 14, 2020

- By
Garland T. McCoy, Co-Founder and Executive Director PAgCASA (Precision Ag Connectivity Act Stakeholder Alliance)
- And
Peter F. Harter, Co-Founder PAgCASA

Introductions

PAgCASA Co-Founders Garland T. McCoy and Peter F. Harter each have over three decades of experience in the Internet technology, policy and legal areas. They have known each other over much of this time collaborating on important policy issues.

In December 2018 when we saw the Farm Bill mandating the Task Force we created the Precision Agriculture Connectivity Act Stakeholder Alliance, PAgCASA.

From January 2019 to present we've canvassed many who have been involved in rural broadband and specifically mapping and have not found anyone focused as much as we are on creating a citizen based, bottom up solution centered on data. We hope to find others out there doing what we are doing, and we are open to joining forces.

Our work caught the attention of Carolyn Roddy who was kind enough to extend an invitation to present PAgCASA's first proposal which is the one we will focus on in our presentation today.

Setting The Stage

"Data is the new oil" -- Clive Humby 2006

For much of rural/agricultural America population density and distance have challenged the creation of viable broadband delivery businesses.

To put it simply demand at affordable prices has been insufficient to support the expenses associated with the provisioning of robust broadband access in much of rural America.

This business model is about to change with the arrival of Precision Agriculture and the billions upon billions of sensors that will be the new drivers of demand.

Consumer's hunger for more information about the food and drink they consume has been on a tear. Agricultural businesses have benefited greatly from this new information exchange by providing the specific foods and drinks consumers want based on this rich data exchange.

This paradigm of "locally sourced" is about to change exponentially as well with the arrival of a tsunami of rich granular data made possible by the sensors that are at the core of Precision Agriculture.

Why A Sensor Survey?

A Survey of the Sensors, their Enabling Spectrum and the Networks they Create Beyond the Farmer's Front Porch will be the Barometer of both the Growth in Demand for Broadband as well as the growth in the new Financial Fuel (data) that will more than pay of it.

Data will be Agriculture's Next Cash Crop (just ask the BIG players)!

There is an old saying, "follow the money" and if money is a validation of a market then what is already happening in the emerging market for agricultural data is telling!

POLITICO

5

Agriculture Giants Being Investigated by Canada's Competition Authority

By Leah Nylen and Liz Crampton

Canada's Competition Bureau is probing allegations that agriculture companies including Bayer, BASF and Cargill sought to quash competition by startup Farmer Business Network.

The bureau today confirmed the investigation and said it was also looking into Corteva Agrisciences, Univar, WinField and Federated Co-operatives, a federation of more than 350 cooperatives in Western Canada. The agency declined further comment on the probe.

In court documents filed in Ottawa on Jan. 30, a Canadian investigators aid manufacturers like Bayer and BASF and wholesalers like Cargill have refused to supply FBN.

FBN, an online platform based in California, aggregates data to help farmers make planting and other agronomic decisions as well as compare pricing. It expanded into Canada in 2017 and bought Saskatchewan retailer Yorkton Distributors in April 2018.

Yorkton had existing contracts with the companies, but many of them began to restrict supply or deny it access to rebate program after the FBN purchase, according to the court documents.

"Some of these parties have engaged in communications that are suggestive of coordinated behavior," Daniel Jensen, a lawyer with the Competition Bureau, said in an affidavit filed in court.

The bureau asked the court to order the seven companies to turn over documents to aid in the inquiry. A court hearing on the request is scheduled for Monday

The companies did not immediately return requests for comment.

Andy Blatchford contributed to this report.

This article goes hand in hand with news reports of agricultural equipment manufacturers selling products to farmers who don't want to pay for all the available options yet they are turned on anyways so that the manufacturer can aggregate data about trends and make bets on the commodity markets.

Understanding The Challenges

There is a plethora of Broadband Mapping initiatives ongoing across the country.

Some are Federally sanctioned/funded by government agencies such as the USDA, FCC, NTIA while others are "home grown" originating from State, local and private sector initiatives and increasingly being built on "crowd sourced" gathered data.

Examples we would highlight demonstrate how broadband mapping surveys that are locally born, where participation and thus the data is largely drawn from the consumers, as opposed to many that rely exclusively on data from the access providers, can provide a much richer picture of the actual areas of broadband coverage and speeds throughout the day.

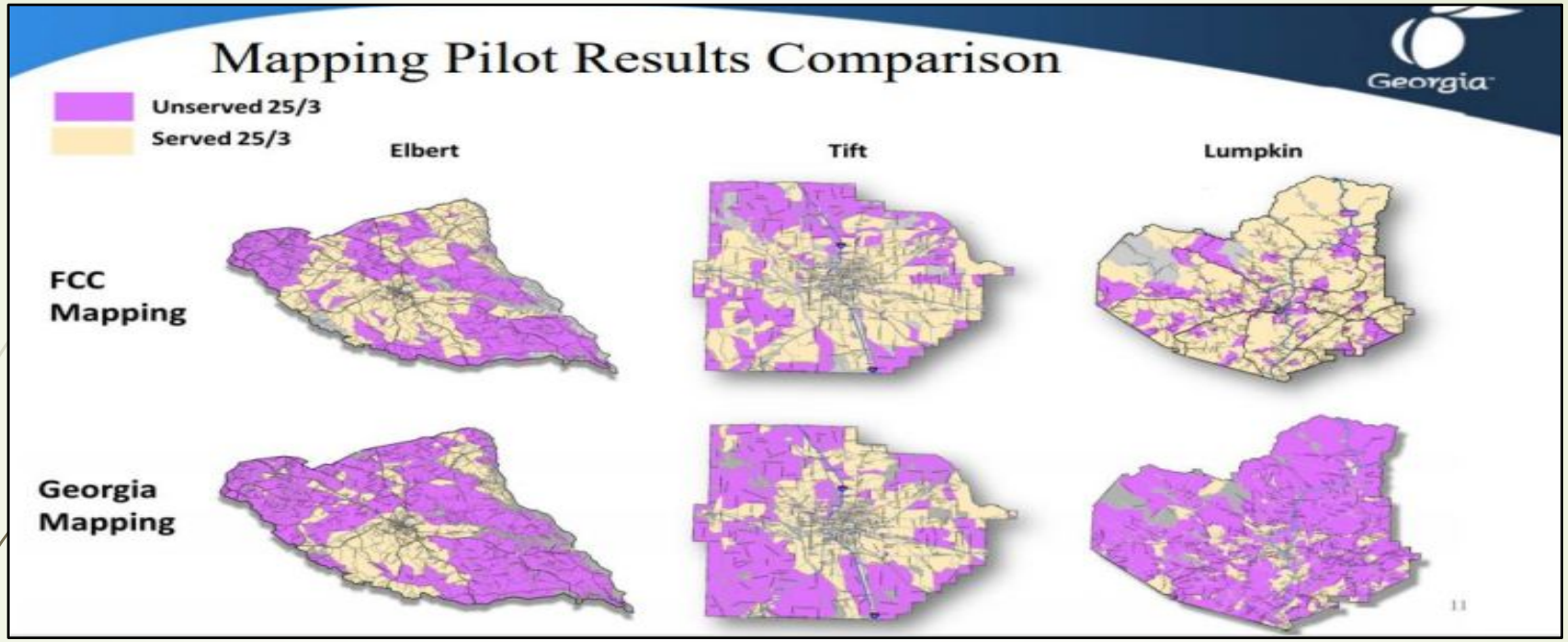
You will see examples of this in both the Lumpkin County Georgia and Polk County Oregon surveys and we have included the North Carolina Farm Bureau survey of its members which is ongoing.

"Rural broadband is a problem, and Georgia is mapping it"

By Emma Hurt Oct 23, 2019

- People without internet access at home visit the Lumpkin County Library 24 hours a day to use its fiber-optic broadband connection. At night, they pull up in the parking lot to connect to Wi-Fi.

Emma Hurt/Marketplace



Georgia decided to map broadband availability to prove that maps prepared by FCC are inaccurate. A three-county pilot shows the federal maps missed half of all addresses without broadband service. The statewide survey is scheduled to be completed by June. (Emma Hurt/Marketplace)

Polk County, Oregon circulated a survey via the Sheriff on Facebook last summer and generated a square mile map of the county illustrating the kinds of services available in each square mile, the uses, the quality, the pricing, the kinds of users and other layers of information and factors. The illustration was generated by ESRI software used by Polk County Commissioners and their staff.

The Digital Divide: Polk County Rural Broadband Study

Dean Anderson
IT Director
Polk County, Oregon

http://polkgis.maps.arcgis.com/apps/MapJournal/index.html?appid=cfa3d05ea50142239ab9071bf1f156e5

North Carolina Farm Bureau is as of this presentation conducting an online Internet Connectivity Survey of its members: https://www.ncfb.org/

Over a thousand of its members have already completed the five-minute survey!

What has become obvious to all stakeholders in the rural broadband ecosystem is the fact that there are great differences between the data gathered and presented in the traditional Census Based Broadband Mapping Methodology which draws from traditional US Census data reported by the incumbent access providers from what local, customer or "crowd sourced" broadband data surveys are presenting.

As discussed at the beginning of our presentation, providing rural broadband access is a business and like any business it can only operate long-term when demand and price are sufficient to ensure the business can generate a sustainable profit. Agriculture is inherently about sustainability.

We believe the arrival of Precision Agriculture with its sensor generating data business model will positively impact both of these key business ingredients.

Now The Good News

A great deal of bi-partisan support and financial resources are now focused on dealing with the challenges of providing rural America with robust broadband access.

We will quickly review some of the legislative and policy highlights as well as the funding and content agencies have to offer in this area.

- October: NTIA update on their multi-state pilot on the availability of broadband
- December: House passed two bipartisan broadband mapping accuracy bills
- December: USDA announced opening of ReConnect funding round 2 is and applications are due March 16, 2020
- January: FCC announced a $16+B auction for rural broadband
- February: President Trump's State of the Union highlighted rural broadband funding
- 2020 election: Many of the Democrat 2020 campaigns feature rural broadband in their policy platforms

Money, bi-partisan support, political focus, and technology are all available.

The Next Step is identifying and deploying a minimum viable product for rural areas with a focus on agriculture.

Our Proposal

We'd like to share with you our ideas for viticulture – the farming of grapes for making wine – and how they apply to agriculture broadly speaking.

We believe that "Sensor Based" mapping based on a bottom up, citizen driven, crowdsourced approach provides the improved accuracy that many are calling for and enables many to showcase what problems they are solving and share solutions which can then accelerate demand for broadband investments.

Imagine a citizen-based app for farmers and their smartphones that taps into their machines and sensors to provide granular data for true broadband mapping and also the Internet applications that are occurring. This can help unlock new value in existing government data and to enable people to share data (like very local, small weather and pest data stations).

A question on the table for people to chew on for our discussion today is whether money will flow to Sensor Based maps and if so, then how may PAgCASA help drive awareness and development of Sensor Based maps?

1. Should PAgCASA apply for a ReConnect grant and build a rural school for Sensor Based data? This school can collaborate with farmers, community colleges, local colleges and universities, local and state ag organizations, local and regional foundations, and also share data and best practices with other states and their ecosystems.

2. Given the similar cold weather climates of the wine growing regions of Oregon and upstate New York there may be an interesting collaboration to consider.

3. Sensors exist on individual vines, blocks of vines and on stations to gather data that builds a very local view that can also be shared to create a very accurate regional perspective on weather, pests, spray drift, smoke and other factors that impact the ground and what is above and below.

4. Some of this hyper local sensor and data activity is based on university research, on products and services from companies large and small, foreign and domestic, on repurposing equipment from other kinds of agriculture or industries, on the creativity of tinkerers.

5. This kind of data thrives because farmers are sharing it to help one another get more accurate information for their local area and to better understand what is going on in their region so that they can better appreciate trends and plan ahead.

6. Sensor and data innovation in mapping in viticulture can then be extrapolated to neighboring agriculture uses as sharing information about weather and pests helps all growers. That kind of data infrastructure and community then spills into forestry – trees are a crop. And that spills over into fire management and tourism.

Starting with Sensor Based mapping in viticulture then into agriculture and then more broadly may be a path of least resistance.

It also helps rural communities that are underserved or overlooked have a new chance to understand what is really going on and in a hyper local manner.

Assuming that what states and counties are trying to do on their own to improve mapping is useful, hen why not take an additional step by funding Sensor Based mapping and in a fun context?

Grapes are grown on nearly every continent and have been a part of civilization for thousands of years.

As we expand our sensor-based survey work we can include the sensors already deployed (sample list below) and seeing how they are or are not being interconnected to one another and also to the newer, precision ag and IoT sensors recently deployed or being planned to be deployed:

- Weather station sensors
- Sensors used for forest management and early fire detection
- Seismic monitoring sensors
- Natural Gas Pipeline sensors
- Electric Utility Transmission, Distribution and substation sensors
- Highway and Car Toll sensors
- Air quality sensors
- Water quality sensors
- FAA and Rural Airport sensors
- GPS system sensors

Given the Precision Ag Connectivity Act's **mandate of providing 95% Internet broadband coverage for rural, agricultural areas by 2025**, new ways of gathering valuable data and new mapping methodology for displaying this data will be needed to provide the guide posts for deployment and tracking of broadband in agricultural, mining and forestry lands across the US.

All of this comes at a time when many are eager to deploy 5G, to take advantage of new kinds of licensed and unlicensed spectrum (LoRaWAN, "White Spaces") being made available and to rip out and replace the Huawei equipment that many rural ISPs purchased and deployed.

There is also some reflection on the history of the USDA on rural electrification and how rural broadband done right can spur economic development and innovation.

This is timely and highly relevant. Last year President Trump signed into the law the bi-partisan and bi-cameral SUCCESS Act which focuses the USPTO on fostering women, veterans and people of color to invent and patent more. It also boosts involvement of underserved communities based on geography and demography. The USPTO is standing up a new "Expanding Innovation" National Council to focus on this mandate.

PAgCASA Is Built On A Set Of Principles

- AIM (All-In-Mapping) Methodology: We need precision mapping for Precision Ag and real precision ag connectivity generates so much granular, hyper local data and location sources. We are enabling the Sensors to inform a much smarter broadband map and break the logjam of Census Block maps.
- All (All-In-Infrastructure) Focus: Traditional industry, public and other silos are broken down in order to create new partnerships that benefit from shared unused or underused infrastructure. Of particular focus will be building partnerships with local electric utilities where our broadband mapping methodology will correct the current paradigm of trying to use "bump maps" to support "smart grids" and where dual use of newly deployed fiber is already in play.
- Necessity is the Mother of Invention: Provision reliable broadband services encompassing farmhouse to the field and sub-soil to stratus while being agnostic on the issues of spectrum, embracing a "whatever works" approach.
- Lodestones: platform interoperability, standards, open data, crowdsourcing, evidence-based process, relentless "in the field" experimentation, and validation/accountability.

- Clearinghouse for Public/Private data for the AIM & All initiatives; best practices, emerging technologies, standards, government RFP, etc. in the precision Ag connectivity space.

- Embrace data management systems specific to Precision Ag enabling blockchain supported secure supply chain management for transparency to the benefit of Farmers, Customers, and Mother Earth.

- Precision Ag produces the quantity and quality of data that drives demand for rural broadband access, which in turn makes it good for carriers, cloud providers, app developers, data research, and oversight. It also encourages long-term investments in infrastructure. A good example of this would be the plethora of small terrestrial weather stations networked over the Internet on a variety of digital platforms that produce critically important data for use both locally and nationally.

- Bring broadband to those who need it most in rural America with particular focus on often forgotten indigenous peoples on Tribal land.

- Integrate the National Security imperative of building a secure "China free" distributed and meshed VPN robust enough to act as the secondary or reserve communication network for America's new "smart" grid should events warrant.
- Sustainability: PAgCASA will operate under the principle articulated by Ben Franklin of "doing well by doing good" which unlocks both financial and social values responsibly.

Let's take your comments and questions now.

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sales for Securify (McAfee), investors, and startups. While at Netscape testified and provided comments on the FCC's VoIP issues proceeding known as the ACTA Petition. He deepened in Washington, DC, lobbying on patent reform for Intellectual Ventures. Peter is a graduate of Lehigh University and Villanova University School of Law. Peter's wife Shelby is a grape grower and winemaker in the Eola-Amity AVA of the Willamette Valley of Oregon. Peter is also a co-founder of PAgCASA (Precision Ag Connectivity Act Stakeholder Alliance). As a farmer living in a rural community Peter daily experiences the challenges posed by a lack of accurate broadband mapping. He conducts his business via a connection to OnlineNW, a local WISP, and relies on Verizon Wireless and AT&T Wireless for backup connectivity. There is no wireline, cable or competing WISP option.