

MEETING OF THE TASK FORCE FOR REVIEWING THE CONNECTIVITY AND TECHNOLOGY NEEDS OF PRECISION AGRICULTURE IN THE UNITED STATES

JANUARY 31, 2024

**HYBRID MEETING: VIRTUAL; COMMISSION MEETING ROOM, FCC HEADQUARTERS,
45 L STREET NE, WASHINGTON, DC 20554**

**10:00 AM CALL TO ORDER AND WELCOME,
ET ROLL CALL**

Christi Shewman, Designated Federal
Officer

Dr. Michael Adelaine, Ph.D, Task Force
Chair

Roll Call: [highlighted in yellow if present]

Dr. Michael Adelaine, Ph.D., CIO & Special Advisor to the President; South Dakota State University (Dr. Adelaine)

Vice Chair:

Dr. Sreekala Bajwa, Ph.D., Vice President, Dean & Director; Montana State University College of Agriculture & Montana Agricultural Experiment Station (Dr. Bajwa)

Ryan Krogh, Manager, Production System Program Management; John Deere (RK)

Members:

Andy Bater, Farmer; Fifth Estate Growers LLC (AB)

Timothy Bradford, Jr., Ph.D., Director of Agronomy; Vayda, Inc. (Dr. Bradford)

Julie Bushell, CEO; Ethos Connected (JB)

Joseph M. Carey, SGE (JC)

Heather Hampton+Knodle, Vice President & Secretary; Knodle, Ltd. (HHK)

Carolyn Price, Executive Director; Upstate New York Towns Association (CP)

Brad Robison, CEO; Tallahatchie Valley Electric Power Association and Tallahatchie Valley Internet Services, LLC; President; MS Fiber (BR)

Joshua Seidemann, VP Policy and Industry Innovation; NTCA (JS)

Joy Sterling, Chief Executive Officer; Iron Horse Vineyards (Joy)

Dan Watermeier, Commissioner, Nebraska Public Service Commission (DW)

Andy Berke, USDA

Dr. Michael Adelaine, Ph.D.: announced the agenda

Opening Remarks

- Chair Rosenworcel
 - o We rely on farmers to use innovative technology and data to feed our nation
 - o We can use this to fuel an ag ecosystem that is more efficient and sustainable
 - o Thank you for being a part of this Task Force and your work

- The future belongs to the connected and that includes precision agriculture
- Commissioner Carr
 - Thank you for the time and effort you are putting into this
 - As we look into the future we need to look to precision agriculture
 - Has spent a lot of time with the farmers across the nation
 - A new GAO report indicates that only 27% of farms and ranches have adopted what we would consider precision agriculture
 - A problem with adoption is connectivity
 - He was testifying on precision ag data and the average is that there is 28x the data stored in farming infrastructure than what is the Library of Congress. That gives us a sense of the challenge ahead of us
 - On a recent trip to a farm in South Dakota he visited with a family that was positively impacted by connectivity. Connectivity made it much easier for them to work both an IT job and implement precision agriculture on their farm
 - He is looking forward to seeing the work product that is put out and for their work
- Commissioner Starks
 - The work this Task Force does will not only benefit the farmers and producers but all of America
 - Would like to thank all of members, but especially the Chair and Vice Chairs for their leadership on this Task Force
 - He understands how vital connectivity is for rural America
 - For our Nation's producers and farmers, connectivity is key to unlocking the benefits of precision agriculture
 - He awaits the recommendations from this term
 - Highlights some of the work that this Commission has done to improve connectivity, including broadband mapping, 5G Fund for rural America, proposed a new regulatory framework for satellite and wireless providers. This is just the beginning of our work and there is much to be done to improve the connectivity of broadband in America
 - Innovative technology powered by broadband can increase efficiency, output, and yields
 - He looks forward to reviewing the recommendations of the Task Force
- AB
 - Fantastic to be here in person and it is an honor to be here representing USDA
 - The appointments of this Task Force is important and the USDA pays attention to it on a regular basis
 - Two of the biggest issues they've heard is last acre and symmetrical service. At USDA they don't yet have anything for last acre and appreciate the Task Force to bring this to our attention. As far as symmetrical they mostly require 100/100 service. Most of the grants they give out are to people who provide symmetrical service and they understand how that upload speed changes what you can do in rural America
 - Since the beginning of the Biden-Harris administration USDA has issued about \$3.6B in funds through their Reconnect program
 - The USDA will have their first broadband technical assistance grants announced in the next few weeks. We have never had technical assistance money before, so this is a big leap forward
 - The new Reconnect round will be announced in the next few weeks. We should expect a large amount of Reconnect funding
 - Thank you for your work on this. This not only helps farming but rural America's lifestyle through high-speed connection
- Dr. Adelaine
 - Would like to thank the Chair and Commissioners for their remarks, as well as for Andy Berke for his remarks on the work of RUS

- For the Task Force, they need to think about building on the work of the past four years. They don't need to cover old ground or rehash previous recommendations, but focus on new areas like sustainability. Need to focus on filling in any gaps and address outstanding issues under the year long timeframe. They need to get to it and get started on moving forward
- Would like to thank the Task Force members and Working Group members, as well as the folks from FCC and USDA who help and make this work possible
- He is excited for this session and excited to see how we can move precision agriculture into this next phase

Darice Gamble; Paula Silberthau: FACA Overview and Records

- Darice Gamble
 - Overview of NARA, disposition schedule
 - Generally all meetings are transferred in a paper format unless it's video'd in a digital format like this meeting
 - All they need to do is be sure that the DFO has a full, complete, and accurate record of decisions and deliberations
 - Has set up a precision ag Task Force email address. Between the email address and the DFO, make sure that the email is transmitted to the email box
- Paula Silberthau
 - Overview of FACA and the work of the working groups
 - FACA governs the operations of federal advisory committees
 - Key guiding principles are that FACA involves transparency, openness in government, diverse and balance in membership, and public accountability
 - Timely public notice of meetings
 - Please let the DFO know if you need more meetings in advance because we need enough time to publish in the Federal Register. We need to start planning 3 weeks before a meeting
 - Public attendance
 - FACA requires that all Task Force be open to the public
 - If we need to close pieces of meetings (e.g., if classified information is being discussed), there is a process for that
 - Document availability
 - Continuing ethics obligations
 - There is a continuing obligation to disclose interests that present or could appear to present a conflict of interest
 - Members must report actual or apparent possible conflicts to the DFO who will work through it with OGC ethics
 - Role of committee chair and vice chair
 - DFO
 - Overview of role
 - FACA record keeping
 - Any substantive matters on which there is communication with the DFO should be copied to the precisionagTF@fcc.gov email box
 - Substantive matters that pertain to the task they are working on, the recommendations they are making, should go to the email box
 - Informal working groups or subcommittees
 - Overview of the acts that working groups can and cannot do
 - Working Groups cannot have a quorum of full TF members
 - WG members can attend full TF meetings, but they cannot participate or vote
 - Working Groups cannot submit surveys that would be subject to the PRA. If

- groups want to do a survey, they should contact the liaison or DFO and they cannot evaluate the contours of what they might be able to do
 - Should coordinate with liaisons when they are having meetings, because the agenda should be approved by the DFO or FCC liaisons
 - Generally should treat discussions in Working Groups as confidential
 - It is fine to invite experts to have presentations. When the presentation is done the expert should leave the meeting
- Ex parte rules
 - There was an ex parte notice that announced the members and this meeting. The ex parte rules are intended to prevent undisclosed conversations between decision makers
- Practical issues: individual views vs. advisory committee views
 - If giving any statement concerning the WG, the member should state that something is public record or that, if not voted, the view is their personal views and not that of the full committee
- Changes in representative member's job
 - If members (other than SGEs) change jobs, please let the DFO know and we can try to get you appointed in a capacity alternative to their appointment representing their employer
- Dr. Adelaine: excellent presentation, recommends that each WG get a copy. Under the compressed timeline, as WG begin writing down their thoughts, can they share that with other WG to see if there is any duplication or collaboration that could happen? When WG begin writing, could it be shared with TF members as a draft if they want to talk about it at the next TF meeting?
 - Paula: work with the DFO and liaisons, but recommends sharing the WG recommendations (as tentative) as early as feasible because it could be helpful to get people to think about these issues and get feedback on them.
 - Christi Shewman: the Task Force will work with staff to ensure as much information as sharing as possible while staying in compliance with existing rules and legislation

FCC and USDA Staff Introductions

- Christi Shewman, FCC, DFO
- Emily Caditz, FCC, Deputy DFO
- Tom Hastings, FCC, Deputy DFO
- Aylene Mafnas, USDA
- Christi Shewman: always feel free to reach out to the staff because we are here to support you

Task Force Overview: Christi Shewman

- Still working on the WG membership and leadership. Will have 4 Working Groups. Vetting members takes some time and we are working through that now. Hopes to have new announcements on Working Groups, liaisons, and who will serve in these roles.
- Provides history of how Task Force was established, its recharterings, and the language in the 2018 Farm Bill that established the Task Force
- The Task Force is charged with providing advice and assessment on providing connectivity on agricultural lands to adopt precision agriculture, along with more specific requirements. A focus in this rechartering is going to be sustainability
- We will follow up with a few documents for members after this if they would like to reference this later
- The main work to draft and provide recommendations is done in the 4 Working Groups
- Each Working Group creates their own section of the report that is then combined and voted upon

at the Full Task Force meeting. The dates for the Full Task Force meetings will be announced soon. Once voted, become the official recommendations of the Task Force and delivered to the Chairwoman and the Secretary of Agriculture

- We try to seek balance of members in the Working Groups that are similar to members of the Task Force
- Chairs and Vice Chairs will organize the Working Group meetings. WG meetings will be held exclusively online or on the phone. Many WGs will meet weekly. WGs can have guest speakers, but must leave the meeting before deliberations take place. Staff liaisons are the primary contacts to the staff for the Working Groups and members should feel free to contact the liaisons at any time.
- Generally speaking as far as communications under FACA, it is better to be more inclusive of what goes in and out of the dedicated email inbox because the staff can take care of that on the backend.
- Please be mindful of any laws and regulations we need to comply with, if any questions come up please reach out to the DFO and leadership team.
- Questions:
 - o Dr. Adelaine: how do the rules around discussions work as far internal discussions to take back to the working group?
 - Christi Shewman: to the extent there are written communications (between members of the full Task Force or between Working Groups) copy the inbox, if there are opportunities for groups to attend please be in contact about that. This is a small group, so to the extent you have a quorum in a meeting (even a working group meeting), effectively become a full task force meeting and we need to be careful about that.
 - o JC: to clarify, quorum is 50%?
 - Christi Shewman: Yes. Normally that is 7, right now it is 6.

Task Force Member Introductions and Precision Ag Engagement

- Christi Shewman: this is the time to introduce members and for them to disclose their potential ethical conflicts
- Dr. Adelaine
 - o Represents South Dakota State University. SDSU has invested \$60M in precision agriculture and look to its future
- Dr. Bajwa
 - o Represents Montana State University College of Agriculture & Montana Agricultural Experiment Station
 - o Serves on a few organizations across the country that promote greater precision agriculture
- RK
 - o Not online. Can introduce himself at the next meeting
- AB
 - o Represents a small farm in rural PA. Provides full disclosures on board members for various PA agriculture boards and that he used to own some small radio
- Dr. Bradford
 - o Travelling. Can introduce himself at the next meeting
- JB
 - o Travelling. Can introduce herself at the next meeting
- JC
 - o He is an SGE
 - o Has primarily worked in wireless communications for most of his career. Until recently he worked for Trimble

- HHK
 - o Represents Knodle Limited Farms.
 - o Is immediate past president of American Ag Land. On AI farm advisory board out of education institutions. Serving on a board for precision ag in the Fiber Industry Association. On an Illinois Civilian Affairs council. On SCI advisory committee. Is a 4H leader.
- CP
 - o Works for Upstate New York Towns Association.
 - o Has served for two years on the deployment group. Hopes that her background in education could be helpful to the Task Force and the Working Group she serves in
- BR
 - o CEO of Tallahatchie Valley Power Association
 - o Board member of Electric Cooperative of Mississippi
- JS
 - o Represents NTCA
- Joy
 - o Partner and CEO of Iron Horse Vineyard
 - o Serves on CA coastal conservancy commission, advisory committee for CA broadband council, chairs rural CA democratic party caucus, and CA state nutrition board
- DW
 - o Chair and Commissioner of Nebraska PUC
 - o Owns farm land
 - o On Nebraska Rural Broadband Task Force

George K. Loftus: How the Research & Education Community Collaborates to Build and Sustain Regional and National Broadband Infrastructure

- Internet2 is a 501(c)(3) but has core components in the education and research space and has over 331 higher education members, 46 State and Educational members, as well as many regional, members
- Has 1.2Tbps trans-Atlantic capacity
- Provides layers 1, 2, and 3 services; as well as other services like cloud services and interconnection
- Has connectivity to 4 major cloud providers
- Runs eduroam: a wireless authentication service that provides global high-speed, roaming wi-fi service
- Has distributed computing within their network
- Offers customers security features: identify management tool that allows to authenticate based on different responsibilities you might have
- There is a large cadre of human beings that work together to make sure the technology functions with it as an uncommon network
- Works with vendors to support the R&E community in the cloud. Develop the community valuation, negotiation a community agreement, to help figure out the best way to deliver these services to their members
- Provides cloud learning, skills, and scorecards for members
- Internet2 has about 250 employees, but their work is driven by their community and their member needs
- Asked members what they should focus on moving forward. Broke it down into themes: 1) infrastructure and services; 2) convening, collaborating, and partnering; 3) innovation and transformation
- Currently working on an NSF grant. Working with HBCU and minority communities to increase access to cyberinfrastructure capabilities

- Has a community anchor program that provides services for K-12 and libraries, as well as other community actor programs
- Partners with MOREnet in Missouri to buildout modules and educational system to improve digital equity
- Questions:
 - o Dr. Bajwa: Montana is a state without a state network. How do states without state networks benefit from what Internet2 does and who drives that?
 - GL: Universities and educational institutions drive improvement in these cases, such as talking with the state broadband office. We can work with you on finding a solution, but it's driven at the state level. Recommends getting in touch with NFCC on the issue of connectivity at tribal colleges.
 - o Dr. Adelaine: What are your thoughts on how to do validation and verification such that everyone on the network has confidence in what they are told?
 - GL: Good question, but it seems to be a natural part of the process. We involve stakeholders at every step of the process and trust that folks trust their colleagues as they have worked through these issues as they test and implement technology and networks.
 - o Dr. Adelaine: How big will the network pipes get?
 - GL: no reason to not deal with anything under 100 gbps. At the state level we should be looking at 100-400 gbps capacity.

Dr. Scott Shearer: Autonomy, Sustainability, and Last Acre Connectivity

- As we look to the future, a lot of our historical “iron based” companies are turning into technology companies, such as John Deere
- Some important moments and technology that point to the future direction:
 - o CNH Industrial bought Raven (a technology company) in 2021. Raven has developed two different autonomous products
 - o Deere announced autonomy in 2022
 - o At Agritechnica in 2023 most manufacturers had some kind of autonomy offering. Of note, many of the devices did not have area devoted for humans.
 - o Autonomy will lead to smaller equipment, which will result in reduced axle loads on equipment and lower compaction depth of soil.
 - o AGCO's Xaver (a single row planter)—machines might be getting really small.
 - o SwarmFarm produces autonomous sprayers that can be weather-responsive
 - o Sabanto Ag has produced autonomous software that depends on cell phone connectivity to control the automation package that can be installed on equipment. The important thing to note here is that they are relying connectivity with a cellphone carrier rather than, for example, cloud computing
 - o ecoRobotix produces a different sprayer that could result in significant herbicide reductions
 - As we connect to the internet AI, we could see reduction in environmental load
 - o Hylio AG-272 spray drone. Spray drones are beginning to become more common in Ohio. These companies use them to spray up to 25,000 acres.
 - o Telematics and data products
 - o In-field sensor networks (IoT), will allow farmers to better control water use in fields
 - o AI driven spray application. When the technology detects a weed in the field with its AI software, it will spray pesticide/herbicide.
- In the future we may have to devices that deploy based on an intelligence payload. The cloud and computing capability will be essential to farming in the future.
- Other considerations for how AI technology will be used going forward: water drainage, controlled drainage

- All AI and these software require connectivity and connectivity will be crucial to the future of farming
- 360 yield center RAIN (high clearance machine, so we will have access to crop during the growing season and will be a great source for animal nutrient management)
- Agrivoltaics: indicate that solar farms and farming can exist
- Precision livestock systems
 - Potential problem: they have a hardwire connection but have problems maintaining it because of rodents
- Wireless providers:
 - Often the focus is on download and upload and ignores latency. This may pose problems for farmers.
- CBRS could be a solution for last acre connectivity. While backhaul will be a problem, there could be a number of solutions or stopgap measures for the last acre that farmers can consider.
- Questions:
 - Dr. Adelaine: we have roughly 700M acres of cropland in US. We need connectivity on all of them. Are we talking connectivity at the plant level, edge of the field, what level of connectivity would get people to adopt precision agriculture?
 - Scott Shearer: He wants to emphasize that he is concerned with connectivity to all acres of rural counties, not just to agriculture. Until AI systems are developed though, we may need live streaming for equipment for the farmer so they can make decisions on what the machine should do. This would indicate that broadband capacity needs to increase substantially. It is increasingly going to be important that we have this connectivity 24/7.
 - HHK: have you looked at boosting signal in terms of increasing wattage on equipment to provide more data?
 - Scott Shearer: there are a number of things that can effect connectivity on equipment. There are also differences in the capacity of license and unlicensed spectrum. The minute you lose connectivity you need to send someone into the field to move it to somewhere to regain connectivity. If we could boost signals that would be huge.
 - Dr. Bajwa: regarding sustainability, in his examples he talks about sustainability, but what is his expert prediction on precision agriculture's impact on sustainability?
 - Scott Shearer: this is a question we haven't explored enough in academia. If we get to the point where we limit the # units of nitrogen, for example, farmers can use per season (as in Europe), they need to figure out the most efficient way to use that nutrient (Nitrogen) per season. Limiting phosphorus could be useful too. The EPA could also relax the setback requirements if using newer technology. We also would not utilize inputs unless there is an economic return on inputs, which will be a crucial role for AI.

Working Group Charges & Next Steps

Charges

- The Chair has announced that the work of the TF will also consider how connectivity can improve sustainability in agricultural productions
- Mapping Working Group
- Connectivity Working Group
- Adoption and Jobs Working Group
- Deployment Working Group

Next steps

- Working Groups:

- We already discussed the next steps are to choose leaders of Working Groups and determine who members will be. Once leadership is chosen, we will identify the new members and ensure good communication there and begin establishing meetings, setting agendas for meetings, and getting liaisons involved with the Working Groups. Working Group members could be solicited through a Public Notice.
- Report:
 - Since this is the last year of the Task Force, the report will be accelerated to a one year timeline.
- Full Task Force Meetings:
 - The leadership will be discussing meetings for the rest of the year. There will be at least two, possibly 3. Final report will be at the end of the year. Target for having that done is 30 days before the final meeting so FCC staff and members will have time to look at what they are voting on at the final meeting.
- If anyone has any questions, reach out to FCC and USDA staff
- Dr. Adelaine should send around the copy of the Cobank study that Dr. Scott Shearer cited

Open Discussion and Questions

- Joy: wanted to mention that she found it encouraging that the Department of Agriculture is already promoting symmetrical. Wanted to suggest everyone be mindful that the Farm Bill has not passed yet.
- HHK: wants to be sure that the Working Groups spins their wheels to much on trying to define sustainability and that they have a shared definition that all the Working Groups can work from. This definition should include economic and social elements.
- Dr. Bajwa: requested clarification on the due date for the report
 - Christi Shewman: this is the last year of the Task Force and is terminating on January 1, 2025, per the 2018 Farm Bill. The staff will work with you on the logistics getting the report in on time.
- JC: agrees with HHK that a definition of sustainability should include economic and social aspects as well.

Closing Remarks

Christi Shewman: Thanks Task Force leadership (Dr. Adelaine, Dr. Bajwa, Ryan Krogh); all Task Force members; USDA staff; and future Working Group members. Announces she is stepping down, Emily Caditz will be DFO, Tom is staying on as Deputy DFO.

Dr. Adelaine: Wishes Christi the best. Thanks for the great presentations and dialogue. Dr. Adelaine would like to go with the same format as Teddy laid out in previous reports—an executive summary with four separate sections. Requests a folder that WG could put drafts where other TF members can see what other WG members and TF members are thinking and ideally avoid duplication. Leaving us with a couple hooks for the group:

- Academics: we've done the dissertation research, now write the final document
- Farmers: we've planted, fertilized, and watered. Now it's time for harvest.
- A sports analogy: in the red zone.
- Technology folks: this is about the last mile. If we don't have connectivity at the last mile, it's all for naught.

Dr. Michael Adelaine: called meeting closed at 2:47pm EDT