

A stylized graphic of a flower on the left side of the slide. The flower has a light blue upper half and a light green lower half, with a white center. It has two large, light green leaves extending downwards and to the right.

Emerging Agricultural Technologies Workgroup

Pesticide Program Dialogue Committee Meeting

May 31, 2023

PPDC Emerging Agricultural Technologies Workgroup: Roster

Ed Messina and Amy Blankinship(Co-chairs 2022), **John Orlowski** : EPA OPP

Alberta “Carla” Theriault (through Feb 2023): EPA Designated Federal Official

Greg Watson (co-chair 2022), **Sarah Hovinga**: Bayer Crop Science

Ruben Arroyo: Riverside County Department of Agriculture and Measurement Standards

Manojit “Mano” Basu: Crop Life America (Co-chair 2021)

Scott Bretthauer, Damone Reabe, Andrew Moore: National Agricultural Aviation Association

Emily Bryson: California Dept. Pesticide Regulation

Dan Cederberg, Brian Satorius (previous), Bart Bolman and Kari Kavanagh (current): Teejet

Gilbert Del Rosario: Corteva Agriscience

Adam Finch: BASF

Rebecca “Becca” Haynie: Syngenta

Ramon Leon: North Carolina State University

Timothy Lane: Battelle

Lauren Lurkins: Illinois Farm Bureau

Bob Mann: National Association of Landscape Officials

Daniel Markowski: American Mosquito Control Association

Dan Martin, Brad Fritz: USDA ARS

Jacob Moore: ADAMA

Kimberly Nesci, Michele Ranville, Julie VanAlstine: USDA OPMP (2022)

Robby Personette: Wisconsin Dept. of Agriculture (2021)

Karen Reardon: Responsible Industry for a Sound Environment (RISE)

Margaret Reeves: Pesticide Action Network

Bryan Sanders: HSE-UAV (2021)

Dwight Seal: North Carolina Dept. of Agriculture (2022)

Scott Shearer: Ohio State University (2021)

Christina Stucker-Gassi: Northwest Center for Alternatives to Pesticides

Nick Tindall: Association of Equipment Manufacturers

Anne Turnbough: AMVAC Chemical

PPDC – Emerging Technology Workgroup

Revised Charge Questions: February 2022

- **Revised Charge Questions:**

- **Is there information on availability and affordability of emerging technology for all communities?**

- **To account for emerging technologies, how should EPA OPP establish a process for:**

- **Determining what additional information / data is needed**
- **Updating risk assessment practices / SOPs**
- **Updating label language**

Using these examples:

- a) **Manned Aerial**
- b) **UAV: off-site movement (including benchmark UAV type & spray system), BMPs / use conditions**



- **How should EPA OPP continue to establish a ‘digital mindset’ for its program and staff?**

- **Use UAV example to start**

Emerging Technology Workgroup Meeting Cadence

- January 13, 2022
- February 11, 2022
- March 10, 2022
- April 7, 2022
- May 5, 2022
- June 2, 2022
- June 30, 2022
- July 28, 2022
- August 25, 2022
- September 22, 2022
- November 17, 2022
- January 12, 2023
- *Feb 9, 2023*
- *March 9, 2023*
- *May 4, 2023*

Presentations:

- **May 26, 2022:** ETWG report to the PPDC
- **In the ETWG:**
 - **August 25, 2022:** Presentation on CLA Drone Working Group, Drift Curves & Summary of Current Knowledge
 - **July 28, 2022:** Association of Equipment Manufacturers, retrofitting of existing application equipment & ‘targeted application’
 - **June 30, 2022:** EPA Environmental Fate & Effects Division, existing approaches for exposure assessment

ETWG Response to Charge Questions (in report)

Is there information on availability and affordability of emerging technology for all communities?

Note: a number of these technologies were covered in [previous ETWG report to PPDC](#)

- **Access via Retrofitting Existing Equipment**
- **Data Management Technologies**
 - More consistent, reliable data from yield monitors, weather stations on application machinery enabling operators to make better decisions
 - Examples:
 - Ability to monitor product placement and application totals during an application
 - Data transfer off the machine to a laptop, notebook, etc.
- **Steering & Guidance Control (using GPS)**
 - Implementation of agronomic prescriptions (pre-treatment scouting and detailed field data analysis that can be utilized to create a treatment map)
 - Examples:
 - Utilize autosteer to maintain a consistent speed and location
 - Internal & external boundary mapping
 - On-machine sensors collect data linked to a specific location

ETWG Response to Charge Questions (in report)

Is there information on availability and affordability of emerging technology for all communities?

- **Access via Retrofitting Existing Equipment**
- **Section Control**
 - Autonomous control of portions of the boom to ensure that the intended area is receiving the application
- **Rate Control**
 - Control the rate at which a machine applies
 - Examples:
 - Pulse Width Modulation (ensures consistent droplet size)
 - Positive on and off shut off nozzles
- **Boom Height Control**
 - Control the height of the boom relative to the target spray range, canopy, and/or ground location
 - Reduce off target movement, Improve coverage / efficacy

ETWG Response to Charge Questions (in report)

Is there information on availability and affordability of emerging technology for all communities?

- **Access via Retrofitting Existing Equipment**
- **Targeted Application Technologies**
 - Combination of all the other technologies to implement actions augmented by
 - Artificial Intelligence
 - Lighting (i.e., on the application boom)
 - Cameras or other forms of image identification

ETWG Response to Charge Questions (in report)

Is there information on availability and affordability of emerging technology for all communities?

- **Contract Services**

- Avoids cost of entry (e.g., purchase of new application equipment)
- Avoids the learning curve often associated with use of new technologies

- **Grant Opportunities**

- Multiple sources of grants or other tools available to support access to emerging technologies

- **Conclusion**

- **ETWG believes many of the emerging technologies that are driving toward precision and digital agriculture have the potential to be accessed by prospective user communities in the United States.**

ETWG Response to Charge Questions (in report)

To account for emerging technologies, how should the EPA establish a process for: Determining what additional data and/or information is needed, Updating risk assessment practices and/or SOPs, Updating Label Language?

ETWG recommendations intended to support EPA OPP in their journey to adapt to the current / future state of pest management

• Continue Engagement

- EPA OPP closely following the developments associated with use of Unmanned Aerial Vehicles (aka Remotely Piloted Aerial Application Systems – RPAAS) for pest management purposes (e.g., support for OECD Drone Subgroup)
- ETWG continues to support EPA OPP in this effort

• LEAN Analysis to Provide Focus, Resources to Update Assessments

- Changes needed to EPA OPP exposure and risk assessment practices and assumptions to reflect current practices in agriculture, vector control, & emerging technologies
- Recommends that EPA OPP conduct a LEAN analysis to develop improved methods for adapting all environmental and ecological assessments - especially those for manned / uncrewed aerial application (RPAAS) and for targeted application

ETWG Response to Charge Questions (in report)

To account for emerging technologies, how should the EPA establish a process for: Determining what additional data and/or information is needed, Updating risk assessment practices and/or SOPs, Updating Label Language?

- **Account for Targeted Application in Assessments, Label Language**

- EPA OPP must account for Targeted Applications to encourage adoption of this technology & recognize potential benefits and/or risks
- Encourage the development of label language that appropriately describes targeted applications
 - Communicates that exposure may be reduced proportionally with targeted application
 - Recognizes that targeted applications can help protect endangered species
 - Mitigations like no-spray buffer zones may be decreased when targeted applications are deployed.

ETWG Response to Charge Questions (in report)

To account for emerging technologies, how should the EPA establish a process for: Determining what additional data and/or information is needed, Updating risk assessment practices and/or SOPs, Updating Label Language?

- **Targeted Applications are application equipment agnostic and can be defined as:**
 - An application method linked to a prescription, scouting and/or sensing result, including real-time (e.g., while the application is in progress), which improves delivery of a pesticide(s) to target the intended pest (e.g., weed, insect, fungus, etc.) in small or irregular areas within a larger use area (section of a field, fairways at a golf course, etc.).
 - Targeted application technologies are often designed to directly target a pest or a section of the intended application area where the pest is located, further outlining the need to assess such technologies independently of traditional application equipment.

ETWG Response to Charge Questions (in report)

Establishing a Digital Mindset, Digital Tools Could Enable Local / Site-Specific Use Directions

- **Development of digital infrastructure, ‘paper-based’ approach no longer suitable**
 - Enable direct communication and/or implementation of use instructions to digital devices such as smart phones / computers and autonomous application machines
 - Enable site specific approaches to risk assessment / use instructions
 - Use case studies / pilots to develop and implement

ETWG Most Important Recommendations (in report)

- **Development of digital infrastructure, 'paper-based' approach no longer suitable**
 - **ETWG urges EPA OPP to work to build a digital mindset for its program by establishing projects and/or pilots that work toward building a digital infrastructure that would allow pest management application recommendations and implementable actions.**
 - **Development and adoption of digital labels / use instructions / label and labeling requirements that can be read, directly delivered to digital devices (e.g., notebook or tablet computer, or a smartphone) and/or delivered to and acted on by autonomous machines – including robots - is not just a need for the future but is a current need.**

ETWG Most Important Recommendations (in report)

- **Development of digital infrastructure, 'paper-based' approach no longer suitable**
- **Resources to Update Assessments**
 - **Develop and Implement Site-Specific Exposure and Risk Assessment Methodology: We recommend that EPA OPP initiate a case study that leverages existing tools to develop localized / site specific estimates using a population of established crop / farm sites / vector management use sites.**
 - **Examples of tools / approaches included in appendices of the report**

ETWG Most Important Recommendations (in report)

- **Account for Targeted Application in Assessments, Label Language**

- **Adjust Exposure Estimates in Risk Assessments**: To identify and overcome the barriers to updating exposure and risk assessment assumptions and approaches, the ETWG recommends that EPA OPP conduct a LEAN analysis to work toward improved methods for adapting to assure that representative use conditions and assumptions are included in all environmental and ecological assessments, especially those for manned / uncrewed aerial application (RPAAS) and ‘targeted applications’ as defined in this report.

Conclusion (from Previous ETWG Report)

- Emerging technologies will continue to arise during this dynamic and important time in agriculture
 - They are a central element to solving one of society's most pressing issues: feeding a growing population while minimizing farming's impact on the environment and human health
- Sustainable and climate-smart production will require this to be achieved by managing the economics as well as factors such as soil health, erosion, water use, and prudent use of agricultural inputs
- Emerging technologies will play an increasingly important role in the non-agriculture sector, namely vector control, and enabling access to dangerous terrain thereby increasing worker safety.
- As with the adoption of any new technology, it will only be successful if it brings benefits to farmers / other user groups, the environment, and society
- EPA needs to continually review and update the pesticide risk profile to account for any changes to risk due to the adoption of these technologies

Recommendations for the EWTG

- **Sunset the ETWG and establish a PPDC working group that will support efforts to build the much-needed digital infrastructure including:**
 - **Development and adoption of digital labels / use instructions / label and labeling requirements that can be read, directly delivered to digital devices and/or delivered to and acted on by autonomous machines**
 - **Development and adoption of a site-specific risk assessment approach**
 - **Initiate a case study that leverages existing tools to develop localized / site specific estimates**