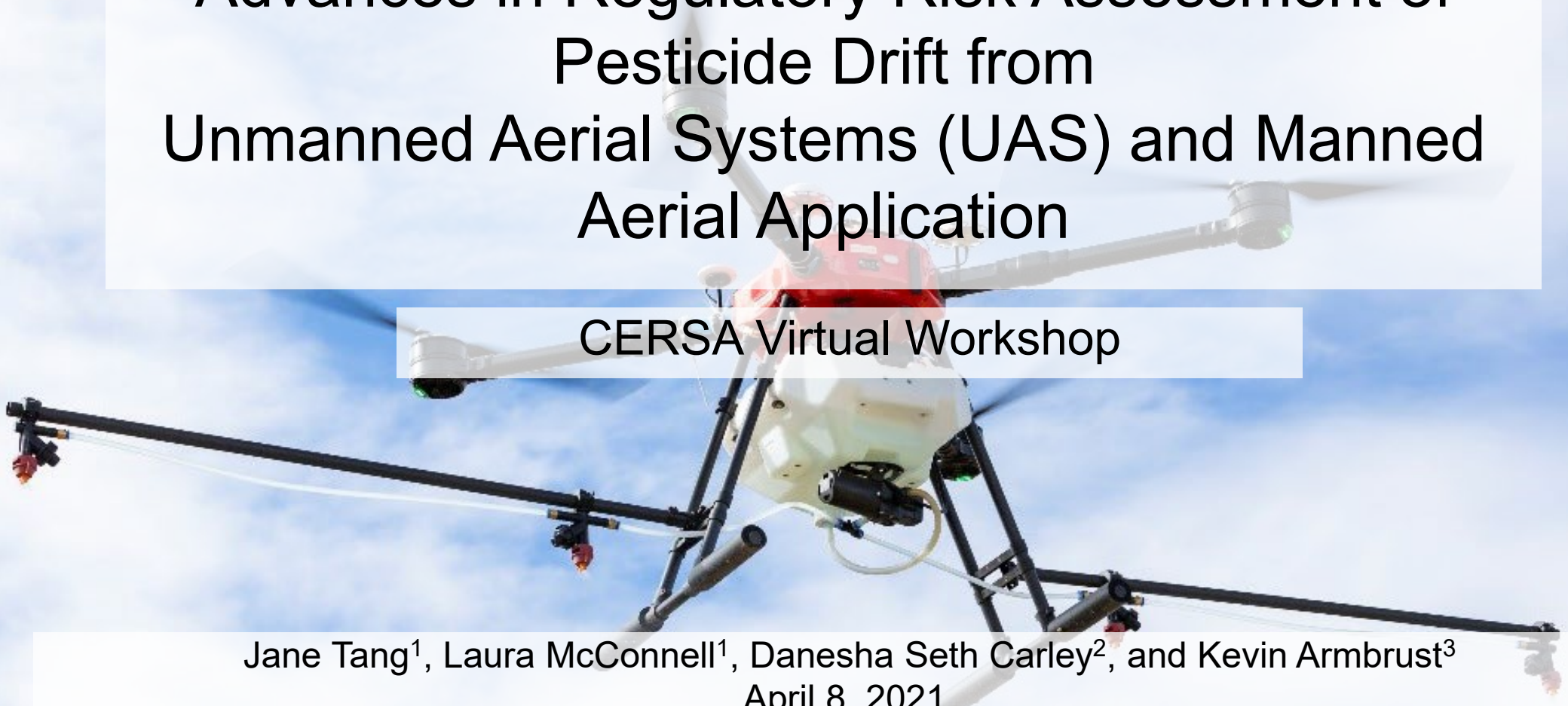
Advances in Regulatory Risk Assessment of Pesticide Drift from Unmanned Aerial Systems (UAS) and Manned Aerial Application

CERSA Virtual Workshop



Jane Tang[1], Laura McConnell[1], Danesha Seth Carley[2], and Kevin Armbrust[3]

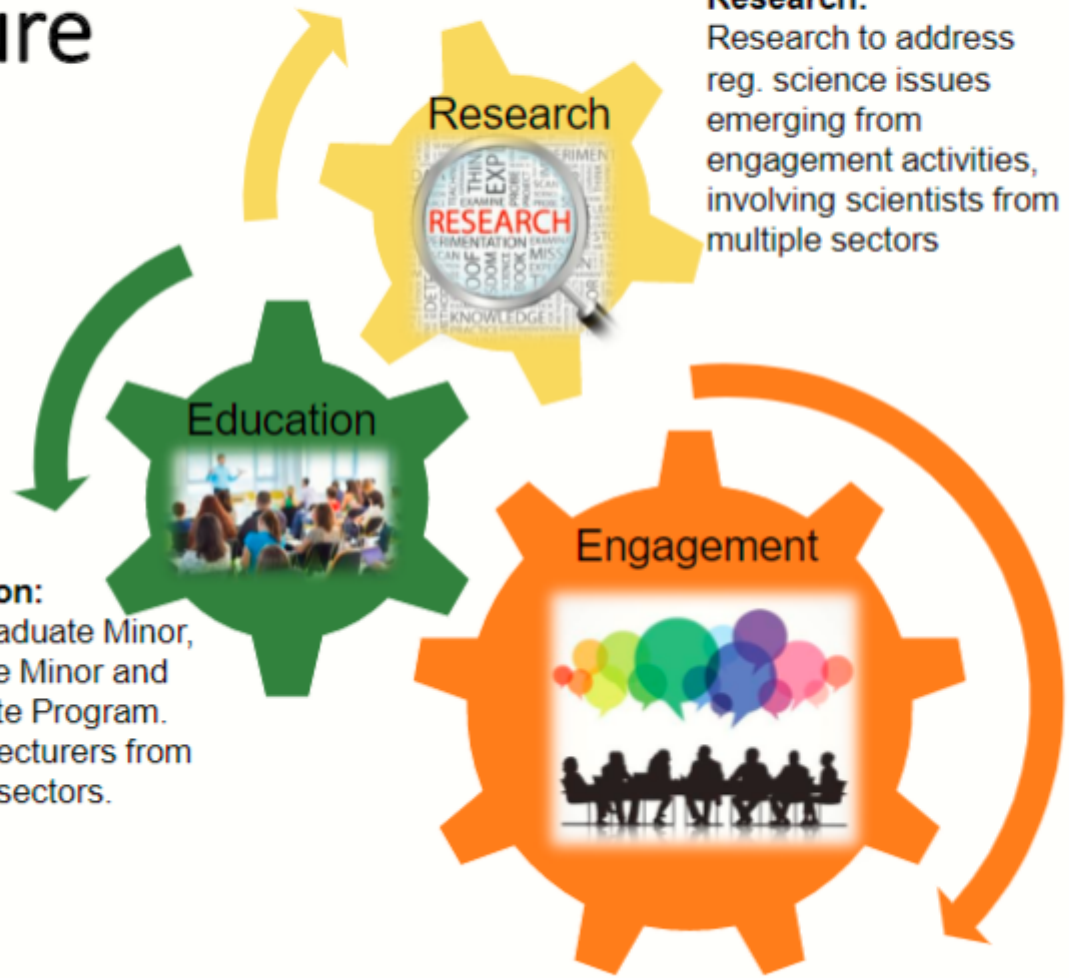
April 8, 2021

[1] Bayer Crop Science, [2]NC State University, [3] Louisiana State University

NC STATE UNIVERSITY

North Carolina State University Center of Excellence for Regulatory Science in Agriculture

VISION:
NC State will partner with a **Consortium of Universities and organizations to advance Regulatory Science in the** US and the world.



Research:
Research to address reg. science issues emerging from engagement activities, involving scientists from multiple sectors

Education:
Undergraduate Minor, Graduate Minor and Certificate Program. Include lecturers from multiple sectors.

Engagement:
Forum for bringing together stakeholders including growers, engaging on emerging issues in regulatory science

https://cals.ncsu.edu/psi/center-of-excellence-for-regulatory-science-in-agriculture/

CERSA Directors

Dr. Danesha Seth Carley, Director

NC STATE UNIVERSITY

Dr. Kevin Armbrust, Co-Director

LSU

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NC STATE UNIVERSITY

CERSA UAS/Spray Drift Virtual Workshop

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2020 CERSA Virtual Workshop

Advances in Regulatory Risk Assessment of Pesticide Drift from Unmanned Application Systems (UAS) and Manned Aerial Application

December 1-3, 2020

Workshop Program Flyer

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- USDA-Bayer Collaboration

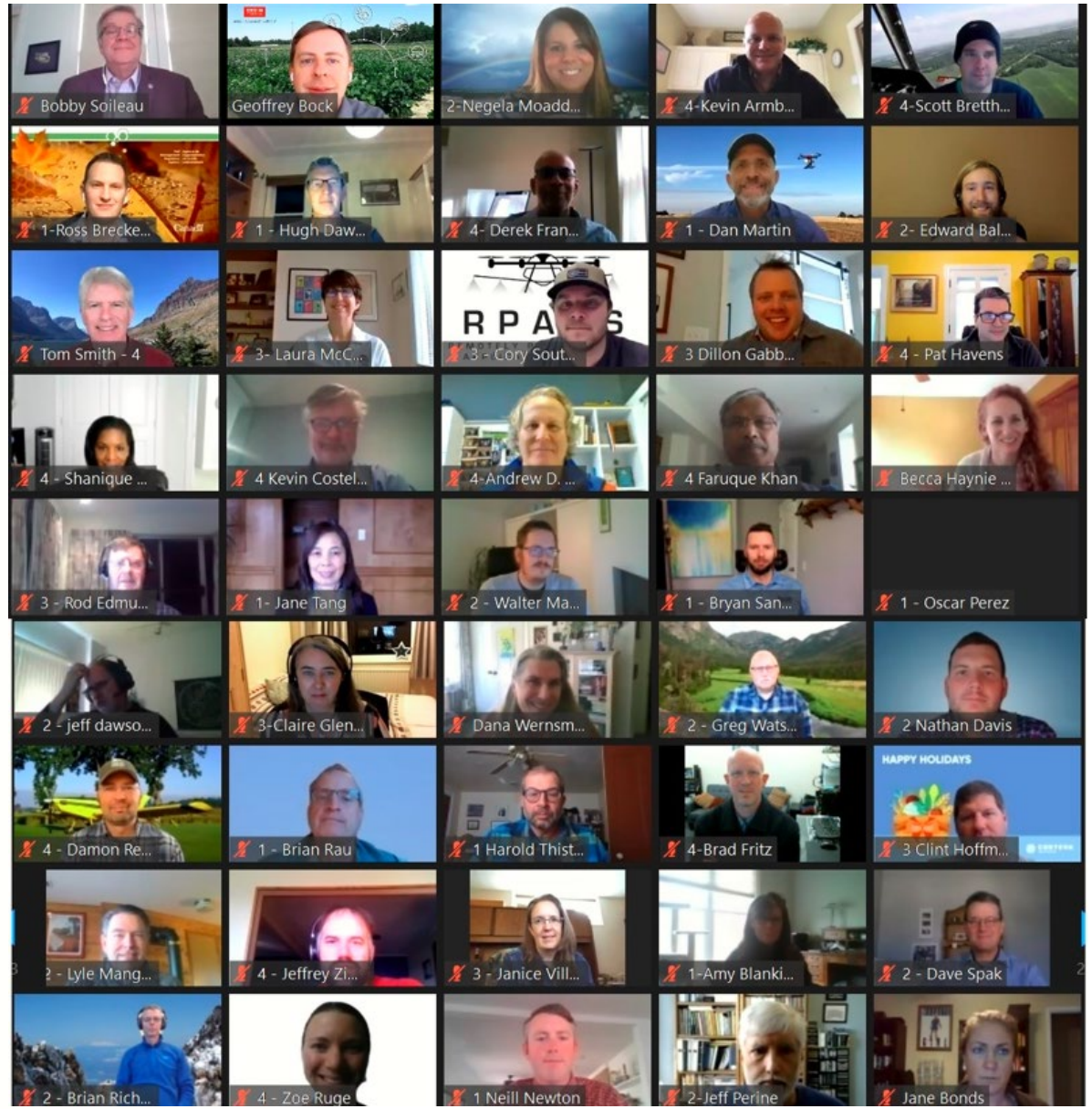
Workshop summary will be posted soon

Scientific Program Committee

- Amy Blankinship, US EPA
- Ross Breckels, PMRA
- Kevin Costello, US EPA
- Monisha Kaul, US EPA
- Jeff Perine, Syngenta
- Daniel Martin, USDA-ARS
- Andrew Moore, Nat'l Ag Aviation Assoc
- Jane Tang, Bayer Crop Science
- Jerome Schleier, Corteva AgriScience
- Cory Southam, StrongField Environ. Solutions
- Harold Thistle, TEALS, LLC
- John David Whall, Health Canada

Organizing Committee

- Danesha Seth Carley, NC State University, Director, CERSA
- Kevin Armbrust, Louisiana State University, Co-Director, CERSA
- Bobby Soileau, Louisiana State University
- Laura McConnell, Bayer, Board Member CERSA
- Geoff Bock, NC State, College of Ag and Life Sciences



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Regulators

IBAMA MMA

United States Environmental Protection Agency

Health Canada

Agriculture and Agri-Food Canada

MapaBRASIL

Australian Government
Australian Pesticides and Veterinary Medicines Authority

Government Agencies

USDA NRCS U.S. Department of Agriculture Natural Resources Conservation Service

USDA ARS Agricultural Research Service

NOAA

OISC Office of Indiana State Chemist

Federal Aviation Administration

Universities

UF University of Florida

UFU Universidade Federal de Uberlândia

unesp Universidade Estadual Paulista "Júlio de Mesquita Filho"

LSU

Industry & Associations

BAYER

pyka

syngenta

NAAA National Agricultural Aviation Association

BASF The Chemical Company

CORTEVA agriscience

STRONGFIELD environmental solutions inc.

TeeJet Technologies

Dairyland Aviation
Aerial Seeding, Spraying & Fertilizing

CAM

NGOs

NPSEC National Pesticide Safety Education Center

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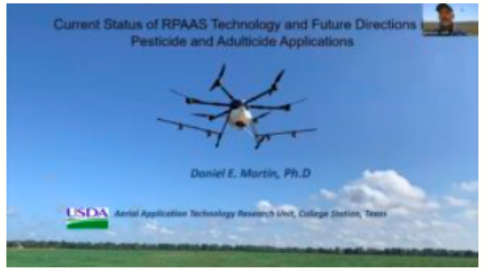
Plenary Presentations

Please see below to access the recorded plenary presentations from the workshop. **Click on the image under each title to watch the presentation on YouTube.** Sub links under each plenary presentation are web resources relevant to that presentation.

Day 1: December 1, 2020

- Opening Remarks – Steve Lommel, Assoc. Dean, NC State College of Agriculture and Life Sciences
- Welcome and Plenary Introductions – Danesha Seth Carley, Director, NC State Center of Excellence for Regulatory Science in Agriculture
- Current Status of UAS Technology and Future Directions in Pesticide and Adulticide Applications – Daniel Martin, Research Engineer, USDA-ARS, Aerial Application Technology Research Unit



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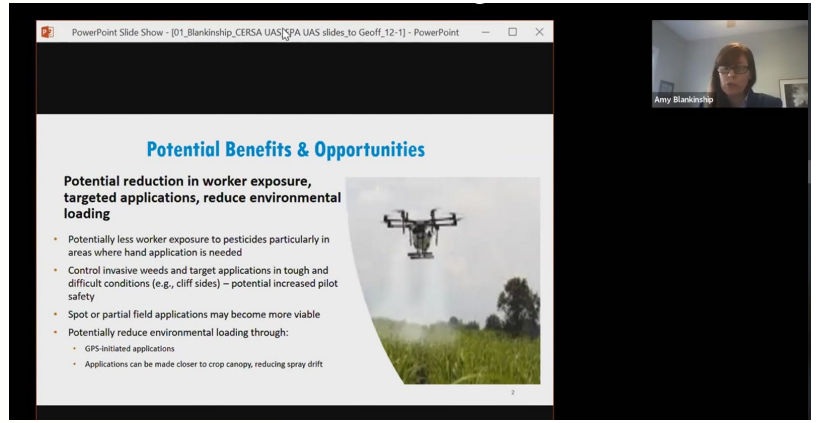
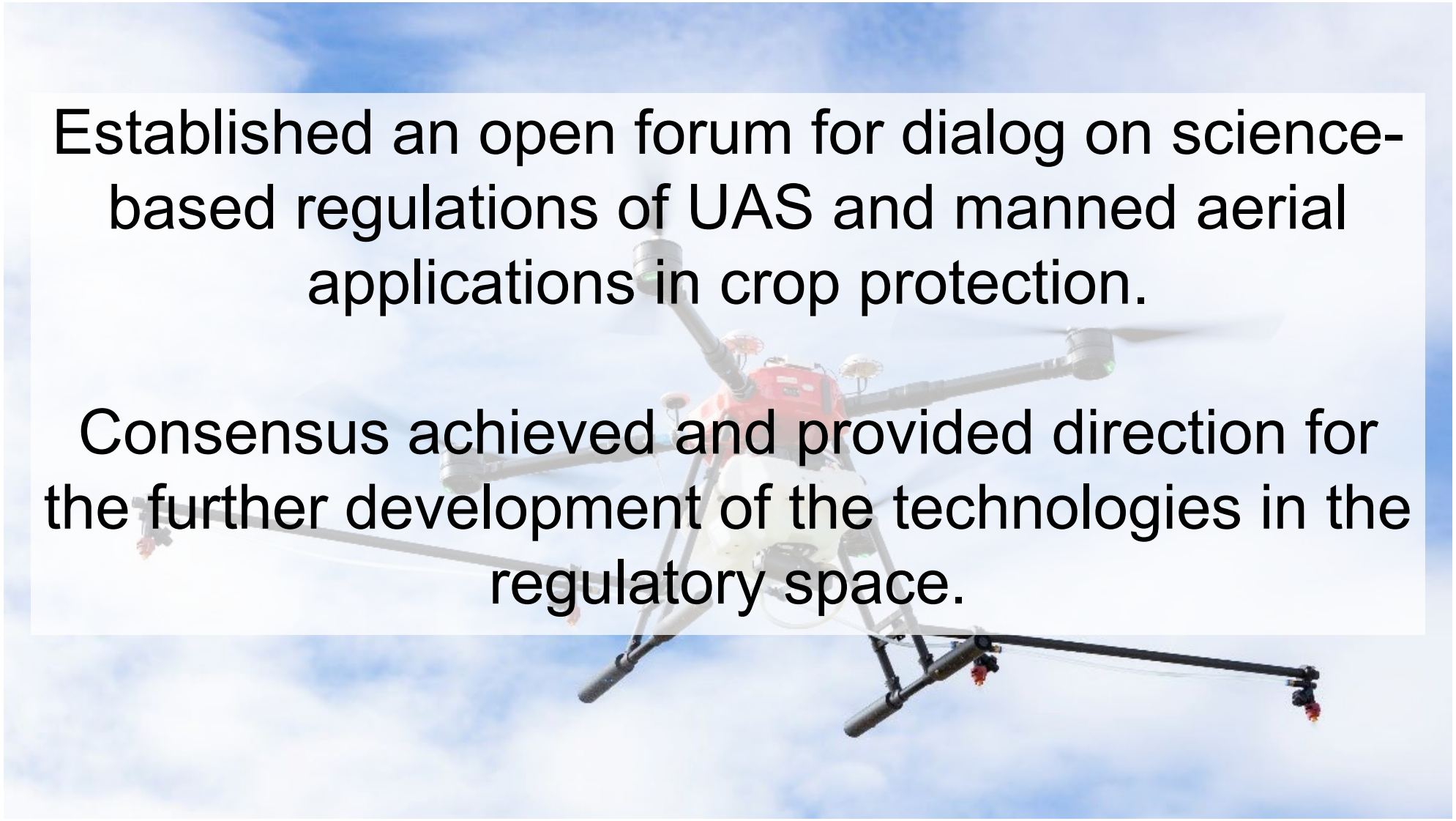




Established an open forum for dialog on science-based regulations of UAS and manned aerial applications in crop protection.

Consensus achieved and provided direction for the further development of the technologies in the regulatory space.

Consensus Statement

“Under the auspices of the 2020 CERSA Virtual Workshop Advances in Regulatory Risk Assessment of Pesticide Drift from Unmanned Application Systems (UAS) and Manned Aerial Application, multiple stakeholders across public and private sectors agree that:

We **promote the implementation of RPAAS platforms in a complementary manner** to conventional aerial and ground application equipment rather than a replacement for traditional application methods that may have the potential to expand application capacity in specific use conditions.

We recognize the **need for the development of public-domain regulatory models**, supported by high quality data, for the predictions of performance, drift and exposure from the use of RPAAS.

We commit to continuing the conversation on how to **keep drift modeling for manned aircraft up-to-date**, whether by revising default inputs or expanding assessments to consider higher tier simulations.

We further support continued **research into the effect of pesticide droplet size on efficacy for all application platforms**.

Therefore, we support **a concerted, collaborative effort involving diverse stakeholders** in academia, government research organizations, industry sectors, and other key groups to develop research protocols, empirical data & regulatory models in order to drive this effort forward.”

1. What are the Potential Benefits of spray UAS technology for Broad Acre, Minor Use, and Industrial Applications?

Broad Acre	IVM/Vector Control	Railway Weed Control

• Limited uses
  • Spot
  • Small acreage
	• Access areas not possible by conventional techniques
	• Operator safety benefits
		• May have advantages comparing to Multi-Purpose Vehicles

*Potential for increased application precision to reduce drift and environmental loading

*Potential economic benefit

*need more data/information

2. What Types of Uses May be of Most Interest to Growers and Where Can Conventional and UAS Technologies be Used Together?

Areas difficult to access with conventional equipment

Applications at boundaries, fence lines and along rights of way

Public health/ vector control treatments

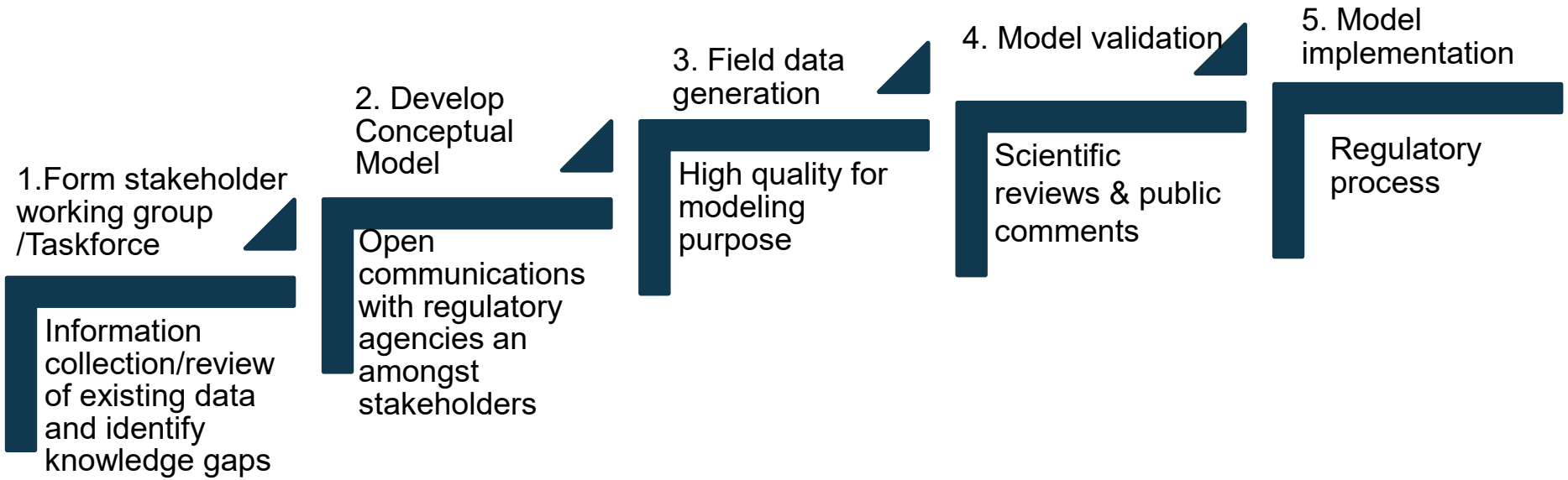
Combination treatment for airblast orchard applications

*UAS spraying within buffer zones regulated for conventional equipment

**Pollinator protection via night-time UAS applications

*Data needed to demonstrate lower drift risk
**Need more data/information

3. What is the Path Forward for a Publicly Available Mechanistic Regulatory Model for Spray Drift from UAS? Are There Existing Models That Can be Used in the Short Term?



Potential hurdles/ challenges are also discussed

4. What is the Path Forward for an Improved/ Modernized Approach to Model Spray Drift from Manned Aerial Applications? How can AgDrift® and AGDISP™ be Updated to Incorporate Advancements in Manned Aerial Application Technologies?

Short-term

Establish an expert working group

Evaluate AgDrift /AGDISP default input and recommend changes to reflect advancements

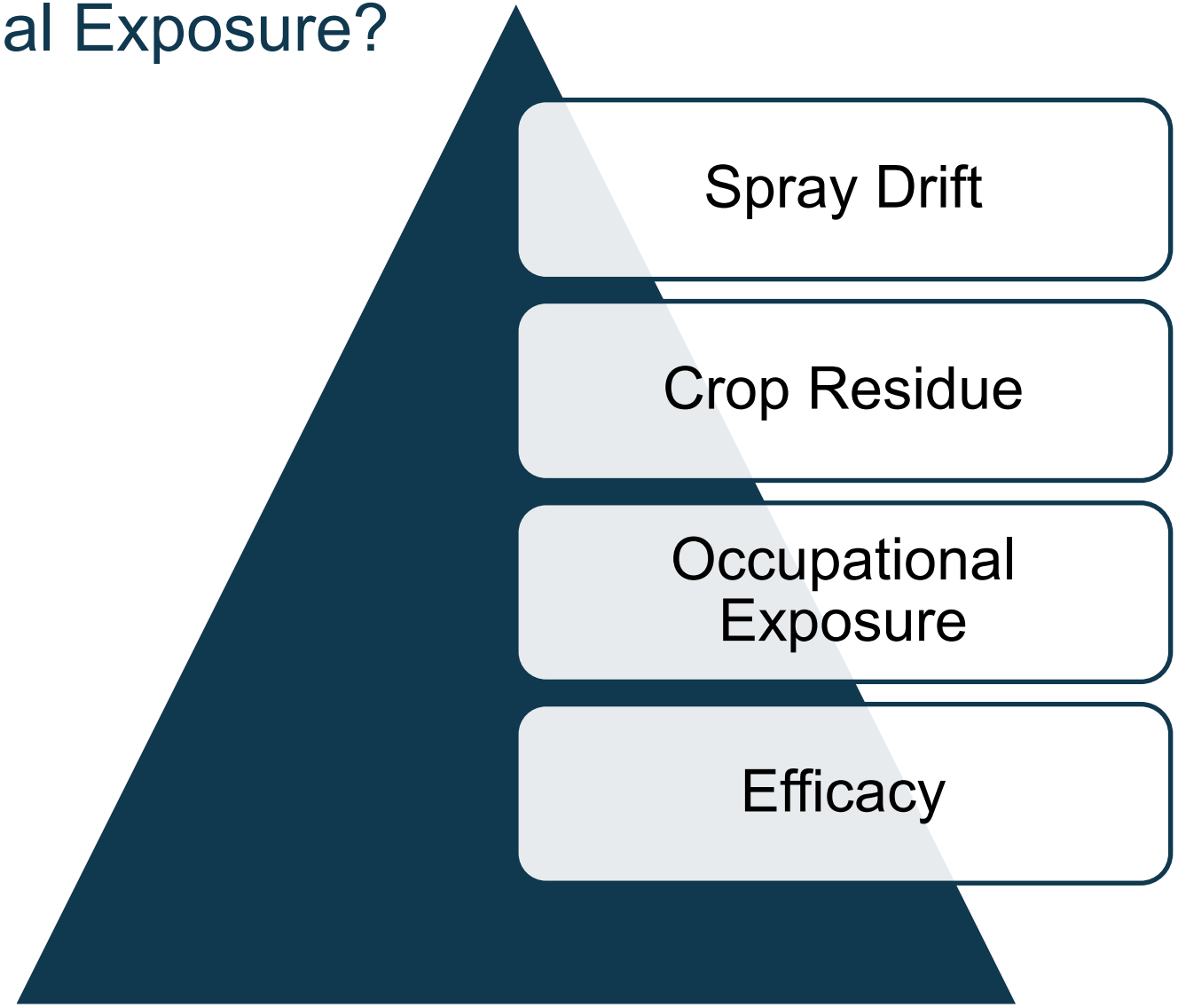
Long-term

Probabilistic exposure consideration of wind speed and direction

Consider multiple Application Assessment Method

Evaluate impact of adjuvant and tank mix on droplet sizes

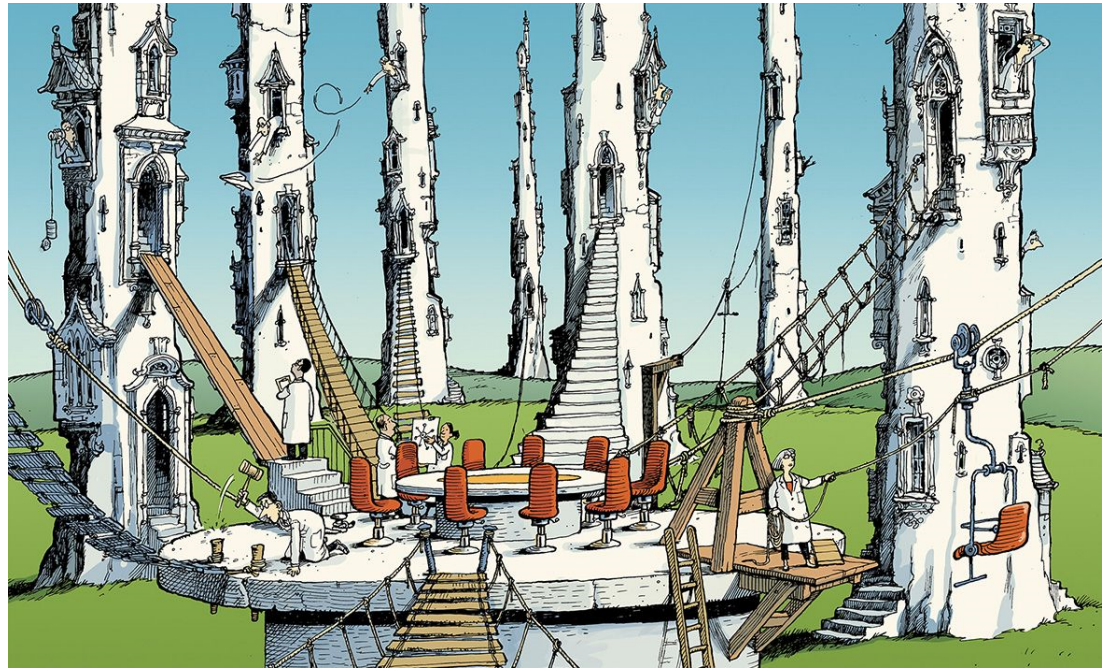
5. What are the Highest Priority Regulatory Data Gaps with Respect to Off-Target Drift, Efficacy, Crop Residue and Occupational Exposure?



Recommended Path Forward – working progress

CERSA can continue to provide a forum for multi-stakeholder engagement on the topic of UAS regulation focusing on technical aspects.

- In the short term, establish a multi-stakeholder working group for improving and modernizing drift modeling for manned aircraft to keep modeling up to date.
- Facilitate discussions on potential modeling approaches for UAS.
- Provide a forum for dissemination and feedback on the work of the Industry Task Group and OECD Working Group.



Gunsalus et al. Nature, 2019
(https://www.nature.com/articles/d41586-019-00519-w)


Thank You