



Overview & Update of the Unmanned Aerial Pesticide Application System Task Force (UAPASTF)

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 **ACS** Fall 2026

Ag Drone Use Continues to Increase

- “The global agriculture drone market was valued at USD 4.38 billion in 2025 and is projected to grow from USD 5.19 billion in 2026 to USD 18.03 billion by 2034”.¹
- “The U.S. agricultural spray drone industry continued its rapid expansion in 2025, with more than 16.4 million acres treated, representing a 58.7% year-over-year increase. Growth was driven largely by an increase in FAA-approved Part 137 UAS operators to 1,710 in 2025”.²
- “In the U.S., the number of agricultural drones registered with the Federal Aviation Administration leaped from about 1,000 in January 2024 to around 5,500 in mid-2025”.³

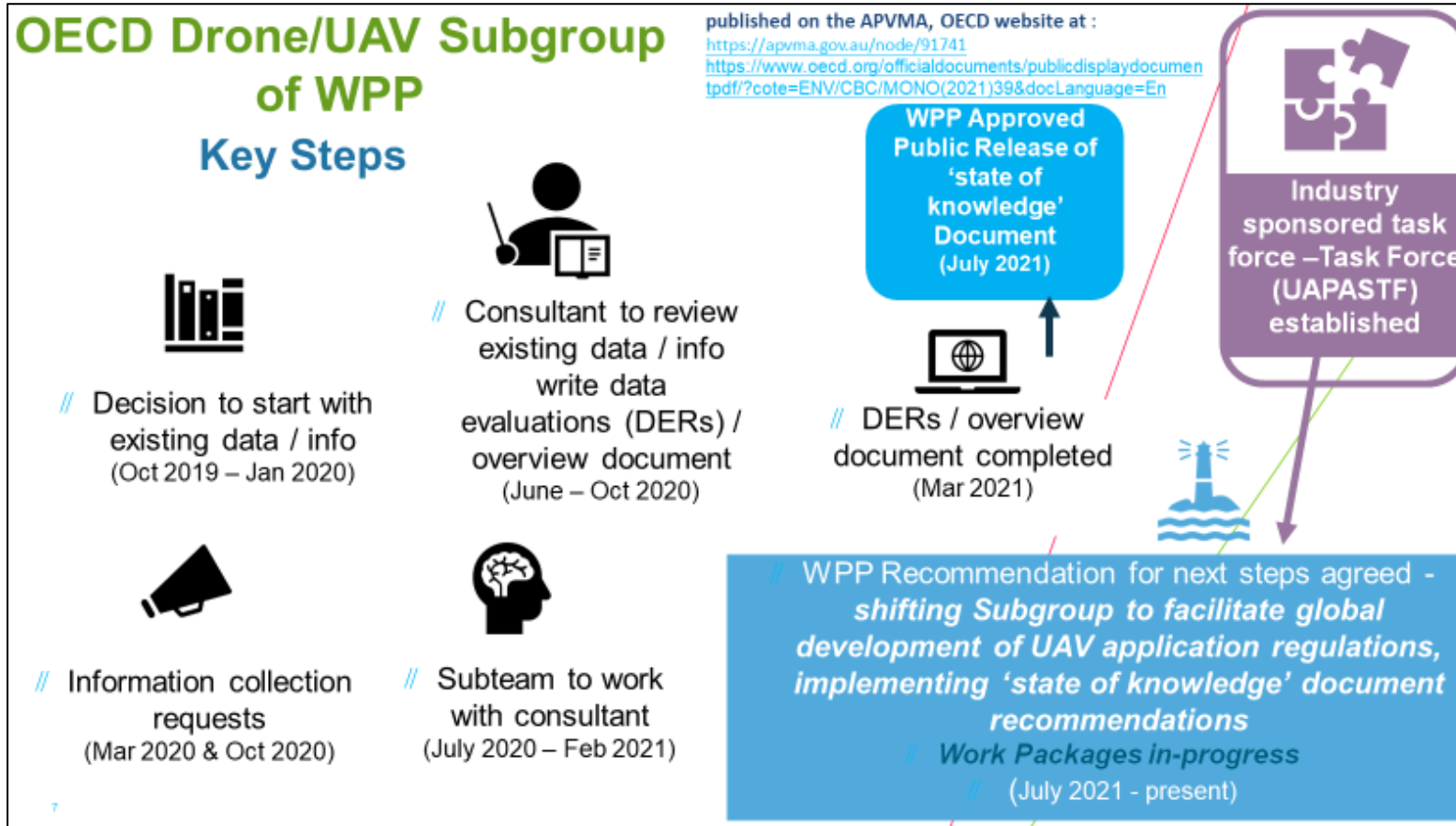
¹Fortune Business Insights. (2026). <https://www.fortunebusinessinsights.com/agriculture-drones-market-102589>

²American Spray Drone Coalition. (2025). <https://americanspraydronecoalition.com/wp-content/uploads/2026/01/2025-ASDC-Impact-Survey-Results.pdf>

³Michigan State University. (2025). <https://msutoday.msu.edu/news/2025/11/agricultural-drones-are-reshaping-farming>



OECD WPP Drone Subgroup – Informing Regulatory Data Needs



OECD State of the Knowledge Work Packages

Drift/Off-site Movement

Operator Exposure

Crop Residue

Best Practices



UAPASTF

Unmanned Aerial Pesticide Application System Task Force Established 2021

- **UAPASTF formed in response to the OECD WPP Drone/UASS Subgroup recommendations—State of the Knowledge Report (2021)**
- **Based in the US - but global in its work / focus**
- **UAPASTF global core mission: supply UAV-based regulatory data to be used in conducting human and environmental risk assessments to support UAV regulatory approvals**

GLP Drift Trials & Models	Worker Exposure
Crop Residue	Best Practices

- **UAPASTF interacts with OECD Drone/UASS Subgroup of WPP, regulatory agencies, CropLife, EUPAF & other stakeholders to develop & provide information / data**
 - **Established and seeking collaborative and confidentiality agreements with UAV-application companies and experts (e.g., additional UAV-application companies in other world areas, UAV manufacturers)**

<i>Member Company</i>	<i>Administrative Committee</i>	<i>Technical Committee</i>
BASF Corporation	Anna Hoffarth	Frank Donaldson (Chair)
Bayer CropScience LP	Sarah Hovinga (Vice-Chair)	Jane Tang
Corteva Agriscience	Travis Bui (Chair)	Rajeev Sinha (Vice-Chair)
Gharda Chemicals Intl	Ram Seethapathi (Treasurer)	Frank Sobotka
Gowan Company LLC	Paul Whatling	Jason A. McDonald
FMC Corporation	Hector Portillo	Roberto Barbosa
NuFarm Americas Inc.	Patti Turner	Tyler Gullen
Syngenta Crop Protection LLC	Jonathan Nicholas	Jo Davies
Valent U.S.A. LLC	Leslie Garcia	Frank Carey
<i>Task force managers</i>	<i>Rhonda Bichsel</i>	<i>Eric Bruce</i>



Visit Our Website
www.UAPASTF.com

UAPASTF Global Regulatory Plan

Environmental Exposure & Risk Assessments

- Understand Spray Drift/Off-site Movement
- Development of Empirical and Mechanistic Models



Operator Exposure

- Qualitative “Job Steps” Survey
- Evaluation of Current NDE Models



Best Practices

- Pesticide application requires expertise and stewardship—especially with new technologies
- September 2024 – v1.0 Released



Crop Residue

- Are crop residues from UAV applications equivalent when compared to conventional applications?
- Connection to Agriculture and AgriFood Canada Residue Program



Field Drift Studies – Data Generation Plan



Globally focused Good Laboratory Practice (GLP) program

- Repeatable experiment to compare drift behavior across locations
- Single CRO & UAV pilot/consultant at each location
- DJI T30 used as benchmark UAV; hydraulic nozzles compared to ground
- Each UAV treatment followed by a ground sprayer (with same spray quality—fine/medium/coarse)
- In-line pressure gauges to confirm spray quality
- Bare ground apps; Release height: 3m (UAV), 0.5m (ground)
- UAV spray pattern was measured for the UAV, release height, nozzle, speed, and environmental conditions
- **Based on “Recommendations for Conducting UAV Field Drift Trials – Proposed Field Study Protocol Guidance”, available at <https://uapastf.com>**

Location	Timing
USA (non GLP) (Robstown, Texas)	February 2023
Canada (GLP) (Saint-Jean-Sur-Richelieu, Quebec)	May 2023
Brazil #1 (GLP) (Santa Helena de Goiás, Goiás)	September 2023
Hungary (GLP) (Bugac)	October 2023
Spain (GLP) (Oropesa)	November 2023
USA (GLP) (Robstown, Texas)	December 2023
Brazil #2 (GLP) (Castro, Parana)	March 2024
Australia (GLP) (Clifton, Queensland)	April 2024
South Africa #1 (GLP) (Delmas, Mpumalanga)	September 2024
South Africa #2 (GLP) Hertzogville, Free State	September 2024



UAPASTF Spray Drift Trials – 2023 & 2024



- **UASS deposition results**

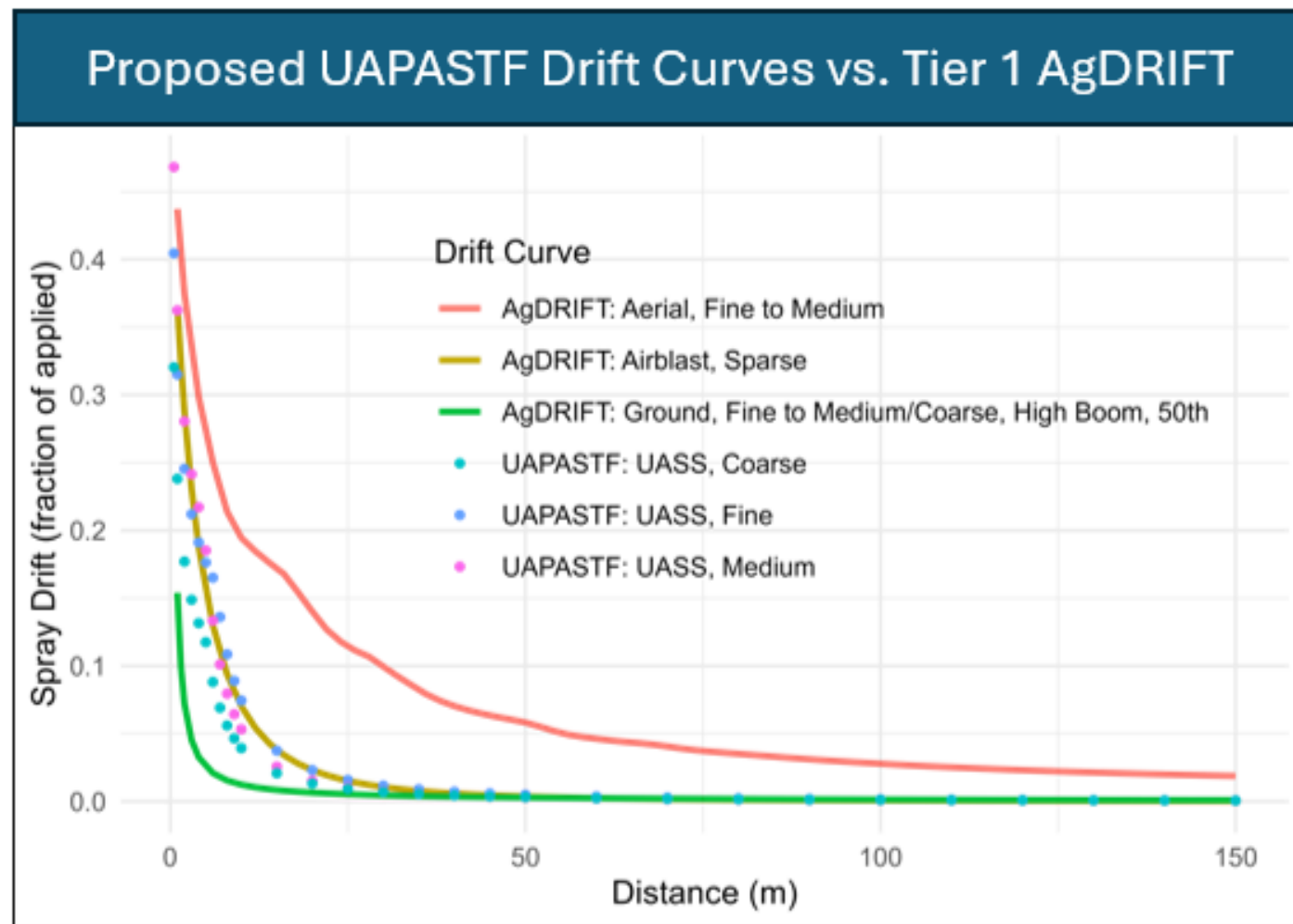
- Follow expected trend by droplet size
- 90% ground deposition within 16m
 - 99% ground deposition observed by 32m
- Data fall between regulatory drift curves for ground and aerial applications

- **Data Submission Timeline**

- **2023 Data:** Submitted to UK CRD, APVMA, US EPA, CAN PRD
- **2024 Data:** Submitted to EPA & PMRA, UK CRD & APVMA *in progress*
- Includes Non-GLP Summary Drift Analysis

- **Modeling**

- **Empirical Curves** using UAPASTF + Literature Database
- **Mechanistic Models** – discussions on-going



Comparison to Published Literature

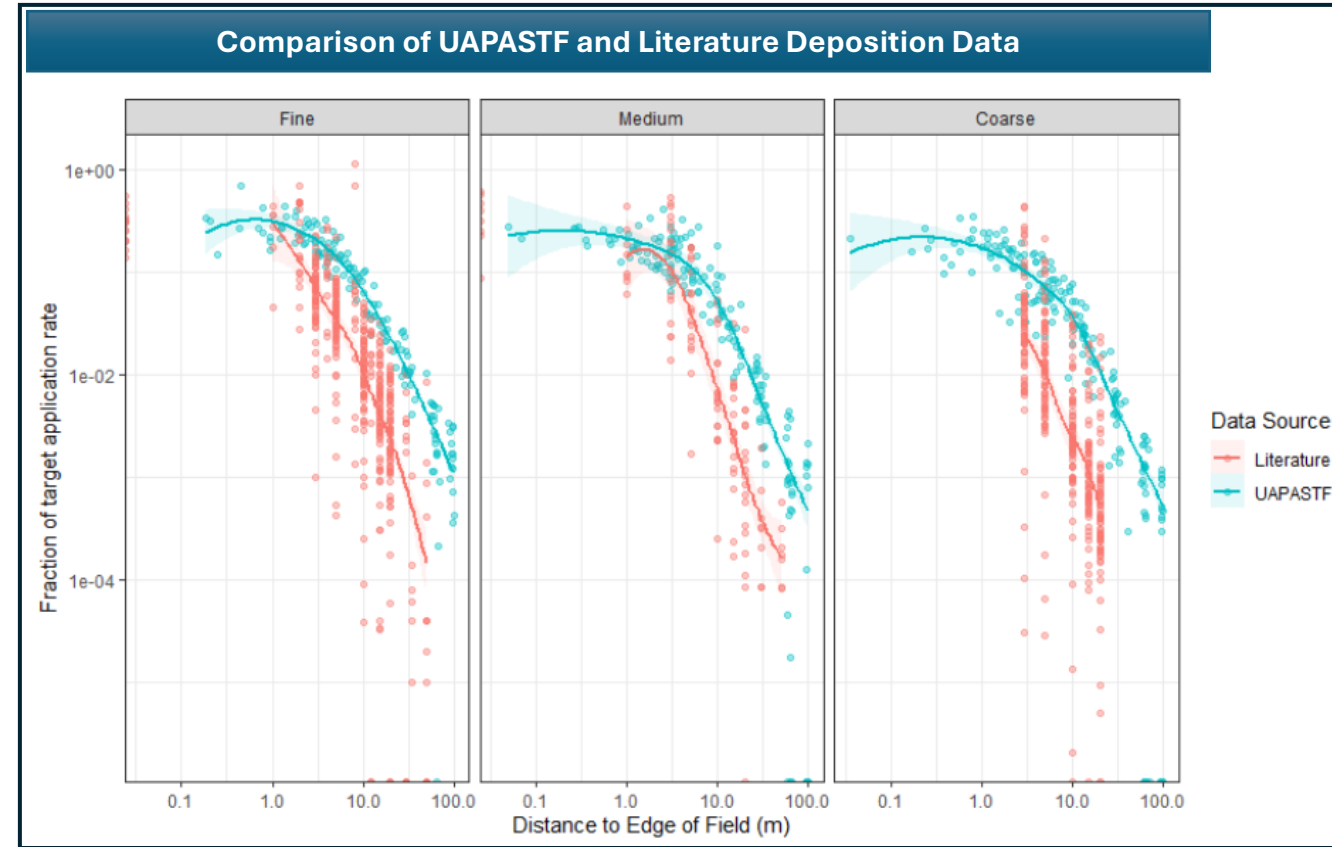


- **Collaboration with Dr. Jane Bonds & CropLife America**

- Database was initially built with data from publications deemed to be relevant and reliable for regulatory purposes
- Includes 6 studies from prominent global drift researchers
- These literature studies covered a range of UAV types, application/environmental conditions, presence / absence of crop (and crop type), and spray particle size distribution.

- **Results**

- Deposition data is within an order of magnitude—despite substantial differences in study parameters.
- This high-level analysis indicates the UAPASTF dataset tends to be higher than the published literature.



Bonds
Publication:



Non-Dietary Exposure - Survey



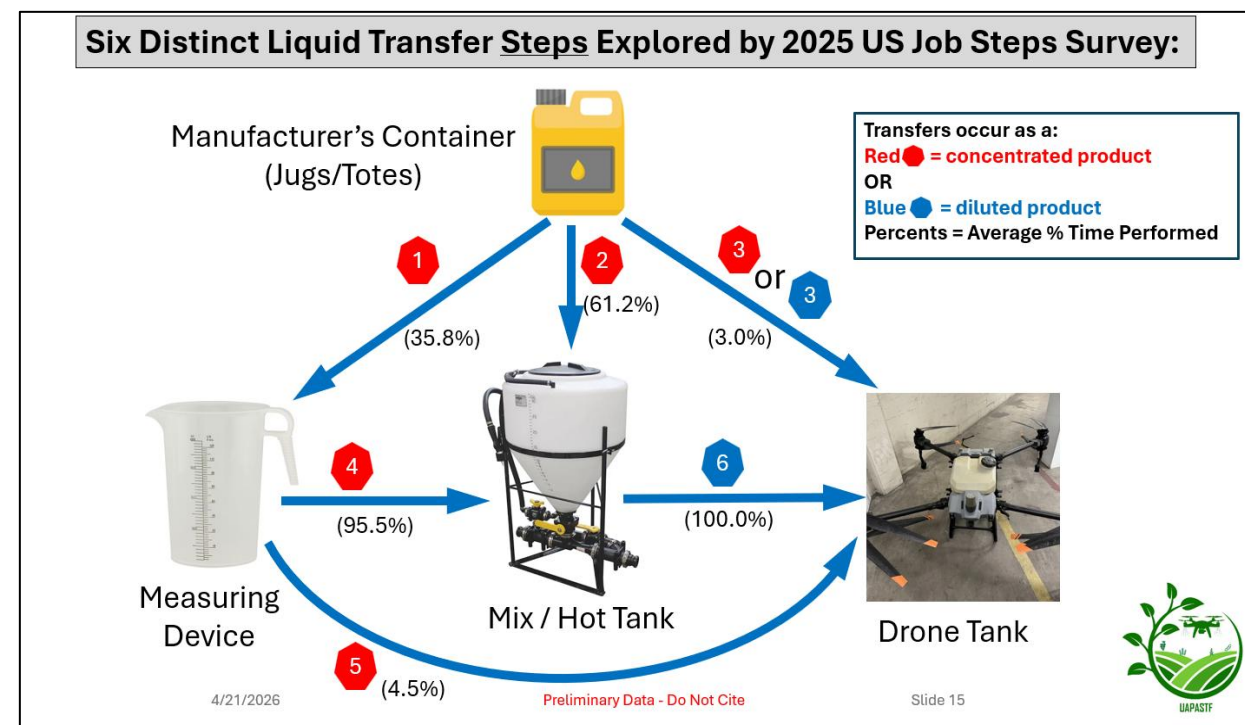
GOAL 1: collect qualitative information on job step distribution for operators (mixer/loader/applicator)

- A data gathering exercise for job-step or operational practices

GOAL 2: collect quantitative information on job steps and applications

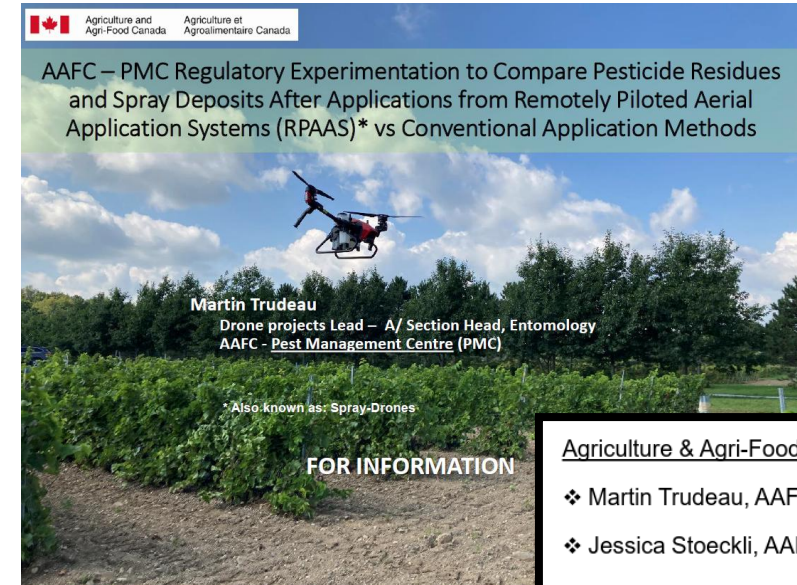
- The most relevant quantitative information related to the parameters that drive the current risk assessment should be collected
 - Formulations handled, ATPD, Volumes used, equipment types

Metric	Response
UAV Platform	T40 and T50
Area Treated Per Day	Median: 150 A / 61 Ha (Range ~50-350 A)
Application Volume	Median: 2 GPA; Mean 2.7 GPA
Crew Characteristics	35% Pilot only (M/L/A); 45% Pilot + Asst
Formulations	249/250 – liquids or products applied as liquid sprays
Stewardship Focus	Do not calibrate (6%); Calibrate with product (8%); Swath Width (47% do not check)



Residue Data for UAV Crop Applications

- **Are crop residues from UAV applications equivalent when compared to conventional applications?**
 - A multidisciplinary working group (WG) was formed
 - A side-by-side GLP comparative study of chemical residues levels from drone and conventional (ground) applications:
 - Multiple UAV platforms
 - 4 crop types (large field, small field, orchard & trellis)
 - Increased application rates above labeled rates and reduced PHI to ensure quantifiable residues
 - PMC conducted field trials at 7 locations in Canada
- **Initial results show that residues from drone application are equivalent (or no worse) than boom applications.**
 - Residues for side-by-side drone applications were not statistically different.



Agriculture & Agri-Food Canada

- ❖ Martin Trudeau, AAFC
- ❖ Jessica Stoeckli, AAFC



Working Group Membership

AAFC – Strategic Policy Branch	Bayer
AAFC – Pest Management Center	Syngenta
HC – Pest Management Regulatory Agency	Strongfield Environmental Solutions
Transport Canada	Precision AI
TBS – Center for Regulatory Innovation	Protein Industries Canada
OMAFRA	Aerial Evolution Canada

UAPASTF BMP Considerations

- Pesticide application requires expertise and stewardship—especially with new technologies
- BMPs increase the likelihood of good environmental and occupational practices
- Not our intention to make this a standard (for example ASAE) but the UAPASTF BMPs could be utilized in works towards standards
- Can be used as guide to expand on local BMPs
- The registered and current product label should ultimately be followed above any other source of information
- Input sought and received from key external experts including: academics, government entities, OECD & CropLife, application specialists and drone manufacturers
- This document is not endorsed or approved by any other organization besides the UAPASTF



Unmanned Aerial Spray Systems (UASS):

Start Here for Best Practice Resources



Drone Pesticide Application is Unique and Growing in Popularity

- Changes in UASS technology and regulations are happening rapidly.
- UASS has broad global appeal, with uptake examples in all four regions of the world.
- Regulatory frameworks and best practices are available and will differ based on the local situation.



Best Management Practices (BMPs) and UASS



- Pesticide application requires expertise and stewardship for proper use and safe handling, especially with a new technology like UASS.
- BMPs increase the likelihood of good environmental and operator practices while considering economic factors, availability, technical feasibility, and effectiveness.
- The BMPs provided here are intended to supplement information on the local product label. The registered and current product label should ultimately be followed above any other source of information. Readers should therefore ensure that this guidance is adapted or supplemented by other country/state/region specific needs, conditions, laws, and regulations, as relevant, including official and required aviation training, to ensure safe operations, which may not be explicitly mentioned on pesticide labels.

Purpose and Scope

- This BMP document intends to provide general guidance on best practices for the safe and effective application of pesticides when using UASS primarily for agriculture. The following areas are discussed:
 - Current licensing regulations in key UASS markets
 - User safety in the context of pesticide handling
 - Equipment set up and calibration parameters that impact spray deposition while reducing off target movement (drift), including impact of equipment selection and environmental conditions
- Because changes in UASS technology and regulations are happening rapidly, this document is intended to be updated regularly to ensuring the guidance and references within stay relevant.



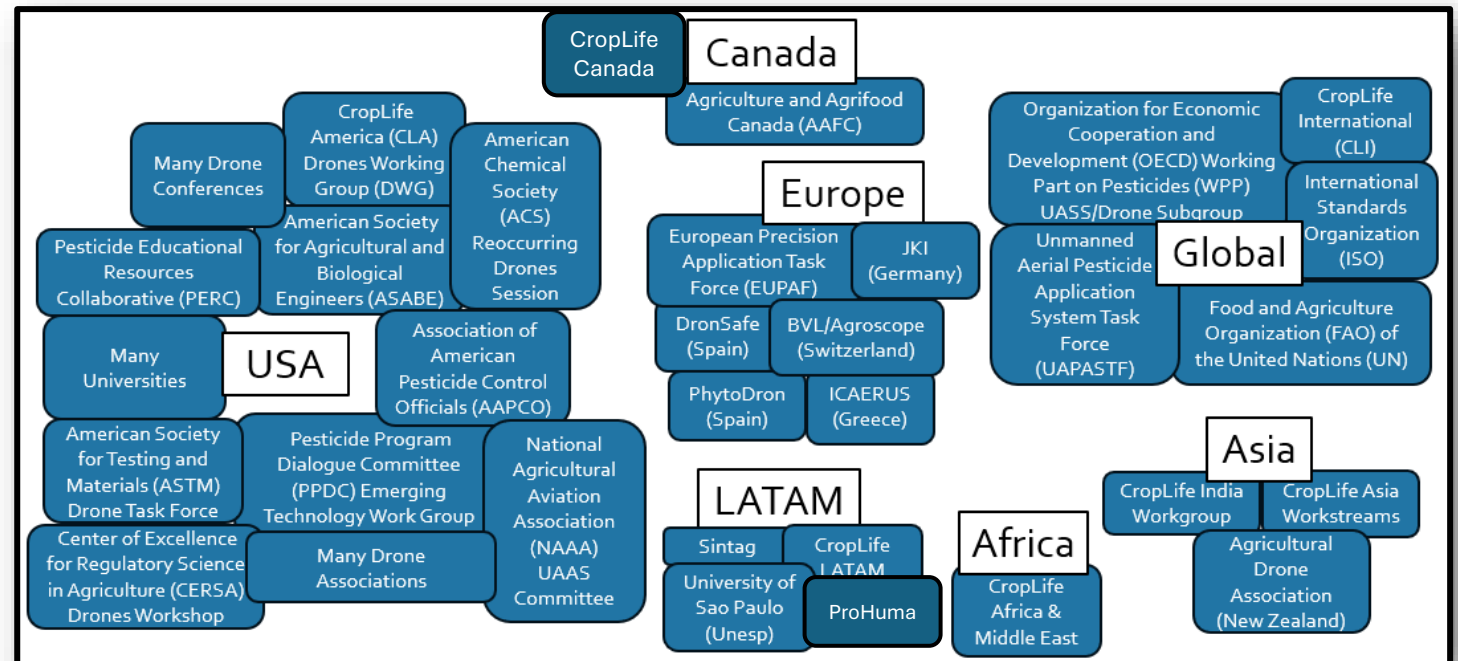
While this is an exciting space, it should also be noted that in many geographies, UASS represent a complementary application technique to existing methods, and further understanding of their unique value and best local practices will help position their use appropriately and more effectively.

The Unmanned Aerial Pesticide Application System Task Force (UAPASTF) consists of the pesticide member companies: BASF Corporation, Bayer CropScience LP, Corteva Agriscience LLC., FMC Corporation, Gowan Company LLC, Nufarm Americas, Inc., Syngenta Crop Protection LLC, and Valent U.S.A. LLC. The UAPASTF, convened by industry, generates, submits, and/or shares/provides access to information and data to governmental agencies to address limitations in available regulatory information and to support risk assessment.

<https://uapastf.com/>

UAPASTF Next Steps

- **Regulatory Activities**
 - Submit 2025 Job-Steps Survey
 - OECD Drift Data Review
- **Building an off-site movement database**
 - Mechanistic models
- **Non-Dietary Exposure - Bystander Evaluation**
 - Systematic Review of Literature
- **Potential Additional Regulatory Considerations**
 - UAV Platforms
 - Nozzle configurations
 - Labeling



And...Continued Connection & Collaboration with to Working Groups
 OECD WPP, EUPAF, CropLife orgs, etc.





Thank you!

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