ISSUE BRIEF
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USDA-ARS Aerial Application Technology Research Unit (AATRU)

The United States Department of Agriculture's Agricultural Research Service (USDA-ARS) operates the Aerial Application Technology Research Unit (AATRU). Internationally recognized for conducting innovative and environmentally sound research, this team of scientists, engineers and support personnel are devoted to developing technologies to make aerial applications more efficient, effective and precise.

Research with Practicable Yields for Aerial Applicators

The AATRU's ongoing research efforts have had tremendous tangible impacts to the aerial application industry. Some of these are highlighted here:

- Developed (and continue to maintain) spray atomization models which provide applicators an easy-to-use tool for selecting operational parameters (nozzles, pressure, airspeed, etc.) to safely comply with pesticide product labels to mitigate spray drift.
- Developed several spray pattern characterization tools and methods which allow applicators to perform testing to make in-field efficacy assessments, including varying operational parameters.
- Worked with the Department of Defense to develop spray systems for use on small uncrewed aircraft systems to treat areas for insects which vector human diseases.
- Patented an electrostatic application system to seed clouds with charged water particles, providing a marked improvement over conventional flare technology.
- Conducted research on the specific role aerial application can play in countering invasive species.

Future research includes utilizing on-board meteorological measurement equipment in coordination with GPS/GIS and other sensors to operationalize real-time drift assessment with AgDRIFT®/AGDISP™. Eventual integration with commercially available pulse-width-modulation spray systems could realize real-time drift mitigation in response to operational and environmental conditions.

A Critical Investment with Proven Returns

Founding father Benjamin Franklin once said, "An investment in knowledge pays the best interest." USDA economists have found that every dollar invested in agricultural research returns $20 to the American economy. Funding the AATRU offers a direct path to drive innovations in aerial application technology for increasing efficacy and efficiency while mitigating the potential for spray drift. Broadly, this helps to protect the environment and ensure access to safe, low-cost food and fiber for the American taxpayer.

Aerial applicators benefit daily from the AATRU's efforts, but it also serves a critical role for agrochemical and equipment manufacturers; AATRU provides unbiased product assessments and often acts as the bridge to introduce these products to the applicators which may benefit from them. Over the years, The American Farm Bureau Federation, the Agricultural Retailers Association, CropLife America, the American Sugarbeet Growers Association, the National Corn Growers Association, the National Association of Wheat Growers, the USA Rice Federation, and the United Fresh Produce Association have all gone on record supporting the program.

For the AATRU to continue to serve the needs of the aerial application industry and address long-term succession planning of project personnel, AATRU needs two additional scientists and two additional technicians, requiring a $2.15 million increase to the program's permanent annual budget.

About NAAA

The National Agricultural Aviation Association (NAAA) represents the interests of the 1,560 aerial application industry owner/operators and 2,028 non-operator agricultural pilots throughout the United States licensed as commercial applicators that use aircraft to enhance food, fiber and bio-energy production, protect forestry, and control health-threatening pests. Furthermore, through its affiliation with the National Agricultural Aviation Research & Education Fund (NAAREF), NAAA contributes to research and education programs aimed at enhancing the efficacy and safety of aerial application.

Contact Andrew D. Moore, NAAA's Chief Executive Officer, at admoore@agaviation.org or (202) 546-5722 with any questions regarding this issue, or any other related to the aerial application industry. Find more information at agaviation.org

Importance of the Aerial Application Industry

Aerial applicators **annually treat**:

- 127 million acres of cropland (28% of the treated commercial cropland nationwide)
- 5.1 million acres of forest land
- 7.9 million acres of pasture and rangeland
- 4.8 million acres for public health and mosquito control

Aerial application is often the **only tool** to:

- Expeditiously eradicate a pest before it destroys a crop.
- Treat crops on rolling hills or in fields with soil too wet for ground applications.

The aerial application industry represents **$37 billion in value** to farmers, input suppliers, processors and agricultural transportation and storage industries.

Without the aerial application of pesticides, the US would see annual losses of:

- 1.69 billion bushels of corn
- 199 million bushels of wheat
- 548 million pounds of cotton
- 295 million bushels of soybeans
- 3.33 billion pounds of rice

The total area of cropland needed to replace the yield lost if aerial application was not available for corn, wheat, soybean, cotton, and rice production is **27.4 million acres**, an area roughly the size of Tennessee.

Aerial applicators seed 3.8 million acres of cover crops annually[2], **sequestering over 2 million tons of CO_2**. According to the EPA this would be the equivalent of removing approximately 412,000 cars with carbon-combustion engines from the roads each year.

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[1] National Agricultural Aviation Association. May 2019. "2019 NAAA Aerial Application Industry Survey: Operators." agaviation.org/2019-naaa-operator-survey

[2] Dharmasena, S. 2020. "How Much is the Aerial Application Industry Worth in the United States?" Research presented at the 2020 Ag Aviation Expo, Savannah, GA. agaviation.org/aat-expo-presentations