

First live-action drone workshop at MVCAC 2020 Annual Conference

Joel Buettner¹, Eric Haas-Stapleton^{2*}

¹Alameda County Mosquito Abatement District, 23187 Connecticut Street, Hayward, CA 94545

²Placer Mosquito and Vector Control District, 2021 Opportunity Dr, Roseville, CA 95678

Corresponding author: Eric.Haas@mosquitoes.org

MVCAC held its first live action drone workshop during the 2020 Annual Conference. Over 40 mosquito control experts from 18 Special Districts attended to observe two treatment and two surveillance drones at work (Figure 1A). Changes in regulations regarding the commercial use of drones, otherwise known as unoccupied aircraft systems (UAS), now afford mosquito control agencies the opportunity to use UAS for aerial inspections of the landscape and to apply pesticides (FAA 2016, Buettner et al. 2018). The environment can surveyed with UAS for accumulated surface water where mosquito larvae have the potential to grow (Hardy et al. 2017, Suduwella et al. 2017), and with high powered zoom cameras, mosquito larvae can be visualized with a UAS from tens of feet above the water surface (Haas-Stapleton et al. 2019). Heavy-lifting UAS can carry a large quantity of pesticide and be programmed for autonomous flight and high precision pesticide applications. Workers using UAS for mosquito control in environmentally sensitive or hazardous areas (e.g., wildlife refuge or wastewater treatment plant, respectively) can do so without damaging the habitat or risking injury. Reduction in injury risk alone may justify intensive use of UAS for mosquito control as doing so may substantially reduce worker injury rates and workers' compensation or insurance claims.

Scott Schon, Lead Vector Control Technician from Placer MVCD, demonstrated the liquid application capabilities of their DJI Agras MG-1S drone (Figure 1B) while Bill Reynolds, CEO at Leading Edge Aerial Technologies, showed granular applications using their PrecisionVision 35 drone (Figure 1C). Tom McMahan, Vector Biologist with Alameda County MAD, demonstrated the visualization capabilities of their DJI Mavic 2 Enterprise Zoom. Eric Haas-Stapleton, Laboratory Director at Alameda County MAD, demonstrated the capabilities of their DJI Matrice 210 RTK for inspecting the land surfaces to workshop participants (Figure 1D) who viewed the flight imagery in real time using a custom bank of Epson Moverio FPV

Smart Glasses that were kindly provided by Werner von Stein from the SF Drone School Research Center (Figure 1E).

Acknowledgements

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REFERENCES

- Buettner, J., S. Schon, E. Ortiz, and M. Boisvert. 2018.** Mosquito assessment and control using unmanned aerial systems (MAC-UAS): program development at Placer Mosquito and Vector Control District. *Proc. Mosq. Vector Contr. Assoc. Calif.* 86: 53-57.
- FAA. 2016.** Commercial Operations Branch - Part 107 UAS Operations.
- Haas-Stapleton, E. J., M. C. Barretto, E. B. Castillo, R. J. Clausnitzer, and R. L. Ferdan. 2019.** Assessing Mosquito Breeding Sites and Abundance Using An Unmanned Aircraft. *J. Am. Mosq. Contr. Assoc.* 35: 228-232.
- Hardy, A., M. Makame, D. Cross, S. Majambere, and M. Msellem. 2017.** Using low-cost drones to map malaria vector habitats. *Parasit. Vectors* 10: 29.
- Suduwella, C., A. Amarasinghe, L. Niroshan, C. Elvitigala, K. D. Zoysa, and C. Keppetiyagama. 2017.** Identifying Mosquito Breeding Sites via Drone Images, pp. 27–30, Proceedings of the 3rd Workshop on Micro Aerial Vehicle Networks, Systems, and Applications. Association for Computing Machinery, Niagara Falls, New York, USA.



Figure 1.—The first UAS workshop at the 2020 Annual Conference of MVCAC. (A) Over 40 participants from 18 Special Districts participated in the workshop. (B) Scott Schon from Placer MVCD readying their DJI Agras MG-1S for a liquid application. (C) Bill Reynolds from Leading Edge Aerial Technologies piloting their PrecisionVision 35 UAS to apply granular product. (D) Eric Haas-Stapleton from Alameda County MAD preparing their DJI Matrice 210 RTK to search for surface water from aloft. (E) Workshop participants viewing the real time imagery from the Matrice 210 RTK in flight using custom bank of Epson Moverio FPV Smart Glasses that were kindly loaned to the workshop by Werner von Stein from the SF Drone School Research Center. Photo credits: A, B, C, D by Werner von Stein from the SF Drone School Research Center; E by Piper Kimball from Leading Edge.