DAGSI Research Topic

1. **Research Title:** Uncrewed aerial vehicles (UAV) detection using neuromorphic solutions
2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level**

    Computer, electrical, industrial, mechanical, or related engineering disciplines (MS or
        PhD level)
    Computer science or related disciplines (MS or PhD level)

4. **Objectives:** Current drone threat detection techniques are limited and involve approaches which are not scalable due to cost and complexity. Neuromorphic sensing and spiking neural networks (SNNs) have shown to be highly accurate when detecting and tracking low-SNR (signal-to-noise) objects in both full light and low-light conditions. Real-time, passive, and low-cost methods are needed to identify drones, reduce clutter, and recognize patterns among drone behavior.

5. **Description:** Scalable low-cost, low-SWaP (Size, Weight, and Power) passive drone detection and tracking are needed to mitigate concerns in a dynamic, changing environment. This project will develop novel methods to combine optical and neuromorphic sensing for drone detection/tracking and drone identification in full and low-light conditions. This system will support advanced data science methods for accurate clutter rejection and tracklet mitigation. Learning by analogy is encouraged in this system to rapidly find new patterns.

6. **Research Classification/Restrictions:** Unclassified
7. **Eligible Research Institutions:** Any university in the State of Ohio

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