FY23/24 DAGSI Research Topic

1. **Research Title:** Generative AI for Limited Three-Dimensional Synthetic Aperture Radar (SAR) Reconstruction

2. **Individual Sponsor:**

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

   > Electrical Engineering (MS or PhD level)
   > Computer Engineering (MS or PhD level)
   > Computer Science (MS or PhD level)
   > Applied Mathematics (MS or PhD level)

4. **Objectives:** Develop approaches for limited 3D SAR Reconstruction leveraging optical-based 3D Reconstruction principles, RF physics, and recent AI trends

5. **Description:** Three-dimensional (3D) modelling and reconstruction techniques have been heavily explored for electro-optical (EO) and LIDAR. However, radio frequency (RF) scattering physics are significantly different from EO imagery, due to the specular nature of RF scattering. Further, the amount of data required for a viable 3D SAR reconstruction, is drastically more than is needed for a comparable 3D EO reconstruction. For this reason, the advances made with 3D EO reconstruction, particularly with generative AI, have not currently extended to 3D SAR reconstruction. This project aims to leverage recent developments in AI-based 3D EO Reconstruction, extend the imaging capabilities to RF/SAR, and conduct low-shot reconstructions comparable to few-shot 3D EO reconstruction techniques.

6. **Research Classification/Restrictions:** Unclassified

7. **Eligible Research Institutions:** All research universities in the state of Ohio

PA Approval #: