

DAGSI Research Topic – Bowald/RYWN

1. **Research Title:** Generative AI Techniques for Magnetic Anomaly Map Prediction

2. **Individual Sponsor:**

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

Example:

Electrical Engineering and Computer Science, Alternative Navigation, Deep Learning/AI, Remote Sensing (MS or PhD level)

4. **Objectives:** Advance the state-of-the-art in magnetic anomaly-based navigation by developing and training a deep neural network on low fidelity magnetic anomaly and other correlated remote sensing data to predict a higher-fidelity magnetic anomaly map suitable for navigation.

5. **Description:** The need for robust & resilient Positioning, Navigation, and Timing (PNT) have driven investments in alternative-PNT technologies to augment the use of GPS. One such method is navigation using maps of the earth's magnetic anomaly field (MagNav). This technique is similar to terrain based navigation but instead matches a magnetometer measurement to a reference magnetic anomaly map. MagNav has been made possible recently through advancements in magnetic sensors; however, many gaps exist in the required reference maps. Creating magnetic maps through aerial magnetic surveys can be costly and time consuming. The goal of this project is to develop novel solutions for magnetic anomaly map generation in areas which have been insufficiently mapped by utilizing techniques including deep learning, to predictively generate magnetic maps.

6. **Research Classification/Restrictions:** Work will primarily be done at the Distro A level.

7. **Eligible Research Institutions:** ABET accredited Ohio Universities.

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