INCORPORATING, TESTING, AND IMPLEMENTING OF ADVANCED GRADIOMETRIC ALGORITHMS DESIGNED FOR AUTONOMOUS UNDERWATER VEHICLES WITHIN GEOSOFT'S OASIS MONTAJ

Jesse I. Angle, NSWC-PCD, Panama City, FL; Darren Mortimer, Geosoft, Toronto, CAN; Brian S. Brunette, AECOM, Hartford, CT

ABSTRACT

The US Navy, contractors, and researchers have been developing passive magnetic gradiometers for a variety of purposes (e.g., mine hunting, seafloor mapping) in the underwater environment for decades. Developments have included sensor hardware, vehicle integration, tailored processing schemes, and detection algorithm development, mostly tied to Autonomous Underwater Vehicles (AUVs) and almost exclusively developed in-house for a limited number of users. Consequently, the dissemination of data collected from these systems to others for independent processing and/or review has been problematic. As an initial step, an Environmental Security Technology Certification Program (ESTCP) funded project sought to create a toolbox within Geosoft's Oasis Montaj, a commercial off-the-shelf (COTS) software package. The end-product would allow a multitude of users to readily import, process, and analyze the data for both quality control and interpretation. Upon completion, future objectives would be to add flexibility beyond the Navy's AUV designs to incorporate and account for different sensor geometries.

The Laser Scalar Gradiometer (LSG) is a prototype passive magnetic gradiometer designed for mine countermeasures surveys, built by Polatomic Inc. in collaboration with the US Navy. The import, processing, and target algorithms have been developed by NSWC-PCD (L. Vaizer et al, 2016). Oasis Montaj is the industry standard software package for analyzing magnetic survey data and the new toolbox designed specifically for this sensor will make future analysis open to a wider audience.

Upon completion of initial, follow-up and final software builds, testing commenced by representatives from each entity inclusive of an independent reviewer. Testing included both qualitative (e.g., ease of use) and quantitative (e.g., repeatability) properties. The primary performance metric, locations and (modeled) properties of targets were compared between the original and Geosoft-imbedded codes After comparison from 4 different sites, both software sets yielded very similar results (J. Angle et al, 2018).

CONCLUSIONS

The project objectives have been met with future interests for increased flexibility to allot different AUV (and non-AUV) sensor systems / geometries, along with processing routines and import formats.

REFERENCES

L. Vaizer et al, *Algorithm for Automatic Detection, Localization and Characterization of Magnetic Dipole Targets Using the Laser Scalar Gradiometer*, 2016, ESTCP Website

J. Angle et al, *Implementing Advanced Magnetic Gradiometric Algorithms within Geosoft's Oasis Montaj Software Platform*, 2018, ESTCP submittal.