Geophysical Data management and automation within the context of a large scale MMRP project

*Joshua T. Celestine, Weston Solutions, Denver, CO*

*J.R. Candlish, Weston Solutions, Knoxville, TN*

Geophysical data management and data integrity are of paramount importance within the Military Munitions Response Program (MMRP) and overall Remediation Industry. Effective data management practices are of key importance as the volume of project related data upsurges, particularly with large scale projects. In the past year Weston has emplo­yed robust data management practices at scale with respect to the remediation effort at Camp Croft, Spartanburg, South Carolina. The Project 7 Munitions Response Site (MRS) is a sizeable remediation effort, as the project includes 6,100 grids and a survey area of approximately 1,277 acres located within a rugged and densely wooded area of Croft State Park. With such a large project, we understood the challenges with managing White River Technologies, Inc. APEX Advanced Geophysical Classification (AGC) survey data, daily quality control (QC) data and grid level deliverables. In order to effectively compile a data package for submittal to our client, we decided that data tools such as Python, Microsoft’s Access and Excel would be effective custodial tools to procure and manage geophysical data.

We employed data management techniques to standardize file formats, naming conventions, and schema structure. By standardizing files, we were able to diagnose problematic inconsistencies within data repositories and maintain effective data relationships. Additionally, we found that efficient tracking was essential as we progressed through the project. Google Sheets was an instrumental tool which allowed our internal team to simultaneously edit/filter a single master tracker sheet with project related details including grid submittal statuses, QC review progress, outstanding data/processing issues, grid delivery priority and much more. Furthermore, cloud storage of the sheet insured that we were never without access to the document. Microsoft’s Access was instrumental for delivery and storage of AGC target data. Relational database management techniques with Structured Query Language (SQL) allowed us to quickly identify problematic metadata and execute corrective actions to ensure metadata integrity. Finally, Python allowed us to improve data package integrity by reducing the amount of manual input/output operations performed by staff. By using Python to build file structures and ingest specific data we were able to better streamline our grid deliverable preparation and submittal process. Several genres of software applicable to the MMRP industry can utilize Python with Application Programmable Interface (API)s. These APIs allow Python developers to create highly efficient automation processes that maintain data integrity and reduce manual effort. Weston found that the Oasis Montaj GX Developer Python API allowed us to perform operations that we had previously done manually for each grid such as spatial layer file loading, poly file masking, Geosoft Database (GDB) supplemental target list creation and supplemental target location plotting within a Seequent map view. Storage and version tracking of Python scripts is also of key importance. Weston found that using GitHub Version Control Systems (VCS) is a highly efficient way to maintain Python scripts and ensure end usability. We found that utilizing GitHub with an Integrated Development Environment (IDE) can streamline tool development and assist with version tracking.