AN AUTOMATED TOOL FOR PERFORMING QUALITY ASSURANCE OVERSIGHT OF ADVANCED GEOPHYSICAL CLASSIFICATION PROJECTS

Stuart Bancroft, Jacobs, Pensacola, FL, USA
Chris Eykamp, Jacobs, Portland, OR, USA
Jennifer Weller, Jacobs, Boulder, CO, USA
John Jackson, EM CX USACE, Denver, CO, USA

Jacobs has developed an Automated Quality Assurance (QA) Tool for the U.S. Army Corps of Engineers (USACE) to automate and streamline manual tasks performed by USACE QA geophysicists. The purpose of the Automated QA Tool is to create a user-friendly product to streamline, standardize, and accelerate QA activities specific to munitions response sites (MRSs) using advanced geophysical classification (AGC). The individual modules of the Automated QA Tool streamline the quality control (QC) and QA information inputs and outputs to inform data usability assessments and facilitate the verification of critical remedial response assumptions. The Automated QA Tool components are accessible from a custom menu loaded into the Geosoft interface or through command line prompts. The Automated QA Tool consists of four separate modules: Validation Target Selection, Customizable Target of Interest (TOI) Search, Conceptual Site Model (CSM) Assumption Test, and Site Noise Assessment.

The Validation Target Selection module provides a physics-based method to inform how validation targets are selected. Targets that fit into other parts of the AGC selection process, such as TOIs, verification targets, and analyst calibration digs, are identified with simple user settings and eliminated from consideration. The remaining eligible digs then are prioritized using physics-based characteristics, including log-linear fits to polarizability curves and intrinsic physical characteristics (size/decay). The results are used to provide a basis for selecting targets as validation digs.

The TOI Search module automates the search process for TOIs using various assumptions about TOI type, TOI orientation, and TOI depth throughout the source database. The user interface allows numerous input combinations to filter and extract a set of source targets that meet the user criteria.

The CSM Assumption Test module facilitates the search for TOIs throughout the project database to affirm the CSM assumptions. The user interface records the expected munitions types and vertical boundary for the project. The items recovered in the project database are compared against the items in the site-specific library and any munitions item or munitions and explosives of concern (MEC) item listed in the project database that does not match an item in the site-specific library is flagged. The output report documents the munitions types recovered and the vertical distribution of all munitions items and MEC items recovered, then it lists any unexpected results (munitions or MEC items recovered that were not part of the CSM). This module also identifies munitions items from the complete Department of Defense (DoD) TOI library with high matches not included in the site-specific library

The Site Noise Assessment module provides mapping and analysis capabilities to assess the geophysical noise response throughout a site and identify areas of concern. This tool offers noise assessment functions based on data chip sampling and synthetic seeding. The Model Coherence Threshold function in UX-Analyze has been incorporated to provide spatial distribution of root-mean-square (RMS) noise and model coherence threshold of data chips placed across the site that are below a user input background threshold. Synthetically inserted TOIs can be placed within the data chip to produce hypothetical model coherence threshold values based on the selected TOI, depth, and orientation. The module output includes a Geosoft map with the RMS noise values presented as a grid layer and symbols or polygons flagging areas above the user threshold as an additional map layer. Synthetic TOI model

coherence results are grouped by user-defined depth intervals and statistically analyzed to estimate classification depth limitations within the project area.