Glossary

A

Accreditation Body
Organization authorized by DOD to evaluate and certify a company to implement Advanced Geophysical Classification (AGC) for Munitions Response.

Advanced Electromagnetic Induction Sensors
Munitions-classifying sensors that are designed with many transmit and receive coils rigidly assembled in a fixed-array configuration. The combination of multiple receive coils, large bandwidth electronics, and supporting sensor data results in the collection of significantly more data than can be collected with single-axis EM61 sensors.

Advanced Geophysical Classification (AGC)
The process of making principled decisions, using data collected by geophysical sensors, to differentiate between buried items that are potentially hazardous and those that can be safely left in the ground during munitions response actions.

Anomaly
As used in geophysics, a deviation from an expected background condition that can result from either a real, physical change (e.g. buried metal object) in the subsurface, or various kinds of interference related to the geophysical equipment or external sources. Note: the anomaly is the deviation. It is to be differentiated from the buried metal object or "source" resulting in the anomaly (IDQTF 2016).

C

Characterization
Iterative development of a robust, high quality CSM through investigative actions, (such as the CERCLA Preliminary Assessment, Site Inspection and Remedial Investigation phases collectively), but generally irrespective of the regulatory framework under which a project is being conducted. At the end of characterization, all known data are used to support the CSM and assessment of risk for an incident to occur at the MRS.

Classify
Determine whether an anomaly is a TOI or non-TOI. This ability is the key capability provided by advanced geophysical classification technology.

Clutter
Nonhazardous metal items such as cultural debris or "fragments" of munitions items, also often called "frag."

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
Passed in 1980, commonly known as Superfund, this act covers the cleanup of hazardous substance spills, from vessels, active, or inactive facilities. Establishes a Hazardous Substances Response Trust Fund, financed by a tax on the sale of hazardous chemicals, to be used for removal and cleanup of hazardous waste releases. Cleanup costs must be shared by the affected state. Within certain limits and subject to a few defenses, anyone associated with the release is strictly liable to reimburse the fund for cleanup costs, including damage to natural resources.

Conceptual Site Model (CSM)
Iterative representation of the site that summarizes and helps project planners visualize and understand available information. The CSM is the primary planning and decision-making tool used to identify the key issues and the data necessary to transition a project from characterization through postremedy.

Cued Mode
Advanced sensor data collection scheme in which the user positions the sensor at discrete XY locations previously

identified by other means (also referred to as static or stationary measurement).

D

Data quality objectives (DQO)
A qualitative and quantitative statement derived from the DQO process that clarifies study technical and quality objectives, defines the appropriate type of data, and specifies tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions.

A qualitative and quantitative statement developed to clarify study objectives, define the type of data needed, and specify the tolerable levels of potential decision errors. A DQO is used as the basis for establishing the type, quality, and quantity of data needed to support decisions.

The qualitative and quantitative statements derived for the DQO process that clarify the study's technical and quality objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity (USEPA 2006).

DOD AGC Accreditation Program (DAGCAP)
The DOD Environmental Data Quality Workgroup (EDQW) developed the DOD AGC Accreditation Program (DAGCAP) to accredit organizations that perform advanced geophysical classification at DOD MRS in support of the AGC implementation effort. The DAGCAP uses third-party accreditation bodies to provide a unified program through which geophysical classification organizations can demonstrate competency and document conformance to a set of requirements.

Digital Geophysical Mapping (DGM)
Data collection process that employs a metal detector system to digitally record sensor and position data for subsequent data analysis and presentation.

Discarded Military Munitions (DMM)
Munitions used by the military in war or peacetime that are of no further value. These munitions are commonly explosives and explosive devices, small and large arm ammunition, chemical warfare compounds, and byproducts of military activities.

Dynamic Mode
A data collection method in which the user collects geophysical and position data with a sensor while in motion.

E

Electromagnetic induction (EMI)
Geophysical technique in which an EMI sensor emits a primary electromagnetic field that induces secondary electromagnetic fields in metallic objects, which are subsequently measured by the EMI sensor.

Extent
Horizontal and vertical distribution of munitions and munitions debris.

Evidence
Information that is relevant and furnishes proof to support the point of decision.

G

Geophysical system verification (GSV)
The quality control (QC) process used to verify that a geophysical sensor is operating properly, and to provide ongoing monitoring of the quality of the geophysical data collection and target selection process as it is performed in the production survey. The process includes daily measurements of an instrument verification strip and production area blind seeding.

I

Industry standard object (ISO)
Commonly available pipe sections that have been characterized and can be used as munition surrogates in the geophysical system verification process.

Instrument verification strip (IVS)
One or more buried inert munitions or industry standard objects emplaced in a line. Data are collected over the IVS twice daily to verify that the geophysical sensor system can deliver the expected detection and classification performance.

Inversion
As used in AGC, fitting measured sensor data to an EMI response model (commonly the dipole model) to obtain the model parameters, including the object's location and depth, orientations of its principal axes, and its principal axis response functions.

L

Library matching
Comparing the derived polarizabilities of each detected buried metal object with the polarizabilities of a collection of known munition items in a library. The objective is to classify the unknown objects based on the degree of similarity of their polarizabilities to an entry in the library.

M

Measurement Performance Criteria (MPC)
Quantitative statements derived from the data quality objectives (DQO) that clarify study objectives, define the appropriate types of data, and specify tolerable levels of potential decision errors. MPCs are used as the basis for determining the usability of data.

Measurement Quality Objective (MQO)
The acceptance thresholds or limits for the collection or analysis of data, based on the measurement performance criteria, which are derived from the data quality objectives (DQOs). MQOs provide quality control specifications for measurement processes, including analytical methods, designed to control and document measurement uncertainty.

Munitions and explosives of concern (MEC)
This term distinguishes specific categories of military munitions that may pose unique explosives safety risks means: Unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (such as TNT or RDX) present in high enough concentrations to pose an explosive hazard.

Munitions constituents (MC)
Any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions

N

Nature
Munition types and their physical characteristics (ferrous or nonferrous).

Non-Target of Interest
Items that are not to be excavated.

Non-Time Critical Removal Action (NTCRA)
A response to a release or threat of release that poses a risk to public health (serious injury or death), or the environment, that clean up or stabilization actions must be initiated. A planning period of at least six months exists before site activities must be initiated, and it has been determined that a removal action is appropriate. (USACE 2009)

P

Parameters
Intrinsic characteristics of a buried metal object, including size, shape, symmetry, aspect ratio, wall thickness, and material composition.

Physical Remedy

As part of a remedial action, a physical removal of explosive hazard may be selected to reduce risk at a munitions response site.

Polarizabilities

Three principal axis responses resulting from the inversion process, which relate directly to physical attributes of the object under investigation. The degree to which these polarizabilities match an item from a library of candidate responses forms the basis for classification decisions.

Process

"An organized group of related activities that work together to transform one or more kinds of input into outputs that are of value to the customer" or stakeholder (Hammer 2001).

Project Delivery Team (PDT)

Includes the PM, technical experts within or outside the service's activity, regulators, specialists, consultants/contractors, selected stakeholders, and representatives from other federal and state agencies.

Q

Quality Assurance

An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer (USEPA 2000). QA is process oriented and proactive and prevents defects by focusing on the process used to make the product.

Quality Assurance Validation Blind Seeding

Seeds emplaced by the government (or its representative) and blind to the production team to provide confidence to the entire project team and stakeholders that the data collected in the project are usable for their intended purpose.

Quality Control

The overall system of technical activities that measure the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the stakeholder; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against "out of control" conditions and ensuring the results are of acceptable quality (USEPA 2000).

Quality Control Blind Seeding

Inert munition or munitions surrogate buried on the site to serve as a process QC check. Surrogates are selected to correspond with munitions of interest on the site. QC blind seeds allow the production team to recognize that problems exist and provides a means of identifying root causes so that corrective action can be undertaken while still in the field.

Quality System

A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization to ensure quality in work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing the work performed by an organization and for carrying out required quality assurance and QC activities.

R

Remedial Action Objective (RAO)

Cleanup goals for a selected remedial action. Preliminary RAOs are often developed during the Preliminary Assessment/Site Investigation phase of a munitions response and are refined into definitive RAOs during the Remedial Investigation/Feasibility Study process. Final RAOs are documented in the Record of Decision or Decision Document. Remediation efforts are considered complete upon attainment of the RAOs

Requirement

A documented specification for a product or service. In theory, good requirements should be necessary, unambiguous, and concise.

Root Cause Analysis/Corrective Action

The process of determining the cause of a failure, the implications of this cause on the remainder of the data set, and the corrective action(s) required to ensure the data will meet project objectives.

S

Systematic planning

A planning process that is based on the scientific method. It is a common-sense approach designed to ensure that the level of detail in planning is commensurate with the importance and intended use of the data, as well as the available resources. Systematic planning is important to the successful execution of all activities at hazardous waste sites, but it is particularly important to dynamic field activities because those activities rely on rapid decision-making. The data quality objective (DQO) process is one formalized process of systematic planning. All dynamic field activities must be designed using systematic planning, whether using DQO steps or some other system. See also Data Quality Objective ([USEPA 2006](#)).

T

Target

A targeted location for future investigation (cued classification or intrusive) derived from: amplitude response detection (anomaly peak locations), advanced detection (source locations), geophysical classification (source locations), or analog assisted detect and dig.

Target-of-interest (TOI)

Items that must be correctly classified and excavated to accomplish site remediation goals. All munitions, QC and QA seeds, and other items designated by the site team, such as significant pieces of munitions, are targets of interest. Some site teams may even include selected fuzes and other components to the TOI list. Munitions do not have to contain high-explosive filler to be classified as TOI; anything that must be excavated and examined to determine whether it is hazardous should be included in the definition of TOI.

Time Critical Removal Action (TCRA)

A response to a release or threat of release that poses such a risk to public health (serious injury or death), or the environment, that clean up or stabilization actions must be initiated within six months ([USACE 2015](#)).

Transects

Transects are approximately evenly spaced data collection paths often designed using [Visual Sample Plan](#) (VSP). VSP statistically calculates a percent confidence level of traversing and detecting a target area with a specified circular radius, which is defined using knowledge from the CSM.

U

Unexploded ordnance (UXO)

Explosive weapons (such as bombs, bullets, shells, grenades, land mines, naval mines) that did not explode when they were used and still pose a detonation risk, potentially many decades after they were used or discarded.

V

Validation

Procedures used to make sure items were correctly classified using GCMR technology and processes. Process validation tests the overall approach in the following four ways: (1) placing blind validation seeds (the locations of which are known only to the government); (2) comparing recovered items to the predictions contained on the dig list; (3) excavating an additional 200 objects (threshold verification digs) beyond last TOI to verify correct placement of the threshold; and (4) conducting validation digs of 200 randomly selected non-TOIs at the end of the project to provide added confidence that anomalies classified as non-TOIs are, in fact, non-TOIs.

Verification

Process of ensuring data are collected properly.