DYNAMIC PROJECT COLLABORATION TOOLS FOR UNEXPLODED ORDNANCE (UXO) REMOVAL

Case Study:
Jefferson Proving Ground UXO Removal Project

James Y. Daffron, P.E.
Project Manager
American Technologies, Inc.
142 Fairbanks Road, Oak Ridge, TN 37830
(865) 481-5350 / jdaffron@atincorporated.com

ABSTRACT

Unexploded Ordnance (UXO) removal and investigation projects typically involve multiple organizations including Government entities, private contractors, and technical experts. Resources are split into functional “teams” who perform the work and interface with the clients. The projects typically generate large amounts of data that must be shared among the project team members, the clients, and the public. The ability to efficiently communicate and control information is essential to project success. Web-based project collaboration is an effective management and communication tool when applied to ordnance and explosives (OE) projects. During a recent UXO/OE removal project at the Jefferson Proving Ground (JPG) in Madison, IN, American Technologies, Inc. (ATI) successfully used the Project Commander® (www.ProCommander.com) project collaboration website as a dynamic project and information management tool.

INTRODUCTION

The purpose of employing a project collaboration tool is to bring all the participants of the extended project enterprise into a single, highly efficient collaborative environment, regardless of geographical or technical boundaries. This case study demonstrates that collaborative websites can be designed to provide efficient access to large quantities of information to numerous users with different interests and needs in a dynamic UXO environment. A tiered security approach ensures that pertinent information is available to the public while also allowing team members to log in with user names and passwords to access and share critical and sensitive information internally.
CASE STUDY

Mixed computing environments and geographically dispersed resources are a fact of life for many UXO projects. By making fully integrated file sharing, document management, geographic information systems, and other tools available in a cross-platform environment over the Internet, it gives companies a better way to manage projects and to do more with less. Many UXO removal and investigation project teams include a number of private contractors, Government agencies, and technical experts. There are generally several project documents such as work plans, explosive safety submissions, sampling and analysis plans, etc., that must be shared among the project team members, Government agencies, and in some cases, with stakeholders and the public. There are also large quantities of data generated during the course of the project that must be made available. Often the data obtained in the field is processed at off-site, contractor locations and then presented to the Government. The data is analyzed by Government technical and management personnel and the results are used to ensure quality, track progress, and make project decisions. The ability to effectively and efficiently communicate and share information is essential to project success. Web-based project collaboration is an effective management and communication tool when applied to projects that require frequent sharing of large quantities of data and information among project team members, clients, and the public in various geographic locations.

ATI successfully used its project collaboration website, ProCommander.com, as a project and information management tool during a recent OE removal project JPG. The project consisted of a removal action on a 312 acre wooded site on JPG. Based on the result of an Engineering Evaluation / Cost Analysis (EE/CA) a scope of work was developed to complete a surface and subsurface clearance of approximately 104 acres along roads that formed the northern and eastern boundaries of the site. The scope was written to allow clearance activities to continue in the vicinity of OE items removed during the investigation.

ProCommander.com was used to link project team members from nine organizations in 12 different locations throughout the United States. The project collaboration website is designed to provide efficient access to large quantities of data and information to various users with different interests and needs.

The collaborative website is dynamic and evolved throughout the project to improve communication and better display data. The site provides a detailed project description and points of contact available to the public and all team members and allows authorized users to view a project schedule. Photographs documenting work completed and OE items found are presented as thumbnail images on the website. They can be enlarged on the screen and/or downloaded and printed. There is a feature that allows users to uploaded, downloaded, or view documents. It is organized by document category so that documents such as work plans, correspondence, and various reports can be easily located by authorized users. Raw and processed geophysical data as well as results of intrusive investigations of geophysical anomalies can be displayed on the website using geographic information system (GIS) technology. The GIS portion of the website provides an efficient, user-friendly method of displaying UXO field data to team members. The GIS allowed spatial data to be overlaid on the JPG site map. The data was updated frequently (generally daily) to provide current project status and results to team members requiring current information in a dynamic environment.
Since there was a relatively high level of public interest in the project, the website also provided general project information, points of contact, and links to related websites. The website was an effective means of submitting and archiving project status reports. The senior UXO supervisor prepared daily reports that were posted on the website and accessed by authorized users at various locations. Weekly reports, required by the client, were also posted and accessed by authorized project team members. The project generated extremely large quantities of geophysical data that were processed and shared among team members. The field geophysicists collected raw data and posted it on the website. The raw data was then processed through a collaborative effort between the field geophysicists and project geophysicist to generate proposed dig sheets. The raw and processed geophysical data, as well as proposed dig sheets, were placed on the site for quality assurance (QA) review by the client. After the QA review, final dig sheets were posted on the website so that they could be downloaded by the senior UXO supervisor for use in the field. The website was an effective method of coordinating the efforts of geophysicists and project personnel working in as many as five locations, simultaneously. One of the most valuable aspects of the website, proved to be the use of GIS to display the results of anomaly investigations. The scope was written with the intent of expanding the removal area based on the results obtained. It was therefore, important to present the results as quickly as possible and in a format that made their analysis as simple as possible. All anomaly locations were shown on a site map with a symbol representing the results of the investigation. Users could obtain specific information about an anomaly of interest by simply clicking their mouse on the symbol representing the anomaly. Queries could be used to view specific types of anomalies, such as those caused by OE items on the site map.

BACKGROUND

JPG consists of approximately 55,264 acres in Jefferson, Ripley, and Jennings Counties, IN. JPG was used as a U. S. Army Proving Ground between 1941 and 1995. JPG was recommended for closure in 1989 under the Base Closure and Realignment Act of 1988. Base Realignment and Closure (BRAC) activities at the site include screening for potential hazards, reducing the potential hazards and ultimately turning facilities over for public or private use. The U.S. Army Soldier and Biological Chemical Command, along with the Louisville District of the Corps of Engineers, oversees BRAC activities at JPG. A 312 acre wooded portion of JPG was identified as potentially contaminated with OE hazards. An EE/CA was performed on the site and a limited surface and subsurface clearance of OE scrap was selected as the best remediation alternative.

The U. S. Army Engineering and Support Center, Huntsville, AL (USAESCH) issued a contract to ATI to perform UXO clearance activities on the site, in accordance with the recommendations of the EE/CA. The Scope of Work (SOW) identified approximately 106 of the 312 acres determined in the EE/CA to be most likely to contain UXO or OE related scrap. This area was primarily along the roads on the North and East boundary of the site. The SOW required this area to be geophysically mapped and the geophysical anomalies to be investigated and removed. Provisions in the SOW allowed removal activities to continue in the vicinity of resources UXO or OE related scrap.

The work required to safely locate, identify, and remove potentially hazardous OE material involves several steps. The area is initially surveyed to establish project boundaries and to define a series of grids (200 ft. x 200 ft. squares) that are used to record results and track project status. After establishing the grids, UXO technicians perform a surface clearance to remove any potential OE hazards from the ground surface. Once the surface is determined to be free of OE hazards, the underbrush and small trees (less than 3 inches in diameter) are cut in preparation for the geophysical survey. Geophysical data is collected
on each grid and processed to identify geophysical anomalies. Geophysical anomalies, that could be caused by underground OE or OE related scrap, are then reacquired and investigated by UXO technicians.

Once the source of the anomaly is located, it is classified as non-OE related scrap, inert OE scrap, or potentially UXO. When OE related scrap is identified in a grid, a risk based decision whether or not to add additional grids is made by USAESCH experts.

The JPG project team consisted of personnel from nine organizations located throughout the United States. The USAESCH provided management, as well as safety and quality oversight during UXO removal work completed on site. ATI, as the prime UXO contractor responsible for the removal action, assembled a team of experts to efficiently and effectively complete the required work. ATI coordinated the efforts of all subcontractors and continuously communicated project status and results to the USAESCH. ATI’s project collaboration website was used extensively by project members to correspond and coordinate project information and requirements. The team members and their geographic locations are shown in Figure 1. In addition to the project team, there were a number of other stakeholders who were interested with the work at JPG who reviewed project information posted on ProCommander.com.

**FIGURE 1 – PROJECT TEAM LOCATIONS**

1. Aberdeen, MD (US Army Soldier & Biological Chemical Command)
2. Louisville, KY (US Army Corps of Engineers)
3. Huntsville, AL (USAESCH)
4. Oak Ridge, TN (ATI & SAIC)
5. Hershey, PA (ATI & ARM)
6. Harrisburg, PA (SAIC)
7. JPG Project Site
8. Cold Springs, CA (Timberline)
9. Hanover, IN (Fawell, Rettit, Sander, Havenspanger & Associates)
10. Gladstone, MI (MBI)

**PROJECT WEBSITE**

ProCommander.com was designed using Visual Interdev and can be accessed using standard web browsers. The back end database was developed using MS SQL and runs on a Windows NT platform. This is a robust platform that is capable of running multiple projects concurrently. The website is designed to be developed and customized for each project with no additional programming or information technology (IT) administrative support. Anyone with standard PC skills can be assigned as a site administrator. The site administrators initially set up the project-specific portion of the website and can perform the following functions:
Add and define projects
Add, edit, and delete users
Assign users to specific projects
Assign user access levels
Add hyperlinks pointing to related websites

Figure 2 shows the screen that users see after logging in to the JPG project site. The site is designed to be intuitive, user-friendly, and provide efficient access to large quantities of project specific information and data.

The following is a discussion of the key aspects of the collaborative website and how it was helpful in completing the JPG UXO Removal Project:

**Project Web Pages (Project Relationship Management):** A unique web page is dedicated to each project, including the JPG UXO Removal Project. This web page was the central repository for all project-related information. It defined the project, its scope, team members, stakeholders, provided project status, showed progress towards completion, displayed all anomalies identified as part of the removal effort, allowed file sharing, and any other function related to that project. As part of setting up the project web page, the team selected the information that should be visible on the project website. Customers and stakeholders are presented with a simplified view of "published" project information. This information included project contacts, milestone schedule, meeting schedule, completed deliverables, status reports, key decisions, etc. Project information was configured both for secure access (log in, encryption, etc.) and public access. The look and feel of the project website is kept consistent for all projects.
Document and File Management: This provides a simple user interface to manage documents associated with the project and allows user to upload multiple files at once. All document type and file formats are supported, including uploads and downloads, using the file transfer protocol (FTP) feature of the website. Users access files based on the “ERIC” file classification system: E-Everyone who has a user name and password can view the file, R-Restricted access to project and client team members, I-Internal files generally limited to internal company documents. This option allowed ATI to share documents for internal review prior to making it available to other team members, and C-Confidential documents such as budget information and other sensitive information available to the senior management only.

Security Password Based Log in: Access is granted on a project-by-project basis and only project team members can enter the secure project space. Once logged in, users can access all the information for specific projects that they have authorization to access. Within each project, the ERIC file classification provides an additional layer of security.

Project Schedule: Tasks and milestones from MS Project and other planning tools can be imported into the project website. The project manager can assign, view, and monitor tasks across the project team. Team members see task assignments on the main project schedule.

User defined links: Links to other websites can be set by the administrator by simply dragging and dropping the related website URL to the appropriate project web page. This feature was used during the JPG project to link relevant team member websites that provided additional public information.

Minimal user training: Users can immediately review, publish, and update project documents and handle their assignments, because ProCommander.com is intuitive. Layout and controls are simple and straightforward. During the course of the project at JPG, a number of new users were introduced to the project website; and because of its intuitive design, they could immediately benefit and use pertinent features.

Availability: The project website is available to monitor and update projects in real time any time night or day. All team members can work from the same up-to-the-moment information to produce better, more timely results. The site can be accessed from anywhere with internet access. JPG project team members accessed, posted, and used information on ProCommander.com in their permanent offices, field offices and in various remote locations.

Low Cost: Since the website was designed to have little to no programming / IT support, the cost for adding projects is minimal. The time spent adding and maintaining a project is spread throughout the organization. The JPG project site was initially set up by an administrative assistant and was built and maintained throughout the project with input from field personnel, geophysists, project managers, and team members.

Geospatial Data: The geospatial data that was collected and analyzed during the course of the JPG project is provided in an easy to use graphical interface. The data is geographically linked to the location that it describes. The data is displayed on a series of three maps designed to provide efficient access to the information. The maps are generated from survey points provided by the land surveyor that defined the site boundary and grids. General grid information, such as grid ID, area, and location, can be obtained by selecting the grid of interest. Grids can be selected by positioning the cursor over the grid or from a drop down menu that lists all grids alpha-numerically by grid ID. Once a grid is selected, the user has the option of viewing and/or downloading raw and processed geophysical data, geophysical maps of the grid, and dig sheets used to identify anomalies to be investigated. During the course of the project, grids were color coded on one of the maps to show phases of work completed. This map is designed to give users a
quick visual image of the project status. As geophysical anomalies were identified, they were also plotted. The symbol used to identify the anomaly on the map is changed to represent the type of item causing the anomaly, once it is identified. Anomalies are categorized as OE scrap, non-OE scrap, QA seed item, or no contact. When a user selects a grid on the map, a geographical representation of the grid is displayed with all anomalies shown by type (if they have been investigated). When a specific anomaly is selected in this view, information is displayed giving the user the item ID, its location (X,Y coordinates), its depth, a description of the item, etc. There are a number of quarry options that give the user the ability to display only those types of anomalies of interest. For example, a user can choose to display only OE related items or just QA seed items, etc.

RESULTS / CONCLUSIONS

Project collaboration helps organizations address the three principal challenges of completing UXO projects today: managing project information, collaborating effectively across geographic and organizational constraints, and accomplishing the work with fewer resources. ProCommander.com was used to address these key objectives.

ProCommander.com enabled JPG project team members to efficiently manage and collaborate on critical project issues across the extended enterprise. The ability to manage project documents, to access critical information in near real-time, to manage deliverables, and to provide appropriate information to the stakeholders resulted in significant improvements in communication and process efficiency, faster response times, and a rapid completion of project milestones.

The geospatial data feature of the JPG project website was used extensively throughout the project. The grid status maps provided a quick visual image of project status, by grid throughout each phase of the project. By color coding grids, users can easily see surface clearing, brush cutting, geophysical surveying, and sub-surface clearing operations. When the geophysical survey was completed on a specific grid, the raw data was uploaded to the site. The data could then be accessed by choosing a grid with the mouse or from a drop down menu. Processed geophysical data, geophysical maps, and dig sheets were posted and accessed in the same way. Dig sheets were created as a database. The locations of geophysical anomalies from a field in this database were used to position symbols on site maps. The symbols and grids were overlaid on the geophysical maps. Once an anomaly was investigated, it was identified by type in a field of the database. The maps on the website were linked to the database such that the symbol representing the anomaly changed based on the information input in this field. A feature was added to the website during the project that allowed users to display only the anomalies of interest. This allows users to display OE related items only, which helped to assess the need to add areas to the SOW.

ProCommander.com proved to be an effective tool for the sharing data and documents. The site senior UXO supervisor used the website to upload daily reports, pictures, and other project documents. These documents were reviewed internally by ATI and then made available to team members, as appropriate. Project plans and reports were posted on the website during their development and in their final version. Raw geophysical data was posted on the site by the site geophysists. Once the data was processed and reviewed by the project and USAESCH geophysists proved to be a very effective method of managing data and documents during the JPG project. Documents and data were posted in draft and final form by team members responsible for producing them. Documents and data were often developed and analyzed through a simultaneous effort of several team members in various geographic locations.

This case study shows that web-based project collaboration is effective in improving process efficiency and communication among geographically dispersed team members involved in complex UXO removal
projects. It achieves the main goal of enhancing management of Formerly Used Defense Sites (FUDS) and other UXO removal projects while adding value for the client and the public and shortening project durations by providing information needed to make quick and sound project decisions.