RESOURCES TRACKING MANAGER: A DYNAMIC ELECTRONIC RESOURCE TRACKING AND MAPPING SYSTEM

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ABSTRACT

Tracking resources in real time during response situations has proven to be an integral part of decision making within an Incident Command System (ICS) structure. To help with this process, a new and portable product called Resource Tracking Manager (RTM) was designed and developed. This product is built from two off-the-shelf technologies, ESRI ArcView® and Microsoft Access®. This paper discusses the use of both products in the RTM and explains how bridging them together creates a system that is accurate, easy to use, and informative. The primary features of this tracking system include: 1) The ability to edit resources on a map and have these edits reflected in the database. 2) The ability to edit resources in the database and have edits reflected on the map. The development of RTM has important implications for resource management in a response scenario. Knowing where resources are, and allocating them efficiently and effectively is key in responding successfully.

INTRODUCTION

Tracking resources in real time during response situations has proven to be an integral part of decision making within an Incident Command System (ICS) structure. To help with this process, a new and portable product called Resource Tracking Manager (RTM) was designed and developed. This product is built from two off-the-shelf technologies, ESRI ArcView® and Microsoft (MS) Access®. This paper discusses the use of both products in the RTM and explains how bridging them together creates a system that is accurate, easy to use, and informative. The primary features of this tracking system include:

1) The ability to edit resources on a map and have these edits reflected in the database.
2) The ability to edit resources in the database and have edits reflected on the map.

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FUNCTIONALITY

Basic functionality of the Resource Tracking Manager system allows the user to manipulate data in two major ways. First, the user can manipulate data in a table through a form, and have those changes reflected in the Map. Similarly the user can use the map graphical interface to move resources on a map, and have the tabular data reflect the change.

In MS Access, Resource Tracking Manager offers the ability to enter (or import) resource data into a file prior to an incident or drill. This file, called Inventory, can be used as a “shopping cart” to select resource information to be copied to the working Resource Tracking Manager database. This function streamlines data entry during an incident; data entry time is dramatically decreased and typographic errors are minimized using this tool. The Northwest Regional Resource Equipment Workgroup maintains an equipment database called the Western Region Resource List (WRRL). It is an Excel spreadsheet which can be downloaded from http://www.wrrl.us. The file name for the version that is importable into Resource Tracking Manager is “WRRLdata.xls”. Also within Resource Tracking Manager the DataSheet serves as a universal form for capturing all pertinent information for a resource. In order for resources to be tracked accurately, certain information must be entered. Within the RTM system, these necessary pieces of information are made apparent to the user through popup boxes. This form also accommodates “disconnects” found is standard ICS resource tracking.

1. Cradle-to-grave tracking is possible by associating an Order Number with a resource. Additionally, each time the status for a resource is changed, an entry is automatically added to the Log field. This information is useful for reviewing the disposition of a resource throughout the incident. Material request numbers can also be tracked and linked to one or more resources.
2. Regulators often request information related to on-scene recovery and storage capacities. Standard ICS forms make it difficult to track these values. Resource Tracking Manager provides these fields on all forms where appropriate so the cumulative values are readily available.
3. Many of the fields common to the List screen are pull-down lists. Such lists expedite record editing and preclude typing errors.
4. Data imported from 211e and 211p forms are displayed on the Data sheet. (ICS forms 211e and 211p track both equipment and personnel).

Resource Tracking Manager’s forms module is based on NOAA’s Electronic ICS Forms. These forms conform to the Standard Oil Spill Response Management System (STORMS) 2000 update. Where appropriate, the forms are linked to expedite data entry and minimize typing errors. A Navigator screen provides quick access to the desired form. One form which is required in ICS is the Situation Status form (ICS-209). When the Resource Tracking Manager system is used correctly, tally of resources and personnel
status is automatic. This is particularly useful for quick updates and planning purposes. 209’s are archived for documentation purposes within RTM and can be retrieved at any time.

Data entered into Resource Tracking Manager’s Check-In forms (211e, 211p) can be automatically imported into Resource Tracking Manager. Graphics can be inserted into forms such as the 201a and the 204. Another useful utility is Resource Tracking Manager’s ability to automatically generate 204’s based on a completed 215. Results from any data search can be printed out or exported for entry into reports or documents. However, for response planning and operations, there are 4 automated reports available in Resource Tracking Manager.

1. Resources by Status – Response resources are listed by status sorted by status.
2. Resources by Location – Response resources are listed by location sorted by location name.
3. Resources by Oil Spill Response Organization (OSRO) – Response resources are listed by agency name and sorted by agency (OSRO) name.
4. Deployed Area Contingency Plan’s (ACP)/ Geographical Response Plan’s (GRP) ACP’s/GRP’s – A list of sensitive or specified areas in the area of concern which have been protected or addressed by response operations.

In ArcMap®, field tactics and planning strategies can be realized. ArcMap® is a fully functional commercial mapping software product. Finding the closest resources available to respond to the spill, monitoring where resources are, calculate distances and areas, and display of features for cartographic view are handled through this interface. Analysis and map publishing can be accomplished through the Arcmap® interface.

METHODS

The core of the Resource Tracking Manager system lies in the fundamental construction of the Personal Geodatabase. Created through the ESRI ArcMap® Engine, the Personal Geodatabase follows the same database architecture as MS Access, therefore can be accessed and maintained through MS Access®. The Personal Geodatabase is also made up of various proprietary tables that are generated by ESRI Arcmap. These tables are clearly labeled within the database scheme, and should not be manipulated directly in MS Access. To successfully work with these critical tables and have a user-friendly interaction between MS Access and ArcMap®, Arc Objects and (VBA) Visual Basic for Applications programming are utilized. As data is manipulated within the MS Access environment, triggers or events automatically call these Arc Objects, and update these proprietary tables. From the ArcMap® interface, the updates are instantaneous to the tables, forms and reports in MS Access.

CONCLUSION

To be successful as a resource tracker within the ICS, communication with the other units, Operations, Planning, and the Situation unit are essential for depicting an accurate up to date picture of in field phenomena. Providing accurate maps and resource statistics to situation status display are critical for successfully planning the next operational phase. The use of Resource Tracking Manager and a single data source that can be manipulated and viewed by both Arcmap and MS Access saves time and reduces redundancy. Changes made in the map are reflected directly in the Microsoft Access Database. Changes made in the MS Access DB are reflected directly in the Arcmap graphical interface. Situation status information is calculated automatically and can be produced at any given time. ICS forms within the Resource Tracking Manager are of a uniform format understood by ICS personnel.

BIOGRAPHY

Abe is a GIS Analyst with Genwest Systems, Inc. He currently manages several GIS projects, websites, and IMS sites for Genwest and Genwest clients. His extensive experience in GIS programs and procedures puts him on the cutting edge of new developments and applications for GIS programs. Abe’s educational emphasis is in Geography, with course material from the University of Washington.