**Air Force Space Command**
**Office of GeoIntegration**

Research Report

# Commercial Emergency Management Software:
## Evaluation Methods and Findings

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# Preface

This study was designed and executed to address an overwhelming outpouring of frustration with the lack of a standardized technology solution to provide Air Force installation commanders reliable, accurate, and dynamic situational awareness for emergency response, management, and recovery.

There is no single source for this frustration, it is the result of competitive market forces, natural and manmade events, human resolve and the primal, albeit unacceptable, reluctance to face criticism for decisive action.

Some of the frustration stems from early promises and enduring expectations that the Air Force GeoBase Initiative would deliver unprecedented capabilities for situational awareness, command and control during contingency operations. However, an understanding of the monumental requirement for first collecting standardized mapping data was either not expressed, or not heard. As a result, Air Force installation-level staff have been heroically trying collect the needed data, knowing that to meet the capability expectations of GeoBase, data must be available first.

Some of the frustration stems not from a lack of viable technical solutions, but rather from an over-abundance of solutions. Because GeoBase was not established with appropriate authority, it was largely left to private contractors to implement at their discretion. As a result, contractor-unique solutions have proliferated at the cost of precious taxpayer dollars. The bombing of the federal building in Oklahoma City, the events of September 11, 2001, hurricanes Katrina and Rita also contributed to a virtual gold rush for commercial software developers to deliver products to support the emergency/disaster management community. The result is literally dozens of software products, yet none developed to fully maximize the substantial investment the Air Force has made in standardized GIS data and architecture.

Additionally, some of the frustration stems from the absence of authoritative direction to identify a standard solution. Air Force Major Commands (MAJCOMs) have been largely left to develop or acquire their own software solution. This has at times resulted in competition within the Air Force when collaboration and consensus is most needed.

Finally, the unavailability (or awareness thereof) of a DoD resource for objectively and defensibly evaluating technology solutions drove Air Force Space Command to collaborate with others to develop and execute an objective, defensible, and repeatable evaluation of emergency response software.

The results of this evaluation effort do not quite lead us to a definitive solution, but rather highlights the operational complexity of emergency response, the absence of accurate functional and technical requirements, and hopefully offers a sound methodology to gaining consensus for an Air Force solution.

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## 1.0 INTRODUCTION

This report presents the first piece in achieving a standard command and control tool for emergency response across Air Force Space Command (AFSPC). Before procuring software, it is important to understand user requirements and current capabilities on the market. To accomplish this, a repeatable and defensible methodology must be used. The methodology implemented for this evaluation is described in detail in this report. The goal of this methodology is to involve all Communities of Interest (COI) in the evaluation process thereby preventing selection of solutions that support one organization's need to the exclusion of other significant stakeholders. In the end, this process should produce a solution that supports the needs of the entire emergency management community and reduce past tendencies to select stovepipe solutions.

This evaluation focuses specifically on existing Commercial-off-the-shelf capabilities to utilize GeoBase data in support of emergency response and management. Included in this report, is a description of the current environment, one that has seen a proliferation of unique vendor solutions. The evaluation results are analyzed and presented using standard deviation bands to describe the prevalence of market capabilities. The impact of the results, including recommendations driven by these results, are included in the discussion section. The discussion section also describes lessons learned and provides guidance for further studies. All of these recommendations are summarized in the recommendations section. Below is a list of the vendors and their software packages included in the evaluation.

| Software Package | Vendor |
|---|---|
| CrisisCommand | AutoDesk |
| WebEOC | ESi Acquisition, Inc. |
| AIMSonScene | FieldSoft Inc. |
| WebTAS | Intelligent Software Solutions |
| I/CAD, I/AlarmPlus, I/Sight, I/Consequence, I/Asset, I/Dashboard, I/Simulator, I/Sensor I/NetCommander | Intergraph |
| DCGS, EPTS, CERRTS, MESA, ITWS, TDF, STAT, ARES, PIDS, JET, AWIPS, NEO | Raytheon |
| Vigilys | SYS Technologies |
| HIRESA | 21st Century Systems |
| VAPO | Applied Research Associates |
| ADMS | ETC Simulations |
| G-TAP | Gregg Protection Sevices |
| InfoPincer | GTS Corp |
| CBR Advisor | Instant Reference Sources |
| SitAware | Systematic Software Engineering |
| Enerscope | The AnalysisGroup & Overwatch |
| Atlas Ops, Atlas RTO, Atlas AIMS, | Ultra Electronics |

**Table 1 Software Packages and Vendors**

## 2.0 ANALYSIS OF THE PROBLEM

Currently, there many different software solutions in use by the US Air Force (AF) in support of emergency response andmanagement. Many of these solutions do not leverage the AF GeoBase and Enterprise architectures. Unfortunately, the number of tools actively in use throughout the AF attests to the current stovepipes of information and capabilities. In the past, no definitive evaluation criteria have been applied to these kinds of software, resulting in confusion and a lack of standardization. A need exists to identify capabilities on the market and how well those capabilities utilize GeoBase data. To do this, a rigorous, effective, standardized evaluation methodology must be used. This methodology should be applicable to identifying market capabilities as well as identifying optimal software solutions.

Little policy exists within the AF regarding C2 software solutions beyond the "HobbyStop" memo from Air Force Space Command (AFSPC) A7C issued in the winter of 2004 and re-issued in April 2007. Headquarters Air Force (HAF) leadership chose to leave the software purchase decision to the individual MAJCOMs, which has resulted in disparate sets of capability criteria. This decision has also led to the proliferation of unique, vendor driven software solutions despite established, albeit, undocumented, standard AF requirements. In addition, our research did not identify a standard methodology for evaluating incident management tools using the AF requirements. All recent national guidance requires incident (emergency) management tools to be interoperable with other (civil) emergency management stakeholders. AFSPC has prioritized interoperability with their community partners.

## 3.0 METHODOLOGY

The evaluation process employed a standard, repeatable methodology developed by AFSPC. The methodology was designed to objectively evaluate software against a standard set of criteria in a controlled environment. Using the methodology, evaluators assessed software packages against stated requirements. This methodology was developed to be repeatable so that it could be used in an evaluation with any scope. By employing this methodology the results are defensible and quantifiable and can be used for analysis or acquisition decision. The scope of this evaluation process was specifically focused on identifying existing market capabilities of C2 software nd their ability utilize the standardized GeoBase data and system architecture. This analysis, in turn, can support future evaluations, acquisitions, and efforts to eliminate existing software stovepipes.

The methodology starts with rquirments gathering. Stakeholder involvement is a key input to identifying mission level needs and prioritizing required functionalities, as shown in **Figure 1**. Stakeholders provide functional needs that in turn are translated into requirements and form the core guidance for the rest of the evaluation. After the finalized list of requirements is documented, weightings can be applied to the requirements to reflect acquisition priorities. The weights should be developed independently by stakeholders not involved in the functional evaluation, but who have a vested interest and in-depth knowledge about the missions. Weightings are intended to be used in the analysis of the documented findings.

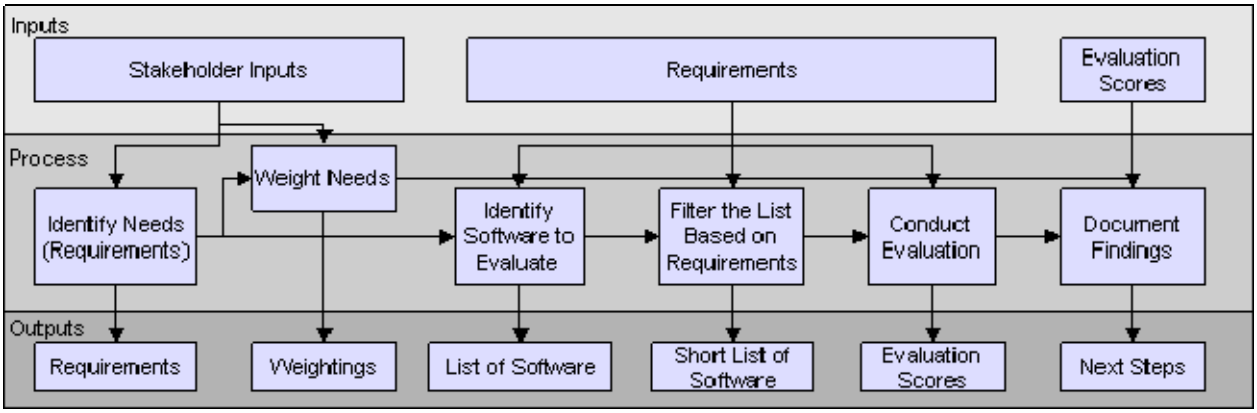


**Figure 1: Evaluation Methodology**

With defined requirements, a candidate list of software can be developed. This list may already exist and be known, however due diligence is needed to identify appropriate software, or in the case of the government, before a formal announcement may be made. The compiled list should be scrutinized further, limiting it to only those that are most applicable. This filtering process can and perhaps should be performed more than once. For the first round of filtering, phone interviews and web meetings can provide low cost (time and dollars) filtering methods. Another option is to filter the list and go directly to in-depth demonstrations. The purpose of filtering the list is to limit the time invested to reviewing only the software packages most applicable to the requirements.

An effective evaluating process employs all of the building blocks put into place in the previous steps. Evaluators assess the software packages and score the software against the requirements. As part of the evaluation process; demonstrations, documentation, due diligence, and other sources of information can be used to evaluate each software package. The same type of information should be used for each software package. After the active evaluation phase, an analyst documents the findings in relation to the scope and requirements and provides recommendations appropriate to the scope of the evaluation.

The following paragraphs will describe, in detail, how this standardized methodology was applied to the AFSPC C2 software evaluation.

### 3.1 Identify Needs

The requirements used throughout this process were acquired by AFSPC from the Air Force Security Forces Center's Common Relevant Operational Picture (CROP) initiative and from proceedings at the Air Force Full Spectrum Threat Response Integrated Process Team (IPT) meeting 8-10 June 2004. These two sources established requirements that focused on how geospatial information and technology can be used to support emergency responders. A subset of the requirements were used in the Security Forces Center "product" evaluation thereby facilitating a comparative analysis of these two studies. The list of requirements provided a jump start to the process as the first step is usually to meet with end-users and stakeholders to define needs or requirements.

The list of requirements provided by the CROP initiative and the IPT contained a total of 75 requirements. Of these, 43 were determined to be "End User" requirements and 32 were determined to be "Technical" requirements. These requirements are grouped thematically in Table 2.

| Category | Category | # of Requirements |
|---|---|---|
| Technical Evaluator | Map Display | 16 |
| Technical Evaluator | Technical Support | 2 |
| Technical Evaluator | Software Specifications | 14 |
| End User Evaluator | Map Display | 34 |
| End User Evaluator | Checklist and Reporting | 3 |
| End User Evaluator | Software Specifications | 3 |
| End User Evaluator | General Overall Review | 3 |

**Table 2 Requirement Categories**

### 3.2 Develop Weightings

In an ideal world devoid of financial constraints, every requirement would be sought in a final product. However, to help prioritize requirements, a standardized weighting methodology was applied. Distributing weight to each requirement from a finite pool, models the financial constraints decision makers face. The weightings used in this study were developed by two independent teams; a team of subject matter experts from the geospatial and information technology community, and a team of emergency management subject matter experts. Both AFSPC teams weighted the requirements from a pool of 100 points. More specifically, the teams were instructed to understand the points as monetary units. With no more and no less than 100 units, they were to distribute all 100 units to identify the worth of each functional requirement.

The functional requirement scores ($S_r$) from the product evaluation exercise are each multiplied by their assigned weight ($W_r$) to reach a final functional requirement value. The functional requirement values are then summed to achieve a total product score ($S_p$).

The simple mathematical formula is expressed as: $S_p = \Sigma (S_r * W_r)$

Only the raw functional requirement scores are reported in this document to allow audiences outside of AFSPC to better utilize the results. Another organization could utilize the results of this study but repeat the weighting exercise to identify each requirement's worth to their particular organization.

### 3.3 Identify Software to Evaluate

AF Security Forces Center (AFSFC) provided AFSPC with a list five C2 software products under evaluation. These were understood by AFSPC to be "best of breed" software for emergency management and became the starting point for market capabilities. Minimal research identified many more products on the market with required capabilities and expanded the list of software to evaluate. To identify as many applicable products as possible, AFSPC legal and contracting leadership recommended releasing a Special Notice in FedBizOpps (Appendix A). The Notice was posted on December 1, 2006 with responses due on January 2, 2007. This pool of five products expanded to 16 software providers who responded to the Special Notice.

### 3.4 Narrowing of the List

A set of "valid product" criteria was developed during the time allocated for software providers to respond. The list of criterion is included in Appendix B. The criteria was based on the requirements used to evaluate each software package. If a product did not receive a score greater than .75 it did not meet the established criteria to warrant further analysis. To score a .75 or below, the software did not meet at least 3 out of the 17 criterion. This form was developed and approved before the responses were received to ensure the integrity of the process (the criteria could not be skewed by information submitted by software providers).

By January 2, 2007, 16 responses were received. Each response was analyzed by two independent reviewers. The results of the review were compared and any discrepancies addressed to the satisfaction of both reviewers. The results of the review are included in Appendix B. Each software provider that met the minimum requirements received a letter signed by the government contracting officer inviting the qualified vendor to subject their software for government conducted evaluation. (Appendix C) Additionally, software providers that did not meet the minimum requirements received an invitation with an explanation of why the AFSPC team felt their software was deficient and contained the caveat that the evaluation team did not see a great deal of capability from their software when measured against the requirements listed in the Special Notice (Appendix D). Usually this list would be narrowed to only those software packages of interest; however government protocol required that all responding software providers be extended an invitation to participate in the evaluation phase.

Two full weeks prior to the evaluation, the software providers were provided a packet of information which included: 1) a terrorist weapon of mass destruction (WMD) scenario to demonstrate against ; 2) the evaluation criteria; 3) technical details: server specifications, operating system and hardware specifications of the government hardware should vendors elect to use government hardware; 4) Common Installation Picture (CIP) schema of geospatial data that would be provided; 5) Schema of the Homeland Security Infrastructure Program (HSIP) data that would be provided; 6) technical interface details; 7) a Demonstration Agreement each software provider was required to sign; and 8) the time and schedule for their demonstration. More detail about how this information was used in the demonstration is discussed in **Section 3.5.2**. As another assurance of a fair and equitable evaluation; the demonstration dates and times were selected using a double-blind process where software providers and time slots were selected simultaneously. This process is described in detail in **Section 3.5.3**.

### 3.5 Evaluation

#### 3.5.1 Evaluators

Two distinct groups of evaluators were created. The first group made up of six people, "End User Evaluators," represented the Emergency Response Community, (Fire/Crash/Rescue, Emergency Management, Medical, and Security Forces). All six were full-time government employees; three were active military and three were civil service. Each community identified a qualified representative to participate in the evaluation. The representatives were to review and operate the software products and score whether or not the software met the requirements. End User Evaluators were selected for their emergency response (ER) technical expertise. None of the End User Evaluators had experience using geographic information systems (GIS) or GeoBase

specifically. AFSPC consciously made this decision in order to better evaluate each product for its ease of use by a non-GIS person in the field and at the EOC. The second group, "Technical Evaluators," focused on the technical aspects of the evaluation and included members from the GeoBase and two different information technology (IT) communities. This group evaluated technical capabilities, implementation, level of effort to install and configure the software, and the behind-the-scenes technical challenges.

As a control factor, Roger Sambrook, Ph D., Assistant Professor in GIS and Anti-Terrorism at the University of Colorado, Colorado Springs joined the evaluation effort. As an independent member, his role was to evaluate the processes and procedures employed. The goal of his involvement was to ensure a defendable, scientific approach was followed throughout the evaluation.

Prior to the first evaluation, both Technical and End User Evaluators attended procurement ethics and technical evaluation training for the evaluation process. It was important for all evaluators to establish a solid grounding in the process and begin with a clear view of their role going into the week. The Evaluation Teams participated in a discussion led by a facilitator that addressed logistics, transportation, security, and the evaluation control procedures. All evaluators were instructed to wear civilian clothes and refrain from using rank or identifying their home base in order to prevent intentional, or unintentional, strategic marketing by the software providers. Binders were provided during training that contained the schedule for the week, the training brief, and blank evaluation forms and associated notes pages for each product.

### 3.5.2 Planning

The goal of the evaluation was to remove as much subjectivity as possible so evaluators could objectively focus on how the software met the requirements. With this in mind, the USAFA Institute for Information Technology Applications (IITA) Lab was selected as a neutral location that could also provide the infrastructure necessary for software evaluation.

Software providers were provided a strict schedule, shown in Table 3: Schedule OverviewError! Reference source not found.. A facilitator acted as the interface between software providers and evaluators in addition to enforcing this schedule. The facilitator introduced the software providers, ushered the evaluators, answered questions from the software provider, and ensured the software provider did not provide marketing material to End Users Evaluators. The facilitator was critical to ensure fairness for all evaluators and to point out areas where particular software providers failed to perform required aspects of the demonstration. The motivation behind the schedule was to promote demonstration of functionality applicable to the requirements rather than allowing the software provider to simply demonstrate/highlight specific areas of the software's functionality.

| Length | Segment | Purpose |
|---|---|---|
| .5 Hour | Introduction | software provider provides overview of software and company |
| .5 Hour | Demonstrate Scenario | Demonstrate how their software could be used in support of the scenario |
| 1 Hour | User Hands-On | End Users are given time to operate the product to assess ease of use, functionality and user interface |
| .5 Hour | Q&A | Address any other questions or unanswered requirements |

**Table 3: Schedule Overview**

The first half hour of the demonstration allowed the software provider to introduce themselves, their company, and their product. During this time only the Technical Evaluators were in the room. Introduction time allowed the software provider to potentially provide any marketing materials. The intent was to protect the End User Evaluators from exposure to extraneous information that could potentially bias their evaluation.

The second half hour was dedicated to demonstrating the product against a standardized WMD scenario (Appendix E - provided to all software providers prior to the evaluation event) The scenario required all products to demonstrate how their software could be used to respond to a set of circumstances. To support this scenario, AFSPC provided a sample set of installation and community geospatial data from the CIP and HSIP. CIP data is a defined dataset of geospatial layers and imagery used for strategic purposes that form a common baseline for all Air Force installations. HSIP provides a common frame of reference for critical infrastructure vulnerability analysis, situational awareness, and domestic crisis consequence management. Software providers were encouraged, but not required, to use the data provided.

After the demonstration against the scenario provided, an hour of "hands-on time" was allocated to allow the End User Evaluators to operate the software and evaluate the user interface, ease of use, and other capabilities. A similar, but slightly different scenario was provided to the Evaluators for use during this time. The scenario provided a more structured activity for the Evaluators to work through as well as an equal set of circumstances to evaluate the different products. Providing scenarios applied a measure of standardization to the evaluation and end-user portions of the product presentation.

### 3.5.3 Software Provider Schedule

The schedule for the week of demonstrations was driven by the number of software providers that accepted the invitation to demonstrate their products. Software providers were allowed as much time as needed the day before their demonstration for technical setup. To ensure an equal amount of time for setup (1 day prior) to all software providers, demonstrations were not scheduled for the first day. Day 1 was designated the training day for Evaluators and setup day for Day 2's demonstrations. The number of products demonstrated was divided equally across the rest of the week. Two and a half hour demonstration slots were created, with a half hour break between demonstrations and one hour for lunch. The individual names of all software packages and individual time slots were put on pieces of paper and drawn randomly. One time slot and one software package were drawn, documented, and verified by a three-person government team until all of the software packages had been assigned a time slot. The order in which the software packages were drawn determined the slot. The first software package drawn was assigned the first slot drawn and so on. The order was done randomly was to ensure no perception of favoritism or first/last advantage existed.

### 3.5.4 Rules of Engagement

During the setup, software providers were required to stay physically separated from the End-User Evaluators to prevent any communication prior to the evaluation. Software providers could only interact with the laboratory staff, facilitator and other software providers during this time.

Software providers were only able to interact with the evaluators during their allocated demonstration period. Upon configuration completion of each software the government's computer hardware was moved to the evaluation room in preparation for the following day's evaluation. Software providers were not told the evaluator's roles, rank, functional positions or locations. Software providers were instructed not to ask evaluators any personal questions. Additionally, evaluators were instructed not to ask the software providers about their competitors, other tools, or the locations/bases where the tool is currently in use. A software vendor's claim that their software was in use at the Pentagon, for example, might bias an evaluator who might incorrectly assume that higher ranking experts endorse/advocate the software. Evaluators were to focus their questions on the functionality listed in the requirements. These measures were taken to keep the evaluation focused on the requirements and capabilities. The facilitator was present to ensure these rules of engagement were followed. Software provider marketing material was not allowed to be given to any member of the Evaluation team. The End User Evaluators did not know the identity of the software providers that would be demonstrating their C2 software suites in advance of the actual demonstration. This was designed to shelter the End Users from independent research prior to arriving for the evaluation process, marketing by software providers in advance, knowledge of where the software is currently used, and other factors that may sway their opinions. The intent of this control activity was to ensure the integrity of the process and keep all evaluators focused on the evaluation requirements.

### 3.5.5 Scoring Guidance

The requirements were divided into two sections. The first section consisted of requirements intended for End User Evaluators. The second section consisted of technical requirements focused on the setup process, technical specifications of the software, and a deeper layer of detail than most End Users would require. This section was only scored by the Technical Evaluators. The technical scoring occurred in two ways; through observation/documentation of the system configuration and also during the evaluation of the software used against the wmd scenario. All evaluators were instructed to compare the software packages against the requirements and not against each other (technical leveling). **Table 4** below shows the scoring numbers, definition and example. The potential scores below related to the question: *("Does the system generate multiple cordons and layer them?")*.

| Score | Definition | Example |
|---|---|---|
| 0 | Does not meet the requirement | Does not provide this function |
| 1 | Partially meets the requirement | Creates cordons but does not layer them |
| 2 | Meets the requirement | Creates cordons and layers them |
| 3 | Exceeds the requirement | Creates cordons and layers them and has additional, applicable functionality |

**Table 4: Scoring Definitions**

The completed evaluation sheets and notes were collected after each demonstration. At the top of each page the Evaluator's number and the name of the product were listed. Evaluator numbers were used to ensure anonymity and to prevent skewing of the results during post evaluation analysis.

### 3.6 Documentation of the Findings

The findings are documented in this report and discussed in Sections 4.0 and 5.0. Section 4.0, provides the statistical analysis of the scoring as well as any other objective findings. Section 5.0 provides context to these results and discusses recommendations for future studies.

## 4.0 RESULTS

The results are discussed in terms of average score to minimize the difference between evaluator scoring trends. The scores presented in this report have not been weighted. As described in Section 3.1**,** the requirements were divided into End User Evaluator requirements and Technical Evaluator requirements. Requirements were also grouped into categories. Table 4 defines the scoring options. **It should be noted that no single software package met all or even most of the requirements.** The results per software package are not as important for the scope of this report because no purchase is expected as a result of this activity, however, the results of how the requirements were met by the software is important. Future procurements and studies can be shaped by the knowledge of what requirements were not met, partially met or always met.

As shown in Figure 2, none of the software packages met either technical or functional user requirements satisfactorily. The average of the requirement categories (far right bar) is between 1.0 and 1.5 with Technical Support and Technical Software Specification between 1.5 and 2.0. None of the categories averaged a fully "Meets Criteria" rating. The three left bars (blue) show the End User categories and the fourth, fifth and six bars (purple) from the left show the Technical Evaluator categories. Technical Support stands out as the strongest category. The average score across all requirements was 1.27. The requirement results and result groupings are in

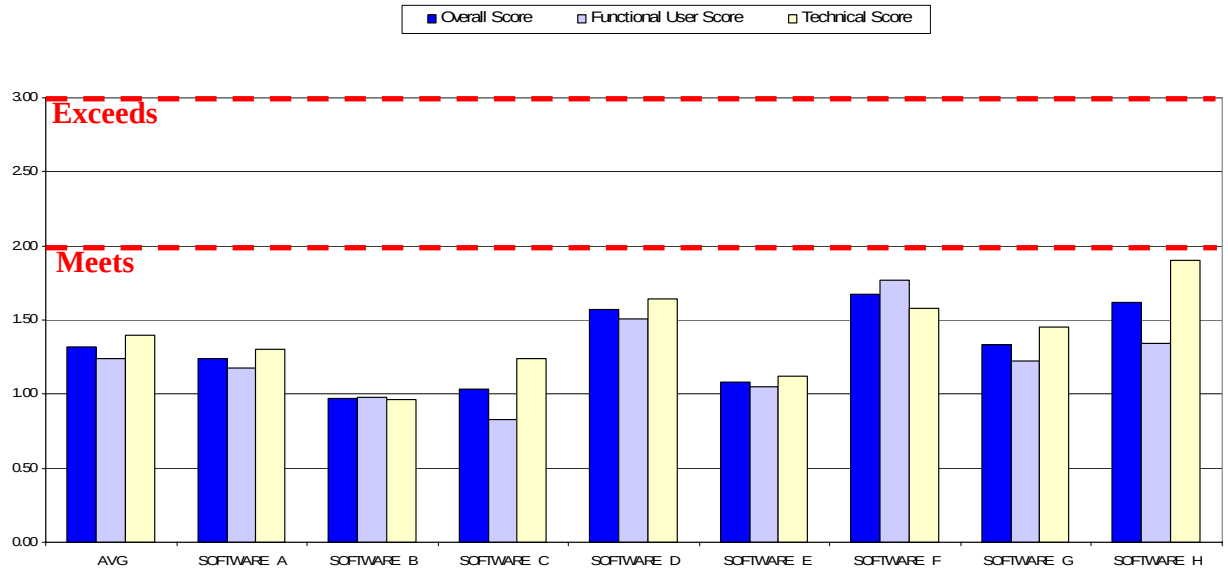


**Figure 2: Evaluation Results (unweighted)**

Requirements 41, 42, 43, 45, and 75 are subjective questions meant to focus on usability and technical setup time and therefore were removed from the scoring to retain the objective character of the evaluation process. The evaluators scored themselves an average of 3.18 out of

the range 1 (beginner) to 4 (Expert) with 5 being "All but Impossible to Use." Evaluators were also asked to rate the usability of the software using the same scale. The average for the level of expertise required by software was an average of 2.73. A key subjective question was how the evaluators felt the software provided situational awareness of the scenario that had been provided. The average score was 1.48. Question 45 was thrown out because the evaluators did not answer it consistently or with the intended scoring of 0 for No and 5 for Yes. The requirement received scores ranging from 1 through 5. Table 5 below shows the end user requirements, their category, average score and how the software packages scored.

| | End User Requirement | Average | Software A | Software B | Software C | Software D | Software E | Software F | Software G | Software H |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Map Display** | | | | | | | | | |
| 1 | Does the system offer the user the ability to control visibility of geospatial layers? | 1.58 | 1.36 | 0.55 | 2.00 | 2.20 | 0.58 | 2.09 | 1.83 | 2.00 |
| 2 | Does the system allow the user to add & display incident site information? | 1.70 | 2.08 | 1.36 | 1.00 | 1.91 | 1.67 | 2.09 | 1.83 | 1.64 |
| 3 | Does the system allow the user to display data in multiple coordinate systems? | 1.28 | 0.92 | 0.70 | 1.27 | 1.91 | 0.30 | 2.00 | 1.82 | 1.30 |
| 4 | Does the system allow various Emergency Support Functionals to input data? | 1.31 | 1.62 | 1.50 | 0.70 | 1.70 | 1.17 | 2.00 | 0.58 | 1.22 |
| 5 | Does the system display regional jurisdiction boundaries such as political, law enforcement, fire, etc? | 1.04 | 0.69 | 0.64 | 0.82 | 1.64 | 0.55 | 1.80 | 1.09 | 1.09 |
| 6 | Does the system generate and display cordon data from multiple information sources such as manual input, automatic generation, and/or external web sources? | 1.31 | 1.42 | 0.82 | 1.27 | 1.73 | 0.75 | 1.90 | 1.42 | 1.18 |
| 7 | Does the system generate and label cordons by location, size, type of event? | 1.45 | 1.46 | 0.82 | 1.55 | 1.73 | 1.00 | 2.00 | 1.67 | 1.36 |
| 8 | Does the system generate multiple cordons then layer them? | 1.34 | 1.42 | 0.55 | 1.45 | 1.73 | 0.75 | 1.91 | 1.58 | 1.36 |
| 9 | Does the system import/export cordons from/to other systems? | 1.10 | 1.31 | 0.82 | 1.09 | 1.70 | 0.36 | 1.67 | 1.00 | 0.89 |
| 10 | Does the system control visibility of graphics and layers? | 1.45 | 1.54 | 0.64 | 1.73 | 1.91 | 0.50 | 2.09 | 1.67 | 1.50 |
| 11 | Does the system generate TCP and ID/assign ECP locations? | 0.71 | 1.15 | 0.45 | 0.18 | 1.09 | 0.55 | 0.82 | 0.50 | 0.90 |
| 12 | Does the system allow manual input of ECP/TCP information? | 1.60 | 1.92 | 1.27 | 0.73 | 2.00 | 1.75 | 2.00 | 1.67 | 1.45 |
| 13 | Does the system track and update ECP/TCP attribute data? | 1.14 | 1.31 | 0.55 | 0.45 | 1.55 | 1.18 | 1.64 | 1.33 | 1.09 |
| 14 | Does the system display local civil emergency facility locations? | 1.14 | 1.23 | 0.60 | 0.91 | 1.82 | 0.64 | 1.64 | 1.08 | 1.18 |
| 15 | Does the system allow user input and display of on-scene command post locations? | 1.57 | 1.85 | 1.36 | 0.80 | 1.73 | 1.75 | 2.00 | 1.58 | 1.45 |
| 16 | Does the system allow user input and display UXO locations? | 1.50 | 1.46 | 1.27 | 0.80 | 1.82 | 1.55 | 1.91 | 1.58 | 1.60 |
| 17 | Does the system generate optimal routes for incident response? | 0.45 | 0.17 | 0.20 | 0.18 | 0.64 | 0.67 | 0.27 | 0.58 | 0.91 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | Does the system allow the user to manually create/modify response routes? | 1.25 | 0.92 | 1.00 | 0.60 | 1.82 | 0.91 | 1.91 | 1.50 | 1.36 |
| 19 | Does the system capture and display status of facilities? | 0.82 | 0.83 | 0.64 | 0.18 | 1.18 | 0.45 | 2.00 | 0.58 | 0.67 |
| 20 | Does the system track emergency responder vehicle locations in near-real time? | 0.89 | 1.62 | 0.09 | 0.36 | 0.91 | 0.45 | 1.30 | 1.00 | 1.36 |
| 21 | Does the system integrate and display CBRNE air dispersion model results? | 1.27 | 1.75 | 0.82 | 0.70 | 0.82 | 0.73 | 2.18 | 1.33 | 1.82 |
| 22 | Does the system integrate and display data from JOEF/JWARN? | 0.49 | 0.17 | 0.11 | 0.60 | 0.50 | 0.13 | 1.33 | 0.25 | 0.86 |
| 23 | Does the system view facility floor, utility, evacuation plans? | 1.28 | 0.92 | 0.64 | 0.91 | 1.27 | 1.00 | 2.45 | 1.92 | 1.10 |
| 24 | Does the system use map bookmarks for quick navigation? | 1.27 | 1.00 | 1.00 | 1.10 | 1.40 | 1.00 | 2.30 | 1.09 | 1.29 |
| 25 | Does the system display weather information? | 1.11 | 1.23 | 1.18 | 0.91 | 1.00 | 0.91 | 1.00 | 1.25 | 1.38 |
| 26 | Does the system allow a user to manually override the weather information? | 1.00 | 0.69 | 1.27 | 0.18 | 1.27 | 0.40 | 1.20 | 1.50 | 1.50 |
| 27 | Does the system track all incident responses and their history? | 1.66 | 1.31 | 1.82 | 0.90 | 1.73 | 2.33 | 2.00 | 1.17 | 2.00 |
| 28 | Does the system allow a user to query by incident number, time and event? | 1.51 | 0.77 | 1.33 | 1.00 | 2.09 | 1.92 | 2.00 | 1.18 | 1.80 |
| 29 | Does the system display building numbers, addresses, and POCs? | 1.14 | 0.62 | 0.64 | 0.55 | 1.45 | 0.45 | 2.09 | 1.58 | 1.73 |
| 30 | Does the system display casualty locations? | 1.07 | 1.54 | 0.91 | 0.60 | 1.27 | 0.83 | 1.50 | 0.67 | 1.20 |
| 31 | Does the system depict and display destroyed and impacted facilities? | 0.95 | 1.08 | 0.64 | 0.55 | 1.00 | 0.64 | 2.00 | 0.67 | 1.00 |
| 32 | Does the system display collection areas such as evacuation, casualty, staging, etc? | 1.27 | 1.54 | 0.82 | 0.64 | 1.64 | 1.08 | 1.91 | 1.42 | 1.10 |
| 33 | Does the system display restricted area, critical assets and infrastructure? | 1.16 | 0.92 | 0.64 | 1.00 | 1.27 | 0.91 | 1.91 | 1.25 | 1.38 |
| 34 | Does the system allow manual input of restricted areas? | 1.38 | 0.92 | 1.18 | 1.09 | 1.73 | 1.08 | 2.00 | 1.67 | 1.33 |
| | **Checklists and Reporting** | | | | | | | | | |
| 35 | Does the system provide AFIMS/NIMS incident report and checklist? | 0.91 | 0.17 | 1.91 | 0.09 | 0.80 | 2.00 | 1.00 | 0.50 | 0.78 |
| 36 | Does the system display historic event data? | 1.53 | 0.62 | 1.55 | 1.09 | 1.67 | 1.92 | 2.18 | 1.33 | 1.88 |
| 37 | Does the system export information into various formats? | 1.21 | 0.82 | 1.40 | 0.90 | 1.90 | 1.42 | 1.40 | 0.58 | 1.25 |
| | **Software Specifications** | | | | | | | | | |
| 38 | Does the system track and manage multiple incidents? | 1.64 | 2.00 | 1.73 | 1.10 | 1.82 | 1.58 | 2.00 | 1.17 | 1.75 |
| 39 | Does the software have an information archive capability? | 1.57 | 0.91 | 1.82 | 1.22 | 1.82 | 1.82 | 1.91 | 1.25 | 1.78 |
| 40 | Is the system compatible with NIMS protocol? | 1.18 | 1.80 | 2.00 | 0.27 | 0.91 | 1.67 | 0.63 | 0.92 | 1.22 |
| | **General Overall Review** | | | | | | | | | |
| 41 | Overall rating of how well the software provided situational awareness of the scenario? | 1.48 | 1.33 | 1.00 | 0.75 | 2.00 | 1.63 | 2.50 | 1.50 | 1.14 |
| 42 | How would you rate the level expertise required to successfully operate this software? (1 Beginner, 2 - Some Experience, 3 - Experienced User, 4 - Expert User, 5 - All but Impossible to use) | 2.72 | 2.38 | 2.20 | 3.50 | 3.18 | 2.08 | 2.55 | 2.46 | 3.40 |
| | **Average Scores** | **1.24** | **1.18** | **0.98** | **0.83** | **1.51** | **1.05** | **1.77** | **1.22** | **1.34** |

**Table 5 End User Requirements and Evaluation Scores**

| | Technical Requirement | Average | Software A | Software B | Software C | Software D | Software E | Software F | Software G | Software H |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Map Display** | | | | | | | | | |
| 44 | Does the system integrate external medical, emergency management, security forces, fire, and EOD information? | 1.47 | 1.60 | 1.00 | 1.50 | 2.20 | 0.86 | 1.33 | 1.29 | 2.00 |
| 45 | Are the cordons viewable to multiple users, (thick/thin clients)? 0-No 5- Yes | 2.60 | 2.67 | 1.17 | 1.67 | 2.40 | 3.43 | 4.17 | 3.29 | 2.00 |
| 46 | Does the system integrate with reverse 911 systems? | 1.15 | 1.20 | 0.83 | 1.20 | 1.00 | 1.00 | 1.00 | 1.17 | 1.80 |
| 47 | Does the system link to authoritative weather information? | 1.28 | 0.80 | 1.00 | 1.67 | 1.80 | 1.00 | 1.00 | 1.14 | 1.80 |
| 48 | Does the system display MOPP sectors? (assuming data availability) | 1.18 | 0.80 | 0.33 | 0.80 | 1.80 | 1.00 | 1.80 | 1.14 | 1.80 |
| 49 | Does the system display CBRNE sensor locations? | 1.17 | 0.80 | 0.17 | 1.17 | 1.60 | 0.57 | 1.83 | 1.43 | 1.80 |
| 50 | Does the system display CBRNE sensor alarms? | 1.17 | 0.80 | 0.17 | 1.17 | 1.60 | 0.57 | 1.83 | 1.43 | 1.80 |
| 51 | Does the system display security sensor locations and nominal coverage or fields of view? | 1.04 | 0.80 | 0.17 | 0.83 | 1.20 | 0.33 | 1.83 | 1.14 | 2.00 |
| 52 | Does the system display security alarm activation status? | 1.07 | 0.80 | 0.17 | 0.83 | 1.20 | 0.57 | 1.50 | 1.29 | 2.20 |
| 53 | Does the system display security gate locations and their status? | 1.13 | 0.80 | 0.17 | 0.83 | 1.20 | 0.57 | 2.00 | 1.29 | 2.20 |
| 54 | Does the system display gate status? | 1.10 | 0.80 | 0.17 | 0.67 | 1.20 | 0.57 | 2.00 | 1.17 | 2.20 |
| 55 | Does the system generate and display threat domes for weapons?. | 0.83 | 1.00 | 0.17 | 0.33 | 1.20 | 0.33 | 1.40 | 1.00 | 1.20 |
| 56 | Does the system generate and display guard post locations, assets, weapons and coverage? | 1.12 | 0.80 | 0.17 | 1.33 | 1.40 | 0.43 | 1.60 | 1.43 | 1.80 |
| 57 | Does the system display sectors, patrol routes, and restricted areas. | 1.16 | 0.80 | 0.50 | 1.00 | 1.40 | 0.67 | 1.67 | 1.43 | 1.80 |
| 58 | Does the system integrate data from SFMIS? | 0.49 | 0.60 | 0.33 | 0.60 | 0.50 | 0.17 | 0.50 | 0.00 | 1.25 |
| 59 | Does the system display and code facilities for their vulnerability level? | 0.93 | 0.80 | 0.17 | 0.67 | 1.20 | 0.17 | 1.40 | 1.43 | 1.60 |
| | **Technical Support** | | | | | | | | | |
| 60 | Does the vendor provide technical support during regular business hours? | 1.919 | 1.33 | 2.83 | 1.17 | 1.50 | 1.83 | 2.00 | 2.29 | 2.40 |
| 61 | Does the software have documented user manuals and reference guides? | 1.9104 | 1.83 | 2.00 | 1.33 | 1.75 | 2.00 | 2.20 | 2.17 | 2.00 |
| | **Software Specifications** | | | | | | | | | |
| 62 | Does the software function on the Air Force Standard Desktop Configuration ? | 1.51 | 1.33 | 2.00 | 1.17 | 2.00 | 1.00 | 1.60 | 1.50 | 1.50 |
| 63 | Does the software operate on Windows 2000, XP, and Server 2003 | 2.09 | 1.83 | 2.00 | 2.33 | 2.40 | 2.00 | 2.17 | 2.00 | 2.00 |
| 64 | How often are new software versions released? | 1.78 | 2.20 | 1.83 | 1.25 | 2.00 | 2.50 | 1.00 | 1.67 | 1.80 |
| 65 | Is software customization required for full functionality? | 1.56 | 1.50 | 1.67 | 1.83 | 2.00 | 1.50 | 1.40 | 1.14 | 1.40 |
| 66 | Can software be utilized at multiple locations simultaneously? | 2.13 | 2.00 | 2.40 | 2.00 | 2.40 | 2.29 | 2.33 | 1.43 | 2.20 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 67 | Does the software utilize either SQL Server or Oracle for its database? | 1.97 | 2.00 | 2.00 | 2.20 | 2.50 | 1.71 | 1.33 | 2.00 | 2.00 |
| 68 | Does the software utilize data supplied by the vendor? If so, how often is the data updated? | 1.00 | 0.83 | 0.80 | 0.75 | 1.17 | 1.57 | 0.67 | 1.00 | 1.20 |
| 69 | Does the software utilize SDSFIE data? | 0.95 | 1.00 | 0.60 | 1.00 | 0.75 | 0.40 | 0.75 | 1.33 | 1.75 |
| 70 | Does the system utilize networked sensor systems (digital and video)? | 1.38 | 1.80 | 0.17 | 0.60 | 2.25 | 0.00 | 2.33 | 1.29 | 2.60 |
| 71 | Does the system manage a timely refresh rate? | 2.03 | 2.50 | 2.00 | 1.67 | 2.17 | 1.71 | 2.17 | 1.86 | 2.20 |
| 72 | Does the system export data to hand held devices, laptops, wireless? | 1.75 | 2.33 | 1.50 | 1.17 | 2.00 | 2.00 | 1.67 | 1.14 | 2.20 |
| 73 | Does the system utilize an active connection the IITA's Oracle/ArcSDE geodatabase? | 1.01 | 0.67 | 0.33 | 1.80 | 1.33 | 0.33 | 0.25 | 1.14 | 2.20 |
| 74 | Does the system meet AF encryption protocols? | 1.45 | 1.17 | 1.00 | 1.75 | 1.75 | 1.57 | 0.25 | 1.83 | 2.25 |
| 75 | How many man-hours did the vendor require to install and configure the software? | 8.51 | 7.00 | 0.86 | 14.00 | 2.20 | 1.00 | 1.50 | 19.50 | 22.00 |
| | **Average Score** | **1.40** | **1.30** | **0.96** | **1.24** | **1.64** | **1.12** | **1.58** | **1.45** | **1.90** |

**Table 6 Technical Requirements and Evaluation Scores**

Question 75 recorded the labor hours to install and configure the software. The average was 8.51hours but the maximum was 22 and the minimum 1 hour. This is such a wide range that the average is not an accurate representation. The differences in installation circumstances are discussed in Section 5.0.

## 5.0 DISCUSSION

This section discusses what the results convey. Each section contains a "considerations table" which summarizes important findings or recommendations.

### 5.1 Analysis of Requirement Categories

Both sets of evaluators scored the ***Map Display*** capability similarly. This indicates that equal focus by the vendor is placed on technical features and user interaction with the map. The average score for the *Technical Support* capability was the highest of all categories but was still below the "Meets Criteria". This will require careful consideration of the support packages before a purchase is made to ensure there are no hidden costs, costs for updates, sufficient support and training. When looking across the categories, none stands out significantly higher than any of the others. A reason for this may be an unequal distribution of requirements between the categories. *Map Display* had the greatest number of requirements due to the fact that use of GeoBase ( a graphical human interface) was the focus of the study. Less emphasis was placed on ***Checklists and Reporting*** **and** ***Software Specifications***. To better analyze what functions are prevalent in the market, analysis at the individual requirement level should done.

| Subject | Future Consideration |
|---|---|
| Technical Support | Ensure all costs for upgrades, training, maintenance, phone support, manuals, and new versions is disclosed up front when considering software pricing |
| Equalize number of requirements | Ensure the requirements have an average number across categories so that category comparisons can be made accurately |

**Table 7: Category Considerations**

## 5.2 Capabilities Lacking in Commercial software

The deficient requirements in **Table 16** span all requirement categories. Analysis assumes that because the scores for these requirements fell below one half a standard deviation from the average that these capabilities are less prevalent in the market. The user community should decide how important these capabilities are in the performance of their jobs. If these specific capabilities are deemed necessary, the ability to integrate or customize functionality should be taken into consideration.

Software providers did not seem to understand the importance of fully demonstrating the desired requirements. All evaluation requirements should be addressed specifically and in advance with software providers to ensure the desire for these requirements is understood and appropriate time to demonstrate capabilities is given. Another option that software providers should consider is to form partnerships with other software providers that perform niche functions to meet the requirements. Specific groups of requirements are addressed below.

Four requirements relate to communicating facility information. Two facility requirements (#14 "dealing with civil emergency locations" and #23 "facility floor, utility and evacuation plans") scored within ½ of a standard deviation of the average. This tells us that these capabilities are represented consistent with the rest of the capabilities on the market. Two other requirements (#19 "indicating the status of facilities" and #31 "displaying impacted or destroyed facilities") were not prevalent in the market. These requirements call for real-time status or updates. The fact that they scored low, indicates that up-to-date sensor, status, impact, and vulnerability is lacking. This requirement should be conveyed to the software providers so they may then improve/demonstrate their capability or solutions to these requirements.

Software providers were requested to utilize Government Furnished Information (GFI) such as Spatial Data Standard (SDSFIE) data, Joint Operational Effects Federation/Joint Warning and Reporting Network (JOEF/JWARN) data and data from Security Forces Management Information System (SFMIS). All of the software scored very low on these requirements. Certain software packages claimed the ability to integrate with any data source available via a web service. To determine if this is in fact the case, sanitized and "dummy" data should be provided further in advance than practiced in this evaluation. Additionally, this requirement could be stressed more strongly to the software providers in advance in order to construct the interface, be familiar with the data, or provide a suitable substitute if one exists.

The requirement to generate optimal routes was not satisfied by any of the products in this evaluation, i.e. all products scored inordinately low. Some software could generate routes however the routes were not optimized. Other software allowed the user to draw a route. The feedback from the software providers was that the user community knew the way to an incident and therefore did not need to use this function. This may be true for local emergency responders but should be validated or invalidated with the entire user community (other civil, National Guard, Federal – generally responders for other jurisdictions) before pursuing the capability further.

| Subject | Future Consideration |
|---|---|
| Status of Facilities | Differentiate between static and monitoring or sensing facility capabilities |
| Integration with GFI | Require software providers to show integration with data, provide data and information in advance |
| Generate Optimal Routes | Verify with the user community that this capability is necessary |

**Table 8: Consideration of Capabilities Lacking**

### 5.3 Capabilities Prevalent in Commercial Software

The requirements prevalent in the market listed in **Table 17** span all categories. Analysis assumes that because these requirements fell above one half a standard deviation from the average that these capabilities are prevalent in commercial capabilities. These requirements all scored closer to "Meets" than "Partially Meets". The prevalent capabilities will not help to differentiate between software packages since they are well represented in most products. However, these capabilities should be reviewed to ensure software packages meet them or the capabilities should be further derived to provide a more granular view of the underlying functionality that is truly required. An example of these two scenarios are below:

1. Requirement 63 states that the software must operate on a specific operating system. Because all software packages met this requirement (average of 2.09) it can be assumed that software being evaluated will run on the stated operating system. To verify, a review of the website or literature can be done outside of the demonstration.
2. Requirement 67 requests that the software be utilized at multiple locations simultaneously. "Utilized" is a word that can be derived into a more specific capability leading to differentiate software and pinpoint the exact capability needed by the end users. (e.g. The software can be updated by both the EOC and the field operator.)

Six requirements scored above or within 0.1 of "Meets". All of these requirements fell into the Technical Support or Software Specification categories. This leads to the assumption that it is standard in commercial industry to provide adequate technical support and have software that has the ability to run on AF standard operating systems and databases. The other two requirements that scored well communicated a timely refresh rate and that the software could be used at multiple locations simultaneously. The results show that the requirements in this group are well represented across the industry. Now that it is known that these capabilities are prevalent, metrics may be associated with them or greater detail derived to assist in differentiating software candidates.

| Subject | Future Consideration |
|---|---|
| Requirements | Force the requirements to be more specific to a need or remove them from the list for evaluators |

**Table 9: Considerations for Prevalent Capabilities**

## 5.4 Other Capabilities

The criteria listed in **Table 18** are the key criterion to differentiate software options. The score for these capabilities was in a larger range and the Min and Max varied to a great degree indicating some software was sufficient and other software was lacking. If this evaluation scope was to choose a software package, the criteria in this list would be the deciding factor.

## 5.5 Lessons Learned

### 5.5.1 Integrator vs. Specific Purpose

The software demonstrated fell into two groups; integrator or specific purpose software. The first group of software packages were provided by integrators of disparate information sources. The second group represented software built for a specific purpose. These vendors provided tools for the user in the field or the commander in the EOC. The entire life-cycle of information needs to be considered when analyzing C2 information for an EOC. There was not a single software package demonstrated that met all or most of the requirements. The requirement set, however, could have been met by integrating multiple software suites. Several important things that must be considered include: which tools the user has in the field, how that tool relays information back to the EOC, and how the EOC uses the data to generate reports and pass information to higher levels. When evaluating tools, legacy applications should be considered. If the current tools provide the information needed but do not have the right communication channels, an integrator software may be the right solution. An integrator may provide a less expensive solution to current stovepipe solutions. This, however, may not be the panacea it appears in a tight fiscal environment as no single software package will be responsible for final interoperable, integrated functionality, i.e. the whole may never work as good as its parts. All of these concerns should be weighed and considered when evaluating and procuring software. If there is a lack of information along with a lack of communication methods, end-to-end software (one package or multiple packages working together) may be a better option. The decision of what type of software is desired will help to focus the evaluation.

| Subject | Future Consideration |
|---|---|
| Integrator vs. Niche | The decision software purpose should be decided; integrator software, or a series of software solutions to meet the needs of the information chain |

**Table 10: Future Considerations**

### 5.5.2 Standard Data

This evaluation strongly encouraged the use of standardized Department of Defense (DoD) geospatial datasets. The CIP schema and a description of the HSIP data was provided in advance. For release reasons, the HSIP data could not be provided to the software providers ahead of time. The majority of the software providers opted not to even attempt to use the data provided due to the lack of advance accessibility and the opinion they could better demonstrate their capabilities with their data. This is a standard industry position. For future evaluations it will be important to require the use of government data. The goal of providing the data was to ensure that the software could connect to and display the GFI. This same goal may be accomplished by requiring vendors to provide the external databases they will utilize in advance so that the evaluators can see that products are connecting to outside data sources. The controls must be in

place and enforced, such as connecting to external databases, to ensure that software being evaluated can actually provide the functionality described. Conversely, software vendors could be required to utilize a set of generic data or fictitious data. Capabilities of the software will be best displayed by allowing the software providers to show their key functionality.

Those software providers that brought their own hardware and used their own data took significantly less time to set up. Software providers that used Government provided, hardware, took significantly longer to set up. Software providers generally utilized their own data since connecting to government databases was considered to present a higher risk in a demonstration setting than using their own data. Additionally, they cited that the time required to build the scenario on this external data could take an inordinate amount of time. Vendors that chose to connect to the government dataset were generally able to connect with little time or effort, however, their setup took much longer because they had to construct their demonstration script after seeing the data.

| Subject | Future Consideration |
|---|---|
| Standard Data | Require the use of Government Data |
| Standard Data | Provide the data in database format with sufficient lead time |

**Table 11: Future Considerations**

### 5.5.3 Requirements

For this evaluation, the requirements were developed by the CROP and the Full Spectrum Threat Response meeting and were focused on how GeoBase can be used to support EOCs. During the demonstrations a scope creep took place in the form of the evaluators looking at all of the software capabilities instead of focusing on how the application worked with GeoBase. To assess a complete EOC solution, the utilization of GeoBase must be considered, however there are also many other facets of the EOC that need to be included in the requirements list. Requirements for these other facets need to be developed from all stakeholders and end users of the information. End-to-end information flow requirements should be determined. Operational needs should also be included in the requirements list. The requirements should be agreed upon and standardized across the MAJCOMs.

| Subject | Future Consideration |
|---|---|
| Requirements | Develop an end-to-end list of requirements including operational needs and information flow requirements |
| Requirements | Have one set of requirements between all MAJCOMs |

**Table 12: Future Considerations**

### 5.5.4 Government Off-The-Shelf (GOTS)

AFSPC's ideal solution is one that leverages previous federal investments, however there is no known comprehensive, current and authoritative portfolio of software developed by or owned by Federal, DoD or AF agencies. During the course of the evaluation effort, many GOTS products in use by military organizations were discovered. When looking at software, it will be important to consider GOTS software capabilities to leverage the tools already accessible by the government. This could prove a good source of requirements. If the GOTS software is

documented properly there should be a requirements document for each software package. These requirements could be reviewed and validated, then integrated into the larger EOC view.

| Subject | Future Consideration |
|---|---|
| GOTS | Review the current GOTS in use and how those GOTS meet the requirements |

**Table 13: Future Considerations**

### 5.5.5 Evaluators

The evaluators that reviewed the software represented different functions of the ER community, few had EOC experience. None of them had a GIS background and only some of them had heard of GeoBase. They entered the demonstrations with the attitude: "How can this software help me?" as opposed to "How can this software use GeoBase data to help me?" It would be helpful to provide the evaluators with an overview of GeoBase so they can better understand how their needs can be met by GeoBase data. This frame of mind helped identify additional requirements that are needed for an EOC but not applicable to GeoBase.

The evaluators gave their computer expertise an average rating of 3.18. The software demonstrated was given a usability rating of 2.73. This communicates that the software on the market is useable by the average user assuming the evaluators represent the average EOC member.

| Subject | Future Consideration |
|---|---|
| Evaluators | If looking specifically at GeoBase application, either train or choose evaluators familiar with GIS |

**Table 14: Future Considerations**

### 5.5.6 Evaluation Controls

As described in **3.0**, there were a number of controls put in place to provide a fair and objective platform on which to evaluate all of the software packages. Certain factors did not proceed as planned. Software Vendor's state of preparedness varied. Some providers were very cognizant of the timeline, scenario and requirements while others were determined to provide their standard demonstration regardless of evaluation effort's requests. This caused differences in the demonstrations and their format. Those that focused on the requirements and scenario provided did not always have the time to show functionality that fell outside of those parameters.

Software providers that did not stick to the plan provided a broader overview of their software and created an equal dilemma; Evaluators had to ask a number of questions to ascertain if their software met the requirements. During the planning process, the possibility of software providers not following the provided schedule, requirements and scenario was not considered and therefore caused confusion and frustration for the evaluators.

The hour of "hands on time" always blended into the "question and answer" half hour. In the post evaluation analysis, these items did not need to be separated in the schedule, or perhaps only a 15 minute wrap up at the end was needed.

### 5.5.7 Future Studies

This study shed light on the capabilities on the market in relation to a specific GeoBase focused list of requirements. This information can be used to shape other studies to determine software currently in use, GOTS capabilities within the government, and eventually for the acquisition of a C2 software package.

The complete set of needs, translated into requirements, should be identified. To capture, "what do we currently do," needs to be fully understood. This includes the operational business practices and required information flows. The requirements should be uniform for all MAJCOMs (Minot AFB is an ACC owned base with a significant AFSPC presence) and software must be uniformly implemented. Standardization will remove the stove-piped software and information paths. The question, "what software do we currently have," needs to be answered. The next question would be, "what does this software do." This knowledge will allow the GOTS currently in use to be evaluated. An informed purchase can be made with the resulting information from these activities.

## 6.0 CONCLUSIONS

The two most important findings in this evaluation are:
— There have not been end-to-end requirements defined, let alone provided to industry.

— No current software meets all of the needs evaluated in this effort.

The solutions on the market provide functionality to meet a segment of the information flow, or they strive to integrate information from existing tools. Going forward, the requirements of the operational community and information flow must be documented and agreed upon bythe Air Force emergency response community. These requirements should then be used to evaluate COTS and GOTS software solutions. The findings from this evaluation should shape the requirements definition efforts and methodology employed when evaluating GOTS and COTS.

## 7.0 RECOMMENDATIONS

The evaluation analysis demonstrated the level of capabilities currently in the market. There were also a number of issues that were identified and discussed in Section 5.0. The table below summarizes the recommendations made in previous sections. The two most pressing recommendations are: 1) developing a standard list of requirements and 2) investigating the GOTS capabilities.

| Subject | Future Consideration |
|---|---|
| Technical Support | Ensure all costs for upgrades, training, maintenance, phone support, manuals, and new versions is disclosed up front when considering software pricing |
| Equalize number of requirements | Ensure the requirements are equally represented across categories so that category comparisons can be made accurately |
| Status of Facilities | Differentiate between static and monitoring/sensing facility capabilities |
| Integration with GFI | Require software providers to demonstrate integration with data - provide data and information in advance |
| Generate Optimal Routes | Verify with the user community that this capability is necessary |
| Requirements | Develop an end-to-end list of requirements including operational needs and information flow requirements |
| Requirements | Have one set of requirements across all MAJCOMs |
| GOTS | Review the current GOTS in use and how those GOTS meet the requirements |
| Evaluators | If looking specifically at GeoBase application, either train or choose evaluators familiar with GIS |

**Table 15 Recommendations**

# APPENDIX A FEDBIZOPS' Special Notice

## General Information

Document Type: Special Notice Solicitation Number:Reference-Number-0129Posted Date: Dec 02, 2006Original Response Date: Jan 02, 2007Current Response Date: Jan 02, 2007Original Archive Date: Jan 17, 2007Current Archive Date: Jan 17, 2007Classification Code:A -- Research & Development NAICS Code:541710 -- Research and Development in the Physical, Engineering, and Life Sciences

## Contracting Office Address

Department of the Air Force, Air Combat Command, 55 CONS, 101 Washington Sq Bldg 40, Offutt AFB, NE, 68113-2107, UNITED STATES

## Description

The Survivability Vulnerability Information Analysis Center (SURVIAC) is assessing the market to gain information about commercial off-the-shelf (COTS) Command and Control (C2) software products for potential use at Air Force bases world-wide supporting Anti-Terrorism and Force Protection. Information about the software's ability to support base emergency response forces (medical, fire, security forces, civil engineering, etc.), ease of use, and compatibly with existing systems will be considered. Currently, several different solutions are being employed by Air Force installations.

SURVIAC is requesting detailed product literature, a tailored vendor demonstration, and evaluation software to assist in determining the capability of software against specific requirements. C2 software vendors are invited to participate by initially providing information about their products. Based on the information provided and market research, qualified vendors will be given the opportunity to continue in the assessment process by demonstrating capabilities of their software offering and providing software and hardware as needed to perform a more in-depth assessment of functional capabilities.

The following capabilities, in a non-prioritized order, are of specific interest to SURVIAC: ability to display map layers; locate crash, spill, fire, flood, accident, attacks; accept inputs from Emergency Response Unit Control Centers (ER UCC's); generate cordon locations and sizes; automatically generate Tactical Control Point) TCP and stage Entry Control Point (ECP) locations; generate optimal routes; determine evacuation routes; notification and evacuation status; track emergency responder vehicle locations; model and plot potential toxic plumes; link facility floor plans to layout map; weather information; chemical, biological, radiological, nuclear or explosive (CBRNE) sensor locations and alarms; security alarm/gate activation;, locations and status; generate and display threat domes for weapons; generate and display post locations; assets; weapons and coverage;, display local civil emergency locations; UXO locations; casualty locations; collection areas; restricted areas; and generate checklists and incident reports.

The goal of the assessment is to determine how well existing COTS products meet specific

functional requirements. These requirements and scenarios are derived from real-world needs, usability standards, and human factors. The specific requirements and assessment scenarios will be provided to qualified vendors.

Please note that this information is being requested for information and planning purposes and does not commit the Government to pay any costs incurred with participation in this assessment or in the submission of any information requested. The Government does not intend to award a contract or otherwise pay for the information requested. THIS IS NOT A SOLICITATION/REQUEST FOR PROPOSAL, BUT A MARKET SURVEY TO LOCATE POTENTIAL SOURCES.

# APPENDIX B Valid Product Criteria

| |
|---|
| **Company Details** |
| Vendor is the seller or authorized representative of the maker of the software |
| Vendor provides technical support during regular business hours |
| Vendor is well established and software is in use at 2 US Government locations (minimum) |
| **Software Specifications** |
| Software should function on standard Air Force hardware and software without causing any interface |
| Software must be supported on Windows 2000, XP, and Server 2003 |
| The latest version of the software should not be more than 12 months old |
| Updates should be provided on a subscription basis (minimum quarterly) |
| Software is already developed and can be implemented with minimal customization |
| Software is net-centric in design and can be shared at multiple locations simultaneously |
| **Data and Database Requirements** |
| The software should utilize either SQL Server or Oracle for its database |
| Data stored in the system must be exportable |
| Any data supplied by the vendor should be updated regularly (minimum quarterly) |
| **Basic Functionality** |
| Software should be GIS enabled (ESRI preferred) |
| Software should have the ability to display crash, spill, fire, flood, accident or attack incident sites |
| Software should have the ability to generate cordon locations |
| Software should have the ability to create and display point-to-point routes |
| Software should have the ability to integrate or communicate with other systems to gather information |

# APPENDIX C Example Sufficient Software Provider Letter

MEMORANDUM FOR ABC Software Provider

ATTENTION: ABC Software Provider

FROM: 55 CONTRACTING SQUADRON 55th CONS/LGCZ
101 WASHINGTON SQ BLDG 40
OFFUTT AFB NE 68113-2107

SUBJECT: Invitation for Software Demonstration

1. Thank you for your submission to FedBizOpps Special Announcement 0129. After a preliminary review of the information you provided, your COTS Software Suite was selected for additional evaluation. The goal of this evaluation process is to gain knowledge about potential Command and Control (C2) software solutions for Air Force Space Command installations world-wide with a primary focus on Anti-Terrorism and Force Protection. The software will be evaluated for functionality in support of base emergency response forces (medical, fire, security forces, civil engineering, etc), ease of use, and compatibility with existing systems. Cost will be an independent factor in the evaluation.

2. I would like to invite your company to demonstrate your proposed software suite to a group of end users and evaluators (between 5-10 government representatives including contractor employees). This demonstration will be performed during an assigned 2.5 hour timeframe the week of March 5, 2007. There will be no reimbursement from the government for this demonstration. You will be given 30 minutes to provide an overview of your software, 30 minutes to demonstrate a scenario that we will provide to you, 1 hour for users to walk through a different scenario provided, and 30 minutes for question and answer. The demonstrations will take place at the USAF Academy's Institute for Information Technology Applications (IITA) Geospatial Information Lab (GIS) Lab.

3. You will be granted access to the Lab area prior to the demonstration/evaluation to configure your software. We strongly recommend you allow ample time for configuration. You will have as much time as you need, but must be ready for the demonstration/evaluation on the scheduled date. No postponements will be granted. Please work with our team to schedule your configuration time. You will have the option of bringing your own hardware or using the Lab's hardware which consists of a Dell Inspiron M70 laptop with 2GB RAM, ~55 GB HD space, 2 GHz processor, Windows XP Service Pack 2, Oracle (I and ArcSDE 9.1). You will be expected to connect to an Oracle 9i database containing Common Installation Picture (CIP) and Homeland Security Infrastructure Protection (HSIP) data. The CIP data consists of 38 layers of infrastructure data each pertaining to an Air Force installation. The HSIP data will contain the following layers of infrastructure data: Hospitals, Law Enforcement, Fire Stations, Red Cross, Schools, Urbanized Areas, major Highways with minimum attributes of Name, Address, Zip Code, State and Phone number. The CIP and HSIP data cannot be released to the vendors; the HSIP data is Sensitive But Unclassified (SBU) as well as For Official Use Only (FOUO). Since this data cannot be released to the vendors, the more desirable approach is for the vendors to

connect to the AF Academy GIS database. If you do not connect to the database, you will need to augment or build your own data to mirror the CIP and HSIP as best possible. You will not have access to the internet. Further details (such as the CIP layers) will be provided when we have received your interest in providing a demonstration.

4. For your information, X contractor is under contract to help coordinate the evaluation for Headquarters Air Force Space Command. As part of this requirement, X will be assisting in the documentation of the software demonstration/evaluation. X is not, in any way, submitting software or any other technology solutions in this effort, and will not at any future time. To further protect your competitive position, X will execute a Non-Disclosure Agreement with your company upon your request.

5. Request you coordinate details/schedule for any configuration requirements and the demonstration with points of contact, XXXXX.

6. Prior to demonstrating your product, you must complete the attached Vendor Demonstration Agreement and return it signed to the POCs at least 7 business days prior to the scheduled date of your demonstration. This agreement clarifies that no costs will be paid by the government in exchange for the demonstration and no funding is currently available for purchase of any AKAT capability identified from this demonstration.

7. Again, I want to thank you for your interest and we look forward to your software demonstration. As noted paragraph 5 above, the POCs will be coordinating all of the details for your software demonstration.

Contracting Officer

Attachment:
Vendor/Demonstration Agreement

# APPENDIX D Deficient Software Provider Letter

MEMORANDUM FOR QRS

ATTENTION: QRS SOFTWARE PROVIDER

FROM: 55 CONTRACTING SQUADRON 55th CONS/LGCZ
101 WASHINGTON SQ BLDG 40
OFFUTT AFB NE 68113-2107

SUBJECT: Invitation for Software Demonstration

1. Thank you for your submission to FedBizOpps Special Announcement 0129. After a preliminary review of the information you provided, your COTS Software Suite uses the Vulnerability of Integrated Safeguards Assessment (VISA) as a foundational element for tabletop exercises and does not appear to be a Real Time Command and Control application as requested in the Special Announcement. SURVIAC is offering the opportunity for Firms that responded to the Special Announcement to provide product demonstrations as part of the continuing evaluation process. The goal of this evaluation process is to gain knowledge about potential Command and Control (C2) software solutions for Air Force Space Command installations world-wide with a primary focus on Anti-Terrorism and Force Protection. The software will be evaluated for functionality in support of base emergency response forces (medical, fire, security forces, civil engineering, etc), ease of use, and compatibility with existing systems. Cost will be an independent factor in the evaluation.

2. Please review the details of the Special Announcement once again, and if you feel that your product was inaccurately characterized I would like to invite your company to demonstrate your proposed software suite to a group of end users and evaluators (between 5-10 government representatives including contractor employees). This demonstration will be performed during an assigned 2.5 hour timeframe the week of March 5, 2007. There will be no reimbursement from the government for this demonstration. You will be given 30 minutes to provide an overview of your software, 30 minutes to demonstrate a scenario that we will provide to you, 1 hour for users to walk through a different scenario provided, and 30 minutes for question and answer. The demonstrations will take place at the USAF Academy's Institute for Information Technology Applications (IITA) Geospatial Information Lab (GIS) Lab.

3. You will be granted access to the Lab area prior to the demonstration/evaluation to configure your software. We strongly recommend you allow ample time for configuration. You will have as much time as you need, but must be ready for the demonstration/evaluation on the scheduled date. No postponements will be granted. Please work with our team to schedule your configuration time. You will have the option of bringing your own hardware or using the Lab's hardware which consists of a Dell Inspiron M70 laptop with 2GB RAM, ~55 GB HD space, 2 GHz processor, Windows XP Service Pack 2, Oracle (I and ArcSDE 9.1). You will be expected to connect to an Oracle 9i database containing Common Installation Picture (CIP) and Homeland Security Infrastructure Protection (HSIP) data. The CIP data consists of 38 layers of infrastructure data each pertaining to an Air Force installation. The HSIP data will contain the

following layers of infrastructure data: Hospitals, Law Enforcement, Fire Stations, Red Cross, Schools, Urbanized Areas, and major highways with minimum attributes of Name, Address, Zip Code, State and Phone number. The CIP and HSIP data cannot be released to the vendors; the HSIP data is Sensitive But Unclassified (SBU) as well as For Official Use Only (FOUO). Since this data cannot be released to the vendors, the more desirable approach is for the vendors to connect to the AF Academy GIS database. If you do not connect to the database, you will need to augment or build your own data to mirror the CIP and HSIP as best possible. You will not have access to the internet. Further details (such as the CIP layers) will be provided when we have received your interest in providing a demonstration.

4. For your information, X Contractor is under contract to help coordinate the evaluation for Headquarters Air Force Space Command. As part of this requirement, X will be assisting in the documentation of the software demonstration/evaluation. X is not, in any way, submitting software or any other technology solutions in this effort, and will not at any future time. To further protect your competitive position, X personnel will execute a Non-Disclosure Agreement with your company upon your request.

5. Request you coordinate details/schedule for any configuration requirements and the demonstration with BAH points of contact XXX.

6. Prior to demonstrating your product, you must complete the attached Vendor Demonstration Agreement and return it signed to the POCs at least 7 business days prior to the scheduled date of your demonstration. This agreement clarifies that no costs will be paid by the government in exchange for the demonstration and no funding is currently identified for the purchase of any C2 COTS Software Suite capability identified from this demonstration.

7. Again, I want to thank you for your interest and we look forward to your software demonstration. As noted paragraph 5 above, the POCs will be coordinating all of the details for your software demonstration.

Contracting Officer

# APPENDIX E Example Scenario

## Event Scenario

It is May 12 and a sunny, warm morning in Colorado Springs. The temperature is 50 degrees with light winds blowing from the NNW at 3-5 mph at the Colorado Springs Airport. Relative humidity is at 30 percent with only a few small clouds in the morning sky.

Peterson AFB and the City of Colorado Springs jointly use, manage, and operate the Colorado Springs Airport. Peterson AFB Fire Department provides primary fire and emergency response for airport operations

A twin-engine aircraft begins its takeoff roll as on any other day. With the prevailing winds, the take-off roll begins on runway 35 Left. This is a heavier than usual flight and the takeoff roll is longer than usual. The plane lifts off to the north and begins its climb out from the Colorado Springs area.

The pilots feel, rather than hear a shutter travel through the fuselage shortly before the aircraft crosses Highway 24. A quick scan of the engine gauges indicates fuel loss from the center tanks and more importantly, hydraulic pressure loss throughout the aircraft. A haze of smoke is seen in the main cabin area.

The pilots, still not knowing what the problem is, but knowing they were experiencing hydraulic failure and loosing fuel declare an in-flight emergency and begin a gentle right turn to return to the airport. Peterson Tower activates the Fire Crash Network. It quickly becomes clear that due to increasing inability to control the aircraft, the pilots would not be able to return to the Colorado Springs Airport. Meadow Lake Airport lying to the northeast is now straight ahead, although having only a general aviation runway and no emergency response vehicles, affords the best facility to land the aircraft.

Struggling with their crippled aircraft, the pilots are able to line up for the approach to runway 33 at Meadow Lake. Keeping their speed high to avoid stalling the damaged aircraft, they touch down on the runway at Meadow Lake. The main landing gear, not fully extended, collapses. The aircraft slides off the runway and comes to rest hard against a hanger full of general aviation aircraft. The main fuselage is intact and the remaining fuel on-board the aircraft does not catch fire. There is some smoke in the cabin. One of the pilots is able to escape the aircraft. The other is not conscious and remains in the plane.

### Event Injects

Caller, (Michelle Green) called in to report what appears to be an aircraft in trouble. Plane is on fire and something fell off near Powers Blvd and Airport Rd

Resident called in to report what appears to be an aircraft in trouble. Plane is on fire and something fell off near Peterson Rd and Constitution Ave.

Another caller is a soldier who works at Ft. Carson. He lives in Stetson Hills, near Stetson Hills and Peterson Blvd. He reports hearing an explosion and then finding what appears to be an IED lying in his yard. He describes it as a PVC pipe about 1' long and 3" in diameter. It has broke open and has gray powder spilling out of it. Caller is a combat engineer and familiar with explosives. Caller reports that it appears there is C-4 and a blasting cap attached to the pipe.

- Plot E911 call locations
- Plot site
- Plot air dispersion model of unknown CBRNE substance at site
- Identify fastest safe route for Peterson AFB EOD responders

Calls begin flooding E911 call center reporting civilians along the Powers Blvd / Peterson Road corridor with sudden onset of nausea, vomiting, and respiratory problems.
- Plot area of E911 calls
- Identify area for Reverse-E911 call focus
- Plot evacuation routes away from event site

Callers report object smoking/smoldering outside in the field near the west gate of Peterson AFB.
- Plot event site
- Plot evacuation routes away from event site
- Identify area for Reverse-E911 call focus

Caller reports 5-car pile-up with vehicle fire at the west gate of Peterson AFB.
- Plot event site
- Identify traffic control sites to re-route traffic from area.

Peterson AFB E911 call center receiving calls of debris/objects from an aircraft have fallen in the area surrounding HQ AFSPC – report smoke, and respiratory problems from staff.
- Plot air dispersion model of unknown CBRNE substance at site
- Notify and evacuate all structures with 1500' cordon with notification to modify evacuation plans to avoid unknown airborne contaminants
- Establish traffic/entry control points for area
- Establish on-scene command post location
- Identify potential triage location

Peterson AFB Firefighter responding to smoldering debris at West Gate site reported unconscious, not breathing.
- Establish 750' cordon around debris site
- Plot air dispersion model of unknown CBRNE substance at site
- Establish traffic/entry control points for area

Aircraft crash reported at about the midpoint of runway 33 at Meadow Lake airport, just on the east side of the runway
El Paso County EOC requests mutual aid from Peterson AFB Fire, EOD, CBRNE teams
- Plot crash site
- Identify safest, most direct route from Peterson AFB to Meadow Lake
- Establish 1500' cordon around debris site
- Plot air dispersion model of unknown CBRNE substance at site
- Establish traffic/entry control points for area-- coordinate with the Colorado Springs Police Department and the El Paso County Sheriffs Department

# APPENDIX F Results Data

The analysis in Table 16, Table 17, and Table 18 use this average as an assumption that communicates the average market capability level. Using this assumption, a score above the average indicate a greater amount of capability in the market and those that score below the average indicate a lesser amount of market capability. The standard deviation for the scores was 0.39. Standard deviation measures the spread of the values and indicates the amount of variance across a set of values. **Standard Deviation is used in this analysis to communicate how much above or below the market average a requirement scored**. The eight vendors who demonstrated their software are assumed to represent the current market capabilities. The average requirement score across the vendors is considered the market capability for that requirement. The market average is defined as the average score across all the requirements. This score is considered the market capability level of software's utilization of GeoBase in support of C2. When calculating the average and standard deviation, blank scores were ignored as they were considered "incomplete data". The average was found by taking the sum of the evaluator scores and dividing by the number of evaluation scores as opposed to the total number of evaluators. The standard deviation finding of 0.39 indicates a relatively low variance in overall scores. Since scores fell into such narrow bands, the analysis will utilize bands of one half of one standard deviation (0.19) to define bands of capability.

As shown in Table 16**,** 18 requirements were below half of one standard deviation of the average.

**Table 16: Requirements Below ½ Standard Deviation**

| Req # | Requirements | Criteria Min | Criteria Average | Criteria Max |
|---|---|---|---|---|
| 5 | Does the system display regional jurisdiction boundaries such as political, law enforcement, fire, etc? | 0.55 | 1.04 | 1.80 |
| 11 | Does the system generate traffic control points and ID/assign entry control points locations? | 0.18 | 0.71 | 1.15 |
| 17 | Does the system generate optimal routes for incident response? | 0.17 | 0.45 | 0.91 |
| 19 | Does the system capture and display status of facilities? | 0.18 | 0.82 | 2.00 |
| 20 | Does the system track emergency responder vehicle locations in near-real time? | 0.09 | 0.89 | 1.62 |
| 22 | Does the system integrate and display data from JOEF/JWARN? | 0.11 | 0.49 | 1.33 |
| 26 | Does the system allow a user to manually override the weather information? | 0.18 | 1.00 | 1.50 |
| 30 | Does the system display casualty locations? | 0.60 | 1.07 | 1.54 |
| 31 | Does the system depict and display destroyed and impacted facilities? | 0.55 | 0.95 | 2.00 |
| 35 | Does the system provide AFIMS/NIMS incident report and checklist? | 0.09 | 0.91 | 2.00 |
| 51 | Does the system display security sensor locations and nominal coverage or fields of view? | 0.17 | 1.04 | 2.00 |
| 52 | Does the system display security alarm activation status? | 0.17 | 1.07 | 2.20 |

| | | | | |
|---|---|---|---|---|
| 55 | Does the system generate and display threat domes for weapons?. | 0.17 | 0.83 | 1.40 |
| 58 | Does the system integrate data from SFMIS? | 0.00 | 0.49 | 1.25 |
| 59 | Does the system display and code facilities for their vulnerability level? | 0.17 | 0.93 | 1.60 |
| 68 | Does the software utilize data supplied by the software provider? If so, how often is the data updated? | 0.67 | 1.00 | 1.57 |
| 69 | Does the software utilize SDSFIE data? | 0.40 | 0.95 | 1.75 |
| 73 | Does the system utilize an active connection the IITA's Oracle/ArcSDE geodatabase? | 0.25 | 1.01 | 2.20 |

Table 17 shows 21 requirements were above half of one standard deviation of the average.

**Table 17: Requirements Above ½ Standard Deviation**

| Req # | Requirements | Criteria Min | Criteria Average | Criteria Max |
|---|---|---|---|---|
| 1 | Does the system offer the user the ability to control visibility of geospatial layers? | 0.55 | 1.58 | 2.20 |
| 2 | Does the system allow the user to add & display incident site information? | 1.00 | 1.70 | 2.09 |
| 12 | Does the system allow manual input of ECP/TCP information? | 0.73 | 1.60 | 2.00 |
| 15 | Does the system allow user input and display of on-scene command post locations? | 0.80 | 1.57 | 2.00 |
| 16 | Does the system allow user input and display UXO locations? | 0.80 | 1.50 | 1.91 |
| 27 | Does the system track all incident responses and their history? | 0.90 | 1.66 | 2.33 |
| 28 | Does the system allow a user to query by incident number, time and event? | 0.77 | 1.51 | 2.09 |
| 36 | Does the system display historic event data? | 0.62 | 1.53 | 2.18 |
| 38 | Does the system track and manage multiple incidents? | 1.10 | 1.64 | 2.00 |
| 39 | Does the software have an information archive capability? | 0.91 | 1.57 | 1.91 |
| 44 | Does the system integrate external medical, emergency management, security forces, fire, and EOD information? | 0.86 | 1.47 | 2.20 |
| 60 | Does the software provider provide technical support during regular business hours? | 1.17 | 1.92 | 2.83 |
| 61 | Does the software have documented user manuals and reference guides? | 1.33 | 1.91 | 2.20 |
| 62 | Does the software function on the Air Force Standard Desktop Configuration ? | 1.00 | 1.51 | 2.00 |
| 63 | Does the software operate on Windows 2000, XP, and Server 2003 | 1.83 | 2.09 | 2.40 |
| 64 | How often are new software versions released? | 1.00 | 1.78 | 2.50 |
| 65 | Is software customization required for full functionality? | 1.14 | 1.56 | 2.00 |
| 66 | Can software be utilized at multiple locations simultaneously? | 1.43 | 2.13 | 2.40 |
| 67 | Does the software utilize either SQL Server or Oracle for its database? | 1.33 | 1.97 | 2.50 |

| | | | | |
|---|---|---|---|---|
| 71 | Does the system manage a timely refresh rate? | 1.67 | 2.03 | 2.50 |
| 72 | Does the system export data to hand held devices, laptops, wireless? | 1.14 | 1.75 | 2.33 |

As shown in Table 18, 31 requirements were within half of one standard deviation of the average.

**Table 18: Requirements within ½ Standard Deviation**

| Req # | Requirements | Criteria Min | Criteria Average | Criteria Max |
|---|---|---|---|---|
| 3 | Does the system allow the user to display data in multiple coordinate systems? | 0.30 | 1.28 | 2.00 |
| 4 | Does the system allow various Emergency Support Functionals to input data? | 0.58 | 1.31 | 2.00 |
| 6 | Does the system generate and display cordon data from multiple information sources such as manual input, automatic generation, and/or external web sources? | 0.75 | 1.31 | 1.90 |
| 7 | Does the system generate and label cordons by location, size, type of event? | 0.82 | 1.45 | 2.00 |
| 8 | Does the system generate multiple cordons then layer them? | 0.55 | 1.34 | 1.91 |
| 9 | Does the system import/export cordons from/to other systems? | 0.36 | 1.10 | 1.70 |
| 10 | Does the system control visibility of graphics and layers? | 0.50 | 1.45 | 2.09 |
| 13 | Does the system track and update ECP/TCP attribute data? | 0.45 | 1.14 | 1.64 |
| 14 | Does the system display local civil emergency facility locations? | 0.60 | 1.14 | 1.82 |
| 18 | Does the system allow the user to manually create/modify response routes? | 0.60 | 1.25 | 1.91 |
| 21 | Does the system integrate and display CBRNE air dispersion model results? | 0.70 | 1.27 | 2.18 |
| 23 | Does the system view facility floor, utility, evacuation plans? | 0.64 | 1.28 | 2.45 |
| 24 | Does the system use map bookmarks for quick navigation? | 1.00 | 1.27 | 2.30 |
| 25 | Does the system display weather information? | 0.91 | 1.11 | 1.38 |
| 29 | Does the system display building numbers, addresses, and POCs? | 0.45 | 1.14 | 2.09 |
| 32 | Does the system display collection areas such as evacuation, casualty, staging, etc? | 0.64 | 1.27 | 1.91 |
| 33 | Does the system display restricted area, critical assets and infrastructure? | 0.64 | 1.16 | 1.91 |
| 34 | Does the system allow manual input of restricted areas? | 0.92 | 1.38 | 2.00 |
| 37 | Does the system export information into various formats? | 0.58 | 1.21 | 1.90 |
| 40 | Is the system compatible with NIMS protocol? | 0.27 | 1.18 | 2.00 |
| 46 | Does the system integrate with reverse 911 systems? | 0.83 | 1.15 | 1.80 |
| 47 | Does the system link to authoritative weather information? | 0.80 | 1.28 | 1.80 |
| 48 | Does the system display MOPP sectors? (assuming data availability) | 0.33 | 1.18 | 1.80 |
| 49 | Does the system display CBRNE sensor locations? | 0.17 | 1.17 | 1.83 |
| 50 | Does the system display CBRNE sensor alarms? | 0.17 | 1.17 | 1.83 |
| 53 | Does the system display security gate locations and their status? | 0.17 | 1.13 | 2.20 |

| Req # | Requirements | Criteria Min | Criteria Average | Criteria Max |
|---|---|---|---|---|
| 54 | Does the system display gate status? | 0.17 | 1.10 | 2.20 |
| 56 | Does the system generate and display guard post locations, assets, weapons and coverage? | 0.17 | 1.12 | 1.80 |
| 57 | Does the system display sectors, patrol routes, and restricted areas. | 0.50 | 1.16 | 1.80 |
| 70 | Does the system utilize networked sensor systems (digital and video)? | 0.00 | 1.38 | 2.60 |
| 74 | Does the system meet AF encryption protocols? | 0.25 | 1.45 | 2.25 |