BETA TEST REPORT

ArchaeoMapper Beta Test Report

ESTCP Project: SI-0611

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Environmental Security Technology Certification Program

ArchaeoMapper Beta Test Report

Report Overview

The ArchaeoMapper Beta Test was conducted Nov 4-6 2008 at the J.B. Hunt Center for Academic Excellence on the University of Arkansas campus. During the three day test, members of the Army User Group and University of Arkansas students familiar with geophysical methods in Archaeology evaluated ArchaeoMapper while working through a series of three tutorials. The first tutorial took the participants through data import and manipulation. The second tutorial introduced the participants to more advanced processing techniques and allowed them to completely process two different data sets. The third tutorial was led by the CAST development team and demonstrated GPR processing and data fusion techniques. Participants were asked to rate and comment on the effectiveness and usability of the ArchaeoMapper software using online forms that were available to them throughout the test. The participants' ratings and comments on these forms (attached in Appendix A) indicated that all the participants were pleased with the design and usability of the software and offered specific suggestions for further improvement. On balance, ArchaeoMapper clearly "passed" the Beta Test and is ready for field evaluations.

Background

ESTCP Project SI-0611 (Streamlined Archaeo-geophysical Data Processing and Integration for DoD Field Use) has two objectives: 1) Assemble a single, user-friendly software (ArchaeoMapper) that will serve as an effective medium for infusing the integrated, multi-sensor geophysical approach into wide use. 2) Demonstrate and validate the cost and performance benefits of the approach and technology infusion tool to a wide range of Cultural Resources Management professionals (see below).

A major component of the Cultural Resources Management (CRM) work conducted on military installations involves evaluation of prehistoric and historic archaeological sites for National Register of Historic Places (NRHP) eligibility in compliance with federal laws. Traditional methods for site evaluation based on hand excavation are costly, invasive, time consuming, and potentially unreliable. As a result of research conducted in the SERDP Project CS-1263 *New Approaches to the Use and Integration of Multi-Sensor Remote Sensing for Historic Resource Identification and Evaluation*, methods have been developed which provide exceptionally detailed, remotely sensed images of the subsurface, which permit accurate characterization of cultural deposits for a wide range of archaeological sites. This research has not only demonstrated that remote sensing (including satellite, aerial, and ground-based geophysical sensors) can produce a level of information about subsurface deposits far richer than that provided by highly invasive traditional approaches, but also that large area (1-2 ha) surveys with multiple instruments are very cost effective; data acquisition typically requiring less than one week of field time. However, the inordinate amount of time required to manually process and fuse the disparate datasets produced by each instrument in the suite is a primary obstacle to much broader adoption and effective use of the methods developed during this research. At present, fully processing and fusing data from a multi-sensor survey typically requires the expert-level use of seven or more commercial-off-the-shelf (COTS) software packages and hundreds of hours of repetitive work. Making remotely sensed information readily available to DoD CRM programs by streamlining data processing and integration will dramatically reduce

labor costs and expertise requirements, and will provide enhanced information content and reliability of survey results (i.e., interpretations of images revealing subsurface cultural deposits). This project will demonstrate and validate the methods, outcomes, and time and cost savings resulting from the application of these newly developed approaches to DoD installation cultural resource (CR) managers, the staff of key regulatory oversight offices, e.g. the State Historic Preservation Offices (SHPO), Tribal Historic Preservation Offices (THPO), and the Advisory Council on Historic Preservation (ACHP), as well as CRM decision makers from other federal agencies (e.g., National Park Service, Forest Service, Fish and Wildlife, Natural Resources Conservation Service). The results of CS-1263 have unequivocally demonstrated the effectiveness and cost savings that will result from the application of the new methods. ArchaeoMapper incorporates these methods in an integrated desktop software application and allows these sophisticated and powerful methods to be employed by novice and expert users alike while reducing the amount of time required to extract information from data collected with multiple geophysical instruments.

Beta Test Design

Testing Environment

The Geomatics II teaching lab is located in the J.B. Hunt Transport (JBHT) Services Inc. Center for Academic Excellence on the second floor near the North end of the building in room 228. This spacious 958 square foot teaching area also functions as a working lab for students enrolled in classes, who are granted access via their student card ID using card readers for unlimited 24 hour access.

Figure 1. Geomatics II classroom in the J.B. Hunt Center for Academic Excellence Building. We did not take photos during the beta test, however, this photo shows how course are typically conducted. Each student has access to one of the dual monitor workstations. The instructor is able to guide the test via an instructor workstation and 5 projectors (1 overhead and 4 LCD monitors in the corners of the classroom).

The Geomatics II lab features 16 high-end Windows XP/64 with duel monitors (one CRT, one LCD) to support stereo photogrammetric, visualization and other high end applications. Each is a quad-core system with 8GB memory. Each CAST teaching lab in JBHT features four Samsung 400PX premium commercial grade monitors featuring high-performance 39.6" dual-input analog/digital LCD displays and DNIe (Digital Natural Image engine) – exclusive image compensation algorithm for brighter and clearer images and text. These displays along with the projection overhead can used to display media, the instructors PC, a student PC, etc. aiding in collaborative education.

Participants

Detailed experience levels are based on the individual's answers to the following questions (from the Tutorial 1 Comment sheets):

1. What types of geophysical methods (magnetometry, GPR, EM, etc.) and instruments (Geoscan, Bartington, GSSI, etc.) are you familiar with?
2. What software do you typically use to process your geophysical data?
3. How long have you been using geophysical methods?

Participants Group Members

Army Users Group

Name	Position	Instrument Experience	Software Experience	Years of Experience
Dr. Laurie Rush	Cultural Resources Manager, Fort Drum	Magnetometry – Geoscan FM36 gradiometer Geoscan RM15 resistance meter GSSI SIR 20 Radar	ArcMap 9.2 Surfer	4 years (intermediate experience level)
Mr. Scott Hall	Cultural Resources Manager, Fort Riley	Geoscan FM36 Gradiometer Geoscan RM15 Resistance Meter	Geoplot Surfer	8 years (intermediate experience level)
Mr. Steven DeVore	National Park Service	Magnetometry, resistance, resistivity, EM, GPR, magnetic susceptibility, digital compaction, metal detection. Magnetics: GeoMetrics, GEM, Geoscan, Bartington;	Geoplot ArchaeoSurveyor Geosoft Surfer Grapher MagMapper Geonics DATW for EM31,38,61 Bartington Magsus	14 years (highly experienced)

		resistance: Geoscan; resistivity: Geohm; EM: Geonics EM31,38,61; GPR: GSSI, Senors and Software, MALA; magnetic susceptibility: Bartington; digital compaction: Spectrum Technologies		
Dr. Kent Schneider	U.S. Forest Service (retired)	EM31, GEM300. Specializes now in GPR, GSSI primary data collector but processes mala SS	Surfer Easy Cad Dat31w Slicer Dicer Radan GPR-Slice Arcview Photoshop, MS Excel	30 years (highly experienced)

University of Arkansas Students

Name	Position	Instrument Experience	Software Experience	Years of Experience
Mr. Duncan McKinnon	Anthropology PhD Student	Magnetometry Resistivity EM GPR Geoscan (RM15,FM256) Bartington GSSI (2000, 3000) EM38B TRI/CARES	Geoplot ArchaeoSurveyor	4 years
Mr. Tuna Kalacyi	Anthropology PhD Student	Geoscan Magnetometry and Resistivity	Geoplot ArchaeoSurveyor	4 years
Ms. Katie Simon	Anthropology Masters Student	GPR (GSSI SIR 2000), EM (EM_38), Magnetic Gradiometry (FM256, Bartington 601.), Resistance Meter (RM-15/MXP 15 and TR Systems CIA)	GPR Process ArchaeoSurveyor	2 years
Ms. Stephanie Sullivan	Anthropology Masters Student	Bartington GSSI (GPR) Gisco (conductivity)	Surfer ArcGIS	<1 year

		Magnetic Susceptibility Resistivity		

Test Structure

The beta test consisted primarily of 3 guided tutorials over the course of 3 days. The tutorials were designed to evaluate the functionality of ArchaeoMapper. Tutorial 1 covered the basic functionality of ArchaeoMapper, allowing the participants to assess how the software imports, displays, manages, and processes data. Participants learned these functions by importing and processing data from Silver Bluff Plantation (one of the four sites surveyed as part of the SERDP project). Participants were instructed to import resistivity and magnetometry data files and assemble individual tiles (survey subunits) into larger composites called "surveys." Using these data, the participants experimented with the different tools in the viewer, including modes of viewing data in 3D, zooming, and panning. Finally, the participants processed the two datasets and by doing this learned how the operation stack functions. The operations stack is one of the most unique attributes of the ArchaeoMapper software, because it allows users to add operations that process the data, but then go back and change parameters, rearrange the order of operations, and add, delete, or simply turn off some operations to see what the outcome will be. Through an iterative process, the user can find the best approach to processing each dataset, and then save this operation stack. The operation stack is also a valuable communication and teaching tool. The user can save the operation stack and send to another user, who can then see exactly what operations were used to create the final result, and even change some parameters in an attempt to improve the results. The beta test participants were impressed by this method of data processing.

Tutorial 1 was very detailed so that participants could learn the basic functionality of ArchaeoMapper. Tutorial 2, however, was less specific (i.e., each processing step was not specified), so that participants could begin to learn the software intuitively based on the fundamental knowledge gained in Tutorial 1. This was easy for many, but not all participants. As a result, some participants raced through this tutorial without problems, while others needed help and additional guidance. Tutorial 2 guided participants through the process of adding new data to an existing survey, and working with electromagnetic (EM) data (magnetic susceptibility and conductivity data types) and ground-penetrating radar (GPR) depth slices as Surfer grid files. Data from Pueblo Escondido (another SERDP site) was used for this tutorial. Through processing these data the participants learned how to use new operations that were not needed for the Silver Bluff resistance and magnetometry data in Tutorial 1.

Tutorial 3 introduced the topics of GPR data processing and data fusion. Most participants were not familiar with GPR data processing, and almost no one was knowledgeable about data fusion; (ArchaeoMapper's capability for data fusion is another of its most unique and valuable components). For this reason, the instructors walked participants through the steps rather than have them do it on their own by following written instructions. Participants were first shown how raw GPR profiles are brought into the GPR processing wizard, processed, and then assembled into 3D cube files. The cube files were then sliced and assembled into composite images ("surveys") and added to ArchaeoMapper just as all other data types are added (as 2D raster images). Next, a variety of data fusion methods were demonstrated including principal components analysis, color composites, mathematical operations, cluster analysis, and Boolean logic operations. The participants were impressed by these functions.

Throughout each tutorial, the participants were provided on-line forms to score and comment on the software. The forms themselves were made available through Google Documents so that the participants always had access to the saved documents. Participants could score and comment during and immediately after a sections of the tutorial (there were several breaks built into each tutorial at which the participants were asked to complete the form), but also at the end of the daily sessions in their hotel rooms. The development team also had read-only access to these forms so that we could more efficiently compile and summarize the results of the individual participants. These forms are still available online at www.docs.google.com (userid: *archaeobeta*, password: *betabeta*). Most of the participants used these forms (which were always available on the second monitor) to comment on functionality or report problems as they occurred.

In addition to the forms provided for rating specific functionality of ArchaeoMapper, the participants were also asked to complete an Overall Assessment (Appendix A). This assessment was more qualitative and attempted to assess the participants' views concerning the current Archaeological Geophysics practice and how ArchaeoMapper will affect current practices.

ArchaeoMapper Function Specific Ratings

Results from the various on-line forms provided to the test participants are summarized in this section. Each of the three tutorials was rated separately. Student rating tend to be sporadic because their class schedules prevented them from being present during the entire test.

Ratings Keys

Participants were asked to provide numerical ratings for specific sets of procedures in ArchaeoMapper using the following rating system.
Ease of Use: How easy is this tool to use?
1 = not at all easy to use or does not work
2 = difficult to use
3 = average ease
4 = fairly easy to use
5 = very easy to use

Accuracy: How well does this tool perform the function for which it was designed?
1 = does not function
2 = functions, but results are faulty (it appears the tool is malfunctioning)
3 = performs the task for which it was designed, with average results
4 = functions well, with good results
5 = works well with impressive results

Effectiveness: How effective is this for producing a good final product?
1 = useless/no benefit
2 = not necessary, but might be applicable in some circumstances
3 = effective, with moderate results
4 = effective, with good results
5 = very effective, produces high quality results

Beta Test Results

The ArchaeoMapper Beta Test consisted primarily of three tutorials. Tutorial 1 covered ArchaeoMapper's basic design and functionality. Mean scores for ease of use, accuracy, and effectiveness ranged between 4 and 4.7 (on a scale of 1-5, with 5 indicating the highest rating), all of which could be characterized as "good". In short, the beta test team were very impressed by ArchaeoMapper and strongly approved of the way the software's design and functionality. In Tutorial 2, most of the beta testers continued to assign scores of 4, while a few 3's as well as 5's were recorded. One of the Army users (Schneider) assigned scores lower than all the other testers in Tutorial 2: all 3's for section 1, and 2's for the other sections (2 means the software functions, but results are faulty). Yet, in his written comments he explains that the ratings are due to "bugs", and he offers detailed descriptions of the problems and what needs to be done to fix them. These comments were extremely useful, and all of the "bugs" he describes were added to our list of modifications and bugs that have either already been fixed, or will be fixed in the coming months (see below).

Tutorial 3 encompassed data fusion and GPR data processing. Given the lack of experience of most user's in the group with both of these, and the fact that the GPR wizard was the newest addition to ArchaeoMapper (and therefore the least thoroughly tested and "de-bugged"), these were demonstrated to the users. Overall the users were impressed with both of these components and approved of the development team's plans for finalizing the GPR processing component. Unfortunately none of the user's took the time to rate this tutorial as they did with the previous tutorials. Comments made during the groups discussion following the demonstration were recorded, however. The only noteworthy concern voiced by the beta testers concerned the development team's plan to not incorporate a fully interactive 3-D component for GPR data visualization. While 3D visualization is impressive to onlookers and clients, the development team considers this a low priority compared to all the other functionality that has been incorporated in ArchaeoMapper. In reality, 3D cubes of GPR data often have little or no benefit to reliable GPR processing and interpretation. Nonetheless, it could add commercial appeal to the software and might be added to ArchaeoMapper in the future. In the mean time, the software does save the GPR data in a 3D cube format that can be displayed in other software and even in freeware that can be downloaded from the internet.

At the end of the beta test, users were given a final multiple choice questionnaire designed to elicit their overall assessment of the current state of archaeological geophysics in North America, and ArchaeoMapper. All users agreed that geophysical investigations as part of archaeological studies are currently inadequate (question 1), but that when used, geophysical investigations usually improve the quality of archaeological results (question 3). In addition, all but one test participant (Schneider), agreed that appropriate levels of geophysical investigations as part of archaeological studies usually reduce costs and save time (question 2). Schneider believes that geophysical investigations usually add costs and time, and added the following comment after his answer to question 2: "because their use has not been incorporated into proper design planning". Finally, three of the four users agreed that in the next ten years, geophysical investigations in the US will come to be a recommended but not required part of most archaeological studies by SHPOs and other review groups. The fourth user, Schneider, believes that geophysical investigations in the US will come to be a required part of most archaeological studies by SHPOs and other review groups. Overall, these answers agree with the basic premise of this ESTCP

project: that archaeological geophysics, when used appropriately, can improve the quality of results, reduce costs and save time, but currently they are underused and inadequate. In addition, the use of geophysics in archaeology is growing and will come to be recommended if not required by SHPOs and other review groups.

One goal of this ESTCP project is to assemble a single, user-friendly software that will serve as an effective medium for infusing the integrated, multisensor geophysical approach into wide use. Questions 5-20 of the final questionnaire were designed to assess the users' perception of ArchaeoMapper's potential to meet this goal. Users were asked to assess the software for three types of user: a beginner, an intermediate, and an expert user. Most or all users agreed that the software is very effective for beginners because: (1) it provides a geophysics "road map" for the new user (question 5), (2) the interface is easy to use (question 6), (3) there is valuable flexibility in the user interface and the structured analysis approach (question 7), and (4) it is easy to learn and easy to use (compared to other software), and will likely increase the use of geophysics in archaeology (question 8). From the perspective of a novice user, the users agreed or strongly agreed that ArchaeoMapper (1) combines ease-of-use with valuable flexibility for archaeological applications (question 9), (2) provides most of the tools needed to process geophysical data (question 10), (3) will reduce the time needed to process geophysical data (question 11), and (4) will enable users to obtain more effective results than previously possible, therefore reducing overall costs and time (question 13). All but one user agreed that the availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations (question 14), while one user was neutral. Finally, half of the users agreed that that the software will reduce costs associated with using geophysics for archaeological investigations (question 12), while the other two users were neutral to that notion. Finally, for expert users, most or all users agreed that ArchaeoMapper (1) combines ease of use with flexibility for archaeological applications (question 15), (2) provides most of the tools needed for archaeological applications (question 16), (3) will reduce time and costs needed to process data (questions 17-18), (4) will enable users to obtain more effective results than they have before (question 20). For question 19, one user agreed that the availability of ArchaeoMapper will increase the use of geophysics in archaeology, while two remained neutral and one (Rush) did not answer questions 15-20 because she did not feel qualified to evaluate the software from the perspective of an expert user. In all cases, users that did not agree or strongly agree were neutral, while no users disagreed or strongly disagreed with any of the statements in the questionnaire (see Appendix C). The overall assessment from questions 5-20 of the final questionnaire shows that users believe ArchaeoMapper has the potential to meet the goal of serving as an effective medium for infusing the integrated, multisensor geophysical approach into wide use.

In general, the beta test team took the test seriously and much was gained by the user group comments and interaction in the computer lab. The feedback was very positive and we have a comprehensive list of improvements to make. The testers clearly recognized and appreciated ArchaeoMapper's most unique capabilities: 1) The operation stack approach allows more effective use of iterative processing (an approach used by most archaeo-geophysical practitioners) than any other software. 2) ArchaeoMapper offers a capability for data fusion that is unique among softwares used by archaeologists. 3) ArchaeoMapper has many of the basic capabilities of a GIS: surveys can be referenced to real world datums, multiple data sets can be overlaid throughout the processing sequence, rendered partially transparent, and colorized. These GIS-like characteristics are a major advance in capabilities for practitioners who do not or cannot currently use an independent GIS. Finally, it is clear from the answers to the final questionnaire that ArchaeoMapper has the potential to meet a major goal of this project: the

assembly of a single, user-friendly software that will serve as an effective medium for infusing the integrated, multisensor geophysical approach into wide use.

Based on these test findings, ArchaeoMapper clearly "passed" the beta test. The testing team was impressed, enthusiastic, and offered many suggestions for improvements, many of which have already been implemented. ArchaeoMapper is clearly ready for the rigorous field evaluation scheduled for early 2009.

Appendix A. Tutorial Comment Sheets by User

Rating Summaries and Selected Comments

In general, all the participants were pleased with the usability, functionality and effectiveness of ArchaeoMapper. Numerical ratings are summarized for each tutorial in the tables below and, while all of the participants' comments are provided in Appendix B, selected excerpts are provided in the section.

Tutorial 1: Basics

Tutorial 1 was broken into two parts for scoring purposes. The first part of the tutorial included parts I-V. The second parts VI-III. The scores for both parts of the tutorial are summarized in the table below and separated by slashes. NR indicates that no rating provided by that user.

	Rush	Hall	DeVore	Schneider	McKinnon	Kalacyi	Sullivan	Simon
Ease of Use	4/NR	4/4	NR/NR	4/4	4/NR	4/NR		4/5
Accuracy	4/NR	5/5	NR/NR	4/4	4/NR	4/NR		5/5
Effectiveness	4/NR	4/5	NR/NR	4/4	4/NR	4/NR		5/4

Table 1a. Numerical Ratings, Tutorial 1.

Scot Hall	"Most of the specific comments were addressed by the people coordinating the beta test. I do like some of the features from the survey editor such as the brightness and contrast bars better than I do those same features in the actual archaeomapper interface. There are at least a couple of tools that seem like they would be very useful in the archeomapper data processing interface. Specifically the grid drawing tool, and the ability to alter the size of the grid. A measuring tool might also be nice to determine intra- and inter-feature dimensions. Also having the gridding and measuring functions could facilitate producing plans for ground truthing or feature testing. As a final thought the software seems very user friendly. After today I feel capable of navigating the functions we beta tested. Kudos to the designers and programmers!!!!"
Laurie Rush	"I was able to navigate through the tool bars and for the most part able to make the software do what I wanted it to do. I also am not very good at new software, so if I am able to navigate, it must be pretty easy to use."
Kent Schneider	"Got comfortable with this phase of software fairly quickly." "functions well with good results" "makes easier to use multiple datasets"

Table 1b. Comments, Tutorial 1.

Tutorial 2: Updating surveys with new data, and loading EM (magnetic susceptibility and conductivity) and 2D GPR slices into ArchaeoMapper.

Tutorial 2 was broken into three parts for scoring purposes. The first part of the tutorial included Parts I-III, the second Parts IV-V an d the third Parts VI-VIII.

	Rush	Hall	DeVore	Schneider	McKinnon	Kalacyi	Sullivan	Simon
Ease of Use	4/3/4	4/NR/NR	4/4/4	3/2/2	4/NR/NR	NR	NR	NR
Accuracy	4/4/4	5/NR/NR	4/3/4	3/2/2	4/NR/NR	NR	NR	NR
Effectiveness	4/4/4	5/NR/NR	4/3/4	3/2/2	5/NR/NR	NR	NR	NR

Table 2a. Numerical Ratings, Tutorial 2.

Steve Devore	"After working with the software yesterday, it was much easier to use it today."
Laurie Rush	I was able to navigate through the tool bars and for the most part able to make the software do what I wanted it to do. I also am not very good at new software, so if I am able to navigate, it must be pretty easy to use.

Table 2b. Comments, Tutorial 2.

Tutorial 3: GPR Processing and data fusion.

Tutorial 3 (which does not have written instructions) was guided by Dr. Ernenwein from the instructor's podium and covered data fusion and GPR processing and slicing.

	Rush	Hall	DeVore	Schneider	McKinnon	Kalacyi	Sullivan	Simon
Ease of Use	NR	3	NR	NR	NR	NR	NR	NR
Accuracy	NR	5	NR	NR	NR	NR	NR	NR
Effectiveness	NR	5	NR	NR	NR	NR	NR	NR

Table 3a. Numerical Ratings, Tutorial 3.

Tutorial 3 was a demonstration of data fusion techniques and the ArchaeoMapper approach to GPR processing. Although the participants had tasks to complete, they were guided by Dr. Ernenwein and the development team via the instructor's podium and overhead projector. This, and the fact that the tutorial took place at end of Day 3 (the beta test's final day), account for the lack of user ratings for this tutorial. However, the Overall Assessment does provide some commentary on this functionality and participant comments are addressed in the ArchaeoMapper modification list below.

Overall Assessments Results

Results from the Overall Assessment are summarized below. Scanned versions of the questionnaires, including general comments are attached in Appendix C.

We are very interested in your assessment of the current status of the ArchaeoMapper software and its potential to improve the use of geophysics in archaeology, specifically archeological investigations at DoD facilities but also more broadly applied. We have previously asked for your comments on each part of the software and ways to improve it. Now we want your overall assessments.

Note: In the following we are using the term "archaeological studies" to apply typically to **evaluation and mitigation level efforts** and in those conditions where geophysics is a feasible method.

Summarized answers include the four (4) Army Test Group participants.

We would like to get your assessment of some general issues first.

1) Geophysical investigations as part of archaeological studies …
   a) are currently adequate
   b) are currently excessive
   c) are currently inadequate (4)

2) Appropriate levels of geophysical investigations as part of archaeological studies …
   a) Usually reduce costs and save time (3)
   b) Usually add costs and time (1)
   c) Will not change the current total costs or time

3) Without considering cost or time, geophysical investigations, when made part of archaeological studies …
   a) Commonly improve the quality of the archaeological results (4)
   b) Commonly do not improve the quality of the archaeological results
   c) Commonly have little effect on the quality of the archaeological results

4) In the next 10 years …
   a) Geophysical investigations in the US will come to be a required part of most archaeological studies - as they are now in England – by SHPOs and other review groups (1)
   b) Most archaeological studies in the US will not involve geophysics even when conditions are appropriate for their application
   c) Geophysical investigations in the US will come to be a recommended but not required part of most archaeological studies by SHPOs and other review groups (3)

This ESTCP project has two objectives:

1) Assemble a single, user-friendly software that will serve as an effective medium for infusing the integrated, multi-sensor geophysical approach into wide use.
2) Demonstrate and validate the cost and performance benefits of the approach and technology infusion tool to DoD geophysical users, representatives of federal, state, and other CRM practitioners, federal and state resource managers.

In the following we are interested in your assessment of ArchaeoMapper's ***potential*** to meet objective 1 in the ESTCP proposal. In these questions we want your assessment of ArchaeoMapper for …

(i) a person new to the use of geophysics in archaeology

(ii) a user that is generally knowledgeable about geophysics but is not an "expert" and

(iii) an expert user with lots of experience in archaeological geophysics.

Note: If you feel you are unable to answer from one or more of these perspectives just leave the question(s) blank.

From the perspective of a **newbie** please agree or disagree with the following:

5) The ArchaeoMapper interface provides a good geophysics "road map" for the new archaeological user
   a) Strongly agree (2)
   b) Agree
   c) Neutral (1)
   d) Disagree
   e) Strongly disagree

6) The ArchaeoMapper interface is easy-to-use for a new user
   a) Strongly agree (1)
   b) Agree (3)
   c) Neutral
   d) Disagree
   e) Strongly disagree

7) There is valuable flexibility in the user interface and the structured analysis approach for the new user
   a) Strongly agree (1)
   b) Agree (3)
   c) Neutral
   d) Disagree
   e) Strongly disagree

8) Because ArchaeoMapper is easy-to-learn and easy-to-use (as compared to others) we will likely see an increase in the use of geophysics in archaeological investigations
   a) Strongly agree
   b) Agree (3)
   c) Neutral (1)
   d) Disagree
   e) Strongly disagree

From the perspective of a **knowledgeable** user:

9) ArchaeoMapper combines ease-of-use with valuable flexibility for my applications
   a) Strongly agree (4)
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

10) ArchaeoMapper provides me with most of the tools I expect to use in my geophysical applications
   a) Strongly agree (3)
   b) Agree (1)
   c) Neutral
   d) Disagree
   e) Strongly disagree

11) ArchaeoMapper will reduce the **time** I need to process my data
   a) Strongly agree (2)
   b) Agree (2)
   c) Neutral
   d) Disagree
   e) Strongly disagree

12) ArchaeoMapper will reduce the **cost** to process my data
   a) Strongly agree (1)
   b) Agree (2)
   c) Neutral (1)
   d) Disagree
   e) Strongly disagree

13) By combining the ability to ingest raw data from many different instruments, process it and fuse the results I will be able to obtain more effective results than I have before reducing overall project costs and or time
   a) Strongly agree
   b) Agree (3)
   c) Neutral (1)
   d) Disagree
   e) Strongly disagree

14) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations
   a) Strongly agree (4)
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

From the perspective of an **expert** user

15) ArchaeoMapper combines ease-of-use with flexibility for my applications
   a) Strongly agree (1)
   b) Agree (1)
   c) Neutral (1)
   d) Disagree
   e) Strongly disagree

16) ArchaeoMapper provides me with most of the tools I expect to use in my geophysical applications
   a) Strongly agree (1)
   b) Agree (2)
   c) Neutral
   d) Disagree
   e) Strongly disagree

17) ArchaeoMapper will reduce the **time** I need to process my data
   a) Strongly agree
   b) Agree (2)
   c) Neutral (1)

d) Disagree
e) Strongly disagree

18) ArchaeoMapper will reduce the **costs** I incur to process my data
a) Strongly agree
b) Agree (2)
c) Neutral (1)
d) Disagree
e) Strongly disagree

19) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations
a) Strongly agree
b) Agree (1)
c) Neutral (2)
d) Disagree
e) Strongly disagree

20) By combining the ability to ingest raw data from many different instruments, process it and fuse the results I will be able to obtain more effective results than I have before
a) Strongly agree (2)
b) Agree (1)
c) Neutral
d) Disagree
e) Strongly disagree

General Comments

See Appendix B.

Software Modifications

Immediately after the beta test (Nov 7, 2008) and again approximately two weeks after the test (Nov 20, 2008) the ArchaeoMapper software development team met to review and discuss the participants' comments from Tutorials 1-3 and the Overall Assessment Questionnaire. The results of these two formal review periods and other informal discussions is the following categorized and prioritized list of modifications to ArchaeoMapper to be made as soon as possible and before submission of the Field Demonstration Plan. Items in red indicate "bugs", items in black are considered improvements and feature additions. Items in blue have been addressed since the beta test. Many of the modifications listed below may be unclear to someone unfamiliar with the ArchaeoMapper software. However, all of them have been reviewed by the development team.

ArchaeoMapper Data Viewer and Processing Interface

1. Retain and operate on original data values in all surveys. Provide tools to adjust mapping of those values to 0-1 for display (std, contrast, etc). Also provide a button to enable dynamic range adjustment so that after an operation is run, a preset mapping is applied to the display (e.g. 2 std and gamma 1). This would almost eliminate the need for the stretch operation (although it should be retained).
2. Gray out “Edit Survey” or “Add Survey” until a project is created.
3. Templates are saved in C:\Program Files\ArchaeoMapper but non-administrator accounts can't write to that folder. Make write privileges part of install.
4. Remove 1 x 1 options in filter size or modify Matlab function that gets passed a 1x1 filter.
5. Specify window size in meters and build filter based on sample rates from each individual tiles.
6. When a project is saved, need "some clear indication that it was actually saved."
7. In Save Project dialogue, "location" is misspelled (missing the "i")
8. On initial import, layer is checked, but not visible. Un-checking and re-checking shows layer.
9. When layer order is changed, the display is not refreshed.
10. Use a file as en entry point to a project instead of a folder. Enable double-click on the project file to open the project in AM.
11. Range Match: add a new interface to choose which tile to match too. Perhaps the N, S, E, W arrow layout. Do not allow “All” selection. Allow area selections and match against adjacent samples in the same tile.
12. Enable meta-data display for surveys. Right-click maybe. Should at least show sample rates and traverse pattern/direction.
13. Operations should close automatically after run.
14. When an existing project is loaded, the entire operation stack should not have to be re-run from the beginning.
15. When parameters of operations change, the user should be notified that the stack is not current. That is, what they see on the display does not represent the current stack. Perhaps a red light - green light near the Run Operation Stack button as an indicator. Also, perhaps changing the color of the operation button (soft yellow) to show that it has changed.
16. Clicking the "I" button of an inactive operation shows the result stored on disk. This is not intuitive since the user thinks that process is inactive. The "I" and "H" buttons should be grayed-out if the operation is inactive. There seem to several issues related to the operation stack in which the order of saved operations is confused.
17. If an operation is unchecked, gray it out to make it more obvious to the user that it has been skipped over when the operation stack was last run.
18. Remove the need for a No-Op.
19. Toggle button to show grid lines with a specified spacing.
20. Toggle button to show tile boundaries
21. Histogram windows are often hidden behind each other and behind the main AM window.
22. Move display controls to Split Pane on the right. Move histogram to this pane.

23. Add ability to change color of shards.
24. Load GeoTiff, DEM (one format only).
25. Zoom to Survey needs to adjust eye point and reorient to North is Up. Center of screen needs to be centroid of survey, not origin.
26. Right hand screen Smooth button shows tile boundaries.
27. Colormaps do not have enough entries, need 256x3 colormap.
28. Add more colormaps. Particularly have one that is reverse grayscale, but with all values beyond min/max displayed as blue/red.
29. Allow colormaps to be reversed
30. New surveys should be added to an existing shard if possible. Even number of active shards do not allow for highlighting.
31. Band calculator: add Boolean logic, power, square, max and min functions to calculator. Min and max will take the max data value of multiple bands in a given location. Syntax might be max(B1,B2,B3) or min(B1,B5).
32. Band calculator: A false expression such as "6B195" returns a result.
33. Adjust exaggeration of height map.
34. When a recently fused survey is opened in the Survey Editor, it displays with no data values (gray, black, maybe). The originating survey is unaffected. This is due to the lack of a mapping from data values to 0-1.
35. 1D Fourier and 2D Fourier can easily cause catastrophic crash of AM. Need to make the viewer inactive while user is working in the filter window, and make sure the filter window is closed to bring user back to viewer (?)
36. Rename Fuse Surveys Tool -> doesn't make sense when breaking apart surveys.
37. Add options to Fuse Survey Tool such as an option to retain tile information or merge into a single "image". Perhaps a resample option.
38. Rename Band_0, Band_1, etc somehow? based on the measurement type from the file header. If a name doesn't exist, then use B1, B2, etc to be consistent with the Band Calculator. Layer/survey entries should be show band labels (B1, B2, etc).
39. It is hard to tell if Band buttons (B1, B2, etc) are depressed or not.
40. Export survey to SURFER grid format.
41. Digitize points (lat/lon) in survey for export to text file and possibly as GPS waypoint file. This is also a way to output locations of anomalies for planning excavations.
42. Export to KML for quick sharing and review.
43. Layout view with ability to add north arrow and scale bar.
44. Compile all Matlab functions as a Java Package (need Java Builder for Matlab).
45. Organize toolbar. Add tool-tips with full operation name and short description
46. GPS import. How to do this? via interpolation?
47. Measuring tool
48. Difference button - make it so that it shows the difference between two places in the operation stack that the user selects. Or at least make it so it shows the difference for the last operation done, not the last in the stack.
49. Difference button - Make it so that it does not dissappear when mouse is not close, and so you can tell that it is on or off.
50. Add buttons to toolbar for creating a new survey or editing a survey.
51. Allow selection of multiple contiguous tiles using a box rather than clicking each one individually.

52. Add labels to the values displayed for pixels when you click in the viewer.
53. Allow user to add a previously created survey to the current project.
54. Toggle button to show tile labels in the viewer and survey tool.
55. Add a log file to show everything the user has done.

Survey Tool/Tile Editor

1. Need to add "feet" vs. "meter" choice to Survey Tool.
2. Add “Auto Assemble” tiles if X, Y values represent survey coordinates.
3. Change initial snap size to 2m in Survey Editor.
4. When snap size is changed, the blue grid does not change. The show grid button must be un-clicked and clicked.
5. Add ability to select/shift/move multiple tiles in Survey Tool.
6. In Survey Editor, may the origin more obvious. Brighten yellow lines, add text, datum mark, etc.
7. Survey tool crashes on Tile Rotate.
8. Tile Editor Undo causes catastrophic crash of AM.
9. Survey Editor navigation control should be similar to Survey Viewer.
10. Some data sets (EM, maybe others) come in to viewer reversed (min data value is mapped to 0, not 1).
11. Add ability to toggle tile name display in the Survey Editor and the Survey Viewer.
12. Standardize slice names to reflect depth range.
13. In the tile editor tool, lines shifted to the left loose forever values shifted off the tile. This can't be repaired with subsequent shifts to the right.
14. GPR Slicing: Down-sample when creating slices and give participants options for how to do this: nearest neighbor, averaging, etc. A good default would be 8 pixels per meter in the traverse direction, using pixel aggregation or averaging (to avoid smoothing).
15. Tile Editor "reset" button. Add text to tell the user that this will put the origin in the lower-left corner.
16. Tile Editor: Need a clearer indication that the tile is selected when you are going to alter the size, etc. Currently a blue box is drawn, but then it disappears when you move your mouse to the "Alter tile" button.
17. Tile Editor: Rather than "none" button, use a black arrow or something more intuitive.
18. Tile Editor: When you open the survey tool to create a new survey, it should open with the default values, not the previous settings - especially the survey name.
19. Load Tile dialogue box: once you select a template - you cannot unselect it (?)
20. Icons for rotating and flipping (mirroring) tiles are not clear. Add pop-up text?
21. Survey Tool:There needs to be some indication that a tile has been rotated or flipped.
22. Adding tiles: “When you first enter the add tiles window it prompts you to enter the parameters and hit ‘next’ on a couple of screens. After the second next it prompts you to save your template. As soon as you hit save it opens a windows-based explorer pop-up. The system expects you to select tiles to use to populate your template, but in the sequence of events that leads to this window it seems like you should be searching for somewhere to save your template. I found this confusing. It seems that there ought to be some sort of prompt to search for raw data prior to the windows explorer pop-up.”

23. Survey Tool: For changing the tile size in the survey tool: In tutorial #2 the GPR surfer grids were slightly smaller than they were supposed to be, so we had to resize. The size as listed in those boxes had several decimal places, and the number were displayed so that you could not see the number from the left (you could only see the last few digits on the right). So you have to put your cursor in each box and use the back arrow key to see the original number. So these numbers need to load so they are left-justified, and probably with fewer decimal places.

GPR Wizard

1. GPR should be able to handle perpendicular tiles, but not in tiles.
2. Should we try to handle GPR obstacles?
3. Incorporate topographic correction.
4. GPR Wizard: out of memory problem (will be solved with Java/Matlab interaction change).
5. GPR Wizard: window too large if profiles are long (will add scroll bar to window)
6. GPR Wizard: ways to rearrange profiles other than little arrows
7. GPR Wizard: show individual traces rather than mean trace when gaining
8. GPR Wizard: Annotate velocity curve points with depth, time, velocity, and relative dielectric permittivity.
9. GPR Wizard: slice thickness slider bars should have a scale in ns and meters, not just samples 0-511.
10. GPR Wizard: Vertical filter
11. GPR Wizard: Gaining step(s) could be eliminated until the last step if display gains are added so the use can adjust gains as needed while going through each step.
12. GPR Wizard: for distance normalization between marks, allow user to input number of traces per meter. Use pixel aggregation (averaging) rather than pixel thinning (resampling) if possible.
13. GPR Wizard: export 3D cube in generic formats for bringing into other programs.
14. GPR Wizard: Time zero correction should optionally operate on each trace, or the average trace per profile.

Appendix B. Tutorial Description Sheets

This appendix presents the three tutorials included in the Beta Test.

ArchaeoMapper Beta Test Tutorial #1: Basics

Test Data: Magnetometry, Resistivity and GPR time slices (in Surfer grid format) from Silver Bluff Plantation, SC

Getting Started

1. Open a web browser, go to google.com, and log in to the beta test account (login: archaeobeta; password: betabeta)
2. go to **My Account**, then docs and open Eval1_Name, where Name is your last name
3. Move the window over to one side of your second monitor
4. launch ArchaeoMapper by double-clicking the icon. You will see the main viewing window. The **Figure 1** window is for debugging purposes only. Please slide this over to your second monitor so it is out of your way. Do not close it - this will close the software.

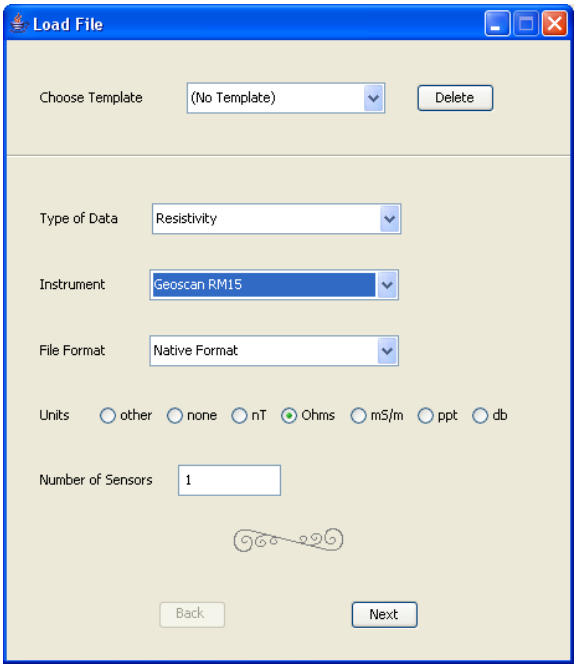
I. Creating a New Project. You can think of a project as a collection of files related to one site. For example, suppose you collected magnetometry and GPR data at Cahokia, you might name the Project "Cahokia" or "CahokiaProject". You would import the magnetometry and GPR data you collected there and add them to the project. Later as you add more data you can add it to the same project. It doesn't matter if the different datasets were collected in different locations at the site, or at different sampling densities. They will be treated as separate surveys or "layers" in the project.

1. Choose File → New Project
2. Name the Project.
3. Click **Browse** and select the **MyProjects** directory on the desktop. Click **Select**. For the tutorial you will store projects you create inside the MyProjects folder/directory.
4. Click **Finish**

II. Loading Geoscan Resistivity Data

Load Resistivity Data and assemble into a Survey

1. Select **File → New Survey**
2. Select **File → Add Tiles**
3. Fill in fields for Resistivity Data collected with a **Geoscan RM15 instrument**.



4. Choose **Native Format**.
5. The units and number of sensors are automatically selected based on the chosen sensor
6. Click **Next**
7. Since all the information is contained in the Geoscan grid file, nothing needs to be entered in the second window. If desired, however, you could change the "No Data" (dummy) value.
8. Click **Next**
9. Go ahead and save the input as a template when prompted. Name it "**SB_RES**." The template allows you to recall the same settings if adding more resistivity data at another time that collected in the same way.
10. You are prompted to locate the data files. They are located in the **Data** Folder on the desktop under **SilverBluff/Res_GeoscanRM15**. Select all files (**CTRL+a**) and then click **Open**. All tiles are loaded in the left panel.

III. Using the Survey Tool

1. Select a tile from the left panel and drag it over into the main window. Now do the same for two more tiles.
2. Select one of the tiles and remove it from the view by selecting **Edit-->Delete Tile in Survey**. That tile is still listed at left, but is removed from the main window.
3. Top panel:
   a) **Pan and Zoom Tools**: Try out the pan and zoom tools located at the top of the window.
   b) When you are done click **None** so you can resume other tasks.
   c) You can click **Reset** to return to the original zoom level with the origin in the lower-left corner.
4. Right panel:
   a) **Snap Size**: You can change the snap size by entering any number in the box, and turn the grid lines on and off with the button to the right.
   b) **Nudge Tile**. Use the arrows in this box to move the tiles according to the snap size
   c) **Rotate or flip tiles**. These tools allow you to rotate or flip tiles in case they are oriented

incorrectly.

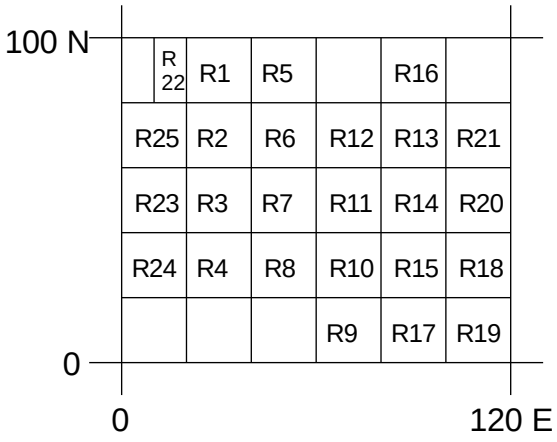
d) **Tile Size**: the tile size is given here. If you want to change it, alter the number and click the **alter tile** button at bottom of panel. The tile will not be cropped (you can do that elsewhere). It will just be compressed or stretch to match the dimensions that it should be.

e) **Bounding Box**: You can use this to place your tile in precisely the right location. If you want to be very precise make sure to change the snap size to match. The four boxes are the locations of the edges of the tile on the left, right, top, and bottom.

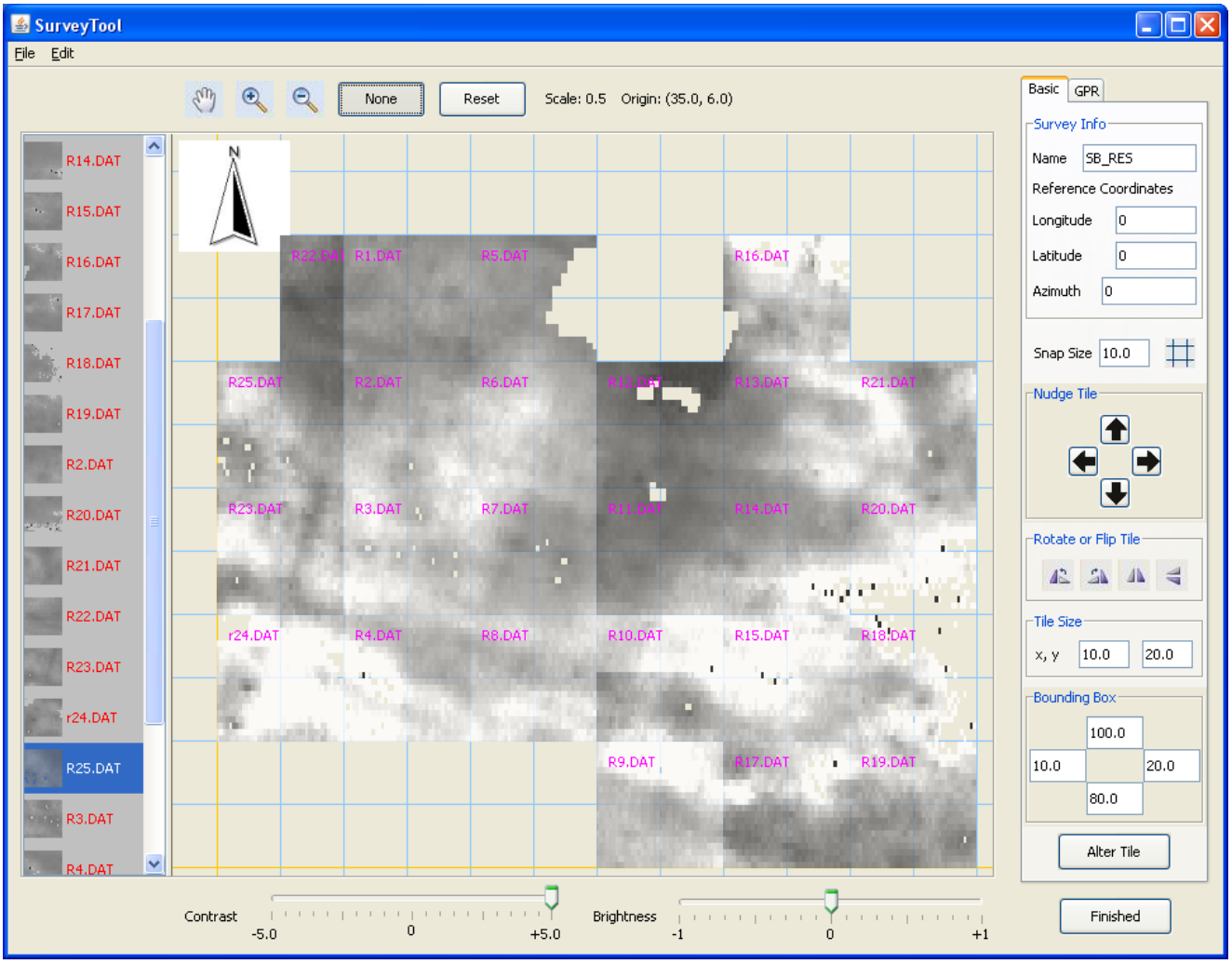
5. Bottom Panel:
   a) **Contrast & Brightness**: Use the slider bar to adjust the contrast of the selected tile. If you slide to the left of 0 the grayscale is inverted. Also test the brightness by moving the slider bar.
   b) In case the tiles were distorted in any way, remove them from the survey. Select the tile (click **none** at the top if you were using the pan or zoom tools), then click **Edit → Delete Tile in Survey**. When you add them again from the left panel they will be unmodified.
6. If you accidentally deleted a tile from the list, you can add it again by starting at step #1, but you can recall the saved template (SB_RES) in the first step to save time.

IV. Assembling the Resistivity Survey

1. Use the tile matrix below to assemble the tiles into a survey by dragging them from the left panel into the main window.



2. None of these tiles need to be edited in any way. To get tile **r22** to snap in place properly you will have to **change the snap size to 10**.
3. **Name the survey**: In the upper-right corner in the **Name** box enter the name **SB_RES**.
4. **Georeference the Survey**: In the boxes entitled **Reference Coordinates** you can enter plane coordinates or latitude and longitude. This gives the coordinates for the **yellow intersecting lines** (the origin) in the lower-left.
5. For this survey we will **enter plane coordinates of 0,0 and azimuth = 0**. If we had GPS coordinates and an azimuth this would place the survey in real coordinate space. The next version of ArchaeoMapper will include the ability to import Geotiff images for background layers, such as aerial photos, satellite images, etc.
6. Your survey should look something like the graphic below. Click **Finished** when you are done. This should close the Survey Tool window and bring you back to the main viewer window, where the survey you just created (SB_RES) has been added to the project.



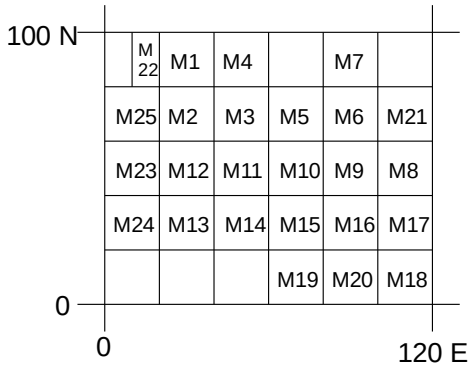
7. Click File--> Save Project.
8. If anything has gone wrong up to this point and you've lost your work, you can open the project *SilverBluffProj1*, which has been created for you ahead of time. Go to File-->Open Project. Browse to the desktop, then double click to open the Tutorial Projects folder. *Important*: now click ONCE on SilverbluffProj1 to select it (not open the folder), then click Select. this opens the project named "SilverBluffProj1".

V. Loading and Assembling the Magnetometry Survey

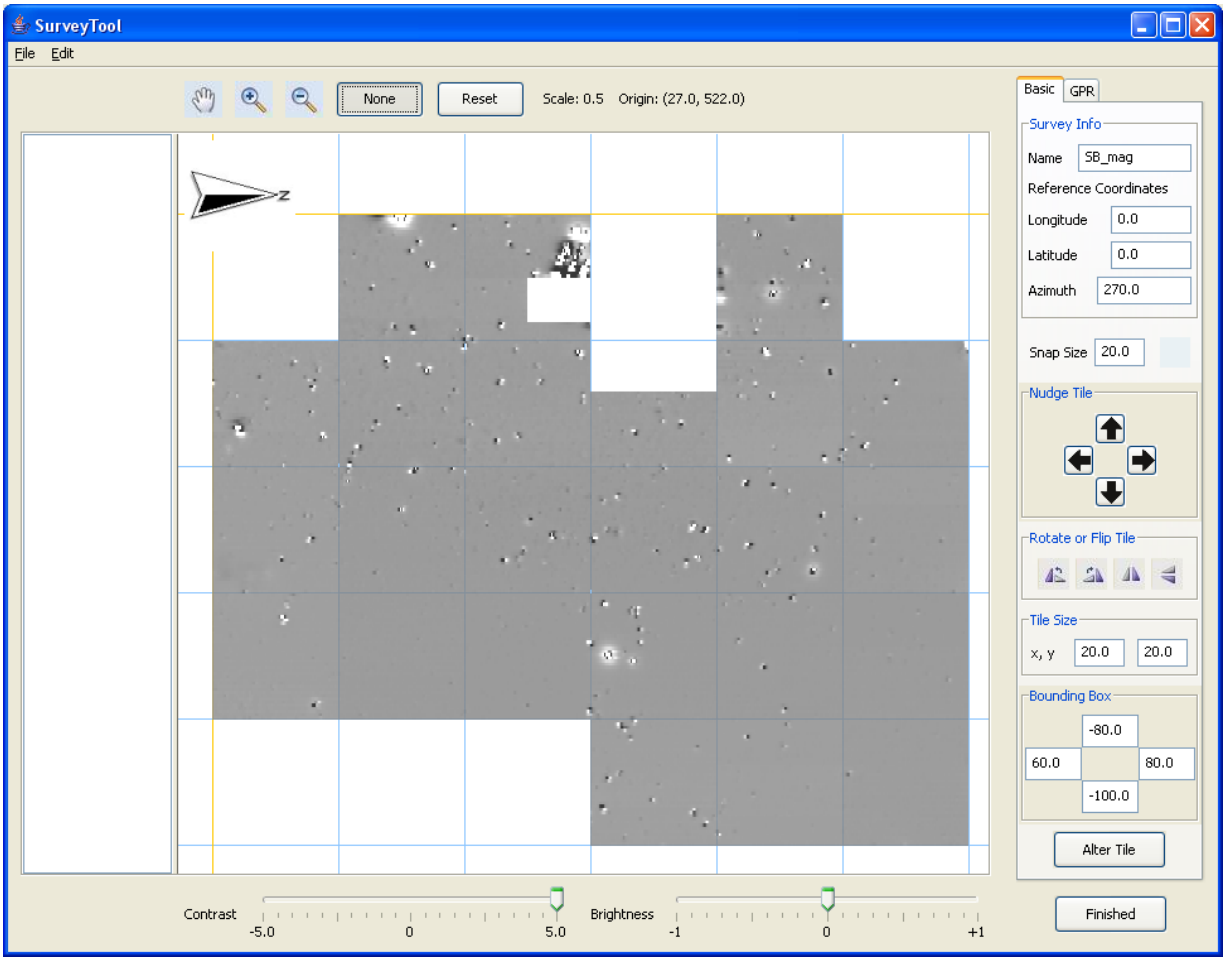
1. Select **File → New Survey**
2. Select **File → Add Tiles**
3. Fill in fields for Magnetometry Data collected with a **Geoscan FM36 instrument**.
4. Choose **Native Format**.
5. The units and number of sensors are automatically selected based on the chosen sensor
6. Click **Next**
7. Since all the information is contained in the Geoscan grid file, nothing needs to be entered in the second window. If desired, however, you could change the “No Data” (dummy) value.
8. Click **Next**
9. Go ahead and save the input as a template when prompted. Name it "**SB_MAG**." This allows you

to recall the same settings if adding more magnetometry data at another time that collected in the same way.

10. You are prompted to locate the data files. They are located in the "Data" Folder on the desktop under **SilverBluff/Mag_GeoscanFM36**. Select all files (**CTRL+a**) and then click **Open**. All tiles are loaded in the left panel.
11. Use the tile matrix below to assemble the tiles into a survey by dragging them from the left panel into the main window.



12. None of these tiles need to be edited in any way. To get tile **M22** to snap in place properly you will have to **change the snap size to 10**.
13. **Name the survey**: In the upper-right corner in the **Name** box enter the name **SB_MAG**.
14. **Georeference the Survey**: In the boxes entitled **Reference Coordinates** you can enter plane coordinates or latitude and longitude. This gives the coordinates for the **yellow intersecting lines** (the origin) in the lower-left.
15. For this survey we will **enter plane coordinates of 0,0 and azimuth = 0**.
16. Your survey should look something like the graphic below.

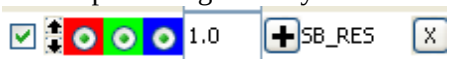


17. Click **Finished** when you are done. This takes you back to the viewer and you see the new survey called SB_MAG added to the project.
18. Click File-->Save Project.
19. If anything has gone wrong up to this point and you've lost your work, you can open the project *SilverBluffProj2*, which has been created for you ahead of time. Go to File-->Open Project. Browse to the desktop, then double click to open the Tutorial Projects folder. *Important*: now click ONCE on SilverbluffProj1 to select it (not open the folder), then click Select. this opens the project named "SilverBluffProj1".
20. ***At this point you have learned the basic method of importing data into ArchaeoMapper. There are other aspects of this process that you will learn and evaluate later (including bringing in EM and GPR data, which includes some preprocessing), but you have seen the basic design. Please go to the Comment Form (in Google documents) and type in your ratings and remarks in <u>Comment Section 1</u>. Please give plenty of feedback. Your comments will be invaluable as we continue to develop and improve ArchaeoMapper! When you are finished continue to the next part below.***

VI. Using the Viewer

1. You should now have two surveys added to your project (SB_RES & SB_MAG). You may have to uncheck and recheck the surveys to make sure it displays. *If there has been any problem up until now and you have lost your data, you can load the project **SilverBluffProj2** from the **TutorialProjects** directory on the desktop.* (follow steps given in previous step #19 above).

2. If you have made a mistake in assembling a survey, you can go back to the Survey Tool. Highlight the survey you want to change, then click **Edit → Survey** and wait for the survey tool to appear. Make any necessary changes and click **Finished**.
3. Save your Project: Click **File → Save Project**
4. **Pan & Zoom**: Click in the display to activate the pan tools. Hold down the **right mouse button** to change the viewing angle. Use the **mouse wheel** to zoom in and out. Click and drag the **center mouse button** (or wheel) to move and re-center the survey.
5. **Right panel:** This panel only appears when your mouse is over on the right edge of the viewer window. Anything you do with the tools on this panel change only the *display* of the data (only what you see), but are not actually modifying the data in any way.
   a) **Changing the color palette**. Move your mouse over to the right hand area of the viewer and a panel appears. In the **upper corner** you can choose different color palettes to apply to the survey.
   b) The slider bars along the right panel are meant to adjust **contrast and brightness**, and clicking on the center button returns these to their original levels. However, these are not working properly at the moment, and will be fixed before the next version.
   c) **Smooth**: The **smooth** button in the lower right smoothes the data you are viewing, but does not modify the data in any way. At this time it also shows the tile boundaries, but this may be changed in the next version so no boundaries are seen. It does not draw tile boundaries, but you can see the edges because you can see through to the pink background color.
6. **Left panel**
   a) **Surfaces**: Surfaces are listed at the top of the left panel. For now we are using flat planar surfaces in plane coordinates, but future versions of ArchaeoMapper will allow you to import DEM surfaces on which to display your data in 3D. At this time, however, you *can* convert your surveys into height maps, and then display other data layers on top so you can see the geophysical data in 3D. We'll look at this in Tutorial #2.
   b) For demonstration purposes, from the **File** menu select **Load Ellipsoid Shards.**
   c) Highlight one of the surveys (SB_RES or SB_MAG) and make sure it is displayed. Click in the display to activate the zoom tools, and zoom out using your mouse wheel. As you continue to zoom out you will see the surface of the earth model take shape, and eventually you can see the globe. Now you can use the right mouse button to change the viewing angle. If you were using real world coordinates your survey would be correctly positioned on the globe, and you could add other geographic data such as satellite images and DEMs. For now it is positioned at 0 latitude and longitude.
   d) to get back to viewing your survey, **right-click** on the name in the left pane and select **Go To Survey**. This centers your survey in the window, and you can use the mouse wheel to zoom back in.
   e) **Surveys**: Surveys (composites of multiple tiles of geophysical data), are listed in the center of the left panel. Right now you should have one survey (**SB_RES**).

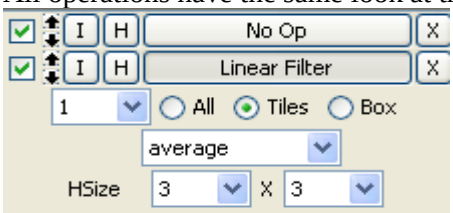


      1. The checkbox turns the survey on and off from the display.
      2. the up/down arrows allow you to move the survey up or down relative to other surveys in the list.
      3. the red, green, blue radio buttons are meant mostly for multiple bands (more about this later), but for now you can use these to display the survey as red, green, blue, or combinations of these.
      4. the white box allows you to change the translucency of a survey. 1 = opaque, 0 = transparent.
      5. the **+** sign can be toggled to **-**, making it translucent so you can see through to the next survey behind it.

6. Clicking the X will remove the survey.

VII. Using Operations and creating an Operation Stack

1. The lower-left panel will list the **operations** (such as despike, smooth, etc.). You add an operation by clicking on one of the buttons along the top of the window, or using the Operations menu. The system is designed so that you can add operations and modify their settings at any time to recalculate your results.
2. Click to highlight the **SB_RES** survey and make sure it is turned on. Move the SB_MAG survey behind it or turn it off.
3. Add a **No-Op** operation by clicking the No-Op button. This operation does nothing to modify the data, but is necessary as a place holder for the raw data. The next version of ArchaeoMapper will have this as a permanent fixture for all surveys, but for now you have to add it. You will see the importance as you work through the tutorial.
4. click the **Run Operation Stack** at the bottom of this panel. Although nothing has been done to the data, you can now see a histogram and statistics.
5. For demonstration purposes add a **Linear Filter** operation (**Linear** button). Keep the default values. This filter has a smoothing effect.
6. Click **Run Operation Stack**.
7. All operations have the same look at the top.



   a) the **check box** turns this operation on and off. This means when you have multiple operations in the stack, you can uncheck one or more of them and rerun the stack to see what the result would be without that operation. You can then recheck it and run again if you decide to keep it.
   b) The **up/down arrows** allow you to move an operation up and down, changing the order they are run.
   c) When you click the **I** button, you will see the **Interim Result** of the operation. When you click this button for the first operation (No-Op), you see the raw data, then when you click the I button for the next operation (Linear Filter) you see the results of that step. This allows you to step through each operation and see the result.
   d) The **H** button displays the resulting **Histogram** associated with the Interim Result in a separate window. You can click this button for each operation and line them up to see how your operations have modified the data distribution with each step.
   e) the elongated button with the name of the operation can be depressed to show the input parameters, or clicked off to close the parameters.
   f) The **X** button deletes the operation from the stack
   g) **Selection choices**: You can do an operation on the entire survey by selecting **All**, on specific tiles by selecting **Tiles** and then clicking on the tiles you want to process, or in a region using a selection **Box**. Try these out by selecting these options with the radio button. When selecting by tile, clicking on the tile selects and unselects it. When a tile or region is selected it is highlighted in color and a histogram of those data appears. A box is selected by holding the left mouse button and dragging.
   h) The **drop-down box** on the left allows you to choose the same exact selection area as used in

a previous operation. Try this by opening the No-Op operation and selecting a box region. Now open up the Linear Filter operation and from the drop-down list choose 1. You can see the same region is highlighted. Now if you click **Run Operation Stack** you can see the linear filter was applied only to the selected area.

i) All other buttons and fields are unique to each operation and will be discusses later.

8. **Delete** the **Linear Filter** operation by clicking the **X** button.
9. **Save** the project and **close** it.

VIII. Processing the Resistivity Survey (SB_RES)

1. **Open** the project **SilverBluffProj3**. This project has the SB_RES and SB_MAG datasets already loaded and processed so you can step through the operations.
2. Display the resistivity survey by checking the box. Uncheck the magnetometry survey. Click on the resistivity survey so it is highlighted white and active.
3. **Uncheck the first operation** (No-Op) and click **Run Operation Stack**. Then **check No-Op** and click **Run Operation Stack** again. In the next version of ArchaeoMapper this won't be necessary, but for now it is the only way to refresh the display to show you the correct result.
4. Now step through the operation stack using the **I** button to see the results of each operation. As you do this you can also open the operation to see the parameters that have been chosen. Here is a brief explanation of what has been done.
   a) **No-Op**: This just shows you the raw data
   b) **Stretch** (standard deviation, 2.5, 1): this is necessary to increase the contrast. All values are scaled from 0-1, and this operation stretched the histogram so the anomalies are easier to see. You can compare the histograms before and after this was done by clicking the H button next to No-Op and then Stretch.
   c) **B1+.2**: the calculator tool was used to fix one tile that had an edge discontinuity. In the next version of ArchaeoMapper this problem would be fixed with the range match operation, but for now range match can only operate on full tiles, not regions. to make the bottom part of this tile match data in the upper part, .2 was added to all the pixels. B1 stands for Band 1 (the only band in this survey). the calculator tool allows you to do simple mathematical operations on regions, tiles, or the entire survey.
   d) **Balance** (all, linear, 2x2): This is an operation that automatically matches the edges of each tile. this is a major feature of ArchaeoMapper!!! We are not aware of any other commercial software that does this. In other programs you have to pick each tile and match it to one next to it, and this can be very time consuming for a large survey. This Balance operation works fairly well and is a great shortcut in many cases. Sometimes a few tiles need to be fixed after Balance is run. The method can be done by fitting a linear or cubic plane to each tile (see the software manual for an explanation). The match area is the size of the box (in pixels) used at the corners of each tile to fit to the neighboring tiles (see software manual for more details).
   e) **Stretch** (standard deviation, 3, 1): Stretch was run once again to improve contrast.
   f) **Range Match** (north, 0.5, both): This is a tool that matches a tile to its neighbor. After running balance there is one tile that still does not match well with the others, so it was matched here. the Overlap parameter lets you choose the percentage of the tile and neighboring tile that is used to determine the difference between them. So if 0.5 is chosen, 50% of the tile is compared to 50% of the adjacent tile, and these values are used to match them together. Using only the mean simply adds or subtracts a constant value to the tile. Using the standard deviation multiplies the tile by a number, which changes the contrast. You can choose both to match both the mean and standard deviation. Finally, if you choose the

trend method, the tile is sloped up or down to match the neighboring tile, while the opposite end remains fixed. In other programs this is treated separately as "deslope" or "detrend."

g) **Fill** (by tiles, then selected regions): This operation finds all dummy values ("coded as NaN, for not-a-number) based on the surrounding values. the different methods refer to various interpolation techniques (refer to software manual for details). The resistivity data have some dummy values in areas where readings could not be taken. The fill operation was done first on most of the tiles, and then a few times using selection boxes to fill in the isolated pixels. Large areas should not be filled in because they are too far from actual measurements to create an accurate map.

h) **Mean Profile Filter** (All, 35, 3, 90): This is another innovation in ArchaeoMapper!!! This filter is a new way to get rid of stripes and in many cases does a better job that balancing the mean of entire transects (as is done with a "Zero-Mean-Traverse" operation). Refer to the software manual for an explanation of how it works. Set the Along Stripe Size to the average length of the stripes that you wish to remove (in pixels). The across stripe size should almost always be 3. Use an angle of 90 degrees to remove stripes in the horizontal direction, 0 degrees for stripes in the vertical direction, or other angles in between for stripes occurring diagonally.

i) **Linear Filter** (All, gaussian, 3 x 5, 0.5): Finally, the entire survey was smoothed using a Linear filter, which is basically a smoothing operation. HSize refers to the size of the convolution box (averaging window) in pixels (rows, columns). See the manual for further explanation.

5. Now that you have stepped through this process, you can go back and experiment with the operations by changing parameters, changing the order of operations, or adding/deleting operations. See if you can improve the final result. If you encounter problems, close the software, reopen, and load SilverBluffProj2. Or, to start with just the raw data, open SilverbluffProj1. If you want to reset the operations to the values used originally they are all given above. By processing the data from the beginning you can also take advantage of the **Difference** button, in the lower right (appears when you move your mouse there). When you click this button you get the difference between the most recent operation and the one before it. This shows you a map of what has been removed by the most recent operation.

VIII. Processing the Magnetometry Survey (SB_MAG)

1. Continue from the previous section or **open** the project **SilverBluffProj2**. This project has the SB_RES and SB_MAG datasets already loaded and processed so you can step through the operations.
2. Display the magnetometry survey by checking the box. Uncheck the resistivity survey. Click on the magnetometry survey so it is highlighted white and active.
3. **Uncheck the first operation** (No-Op) and click **Run Operation Stack**. Then **check No-Op** and click **Run Operation Stack** again. In the next version of ArchaeoMapper this won't be necessary, but for now it is the only way to refresh the display to show you the correct result.
4. Now step through the operation stack using the **I** button to see the results of each operation. As you do this you can also open the operation to see the parameters that have been chosen. Here is a brief explanation of what has been done.
   a) **No-Op**: This just shows you the raw data
   b) **Stretch** (standard deviation, 1, 1): Stretch was run to improve contrast.
   c) **ZMT** (All, median, along traverse): This stands for Zero Mean Traverse or Zero Median Traverse. It computes the mean or median of each traverse of data and adds or subtracts a

value to make the mean or median equal to zero. This gets rid of stripes in the traverse direction. If you change the method to mean you can see that with data such as these this creates more striping artifacts than it removes. The median option is often much better because it ignores outliers.

d) **Stretch** (standard deviation, 2, 1): Stretch was run once again to improve contrast.
e) **ZMT** (All, median, across traverse): This operation is used again but in the opposite direction. This effectively removes some of the vertically oriented edges between tiles. This operation will probably be renamed to something more descriptive such as Tile Destripe.
f) **Stretch** (standard deviation, 2, 1): Stretch was run once again to improve contrast.
g) **Mean Profile Filter** (All, 31, 3, 90): (see above for description of this filter). This filter works quite well on magnetometry data, removing many of the stripes that do not occur all the way across tiles.
h) **Stretch** (0.2-0.4, gamma = 1): Stretch was run once again to improve contrast.
i) **Fill** (by tiles, then selected regions): As with resistivity data, this was used to fill in most of the dummy values except large areas.
j) **Linear Filter** (All, Gaussian, 3 x 5, 0.75): Finally, the entire survey was smoothed using a Linear filter, which is basically a smoothing operation. HSize refers to the size of the convolution box (averaging window) in pixels (rows, columns). See the manual for further explanation.
k) **Stretch** (standard deviation, 2, 1). One final stretch to increase the contrast.

5. Now that you have stepped through this process, you can go back and experiment with the operations by changing parameters, changing the order of operations, or adding/deleting operations. See if you can improve the final result. If you encounter problems, close the software, reopen, and load SilverBluffProj2. Or, to start with just the raw data, open SilverbluffProj1. If you want to reset the operations to the values used originally they are all given above. By processing the data from the beginning you can also take advantage of the **Difference** button, in the lower right (appears when you move your mouse there). When you click this button you get the difference between the most recent operation and the one before it. This shows you a map of what has been removed by the most recent operation
6. ***At this point you have learned the basic setup of the ArchaeoMapper Viewer and how data processing is done using the operations stack. Please go to the Comment Form (in Google documents) and type in your ratings and remarks <u>Comment Section 2</u>. We appreciate your time! When you are finished continue to Tutorial #2.***

ArchaeoMapper Beta Test Tutorial #2: Updating surveys with new data, and loading EM and GPR data into ArchaeoMapper

Assembling the Escondido Data. Most of the Pueblo Escondido geophysical survey was completed in 2004, but additional areas were added in 2005. Since you already loaded magnetometry data, this survey is started for you. You will need to add the 2005 tiles. In this tutorial you will also learn to load EM files from the Geonics EM38b, and GPR data from a GSSI Sir2000. Both of these surveys have been started for you to speed things up, but you will add more data to see how each type of data is loaded. This is also an example of what you would do if you wanted to add new data to an old project.

I. Getting Started

5. Open a web browser, go to google.com, and log in to the beta test account, and open the Google document for tutorial #2 with your name on it. Move the window over to one side of your second monitor
6. Launch ArchaeoMapper and slide the debugging window off to the side.

II. Update the magnetometry layer:

5. Open *EscondidoProj1* from the desktop under *TutorialProjects.*
6. Click to highlight the magnetometry survey (PE_MAG on the list) (survey layer background color turns white)
7. Go to **Edit**-->**Edit Survey**. This launches the Survey Tool.
8. You are going to add five new tiles along the top: M-A, M-B, M-C, M-D, and M-E, and tile M12 (see below).

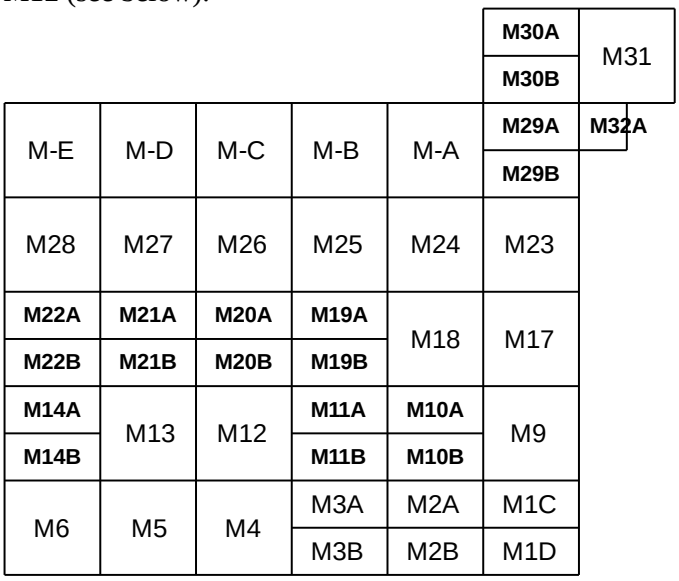


Figure 1

9. Go to **File-->Add Tiles** and fill in the correct information. These tiles were collected with a Geoscan FM256.

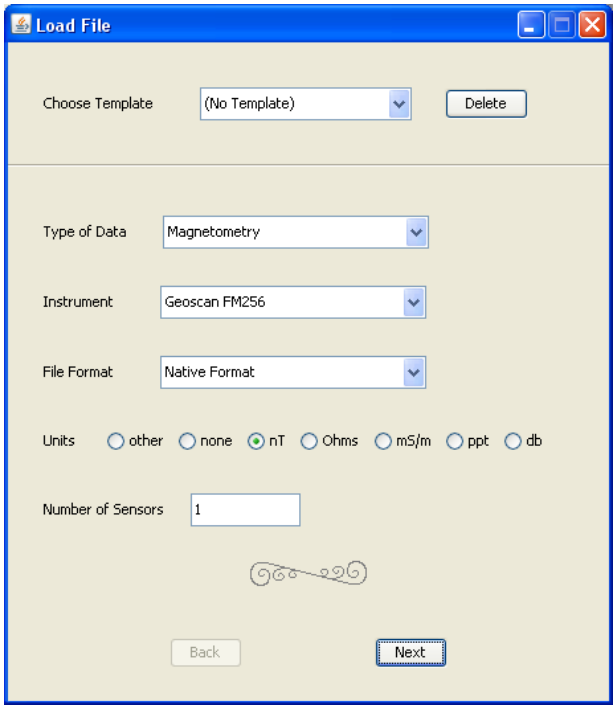


Figure 2

10. You can accept all default settings and there is no need to save the template.
11. The data files are located on the Desktop in the directory *Data\Escondido\2005mag*
12. Select all files and click OK.
13. Drag and drop the tiles into the correct place according to Figure 1 above (It should look like Figure 3). Then click **Finished**. This will take you back the ArchaeoMapper viewer

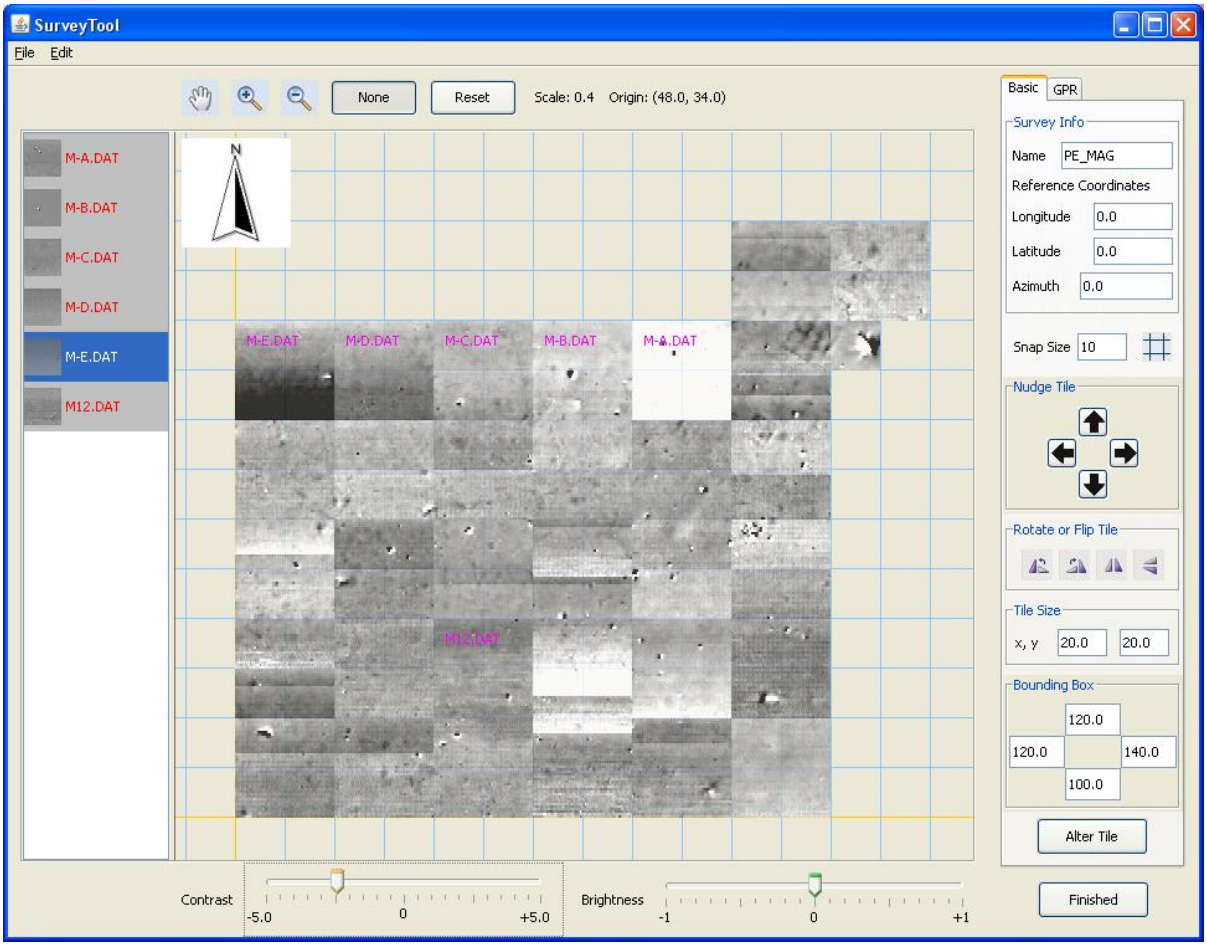


Figure 3

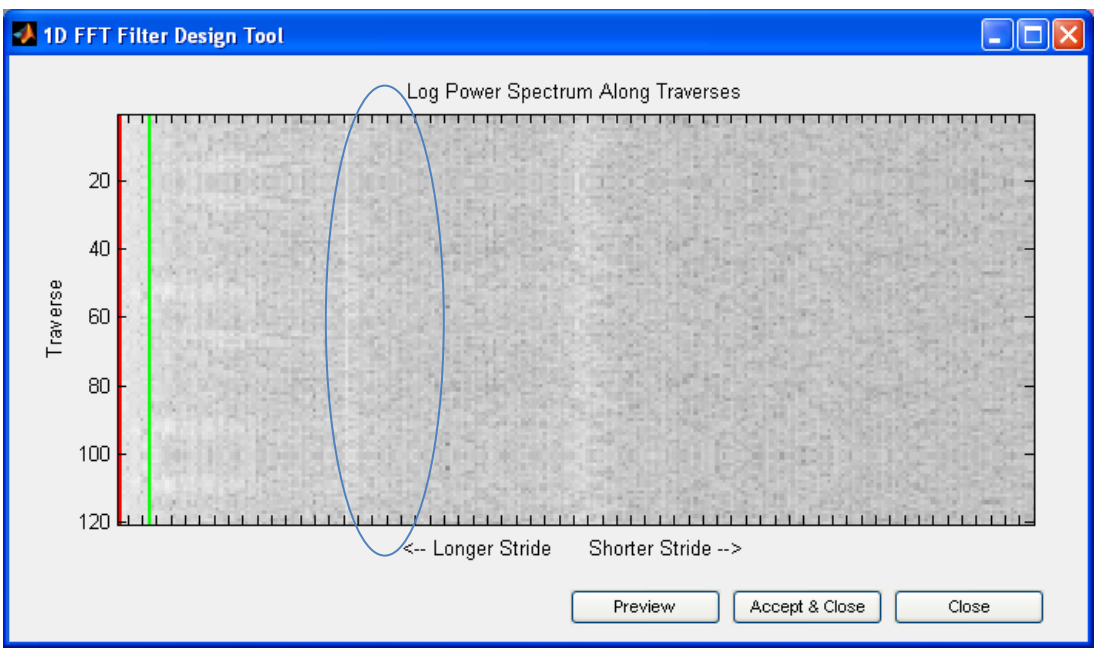
14. Note that these 2005 tiles were collected with a lower sampling density than the FM36 files from 2004 - but you can add them to the same survey!
15. Create a new version of the project by clicking **File-->Save As**. Name the project *MyEscondido*. Use the **Browse** button to select a folder in which to save the project. Save the project on your desktop in the *My Projects* folder.
16. You are now ready to process this survey.

III. Process the Magnetometry Survey

17. First, add a ***No Op*** operation. This will compute statistics and allow you to see the histogram and statistics of the survey.
18. The first step is to improve the contrast using the ***Stretch*** operation. Experiment with the different parameters for stretch. The goal is to make the (yellow) histogram fill the full data range. When you have improved the contrast this way, you should see more details in the data. If you clip too much data at the low or high ends, this could cause problems later in the

operation. However, you can always go back and make changes here. You may have to add several stretch operations to improve the contrast after different operations.

19. Next, we need to balance (or edge match) the tiles in the survey. You have several tools that can be used in combination for this, but you should start with Zero Mean Traverse (***ZMT*** on the toolbar) to remove the obvious striping. Use the difference button to see the stripes you have removed. Remember to add a stretch operation to improve contrast if necessary. It might be a good time to save your project.
20. Look at tiles M9, M17 and M23. Notice the periodic pattern in the traverse direction (this looks like vertical lines). This defect is likely due to a gait pattern in the data collection (a bouncy walk). There are several options for removing this; we'll look at ***1D Fourier*** today. Add this operation to the stack and select tile M9 for processing. Click the **Filter…** button in this operation. You should see Figure 4. The background you see is the frequency power spectrum along each traverse. It is a representation of the data in terms of waves (sines and cosines). Values on the left are long wavelength components of the signal, values on the right are short wavelength components. Gait patterns of a particular person will show up at the same frequency (or stride length) in every traverse. The two white lines in Figure 4 indicate a long component of the gait and a shorter component. This operation will allow you remove one gait pattern at a time. Let's remove the longer component first. With the mouse, drag the green bar to the right edge of the first white bar (in the blue circle on Figure 4). Position the red bar just to the left. Remember to allows position the red bar to the left of the green bar. You can see the effect by pressing the **Preview** button. When you are satisfied, press **Accept & Close**. You will not see the result in the viewer until you run the operation stack. Do that now.



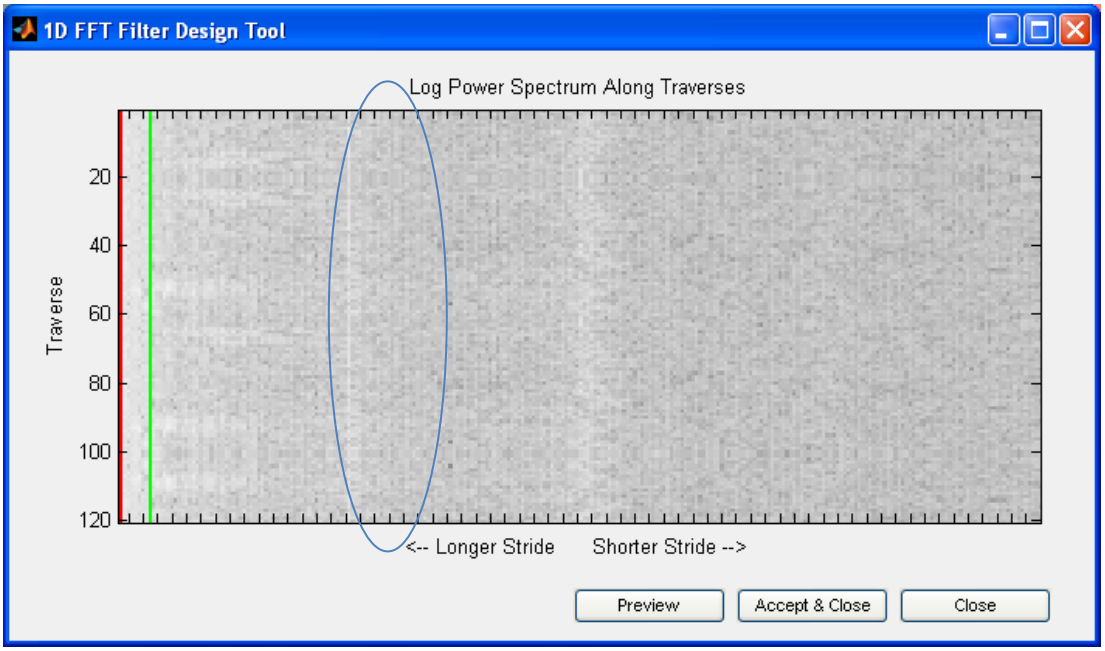


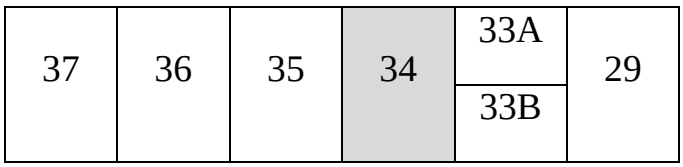
Figure 4

21. Look at the difference (click the **Difference** button on the right panel) to see what has been removed. This is the gait pattern of this individual.
22. This gait is in many of the tiles. Now that you know the pattern you may remove in more tiles. In the same ***1D Fourier*** operation, change to Tile selection mode, and select all tiles except M32A. Run the operation stack. This will take a little time (maybe a minute or two). The slowness is due results being printed in the log window. When we don't have to have the log/debug window, this will move much faster..
23. Now look at the difference. Can you tell which tiles were collected by a different person and who had the longer stride?
24. Now we want to remove the secondary gait defect. Open another ***1D Fourier*** operation and use it remove the secondary effect in the tiles you think need it. Follow the same procedure as in steps 16-19.
25. This has perhaps taken some time, so we'll demonstrate a capability that will lock in these operations. We can create a new survey from the current state of this one by selecting **Tools -> Fuse Surveys**. In the window that appears, click on the survey name. It will move to the right column. Name the new survey (type in the top box) PE_MAG2. Click **Finish**. This is unorthodox (because it's easier to forget the processing history) but is sometimes is helpful.
26. Highlight the survey you just created. You should see no operations so add a ***No Op***.
27. The next step is to reduce or remove the along traverse stripes. Use the ***Mean Profile Filter (MPT)*** for this. Add it to the stack. Experiment with this tool. Horizontal stripes are considered to be oriented at 90 degrees and the along stripe filter is generally longer than the across stripe filter. Remember to use the **Difference** button to see what you've removed.
28. The next step is to remove differences at the vertical edges of tiles. This really isn't an edge match issue but is perhaps the result of slightly picking up the instrument at the end of the traverse. The ***Mean Profile Filter (MPT)*** operation also works well for this. This time the "stripes" are in the vertical direction (angle = 0 degrees). Add this operation to the stack and experiment with its parameters.

29. We'll next try to remove some of the "spikes" or outliers in some of the tiles (e.g. M9 and M17). Add the ***Despike*** operation to the stack and experiment with different settings to see the effects. Typically the parametric setting works best. The lower the threshold the more data will be removed (a good value is around 1.5 to 2.0). You can refer to the ArchaeoMapper Operations Reference for more details.
30. Next, we'll take you through a series of **Range Match** (**Match** on the toolbar) operations to try to balance the tiles. Add a **Range Match** operation to the stack. Select the second column of tiles from the left and match them against the tiles to the west. Experiment with the different parameters settings to achieve the best result. We'll help you if you need it.
31. Perform step 26 with the 3rd , 4th , 5th and 6th columns. In this way, you are moving through the survey sequentially matching tiles.
32. If you are interested in achieving a slightly better look, you may add a **Linear Filter** (**Linear** on the toolbar) and smooth the entire survey.
33. ***Go to Google comment form and fill out comment section 1 which is for steps I-III.***

IV. Update the EM Survey: EM data collected with the EM38 or EM38B are dramatically different than Geoscan data, and require more processing at the beginning. The instrument is not set up to collect specific sized tiles (grids). Instead, data are collected in lines that can be any length, and you can collect as many lines as you want for a given tile or grid. At Pueblo Escondido we collected data in 20 x 20 m tiles, but many have mistakes including extra lines that need to be deleted. If a problem occurred while a line was being collected, it was recollected and named with a b, c, or d, etc. suffix. The bad lines could not be deleted in the field. So, for example, if something goes wrong while collecting line 5, the lines is started over and named 5b. If something goes wrong again, the line is started over and named 5c, and so on. Therefore, if we have a line5c, we know we have to delete line 5b and line 5. Many lines also have extra data points, or may be missing some, etc. The editor allows you to fix these problems.

1. Load the project called *EscondidoProj2* from the *Data* folder located on the desktop.
2. This project contains results from the Mag processing in section III (compare with your results) and an additional EM survey called PE_EM2. Highlight the PE_EM2 survey.
3. Note that this EM survey contains two bands: the top one is magnetic susceptibility and the bottom is conductivity. These were collected simultaneously, and also imported and assembled at the same time.
4. Go to **Edit-->Edit Survey**. This launches the Survey Tool with survey PE_EM2 loaded. You are going to add a new tile (shaded gray), 34 (see Figure 5). Note that this tile has a different sampling density but does not need to be re-sampled to be added to the current survey.



<table>
<tr><td rowspan="2">28</td><td>27A</td><td rowspan="2">26</td><td rowspan="2">25</td><td rowspan="2">24</td><td rowspan="2">23</td></tr>
<tr><td>27B</td></tr>
<tr><td rowspan="2">22</td><td rowspan="2">21</td><td>20</td><td rowspan="2">19</td><td rowspan="2">18</td><td rowspan="2">17</td></tr>
<tr><td>20</td></tr>
<tr><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td></tr>
<tr><td rowspan="2">6</td><td>5A</td><td rowspan="2">4</td><td rowspan="2">3</td><td>2A</td><td rowspan="2">1</td></tr>
<tr><td>5B</td><td>2B</td></tr>
</table>

Figure 5

1. Go to **File-->Add Tiles** and load the *EscoEM05b* template. This sets the import parameters for all these tiles and can save you some time.
2. The data files are located on the desktop in the folder *data/Escondido/2005EM38b*. Select all files and click **OK**.
3. For each file you selected, you will be taken to a special editor to fix the line problems. Let's explore the options in this editor using the tile "*34.P38*":
   a. Move the mouse around over the data. The cell you are over turns red, and line number, station number, and value are given in the boxes along the upper-left.
   b. You can change the display contrast with a slider bar in the upper right. This helps you judge where errors are located and how they should be fixed.
   c. Below the data display you can select which band you want to display. The two bands in these data are magnetic susceptibility and conductivity.
   d. The next box allows you make edits to individual cells or pixels. Click to highlight "Edit Reading". Now you can click on any cell in the data window and you are prompted to change the value of that cell.
   e. In the next box to the right you have options for editing lines of data. If you highlight **Remove Line** you can delete the bad lines in this tile. Go ahead and delete lines L5 and L6.
   f. Now you can truncate the extra readings from the ends of lines. Highlight **Truncate Line** and then select a line that has an extra reading at the end (e.g. L5b). Enter the correct values. The leftmost station should be 1 and the rightmost station is 80. You can do this for all the lines that have extra readings.
   g. If there were any lines that were shifted in one direction or another, but that did not have extra readings, you could highlight "Shift Line Left" or "Shift Line Right" to move them into the correct place. You can experiment with this by shifting a line back and forth, but remember to shift it back to the original position.
   h. You could also use rubber sheet line for lines that are too short or too long, but that

we know started and ended in the correct place. They are too long or short if the surveyor walked too fast or slow. Rubber-sheet will resample along that line to create the correct number of readings per line. You will get the opportunity to try this on another tile.

i. There are some additional function buttons along the lower-right
j. Smart Auto Fix truncates all lines with too many cells, and deletes lines if there are other lines with the same number and a letter suffix. Click this button and you will see it fix the rest of the errors if there are any (this will work in other tiles).
k. Clicking **Change Traverse Pattern** switches from zigzag to unidirectional lines. You can click on this to see the effect. Click it again to go back to the original traverse pattern.
l. The **Destagger** button corrects for errors related to zigzag surveys. You can move either the odd or even numbered lines to the left or right by a specified number of stations. Try this and then click undo to get to the original state.
m. If the survey is oriented incorrectly, you can rotate it in this editor by clicking this button. Click it once to see the change, then again to go back to the original state.

4. When you are finished with all the edits to a tile, click **Save & Exit**.
5. Drag and drop the tiles into the correct place according to the graphic above, then click **Finished**.
6. Save the project by clicking **File-->Save Project**.

V. Process Magnetic Susceptibility Survey

NOTE: This section is meant to be self-guided to a large extent. The steps below represent a general course of action for you to follow but allow considerable freedom to experiment. Ask us questions!

7. You may continue with the previous project or load *EscondidoProj3*.
8. The first thing to do is break this 2-band survey in (2) 1-band surveys. Use the **Tools->Fuse Surveys** option. Save the new survey as *PE_MS*.
9. We'll work through another operation stack. First add a **No Op** operation.
10. For this layer, let's next fill in the VOID values using a **Fill** operation.
11. Remove spikes with **Despike**.
12. Remove stripes with **ZMT.**
13. Use the **Stretch** to improve contrast.
14. A couple of **Despike** and **Stretch** operations might be used here.
15. Try to remove the differences at tile boundaries using a series of **Range Match** operations.
16. A few stripes might remain. Use **Mean Profile Filter** (**MPF**) to remove these.
17. Here you might be ready to apply a few filters to make the survey easier to interpret.
18. Compare your results to the one in Figure 6.
19. ***Go to Google comment form and fill out comment section 2 which is for steps IV-V.***

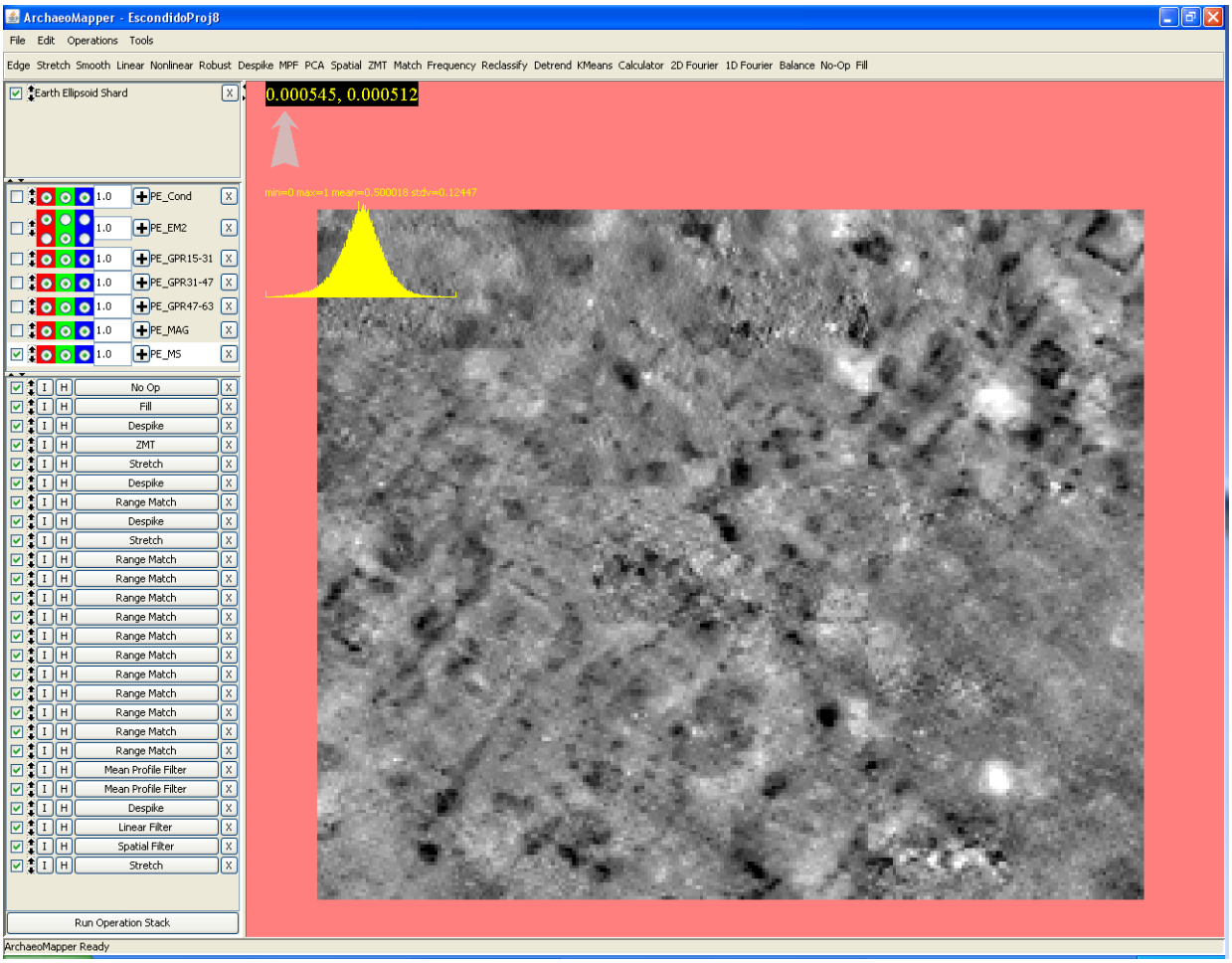


Figure 6. Magnetic Suspceptibility Final Result.

VI. Process Conductivity Survey (Optional. Good for practice, but the data doesn't reveal much!)

20. Separate the Conductivity band into a new survey using the **Tools->Fuse Surveys** option. Save the new survey as *PE_Cond*.
21. We'll work through another operation stack. First add a **No Op** operation.
22. For this layer, let's next fill in the VOID values using a **Fill** operation.
23. Remove spikes with **Despike**.
24. Remove stripes with **ZMT.**
25. Use the **Stretch** to improve contrast.
26. A couple of **Despike** and **Stretch** operations might be used here.
27. Try to remove the differences at tile boundaries using a series of **Range Match** operations.
28. A few stripes might remain. Use **Mean Profile Filter** (**MPF**) to remove these.
29. Here you might be ready to apply a few filters to make the survey easier to interpret.

VII. Load Surfer Grid Files of GPR Slices

1. Chose **File -> New Survey**
2. Choose **File -> Add Tiles**
3. In the **Type of Data** field, select **Other.**
4. Instrument should automatically to **Other.**
5. In the **File Format** field, select **Surfer Ascii Grid**.
6. Select db for the Units.
7. Number of Sensors should equal 1.
8. Click **Next**
9. The next dialog is for information only because it is reading this information from the file header.
10. Click **Next**.
11. You should be able now to save the template. Try it, but it's not critical.
12. In the **Load File** dialog that appears, navigate to the *Desktop* folder *Data/Escondido/GPR/SURFER/31-47cm*. Select all the files in this folder. These files represent a slice of GPR data averaged from 31-47 cm.
13. Assemble the tiles into a survey according to Figure 7. The entries in this diagram correspond to the last few letters of the file name.
14. Each tile needs to be slightly rescaled to its original 40m x 40m size. Notice in the tile size fields on the right hand side of the Survey Tool that the Tile Size is not 40.0 x 40.0. In order to rescale, simply enter the correct dimensions (see Figure 7 again).
15. Each tile needs to flipped (or mirrored) up-down. Do this for each tile.
16. After the tiles are assembled, name the Survey PE_GPR31-47.
17. When complete, your GPR data should look like Figure 8.
18. Click **Finished** to go to the ArchaeoMapper viewer.

T29-30 40 x 20	T27-28 40 x 20	T26 20 x 20	T29 20 x20

T06 40 x 40	T05 40 x 40	T04 40 x 40
T03 40 x 40	T02 40 x 40	T01 40 x 40

Figure 7

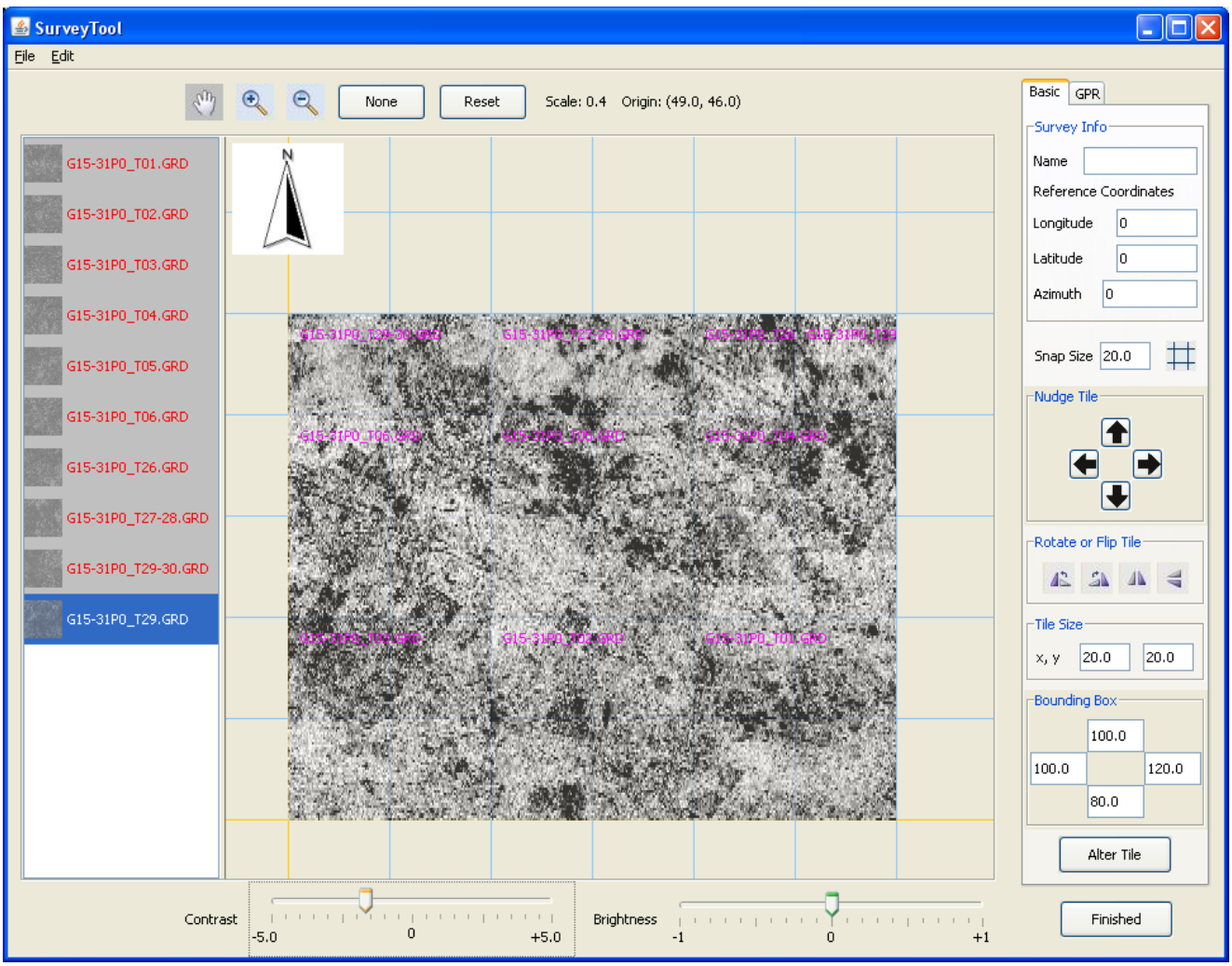


Figure 8.

VIII. Process GPR Slices

19. Process the GPR slices using the available operations. The sequence might be **No Op** (of course), followed by **Despike**, multiple **Range Match** operations, some operations to remove stripes (**ZMT** or **MPF**) and some filtering.
20. One possible result is shown in Figure 9.
21. Please comment on Sections VI-VII on the Google comment form.

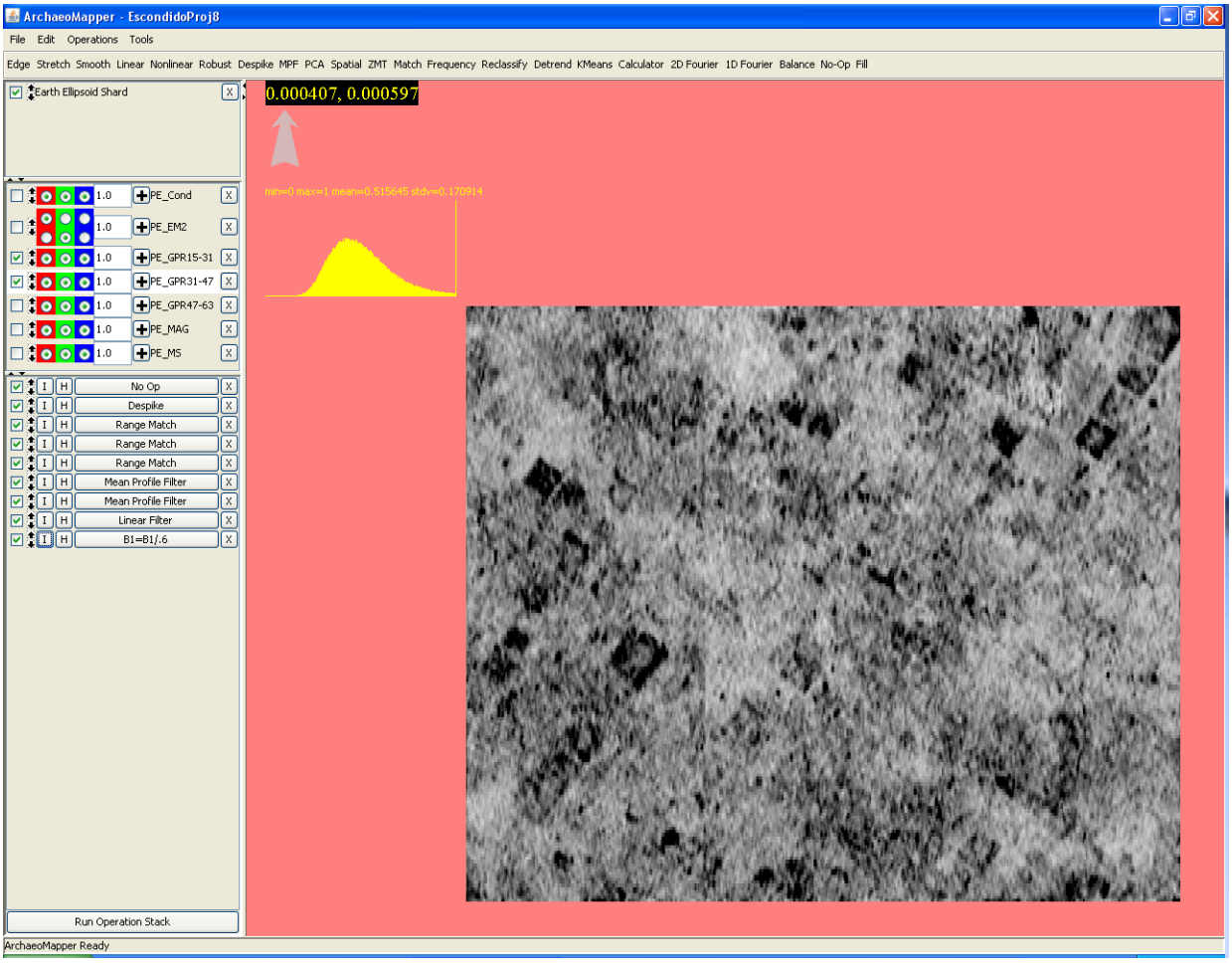


Figure 9

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Appendix C. Tutorial Comment Sheets by User

The ArchaeoMapper Tutorial rating /comment forms from the Army Users Group are provided for reference. They are also available (along with the students comment forms) directly from the ArchaeoMapper Beta Test Google Account described in the body of the report. These are provided unedited except for removable of large blank spaces that are present in the original documents.

LAURIE RUSH

ArchaeoMapper Beta Test Comment Form for Tutorial #1:

Instructions: (1) Answer questions 1-3 in the User Background section. (2) Start Tutorial #1, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:

Ease of Use: How easy is this tool to use?

1 = not at all easy to use or does not work

2 = difficult to use

3 = average ease

4 = fairly easy to use

5 = very easy to use

Accuracy: How well does this tool perform the function for which it was designed?

1 = does not function

2 = functions, but results are faulty (it appears the tool is malfunctioning)

3 = performs the task for which it was designed, with average results

4 = functions well, with good results

5 = works well with impressive results

Effectiveness: How effective is this for producing a good final product?

1 = useless/no benefit

2 = not necessary, but might be applicable in some circumstances

3 = effective, with moderate results

4 = effective, with good results

5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

User background information

1. What types of geophysical methods (magnetometry, GPR, EM, etc.) and instruments (Geoscan, Bartington, GSSI, etc.) are you familiar with?
   Magnetometry - Geoscan magnetometer, RM 15 Geoscan resistance meter, and GSSI SIR 20 Radar

2. What software do you typically use to process your geophysical data?
   We use the software packages that came with the equipment and then import into our GIS which is ARCMAP 9.2. One of our analysts has used Surfer as well.

3. How long have you been using geophysical methods? Since 2003

Comment Section 1. Please rate the basic import (Survey Tool) part of ArchaeoMapper (what you learned in Tutorial #1, parts I-V) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4, I was able to navigate through the tool bars and for the most part able to make the software do what I wanted it to do. I also am not very good at new software, so if I am able to navigate, it must be pretty easy to use.

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4, I think it functions well, although I think it seems to handle the resistivity data better than it handles the mag data.

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4, Effective with good results.

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Project location is misspelled in the new project window - it is missing the i

Edit Survey Window Comments

1. I didn't understand what snap size was, so when I was experimenting with it, I had no idea what was going on. I do understand it now.

2. I also initially had trouble with the pan, select, and reset buttons - they aren't quite intuitively clear. Sometimes the buttons seem to respond and sometimes they don't and I am not sure if it means that I have a tile or section selected or not. I found myself doing a little bit of "mad clicking" and sometimes "mad clicking" worked. When you click reset, what exactly is it taking you to? On mine - it just made the squares bigger and took me to a section of the grid that I didn't recognize except now I realize it was the datum or 0,0. Would it help to put 0,0 or whatever the critical coordinate is in the corner so the user immediately recognizes where they are?

3. In the alter tile window, after you select the tile - when you move to the menu choices the highlighting on the tile disappears so it looks like you deselected it. for me, it would be really helpful if the boundary of the tile you are working on stayed highlighted until all the alterations were complete.

Operations Window

I had trouble working in the operations window at first because I initially had no clue that I was supposed to use the middle button and my grid squares were too big and in the corner, and I had no idea how to put them in a manageable format.

When you click on the H box, the histograms open on top of each other and stay open. I had about twenty open at once and had no idea.

When I used the select tile option for the fill tool, it added colors to the selected tiles. After I ran the operation, the colors stayed on.

On the difference button, it shows the difference for the last one on the list, not the last one you did. As a result, I would do an operation click on difference and of course it didn't show me the difference for what I just did.

On the range match, I wasn't sure which tile I was selecting to match to so first I highlighted two to match to each other. When I realized that was wrong, then I wasn't sure which one to select vs which one was the right direction to match to. We talked about possibly highlighting on a little grid the desired matching sequence.

Comment Section 2. Please rate what you learned in Tutorial #1, parts VI-VIII by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

ArchaeoMapper Beta Test Comment Form for Tutorial #1:

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Key to ratings:

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1 = not at all easy to use or does not work

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1 = useless/no benefit

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Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

User background information

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2. What software do you typically use to process your geophysical data?
   We use the software packages that came with the equipment and then import into our GIS which is ARCMAP 9.2. One of our analysts has used Surfer as well.

3. How long have you been using geophysical methods? Since 2003

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4, I was able to navigate through the tool bars and for the most part able to make the software do what I wanted it to do. I also am not very good at new software, so if I am able to navigate, it must be pretty easy to use.

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4, I think it functions well, although I think it seems to handle the resistivity data better than it handles the mag data.

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4, Effective with good results.

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Project location is misspelled in the new project window - it is missing the i

Edit Survey Window Comments

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means that I have a tile or section selected or not. I found myself doing a little bit of "mad clicking" and sometimes "mad clicking" worked. When you click reset, what exactly is it taking you to? On mine - it just made the squares bigger and took me to a section of the grid that I didn't recognize except now I realize it was the datum or 0,0. Would it help to put 0,0 or whatever the critical coordinate is in the corner so the user immediately recognizes where they are?

3. In the alter tile window, after you select the tile - when you move to the menu choices the highlighting on the tile disappears so it looks like you deselected it. for me, it would be really helpful if the boundary of the tile you are working on stayed highlighted until all the alterations were complete.

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On the range match, I wasn't sure which tile I was selecting to match to so first I highlighted two to match to each other. When I realized that was wrong, then I wasn't sure which one to select vs which one was the right direction to match to. We talked about possibly highlighting on a little grid the desired matching sequence.

Comment Section 2. Please rate what you learned in Tutorial #1, parts VI-VIII by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

ArchaeoMapper Beta Test Comment Form for Tutorial #3:

Instructions: (1) Start Tutorial #3, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:
Ease of Use: How easy is this tool to use?
1 = not at all easy to use or does not work
2 = difficult to use
3 = average ease
4 = fairly easy to use
5 = very easy to use
Accuracy: How well does this tool perform the function for which it was designed?
1 = does not function
2 = functions, but results are faulty (it appears the tool is malfunctioning)
3 = performs the task for which it was designed, with average results
4 = functions well, with good results
5 = works well with impressive results
Effectiveness: How effective is this for producing a good final product?
1 = useless/no benefit
2 = not necessary, but might be applicable in some circumstances
3 = effective, with moderate results
4 = effective, with good results
5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

Comment Section 1. Please rate this portion of tutorial. (what you learned in Tutorial #3) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

SCOTT HALL

ArchaeoMapper Beta Test Comment Form for Tutorial #1:

Instructions: (1) Answer questions 1-3 in the User Background section. (2) Start Tutorial #1, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:

Ease of Use: How easy is this tool to use?

1 = not at all easy to use or does not work

2 = difficult to use

3 = average ease

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Accuracy: How well does this tool perform the function for which it was designed?

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User background information

1. What types of geophysical methods (magnetometry, GPR, EM, etc.) and instruments (Geoscan, Bartington, GSSI, etc.) are you familiar with?
   The Geoscan Fluxgate Magnetometer and the Goescan Resistance Meter

2. What software do you typically use to process your geophysical data?
   Geoplot and Surfer

3. How long have you been using geophysical methods?
   8 years

Comment Section 1. Please rate the basic import (Survey Tool) part of ArchaeoMapper (what you learned in Tutorial #1, parts I-V) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
5

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Comment Section 2. Please rate what you learned in Tutorial #1, parts VI-VIII by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
4

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
5

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)
5

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain. Most of the specific comments were addressed by the people coordinating the beta test. I do like some of the features from the survey editor such as the brightness and contrast bars better than I do those same features in the actual archaeomapper interface. There are at least a couple of tools that seem like they would be very useful in the archeomapper data processing interface. Specifically the grid drawing tool, and the ability to alter the size of the grid. A measuring tool might also be nice to determine intra- and inter-feature dimensions. Also having the gridding and measuring functions could facilitate producing plans for ground truthing or feature testing. As a final thought the software seems very user friendly. After today I feel capable of navigating the functions we beta tested. Kudos to the designers and programmers!!!!

ArchaeoMapper Beta Test Comment Form for Tutorial #2:

Instructions: (1) Answer questions 1-3 in the User Background section. (2) Start Tutorial #1, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:
Ease of Use: How easy is this tool to use?
1 = not at all easy to use or does not work
2 = difficult to use
3 = average ease
4 = fairly easy to use
5 = very easy to use
Accuracy: How well does this tool perform the function for which it was designed?
1 = does not function

2 = functions, but results are faulty (it appears the tool is malfunctioning)
3 = performs the task for which it was designed, with average results
4 = functions well, with good results
5 = works well with impressive results
Effectiveness: How effective is this for producing a good final product?
1 = useless/no benefit
2 = not necessary, but might be applicable in some circumstances
3 = effective, with moderate results
4 = effective, with good results
5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

Comment Section 1. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts I-III) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4, Moving into the second day I'm finding that I'm becoming very comfortable with the system.

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 5

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 5

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Comment Section 2. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts IV-V) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Comment Section 3. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts VI-VIII) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

ArchaeoMapper Beta Test Comment Form for Tutorial #3:

Instructions: (1) Start Tutorial #3, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:
Ease of Use: How easy is this tool to use?
1 = not at all easy to use or does not work

2 = difficult to use
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4 = fairly easy to use
5 = very easy to use
Accuracy: How well does this tool perform the function for which it was designed?
1 = does not function
2 = functions, but results are faulty (it appears the tool is malfunctioning)
3 = performs the task for which it was designed, with average results
4 = functions well, with good results
5 = works well with impressive results
Effectiveness: How effective is this for producing a good final product?
1 = useless/no benefit
2 = not necessary, but might be applicable in some circumstances
3 = effective, with moderate results
4 = effective, with good results
5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

Comment Section 1. Please rate this portion of tutorial. (what you learned in Tutorial #3) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 3. I had some issues with the addition of tiles in the survey tool, as well as the transition to actual archaeomapper.

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 5. This aspect of the system seems to be in good shape.

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 5. It seems to have everything necessary to input and process the data.

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

1. When you first enter the add tiles window it prompts you to enter the parameters and hit "next" on a couple of screens. After the second next it prompts you to save your template. As soon as you hit save it

opens a windows based explorer pop-up. The system expects you to select tiles to use to populate your template, but in the sequence of events that leads to this window it seems like you should be searching for somewhere to save your template. I found this confusing. It seems that there ought to be some sort of prompt to search for raw data prior to the windows explorer pop-up.

2. Inserting these tiles into the template was a little more difficult because they were larger than the default snap grid size. I guess this kind of threw me for a loop in relationship to the previous exercise where the largest grids matched the default snap to size. I wonder if you should also be prompted to input a standard input template grid size. Just a thought. I also wonder if a little more obvious color for the base lines in the input template, such as red, might make it a little easier to use.

3. After some difficulties here in the last few moments, it just seems that there need to be a more intuitive progression of where/how the files are saved, and there should be more of a process. You should either have to open an exisiting project or create a new project before you can even get into the survey tool. It didn't seem like there was a way to "add survey" to an exisiting project. There probably is, but it doesn't seem like there's a direct way to do this.

KENT SCHNEIDER

ArchaeoMapper Beta Test Comment Form for Tutorial #1:

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Key to ratings:

Ease of Use: How easy is this tool to use?

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User background information

1. What types of geophysical methods (magnetometry, GPR, EM, etc.) and instruments (Geoscan, Bartington, GSSI, etc.) are you familiar with?
   Been doing this for 30 years and used them all, mostly EM31, GEM300. Specialize now in GPR, GSSI primary data collector but process mala and SS.

2. What software do you typically use to process your geophysical data?
   Surfer, easy cad, dat31w, slicer dicer, radan, gpr-slice, arcview, photoshop, excel

3. How long have you been using geophysical methods?

30 years

Comment Section 1. Please rate the basic import (Survey Tool) part of ArchaeoMapper (what you learned in Tutorial #1, parts I-V) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4. Got comfortable with this phase of software fairly quickly.

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4. functions well with good results

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4 makes easier to use multiple datasets

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Lots of bugs which is expected. For the Grid, would be good to put a grid 0/0 anchor. In Creating new project, need label "project opened". Under III, consider adding Pan, + and - icons on the Mouse so you can see what function you're using. For the grid, show whether in feet or meters or both. Yeh, some datasets are mixed. Consider a moveable XY grid rather than the currenly fixed grid. This could be optional.

Comment Section 2. Please rate what you learned in Tutorial #1, parts VI-VIII by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

<u>YOUR COMMENTS</u>: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Fix the open project so it double clicks rather than single clicks, or opens as a file folder (discussed with Eileen). Where have "Highlight one of the Surveys", put a box around where the white part is so one knows what to click to "highlight". Make sure not overwriting operation stack contents No Op. When hae an operation unchecked, gray out the box.

General Cosmetics: User choice of grid line color

ArchaeoMapper Beta Test Comment Form for Tutorial #1:

Instructions: (1) Answer questions 1-3 in the User Background section. (2) Start Tutorial #1, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

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In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

Comment Section 1. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts I-III) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 3 takes a moment to adjust snapping

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 3 ok

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 3 ok

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

OVERALL - in answering this comments sheet it doesn't seem to me it matches the Tutorial so I may put some comments in the wrong "section".

Snap tool not snapping to designated (pointed) grid tiles. If possible a dot on mouse could serve as placement for snap
Need to have the tiles numbered so one can see all the numbers on the screen at one time. Might have a toggle on/off if someone doesn't want to see all the numbers

Need a label in the Save As box so it is noticeable

Add "Help Set" for as many operations as you can, with user reset option.
Bug at 21 if go to Edit Survey

Develop "Back" and "Undo" throughout

Develop a "log" file perhaps in an active small window so user can see processes performed

Comment Section 2. (IV, V) Please rate this portion of tutorial. (what you learned in Tutorial #2, parts IV-V) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 2 some bugs

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 2 some bugs

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 2 some bugs plus some added labeling would be helpful

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Bug at g-m, seems to be associated with using Undo button, freezes up

Need labeling to ID the band.
Fix so Survey tool doesn't come up behind Archaeomapper.
Seems to be con"fusion" over Fuse. It seems to fuse but also dissemble breaking 2 bands into one.
Maybe separate funtion buttons?
Remove "All" option from Range match

"Undo" button is needed, seems when you do a workaround thru "delete" the image and processes are still there. Don't know how to completely get out of an operation, ie zero out the previous action. It seems to stick around.

Comment Section 3. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts VI-VIII) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 2 bugs

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 2 bugs

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 2 bugs

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

-Request to "Save new survey as PE_Cond". But there is no "Save Survey" option.
-Same issues as above, the biggest being that deleting previous operations doesn't make the result go away.
-General - when Open Project, requires one click. Use doubleclick convention
change color of tile names from purple to green or starkly contrasting color or provide user defined color palatte
-Make mouse +/- function visible on tile grid when sizing
-Add a log or some kind of identifier that tells me which grids I have flipped and perhaps which way I flipped them. If I have to leave my dataset and return not knowing where I left off, or if I forget to flip a tile on a complex grid, I need some kind of reference lot or icon to see what I've done and what needs yet to be done.
-add hover icon over "Rotate or Flip Tile"
-don't permit unusual file characters
-consider a preview window to view all your layers before you export to tif. Reason: may want to compare and perhaps go back and post process one or more layers to improve view before export.
-when rifle through my previous process operations, I am not getting the same view that I think I saw when I originally ran an operation?

ArchaeoMapper Beta Test Comment Form for Tutorial #3:

Instructions: (1) Start Tutorial #3, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:
Ease of Use: How easy is this tool to use?
1 = not at all easy to use or does not work
2 = difficult to use
3 = average ease
4 = fairly easy to use
5 = very easy to use
Accuracy: How well does this tool perform the function for which it was designed?
1 = does not function
2 = functions, but results are faulty (it appears the tool is malfunctioning)
3 = performs the task for which it was designed, with average results

4 = functions well, with good results
5 = works well with impressive results
Effectiveness: How effective is this for producing a good final product?
1 = useless/no benefit
2 = not necessary, but might be applicable in some circumstances
3 = effective, with moderate results
4 = effective, with good results
5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

Comment Section 1. Please rate this portion of tutorial. (what you learned in Tutorial #3) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

STEVE DEVORE

ArchaeoMapper Beta Test Comment Form for Tutorial #1:

Instructions: (1) Answer questions 1-3 in the User Background section. (2) Start Tutorial #1, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:

Ease of Use: How easy is this tool to use?

1 = not at all easy to use or does not work

2 = difficult to use

3 = average ease

4 = fairly easy to use

5 = very easy to use

Accuracy: How well does this tool perform the function for which it was designed?

1 = does not function

2 = functions, but results are faulty (it appears the tool is malfunctioning)

3 = performs the task for which it was designed, with average results

4 = functions well, with good results

5 = works well with impressive results

Effectiveness: How effective is this for producing a good final product?

1 = useless/no benefit

2 = not necessary, but might be applicable in some circumstances

3 = effective, with moderate results

4 = effective, with good results

5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

User background information

1. What types of geophysical methods (magnetometry, GPR, EM, etc.) and instruments (Geoscan, Bartington, GSSI, etc.) are you familiar with?
   magnetometry, resistance, resistivity, EM, GPR, magnetic susceptibility, digital compaction, metal detection/// magnetics: GeoMetrics, GEM, Geoscan, Bartington; resistance: Geoscan; resitivity: Geohm; EM: Geonics EM31,38,61; GPR: GSSI, Senors and Software, MALA; magnetic susceptibility: Bartington; digital compaction: Spectrum Technologies

2. What software do you typically use to process your geophysical data?
   Geoplot, ArcheoSurveyor, Geosoft, Surfer, Grapher, MagMapper, Geonics DATW for EM31,38,61, Bartington magsus

3. How long have you been using geophysical methods? 14 years

Comment Section 1. Please rate the basic import (Survey Tool) part of ArchaeoMapper (what you learned in Tutorial #1, parts I-V) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

The save template did not work under tutorial step 9 in loading data II. When using survey tool to build the project, there needs to be some kind of indication as to the reference coordinate location besides the differenc collor x and y lines. Without knowing ahead of time where the reference coordinate point is located, it is easy to build the grid starting in any block.

Comment Section 2. Please rate what you learned in Tutorial #1, parts VI-VIII by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

ArchaeoMapper Beta Test Comment Form for Tutorial #2:

Instructions: (1) Answer questions 1-3 in the User Background section. (2) Start Tutorial #1, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:
Ease of Use: How easy is this tool to use?
1 = not at all easy to use or does not work
2 = difficult to use
3 = average ease
4 = fairly easy to use
5 = very easy to use
Accuracy: How well does this tool perform the function for which it was designed?
1 = does not function
2 = functions, but results are faulty (it appears the tool is malfunctioning)
3 = performs the task for which it was designed, with average results
4 = functions well, with good results
5 = works well with impressive results
Effectiveness: How effective is this for producing a good final product?
1 = useless/no benefit
2 = not necessary, but might be applicable in some circumstances
3 = effective, with moderate results
4 = effective, with good results
5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop).

In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

Comment Section 1. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts I-III) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4 After working with the software yesterday, it was much easier to use it today.

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.When running the filter, it would be helpful to have the grid lines and the grid names on the screen to be able to identify locations within the composite. It would also be helpful to have a means to select the grids in a format that would not require clicking on each grid to select it for the filtering operations.

Comment Section 2. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts IV-V) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 3

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain. The UNDO button did not return the data to the correct positions after using the Destagger button.When I did

the final step to save the project, the screen locked. It would also be good to have the destagger to move left or right rather than in just one direction. In the tools-fuse surveys option in saving the new survey, it needs directions concerning the which band needs to be moved to the right side of the display.

Comment Section 3. Please rate this portion of tutorial. (what you learned in Tutorial #2, parts VI-VIII) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning) 4

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain. As in the other uses of the survey tool, it would be better to have the north arrow outside of the grid working space. The selection for the tiles in the range match is not providing a color mask to indicate which tile is selected. It is caused by not having the Earth Ellipsoid Shard as just a single item. When rotating or fliping the tiles, there needs to be some way to identify which files you have already operated on.

The file structure in confusing to us that have not been use to the GIS terminology and the file structure in gis. Using other software much of the structure is embeded in the program and when saving and naming files and folders. It needs to be clear on the options that are present in archaeomapper for the placement of the survey and project files.

ArchaeoMapper Beta Test Comment Form for Tutorial #3:

Instructions: (1) Start Tutorial #3, and when asked for comments use this form. For each comment section, please give ratings for ease of use, accuracy, and effectiveness (see key below).

Key to ratings:
Ease of Use: How easy is this tool to use?
1 = not at all easy to use or does not work
2 = difficult to use
3 = average ease
4 = fairly easy to use
5 = very easy to use
Accuracy: How well does this tool perform the function for which it was designed?
1 = does not function
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3 = performs the task for which it was designed, with average results
4 = functions well, with good results
5 = works well with impressive results
Effectiveness: How effective is this for producing a good final product?
1 = useless/no benefit
2 = not necessary, but might be applicable in some circumstances
3 = effective, with moderate results
4 = effective, with good results
5 = very effective, produces high quality results

Note: This is a very subjective rating scale, and it will depend on your background and experience. It is natural for you to compare ArchaeoMapper to the software you are used to using (including geophysics packages such as Geoplot, gridding/mapping software such as Surfer or CAD, GIS packages such as ArcGIS, or others you may use such as Adobe Photoshop). In some cases there will be no comparison so you are simply rating the software without comparison to other products. Please type in an explanation of your ratings in each section.

Comment Section 1. Please rate this portion of tutorial. (what you learned in Tutorial #3) by first giving ratings in the three categories, and then typing in your comments.

1. Ease of Use. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

2. Accuracy. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

3. Effectiveness. (type in 1, 2, 3, 4, or 5 and explain your reasoning)

YOUR COMMENTS: Please be as detailed as you can. You can paste in screen captures (using the print screen button and paste) and write as many pages as you need to explain.

Appendix D. Overall Assessment Forms by User

The ArchaeoMapper overall assessment forms are provided for reference. These were completed on the last day after leaving the computer lab.

Kent

Overall Assessment

We are very interested in your assessment of the current status of the ArchaeoMapper software and its potential to improve the use of geophysics in archaeology, specifically archeological investigations at DoD facilities but also more broadly applied. We have previously asked for your comments on each part of the software and ways to improve it. Now we want your overall assessments.

Note: In the following, we are using the term "archaeological studies" to apply typically to **evaluation and mitigation level efforts** and in those conditions where geophysics is a feasible method.

We would like to get your assessment of some general issues first.

1) Geophysical investigations as part of archaeological studies …
   a) are currently adequate.
   b) are currently excessive.
   c) are currently inadequate.

2) Appropriate levels of geophysical investigations as part of archaeological studies …
   a) Usually reduce costs and save time.
   b) Usually add costs and time. Because their Use have not been incorporated into project design Planning
   c) Will not change the current total costs or time.

3) Without considering cost or time, geophysical investigations, when made part of archaeological studies …
   a) Commonly improve the quality of the archaeological results.
   b) Commonly reduce the quality of the archaeological results.
   c) Commonly have little effect on the quality of the archaeological results .

4) In the next 10 years …
   a) Geophysical investigations in the US will come to be a required part of most archaeological studies - as they are now in England – by SHPOs and other review groups.
   b) Most archaeological studies in the US will not involve geophysics even when conditions are appropriate for their application.
   c) Geophysical investigations in the US will come to be a recommended but not a required part of most archaeological studies by SHPOs and other review groups.

This ESTCP project has two objectives:

1. Assemble a single, user-friendly software that will serve as an effective medium for infusing the integrated, multi-sensor geophysical approach into wide use.
2. Demonstrate and validate the cost and performance benefits of the approach and technology infusion tool to DoD geophysical users, representatives of federal, state, and other CRM practitioners, and federal and state resource managers.

In the following, we are interested in your assessment of ArchaeoMapper's ***potential*** to meet objective 1 in the ESTCP proposal. In these questions, we want your assessment of ArchaeoMapper for ...

(i) a person new to the use of geophysics in archaeology

(ii) a user that is generally knowledgeable about geophysics but is not an "expert" and

(iii) an expert user with lots of experience in archaeological geophysics.

Note: If you feel you are unable to answer from one or more of these perspectives just leave the question(s) blank.

From the perspective of a **newbie,** please agree or disagree with the following:

5) The ArchaeoMapper interface provides a good geophysics "road map" for the new archaeological user.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

6) The ArchaeoMapper interface is easy-to-use for a new user. Assuming working level computer skills
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

7) There is valuable flexibility in the user interface and the structured analysis approach for the new user. When the suggested improvements are added
   a) Strongly agree

b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

8) Because ArchaeoMapper is easy-to-learn and easy-to-use (as compared to others). we will likely see an increase in the use of geophysics in archaeological investigations.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

other costs such as equipment, budgets prepared that include geophys

---

From the perspective of a **knowledgeable** user:

9) ArchaeoMapper combines ease-of-use with valuable flexibility for my applications.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

10) ArchaeoMapper provides me with most of the tools I expect to use in my geophysical. applications
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

11) ArchaeoMapper will reduce the **time** I need to process my data.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

12) ArchaeoMapper will reduce the **cost** to process my data.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

Haven't yet ~~brought in~~ brought in + processed data to the end

13) By combining the ability to ingest raw data from many different instruments, process it and fuse the results. I will be able to obtain more effective results than I have before - reducing overall project costs and or time.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

14) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

From the perspective of an **expert** user:

15) ArchaeoMapper combines ease-of-use with flexibility for my applications.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

16) ArchaeoMapper provides me with most of the SOFTWARE tools I expect to use in my geophysical applications.

a) Strongly agree
b) Agree

c) Neutral
d) Disagree
e) Strongly disagree

17) ArchaeoMapper will reduce the **time** I need to process my data.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

18) ArchaeoMapper will reduce the **costs** I incur to process my data.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

19) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

20) By combining the ability to ingest raw data from many different instruments, process it and fuse the results. I will be able to obtain more effective results than I have before.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

General Comments:

Please provide any additional assessments you feel would help with the direction of the continued development of ArchaeoMapper.

- Bounce ideas to your beta group as software developer
- ID "end" point for Arch mapper development
  Where does it quit
- develop online questionnaire to archs regarding Arch mapper ~~functionality~~ functionality
  - it may be forgotten as DOD today But ESRP has a larger market in mind?

Lauri

Overall Assessment

We are very interested in your assessment of the current status of the ArchaeoMapper software and its potential to improve the use of geophysics in archaeology, specifically archeological investigations at DoD facilities but also more broadly applied. We have previously asked for your comments on each part of the software and ways to improve it. Now we want your overall assessments.

Note: In the following, we are using the term "archaeological studies" to apply typically to **evaluation and mitigation level efforts** and in those conditions where geophysics is a feasible method.

We would like to get your assessment of some general issues first.

1) Geophysical investigations as part of archaeological studies …
   a) are currently adequate.
   b) are currently excessive.
   c) are currently inadequate.

2) Appropriate levels of geophysical investigations as part of archaeological studies …
   a) Usually reduce costs and save time.
   b) Usually add costs and time.
   c) Will not change the current total costs or time.

3) Without considering cost or time, geophysical investigations, when made part of archaeological studies …
   a) Commonly improve the quality of the archaeological results.
   b) Commonly reduce the quality of the archaeological results.
   c) Commonly have little effect on the quality of the archaeological results .

4) In the next 10 years …
   a) Geophysical investigations in the US will come to be a required part of most archaeological studies - as they are now in England – by SHPOs and other review groups.
   b) Most archaeological studies in the US will not involve geophysics even when conditions are appropriate for their application.
   c) Geophysical investigations in the US will come to be a recommended but not a required part of most archaeological studies by SHPOs and other review groups.

– maybe

– it amazes me how little the average US archaeologist knows about the state of the art for geophysics in Britain

This ESTCP project has two objectives:

1. Assemble a single, user-friendly software that will serve as an effective medium for infusing the integrated, multi-sensor geophysical approach into wide use.
2. Demonstrate and validate the cost and performance benefits of the approach and technology infusion tool to DoD geophysical users, representatives of federal, state, and other CRM practitioners, and federal and state resource managers.

In the following, we are interested in your assessment of ArchaeoMapper's ***potential*** to meet objective 1 in the ESTCP proposal. In these questions, we want your assessment of ArchaeoMapper for ...

(i) a person new to the use of geophysics in archaeology

(ii) a user that is generally knowledgeable about geophysics but is not an "expert" and

(iii) an expert user with lots of experience in archaeological geophysics.

Note: If you feel you are unable to answer from one or more of these perspectives just leave the question(s) blank.

From the perspective of a **newbie,** please agree or disagree with the following:

5) The ArchaeoMapper interface provides a good geophysics "road map" for the new archaeological user.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

6) The ArchaeoMapper interface is easy-to-use for a new user.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

7) There is valuable flexibility in the user interface and the structured analysis approach for the new user.
   a) Strongly agree

b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

8) Because ArchaeoMapper is easy-to-learn and easy-to-use (as compared to others). we will likely see an increase in the use of geophysics in archaeological investigations.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

From the perspective of a **knowledgeable** user:

9) ArchaeoMapper combines ease-of-use with valuable flexibility for my applications.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

10) ArchaeoMapper provides me with most of the tools I expect to use in my geophysical. applications
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

11) ArchaeoMapper will reduce the **time** I need to process my data.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

12) ArchaeoMapper will reduce the **cost** to process my data.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

13) By combining the ability to ingest raw data from many different instruments, process it and fuse the results. I will be able to obtain more effective results than I have before - reducing overall project costs and or time.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

14) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

From the perspective of an **expert** user: – Cannot answer

15) ArchaeoMapper combines ease-of-use with flexibility for my applications.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

16) ArchaeoMapper provides me with most of the tools I expect to use in my geophysical applications.

a) Strongly agree
b) Agree

c) Neutral
d) Disagree
e) Strongly disagree

17) ArchaeoMapper will reduce the **time** I need to process my data.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

18) ArchaeoMapper will reduce the **costs** I incur to process my data.
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d) Disagree
e) Strongly disagree

19) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations.
a) Strongly agree
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d) Disagree
e) Strongly disagree

20) By combining the ability to ingest raw data from many different instruments, process it and fuse the results. I will be able to obtain more effective results than I have before.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

General Comments:

Please provide any additional assessments you feel would help with the direction of the continued development of ArchaeoMapper.

I think that archaeomapper has excellent potential for improving the ease & accuracy of processing geo-physical data in archaeology. I think that customers in related fields like utility companies are going to be enthusiastic about using it as well.

I appreciated our discussion about linking to new + less knowledgeable users - and users with older equipment. It occurs to me that developing that interface will also strengthen geo-physical programs for indigenous people - ie Native American consultation & CR programs.

a SHPO education program could be very useful - some of the reviewers in these offices have completely lost touch with current ~~practices~~ practice in the field. They will also need education in order to competently over

evaluate geophysics reports submitted
to them.

Scott

Overall Assessment

We are very interested in your assessment of the current status of the ArchaeoMapper software and its potential to improve the use of geophysics in archaeology, specifically archeological investigations at DoD facilities but also more broadly applied. We have previously asked for your comments on each part of the software and ways to improve it. Now we want your overall assessments.

Note: In the following, we are using the term "archaeological studies" to apply typically to **evaluation and mitigation level efforts** and in those conditions where geophysics is a feasible method.

We would like to get your assessment of some general issues first.

1) Geophysical investigations as part of archaeological studies ...
   a) are currently adequate.
   b) are currently excessive.
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2) Appropriate levels of geophysical investigations as part of archaeological studies ...
   a) Usually reduce costs and save time.
   b) Usually add costs and time.
   c) Will not change the current total costs or time.

3) Without considering cost or time, geophysical investigations, when made part of archaeological studies ...
   a) Commonly improve the quality of the archaeological results.
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   c) Commonly have little effect on the quality of the archaeological results .

4) In the next 10 years ...
   a) Geophysical investigations in the US will come to be a required part of most archaeological studies - as they are now in England – by SHPOs and other review groups.
   b) Most archaeological studies in the US will not involve geophysics even when conditions are appropriate for their application.
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1. Assemble a single, user-friendly software that will serve as an effective medium for infusing the integrated, multi-sensor geophysical approach into wide use.
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In the following, we are interested in your assessment of ArchaeoMapper's ***potential*** to meet objective 1 in the ESTCP proposal. In these questions, we want your assessment of ArchaeoMapper for ...

(i) a person new to the use of geophysics in archaeology

(ii) a user that is generally knowledgeable about geophysics but is not an "expert" and

(iii) an expert user with lots of experience in archaeological geophysics.

Note: If you feel you are unable to answer from one or more of these perspectives just leave the question(s) blank.

From the perspective of a **newbie,** please agree or disagree with the following:

5) The ArchaeoMapper interface provides a good geophysics "road map" for the new archaeological user.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

6) The ArchaeoMapper interface is easy-to-use for a new user.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

7) There is valuable flexibility in the user interface and the structured analysis approach for the new user.
   a) Strongly agree

b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

8) Because ArchaeoMapper is easy-to-learn and easy-to-use (as compared to others). we will likely see an increase in the use of geophysics in archaeological investigations.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

From the perspective of a **knowledgeable** user:

9) ArchaeoMapper combines ease-of-use with valuable flexibility for my applications.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

10) ArchaeoMapper provides me with most of the tools I expect to use in my geophysical. applications
a) Strongly agree
b) Agree
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11) ArchaeoMapper will reduce the **time** I need to process my data.
a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

12) ArchaeoMapper will reduce the **cost** to process my data.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

13) By combining the ability to ingest raw data from many different instruments, process it and fuse the results. I will be able to obtain more effective results than I have before - reducing overall project costs and or time.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

14) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations.

a) Strongly agree
b) Agree
c) Neutral
d) Disagree
e) Strongly disagree

From the perspective of an **expert** user:

15) ArchaeoMapper combines ease-of-use with flexibility for my applications.

a) Strongly agree
b) Agree
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e) Strongly disagree

16) ArchaeoMapper provides me with most of the tools I expect to use in my geophysical applications.

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19) The availability of ArchaeoMapper will increase the use of geophysics in archaeological investigations.
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20) By combining the ability to ingest raw data from many different instruments, process it and fuse the results. I will be able to obtain more effective results than I have before.
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General Comments:

Please provide any additional assessments you feel would help with the direction of the continued development of ArchaeoMapper.

~~[illegible] I [illegible] questions about new users [illegible]~~

While I think this software is a powerful tool for casual & expert users, I don't know if it really provides tools to help new users. I would generally put myself somewhere between new user & casual user. Of course we haven't seen a manual yet!

Steve

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From the initial ~~beta~~testing session, the software has the potential to provide a very strong processing tool. The real ~~tests~~ will come when it can be field tested and the data can be compared to other software packages.

MIKE

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In the user's manual, we should provide evidence of the benefits of data fusion/integration. For example, do we have examples where you don't recognize a 'feature' in data set A or B, but you do when A+B are fused? Similarly, do we have situations where fusing data makes it more apparent that certain anomalies are clutter, not features?

We should indicate that one benefit of fusion is to help decide which of 4 instruments are 1st + second best. Often time/cost will discourage use of 3 or 4 instruments but when working in a small region, you can learn which instruments are likely to be the best choice for #1 and #2.