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EXECUTIVE SUMMARY

Preparing the next generation for the future while meeting local needs of today sounds like an extremely daunting task, but the EAST Project does just that. Responding to the needs of modern students in a rapidly changing world, the Environmental and Spatial Technology (EAST) Initiative is a highly innovative and successful model for bringing educational and social relevance into the classroom. EAST is an elective offered in Arkansas schools that allows students to immerse themselves in sophisticated, industry-standard applications related to geospatial technology. EAST students directly apply their learning to community service projects that are on or above the level of what their cities and local governments can achieve. As students apply their learning and commitment to civic causes, EAST helps them to attach significance to the educational opportunities offered through their core curricula and provides a unique opportunity to explore technologies of the some of the most progressive professional fields of study.

EAST has been so successful that there are now classes in six other states and roughly 200 schools. These efforts are supported by the Arkansas EAST Initiative, which was incorporated in December 2001as a 501(c)(3) educational non-profit organization. EAST as a concept was initiated in rural North Central Arkansas out of pure need. A second-career educator, Mr. Tim Stephenson, was given 20 at-risk students in a vaguely defined “environmental science” class. Seeing the rise in their attention and effort when given hands-on projects to complete, Mr. Stephenson sought to expand the scope of his class. He convinced a small group of civic leaders and businessmen to support him by adding sophisticated technology (primarily GIS/GPS and CAD applications) to this educational environment. The success that these students experienced was so dramatic that Mr. Stephenson has been asked to share his experiences and expertise with educators across the state and nation.

The EAST model rests on four strong pillars: 1) self-directed learning; 2) community service projects; 3) teamwork; and, 4) advanced computer applications. Essentially, each EAST classroom is a showplace of modern technology, a self-contained, student-run network that is rich in advanced applications such as CAD, solid modeling, studio quality animation, GIS/GPS, visualization, digital video editing, web page design, and others. The EAST classroom does not exist as a means unto itself; the technology is not the reason for the class, rather it is the laboratory through which students are challenged with community-oriented projects. Additionally, EAST educational experiences are occasionally expanded into summer projects where several schools may collaborate to undertake community projects on a larger scale.

The very nature of the sophisticated community service projects undertaken by these EAST students encourages a natural teaming of diverse talents in the classroom. When all of these elements are combined, the EAST environment is one that fosters profound growth and development in the students, the schools, and the communities that become a part of the EAST Initiative projects. The EAST Initiative takes pride in the fact that through this type of educational opportunity, students learn highly marketable skills that are beneficial to their communities immediately upon graduation.

Description of project, including length of time in operation:
EAST is truly an innovative approach to education. It is an approach that can fundamentally change the way students experience education. To the casual observer, EAST seems to be nothing more than just another computer class with sophisticated software. Rather, the entire lab experience seems to revolve around the computers and the software that students find endlessly fascinating. However, underlying the "wow" factor is a significant learning opportunity that has the capability to challenge and energize EAST participants for a lifetime.

- EAST is best described as a performance based learning environment that utilizes problem-based service learning and advanced technological applications.

This means that EAST is a vibrant class that stresses *real world, hands-on* application rather than the traditional school learning. The class is structured around students taking on specific projects, many of their own choosing with guidance from their teacher that can help their schools and communities. They use the capabilities of a sophisticated computer laboratory *as a resource* to accomplish these goals.

- EAST exists in an interdisciplinary laboratory environment where the intellectual and problem solving growth of students is the focus, not the technology rich environment

Although EAST students have some of the most sophisticated technology in the world at their disposal, the class itself is not about teaching the technology. The lesson of the past twenty-five years (at least where education and technology meet) is that when we just teach the *technology*, that technology quickly becomes obsolete, leaving the student wanting in current market needs. However, students who construct their own educational experience by learning to use specific technological applications to resolve current issues while working within a real-world "corporate" environment, are out in front of others entering today's workforce.

EAST uses technology as a *starting point* in the development of its relevant goal: to develop creative, open minded, innovative, problem-solving students today who will become our leaders tomorrow.

- EAST is designed to serve a diverse population of students from those identified as special education to the "middle" students to the advanced and gifted students.

Students, working in teams and individually, identify real-world problems in their schools and communities and complete projects that propose solutions to the identified problems. In an effort to make EAST labs more like the "real world" they will enter, a cross-section of students are selected for these labs. This common experience (EAST) is provided to all students based upon their interest and effort, not their pre-test scores, or accumulated past achievement. The special education student in EAST is in an atmosphere of individualized self-direction. The "gifted" student has the opportunity to apply their interests to a real setting and see tangible results that have an impact on how their school and community function. The "middle" student, who does not have the same federal "safety nets" designed to keep education relevant, gets the best the school has to offer. Each of these students shares in a rich and rewarding educational experience which, at various times, makes them the "expert" in their specialty or a driving force behind the completion of a project.

The EAST lab is a multi-station Windows-based lab that offers students a variety of different types of industry standard hardware and software applications. Among the opportunities for growth in EAST is the chance to learn more about:

- Networking and Network Administration
- Desktop Publishing
- Presentation Software
- Computer Aided Design (CAD)
- Visualization Software
- Global Positioning Systems (GPS)
- Geographical Information systems (GIS)
- Web Page Design
- Computer Generated Animation

Today's learner has been raised in a highly visual and technology oriented society, with thousands of visual messages bombarding them daily. Students have come to expect instantaneous and colorful feedback every few seconds. The computers and other equipment in the EAST lab appeal to this desire for "flash" and "sparkle" and provide the "hook" that captures student interest. The EAST students tend to be highly, intrinsically motivated to succeed. Part of the credit for this atmosphere goes to the equipment itself.

Initially, learning often seems to be more of a game and a challenge than it does a task. However, EAST students must do some serious learning in order to become proficient in the various software and the different challenges of the diverse projects. As students progress through EAST, the learning becomes more self-directed, and meaningful.

The other major factor in the EAST atmosphere is the attitude that the facilitator and the school provide. The role of the school and the facilitator is to work alongside the students in accomplishing their goals, not as the final judges of right and wrong answers. The result is a mutually beneficial improvement in overall classroom morale. Students and teachers (and administrators and community leaders and parents) all become a part of a team dedicated to accomplishing specific goals.

In total, all of these qualities add up to an educational opportunity unlike any other in the current model of schools. EAST encompasses all the other objectives of our system: real, purposeful intrinsically motivated learning that has a concrete application in the local community.

Significance to the improvement of the operation of government.
The best verifiable evidence and most significant achievements of the EAST project come from a variety of sources. These include student, facilitator, and parent interviews, case studies and performance based assessment tools such as rubrics and portfolios. Our evidence supports EAST as having a significant positive impact in the following areas of student achievement: the ability to apply problem-solving strategies to unpredictable, real-world problems; the ability to work collaboratively in productive teams; the ability to research and evaluate the validity and relevance of information; the ability to share information through a variety of modes; the ability to construct their own learning using

a variety of resources; and, of course, the use of advanced technologies in community-based service-learning projects.

The EAST initiative is having an impact on the schools, communities, and students that are participating in it. It is producing a change in the way that communities perceive schools and school children, in the life expectations of the students, and in the way schools perceive their role in the community. Much of the proof for these claims, however, is not as easily verified as "improvement on a standardized test". Although anecdotal in nature, the best proof of the EAST initiative's success is the success that EAST students are experiencing and carrying forward with them in life.

Research into the effectiveness of the goals of the initiative is widespread and supports the contention that this sort of learning environment has the potential to positively impact all students who participate in it.

Benefits realized by service recipients, taxpayers, agency or state.

EAST students have provided the volunteer, technology-enabled manpower needed for some state projects. In some cases, those projects could not have moved forward without the assistance provided by EAST. A major difference between EAST and other programs is the focus EAST places on community service projects. EAST students are taught from their first day in the class that they have a responsibility to their schools and their community to "do something" with all the skills that they will acquire. Learning CAD, GIS animation, video editing or one of the other applications found in the EAST lab is fun and exciting, but without practical application—without doing something of value with the knowledge – then it is ultimately a wasted activity. And though EAST students are being exposed to software that is making them much more marketable employees, they are also being empowered to become agents of positive change in their local communities.

The communities that have EAST labs are becoming partners in the day-to-day activities of their schools because the communities (most often the beneficiary of the projects) need the expertise and access to high-end learning that the EAST labs provide. (See also, the response to the following question: Return on investment)

Return on investment, short-term/long-term payback.

EAST was not created to be a national initiative. It was created to try to bring relevant education to a small group of students in one, rural school. As a result of those students' successes, other schools in Arkansas began to become part of the EAST partnership. Today EAST is a national initiative that spans from Alabama to Hawaii. There are more than two hundred EAST schools nationwide and it has seen over 20,000 participants. The EAST mission has not changed since it inception, but the scope of that mission has broadened to include all students in schools across the country.

The following Case Studies document the effectiveness of this program in two communities in Arkansas:

Case Study #1 – Eureka Springs High School EAST Lab

Although the Enhanced 911 Program was implemented in Arkansas in 1997, the rural nature of communities such as Eureka Springs, Holiday Island, and Beaver still left some roads unidentified and difficult to find. In one instance, it took the Eureka Springs police two hours to locate a particular street and respond to an emergency call. In the summer of 2002 and in a response to the communities' needs, the Eureka Springs High School EAST Lab approached the local Police and Fire Departments and offered to provide accurate maps of the area's rural roads and city streets in order to improve emergency response time and save lives among the 5073 residents of these communities. The mayors from the three communities, the 911 Coordinators and Dispatchers, and Police and Fire Chiefs, as well as local business leaders met with the students in the EAST lab to assist in coordinating the effort.

Using GPS/GIS equipment from the EAST lab and following Arkansas Geographic Information Office standards, the students identified, processed, and entered their data for rural road and city street identification for the area along with directional instructions to incorporate into a computer program they created that when an address is entered by the dispatcher a map appears along with driving directions, noting landmarks, to help guide the emergency personnel to the address, thus improving response time to 5-10 minutes per call on average.

It is the goal, as the project continues into the 2002-2003 school year and continues to evolve, to reduce that response time even further through appropriate training of emergency personnel on how to use the program and the maps. To take the project a step further, students are planning to develop a website to allow the Police Department easy access to updated maps and information. The EAST Lab has made the commitment to maintain the validity of the maps and written directions in coordination with the Carroll County 911 Office.

Case Study #2 – St. Joe High School EAST Lab

Currently, only one person in the St. Joe community knows where all of the water meters and access points in the system are. When he is unavailable, locations are difficult, if not impossible, to find.

Not long ago, the local firefighters ran out of water while attempting to extinguish a fire that had started in a home. After the incident, it was discovered that a source for water to refill the truck was just 30 yards away but no one knew that at the time and they were unable to control the fire and subsequently the house burned to the ground.

Shortly after that, St. Joe High School Environmental And Spatial Technology (EAST) Lab students were approached to see if they could help the community with this problem. To make this project come together, the students had to work closely with the three local mayors, the programmer who wrote the SP&G billing software, the Water Associate Superintendent, SP&G Bookkeeper, and SP&G Board Members. Students taking the elective high school course, EAST, learn how to help their communities solve problems using high-end technology resources, both software and hardware. This project was a great chance for the students to use what they learn in EAST and make a significant contribution to their community at the same time.

The students took on the challenge by locating and plotting the latitude and longitude coordinates for all meters and access points in their local water system, the St. Joe, Pindall, and Gilbert (SPG) Water Association. With this data, and a GPS rover, any point in their system could be found as needed.

Wall maps of all of the points would be produced to assist in future fieldwork and many needs that arise in the office. In addition, a separate set of water access point maps would be given to the fire department for their use for future firefighting.

Most of the technological equipment needed was already available in the EAST lab. Trimble GeoExplorer 3c data loggers provided the link to latitude/longitude information via satellites and Intergraph's GeoMedia Professional software allowed the data to be used in computer workstations back in the lab.

To pay for student wages and additional equipment, a grant proposal was written and approved. The grant provided $10,000 for the project through the Arkansas Department of Education/EAST Initiative.

Case Study #3 – Fountain Hill High School

Fountain Hill Rural Water Association has only one individual near retirement age (who holds a fulltime job elsewhere) who reads the water meters or even knows where all 400 are located and only reads them two days per month. With this time constraint, and the area coverage being 65 miles in radius, the FHRWA has estimated the billing based upon a yearly meter reading, and in most cases homeowners and businesses only get one bill a year based upon that single reading. Records of the reading are kept by hand by a part-time bookkeeper who is employed fulltime as the school's secretary. Thousands, if not ten's of thousands of dollars in revenue are lost annually because of the lack of adequate meter reading and billing procedures, leaving the water association strapped for funds for maintenance, etc.

The Fountain Hill EAST Lab decided to undertake this as a class project and divided into teams to use GPS to plot the coordinates for the meters and have plotted half of the meters to date due to restrictions of the driving distance and the class schedule. However, they plan to use this coming summer break to finish plotting the rest of the meters. Another team formed and used Visual Basic to develop a software program for the bookkeeper that will allow her to enter the data for each meter and generate a bill calculated on the set rate and accurate water usage.

It was noted that some addresses on the water association books were incorrect or incomplete, so in addition the meter location, and particular identification number, the students also made notes of corrections and photographed the homes and businesses served from these meters as backup to assist anyone who didn't have GPS knowledge or equipment to find the actual sites.
Fountain Hill's Mayor Ralph Hollis was excited to have this information more readily available because he sees this as a major move toward improved water quality and service for his town.