National Visiting Committee Report Year 4

National Geospatial Technology Center of Excellence

DUE 0801893

Monterey, California

February 8-10, 2012

The fourth meeting of the National Visiting Committee (NVC) for the National Geospatial Technology Center of Excellence was held on February 8-10, 2012 at the Monterey Beach Resort in Monterey, California. Ten NVC board members were present representing industry, academia, and professional societies (see Appendix A). Although we had a well-planned agenda (see Appendix B), we modified the meeting somewhat in light of the news everyone received just as the meeting was starting – i.e. the GeoTech Center was not being refunded because the proposal did not review well. After much sadness and discussion with the Co-PIs, we decided to proceed with the meeting and provide comments on the work that has been done this past year and give recommendations on future directions.

A Note from the Chair of the NVC:

As an ATE Center Director and the PI of the foundational research grant for the GeoTech Center, I am personally and professionally invested in the success of the GeoTech Center. Given a variety of events on the national level – including the acceptance of the Geospatial Technology Competence Model (GTCM) by the Department of Labor and the inclusion of this model in the strategic planning of many organizations – the need and opportunity for a GeoTech Center has never been greater. The GTCM provides the framework for aligning geospatial technology education (e.g. curriculum, professional development, internships, certification, and articulation) with workforce needs. The impact of the GTCM on geospatial programs can be transformative, and the need for national-level guidance and coordination makes the role of the GeoTech Center more important than ever before. I believe the GeoTech Center has the potential to have the most impact on the greatest number of colleges and universities of any ATE Center today.

That being said, not securing NSF funding to continue the Center is a major setback. I highly recommend that the Center PIs take a good look at what will be required to sustain a center in the long run. We must focus on the vision of achieving an efficient and effective geospatial technology education system and let this vision guide the decisions that need to be made as the GeoTech Center moves forward. Many of us believe that a nationally coordinated geospatial technology education system that is tied to nationally recognized core competencies defined by the workforce is now possible. At the time of the NVC meeting, the GeoTech team planned to submit a resource center proposal in October based upon the NSF program director's recommendation. If a resource center is funded, the current yearly GeoTech Center budget of $1,000,000 will be reduced to $400,000 for the next number of years.

In addition to reducing the budget, plans for establishing the GeoTech Center as a resource center must also address other critical questions:

- ***Where should the GeoTech Center be housed as we move ahead?*** Del Mar College's current indirect rate of 51% is high and it is strongly suggested to work with the college to reduce this rate or provide for release time for the director or staff to do Center work. Second, the administration of the Center's host institution must have a substantive and long-term commitment to supporting the Center; working with Geotech to reduce indirect or pay for GeoTech staff would greatly help as the Center transition to a resource center. Lastly, a resource center proposal would be greatly strengthened if the PI is committed to serve as the director for at least the duration of the proposed project and to plan for the long-term sustainability of the Center (i.e. the Center will need to have many other grants in the pipeline during this four year period.)

- ***How will the Center write a compelling proposal and create effective literature to convey the plans and accomplishments of the Center?*** This has been a long standing problem as noted in previous NVC reports (i.e. Goals and Objectives not aligned with the work of the Center.) This has also made evaluation and documentation of the Center's accomplishments challenging in the past. I know that the Center is doing great work and that the team is passionate about this work. However, continuation grants are the most difficult to write and they get harder with time as more accomplishments need to be highlighted. Additionally, as a Center matures, the complexity required to sustain it (i.e. proposal writing) increases tremendously. Funding generally comes from many sources and agencies. So effective written communication that conveys past accomplishments, current needs and future goals is essential for a Center. How the Center will overcome this hurdle needs to be actively discussed, and this discussion should engage people who have the necessary skill sets to write a focused and effective proposal.

Lastly on a positive note, the GeoTech team is an impressive group of individuals that work quite well together. Each PI and key staff brings unique talents and strengths to the table. There is nothing like watching an energized team receive the disappointing news of not being refunded. However, the real testament to the strength of the team is how they react to adverse news. No one has walked away and everyone is committed to the vision of a coordinated geospatial technology educational system. Clearly money is not driving this group but the opportunity to make a significant difference in how geospatial technology education is delivered. It is the character of this team that makes me believe they will be successful in changing the face of geospatial technology education. Phil Davis has done a good job of garnering the support of his team.

For the following 6 Goals, one to two NVC members wrote up the comments and recommendations of the group.

Goal 1:— Maintain Alignment of the GTCM with Industry needs

The Geospatial Technology Competency Model (GTCM) is the GeoTech Center's crowning achievement. Within its first three years as a national center, GeoTech organized the effort that

led to the GTCM's completion, acceptance and publication by DOLETA, endorsement by the GIS Certification Institute (GISCI), acknowledgement by the Department of Interior's National Geospatial Advisory Committee, publication in various outlets, and use by educators and institutions across the country and around the world.

However, awareness of the GTCM remains spotty in higher education and especially secondary education. Furthermore, the complementarity of the GTCM and the UCGIS *GIS&T Body of Knowledge* is not widely understood. Inadequate awareness and understanding undermine the GTCM's impact as well as the GeoTech Center's achievement. Therefore, promoting the GTCM ought to be a priority of the GeoTech Center in both its remaining six months as an NSFG-funded national center, and moving forward as a proposed NSF ATE resource center.

Recommendations for future work:

The NVC recommends that the Center pursue three opportunities to raise awareness and increase understanding and use of the GTCM. In priority order, these are:

1) Plan a GTCM update that entrains a large and diverse population of practitioners and educators, and that attracts attention from the geospatial press and commentators. The plan should include a survey methodology and sampling strategy to attract and collect specific inputs from hundreds of GISPs, ASPRS Certified Photogrammetrists and Mapping Scientists, Professional Surveyors, and education professionals. In addition to promoting the GTCM (and the GeoTech Center's stewardship of it), the survey process should yield reliable data that help refine and validate the GTCM. A report that presents results of the data analysis should be delivered to a reconstituted GTCM Task Force, which should recommend changes to the DOLETA.

2) Participate actively in the GISCI's Examination Working Group (EWG). In 2011, the GISCI Board of Directors charged the EWG to create a work plan resulting in a competency-based examination for future GISP applicants. The charge states that the GTCM should be used by examination developers as a basis for the test. The GeoTech Center should support this charge. Co-PI Rodney Jackson is already an EWG member, and he is well-positioned to help ensure that the GISP exam aligns closely with the GTCM. In addition, the NVC recommends that the Center nominates John Johnson for EWG membership. The knowledge and experience John has gained through his DACUM job analyses would be a valuable addition. The NVC strongly recommends that the Center explore the possibility of licensing to GISCI the test bank developed for the National Geospatial Technology Skills Competition. If successful, the activities will lead to wider use of the test bank, thereby enhancing the authority and visibility of the GTCM (and, by association, the GeoTech Center), and also perhaps providing an opportunity to earn income for professional services rendered.

3) Seek opportunities to provide for-fee professional services to industry partners. One example is the Programs Finder database and map published at geotechcenter.org. This database is comparable to (and perhaps competitive with) Esri's Online Academic Programs database, which attracts many thousands of users each year. The GeoTech Center should explore the possibility of teaming – or contracting – with Esri to create a new geospatial programs database that serves the needs of current and aspiring geospatial professionals who seek formal education. (See Goal 5 for further discussion of this recommendation.)

Goal 2: Promote the use of the GTCM and GTCM-based curriculum resources by two-year college geospatial programs

The single greatest accomplishment of the GeoTech Center has been the completion of the Geospatial Technology Competency Model (GTCM) and its adoption by the U.S. Department of Labor. The GTCM can now serve as the worldwide framework for how geospatial technology education develops and advanced certification and job skills. Never before has a descriptive document been prepared that lays the foundation for improving the quality of the geospatial workforce at all levels. We commend the GeoTech Center's efforts to promote the GTCM and help faculty to leverage this critical resource in their institutions. The model courses now under development, the targeted and professional webinars, GTCM-based assessment tools, and changes to the website are all effective endeavors in promoting the GTCM.

The revised evaluation plan is also an important step forward. Continued evaluation will be critical in compiling further formative feedback for the courses, assessments, etc., and it will provide crucial evidence for funders of the GeoTech Center's successes in implementing the GTCM.

Recommendations for future work:

The challenge before the GeoTech Center at this time is to better promote the completed GTCM-based products plus the remaining course packages currently under development. While completion of the remaining course packages is essential, it is imperative that the GeoTech Center demonstrate success of the already-completed course packages by documenting adoption among higher education institutions. The GeoTech Center must undertake activities that will get the attention of funding bodies and ensure that they look favorably upon its successes, especially now that funding remains uncertain.

The Center's highest priorities, then, are to "sell itself" to secure the next round of ATE funding, position itself to garner more diverse funding sources, and plan strategically to support long-term impacts of the GTCM. Promotion of the GTCM will be central to these efforts. The GeoTech Center has developed numerous educational tools that need to be marketed. All of these tools can be combined with success stories and documentation of impact in order to help market the complete set of goods and services that the Center will maintain as resources for the educational community. Success must be measured and enumerated, not only to show the value of these resources to potential adopters, but also to provide the "wow factor" missing in this year's proposal to renew funding. Therefore these actions are recommended:

- Renew the focus of outreach efforts on community colleges. Remember, two-year colleges are the primary focus of the ATE Program, so showing success and commitment in that area is central to the GeoTech Center's mission and fundamental to prospects for future funding from the ATE Program. While the strong interest among four-year schools is commendable and noteworthy, they are not the primary audience.

- Demonstrate successes by documenting adoption of GTCM-based course packages at both two-year (top priority) and four-year institutions (secondary priority); demonstrate impact on student learning and workforce needs, even if the documentation is anecdotal.

- Require all visitors to the course site to register on the Moodle server in order to access materials to improve tracking of users; follow up with registrants to determine how they are using the materials accessed through the site.
- Take advantage of the efficiency and power of social networking to proactively build membership and outreach activities with limited remaining funds.
- Take advantage of strong interest from four-year institutions to promote the GTCM's potential to support articulation between educational levels while maintaining a primary focus on two-year schools.
- Continue to increase the depth and breadth of evaluation for webinars, workshops, website, and related outreach activities.
- Develop success stories with case studies from programs using course packages.
- Find champions within existing two-year programs and develop profiles of these individuals for use in reporting, grant proposals and the website:
    - What were their success/failures and challenges?
    - What would they do differently to promote awareness or increase impact on student learning or workforce needs?

In addition, the GeoTech Center must expand its outreach to institutions not yet familiar with the GTCM. Therefore it is necessary to actively seek new participants:

- Map the existing programs that use the GTCM and make them reference sites.
- Use proactive recruitment and outreach strategies to reach small, rural and underserved community colleges.
- Target new markets for course packages by looking at the map to determine where programs are lacking. Find new "champions" in these areas who will promote the GTCM and the course evaluation tools.

To ensure the longevity of the impact of the GTCM, we further recommend the following:

- Begin identifying funding sources and strategic partnerships to achieve the Center's outreach goals, for instance, coordinating with USGIF to reach veterans, working with industry representatives and associations to reach audiences in the workforce, and exploring funding opportunities among other NSF programs and other government agencies.
- Carefully assess the return on investment for the competition before proceeding with it in 2013. While the committee recognizes the significant impact on the participants, they question whether the national impact of the competition justifies the investment of time and effort.

Goal 3: **Provide opportunities for faculty and student awareness of, and interaction with, the geospatial technology industry**

The national student competition, successfully launched in 2011, has been the primary focus of Goal 3. The three rounds are based on geospatial skills and interpersonal and communication skills identified in the GTCM. In 2011, the first round was an on-line exam. Students who received a passing score were eligible for the next round, which consisted of developing a project and presenting the results in a video. Developers of the six top projects were invited to the ESRI Education User Conference (EdUC), where they displayed project maps in the Map Gallery and presented their work to a professional audience, which then selected a winner. Interaction with geospatial technology industry professionals consisted of round two mentoring and opportunities for discussion during the EdUC. The competition was well-received at the EdUC and generated interest in the work of the GeoTech Center.

The competition was widely announced and a large number of students - 77 - took the exam in the first year. It was surprising that the number - 54 - decreased rather than increased in the second year, but this is still substantial participation. In the first year, fewer students than anticipated - 14 - qualified to continue to round two, resulting in positive adjustments for the second year. The exam is now less difficult, taking into account that most participants are still enrolled in introductory courses, and it no longer eliminates students from the second round. This was an excellent decision, in that it enables all participants to develop projects, receive professional mentoring and compete for the opportunity to attend the EdUC. Providing professional mentors for the larger number of students currently developing projects is no doubt more challenging, but should be doable given the many volunteers.

Recommendations for future work:

Exam Development

- Continue to develop the exam.
- Develop a more advanced version of the exam that can be used by geospatial programs as an exit exam.
- Develop both exams as planned, according to the eight-course GeoTech-developed curriculum, focusing on GIS and remote sensing. Consider whether workforce requirements warrant a focus on photogrammetry.
- Provide access to both exams on the GeoTech website.
- Make the exams protected and not printable.
- Charge a fee for the exit exam.

Competition

- Evaluate the cost-effectiveness of the 2011 and 2012 competitions to determine whether to continue to offer the competition.
- Is a high level of participation predictable and sustainable?
- What is the measurable return on investment?

Internships:
An internship program will become an important new component of Goal 3. Solid plans to date include building a national network of internship training sites that leverages the USGIF network of industry and federal employers and the opportunities identified through national organizations such as URISA, NASA, and USGS; developing protocols that guide the internship program;

placing 20 interns per year; and monitoring their progress through surveys, interviews, and focus groups.

NVC recommendations:

- Continue to develop a national-level internship program, but also provide guidelines for developing local internships, since many community college students are unable to travel to distant locations.
- Look to many good national-level examples that can serve as models for the internship program.
- Provide guidelines for integrating internships into capstone courses.
- Use the internship program as a way to support career-development for students from underserved populations.
- Include in the internship protocol a detailed 'Training Plan' template to ensure that the interns receive appropriate work experience and professional guidance.
- Develop 'Employer Appreciation' models for both local (such as a campus event) and distant (such as a certificate of appreciation) internship providers.
- Develop a 1-2-3 year student follow up tool to track early career choices via both direct communications and LinkedIn group communications (which would also have the advantage of introducing the students to a professional on-line community).

Other considerations:
Financial sustainability of the GeoTech Center will require funds beyond NSF and DOL grants. The exam can provide an additional source of revenue. Another source could evolve from the development of a national network of internship training sites, since successful internship placements may lead to corporate sponsorship by employers who understand the value of a continuing and reliable source of interns.

NVC recommendations:

- Adopt a spirit of entrepreneurship when discussing funding and revenue options that can enlist the support of the geospatial technology industry.
- Develop 'products', such as the exam, that will have value to customers and can become a 'pay-for-itself' marketing tool.
- Develop a strategy for using social networks to enhance faculty and student awareness of the geospatial industry, such as LinkedIn http://www.linkedin.com/ for business-to-business outreach; Facebook https://www.facebook.com/ for student outreach; Twitter http://twitter.com/ for short, concise messages to interest followers.
- Seek out a business consultant, such as an MBA (Marketing) graduate student, who would be willing to work with the GeoTech Center to enhance industry outreach as a part of a degree project without compensation.

In summary, the GeoTech Center has developed solid opportunities for faculty and student awareness of, and interaction with, the geospatial technology industry. The 2012-2013 extension year will be one of austerity. Investments in contest and internship initiatives will have to be evaluated carefully during that time, but if they can be justified as cost-effective they should be pursued to the extent that is practical, in anticipation of restored funding in 2014.

Goal 4: Provide opportunities for faculty professional development

The GeoTech Center has demonstrated success in conducting numerous professional development activities for college faculty. The use of geographic information science and technology for campus-focused projects, seminars, and an examination/GIS competition, highlights the capabilities of geospatial technologies and are especially applauded for raising awareness and support for geospatial faculty. The NVC continues to encourage the GeoTech Center in this regard, especially with respect to the use of the widely accepted GTCM in its professional development activities.

The NVC applauds the documented feedback from community college faculty following the past years Technology Workshops and Webinars. We recognize the very productive use of the Center's new evaluator, Ms. Candiya Mann, in implementing post-workshop and post-seminar surveys of participants.

Recommendations for future work:

Again, the NVC recommends that GeoTech Center researchers continue to identify two-year college faculty who have geospatial skills and who have successfully developed ongoing geospatial technology programs. Center-sponsored professional development activities and resources should be widely announced through clearinghouse materials posted on the website and on Moodle. The outcomes from each professional development activity should continue to be documented and assessed to identify what is most effective.

The GeoTech Center has engaged an increasingly large number of community college faculty this year and continues to plan workshops and webinars to reach more faculty. With the number of geospatial faculty now identified nation-wide, the NVC will repeat a previous suggestion that the GeoTech Center explore the possibility of initiating a community college Geospatial Faculty Forum which can offer opportunities for experiences as well as promoting faculty development. Another way to promote faculty development opportunities would be to expand the use of social media such as Linkedin.

In summary, the NAB recommends that the GeoTech Center:

- Continue to focus professional development on community college faculty who teach geospatial technology.
- Work closely with the evaluator to continue to define desired outcomes for each professional development activity.
- Encourage geospatial faculty to seek professional qualifications to strengthen their geospatial credentials, such as the GISP qualification
- Continue support of an effective professional development dissemination center on the website.

Goal 5: Maintain an Educational Resource Clearinghouse

The plans that resulted from the 2011 NVC Meeting in Atlanta are as follows:

2011 Goals

- *Update the website with content directly related to the GTCM*

- *Redesign the Resource pages*
- *Simplify the site navigation*
- *More fully index web content for better search capabilities*
- *Expand the college database to include university programs*
- *Redesign the back-end database design to improve efficiency*
- *Redesign the web map interface to improve appearance and functionality*

This year's Goal 5 in the GeoTech Center report represents a consolidated version of last year's Goal 2 – GeoTech Center's Website and Resource Clearinghouse and Goal 3 - National Database of College and University Programs and Software Systems. The NVC strongly encouraged the GeoTech Center to focus exclusively on the areas that could be strongly identified and associated with the GTCM, to divest itself of all other areas, and to concentrate on upgrading the website and all resource materials, concentrating only on those of the highest professional content and appearance.

The NVC found to its great satisfaction that the Center extensively addressed all areas discussed last year and that our recommendations were well carried out. Students working under the capable direction of Center partner Ming-Hsiang (Ming) Tsou, Associate Professor in the Department of Geography, San Diego State University, are now developing a new website displaying the college program database. All resources are related directly to the GTCM. The new site, still in the formative stage, provides all indications of being the upgraded visual asset the Center needs as a vital part of its branding, and there is now a true focus on the GTCM in all areas of the site, a major accomplishment.

One of last year's major recommendations was an almost complete overhaul of the entire website, and that has been done remarkably well. The website overall shows extensive rebuilding, with full indexing of the pages and content, giving the site a more robust look and feel, with increased search functionality. The resources available through the site are now catalogued in the NSF national database and the metadata has been updated, all major accomplishments.

A summary of the NVC's discussions regarding Goal 5 appears below, with recommendations for activities related to each area.

Recommendations for future work:

- <u>College/University Database Development and Maintenance</u>
  The expanded and University-updated college database remains a singular and outstanding product of the GeoTech Center, and the time necessary to maintain the accuracy and completeness has been and will be an excellent investment. A short-term revenue opportunity identified at this meeting and connected with that database could help the Center bridge the funding gap until the next budget cycle and could even serve as a foundation for longer-term sustainability. The NVC is excited about this and strongly encourages the GeoTech Center to begin conversations with Esri to determine how the Center's college database and its continued maintenance might be the foundation

for a partnership that would benefit both the Center and Esri. At some time in the future, the database could even be expanded to include the K-12 geospatial programs.

- Continue to Upgrade Resource Content and Focus on High-Quality, Professional Content
  While we can see the increased professionalism in the Center's webinars and resource products offered online, this area will require constant attention so that the standards never slip. With the website serving as both a portal for regular users and as the first-time welcome for new visitors, it must remain one of the highest Center priorities to keep the 'brand' alive and well.

  The Center has decided to use Moodle as the resource content distributor, and we recognize that this open-source, web-based, highly functional software has found ready acceptance within the academic community. We consider this a good move and support continued development with this platform.

- Areas of Continued Website Improvement
  While the Center has improved the website greatly, there is still a need to continue to strive for high-quality resource content, with webinars, whitepapers, and course curriculum material. One area of continued improvement can come from a shift from text-heavy pages to those containing more photos and graphics. The Center should also make a determined effort to use photos showing minority engagement in the geospatial world.

- Tracking and Using Web Statistics
  The current web host and Moodle both provide the ability for the Center to track web statistics related to visitors, but the mining from this area should be expanded substantially. The Center must very closely follow those who use the site and all its resources, from individual IP addresses, number of visits, time spent on each page, number of downloads, etc. As important as an intimate knowledge of those who use the site, a knowledge of those in the academic community who do NOT use the site and why they do not use it. This knowledge and the reporting metrics would be invaluable in helping the Center to track and prove their effectiveness throughout the geospatial educational community.

- Increasing Student Involvement & Other Future Concerns
  While some areas cannot be pursued based on currently available financial or staff resources, we encourage the Center to give thought to future programs that could improve or expand their effectiveness. These should include the establishment of a national student intern program. It is well known that students who have had intern experiences are hired at a much higher rate than those who have not. The Center could be the central point for a national program of some kind and the website and database could serve as a central means of tracking the students and the programs with which they are involved.

  Reaching, engaging, and tracking student involvement in the geospatial world will be an important part of the Center's future work, and an ability to measure those areas in some way will be a powerful tool for the Center to use in displaying its activities and results.

The Center's involvement with the formation of a URISA Texas Chapter and efforts to increase student contact and involvement in that state could serve as a model for expanded efforts in the future. Time and effort will, of course have to be monitored carefully.

The Center has done an outstanding job of upgrading the website and its resource content. This is important, as the website remains the most visible and obvious presence for current and potential users. Its presence, appearance, and content will have a continued impact on every phase of the Center's work.

We are excited about revenue streams that could be associated with the already created college database. The Center should pursue this area vigorously, as they will be critical to the Center's continued existence.

It is imperative that the Center find a way to tell its story and convey the passion and excitement already present in its efforts and programs. The website needs to be a major part of that conversation with education and industry, and it should provide both anecdotal and measurable performance metrics regarding the Center's place and demonstrated performance in geospatial education at all levels.

Goal 6: Improve Access to Geospatial Technology Education for Rural and Underrepresented Populations

While past progress and future plans of the GeoTech Center are addressing improved access especially in rural areas, to Hispanic populations and with ties to tribal colleges, we have some suggestions to further improve access to rural and underrepresented groups. The Center can immediately make Ken's white paper on recruitment strategies available on Moodle and track use/successes. ("Do more with less at rural/minority colleges"). Additional suggestions are listed below.

Recommendations for future work:

1) Promote the unique position of two-year colleges to serve rural and underrepresented populations, as well as partner with institutions and associations established for this role. One suggestion is to add an attribute to institutions mapped on National CC Geospatial Program Map if they are Historically Black Colleges and Universities (HBCU), Hispanic Association of Colleges and Universities (HACU), Tribal Colleges and Universities (TCUs) and colleges of the Rural Community Collage Alliance (RCCA). For instance a listing of HBCUs can be found at http://www.edonline.com/cq/hbcu/c_state.htm. Although there are maps of these institutions available currently online, they are located at separate websites, have various degrees of cartographic detail and disparate formats. For example, The U.S. Department of Education website maps HBCUs with mash-ups that link to text information and web links (Figure 1).

Information about HACUs can be found at http://www.hacu.net/hacu/default.asp with links to a current list of 38 HACU-affiliated Hispanic-Serving School Districts defined by K-12 school districts whose total student enrollment is at least 25 percent Hispanic (Figure 2). The American

Indian Higher Education Consortium (AIHEC) is a voice for the Tribal Colleges and Universities (TCUs) and" promotes and strengthens Indigenous languages, cultures, communities and tribal nations…" There are 32 Native American Colleges listed at http://www.fws.gov/pacific/aba/dcr/_pdfs/tacus.pdf and maps are provided at http://www.aihec.org/ (Figure3).

2) In addition to promoting the GeoTech Center to HBCUs, HACUs and TCUs, the GeoTech Center can be promoted through professional organizations such as The Voice of Hispanic Higher Education Magazine, National Assoc. for Equal Opportunity in Higher Education (NAFEO), National Association of HBCU, Women in Geography (WIG), Society of Women Engineers, IEEE Women in Engineering, ORURISA Women in GIS, Rural Community College Alliance (RCCA).

3) Connect with individuals who can act as GeoTech Champions at HBCUs/HACUs/TCUs and rural institutions. For example, Dr. Kathaleena Edwards Monds, Interim Dean of the College of Business and Professor at Albany State University (ASU) is an advocate for geospatial instruction and training for African American students at her rural HBCU in Georgia. She sees students with geospatial skills for the first time developing a world view that connects them to geography, people and opportunities beyond their county boundaries. She was awarded a 4-H GIS/GPS Beginners Grant and an ASU Ancestry Project Grant that involved using DNA analysis to trace the African ancestors of 4-H students and then use GIS to map and analyze their migration patterns. She was also accepted in the GeoTech Center sponsored Teachers Training Teachers program at Gainesville State College, where she spent a week learning remote sensing and GIS for incorporation into her ASU business curriculum.

4) Display a diverse climate on the GeoTech Center website (photos/stories). As mentioned above, the GeoTech Center is the world's window to you and your opportunity to reach the world. It should be filled with images of students and faculty interacting with technology, computers, imagery and their environment. Images that show diversity in gender, culture and ethnicity will speak to and attract a diverse audience. Individuals will feel welcome when they see themselves in GeoTech materials and web pages. Use this to advertise the success you already have in outreach to and involvement with students of underrepresented groups.

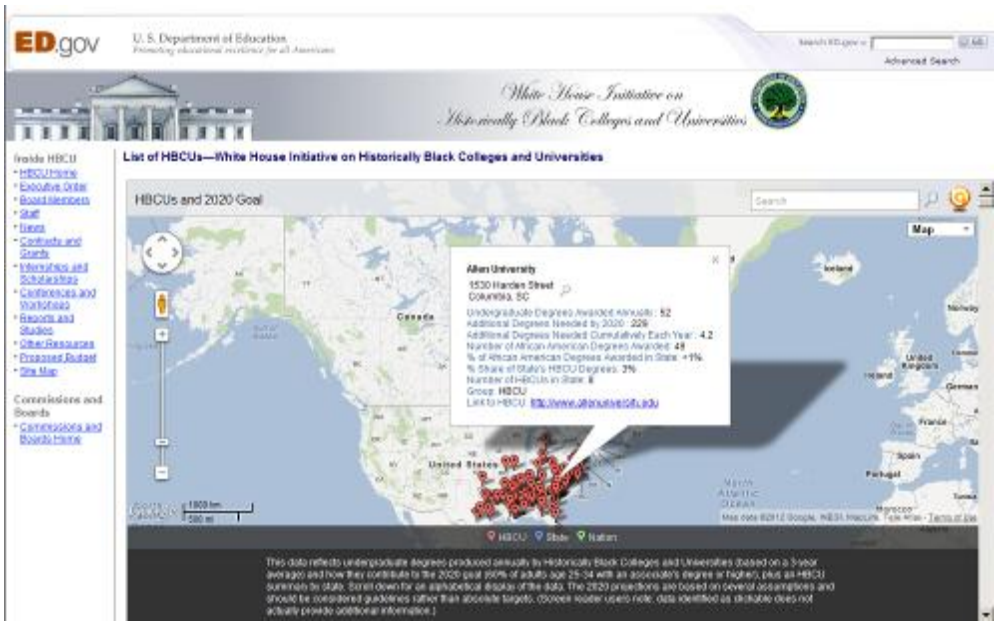

Figure 1. Map of HBCUs with mash-ups linked to further information about individual institutions, Source U.S. Department of Education, http://www2.ed.gov/about/inits/list/whhbcu/edlite-list.html

Figure 2. Map of Hispanic-serving School Districts in the U.S., Source Hispanic Association of Colleges and Universities, http://www.hacu.net/images/hacu/membership/pdf/2011%20HSSD%20Map.pdf

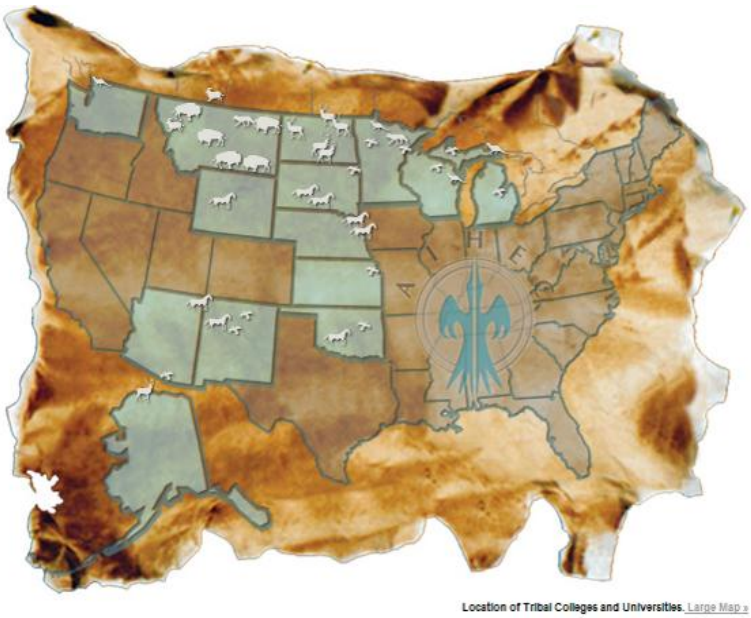

Figure 3a. Map of Tribal Colleges and Universities, http://www.aihec.org/.

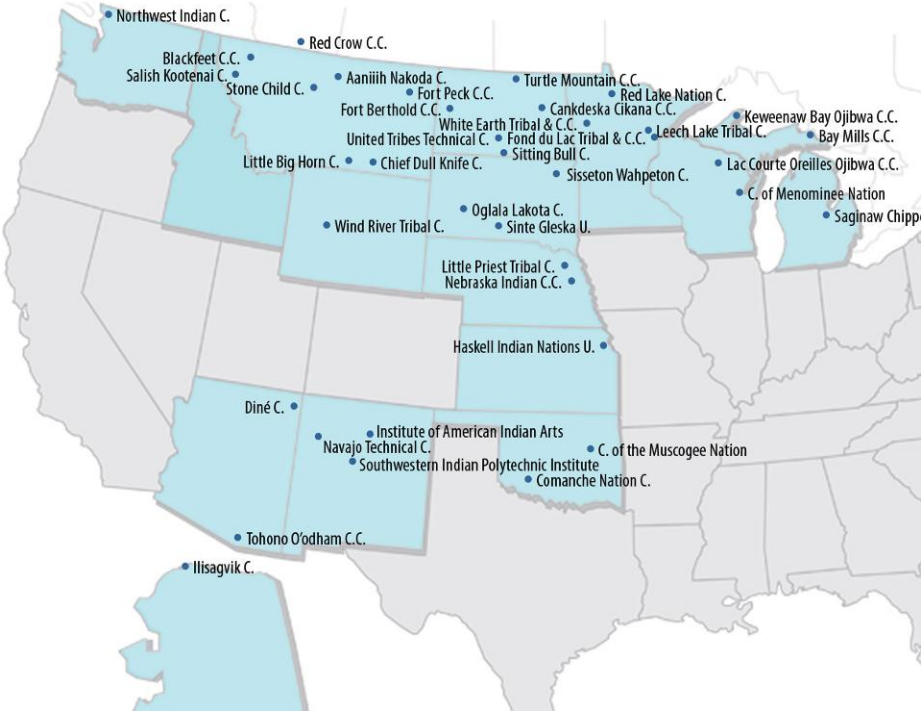

Figure 3b. Enlarged map of Tribal Colleges and Universities, http://www.aihec.org/.

External Evaluation:

The External Evaluation Report presented for the GeoTech Center Year Four NVC review was brief due to the introduction of a new external evaluator. The new external evaluator is the Social & Economic Sciences Research Center at Washington State University represented by Candiya Mann, Senior Research Manager. As a result of the late introduction of the external evaluator, the Center was forced to limit this year's evaluation to the focus Workshops and Webinars Surveys conducted during the evaluation period. However, some excellent insight was gained to the effectiveness of GeoTech's workshops.

1. Surveys of workshops presenting the GTCM were well received by the participants but additional follow-up with participants is needed to determine if use of the GTCM and Assessments tools are being implemented.
2. Feedback through the evaluation surveys of the workshop and webinar session gave the session Excellent Ratings for both Face to Face and Online session.

Recommendations:

1. Although next year's budget limitation may reduce the number of Face to Face sessions, the community building value resulting from these type sessions should not be overlooked.
2. Continue to work with the external evaluator to improve up front coordination of center activities to strengthen the evaluations process.

Appendix A: National Visiting Committee Members Present

Deidre Sullivan (NVC Chair)	Director and PI for the MATE Center
Candiya Mann (Evaluator)	Washington State University
Osa Brand (NVC Member)	Director of Education for the National Council on Geographic Education (NCGE)
Joe Francica (NVC Member)	Directions Magazine
David DiBiase (NVC Member)	Director of Education, Industry Solutions – Esri
Tora Johnson (NVC Member)	University of Maine at Machias
Marguerite Madden (NVC Member)	University of Georgia
Bill Hodge (NVC Member)	GIS Division Manager of the City of Midland, TX
Sid Shrum (NVC Member)	Greenville Technical College, South Carolina
Richard Serby (NVC Member)	GeoSearch, Inc.
Gary Jeffress (NVC Member)	Texas A&M University – Corpus Christi

Partners/CoPI's Present

John Johnson	DACUM Specialist
Rodney Jackson	Edgecombe Community College
Amy Ballard	Central New Mexico Community College
Chris Semerjian	Gainesville State College
Ken Yanow	Southwestern College

GeoTech Center Staff Present

Phillip Davis	GeoTech PI/Director
Ann Johnson	GeoTech CoPI/Associate Director
Minerva Borger	GeoTech Center Coordinator

Appendix B: NVC Agenda for 2012 Visitation

Date	Time	What
Wed. February 8th	7-8:00am	Breakfast (hot & continental) provided on location
	8-11am	Closed meeting
	9-1:30pm	NVC presentation preparation
	11-1:30pm	Working lunch provided on location
	7-9pm	Group dinner (optional)
Thurs. February 9th	7-8:30am	Breakfast (hot & continental) provided on location
	8:30-8:45am	Overview of GeoTech presentation(s): Ignite Style (10 min, 10 slides)
	8:45-9:45am	**Goal 1— Maintain the alignment of the GTCM with industry needs. (Ann Johnson—lead)** **Goal 2— Promote the use of the GTCM and GTCM-based curriculum resources by two-year college geospatial programs. (Chris Semerjian—lead)** 30 Minute NVC give & take on prior goals 10 minute break
	9:45-10:45am	**Goal 3 — Provide opportunities for faculty and student awareness of, and interaction with, the geospatial technology industry. (Amy Ballard—lead)** **Goal 4—Provide opportunities for faculty professional development. (Ken Yanow—lead)** 30 Minute NVC give & take on prior goals 10 minute break
	10:45-11:45am	**Goal 5—Maintain an educational resource clearinghouse. (Phillip Davis—lead)** **Goal 6—Improve access to geospatial technology education for rural and underrepresented populations. (Rodney Jackson—lead)** 30 Minute NVC give & take on prior goals
	11:45-12pm	**Evaluation plan update from Ms. Candiya Mann, Center Evaluator.**
	12-1pm	Lunch provided on location
	1-5pm	Closed session
	7-9pm	Informal dinner on our own
Fri. Feb 10th	7-8:30am	Breakfast on your own
	8:30-12pm	NVC report out to CoPIs