

Project Summary

The **National Geospatial Technology Center (NGTC)** is a collaboration of community and technical colleges, universities, and industry, with the primary mission to increase the quantity, quality, and diversity of workforce technicians in the geospatial technology industry. The NGTC will focus on serving the needs of the two year college educator and student. The following goals will be met to realize the mission of the NGTC:

Goal 1: Increase the capacity of community and technical colleges to educate geospatial technicians through increased partnerships between colleges, universities, government, and industry and specifically serve as a conduit between other NSF projects and Centers using the technology.

Goal 2: Increase the number of students enrolled in geospatial technology coursework and programs.

Goal 3: Create a national clearinghouse of exemplary geospatial curriculum material and a national geospatial database web service, aligned with nationally recognized core competencies.

Goal 4: Increase the number of community and technical colleges, secondary schools, and universities participating in articulation to promote geospatial education.

Goal 5: Increase the number of community college, technical college, and secondary school teachers participating in geospatial professional development.

Intellectual Merit

The NGTC will unify the efforts to maintain and disseminate the latest in geospatial education and technology nationwide. The intellectual merit of the NGTC results from its emphasis on the need to continuously update occupationally-based education material for the geospatial workforce. This high-tech field is evolving exponentially. For example, Google Earth, unknown before 2005, surpassed 200M downloads in 2007. Each new release of GIS software essentially voids much of the training and educational material currently employed by geospatial educators. Other geospatial technologies, like GPS and remote sensing, and the expanding available new geodatabases, are all undergoing a similar rapid change. The efforts of the NGTC will expand the body of knowledge available to students, educators, researchers, and employers in the geospatial technology industry.

Broader Impacts

As the central repository of two-year college geospatial programs, the broader impact of the NGTC is to provide a single focal point for the latest technology that will benefit educators at all levels, as well as researchers, business/industry, governmental and military entities, and international users of geospatial technologies. The work of the NGTC will establish models for exemplary geospatial programs in terms of technology, curriculum, articulation, and workforce education well into the 21st century. The NGTC will disseminate using a database-enabled website to collect, evaluate, and disseminate the latest in occupational education material. The extensive network of partners is committed to education, presentation, and public awareness activities to expand dissemination to all areas of the US. All NGTC partner institutions will engage a student population of under-represented minorities and women as the next generation of geospatial science students.

Motivating Rationale

The importance of Geospatial Technology to the US economy has been recognized by the Department of Labor in their *2003 Presidential High Growth Job Initiative*. Geospatial Technology, along with Biotechnology and Nanotechnology, was identified as one of the top three growth areas for the US workforce in the 21st century. While the ATE program has funded many GIS-related projects under numerous disciplines, it has never focused on a single unified source for curriculum, data, and training materials that are so critically needed by colleges and universities. Planning for this project began in Denver in August, 2006, at the first advisory committee attended by the PI and several CoPIs. The team met again at the *Envisioning a National Geospatial Technology Resource Center* research project conducted in Monterey, CA, in January 2007. Fifty participants from colleges and universities across the nation concurred with the advisory committee that NSF should prioritize funding for a center of excellence dedicated solely to the field of geospatial technology. The committee will issue a final report during summer 2007, which will be incorporated into the NGTC full proposal in October 2007.

Workforce Needs and Academic Alignment

One of the major issues arising from the National Forum was the need to more closely align geospatial curriculum with precise workforce “pathways” in order to more accurately reflect industry needs in technician education. A thorough review of existing Developing A Curriculum (DACUM) studies nationwide by Hugh Howard revealed a paucity of current workforce data. Only four DACUM efforts of any significance were found in his review of the literature, and these were all out of date in this rapidly changing field. The study revealed that of the 100 unique skills identified in the four DACUMs, only 25% appeared in all four, and only 10% could be termed common to all. This reveals the uniqueness of each specialty in the geospatial fields, and the difficulty of establishing a one-size-fits-all curriculum. The study provides an excellent baseline for what is known of the geospatial workforce needs nationwide.

One objective of the NGTC will be to update the DACUM database in each major region of the nation. The strengths of the NGTC partnership are 1) the broad geographic diversity of the partners, and 2) the diversity of geospatial specialties among the partners. This breadth of expertise will be critical in assessing and serving the wide diversity of specialties within the geospatial workforce. The NGTC proposes to complete a DACUM at each of its CoPI campuses and coordinate the results for correlation. Data collected will become the basis for the more ambitious goal of aligning these DACUM findings with new Career Pathways through the University Consortium Geographical Information System (UCGIS) Body of Knowledge (BoK) document. These pathways will be used by the NGTC to provide a precise taxonomy of the exemplary curriculum material to be catalogued and disseminated by the NGTC website. Another proposed project (June 2007), *Delineating Curricular Pathways through the GIS&T Body of Knowledge*, has Ann Johnson and Phillip Davis as CoPIs. The purpose of this additional project is to map precise career pathways for specific geospatial specialties through the BoK document. The result will provide a detailed description of the competencies needed by technicians in specialties of the geospatial industry. The synergy between these two grants will allow better articulation of NGTC and UCGIS research efforts into curriculum alignment between colleges and universities.

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Goals—Objectives—Activities

- 1. Increase the capacity of community and technical colleges to educate geospatial technicians.**
 - 1.a. develop a baseline measurement of existing geospatial programs in community and technical colleges.
 - 1.b. provide peer mentor links between secondary school teachers and/or college faculty and/or industry representatives to increase professional collaborations.
 - 1.c. conduct peer review and catalog relevant ATE Centers and projects related to geospatial technology and disseminate to partner schools and colleges and visitors via the NGTC website.
 - 1.d. secure new industry partners for schools and colleges nationwide to increase their capacity to locate relevant technical information from experts and opportunities for the teachers and students.

- 2. Increase the number of students enrolled in geospatial technology programs.**
 - 2.a. determine a baseline of current college and secondary enrollments at member institutions.

- 2.b. track the number of students moving through the education pipeline at member institutions to determine local, regional, and national capacity for meeting industry needs for technicians.
 - 2.c. provide national awareness of geospatial technology job opportunities to students, parents, teachers, counselors, state workforce agencies, etc.
 - 2.d. increase the number of women, minority, and underrepresented groups in geospatial technology internships and work training.
 - 2.e. research and catalog innovative geospatial teacher-preparation programs nationwide and model and replicate these programs to member schools and colleges.
- 3. Create a national clearinghouse of exemplary geospatial curriculum material and a national geodatabase web services, aligned with nationally recognized core competencies.**
- 3.a. catalog those exemplary learning objectives, modules, courses and programs from sources nationwide.
 - 3.b. provide relevant and up-to-date geodatabases for the learning community for remote access to geospatial information.
 - 3.c. create a state-of-the-art functional website with full search features for clearinghouse material based upon learning outcomes, grade level, level of expertise, and workforce application criteria.
 - 3.d. provide a peer-review system for ascertaining the quality and usability of learning material submitted to the NGTC clearinghouse website for dissemination.
- 4. Increase the number of secondary schools, community and technical colleges, and universities participating in articulation to promote geospatial education.**
- 4.a. collect and identify exemplary articulation models from partner schools and colleges nationwide (with continuous revision).
 - 4.b. create searchable database of articulation agreements nationwide for dissemination via NGTC website.
 - 4.c. identify grade-level appropriate material for teaching geospatial awareness.
 - 4.d. disseminate learning materials and exemplary programs to schools and college nationwide.
- 5. Increase the number of community and technical college and secondary school teachers participating in geospatial professional development.**
- 5.a. increase the number of community and technical college faculty participating in relevant professional organizations.
 - 5.b. research, collect, and disseminate widely the best in informal education offerings nationwide.
 - 5.c. provide training to schools and colleges nationwide through the network of partners on exemplary models for creating and sustaining professional development of geospatial teachers at both the college and secondary levels.
 - 5.d. provide model curricula, online courses, summer faculty internships, and other teacher preparation activities
 - 5.e. create partnerships with state and regional education agencies through NGTC partner schools, colleges, and universities to promote dual credit and Tech-Prep articulated courses in the most effective and efficient method.