ESTABLISHING THE GEOSPATIAL TECHNOLOGY APPRENTICESHIP PROGRAM

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Abstract: The geospatial workforce has been recognized as one of the nation’s high growth labor force needs areas for the 21st century. With the support of NASA and the U.S. Department of Labor, the Workforce Learning and Performance Center at the University of Southern Mississippi has received significant support to establish and benchmark a pilot geospatial apprenticeship program at Stennis Space Center on the Gulf coast of Mississippi. This geospatial apprenticeship program has followed established guidelines from the U.S. Department of Labor and will serve to establish the apprenticeship standards for the geospatial specialist for the U.S. Examples of the geospatial apprenticeship process and its benefits and capabilities for existing geospatial companies will be discussed.

INTRODUCTION AND BACKGROUND

The development of a trained workforce in the geospatial technology industry remains a critical need for the future growth of that industry. Recognizing this, NASA’s Stennis Space Center, which is the lead center for Earth Science Applications, sought to build a process that could begin to address this critical need. Partnering with the Workplace Learning and Performance Center (WLPC) at the University of Southern Mississippi, the development of a competency-based approach to geospatial workforce training and development was accomplished. This competency model identified 12 roles that are prevalent in the geospatial technology industry, and linked competencies required for this industry that cut across these 12 roles. As a result of this industry-based assessment, the Geospatial Technology Competency Model (GTCM) represents the most advanced workforce development approach to training geospatial technologists currently available today.

Subsequent to the development of the GTCM, interest has continued to grow with respect to the implementation of this workforce development tool. In the spring of 2003, this interest reached the Department of Labor’s Business Relations Group (DOL-BRG), which is charged with identifying high growth industries that can be targeted for DOL support to provide a well-trained workforce to meet these high growth industry needs. Given that the geospatial technology industry had already been identified as a high growth industry, DOL-BRG sought to pilot test a workforce training approach, built upon the WLPC’s existing GTCM workforce model.

Through a coordinated partnership with WLPC and the DOL-BRG, the establishment of a workforce training pilot program for the geospatial technology workforce was established in July of 2003. This DOL-supported pilot program, known as the Geospatial Technology Apprenticeship Program (GTAP), seeks to use existing DOL programmatic assets to demonstrate an implementation of the GTCM competency model for that industry. The nature of this program, as well as the steps taken to implement it in a geospatial employer environment, is described below.

SUPPORT FOR AN APPRENTICESHIP MODEL FOR GEOSPATIAL TRAINING & DEVELOPMENT

Critical to the implementation of the GTAP has been the recognition that DOL’s own apprenticeship program approach is ideally suited to train this industry’s workforce. There are several benefits that a DOL certified apprenticeship approach could bring to training geospatial employees. First, apprenticeship models are well established in the U.S., with thousands of occupations that have used an apprenticeship approach since the late 1930’s. The institutional knowledge DOL has concerning apprenticeship could be leveraged by the WLPC to apply this same approach to training geospatial technology employees.
Secondly, the creation of a DOL-certified apprenticeship program for the geospatial technology workforce provides a standard, certificate-based approach that follows established apprenticeship guidelines established by the U.S. government’s Department of Labor. Since the training and development of these employees will follow an approved set of standards for geospatial training, employees who are trained and certified by DOL will receive an apprenticeship certificate recognized nationwide, thus eliminating the unknown capabilities that a potential employee may have with respect to geospatial technologies.

Third, DOL apprenticeship programs require a quantifiable and verifiable standard for on-the-job learning (OJL) and the related instruction that employees and employers must follow to successfully achieve certification. This requirement places the employer and employee in a partnering arrangement, with clear expectations that the employer will appropriately provide OJL experience in the actual workplace. Geospatial apprentices are not simply trained in related instruction (i.e. classroom environments), but are paid employees of their apprenticeship-sponsoring employer, who is directly responsible for their OJL training. As a result, a standard for on-the-job experience, coupled with classroom instruction, is used to synergistically expose new geospatial employees to geospatial tools and how these tools are used in a host employment environment.

Finally, the use of an apprenticeship model benefits employers, since they are required to engage and provide documentation for their geospatial apprentices on their OJL experience. Based upon anecdotal evidence, training for geospatial employees in the past has often been based upon a hope that, given enough time, the employee will on their own eventually learn what is need in the work setting. Over time, employers who use the GTAP program will recognize that it is in their own best interests to take an active role in the training of their geospatial technology employees. Training in an apprenticeship model directly leads to a more productive geospatial apprentice, who can integrate classroom instruction with their existing employer’s workplace needs, and thereby be more productive in the long run.

BUILDING THE GEOSPATIAL TECHNOLOGY APPRENTICESHIP MODEL

Using the Mississippi Gulf Coast region and the Stennis Space Center as GTAP pilot locations, the formation of the GTAP was begun in July, 2003. Several steps have been conducted to support this development. These steps have been undertaken with the support and guidance of geospatial technology employers from the pilot locations, junior colleges in the pilot location areas who are charged with providing the classroom instruction for GTAP apprentices, DOL’s Office of Apprenticeship Training, and the WLPC of the University of Southern Mississippi.

As mentioned previously, the creation of a DOL-certified apprenticeship program requires that the GTAP create and meet national standards with respect to classroom instruction and OJL experience. To accomplish this, GTAP staff has built both a training matrix for OJL and classroom instruction and a set of apprenticeship standards that have been accepted and adopted by DOL as the program standards for an apprenticeship program focused on geospatial technology. Central to this training matrix is the GTCM competency model, and its relation to classroom related instruction and OJL experience. These standards provide DOL with an apprenticeable occupation for geospatial employees known as the geospatial specialist. These standards, since they are national in scope, allow other interested employers, educational institutions, and related partners to adopt these standards to create apprenticeship programs in other parts of the U.S.

In addition to the development and adoption of apprenticeship standards for the geospatial specialist, building the GTAP requires the establishment of an apprenticeship committee. This apprenticeship committee is charged with managing the apprenticeship program in the pilot locations, and is made up of geospatial employers who direct the program. As a result, the GTAP is employer-driven, and focused on
the individual needs and workforce requirements of employers in the pilot area locations. The apprenticeship committee accepts apprentices for training, verifies and validates geospatial employers with respect to the apprenticeship standards and their compliance, and provides education and outreach for the general GTAP pilot program.

Also, the establishment of GTAP requires that apprentices achieve training provided by junior colleges in the pilot location, using accepted curriculum to provide the necessary classroom theory and basic software knowledge that is then applied in the employment setting. To accomplish this, and ensure that this instruction and OJL experience follows the GTCM competency model, GTAP staff is conducting a mapping of this curriculum to the GTCM roles, competencies, and outputs. Through this mapping activity, the research-derived GTCM can appropriately be applied, thus ensuring that the industry-derived competency model can be integrated and implemented within the apprenticeship model.

Finally, the GTAP program uses an ROI approach to capture the effectiveness of the pilot program, and to examine how well an apprenticeship approach can successfully lead to productivity within the workplace environment of a geospatial technology organization.

**SUPPORT INITIATIVES FOR GTAP**

In addition to the support and general program components provided by DOL to establish the GTAP program, other efforts by WLPC are incorporated or are available to facilitate the pilot program. For example, to capture existing employer workforce needs, an assessment program is available to GTAP employers. This assessment program captures the employment needs of an organization with respect to the roles, competencies, and outputs identified by the GTCM competency model those organizations need. In addition, geospatial employers have access to the WLPC’s Geospatial Technology Readiness Scorecard, a research-based instrument that determines the degree to which an organization is able to successfully implement a competency-based workforce development approach to address their workforce needs. Finally, a learning management system (LMS) is a component part of the GTAP. This LMS provides a database management approach to managing apprenticeship training within the GTAP program.

Each of these support initiatives is designed to provide support for employers, geospatial specialist apprentices, or for program management. Used together, they can streamline the implementation of the pilot program, or provide benefits to individual apprentices or employers as they progress through the pilot program.

**FACTORS TO CONSIDER FOR IMPLEMENTATION**

The development of a DOL-certified apprenticeship approach to geospatial technology training and development represents a new step in building the geospatial workforce. Past approaches to geospatial training have either focused heavily or exclusively on classroom instruction, without the benefit of actual workplace application. Conversely, many geospatial employers have consigned the training of their geospatial employees to the employees themselves. These employees are given little or no guidance with respect to their knowledge and understanding of the background and theory related to geospatial technologies, and are left to their own devices with respect to software training.

Through a DOL-certified apprenticeship approach, the geospatial employee gains both a knowledge and understanding of these technologies through classroom instruction, as well as a supervised hands-on application of these technologies in actual workplace settings. Throughout this approach, these apprentices are fully employed by their respective organization, and receive the added benefit of
achieving an apprenticeship certificate recognized at the national level that can be used for employment at other organizations that employ geospatial specialists.

The initial development phase of the GTAP program has already completed many of the steps needed to allow for replication of the pilot program. Several factors should be considered, should a geospatial employer, educational institution, or local partnership be interested in replicating the GTAP apprenticeship approach. These factors include:

- Are there established employers in our area that can benefit from an apprenticeship program in geospatial technology?
- Are these employers willing to recognize and commit to a training and development program that entails an established commitment on their part to provide supervision of the apprentice?
- Is there a willingness to work with junior colleges or other educational institutions to provide the required classroom instruction for geospatial technology, and will the instruction delivery accommodate work schedules?
- Can the area attract and maintain a viable number of individuals interested in becoming apprentices in geospatial technology?
- Is the area willing to commit time and energy in establishing a geospatial specialist apprenticeship committee, and provide the necessary administrative support to manage DOL reporting requirements?

To succeed, the above factors represent critical areas that should be addressed or understood prior to adopting an apprenticeship approach to training geospatial technology workers. Given the current progress of the GTAP pilot program on the Mississippi Gulf Coast, there appears to be substantial benefits that can be built using an apprenticeship approach to training and development a geospatial technology workforce. The creation of a DOL-certified apprentice can have significant impact on geospatial technology organizations, or organizations that use these technologies to accomplish organizational goals or objectives. It is our hope that further adoption of this approach continues into the future.
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