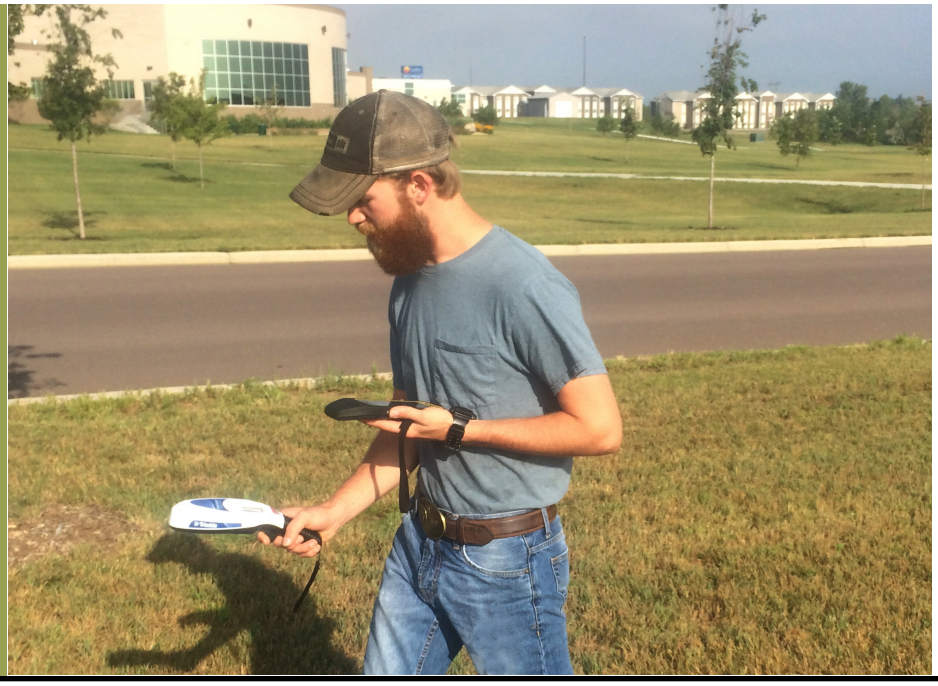

Precision Technology Specialist

Program Expansion

Presented to the
South Dakota
State Board of Education
November 2015

For Implementation Fall 2016

Mitchell Technical Institute
1800 East Spruce Street
Mitchell, SD 57301

Mitchell Technical Institute

Precision Technology Specialist Program Expansion

Length of Program: Two options (two-year AAS and one-year Diploma)

Number of Students: 24 (AAS) and 12 (Diploma)

Projected Start Date: Fall 2016

Executive Summary

It is the intent of MTI to expand the Precision Technology Specialist program to meet a growing need for a skilled workforce trained in the high-demand precision technologies of GPS, GIS, geospatial mapping, and data management. MTI proposes adding a GPS/GIS Mapping Technology diploma option; we also propose renaming our AAS degree to reflect its strong emphasis on GPS technologies in agriculture. This expansion is the next step in fulfilling MTI's vision for precision technologies as originally presented in the Program Proposal to the State Board of Education in 2010.

MTI proposes adding a diploma option to fill a workforce need for mapping skills using GPS/GIS technologies. Advisory boards for MTI's programs including Power Line, Propane and Natural Gas, Telecommunications, and Automation Controls/SCADA have consistently articulated a need for employees with mapping skills. We believe a one-year diploma option would fill this need for a wide cross-section of industries and government entities in South Dakota and the Midwest who depend on mapping for building roads, municipal planning, emergency response systems, railway safety and operations, and utilities construction and maintenance, to name just a few.

MTI also proposes changing the name for the AAS option. We began the Precision Technology Specialist program in 2011 with a slant towards agriculture to fill a high demand for these skills in the agriculture industry in South Dakota. The AAS degree program curriculum incorporated courses in computers, GPS, data collection, agronomy, and agriculture economics to prepare graduates to use precision

technologies in the agriculture industry. Graduates have gone to work in equipment sales and service, dealerships, and farm cooperatives, and the program remains strong in enrollment and placement. We would like the current AAS degree's name to be changed to "Precision Agriculture Technician" to better reflect the ag-oriented curriculum and jobs for which this degree prepares its graduates.

MTI believes the Precision Agriculture Technician AAS option and the GPS/GIS Mapping Technician diploma option, as well as the GPS/GIS technology courses that have recently been incorporated in other existing programs, work together to more effectively achieve the goals of the Precision Technology Specialist program to "meet all the needs of current and future industry trends" (2010 Program Proposal to the SDBOE).

Identification and Description of Program Expansion

Mitchell Technical Institute proposes to expand the Precision Technology Specialist program beginning in Fall 2016. The demand for employees with training in geospatial data processing and technologies is growing across industries and is outpacing the companies' ability to train employees. A new diploma option focusing on GIS (geographic information systems), data collection and management, remote sensing, and mapping would prepare graduates to enter a variety of industries from utilities to transportation to communication, all critical components of the economy of South Dakota. The one-year GPS/GIS Mapping Technician diploma would fill an essential workforce need.

MTI also proposes a name change for its Associate of Applied Science degree in this program. The two-year AAS option was designed to support the precision agriculture industry and curriculum includes courses in guidance systems, variable rate systems, electronics, wireless communications, ag sales, agronomy, and GPS/GIS. It is proposed that this degree option be renamed "Precision Agriculture Technician."

Objectives and Purpose

The Precision Technology Specialist program at Mitchell Technical Institute will continue to be dedicated to offering students the experience and overall training to become a successful precision technician. The program will continue to provide attention to professionalism, communication and technical skills. Objectives of the program include helping students to:

- Understand the basic purposes and concepts of precision technologies
- Understand basic principles of the various tools of precision technologies including GPS and GIS
- Recognize the use of these tools to collect data, analyze data, manage data, and use the information to make a decision
- Describe justifications that demonstrate the economic or environmental benefits of precision

technology

- Communicate effectively through both oral and written means
- Demonstrate a professional attitude and work ethic
- Apply reasoning and critical thinking to solve problems and seek information
- Work cooperatively in a team environment
- Use computer technology within a field of study
- Apply technical skills required of an entry-level technician in a chosen field

Methods of Attaining the Objectives of the Program

Pending approval of this program expansion, MTI will develop marketing materials and recruit students for its new diploma option and newly renamed AAS option. Current instructors in the Precision Technology Specialist program, with guidance from the advisory committee, will finalize course syllabi, purchase any additional equipment and software, arrange classrooms, develop schedules, and secure resource materials.

MTI provides assurance that it possesses the resources and staff necessary to:

- Develop marketing materials and recruit students
- Recruit and supervise qualified staff
- Assess the abilities of students for good program and course placement
- Provide tutoring for students needing extra academic help
- Provide access to library materials and computer labs
- Develop and administer budgets
- Make available textbooks and other instructional resources
- Provide career and personal counseling to students
- Evaluate programs and staff
- Assist students in finding jobs
- Secure input from industry through advisory committees
- Maintain membership in professional organizations and provide time and fiscal resources for professional development
- Provide financial aid and scholarships
- Provide for internships
- Provide a typical technical institute climate
- Assist students with housing and provide daytime food service
- Provide services to disabled and nontraditional students
- Provide classrooms and laboratories
- Provide a variety of general education courses

Description of the Needs Based on Labor Market Demands

Career opportunities for diploma graduates:

- GPS technician
- Survey technician
- Survey field technician
- Mapping technician
- GIS specialist

According to the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook, "Employment of surveying and mapping technicians is projected to grow 14 percent from 2012 to 2022, about as fast as the average for all occupations. Recent advancements in mapping technology have led to new uses for maps and a need for more of the data used to build maps. As a result, surveying and mapping technicians are expected to have more work…., *prospects will be best for those who are trained in geographic information systems (GIS)*." (Emphasis added by MTI.) (Source: http://www.bls.gov/ooh/architecture-and-engineering/surveying-and-mapping-technicians.htm)

SOC Code	Occupational Title	2012 Employment	2022 Employment	Numeric Change	Percent Change	Average Annual Demand for Workers
17-3031	**Surveying and Mapping Technicians**	**165**	**190**	**25**	**15.2%**	**6**

Source: https://dlr.sd.gov/lmic/occupation_projections_2012_2022.aspx

Graduates with skills produced in the program would find employment in a variety of fields and positions; the occupational code does not fully represent all job titles where graduates would find employment so provides an incomplete picture of the job outlook. MTI has consistently heard from its advisory boards across many industries that there are not enough technicians skilled in GPS/GIS and mapping technologies. Their companies are increasingly relying on these technologies for planning, development, and maintenance activities within their respective industries. We anticipate graduates of the GPS/GIS Mapping Technician program to be employed in a variety of industries: mining, quarrying, and oil and gas extraction; utilities and communication; construction; manufacturing; transportation; and forestry and water resources.

Population Served

The program is available to any applicant who has successfully completed the admission requirements set by Mitchell Technical Institute. MTI does not discriminate in its educational programs on basis of race, color, creed, religion, age, sex, disability, national origin or ancestry. The program will draw its students from South Dakota and surrounding states. This program will not only be targeted at traditional-age college students, but will also be appealing to career changers and employed individuals who need formal education in geographic information systems and applications.

Projected Three Year Budget

Costs for the development of a new diploma option will be very manageable. Current instructors in the Precision Technology Specialist department have the educational and experiential backgrounds to teach the courses that will be incorporated into the curriculum. Mitchell Technical Institute was fortunate to receive a grant in support of energy workforce development that allowed us to purchase the equipment and develop the curriculum for GPS/GIS technologies courses for our energy programs. MTI has the GIS software, CAD software, Trimble GPS units, iPads, drone, and Trimble Business Center software already on hand, so purchases of equipment and supplies will be minimal.

	2015-2016	2016-2017	2017-2018	2018-2019
Salaries/Benefits	$0	$0	$0	$0
Equipment	$0	$5,000	$5,000	$5,000
Supplies	$0	$5,000	$5,000	$5,000
Travel	$2,000	$2,000	$2,000	$2,000
Marketing	$2,500	$2,500	$2,500	$2,500
TOTAL	**$4,500**	**$14,500**	**$14,500**	**$14,500**

Program Competencies and Entry and Exit Points

Entry point will be the fall of 2016. The exit point will be at the completion of coursework. Graduates will receive a diploma in GPS/GIS Mapping Technician or an AAS degree in Precision Agriculture Technician. Graduates must maintain an overall GPA of 2.0 to graduate. The curriculum will have defined and assessed learning outcomes that will be reviewed and approved by a program advisory board. Additionally, MTI will adhere to any future guidelines or certifications set by industry.

Statement of Non-duplication

MTI is not aware of a similar one-year technical program offered in South Dakota. South Dakota State University offers a certificate in Geographic Information Sciences geared towards geographers, especially employees of the EROS Data Center, who need specialty training in GIS analysis and software. SDSU also offers a bachelor of science degree in Geographic Information Sciences, a four-year major option in the university's geography department, while the South Dakota School of Mines and Technology offers a minor in Geospatial Technology for its science and engineering students. In contrast, MTI's diploma option will emphasize the usage of GPS hand-held units, collecting data, and mapping data with wide application in many industries and government sectors. We believe the technical, hands-on focus of our proposed diploma is uniquely suited to our mission to "provide skills for success in technical careers" and not available at any other institution in the state.

Proposed Curriculum and Course Descriptions – GPS/GIS Mapping Technician (diploma)

FIRST SEMESTER (Fall)

PTS	XXX	Introduction to GIS	4 credits
PTS	XXX	GPS Data Collection & Management	4 credits
PTS	XXX	CAD I	2 credits
CIS	105	Complete Computer Concepts	3 credits
ENGL	110	Workplace Communications	3 credits
SSS	100	Student Success	1 credit
			Total Semester Credits: 17

SECOND SEMESTER (Spring)

PTS	XXX	Cloud-based GPS/GIS Applications	2 credits
PTS	XXX	Advanced GIS Problems and Analysis	4 credits
PTS	XXX	Remote Sensing	3 credits
PTS	XXX	CAD II	2 credits
BUS	216	Spreadsheet Concepts and Applications	3 credits
MATH		Math Elective	3 credits
			Total Semester Credits: 17

COURSE DESCRIPTIONS

Introduction to GIS –This course introduces tools and techniques of data creation, data integration, mapping, and spatial analysis in geographic information systems (GIS). Students will create geodatabases for field GPS data collection. The course will incorporate hands-on use of ESRI Arc Map.

GPS Data Collection and Management – Students will be introduced to basic GPS principles including GPS corrections, constellations, navigation and primary industry uses. Students will have hands-on experience with different data collection techniques using Trimble GPS devices. Workflow procedures and geodatabase implementation will be practiced.

Advanced GIS Problems and Analysis – This course will be a continuation of Intro to GIS. Students will also be involved in GIS modeling, problem solving, planning, and geo-referencing CAD plans for utility

and construction purposes.

Cloud-based GPS/GIS Applications – Students will work with mobile GPS/GIS products including but not limited to ESRI, Trimble, and AgTerra products. The course will focus on collecting data and uploading to cloud-based services. It will also cover the online cloud-based GIS services available to analyze collected data.

Remote Sensing – The course will focus on the implementation and interpretation of remotely collected data. Students will have access to MTI's Trimble UX-5 for top of the line drone imagery. They will also have access to satellite and other aerial images to analyze, create data, and make decisions.

CAD I - This course introduces computer-aided drafting software for specific technologies. Emphasis is placed on understanding the software command structure and drafting standards for specific technical fields. Upon completion, students should be able to create and plot basic drawings.

CAD II - A continuation of CAD I moving onto advanced techniques. Advanced AutoCAD concepts such as assigning data to blocks and importing and exporting of AutoCAD files from and to other software are all covered. The majority of this class is in 2D drawing however 3D isometric views are covered.

National Wage Factor

In 2014, the mean annual wage for surveying and mapping technicians was $43,870.[1] Mapping technicians require postsecondary education while surveying technicians typically can be hired with a high school education. Consequently, mapping technicians will earn a higher wage. [2] The median annual wage for "drafters, engineering technicians, and mapping technicians" is $51,720.[3]

Surveying and mapping technicians typically work full time but may have longer hours during the summer, when weather and light conditions are most suitable for fieldwork.

[1]Source: Bureau of Labor Statistics 2014 wage data, on the Internet at http://www.onetonline.org/link/summary/17-3031.00#JobOpenings

[2]Source: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2014-15 Edition, Surveying and Mapping Technicians, How to Become One, on the Internet at http://www.bls.gov/ooh/architecture-and-engineering/surveying-and-mapping-technicians.htm (visited October 14, 2015).

[3]Source: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2014-15 Edition, Surveying and Mapping Technicians, Pay, on the Internet at http://www.bls.gov/ooh/architecture-and-engineering/surveying-and-mapping-technicians.htm (visited October 14, 2015).

South Dakota Wage Factor

The average annual wage for Surveying and Mapping Technicians in South Dakota is $39,195, according to the South Dakota Labor Market Information Center's June 2015 estimates. The 25th quartile (similar to a starting wage) is $14.79 per hour. The highest paid technicians are in the eastern region of the state (where MTI is located) and account for 25% of those employed in the state.

Source: SD Labor Market Information Center (http://apps.sd.gov/ld54lmicinfo/WAGES/OWLISTPUBA.ASP)

CIP Code

45.0702 – Geographic Information Science and Cartography

A program that focuses on the systematic study of map-making and the application of mathematical, computer, and other techniques to the analysis of large amounts of geographic data and the science of mapping geographic information. Includes instruction in cartographic theory and map projections, computer-assisted cartography, geographic information systems, map design and layout, photogrammetry, air photo interpretation, remote sensing, spatial analysis, geodesy, cartographic editing, and applications to specific industrial, commercial, research, and governmental mapping problems.

ATTACHMENT A

LARSON
UTILITY SOLUTIONS

601 Lincoln Ave NW
Huron, SD 57350

T: 605.352.9638
E: support@larsonus.com

23 September 2015

Mr. Mark Wilson, President
Mitchell Technical Institute
1800 East Spruce Street
Mitchell, SD 57301

Dear Mr. Wilson:

I am writing on behalf of Larson Utility Solutions to express my support for the proposed GIS/GPS Technical diploma program at Mitchell Technical Institute. My name is Nathan Sommers and I am a GIS Analyst with Larson Utility Solutions.

Larson Utility Solutions is based in Huron, SD and provides GIS services to the majority of eastern South Dakota's Rural Electric Associations and many other private clients and utility companies. Our services range from high-accuracy GPS collection of new underground facilities to preforming site-suitability analysis for proposed construction. We rely heavily on well-trained GIS technicians to do the best work possible with this constantly evolving technology.

While the need for well-trained GIS technicians is always present, what we regularly find is that these positions go unfilled as students have little to no knowledge of GIS outside of agriculture applications. With so few employees to choose from, we often times face the challenge of choosing which projects we are able to take on with our small staff. Having a program developed to focus more on GIS for utilities and general practice would be an immense benefit to not only us, but to the state and region as a whole. South Dakota is lacking behind other states in their use of GIS in both public and private sectors. Few people know what a powerful tool GIS is and even less know how GIS can be used to make their workflow easier. With powerful technology like this finding its place in more and more fields, Mitchell Technical Institute could help to bridge the gap in local and regional education in GIS technology.

We strongly urge the approval of this program and look forward to working with MTI in support of the GIS/GPS Technical program.

Thank you.

Sincerely,

Nathan Sommers

Bret Atkins
Sr. Human Resources Manager
Bret.atkins@blackhillscorp.com

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Mr. Mark Wilson, President
Mitchell Technical Institute
1800 East Spruce Street
Mitchell, SD 57301

Dear Mr. Wilson:

I am writing on behalf of Black Hills Corporation to express my support for the proposed GIS/GPS Technical diploma program at Mitchell Technical Institute. My name is Bret Atkins and I am a Senior Human Resources Manager with Black Hills Corporation Rapid City South Dakota.

Black Hills Corp. (NYSE: BKH) is a growth-oriented, vertically-integrated energy company with a tradition of improving life with energy and a vision to be the energy partner of choice. Based in Rapid City, S.D., the company serves 785,000 natural gas and electric utility customers in Colorado, Iowa, Kansas, Montana, Nebraska, South Dakota and Wyoming. The company also generates wholesale electricity and produces natural gas, oil and coal. Black Hills Corp.'s more than 2,000 employees form partnerships and produce positive results for our customers, communities and shareholders. More information is available at www.blackhillscorp.com.

While the need for well-trained GIS/GPS technicians is always present, students have little to no knowledge of GIS/GPS outside of agriculture applications. Having a program developed to focus more on GIS/GPS for the energy industry and general practice would be an immense benefit for Midwest region as a whole. Few people know what a powerful tool GIS/GPS is and even less know how GIS/GPS can be used to make their workflow easier. With powerful technology like this finding its place in more and more fields, Mitchell Technical Institute could help to bridge the gap in local and regional education in GIS technology.

We strongly urge the approval of this program and look forward to working with MTI in support of the GIS/GPS Technical program.

Sincerely,

Bret Atkins
Sr. Human Resources Manager