The primary data collection devices used during the internship. The Total Station pictured here (left) has been replaced by a Robotic Total Station that can be operated by a single user. In order, the reflected rod is used with the total station. At right is the RTK GPS unit. The ‘bell’ on top is the receiver and the data logger used with the RTK GPS unit. Users have the flexibility of using both the traditional and robotic total station equipment, depending on their needs and the project requirements.

The RTK (Real-Time Kinematic) GPS system is used for precise positioning and surveying. It is particularly useful for indoor and underground locations where traditional GPS signals may not be reliable. The Robotic Total Station is a more advanced instrument that allows for rapid and accurate measurement of distances and angles.

The data logger (top shelf) is the device that allows the user to store information about the points collected. It records the data collected by the Total Station or the GPS unit and saves it for later processing.

Introduction

The Energy and Campus Development GIS Group partners with the UNH Geography Department to offer a GIS internship to interested candidates. The partnership has existed for several years, offering real-world, hands-on GPS and GIS experience to a wide range of Geography majors. Interns with the ECD GIS Group are given a unique on-the-job instruction in order to prepare them for a broad spectrum of potential tasks. Such tasks may include: Collection of surface and/or subsurface features using Real-Time Kinematic GPS or Robotic Total Station equipment, subsurface utility location and identification for compliance with the Dig Safe program, modification of existing Geodatabases, digitization of features in ArcGIS software, analysis and extraction of data using ArcGIS ModelBuilder, as well as many other spatially-oriented tasks.

ADA Accessibility Project – Fall 2010

During the Fall 2010 semester, the majority of intern duties involved the collection of field data using RTK GPS and the Robotic Total Station. As part of the University’s movement toward full compliance with the Americans with Disabilities Act (ADA), existing pedestrian surface feature data was verified and updated. Location of ADA parking spaces, stairs, walkway curb-cuts, walkway surface type and slope were collected and then utilized in the GIS group’s ADA web map that helps users identify ADA accessible routes on campus. Perhaps one of the most important aspects of the map is its ability to show unevenness or steepness. Patterns and color codes indicate the general texture or slope of a given pathway in order to warn users of uneven or steep terrain. In addition to outdoor surface data, individual buildings are investigated to determine their interior accessibility. Buildings on campus that lack ADA accessible entrances or necessary ramps and elevators can be identified in the Accessibility web map and avoided by persons with disabilities.

CAD Conversion Project – Spring 2011

During the Spring 2011 semester, the majority of work involved the construction of spatial models using ArcGIS ModelBuilder. The models were designed to extract specific spatial and tabular data from building drawings originally made with CAD drafting software. Using the model, room lines were ultimately converted to polygons within a feature dataset that could be more fully analyzed by ArcGIS software. Once the project is completed, planners can answer questions about all of the rooms in every building on campus at once, something that the CAD program isn’t capable of. Furthermore, ArcGIS can link the existing data to other databases on campus, allowing simple tabular data, like class schedules, chemical inventory, or space utilization, to be viewed graphically. In addition, the rooms and buildings will be georeferenced in ArcGIS, so that spatial analyses may be performed on them. In CAD, buildings are viewed one at a time, and are not spatially referenced, so spatial analysis is impossible. Once the building and room data is fully imported into ArcGIS and linked to other databases on campus, some very informative and complex spatial analyses will be possible. For example, the software can use buildings, room, chemical inventory, and space utilization data to predict which rooms would be affected by a potential gas leak and which parties to notify at any given time.

Results

Both of these are very important ongoing projects for the Energy and Campus Development GIS Group. The ADA Accessibility web map is currently in the testing phase. Collection of the data by the GIS Group and their interns will continue as needed. The CAD Conversion project is still underway as well. Constructing the models used in the project takes a great deal of patience and attention to detail. Both projects will significantly improve life on campus. These are just two of the many projects that the GIS Group handles on a day-to-day basis.

The UNH-ADA Accessibility Interactive Web Map helps users find ADA accessible routes on campus. Colors are used to show varying levels of steepness for the safety and convenience of persons with disabilities on the UNH campus.

Energy and Campus Development GIS Internship

Fall 2010 - Spring 2011
University of New Hampshire - Durham

By Jeff Nelson