Pedestrian Walkways Mapping Program
University of New Hampshire

By
Kevin Schwenzfeier & Charley Faria
UNH Facilities Information Technology GIS Internship

ABSTRACT:
Pedestrian Walkway Mapping Project was undertaken by the University of New Hampshire's Facilities Information Technology GIS Division during the spring 2006 academic semester (January to May). The purpose of the project is to obtain data points of various pedestrian walkways throughout the university campus, with a primary goal being to create a more detailed and updated GIS map with various uses being for students and faculty.
The projected consisted of three major parts: 1) gathering information on which features to concentrate on and create a geodatabase for those features on the RTK unit's data collector and ArcMap for post processing (refer to figure 6); 2) obtaining data points through field work using the RTK unit (refer to figure 1); and post process all the field collected data by constructing shape files and geodatabase feature classes in the ArcMap software.
The first portion of the project was mainly indoors, with only one trip to the field to gather information on which walkway features are most heavily used throughout the campus (an example of these features can be seen in figures 4 and 5). With those areas in mind, with the aid of Peter Lisichenko, the construction of the geodatabase for the project began. The geodatabase was created using the ArcCatalog software. It was then transferred to ArcMap for post processing and the RTK data collector for use in the field.
Field work consisted of gathering sample points of the several feature classes created in the geodatabase. Through use of the Trimble RTK unit (refer to figure 2), which maintained a constant satellite link in real time, data points were obtained and later imported into software as the primary step in the post processing of the project. The desired mapping area contained all university maintained and owned walkways, and excluded all Town of Durham pedestrian use properties.
With the understanding that the entire campus was not going to be fully mapped during the given time, it was decided that the main core area of campus should be the main area of focus (refer to figure 1). This area consisted of major paths along Main Street, College Road and Williamson Way.
Collection of data points would at time prove to be very difficult. The RTK unit is very sensitive in areas where there are trees, chain link fences and buildings. These features all interfere with the units ability to maintain a link to the satellites. When these setbacks occurred, the Disto Laser measuring tool was used in the field in what is called an offset measurement. The RTK unit was placed in an area where it could maintain a link to the satellites and the Disto unit was used to obtain the distance from the point that was needed to the RTK unit (refer to figure 3). Using a compass, Northing degree measurements were obtained from the point to the RTK unit or vice-versa. All the measurements were then entered into the data collector and a data point was stored.
The final component for the project was to post process all the collected data. The first step in processing was to import the data from the RTK unit's data collector to the Trimble Geomatics Office software. The software allowed for viewing of all the data points collected during that day's field work. This data then became GIS Files and were imported into ArcMap 9.1 for editing.
The data that was transferred to ArcMap was originally viewed as points (refer to figure 7). These points allowed the editing features of the software to create construction shapefiles (refer to figure 8 and 10). These construction shapefiles formed the framework for the geodatabase feature classes to be created (refer to figure 9 and 10). The geodatabase allowed for classification between different types of features by using different colors to represent each target.
Having not been able to finish the project, the map is not entirely complete. However, the steps that have been accomplished in the given timeframe have set the foundation for future participants of the walkway project.

RTK Unit in Use

In the field, measuring, observing, and collecting a point using the RTK GPS Unit.

RTK Unit and Disto in Use

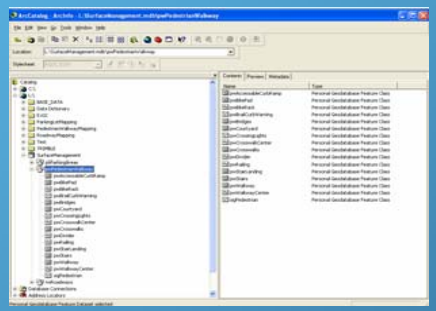
In the field, collecting a point using the offset feature in the RTK unit through the aid of the disto laser measurement tool.

Curb Ramp with Brail Curb Warning

Walkway, Bridge, and Railing

Cross section of features included in ArcCatalog geodatabase feature class library.

ArcCatalog - ArcInfo



Program used to create database for post processing; view of pedestrian walkway feature class library shown.

Core Area of UNH Campus Walkways

Aerial imagery of UNH Campus used as reference for post processing data in ArcMap software. Figure includes walkways and accessible curb ramps in shapefile and geodatabase feature class formats mapped in the campus' main core area.

Data Points

Data points collected from field work around Hamilton Smith Hall.

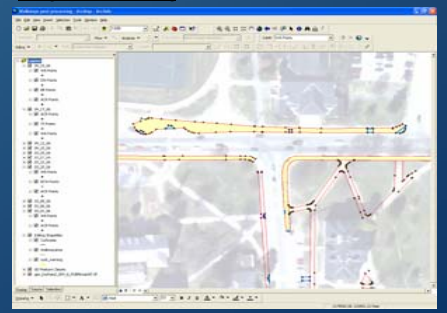
Construction Shape Files

Construction shapefiles created during post processing of fieldwork near the MUB.

Geo Databases Feature Classes

Geodatabase feature classes near Congreve Hall after creating construction shape file.

ArcMap - ArcInfo Post Processing



View of ArcMap including layers, points, construction shapefiles, and geo database feature classes.