

Summer GIS Internship at Energy & Campus Development

Field Data Collection Equipment

Photo 1: Total Station, Reflecting Rod, and RTK GPS



The Total Station and Reflecting Rod were used to survey features that could not be collected with the RTK GPS unit.

Photo 2: Radio Detection Unit



The Radio Detection Unit was used to locate subsurface Electrical and Telecom lines.

GIS Group

University of New Hampshire, Durham, NH

By Joe Guerra

Introduction

In the Summer of 2007, Joe Guerra continued his work for the University of New Hampshire (UNH) Energy and Campus Development Geographic Information Systems (ECD GIS) Group. Instead of focusing on just one specific project, Guerra undertook a variety of tasks. He continued to develop his knowledge of the RTK GPS and Total Station hardware, and ESRI ArcGIS version 9.2 software. In addition, he gained new experience with the Radio Detection Unit and Autodesk Map 6. Guerra received credit toward his Geography Major and will continue his work for ECD GIS in the future.

Technologies

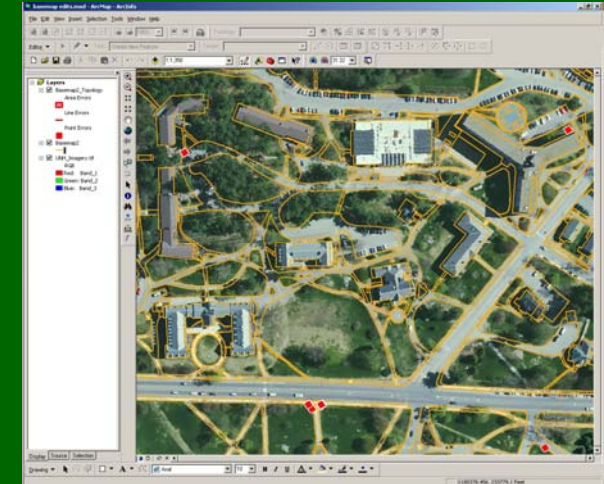
A variety of technologies were utilized throughout the summer. The RTK GPS unit and Total Station were used to collect a few remaining manholes associated with last semester's Sewer Manhole Project. The RTK GPS unit utilizes a network of 26 orbiting GPS satellites and the UNH Base Station to measure locations to sub-centimeter accuracies. The Total Station measures accurate locations using control points (mapped with RTK GPS), angles, distances, and a reflecting rod. Traverse methods were specifically used in areas where dense tree cover and building obstruction made RTK GPS data collection impossible. Traverse survey methods utilize RTK GPS established benchmarks combined with multiple Total Station positions in order to calculate feature locations over large linear distances. Guerra also started to work on the Electrical Distribution Mapping Project, which uses a Radio Detection Unit to locate subsurface features, such as electrical and telecom lines. Finally, all field collected data, regardless of collection style, was assembled, edited, and analyzed in ArcGIS 9.2, where Guerra used some of the more advanced functions available in ArcMap, ArcCatalog, and ArcToolbox.

Results

Guerra gained a true understanding of what it was like to be a GIS employee. He worked on a variety of tasks as prioritized by ECD GIS. The Sanitary Sewer Manhole Project was completed from the previous semester's work, utilizing the Total Station for data collection and Autodesk Map 6, Microsoft Excel, and ArcGIS for post processing. Guerra was responsible for editing a large area of the UNH campus Base Map in ArcMap. He also conducted a large amount of data management and editing in ArcMap and ArcCatalog to update multiple utility distribution datasets. Finally, he started the Electrical and Telecom Distribution Mapping Project using the Radio Detection unit and RTK GPS unit. Guerra's tasks changed day-to-day and he learned to be flexible but focused during his multifaceted summer internship.

Base Map Editing

Figure 3: Base Map Editing Session



Aerial imagery and Base Map data layers are especially important for ECD GIS. ArcMap was used to edit the current campus Base Map according to the most recent Aerial imagery (2005) and construction documents available. Particular emphasis was applied to editing Base Map topology errors. ECD GIS will use the updated Base Map to code all areas of campus based on primary and secondary activities. In addition, the Base Map will provide detailed attribute information for the campus.



Post Processing

Figure 1: Post Processing Traverse Area

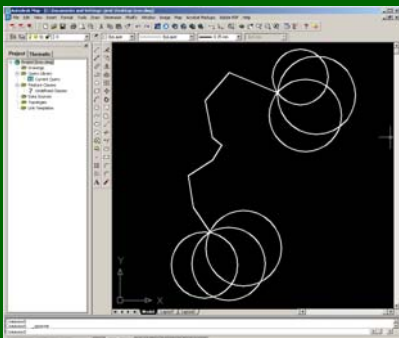
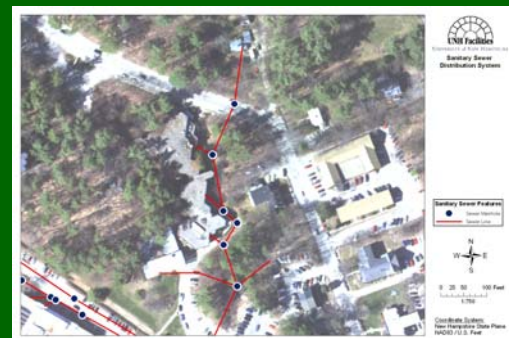


Figure 2: Assembled data in ArcMap



Traverse calculations were initially conducted in Autodesk Map 6 and then imported into ArcMap 9.2. Traverse calculations are useful in areas of dense tree and building cover.

Data Management

Figure 4: ArcMap Editing Session

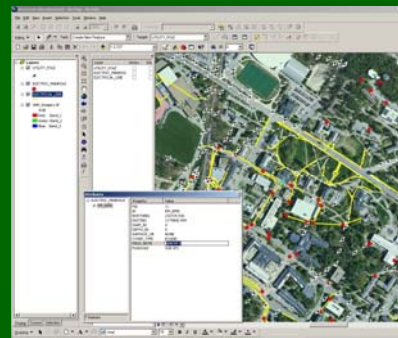
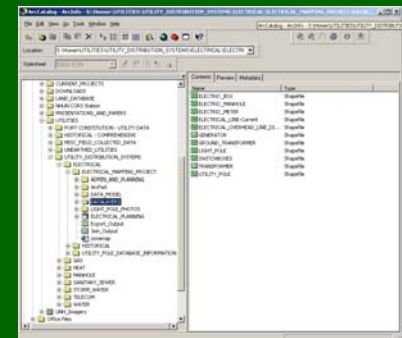


Figure 5: ArcCatalog View of Electric Data



ArcMap and ArcCatalog were used to edit and analyze historical and GPS collected electrical distribution data. All electrical data will soon be located and validated as part of the Electrical Distribution Mapping Project.