Implementing GPS to Enhance GIS at Unitil

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Presentation Overview

- Unitil Company Overview
- Overview of Unitil GIS
- Unitil GIS Facility Data
- Emergence of GPS at Unitil
- Transition to Current GPS Program
- Assessment of Program
- GPS/GIS Integration
Unitil Company Overview
Primary Lines of Business

- Natural Gas Distribution
- Distribution of Electricity
- Interstate Gas Transmission
Unutil Company Overview

Public Utility Holding Company

- Unutil Energy Systems (NH)
  29,600 (E) Capital
  44,300 (E) Seacoast

- Fitchburg Gas & Electric Light Company (MA)
  28,500 (E)
  15,120 (G)

- Northern Utilities (NH and ME)
  54,200 (G)

- Granite State Gas Transmission
  87 miles of Interstate Pipeline
Unitil GIS – Technology

- ArcGIS Desktop clients
  - ArcReader field solution
- Proprietary GIS formats: ESRI ArcSDE and Telvent ArcFM Environment
  - Designer / Session Manager
- Simultaneous, multi-user editing through versioning
- Enterprise GIS repository based on Microsoft SQL Server RDBMS
Unitil GIS – Users

- Core Editors: (ArcGIS Desktop)
  - GIS Group
  - IS Administrator
  - Electric Operations
  - Electric Engineering

- Active Users: (ArcReader)
  - Dispatch (Desktop)
  - Gas Field Operations
  - New Business
  - Gas Construction

- Casual Users: (ArcReader)
  - All Employees
Current GIS Projects

Gas
- Gas Expansion Initiative
- Emergency Preparedness
- GIS Data Modernization Project
- DIMP & IMP

Electric
- Tree Trimming
- Emergency Preparedness
- Customer Connectivity
- Outage Management System
- AMI
Unil GIS Facility Data

- Developed from a variety of basemap sources:
  - Electric:
    - MA FGE: GPS Pole Survey
    - NH Capital: Flyover
    - NH Seacoast: USGS
  - Gas:
    - MA FGE: Muni Data / USGS
    - NH: Aerial Imagery / State Data
    - ME: Aerial Imagery / Muni Data
- Maine Gas GIS:
  - Robust landbase acquired from municipalities
  - GPS data to reinforce positional accuracy of source data
Before GPS

- Raster maps were used and only relative accuracy was considered.
- Paper records were relied upon which degrade over time.
- GPS had been periodically investigated over the past dozen years.
Goals of GPS

- Collect spatially accurate data at strategic points of gas facilities
- Desired accuracy based off Chapter 895 DigSafe tolerance zone
- Retain old methods of data collection
Taking the Plunge

- No precedent to model from in gas distribution industry
- Program commenced in spring of 2008
- GPS was contracted out to Oest Associates for quick start up
- Difficult to coordinate
- 5000 points acquired in 2 years
Capturing a Gas Main
Capturing a Gas Service

Subfoot accuracy may not be achievable in this area.

Capture an even spacing of points around a curve

Curb Cock

New Main to be Captured

Valve

Existing Main

Street
Taking a Step Forward

- Buyout of NU by Unitil proved to be a benefit for program

- Management budgeted to bring GPS in house, and to construction contractor crews for all 3 states

- Better prepared to meet recent State and Federal Regulations
Current GPS Program

- Two entities: Unitil field maintenance crews and construction contractors

- Both groups use Trimble products: GeoXH, ProXRT, TerraSync and Pathfinder Office

- All data flows to one GPS administrator for review and warehousing
Contractor Crews

- Responsible for the installation of gas mains and services
- Data downloaded to state supervisors
- Post processing occurs at contractor office
- Data sent to Unitil as a shapefile
- Quick delivery to meet DigSafe Buffer guidelines
Unitil Field Crews

- Responsible for leak repairs, leak surveying and general gas system maintenance
- Take GPS shots when main is exposed
- Points are downloaded via central laptop (non-network) at each operation center
- MyDropBox application allows access to laptops by administrator
- Points are post processed, and leak data sent on to compliance management system and stored in GIS
Keys to Success

- Thorough training
- Targeted data dictionaries
- Password protection settings on GPS units
- Efficient delivery of points
- Proper file management
Limitations

- Technological solution for non technical workforce
- Extra layer of work – implement into workflow
- Best suited as a supplemental solution
- Non network field laptops
- Hardware upkeep
- Limited amount of time to capture point – no mission planning
Future of GPS

- Effectiveness will increase with new GPS technologies
- DIMP rules may require facility manufacturing data. GPS can leverage barcode scanning
- Leak survey GPS solution to route surveyors and take shots when gas detected
- GPS may be used to assist dispatchers
- Once enough data has been accumulated, GPS can be used as a locating tool
Unitil GIS – Maine Gas GPS – Main Locations
Unitil GIS – Maine Gas GPS – Main Locations
Unitil GIS – Maine Gas GPS – Leak Locations
Unitil has invested considerable time & capital in geospatial solutions.

GIS is the central data source for many essential company systems.

GIS is only as good as its source data.

GPS program is ideal application for providing highly accurate source data.

Unitil’s progressive management approach will aim to move technological solutions forward.
Thank You.

Questions?