AGENDA

- GNSS Glossary
- WaterOne overview
- Legacy workflow
- RFP Prep and requirements
- Proposed workflow
- Preliminary results
Glossary

- **GNSS** (Global Navigation Satellite System). Includes GPS and all GPS-like satellite navigation systems such as Glonass, Galileo, BeiDou.

- **RTK** (Real-Time Kinematic). Real-time, 1-2cm GNSS positioning using an RTK base or network.
WaterOne Overview

- **Headquarters:** Lenexa, KS
- **Service area:** 272 sq miles – Kansas City metro
- **Metered accounts:** 145,000
- **Population served:** 420,000
- **Miles of water mains:** 2,685
- **2016 GIS Staff:** 3 x analysts, 2 x editors, 1 x programmer, 1 x GPS collector.
- **Software:** ArcGIS Server 10.3.1, ArcMap 10.3.1, Portal, AGOL, SAP
New Construction GIS activities

- As-built GIS data added in 2016:
  - 52 miles of water mains.
  - 14 miles of service lines.
  - 7,983 new features.
  - 44,459 attributes entered.
  - less than 40% of features captured with GPS.
GPS “Move” process

- Features updated using GPS-captured points:
  - 65,227 GPS updates of existing assets.
  - 576 miles of main modified by geometry/attr edits.
  - ~200,000+ related attribute edits.
  - ~120,000 point backlog (not GPS’d). 90% meters.
The Challenge

- Legacy data collection workflow was too cumbersome:
  - Caused a major backlog of data to be processed.
  - User frustration with GPS equipment.
  - User frustration with physical data download process.
  - Decision to develop RFP to overhaul workflow.
CURRENT GPS DATA SETUP FLOWCHART

GPS SETUP

MOBICONTROL Server

Mobi Control Mobile Mgmt Software

Net_XS_902M.exe installed on each GPS unit

Device Tree within Mobi Control Settings (By Job Function)

File Sync Rules
One rule created for each device

GPS DATA COLLECTION PROCESS

‘Construction’ & New Services Field Staff collect GPS data using Trimble GPS device

Construction

GPS connected to WiFi at EOD

RAWGPS file created

New Services -

RAWGPS Files processed/converted to Shape Files

GPS Manual Download

File sent to “Export” Folder – posted into GIS by GIS Editor

GPS DATA CONVERSION

Connection Manager Software

Pathfinder Office

CM is a “sniffer” program – continually monitors for RAWGPS files/formats to GIS readable format

Rules are established within Mobi Control Software to manage how and when the Trimble Devices process data. GPS Units are currently configured to begin data downloads at approx 2:00 AM daily.
New Workflow

• Transition from GPS handheld to Bluetooth GNSS receiver w/rugged tablet computer using Windows. Option to use iOS or Android devices in the future.

• Transition from physical data download to real-time data workflow directly to WaterOne AGOL/Server.

• Transition to full Esri workflow from field to finish. ArcPad/Collector to AGOL/Server.

• Entire water system loaded on the tablet and available to the user.
Field Hardware/Software

- **Panasonic ToughPad tablet** (10” outdoor display)
- Highly-customized ArcPad data collection app. Can transition to Collector when it is ready.
- **Arrow 200 RTK GNSS receiver** for centimeter-level horizontal/vertical accuracy.
- MoDOT RTK Network access free of charge.
- County orthoimagery/Esri StreetMaps for background data.
Results

• Data Collection
  - Average accuracy per point
  - GNSS vs. Manual shots
  - Total # of RTK shots collected to date.

• Operations/Executive Dashboards
  - Progress reports.
  - Using Operations Dashboard client
  - Using webmaps.
Decision Rationale

• Field data collection - ArcPad
  - Highly-customizable user interface.
  - Configurable to survey-grade 3D data collection.
  - Real-time connection to ArcGIS Online and Server.
  - Looking towards CollectorX.

• Full Esri workflow
  - Leverage ArcGIS Online/Portal and Server.
  - Completely flexible mobile GIS environment.
  - Efficient workflow.
Decision Rationale

• Eos Arrow RTK GNSS receiver.
  - Real-time centimeter accuracy.
  - Compatible with Windows/iOS/Android.
  - Compatible with Esri ArcPad and Collector.

• ToughPad tablet
  - Best outdoor-viewable display.
  - Rugged. Low/high temperature rating.
  - Field connectivity. Windows 10. TPM (security).
  - Can also be used as office desktop.
Challenges

• Security.
  - Tablet. VPN, TPM, Sign-on.
  - AGOL. Off-premises (eg. firewall).
  - Data. On-device.

• Long-term ArcPad support from Esri.

• IT
  - Remote access for developers.
  - Operating outside the firewall.
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