

Improving Fiber Asset Location Efficiency Using Collector for ArcGIS



Brian Nemec – Consolidated Electric Coop
Glenn Farrow – POWER Engineers Inc.

About Consolidated Electric Coop (CEC)

» **CEC**

- 1870 Miles of Primary and Secondary
- 6 Counties
- 61 Employees

» **Enlite (Fiber)**

- 369 Miles of Fiber
- 8 Counties
- Enlite and Electric Employees are Shared

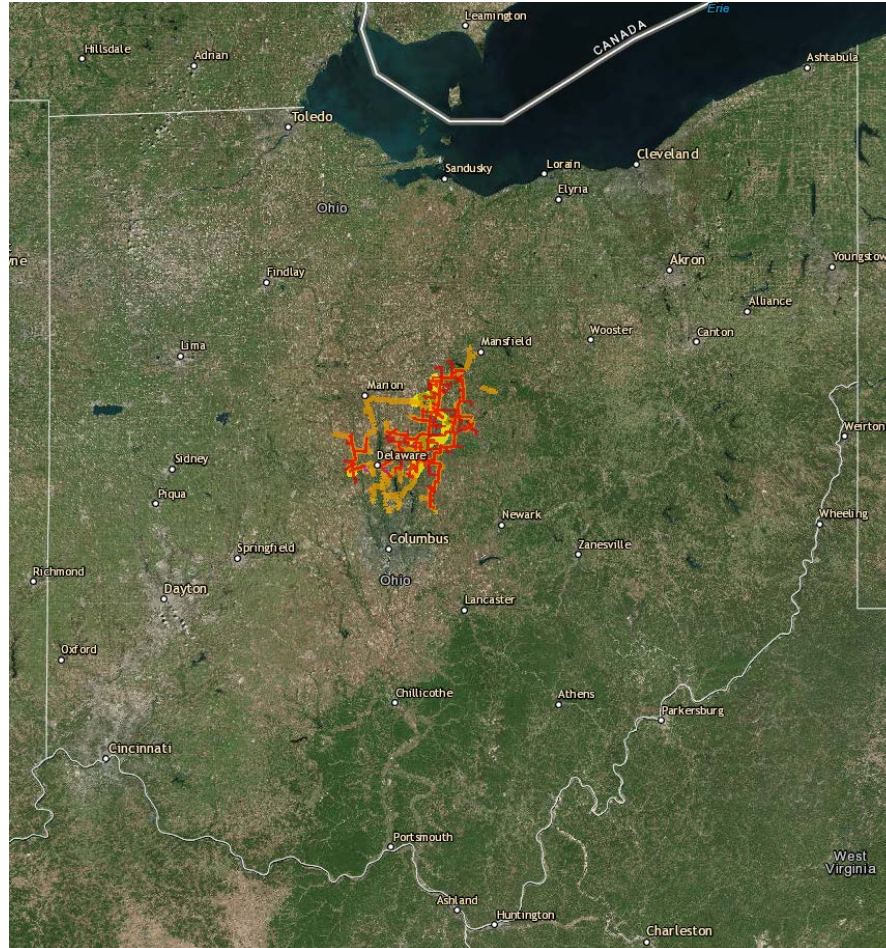
» **Bright Energy**

- 83 Miles of Distribution Main
- 2 Counties
- 6 Employees

» **Locators**

- 2 Full-time Locators

CEC Service Territory



About Brian Nemec, GISP

- » BS in Natural Resources – Forestry (2000)
- » MS in Civil Engineering (2010)
- » GIS Professional (GISP)
- » 9 years of GIS experience
- » 1st year at CEC as GIS Administrator
- » Previous 8 years in municipal utilities
 - City of Boulder
 - City of Columbus
 - City of Westerville

About POWER Engineers Inc.

- Established in 1976
 - 100% Employee Owned
 - 2100+ Employees
 - 40+ Offices in the US
 - Federal, Power Delivery, Generation, Facilities, Communications, Environmental & GAM
 - 60+ Consultants in Geospatial & Asset Management (GAM)
- Consultants average 20+ years experience
 - » Application services
 - » Asset management
 - » Business intelligence
 - » Cityworks services
 - » Esri roadmaps
 - » Geospatial consulting
 - » POWER360® (SaaS)
 - » System integrations
 - » System selection
 - » Utility network modeling

About Glenn Farrow

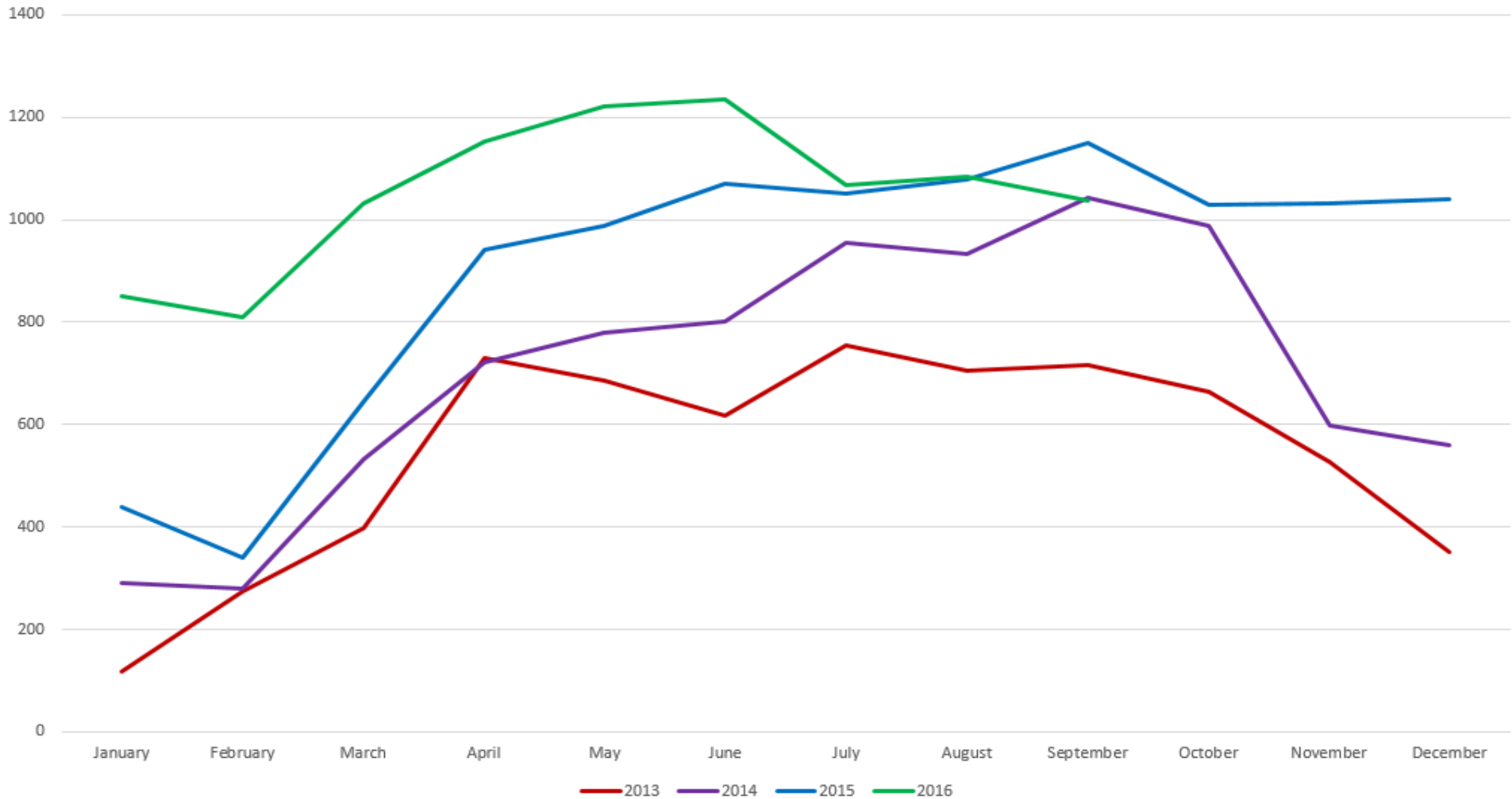
- » BS in Forestry - University of Alberta (1986)
- » 30+ years using Esri software
- » 30 years in GIS Consulting
 - GFIS
 - GeoVision
 - Smallworld
 - ArcGIS/ArcFM
- » 7 years with POWER Engineers Inc.

OUPS – Ohio Utility Protection Services

- » Similar to other central ‘Call Before You Dig’ agencies in other states
- » CEC submits underground electric, fiber, and gas lines to OUPS
- » OUPS creates a buffer of an agreed upon distance around each service line
- » When OUPS creates a ticket, they create a ‘best fit’ polygon around the work area
- » If the work area intersects any of our buffered lines, we receive a ticket for a locate

CEC Locate History

CEC Locates - 4 years



Business Drivers

- » Move from a desktop/laptop to a mobile device
- » Provide spatial location; not just tabular address
- » Leverage existing ESRI tools and apps
- » Eliminate back office work from non-locators
- » Provide real-time asset data on maps
- » Leverage locators in data cleanup

Historical Workflow

- » Email received from OUPS
- » Dispatcher/Operations Engineer (2) uses Windows app (WebTMS) to:
 - Sort through tickets
 - Clear tickets that do not need locating (no assets in area)
 - Assign tickets to locator
- » Locator uses Windows app to view tickets and look at address to determine location
- » Locator does their work and uses the Windows app to respond to ticket

Historical Workflow

WebTMS Operator v4.1.0.4

<<< Initial Receive [IR] Assign to Locator... Post Response... View... Print... Export Polygons... Refresh

WORKOFFLINE Member Code: <No Filter>

WebTMS **10 Tickets**

System Overview

- 0 Offline Responses
- 10 Initial Receive [IR]
- 42 Assigned [AL]
- 0 Messages

Ticket Search

Reports (Website)

Map

User Settings ...

Status / Events

Center	Received	Seq#	Seq Date	Type	Priority	UPDT
OUPS	2016/10/13 09:06	00008	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 09:44	00009	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 09:46	00010	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 10:01	00011	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 10:09	00012	2016/10/13	UPDT	ROUT	N
OUPS	2016/10/13 10:21	00013	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 10:27	00014	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 10:54	00015	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 11:01	00016	2016/10/13	NEW	ROUT	N
OUPS	2016/10/13 11:08	00017	2016/10/13	NEW	ROUT	N

Ticket	Local Area	Stage	Member Code	Locator	Response Date	Response
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Ready Disabled Last Refresh: 11:20 AM ONLINE

Historical Workflow

The screenshot shows a web browser window with the following content:

Browser tabs: OUPS MWEP 2016/10/11 #00015A, -00A ROUT UPDT LREQ

Page Header: Stage: **AL** **ROUT** Print

Navigation: Ticket Text | Responses | MAP | Notes <0> | History <10> | Attachments <0>

Original Ticket

```
MWEP 00015 OUPSa 10/11/16 10:09:05 -00A ROUT UPDT POLY LREQ

Ticket : A628501579 Rev: 00A Taken: 10/11/16 10:08 AM Channel: WEB
Old Tkt: B626000179 Taken: 09/16/16 07:46 AM

State: OH Cnty: DELAWARE Place: BERKSHIRE TWP
State: OH Cnty: DELAWARE Place: KINGSTON TWP

Address : Street: WILSON RD
Cross 1 : KENLEY PL Intersection: Y
Cross 2 : BIG BLUESTEM Between: N
Rail/Hwy: Milemarker(s):
Where : BEGINNING AT THE INTERSECTION OF KENLEY PL AND WILSON RD (TWP RD 56),
      : MARK NORTHEAST TO THE INTERSECTION OF WILSON RD AND BIG BLUESTEM.
      : MARK BOTH INTERSECTIONS AND MARK 100 FT OFF OF SOUTHEAST SIDE OF
      : WILSON RD FROM CENTERLINE OF WILSON RD..

WorkType: EXCAVATING
Done for: MISC. - WILSON RD SEWER REPAIR
Done by : GEORGE J IGEL & CO INC.
Whitelined: N Blasting: N
Means of Excavation: BACKHOE

Work date: 10/13/16 10:08 AM Meet: N
Start by : 10/25/16 10:08 AM Response Due: 10/13/16 10:23 AM
```

Bottom of page: Schneider Electric - Exchange

Historical Workflow

UPS MWEF 2016/10/11 #00015A A628501579-00A ROUT UPDT LREQ

Stage: **AL** **ROUT**

Ticket Text Responses MAP

Responses

Member Code	Stage	Locator
MWEF	AL	BMYS

Selected Response

Member Code **MWEF**
Stage **AL**
Locator **BMYS**
Date Assigned
Updated **10/11/2016**

RESPONSE

Response

Located Thu, Oct 13 2016 at 11:25 AM

Work Done

Contacted

Remarks

ASSIGN LOCATOR

Locator < No Change >

NOTES

Add Ticket Note

Work Done

Remarks

Print

Submit

Cancel

Edit ..

New Workflow

- » Locator opens Collector to view map and ticket information, self-assign work, and respond to tickets
- » Processing of emails tickets and responses to tickets done on server using scheduled tasks written in Python
- » Locators can also use Collector to make a note of missing/incorrect GIS attributes/assets that need to be fixed.

New Workflow

The screenshot shows a mobile application interface for map management. The top status bar displays 'Verizon LTE', the time '1:07 PM', and a battery level of '97%'. The app's header is blue with the word 'Maps' and several navigation icons. The main map area shows a geographical region with roads like 'Kilbourne Rd', 'Bowtown Rd', and 'Hogback Rd'. A large green area is highlighted with a dashed green border, representing a specific site. A blue area is also visible to the south of the green area. On the right side, a details panel is open, showing information for a specific ticket.

Verizon LTE 1:07 PM 97%

Maps

Kilbourne

Kilbourne Rd 65

Bowtown Rd 84

Salt Well Run

Bald Lick

Hogback Ridge Reserve

Hogback Rd

971 ft

N Old State Rd

Longwell Run

Berkshire Rd

71

OUPS Tickets - MWEP: A629202304
A629202304

Details

Area
924.2 acres

OUPS Tickets - MWEP:
A629202304

Member:
MWEP

Ticket Type:
NEW

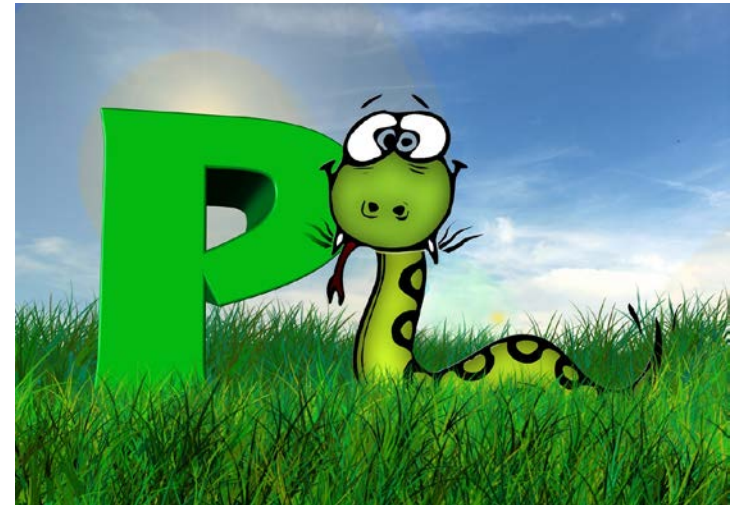
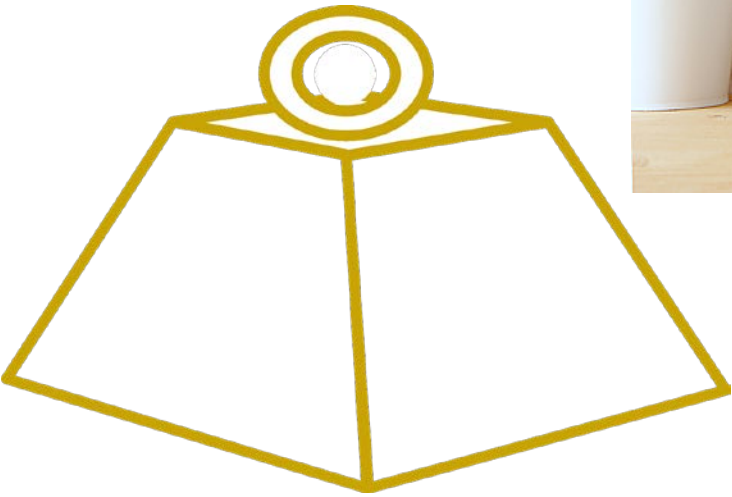
Priority:
INSF

Date Taken:
October 18, 2016

Address:
3103

Street:
N 3 BS & K RD

Technical Overview



Technical Overview

The screenshot displays the Microsoft Outlook interface. At the top, the 'Office 365' and 'Outlook' logos are visible, along with the 'Consolidated Electric Cooperative, Inc.' logo and a tagline 'Your Taskline Energy Partner'. The interface includes a search bar, navigation tabs (New, Delete, Archive, Junk, Sweep, Move to, Categories), and a user profile icon.

The left sidebar shows the 'Folders' pane with 'History' selected. The main pane displays a list of email history entries from 'notification@ohtms.oups.org'. The selected email is titled 'OUPS MWEP 2016/10/18 #00033A A629202771-00A ROUT NEW LREQ' and includes a warning: '*** ATTENTION: This email came from an external source. Do not open attachments or click ...'.

The right pane shows the detailed view of the selected email. The sender is 'notification@ohtms.oups.org' with a pink profile picture. The email content includes a warning, a subject line 'MWEP 00033 OUPSa 10/18/16 12:46:09 A629202771-00A ROUT NEW POLY LREQ', and a ticket reference 'Ticket : A629202771 Rev: 00A Taken: 10/18/16 12:44 PM Channel: OPR'. The address details are: 'State: OH Cnty: DELAWARE Place: DELAWARE TWP', 'Address : 421 Street: LONDON RD', 'Cross 1 : LIBERTY RD Intersection: N', 'Rail/Hwy: Milemarker(s):', 'Where : SOUTH EAST SIDE OF THE ROAD -- INCLUDING THE ROAD WAY', and 'WorkType: REPLACE STORM SEWER CASTING Done for: CITY OF DELAWARE'.

Technical Overview

MWEP 00033 OUPSa 10/18/16 12:46:09 A629202771-00A ROUT NEW POLY LREQ

Ticket : A629202771 Rev: 00A Taken: 10/18/16 12:44 PM Channel: OPR

State: OH Cnty: DELAWARE Place: DELAWARE

State: OH Cnty: DELAWARE Place: DELAWARE TWP

Address : 421 Street: LONDON RD

Cross 1 : LIBERTY RD Intersection: N

Rail/Hwy: Milemarker(s):

Where : SOUTH EAST SIDE OF THE ROAD -- INCLUDING THE ROAD WAY

: FARTHEST POINT OFF ROAD: NONE

: DISTANCE FROM CROSS STREET: OFF OF

: ** MAN HOLE MARKED WITH A WHITE X **

WorkType: REPLACE STORM SEWER CASTING

Done for: CITY OF DELAWARE

Done by :

Whitelined: Y Blasting: N

Means of Excavation: BOBCAT SKID LOADER WITH DRILL BIT

Work date: 10/20/16 12:59 PM Meet: N

Start by : 11/01/16 12:59 PM Response Due: 10/20/16 12:59 PM

Best Fit: 40.291593/-83.079511 40.289891/-83.078273

: 40.286507/-83.086507 40.284805/-83.085270

Comments:

Caller : DALE FILBY Phone: 740-816-7338
Company : CITY OF DELAWARE Type: MEMB
Co addr : 241 CHERRY ST
City : DELAWARE St: OH Zip: 43015
Alt Tel#: 740-816-7338
Fax : 740-203-1997
Email: DFILBY@DELAWAREOHIO.NET

Grids : 4017000830430 4017000830500
Polygon : 40.290900/-83.079018 40.290736/-83.078902
: 40.290547/-83.078873 40.289649/-83.078922
: 40.289499/-83.078972 40.289362/-83.079081
: 40.289338/-83.079105 40.285486/-83.084333
: 40.285401/-83.084483 40.285332/-83.084844
: 40.285411/-83.085201 40.285944/-83.086019
: 40.285987/-83.086058 40.286022/-83.086132
: 40.286181/-83.086270 40.286366/-83.086329
: 40.286555/-83.086301 40.286798/-83.086107
: 40.290809/-83.080588 40.291013/-83.080278
: 40.291202/-83.079819 40.291212/-83.079570
: 40.291106/-83.079226 40.290966/-83.079055

Members:

CGE =COLUMBIA GAS OF OH-COLUMBUS(UT CSP =AEP COLUMBUS SOUTHERN POWER (DWRS =DELAWARE - CITY OF (SEWER) DWRTR =DELAWARE - CITY OF (TRAFFIC) DWRW =DELAWARE - CITY OF (WATER) GTO =FRONTIER COM (FORMER VERIZON) MCIP =MCI MWEP =CONSOLIDATED ELECTRIC COOP WCOP =TIME WARNER CABLE - CENTRAL OH

Technical Overview

"Ticket : (?P<ticket>.{10})\s+Rev: .{3}\s+Taken: (?P<taken>\d\d\d\d\d{2,4}\d\d:\d\d\s*(AM|PM))\s+(Channel|Chan):\s+(?P<channel>[^\s]+)"

"Address : (?P<address>.*)\s+Street: (?P<street>.*)((Cross 1 :)|)(Rail/Hwy:)"

"Cross 1 : (?P<cross1>.*)\s+Intersection: .*(Cross 2 : (?P<cross2>.*)\s+Between:)*"

"Where\s+:\s*(?P<whereText>.*)\s*WorkType:"

"WorkType: (?P<worktype>+)Done for:"

"Done for: (?P<doneFor>.*)\s*Done by : (?P<doneBy>.*)\s*Whitelined:"

"Means of Excavation: (?P<excavation>.*)\s*Work\s+date: (?P<workdate>\d\d\d\d\d{2,4} \d\d:\d\d\s*(AM|PM))"

"Start by : (?P<startBy>\d\d\d\d\d{2,4} \d\d:\d\d\s*(AM|PM))\s+Response Due: (?P<responseDue>\d\d\d\d\d{2,4} \d\d:\d\d\s*(AM|PM))\s+"

"Best Fit: (?P<coords>\d{2}\.\d{6}/-\d{2}\.\d{5,6}\s+\d{2}\.\d{6}/-\d{2}\.\d{6}\s+\d{2}\.\d{6}/-\d{2}\.\d{6}\s+\d{2}\.\d{6}/-\d{2}\.\d{6})"

"Best Fit: (?P<coords>\d{2}\.\d{6}/-\d{2}\.\d{6}\s+\d{2}\.\d{6}/-\d{2}\.\d{6}\s+\d{2}\.\d{6}/-\d{2}\.\d{6})"

"Comments: (?P<comments>+)Caller\s+:"

"Caller\s+ : (?P<callerData>.*)\s+Grids\s+:"

"Members: *BEGP"

"Members: *MWEF"

Technical Overview

Feature Class Properties

General Editor Tracking XY Coordinate System Domain, Resolution and Tolerance
Fields Indexes Subtypes Feature Extent Relationships Representations

Field Name	Data Type
OBJECTID	Object ID
Shape	Geometry
TicketNumber	Text
Priority	Text
TicketType	Text
DateTaken	Date
Address	Text
Street	Text
CrossStreets	Text
WhereText	Text
WorkType	Text
DoneFor	Text
DoneBy	Text
ExcavationMethod	Text
WorkDate	Date
StartBy	Date
ResponseDue	Date
CallerData	Text
TicketStatus	Text
MWEPStatus	Text
BEGPStatus	Text
MemberCodes	Text
LocatorComments	Text
AssignedLocator	Text

Database Properties

General Domains

Domain Name	Description
AssignedLocatorDomain	Assigned Locator
MemberCodesDomain	Member Codes
OupsStatusDomain	Oups Status
TicketStatusDomain	Ticket Status
YesNo	

Domain Properties:

Field Type	Text
Domain Type	Coded Values
Split policy	Default Value
Merge policy	Default Value

Coded Values:

Code	Description
003	003-TICKET CANCELLED
002	002-MARKED (UP TO PRIVATELY OWNED UTILITY)
001	001-NO CONFLICT
007	007-JOINT MEET/LARGE PROJECT WILL COORDINATE WITH
006	006-HIGH PROFILE FACILITY-FACILITY/OWNER REQUESTS
005	005-EXCAVATION REQUEST COULD NOT BE COMPLETED B

OK Cancel Apply

Technical Overview

Share ✕

Choose who can view this map.

Your map is currently shared with these people.

- Everyone (public)
- Consolidated Electric Cooperative, Inc.
- Members of these groups:
 - Electric - Editing - Linemen
 - Emergency Management - Editing
 - Fiber Maps - Editing
 - Fiber Maps - Reference
 - Gas - Editing
 - Operations Dashboard
 - OUPS Project
 - Reference Maps

Link to this map

[http://\[redacted\]](http://[redacted])

- Share current map extent

Embed this map

Note: To embed your map, you must share it with Everyone.

Technical Overview

The screenshot shows a mobile GIS application interface. The top status bar displays "Verizon LTE", "1:07 PM", and "97%" battery. The app header is "Maps" with navigation icons. The map shows a rural area with roads like "Kilbourne Rd", "Bowtown Rd", and "Hogback Rd". A green dashed outline highlights a specific area labeled "Salt Well Run" and "Bald Lick". A blue dashed outline highlights another area labeled "Hogback Ridge Reserve". A red dashed outline highlights a third area. The details panel on the right contains the following information:

Details	
	OUPS Tickets - MWEP: A629202304 A629202304
	Area 924.2 acres
	OUPS Tickets - MWEP: A629202304
Member:	MWEP
Ticket Type:	NEW
Priority:	INSF
Date Taken:	October 18, 2016
Address:	3103
Street:	N 3 BS & K RD

Technical Overview - Responder

```
sock.sendall("USER %s\n" % (c.cecMemberCode))
data = sock.recv(1024)
|
| if data.startswith("331 User name okay, need password"):
|     sock.sendall("PASS %s\n" % (c.cecMemberPassword))
|     data = sock.recv(1024)
|
|     if data.startswith("230 User logged in, proceed"):
|         fields = ['TicketNumber', 'MemberCodes', 'MWEPStatus', 'BEGPStatus', 'TicketStatus', 'AssignedLocator']
|         with arcpy.da.UpdateCursor(fullOupsFc, fields, c.cecResponseWhereClause) as cursor:
|             for row in cursor:
|                 ticketNumber = row[0]
|                 memberCodes = row[1]
|                 mwepStatus = row[2]
|                 begpStatus = row[3]
|                 responder = row[4]
|                 mwepSuccess = False
|                 begpSuccess = False
|                 if not mwepStatus is None and memberCodes in ['MWEP', 'BOTH']:
|                     mwepSuccess = sendResponse(sock, ticketNumber, 'MWEP', responder, mwepStatus)
|                 else:
|                     mwepSuccess = True
|                 if not begpStatus is None and memberCodes in ['BEGP', 'BOTH']:
|                     begpSuccess = sendResponse(sock, ticketNumber, 'BEGP', responder, begpStatus)
|                 else:
|                     begpSuccess = True
|                 # Only update row if all responses succeeded
|                 if begpSuccess and mwepSuccess:
|                     edit.startOperation()
|                     row[4] = c.cecSuccessfulResponseCode
|                     cursor.updateRow(row)
|                     edit.stopOperation()
|
|             sock.sendall("QUIT\n")
|             data = sock.recv(1025)
|             if not data.startswith("221 Thank you for your responses"):
|                 logger.error("Unexpected response when terminating Oups session: %s" % (data))
|
| else:
|     logger.critical("Failed to login to Oups server as user %s" % c.cecMemberCode)
```

Future

- » Admin dashboards using Operations Dashboard for ArcGIS
- » Analysis of 'hot' ticket areas
- » Improvement of maps and asset locations
- » Historic record of locates with pictures for reference/confirmation

Future

The screenshot displays a GIS application interface for OUPS tickets. The main map shows a geographic area with numerous blue rectangular markers representing tickets. The interface includes several panels:

- Number of Assigned Tickets:** A bar chart showing a value of 121 for 'Jon Todd'.
- Historic Query and Show:** A panel with a search history for 'Historic Oups Tickets - 2 Week', last executed on 10/13/2016 at 11:45:20 AM, with 414 results. It includes options to 'Limit the results to the current map extent' and buttons for 'Hide', 'Zoom to', and 'Select'.
- Open Tickets:** A list of 15 tickets with their IDs and due dates, such as 'A625103362 Due by 9/9/2016 9:51:00 AM'.
- Number Unassigned:** A large text display showing '3 Unassigned'.
- Emergency Tickets:** A list of 2 tickets, including 'A628503716 Due by 10/13/2016 11:53:00 AM'.

The map itself is titled 'OUPS Ticket Dashboard' and shows various townships and landmarks, with a scale bar and navigation controls at the bottom.

Questions

