GIS FOR LAW ENFORCEMENT: EXAMPLES + TIPS FOR MANAGING DATA

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GIS MANAGER
MONTGOMERY COUNTY MARYLAND POLICE DEPARTMENT
About Me

- In GIS since 2005, Public Safety GIS since 2013
- Bachelor’s and Master’s in Geography
- Geographic Information Systems Professional (GISP)
- Fire & Rescue GIS Analyst for 4 years
- Police GIS Manager for 6+ years
- Emergency Management/Public Safety GIS consultant for 9+ years
- Borderline unhealthy obsession with cats and Taylor Swift
ABOUT MCPD

- 1300 sworn
- 650 civilian
- 6 districts/stations
- 507 sq mi
- 1.06 million people
OUTLINE

- Why GIS and examples of what we do in MoCo Police
- Importance of data centralization, quality and management
- Caveats and Issues
- Questions

Assumptions

- Decent understanding of Geographic Information Systems and/or relational database management systems or have someone in your org that does
- Using ArcGIS Enterprise, ArcGIS Online, or have the capacity and/or desire to do so
WHY IS GIS/MAPPING SO IMPORTANT?

- Nearly everything has a “where” component
  - CAD data, RMS, addresses, beats/regions, districts, you name it!
  - Take advantage of XY coordinates or addresses
- Identify patterns, trends, and correlations
- Useful for predictive analysis
- Provides data-driven insights for things like resource allocation, understanding populations/communities served
Static PDF maps become outdated the moment they are created

Online maps allow you to interact – zoom, read-pops, symbolize, control scaling, labels, etc

Give the power to the end user through functional applications

Can connect to your secure, centralized data sources
NOTE:

The following examples are built in ArcGIS Enterprise version 10.9.1

Functionality will vary between ArcGIS Online and Enterprise versions
Consider having a common location to access applications

- Portal/AGOL home or use what your agency already uses, like Sharepoint
MC STAT

- Interactive map used in weekly comp stat meeting
- ArcGIS WebApp Builder
- Hosted in ArcGIS Online – no PII, publicly accessible data
DAILY THEFTS FROM AUTO

- Updated each morning at 5am
- Interactive Portal map + emailed PDF map

See attached file or click here to view the interactive map.

Please email questions or concerns to Shelby Roberson.
DAILY THEFTS FROM AUTO

- Interactive map built in ArcGIS WebApp Builder (to be retired 2025)
- Can view details about individual incidents
- Can export table
- Can click links directly to CAD or RMS incident page
TACTICAL CRIME INFORMATION CENTER (TCIC)

- Built in ArcGIS Dashboards
- Pop-up window uses Experience Builder. User must agree to terms.
- All widgets are interactive with each other
- Allows users to query
- Graphics update based on data
- *Future release will allow CSV export
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OPEN CALLS FOR SERVICE DASHBOARD

- Built with ArcGIS Dashboards
- Connects to CAD Oracle database via a SQL Server view
- Updates near-real time
OPEN CALLS FOR SERVICE DASHBOARD

- Widgets connected to each other
- Used heavily by command staff
OPEN CALLS FOR SERVICE DASHBOARD – CED VERSION

- For Community Engagement Division
- Focuses on Crisis Intervention Team calls
- School calls
HOTSPOT STUDIES

- Built in ArcGIS Experience Builder
- Looks at rolling 2-year data (updates daily)
- Live demo
ARCGIS SURVEY123

- We use for multiple programs
  - Etch & Catch catalytic converter program
  - Trespass agent letter locations
  - Homeless camp locations
  - Complaints/Compliment forms
  - Security camera program
  - Casualty form
  - Tracking overdose info
  - Public sign up for ride alongs
SURVEY123: ETCH & CATCH

- Built with Survey123 Connect
- Link
DRONES

- Crash reconstruction – clear traffic quicker
- Large incidents
- Drone as first responder
ARCGIS SOLUTIONS FOR LAW ENFORCEMENT

- Helpful if starting from scratch
- If not, use for ideas
- Link
HIGH QUALITY DATA LEADS TO ACCURATE END USER PRODUCTS & ANALYSIS

LET'S TALK ABOUT DATA!
LET’S TALK ABOUT DATA

Garbage in, garbage out

As GIS analysts (or first responders!) we have the power to control what is coming in

Reduce human error
Make it nearly impossible to input mistakes
Streamline workflows
Security
DITCH THE SPREADSHEETS

- Sheets/tables aren’t linked by relationships
- Easy to make errors – overwrite functions, calculations, delete data.
- Cannot handle large amounts of data
- Sharing and multi-user editing is hard and leads to copies and copies and copies of data. What is authoritative??

*Excel can still be useful for personal, quick analysis but don’t make it a large part of your business processes*
CENTRALIZE YOUR DATA!

- Leverage your existing CAD & RMS databases
- Link to an enterprise geodatabase
- Every example you’ve seen today is pulling source data from a central database
- Databases provide structured storage and easy access to vast amounts of data
- You can leverage native spatial data types with your XY data
- Officers/users can quickly retrieve and query accurate and timely information
KNOW YOUR DATA

- Absolutely critical to understand your data (existing OR data you create!)
  - What tables and fields do you have available? Look at schemas, get familiar.
  - Create/ask for a database diagram. What is related to what?
  - Understand field types. Date/time (time zone!), integer, text? This matters when you are displaying data and doing analysis.
  - Document anything that you filter out.
    - Didn’t include X type of incidents? Fine, but make sure it is communicated to your end user(s).
If you have XY data in your database, you can make a map. Even if your data isn’t “GIS data”.

SQL Server has a native spatial data type – geography or geometry (depending on projected vs geographic coordinate system).

You can easily transform XY data into a geography/geometry data column.

Mappable in ArcGIS.
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Mappable in ArcGIS
CREATING/COLLECTING DATA

- Reduce human error – don’t let error be an option
  - Make use of Domain values (pick lists)
  - Use geocoding services for addresses
- Streamline processes
  - Smart forms
  - Only collect relevant data
AUTOMATE AS MUCH AS YOU CAN

- No reason to do the same tasks manually over and over
- Can you link directly to the source?
  - If using Enterprise GIS, choose to publish your data as registered with the database server or use GeoEvent Server
  - If using ArcGIS Online, schedule updates or explore ArcGIS Velocity
- Explore ModelBuilder, Python
- Schedule jobs
  - ArcGIS Pro tools can now be scheduled
  - SQL server
  - Windows task scheduler
- Power Automate or Make for emails
Awesome tools for automation that link to ArcGIS

Automate report creation and send emails based on Survey123 responses

https://www.make.com/en
Advocate, advocate, advocate

Reach out to whoever does your IT & GIS

Show the art of the possible

Bring in Esri

Ask around your region to see what others are doing. Make connections!

Training and keeping up-to-date is critical
- Esri licensing
- Network security/firewalls
  - Must carefully consider how this is set up
  - CJIS compliance
- Training
Thank you!

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Field Maps In The Field

EJ McCormick
Cornelius Fire Department
George Brinzey
Cornelius Police Department
Cornelius, NC

- Located 30 minutes outside Charlotte, NC
- Home of Lake Norman
- 31,000 residents
- 15 Square miles
- Mixed use of residential, commercial, and educational
The Cornelius Fire Department

- Two firehouses
- 90 Active members
- All hazards department
- Mix of full and part time staffing
- 3,500 calls a year
- Three staffed companies daily
How Did We Get Here?

- Group effort with local EM
- Explanation of issues and proposed solutions
- Field testing prior to "busy season"
- Multi agency approach
Our Issues

• Large lake, large problems
  50 sq mi – 32,510 acres
• Need to track resources
• Real time data
• Command post vs.
  incident location
• How to implement
• Deployable
Where Are They!?

• Resource tracking
• Real time data entry
• Continuity
• Harmonizes with existing technology
• Multiple feature layers
• USER FRIENDLY
• Custom grid developed by Lake Norman public safety agencies.
• This will show up as users zoom out and disappear as they zoom in.
• Grid is available to telecommunicators and given to first responders at time of dispatch.
• Members very used to this grid and we didn’t want to lose capability.
User Features

Data input for command to review in real time and make tactical decisions
Clear Directions

Post incident documentation

Actively engaged resource organization
• Night responses present unique challenges
• Using Field Maps we are able to see and assist responders rapidly
• Screen sharing has been hugely successful
July 1 2023
Three agencies working together until 3am
Multi day command post
Get To Work!

- 20 generic logins and passwords
- One sheet laminated card
- Quickly get to work
- Easy to choose selections
- Never let the tech hinder the mission!
Waterproof cards with clear instructions and login credentials

Lake Norman SAR Map & Tracking

1) Download ArcGIS Field Maps

2) Open Field Maps and select **Sign In With ArcGIS Online**
3) Enter credentials on the front of this card
4) Click slider button to turn tracking on
   a. Set duration to **Until Switched Off**
5) Select Mecklenburg County Water SAR Map

You are now ready to work. Use the (+) at the bottom of the map to input points of interest.

LOGIN: MeckPhone1
PASSWORD:
ArcGIS Football

- Dubbed “The Football”
- Although not as cool as the presidents it does help us get set up!
- Designed for grab and go missions
- Can be used in the field or the command post
- Limited by computer battery life while on the water
8 full time officers and 2 supervisors and reserve officers
Conduct proactive patrols, marina checks, safety events, training and community events
3 Vessels - 29ft SAFE Boat, 27 & 25 ft Life Proof Boats
The unit handles preventative maintenance on vessels. (oil changes, major service, etc.)
In conjunction with North-Mecklenburg SWAT team, we have formed a MOAT team which specializes on Maritime operations
Benefits to LEO

1. Real-Time Situational Awareness:

2. Navigation and Location Tracking:

3. Data Collection and Incident Documentation:

4. Collaboration with Other Responders:

5. Offline Capabilities:

6. Layer Support:

7. Forms and Workflows:
Situational Awareness

- Field Maps provides real-time access to maps, allowing law enforcement and emergency responders to visualize the current situation in the maritime environment.
- Layers can include nautical charts, vessel traffic data, weather conditions, and any relevant GIS information.
Field Maps supports GPS-based navigation, helping law enforcement navigate to specific locations efficiently.

The app can enable location tracking for personnel and vessels, facilitating coordination and ensuring everyone is aware of each other's positions.
Law enforcement officers can use Field Maps to collect data on the search and rescue mission, such as marking areas already searched, recording locations of interest, and documenting any findings.

Custom forms can be created to gather specific information, such as details about the missing boater, vessel information, and observed conditions and witness statements along with picture of scene.
Collaboration with Other Responders

- Field Maps allows seamless collaboration with other emergency responders. For example, the app can be used to share real-time updates with Coast Guard, maritime rescue teams, and other law enforcement agencies involved in the operation.

- Information collected in the field is instantly shared, enhancing overall coordination.
Offline Capabilities

- In maritime settings, connectivity can be a challenge. Field Maps' offline capabilities ensure that law enforcement can still access critical maps and data even in areas with limited or no network coverage.
Layer Support

- Incorporating dynamic layers, such as real-time weather updates or vessel tracking information, can enhance decision-making during the search and rescue mission.
Forms and Workflows

- Forms that capture essential details about the missing boater, the last known location, and any other relevant information. This ensures that responders gather consistent and valuable data.
Integration with Systems

In app forms that capture essential details about the missing boater, the last known location, and any other relevant information. This ensures that responders gather consistent and valuable data.
Field Maps integrates with management systems, allowing law enforcement to share information seamlessly with emergency management teams and other stakeholders involved in the response.

By leveraging these features, Field Maps can significantly improve the efficiency, coordination, and data management aspects of search and rescue operations in a maritime setting. It provides a comprehensive solution for law enforcement to collaborate with other responders and make informed decisions during critical incidents.
2022 Results

- More effective
- More organized
- Less downtime
- Real time data
- Better documentation
- Safety
- Multiple uses outside lake
- Gen Z
- ESRI Support