**Quality Data. Quality Response.**

911 Datamaster

The Need for Statewide Structure and Guidance for GIS in a NG911 world

November 29, 2017

# Multiple Initiatives Are Driving the Need for a Statewide Focus

- November 2014 'Roadmap' agreement between NENA, APCO, 4 CMRS providers.
- 4th report released February 3, 2015 as FCC 15-9.
  - Details new accuracy requirements for:
    - Outdoor location accuracy (X/Y)
    - Indoor location accuracy (X/Y)
    - Vertical accuracy (Z)
    - Defines 'Dispatchable Location' (Sub-addressing)
    - National Emergency Address Database (NEAD)
  - FCC tasked the Communications Security, Reliability, and Interoperability Council (CSRIC) with evaluating location technologies to support E911 services for indoor environments.
  - PSAPs must be ready to accept new data and CPE must support new data fields.

# Multiple Initiatives Are Driving the Need for a Statewide Focus (continued)

- Wireless Location Determination in the Future
  - All wireless 9-1-1 call's X/Y location must be accurate to within 50 meters.
  - Address information for a Dispatchable Location will be delivered.

- Dispatchable Locations:
  - Different than 'Routable' and defined in FCC 15-9 as:

    *"the civic address of the calling party plus additional information such as floor, suite, apartment or similar information that may be needed to adequately identify the location of the calling party."*

  - Wireless GIS layers will be needed for 9-1-1 and will likely require assignment of a dispatchable location for every cell tower and sector, as received from a wireless service provider in a call routing spreadsheet.
  - Dispatchable Locations must be validated.
  - GIS data will need the granularity needed to support this (i.e. subaddressing).

# The Importance of GIS Data for Next Gen 9-1-1 – A Little Background

- In today's E9-1-1 world, calls are routed to the appropriate Public Safety Answering Point (PSAP) based on the telephone number.
  - For wireline calls:
    - A selective router will look at the NPA-Nxx of the calling party number and deliver the call to the appropriate trunk group. No GIS data is used in route determination.
    - The ALI database translates the calling party number to a civic address which is presented to the PSAP at call time.
  - For wireless and VoIP calls:
    - The call is assigned a "local" calling party number for the sake of routing based on the cell tower location and/or cell sector.
    - A selective router will look at the "fake" NPA-Nxx of the calling party number and deliver the call to the appropriate trunk group. No GIS data is used in route determination.
    - The ALI database translates the "fake" calling party number to an x/y and the "real" calling party number which are presented to the PSAP at call time.

# The Importance of GIS Data for Next Gen 9-1-1 – Moving Forward

- In the end state of NG9-1-1, calls are routed to the appropriate Public Safety Answering Point (PSAP) based on geodetic data.
  - A Location Information Server (LIS) translates the calling party number to a location (either civic or x/y).
  - A Emergency Call Routing Function (ECRF) is queried with this location to determine PSAP routing.
  - Location is delivered to the PSAP in the SIP call stream.
- To utilize GIS data for these life-saving events, we must have a cohesive and accurate database of GIS data on a statewide basis.
  - Each agency's data must be accurate and homogenous.
  - Each agency's data must "fit" with its neighbors. No gaps or overlaps in coverage areas.

# GIS Data Content

- One of the first steps in statewide coordination should be to have a single data schema with minimum requirements for the attribution required for NG9-1-1.
  - NENA is in the process of publishing the "NENA Standard for NG9 1 1 GIS Data Model".
    - Details required layers
    - Details required attribution within each layer
    - Does not detail the quality assurance that must occur.
  - Given that the Data Model is not published yet, some states have created their own data model based on the working version of NENA's document.

- NENA Map Service

# GIS Data Quality

- States should determine the appropriate quality measures and expected compliance percentages.
- The basics:

**Polygons** (Required)

1. Empty (Null) Geometry
2. Geometry Overlaps
   - PSAP
   - Responders
3. Geometry Gaps
   - PSAP
   - Responders
4. Missing Required Field Values

**Road Centerlines** (Required)

1. Empty (Null) Geometry
2. Address Range Overlaps
3. Address Ranges Zero
4. Not in a Polygon
   - PSAP
   - Responders
5. No USPS Standard Match
6. Required Field Values Missing

**Address Points** (Required)

1. Empty (Null) Geometry
2. Not in a Polygon
   - PSAP
   - Responders
3. In Multiple Polygons
4. No USPS Standard Match
5. Required Field Values Missing

# GIS Data Quality Metrics – An Example

## Grades by Feature Class

**A**   No Critical Issues found in AP, RCL, PSAP, ESN, Fire, Law, or EMS features

**B**   Less than 10% of AP or RCL features have Critical Issues

**C**   10% or more of AP or RCL features have Critical Issues
    or

\* PSAP, ESN, Fire, Law and/or EMS features provide required information that is needed for use in determining a PSAP to route a call to as well as the emergency responders for that location. Any Critical issues found in these layers must be addressed prior to using data for call routing in ECRF.

| Layer Type | % Error | Current Critical Issues |
|---|---|---|
| AP | 0.08% | - In Multiple Polygons<br>- Required Field Values Missing<br>- No USPS Standard Abbreviation Match<br>- Not In Polygon |
| ESN | 2.07% | - Geometry Overlap<br>- Geometry Gap |
| RCL | 1.18% | - Address Range Zero<br>- Not In Polygon<br>- Address Range Overlap<br>- Required Field Values Missing<br>- No USPS Standard Abbreviation Match |

# The Need For Guidance

- Need a timeline that matches statewide NG9-1-1 initiatives.
- Effort required:  0.01 hours per population.  So a State of 28 million is looking at 280,000 hours (135 years).
- There will likely be minimal funding and guidance from the Federal Government.  Policies and best practices are needed to ensure continued, consistent success for NG9-1-1.  Institutional consistency is paramount.
- Multiple state agencies are stakeholders.  For example, Texas DIR estimates that 36% of the State's agencies utilize GIS technology.
- Multiple local government agencies are stakeholders.
- Multiple federal government agencies are stakeholders.

The State is the appropriate level for GIS standards and aggregation.

# The Need for Structure

- Need for an agreed upon (mandated?) GIS data model.
  - NENA has one.
  - Several states have their own.
  - NEAD has its own.
  - NAD has its own.
- Determine how and when GIS data aggregation will occur.
  - Timeliness:  Need will vary by usage.
  - Security:  Who can access?  Who can update?  Will any data be confidential/proprietary?
  - Accessibility/Availability:  The need for structure must be weighed against the need for the data.

## Options

- A statewide advisory committee
- Legislation
- Funding
- Establish data sharing mechanisms
- Technology sharing

# Some Last Reminders about NG9-1-1 GIS Data

- Understand the basic functional elements that depend on GIS data.
- NG9-1-1 routes calls off your GIS data via an unattended system.
- Technology is available to help sites streamline their work.
- Services are available to help sites quickly get caught up.
- Imperative to get local data ready now via NG9-1-1 oriented tools / processes / services.
- And we haven't even gotten to 3D yet (but it's coming up next).
- NG911 Now Coalition (NENA, NASNA, iCERT) working to accelerate Next Generation services nationwide implementation, including retirement of legacy systems, by 2020.

# Questions

**Richard Kelly**
RichardK@911Datamaster.com
512.331.0633

**Jim Shepard**
JimS@911Datamaster.com
512-656-7713