



New Mexico Association of Counties

GIS/RA Affiliate

June 9, 2005

DFA/SDR Update



The Statewide Centerline Project for E9-1-1 Dispatch Call Mapping



Project Goal:

Create a seamless, complete statewide centerline GIS layer to be used primarily to locate landline and cellular 9-1-1 calls in PSAPs throughout the state of NM.

Provide the mechanism to upload data through a dedicated network to a server, combine and QA/QC the data, cut it into appropriate pieces representing PSAP boundaries with buffers, then distribute it back to PSAPs.



Identify GIS Providers

In New Mexico there are:

- 33 Counties
- 102 +/- Incorporated Municipalities
- 19 Pueblos
- 2 Indian Nations/5 Tribes
- Several PSAPs that use GIS outside of call mapping



Break it Down Further:

- Some counties provide GIS and Addressing for all or some of their municipalities
- Some Pueblos and Indian Nations do not have GIS nor do they plan to have it in the future
- Some larger municipalities provide GIS and Addressing for their entire county
- Some counties provide GIS for a neighboring county or for Indian Nations or Pueblos within their county boundaries
- Some counties with mapping/addressing/GIS do not have the resources to cover cities who need these services (Roosevelt/Portales)



A Brief Aside: *We do know that it's Not All About 9-1-1 or Addressing*

- This project requires time and output from people and departments not solely dedicated to E9-1-1 or Addressing.
- These people and departments have other priorities. I have seen rural addressors, sometimes the only GIS users in a county, working on bus routes, layers depicting known sexual offenders and mapping culverts for the road department.
- SDR can and will perform the necessary database upgrades. The trade-off, which is often the “killer,” is temporary data ownership.



An Example...

San Juan County

San Juan County GIS & Rural Addressing

Farmington/GIS & City Addressing

Aztec/GIS & City Addressing

Bloomfield/GIS & City Addressing

Navajo Nation: Recognized “Hole”



Another Example...

Taos County

Taos County

Town of Taos

Village of Red River

Taos Pueblo

Picuris Pueblo—Recognized “Hole”



And Just One More

DeBaca County

DeBaca County—GIS and Addressing for all of Rural
DeBaca County and City of Ft. Sumner



The Necessary Commitment

Maintain Centerlines in your “GIS Location” area

- Add new centerlines using imagery or GPS
- Update road names and ranges
- Assure proper topology, segmentation, segment direction
- Assure “unique” datasets with no overlap

Coordinate Regular Transmission of Centerlines through “GIS Data Source” in your county

- Deliver centerlines to Data Source on scheduled interval by CD, e-mail, network, other media
- Assure MSAG/GIS integrity
- If you are the designated data source, upload your centerlines and other centerlines from your county as proscribed, receive error reports and coordinate error resolution



Benefits of Participation

- Some GIS Software support from State
- Data Sharing: Access to centerlines, addressing and other GIS layers in areas contiguous to your GIS area of responsibility
- Standardization of data
- Enhanced dispatch call mapping benefits all citizens whose lives or property are in danger
- Training



Potential Future Benefits

Enterprise GIS: Separate County agencies work together to ensure that road naming, addressing, signage, assessment, MSAG, 9-1-1 databases and other municipal and county databases are synchronized. This builds the basis for future enterprise-level databases, full-county GIS. Cooperating entities can work together for larger projects such as new aerial imagery.

“Flat” or “Non-Geographic” Databases: Fully attributed centerlines with accurate road names and correct ranging allows your GIS department to utilize other “flat” databases such as utility records and assessor data and depict them spatially or link or join them to existing geographic data.



GIS/MSAG Integration:

Why it is needed
How to achieve it



GIS Centerlines

Developed for:

- Rural or Municipal Addressing
- Assessor (references for parcels)
- Planning
- Road Department
- Utilities



GIS Centerlines...

Offer life and property savings benefits to your county's residents when used in PSAPs for E9-1-1 dispatch call mapping



New Mexico Statewide Centerline Project

The State of New Mexico is committed to providing the mechanism to deliver comprehensive, standardized centerlines to each PSAP to be used for emergency call location. The statewide data collection, QA/QC and distribution effort is part of the “NED” project.



STANDARDS

To effectively collect data from 70 or more sources and combine it into a seamless centerline layer to be cut up and distributed back to PSAPs for dispatch call mapping, GIS and Attribution standards had to be determined. “Best” GIS practices and NENA standard attribution were chosen as appropriate for this project.



Identification of GIS Centerline Providers /GIS "Locations"

SDR conducted survey of counties and municipalities, compiled population and geographic information, studied what is in place and made recommendations to the State. These GIS Centerline Providers are confirmed during the SDR Project and software and training is provided. Client input is considered when final decisions are made.



Identification of GIS Centerline Upload Points /GIS "Sources"

This decision is made on a project by project (county by county) basis with the goal of one "Source" per county. GIS Centerline Providers ("Locations") upload through the GIS Source in their county.

Networking is required, and this "Source" should be in a stable location with as experienced a user as possible.



GIS STANDARDS

Centerlines must be:

- Spatially Accurate (GPS or Imagery)
- Segmented at each road intersection
- Snapped at each intersection/break
- Segment direction must follow addressing direction



CENTERLINE OWNERSHIP DURING SDR PROJECT

- SDR can bring centerlines to the standards required by the Statewide Centerline Project. (All new centerlines created by SDR meet GIS standards. Centerlines created by SDR under first SPA do not meet all standards.)
- However, this is not a requirement when SDR is working with you. SDR will request a copy of your current centerlines to analyze and will then return analysis results to you.
- The “test” is the QA/QC process when the data is uploaded for processing and distribution back to the PSAPs. Data that doesn’t conform to standards will be returned to the GIS Provider for correction. Some non-conforming data is acceptable. Exceptions will be noted and “passed” on future QA/QC.



CENTERLINE ATTRIBUTION

- **Road Name** in Four Fields: Pre-Directional, Road Name, Suffix (Street Type) and Post Directional
- **Address Ranges** in Four Fields: Left to, Left from, Right to and Right from
- Other required fields but no data is required in these fields



ADDRESSIT FORMAT CONVERSION

- All “AddressIt” users will receive a tool this year to convert AddressIt road centerline attribution in shapefiles or feature classes in geodatabases to “NED” format.
- This tool outputs a new shapefile and does not change your existing data.
- AddressIt 2.0 released later this year will contain full personal geodatabase support and many other enhancements including:
 - three format lat/long display and lookup
 - complete road segment and de-segment tools
 - complete MSAG coding and compilation tools
 - Postal standards check in road name
 - Change tracking for re-assigned addresses



GIS/MSAG INTEGRATION

The key to successful dispatch call mapping is address and/or centerline data that contains MSAG-valid road naming and correct, complete ranging.

The State of NM cannot guarantee or assure this data synchronization. This is achieved at the local/county level by cooperation and communication among GIS/RA and PSAP/9-1-1



IMPORTANT PLAYERS

- Rural Addressing Authority
- PSAP Director
- MSAG Coordinator
- GIS/Mapping

Sometimes, Addressing, GIS and MSAG are all integrated in one job description/person



The 9-1-1 Call

- When caller dials 9-1-1, resident, location and emergency responder information is transmitted in an ASCII string to the correct PSAP
- Dispatch mapping software at the PSAP reads this text string and
- Locates corresponding address point or parcel or....
- Geo-codes the address to the centerlines to interpret the caller's location or....
- Locates the coordinates of a Phase 2 wireless call and geocodes to the closest potential address location



SUCCESSFUL DISPATCH CALL MAPPING

The only way to guarantee correct call location is a direct, precise match between the address information in the 9-1-1 text string and the address information in the addressing and/or road centerline layers.



Sample (actual) 9-1-1 Calls Text

□H□K□H□K□202
M1- 283 ESN=000870 14
(573) 448-3557 18:00 12/26/04
31024
COUNTY ROAD 322A

DUNKLIN COUNTY
MO
SMITH,EARL D
573-448-3557 RESD
ALT#= TELCO=SWBT
X= CNF=
Y= UNC=

DUNKLIN CO SHERIFF
CLARKTON FIRE DEPT
MALDEN EMS
□D□E02□D

□H□K□H□K□202
M2- 283 ESN=004065 11
(573) 211-7181 17:54 12/26/04
101
Verizon Road - Omni Sector
CALLBK=(870)838-6572
Kennett MO
VERIZON WIRELESS
573-211-7181 WRLS
ALT#= TELCO=
X=-090.063879 CNF=100
Y=+036.214714 UNC=0010502

□e□E02□D



Actual vs. Potential Ranges (city blocks)

- Dispatch call mapping products default to geocoding for call lookup but can be set up to locate a point or polygon in an “address” layer.
- Geocoding pro-rates the distance on a segment based on the assigned address range fields.
- If a city block contains addresses 101-111 but the range is entered as 100-199, a caller calling from “111” will be located at the beginning of the block rather than at the end.
- Possible solutions: educate dispatchers, enter actual ranges in GIS rather than potential ranges and/or set up dispatch call mapping to recognize address layer.



The MSAG

The E9-1-1 “control” document to standardize addressing and route the calls by means of the ESN (Emergency Service Number)

County or PSAP specific list of road names, high and low address ranges, communities and ESNs

Used by local phone companies to validate customer service addresses

Most MSAGs in NM developed before GIS was widely used by most county agencies

Most existing MSAGs in New Mexico do not closely match GIS road centerline data



Non-Matches/ Close Matches

When the text address data transmitted to the PSAP with the 9-1-1 call does not match the GIS, call location either fails or the software will suggest a list of “near” matches

User (dispatcher) must pick from the list of close matches, attempt to manually locate the call location or continue without mapping



Close Match Options

Call is received from 12345 County Road 245A

Road not found. Please choose from the following roads:

- County Rd 245A**
- County Rd 245**



Close Match Options

Call is received from 320 E Maple Ave

Road not found. Please choose from the following roads:

- E Maple St**
- E Maple**
- Maple Ave**



Close Match Options

Call is received from 96 Santiago Blvd

Address not found. Please choose from the following road segments:

100-199 Santiago Blvd

200-299 Santiago Blvd

300-399 Santiago Blvd



NM Case Studies

Socorro County/City of Magdalena: GIS lists city streets with pre-directionals but MSAG uses post-directionals.

“E Poplar St” vs. “Poplar St E”

In the city of Albuquerque, the GIS uses two-letter (postal standard) quadrant post-directionals but the MSAG includes a space between the two letters in the directional

“San Mateo Dr NW” vs “San Mateo Dr N W”

This causes almost all call lookups to fail as Albuquerque has quadrant addressing throughout the city

In the small town of Red River in Taos County, the MSAG refers to Forest Service Roads as “Forest Rd 448” but the centerline uses “USFS 448.”



RESOLVING DISCREPANCIES

Sometimes the entities involved cannot agree on the “correct” or “official” road name or designation. In our work in Las Vegas, the MSAG may refer to a city street as “Midland” while the road sign says “Midland St” and residents returning questionnaire cards report “Midland Rd.”

Rarely is one source completely “correct”—most often, both MSAG and GIS need to be changed in part to accomplish synchronization

Must establish an addressing plan with road naming and addressing conventions to govern use of road names and ranges in MSAG AND GIS



CHANGING THE MSAG TO MATCH GIS

- MSAG Coordinator logs into “911Net”—a site maintained by Intrado—, accesses the MSAG and submits a change request
- Limited to 50 changes per day
- Intrado does not guarantee that all the submitted changes can be processed in a day
- For road name changes, Intrado will automatically update the telephone (ALI) records containing that road name
- MSAG Coordinator must update other telephone companies so they can change their customer service records to correspond to the changed road name
- A client without internet access must fax in change requests



CHANGING THE GIS TO MATCH THE MSAG

- User updates attribute table using normal GIS edit tools or tool such as ASIA or AddressIt
- User updates associated data in address points or parcels
- Post office must be notified if the GIS contains “official” road naming/addressing data and is used for mail delivery
- Residents may need to be notified if mailing address is affected (new suffix, post-directional instead of pre-directional, etc.)
- Local Telephone Company must be notified



KEY PROBLEM AREAS

Suffix (Street Type) Conflict

Poplar St *vs.* Poplar Dr

Poplar *vs.* Poplar St



KEY PROBLEM AREAS

Suffix Abbreviation

Trl vs. Tr

Loop vs. Lp

Ave vs. Av



KEY PROBLEM AREAS

Abbreviating vs. Spelling Out

Hwy 528 vs. Highway 528

County Rd 101 vs. County Road 101

(Suffix abbreviations should only be used in the suffix field)



KEY PROBLEM AREAS

Different Designations for Road Type

NM Highway 28 *vs.* State Hwy 28

State Rte 28 *vs.* Highway 28



KEY PROBLEM AREAS

Pre-Directionals vs. Post-Directionals

NW Alameda Blvd *vs.* Alameda Blvd NW

S Aztec Rd *vs.* Aztec Rd S



KEY PROBLEM AREAS

Abbreviations to Shorten Road Names

Bloomfield Cemetery Rd *vs.* Bloomfield Cmty Rd



KEY PROBLEM AREAS

Directional vs. No Directional

E Taos Rd *vs.* Taos Rd

Austin St SE *vs.* Austin St



KEY PROBLEM AREAS

Spelling

Torro Rd vs. Toro Rd.

Dona Ana Blvd vs. Dona Anna Blvd.



KEY PROBLEM AREAS

Punctuation

Mayfield-Brown St *vs.* Mayfield Brown St

Jenkin's St *vs.* Jenkins St

Postal Standard and general practice is to avoid punctuation in road names



KEY PROBLEM AREAS

Spanish/English

Ana Maria Ave *vs.* Avenida Ana Maria

Calle Cinturon *vs.* Cinturon St.



KEY PROBLEM AREAS

Numbers/Letters

First St *vs.* 1st St.

Fourth Ave *vs.* 4th Ave



KEY PROBLEM AREAS

County Road Designations

County Road B120 *vs.* B120

Road 303 *vs.* 303 Road



Postal Standards

All new MSAGs must adhere to standards set in USPS Pub 28

Existing MSAGs not required to change

Large-scale changes to adhere to Postal Standards are considered “Projects” by Qwest/Intrado

Santa Fe and Bernalillo/Alb are currently undergoing MSAG Postal Standardization projects. Both entities are moving toward changing MSAGs to match already postal-standard GIS

In general, changes to MSAG/GIS should move toward postal standardization



Postal Standards As Applied by the USPS and Telcos

Pub 28 is a long document which must be interpreted by end users

Areas of emphasis for telcos are standard suffix use, standard directionals/post-directionals, postal-valid MSAG communities, use of numbers in road names, spelling out “Highway” and “Road” in road name body

USPS may apply rules inconsistently (post master by post master) but are more likely to be more rigorous when they do follow the standard than the telcos



Importance of the Addressing Plan

Provides a guideline so that addressing and road naming decisions are made in context of all potential users of addressing and GIS information

Makes the job of assuring the synchronization of many data sources much easier

Helps maintain continuity when personnel changes occur