Delta DX Association - 2013

CQ/X de NO5W

GPS-Enabled Software for Mobile Contesting

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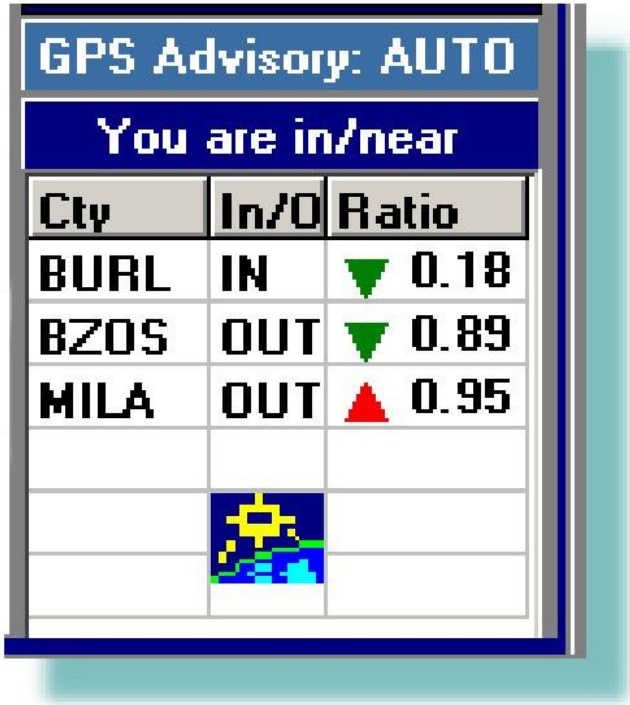
Download site: www.no5w.com



Where We're Going

1. Brief intro to mobile contesting
2. What's important to mobile contest ops
3. CQ/X Functionality Supporting 2.
4. CQ/X Demo with Simulated GPS Data
5. Methods used in CQ/X

Questions at any time

Who am I?

About NO5W

- Chuck K5MPM 1957-68, NO5W 1984-
- Active Contester
  - Mobile Operator in state QSO parties including TXQP, LAQP, MSQP, FQP, GQP, OKQP, KSQP
  - Multi-op at KN5O, NR5M, NX5M, N1LN, K5NZ
- Developer of CQ/X and PileUpNet
- Member of ARRL, NARS, CTDXCC, FOC, CWOps, DDXA
- Coordinator of Texas QSO Party 2006-

How about you?

Audience Survey – Who has

- Operated a state QSO party as a mobile?
- Operated a VHF/UHF contest as a rover?
- Used a GPS in a contest?
- Used CQ/X in a contest?

What is Mobile Contesting?

Two Types of Mobile Contesting

- As a Rover in VHF/UHF Contests
  - National/international sponsorship
  - Station could be in motion but often sets up at a location, works the pileup, and then moves
  - Rover can be worked each time op is in a new grid square
- As a Mobile in HF Contests
  - State/regional QSO Party sponsorship
  - Usually in motion but often stops
    - to work a pileup, or
    - two or more counties from county lines
  - Can be worked each time op is in a new county

Focus of Tonight's Talk

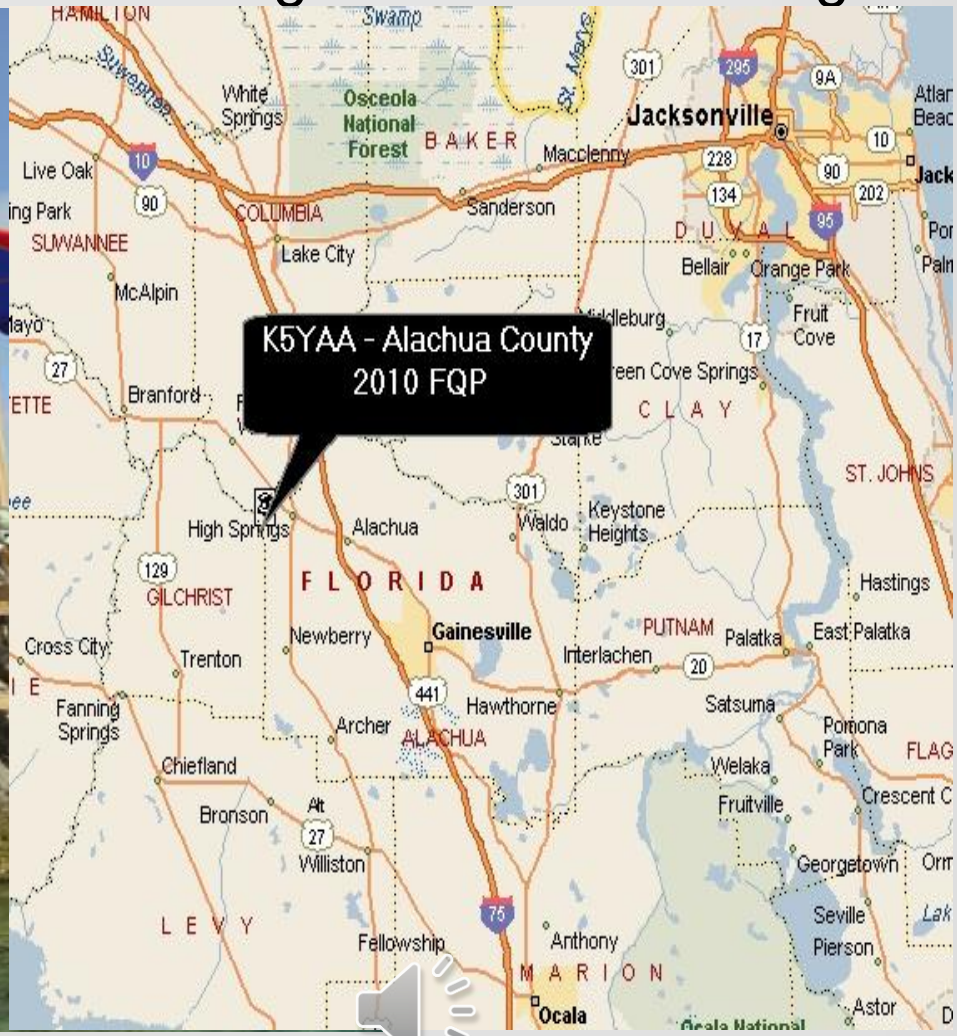
GPS-Enabled Software
Supporting Mobile Operation
in
State QSO Parties

Why Operate as a QP Mobile

- Most of all – its fun!
- You can be competitive – most ops use
  - 100 watt radio – no amps
  - Limited mobile antennas
- It's a road trip and a chance to
  - See new parts of the state
  - Have an eyeball QSO with another mobile
  - Enjoy camaraderie of a mobile multi-op
- Put your GPS to new use
- Test your ability to handle pileups
  - At each county change you're DX

At Each County Change You're DX

Which of these ops are we listening to in this recording?



What it Takes to Do Well*

*Mobile scores from a recent TXQP

CW Only

Call	QSOs	Mults	Score
AD4EB	2031	139	887927
N5NA	1495	137	640945
N5RZ	1736	107	587756
NO5W	1684	108	581616
W3DYA	1111	127	455791

Phone Only

Call	QSOs	Mults	Score
N5XTR	1740	109	394820
KK5LO	762	97	184828
NA5F	471	90	87780
KE5LQ	167	61	33874
KF5CRX	104	51	21108

Mobile Contesting Opportunities

Nearby

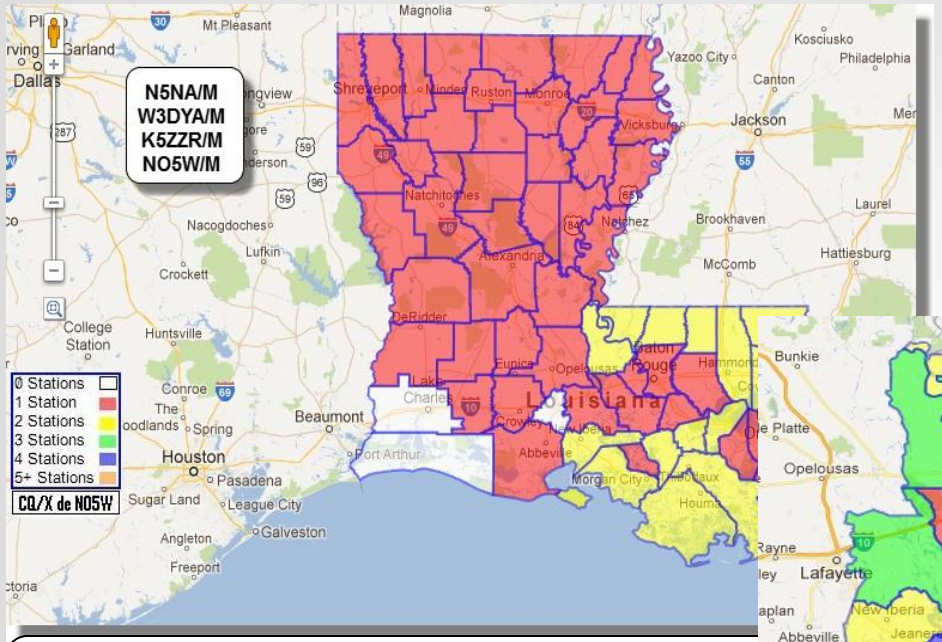
QSO Party	Length (hours)	When	Mobile activity
Texas	18	Late September	Large – 25-30 mobiles
Oklahoma	18	Mid-late March	Moderate – 5-6 mobiles
Mississippi	12	Late February	Moderate – 6-7 mobiles
Alabama	12	Early June	Moderate – 5-6 mobiles
Louisiana	12	Mid February	Small – usually < 4 mobiles
Arkansas	12	Mid September	Small – usually < 4 mobiles

Not so nearby but doable

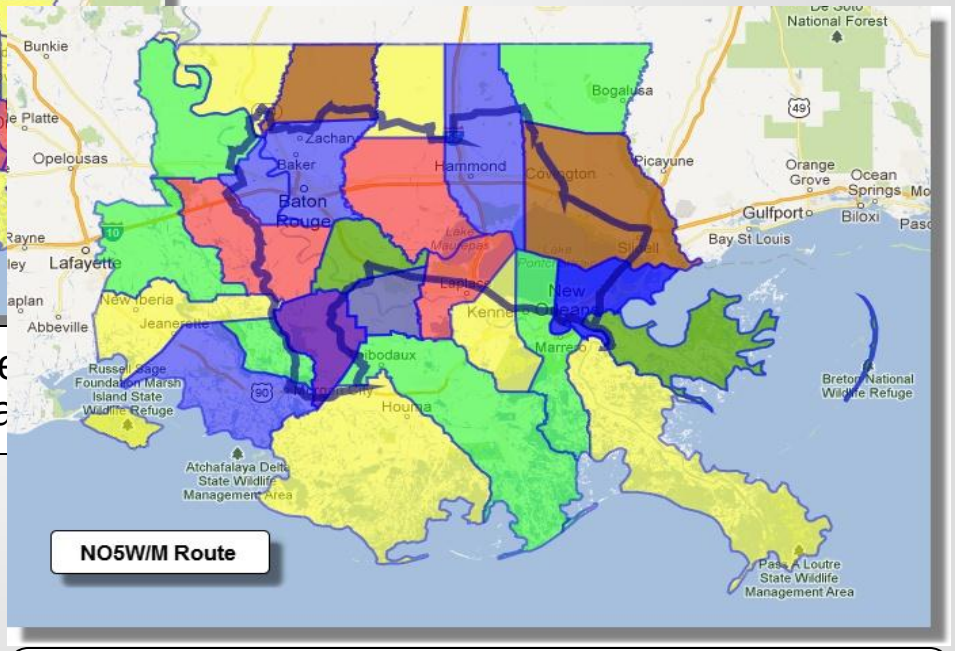
Florida	20	Last FWE April*	Many out of state ops
Georgia**	20	2nd FWE April	Many out of state ops
Kansas	12	Late August	New - off to a great start
Tennessee	9	Early September	Moderate - but great ops

*Sometimes moves by a week to avoid conflict with Easter Sunday
**Many small counties

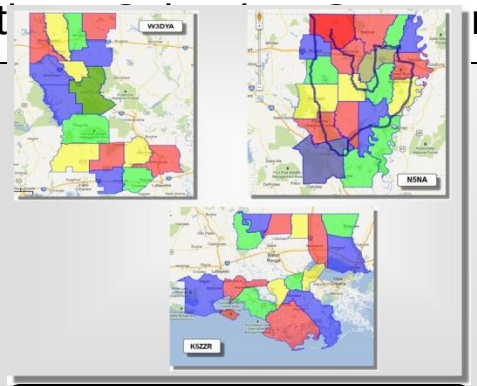
LAQP 2013 Activity



Any volunteers for a trip to Lake Charle
act n, and Lafa

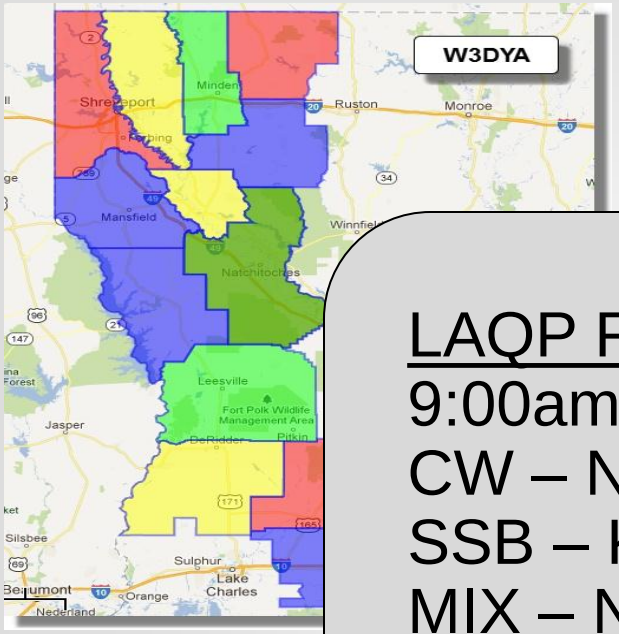


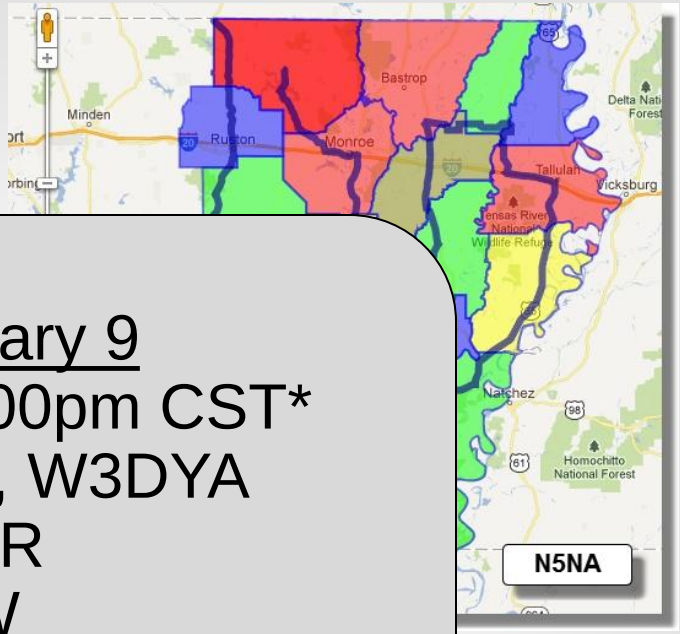
K1DW and NO5W will be touring SE LA to activate 24 counties ~400 total miles



W3DYA, N5NA, K5ZZR

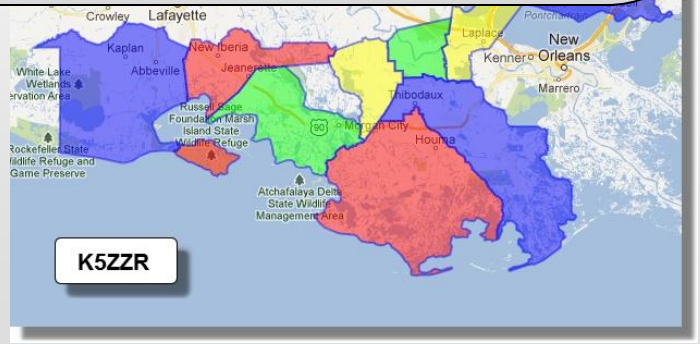
Other LAQP Mobile Routes





LAQP February 9
9:00am – 9:00pm CST*
CW – N5NA, W3DYA
SSB – K5ZZR
MIX – NO5W

*Mostly 9:00am – 6:00pm



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GPS-Enabled Software for Mobile Contesting

Three Phases of a Mobile Trip

1. Planning
   - Design the route
   - Design the stops for gas, etc
   - Test the route – is it feasible?
   - Publish the route on the web
2. Operating
   - Know what county you're in
   - Run the route staying on track/schedule
   - Know how far to the next one and how far to lunch, etc
   - Advise driver of distance to the next turn/highway change
   - Operate efficiently
3. Reporting
   - Summarize your experience on 3830
   - Submit log and post log on a Google Map
   - Confirm QSOs

CQ/X Functionality Supports

Planning

- Computes the county line crossings from route data downloaded from Google Maps*
- Performs route feasibility analysis based on user specified info
  - Max distance on tank of gas, time required for fill up,
  - Required minimum time in each county,
  - Average driving speed, etc
- Creates KML file for publishing route as a Google Map*

Operating

- Detects what county you are in from GPS lat/lon*
- Automatically changes county-dependent messages*
- Tracks distance to multiple waypoints*
- Provides distance and estimated time to next county*

Reporting

- Saves GPS log for posting a Log on a Map and for QSLs*
- Writes Cabrillo and ADIF logs

*Will include in demo as time permits

Why it's useful to know distance to next county

- A pileup is raging and you see you're only one mile from the next county and the driver is going 70mph
- You've been calling CQ for three minutes with no callers and you've already tried 15m and SSB
- You're working a station and you notice you're only 1-2 miles from the next county where you can work him again.
- You're operating solo and haven't yet found a stopping location in the current county – how much longer can you afford to look?

How is distance to next county determined?

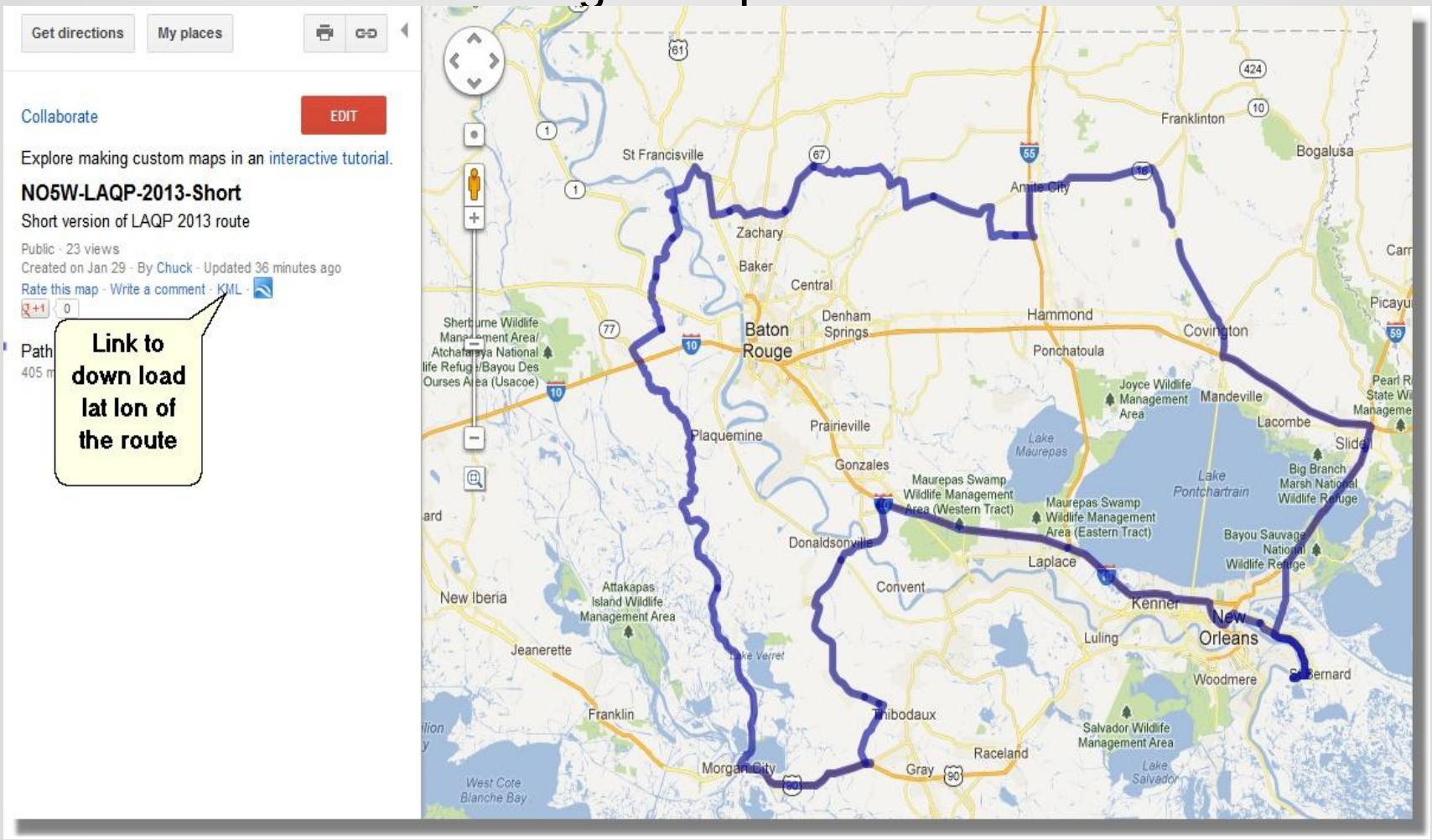
- User provides a Crossing File listing the county lines he is going to cross and the lat/lon of each crossing point. For example

```
St.Tammany-Washington LA450 30.70674896 -90.22531128 5.79
Washington-Tangipahoa LA16 30.75700760 -90.26448059 10.85
Tangipahoa-Livingston LA40 30.64310074 -90.56719208 35.71
Livingston-St.Helena LA43 30.64984131 -90.62203217 39.58
St.Helena-EastFeliciana LA10 30.88854027 -90.84573364 67.17
EastFeliciana-WestFeliciana LA10 30.84005547 -91.22669983 91.00
WestFeliciana-PointeCoupee LA10 30.72001648 -91.35255432 111.04
PointeCoupee-WestBatonRouge LA415 30.63688469 -91.31735229 119.71
WestBatonRouge-EastBatonRouge I10 30.43937302 -91.19590759 140.42
EastBatonRouge-Ascension I10 30.33004951 -91.01412201 154.40
Ascension-St.James I10 30.14356232 -90.75949097 176.16
St.James-St.JohntheBaptist I10 30.12036133 -90.64974976 182.97
St.JohntheBaptist-St.Charles I10 30.07910347 -90.40928650 197.77
St.Charles-Jefferson I10 30.00644302 -90.28008270 207.20
Jefferson-Orleans I10 29.99568558 -90.12312317 216.80
Orleans-Jefferson CCC 29.93770027 -90.05800629 222.83
Jefferson-Orleans CCC 29.93777466 -90.05100250 223.25
Orleans-Plaquemines LA407 29.90423965 -89.98480988 228.29
Plaquemines-Orleans LA407 29.90213966 -89.97827911 228.77
Orleans-Plaquemines LA407 29.90282059 -89.98055267 229.08
Plaquemines-Orleans LA407 29.90278053 -89.98042297 230.43
Orleans-Plaquemines LA407 29.90216637 -89.97837830 230.69
Plaquemines-Orleans LA407 29.90417099 -89.98459625 231.15
Orleans-Jefferson CCC 29.93893051 -90.05232239 236.15
Jefferson-Orleans CCC 29.93886948 -90.05805206 236.49
Orleans-St.Bernard LA39 29.96325111 -90.00533295 244.15
St.Bernard-Orleans LA47 29.98173904 -89.94538116 250.13
Orleans-St.Tammany I10 30.18279839 -89.82317352 266.62
```

- Not to worry - its not necessary to enter all that data!!

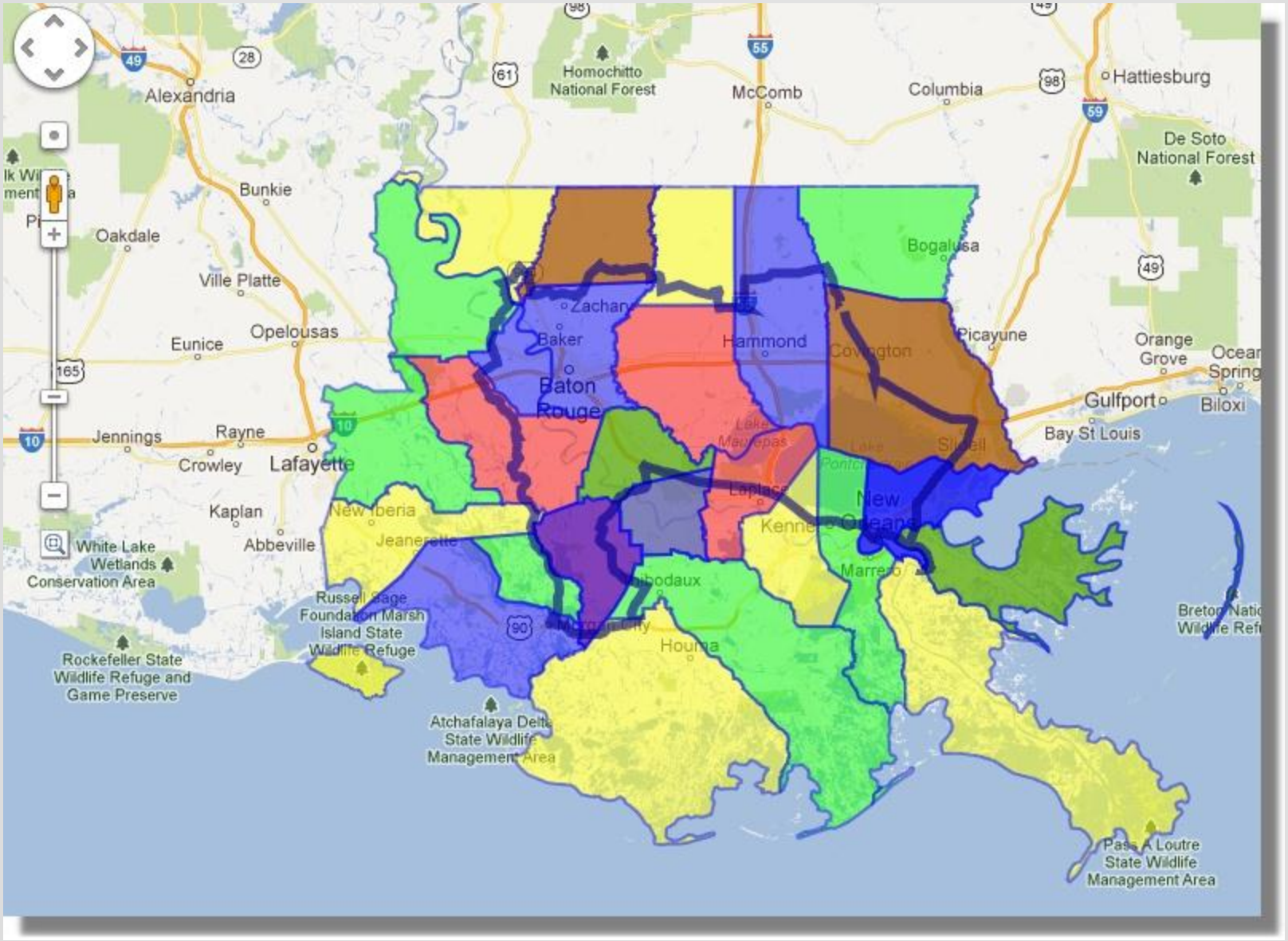
Using CQ/X to Create a Crossing File

1. Draw route on a Google Map and download lat/lon



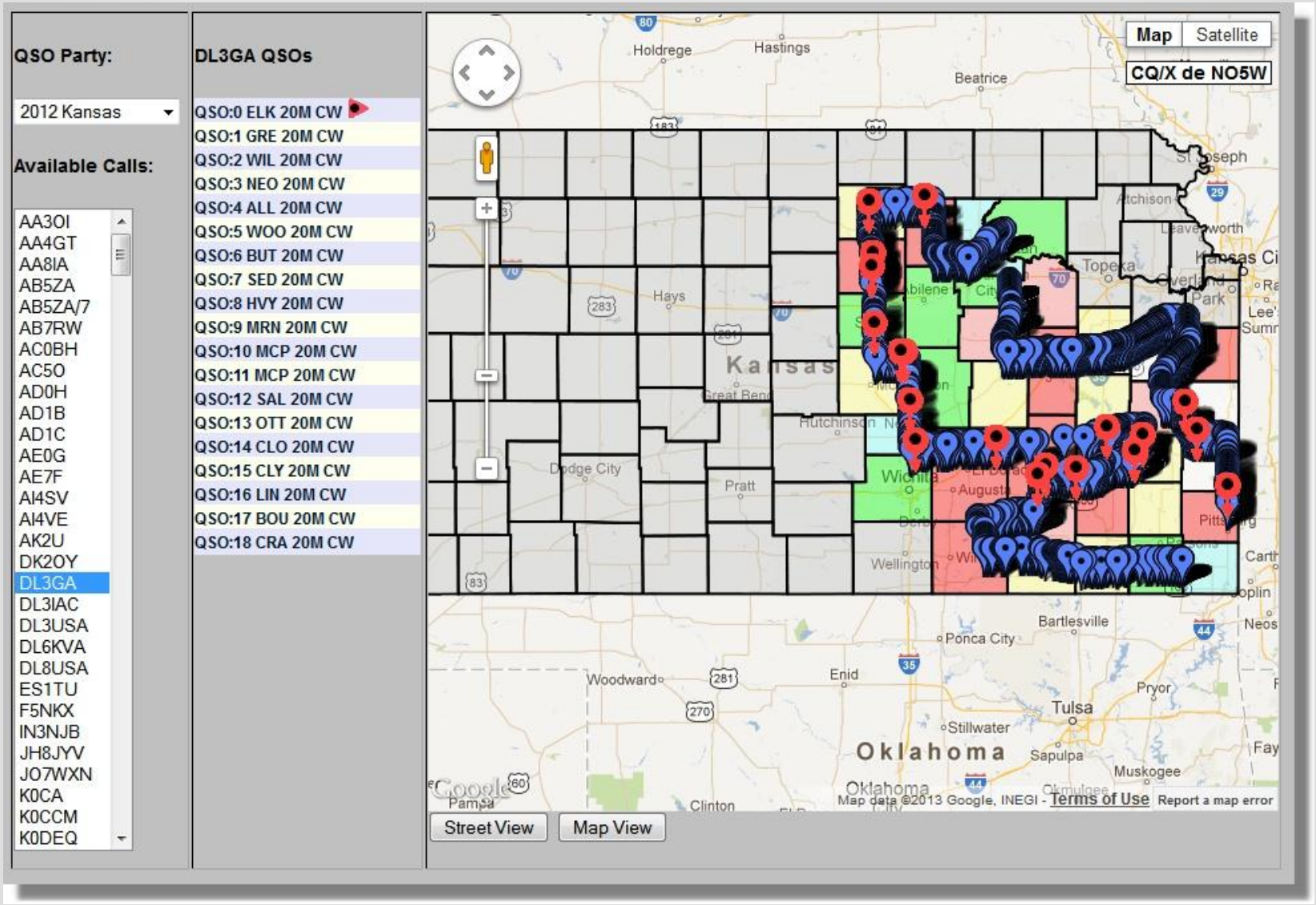
2. Use CQ/X to compute the county line crossings --

Creates KML file for publishing route as a Google Map



Reporting: Log On A Map

Here's a unique mobile-oriented way to put your log on the web

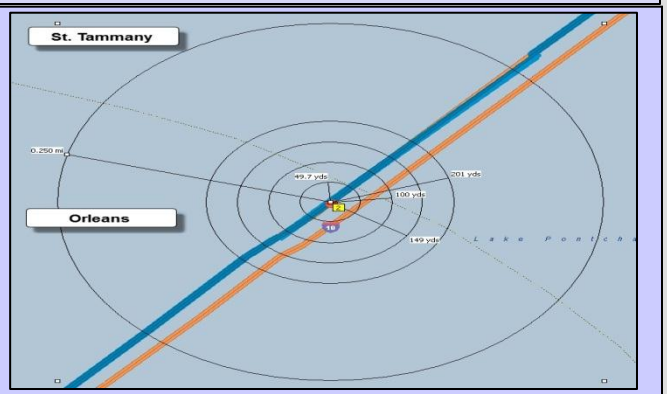


CQ/X Demo

The Demo Test Configuration

Announce
New County

Performance Evaluator



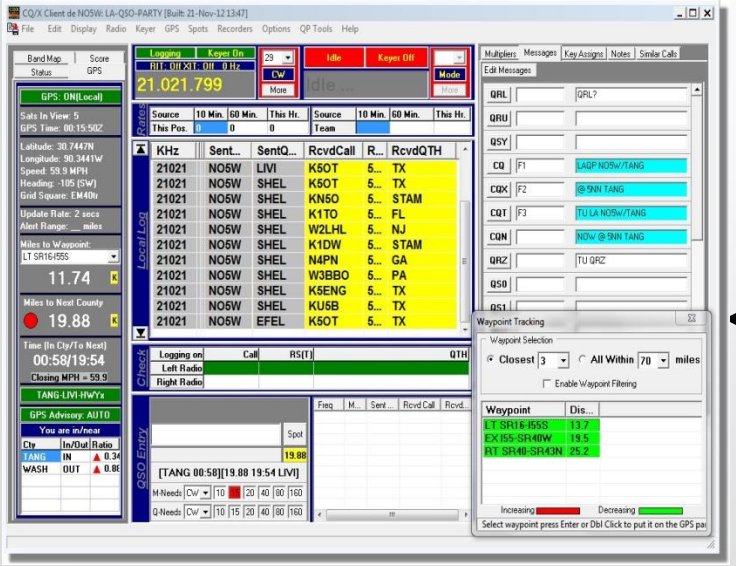
MS Streets & Trips

USB-Serial Adapter

Laptop

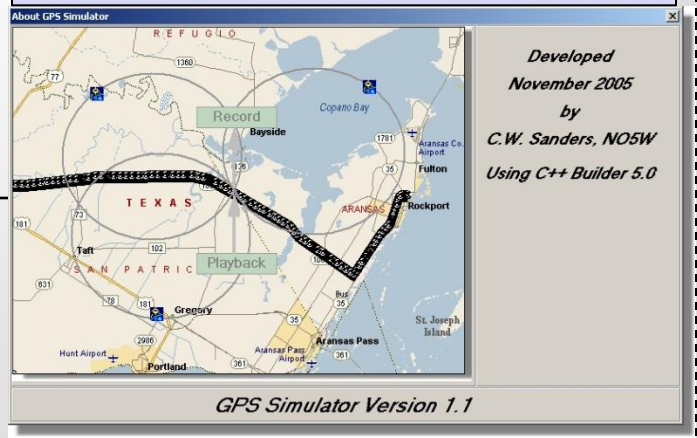
VSP

CQ/X: GPS-Enabled Logger



VSP

GPS Simulator



VSP=Virtual Serial Port

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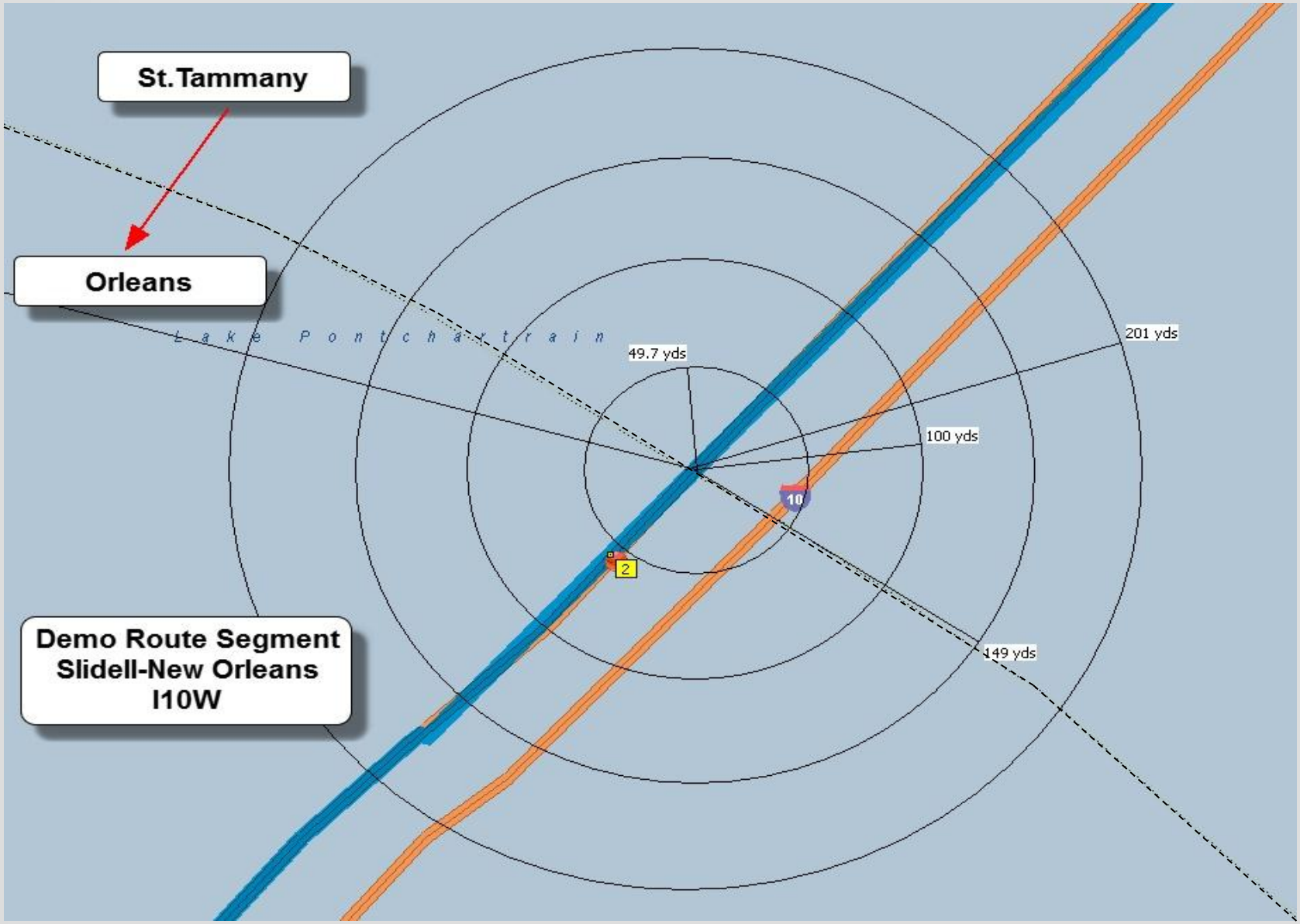
Demo C/L: STAM-ORLE I10



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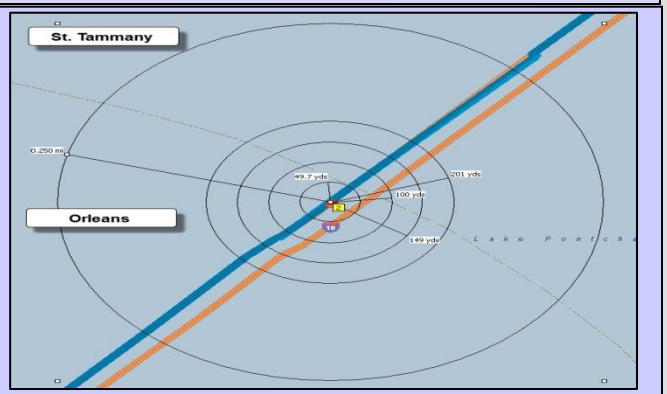

MS Streets & Trips

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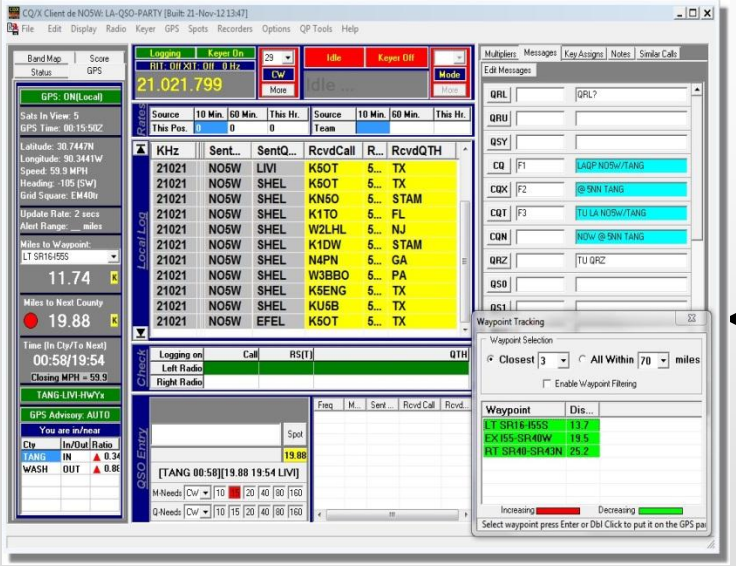
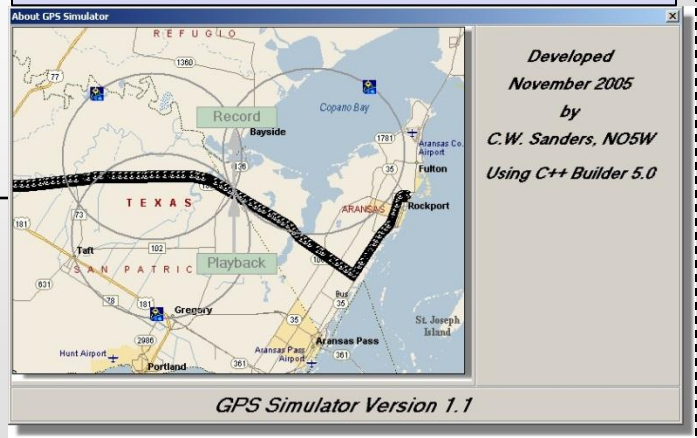


VSP

GPS Simulator



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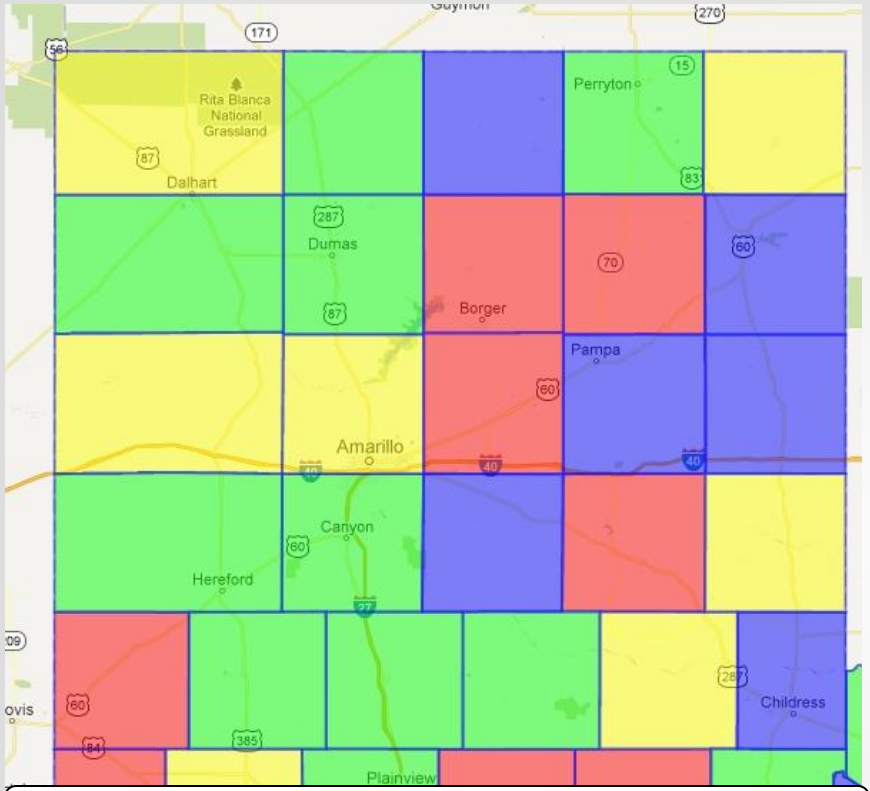
Methods Used in CQ/X

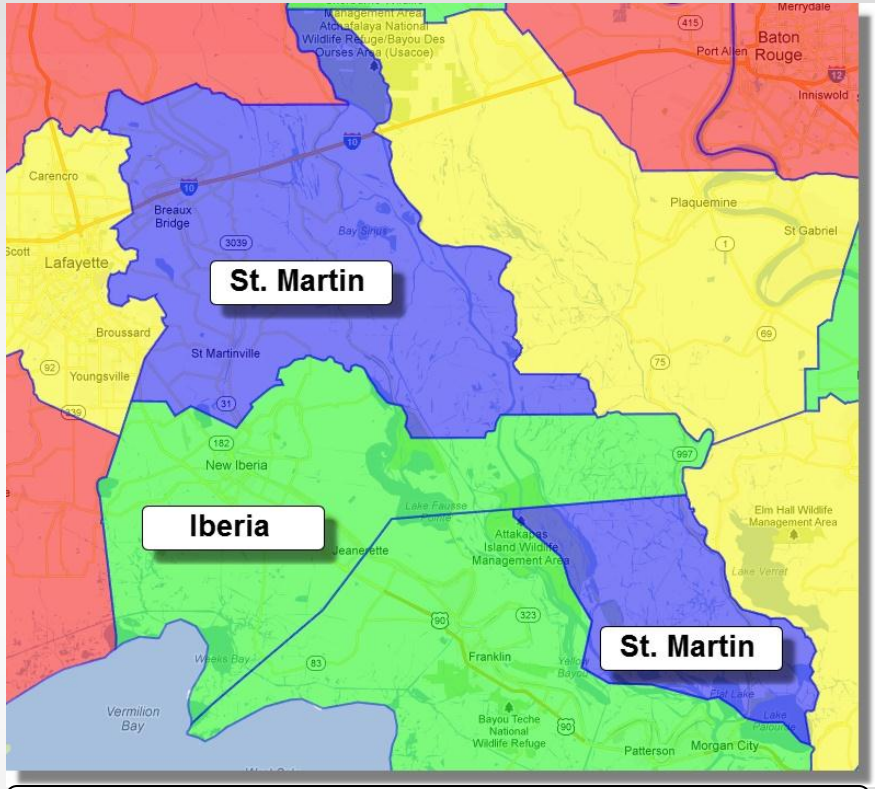
Main Ingredients

- The boundary of each county/parish in a state is modeled as a polygon defined by a sequence of latitude and longitude points
  - Polygon data was obtained off the internet from TIGER data
  - A utility was developed for extracting the TIGER data into a CQ/X format
  - Complexity of the polygons varies --
    - Some counties are simple rectangles (e.g. Texas panhandle counties)
    - A typical county will require several hundred points
    - A few counties will require more than 1000 points
    - Even fewer counties will consist of several disjoint pieces
- Additional data was developed to improve performance
  - Center and radius of a circumscribing circle for each county
  - Names of adjacent counties for each county
- A two phase algorithm to find the county containing a given point
  - Phase 1: Eliminate most counties by using the circumscribing circles. If the point is not in the circle of a county it can't be in that county. --
  - Phase 2: Examine remaining (usually < 6) counties in detail using a technique called "wrapping number" analysis to determine the county containing the point.
- Once underway the next county must come from the set of counties that are adjacent to the current one.

Example Counties

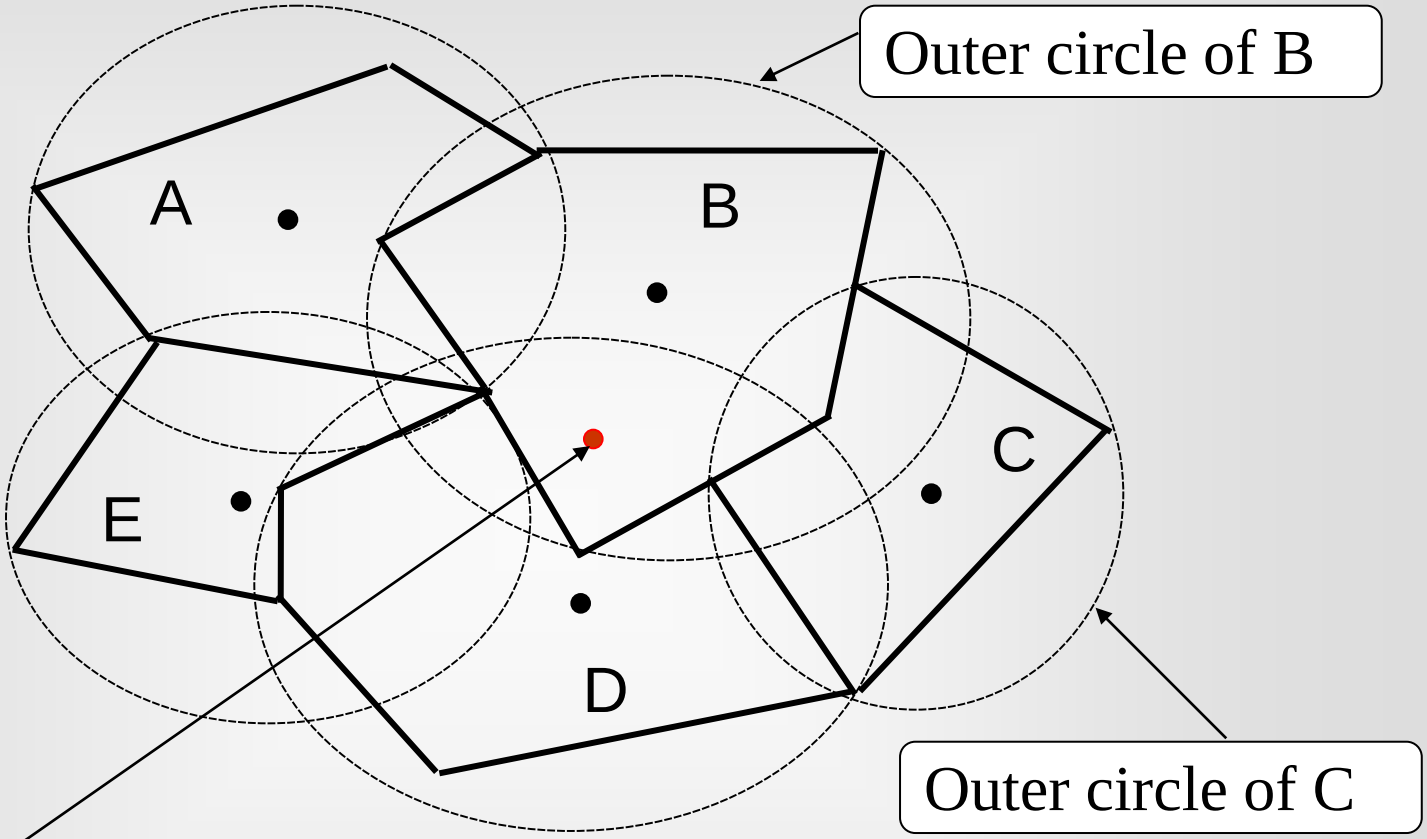


Simple Texas Panhandle Counties



What's the story on St. Martin?

Screening: A Simple Example



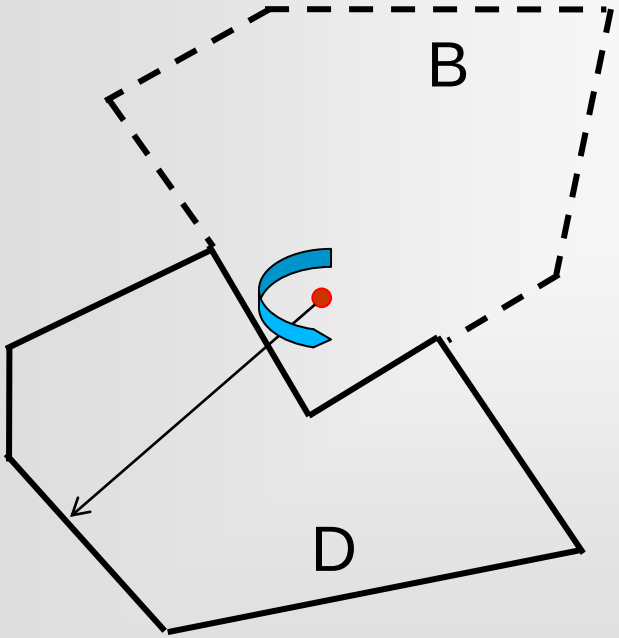
Current point: definitely not in A, C, or E.
Must be in either B or D.

1. To be in a given county you **must** be in its outer circle.
2. If you are in the outer circle of a county you still **may** not be in the county

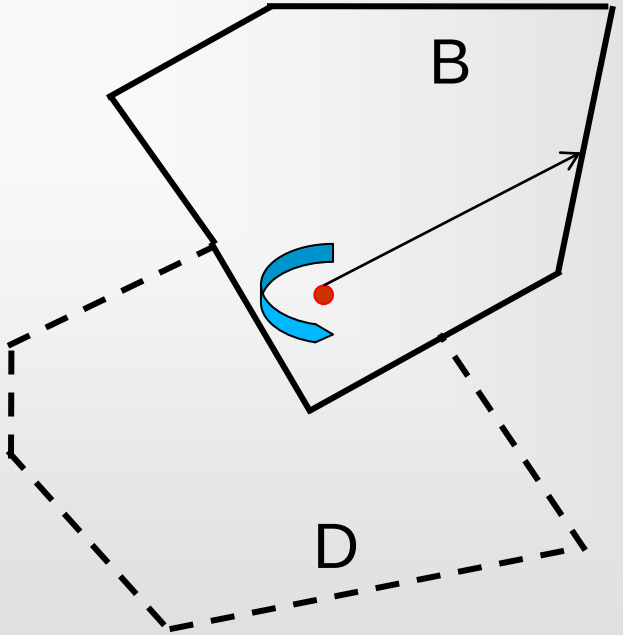
Detailed Analysis: A Simple Example

Winding number analysis (WNA) –

1. tie a piece of old phillystran to your current point
2. traverse each polygon separately and when done count the number of wraps of the phillystran. If the count is non-zero that's the county you're in.
3. Simple concept – challenge is writing computer code to do it!

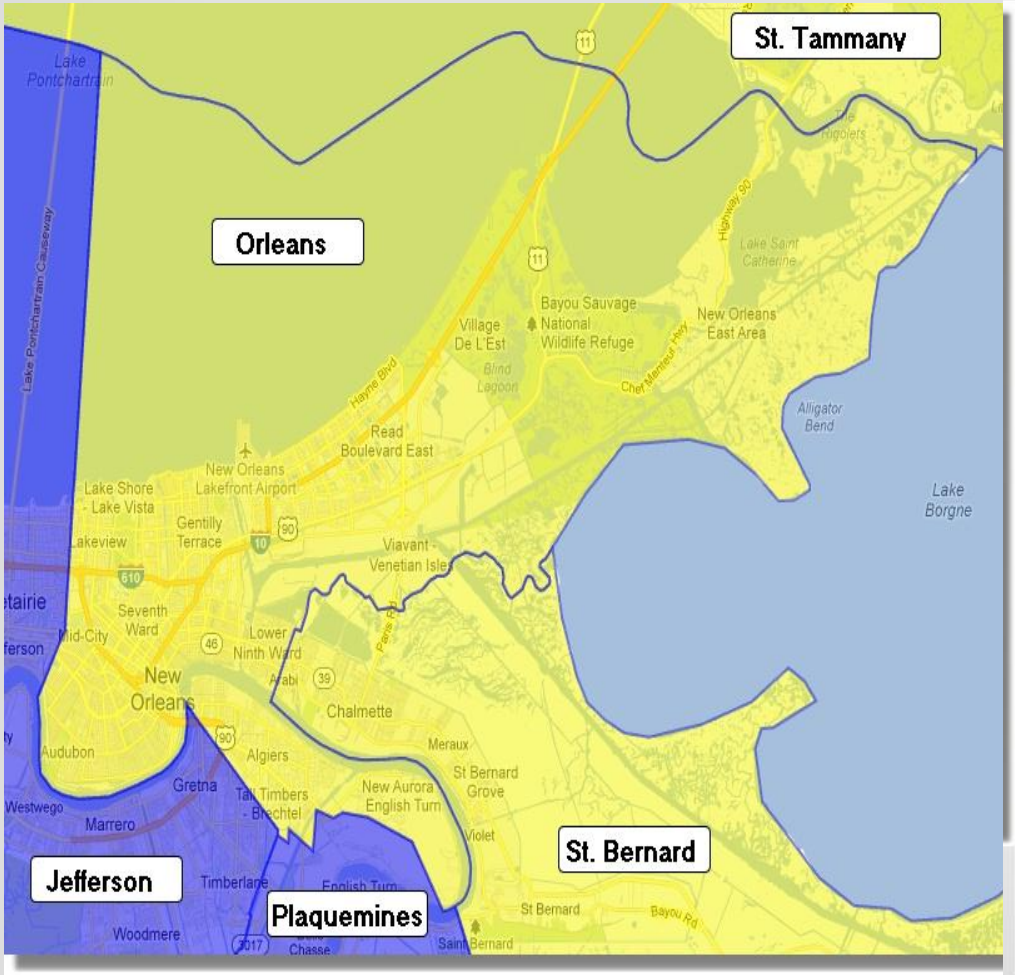


Testing D



Testing B

Orleans Parish – Two Views



Map View

-89.90146100,30.19247800
-89.88871900,30.19703300
-89.87868900,30.19919400
-89.87399900,30.19907900
-89.87149600,30.19790800
-89.86646600,30.19303900
-89.86253900,30.19077800
-89.85852300,30.18947200
-89.84827500,30.18808600
-89.84255200,30.18728100

Longitude, Latitude
348 Total Points

-90.03165400,30.16967600
-90.02415000,30.16529800
-90.01581300,30.15928200
-90.00609900,30.15348000
-90.00012200,30.15024000
-89.99626800,30.14962500
-89.99611400,30.14963800
-89.99351700,30.15031500
-89.91252400,30.18778700
-89.90146100,30.19247800

Closure: Last point = First point

Computer View

GPS data says: Lon = -90.12388 Lat = 30.01996 Are you in Orleans?

In Orleans Parish? Nope, Jefferson

You're Waiting for an Oyster Po-boy at R&O's

For more info and
to download CQ/X visit

http://www.no5w.com

Thanks for listening