



LASERTM

NG9-1-1 Institute Technology Showcase

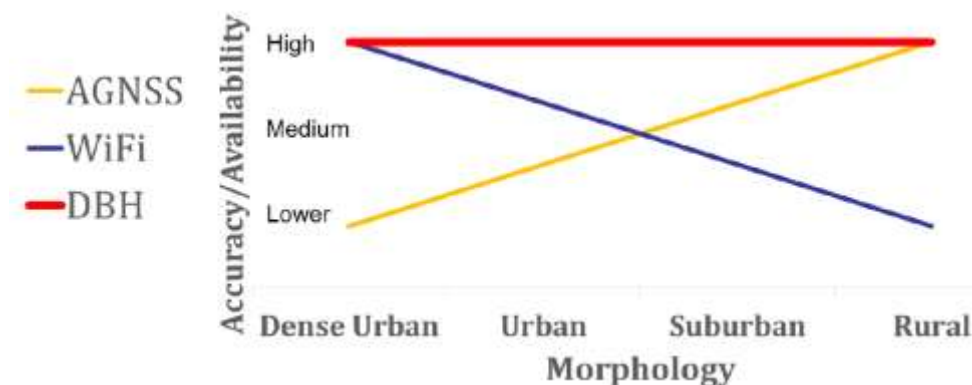
February 2018

Location, Location, Location (and other data)

Kind of a big deal

- DBH 2 years ago was a question...today it's a given

Position Method	Accuracy	Availability	Latency	Morphology (DU, U, S, R)
AGNSS	High	Medium	High	U, S, R
OTDOA	Medium	High	Low	DU, U, S
Small Cells	High	Low	Low	DU, U
NEAD	High	Low → High	Low	ALL
DBH	High	High	Low	ALL



DBH combines the advantages of existing location techniques into a single wrapper.

Reference: Ryan Jensen, T-Mobile

Device Based Data

- Logic that resides on and collects information from the device
- Utilizes the sensors and information on the device
 - WiFi, Bluetooth, gyroscopes, magnetometer, barometer, GPS, etc.
- Can leverage sources like NEAD, proprietary, and crowd-sourced WiFi databases (and Bluetooth and more...)
- Beyond location, can include supplemental data about the caller

Device-Based Data for Location

GPS	(A)GPS information sufficient to derive latitude and longitude, (and optionally altitude) including number of satellites in view, time of last fix and constellation(s) used.
WiFi	All WiFi access points within range of the device – BSSID, RSSI (in dBm), Frequency (5GHz, 2.4GHz, etc.).
Bluetooth/LE	All Bluetooth/LE devices within range of the device – MAC, RSSI.
Attached Cell	MCC, MNC, Type (LTE, GSM, etc). Pertinent unique identifiers for the RAN technology plane, e.g. ECI, LAC, TAC, CID, etc. Signal quality indicators, e.g. RSSI, S/NR, RSRP, RSRQ, etc.
Nearest Neighbors	Pertinent unique identifiers for the RAN technology plane, e.g. ECI, LAC, TAC, CID, etc. Signal quality indicators, e.g. RSSI, S/NR, RSRP, RSRQ, etc.
Unique Handset Identifier	MSISDN, IMEI or other globally unique device identifier.
Accelerometer	Acceleration in X, Y, Z axes.
Barometer	Current barometric pressure in millibars.
Thermometer	Current ambient air temperature in degrees Celsius.
Hygrometer	Current relative humidity in %.
Battery Level	Current battery charge level, in %.
Acoustic Reference	Determine if known acoustic positioning cues are present in audio stream and decode details accordingly.
OS-determined Commercial Location	Most recent location and associated data as determined by the core location framework.



Sensor data collected at the moment the user requests emergency assistance. Timings and behaviors are policy-driven with policies customizable per MNO and/or OEM and/or jurisdictional preferences.

Sensor data is sent to the LaaSera platform for analysis and combination with exogenous and inferential data to algorithmically determine location with a highly credible uncertainty factor.

Enhanced Location Data

The screenshot displays the LAASER mobile application interface. At the top, there is a navigation bar with a back arrow, a 'Map' button, an 'Info' button, and a 'Weather' button. The 'LAASER' logo is in the top right corner. Below the navigation bar, the incident details are shown: 'INCIDENT ID 396011' and 'TIME 12:37:41 May 6, 2017'. The main area is a satellite map of Pompano Beach, FL, with a vertical line of green location markers and a red marker at the top. A scale bar indicates 1.25 miles. On the right side, there is a panel with map controls (Map, Satellite, C), a 'Display: 1000' dropdown, and a list of estimated addresses with their corresponding location data and checkmarks.

Map Satellite C

Display: 1000

EST. ADDRESS 1
681 SW 16TH TER
POMPANO BEACH, FL
33069

UNCERTAINTY 9 m

BEARING NNE 17

SPEED 49 MPH

ALTITUDE --- m

BAR PRESSURE 1013 mb

1 681 SW 16TH TER
POMPANO BEACH, FL 33069
12:37:41 May 6

2 1898 SW 8TH ST
POMPANO BEACH, FL 33069
12:37:34 May 6

3 1982 S CYPRESS BEND DR
POMPANO BEACH, FL 33069

Supplemental Data

← Map Info Weather **LAASER™**


INCIDENT ID 721607 TIME 16:56:34 April 26, 2017

General

Emergency Contacts

Automobile

Michael Self



Age 50 DOB Mar 28, 1967 Gender Male
Hair Blonde Eyes Blue Weight 270
Height 6' 4" Blood Type A-

Updated April 14, 2017

Address

Mobile Phone

Home Phone

Current Medications asa, Altace

Allergies penicillin

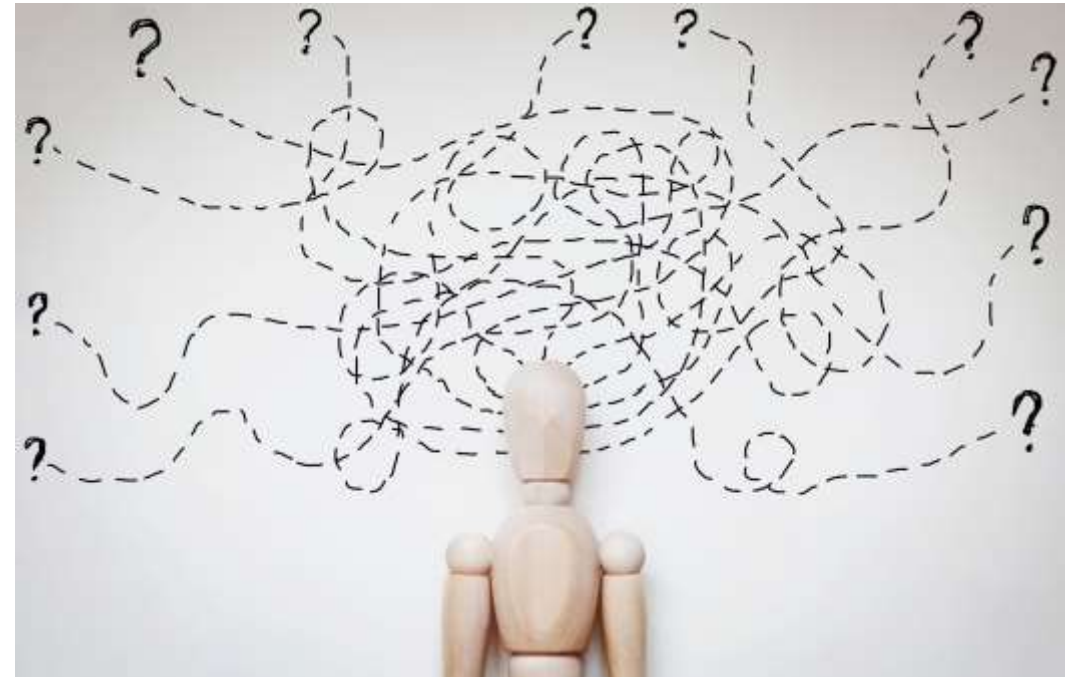
Organ Donor No

What do you do with all this data?

- With all of these potential sources of data available, it can be tough to determine what information to use and when to use it
 - Carrier based location
 - Device based location
 - User provided location
 - Information from mobile apps
 - Associated potential location data (customer opt-in, billing address, etc.)

What if they don't agree?

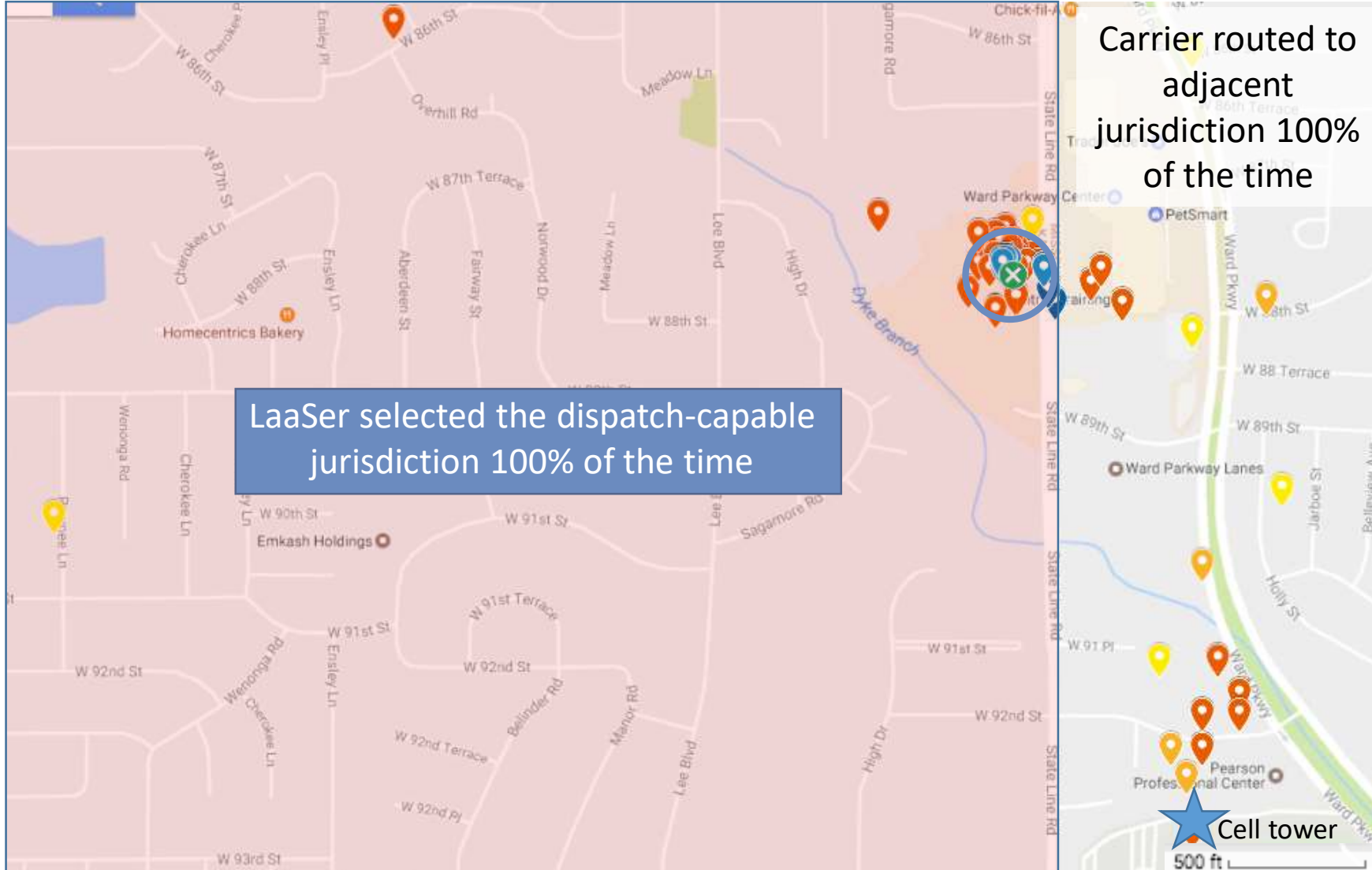
What if you don't get it on every call?



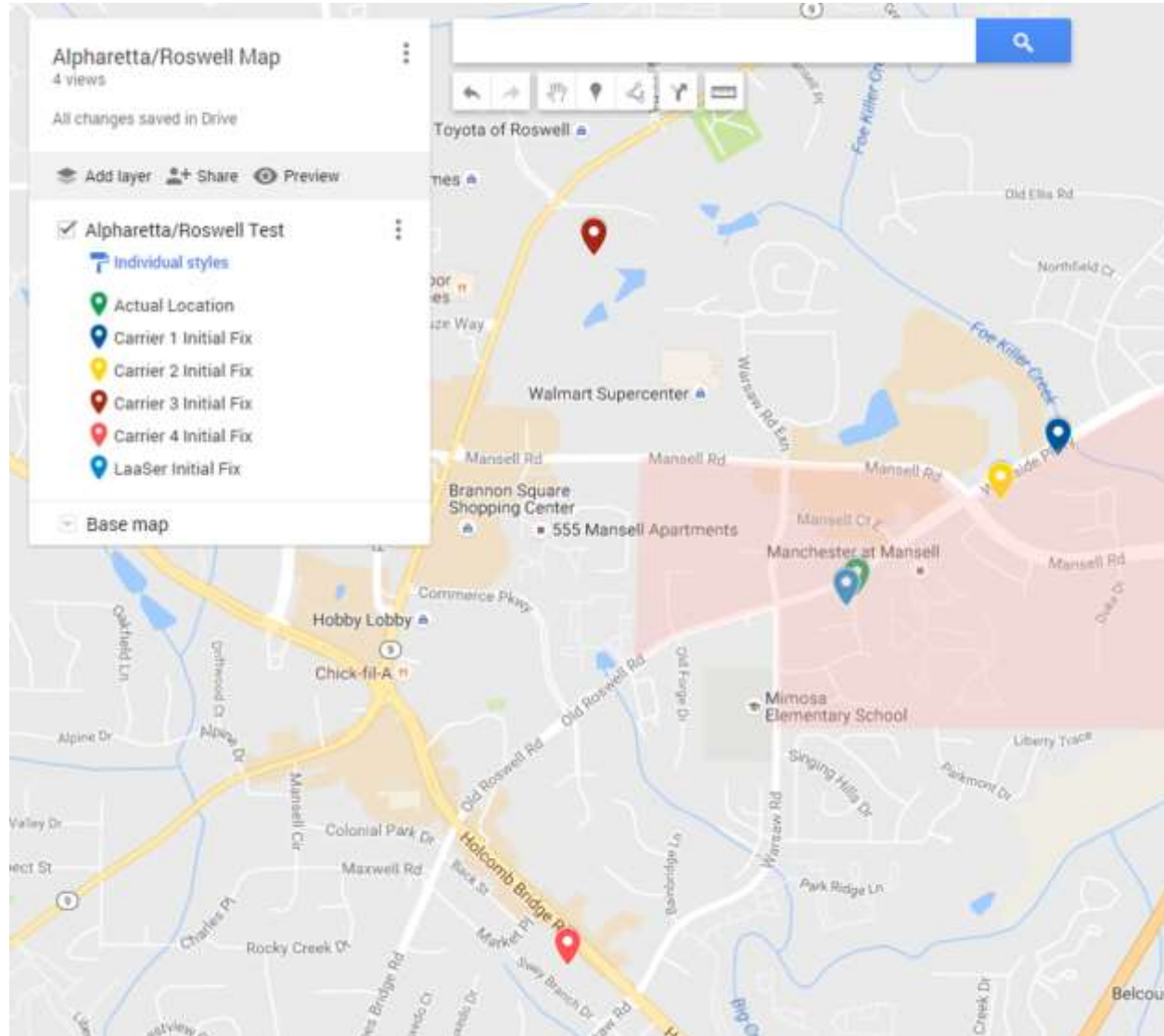
911 Routing for Mobile Callers

- Calls routed based off sector of cell tower
- Jurisdictions coordinate on routing decisions
- Hard to be precise with overlaps and population fluctuations
- Creates situation where calls are routed to neighboring jurisdiction that cannot dispatch assistance; requires call transfer
- X/Y-based routing minimizes transfers, but is it doable?

Phase 1 Routing



Phase 1 Routing, continued



Phase 1 Routing, continued





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