Wireless Call Processing
Train The Trainer

Tim Addington, ENP
Bernard Brown, ENP
ISP Regional Coordinators

Webinar
May 12, 2015
Integrated Services Program (ISP)

- Established in 2006
- Consolidation of
  - Public Safety Communications (PSC)
  - Virginia Geographic Information Network (VGIN)
- The ISP is VITA’s consolidated, centralized program for delivery of services to local government public safety and geospatial programs.
ISP Goals

- Committed to helping our constituents achieve their business-oriented goals
- An effective collaborative approach that leverages the Commonwealth’s economies of scale potentials that provides more cost effective solutions to state agencies and local governments
- A governance model that is coordinated among all interested stakeholders including the Boards and professional associations
ISP Organization

- PSC
  - PSC Coordinator
  - PSAP Assistance
  - PSAP Grant Funds
  - CMRS Funding
  - NG-911 Projects
  - Radio Services

- Regional Outreach
  - Consultation
  - Assessments
  - Education
  - Advocacy
  - Support

- VGIN
  - VGIN Coordinator
  - GIS Assistance
  - Enterprise GIS
  - Imagery Program
  - Road Centerline
  - Clearinghouse

ISP Director
Administrative Assistant
Webinar Instructors

- Tim Addington, ENP
  - Region IV Regional Coordinator
  - Former director of Scott County 9-1-1

- Bernard Brown, ENP
  - Region VI Regional Coordinator
  - Former director of City of Danville
Logistics & Ground Rules

- Restrooms
- Emergency Exits
- Cell Phones (if allowed) to be on vibrate
- Continuing Education Credit
  - DCJS
  - OEMS
  - Others
- Name Tents
- Questions (are they allowed during or after)
Introductions

- Name and agency
- Years experience
- Any specific wireless E-911 and call processing issues you want to address during training session?
Students Experiences

- Basic Call Processing (wireline or wireless)
- Wireline Call Processing
- Wireless Call Processing
- VOIP Call Processing
- Text-to-911
- Non-Service-Initiated

www.vita.virginia.gov
Current Training

- DCJS Academies
- On The Job Training
- Individual PSAP Training
- Vendor Training
- VITA-ISP

www.vita.virginia.gov
Webinar Today

• There are various levels of training throughout the commonwealth

• Your agency’s individual training program may surpass what we will be going over today

• This is not to replace DCJS training but is a tool to augment your training program
New Hire VS Refresher

- Train ASAP
  - Don’t wait until academy
- Refresher Training Annually
- As Specific Needs Arise
  - Errors in processing calls
  - New Call Handling Equipment
  - Upgrades to equipment which affect process
Setting The Stage

- Wireless 9-1-1 in the News
- Videos
  - Denise Amber Lee Abduction
  - Georgia Tragedy
  - [http://youtu.be/06FOGQsIMyc](http://youtu.be/06FOGQsIMyc)
Wireless E-911 Overview

- Review common terms
- Deployment Phases
- How wireless E-911 works
- Wireless technology solutions
- Classes of service
- Correct wireless call processing and understanding the ALI data
- Wireless issues to consider
Wireless 9-1-1 Statistics

- Why is education so important?
  - 72% of all 911 calls made come from wireless devices
  - 40% of all U.S. households rely on wireless for their primary service and have dropped their landline phone service
  - Wireless devices are a way of life now:
    - Text messages
    - Smartphones
    - Still photos and videos
    - I pads & laptops
Key Terms

Wireless 9-1-1 Call Processing
Terms For The Telecommunicator

Integrated Services Program
Public Safety Communications

www.vita.virginia.gov
Key Terms

- **Cell Sector** - One face of a cell antenna (typically 3-sided) that operates independently of the other sectors.

- **COS (Class of Service)** – A designation of the type of wireless location service. (MOBL, W911, WRLS, WPH1, WPH2)

- **COF (Confidence/Uncertainty Factor)** – Displays the estimated measurement area in meters based upon statistical calculations.

- **COP (Confidence Percentage)** – Displays the estimated percentage on how sure the Phase II location measurement is accurate.
Key Terms

- **ESN (Emergency Service Number)** - An ESN is a three to five digit number representing a unique combination of emergency service agencies (Law Enforcement, Fire, and Emergency Medical Service) designated to serve a specific range of addresses within a particular geographical area, or Emergency Service Zone (ESZ).

- **pANI (Pseudo Automatic Number Identification)**
  A telephone number used to support routing of wireless 9-1-1 calls. It may identify a wireless cell, cell sector or PSAP to which the call should be routed. Also known as routing number.

- **GPS (Global Positioning System)** - A satellite based Location Determination Technology (LDT)
Key Terms

• **Handoff** - The transfer of a wireless call in progress from one transmission site to another site without disconnection.

• **MPC – (Mobile Position Center)** - serves as the entity which retrieves, forwards, stores and controls position data within the location network.

• **MSC - (Mobile Switching Center)** - The wireless equivalent of a Central Office, which provides switching functions from wireless calls.

• **Rebid** - Query or request ALI information. Method used to retrieve Phase II call location information.
Deployment Phases

- **Phase 0** is characterized by the wireless being delivered to the PSAP on a 10-digit telephone line. There is no location information or callback number. (legacy process and may never see)

- **Phase I** delivers the call to the PSAP based on the cell site and sector receiving the call and provides the address of the cell site and call back number for the caller.

- **Phase II** is delivered to the correct PSAP using the same method as Phase I, but the actual location of the caller is provided as a longitude and latitude. However, the longitude and latitude may deviate from the caller’s actual location by a margin of error.
The accuracy differs between handset and network based solutions.

**Phase II - Accuracy**

- **Handset Based Solution**
  - Global Positioning System (GPS) in handset
  - Requires handset replacement
  - 50 meters / 67% of the calls
  - 150 meters / 95% of the calls

- **Network Based Solution**
  - Triangulating based on at least three cell sites
  - Works with existing handsets
  - 100 meters / 67% of the calls
  - 300 meters / 95% of the calls
Technologies

• There are two technologies utilized to determine the location of a caller

  – Handset Solution
  – Network Solution

  – The following are processes for determining location of the caller AFTER the call delivery has been made to the PSAP.
Handset Solution

- Handset technology – FCC requires a GPS receiver in all new handsets by 2018. Currently 85% of devices have a GPS receiver chip. Older devices were not required to offer that type of technology.

- PROS –
  - Very accurate with a good satellite fix
  - Does not require access to multiple towers

- CONS
  - May require 15-20 seconds to calculate lat/long
  - Requires line of sight to satellites
  - Handsets require GPS chip that puts additional drain on battery
  - Older phones without GPS chips cannot provide location information

- Wireless Carriers using handset solution
  - Appalachian Wireless, Ntelos, Sprint, US Cellular, Verizon Wireless
Network Solution

- Network technology is less accurate, but works with all existing handsets.
Network Solution

• PROS
  – Can calculate lat/long very quickly
  – Does not require line of sight to satellites
  – Older phones can provide location information
  – Does not drain battery of cell phone

• CONS
  – Needs access to multiple towers to accurately calculate lat/long
  – Less accurate than GPS technology

• Wireless Carriers using network solution
  – AT&T and T-Mobile
Facility Based VS Reseller

• Facility Based
  – Appalachian Wireless
  – Ntelos
  – Sprint
  – US Cellular
  – Verizon Wireless
  – AT&T
  – T-Mobile

• Reseller
  – Boost Mobile
  – Cricket
  – Tracfone
  – StraightTalk
  – Walmart Family Mobile
  – Many more resellers
How Wireless E9-1-1 Works

• Cellular Tower with three cell sectors. The number assigned to each sector is known as P-ANI. This number will appear on the ALI display. It is utilized for routing purposes and is not a valid callback number. Each sector can potentially be routed to different PSAPs.

• Often this number is referred in more technical terms as the ESRK (Emergency Services Routing Key) or ESRD (Emergency Services Routing Digits)
Cell Tower with Sector pANI

540-511-8097

540-511-8098

540-511-8099
Simulation of Cell Sectors

- Set up 3 chairs in a triangle
- Three individuals standing back to back in a triangle
Wireless 9-1-1 Call Delivery

Diagram showing the process of a wireless 9-1-1 call delivery, including the MSC (Mobile Switching Center), ESRK (Emergency Services Routing Key), PSAP (Public Safety Answering Point), and SCP (Service Control Point). The diagram illustrates the flow of information from the call to the appropriate emergency services.
Counties A, B, C & the City each have their own PSAP
Wireless E9-1-1 Call Routing

Counties A, B, C & the City each have their own PSAP

There is a cell tower in County C
Wireless E9-1-1 Call Routing

Counties A, B, C & the City each have their own PSAP

The cell tower and each of the sectors are assigned to County C

A single sector is routed to a single PSAP, in this case 9-1-1 calls are routed to County C

Cell sector covers multiple PSAP’s
Wireless E9-1-1 Call Routing

Counties A, B, C & the City each have their own PSAP.

The cell tower and each of the sectors are assigned to County C.
A single sector is routed to a single PSAP, in this case 9-1-1 calls are routed to County C.

Caller is in county B and the 9-1-1 call is routed to County C PSAP.
Counties A, B, C & the City each have their own PSAP.

The cell tower and each of the sectors are assigned to County C.

A single sector is routed to a single PSAP, in this case 9-1-1 calls are routed to County C.

Caller is in county B and the 9-1-1 call is routed to County C PSAP.

County C PSAP transfers 9-1-1 call to County B.
Call Handling Equipment

- Currently there are 6 types in the Commonwealth
  - Airbus Communications DS (Cassidian)
  - Intrado
  - Motorola-Emergency CallWorks
  - TCS
  - TriTech (911Inc)
  - Zetron
What My Screen Is Telling Me!

• Each has a different appearance, but the information and process to update the information is similar.

• Trainer should be aware of the types of systems that the students are utilizing.
Sample ALI Screens

- **Callback Number**: 540-397-2710 07/13 16:54:42 16
- **Wireless Service Provider**: WIRELESS-NTELOS(XYP) WRLS
- **P-ANI**: (540) 511-7769
- **Lat/Long**: LAT:+037.294120 LON:-080.062050

**Emergency Calls Waiting**: 0
**Emergency Calls on Hold**: 0
**Admin Calls Waiting**: 0

**Class of Service**: Wireless
**Confidence Factor and Percentage**: N/A

**Location**: SALEM, VA
**Address**: 220 E MAIN ST

**requests**
- Request ALI
- Release Call
- Pick Up 9-1-1 Call
- Refuse Call
- Call History
Even though this call shows WPH2 for Phase II, notice the extremely high COF (meters).

10,502 meters is approximately 6.5 miles
Re-bid

Re-bidding the ALI for a wireless caller may be helpful when –

• The call comes into the PSAP displaying “No ALI” or “No Record Found”.
• The call comes into the PSAP with Phase 1 information only. This includes callback number and tower location only.
• The caller is traveling and you need updated information about his/her location.
• If the COF is poor and you need to try to obtain a more accurate location. (Ex. The COF is 0 or very high)
• Re-bids only work while the call is still active.
Re-bid

- Different terminology - but concept is the same
- Rebid - TriTech
- Rebid ALI - TCS
- RTX - Intrado
- Request ALI - AirBus DS (Sentinel)
- Repeat (Interact)
- Retry ALI – (Motorola-Emergency CallWorks)
- Update-Airbus DS (Vesta 911)
- All are the same
Rebid Reference Screen Shots

- We have collected a series of screen shots in the next few slides.
- This is to reiterate the importance that a telecommunicator needs to be aware of how to rebid a call.
Airbus DS Communications

Vesta 911
Vesta 911
TCS Call Handling – xT911 ALI Rebid
TCS Call Handling – xT911 ALI Rebid Button
TriTech (QuickLink)
Inform 911
ZETRON Call Handling ALL Rebid

Manual rebid is done by clicking on the circle icon shown inside of the red box.
Some jurisdictions utilize automatic rebids as a tool in reviewing their standardized location accuracy.

It is up to the trainers and telecommunicator to know what type of Re-bid (Automatic or Manual) is occurring with their equipment and what they are seeing on the display screen.

Each jurisdiction’s individual process needs to be understood.
Issues with Automatic Re-bids

• Typically, an automatic ALI re-bid function should only be deployed for the initial bid to retrieve the Phase II location.

• Multiple automatic re-bids unnecessarily adds to network congestion when a location update is not needed.

• An automatic re-bid can confuse the call taker in some situations. Such as; the location of the incident may be at the original location though the caller is moving (i.e., someone calling about an accident they are passing).

• Instead of the map intermittently updating itself to the caller’s location, it is best to let the call taker manage the re-bid process. Though each carrier has their own re-bid interval, waiting at least 30 seconds between re-bids will work for all carriers.
Non Service Initiated (NSI) Wireless Phones

- Cell phones that can dial 9-1-1 but have no subscriber service. Ex: when someone purchases a new cell phone and moves their service to that phone, but still have the old phone to dial 9-1-1.

- Non-Service Initiated (NSI) or disconnected handsets provide call back number with 911 area code – (Example: (911)-123-3456

- No subscriber information is available for NSI phones and little can be done for abuse callers.

- These phones are often given to charity organizations for personal safety issues. (Ex: domestic violence victims, senior citizen groups, community watch groups, etc.)
Know Your Resources

- WSP Emergency Contact Numbers
- Exigent Circumstance Procedures

  - federal law allows that if the WSP reasonably believes that an emergency involving immediate danger to life or property (an “exigent circumstance”) .. the WSP may provide subscriber information
Additional Resources

- **NENA** - National Emergency Number Association
- **APCO** - Assoc. of Public Safety Communications Officials
- **FCC** - Federal Communications Commission
- **SCC** - State Corporation Commission
- **VITA Regional Coordinators**
What would you do?

- Mapping Software / Display crashes
- 37.2885308  -80.088447
- Google maps
- whatsmyGPS.com
- Bing Maps
Error Reporting

• Local Protocols
  – No Record Found
  – Accuracy Discrepancies
    • -O- or Very high COF
Transferring Calls

• Local Protocol

• Understanding Capabilities
  – Does the data transfer?
  – Are you transferring to a 911 trunk or to an administrative number?
  – Is the PSAP you need to transfer to in a different LEC?
  – Is the PSAP you need to transfer to in a different LATA boundary?

www.vita.virginia.gov
• Currently all wireless phones can call 911 even if they do not have activated service.

• Wireless calls are routed by the cell sector, not by the caller’s location.

• A cell tower often takes in more than one jurisdiction.

• Note whether call status is “On Line” or “Hung Up.” Check conference window to see if 911 Trunk appears.
Things to Remember

• A proper confidence factor (COF) is not delivered on all calls (it may be 0 or exceed 1,000 meters) If this is the case, a re-bid should be done.

• Do not let newer technology take the place of common sense. Always ask the caller their location. Technology such as the re-bid was intended for callers who cannot tell you their location.
Things to Remember

• Always be aware of the factors that can affect cell reception. The following factors can contribute to decreased cell reception.
  – Buildings – Tall buildings can interfere with coverage and often people cannot get reception inside of large buildings.
  – Terrain – deep valleys and tall mountains
  – Weather – Rain and humidity can decrease the cell signal
  – Tower goes down
Questions

Regional Coordinator's Coverage Areas

Legend
ISP Regions
1 (Richmond)
2 (Shenandoah)
3 (Central)
4 (Southwest)
5 (Tidewater)
6 (Roanoke)
7 (NOVA)