

21st Century EMS Communications Systems: “Brick” to the Tricorder



Kevin McGinnis, MPS, EMT-P

Communications Technology Advisor

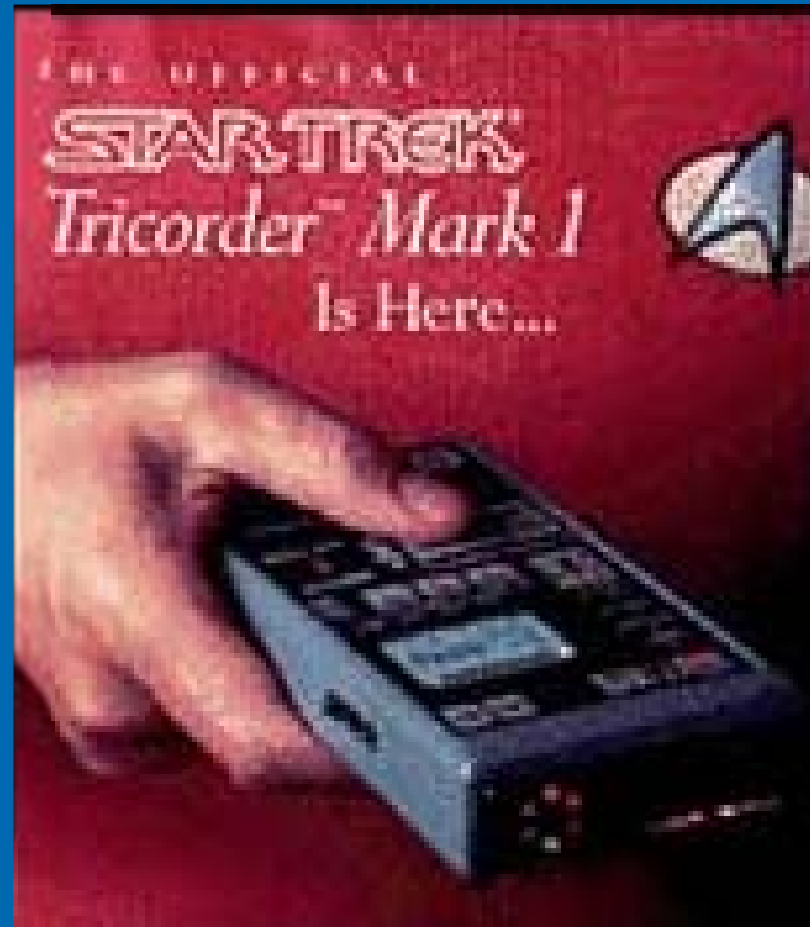
National Association of State EMS Officials

National Association of EMS Physicians

National Association of EMTs

National Association of EMS Educators

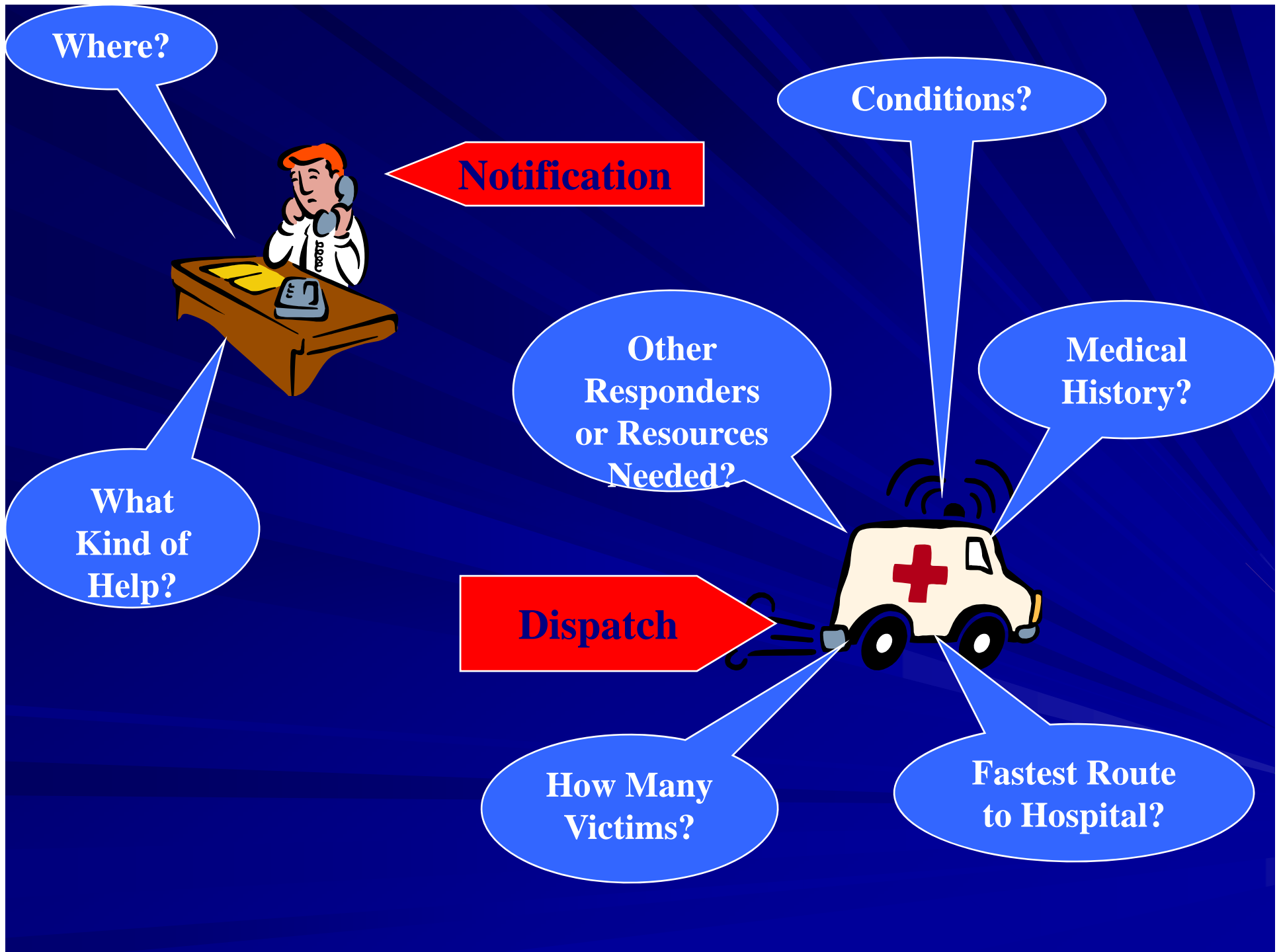
National EMS Management Association











“Golden Hour”



“Golden Hour”

≠ 20+20+10+30+120+40 Minutes

Nor

≠ 20+20+30+40 Minutes



Trauma, Heart Attack, Stroke.....

EMS Communications Now

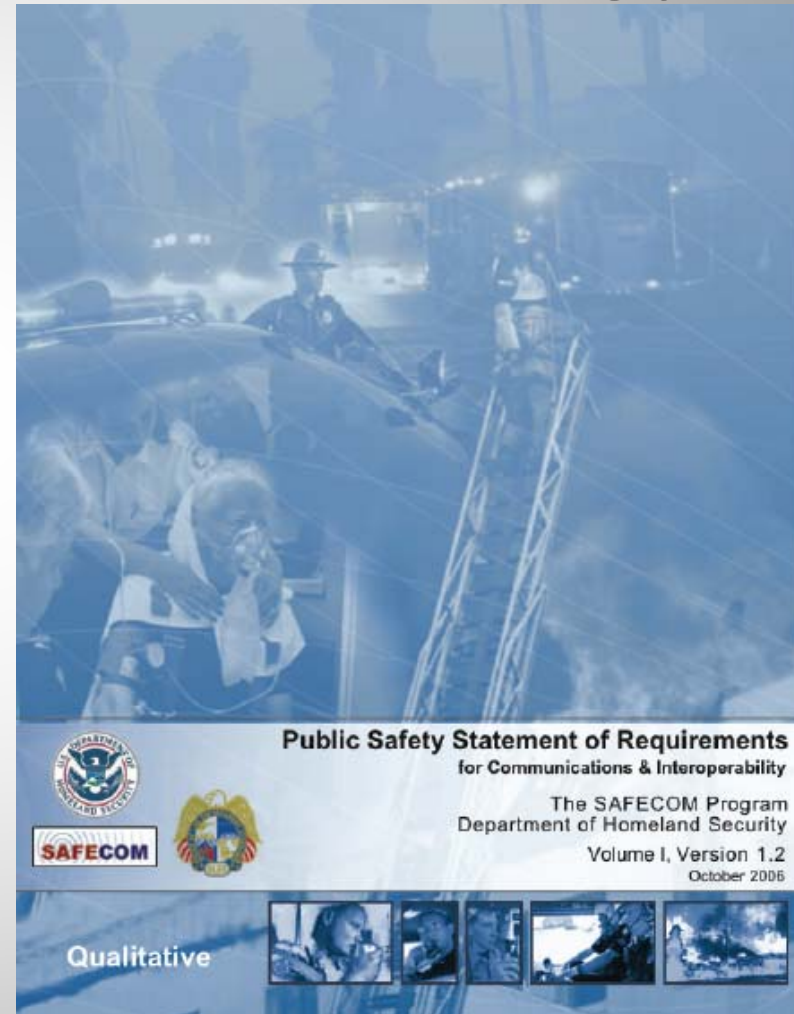
- Narrowband Land Mobile Mission Critical Voice And Limited Telemetry
 - VHF/UHF/700 MHz/800 MHz
- Commercial Voice and Limited Telemetry Services
 - Telephone and Cell Services
- Broadband - Not Mission Critical Usage
 - 3G Commercial/Unlicensed Systems
 - Lack Mission Critical Reliability
 - Lack Public Safety Priority
 - Lack Patient Security
 - Lack Wide Area Coverage in Rural Areas

EMS Needs Improved Communications Technology

Joint Advisory Committee on
Communications Capabilities of
Emergency Medical and Public
Health Care Facilities



Report to Congress
February 4, 2008



Public Safety Statement of Requirements
for Communications & Interoperability

The SAFECOM Program
Department of Homeland Security

Volume I, Version 1.2
October 2006

Qualitative

EMS Information Needs



Situational Awareness



Common Operating Picture



Sequential Processing



Parallel Processing



Inability to Adopt Available Diagnostic Applications

What We Need to Improve Info:

■ Network of Data Bases

- Resource Status
- Events Status
- Adequate Bandwidth to Push/Pull/Park Data:
 - Voice
 - Other (Complex Biotelemetry, Video, Images)

■ GIS- (Visually) Based User Interfaces

- PDA, MDU, Desktop

Current Pre-Dispatch

- Ambulance System Status: “I wonder...”
 - Crew
 - Vehicle/Equipment/Supplies
 - Hospitals
 - Neighboring Services
 - Specialty Responders/Police/Fire

Ridgeway EMS 1

EMSREMS

DOTREMS

UNITED AMB.

MERCY
HOSP.

LIFE FLIGHT

++/Available

MVC

CITY FIRE/RESCUE

DIABETIC

CITY TRAUMA CTR.

JONES MEM. HOSP. CARDIAC
(DIVERT)

EMS 1 1800-0600
•K. McGinnis P11024
•G. Smith E86054
EMS 2 Out of Svc.

MVC

Unscheduled

VERNON FD
VOLUNTEER
AMBULANCE

Call: 1800-1800
•E18924/E93204

RIDGEWAY EMS

NEW SHARON FD
1ST RESPONDERS

RIDGEWAY FD
EXTRICATION/HAZ MAT

RIDGEWAY HOSP.

ER: Smith
No surgeon

LEREMS

FREMS

EMS 1
Inventory/
Status:

+ / +

Ridgeway EMS 1

EMSREMS

ACN Alert

UNITED AMB.

MERCY
HOSP.

LIFE FLIGHT

MVC

CITY FIRE/RESCUE

CITY TRAUMA CTR.

MVC

NEW SHARON FD
1ST RESPONDERS

 **MVC** 

RIDGEWAY EMS

VERMONT
VOLUNTEER
AMBULANCE

RIDGEWAY FD
EXTRICATION/HAZ MAT

RIDGEWAY HOSP.

Other Medical
Alarms

2 Patients/45MPH

1001 Hendrix Highway (Nash/Oak Sts.)

Toyota Prius/Object/Head On

++Airbags ++Belts

++Severity

Crash at 8:29 PM, 5/8/10

Probability of Injury: 92%

[Add/Edit Passenger Details](#)

Passenger	Age	Gender	Safety Belt	Entrapment	Ejection	Prob. of Inj.
1	40	F	N	Y	N	92.0%

DeltaV: 30mph

PSAP Contact:

PAYETTE
1130 3RD AVE N
PAYETTE, ID 83861
(208) 642-6006

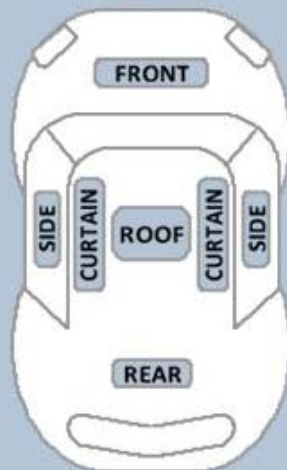
Incident Information:

Incident ID: 1438314045
Event Notification: Vehicle Accelerometer
Event Verified:
Rollover: No
Data Provider: OnStar
Provider Contact: 800-466-7827

Vehicle Information:

Color: White
Year: 2009
Manufacturer: General Motors
Make: Chevrolet (1)
Model: Cobalt Sedan

Direction of Force



☒ Airbag Deployed

Car Curb Weight (lbs): 3200

Passenger Side Damage?

Rear Damage?



At A35. Look out for an accident.

ID: ONSTAR-1438314045.2

Status: **CURRENT** Auto-held (updated)

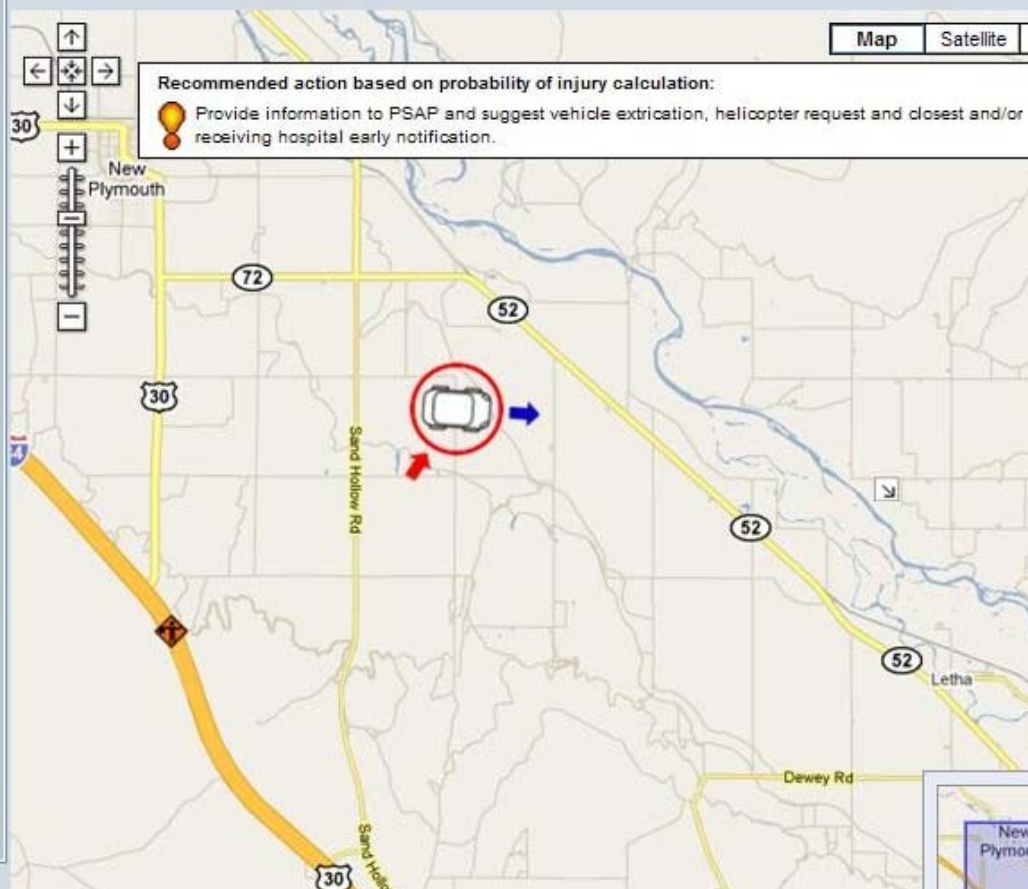
Author: unknown

Received: 10:25 9 PM, 5/8/10

Map Satellite

Recommended action based on probability of injury calculation:

Provide information to PSAP and suggest vehicle extrication, helicopter request and closest and/or receiving hospital early notification.



[<< Previous Report](#)

[Next Report >>](#)

Create Event

Close

Ridgewa

TOYOTA

PRIUS

Gasoline-Electric Hybrid

*Emergency Response Guide
(Revised)*



VERNO

FREMS

UNITED AMB.

ACN Alert

MVC

CITY FIRE/RESCUE

MVC

NEW SHARON FD

 **MVC** 

RIDGEWAY EMS

RIDGEWAY FD

2 Patients/45MPH/Front Seats

2004 Toyota Prius Head On/Object

++Doors ++Patients (Driver Priority)

Ridgeway EMS 1

Parallel Processing

EMSREMS

DOTREMS

MERCY
HOSP.

UNITED AMB.

LIFE FLIGHT→

ETA: 12 Min's.

MVC

CITY FIRE/RESCUE

JONES MEM. HOSP. CARDIAC
(DIVERT)

DIABETIC

CITY TRAUMA CTR.

Team On Alert for Pt:+

VERNON FD
VOLUNTEER
AMBULANCE

NEW SHARON FD
1ST RESPONDERS

RIDGEWAY EMS

ED On Alert for Pt: +

 MVC 

RIDGEWAY FD
EXTRICATION/HAZ MAT

RIDGEWAY HOSP.

ROAD CLEARANCE

Lights + /Cars ++

Ames St. to Clark St. to Old
Highway (E); 15.2 Mi.s;
#3945 Old Highway

ETA: 10 Min's.

At Scene: More Parallel Processing





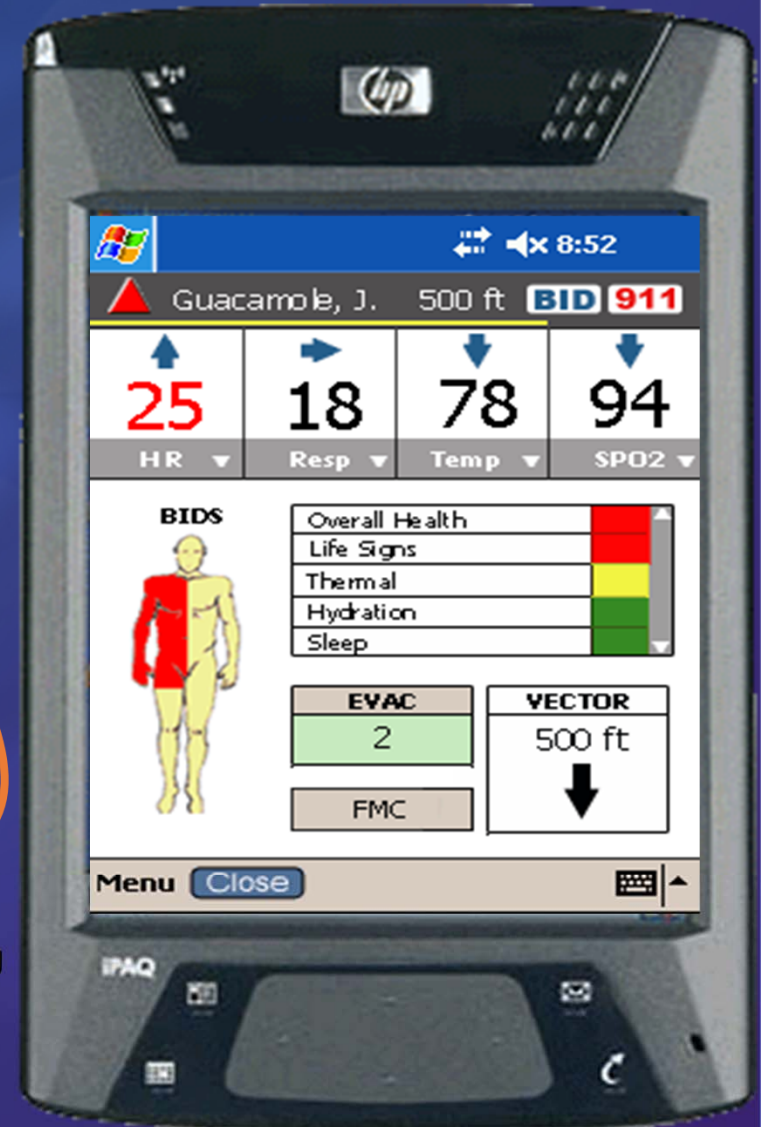
Electronic Health Record

Portable PSCD Type Platform

Speech Recognition Input



Wireless Patient Monitoring





Ridgeway Hospital

UNITED AMB.

EMSRKEMS

UNITED CCT

MERCY
HOSP.

DOTREMS

United Wheelchair

LIFE FLIGHT

To MVC

MVC

JONES MEM. HOSP.
(DIVERT)

CAR

- Patient Description:

- Male; 20 y/o; MVA;
- Tib/Fib Fx x1/x1
- AO x 4
- 140/90;88;18;CR+
- 2ary -; GCS-,TS-, CT-

CITY TRAUMA CTR.

Patient History

- Meds
- Allergy
- Factors

MVC

Pt.1

Pt.2

VERNON FD
VOLUNTEER
AMBULANCE



RIDGEWAY HOSP.

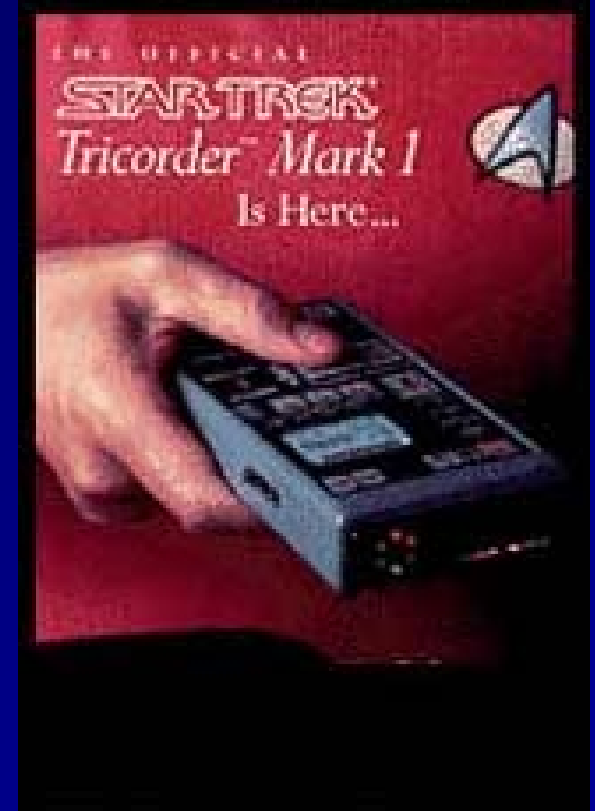
Specialist Call List

Service Call List

- 3 Lead EKG
- 12 Lead EKG
- VS Monitor
- CT Scan

■ Other Technologies

- 2 Way Video (Virtual MD/Community Paramedicine)
- Stand Off VS Monitoring
- Portable CT Scan (Images)
- Portable Ultra Sound (Video & Images)



■ Other Technologies

- Multiple Patient Monitoring (Mass Casualty Incident)
- Multiple Responder VS Monitoring
- Infra Red Crowd Disease Detection

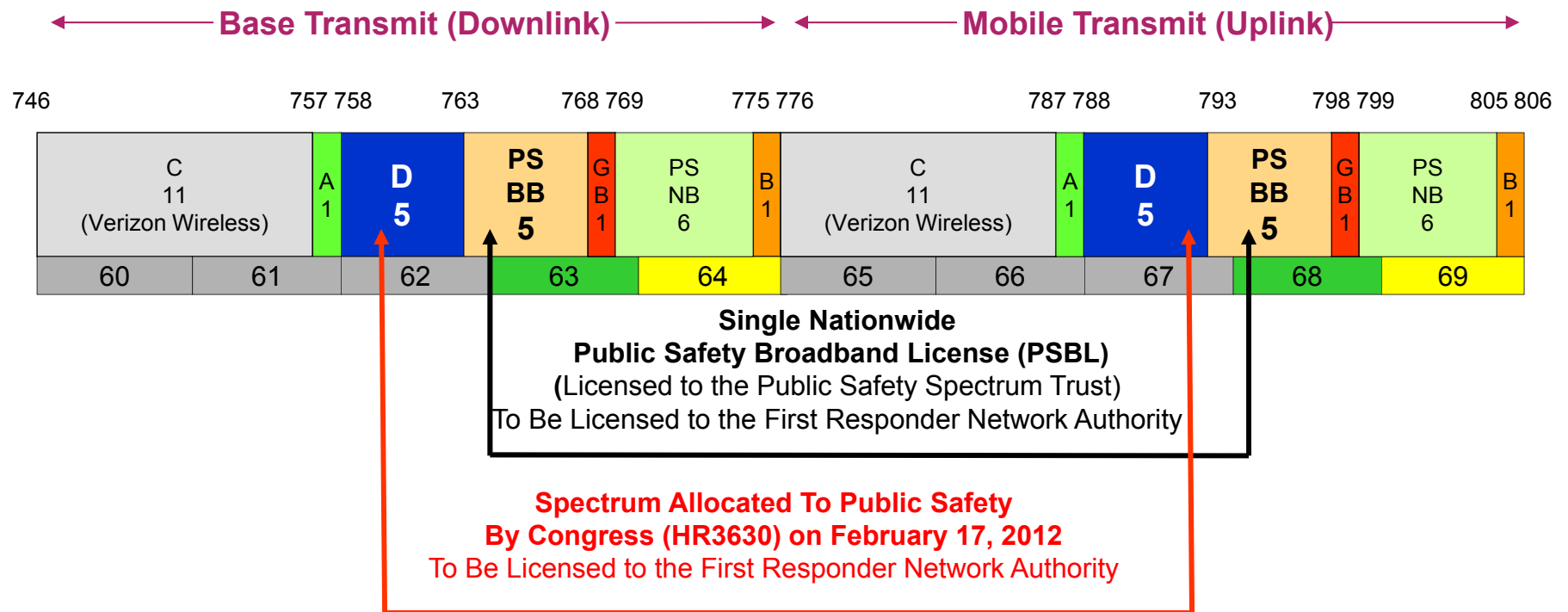


■ Other Predicted Technologies

- EMS Based Routine Patient Monitoring
- Automated Dispatching Based on Monitored Patients and Vehicles
- Audio/Video/Data Interfaces with “I’ve fallen” Systems
- Access to Searchable Patient Records/Images/Data
- Real-Time Vehicle Extrication Hazards Alerting Based on AACN Including Video/Images as Necessary
- Syndromic Surveillance and Quick Alerting to Specific Populations
- Physician Mediated Interface Between EMS Dispatch, EMS Crews and Nurse Call Centers

Nationwide Public Safety Broadband Network

Upper 700 MHz Band Plan





MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012

TITLE VI – PUBLIC SAFETY COMMUNICATIONS AND ELECTROMAGNETIC SPECTRUM AUCTIONS

KEY FEATURES OF THE ACT

- Act implements key Administration priorities
 - Public Law No. 112-96 (enacted February 22, 2012)
- NTIA to establish the First Responder Network Authority (FirstNet)
- FirstNet to establish a nationwide public safety broadband network (PSBN) based on a single, national network architecture
- Reallocates 700 MHz D Block spectrum to public safety
 - The Federal Communications Commission (FCC) to grant a single license to FirstNet for the use of both the 700 MHz D block and existing public safety broadband spectrum
- Deficit-neutral
 - Funded through proceeds of spectrum auctions through FY 2022
 - Network is self-sustained over long-term through fees

TECHNICAL ADVISORY BOARD FOR FIRST RESPONDER INTEROPERABILITY

- Act establishes an Interoperability Board within the FCC
- Not later than 90 days after enactment (May 22, 2012), the Interoperability Board, in consultation with NTIA, NIST, and OEC, shall:
 - Develop minimum technical requirements to ensure a nationwide level of network interoperability
 - Submit to the FCC for review the recommended minimum technical requirements – **Completed**
- Not later than 30 days after the date on which the Interoperability Board submits recommendations to FCC (June 21, 2012), the FCC shall approve the recommendations with any revisions it deems necessary and transmit them to FirstNet – **Completed**



§ 6203

FIRST RESPONDER NETWORK AUTHORITY

“FirstNet”

- Act establishes FirstNet as an independent authority within NTIA
 - Exempt from Paperwork Reduction Act (PRA), Administrative Procedures Act (APA), and Regulatory Flexibility Act (RFA)
- Headed by a 15-Member Board
- Holds a single public safety 700 MHz wireless broadband license
- Takes all actions necessary to ensure the design, construction, deployment, and operations of the nationwide PSBN, in consultation with Federal, State, tribal, and local public safety entities, Director of NIST, the FCC, and public safety advisory committee
- Ensures deployment phases with substantial rural coverage milestones



FIRSTNET

BOARD

- **FirstNet Board shall consist of:**
 - **Secretary of Homeland Security**
 - **Attorney General of United States**
 - **Director of Office of Management and Budget**
 - **12 individuals to be appointed by the Secretary of Commerce not later than 180 days after enactment.**
 - **The appointments shall have:**
 - **Not fewer than 3 individuals to represent collective interests of States, locals, tribes, and territories**
 - **Not fewer than 3 individuals who have served as public safety professionals**
 - **The appointments shall:**
 - **Seek to ensure geographical and regional representation**
 - **Seek to ensure rural and urban representation**





FIRSTNET INAUGURAL BOARD

SECRETARY OF DHS -- ATTORNEY GENERAL -- DIRECTOR, OMB

Samuel “Sam” Ginn (Chairman)

Telecommunications executive

Term: 2 years

Tim Bryan

CEO, National Rural Telecommunications
Cooperative

Term: 3 years

Charles “Chuck” Dowd

Deputy Chief, New York City Police
Department

Term: 2 years

F. Craig Farrill

Wireless telecommunications executive

Term: 3 years

Paul Fitzgerald

Sheriff, Story County, Iowa

Term: 2 years

Jeffrey Johnson

Fire Chief, retired; CEO Western Fire Chiefs
Association; Former Chair, Oregon State
Interoperability Council

Term: 1 year

William Keever

Retired telecommunications executive

Kevin McGinnis

Chief/CEO, North East Mobile Health
Services

Term: 3 years

Ed Reynolds

Retired telecommunications executive

Term: 2 years

Susan Swenson

Telecommunications/technology executive

Term: 1 year

Teri Takai

Government information technology expert;
former CIO, states of Michigan and California

Term: 1 year

Wellington Webb

Founder, Webb Group International; former
Mayor, Denver, Colorado

Term: 3 years

FIRSTNET

PUBLIC SAFETY ADVISORY COMMITTEES

- FirstNet shall establish a standing advisory committee for public safety
- FirstNet may also establish, as necessary, additional standing or ad hoc committees, panels, or councils



STATE AND LOCAL CONSULTATION

- FirstNet must consult with regional, State, tribal, and local jurisdictions regarding the distribution and expenditures of any amounts required to carry out its responsibilities, including:
 - Construction or access to the core network and any radio access network build out;
 - Placement of towers;
 - Coverage areas of the network, whether at the regional, State, tribal, or local levels;
 - Adequacy of hardening, security, reliability, and resiliency requirements;
 - Assignment of priority to local users;
 - Assignment of priority and selection of entities seeking access to or use of the nationwide interoperable PSBN; and
 - Training needs of local users
- FirstNet consultation must occur through the designated single officer or governmental body designated by each State



STATE AND LOCAL IMPLEMENTATION GRANT PROGRAM

- NTIA shall establish a grant program to States
- Program shall assist State, regional, tribal, and local jurisdictions to identify and plan the most effective way to utilize and integrate the infrastructure, equipment, and other architecture associated with the nationwide PSBN
- Not later than 6 months, and in consultation with FirstNet, NTIA must establish grant program requirements, including:
 - Defining eligible costs
 - Determining scope of eligible activities
 - Prioritizing grants for activities that ensure coverage in rural as well as urban areas
- Each State shall certify a single officer or governmental body to serve as coordinator of implementation of grant funds
 - Also serves as point for FirstNet consultation under §6206



§ 6302

STATE NETWORK PROCESS

- FirstNet must complete the RFP process for the construction, operations, maintenance, and improvements of the nationwide PSBN
- Upon completion of the RFP process, FirstNet will notify the Governor of each State (or his/her designee) of:
 - Completion of the RFP process;
 - Details of the proposed plan for buildout of the nationwide, interoperable broadband network in the State; and
 - Funding levels for the State as determined by NTIA
- No later than 90 days after being notified by FirstNet, each Governor must choose whether his/her State will:
 - Participate in the deployment of the nationwide PSBN as proposed by FirstNet; or
 - Conduct its own deployment of a radio access network in the State



STATE NETWORK

STEPS

- If State decides to opt-out, the Governor must notify FirstNet, NTIA, and the FCC
- The State then has 180 days to develop and complete RFPs for the construction, maintenance, and operations of the radio access network (RAN) within the State
- The State shall submit an alternate plan for the construction, maintenance, and operations of the RAN within the State to the FCC and the plan must demonstrate:
 - That the State will be in compliance with the minimum technical interoperability requirements
 - Interoperability with the nationwide public safety broadband network
- FCC shall review and either approve or disapprove the plan



§ 6302

STATE NETWORK

PLANS AND POTENTIAL GRANT

- If the FCC approves the plan:
 - State may apply to NTIA for a grant to construct (not operate and maintain) the RAN within the State
 - State shall apply to NTIA to lease spectrum capacity from FirstNet
- In order to obtain a grant and lease, the State must demonstrate it has:
 - Technical capability to operate, and the funding to support, the State radio access network;
 - Ability to maintain ongoing interoperability with the nationwide PSBN;
 - Ability to complete the project within the specified comparable timelines specific to the State;
 - Cost-effectiveness of the State plan; and
 - Comparable security, coverage, and quality of service to that of the nationwide PSBN



STATE NETWORK

PLANS AND POTENTIAL GRANT

- If the FCC disapproves the plan:
 - The construction, maintenance, operations, and improvements of the network within the State shall proceed in accordance with the plan proposed by FirstNet
 - U.S. District Court for the District of Columbia has exclusive jurisdiction to review a decision of the FCC
- Additional State Network Items:
 - If a State chooses to build its own RAN, the State shall pay any user fees associated with the State use of elements of the PSBN
 - Matching Share Requirement: Section 6302 requires that the federal share of any activity carried out under that section using a grant may not exceed 80 percent of the eligible costs of carrying out that activity
 - Therefore, there will be a minimum 20 percent matching requirement for both the State and Local planning grants and the State construction grants



FUNDING

NTIA BORROWING AUTHORITY



- The Act grants NTIA borrowing authority not to exceed \$2B to implement Subtitle B – Governance of Public Safety Spectrum



- The Act grants NTIA borrowing authority not to exceed \$135M to implement Section 6302 – State and Local Implementation
- In each case, NTIA borrows the initial funds from the general fund of the Treasury prior to the deposit of auction proceeds into the Public Safety Trust Fund (PSTF)

FUNDING

PUBLIC SAFETY TRUST FUND

- Amounts deposited in the PSTF are funds from the incentive auctions to be carried out by the FCC under 47 U.S.C. § 309(j)(8)(G) or the auction of spectrum pursuant to Section 6401
- Funds deposited in the PSTF are available on a cascading order of priority:
 - Repayment of amounts borrowed by NTIA - up to \$2B
 - Repayment of amounts borrowed by NTIA - up to \$135M
 - Buildout of PSBN in the amount of \$7B minus amount borrowed initially by NTIA (Section 6207 of the \$2B)
 - Public Safety Research and Development - \$100M
 - Deficit Reduction - \$20.4B
 - 911, E911, and NG911 - \$115M
 - Additional Public Safety Research - \$200M
 - Any additional deficit reduction



NTIA's State and Local Implementation Grant Program (SLIGP) Development to Date

- **February 22, 2012:** Enactment of Middle Class Tax Relief and Jobs Creation Act of 2012 (Pub. L. No. 112-96), establishing Nationwide Public Safety Broadband Network (NPSBN) and authorizing \$135 million for the SLIGP
- **May 16, 2012:** NTIA releases Request for Information (RFI) seeking input on SLIGP requirements
- **June 15, 2012:** Comments on RFI due to NTIA
- **August 21, 2012:** NTIA releases SLIGP requirements, as required by law
 - These are preliminary requirements
 - This is not the application
- **First Quarter of CY 2013:** Grant application will be released

SLIGP Details

- **Eligible Applicants**
 - 56 States and territories are eligible for grants
 - Each State and territory will need to submit an individual application
- **Funding Distribution**
 - Formula-based, matching grant (Federal share cannot exceed 80%)
 - NTIA plans to distribute available funding in two phases
 - **Phase One:** To focus on initial planning and stakeholder outreach
 - **Phase Two:** To prepare for data collection
- **Eligible and Ineligible Costs**
 - Eligible: planning-related costs
 - Ineligible: site preparation, acquisition, and deployment of LTE equipment
- **Rural Prioritization**
 - Act requires prioritization of funds for activities that ensure rural coverage
 - NTIA anticipates having States address how they will prioritize their grant activities to ensure coverage in rural areas

SLIGP Application

- **Grant Release Date:** NTIA expects to release the Federal Funding Opportunity (FFO) announcement in Q1 of CY 2013 (Jan-Mar)
- **NTIA will likely require applicants to:**
 - Designate a single officer or governmental body to coordinate grant funds in the application
 - Explain how the State plans to collect input from local and tribal entities
 - Explain how existing public safety governance and planning authorities in each State might be incorporated into the consultation with FirstNet regarding the NPSBN
 - Describe how the State plans to expand the expertise of their governance structures to include representatives with an understanding of broadband and Long Term Evolution (LTE) technology
- **Recommendations for OEC stakeholders** Read the requirements: think through responses to the application criteria
 - Get Involved: share your ideas with the State-designated grantee

