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December 3, 2009

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of:	)	WC Docket No. 02-60
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	))	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)))))	GN Docket No. 09-51 GN Docket No. 09-137

NBP Public Notice # 17

COMMENTS OF THE NATIONAL ASSOCIATION OF STATE EMERGENCY MEDICAL SERVICES OFFICIALS - NBP PUBLIC NOTICE #17

The National Association of State Emergency Medical Services Officials (NASEMSO) hereby submits its Comments in response to the Federal Communications Commission's ("FCC" or "Commission") November 12, 2009 Public Notice ("*Notice*") in the above-referenced proceeding.[1] As part of the *Notice*, the FCC seeks comment on issues related to broadband deployment for public safety in rural and tribal areas and broadband and it is on those that these comments focus (NBP Public Notice # 17).

[1] *Comment Sought on Health Care Delivery Elements of National Broadband Plan – NBP Public Notice #17*, Public Notice, DA 09-2413 (rel. Nov.12, 2009) ("*Notice*").

Our Association is an active member of the Public Safety Spectrum Trust (PSST), the FCC's selected Public Safety Broadband Licensee (PSBL). We have therefore participated in the formulation and approval of the Comments in response to NBP Public Notice #17 that the PSST has submitted. Nothing in this filing diminishes the importance of the considerations that constitute the Comments submitted by the PSST. We are elaborating upon some concepts important to the emergency medical services (EMS) community in this nation consistent with the NASEMSO presentation at the Commission's field hearing on November 12, 2009 on public safety broadband needs.

These comments attempt to follow the question format specified in the Notice, and we feel that we have important information to provide the Commission with regard to anticipated future EMS technology applications and their broadband communications implications. However, while the national EMS community has been able to predict many of those technologies, we have not yet been able to gain significant experience with use of those technologies in the field, nor have we had access to sufficient expertise to estimate the bandwidth or broadband system needs to support those technologies. Therefore, we are unable to address many of the related questions about system specifications and technical requirements.

What is clear, however, is that the future of EMS communications is broadband. To save time in life-threatening situations, it is essential to use technologies now available or in development to send data in addition to voice communications. Fast, robust data communications will enable EMS professionals to have a level of situational awareness (a real-time understanding of all events and resources impacting response, patient care, and transport) and a common operating picture (all responders and hospital staff involved in an EMS call share the same understanding and expectations for what is occurring) not possible today. In this way, life-threatened patients may be more quickly brought to the attention of the EMS system, and responders will be better informed and more quickly able to make decisions about appropriate emergency treatment and transportation. The aging VHF, UHF, and trunked systems used by EMS for the past 35 years will not support these data communications. While EMS providers in urban areas may be able to take advantage of 4.9 GHz public safety broadband systems, the rest of the national EMS community will be unable to support their patients' needs this way. Commercial wireless and unlicensed municipal systems may serve some limited roles in these communications; however the ability of EMS personnel in the field to transmit life-critical data to a physician directing them from an emergency room cannot afford the delay that any system failure or transmission rate slowdown could cause. Being able to utilize the combined capabilities of 4.9 GHz and a new 700 MHz national broadband network, with existing and new telemedicine and other fiber networks, will assure the EMS community the broadband transmission capabilities that it needs in both urban and rural settings to provide advanced emergency care and to assist community health systems fill other potential gaps.

1. IT Infrastructure to Support Healthcare Delivery. Mapping the current state of internet connectivity is necessary to understand the extent of the gaps in the current connectivity. We seek to better understand the countrywide connectivity of the following delivery settings:
a. Hospitals
b. Community health clinics and outpatient centers
c. Physician offices
d. Long-term care facilities
e. Home
f. Emergency Medical Responders
g. Indian Health Service, Dept. of Health and Human Services, and other health service providers on tribal lands

These comments focus on **emergency medical responders** in their traditional role as mobile field practitioners as well as in their evolving role in augmenting primary care as community EMTs and community paramedics. In these community paramedicine roles, their broadband communications needs will expand to links with the rural and other outpatient clinics and emergency departments they support and from which they receive medical direction for the primary care services they provide.

i. What internet connectivity types (dsl, cable, fiber-to-the-premise, wireless, etc.) and speeds (in mbps) support each of the above delivery settings across the U.S.? What percentage of each delivery setting is served by each type and speed of connectivity? We welcome detailed analyses of the state of connectivity across each delivery setting.

Currently, EMS personnel and agencies have no greater or different connectivity to the internet or other data transmission services than the general public. Mission critical voice and biotelemetry communications have been facilitated by narrowband communications (VHF, UHF, trunked 800 MHz, satellite, and cell phone) which have largely remained unchanged for the past thirty-five years. A number of EMS providers have begun to use commercial wireless and unlicensed, urban mesh network systems for sending patient care report (PCR) data back to their bases of operations for processing, and for some video to send patient images from the scene or ambulance to a physician consultant/medical director is being used currently in Texas[2], Arizona[3] and Louisiana[4]. These links are presumably also used for internet access.

ii. How might internet connectivity vary by delivery setting size or location (rural versus urban)? What are other contributing factors to variations in delivery setting connectivity? We welcome detailed analyses of variations in connectivity by delivery setting.

We use "internet connectivity" to include all data transmission needs whether they are direct between parties or through the internet. Connectivity for the applications described below, under Question 2, will vary by urban and rural settings. Current broadband service connectivity is of

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[2] DREAMS Ambulance Project: http://tees.tamu.edu/index.jsp?page=feature_dreams
[3] http://www.emsresponder.com/print/EMS-Magazine/Telemedicine-Becoming-Reality-for-Prehospital-EMS/1$5340
[4] http://www.emsresponder.com/web/online/ED-Industry-Wire/Baton-Rouges-Launches-EMS-Telemedicine-Program/33$9279

inadequate quantity and quality for public safety use in both settings, in general, and for EMS mission critical use specifically. The future operations and technology needs of urban and rural EMS will both require broadband service, but with different uses and connectivity. The mission of rural EMS routinely requires the transporting patients long distances across remote territories where cellular communications, let alone broadband service, are not commercially viable. In many instances, these territories have lapses in the aging EMS VHF/UHF land mobile radio service as well which, at its most functional, does not support internet connectivity and other broadband applications for emerging EMS technologies. These circumstances often lead rural ambulance providers to install cellular, land mobile radio, and expensive satellite radio units in their vehicles, none of which have been broadband capable. While urban EMS providers are beginning to use commercial wireless broadband and unlicensed municipal broadband systems for sending electronic prehospital care record (PCR) data back to their headquarters for processing and patient video to receiving hospitals for consultation purposes, rural services do not have these capabilities. The only licensed public safety broadband, 4.9 GHz, is hotspot technology with limited suburban and rural EMS application.

Not only is the quantity of broadband service lacking in rural areas but its quality, where it does exist, cannot allow it to be used for mission critical EMS operations. Current EMS communications require immediate, and often lengthy, access to physician consultation. This may include the transmission of biotelemetry and, in the future, the transmission of multi-vital sign, video and imaging data requiring broadband support. In rural areas, where transport times may be forty minutes to two hours or more, access and reliable connectivity are critical. The minute to minute variability of throughput available in commercial and unlicensed broadband connections, the lack of priority use for EMS in access to that throughput, the fragility of non-hardened infrastructure and broadband networks (e.g. BlackBerry network crashes in recent years for hours at a time), and security issues all contribute to a lack of commercial wireless utility for mission critical EMS operations in both rural and urban applications.

Between the use of video and other applications in true emergencies to provide adequate supervision of rural EMS providers on long transports, and their use in community paramedicine settings to sort out emergencies from non-emergencies and to provide care to prevent emergencies, EMS will have a constant need for broadband support. These types of uses will generally decline from frontier to rural to suburban to urban settings. Other applications described below (e.g. situational awareness and common operating picture enhancing capabilities, electronic patient record access from the scene, and PCR transmission from ambulance to hospital) may be heavily used in urban EMS settings. The difference will be more frequent, much shorter data bursts or activity in urban areas, and less frequent, longer accesses in rural areas. Connectivity in rural areas will depend on a mix of broadband access types. Importantly, rural and suburban EMS will heavily rely on the proposed 700 MHz national public safety broadband network with its terrestrial transmission length, wide area coverage, redundancy and reliability, security, priority access, and satellite back-up system. Without this system or something similar in all these respects, rural and suburban EMS will largely be unable to leverage broadband to support EMS technology of the near future. NASEMSO proposes that this network, some applications of 4.9 GHz licensed public safety hotspot technology, and perhaps ties to the future, intelligent transportation system (ITS) networks using linked 5.9 GHz Dedicated Short-Range Communications (DSRC) may offer EMS mobile access to “nodes” (antenna access) along current and future telemedicine and other fiber networks to allow rural EMS providers to connect to hospitals and health clinics many miles away for emergency and community paramedicine connections. Connectivity in urban areas can be achieved with a mix of 4.9 GHz public safety licensed mesh and other hotspot system access, the 700 MHz public safety broadband network, and the 5.9 GHz ITS roadway networks.

iii. What is the prevalence of private fiber networks among these delivery settings? We welcome detailed analyses of private fiber networks in support of healthcare delivery.

There is significant telemedicine and other private fiber across rural areas that offer the potential for piggy-backing EMS broadband transmissions to nodes along that fiber as EMS units send primary care video and multi-vital sign data from patient homes to physician supervisors in health clinics, and as ambulances make their way toward distant urban specialty centers with similar transmission needs.

iv. What criteria does a delivery setting use to determine sufficient connectivity levels in terms of peak and average transmission rates, guaranteed minimum bandwidth, latency, jitter, reliability, etc.? What is the marginal value of improving IT infrastructure based on the previous criteria? We welcome detailed analyses of the decision criteria/thresholds and costs/benefits used by delivery settings to make IT infrastructure decisions.

Transmission breaks, packet loss, slow-downs or other degradation cannot be tolerated in mission critical EMS broadband communications. Critical multi-vital signs or other monitoring or imaging data errors could result in misinterpretation of a patient's condition and subsequent medical errors causing patient harm. Wide area coverage through widespread broadband build out and satellite system back-up, transmission length, redundancy, reliability, EMS priority access, security, and hardening required for mission critical EMS applications are other criteria. Throughput needs will vary from real-time medical record access from the scene (low rates), to multi-vital sign transmission (estimated in one study at 76 kbps per patient monitored[5]), to video transmission estimated to be in the 1 to 5 mbps range with medical quality video in the high end of that range. For imaging throughput requirements, the FCC's new consultant on telemedicine/broadband health

[5] http://www.jhuapl.edu/AID-N/ . http://blog.xbow.com/xblog/2007/08/aid-n---advance.html

care issues, Dr. Mohit Kaushal, recently stated in a blog: "The technology exists so that they could pull up that diagnostic image in real time, from the imaging center where it was performed. But such technology requires a 100 mbps broadband connection -- a fiber connection -- which many hospitals lack."[6] We are still seeking imaging requirements for wireless transmission and hope that this estimate does not accurately preclude mobile broadband transmission of EMS derived imaging

2. Connectivity Requirements to Support Health IT Applications. Multiple health IT applications are being deployed using public and private communications networks. We seek to better understand the underlying IT infrastructure necessary to support successful implementation of current and emerging health IT applications, including:
a. Electronic health records
b. Real time video for Telehealth consultations and diagnoses
c. Remote patient monitoring systems
d. Mobile and other portable remote monitoring systems
e. Other applications that enable or cause advanced healthcare delivery

We will address this question by supplying a list of anticipated future technology applications and, where we have such information, broadband communications implications of each. We will then provide general applications information for those sub-questions below as we can.

The following is drawn from two national EMS communications planning efforts over the past five years. One was led by the Intelligent Transportation Society of America's Public Safety Advisory Group (an informal practitioner input group of the US Department of Transportation), and the other by a partnership of NASEMSO and the National Association of EMS Physicians (NAEMSP) under the aegis of the EMS Working Group of the National Public Safety Telecommunications Council (NPSTC). The latter will result in a paper to be published in January, 2010.

Both of these efforts recognize that current EMS communications have not significantly evolved since their origin over 35 years ago. These systems remain primarily land mobile radio, voice based

[6] Broadband Gaps in the Healthcare Sector, November 25th, 2009 by Mohit Kaushal, Digital Healthcare Director

applications on an aging VHF/UHF infrastructure that will be further challenged by the narrowbanding process culminating in 2013. Therefore, outside of some experimental and pilot applications, broadband has not been a reality for EMS. These two national initiatives sought to assess the weaknesses in the EMS communications system, predict future EMS technology adoption, and begin to predict the communications implications (e.g. bandwidth and infrastructure needs). The following reflect those findings. Because of a shortage of resources, these efforts are bountiful in predicted technology use for suggesting communications needs, but do not yet quantify those needs beyond some throughput estimates. This quantification is being pursued.

Situational Awareness and Common Operating Picture Improvement

Over the past 35 years, EMS communications have comprised dispatch messages, coordination messages with other responders, and voice and biotelemetry messaging with hospital staff. With longer patient transports in rural and suburban areas, it is not uncommon for there to be several ambulance/hospital exchanges during a transport, providing updates or seeking new orders in response to changes in patient condition. In years past, this messaging could be done at a fairly leisurely pace because neither ambulance crews nor emergency department (ED) staffs were particularly over-taxed. Time could be taken for medical overseers at the hospital to fully understand the patient's situation before issuing medical orders.

In more recent years, small rural hospitals have closed in great numbers, centralizing emergency department services in larger hospitals further away. The result is longer ambulance transports and increasing patient and EMS communications volumes in those hospitals. Those small rural hospitals that remain are often "critical access hospitals" (CAHs) which have limited ability to care for longer term patients, thus increasing EMS transport numbers through transfers to larger hospitals. These

CAHs chronically suffer from funding limitations and often may have no more than one physician and one nurse in the ED, who may have responsibilities elsewhere in the hospital when no patients are present, and may become overwhelmed by a car crash with multiple patients. Additionally, EMS call volumes have generally increased each year nationally. Urban emergency department volumes have done the same, particularly with changes in the pattern, availability and use of primary care (e.g. greater numbers using EDs as the source of primary care). The concern about disease outbreaks, such as H1N1, has exacerbated this. The result of all of these developments is busier EMS crews and busier ED staffs with less time and ability to communicate with one another in all settings. Further, there are no generally available systems through which these providers may access real-time information about events and resource status that may affect their work. For instance, an EMS crew may have no information on the number and severity of the patients to whom they are responding until they arrive at the scene, no information about the availability of air medical or extrication resources until they actually call for them, and no information about the availability of the hospital to which they want to transport until they call that hospital.

In the future, it will be necessary to develop networks of databases that contain information about events and resources updated in real-time and accessible through a user friendly, GIS capable interface on PDAs carried by responders and physicians, mobile data terminals in EMS vehicles, and desktop units at responders' bases of operations, dispatch centers, and hospitals. Diagram 1 depicts such an interface screen. The screen represents the jurisdiction of the user, and events and resources within that area. Information not readily available on the initial screen can be obtained by selecting an icon and drilling down.

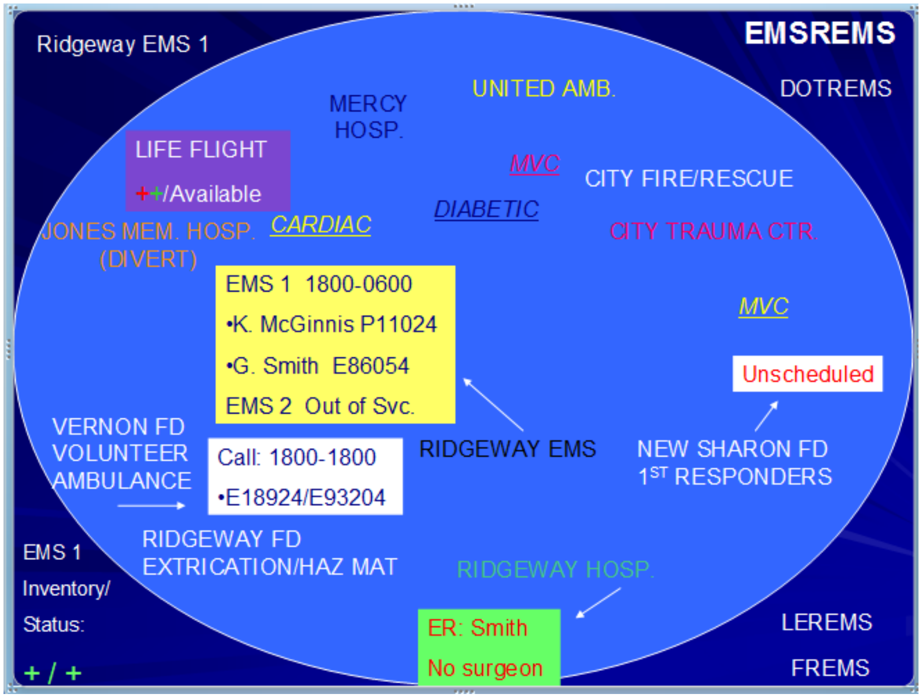

Diagram 1

Diagram 2

Ad hoc databases will be created each time a patient is encountered. Multi-vital signs, video, electronic health record, and voice to text translation of medic findings will be pushed to those databases and parked until the intended recipient (e.g. an incoming air medical crew or a medical direction physician in the hospital) is available to review them (Diagram 2). These recipients can then pull down that data to their own screen (see Diagram 3) and push queries or orders back to the EMS crew for consumption when they are available. When an emergency dictates, either party could break into the other's process and revert to voice and data communication as needed.

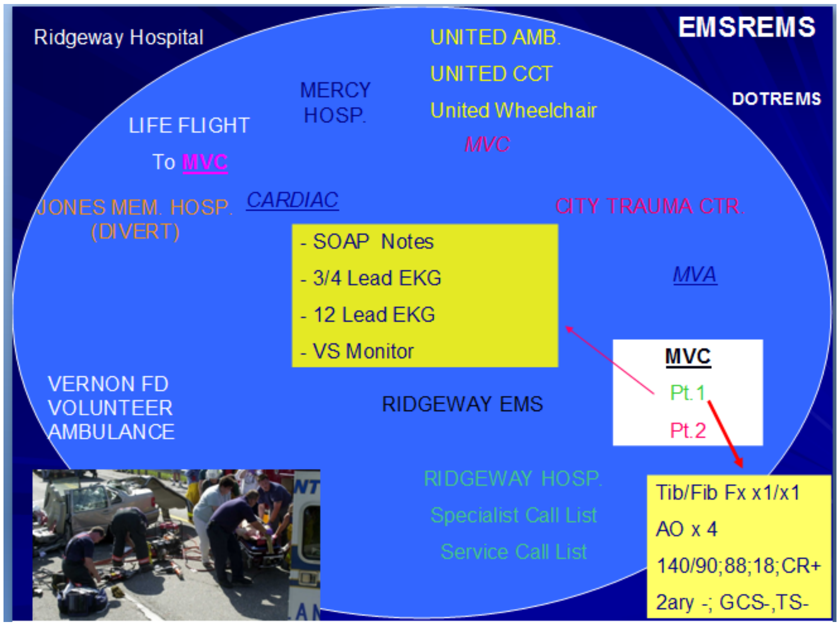

Diagram 3

In this system, everyone involved will have all the information they need on events and resource status necessary to manage the patient's needs (situational awareness) and the same expectations about the process of the event (common operating picture). Without this system, EMS care will continue to erode in these regards.

Medical Quality Video and Imaging

The use of video to send patient images from the scene or ambulance to a physician consultant/medical director is being used currently in Texas[7], Arizona[8] and Louisiana[9]. While the utility of video in EMS remains an open question in the national EMS community, it is more likely to have a role in rural settings than in urban settings for two reasons.

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[7] DREAMS Ambulance Project: http://tees.tamu.edu/index.jsp?page=feature_dreams

[8] http://www.emsresponder.com/print/EMS-Magazine/Telemedicine-Becoming-Reality-for-Prehospital-EMS/1$5340

First, urban systems have high call volumes, and can afford highly trained EMS personnel (paramedics) who have a high level of patient interaction experience. The reality of a large call volume, short transport times to hospitals, and the training and experience of the personnel mean that real emergencies are dealt with effectively and that subtleties in signs and symptoms that may become a treatment factor later can be managed by a physician in the ED after a few minutes' transport. Rural areas often do not have the call volume to be able to afford the cost of paramedic-level personnel or to provide sufficient experience to maintain an effective practice. Transport times are relatively long and subtle signs and symptoms that may not be appreciated by personnel with a lesser amount of training and experience may become a treatment factor before arrival at the hospital. Therefore, in urban areas injecting the expense and process of video transmission may not be as value-added as it could be in rural areas where the interpretive eye of an emergency physician to view the patient, or portable CT images (e.g. to determine the type of stroke a patient is suffering) or portable ultrasound video/images of the patient (e.g. to determine the presence of internal bleeding), may make a critical difference in treatment and how/where the patient is transported. Today, satellite-based and wired broadband audio/video/imaging systems operate in military and civilian applications to link remote/rural medical facilities with specialists in urban centers to provide intensive care monitoring and treatment and "tele-trauma" consultation. The public safety broadband network, including satellite back-up and node links to telemedicine and other fiber networks, could wirelessly provide these capabilities to ambulance and rural hospital/clinic personnel to effectively intervene in life-threatening situations that they would otherwise not be adequately trained or experienced to accomplish.

Second, an emerging concept in rural EMS and health care is "community paramedicine". Under a

[9] http://www.emsresponder.com/web/online/ED-Industry-Wire/Baton-Rouges-Launches-EMS-Telemedicine-Program/33$9279

widely discussed "medical home" concept of implementation and financing, paramedics and other EMTs could become affordable in rural communities because they not only provide advanced life support services, but help to fill gaps in primary health care services. Working in and out of rural clinics and hospitals, paramedics and other EMTs could provide preventive care services in the community and other primary care and follow-up services in patient homes. They would be responsible for patient remote monitoring and for visiting patients in their homes thereby reducing the need for clinic visits and catching incipient problems before they necessitate an ambulance call, clinic or ED visit. They would be able to respond to some "emergency" calls and be able to address the patient's needs without transport to a hospital (one study suggests that transports could be reduced by 15% with such a system in an urban setting)[10]. Because it would not be cost-effective to train these EMS providers at a level to make them independent practitioners, the ability to wirelessly video-consult with physicians and mid-level practitioners in rural clinics and hospitals will become crucial for the benefits of community paramedicine to be robustly realized. This concept projects a need for on-going and frequent broadband utilization by EMS in rural areas in years to come. Video requirements are estimated to be in the 1 to 5 mbps range with medical quality video in the high end of that range. For imaging throughput requirements, the FCC's new consultant on telemedicine/broadband health care issues, Dr. Mohit Kaushal, recently stated in a blog: "The technology exists so that they could pull up that diagnostic image in real time, from the imaging center where it was performed. But such technology requires a 100 mbps broadband connection -- a fiber connection -- which many hospitals lack."[11] We are still seeking imaging requirements for wireless transmission and hope that this estimate does not accurately preclude mobile broadband transmission of EMS derived imaging.

[10] http://www.ncbi.nlm.nih.gov/pubmed/12385614 . Prehospital Emergency Care. 2002 Oct-Dec;6(4):445-8
[11] Broadband Gaps in the Healthcare Sector, November 25th, 2009 by Mohit Kaushal, Digital Healthcare Director

Other EMS Applications

The following are other, specific technology applications with broadband implications that the two national EMS communications initiatives have suggested:

- Patient Multi-Vital Signs Monitoring: The ability to attach one or more micro-monitors to a patient to wirelessly receive and transmit electrocardiograph, capnography, blood pressure, and other vital signs packaged for display in a database. One project, by the Johns Hopkins Applied Physics Lab, suggested that simple multi-vital signs transmission require 76 kbps per sending unit and demonstrated a system that could monitor twenty wireless patient sending units per receiver at a time in a mass casualty situation.[12]

- Responder Multi-Vital Signs Monitoring: Similar to the Patient Multi-Vital Sign Monitoring, but intended for use by EMS responders monitoring fire, police and other responders in hazardous circumstances (e.g. firefighters inside a burning building; SWAT team members inside a building in a hostage taking scenario). This could also be used to detect chemicals, gases, radioactivity and other hazards being encountered by monitored responders.

- Stand Off Vital Signs Monitoring: The ability to wirelessly detect, receive and wirelessly transmit multiple vital signs to a database without physically touching the patient.

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[12] http://www.jhuapl.edu/AID-N/ . http://blog.xbow.com/xblog/2007/08/aid-n---advance.html

– Infrared Crowd Disease Detection: The ability to wirelessly scan, receive and transmit to a database the body temperatures (and body area temperatures) of individuals in crowds which suggest illness.

– Wireless Speech to Text Translation: The ability to speak into a microphone in a noisy emergency scene environment and have that speech translated and wirelessly transmitted into an ad hoc patient event database for real-time review by others on the scene, coming to the scene, or in a hospital ED supervising care at the scene.

– Receipt of Patient Electronic Record in Real-Time: The ability of on-scene EMS staff to receive and potentially manipulate (to focus on pertinent records only) medical history for their patients either wirelessly from a regional health care medical record system (like that piloted in Indianapolis in the past year[13]) or by patient-carried data records (like electronic dog tags being piloted in the military[14]).

– Creation of Ad Hoc Multi-Component Patient Databases: This is simply starting as transmission of electronic patient care reports to hospitals before the patient arrives, augmented by separate transmissions of 12 lead electrocardiophy and simple vital sign transmission. Using technologies described above, the ability to create in a single user interface window, data sent wirelessly from the scene that includes video, multi-vital signs, voice-to-text translated patient notes, and pertinent patient history components. This database could be made available in real-time to authorized

[13] http://www.medicine.indiana.edu/news_releases/viewRelease.php4?art=1114
[14] http://www.tatrc.org/?p=projects/eic

responders (e.g. incoming airmedical crews who will transport the patient), specialists guiding care remotely (e.g. trauma surgeons directing a specialized procedure in the field), and emergency physicians routinely supervising EMS calls.

– EMS-Mediated Remote Patient Monitoring Systems and "Just-In-Time" Patient Warning and Reference Guidance: In community paramedicine and other settings, patients with post hospital discharge and/or chronic health monitoring needs can be remotely followed through the use of multi-vital signs monitors (as described above), video, or specialized monitors appropriate to their condition. These could be monitored at EMS dispatch and/or nurse advice service centers and would have alarms should the vital sign(s) monitored go outside a preset range. While this could be done by wireline service in most settings, though less so in rural areas, the ability to rebroadcast the monitoring device transmissions to responding EMS crews would need to be wireless. In addition, based on the patient history and current monitoring results, care warnings pertinent to that patient and condition, along with other relevant reference or medical protocol guidance, could automatically be sent to EMS responders in real-time. In a similar fashion, "I've fallen and can't get up" emergency alerting systems, currently wireline dependent and plaguing responders as a common source of false alarms, could be set up with audio-video and vital signs monitoring interfaces with not only wireline support but wireless retransmission to responding EMS crews.

– Advanced Automatic Crash Notification (AACN) Data Rebroadcasting and "Just in Time Training" and Reference Material Rebroadcasting: AACN has the potential to significantly reduce death and disability in rural car crashes by eliminating the time now required to “discover” that the crash has occurred, the time required to determine the physical location of the crash, and the time now required to respond to a crash and determine that specialty response (e.g. extrication, air medical evacuation) is needed. To take optimum advantage of these potential time savings, the AACN data should be simultaneously transmitted to all potential responders, and hospital and specialty care facilities that have requested to be notified of crashes exceeding a certain severity in a specific geographic area. In addition, certain crash data needs to be automatically assessed and resulting information transmitted to responders and facilities based on the assessment. For example, speed/rollover/impact-vector data may be among data used to determine the severity of the crash and result in automatic dispatch of airmedical and other specialty responders and notification of trauma centers (see Diagram 4). Other vehicle data such as vehicle type and year/speed/rollover/impact-vector could be used to send an electronic vehicle access manual to responding extrication crews with diagrams and methods for best accessing patients and avoiding hazards in that vehicle (see Diagram 5).

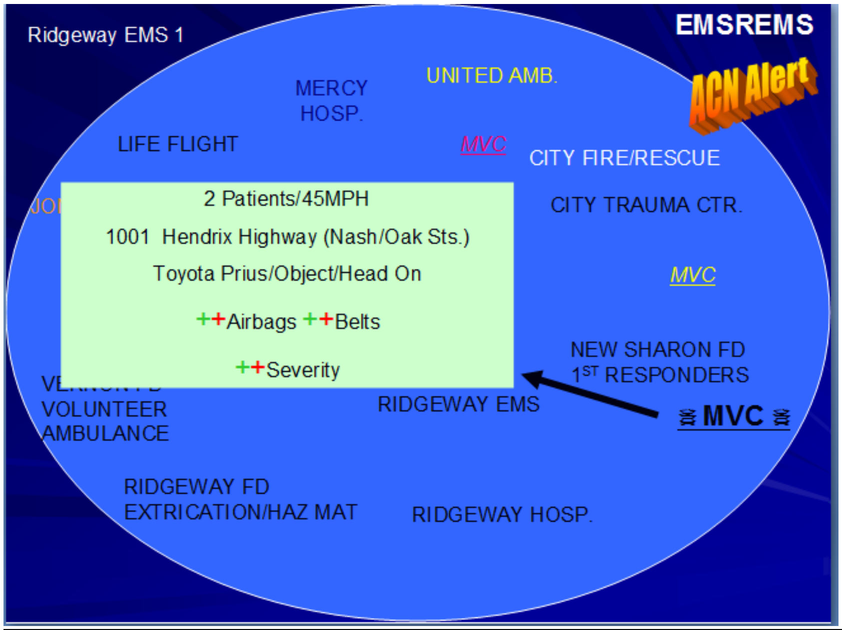

Diagram 4

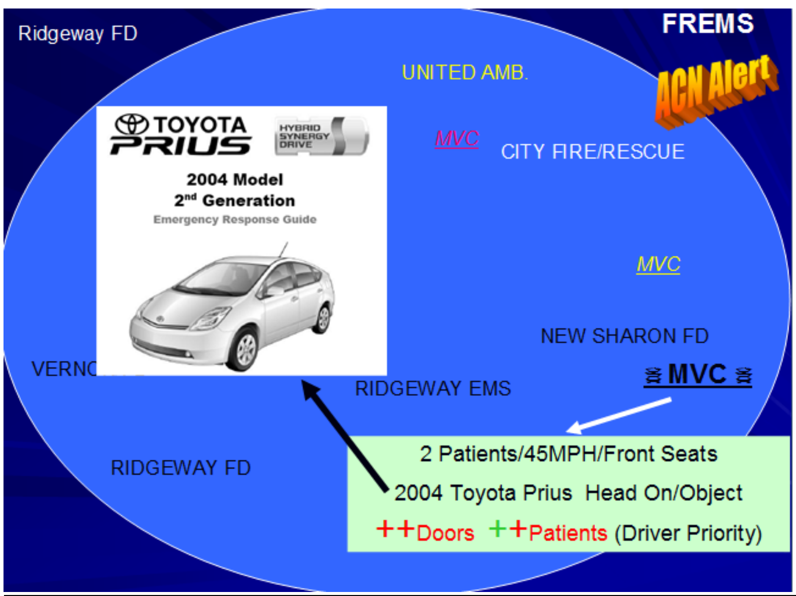

Diagram 5

– <u>Closed Circuit Television (CCTV) Scene Transmission</u>: Wireless receipt of live video feeds of an emergency scene from traffic, police, homeland security and other public monitoring CCTV systems by responding crews will help plan approach and vehicle staging at the scene.

– <u>Robotic Remote Hazard Suppression and Patient Extrication</u>: The use of remotely controlled robots to defuse/suppress hazards and remove patients from hazardous settings. This application requires audio, video, and robot-control data transmission.

– Wireless Vehicle Systems, Equipment and Supply Monitoring: The ability now exists to monitor virtually every critical system of a public safety vehicle. Radio frequency identification (RFID) and other tagging device technology make it possible to track the inventory of equipment and supplies in a vehicle. Wirelessly transmitting this information to the vehicle operator's communications unit, with event-linked special warnings (e.g. sending a "leaving scene to transport to hospital" message while a critical patient care device is registered as not having been returned to the vehicle; transmitting an "en route to scene" message with a critically low air pressure in a tire or low inventory of a critical supply) would reduce delays in restocking and inventorying vehicles and medical errors caused by missing equipment or supplies.

– Syndromic Surveillance and Quick Alerting to Specific Populations: Real-time transmission of dispatch and PCR data to monitoring systems which assess for specific patterns of patient complaints, signs and symptoms in specific geographic areas. Transmission of these assessments to EMS responders and public health authorities when specific outbreak or hazardous event occurrence is predicted.

vi. How might application usage by individuals (patients and doctors) both in their homes and on a mobile basis affect network requirements? How might these requirements vary by the content (e.g., text, image, or video) of the application? We welcome detailed network requirement analyses for health IT applications in both home and mobile settings.

During routine use, EMS providers would be accessing situational awareness/common operating picture monitoring systems constantly, drilling down into remote data bases for updated event and resource information. This would be a particularly heavy use with many ambulances in urban and suburban areas, but would largely be text data. Video, imaging and multi-vital signs data transmission would be largely used in suburban and rural settings, as previously described, to enable physician overseers to make assessments and guide care for emergency or community paramedicine applications. EMS-based routine patient home monitoring would be largely alarm-based monitoring of certain vital signs or regular bursts of data on an appointment basis with the patient. Vital sign monitoring of multiple responders in dangerous settings, and of multiple casualties in larger events (both EMS functions) would be potentially bandwidth intensive and not an infrequent event in urban/suburban settings (e.g. monitoring of firefighters in burning buildings).

vii. Which communications technologies and networks meet the requirements? Which are appropriate for the application being discussed? If this varies by content, why does it vary and in what way? We welcome detailed analyses of the costs, relative performance and benefits of alternative network technologies currently employed by existing applications.

Because EMS is mobile, the "last mile" communications technologies need to be wireless. We encourage the Commission to continue to pursue its proposed 700 MHz national public safety broadband network for this purpose. The currently available 4.9 GHz public safety hotspot and mesh network technologies can well serve urban EMS applications, and in a more limited fashion may serve incident area network applications in all settings. We hope the Commission and the leaders in implementing 5.9 GHz ITS communications systems will partner with EMS for broadband access along the roadways used by ambulances on long transports. Finally, we encourage the Commission to explore ways in which current and planned telemedicine and other fiber networks may be leveraged as pathways, using these "last mile" wireless solutions to access them, giving EMS very long transmission legs to reach from remote areas where emergency and community paramedicine activities require the most real-time physician guidance and the facilities where those physicians are located.

viii. Are current commercial communications networks adequate for deploying the application in question broadly across the country? If not, what are specific examples of the ways in which current networks are inadequate? How could current networks be improved to make them adequate, and at what cost? If this adequacy varies by content of the application, why does it vary and in what way?
ix. How suitable are commercial wireless networks for health IT applications? We welcome detailed comparisons of the suitability and reliability of commercial wireless networks and other types of networks.

No. Current commercial communications networks do not serve many rural/frontier areas reliably, hence none of the applications described above which would greatly serve rural communities would be possible. In both urban and rural settings, commercial wireless service is inadequate for mission critical EMS broadband communications. Transmission breaks, packet loss, slow-downs or other degradation cannot be tolerated in these applications. Critical multi-vital signs or other monitoring or imaging data errors could result in misinterpretation of a patient's condition and subsequent medical errors causing patient harm. Current networks lack wide area coverage through widespread broadband build out and satellite system back-up, redundancy, reliability, EMS priority access, security, and the hardening required for mission critical EMS applications.

xi. What role might health IT applications play in local and national emergency preparedness (e.g., natural disaster, pandemic, bioterrorist attack, etc.)? What connectivity types and speeds across delivery settings would be needed to ensure public safety in times of crisis? We welcome detailed analyses of the role of various health IT applications in promoting public safety.

Telemedicine video, multiple patient/multiple responder vital signs monitoring, remote imaging transmission and assessment, and Syndromic surveillance systems described above all have very obvious applications in these types of large scale events. Major health or injury events require scaling up day-to-day EMS operations if they are optimally planned for and managed. So too would be scaling up the use of the day-today technology applications and the communications infrastructure and capabilities to support them. The major barrier in such events would be bandwidth availability. The Commission is encouraged to pursue the public/private partnership architecture of its proposed 700 MHz national public safety broadband network. Not only does this provide financial support for the network and expertise to maintain the network, but it allows use of the network to be scaled up in times of disaster. Further, the Commission should explore the leveraging of current and planned telemedicine and other fiber networks by EMS as previously described. The ability to use such networks during disasters could reduce the strain on wholly wireless systems being used by EMS and other public safety responders.

xii. What should be the role of the federal government in ensuring the connectivity necessary to enable promising health IT applications? We welcome specific policy suggestions, as well as cost/benefit analyses and tracking mechanisms.

The federal government should assure the implementation of the 700 MHz public safety broadband network proposed by the FCC and provide funding for at least some of its standing up and building out. The Public Safety Spectrum Trust (PSST) has proposed the use of public/private partnerships, the secondary use of the spectrum by commercial users, and expanding the definition of public safety users to include "critical infrastructure" users such as hospitals (for uses in addition to their qualifying EMS role), some utilities, and transportation. We emphasize our support for these concepts as means of broadening participation and therefore lowering deployment costs of the national public safety broadband network. We also support the Commission's satellite capability requirements for the 700 MHz network to ensure broadband coverage in rural areas. We encourage the Commission to consider means of employing the 700 MHz and 4.9 GHz systems to allow wireless access to existing and planned telemedicine and other fiber networks to leverage those resources to boost transmission distances complimentary to the need for tower construction. Enabling all EMS providers and other public safety colleague disciplines to have access to Universal Service Funds, perhaps through incentives to build out in the 700 MHz system or to link it to existing or planned fiber networks as described above, would be beneficial to rural public safety. Similarly, the National Telecommunications and Information Administration ("NTIA") or the Rural Utilities Service ("RUS") might be able to facilitate public safety use of new facilities or networks built with broadband stimulus funding in remote areas. For example, it could require grant recipients to provide priority access to public safety entities during emergencies. Finally, the federal government should better assure the availability of military health IT capabilities in the civilian sector.

4. Health IT Use Drivers & Barriers. There is wide disparity across healthcare delivery settings in both utilization of available internet connectivity and adoption of health IT applications. We seek to better understand the drivers and barriers under both situations for each delivery setting (hospitals, clinics, physician offices, long-term care facilities, etc.), and individuals in their homes and on a mobile basis. We welcome quantitative analyses and anecdotal evidence of drivers and barriers (including, private insurance/government reimbursement for care provided, economic, socio-demographic, technological, educational/training, policy, etc. conditions).

a. What are the primary drivers and barriers to taking advantage of available internet connectivity across delivery settings?

EMS is a mobile health care service requiring wireless access to broadband service for its applications. In rural areas, this access often does not exist. In all settings, this access primarily exists through commercial wireless and unlicensed hotspot technologies which do not provide the wide area coverage, reliability, redundancy, EMS access priority, security, or infrastructure hardening to qualify them as mission critical communications capable. These significant barriers thwart the adoption of new technology in EMS which otherwise continues to fall back on increasingly unworkable voice communications between EMS provider and physician and an aging, narrowband communications system.

b. What in the healthcare sector may be a disincentive to invest in broadband services (particularly for telemedicine)?

At least for EMS telemedicine systems, the lack of mission critical capable wireless bandwidth is a disincentive.

e. Reimbursement issues are frequently cited as a barrier to adoption of health IT applications. We welcome detailed quantitative analyses and examples of non-adoption specific to reimbursement issues.

EMS is reimbursed by the Centers for Medicaid and Medicare Services (CMS) only for patient interactions which result in transports. Reimbursement is typically "bundled" meaning that new life-saving or cost-reducing technologies, such as EMS telemedicine, may not be separately charged for. Both of these need to be changed. EMS should be reimbursed to participate in community paramedicine programs and in "treat and release" systems using the wireless physician-monitoring applications described above. Either through a "medical home" model of supporting these services through local primary care and/or hospital-based emergency physicians, or through specific reimbursement for these services and IT applications by community paramedics and EMTs.

6. Universal Service Rural Health Care Support Mechanism and Rural Health Care Pilot Program.

As previously discussed, the Universal Service Fund (already extended for use by some health care and EMS providers, but not all) should be considered as a means of supporting public safety broadband network build out and public/private partnership incentivization as envisioned by the FCC and PSST. Its stated purpose to facilitate access to advanced telecommunications and information services in all regions of the nation, particularly in rural and high cost areas, at just, reasonable, and affordable rates[15] is absolutely aligned with this use. It is the cost of build out and servicing the public safety broadband network in rural areas that makes public/private partnerships to cover those areas a difficult "rural and high cost" proposition (and jeopardizes the potential success of the whole nationwide approach to interoperability in public safety broadband). As also previously described the NTIA and RUS could utilize broadband stimulus funding (the Broadband Technology Opportunities Program or the Broadband Initiatives Program) to directly incentivize

[15] 47 U.S.C. § 254(b)

building the public safety network in rural areas; or indirectly require systems that have used these funds to build networks to allow public safety use to augment build out in rural areas. Finally, the specific exploration and piloting of the concept of leveraging current or planned telemedicine and other fiber networks linked to EMS providers through "last mile" wireless broadband nodes for emergency and community paramedicine applications should be supported by these funding programs.

Respectfully Submitted,

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