Use of TETRA Networks in Crisis Situations for Health Information Transfer Strategies

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ABSTRACT

Telecommunications have been evolved dramatically during the last ten years, laying solid foundation for the next generation of Web Technologies and ultimate automated information cyberspace. As a result of this evolution and the users’ demands, the current efforts of the researchers, in the areas of Health Information Transfer in Crisis Situations, promotes formation of inter-disciplinary international teams of experts, in order to create a new generation of technologies which will facilitate the future health information systems. The TETRA network can enable existing information and resources to be extended out to the point of care, helping medical professionals deliver top medical care in a more timely and efficient manner. In medicine, time savings equals hospital savings. The objective of this paper is to study how simply a medical specialist can collect physiological data from mobile-remote patients and how reliably health information can be transferred from emergency places to hospitals through TETRA.

Keywords: Crisis Situations, Health Information Transfer, Quality of Services, Strategies, Tetra Network

INTRODUCTION

Rapid advances in information technology and wireless communications are leading to the emergence of a new type of information infrastructure that has the potential of supporting an array of advanced services for healthcare.

One of the critical points for the Quality of Services (QoS) in mobile communications systems, which are used in modern health information transfer, is the dynamic channel – frequency management scheme for mobile communications systems that supports services in ubiquitous communications infrastructures.

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for future technologies (Ioannou et al., 2003; Ioannou, Panoutsopoulos, & Kotsopoulos, 2006). The future demands of mobile communications and health services will require complex computing and communications infrastructures (Ioannou et al., 2004; Dimitriadou, Ioannou, Panoutsopoulos, Mougiakakou, Stavroulakis & Kotsopoulos, 2005; Ioannou, Dimitriadou, Ioannou, Panoutsopoulos, Garmpis & Kotsopoulos, 2006; Ioannou, Dimitriadou, Ioannou, Panoutsopoulos & Kotsopoulos, 2006).

According to all the mentioned above parameters, it is evident that mobile communication systems experience a rapid increase in the number of subscribers, which places extra demands on their health services and capacity. This growth rate increases the demand of the involved reliable and efficient operations. In terms of mobile communications, this growth leads to a new network architecture where the cells are designed to be increasingly smaller. The most serious problem that arises in this architecture is the handoff issue, which occurs when a mobile user moves from one microcell to a neighbouring one. This problem becomes more serious for high speed moving terminals, where the handoff rate increases and the probability that an ongoing call will be dropped, due to the lack of a free traffic channel is high.

Today’s healthcare professionals need to be connected to the network always. Continuous connectivity is the watchword of these demanding users, who need to communicate over the network seamlessly and stay connected everywhere in emergency cases as health information transfers. TETRA technology provides several ways of protecting the privacy and security of communication, such as authentication, air interface encryption and end-to-end encryption (Stavroulakis & Ioannou, 2007; Dimitriadou, Ioannou, Panoutsopoulos, Garmpis & Kotsopoulos, 2005; Stavroulakis, Ioannou & Panoutsopoulos, 2007).

Using a TETRA network can benefit not only ambulance crews, but also medical personnel at remote locations. Even though doctors are rarely present in ambulances, they can use the transmitted medical data to make a formal diagnosis, enabling treatment to be started and saving several critical minutes before arrival at the hospital. The objective of this research is to study how simply a healthcare professional can collect physiological data from mobile and/or remote patients can and how securely and reliably health information can be transferred from emergency places to hospitals through a TETRA network.

HEALTH INFORMATION TRANSFER

High quality health care requires individuals to share sensitive personal information with their doctors and other healthcare professionals. This information is necessary to make the most accurate diagnoses and provide the best treatment. It may be shared with others, such as insurance companies, pharmacies, researchers, and employers, for many reasons. If patients are not confident that this information will be kept confidential, they will not be forthright and reveal accurate and complete information. If healthcare providers are not confident that the organization that is responsible for the healthcare record will keep it confidential they will limit what patients add to the record. Either of these actions is likely to result in inferior healthcare. The privacy and security of personal health information has become a major public concern.

TETRA NETWORK

Terrestrial Trunked Radio (TETRA) comprises a suite of open digital trunked radio standards defined by the European Telecommunications Standards Institute (ETSI), in order to meet the needs and the demands of the most demanding of Professional Mobile Radio (PMR) users.