
A REVIEW PAPER ON WIRELESS COMMUNICATION

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Abstract

Public Safety (PS) organisations offers a healthy as well as safe atmosphere globally, that add values to the society. The type of the services they offer include human, environmental and asset safety as well as examine a wide range of natural as well as man-made threats, terrorist strikes, technical, radiological or environmental incidents. In order to improve communication of the PS officers during an emergency situation and to enhance the response efforts, the ability to share information (e.g., voice or data) is essential. In the field operations, wireless communication is especially crucial for the supporting the mobility of first responders. Recent disasters have stressed the need to strengthen the wireless networks utilized by the PS organisations in terms of interoperability, capacity and broadband connectivity. This review paper discloses the outstanding challenges in this arena, the status of wireless communication technologies in this particular field, and the current regulatory, standardisation and research activities, with a particular emphasis on the USA and Europe, to address the challenges identified.

Keywords: *Wireless Communications, Security, Public Safety (PS), Software Defined Radio (SDR), Radio Frequency Spectrum (RFS), Cognitive Radio.*

I. INTRODUCTION

In disaster preparedness and recovery, public safety (PS) agencies play a vital role in helping to respond to emergency situations, including catastrophic disasters [1]. First responders are usually among the first on the scene of an emergency, including law enforcement, firefighters, emergency care services, and other agencies. Military agencies, volunteer groups, non-governmental organisations and other local and national organisations may also contribute to disaster response during major natural disasters [2].

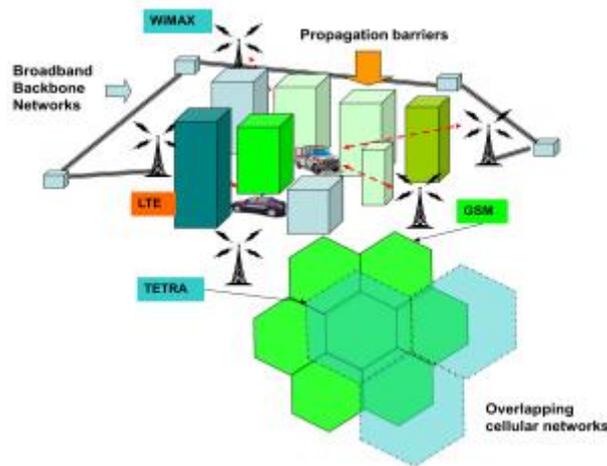


Fig. 1 Shows the Emergency crisis in the urban area

With contributions from a range of disciplines, the corpus of research papers on PS organisations and emergency response and, in particular, interest in the use of information communication technology (ICT) has expanded over the last ten years [3][3]. ICT infrastructures and facilities are largely dependent on PS organisations and emergency responders to perform their duties. Figure 1 shows the Emergency crisis in the urban area.

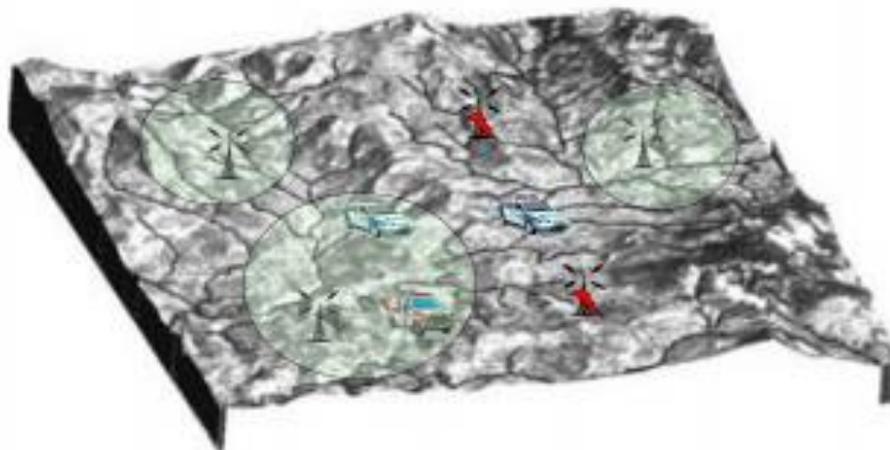


Fig. 2 Illustrates the Large natural disaster [4].

TETRA standard [20] defines the air interface and the interface between the TETRA network and ISDN, PSTN, PDN, PABX and other TETRA systems. The standard also includes the specifications of all basic and advanced services for a TETRA network. Figure 2 illustrates the large natural disaster. Table 1 shows TETRA REL1 vs TEDS. Figure 3: Illustrates the Inter-cell long range interference.

Table 1 TETRA REL1 vs TEDS.

Sl. No.	Features	TETRA 1	TEDS
1	Channel Access Method	TDMA	TDMA
2	Modulation Procedure	π /QPSK	4 or 16 or 64 QAM
3	Carrier/bandwidth	25 KHz	25 or 50 or 100 or 150 KHz
4	Channels	4	4

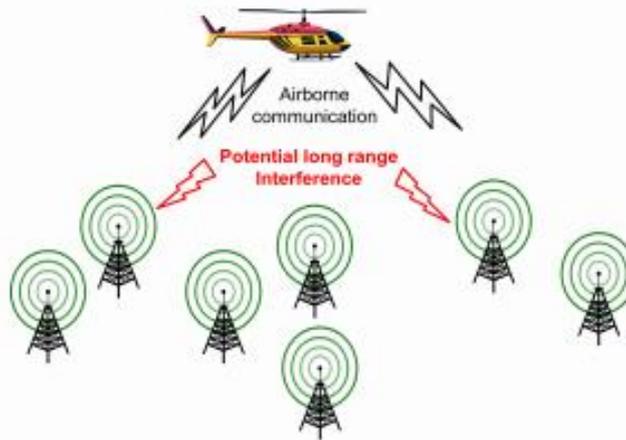


Fig. 3 Illustrates the Inter-cell long range interference [4].

II. LITERATURE REVIEW

Zimmer et al. conducted a research on surveillance, privacy and the ethics of vehicle safety communication technologies. Recent developments in wireless technology have led to the development of smart, in-vehicle protection applications designed to exchange information on nearby vehicle activity, possible road hazards, and eventually predict hazardous scenarios or impending collisions. These Vehicle Safety Communication (VSC) technologies are focused on the establishment of autonomous, self-organizing, wireless communication networks linking vehicles to and from roadside infrastructure [2].

Baldini et al. conducted a survey on wireless communication technologies for public safety. Public Safety (PS) organisations, by providing a healthy and secure atmosphere, add value to society. The services they provide include human, environmental and asset security and investigate a broad variety of natural and man-made threats, terrorist attacks, technical, radiological or environmental incidents. In order to enhance the communication of PS officers during an emergency situation and to improve response efforts, the ability to share information (e.g., voice and data) is important. In field operations, wireless communication is especially critical for supporting the mobility of first responders [5].

III. DISCUSSION AND CONCLUSION

This paper identified the various operational contexts, functions and requirements of public safety organisations and described the various emergency response wireless communications technologies used by public safety organisations and the standards of technology and regulatory frameworks governing public safety organizations. Also addressed was the future advancement of communication technology in the PS domain, mentioning some recent technological advances.

Finally, while the literature indicates that the PS field is a niche market, it should be taken into account that if we focus on the number of major emergencies in the last 10 or more years, including terrorist threats and environmental disasters, we must consider the importance of these technologies and the importance of the work of PS organisations in modern society.

IV. REFERENCES

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