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Intelligent transport systems — Pre-emption of ITS communication networks for disaster and emergency communication — Use case scenarios

Systèmes intelligents de transport — Préemption des réseaux de communication ITS pour les secours en cas de catastrophe et les communications d'urgence — Scénarios de cas d'utilisation

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Foreword

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This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

Introduction

This document presents use case scenarios in support of future development of standards for ad-hoc wireless network communication under disaster and emergency cases.

Under certain natural disaster situations such as earthquake, tsunami, hurricane, and snowstorms, the existing commercial telecommunication infrastructure, either wireless or wired networks, can be destroyed. In order to provide communication means for the disaster areas, some ad-hoc networks may need to be established.

Intelligent transport systems — Pre-emption of ITS communication networks for disaster and emergency communication — Use case scenarios

1 Scope

This document provides the outcome of discussions on use case scenarios and assumed requirements for using ad-hoc wireless networks under disaster and emergency conditions including related priority, security and urgency aspects of communication requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15662, *Intelligent transport systems — Wide area communication — Protocol management information*

ISO 21210, *Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking*

ISO 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15662, ISO 21210 and ISO 21217, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
information sender
person(s) or organization(s) that send a message for disaster use cases

Note 1 to entry: Messages may include the information for a disaster, damage area, damage level, vital and safety information, refugee camp and rescue supply.

3.2
information destination
person(s) or organization(s) to which an *information sender* (3.1) wants to provide information

3.3
information urgency level
level of allowable time to deliver the information from an *information sender* (3.1) to an information destination

3.4
information lifetime
time period during which information is effective

4 Use cases

4.1 Disaster information dissemination

Before, during and after a disaster, a public authority transmits disaster and related information, including disaster condition, damaged area, damage level, needs of evacuation, evacuation facilities and recommended evacuation route.

The information distribution will be disseminated uni-directionally from public agencies to public citizens.

4.2 Alive information ("I am alive" message)

After a disaster, persons in any area of the country, not only in a disaster area, send this message including their vital message and health condition. The information sent by persons in a disaster area may include personal identifiers that include address, age and name and information attribution, including time stamp and position.

4.3 Rescue information

After a disaster, emergency information will be sent out from disaster victims. The information is urgent and includes their health, injury, need of material, drug, medical treatment and food information.

4.4 Person finder

After a disaster, persons inside/outside of a disaster area can search persons with their name, address and physical features.

4.5 Information dissemination in a refugee

After preparing refugees for victims of a disaster, each refugee provides the current condition, logistics and relief supply information.

4.6 Doctor and refugee information exchange

During refugee operation in a disaster area, refugee operators and doctors in refugees exchange the information for the current condition of a refugee, injured persons, required staff, required medical treatment, medical facility and emergency package including medicine and food.

4.7 Public authorities information exchange

After a disaster, public authorities (police, regional government, hospital, refugees, exchange, and army) exchange the information to provide urgent relief from disaster and its efficient activities.

5 Assumed requirements

5.1 Disaster information dissemination

5.1.1 Communications requirements: functional

For disaster information dissemination, wide area transmission media will be used. Both one-way broadcast and two-way communication may be used.

5.1.2 Communications requirements: performance

For disaster information dissemination, robust communication and fast-transmitting media will be needed. In the case of tsunamis and earthquakes, the warning information may be transmitted for several seconds or up to 10 min.

5.1.3 Communications requirements: security and security threats and risk

Masquerade may be assumed as threats. Countermeasures for masquerade may be needed for disaster information dissemination.

5.1.4 Information urgency level and lifetime

The information urgency level may be highest for providing the latest information about disasters to others. Information lifetime may be 1 h, basically; however, the information may always be useful with time stamp information.

5.1.5 Information sender and information destination

An information sender may be a public authority for providing public official information. Information destinations may be persons in disaster areas.

5.2 Alive information ("I am alive" message)

5.2.1 Communications requirements: functional

For alive information, wide-area transmission media will be used. Both one-way broadcast and two-way communication may be used.

5.2.2 Communications requirements: performance

For alive information, robust communication is needed. In order to achieve a certain level of message robustness, acknowledging messages may be useful.

5.2.3 Communications requirements: security and security threats and risk

Masquerade and communication interruption may be assumed as threats. Countermeasures for masquerade and communication interruption may be needed for sending alive information. For protecting privacy information, countermeasures for communication interruption may be needed; however, the countermeasure may be activated upon the sender's demand.

5.2.4 Information urgency level and lifetime

The information urgency level may not be so high. Information lifetime may be 1 h to 6 h, basically; however, the information may always be useful with time stamp information.

5.2.5 Information sender and information destination

Information senders may be anybody in the country. If communication capacity is limited, information sent from disaster areas may be prioritized. Information destinations may be public authorities and network operators for disaster message board services.