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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

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

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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.

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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

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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.

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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.

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5.3 Rescue information

5.3.1 Communications requirements: functional

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

5.3.2 Communications requirements: performance

For rescue information, robust (QoS) messages should be transmitted and the confirmation information that the information is received at a destination may be needed. Two-way communications will be needed for responses from rescue teams or public agencies.

5.3.3 Communications requirements: security and security threats and risk

Leaking privacy information may be assumed as threats. Countermeasures for protecting privacy may be needed for sending rescue information.

5.3.4 Information urgency level and lifetime

The information urgency level may be high. Information lifetime may be 2 d or 3 d, basically; however, the information may always be useful with time stamp information.

5.3.5 Information sender and information destination

Information senders may be victims in disaster areas. Information destinations may be public authorities that can provide emergency support to victims.

5.4 Finding of persons

5.4.1 Communications requirements: functional

For finding of persons, two-way communications is used.

5.4.2 Communications requirements: performance

For finding of persons, robust communication may be needed; however, the high capacity will not be needed.

5.4.3 Communications requirements: security and security threats and risk

Masquerade, communication interruption and leaking privacy information may be assumed as threats. Countermeasures for masquerade, communication interruption and leaking privacy information may be needed for exploring personal information.

5.4.4 Information urgency level and lifetime

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

5.4.5 Information sender and information destination

Information senders may be anybody in the country. Information destinations may be public authorities that can implement and maintain the database of victims.

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5.5 Information dissemination in refugees

5.5.1 Communications requirements: functional

For information dissemination in refugees, both one-way communication and two-way communication may be used.

5.5.2 Communications requirements: performance

For information dissemination in refugees, small capacity communications will be sufficient for basic information. High-capacity communication will be needed for rich contents (streaming, VoIP, motion pictures).

5.5.3 Communications requirements: security and security threats and risk

General threats may be assumed as risks. General security countermeasures may be needed.

5.5.4 Information urgency level and lifetime

The information urgency level may be moderate. Information lifetime may be 1 h to 6 h; however, the information may always be useful with time stamp information.

5.5.5 Information sender and information destination

Information senders may be refugee camp operators. Information destinations may be victims and staff in refugees.

5.6 Doctor and refugee information exchange

5.6.1 Communications requirements: functional

For doctor and refugee information exchange, two-way communications is used.

5.6.2 Communications requirements: performance

For doctor and refugee information exchange, basic information will be enough in case of small capacity communication. High-capacity communication will be needed for rich contents (streaming, VoIP, motion pictures).

5.6.3 Communications requirements: security and security threats and risk

Leaking privacy information may be assumed as threats. Countermeasures for protecting privacy may be needed for sending rescue information.

5.6.4 Information urgency level and lifetime

The information urgency level may be highest. Information lifetime may be 1 h to 6 h; however, the information may always be useful with time stamp information.

5.6.5 Information sender and information destination

Information senders may be refugee camp operators, doctors and medical staff. Information destinations may also be refugee camp operators, doctors and medical staff in other refugee camps.

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