ITU-T's activities on disaster relief and emergency communication

24 April 2019

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ITU-T Study Groups

- SG2 Operational aspects
- SG3 Economic and policy issues
- SG5 Environment and circular economy
- SG9 Broadband cable and TV
- SG11 Protocols and test specifications
- SG12 Performance, QoS and QoE
- SG13 Future networks (& cloud)
- SG15 Transport, access and home
- SG16 Multimedia
- SG17 Security
- SG20 IoT, smart cities & communities



Disaster relief and emergency communication by ITU

- Huge number of people are affected under disaster
- All sectors of ITU are working to contribute to disaster relief from the telecommunication/ICT aspects ... to make a big difference
- Disaster relief activities include preparation for possible disasters, early detection, rescue, evacuation assistance, safety confirmation, recovery assistance, etc.
- ITU-T SG2: Lead study group on telecommunications for disaster relief/early warning, network resilience and recovery
- Focus Group (FG) on disaster relief systems, network resilience and recovery was created under SG2 and concluded with 8 Technical Reports
- SG11, SG12, SG13, SG15, SG16 and SG20 are also working on items related to disaster relief and emergency communication



Focus Group (FG) on disaster relief systems, network resilience and recovery

- The FG was established in January 2012 and concluded successfully in June 2014 producing 8 technical reports (deliverables):
 - Overview of Disaster Relief Systems, Network Resilience and Recovery
 - Disaster Relief Systems, Network Resilience and Recovery (DR&NRR): Promising technologies and use cases
 - Gap Analysis of Disaster Relief Systems, Network Resilience and Recovery
 - Terms and Definitions for disaster relief systems, network resilience and recovery
 - Requirements for Disaster Relief Systems
 - Requirements for network resilience and recovery
 - Requirements on the improvement of network resilience and recovery with movable and deployable ICT resource units
 - Technical Report on Telecommunications and Disaster Mitigation
- These reports are used for developing Recommendations
- These technical reports are available on the FG publication page at <u>http://www.itu.int/pub/T-FG/e</u>



Recommendations on disaster relief and emergency communication



Disaster message board service (Rec. ITU-T E.108)







Disaster voice message delivery service (Rec. ITU-T E.108)





Requirements for safety confirmation and broadcast message service for disaster relief (Rec. ITU-T E.119)





Framework of disaster management

- Framework of disaster management for network resilience and recovery (ITU-T L Suppl.35)
 - High-level objectives of NRR against disasters
 - Several approaches (i.e., redundancy, congestion control, repair, substitution and robustness)
 - Effective time frame (i.e., phase) for disaster recovery
 - Information about relevant technologies
- Framework of disaster management for disaster relief systems (ITU-T E-100 series Suppl.1)
 - High-level category of disaster relief (DR) systems including early warning systems
 - Services and systems that need common specifications or requirements
 - New study areas of disaster relief systems, which includes newly produced ITU-T Recommendations, and its requirements



L suppl.35 - Disaster phases and relevant approaches for network resilience and recovery



Example of guidance service for disaster relief (ITU-T E-100 series Suppl.1)





Movable and Deployable Resource Unit (MDRU) (Rec. ITU-T L.392)





Movable and deployable ICT resource units (MDRU) – truck container type





MDRU in various sizes





Accessibility

- From FG technical report on disaster relief system requirements Consideration of accessibility
 - Systems must be helpful for people with disabilities. Death rate for people with disabilities was twice that for those without disabilities during the East Japan Earthquake in March 2011.
 - Systems must be applicable for foreigners including visitors, who may have limited knowledge about the site and difficulties in understanding the local language.
- ITU-T SG16: Lead study group on telecommunication/ICT accessibility for persons with disabilities



Multimedia telecommunication relay services (Rec. ITU-T F.930)





Audio-based indoor and outdoor network navigation system for persons with vision impairment (Rec. ITU-T F.921)

- <u>ITU-T F.921</u>: describes the key usability elements for audio-based network navigation system for persons with vision impairment
 - Design principles: Universal Design principles
 - Validation principles: testing of the installation, configuration, usability and accessibility
 - How to give directions
 - Components & classification for audio instructions
 - Specific features, landmarks and objects
 - Entrances and exits
 - Pathways
 - Decision points
 - Tactile walking surface indicators
 - Escalators, stairs, lifts
 - Ticket control gates and barriers
 - Platforms
 - Railway stations
 - Mobile app features





Digital signage: Requirements for disaster information services (Rec. ITU-T H.785.0)

- Early warning to lessen damages
- Reports of up-to-the-minute situations
- Announcements of traffic status/evacuation sites •





Disaster information service using unmanned aerial vehicles (UAV)

- Use cases and scenarios for disaster information service
- Drought, fire, flood, landslide, earthquake, volcanic eruption, tsunami, etc.





Prioritized service under disaster

- Emergency Telecommunications Service (ETS)
 - National service providing priority use of network resources to achieve a higher probability of end-to-end communication and use of applications, to ETS authorized users in times of disaster and emergencies
- International Emergency Preference Scheme (IEPS)
 - E.106 "International Emergency Preference Scheme (IEPS) for disaster relief operations"
- More information is shown in the "backup"



Common Alerting Protocol (CAP) (Rec. ITU-T X.1303/X.1303bis)

- X.1303 "Common Alerting Protocol (CAP V1.1)"
- X.1303bis: "Common alerting protocol (CAP 1.2)"
 - General format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks.
 - Capabilities:
 - flexible geographic targeting using latitude/longitude shapes and other geospatial representations in three dimensions;
 - multilingual and multi-audience messaging;
 - phased and delayed effective times and expirations;
 - enhanced message update and cancellation features;
 - template support for framing complete and effective warning messages;
 - compatible with digital encryption and signature capability; and
 - facility for digital images and audio.
 - XML and compact binary encodings.



Emergency calls originating from vehicles (Rec. ITU-T P.1140)



Source: Continental - Automatic Emergency Call

ITU-T P.1140: Speech communication requirements for emergency calls originating from vehicles Referenced in new UN regulation on automatic emergency call system for road traffic accidents (UNECE WP.29)



Requirements and capability framework for IoT-based AERS (Rec. ITU-T Y.4119)

• Provides an overview of an IoT-based automotive emergency response system (AERS), identifies requirements of the AERS for aftermarket devices, and provides a capability framework of the AERS.



Timing diagram of AERS









ITU/WMO/UNESCO-IOC Joint Task Force on SMART submarine cables

• SMART submarine cable: submarine cable repeaters equipped with scientific sensors (e.g., sea water temperature, pressure, acceleration)



Details are at http://www.itu.int/en/ITU-T/climatechange/task-force-sc/Pages/default.aspx





Emergency Telecommunications Service (ETS)

- National service providing priority use of network resources to achieve a higher probability of end-to-end communication and use of applications, to ETS authorized users in times of disaster and emergencies
- E.107 "Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS"
- M.3350 "TMN service management requirements for information interchange across the TMN X-interface to support provisioning of Emergency Telecommunication Service (ETS)"
- Q.sup.62: Overview of the work of standards development organizations and other organizations on emergency telecommunications service
- Q.sup.63: Signalling protocol Mappings in support of Emergency Telecommunications Service in IP Networks
- Q.sup.69: Framework for interconnection between VoLTE-based network and other networks supporting emergency telecommunications service (ETS)
- Y.1271: Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks
- Y.2705: Minimum Security Requirements for Interconnection of Emergency Telecommunications Service (ETS)



International Emergency Preference Scheme (IEPS)

- E.106 "International Emergency Preference Scheme (IEPS) for disaster relief operations"
- Q.sup.53: Signalling requirements to support the International Emergency Preferential Scheme (IEPS)
- H.248.81: Gateway control protocol: Guidelines on the use of the international emergency preference scheme (IEPS) call indicator and priority indicator in ITU-T H.248 profiles









ITU/WMO/UNESCO-IOC Joint Task Force on SMART submarine cables

- Tasked with developing a strategy and roadmap for the availability of SMART (Science Monitoring And Reliable Telecommunication) submarine cables
- SMART submarine cable: submarine cable repeaters equipped with scientific sensors (e.g., sea water temperature, pressure, movement)
- A global network could be established providing real-time data for ocean climate monitoring and disaster mitigation (particularly from tsunamis).
- The task force is composed of about 140 international experts from the science, engineering, business and law communities.

Details are at http://www.itu.int/en/ITU-T/climatechange/task-force-sc/Pages/default.aspx



Work items under development (1)

- Q.ETN-DS: Signalling architecture of the fast deployment emergency telecommunication network to be used in a natural disaster
- Q.suppl.Multi_Access: Signalling requirements for IMS emergency telecommunications service in support of multiple accesses
- Q.suppl.Multi_Devices_ETS: Signalling requirements for VoLTE-based network and GSM/UMTS network supporting Multi-device emergency telecommunications service



Work items under development (2)

- H.DS-CASF: Digital signage: Common alerting service framework
- Y.AERS-msd: Minimum set of data structure for automotive emergency response system
- Y.AERS-mtp: Minimum set of data transfer protocol for automotive emergency response system
- Y.disaster_notification: Framework of the disaster notification of the population in smart cities and communities
- Y.smart-evacuation: Framework of smart evacuation during emergencies in smart cities and communities





