

- consultation of medical databases;
- registering refugees and displaced persons;
- sending relevant information;
- general information.

The advantages of these information media are the speed at which media on the Internet can be shared and updated – including, for example, photos, graphics, audio, video, live video and other relevant information – and that people can subscribe to notification systems that send messages relevant to emergency situations. On the other hand, the disadvantages are mainly that information on the Internet is not updated in real time in disaster situations where Internet access cannot be guaranteed, or that information may be only updated at certain times (United States Federal Emergency Management Agency, 2005). Therefore, all of the information media used to inform citizens about possible hazards should be published online in accessible formats so everybody can access that important content.

Social networks

Social networks, similar to the Internet more generally, are another means for dissemination of information in a possible emergency. However, it is important that the veracity of the information be confirmed, without limiting social media. Best practice is for government entities to develop and have their own applications and information channels on the Internet and social networks, so that citizens can have confidence in the accuracy of information and the official nature of warning or alerts, as well as safety reminders and preparedness tips.

Social networks are quite flexible, messages can be short and spread quickly: for example, through Twitter, Facebook, Instagram, WhatsApp, etc. However, it is not possible to control the messages on social networks once they have been sent, and misinformation can spread. Thus, it is important, as noted above, that governments build their own applications to inform the people, as well as to develop the means to verify information reported via social media.

Amateur radio

Radio amateurs have supported communications in emergency situations on a voluntary basis since the beginning of radio communications. They are experts in radio communications and have the equipment, skills and necessary frequencies allocated by ITU (2017d) to deploy networks in emergency events quickly and efficiently. Amateur radio activity is authorized in accordance with the licenses issued by national governments: therefore, they are authorized to re-establish national and international communications if necessary.

To ensure that radio amateurs have the training and skills necessary to support communications in case of an emergency, the International Amateur Radio Union has developed a guide for emergency telecommunications that allows potential operators to be trained (International Amateur Radio Union, 2015).

Radio amateurs can help in a possible emergency with communications of different types: for example, supporting an international institution such as the International Federation of the Red Cross and Red Crescent Societies;⁸ providing communications to those displaced by the disaster and/or other relief efforts; providing support to the emergency management agency of the national government by providing inter-institutional communications; or supporting logistics communications to the humanitarian agencies on the ground, e.g., firefighters or civil defence workers, among others.

⁸ The International Federation of the Red Cross and the International Amateur Radio Union signed a Memorandum of Understanding on Cooperation in Emergency: Telecommunications for Disaster Preparedness and Response, which has been in place for more than a decade. Available at www.iaru.org/uploads/1/3/0/7/13073366/ifrcandiarumou.pdf (accessed 22 February 2019).

The support provided by radio amateurs in cases of emergency has the following advantages:

- There is great coverage, due to the large number of amateur radio stations available and operating in all regions and in almost every country in the world.
- The coverage of amateur radio stations becomes a network independent of others.
- There are training programmes and simulation exercises for emergencies developed by national radio amateurs for situations of telecommunications in emergencies.
- They are qualified temporary volunteers who provide skills and experience essential for emergency telecommunications, with the sole purpose of supporting humanitarian aid services.
- They have skill in solving problems related to the use of telecommunications during emergencies with often very limited resources.
- Many amateur radio stations trained to handle emergency telecommunications have alternative power sources, such as battery power, solar power or generator power and can operate during power disruptions.

The coverage of amateur radio networks can vary between short-range networks, *i.e.*, tens of kilometres, to long-range networks that exceed 500 km. Additionally, amateur radio satellites can be used for medium- and long-range communications, fulfilling the function of storage and retransmission.

It is important to mention that radio amateurs should only carry out or accept tasks that are foreseen in the agreements reached with other stakeholders, such as government authorities, that clarify their role in emergency operations. Volunteer radio amateurs typically do not make decisions in rescue operations and are usually only qualified or authorized to send and receive accurate communications. The normal role of the amateur radio service is to establish and support communications for those who directly carry out emergency operations.

Finally, it is also important to note that reliance on amateur radio networks can present certain disadvantages in countries without a robust and active amateur radio population due to an insufficient number of amateur radio operators. It is important for administrations in countries without an active amateur radio service to foster and promote the growth of amateur radio so as to provide an adequate supply of amateur radio operators is available during emergency telecommunications operations.

Broadcasting

One of the most powerful means of transmitting information to the general public is radio (voice) and TV broadcasting. Broadcasting is one of the mediums that has been in the public service the longest, with radio broadcasting dating back to the early twentieth century, and TV broadcasting in service since 1930. In this sense, radio and TV broadcasting services present one of the highest penetrations in terms of population.

For the specific case of emergencies and disasters, radio broadcasting plays a fundamental role in informing the public about the various situations that may arise, including breaking news alerts that can interrupt the usual programming. The government entities in charge of dealing with emergencies should be in continuous communication with the radio and television broadcasting stations when the situation warrants such communication. This ensures that the information that is transmitted to the public is as up to date and accurate as possible. In addition, the government should also facilitate access and help journalists who want to cover events in real time from the affected areas. In this sense, it is recommended to build meeting points for the press near areas of interest but far from high-risk zones.

Likewise, a warning system can be connected to broadcasting stations in such a way that they can interrupt the usual programming in case of emergency to transmit information to the public, such as evacuation orders.