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PROPOSED DRAFT NEW REPORT ON THE IMPORTANCE OF TERRESTRIAL BROADCASTING IN PROVIDING EMERGENCY INFORMATION TO THE PUBLIC

Introduction

For many decades, radio and television broadcasters have been the primary source of critical information to the public in the event of disasters such as tornadoes, hurricanes, tropical storms, floods, snowstorms, earthquakes, tsunamis, terrorist violence, mass transportation accidents, and industrial or technological catastrophes. On these occasions, radio and television broadcasting provides reliable point-to-everywhere delivery of essential information and safety advice to the public, to first responders and others via widely available consumer receivers, both mobile and fixed.

This report provides a compilation of supporting evidence that terrestrial broadcasting plays a critically important role in disseminating information to the public in times of emergencies. The report is organised as follows:

- Section 1 - A brief background on the role of broadcasters and advantages of terrestrial broadcasting during emergencies for providing information to the public.
- Section 2 - Provides explanations of broadcasters' experience in gathering and reporting of public safety information.
- Section 3 - Describes operational methods used to assure continued broadcast service.
- Section 4 - Shows how the existing broadcast infrastructure is used to support emergency communications.
- Section 5 - Describes new broadcasting techniques and systems for distributing emergency information.
- Section 6 - Provides examples of how individual broadcast organisations collaborate with each other and other relevant organisations during emergencies.
- Section 7 - Covers the public service efforts broadcasters have undertaken associated with emergency and disaster situations.
- Section 8 - Describes the role of international broadcasting for disaster relief.
- Section 9 - A list of previous ITU-R documents related to the subject of emergency broadcasting.
- Section 10 - Includes a set of cases studies of how broadcasting has been used in emergency and disaster situations, including a set of links to video documentaries.
- Section 11 - Provides conclusions about the importance of terrestrial broadcasting in providing emergency information to the public.

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Annexes

1 Background

By their nature, natural and man-made disasters, whether impending or immediate, quickly capture the attention of a very large majority of the entire population in an affected area. In disaster situations, members of the public seek at first not to communicate, but to be informed, so that they may understand what is happening (or about to happen), and to assess whether and how they and their family and friends may be affected.

An earthquake is perhaps the purest example of instantaneous mass awareness. Everyone within the quake zone feels the motion more or less simultaneously. The normal individual reflex is to tune to radio and/or television broadcast stations that are known to have a strong record of serving viewers by reporting and interpreting emergency situations. These can include a mix of national network information and local information as well. The broadcast listening and viewing public is aware that in such circumstances, scheduled radio and television programming is quickly interrupted by broadcast station news personnel who report information they have collected from many sources throughout the emergency. As coverage continues, broadcasters include information from reporters at various scenes, police and fire departments, relevant federal, state and local government agencies, weather and geological bureaus, and the like.

Following the initial need for information, personal communication is then attempted as citizens seek rapid contact with family members and friends. At this point communication networks can suffer connectivity failures due to blocking or traffic congestion, and often loss of power at key network centres, cellular transmission towers, fibre links or other intermediate processing points. Failed elements can include wired and wireless telephone and mobile data networks, cable television networks, and in cases of severe weather, even direct-to-home satellite services. While these non-broadcast media often suffer infrastructure failure within a disaster area, broadcasting's architecture is uniquely simple and powerful. If the main transmitter and the radio or television studios that feed it remain on the air, reception is available wherever there are working receivers. Moreover, there has been rapid growth and availability of small handheld and car equipped television receivers, plus large screen devices operating in most emergency shelters such as police stations, hospitals, sports arenas, public buildings, etc. Overall robustness of broadcast services is enhanced by the geographical diversity of multiple radio and television services within a given country. If one or a few radio and television broadcasters are not able to remain in service, or have an outage, other broadcast signals are usually available.

Radio receivers, of course, can be AC-powered, battery, or hand crank-operated, and are present in virtually all motor vehicles. These are nearly always reliable, regardless of almost any disorder or disruption taking place in the affected disaster area. Portable television receivers are much less common, but even this is destined to change, as mobile DTV reception capability is beginning to be rolled out to portable devices such as cellular phones.

A particular attribute of information provided by many broadcasters is the professional quality of the compilation and analysis of local facts and guidance by experienced broadcast station news personnel who often report around the clock. Broadcasters gather and convey information and video from reporters deployed at various locations including, police and fire departments, relevant national and local government agencies, weather, geological, scientific and medical bureaus, etc.

Radio and television broadcasters have an expert ability to interpret information and impact for their viewers in the local broadcast coverage area. Viewers are offered comfort by hearing or seeing well-known, trusted local news reporters and anchors interpret the situation and provide advice and guidance for viewers' safety.

All but the smallest radio and television stations have an important ability to gather and summarize information for the public by bringing to bear their electronic news, traffic and meteorological personnel with special knowledge of the local area, their field audio and video reporting capabilities, as well as sophisticated graphics, mapping and weather radar systems, not to mention well-honed utilization of Internet sources for collecting vital emergency information.

Television broadcasting is particularly powerful when it displays maps of emergency areas annotated with critical information prepared by the broadcasters' news and meteorological personnel, and first responders and emergency agencies. Hundreds of thousands (or millions) of television broadcast viewers, whether fixed or mobile, can each examine the same maps and determine their own location relative to the areas in crisis. In this way they are able to draw valuable conclusions about actions they may need to take to protect their safety (e.g., decide evacuation routes, whether to shelter in their present location, or measures for property protection), and the safety of family members and others.

Most broadcasters have disaster plans that include the presence of backup generator power at key studio and transmitter locations, associated long-term fuel storage, as well as backup facilities in secondary locations where information gathering and studio work can be moved if the primary location is disabled due to catastrophic conditions.

It is also common for radio and television receivers to be available in critical locations such as police and fire stations, hospitals, government buildings, auditoriums, indoor stadiums and public shelters, often with backup generator power. Thus, both citizens and emergency responders will often benefit from the distribution of key information by local broadcasters.

It is important to note that in regions with diverse and thriving terrestrial broadcasting systems, many emergency broadcast services are provided free of charge to the public, and do not involve government expenditure. In the U.S. for example, emergency broadcasts are planned, executed and fully paid for by commercial broadcasters as part of their business mission, which includes the responsibility to serve their communities in times of special need. The preservation of free, over-the-air broadcast services for television and radio is thus a vital supporting component of maintaining this system.

2 Terrestrial radio and television broadcaster experience in gathering/reporting of public safety information

Many broadcasters strive to provide comprehensive emergency broadcast content on air, online and on all other useful platforms. They work with emergency authorities to provide reliable, accurate and timely information and warnings to keep the community safe, and they endeavour to be their companion in difficult times, and to assist them with recovery efforts. Emergency broadcasting consists of all content relating to an unfolding natural or man-made disaster which affects lives or poses threats of significant property damage, and for which repetitious content assists the community to respond. Emergency broadcasting will be undertaken "as local as possible", having regard for staff work levels, safety and budgets. The urgency and repetition of emergency broadcasting is based on the time to the possible threat, the number of lives threatened and the cost of likely damage.

Providing timely, relevant and practical information to people who are confused and demoralised by the impact of a crisis on their lives, is in itself a useful form of aid. Broadcast information is particularly useful in situations where physical access is difficult and aid responders may take several days or weeks to reach affected communities. Appropriate information and advice, delivered in a user-friendly way, can help people to cope with the crisis and mitigate the threats that it poses

to their wellbeing until physical help arrives. Direct communication via radio or television also helps to reduce the sense of isolation and helplessness that crisis-affected communities experience.

Once aid has begun to arrive, broadcast programming can tell the affected community how and where to access the help that is available. It can explain how to register to receive aid and where and when distributions will take place. Broadcast programming can also publicise other important services for the affected community. It explains how families which have been split up can contact tracing services to find their loved ones. It can alert women to services that help them deal with sexual harassment and other protection issues. It can explain how people can keep themselves safe from diseases and where they can access medical services.

Radio and television can help aid responders to manage the expectations of the people they are seeking to assist. For example, if a food distribution in certain towns and villages has been delayed by landslides blocking a road or by difficulties in the supply chain, broadcast programming can explain to the intended recipients why the distribution has been delayed. It can also advise when the delayed distribution is now expected to take place. Without such explanation and reassurance, the affected communities might feel abandoned and frustrated and believe themselves to be the target of deliberate discrimination or neglect.

The following Annexes provide examples of broadcaster experience in gathering/reporting of public safety information:

– Annex 2A: Australian Broadcasting Corporation
– Annex 2B: First Response Radio
– Annex 2C: BBC Media Action
– Annex 2D: British Broadcasting Corporation
– Annex 2E: Louisiana Public Broadcasting.

3 Operational methods used to assure continued broadcast service

The broadcast imperative is to be on the air and available at all times, especially during emergency situations. Most facilities possess redundant capabilities and signal paths in order to maintain their over-the-air and cable feeds. In larger markets, more robust measures are employed. These are usually "case-hardened" facilities that include multiple power feeds from diverse power generation stations, full backup power generators at the studio and transmitter sites, multiple signal paths from studio to transmitter sites, redundant transmitters /antennas and direct feeds to cable and satellite operators. All of these minimise the number of single points of failure that could keep vital information from being broadcast.

Some humanitarian agencies have "radio in a suitcase" kits on standby, which are used to re-establish FM radio services when these are destroyed or damaged. Used in conjunction with a small petrol-driven generator, the equipment can enable an FM radio station to be on-air within hours of a disaster occurring. The idea is usually not to set up a completely new radio station, but to operate a special radio service on the FM frequency and broadcasting licence of a local partner station that is no longer able to broadcast from its own studios and transmitters.

In the United States, the FCC's Communications Security, Reliability and Interoperability Council (CSRIC) was formed to provide recommendations to the FCC to ensure, among other things, optimal security and reliability of communications systems, including broadcasting, during terrorist attacks, natural disasters and all other threats or attacks nationwide. The FCC's Media, Security and Reliability Council (MSRC) for radio and television broadcasting developed Best Practices, which were updated by the CSRIC. The Best Practices include recommendations for detecting, preparing

for, preventing, protecting against, responding to and recovering from terrorist threats, natural disasters or other attacks upon national infrastructure and people.

The 2011 CSRIC report on Best Practices can be accessed at http://transition.fcc.gov/pshs/docs/csric/WG2B-MSRC-Best-Practice-Update-Final-Report.pdf

The following Annex provides examples of operational methods used to assure continued broadcast service:

– Annex 3A: BBC Media Action - Use of emergency equipment.

4 Use of existing terrestrial broadcasting infrastructure to support emergency communications in disaster situations

Television broadcasting's commitment to providing local news and information for many hours a day has created established in-house procedures to deal with the dissemination of all types of news. These same procedures are easily and quickly adaptable to provide life and safety information to the public. Stations are linked via Emergency Alert Systems to state and national emergency information channels and can repeat messages from civil and governmental authorities very quickly. Electronic News Gathering and satellite outside broadcast vehicles are quickly deployed to be on-the-scene with live pictures and sound. These facilities are also deployed at civil and governmental press conferences and instantaneously relay information to the public. Closed Captioning systems along with full screen graphical displays, news "tickers" and lower-third screen text information make sure that those who are hearing impaired are also provided with emergency information. Even the simplest form of communication, for example, telephone calls can serve as a source to the broadcast signal and can be placed on-air from public officials or civilians in the disaster area and their messages relayed to viewers and listeners.

Terrestrial broadcasters have adapted many different technologies to aid in news gathering and the dissemination of emergency information:

– Live and recorded mobile phone videos can be placed on the air, making it possible to use non-traditional broadcasting equipment to share important information.
– Broadcasters are adapting small aperture satellite dish technology that allows for a more easily deployed satellite news gathering tool in a local market.
– Diversity microwave receive sites that make it possible to use small vehicles equipped with microwave transmitters to drive and report on road and other conditions.
– Helicopters to give overall views of an area-wide emergency.
– Computer mapping software to quickly document and display details of an emergency to the public.

The following Annex provides examples where existing terrestrial broadcasting infrastructure has been used to support emergency communications in disaster situations:

– Annex 4A: BBC Media Action - Use of existing broadcast infrastructure.

5 New broadcasting techniques and systems for use in emergency communications

A number of emergency warning systems exist which allow broadcast networks to alert people of impending disasters and enable them to prepare for emergencies. The emergency warning systems use special warning or alert signals embedded in digital radio transmissions to automatically switch on the receiver equipment (if so equipped) and issue an emergency bulletin, alerting people to an impending disaster such as a tsunami or an earthquake. See Annexes 5A and 5B for examples of these systems.

The U.S. Emergency Alert System (EAS) is a public alert and warning system that uses the communications assets of EAS participants, including terrestrial broadcasters, cable television systems, wireless cable systems, Satellite Digital Audio Radio Service (SDARS) providers, direct broadcast satellite (DBS) services and wireline video service providers to allow the President of the United States the capability to address the American public during a national emergency. This system is designed to be available under all conditions. The system is also used by State and local authorities to deliver important emergency information, such as AMBER alerts. The National Weather Service (NWS) regularly uses the system to disseminate emergency weather alerts and advisories. A brief history and description of the U.S. EAS is given in Annex 5C.

The U.S. Advanced Television Systems Committee (ATSC) Mobile Emergency Alert System (M-EAS) will build upon established ATSC Mobile Digital Television and Non-Real-Time standards to provide a robust and reliable alerting service for the public. It leverages the demonstrated excellent reliability of the broadcast digital television service to serve emergency needs that cannot be satisfied by other communications means that become damaged or overloaded during natural disasters. It provides a means for dissemination of both national and local alerts, and significantly extends alerting capabilities to include rich media such as maps and videos. A more detailed description of the M-EAS system is given in Annex 5D.

In many disasters people have lost their belongings and do not have a radio, or they are not radio listeners so do not own a radio. Ideally, radios and portable/mobile television receivers must be commonly available, so that the information being broadcast can be received and passed on across the disaster area.

The minimum requirement for an emergency radio should be that it does not require AC power and has both AM and FM bands. It should also have access to the shortwave band in regions where shortwave listening is prevalent, which will be used if the disaster is over a wide area. A wind-up radio would be a suitable choice for use in rural areas, where people would find it difficult to purchase replacement batteries. Some wind-up radios also include a torch or flashlight.

Details of systems for use in emergency communications are given in the following Annexes:

– Annex 5A: Digital Radio Mondiale (DRM) Emergency Warning Functionality (EWF).

– Annex 5B: HD Radio Emergency Alert System.

– Annex 5C: U.S. Emergency Alert System (EAS).

– Annex 5D: U.S. Mobile EAS for ATSC Mobile DTV.

– Annex 5E: BBC Media Action - Use of new broadcasting technologies.

6 Collaboration between broadcasting organisations in emergency situations

Broadcasters in most cities have developed coordination networks that allow stations to share limited microwave channels for news gathering. These same networks are used during emergencies to pool feed coverage to all stations and obtain the most efficiency from the microwave band for news gathering. Additionally, stations in overlapping markets routinely share video coverage and many TV stations partner with radio stations and allow them to rebroadcast their TV audio over radio, in order to reach citizens who are listening on battery-powered radios. These are usually people who have lost power and must rely on car or portable radios for news and information.

The Communicating with Disaster Affected Communities (CDAC) Network (www.cdacnetwork.org) is a London-based network of UN agencies, international Non-Governmental Organisations (NGOs) and media development organisations that is committed to the development of communication with disaster affected communities.

BBC Media Action is a founder member of this organisation, which was created in 2009. CDAC works closely with the UN Office for the Coordination of Humanitarian Affairs (OCHA), and the Red Cross/Red Crescent movement to promote the systematic use of two-way communication with disaster affected communities in all humanitarian emergencies.

Broadcasting plays a fundamental role in such communications, alongside mobile telecommunications and traditional face-to-face communication activities.

Four media development agencies which specialise in using information transmitted by radio as a form of aid in humanitarian emergencies are currently members of CDAC. These are:

– BBC Media Action (http://www.bbc.co.uk/mediaaction/).

– Internews (http://internews.org/), a US-based media development organisation.

– First Response Radio (http://firstresponseradio.org/), a global specialist in setting up emergency radio services serving disaster-affected communities.

– International Media Support (IMS) (http://www.i-m-s.dk/), a Danish media development organisation. It runs Radio Ergo, (www.radioergo.org), a Nairobi-based humanitarian radio station serving Somalia.

The Thomson Reuters Foundation (http://www.trust.org/), the charitable arm of the Reuters news agency, which operates the humanitarian information service Alternet (http://www.trust.org/?show=alertnethumanitarian), is also a full member of CDAC.

The UK Department for International Development (DFID) now looks to CDAC's member agencies to coordinate the communications response to a breaking emergency, before they apply for funding to execute such activities through the UK DFID's Rapid Response Facility.

In August 2013, CDAC was in advanced negotiations to secure core funding from the UK DFID which would allow the organisation to play a more direct role in coordinating the communications response to major humanitarian emergencies in the coming years.

In some countries, ad-hoc bodies have already been formed at the country level to coordinate government and aid agency communications with affected communities during a humanitarian emergency. These initiatives are often off-shoots of humanitarian coordination bodies that have been formed to coordinate all development and emergency response activity in the country.

Typically, such a forum brings together the main government departments involved in emergency response activities, UN agencies, international and local NGOs, the Red Cross/Red Crescent movement and leading players in the local media. They may also include international donors and the country's main telecommunications operators.

In Nepal, BBC Media Action leads the Communications Sub-Group of one such body called the Nepal Risk Reduction Consortium (NRRC) (http://un.org.np/coordinationmechanism/nrrc/communicationgroup). The NRRC focuses mainly on disaster preparedness, but its communications activities extend into disaster response.

In Bangladesh, BBC Media Action is helping to form a permanent working group to coordinate two-way communication with the affected population in humanitarian emergencies. This body, called Communicating with Communities in Emergencies, includes representatives of the Ministry of Disaster Management, UN agencies, international and local NGOs, the Bangladesh Red Crescent Society and BBC Media Action. In August 2013 it was still negotiating the participation of leading Bangladeshi media organisations and mobile telecoms operators.

Bilateral cooperation between different media development organisations in humanitarian emergencies is also becoming more common. Between 2010 and 2012, BBC Media Action and Internews worked together as partners in the infoasaid project. Infoasaid (www.infoasaid.org) promoted the adoption of two-way communication between aid agencies and disaster-affected populations. It set up several pilot projects in East Africa with partners that included ActionAid, World Vision, Save the Children and the International Rescue Committee (IRC). Most of these pilot projects involved partnerships with local radio stations in Kenya and Somalia, for the production and broadcast of special disaster relief programming.

In August 2013, BBC Media Action and Internews were discussing a new partnership for humanitarian broadcasting in South Sudan. Both countries already have offices in the capital Juba and a portfolio of media development activities in the country focussed on radio.

The following Annexes provide further examples of collaboration between broadcasting organisations in emergency situations:

– Annex 6A: Louisiana Public Broadcasting - Collaboration between broadcasting organisations.

– Annex 6B: International Association of Broadcasting - Cooperation between broadcasters and government entities.

7 Public service efforts by broadcasters associated with emergency and disaster situations

Over the past decade, there have been numerous examples of international, state, private and NGO-sponsored broadcasters running special programming for people affected by humanitarian emergencies. In many cases, such initiatives have taken the form of a spontaneous reaction to a rapid-onset emergency. Relatively few broadcasting organisations actively plan for such contingencies.

Internews has been active in setting up local radio stations to serve people affected by humanitarian disasters. It has worked particularly with communities affected by conflict in countries such as Afghanistan, South Sudan, Sudan, Central African Republic, Somalia and Chad.

First Response Radio specialises in the rapid deployment of suitcase radios to communities suffering the impact of natural disasters. It was the first organisation to get a radio station back on air in Banda Aceh in Indonesia after the 2004 Indian Ocean tsunami.

The emergency response role of Danish-based IMS mainly consists of supporting local media in countries affected by conflict. IMS runs a humanitarian radio service for Somalia, called Radio Ergo (http://www.radioergo.org/). This broadcasts on short wave from studios in Nairobi and also distributes its programmes to Somali FM partner stations for re-broadcast.

Many other international media development NGOs, such as Free Press Unlimited, IREX, Equal Access, Search for Common Ground and the Institute of War and Peace Reporting, also provide humanitarian programming to disaster-affected communities, particularly those affected by conflict. However, they mostly operate long-term projects. They have not so far developed a niche role as rapid responders to a breaking crisis.

The radio networks set up by the UN Department of Peacekeeping Operations, in countries where UN peacekeeping forces have been deployed, generally carry humanitarian programming for disaster-affected communities as a core part of their output. Radio Okapi (http://radiookapi.net/) in the Democratic Republic of Congo (DRC) and Radio Miraya (http://www.radiomiraya.org/) in South Sudan, both of which were established in partnership with the Swiss-based Foundation Hirondelle (https://www.hirondelle.org/), are prominent examples of well-established UN radio stations that carry a large amount of humanitarian content in their broadcasts.

The following Annex provides further examples of public service efforts by broadcasters associated with emergency and disaster situations:

– Annex 7A: BBC Media Action - Public service efforts by broadcasters.

8 The role of international broadcasting for disaster relief

The most effective dissemination of information to the disaster stricken population is multi-platform, but radio is the most dominant technology, especially in early post-disaster situations. The specific technology of international broadcasting on shortwave is disaster-resilient, because the transmission facilities are well removed from the affected region.

Annex 8A provides further information on the importance of terrestrial radio in international broadcasting. Annex 8B gives further details about the International Radio for Disaster Relief (IRDR) project, conceived by the HFCC - International Broadcasting Delivery (HFCC). The project's ultimate aim is to identify frequency channels in each shortwave band, which the global coordination community will reserve for disaster mitigation broadcasting:

– Annex 8A: HFCC - The importance of terrestrial radio in international broadcasting.

– Annex 8B: HFCC - The International Radio for Disaster Relief project.

9 Relevant ITU-R Recommendations, Reports and Resolutions

The following ITU Recommendations and Reports provide further guidance:

– Recommendation ITU-R BT.1774 *Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief.*

– Resolution 647 (WRC-07) *Spectrum management guidelines for emergency and disaster relief radiocommunication.*

10 Case Studies

The following Annexes provide examples highlighting the advantages of radio and television broadcasting in public disasters and emergencies:

– Annex 10A: Impact of Hurricane Sandy on a U.S. Cable Television Operator.
– Annex 10B: Information on Disaster Coverage and Public Service by U.S. Broadcasters.
– Annex 10C: First Response Radio India deploys to Uttarakhand floods.
– Annex 10D: First Response Indonesia in Aceh earthquake area.
– Annex 10E: First Response India - 2008 Bihar flood response.
– Annex 10F: Emergency broadcasting to protect the public in Japan.
– Annex 10G: Radio Ishinomaki - Ishinomaki City, Miyagi, Japan.
– Annex 10H: Video links.

11 Conclusions

As evidenced in this report, terrestrial radio and television broadcasting is a critically important medium for information dissemination to the public in times of emergencies. The intrinsic one-to-many broadcast architecture and the geographic diversity of terrestrial broadcast transmission facilities provide high service reliability during crises of all types. The professional compilation and analysis of information that is emblematic of broadcast journalism provides high quality information available when and where it is most needed. Fixed, mobile and portable terrestrial broadcast receivers are readily available, inexpensive and virtually ubiquitous in most societies.

In many regions, radio and television broadcasters and government authorities collaborate in ensuring highly reliable services during emergencies, via the availability of back-up equipment and supplies, as well as standardised procedures and checklists intended to ensure a high degree of emergency preparedness and continued information flow to the public. In times of crisis and disaster, or wherever mass dissemination of information is required instantaneously, radio and television broadcasting is unparalleled in its ability to effectively reach affected populations with relevant information-rich media content.

The case studies in this report represent only a few of countless examples that attest to the global importance of terrestrial broadcasting, helping to protect and save lives during local, national and international emergencies.

ANNEX 2A

Australian Broadcasting Corporation

The Australian Broadcasting Corporation has broadcast on radio, reports of all major disasters in Australia since its establishment in 1932, often to great acclaim, particularly when its coverage has been in isolated places, or where its staff had been the sole providers of information during catastrophic events. Emergencies had been covered as news - content that was interesting, important and useful - that was usually describing what was happening and why. Often this kind of news would roll for hours, and over the full length of a broadcast listeners would come to understand the full impact of what had occurred, and how they should respond. TV covered emergencies as news broadcasts. The digital age brought new platforms but similar content.

In January 1997, a new ABC Program Director at Local Radio in Melbourne, Victoria, Ian Mannix, changed the nature of this broadcasting, when arranging coverage of a massive bushfire which was started by an arsonist in the nearby Dandenong Ranges. The fires burnt aggressively for days. Three people died and forty homes were destroyed.

Mr Mannix, who had been a senior journalist in the ABC News and Current Affairs division for the previous decade, was unfamiliar with the nature of bushfire response. He contacted the Victorian Country Fire Authority and asked for advice on what to say to the listeners "who were confronted by flames". The Country Fire Authority had no experience in providing warnings. They had never written a warning for the person at risk.

With an offer by Mr Mannix that 774 ABC Local Radio Melbourne would broadcast the warning repeatedly and for as long as necessary, the Country Fire Authority Community Education Manager, Suisan McKenzie, wrote the first warning to be broadcast on radio. Surprisingly, and in a move that challenged the radio broadcasters, the warnings advised the residents to "stay at home".

This was a confronting message for the broadcasters and the community, but was based on the research at the time that people would be safe in their homes while a bushfire passed over, and they could then run outside to the already burnt area and survive. It was preferable to trying to flee in a car, or worse, on foot, into smoke and uncertainty. During the devastating 1983 Ash Wednesday bushfires in southern Australia, more than half of all deaths occurred when people fled their homes.

The warnings written by Ms McKenzie that day were long, full of jargon and contained no context and little understanding of the size of the threat. Over the next eight years ABC Local Radio Victoria worked with the Country Fire Authority to refine the process, and "emergency broadcasting" was born. The guidelines included agreeing to issue the warnings at set intervals, creating a distinctive alert sound to precede them on air; and new formats were created which resulted in two types of warning being created. A "bushfire alert" was read every 30 minutes, referring to a lower level bushfire where the threat was some hours away, and the other, an "urgent threat message" was read every 15 minutes referring to a much more serious and immediate threat.

The listeners came to rely on the warnings for early advice about an impending threat. Emergency broadcasting was implemented numerous times throughout summers in Victoria, which is the world's most bushfire prone region, from 1997-2006. But the system was confined to Victoria, despite Canberra suffering a major fire in 2005 that burnt 500 homes and killed six people; and in South Australia on the Eyre Peninsula nine people died when the fastest moving bushfires in Australia's history were experienced in that state.

In February 2009 Victoria suffered under a dozen bushfires, which killed 173 people, injured 2500 more and destroyed or damaged ten thousand properties. The broadcasting on the day was dominated by the unfolding catastrophe as ABC Local Radio stations issued 12 simultaneous "Urgent threat messages" and more than ten "advices".

The process of gathering information from the fire ground, sending the information to a media office at fire headquarters, having them re-written and checked, and then passed to the radio broadcasters, was overwhelmed during the day and eventually the warning system collapsed for 24 hours. ABC Local Radio continued rolling coverage and used interviews with emergency agencies to give people they could use to respond to the event.

The resulting 2009 "Black Saturday" Bushfires Royal Commission called for the warning system to be enhanced; for it to be taken up by commercial radio stations and TV, and encouraged all fire agencies around Australia to implement the same system. A new warning system was created: "The Australian Bushfire Warning Framework". It included three warning levels: "Advice", (the authorities have confirmed a fire has started), "Watch and Act" (the authorities have confirmed the fire poses a threat to the community), and "Emergency Warning" (the authorities have confirmed there is an immediate threat to the community which must take action to survive). The system has since been revised to include all State Emergency Services agencies which respond to floods and storms.

The ABC has agreed it will issue these warnings whenever and wherever required, and will do so at 30 minute intervals for "Watch and Act" messages, and 15 minute intervals for "Emergency warnings". The principle behind the repetition is that the latest information will be updated and the listener can leave the radio, deal with the event and prepare, and return to the radio at a set time to hear the next latest information and warning. The public in Australia has now come to expect this level of service from the national broadcaster.

In order to ensure that the ABC staff can meet the expectations of the public, training and broadcast guidelines were created to ensure consistency across the country. The development is now under the direction of Ian Mannix, the Manager, Emergency Broadcasting and Community Development.

The guidelines for broadcasters are contained in a training booklet and are issued to all broadcasters and available in all studios:

– The warnings will be based on the urgency of the threat and the number of people involved.
– They will be repeated at 15, 30 or 60 minute intervals.
– All will be preceded by the distinctive "ABC Emergency alert" sound.
– Staff will receive an emergency broadcasting induction and annual training.
– ABC staff will work in partnership with emergency agencies to ensure the system is working well and reviewed annually.
– Any changes required by ABC staff to the wording of the warning will be referred to the agency for discussion first.

This has provided a reliable platform for all emergency agencies and the Bureau of Meteorology to issue all warnings for all hazards at any time of the day or night. The reliability however can depend on staffing and infrastructure. The ABC has committed itself to understanding the hazard environment to ensure it can forecast times when staff might be needed to issue warnings, and that at other times when an emergency comes by surprise, mechanisms are in place to ensure rapid response.

The ABC transmitters are owned by a private company, which has entered into an agreement with the ABC to further enhance the reliability of the service. The ABC advises the company that it is broadcasting warnings in a region, and works directly with its senior executives to ensure transmitters are well prepared to carry warning broadcasts. This can include:

– Switching from external to generator power to ensure that if the power goes out due to the emergency, the sudden trip will not result in loss of transmission.

– Re-tuning transmitters to a stand-by satellite frequency should the local telecommunications link be at risk, for example during a cyclone.

– Refuelling the generators out of normal maintenance time to ensure the transmitters can run on the generator for extended periods.

The broadcast company has also flown stand-by transmitters to various locations where emergency broadcasts are occurring in case one of the transmitters is isolated or put out of action.

The ABC believes it is the only broadcast organisation in the world which issues warnings in partnership with emergency agencies in this way. The warnings are now part of the emergency landscape throughout Australia. The ABC has used the guidelines to direct warnings online and on TV, and will continue to work with emergency agencies to improve the service as new technology develops more effective ways of issuing warnings to the community to help keep them safe and recover.

ANNEX 2B

First Response Radio

Introduction

First Response Radio delivers critical information, via radio, to affected communities in the immediate aftermath of disasters. http://firstresponseradio.org/

First Response Radio is a network of radio broadcasters, NGOs and government partners. Our members have been working in disaster areas since the Tsunami of 2004, providing critical information via radio, as aid.

In times of disaster, radio not only saves lives, it can also bring hope and critical information to the affected community. When the 2004 tsunami struck Banda Aceh, Indonesia all the radio and TV stations went off the air. During the 2005 South Asian earthquake the only radio station near the epicentre lost its tower and went off the air. In times like these, people are in desperate need of news, information on how to get to safety and how to survive. The unfortunate trend seen recently is that when radio is so important, many times it goes off the air and does not come back until well after the emergency is over. A trained team or Rapid Response Radio Unit is able to begin broadcasting within 72 hours, sending out critical information.

After the Asian Tsunami it took several weeks for any radio station to get back on the air. Our first Rapid Response Radio Unit took 4 weeks to get on air – a good effort, but which highlighted the obvious need for the radio community to learn how to respond faster. Following the lead of humanitarian and rescue organizations, First Response Radio has taken the same challenge; the goal is to have a radio station on the air within 72 hours of a disaster. To meet this goal requires preparation in several areas: equipment, programming, training and practice.

Since 2004 First Response has responded to the following disasters:

– 2013: Central Aceh, earthquake, Indonesia
– 2012: Uttarakhand flooding, India
– 2012: Assam Flooding, India
– 2010: Mt Merapi Volcano, Indonesia
– 2010: Pakistan flooding
– 2009: Pangasinan flooding, Philippines
– 2009: South India flooding
– 2009: Earthquake, Padang, Sumatra, Indonesia
– 2008: Flooding, Bihar, India
– 2005: Earthquake, Northern Pakistan
– 2004: Tsunami, Banda Aceh, Indonesia.

Equipment

The "Radio in a Suitcase" kit is described below. We find it helpful to have the studio and transmission equipment in separate cases. This keeps the weight of each suitcase below 23kg, and also allows for deployment of just the pieces that are needed in any given disaster.

With the 600W FM transmitter and single dipole antenna mounted at 20 m, we find that the coverage is up to 15 or 20 Km. If the station is positioned in the centre of the affected community, this can reach a very large group and would, for example adequately serve the 500,000 refugees in Dadaab, Kenya.

Some other "Radio-in-a-Box" kits have all items in one box and cannot be easily transported. Airlines will refuse equipment over a certain weight and "all in one" box solutions cannot be checked as luggage, but must be sent as air freight. While good equipment is essential, we also learned it was the easiest problem to solve and next we looked into critical information and training.

Rapid Response Radio Unit - "Radio in a Suitcase"

Standard equipment kit includes the following:

Studio in a suitcase (20kg):

– Everything needed to record or broadcast live radio programs

– 7 channel mixer, CD player, digital recorder and laptop (play-out and recording software included)

– Fits into standard wheeled Samsonite suitcase

– Includes spare laptop and extra field recorder.

600W FM transmitter (20kg):

– Packed in a rugged 4 rack unit wheeled Gator flight case

– Single dipole antenna and cables included in separate padded case

– Able to cover up to 20 km.

Optional equipment:

– 2kw Honda Generator.

Stockpile of Radios:

– 1000 wind-up radios

– Has AM/FM/SW bands

– Includes built-in flashlight.

Critical information

Information IS humanitarian aid. Fear grows in a vacuum of information.

"You did not distribute food, not clothes, nor any other materials to the flood victims, but what you have done for the flood victims is greater than others did (SMS message received by a First Response Radio team after the floods in Bihar)".

First Response Radio has developed the Critical Information Matrix to ensure they provide the right humanitarian information at the right time.

The first phase of a disaster is the most crucial for delivering life-saving information. This information needs to cover all the following UN cluster group categories: Disaster News, Shelter, Water, Sanitation & Hygiene, Food & Nutrition, Health (Physical and Mental), Protection, Livelihood and Education.

First Response Radio teams do not aim to remain for the long term. Usually they will stay on-air for about a month, in the emergency phase and into the second phase of the disaster.

Training

While Broadcasters are already skilled at their job, they need to learn to work within the humanitarian community to be truly effective. In the same way, government and humanitarian volunteers need to learn the basics of radio.

The training starts with a 5 day classroom-based workshop which combines background knowledge about radio with the unique environment experienced in disaster relief work. Participants, (from broadcast, NGO and government backgrounds) , are taught about making radio programmes specifically geared to disaster, about the phases of disaster and the effects it has on those involved. They are trained in setting up and using the "Radio in a Suitcase" equipment and advised about ways to stay safe in the field. The training is practical and hands-on. There will be daily homework and assignments where the participants put into practice what they have learned.

This is followed by a 3 day Field Trial when participants are taken to an area which has suffered a recent disaster. It is designed to provide students with an experience as close as possible to a real disaster, where they will produce live, disaster related radio for 72 hours.

First Response Radio training provides a team with the experience necessary to travel to a disaster area to set up a radio station and broadcast essential information to the affected community. Trained teams have the confidence and ability to work in field conditions and record radio messages that help provide critical information for a community that is recovering from a disaster/emergency.

Regulatory issues

Access to terrestrial broadcast licenses is required. For FM this would be a low power license up to 600W. In some countries, where community radio stations are common this can be an easy process – in other countries there is no process possible to get an FM license at short notice. Indonesia is very open and the Philippines National Telecommunications Commission has been very supportive to First Response Radio. In India a longer process is involved, but once we begin cooperating and negotiating with government ministries, then solutions tend to present themselves. USA and the UK both seem to have tight FM restrictions, so there is no possible route to get a short term or temporary license in a timely manner. The goal of the Rapid Response Radio unit is to get on the air in 72 hours, so we need to get a frequency cleared or approved in about 24 hours.

These negotiations need to be conducted at a country by country level, but it is our recommendation that the emergency licensing procedures be collected and shared amongst ITU member countries, even to provide awareness of the issues and possible solutions.

When First Response went to the Bihar floods in North India, we were not able to negotiate an FM license. In this case we used the SW radio bands. To begin with, our network partner used their normal frequency for North India and replaced the program with emergency programming. Many times this is not possible or additional air time is needed to adequately inform the public. In this case we used a SW broadcast broker to buy the airtime for us. The challenge then is to get a clear frequency coordinated at very short notice. Due to the importance of the content it is essential to have +/- 10 kHz clear at a minimum.

Key case studies

Every disaster is different, as shown by the wide range of responses below:

– Bihar, India 2008. SW radio, 1 hour/day for 6 weeks

– Padang, Indonesia 2009. FM Radio, on air within 5 days on community radio frequency. 24 hours a day, for two weeks

– Uttarkhand, India 2013. SW was on the air in less than 72 hours, before team went into the field

– Central Aceh Earthquake, July 2013. Radio distribution and support of local FM radio.

Coordination

Any broadcaster can provide helpful, critical information to their audience, if they know where to find the information and are coordinated with other agencies. First Response Radio has found it most helpful to join the Communicating with Disaster Affected Communities (CDAC) network that focuses on these issues. The CDAC network can connect media organizations and humanitarian agencies together.

Radio distribution

Sometimes people escape disaster and have taken their radios with them, but in most cases they will have lost most of their possessions. The assumption is that the humanitarian community will need to provide radios for the affected communities. We keep a stockpile of 1000 wind-up radios, but this is only enough to get started. In Haiti the US Army distributed 50,000 wind-up radios. There is a need for global and regional stockpiling of radios, ready for distribution. This is a task that should be shared between governments and NGO/humanitarian organizations. First Response has drafted radio distribution policies and guidelines.

Video Links:

http://youtu.be/_GCJGoySf3E - published on 15 August 2013.

A complete introduction to the world of First Response Radio and 72 hour disaster response, in 72 seconds.

http://youtu.be/F96UaXwhyGA - uploaded on 18 August 2011.

"Radio in the Ring of Fire" - a short documentary video about FIRST Response Indonesia's Rapid Response Radio Unit. This team deployed their "Radio in a Suitcase" station into the Sumatran Earthquake in Padang in October 2009.

http://youtu.be/b29Mi3ts1zE - CDAC Network preparedness workshop.

Mike Adams, FIRST Response Radio.

http://www.frontlinesms.com/2013/06/19/first-response-radio-life-saving-information-in-disaster-2/

Using FM radio and frontline SMS together, to allow listeners a way to feedback to the programs.

ANNEX 2C

BBC Media Action

BBC Media Action is the international development charity of the BBC. It works with media and communication to help transform people's lives. BBC Media Action works closely with the BBC World Service, but it is funded separately from the rest of the BBC. Like other international NGOs, BBC Media Action relies mainly on grants from donors to fund its projects. This paper represents the specific views of BBC Media Action. It does not speak for the BBC as a whole.

For the past 10 years BBC Media Action has engaged in initiatives that work with radio and television to provide useful and actionable information to people affected by humanitarian emergencies.

Broadcasting humanitarian information to communities affected by conflict requires a completely different approach to conventional news reporting. The latter usually takes the form of factual and analytical reporting of the conflict for audiences that are not directly affected by the crisis.

Lifeline reporting, on the other hand does not seek to report on the conflict per se. It does not engage in the gathering of conventional hard news. Instead, Lifeline broadcasting focuses on providing life-saving information and psychological support for non-combatants whose lives have been disrupted or put at risk by the fighting. It is non-partisan and politically neutral and forms part of the humanitarian response to the disaster.

All Lifeline broadcasts produced or supported by BBC Media Action respect the four humanitarian principles defined by the UN General Assembly in its Resolutions 46/182 of 1991 and 58/114 of 2004:

– Humanity - Human suffering must be addressed wherever it is found. The purpose of humanitarian action is to protect life and health and ensure respect for human beings.

– Neutrality - Humanitarian actors must not take sides in hostilities or engage in controversies of a political, racial, religious or ideological nature.

– Impartiality - Humanitarian action must be carried out on the basis of need alone, giving priority to the most urgent cases of distress and making no distinctions on the basis of nationality, race, gender, religious belief, class or political opinions.

– Operational Independence - Humanitarian action must be autonomous from the political, economic, military or other objectives that any actor may hold with regard to areas where humanitarian action is being implemented.

Lifeline broadcasting should never take sides. Its purpose is not to give information about the progress of the conflict, such as news about military deployments and the outcome of battles.

Instead, Lifeline broadcasting should provide useful information that helps the affected non-combatant civilian population people to survive and stay safe. It could include the following types of conflict-related information:

– The identification of safe areas and information about the safest routes to reach them

– The promotion of safe practices, such as how to avoid injury by mines and unexploded ammunition and how to report any explosives that are detected.

Most Lifeline broadcasting to disaster-affected people in conflict zones deals with information and advice about the same basic human needs that also feature heavily in natural disasters; how to obtain, food, water, shelter and medical treatment, how to stay healthy by observing proper hygiene and sanitation, how to trace missing family members, how to cope with the trauma of the disruption to normal life and how to protect yourself from personal threats, such as sexual attack.

BBC Media Action Lifeline programming also respects the "Do no harm principle". This states that when providing assistance, an aid responder must be careful not to inadvertently cause harm to the intended beneficiaries or to other vulnerable groups by their actions.

Reporters of conventional news may be seen as partisan or hostile by participants in the conflict and may be denied access. They may even become deliberate targets of attack. Journalists who contribute to Lifeline programming run similar risks, since in practice combatants are unlikely to distinguish between them and other reporters.

BBC Media Action staff that operate in conflict zones are required to undergo Hostile Environment and First Aid Training (HEFAT) before their deployment to maximise their safety in the field. They are usually equipped with satellite telecommunications equipment, such as satellite phones and satellite data modems, to help them maintain contact with their base if normal telecoms links are not available.

Providing timely, relevant and practical information to people who are confused and demoralised by the impact of a crisis on their lives, is in itself a useful form of aid. Broadcast information is particularly useful in situations where physical access is difficult and aid responders may take several days or weeks to reach affected communities. Appropriate information and advice, delivered in a user-friendly way, can help people to cope with the crisis and mitigate the threats that it poses to their wellbeing until physical help arrives. Direct communication via radio or television also helps to reduce the sense of isolation and helplessness that crisis-affected communities experience.

Once aid has begun to arrive, Lifeline programming can tell the affected community how and where to access the help that is available. It can explain how to register to receive aid and where and when distributions will take place. Lifeline programming can also publicise other important services for the affected community. It explains how families which have been split up can contact tracing services to find their loved ones. It can alert women to services that help them deal with sexual harassment and other protection issues. It can explain how people can keep themselves safe from diseases and where they can access medical services.

Radio and television can help aid responders to manage the expectations of the people they are seeking to assist. For example, if a food distribution in certain towns and villages has been delayed by landslides blocking a road or by difficulties in the supply chain, Lifeline broadcasting can explain to the intended recipients why the distribution has been delayed. It can also advise when the delayed distribution is now expected to take place. Without such explanation and reassurance, the affected communities might feel abandoned and frustrated and believe themselves to be the target of deliberate discrimination or neglect. This could lead to ill-will against aid responders and even attacks on aid workers and supply convoys. Such incidents occurred during the 2010 floods in Pakistan. There were several cases of food trucks being stopped and looted on their way to distribution points by villagers from other communities. People resorted to this action because they had not yet received any aid, or any assurances about when they might expect aid to arrive.

BBC Media Action believes that communication with disaster-affected communities should be a two-way process, so, wherever possible, our Lifeline programmes are interactive. They do not just give useful information. They also enable the affected community to make its own voice heard. Radio and television can give crisis-hit people a platform to state their views, express their concerns and give useful information to aid providers. Giving affected communities a voice through Lifeline programming can empower these often demoralised communities and give them a sense of dignity. It can boost the self-confidence of those who are suffering and motivate them to take action to help themselves. Two-way communication becomes particularly immediate and powerful when people can communicate with Lifeline broadcasters via the mobile telecommunications network.

Aid responders can benefit from listening to the concerns of the affected population, articulated through the media. The information received can help aid agencies to identify gaps in the humanitarian response that need to be addressed. It can also highlight points of misunderstanding that should be resolved if the aid operation is to run smoothly. Feedback from the affected community enables aid responders to adjust their operations in order meet the needs of the assisted population more effectively.

Finally, giving the affected community a voice also helps to make aid responders more accountable to those they are trying to assist. Lifeline broadcasting can help the affected community to register complaints. It can help aid agencies to communicate what is being done to address any complaints that are raised. Sometimes aid workers are accused of selling aid items which should be distributed free of charge on the basis of need. Lifeline programming can make clear that all aid is provided free of charge on the basis of need. It can also advise people how to denounce any perceived irregularities and provide reassurances that wrongdoers have been disciplined.

In the longer term, the information provided and the views expressed by the affected population can help policy makers to adjust their planning for future humanitarian responses.

Since 2003, BBC Media Action has produced and broadcast Lifeline radio programmes for audiences ranging from civilians affected by conflict in Iraq, Somalia and Sudan, to communities affected by floods in Pakistan, cyclone damage in Burma and Bangladesh and the devastation wrought by a massive earthquake in Haiti.

Wherever possible, the Lifeline programmes are interactive, giving listeners a chance to ask questions and have them answered on air. They also provide a platform for people to express their views about the difficult situation they are facing.

BBC Media Action's Lifeline programming has its roots in the emergency radio broadcasts for disaster-affected communities produced by the BBC World Service in response to major humanitarian crises since 1994. This kind of special programming was first broadcast by the BBC World Service on short wave to help people in the Great Lakes region of Africa affected by the genocide in Rwanda.

BBC Media Action - which was formerly known as BBC World Service Trust - was created as an autonomous organisation in 1999. Since then, it has often worked closely with the BBC World Service - particularly its 28 local language services - to create and deliver Lifeline programming.

Why radio?

Radio is usually the best way to reach people affected by a rapid-onset humanitarian crisis, even if the target audience relies on television or other media as its main source of news and information in normal times.

Television distributed by terrestrial broadcast, cable or satellite, is often the most widely used source of news and information before a crisis breaks. It is an excellent channel for helping people to prepare for a disaster and become more resilient. But radio is a more robust and reliable channel of communication once a crisis hits. Following a disaster, radio is more likely to continue functioning and reaching its audience than any other media. Radio is also more effective as a medium for communicating with remote rural communities which have little or no access to television, mobile telecoms or the internet.

Television is difficult to access if the electricity supply has been disrupted or if the disaster-affected community has been displaced. When people leave home in a hurry they are unlikely to take a heavy television set with them. They are much more likely take a small transistor radio, which can run on batteries, or a mobile phone. Many mobile phones can be used to listen to FM radio broadcasts with the aid of earphones. The earphone cable acts as an aerial for the built-in radio. In many Asian countries, such as Pakistan, Nepal and Bangladesh, a large proportion of regular radio listeners routinely tune in to FM stations on their mobiles in normal times, especially when they are on the move.

Radio is also more resilient to the disruption of normal telecommunications networks than the internet. The latter relies on sophisticated communication networks which often fail in an emergency. Furthermore, in most developing countries, internet usage is still concentrated amongst the educated and relatively affluent urban elite. It can only be accessed easily by educated people who are literate in a language used on computer keyboards and who know how to use a computer or smart phone. The internet has a much lower penetration rate amongst the urban poor and often fails completely to reach remote rural communities. Yet these marginalised segments of the population, which often have low literacy rates, are invariably the people who are hit hardest by humanitarian emergencies. Information disseminated via the internet is unlikely to reach them directly.

Internet access across the world continues to develop, but for now, its reach among the communities that are most vulnerable to disaster is limited. Furthermore, in the immediate aftermath of a disaster, the internet infrastructure is more likely to suffer damage and dislocation than the studios and transmitters of broadcasters.

Audience surveys conducted by the BBC consistently show that people prefer to listen to radio on FM. This gives better sound quality than medium or short wave. Today, more than half the regular listeners to the BBC World Service and its 28 language services tune in to BBC radio programmes on FM. The BBC has its own FM relay masts in many large cities. In other cities and in many smaller towns and rural areas radio audiences listen to BBC programmes relayed on FM by local partner stations. These relay partners range in size from small community radio stations to national broadcasters with a nationwide network of relay transmitters.

The number of people who listen to the BBC's international broadcasts on FM has increased by 5% to 82.3 million in the three years to mid-2013, according to BBC audience survey data. However, the global short wave audience of the BBC declined by 26% to 62.7 million over the same period.

The BBC Swahili Service no longer broadcasts on short wave at all. Today it reaches its 17 million regular listeners in East Africa exclusively on FM.

BBC World Service radio audiences by channel in 2013

BBC World Service radio – all languages	Audience total	Audience percentage
All radio channels	144.8 million	100%
FM (including relay partners)	82.3 million	57%
Medium Wave	14.8 million	10%
Short Wave	62.7 million	43%
Internet	830,000	0.6%

Source: BBC Global News estimates based on audience survey data.

NB The percentage audience shares do not add up to 100 because some listeners tune in to the BBC on more than one channel.

People generally prefer to listen to radio programmes broadcast in their own language that focus on issues of immediate relevance to the environment in which they live. Broadcasters which offer this option are usually preferred over those which offer programming that is broader in focus and delivered in a second language in which the audience is less fluent. In Nigeria, for instance, where English is the official language of government and business, far more people listen to the BBC Hausa service than to the BBC's Africa Service in English. According to BBC audience survey data, 6.9 million people listened regularly to the BBC in English in Nigeria in 2013, whereas 19.5 million tuned in to the BBC Hausa Service. Hausa is the main language spoken in northern Nigeria.

The preference for locally relevant information delivered in local languages is especially strong at times of crisis. People need practical information that they can use immediately to mitigate risks and access the services of aid providers in their immediate vicinity.

Disaster-affected communities need to know rapidly where they can obtain food, clean water, shelter and medical services. They also need advice on how to stay as safe as possible in their local environment. Such information is most valuable when it is local and specific in nature, rather than national and generic. For example, a local radio station can give detailed information about which health centres and hospitals in the district are still functioning and where local farmers can go to get seeds and tools. This sort of detailed local information is beyond the scope of a national broadcaster to deal with.

Lifeline Programmes therefore attract the most attentive audiences and have the greatest impact when they are broadcast on FM and contain a large amount of specific local information.

Humanitarian crises usually affect certain parts of a country rather than its entire population. Wherever possible, BBC Media Action supports the production of Lifeline programming that is produced locally within the crisis zone and is tailored to meet the needs of crisis-affected people of the surrounding area.

Increasingly, we are helping partner radio stations with significant audiences in the crisis zone to produce their own Lifeline programmes adapted to local needs.

In 2013, BBC Media Action adopted this local and collaborative approach to Lifeline programming in Bangladesh and Nepal. In Bangladesh we helped two community radio stations launch a daily Lifeline programme in Barguna district, a coastal area which was heavily damaged by Cyclone Mahasen in May. In Nepal, in June and July, we helped three radio stations in Kailali district to

produce special programmes to help the local population deal with floods caused by intense monsoon rainfall in the Himalayas.

This focus on helping local radio stations to produce their own Lifeline programming is relatively new. It reflects the recent creation of capacity within selected BBC Media Action country offices to provide this kind of support.

Previously, BBC Media Action focused mainly on producing Lifeline programmes in-house for broadcasting to an entire country, even though only part of that country might have been affected by a humanitarian emergency. Typically, these Lifeline programmes were broadcast by one of the BBC 28 language services. This guaranteed the programmes a large audience in the country concerned. However, this audience did not necessarily include a large proportion of the crisis-affected population. To remedy this situation, the Lifeline programmes were often offered to other partner stations for rebroadcast.

This national approach, in partnership with the BBC language services, remains useful when disaster strikes an entire country, as during the Pakistan floods of 2010. On that occasion, the BBC Urdu and Pashto services ran three daily Lifeline bulletins to meet the information needs of those affected by the flooding, with support from BBC Media Action.

Sometimes, beaming Lifeline programming into a country from abroad on short wave is the only feasible way of getting vital information to the disaster-affected population quickly. This situation typically arises when direct access to radio stations within the disaster-affected country is difficult or impossible.

This was the case in Myanmar after Cyclone Nargis devasted southern coastal areas of the country in 2008. The BBC Burmese service responded to the crisis by producing a series of five-minute bulletins on humanitarian topics. These were beamed into the country on short wave, but were not relayed by local radio stations within Burma. These were all state-controlled at the time and the Burmese government was not willing to relay programming produced by the BBC. However, these short wave broadcasts still managed to reach a large audience within Burma, including many of those affected by the cyclone. The BBC Burmese service estimated that it had a regular audience of 8.3 million people in the country at that time. The government of Myanmar has since begun to liberalise access to the air waves as it has embraced a process of democratisation. This should make it easier for BBC Media Action to produce and broadcast Lifeline programming in partnership with local radio stations in the event of future emergencies. Burma is one of the countries where BBC Media Action plans to roll out Preparation for Lifeline activities in 2014.

The increasing geographic reach of mobile networks in developing countries and high levels of mobile usage among all sectors of the population usually allow mobile telecommunications channels to be used in combination with radio to create an effective two-way system of communication.

The mobile revolution of the past decade has made it cheap and easy for radio listeners everywhere to call into phone-in programmes. If they are literate, they can also send SMS messages to a radio station to give information, ask questions and express opinions. According to the GSMA, the global association of mobile telecoms operators, 46% of the world's population owned a mobile phone in 2012. This figure was expected to rise to 53% in 2017, as a further 700 million people signed up as mobile subscribers, mostly in developing countries.

SMS messages, which are cheap and can be sent over networks operating at low levels of capacity, are particularly useful as a channel of feedback from the affected community in an emergency. If the mobile network has been damaged and its traffic carrying capacity has been reduced, SMS messages will often get through whereas voice calls will not. In the immediate aftermath of the

2010 earthquake in Chile, the government urged people to use SMS messages rather than voice calls to check up on their friends and relatives for this reason.

Interactive Voice Recognition (IVR) services make it easy for people who cannot read or write to phone an information line and listen to one or more recorded messages. IVR systems can also be configured to allow callers to leave a recorded message of their own.

IVR services also offer a feedback channel for radio audiences in Asian countries, such as Bangladesh and Nepal where the mobile network does not support the script of the alphabet used by the main national language. This technical obstacle makes it difficult for the general public in these countries to use SMS messages, even if they can read and write. Those who do use SMS messages in Bangladesh and Nepal are mostly well educated people who have learned English and are able to write in Latin script.

SMS and IVR systems can be useful channels of communication in their own right, but they are particularly powerful in an emergency when used in combination with radio. However, it should be noted that in many large countries with poor infrastructure and scattered populations, such as the Democratic Republic of Congo (DRC), Ethiopia and South Sudan, large swathes of the rural population still remain beyond the reach of a mobile signal. For them radio is especially important as a link with the outside world.

Challenges

Very little rigorous research has been undertaken so far to evaluate the impact of Lifeline programming on the overall effectiveness of aid delivery. This is partly because it is very difficult for media development organisations to undertake baseline research at the start of a rapid onset emergency. However, anecdotal evidence and after action reviews undertaken after some interventions indicate that Lifeline radio programming is capable of producing a significant impact.

In 2006, BBC Media Action launched a special Lifeline programme in Darfur Arabic for the conflict-affected population of Sudan's Darfur region. This daily programme, broadcast by the BBC World Service on short wave, also reached Darfuri refugees in Chad. One UNICEF officer in the Darfur town of Nyala noted that the child immunization rate at local camps for displaced people doubled after immunization had been promoted on the BBC Lifeline programme.

Today, wherever possible, BBC Media Action endeavours to produce Lifeline Programming that is:

– local in focus;

– broadcast on FM;

– interactive - allowing the target audience to feed-back information, questions and concerns, usually via the mobile telecoms network.

However, practical problems often arise which make this formula difficult or impossible to implement in practice.

Firstly, FM broadcasts have a very limited range. Many community radio stations operate low-powered transmitters with a broadcast range of less than 20 km. Even high-powered FM transmitters seldom reach further than 150 km. In mountainous areas, the range of FM broadcasts may be further limited by the nature of the terrain. And in sparsely populated areas, such as the arid and semi-arid zones of the Sahel and East Africa, many communities are simply beyond the reach of FM radio broadcasts.

Some technical solutions to these problems exist, but they have seldom been tried, partly because of contractual and regulatory issues.

These possible solutions include:

– Boosting the transmitter power of existing FM stations to increase their range - This process is slowly taking place in Bangladesh, where all 14 existing community radio stations have applied to increase their maximum permitted transmitter power from 100 to 250 watts. However, gaining official authorisation to increase transmitter power rapidly in the heat of a crisis remains a stiff procedural challenge in most developing countries.

– Installing relay transmitters for existing radio stations on mobile phone masts to open up new areas to FM coverage - Something similar has been done successfully in Liberia, where mobile networks began to construct base stations in the interior after the 1990-2003 civil war, at the same time as new community radio stations were being opened in rural areas. Many of the new community radio stations co-located with mobile base stations in order to mount their transmitters on the mobile tower and power their studios with the mobile operator's generator set at the base. This collaboration saved the community radio stations the expense of building their own mast and running their own generator. Mounting FM relay transmitters on mobile masts to extend the range of existing radio stations is a technique that has not so far been trialled in an emergency.

– Setting up new FM radio stations from scratch to cater for isolated communities that were previously without FM coverage, such as camps for refugees and displaced people - The media development agency Internews (www.internews.org) did this successfully in Chad from 2005 onwards. Internews established three new FM radio stations serving camps holding more than 200,000 refugees from Darfur and the host population of eastern Chad. More recently, Internews has also partnered with the Kenyan radio station Star FM, to set up a special Somali language radio station in the Dadaab complex of refugee camps in eastern Kenya near the Somali border. This station serves the information needs of Dadaab's 400,000 residents.

The development of suitcase radios has made it much cheaper and faster to set up new FM stations, from scratch very quickly. Suitcase radios are literally a mini radio studio, complete with a music library, audio mixing and editing equipment, microphones, headphones, a laptop and a mobile phone, packed into a suitcase. They are used in conjunction with a small generator set, a small low-powered transmitter and portable transmission antenna that can be mounted on a tall building or tree. This light and portable kit can be assembled and put on air in less than one hour. Even with a relatively low-powered transmitter, suitcase radios are able to broadcast programmes on FM over a radius of up to 15 km - enough to cover the urban area of a large city. Suitcase radios can either be used to launch a new emergency radio station, or to put existing broadcasters back on air rapidly if their installations have been damaged or destroyed. First Response Radio (http://firstresponseradio.org) successfully used a suitcase radio to re-launch local FM radio broadcasting in Banda Aceh in Indonesia after the surrounding coastal area was devastated by the 2004 tsunami, putting all local TV and radio stations off air. BBC Media Action has a suitcase radio on standby in Kathmandu to provide emergency broadcasting facilities, in partnership with the Nepalese government and local broadcasters in the event of catastrophic damage to the city following a major earthquake.

However, despite the technical feasibility of extending the broadcast reach of existing FM stations or setting up new FM stations from scratch, restrictive regulation, slow bureaucratic processes and political sensitivities can combine to make the upgrading of radio transmission capacity a slow and expensive process, even in the midst of a major humanitarian emergency. The only way to reach FM-deprived communities quickly by radio, in such instances is on medium wave or short wave broadcasts from existing radio stations based outside the disaster zone.

In states where broadcasting is tightly controlled by the government and in states affected by conflict, political considerations may prevent aid responders from using local FM or medium wave radio stations based inside the country for Lifeline programming.

In such cases, short wave broadcasts beamed in from abroad are still the most viable alternative. Audience research in Darfur by BBC Media Action and other broadcasters, such as the Sudan Radio Service (SRS), has shown that where FM broadcasts do not exist or are tightly controlled by the government, short wave broadcasters transmitting humanitarian information from abroad still manage to achieve significant audiences.

In Syria, where the United Nations estimates that more than 100,000 people have died in two years of conflict, humanitarian organisations were still struggling in August 2013 to establish a politically neutral radio or TV channel capable of reaching ordinary civilians affected by the fighting.

So far, the only alternative to short wave that had been tried inside Syria was internet radio. In June 2013, several media development and press freedom organisations, including Reporters Sans Frontieres (RSF), International Media Support (IMS) and Canal France International, helped to launch a Paris-based internet radio station staffed by Syrian journalists called Radio Rozana (www.rozana.fm), reaching people with access to the internet. Other media development organisations were meanwhile planning to set up radio stations to serve Syria refugee camps in neighbouring countries, particularly in Jordan.

Where disaster-affected communities do not have access to radio receiver sets, or where it is desirable to encourage the formation of collective listening groups to discuss the content of special programmes, it is possible to distribute solar/wind-up radios for collective listening. These radios are robust and do not require mains power or batteries to operate. The larger models are powerful enough to allow groups of up to 40 people to listen at the same time. Some of the latest models have a built-in record and playback facility. This allows programmes to be recorded live and played back to local audiences at other times that are more convenient for collective listening.

The purchase and distribution of several thousand solar/wind-up radios can be an expensive and time-consuming business. However, since 2003, USAID has distributed more than 200,000 solar/wind-up radio sets in South Sudan[1] and three adjacent areas of (North) Sudan that are affected by conflict. That amounts to approximately one radio set for every 50 people in the region.

In mid-2013 the UK's Department for International Development (DFID) told aid agencies accredited to apply for funding under its Rapid Response Facility[2] that it would seriously consider the possibility of establishing a stockpile of solar/wind-up radio sets for immediate distribution in a rapid-onset emergency.

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[1] USAID - Radio for a new nation http://www.usaid.gov/news-information/frontlines/democracy-human-rights-governance/radio-new-nation.

[2] Announced at meeting between DFID and RRF partners in London on June 6th 2013.

ANNEX 2D

British Broadcasting Corporation

The BBC has a very robust and resilient television network and geographically diverse play-out system. This includes reserve feeds and additional power sources at appropriate points within the infrastructure.

The BBC is unique as it has a UK wide broadcast network supported by both National and Local broadcast layers that in total cover the whole UK. At the local level, strong relationships have been formed between the emergency services and local BBC management. This relationship is developed on trust and ensures first responders can convey appropriate information that can be broadcast during an incident at a local level.

The BBC is in a unique position as it has a local news infrastructure that operates at a local level across the UK. It has been shown in times of crisis, be that localised flooding, school snow days etc., the public will turn to local programming, either through direct radio broadcasts or via the BBC local news websites.

The widespread use of FM radio, smartphones and DAB radios enable the BBC to quickly and easily reach large numbers. The expanding use of smartphones is a technology that will assist in getting emergency information to the public. The 4G standard does have the ability for a broadcast mode to be activated that could be used at times of crisis. However, the technical feasibility to do this would need to be discussed with mobile network operators.

The BBC is a public service broadcaster and has strong links with other UK broadcasters at all levels. If a major issue was to arise with another broadcaster (as a result of a disaster situation) that had public safety implications, this would be dealt with at a local level as long as it did not inhibit the ability to keep the BBC services on air, that are supplying the emergency information to the public as a result of the emergency situation.

The BBC has a 24/7 news channel broadcasting on all platforms in the UK. News is a single division across all the BBC and as such can feed into all BBC media outputs - TV, Radio and internet.

The BBC has strong links to the emergency services at the local level and a high degree of trust has been developed to ensure emergency information is conveyed as required during a disaster situation. Any additional information would be verified following the BBC's rigorous high quality journalistic codes and processes.

ANNEX 2E

Louisiana Public Broadcasting

Louisiana Educational Television Authority (LETA) has recently completed a $1.5 million dollar installation of a new emergency back-up generator and building-wide rotational inertia UPS and electrical upgrade at the LPB Broadcast Operations Centre Teleplex.

In addition, LETA has completed a $100,000 dollar installation of new emergency back-up generators at the Monroe and Lafayette transmitter sites, and the acquisition of a Satellite Uplink Truck to complement our state-wide fibre optic connection and our satellite transponder.

LETA has for its use for emergency communications the following:

– Fibre connection from the State Capitol to its Broadcast Operations Centre operated 24x7, 365 days of the year.

– Fibre connection from the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP).

– Live press conference capabilities from each location.

– LETA owns a satellite truck and our own transponder on SES 2 Transponder 5 for mobile uplinks.

– LETA has entered into a contract with GOHSEP for services.

– LETA signal is available via downlinks at news stations throughout the state

– Fibre or satellite to national media using VYVX first video two way fibre.

As a state agency, LETA works closely with the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) during all emergency situations. This is especially the case during the hurricane season, as we are in a high impact area being a Gulf state. We have produced public awareness promotional spots for television and radio audiences.

ANNEX 3A

BBC Media Action - Use of emergency equipment

BBC Media Action has a suitcase radio on standby in Nepal which can be used to set up an emergency radio station in conjunction with the government and local broadcasters in the event of a major earthquake in Kathmandu. Used in conjunction with a small petrol-driven generator, the equipment can be used to put an FM radio station on-air within hours of a disaster occurring. The idea is usually not to set up a completely new radio station, but to operate a special Lifeline radio service on the FM frequency and broadcasting licence of a local partner station that is no longer able to broadcast from its own studios and transmitters.

BBC Media Action is considering the deployment of suitcase radios as back-up equipment to provide emergency broadcasting facilities in other strategic locations where existing broadcasters may be shut down by the sudden collapse of infrastructure in an emergency. The existing suitcase radio in Kathmandu may also be deployed to emergencies in other Asian countries, if required

BBC Media Action also has several satellite telephones and Broadband Global Area Network (BGAN) satellite modems which can be deployed to support emergency broadcasting in locations where the local telecoms infrastructure has collapsed. They could provide emergency telephone and internet links for a radio station in a disaster zone that had no other telecommunications links to the outside world. The satellite phones are used exclusively for voice communication. The BGANs, which are similar in size and weight to a laptop computer, may be linked to a telephone handset to provide voice communication. However, in practice BBC Media Action mostly uses them to send and receive email messages. The BGANs may also be used to access websites on the internet. BBC Media Action has not so far deployed this equipment in support of a radio station transmitting Lifeline programming from inside a disaster zone, but it is ready to do so at any time should the need arise.

BBC Media Action has acquired small quantities of solar/wind-up radios to equip listening groups that form part of our outreach activities in non-emergency media projects. However, it does not keep a stock of solar/wind-up radios for distribution in humanitarian disasters. BBC Media Action is not geared up to handle sophisticated logistics. We would normally expect one of our aid agency partners to handle the transport and distribution of any radio sets acquired for distribution to the affected population following a disaster.

ANNEX 4A

BBC Media Action - Use of existing broadcast infrastructure

BBC Media Action often uses one of the short wave, medium wave and FM broadcasts by the BBC's 27 language services to transmit Lifeline programmes, if it broadcasts to a disaster-hit country where it commands a large local audience. Lifeline programmes distributed in this way are broadcast from the BBC's own short wave and FM transmitters and from the FM transmitters of partner radio stations which relay BBC World Service and BBC Media Action programmes.

BBC Media Action may also produce Lifeline programming which it does not transmit itself, but which is transmitted exclusively by other radio partners. For example, in 2010, BBC Media Action and the BBC World Service collaborated to produce a daily programme called *Konekyson Ayiti* for people affected by a major earthquake in Haiti. The programme was produced in Miami, Florida, in Haitian Creole in conjunction with staff on the ground in the Haitian capital Port-au-Prince. However, the programme was actually transmitted by Radio France International (RFI), which had a network of FM transmitters and a large regular audience in Haiti. This was an operation that was created from scratch in just four days. The BBC had not previously broadcast programming in Haitian Creole, but the scale of the emergency in Haiti justified a special initiative to produce and broadcast Lifeline programming for the affected population.

Collaboration in the production and broadcast of Lifeline programming should ideally involve a three way partnership between the government of the disaster-affected country, aid responders and broadcasting organisations. This helps to ensure that urgent issues are addressed properly and in a timely manner, and that the affected population receives clear and consistent information and advice. The government should normally be closely involved, since it is usually the first responder to any emergency and it coordinates relief operations.

In May 2013, BBC Media Action produced a series of cyclone warning announcements for radio and television in Bangladesh as Cyclone Mahasen swept towards the coastline, through the Bay of Bengal. These public service announcements, produced in just 48 hours were created on the basis of standard messages approved by the Ministry of Disaster Management. They were transmitted at frequent intervals by the state radio network Bangladesh Betar and the state television network BTV. These broadcasters lacked the specialist expertise in humanitarian broadcasting required to create effective and compelling public service announcements on their own.

Following the passage of Cyclone Mahasen, which proved less damaging than had been feared, BBC Media Action provided editorial and financial support for two local radio stations in one badly hit coastal district to produce Lifeline programming for the local population. The BBC Media Action office in Dhaka sent a team of journalists and humanitarian liaison staff to support the production of a daily 20-minute Lifeline programme, by two community radio stations in Barguna district, a densely populated area of small farming and fishing communities with a population of about 900,000. Working closely with government officials, the Bangladesh Red Crescent Society and aid agencies involved in the local relief effort, the BBC Media Action team enabled the two community radio stations, Radio Krishi and Lokobetar, to produce a daily magazine programme for cyclone survivors. This programme was sustained on air for a period of three weeks. It was produced by each station on alternate days and was broadcast every evening by both.

BBC Media Action support for local broadcasters to produce their own Lifeline programmes is likely to become increasingly common, since information of specifically local relevance is highly valued by people affected by humanitarian emergencies.

In June and July 2013, BBC Media Action Lifeline programming specialists in Nepal, trained local radio stations and aid responders in Kailali district in the northwest of the country, to produce early warning and disaster response programming to address frequent floods and landslides in the area. The training sessions brought together government officials, the police, local staff of the international NGO Mercy Corps, community leaders and journalists from three local FM stations in Kailali District. The training has enabled these partners to start transmitting Lifeline programmes spontaneously during future flood emergencies, without waiting for external assistance to do so.

ANNEX 5A

Digital Radio Mondiale (DRM) Emergency Warning Functionality (EWF)

Overview

Digital Radio Mondiale (DRM) supports and provides a fully integrated disaster and early warning service called Early Warning Functionality (EWF). The functionality described below is part of the DRM system specification, which is described in Recommendation ITU-R BS.1114-7 and is a European Telecommunications Standards Institute (ETSI) standard[3].

Task

The task of any early warning system is to inform the general public (and relevant authorities) about the impending disaster, with maximum reach and as quickly as possible, giving all relevant information.

Requirements

A typical early warning system has the following requirements:

– Send notification to maximum number of people in the affected areas as promptly as possible.

– Must cover large areas with very high reliability.

– Must work when common information services and local services fail.

– Make warnings available on devices that people use on a daily basis.

– Reach devices that are still operational if electricity fails (for example, radio sets and other devices with independent energy source).

– Be as un-intrusive as possible for daily use.

– Must be available and continuously on-air for the duration of the emergency.

– Control of emergency notification and immediate access by authorities.

– Make emergency message available to widest possible audience, including the visually or hearing impaired.

Summary

The DRM technology provides an ideal platform for delivering emergency warning services. EWF support is mandatory as described in the DRM minimum receiver requirements and second level receiver profile[4], with no need for special chipsets or extra adaptation for EWF. Everything needed for EWF is already in the receivers built according to the above specifications issued by the DRM Consortium. The DRM technology should be the major building block of a national emergency warning policy, providing full and continuous services as a last resort, potentially even from a remotely located transmitter site.

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[3] ES 201 980.

[4] See www.drm.org.

DRM building blocks - how EWF works

Broadcast functionality

The DRM system employs Alternative Frequency Signalling (AFS) which points the receiver to the emergency broadcast (even if the receiver is tuned to a different service ID or on a different frequency). It also employs emergency announcement signalling, where the receiver has general support for the emergency announcement feature and the current activation status of the tuned programme (can be sent in DRM signalling channel along with any audio or data transmission).

Receivers may check regularly for announcement activity even if turned off, as announcement information is carried in the signalling channel (no need to decode full DRM signal for checking; for battery-operated receivers proper engineering solutions are needed to make this feature available). If emergency announcement is active, DRM receivers switch automatically to the emergency broadcast. Emergency content is provided automatically in the form of audio and text information (see below for details).

Listener experience

Listeners receive emergency broadcasts comprising:

– Audio programme (provided in one language at a time).

– DRM text messages (short text lines appearing on screen, updated automatically every few seconds).

– Journaline[5] advanced text service (providing detailed instructions in multiple languages simultaneously).

When the alarm signal is triggered by the authorities

All running DRM receivers pick up the alarm signal from the currently tuned DRM service and switch to the emergency broadcast. All DRM receivers present the audio content of the emergency broadcast. DRM receivers with a text screen, in addition present text headlines (DRM text messages) plus detailed, multilingual information and instructions (Journaline) for instant and interactive look-up by the user. Receivers which are turned off may switch on automatically. This is a requirement to be defined by regulators for DRM receivers sold domestically.

The ability of receivers to check on emergency warning signals being active should be a general requirement for receiver manufacturers. Deploying DRM's multimedia capabilities (text messages, Journaline) allows additional facilities for audio impaired listeners[6] and allows listeners to be addressed in their own language.

As a result, target listeners of the EWF can receive detailed text information through Journaline, supporting multiple languages and scripts simultaneously in one single broadcast (see Figure 1), such as:

– The reason for the emergency warning.

– Instructions on what to do.

– Contact details for further information.

– List of affected areas.

– List of affected people/population (search messages etc.).

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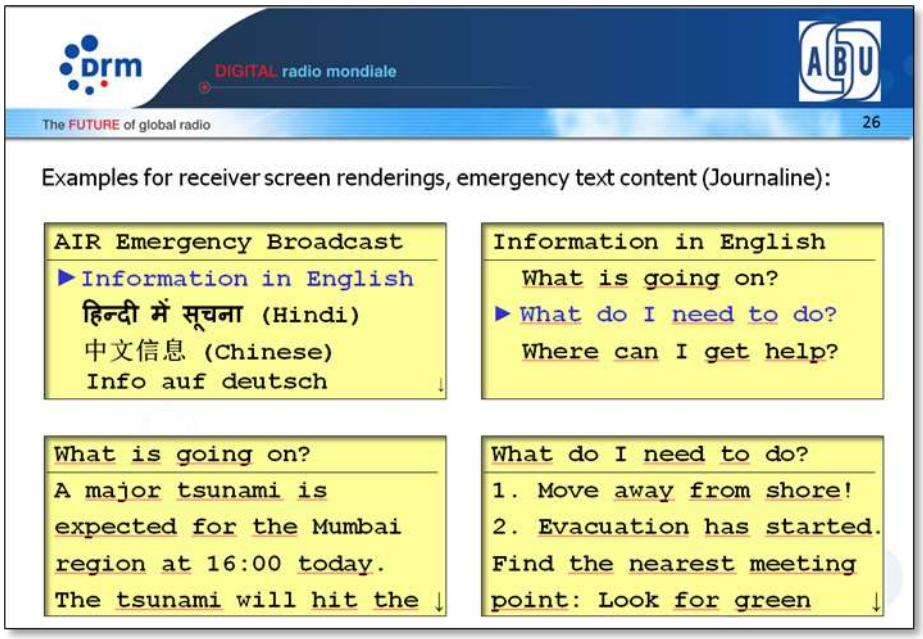
[5] See ETSI Standard TS 102 979.

[6] See Recommendation ITU-R BS.1894.

FIGURE 1

Examples of screen renderings and emergency content (Journaline)



Implementation

DRM broadcast chain

A DRM broadcast chain consists of:

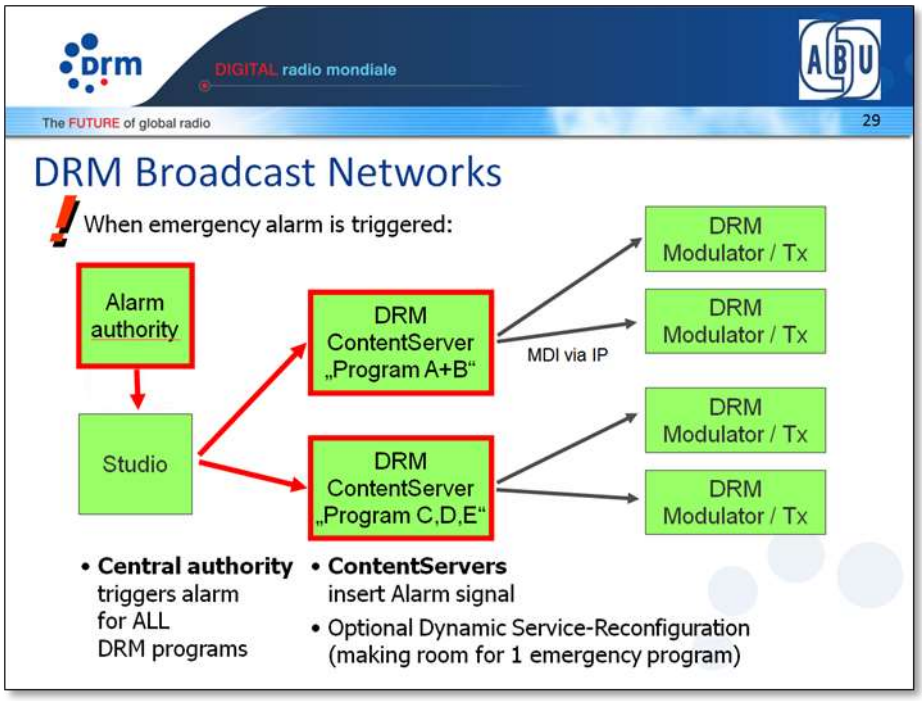
Studio (content) - DRM Content Server(s) - DRM Modulator(s)/Transmitter(s).

If authorities trigger the emergency signal, it must automatically be provided to the studios, which in turn activate it at the DRM Content Server(s) (or grant authorities direct access to an appropriate interface). The emergency warning signal must be activated for all DRM on-air services (even if they do not carry the emergency program themselves, but simply point receivers to it, for example a public broadcast).

During implementation, DRM configuration(s) may need to be dynamically reconfigured to make room for the emergency programme and additional content. Typical interfaces to trigger/activate the DRM emergency signal on a Content Server may include web interface access (for manually activating a trigger) or UECP (international standard for automated announcement distribution within studio environments). See Figure 2.

FIGURE 2

DRM broadcast chain



Implementation considerations for the DRM broadcast chain

The following are implementation considerations for the DRM broadcast chain:

– Enable emergency alarm signalling for all DRM broadcasts (+ AFS links to emergency programme).

– Establish alarm trigger signal path from central authorities to all stations

– The content to be put on-air (audio + text) must be prepared in advance for each possible emergency scenario, to be available and placed on-air immediately when required, and easily accessible by broadcasters.

– If required, prepare DRM broadcast configurations for emergency program scenario to quickly switch configurations in case of emergency. For example, to add the emergency service with audio and text content into a regular DRM broadcast (optionally replacing existing content and programmes in the broadcast).

Activation of emergency alert

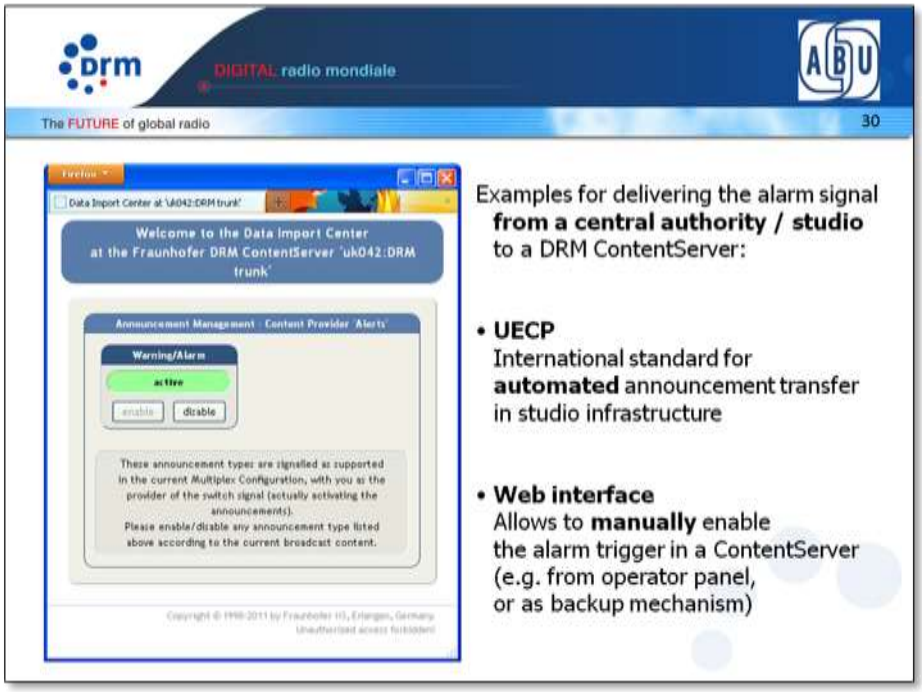
When the emergency alert is required to be activated, the following steps should be taken:

– Activate trigger chain from authorities through studios to DRM Content Servers and ultimately the DRM receivers, to switch all receivers automatically to the emergency programme (see Figure 3).

– Broadcast (at least) one emergency programme covering at least the region of the emergency with audio + text information.

FIGURE 3

Announcement management screen



Conclusion

The DRM audio broadcasting system has all required tools built in - and supported - by available chipsets for a quick and complete mass notification when disasters/catastrophes occur:

– Providing DRM receivers with switch signals and alternative frequencies to receive emergency programmes.

– Providing listeners (including impaired users) with complete and detailed information by audio and multilingual on-demand text (Journaline).

Preparation in advance is key in three major areas:

– Alarm trigger routing (from central authority to DRM receivers).

– Content preparation for immediate availability (text information, audio loops/feeds.

– Full receiver functionality to be implemented (including EWF and automatic wake-up).

ANNEX 5B

HD Radio Emergency Alert System

The HD Radio system can provide important new and enhanced emergency alerting capability. This functionality can be added at low cost by any station that has implemented digital broadcasts using HD Radio technology. Unlike analogue based AM/FM alerts, HD Radio alerts can provide rich visual and audible content. The HD Radio system can support emergency alerts in both medium wave and the VHF band.

HD Radio emergency alerts, referred to as "Active Alerts", support the following content:

– Multi-lingual audio, provided simultaneously on stations supporting multicast (HD2/HD3) channels.

– Multi-lingual text.

– Images such as photos, maps and more.

– Alert parameters including alert "matter", locations, target audience and "seriousness".

In addition to these features added to the transmission stream, HD Radio receivers can support the following receiver alert-related features:

– "Wake-up" on alert which turns on the receiver upon receipt of an alert message.

– "Break-through" on alert which switches the multi-function device from non-receiver mode (i.e. MP3 player, etc.) to receiver mode, upon receipt of an alert message.

– Filtering notifications based on target locations, target audience and alert "matter".

– Language options.

– History log, alert reminders.

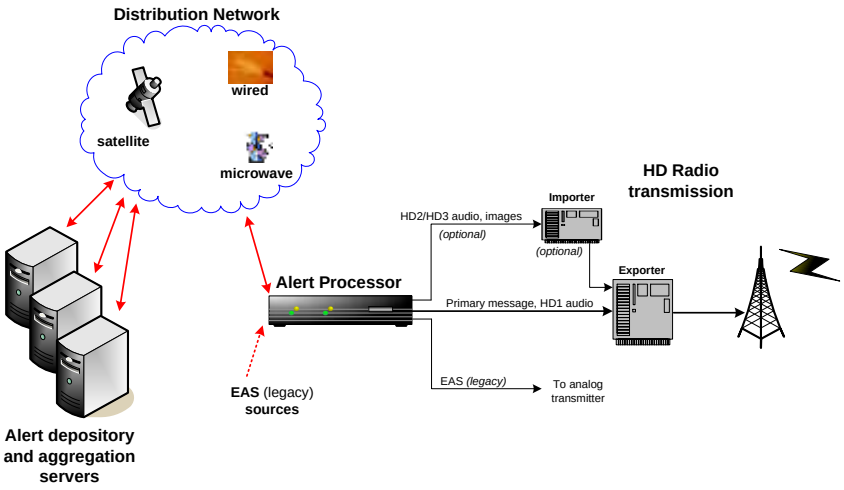
– Supporting people with visual or audible impairments by further enhancing or converting alert message elements.

HD Radio Active Alerts can support up to 380 bytes in the primary alert message. The system can transmit up to 374 text characters in an uncompressed format and more in a compressed format. This conforms to ISO/IEC 8859-1:1998 and ISO 639-3 requirements. Available formats include plain text, SAME, FIPS, and ZIP. The system allows adding more formats.

HD Radio stations can implement Active Alerts with the introduction of an "Alert Processor". The Alert Processor receives the alert content from government officials or other authorized sources, in any one of the practiced methods. It generates the primary alert message (i.e. core alert content), as well as accompanying audio and images. The alert message is sent from the Alert Processor to the HD Radio Exporter or, in the case of stations that have implemented other advanced services, the HD Radio Importer. Figure 1 below sets out the station configuration:

FIGURE 1

Station functional elements



The Active Alert messaging feature can include three independent elements. First, the HD Radio system can send text information to the receiver for display on the receiver screen. This text information is transmitted as part of the Station Information Service ("SIS") instead of part of the station information. Second, the system can send an audio alert over both the main HD1 channel as well as the multicasting (HD2/HD3) channels. The alert audio replaces the station's regular audio programming. Third, the system can transmit images, maps or other data using the Advanced Application Services (AAS). By using three separate pathways for transmission of the different elements of the emergency alert, the HD Radio system ensures the transmission of the primary text alert message does not compete with other station services.

For stations operating with the correct equipment and configurations to support Active Alerts, the HD Radio system should support approximately 95% receiver detection of emergency messages for a single attempt and 99% for the second attempt, when the receiver operates within its HD Radio audio coverage area.

ANNEX 5C

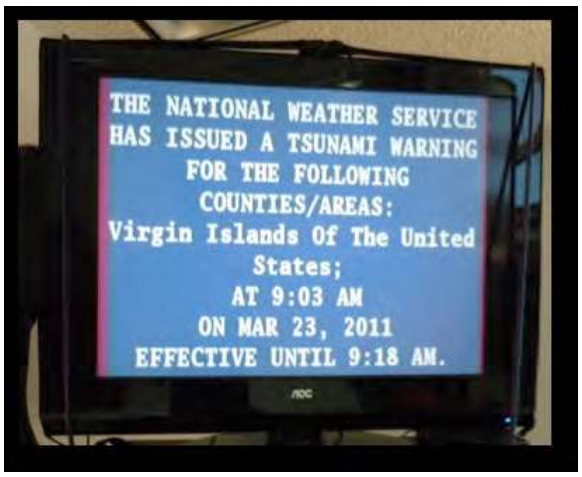
U.S. Emergency Alert System (EAS)

A Brief History

The Emergency Alert System (EAS) leverages the capabilities of participating analogue and digital radio, television, cable, satellite, and wireline providers, working in concert to distribute alert and warning messages to the public. The alert messages can be originated by emergency management authorities at all levels of government to warn the public of imminent emergencies.

The EAS was created in 1994. It is the latest in a series of alert and warning systems that began with the Control of Electromagnetic Radiation (CONELRAD) program, established by President Harry Truman in 1951. The CONELRAD was replaced in 1963 by the Emergency Broadcast System (EBS), which remained in place until 1994. The Federal Communications Commission (FCC) created the EAS in 1994 and began enforcing requirements that mandated that all broadcast stations have EAS equipment installed by 1997. In 2001, cable systems were required to have EAS equipment installed to override all program channels with a national-level EAS message, also known as an Emergency Action Notification (EAN).

Example of a National Weather Service EAS message



The Primary Entry Point (PEP) concept first surfaced in the mid-1980s. Primary Entry Points are broadcast stations located throughout the country with a direct connection to the Federal Emergency Management Agency (FEMA) and resilient transmission capabilities. These stations provide the initial broadcast of a Presidential EAS message. FEMA is increasing the number of PEP facilities to provide direct coverage to at least 90% of the American public.

Even in today's world of seamless technology and portable communications devices, the Government maintains a system of radio stations to support public alert and warning (A&W). In addition to the PEP System's primary role to broadcast and relay the President's message in a dire emergency, PEP stations are designed with a much higher level of resiliency. These "hardened"

radio stations provide the nation with last resort mass communications capabilities under all conditions, as required by the President of the United States.

Broadcast radio receivers are ubiquitous. These radio receivers can receive one or more of the approximately 14,355 full power radio stations broadcasting throughout the country. Over-the-air radio broadcasts are one-way, omnidirectional transmissions. In the aftermath of a national, catastrophic event, alerting authorities can leverage operational area capabilities to transmit crucial information to the public through as many methods as possible. However, broadcast radio may be the most effective method since it is possible that terrestrial Internet Protocol (IP) networks and other pathways could be inoperable, especially at "last mile" delivery to the public. Prolonged power outages are expected in most catastrophic scenarios, negatively affecting IP networks and other communications. The national EAS program provides the nation with an unparalleled, survivable communications network, available under the direst conditions.

The above excerpt is from "An Emergency Alert System Best Practices Guide - Version 1.0", by the Federal Emergency Management Agency.

Full text at http://www.fema.gov/pdf/emergency/ipaws/eas_best_practices_guide.pdf

ANNEX 5D

U.S. Mobile EAS for ATSC Mobile DTV

The ATSC Mobile Emergency Alert System (M-EAS) builds upon established ATSC Mobile Digital Television and Non Real Time standards to provide a robust and reliable alerting service for the public. It leverages the demonstrated excellent reliability of the broadcast digital television service to serve emergency needs that cannot be satisfied by other communications means that become damaged or overloaded during natural disasters. It provides means for dissemination of both national and local alerts, and significantly extends alerting capabilities to include rich media such as maps and videos.

Introduction and background

M-EAS - was designed upon existing ATSC standards, specifically the ATSC Mobile DTV standard - and Non Real Time (downloaded and stored) service standard. By the addition of a few new tables of emergency-related information to the mobile DTV signal, M-EAS capable mobile and handheld receivers can be directed to both basic and more detailed emergency information. M-EAS utilizes the international Common Alerting Protocol (CAP), which specifies how messages are structured and enables geo-targeting. CAP compliance allows ready adoption of M-EAS into the U.S. Integrated Public Alert and Warning System (IPAWS). M-EAS does not replace the legacy EAS, but extends the dissemination of emergency information. In addition, M-EAS expands the types of information that can be provided to include rich media like maps and videos.

Motivation for the development of M-EAS was centred on the broadcasters' demonstrated capability to maintain service under extreme conditions, by use of backup transmitter power; and on the one-to-many nature of broadcasting that avoids the data overload that has been the bane of cellular systems. M-EAS uses a portion of the existing broadcast data stream and therefore requires no new spectrum or transmission infrastructure. M-EAS receivers, like any handheld device, can be recharged from a variety of sources including cars in case of electric power failure.

PBS (the Public Broadcasting Service), in conjunction with LG Electronics and its U.S. subsidiary Zenith Electronics, Harris Broadcast, and Roundbox, along with additional funding from NAB Labs conducted a one-year test to assess the potential of television stations using Mobile DTV (MDTV) to distribute real-time, live broadcast emergency messages to the public. Tests were conducted at public television stations located in Boston, Las Vegas, and Alabama with support from the Corporation for Public Broadcasting. KOMO-TV, a commercial station in Seattle, helped create a tsunami alert simulation. These field trials confirmed the ability of U.S. broadcasters to make "dual use" of their new Mobile DTV transmission capability to provide rich-media emergency alerts.

The pilot led to standardization by the Advanced Television Systems Committee (ATSC) and continuing dialogue with FEMA, the National Weather Service, the FCC, and Congress, as well as state and local emergency managers.

Receiver behaviour

The M-EAS signal provides the necessary data so that a MDTV receiver can provide user-friendly notification of emergencies:

– Wake-up from standby monitoring.

– Automatic presentation of new or updated message text (with the intent to be overlaid on or below the program currently being viewed).

– Ignoring of repeated old messages to which the user has already responded.

– Listing of available emergency rich media content in the service guide.

– Deletion of canceled messages.

Example of M-EAS content - Hurricane scenario

In this example, preparedness information is made available at any time before an event. This information is not easily conveyed in a short text message, so the text is used as a pointer to richer resources (Figure 1). As shown in Figure 1, the text banner is created by the receiver with text extracted from the CAP message. In this implementation, the user taps on the banner to reach a service guide with a menu of rich media items associated with the current emergency (Figure 2). The user then selects a rich media element to view (Figure 3). Other implementations of receiver functions are possible.

The CAP standard includes an Alert message, optional Update message(s), and a Cancel message. In the example, and potentially in actual use, an initial CAP Alert message and the corresponding message banner may be an early warning. Subsequent CAP text Update messages may be of a more urgent nature. In either case, linkage can be provided to the service guide (Figure 2) and then to rich media including weather radar (Figure 3) and evacuation orders/routes (Figure 4).

FIGURE 1

Initial CAP text message

FIGURE 2

Service guide listing linked from CAP message

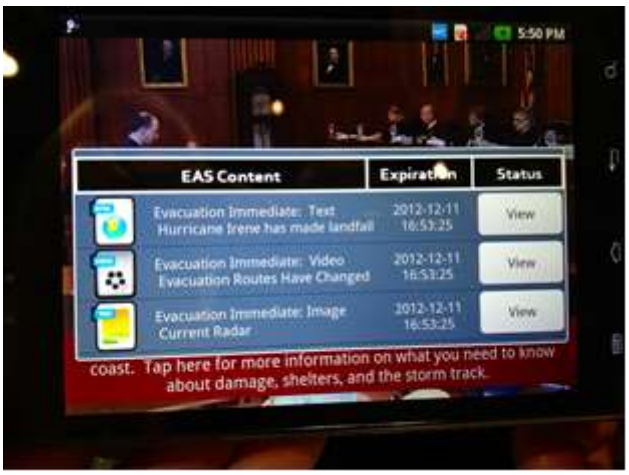


FIGURE 3

Weather radar map broadcast via M-EAS

FIGURE 4

HTML page of current information via M-EAS

Receiver configurations

M-EAS incorporation has been demonstrated or announced for a variety of consumer devices, including:

– Cell phones.
– iOS device adapters.
– Tablet receivers.
– In-car receivers.
– PC accessory cards.
– External adapters for PCs.

Conclusion

M-EAS extends the reach of public emergency alerts by use of the existing mobile digital TV infrastructure. Compatible additions to existing digital TV broadcasts provide reliable alerting service to M-EAS capable portable and handheld devices, and are not subject to network overload due to the inherent one-to-many nature of the broadcast service. Relatively simple additions to a station's existing mobile TV equipment allow forwarding of CAP messages, plus the addition of highly useful rich media containing detailed information that can be originated locally.

References:

– [1] A/153 Part 10:2013, "Mobile Emergency Alert System" http://www.atsc.org
– [2] A/153 :2011, Parts 1 to 9, "ATSC Mobile DTV System" http://www.atsc.org
– [3] A/103:2012, Non Real Time Content Delivery http://www.atsc.org

Excerpt from "Mobile Emergency Alerting via ATSC MDTV", Jay Adrick (Harris Broadcast), Wayne Bretl (Zenith Electronics), Jim Kutzner (PBS) and Wayne Luplow (Zenith Electronics), Proceedings of the NAB Broadcast Engineering Conference, 2013.

ANNEX 5E

BBC Media Action - Use of new broadcasting techniques

Suitcase radios allow new FM stations to be set up rapidly in disaster situations where all local broadcasters have been put off air. Once the suitcase radio, another suitcase containing the transmitter and a bag containing the antenna have been brought to the broadcasting location, along with a small petrol driven generator to supply power, the radio station can be assembled and put on air within 45 minutes. BBC Media Action would normally aim to deploy and operate a suitcase radio in collaboration with local broadcasters whose own studios and transmitters have been put off air by the disaster.

Several non-radio techniques have been developed to enable Lifeline programming and the essential messages that it contains to reach audiences well beyond the normal broadcast coverage area of a radio station. One such technique is to play recorded radio programmes over a loudspeaker to groups of people in a public place, such as a village meeting place or market. BBC Media Action has already used this strategy successfully in Bangladesh.

Following Cyclone Mahasen in May 2013, BBC Media Action supported the production of a 20-minute daily Lifeline programme by two community radio stations in Barguna district. The broadcast range of each station was only 17 km. However, some of the Lifeline programmes reached thousands of listeners up to 40 km away thanks to a three-way collaboration between the community radio stations, BBC Media Action and the Bangladesh Red Crescent Society. Red Crescent volunteers played recordings of selected Lifeline programmes over loudspeakers to meetings of villagers in public places in 16 far-flung communities outside the radio coverage area. They were listened to with great enthusiasm by these off-line audiences.

Another way of extending the reach of Lifeline programming is to systematically transmit vital information contained in the broadcasts by SMS to people beyond the broadcast range of the station. Text messages can be sent from the radio station to focal points in the community, who then transmit the information by word of mouth to their neighbours. Alternatively, or in addition, members of the public can be allowed to self-subscribe to an SMS news update service provided by the radio station. Obviously, there are strict limits to the volume and complexity of information that can be transmitted in a 160 character SMS message. However, the format is ideal for transmitting early warning messages and for communicating service announcements - such as the location, date and time of a medical clinic or food distribution.

BBC Media Action set up a successful SMS information system for ActionAid in Isiolo County in Northern Kenya in 2011, through its infoasaid (www.infoasaid.org) partnership with Internews. Infoasaid established an SMS-based two-way communication network between the ActionAid regional office in Isiolo town and some 250 village relief committees. These committees organised food distributions and cash for assets work programmes in rural communities up to 200 km away. Each relief committee was equipped with a simple mobile phone and a solar charger to keep the handset constantly available for use. Actionaid disseminated messages to these contacts using FrontlineSMS software installed on a lap-top computer. FrontlineSMS (www.frontlinesms.com) is free SMS management software that can be downloaded from the internet. It is widely used by radio stations all over the world to manage incoming text messages from listeners and conduct opinion polls by SMS. It would be easy for radio stations to use the FrontlineSMS or other similar types of SMS management software to provide a news alert service for people beyond their normal broadcast coverage area.

ANNEX 6A

Louisiana Public Broadcasting - Collaboration between broadcasting organisations

Louisiana Educational Television Authority (LETA), in collaboration with the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), has proposed a project for enhancement of Emergency Alert and Communication Resources at originating points of alerts. LETA would be designated as the single provider of video and audio pool services to all media outlets throughout the state. These enhancements would allow GOHSEP to work in a cohesive manner, enabling them to "speak with one voice", providing a better means of managing resources and minimising duplication of effort.

Originating points of alerts would include the pressrooms at GOHSEP, at the State Capitol and at the Joint Information Centre. LETA would also support communication directly from the Remote Command Centre. In directly serving the needs of first responders, LETA would help in saving lives and protecting property and it would position LETA as an essential participant in both local and state-wide emergency protocols.

LETA has a working collaboration with New Orleans station WWL-TV 4, a CBS affiliate. In the event of a mandatory city evacuation due to a hurricane, WWL-TV 4 will move their broadcast operations to the LETA Broadcast Operations Centre Teleplex in Baton Rouge and continue on-air operations. This has been in effect since August 2005 and was most evident during Hurricane Katrina, when New Orleans was devastated. Station WWL-TV 4 occupied space from August until October at the LETA studios.

ANNEX 6B

International Association of Broadcasting - Cooperation between broadcasters and government entities

For over 80 years, radio and television broadcasters from all over the three Americas have been, and are an example for their mission in the service of their countries, to provide multiple forms of assistance and support in dramatic situations caused by natural disasters, catastrophes, epidemics and any other situations requiring the protection of human life.

In the United States, radio and television broadcasters are constantly serving their communities and audiences in critical times of emergencies and disasters of all kinds. The National Association of Broadcasters (NAB) has important information and programs about this extraordinary task of commitment, dedication and generosity.

In Latin America, the experience is similar: broadcasters and their national associations are also an example of on-going commitment to disseminate life-saving information, to undertake aid campaigns and mobilise the public at critical moments when other communication technologies fail. Since broadcasting began its development in the Latin American countries, broadcasters understood and assumed the important role they play to help their people, not only in the specific dissemination of emergency and safety issues, but also to organize solidarity campaigns, to raise funds, medicines, food and the necessary things to provide relief to victims of tragedies.

Several examples of aid campaigns for the rebuilding of villages and communities were implemented by the voluntary action of broadcasters. There are also prevention programs through radio and television programmes, as well as brochures and instruction manuals that have been disseminated to collaborate with public organizations engaged in disaster prevention.

The International Association of Broadcasting (IAB) and its broadcasters associations of different countries have held multiple activities to strengthen and improve their work in this area. The Declaration of Principles of Ethics IAB adopted in Lima in 1955 states in its fifth principle:

"Broadcasting is uniquely capacitated to render the greatest service in all cases where human life or the welfare of the nation is in peril through catastrophes, epidemics, pests, states of panic or other upheavals. Its duty, in such circumstances, is to give their uttermost effective aid to both the people and the authorities".

Facing hundreds of phenomena that have plagued most Latin American countries, IAB and its members have held seminars and events to share experience and knowledge on what to do in cases of emergency and natural disasters or man-made catastrophes.

First Regional Forum of Radio and Television Co-operation, Mexico, Central America, January 31 - February 2, 1999, Villa Hermosa, Tabasco, Mexico.

This meeting was organized by the National Chamber of the Radio and Television Industry of Mexico (CIRT) supported by the Union of Broadcasters Associations of Central America (UNARCA), and IAB's sponsorship and co-operation. Multiple actions and radio and television contributions in favour of supporting campaigns in view of social emergency situations, public health plans and civil promotion were analysed. Over 200 broadcasters from those countries that had been summoned attended this Forum. The outcome of the event was the Tabasco Declaration, which strengthened even more the recognized work of broadcasting to the service of high social and community interests and ratified the enforcement of the principles stated by IAB in Lima in 1955.

In recent years, training and cooperation agreements between broadcasters and government entities for the prevention and attention of natural disasters have increased in almost all Latin American countries.

In addition, IAB has been fostering regional campaigns to promote broadcasters' support in different countries, for the assistance to other countries under disaster situations. IAB promotes among its members the incorporation of New Broadcasting Techniques and Systems for Uses in Emergency Communications. This resolution, after its preamble states:

"To request the Governments and civil protection agencies to consider the advantages of sound broadcasting in terms of coverage, surplus, infrastructure and technology available, as a fundamental support in the implementation of early warning systems and civil protection. To urge Mobile Telephone Companies, and those Companies that manufacture mobile equipment, to include FM radio in consumer devices, facilitating the access of the public to the information this free, over-the-air medium provides in real-time access, especially if the fundamental role that radio plays in emergency and disasters of various kinds is considered".

IAB is permanently defending freedom of expression and freedom of reception of all kinds of broadcasts, to foster the collaboration of the broadcasters in public interest and social service activities. The principles of friendship and solidarity among people are part of IAB doctrine and promote the knowledge and the cooperation bonds for the countries. It is timely to transcribe the third principle of the IAB Declaration of Ethical Principles from 1955:

"3. By its very essence, broadcasting has an international mission with exacting duties to fulfil. Broadcasters of the Americas concur in their purpose of permanently serving the principle of solidarity and friendship among the American peoples and of using the powerful broadcasting media of the radio and television industry to make know the sister republics of the continent in their own countries, exalting the characteristics akin to all and which form a bond between them. This principle, which by preference refers to the countries of the Americas, also embraces all the other nations in the world".

ANNEX 7A

BBC Media Action - Public service efforts by broadcasters

BBC Media Action has worked closely with the government of Bangladesh and the state broadcasting networks BTV and Bangladesh Betar to produce and broadcast early warning and cyclone response messages during the approach of Cyclone Mahasen in May 2013.

Such collaboration is not new. During the Pakistan floods of 2010, the state radio network, Radio Pakistan, re-broadcast Lifeline programmes produced by the BBC's Urdu and Pashto language services. These programmes gave practical advice to people affected by the floods - such as what to do about snakes in the water. They also carried interviews with people affected by the disaster.

In Bangladesh and Nepal, the two countries where BBC Media Action's preparation for disaster response activities are most advanced, we are helping to develop consensus key messages for broadcast during the early warning and response phases of a humanitarian emergency.

More than 50 key messages, customised for local use, have already been developed by the Nepal Risk Reduction Consortium (NRRC) for use in the event of floods, landslides and earthquakes. These messages, agreed at workshops facilitated by BBC Media Action in January and May 2013, have been adopted by the government and the Nepal Red Cross Society and will be routinely broadcast in future emergencies.

BBC Media Action has launched a similar initiative in Bangladesh. In this country, the key messages will be developed and approved by a new working group called Communicating with Communities in Emergencies. This body, created with the support of BBC Media Action, brings together representatives of the government, UN agencies, international and local NGOs, the Red Cross/Red Crescent movement and local media organisations.

The distribution of centrally produced radio programming to local broadcasters by satellite is a well-developed technique that is widely used by national broadcasting networks in several countries, including Indonesia, the Philippines, Afghanistan and Nepal.

International broadcasters, such as the BBC World Service and Radio France International also use satellite transmission to distribute their programmes internationally to FM relay partners across the globe. The satellite receivers are small and relatively inexpensive. Wherever such a distribution network exists, it can easily be utilised for the distribution of centrally produced Lifeline programming in emergencies.

Satellite distribution systems are highly resilient to the impact of natural disasters which may cause normal telecommunications networks to crash. In such circumstances, satellite links can still be used to relay centrally produced Lifeline programming to local radio stations in the most remote locations, for immediate broadcast on FM to the local community.

In Indonesia, the radio news agency KBR68H (www.kbr68h.com) regularly supplies news bulletins and other programmes by satellite, to more than 900 radio stations across the country.

In Nepal, the Association of Community Broadcasters (ACORAB) (http://www.acorab.org.np/) supplies news bulletins and programming produced in Kathmandu to more than 100 local radio stations in the interior by satellite. The Ujyaalo 90 (http://ujyaaloonline.com/) meanwhile distributes programmes by satellite to around 50 stations in the interior.

In Afghanistan, the Salaam Watander (http://www.salamwatandar.com/) network, established by Internews, supplies programming produced in Kabul by satellite to more than 40 local radio stations.

In the Philippines, the Manila Broadcasting Company, the country's largest radio broadcasting group, supplies central programming to more than 100 local FM stations in its Radyo Natin (http://www.radyonatin.com/) network by satellite. Each Radyo Natin local station also produces several hours per day of its own programming.

ANNEX 8A

HFCC - The importance of terrestrial radio in international broadcasting

The HFCC is a non-governmental, non-profit association and is registered as a regional co-ordination group with the Radiocommunication Sector of the International Telecommunications Union (ITU-R). It is also a Sector Member of the ITU-R. The HFCC manages and coordinates global databases of international shortwave broadcasting, by providing tools and services to its Members for the resolution or minimisation of instances of mutual interference among shortwave transmissions. Further information can be found at: http://www.hfcc.org.

Background

The media scene continues to develop hand in hand with the emergence of new delivery platforms and the changing patterns of media usage. International broadcasting has not been left out from the process of transformation. This has created an increasingly challenging multi-platform environment for international radio as well as new possibilities.

While a number of shortwave broadcasting services have recently been severely cut or completely phased out, this distinctive medium remains relevant for a large critical audience interested in programming that focuses on both regional and international affairs and is broadcast from the perspective of different communities around the world.

Due to the unique long-distance propagation property of shortwave radio, by means of multiple reflections from layers in the upper earth's atmosphere, a transmitter can reach easily relatively near or more distant world regions. This is important where other platforms such as satellite, FM or Internet are unavailable because of high cost, geographical location, and lack of infrastructure or due to restrictions or disasters. Receivers are inexpensive and there are no access fees. Shortwave radio is important for travellers and isolated people and it reaches across the Digital Divide to the most disadvantaged and marginalised societies. This is in keeping with the Declaration and Action Plan of the World Summit on the Information Society.

The HFCC - International Broadcasting Delivery has become a partner of the UN agency UNESCO for the preparation of World Radio Day celebrated earlier this year. UN Secretary General Ban Ki-moon had this to say in his message to the World Radio Day celebrations: "From short-wave to FM to satellite transmission - radio connects people wherever they are. In conflict situations and times of crisis, radio is a lifeline for vulnerable communities".

These humanitarian aspects and the huge number of people around the globe emerging from poverty continue to represent an important potential target audience for direct content delivery from terrestrial transmitters. Fifty per cent of world population lives on less than $2.50 a day. In other words, a total of three billion people live below the poverty line.[7] Their first choice of communication device will be either a mobile telephone, or a radio, or both, and listening to a local FM or community station or an international broadcast will be a more affordable media source than a computer, TV set or a video or CD player.

Unfortunately this future opportunity for international broadcasters and for millions of potential listeners might be lost for good due to the present changes in media delivery that are under way mainly in the developed world.

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[7] http://www.statisticbrain.com/world-poverty-statistics/ Research Date: 23.07.12.

Dialogue among peoples

International radio broadcasting could help solve contemporary challenges brought about by the need to bridge the gap in knowledge about other civilizations, cultures and societies that have entered into frequent contact with one another due to globalisation. International broadcasting is capable of motivating dialogue among peoples, mutual understanding and respect, and the exchange of ideas.

An increasing penetration of community radio into many regions provides a tool and platform for (local) community debate and dialogue and supports democratic processes within societies. International broadcasting is capable of playing the same role for regional and global communities. Broadcasters are able to enter into partnerships with local media, supply and exchange media content and enhance the inter-cultural dialogue.

International radio is an invaluable tool in distance education. It reaches men, women and children in areas where traditional education systems cannot, due to lack of financial means, education infrastructure or accessibility. It can be used to promote literacy among youth and adults alike and to empower women in societies where the right to education is denied due to gender bias. Radio can also be used to provide health education and information to communities during epidemics or following a natural or man-made disaster.

Radio in emergencies

Important statistical conclusions have been drawn about the role of media and communication in the Great East Japan Earthquake of 2011, during a symposium between the Ministry of Information and Communication of Japan, and the ITU in March 2012: Radio was on top of the list of useful media and information sources. A call for a multi-channel flow of information was also made in the symposium: "The more diverse the media striving to relay information is, the higher the possibility that essential information will be communicated ", and further: "There is no singular media or network that represents the most appropriate means of relaying information in disaster-stricken areas; such media should be diverse in nature".[8]

The HFCC - International Broadcasting Delivery association, in close co-operation with its sister co-ordination groups: the Asia-Pacific Broadcasting Union (ABU) and Arab States Broadcasting Union (ASBU) are now working on a comprehensive system that has been missing in the world community. A global frequency database of shortwave broadcasting and an online co-ordination procedure of frequencies, managed in accordance with the International Radio Regulations will be implemented by the International Radio for Disaster Relief (IRDR) project. The project is described in more detail in another HFCC contribution to WP 6A.

New technological developments for traditional delivery

The future of radio is digital and the digitisation of shortwave and other bands of AM broadcasting is already in progress. The globally standardised DRM (Digital Radio Mondiale) system is a high-quality replacement for current radio broadcasting on all AM bands. There should be no obstacle to a speedy introduction of DRM to shortwave broadcasting; since there is a dramatic improvement between the quality of the present AM broadcasting and the future digital DRM standard.

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[8] *"Earthquakes and Media" by M.Sugaya (MIC-ITU symposium on disaster communications, Sendai,March 2012).*

Shortwave broadcasting and internet applications - Competition or synergy?

There are many ways that short wave broadcasting and internet applications can complement each other:

– The presence of broadcasters across all distribution platforms is important for effective worldwide delivery. Audiences are able to personalise their listening experience.

– There is evidence that radio is best for live listening - especially for news, current affairs and sport programmes. Authentic experience is enhanced by listening live to long-distance shortwave radio stations and their programmes.

– Radio has a strong emotional appeal. People listen regularly to one or two radio stations only. This appeal of radio has been even more typical in shortwave broadcasting. Enduring bonds and contacts between listeners to shortwave stations and broadcasters have existed long before the advent of social media.

– New delivery platforms and technologies are ideal for improving the service of shortwave radio to the audience. The spoken word and music can be enriched by images and video clips. Audio on demand services have enabled listeners to download programmes archived by radio stations.

– Social media platforms can be used to strengthen communication and dialogue between the programme makers and their audience. This in turn can help develop communities of listeners that can promote the station and its content.

– New technologies are ideal for the collection of user-generated content, irrespective of the distance between the source and the core broadcasting station.

– Programmes and frequency schedules of shortwave stations change quite often. The internet is an ideal medium for keeping track of these changes and promoting direct listening to shortwave stations.

– Shortwave transmitters around the world complement internet based services and are a vital communication tool during major emergencies caused by natural or man-made disasters. The effective flow of information to affected populations is most needed after the disaster strikes. The need for communication comes later.

Present developments

From 2012, the HFCC became a partner of UNESCO for the preparation of its World Radio Day. The UN-lead agency has acknowledged, for the first time ever not only the potential of international radio broadcasting for building bridges of understanding between peoples, but also its humanitarian role in disaster risk reduction. This is especially important in the disaster relief phase of an immediate response after a disaster event has happened.

In 2012 the HFCC informed the ITU Multi-stakeholder Forum on Emergency Telecommunications in Bogota, Columbia about its IRDR project. The forum was held in keeping with an important ITU-D Emergency Telecoms programme with the aim to ensure the timely flow of vital information to audiences in disaster and post-disaster situations.
There have already been contributions and actions in the ITU recently that indicate that there are other initiatives in the effort to highlight terrestrial broadcasting in this field, including the contribution of the National Association of Broadcasters and other ITU members.

Proposals

The multi-platform distribution of broadcasting has become a reality. The irreplaceable role of terrestrial - and especially of radio - broadcasting is very important in disaster risk reduction. Since some present adjustments implemented in terrestrial facilities in international broadcasting might be irreversible, there is a synergistic approach needed urgently among the ITU sectors that should help include terrestrial broadcasting within a system of global emergency telecommunications.

During the May 2013 Phuket Meeting of the ITU-T Focus Group on Disaster Relief Systems, Network Resilience and Recovery (FG-DR&NRR), the HFCC suggested that a chapter dedicated to broadcasting, which was present in the January version of the Handbook on Telecommunications and Disaster Mitigation should be re-introduced into the version submitted to the Phuket FG-DR&NRR meeting, with content reporting on the possibilities of broadcasting and on new developments in this sphere.

Although a series of ITU-R documents has been included in the draft text of the Handbook, the substantive Recommendation ITU-R BT.1774-1 "Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief", relating to Question ITU-R 118/6 has not been mentioned, although this Recommendation contains a series of typical characteristics of satellite and terrestrial broadcasting.

Another ITU-R document, Resolution 647 (WRC-07), was also not included in the Handbook. This Resolution is vital for wireless services, including broadcasting on available frequencies/frequency bands for use in Emergency and Disaster Relief situations and/or standard operating procedures and both international and national spectrum management practices.

Question ITU-R 209-4/5 is being studied on the use of amateur radio services in support of disaster radiocommunications. Another question should be studied, recognising that the terrestrial broadcasting service might be an important (and at times the only) channel for the flow of information to disaster affected populations. The question should relate to the technical, regulatory and procedural aspects of implementing this service for disaster relief purposes. The results of these studies should be brought to the attention of relevant study groups of ITU-T and ITU-D sectors.

These proposals, along with other details for implementing terrestrial broadcasting within a system of global emergency telecommunications should be also included in the revised and amended edition of the Handbook on Emergency Telecommunications and other related ITU documents and publications.

The concept of Worldwide Broadcasting Roaming for consumer receivers was first proposed in ITU-R Question 136/6. There is a growing selection of "emergency" receivers on the market in a number of countries. The concept should be adjusted specifically from the point of view of their functionality, frequency coverage etc. in disaster relief situations and placed on the agenda of the relevant groups of all ITU sectors.

ANNEX 8B

HFCC - The International Radio for Disaster Relief project

The HFCC is a non-governmental, non-profit association and is registered as a regional co-ordination group with the Radiocommunication Sector of the International Telecommunications Union (ITU-R). It is also a Sector Member of the ITU-R. The HFCC manages and coordinates global databases of international shortwave broadcasting, by providing tools and services to its Members for the resolution or minimisation of instances of mutual interference among shortwave transmissions. Further information can be found at: http://www.hfcc.org.

Introduction

The purpose of the IRDR project is to offer to the world community a global platform for a wireless radio service to audiences in disaster and post-disaster situations when local and even regional communication and information networks are destroyed or overloaded and the population affected by the disaster suffers from an information blackout.

The distribution of radio content has become more fragmented with the advent of new - mainly digital - technologies, but the role of shortwave broadcasting as "crisis radio" was again identified during the recent earthquakes in Haiti and Japan. International broadcasters and their listeners have been aware of the unique property of shortwaves. Shortwave radio is capable of covering all world regions and therefore its implementation for disaster risk reduction and mitigation needs a co-ordinated system. The present proposal sets out the groundwork for a project of participating broadcasters, technical specialists and frequency managers.

Since most of the tools needed are already in place, the platform could become operational very soon. In reality there is a certain urgency about the project, since the current adjustments and austerity measures that are in progress in international broadcasting have resulted in substantive reductions or complete closing down of shortwave services in a number of countries. Some of them might be irreversible and there is a danger that the technical facilities needed for the project will not be available in the future.

Background

Information and communication is vital and can be life-saving to disaster affected populations. This continues to be a daunting challenge. "Poor information flow is undoubtedly the biggest source of dissatisfaction, anger and frustration among affected people"[9] was one of the conclusions of a report on the Indian Ocean Tsunami of 2004.

After a disaster occurs, the media immediately starts reporting from the affected regions to the outside world, whereas the flow of information in the opposite direction is largely missing. "Left in the Dark - the Unmet Need for Information in Humanitarian Responses" was the title of a BBC World Service Trust policy briefing issued back in 2008. The briefing noted that humanitarian aid was increasingly effective and coordinated in getting food, water, shelter and medical help to the people, but that the lack of information adds to stress and anxiety in emergency situations. "Effective information and communication exchange with affected populations are among the least

9 Links between relief, rehabilitation and development in the tsunami response, Tsunami Evaluation Coalition (TEC) July 2006.

understood and most complex challenges facing the humanitarian sector in the 21st century".[10] "Empowering people through media and communications can educate and lift spirits, both crucial to galvanising people to help themselves. Hearing others share similar experiences of hardships and recovery can play a critical role in improving the psychosocial wellbeing of those affected by disasters".[11]

After four years, one of the authors researched and wrote a follow up document for BBC Media Action (new name of BBC WS Trust) under the title "Still in the Dark?" published in March 2012, and reported: "Unfortunately, the reasons why so little systematic communication work takes place, and why so many communication needs remain, have changed little since they were outlined in the original "Left in the Dark" paper, including insufficient understanding or investment in communication, and lack of recognition and support from the humanitarian sector".[12]

The briefing then tries to conclude on an optimistic note. It points out that humanitarian agencies should hire and resource dedicated communication staff, since this is now all the more important in the quickly changing media landscape. The quick growth of social media - Twitter and Facebook - is also noted - especially their potential for communicating and getting feedback, including SMS messaging, although "In Haiti the going rate for phone charging on the streets of Port au Prince immediately after the earthquake was 40 gourdes or one US dollar - the average daily income - for just 15 minutes of charge time".[13] The briefing then suggests that an effective communication network should be multi-platform and notes that the recommendation of the original 2008 "Left in the Dark" document that wind-up radios should be included in emergency supplies still remains essential and unfulfilled.

Important conclusions have been drawn about the role of media and communication in the Great East Japan Earthquake of 2011, during a symposium between the Ministry of Information and Communication of Japan and the ITU in March 2012. Japan has an 80 per cent Internet penetration and a highly advanced media market. Radio was on top of the list of useful media and information sources at the time of evacuation in the study of two segments of population: those housed in emergency shelters and those in the group of internet users. 29 per cent of the people in the evacuated group and 69 per cent in the internet group received useful information from radio. Community wireless systems and public announcements came next in the list, with around 21 per cent each in both population segments. Twitter and the SNS and BBS web-based interactive systems recorded almost zero rating in the evacuated group and around 4 per cent in the internet group. What was quite surprising was that only 8.7 per cent of internet users found useful information on websites providing disaster information. The fact that on average about 48 per cent of people got useful information by way-of-mouth indicates that the need for information from other sources was unmet.

A call for a multi-channel flow of information was also made in the symposium: "The more diverse the media serving to relay information is, the higher the possibility that essential information will be communicated", and further: "There is no singular media or network that represents the most

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10 "Left in the Dark" by Imogen Wall, Lisa Robinson, BBC World Service Trust, October 2008, page 3.

11 "Left in the Dark" by Imogen Wall, Lisa Robinson, BBC World Service Trust, October 2008, page 4.

12 "Still in the Dark?" BBC Media Action Policy Briefing, Imogen Wall, March 2012, page 8.

13 "Still in the Dark?" BBC Media Action Policy Briefing, Imogen Wall, March 2012, page 6.

appropriate means of relaying information in disaster-stricken areas; such media should be diverse in nature".[14]

Available evidence indicates that the multi-platform distribution of media is even more important in the delivery of humanitarian disaster relief information and that wireless sound radio in particular is on the top of the list. A number of media researchers believe that wireless terrestrial radio is going to be more resilient to the incoming changes of media content delivery than television.

The idea that terrestrial radio has got a solid footing and that it will continue to represent an indispensable technology in emergency situations is echoed in the 2012 analysis of the influential umbrella organisation of European telecommunication organisations: "Traditional on-air radio has many strengths and is a vibrant medium. It is likely that it will remain an important mechanism for the delivery of radio content for a quite long time. ... It enables the delivery of services to a mass audience at a guaranteed quality of service to fixed, portable and in particular mobile receivers in a cost effective manner. ... During emergency situations broadcast radio may be the only reliable means of providing service information and news updates".[15]

Unfortunately, communication systems collapse just when people need them most. This includes radio and television stations, mobile telephones and internet connections. Long distance wireless broadcasting remains the only source of radio information in many disaster scenarios.

Project outline

The United Nations led World Conference on Disaster[16] Reduction approved a pivotal resolution in the "Hyogo Framework for Action 2005-2015" that mandated international organisations to engage fully in supporting and implementing the strategy of disaster risk reduction and mitigation.

One of the five main conference objectives as endorsed by the United Nations General Assemblies has been "To increase the reliability and availability of appropriate disaster-related information to the public and disaster management agencies in all regions, as set out in relevant provisions of the Johannesburg Plan of Implementation"[17] consistent with the Hyogo Framework. The Hyogo document serves as a generic and rolling framework which was already subjected to a mid-term review in 2011, in keeping with the new and emerging global agenda on disaster prevention and mitigation. The United Nations Office for Disaster Risk Reduction (UNISDR) is the focal point for the implementation of the Hyogo Framework.

The present information and communication project that has been proposed is in response to the call for action in the Hyogo protocol. The project is completely disaster-resilient, since it is based on the globally co-ordinated transmissions of international radio. The wireless radio energy of shortwave transmissions travels to the targeted disaster region via reflective layers in the upper atmosphere and the target may be hundreds or even thousands of kilometres away from the transmitter.

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14 "Earthquakes and Media" by M. Sugaya (MIC-ITU Symposium on Disaster Communications, Sendai, March 2012).

15 Possibilities for Future Terrestrial Delivery of Audio Broadcasting Services, April 2012, CEPT - Electronic Communications Committee.

16 In keeping with the Hyogo Framework, the term disaster in this project encompasses disasters caused by environmental and technological hazards and risks.

17 "Hyogo Framework for Action 2005-2015 - Building the Resilience of Nations and Communities to Disasters", Kobe, Hyogo, January 2005.

The project has been conceived by the HFCC - International Broadcasting Delivery association, in close co-operation with the Asia-Pacific Broadcasting Union and the Arab States Broadcasting Union, the HFCCs sister co-ordination groups. Despite the unique resilience of shortwave broadcasting, a dedicated system using technical facilities of international radio has not been developed yet for disaster risk reduction.

Important prerequisites for the setting up of a world-wide system are already in place. Frequency co-ordination of shortwave broadcasting was developed by an international group of broadcasting and telecommunication experts in the early 1990s. The group, later becoming the HFCC - International Broadcasting Delivery association[18] includes major broadcasters such as the IBB (i.e. stations of US governmental broadcasting) RTC from China, The Voice of Russia, IRIB from Iran, BBC, RFI and many other smaller stations. The HFCCs global database contains about 85 per cent of global shortwave frequency requirements used for broadcasting. The other 15 per cent is comprised mostly of smaller stations, especially in the so called tropical broadcasting zone. These stations mainly serve local listeners and are not interested in international co-ordination.

According to ITU-R Resolution 647 (WRC-07): "The immediate availability of pre-identified and pre-coordinated frequencies, and/or spectrum-flexible technologies to allow near-instantaneous decisions to make use of available spectrum, are important for successful telecommunications in the very early stages of humanitarian assistance intervention for disaster relief".[19]

This important requirement will be met in the IRDR project, since according to Article 12 of the International Radio Regulations individual frequency channels for broadcasting are not assigned, but are internationally co-ordinated in the High Frequency bands allocated to the Broadcasting Service.

Global web-based software is located on the HFCC server, to aid coordination between broadcasters and Frequency Management Organisations. An automated system checks for any frequency changes or additions every ten minutes. If any are detected, the processing of frequency schedule data then starts automatically, the global database is updated and any possible incompatibilities or "collisions" identified.

There are ten international shortwave bands and work is under way to identify one or two frequency channels in each band, which the global coordination community will reserve for disaster mitigation broadcasting. The results of both frequency and time-slot compatibility calculations will be immediately visible on the website. Thus the current state of occupancy of the spectrum reserved for the IRDR will be available to all participants at any moment. Specialised software will be available for the selection of frequencies and suitable antennas. The commencement of emergency transmissions will be possible immediately after the start of an emergency. A station in an ITU member country that might be interested in the IRDR - and is still outside the global co-ordination process - would be able to join, and take part in the IRDR. Participating stations will be offered an option to register some of their regularly used frequencies for the IRDR.

Programme content of the IRDR is not the subject of this communication, but as was stated in connection with footnote 4 on page 2, a dedicated communication staff should be resourced in humanitarian rescue teams. Obviously an on-going contact with media outlets has been envisaged and this includes international broadcasting.

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[18] More about the history of the HFCC coordination can be found here: www.hfcc.org.

[19] ITU-R Resolution 647 (WRC-07) Spectrum management guidelines for emergency and disaster relief.

The project will benefit further from the digitisation of the AM broadcast bands that is already in progress. The globally standardised Digital Radio Mondiale (DRM)[20] system is a high quality digital replacement for current analogue radio broadcasting in the AM bands, capable of providing a listening experience comparable to local FM broadcasting, with easier tuning and added data services. The DRM consortium and Fraunhofer Institute from Germany have developed a DRM Emergency Warning System, which employs an alarm signal which can switch a receiver to an emergency broadcast, or switch the receiver on automatically, so that the emergency broadcast can be received. In addition, headlines and detailed emergency information may be sent to the receivers text screen. Textual information can be made available immediately in multiple languages.

The use of high-quality digital transmissions as a wireless long-distance feed of programme material is another possibility. The received programme can be relayed by a local community radio station that has survived or via a local low-power "Radio-in-a-Box" device that has been developed with the assistance of UNESCO in co-operation with the Asia-Pacific Broadcasting Union[21].

Summary and conclusions

Integrative disaster risk management is a paradigm developed in the atmosphere of ever rising occurrence of natural disasters. This multidisciplinary approach is promoted by UNESCO and other United Nations agencies.

All available evidence collected during the preparation of this document suggests that media can play a crucial role in disaster risk reduction. The most effective dissemination of information to the disaster stricken population is multi-platform, but radio is the preferred technology, especially in early post-disaster situations.

The specific technology of international radio is disaster-resilient, because the transmission facilities are well removed from the affected region and radio energy is beamed toward the target area by means of highly directional antennas.

The proposed co-ordinated global system is new. The current technology changes in the media create a multi-platform system and new channels of content distribution, but this should not reduce the potential of wireless-based technologies that may be the only information source for people in specific context situations.

The project should raise awareness of international radio for disaster risk management. An effort will continue on how to position the International Radio Disaster Relief project within the structure of UN led agencies and institutions active in disaster risk reduction. It has been conceived in the spirit of the Hyogo Framework as the contribution of international radio broadcasting to the integrated global management of disaster risk reduction.

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[20] Digital Radio Mondiale (DRM) is the universal digital system for all broadcasting frequencies, including LW, MW, SW, and VHF bands I, II and III.

[21] According to news reports, the Thomson Broadcast company placed on the market a DRM-FM transponder early in 2012. DRM reception capability is already incorporated within the unit that converts the programme material from a long-distance digital transmission to the local FM audience. The transmitting power and energy consumption are low, making it possible to use a photovoltaic power supply to free the system from public energy supplies and from running costs.

ANNEX 10A

Impact of Hurricane Sandy on a U.S. Cable Television Operator

Cablevision Systems Corporation, one of the United States leading media and telecommunications companies, suffered severe service impacts from Hurricane Sandy in late 2012.

Hurricane Sandy affected 24 states, including the entire eastern seaboard from Florida to Maine and with particularly severe damage in New Jersey and New York. Early on 29 October, Hurricane Sandy moved ashore in the state of New Jersey, south of New York City, as a post-tropical cyclone with hurricane-force winds. The storm was nicknamed "Superstorm Sandy" by the media.
Its storm surge hit New York City on 29 October, flooding streets, tunnels and subway lines and cutting power in and around the city. One source cites damage estimates in the US at more than $71 billion (2012 USD).

In a Cablevision Systems press release dated 1 November 2012, the company made the following statement: *"Following this unprecedented event, loss of electrical power continues to be the primary cause of widespread disruptions of Optimum service. Cablevision crews are in the field and working to restore service as quickly as possible after the return of power. We will continue to provide updates for our customers on Optimum.nett"*.

The press release included a table reporting service outage statistics: 1.6 million customers of Cablevision's "Optimum" brand services (cable television and/or Internet access) in the states of New York, New Jersey and Connecticut were without power three days after the storm hit, and of the 1.6 million other customers still with power, 7,265 homes had no Cablevision service due to cable system outages.

A full four months later, on 28 February 2013, Cablevision issued its corporate earnings press release with the sub-headline "Superstorm Sandy Impacts Fourth Quarter Results". It included the following assessment of its Cable Television customer base during the fourth quarter of 2012, including the impact of Superstorm Sandy:

"Includes a net reduction of approximately 11 thousand customer relationships, 10 thousand video, 9 thousand high-speed data and 7 thousand voice customers that were located in the areas most severely impacted by Superstorm Sandy who we have been unable to contact and those whose billing we have decided to suspend temporarily during restoration of their homes…Our customer counts as of 31 December 2012 have been reduced accordingly (27 thousand customer relationships, 24 thousand video, 23 thousand high-speed data and 19 thousand voice)".

Clearly, severe weather can take a serious toll on the public's ability to receive wired television and Internet service (and telephone service) during and following a serious public emergency.
It is known that those affected homeowners were able to utilize battery-powered radio and television receivers to continue to receive high-quality emergency information. CBS owns and operates two all-news radio stations in the city of New York that provided continuous coverage and advice to the public during Superstorm Sandy.

Just as the storm was making landfall, on 29 October, Radio management and marketing magazine "Radio Ink" interviewed Federal Emergency Management Agency Director Craig Fugate, who urged people to turn to traditional radio in case other media fail. "One of the things you do not really think about anymore is having a battery-powered radio or hand-cranked radio to get news from local broadcasters, "he said". The Internet may go out, cell phones will be congested, radio is oftentimes the way to get those important messages about what's going on in the local community".

ANNEX 10B

Information on Disaster Coverage and Public Service by U.S. Broadcasters

A NABA Associate Member, the National Association of Broadcasters (NAB), is the primary national trade association and voice for the U.S. radio and television broadcasters. NAB advances the interests of its members in federal government, industry and public affairs; encourages content and technology innovation; and spotlights the important and unique ways stations serve their communities. Following are web links to NAB compilations of information on how broadcasters have served their public audiences in the face of various disasters in recent years.

NAB blog post on broadcasters as "first informers":
http://nabroadcasters.wordpress.com/2012/01/31/broadcasters-americas-first-informers/

NAB *Licensed to Serve* Newsletter on 2012 Super Storm Sandy:
http://www.nab.org/xert/2012Emails/publicservice/sandyLTS.html

NAB *Licensed to Serve* Newsletter on St. Louis tornado coverage in April 2011:
http://www.nab.org/xert/2011Emails/PublicService/aprilNewsletter.html

NAB *Licensed to Serve* Newsletter on Alabama storms April 2011:
http://www.nab.org/xert/2011Emails/PublicService/juneNewsletter.html

NAB *Licensed to Serve* Newsletter on Hurricane Irene October 2011:
http://www.nab.org/xert/2011Emails/PublicService/octoberNewsletter.html

NAB *Licensed to Serve* Newsletter on the Boston Marathon tragedy in May 2013:
http://www.nab.org/xert/2013Emails/PublicService/052013LTS.html

NAB *Licensed to Serve* Newsletter special issue on Oklahoma tornado relief in May 2013:
http://www.nab.org/xert/2013Emails/publicservice/052013OKLTS.html

NAB *Licensed to Serve* Newsletter on broadcasters' response to tragedy in July 2013:
http://www.nab.org/xert/2013Emails/PublicService/072013LTS.html

ANNEX 10C

First Response Radio India deploys to Uttarakhand Floods

First Response Radio (FRR) India began emergency broadcasts within 72 hours of the onset of flash floods and landslides in the Northern state of Uttarakhand in the Himalayas. According to Uttrakhand Chief Minister the floods were a "Himalayan Tsunami".

The special broadcasts began going out on June 19th 2013 via SW radio for 30 minutes a day towards the affected region to provide critical information to those affected by the flooding including the many pilgrims who are not from that state.

Even before full assessments were available, FRR began preparing broadcasts from Delhi based on the news, government and NGO information. In the early days of the special broadcasts the floods were still increasing and programs warned listeners of the increased danger of floods.

On June 21st FRR India deployed a team of 4 people into Uttarakhand state. Most of the team members had already completed FRR training in 2011 where they learned how to use the suitcase studio to produce emergency radio programs.

Team leader, Firoz Faridi is an FRR veteran having responded to previous disasters in Bihar (2008), Ley (2009) and lasts summer's Assam floods.

Once in the affected area they began interviewing the affected community, Government and NGOs. Every day they produced a 30 minute program of useful information using the suitcase and upload the programs over the (slow) internet for broadcast that night.

On the 22nd Firoz took his team to the most affected town of Uttarkashi. The road in was still in very bad shape but by traveling behind Indian Army and government bulldozers, they arrived in Uttarkashi.

When FRR INTL coordinator, Mike Adams called Firoz he asked "What was the most important information that the programs were providing for those affected by the flash floods?" Firoz replied: "On our emergency radio programs we were passing information about rescue operations, health tips, weather information and information about relief camps and health camps".

Broadcasts could be heard on Shortwave Radio (SW) on 9500 KHz on the 31 Meter Band from 8:00 to 8:30 pm local time, nightly (1430 UTC).

ANNEX 10D

First Response Indonesia in Aceh earthquake area

First Response Radio (FRR) network members, First Response Indonesia, have responded to the earthquake in Aceh province, Indonesia. On Thursday 11th July 2013 First Response Indonesia deployed a team. Many of the members had already completed FRR training, where they learned how to use the suitcase studio to produce emergency radio programs. They drove into the affected areas on Friday (12th July).

Team leader, Carly Sumampouw reported that First Response Indonesia was coordinating with OCHA and the Government representatives. The national radio station, RRI had been operating on reduced power (100 W) since the 2 July earthquake. FRI was working with them to get back to full power and help provide radio programming to support the two-way communication needs of the affected community. Key issues identified by OCHA and NGOs included the psychosocial counselling for trauma, the immediate needs of the vulnerable community and, even though it was still the emergency phase, discussion on how to rebuild more effectively had already begun. Radio distribution had begun through the coordination centers.

ANNEX 10E

First Response Radio India - 2008 Bihar flood response

Background

Disasters continue to be of critical concern worldwide, particularly to those who are most vulnerable to them. Relief workers often prioritise meeting the basic needs of those affected - providing food, shelter, water etc. However, those affected often lack essential information that can help them survive before they receive help. Communication during this time is key, and yet often poor. People are desperate for information about what has happened, what they should do, and how they can get help. It was only after the devastating effects of the 2004 Asian tsunami that information began to be viewed as aid itself, as acknowledged in the 2005 World Disasters Report (Niskala, M. 2005).

It was also during the 2004 tsunami that the idea for "Rapid Response Radio" was first put into practice by Health Communication Resources (HCR). HCR media trainers and local partners scrambled together radio equipment to get on air and broadcast critical information. The team quickly learnt the need to follow their original plan, which had stated the need for a Rapid Response Radio Unit and training.

Since that time, HCR has trained local media groups and relief workers in different countries on how to collaborate to get critical information to disaster survivors through the medium of radio. HCR-trained teams have responded to the 2005 Pakistan earthquake, 2008 Bihar floods, 2009 Padang earthquake (this was the fastest response, set up and on air within five days of the earthquake), Pangasinan floods (Philippines) and the 2010 Pakistan flooding.

Introduction

On 18 August 2008, the River Kosi breached the eastern embankment in Nepal, near the Indian border, shifting 120 km eastwards. The floods caused mass destruction and chaos - spreading through nearly 1,000 villages, across five districts, destroying houses, livestock, and people. The worst affected area was in the north Indian state of Bihar, where around three million people were displaced. As local and international NGOs crowded the scene, affected people remained stranded, wondering if and when aid would reach them.

It was into this situation that the First Response India team entered, having been trained only two months earlier at an HCR workshop in Delhi for media practitioners and relief workers. The First Response India team was comprised of local media NGO and FEBA India, who had attended the workshop. First Response India used a radio station packed into a suitcase to make radio programmes for stranded villagers, providing critical information and a listening ear to many who believed they had been forgotten. First Response India broadcast for one hour per day on shortwave for six weeks.

During this time, the team received over 1,800 calls and SMS messages. Many would hang up after the first ring, leaving a "missed call", and the team would call them back. The first caller requested help to bury the two dead bodies of his children, left on the roof in the evacuation. Others wanted information about jobs after the floods, whilst some called complaining no food or relief had reached them. The First Response team alerted relevant NGOs and the local disaster response coordinators, gathering information from them to communicate back to their listeners. Listeners reported their relief at having someone to communicate with, amidst their loss. The team collaborated with health workers to provide information, such as how to avoid sickness spreading as

dead animals and bodies floated in the waters. The information provided included how to clean the camps, how to avoid food contamination, where to get water purification tablets from and how to use them. Health messages were aired repeatedly to re-enforce messages.

Aims and objectives of the project

The goal was an improved humanitarian response through more effective communication. The overall purpose was to provide broadcasts with critical information for those affected by the disaster.

The objectives of the project were to:

– Improve coordination between relief workers, government and affected people.
– Ensure aid reached more people affected.
– Ensure the affected population knew where and how to receive help.
– Reduce stress through information flow.
– Reduce communicable diseases through health promotion and education.

Project evaluation - A summary

Participatory methodology was used to assess the team's success in meeting the objectives. The lessons learned draw on the stories and interviews with people affected by the floods, gathered by the field producers in 2008. They also draw on the field producers' and team leader's account of events, and the challenges that they faced.

Lessons learned

1 Relationships are key

The First Response India team has a partnership with the local hospital in Bihar. During the response, they learned the significance of understanding each other's work and having a good relationship. It was this working relationship that allowed the First Response team to conduct a needs assessment on the ground before responding. It also meant that it was easier for the First Response India team to get information from the authorities as they were working with a well-known, respected group of professionals. Relationships with NGOs meant that they could work directly with relief groups on the ground to gather critical information in order to enable them to respond to listeners.

During the Bihar response, the First Response team learnt how important government support is. Despite attempts at several levels, the government did not grant an FM license which meant First Response India could not provide local broadcasts. Instead, First Response India used an existing Short Wave outlet. This posed the extra challenge of finding somewhere to upload the programmes, especially as at that time they did not have a good internet connection or USB storage systems. Since then, First Response India has begun to build a relationship with the broadcasting department of the Indian government and the National Disaster Management Authority (NDMA), seeking agreement for licenses during disasters.

2 Ensure field staff are local

Local field staff have a better understanding of the community. The main field producer had a deep care and commitment to the people affected by the Bihar floods, because he was a North Indian himself. The combination of local knowledge, care and compassion gave him the ability to sustain the long hours and difficult conditions.

3 Have a pool of trained team members who can respond, to enable field staff to rotate

A team of six travelled to Bihar initially on 6 September. The majority of the team had to leave after a week, leaving only two producers (one trained in disaster response, one not). Managing calls from emotional, grieving listeners each day was emotionally and psychologically draining. The project was not able to rotate staff with such a small team, and had to work consistently. Since this time, First Response India has more trained people. A larger pool of people who can respond means they can rotate staff in the future. The team is managed by the First Response India coordinator, based in Delhi.

4 Ensure disaster plans (including allocation of funds) are in place to allow quick response

The First Response India team arrived from Delhi to the disaster zone nineteen days after the Kosi breached its embankment and began flooding. By this time, the place was crowded with international NGOs who dominated the scene. The team struggled to find a place to set up its station and somewhere to stay. To avoid this in the future, the team now has a local plan in place, which includes an emergency fund. This will enable the team to make a quicker decision without having to go through a hierarchical request process. Funds may also be used for air travel, which would cut the two days lost using ground transport - and reduce the level of tiredness on arrival.

Conclusions

Since the Bihar flooding, First Response India has gone on to train other teams in disaster radio response. Its aim is to equip other teams across India with the skills needed to improve collaboration and communication with people affected by crisis.

Radio can also play a key role in other phases of the disaster. This was demonstrated in the 2005 Pakistan earthquake, where radio was used in a variety of ways during the rehabilitation stage. Broadcasts included interviews with experts on stress management, medical treatment and dealing with after-shocks. Community members spoke on tolerance, promoting dialogue (following outbreaks of violence in the community). Radio also has a role to play in mitigation and in reducing communities' vulnerabilities to disasters. This is part of FEBA's community radio strategy. FEBA has provided two rural community stations in Nepal with suitcase studios and training, which they use for community based programming - including health, sanitation, governance, rights, local music and dialogue.

Effective communication and information flow has the potential to transform communities and save lives. In the disaster context, this potential can only be realized if accurate and timely information is combined with effective communication at all stages of the disasters and between all players. In the right hands, radio can be a powerful tool to help this process. It can provide a voice and a platform for the people who, ironically, are often not included or consulted in the humanitarian response - the affected community.

Health Communication Resources Case Study

The Use of Radio in Disasters: 2008 Flood Response, North India.

Case Study of *First Response India*

Prepared for CDAC Network Media and Tech Fair, March 2012

Trainer: Health Communication Resources (Non-Government Organisation)

Technical provider: Broadcast Warehouse & Randall Concepts

Field implementer: First Response India team

ANNEX 10F

Emergency broadcasting to protect the public in Japan

1 Disaster broadcasting in Japan

1.1 Earthquake Early Warning (EEW)

Japan is affected by typhoons nearly every year and volcanic disasters triggered by eruption and volcanic earthquake activity frequently occur. Japan is particularly prone to earthquakes, due to its location coinciding with the boundaries of the Pacific plate, the Philippine Sea plate, the Eurasian plate, and the North American plate. The Japan Meteorological Agency can detect the small vibrations that occur before a major earthquake, enabling it to predict and provide information on the magnitude and epicentre of the tremor. This data is automatically delivered to broadcasters via a direct line. Broadcasters instantly provide the warning across all its TV and radio channels.

1.1.1 Structure of Earthquake Early Warning

The structure of the Earthquake Early Warning system is shown in FIGURE 1. When an earthquake occurs, preliminary tremors (P-wave) and the principal motions (S-wave) that causes strong shaking occur simultaneously at the focus. These two sets of waves propagate at different speeds: P-wave at about 7 km/sec and S-wave at about 4 km/sec. When a seismograph near the epicentre detects a P-wave that comes first, the system estimates the focus and magnitude of the earthquake and then calculates the arrival time and estimated seismic intensity of the subsequent S-wave, based on the distance from the epicentre and other factors. The Meteorological Agency issues an Earthquake Early Warning when it determines that an earthquake of seismic intensity 5-lower or more is expected in some areas. This warning can inform people, in relatively distant areas from the epicentre of an approaching strong earthquake before the S-wave actually arrives. Therefore, they are given a window of time to take evasive action, such as evacuation and preparing themselves for the earthquake. The Meteorological Agency's Earthquake Early Warning system calculates and analyses data from more than 4,200 seismographs installed all over Japan. The Agency started fully fledged operation of this system on 1 October 2007. It should be also noted that the estimated intensity predicted by the Agency has a margin of error of plus or minus 1.

In the Great East Japan Earthquake, which occurred on 11 March 2011, the Meteorological Agency detected a P-wave by a seismograph installed in Ishinomaki City, Miyagi Prefecture, 22 seconds after the earthquake occurred, and issued an Earthquake Early Warning after another 8.6 seconds[22]. FIGURE 2 shows the window of time between the Earthquake Early Warning announcement and the arrival of the S-wave in this earthquake. It shows there was an 18 second window before the arrival of the S-wave in Kurihara City, Miyagi Prefecture, which recorded the maximum seismic intensity of 7. It also demonstrates that there was a 16-second window in Sendai City, Miyagi Prefecture, which registered the seismic intensity of 6-lower, and about a 65 second window in Tokyo.

Most of the broadcasters have exclusive lines for Earthquake Early Warning signals. For example, NHK (*Nippon Hōsō Kyōkai* / Japan Broadcasting Corporation), the Japanese public broadcaster, has a duplex structure of 64 kbps exclusive lines for Earthquake Early Warning, in order to obtain

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[22] The Japan Meteorological Agency, "Quick Report of Great East Japan Earthquake and Tsunami", *A Report on Natural Phenomena at the time of Disasters*, No 1. 2011.

up-to-the-minute data from the Meteorological Agency. Once a broadcaster receives data, a graphic, consisting of a map and words (shown in Figure 3) is generated immediately. Soon after the graphic is generated, it is automatically superimposed on the main broadcast feed. At the same time, an alarm voice announcement is synthesized and a warning is conveyed to viewers with the image and voice. All of these processes are performed automatically.

FIGURE 1

Concept of EEW

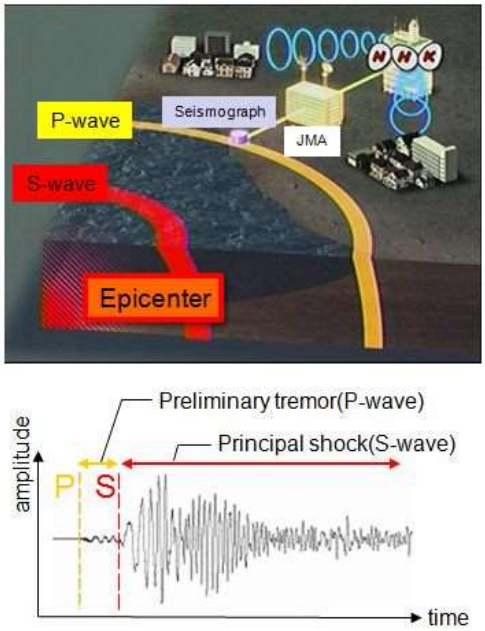

FIGURE 2

Window of time from the EEW announcement till the arrival of S-Wave (sec)

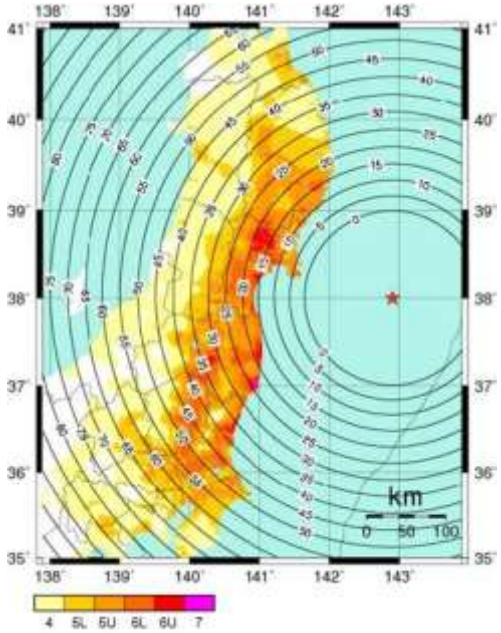

FIGURE 3

NHK broadcast screen at the time of the EEW announcement
(The caption says: "Earthquake Early Warning (JMA), an earthquake in offshore Miyagi, caution for strong shaking. Miyagi, Iwate, Fukushima, Akita, Yamagata")

1.1.2 Issue of delay in digital broadcasting

When an Earthquake Early Warning is issued, an Earthquake Early Warning screen is superimposed on the main broadcast feed and an alarm voice announcement is delivered. However, if this method of providing information using video and audio signals is applied via Japan's digital terrestrial broadcasting (ISDB-T), system, there would be a delay caused by the inherent MPEG-2 encoding process and multiplexing of channel streams. Transmission delay will also occur when distributing broadcast signals from the broadcast centre in Tokyo to local broadcasting stations across the nation, because of the multistage relay. Ultimately, a warning is displayed on a digital TV screen about 1 to 2.5 seconds later than on a conventional analogue TV screen. There is only a short window of a little more than 10 seconds to a few tens of seconds from an Earthquake Early Warning announcement until the arrival of S-wave in relatively close areas to the epicentre. From the perspective of protecting lives and properties from a disaster, a maximum delay of 2.5 seconds needed to be achieved where possible. In September 2008, the Ministry of Internal Affairs and Communications demonstrated its recognition that some measures needed to be taken for speedy transmission of Earthquake Early Warnings[23].

In the case of NHK, it started operation of an enhanced warning transmission system on 2 August 2010, using a mechanism of the ISDB-T data broadcast transmission in which the character codes "Earthquake Early Warning" are sent and immediately displayed on a TV screen. By using the mechanism of transmitting instantaneous event messages, which is one of the ISDB-T data broadcast functionalities, a digital TV that has received data, displays the message "Earthquake Early Warning" using its built-in font and replays its built-in alarm sounds immediately (Figure 4). This made it possible to communicate an Earthquake Early Warning announcement with images and voice to viewers about 1.0 to 2.5 seconds faster than providing superimposed information on the main broadcast feed (Figure 5).

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[23] The Ministry of Internal Affairs and Communications, "Promoting Technical Studies for Prompt Transmission of Emergency Earthquake Warnings on Digital Terrestrial Television Broadcasting and Media", *http://www.soumu.go.jp/menu_news/s-news/2008/080912_5.html (online),* 12 September 2008.

FIGURE 4

Showing immediate display of the words "Earthquake Early Warning"

FIGURE 5

Warning screen displayed in several seconds

1.2 Emergency Warning System (EWS)

In the event of imminent disaster, an alert is issued via TV and radio to warn the public. Devices capable of receiving the alert are switched on automatically. This system is activated when a tsunami warning is issued by the Japan Meteorological Agency.

In the Great East Japan Earthquake, NHK started the Emergency Warning System (EWS)[24] simultaneously with the issuance of the major tsunami warning. Though terrestrial TV broadcasting in Japan was due to be completely switched over to digital broadcasting in July 2011, the earthquake occurred in March, during the transitional period when both digital and analogue broadcasts were available. Therefore, NHK implemented the Emergency Warning System on both of their digital and analogue broadcast services.

[24] See Recommendation ITU-R BT.1774-1.

1.2.1 Structure of Emergency Warning System on ISDB-T

Japan's digital terrestrial broadcasting system, ISDB-T, enables hierarchical transmission, allowing a mixture of multiple transmission parameters. The Emergency Warning System in digital broadcasting uses the TMCC (Transmission and Multiplexing Configuration and Control) signals defined in OFDM frames for hierarchical transmission parameters, as a way of sending control signals at the start and end of the warning. In these TMCC signals, an Emergency Warning System identifier is defined. Meanwhile, in Japan's analogue TV and radio broadcasting network, the start and end signals of the Emergency Warning System were sent as audible signals to control the receiver. Using the frequency-shift keying (FSK) scheme, data signals "1" and "0" were modulated to 1,024 kHz and 640 kHz tones respectively, and the data was transmitted at 64 kbps. As these tones are audible to the human ear, people readily associate the sound with the start and end of the Emergency Warning System. For digital broadcasting, these audible signals are not necessary for system operation. However, NHK has continued to use the same audible signals, in order to alert viewers using the same warning sound. Upon receiving the EWS flag, digital receivers with the Emergency Warning System reception function, including in-car digital tuners, automatically turn on the receiver or change channel to the one providing EWS broadcasting, or show a prompt message to change channel to the one providing the EWS broadcasting.

2 Broadcasting in the Great East Japan Earthquake

2.1 About the Great East Japan earthquake

An earthquake with a magnitude of 9.0 hit Japan at 14:46:18.1 JST on 11 March 2011. Its epicentre was 130 km off the eastern coast of Sanriku, in Miyagi Prefecture and at a depth of 24 km on the sea bed. It is the largest earthquake on record in Japan. In one place it registered an intensity of 7, the highest on the Japanese seismic scale of zero to 7. Intensities of 5-lower or above were observed in wide areas of eastern Japan. In terms of intensity, it was the fourth largest earthquake in Japan since 1900.

Thirty minutes to one hour after the earthquake, tsunami waves of at least 10 metres high hit various parts of the Japanese archipelago. The maximum run-up height reached 40.5 metres. Huge waves caused serious casualties and devastating damage in coastal areas in Tohoku and Kanto, facing the Pacific Ocean. The earthquake also caused liquefaction and land subsidence in wide areas.

Strong shaking and the tsunami triggered a nuclear crisis. Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station lost all its power sources. The plant became unable to cool down its reactors. This resulted in Japan's worst ever nuclear accident, with massive leaks of radioactive material into the air and the sea. Even now, the areas surrounding the power plant are off limits and many people are forced to live in temporary accommodations. There are serious concerns about how radiation can affect people and foodstuffs. This raises the need for long-term responses.

As of 9 August 2013, the disaster left 15,883 people dead and 2,656 missing. In all 126,483 houses were destroyed and 272,287 others damaged. The Japanese government estimates the damage caused by the disaster at about 17 trillion yen or about 170 billion dollars.

2.2 Damage to broadcast facilities

2.2.1 Damage to remote-controlled cameras

Broadcasters in Japan have remote-controlled cameras installed along the Pacific side of the Tohoku region (Aomori, Iwate, Miyagi and Fukushima prefectures). Whilst these remote-controlled cameras served as an extremely useful tool for the initial emergency newscasts, the cameras themselves suffered serious damage from the earthquake and tsunami on the day of the quake, 11 March 2011. According to NHK, two of its 36 cameras installed in the region collapsed and were submerged by the tsunami and 21 cameras became unavailable due to power outages.

One example of a completely lost camera is the "Onagawa camera" installed along the coastline near the Onagawa nuclear power plant, on the Oshika Peninsula, which is located on the east side of Sendai City. Directly hit by the tsunami, the camera was destroyed, along with the steel pole it was attached to (Figure 6). Other remote-controlled cameras of 4 commercial TV stations installed at the same location were similarly damaged.

FIGURE 6

Damage of "ONAGAWA Camera" destroyed by the tsunami

2.2.2 Damage to transmission sites

On the day of the Great East Japan Earthquake, broadcast transmission sites in the earthquake-stricken regions were severely damaged.

NHK had 810 digital TV, 1179 analogue TV and 44 medium wave radio transmission sites in the earthquake-stricken regions on the day of the Great East Japan Earthquake. After the earthquake, 182 digital TV, 351 analogue TV and 7 medium radio transmission sites ceased operation, mainly due to power cuts. Most of the transmission sites were recovered by emergency power generators. As shown in Figure 7, two digital transmission sites were washed away, along with many households in their service areas by the tsunami.

Iwate Broadcasting Company (IBC) made every effort to continue radio broadcasting. Some IBC staff went to the radio stations to refuel the generators. The ordinary routes to the stations were damaged by the earthquake and engulfed by the tsunami. Therefore, the IBC staff had to go on foot, with heavy loads and try some detours to the stations (Figure 8). Sometimes these routes were blocked by heavy snow.

The Tokyo Tower analogue television antenna, which served more than 13 million households, was damaged by the quake (Figure 9). Fortunately this did not affect its service area too seriously and it was repaired temporarily and continued operation until the analogue switch off on 24 July 2011.

FIGURE 7

Digital TV station washed away by the tsunami

FIGURE 8

IBC staff member walking to a radio station

FIGURE 9

Damage to the "Tokyo Tower" analogue antenna

2.3 Disaster reporting

Following the severe disaster on 11 March 2011, the broadcasters continued emergency broadcasting for longer than had been experienced before. Emergency broadcasting continued for several weeks after the disaster and the broadcasters had to continue this in a very trying and unprecedented situation.

NHK is the only public, statutory broadcaster in Japan. Under the Broadcast Act, NHK is under an obligation to broadcast early warning emergency reporting in times of natural disasters such as earthquakes and tsunamis. However, the other (commercial) broadcasters also provided emergency programs. All commercial broadcasters refrained from TV and radio advertising for several days after the disaster occurred. Nevertheless, disaster reporting continued, as shown in Figure 10.

FIGURE 10

Nippon Television Network Corporation reporting from the disaster area

Disaster reporting by NHK and commercial broadcasters provided the public in Japan with plentiful and accurate information. It enabled the people in Japan to rightly determine how to act in the situation of unimaginable catastrophe.

The authorisation process to licence broadcasting stations was also changed, to fit the emergency situation. Some broadcasters were licenced temporarily and promptly, to offer emergency broadcasting utilizing existing equipment, such as community FM radio, or newly-established temporary equipment. Those efforts of broadcasters widened the service area so that more people became able to obtain vital information, such as the location of food and water supplies and names of evacuated people in shelters. Many volunteers and local government officials contributed to the operation of these local radio stations (Figure 11).

FIGURE 11

**The Studio of "Natori Saigai (disaster) FM"
established at Natori City office building, Miyagi prefecture**

2.3.1 NHK disaster reporting

In the event of a natural disaster, NHK aims to mitigate the impact by delivering accurate and timely information.

When the earthquake occurred at its focus at 14:46:18.1 JST, NHK's General TV was broadcasting Diet Deliberations live. Twenty-two seconds later, a seismograph set by the Meteorological Agency in Ishi-no-maki City in Miyagi Prefecture observed the first seismic wave. Nine seconds later, the Agency issued an Earthquake Early Warning[25]. At the same moment, NHK aired the warning on all its channels.

One minute and 59 seconds after the earthquake occurred, NHK suspended regular programs on all its channels, and began broadcasting emergency news. NHK aired tremors live, as captured by remote-controlled cameras, together with newsflashes on how different areas were being shaken. Fifty-four seconds later, NHK received information that the quake measured an intensity of up to the maximum of 7.

Three minutes and 45 seconds after the earthquake, the Meteorological Agency issued a major tsunami warning. Nine seconds later, NHK began emergency broadcasting of the major tsunami warning. NHK repeatedly aired estimated places, times and heights of the tsunami, telling people in coastal areas to evacuate at once. NHK kept on broadcasting VTR images that captured the moment the quake hit different areas and live footage captured by remote-controlled cameras at various places in the Tohoku region.

Twenty-seven minutes after the earthquake, a remote-controlled camera at Kamaishi port in Iwate Prefecture captured sea water slowly beginning to submerge the land. Several minutes later, remote-controlled cameras at various other places began filming the moments massive tsunami waves reached land. Huge waves were sweeping away cars and water was rising rapidly, engulfing streets and towns.

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[25] The Japan Meteorological Agency, "Quick Report of Great East Japan Earthquake and Tsunami", *A Report on Natural Phenomena at the time of Disasters*, No 1. 2011.

About one hour after the earthquake, a cameraman on board an NHK helicopter broadcast live from the air how huge tsunami waves were running up on land, hitting buildings and swallowing them, one after another. The huge stream of debris went on engulfing plains. This unbelievable and shocking live footage was broadcast not only in Japan, but all around the world.

Massive aftershocks continued. Many Earthquake Early Warnings were issued. NHK received images from various sites, depicting damage caused by the earthquake and tsunami. In the Tokyo metropolitan area, a fire broke out at a petrochemical complex. Public transportation systems were paralyzed. About 100,000 commuters were unable to go home, and remained stranded on the street. NHK reported all this live. When night fell, NHK obtained footage of a fire engulfing the city of Kesen-numa in Miyagi Prefecture, from a Ground Self-Defence Force's helicopter.

Shortly after 19:30, NHK aired a newsflash, that the government declared a Nuclear Emergency Situation at Fukushima Daiichi Nuclear Power Station. At 21:30, the government issued an evacuation order. From that time on, NHK found itself having to report two extremely serious situations simultaneously: the disaster caused by the earthquake and tsunami, and the nuclear accident. The initial emergency news program, that started with the first Earthquake Early Warning continued non-stop for 43 hours.

During the week that followed, NHK continued disaster reporting on NHK General TV, BS-1 and Radio 1. NHK set Educational TV as the channel for information on missing persons. In this way, NHK continued conveying necessary information to viewers and listeners. For those who had no access to television or radio services, NHK streamed General TV programs on the Internet.

In covering the nuclear accident, NHK positioned itself outside the 30 km evacuation zone. NHK used their helicopters to film reactor buildings, and activities to drop water over the buildings to cool down the reactors. Each of the helicopters is equipped with a Hi-Vision (high-definition) camera with anti-vibration functions. NHK attached a telephoto lens to this camera and installed a filter, in order to provide the clearest images for the viewers.

As for the nuclear accident, NHK was unable to cover news within 30 km from the nuclear power plant, as the area is a compulsory evacuation zone after the nuclear accident. Therefore NHK sent helicopters every day to cover the nuclear power plant. NHK filmed the plant from the air, above a location at least 30 km away from the plant. NHK used cameras with lenses of a magnification of x42, set on anti-vibration tables. To broadcast clearer images captured by helicopters, NHK enlarged and sharpened images, by putting them through digital processing at NHK's news centre (Figure 12).

As the nuclear power plant lost the electricity used to cool down its reactors, fire fighters and members of the Self-Defence Forces sprayed water from fire engines. At that time, NHK was able to report the activities in the best possible way under restricted conditions.

During one month from 11 March, NHK devoted about 77 per cent of its entire broadcasting hours, or 571 hours 52 minutes, to programs related to this serious disaster and the nuclear accident. That was more than twice as many as those provided to cover the Great Hanshin-Awaji Earthquake in 1995.

FIGURE 12

Image transmitted from a helicopter (shot at 30 km away)

2.4 News gathering in emergencies

Broadcasters in Japan have the resources and facilities to carry out news coverage across the country, including utilising helicopters and remote-controlled cameras.

Remote-controlled cameras

The broadcasters have remote-controlled cameras set up throughout Japan. For example, NHK has more than 460 remote-controlled cameras. These cameras, or "robot cameras", are installed mainly in highly-populated streets, intersections, coastal areas, highways, major terminal stations and nuclear power plants, so that they can be used not only for covering incidents and accidents, but also for reporting earthquakes and tsunamis, typhoons, traffic information, weather information and even nuclear accidents. Video and audio signals from these cameras are transmitted to the nearest broadcasting station via a microwave link or optical line. Cameras are operated and controlled through a dedicated phone line.

In addition, live streaming images from each remote-controlled camera are continuously collected at the broadcast centre in Tokyo, and footage over the previous 12 hours is stored in a storage system. Each remote-controlled camera is continuously connected to the broadcast centre in Tokyo via a virtual private network, using public IP lines, such as FTTH, ADSL and ISDN. Images are compressed in real time by an IP encoder, to about 50 kbps to 384 kbps and then transmitted. Footage and live images from each camera stored in the broadcast centre can be retrieved by simple GUI operation and replayed from the desired point in time. Thus, the broadcasters have the ability to immediately air footage from remote-controlled cameras, as the first reported images in an emergency newscast. For urgent news, footage from this system is used first, although the image quality is low. Within a few minutes, a microwave link or other lines are established and the broadcast can be switched to HDTV high-resolution images.

Most of the remote-controlled cameras have batteries, so they may cope with a minor power interruption. Therefore, they were able to capture the scenes from the moment the earthquake occurred, until the arrival of the tsunami, from various directions, despite the large-scale blackout. The duration of the batteries currently used is about 2 to 4 hours, but the remote-controlled cameras faithfully kept filming the earthquake tremors and how the massive tsunami arrived, without being affected by the loss of power supply in the disaster areas. By using microwave links similarly equipped with batteries, it enabled the shocking footage of the arrival of the tsunami (Figure 13) to be broadcast live. In covering the earthquake and tsunami, images from these remote-controlled

cameras, powered by batteries was the only source from which information was gathered, except by the helicopters.

However, even the power supplied by the batteries was depleted in the evening, putting many remote-controlled cameras out of commission. Meanwhile, there was one camera which had been hit by the tsunami, but continued operation. The "Hachinohe-port" camera survived, being the only working camera along the Pacific coast of the Tohoku region. The camera is installed on the rooftop of a six-story building owned by Hachinohe City, Aomori Prefecture. Based on lessons learned from the past experience of tsunamis, a private power generator was installed on the fifth floor of the building. In addition, a pump to supply fuel from an underground fuel tank to the power generator was placed in the room protected by insulated double steel doors. As a result, the private power generator worked successfully. As the remote-controlled camera equipment was also powered by this power generator, the "Hachinohe-port" camera was able to maintain operation, while the surrounding area lost power for more than a week. It became the sole remote-controlled camera installed along the Pacific coast of the Tohoku region since the evening of 11 March, when many other cameras failed due to blackouts and power loss from batteries.

In order to maintain emergency newscast capability using remote-controlled cameras, most of the damaged robot camera equipment is now restored and additional remote-controlled cameras have also been installed. Through this experience, the broadcasters have started examining how they can better respond to longer power outages, for example, by using a larger capacity battery or by introducing a new power supply system, such as a small generator, solar power or wind power as alternatives to battery power. Increasing remote-controlled cameras further will also be considered and more disaster-resistant locations for these cameras will be studied, so that the system will be strengthened to capture earthquakes and tsunamis more accurately than today.

FIGURE 13

Footage of the moment the tsunami arrived captured by the "KAMAISHI" camera (live broadcast)
(The caption says: Tsunami Warning added; East Kagoshima, West Kagoshima, Okinawa.
The map on the bottom of the screen shows where Tsunami Warning was issued)

Satellite OB vans deployed

After the earthquake, the power supply was cut off for many hours in almost all the areas in the Tohoku region. This considerably limited the operation of microwave-relay links. In such a situation, the use of satellite outside broadcast (OB) vans was particularly useful at this initial stage of the disaster.

Figure 14 shows where NHK's satellite OB vans were at work on the evening of 12 March, one day after the earthquake. When the disaster struck, its 46 vans were mobilised. Seventeen of them rushed to the areas hit by the earthquake and tsunami.

For nearly two weeks after the earthquake, mainly relay resources in coastal areas were hit hard, and evacuation centres nearby, were mobilised. The big problem was fuel. There was practically no fuel available in coastal areas.

For disaster reporting, the power of on-vehicle transmitters is usually kept on, so that it can be possible to broadcast live or send news reports at any time. However, to economise on the use of fuel, the power for all devices was removed, except for those used to communicate with the broadcast stations. The power would be turned on only when the transmitters were used to go on air or send reports. For a while, the broadcasters had fuel transported from other regions, such as Nagoya or Tokyo to refuel their vans.

It was also extremely difficult to secure a means of communication between OB vans and broadcast stations. Cellular phones could hardly be used, as service providers set restrictions on calls. Some broadcasters have a license to use microwave wireless links. But this did not solve the problem. More than 40 satellite OB vans, always on the move to gather news, and the helicopters, always flying to gather news, had to use the same wireless channel for communications. This made it difficult to communicate with OB vans. After a while, it became gradually easier to use cell-phone text messages, though using cell-phones themselves remained difficult. Therefore cellular text messages were used to send notices to all and keep in contact with one another.

Another important challenge was safety management of reporting crews at sites. As the days went by, reconstruction work progressed. The broadcasters were reporting more from areas hit hard by the tsunami. But as aftershocks continued, they needed to give the highest priority to the safety of reporting staff.

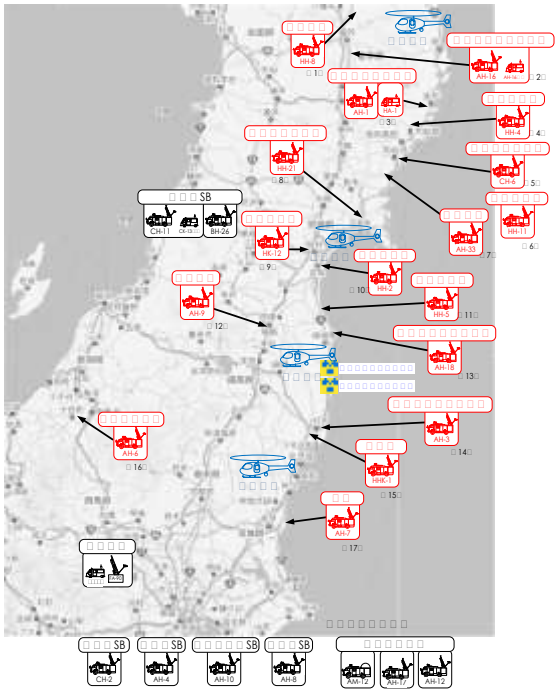
For example, NHK set the following as safety guidelines:

– NHK will not report from areas inundated by the tsunami.

– NHK does not broadcast live, or send news reports by satellite OB vans, from the places considered unsafe. Those who hope to broadcast live from such places will have to seek the approval of those in charge at relevant NHK broadcast stations.

FIGURE 14

Where satellite OB vans were deployed one day after the earthquake



Helicopters

Broadcasters in Japan have helicopters across the country for emergency reporting. Those helicopters are indispensable to shoot accident or crime scenes from the air and cover rescue activities by fire fighters or the Self-Defence Forces.

NHK always has 14 helicopters standing by in 12 locations. One such NHK helicopter became the only one among those from other television networks to be able to take to the air and made it possible to provide a live report of the tsunami engulfing the city of Sendai in Miyagi Prefecture, near the epicentre. The camera on board the helicopter filmed, from the air, how black tsunami waves were running up the Natori River, about 4 km south of Sendai Airport, engulfing fields and houses (Figure 15). This live footage shocked not only Japan, but the entire world. By analysing images taken from this helicopter, scientists found the tsunami waves were propagating at a speed of 20 km/h. The helicopter was unable to return to Sendai Airport, as the airport itself had been engulfed by the tsunami (Figure 16). So, it continued to gather news from the air, and landed at Fukushima Airport two and a half hours later.

The earthquake also caused damage at many places in Tokyo. The helicopters in Tokyo were used to report the fire at the petrochemical complex and in streets flooded with commuters who were unable to go home.

FIGURE 15

Running up of tsunami filmed from the NHK helicopter
(The caption on the top centre of the screen says: Tsunami Warning; in East Kagoshima, will be at 5:10p.m., 1m height. The list in bottom left describes the observed tsunami: in Soma Port, at 3:50 p.m., over 7.3m, and other regions follow)

FIGURE 16

SENDAI heliport was hit by the tsunami

2.5 New broadcasting techniques and operations in emergency

2.5.1 Information on missing persons

Immediately after the earthquake, broadcasters in Japan started to broadcast information on missing persons. They thought people would feel an immediate need to make sure their relatives or friends were safe. The broadcasters began accepting information by telephone and began broadcasting it. Several days later, some broadcasters also began broadcasting lists of people accommodated at each of the evacuation centres.

NHK began broadcasting such information on Educational TV and NHK FM at 18:45 on 11 March (Figure 17). Additionally, NHK's homepage, "NHK Online", also began providing such information. NHK also made the data available on NHK Data Broadcasting, so that people could search missing persons by inputting their names (

Figure 18). NHK also linked up with Google's internet message board service, "Person Finder", to give people online access to the information NHK gathered.

Iwate Broadcasting Company, (IBC) first informed the names of 48 people who were evacuated at the Kamaishi Port Office, Ministry of Land, Infrastructure, Transport and Tourism, at 11 p.m. on 11 March. The Kamaishi Port Office was struck by the tsunami and isolated until IBC first got in contact by satellite phone. The names of the people evacuated were read by the staff of the Kamaishi Port Office on the satellite phone. After that, IBC collected lists of people in the evacuation centres and it read out every person's name. On 13 March, IBC started to publish the lists on its homepage. It recorded 1 million views a day on 18 March and over 20 thousand names were listed at that time.

FIGURE 17

Broadcasting information on missing persons
(Names, places and messages are displayed)

FIGURE 18

Screen for searching safety information on data broadcasting
(Software keyboard for searching names is displayed)

2.5.2 Streaming services for the internet

Some broadcasters began streaming their programmes live on 11 March, the day the earthquake occurred. This was to offer emergency news and information about people's lives and properties for those people in areas hit by the disaster and for those who have no access to television or radio broadcasting. The broadcasters did this with the cooperation of video service providers.

The live streaming of TV programs was done via video service providers, for example, Ustream, Yahoo! Japan and Nico Nico Douga. In the case of NHK, its General TV service via the Internet recorded access from more than 36-million people (Figure 19). By streaming TV programs via video service providers, the broadcasters were able to avoid a high concentration of access on their homepages. This also enabled them to keep offering essential information on their homepages.

As for radio programs, wire circuits for delivering radio programs from Tokyo to Sendai were cut off. Therefore, some broadcasters started to provide their radio programs via the Internet. For example, NHK streamlined Radio 1 programs on 48 kbps on the Internet. It recorded access from about 920,000 people.

After a while, the broadcasters terminated their on-line streaming, as they were broadcasting increasingly more programs for which they had no approval for distribution on the Internet (NHK ended its streaming services on 25 March). While the broadcasters were offering streaming services, they had never offered any programs for which they had no approval. The broadcasters interrupted streaming, whenever such programs were being aired.

FIGURE 19

Streaming of NHK programme (via Ustream)

2.5.3 Broadcasting for people with disabilities

For people with hearing disabilities, NHK started broadcasting emergency caption news 20 minutes after the earthquake occurred. NHK usually offers about four hours of caption news for such people per day. To create caption data, the speed word-processing system was utilized.

On the day of the earthquake, NHK increased its schedule of caption news, and began broadcasting them promptly. It was foreseen that NHK was going to be reporting on the disaster for many days. It was clear that it would be unable to depend solely on the speed word-processing system, because it was difficult to get enough operators. Therefore, NHK also used an automatic voice recognition system, developed by NHK Science and Technology Research Laboratories. On Educational TV, NHK extended its regular programmes to include news reports and commentaries with sign-language interpretation. Furthermore, NHK also allocated additional hours for such broadcasting. For people with visual disabilities, commentaries in sound were also offered.

2.5.4 Broadcasting for foreign nationals living or visiting Japan

Immediately after the emergency warnings were broadcast, NHK began broadcasting in a number of foreign languages, to inform foreign nationals living in Japan. Announcements were provided in English, Portuguese, Chinese and Korean on the audio sub channel. The announcements informed foreign viewers that a major tsunami warning, a tsunami warning and a tsunami advisory had been issued, and it repeatedly informed them where the tsunami was likely to hit and when. NHK already kept, in its system, pre-recorded sound data of tsunami warnings and advisories in each of these languages. When tsunami information is given on-line by the Meteorological Agency, the system automatically creates fluent comments to be announced in each of the four languages using the files. The announcements are aired on the sub channel, at the same time as an announcement in Japanese is given on the main audio channel.

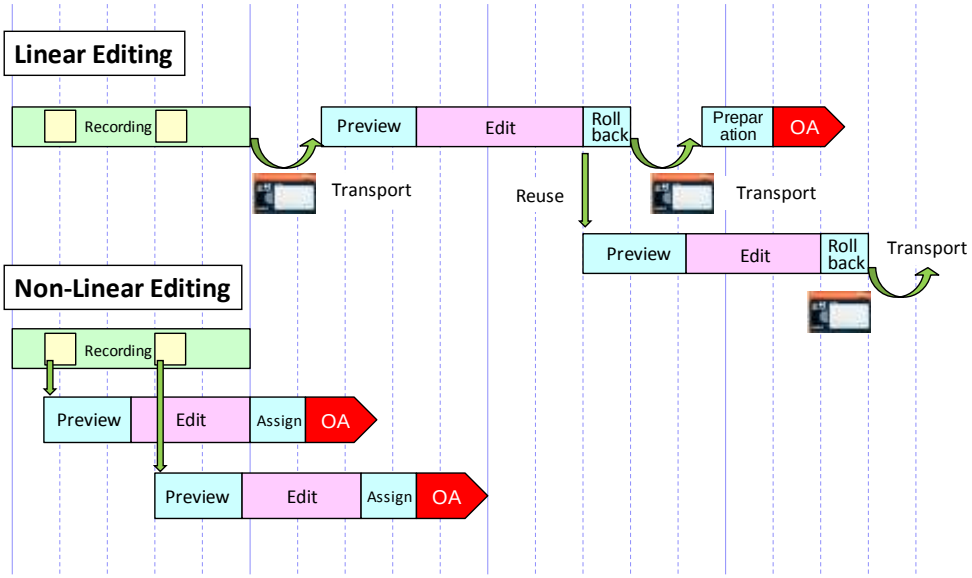
In its regular schedule on General TV, NHK offers multiplex news services in Japanese and English, in its main news programmes in the evening, "News 7" and "News Watch 9". At the time of the disaster, it also offered news in English prepared for NHK's international broadcasting network, NHK World, and on many other news programmes on General TV, using the sub channel. These news items were prepared essentially for viewers in other countries. Therefore, it may not have corresponded completely with the news prepared for Japanese audiences. However, NHK World reported a great deal on the disaster. NHK began offering these services on 15 March, four days after the earthquake, until 8 April.

2.5.5 File-based non-linear news video system

Fuji Television Network (Fuji TV), one of the major commercial broadcasters in Japan, utilised its own file-based nonlinear news video system, named "F-BINUS"[26] [27]. With this system, footage transmitted from the scene is stored in the recording server, simultaneously allowing access as material to be edited. With traditional tape-based systems, footage can be used only after the recording is completed and only single access at once is possible (Figure 20).

FIGURE 20

Editing procedure of Linear and Non-Linear systems



When the severe disaster of the Great East Japan Earthquake struck, Fuji TV immediately shifted to emergency reporting, despite its broadcast station being damaged by the long lasting earthquake. For several hours after the earthquake, only a small amount of footage had been sent via the network, so the editors had to share this at the same time. The non-linear news video system worked effectively and Fuji TV was able to broadcast the emergency reports smoothly.

However, after several hours, the amount of footage available had gradually increased. Usually, about 200 pieces of footage is sent per day - after the disaster, more than 500 pieces of footage per day were being sent. This situation continued for about one and a half months. The metadata function of F-BINUS played an essential role. Utilising the metadata, footage for on-air play-out was able to be searched quickly among the numerous footages stored. As a result, about 1,500 edited video clips a day were created for on-air play-out. The edited clips were arranged flexibly using F-BINUS's transmission user interface, which indicated footage as "cards" that programme directors could select and intuitively assign to the channels (Figure 21).

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[26] Fuji File-Based Intelligent News Production System.

[27] Fuji TV also utilizes IP-based infrastructure in its network (see Report ITU-R BT.2268).

FIGURE 21

F-BINUS's transmission user interface

2.6 The importance of broadcasting in disasters

2.6.1 Survey of media use immediately after the earthquake

According to investigations by NHK Broadcasting Culture Research Institute (Figure 22)[28], the media used for getting information soon after the Great East Japan Earthquake were "radio" (51%), "TV receiver" (21%) and "One-Seg" (19%). One-Seg is one of the features of ISDB-T, which enables TV programs to be received on mobile phones. In the disaster stricken area, the information could not be acquired from TV receivers because of power cuts. Mobile phone calls and text messages were not connected due to traffic congestion and damage to infrastructure, and this meant that most people were isolated from information. A radio receiver, which can operate for long periods with a small size battery, was the most vital device to obtain information in this situation.

According to the report by the Nomura Research Institute (Figure 23)[29], NHK TV was the most reliable source of information after the Great East Japan Earthquake, (80.5 percent of the respondents), followed by commercial TV broadcasting, (56.9 percent), and internet, (43.2 percent). These results found that broadcasting is the most dominant medium to inform the public in an emergency situation, as the information provided is reliable, accurate and prompt.

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[28] NHK Broadcasting Culture Research Institute, The NHK Monthly Report on Broadcast Research September 2011, "The Great East Japan Earthquake: How Disaster Survivors Used the Media (Japanese)" *http://www.nhk.or.jp/bunken/summary/research/report/2011_09/20110902.pdf*, Summary (English) *http://www.nhk.or.jp/bunken/english/reports/summary/201109/02.html*.

[29] Nomura Research Institute, News Release (Japanese), 3 May 2011, *http://www.nri.co.jp/news/2011/110329.html*.

FIGURE 22

Media use immediately after the Great East Japan Earthquake

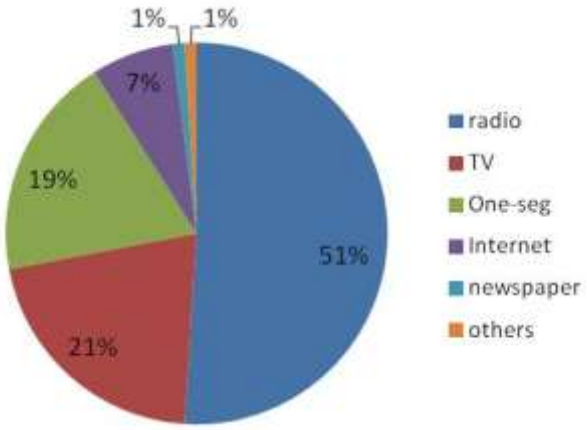
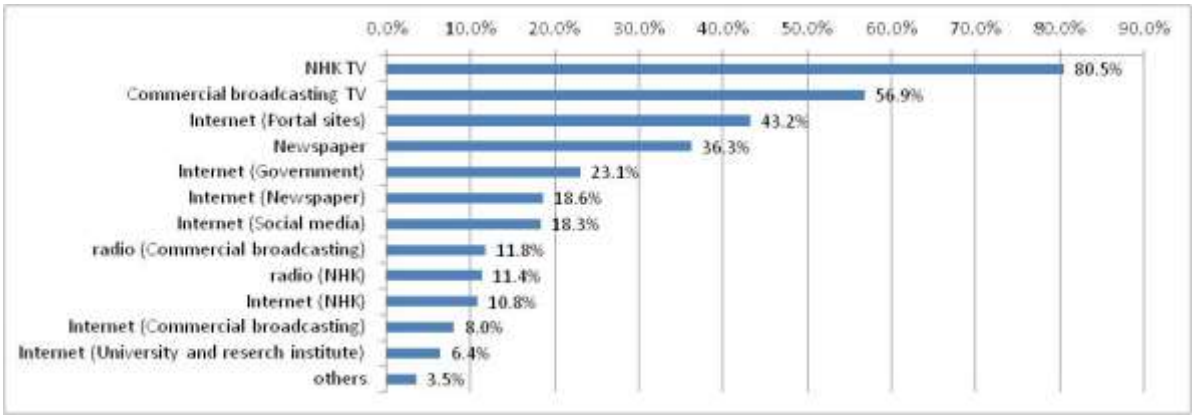


FIGURE 23

Reliability of media for information about the Great East Japan Earthquake



2.6.2 One-Seg Mobile TV saved many lives

One-Seg is one of the features of ISDB-T, which enables TV programs to be received on a mobile phone.

The following newspaper article gives an example of the use of One-Seg after the disaster[30]:

> A huge earthquake struck on March 11 in the north-east area of Japan. Right after the end of the violent shakes caused by the earthquake, Mr. Takahashi, Senior Managing Director of TOYO KNIFE (Figure 24), an industrial cutlery company located in Miyagino district, Sendai City, immediately turned on the One-Seg TV function on his mobile phone in his office, to which the power supply was cut off.

[30] Summary from Sankei Shimbun (major Japanese national newspaper), 24 June 2011.

He got an emergency warning alarm for a tsunami on his One-Seg TV (mobile phone). Regrettably his office was located very near the port (about 500m from Sendai-Shiogama Port), so he and other staff did not have much time to evacuate, but 100 people managed to rush to a shelter on a hill.

By the time they arrived at the shelter (Tagajyo Public Cultural Center) at 3:30 pm, the TOYO KNIFE office and factory had been completely destroyed by the long-lasting, huge tsunami (Figure 25).

Mr. Takahashi said "We could not watch TV because of the power cut, but we could get information on the disaster quickly from our One-Seg TVs".

FIGURE 24

Location of TOYO KNIFE by Sendai-Shiogama Port

FIGURE 25

Miyagino district, Sendai City (after the huge tsunami waves)

The following newspaper article gives another example of the use of One-Seg after the disaster[31]:

[31] Summary from Yomiuri Shimbun(Japanese major national newspaper), 29 March 2011.

Two policemen saved 40 lives from the train after receiving the tsunami warning alarm from mobile TV (One-Seg) right after the earthquake occurred at 14:46 on 11 March 2011.

They got a tsunami warning alarm from the passenger's mobile phone with TV when checking if everyone is fine in the train. They quickly decided to lead the 40 passengers to the hill to avoid the disaster of tsunami. All passengers were safely evacuated from the tsunami area before the tsunami hit the train.

FIGURE 26

Location of Shinchi Station

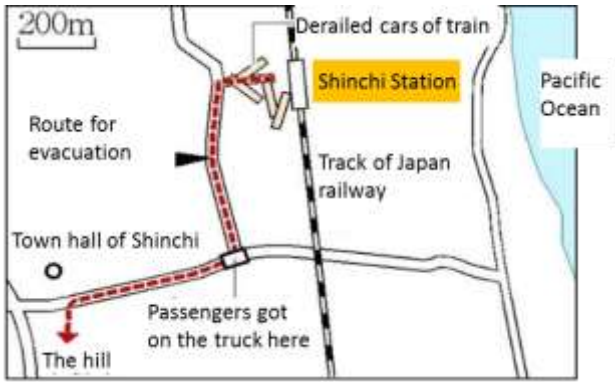


FIGURE 27

Train carriages derailed by huge tsunami waves. (12 March 2011)

Many people watched mobile TV in the evacuation centres. As power was disrupted, mobile TV was a very important information source for people in the disaster area[32] (Figure 28).

[32] Summary from Sankei Shimbun (major Japanese national newspaper), 24 June 2011.

FIGURE 28

People could see TV on a mobile phone even during the blackout

2.6.3 Donating radios and television sets to evacuation centres

Some broadcasters donated radios and television sets to evacuees, so they could have access to broadcasting. NHK distributed 10,000 radios and 750 television sets to evacuation centres in the Tohoku region, with the cooperation of JEITA (the Japan Electronics and Information Technology Industries Association). The Ministry of Internal Affairs and Communications also provided 10,000 radios to the disaster areas free of charge.

Radio played a very important role in the disaster area, as many radio receivers work with batteries and people can receive information even during a power outage. The radios were mainly distributed in areas where power continued to be unavailable.

NHK began installing television sets, starting with those evacuation centres where electricity was secured. About one month after the earthquake, such television sets were in service at 397 of the 1,147 evacuation centres. The remaining evacuation centres already had TV sets.

In delivering radios and television sets, getting fuel was again a big problem. It was also difficult to obtain such essential materials as reception antennas and coaxial cables.

2.6.4 Postponement of the switch off of the analogue TV service

Japan had planned to end all analogue terrestrial television broadcasting at noon on 24 July 2011, in order to complete the conversion to digital terrestrial television broadcasting. But for three prefectures hit hard by the disaster, Iwate, Miyagi, and Fukushima, the government announced that it would postpone the switch off until 31 March 2012[33]. The Ministry of Internal Affairs and Communications considered it would be difficult for people in those areas to obtain the equipment necessary to receive digital terrestrial broadcasting by the deadline in July.

Also, there were many households and facilities in the Kanto region, including Tokyo, and Nagano Prefecture, central Tokyo that became unable to receive digital or analogue terrestrial broadcasting because of the disaster. For them, broadcasters in Japan cooperated with the Ministry of Internal Affairs and Communications to use satellite channels to broadcast simultaneous re-runs of digital terrestrial television programming, in order to ensure that people could get access to television broadcasting.

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[33] The Ministry of Internal Affairs and Communications, "On Complete Conversion to Digital Terrestrial Television Broadcasting", *http://www.soumu.go.jp/menu_kyotsuu/important/kinkyu02_000089.html (online),* 20 April 2011.

3 Disaster resistance broadcasting

3.1 Enhancing broadcasting capabilities to maintain broadcasting

The Great East Japan Earthquake of 11 March 2011 painfully reminded the broadcasters in Japan of their vital role of protecting and reassuring the public. To carry out this responsibility, they must be able to maintain broadcasting to deliver accurate information, regardless of any disaster that may occur. With regard to the enhancement of broadcasting facilities, some broadcasters are preparing back-up systems, in preparation for a major earthquake or other disasters in Tokyo. For example, NHK is preparing a back-up system for its headquarters, at the Osaka Broadcasting Station and at other stations (Figure 29). In addition, the broadcasters have increased the number of installed remote-controlled cameras to capture footage of earthquakes and tsunamis. The power facilities of broadcasting stations and centres will also be enhanced. The broadcasters have also installed more remote-controlled cameras around the Tokyo area and also across the nation. In Watari Town, Miyagi Prefecture, remote-controlled cameras that can function solely on green energy, such as sunlight and wind, have been installed by NHK (Figure 30). NHK is currently researching whether or not these cameras will be able to function during winter, when green power generation is at its lowest. At the broadcast stations, where there is a fear of their power generators being flooded by tsunamis, basic power generators have been installed on the roof (Figure 31). The broadcasters are strengthening their power supply facilities so that they can continue broadcasting even during a disaster.

FIGURE 29

Enhancing broadcasting capabilities

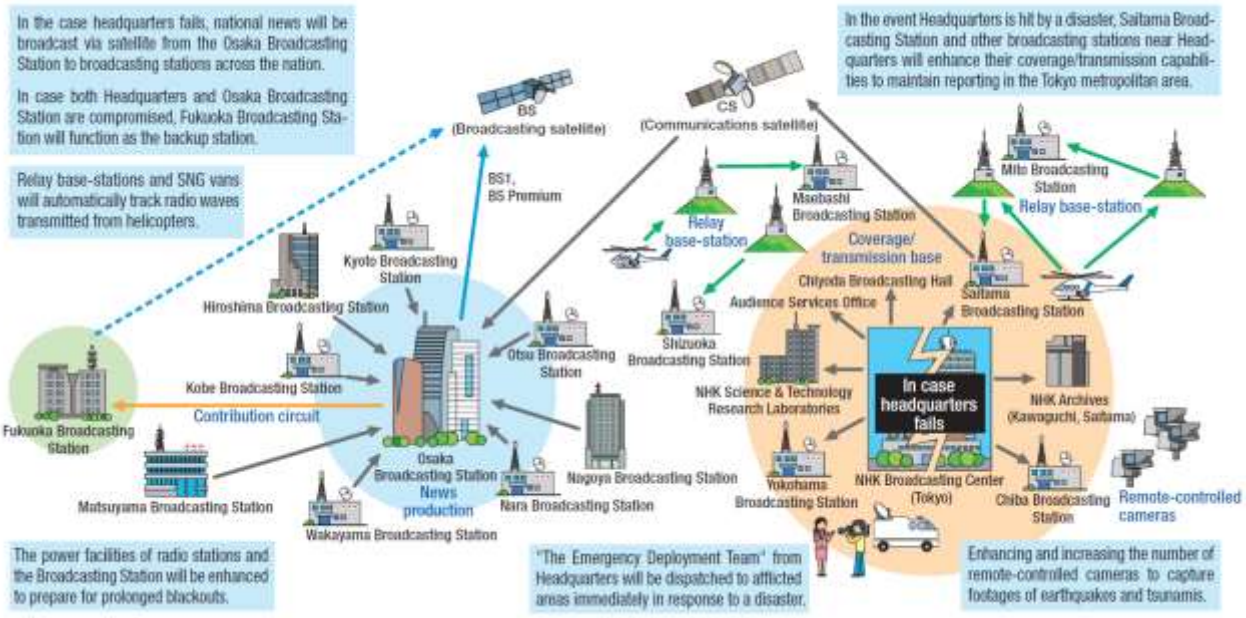

FIGURE 30

Remote-controlled cameras and solar panels

FIGURE 31

Basic power generator

ANNEX 10G

Radio Ishinomaki - Ishinomaki City, Miyagi, Japan

"When the power goes down, community radio stations are essential lifelines, particularly in the early stages of a disaster. Sadly in normal times it is not acknowledged and funding is very limited" - Masahiko Konno, Technical Director, Radio Shinomaki

Radio Ishinomaki is a well-established local commercial radio station in Ishinomaki City, Miyagi. The city was badly damaged in the March 2011 disaster and all power was lost. But the broadcast continued here using generators, which powered the station and its antenna on a hill. The power cut meant petrol station pumps were not working so the only option was for technician, Masahiko Konno, to ask locals for gasoline from their cars. After collecting about 20 litres, enough for one day's broadcasting, the tsunami struck. This meant roads were blocked, which meant, in turn, that the station ran out of fuel for its generators - it went off the air for a day and a half. While it did, the Hibi Shimbun's "wall paper" was the only operative media in the city.

On 13 March, much of the city was still submerged under almost a metre of water. The Self Defence Force transported survivors to safety on the same hill as the antenna and although Masahiko tried to get on one of the evacuation vehicles, emergency services staff thought he was a journalist looking for a story and refused. After explaining that the radio station was transmitting lifesaving information, a soldier allowed him to travel. With a microphone, camera and gasoline tank Masahiko went to the antenna, restarted the generator and began broadcasting on the hill, in the bitter cold. For over a fortnight there was no electricity; car shop owners donated extra gasoline from the tanks of unsold cars.

Eventually a temporary studio was set up in Ishinomaki's city hall so that official information could be broadcast. The city's mayor was on air regularly for over a month. The presenters took turns to read out 5,000 to 6,000 names each day, from lists of the deceased and missing persons; this saved people the effort of going to each evacuation centre searching for their loved ones. The radio station asked people with information to come directly to the studio and many locals, keen to help or to share their experiences, arrived with memos that were read out on air. The station donated 30 radios to the Ishinomaki Red Cross hospital.

The radio station is funded by commercials but the need to transmit lifesaving information was so great that no commercials were aired for weeks. As a result, the station had no revenue. Ishinomaki authorities later helped with the station's running costs, but the station has already had to make cutbacks. Ishinomaki's city authorities have decided that future disaster warnings and announcements must be transmitted by radio, not just on the public address system. And Radio Ishinomaki is taking part in local government drills for broadcasting announcements.

ANNEX 10H

Video links

http://vimeo.com/72501084 - Published on 19 August 2013.

"Bridging the Gap" - an Internews video, filmed and edited by Hawkins Ramah, written and produced by Rafiq Copeland, with additional footage from Film Aid. Dadaab, the world's largest refugee camp, on the border of Kenya and Somalia, is a makeshift home to more than 400,000 people. In this transitory city, the need for reliable, accessible humanitarian information was identified by Internews in 2011 as a critical need for a more effective humanitarian response.

http://www.youtube.com/watch?v=AP6vZRz6e54 - Published on 1 July 2013.

An account of the broadcasters response to the tornado that devastated Moore, Oklahoma, by University of Oklahoma Media Arts Professor Scott Hodgson and his students and features interviews and never-before-seen footage on broadcasters' efforts before, during and after the storm.

http://www.youtube.com/watch?v=L7VLFjaAmBM - Published on 2 July 2013.

A video by Global News about the floods in Southern Alberta, Canada, assembled by Jimmy Lee from Global Calgary's Creative Services department.

http://www.youtube.com/watch?v=jRWQIxLFUHw#t=36 - Published on 24 April 2013

A video jointly produced by the Broadcast Education Association, the University of Oklahoma and the University of Alabama about broadcast coverage of Super Storm Sandy in October 2012, which struck the eastern seaboard of the U.S.

http://www.youtube.com/watch?v=I8c3TZoIEgM - Published on 7 February 2012

A video documentary by the University of Oklahoma media arts professor Scott Hodgson and his students, along with Chandra Clark, professor of telecommunications and film at the University of Alabama, about residents that heeded the warnings of ABC 3340's meteorologist regarding the imminent danger from the tornado that struck Tuscaloosa, Alabama on 27 April 2011 and took shelter in a nearby church.