

DVB Emergency Warning System (EWS)

How to use DVB standards to create an Emergency Warning System.



What is DVB EWS?

The capability to inform a wide audience of immediate dangers such as earthquakes is a relevant feature for every broadcast system. The Emergency Warning System defined by DVB provides the necessary mechanisms to distribute relevant information to the general public in case of emergencies.

The necessary signalling for DVB EWS is defined in the DVB Service Information (SI) standard [1] in combination with the Specification for Video and Audio Coding [2]. These two documents describe a general solution, which can be used worldwide to deliver warning messages to the end user. The solution can be implemented easily and provides sufficient flexibility to be deployed over all broadcast channels: terrestrial, cable, satellite and IPTV.

Background

Despite continuous progress in early detection of imminent natural disasters, the lead-time may still be as short as a few minutes. It is therefore of utmost importance that the widest possible audience can be informed about steps they can take to protect themselves. Broadcast channels are the best suited method to reach this wide audience in any EWS scenario.

Warning messages should ideally contain both visual and audio indications. The viewer might not be looking at the screen (blind person or radio listener), or the sound might be muted or the speakers not connected (deaf person or shop display). The DVB system supports an EWS implementation with the minimal use of audio messages. It is at the discretion of the local authorities and broadcasters to arrange for a scheme where the audio message is accompanied by a visual message inserted into the video stream during the announcement.

It is obvious that the signalling aspects are a necessary ingredient for any EWS solution. However, only a complete end-to-end solution from source, a seismic sensor for example, to the TV receiver is sufficient for an EWS. Such a solution must be defined and set up by a national regulator/authority, which should also act as the relevant body for triggering EWS messages. In addition, the regulator/authority is responsible for providing the necessary head end specification such that alarms can be triggered and the necessary audio messages are inserted in the broadcast. Furthermore, a receiver specification must be in place such that the receivers are reacting on the presence of EWS signalling as specified.

How does it work?

The EWS solution defined by DVB is based on DVB SI (Service Information). The Service Description Table (SDT) carries the Announcement Support descriptor and indicates the location of the service (on the same or different multiplex) carrying the emergency audio announcement. DVB-SI also provides for dynamic and automatic switching of the receiver to the announcement from any service (advertisement or programme segment). This is realised by an announcement flag provided in the Adaptation Field of the Transport Stream (TS) packets carrying the announcement audio as defined in [2]. If the announcement service is in a different multiplex, a proxy service in the current multiplex duplicates the announcement switching flag. Therefore, at all times it is sufficient for the receiver to monitor just one additional audio stream to be informed on any EWS messages being broadcast.

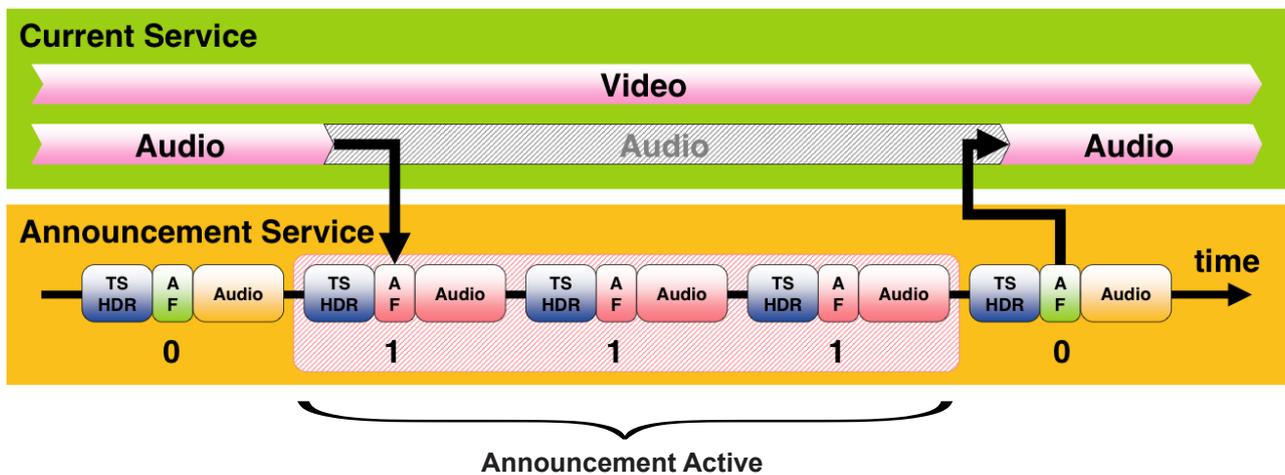
For a receiver to find and monitor the EWS signalling, the first step is to identify the Announcement Support descriptor(s), which are carried in one or more service descriptor loops in the SDT. The descriptor will point to the audio channel carrying the warning announcement. The announcement can be broadcast in four different ways:

1. In the usual audio stream of the service
2. In a separate audio stream that is part of the service
(Component tag identifies the announcement channel)
3. In a different service in the same transport stream
(Service_ID and component tag identify the announcement channel)
4. In a different service in a different transport stream
(Original_Network_Id (ON_ID) and Transport_Stream_Id (TS_ID) identify the announcement channel)

How does it work? (Continued)

As the next step the receiver has to monitor the dynamic flags, which trigger the real time announcement switching. The relevant information is provided in the “Announcement Switching Data Field” defined in [2]. This information is carried in the private data fields of the TS header adaption field as well as in the ancillary data field of MPEG audio frames. In both cases the “announcement_switching_flag_field” will indicate that there is an announcement. Typically, the receiver middleware will monitor the private data field of the TS header adaption field to detect the start and end of emergency messages. An audio codec implementation can use the same information in the ancillary data field of MPEG audio frames to adjust the audio settings to enhance syllable articulation (e.g. raise volume, and reduce surround effects). These methods enable the receiver to react appropriately to emergency situations, and make sure that it is turned on and tuned to the audio channel containing the alarm messages at the right times.

The intended behaviour of the DVB EWS receiver is shown in Figure 1 The receiver is monitoring the announcement flag (AF) in the “announcement_switching_flag_field” in the TS Header (HDR). When the announcement becomes active the flag will switch from “0” to “1”. The receiver will present the relevant audio channel either from the same multiplex or, in case of option 4, from a different multiplex. The audio announcement will be active as long as the Announcement Flag (AF) is set to “1”.



Links

[1] ETSI EN 300 468: “Specification for Service Information (SI) in DVB systems”.

[2] ETSI TS 101 154: “Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream”.

www.dvb.org/dvb-si