A National Alert and Information System using Selectively Addressable Digital Television

Reg Maling
Emergency Planning Society
Windfall 11 Chalkside Road Butlers Cross Aylesbury Bucks HP17 0TS
rgmaling@nildram.co.uk
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Introduction

The technology exists to allow Digital Receivers to be programmed with a range of identifiers giving a comprehensive method of selectively informing any group of the population by any criteria.

Basic identifiers would be a combination of Postcodes and National Grid References.

This combination provides selective addressing of TV Receivers from one TV in one house to all TVs in the whole country.

Other identifiers can range from individual characteristics such as Blood Groups (which would allow the National Blood Authority to call on specific donor types in specified areas) to occupational groups such as Farmers (which would allow warnings, as for Foot and Mouth disease, to be transmitted to every farm in a precise 3 mile radius area).

The possibility of such a system was anticipated in 1983 and an appropriate enabling Amendment provided in the Cable and Broadcasting Act (1984).

Commercial uses of the system were started in 1984 but there are no services to warn and inform the public despite many approaches to the Home Office as "Lead Department for Emergency Planning" and other Government Departments with specific responsibilities for hazard warning, e.g. Environment for Flood Warnings and Overseas Nuclear, DTI for home produced Nuclear, etc.

The United States is prone to a greater range of environmental hazards to a greater intensity than the UK. The National Imagery and Mapping Agency (NIMA) of the Pentagon is considering a similar system which could lead to a NATO Standard for Warning and Informing the Public.

The Pentagon is at a disadvantage because the Digital TV Transmission System currently proposed for the USA is not suitable for Emergency Warning.

As well as providing the UK with its own system, it could be of considerable assistance to the Pentagon if the UK offered a joint development based on the UK/European Standard.

This in turn could assist the Pentagon in demonstrating the general advantages of the UK/European system to the Federal Communications Commission and lead to the USA adopting this standard for its domestic TV system as well as for emergencies. The existence of a NATO system could provide the basis for a common world system.

Background

In the early 1980's the author's work on Viewdata and Teletext systems indicated the feasibility of programming TV sets to receive selectively addressed messages and data. This later became formalised as Data Broadcasting.

In 1983 the author heard Mr Roger Gale MP being interviewed on radio concerning the then problem of straw burning leading to clouds of smoke obscuring visibility on Motorways and other roads due to the absence of a system to provide wind direction forecasts for small areas.

The author's approach to Mr Gale led to an introduction to Mr Douglas Hurd MP, then Minister of State Broadcasting at the Home Office, and an explanation of the whole concept of Selective Addressing as the basis for a National Alert and Information System. Mr Hurd was impressed with the potential of such a National System and introduced an enabling Amendment to the Cable and Broadcasting Act (1984) then passing through the House.

During his introduction to the Amendment at Third Reading, Mr Hurd spoke of "a specialised service for Doctors and Farmers". An Opposition Spokesman interjected with, "And the Stock Exchange will get it first!" Which is exactly what happened.

Following the provision of the Amendment, there was a proposal for a Joint Venture between BBC Enterprises and Cable and Wireless. But the recommendation of BBC Enterprises was overridden by the then Director General of the BBC and the BBC

went its own way with a commercial system called Data Cast. Cable and Wireless lost interest and a commercial service was established by a JV between Air Call and Oracle Teletext using spare transmission capacity in Channel 3.

But despite the broadcasting initiative coming from the Home Office, the Emergency Planning Division of the Home Office ignored the opportunity to develop a National Alert and Information System for the Public.

Admittedly the E.P.D. was limited by its policy brief to "Providing a Warning System for Overseas Air Attack", unaltered since the 1939-1945 war.

The only countrywide system of warning the Public was the wartime Air Raid Sirens. These were withdrawn in the early 1990's, saving the Home Office £9 million per year in maintenance. Nothing was put in their place. A few siren systems were retained at the request of (and paid for by) Local Authorities where a specific hazard existed such as a large petro-chemical complex.

It is accepted that, prior to the introduction of Digital Television, Analogue TVs would need to be specially designed or have adapters provided. Such designs or adapters were justifed for commercial applications or where the benefits of early warnings outweighed the cost. It is argued that the £50-100 cost would have been trivial compared to the repair bills subsequent to flooding, for example.

However, with the introduction of Digital TV, the appropriate selective addressing facility can be provided as part of the software in the receiver.

Selective Addressing

The UK is fortunate in the comprehensiveness of its Postcodes and its Mapping. Not generally known is the existence of a unique Postcode for each house or business (or flat with its own letter box), comprising some 25 million unique Postcodes for the whole country. This is provided by the addition of 2 digits to the common Postcode, e.g. HP17 0TS is common to 22 houses, but the addition of 1J, giving HP17 0TS1J, is unique.

UK Mapping, as provided by Ordnance Survey, is of a high standard with the positioning capability to 10cms and an overall accuracy to 1 metre.

The combination of the unique Postcode and the National Grid Reference in each Digital TV would provide the basis for a comprehensive National Message Addressing System at negligible cost.

At the time of the allocation of TV Spectrum for Public Service Broadcasting of Digital TV, the BBC was given the best coverage of the country.

Digital TV is transmitted, as its name implies, by a stream of digits comprising digits standing for Vision, Voice or Text. It is technically simple to vary the proportion of each, such that messages (as text or data) can be inserted into the normal TV Broadcast but only extracted by the intended TV Receiver.

The development of Digital TV in the UK was greatly facilitated by the formation of the Digital Television Group (DTG) comprising a highly competent membership of Broadcasters and Manufacturers working together to design and implement common standards.

The DTG is aware of the potential requirement by Government and can react rapidly given a Policy Directive.

Postcodes and Map References can be added to digital receivers by the Broadcasters as part of the normal transmissions, by the retailer at the time of purchase or by the viewer using a simple screen menu in conjunction with the remote control. Other identifiers, such as occupation, or personal characteristics such as blood groups, can be added manually by the viewer or by the insertion of a Smart or Affiliation Card into the card reader slot of the receiver.

Diverse Responsibility.

Until recently the Home Office had responsibility for Overseas Air Attack; Environment has responsibility for Overseas Nuclear, Flood Warning and other hazards resulting from environmental pollution; DTI has responsibility for UK Produced Nuclear; MOD has responsibility for Nuclear in Transport,etc.

No one of these responsibilities in isolation has justified an individual Departmental initiative on behalf of the whole country, thus leading to small diverse systems - where any existed at all. Since last year, the Cabinet Office Civil Contingencies Secretariat has assumed overall responsibility for co-ordinating the response to various threats.

The Department of the Environment has installed a few automatic voice messaging systems for Flood Warnings, but these are inadequate in coverage and usefulness. These single purpose automatic voice message systems have been provided for areas predicted as prone or likely to be flooded. Recent storms have occurred beyond the predicted areas. Hence the need for a National System based on the existing infrastructure, namely the DTV Broadcasting Network, where there is ample transmission capability for the occasional warnings.

Six years ago such a system was offered to the then National Rivers Authority, started, then dropped. The NRA then reverted to a technology which it understood, ignoring BT's ability to provide exchange based national systems, and spent many tens of thousands of pounds in bespoke automatic voice message systems with inadequate coverage and many thousands of homes left without warnings and consequential damage. The successor organisation, the Environment Agency, has commissioned a 3 year, £4 million R & D Project to examine a range of methods for Flood Warning, ingoring the obvious under its nose.

The proposed National Alert and Information System would be provided by the Broadcasters, principally the BBC, and intended to be available to all authorised Government and Quasi Government Depart ments, with those Departments having editorial responsibility for their use of the system.

There is considerable interest from the Police, with the concept of a Public Information Module being added to Command and Control. With the National Strategy for Police Information Systems (NSPIS) being implemented around the country, the Police could be the first users both for their own purposes and to assist until Government Departments and Local Authorities acquired their own capability. Departmental equipment need be no more than a Word Processor (Personal Computer) equipped with the appropriate software and a high security link to the Broadcasters.

System Implementation. Given a Government Directive, it should be possible for all new Digital TVs and Set Top Bo xes to be software equipped within a few months. In parallel would be the examination of the ease of retro conversion of existing receivers.

Digital TV offers both extra programme channels as part of Public Service Broadcasting (Free to View) and from Pay TV. For Householders content with the existing Public Service programmes provided by Analogue Transmissions (Channel 1-5), a simple Digital Adapter could be provided. This would make a useful contribution to the growing population of Digital Receivers needed before Analogue Switch Off can take place.

While the above emphasis has concentrated on Digital TV Receivers, Personal Computers can be equipped with Plug-In Digital Receiver Boards or external adapters, thus considerably widening the reception population in coverage of home and work.

Potentially, any digital broadcast receiver (Digital Audio Broadcasting, Mobile Phones, Pagers, etc.) can be programmed for Selective Addressability, but bearing in mind their reduced memory and display capabilities.

Other Uses of Selectively Addressable Digital TV

There is a wide range of non-emergency general and specialised applications once a National System is in place.

With Digital Attacks (Cyberwar) having moved beyond the purview of the Hackers - some usefully discovering weaknesses in software operating systems, others merely malicious - to State supported attempts to disable the Critical National Infrastructure (CNI), as well as cause immense commercial damage, there is a need for the immediate distribution of Virus Alerts to be followed by corrective measures. Data Broadcasting, direct to DVT Receiver Cards in Personal Computers, can perform this function for the whole country.

Conclusion

Selectively Addressable Digital Television offers a high capacity and high integrity method for the delivery of data for specific purposes to specific locations or people throughout the whole country, in real time, within a few seconds of receipt of the data.