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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Review of the Emergency Alert System	)	EB Docket No. 04-296
	)	
	)	

To: The Commission

While I have filed a reply comment to the EB Docket 04-296 FNPRM regarding EAS at the end of December last year, and late filings since (2006-02-14 the latest), there is one item of concern which was a problem in New Orleans. This is following

1) The inability to effectively distribute EAS messages in more than one language. While this was in part the failure of a Spanish language broadcaster to keep their station on the air, it also illustrates a limitation of the EAS system as presently configured.

Accordingly I wish to submit a proposal to address that issue. ~~It is detailed on the following page~~. That page is ~~can be considered an~~ Appendix C of my previous filing. Appendices A and B would be the Comment on EB Docket 04-296 section and Responses to the Plan Proposal respectively.

In brief, this proposal is to modify the use of the first J in JJJHHMM such that the header code remains unchanged for English, but the interpretation of that first J provides not only the hundreds of Julian calendar days value, but also a code for assigning a language identifier.

Some examples are given to illustrate the flexibility and to consider in applying this beyond North America. The inclusion of a Chinese example is for illustration, there have been no discussions regarding EAS with any communist country, nor are there any intentions to do so without appropriate discussions with the U.S. Government. Neither are there any intentions to discuss this matter with the U.N. or its' agencies such as the I.T.U. without appropriate discussions with the U.S. Government. As the Asian Disaster Preparedness Center in Thailand operates in cooperation with USAID, this is not considered to be U.N. controlled.

This proposed EAS header modification would need consideration by EAS manufacturers and testing to see if unexpected behaviors occurred with currently used software versions in all current encoders/decoders. Accordingly please find attached;

a) A Coding Method for Language Selection.

Sincerely,

FW Bell

Frank W. Bell

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To: The Commission

While I have filed a reply comment to the EB Docket 04-296 FNPRM regarding EAS at the end of December last year, some further information has become available. These concern;

1) The history of P in PSSCCC. and
2) The extent of capabilities of the use of SS7 (Signaling System 7).
3) The preference of NWR or NOAA to be able to use latitude and longitude in the definition of area selection.

Based on these I have made amendments to the original document with the following major revised areas

a) An improved specification for the use of P based on the need for both county sectors and country or other codes. This now has a logical scheme to be able to use latitude and longitude.
b) A proposal to develop a specification and standard for EAS messages using SS7 as a basis for the incorporation of this capability into new equipment designs. This is considered a long term plan.
c) A diagram depicting the extended Emergency Alert System relationships.
d) A section considering the security of consumer electronics.

There are also some minor improvements or additions.

Concerning the SBE comment already filed; For the large majority, I wish to add my support to that, with the following comments;

10) The "E-Chip" concept is a functionality that I am also describing. Usually it will be implemented as additional software in the receiver/STB processor and perhaps some modification to the CG (Computer Graphics) capability to display EAS messages appropriately. On occasion it may be discrete hardware.

11) The warning device concept described would be accomplished by adding to the above the ability to switch on from standby the receiver/STB/cellphone and also having a Do-Not-Disturb-Override capability. The latter may need an amendment to the SMS standard.

12) The reliability of the internet is a concern. I have been informed that ISPs do not usually have the Six Sigma reliability design that is normally found in telecomm facilities and the mid to best broadcasters.

13) The reliability of a dedicated EAS message distribution network is commented on, noting the desirability of keeping the present broadcast daisy chain as a backup. Accordingly I am requesting leave to make a later filing of the amended comment.

Yours truly,

Frank W. Bell PMP, CBTE, CBNT

Implementing a World Emergency Alert System Program

Frank. W. Bell 2006-02-21

In North America is an emergency alert system (EAS) which is the only system that alerts the general public by immediate or slightly delayed broadcasts on all radio and TV stations. A familiarity with this system is assumed of the reader, otherwise read EASINTRO for a background. This system can be effectively adopted worldwide with some improvements as noted below.

TERMINOLOGY; The Project Management Institute is in process of defining the standard definition of a program. In the interim I shall use the dictionary definition. This is more than a project because:-

1) Especially in the later implementation phase, there will be many projects with their own approval, budget, etc to implement this World Emergency Alert System.
2) There are multiple, rather independent, deliverables. They only depend on the implementation of the national plans for deployment. A project has normally one deliverable or a batch of similar deliverables.
3) This involves a large amount of standards development in engineering standards committees. It is rare that any project requires any development of a standard.

SCOPE STATEMENT --------------------

INTRODUCTION; The version 0 of the EAS protocol, which is currently in use, is designed for the U.S. only. Some of the following items are for a new version suitable for worldwide application. Others are improvements that are already in the process of being implemented for version 0, but may be reconsidered in some aspects for the next version. Yet others are perhaps not in need of reconsideration, and are included for completeness. The implementation varies amongst the states, with California being the most technically advanced.

CATEGORY CODING; The categories of emergencies and messages are very comprehensive. The only improvement I can suggest is to give lahars, dam failures and sliding bogs the same code as flash floods.

REGIONAL CODING; This is PSSCCC. EAS uses a two digit regional code SS, which is adequate for North America and counties/provinces CCC are another three. The P was originally intended to be the first character of a country code and smaller countries would split to share the next character similar as is done for airplanes. In the implementation, P was defined as 0x00 (hexadecimal 00) (binary 00000000). More recently however the P has been assigned to be used for county sector coding. ASCII is the definition format with 0 (0x30) being the whole county, 1 being the northwest sector, 2 the north, 3 the northeast, 4 the west, 5 the central, 6 the east, 7 the southwest, 8 the south and 9 (0x39) the southeast. I suggest that 0x3A be reserved for the East 3 sectors unless the latitude and longitude area defines a smaller area. Similarly that 0x3B be the North 3 sectors, 0x3C be the East 3 sectors, 0x3D be the South 3 sectors, and 0x3E be the whole county. Also that 0x3F be reserved to mean that only the latitude and longitude area definition will apply, however that should only be used when county officials are satisfied that enough EAS decoders have the correct latitude and longitude of their position entered. This range 0x0-0xF is the last 4 bits of that byte. The FCC also wished to reserve 10 to 16 but these are not ASCII characters and so this is not currently implemented. The SCTE reserved 0x30 to 0x3F. To assign subdivision codes to large countries seems desirable so in order to avoid conflict with software installed in the U.S. I propose;
0x00 - 0x0F Reserved (possible Antarctic, oceanic or space use)
0x10 – 0x1F China
0x20 – 0x2F Australia
0x30 – 0x3F USA as at present
0x40 – 0x4F Canada
0x50 – 0x5F Russia
0x60 – 0x6F Brazil
0x70 – 0x7F Argentina
This would be followed by the present SSCCC 5 digit code.

In order to provide for a country code, I propose that country codes start with bit 7 set to 1. This gives provision for country codes to be assigned as proposed below;
0x80 – 0x8F non-American and Caribbean countries.
0x90 – 0x9F non-American and Caribbean countries.
0xA0 – 0xAF non-American and Caribbean countries.
0xB0 – 0xBF Reserved so as to avoid compatibility problems with EASv0 software.
0xC0 – 0xCF country codes including Caribbean and American not included above
0xD0 – 0xDF country codes
0xE0 – 0xEF country codes
0xF0 – 0xFF country codes with next character being another country character, for small countries.

Some governments may derive their regional coding system from the zip or postcode system. This has the advantage that regular users usually know their zip/postcode, and when configuring their equipment can enter this. As some postcode systems are alphanumeric, this should be provided for in the user interface and format definitions. The final digits zero meaning a region broadcast may require some tweaking of the coding system e.g. using last digits ZZ if 00 is a zip/postcode number assigned. If ZZ is assigned, then perhaps 99 is not. In the U.S., the last digit is the county sector, divided into 9, with 0 meaning the whole county. That aspect of implementation needs further research, and the original design may be adequate worldwide. The countries are responsible for devising their identification scheme and if their assignment is unworkable, e.g. not enough characters in a country split character assignment, this is a matter to resolve as the standard is being finalized. The last byte shall have the last 4 bits assigned as above. The purpose of this is to make a definition such that one version of software shall apply to all EAS decoders in the world of that make and model, except if the country code is in the software rather than locally configured.

The seas and oceans, for administrative purposes, are currently divided into 19 areas. These are called METAREAS and, except for the ones called ARCTIC OCEAN and ANTARCTICA, the area is listed by Roman numeral, plus perhaps an N or S. This does not include freshwater areas such as the Great Lakes that are in the U.S. FIPS code. Also countries can include their economic zone of the sea in their country divisions. The U.S. has FIPS codes for these areas.

LOCATION DETERMINATION; For their jurisdictional purposes, emergency managers issue alerts based on their state or county EMO (Emergency Management Office). Counties may be divided into 9 sectors of north, middle, south and also east, central, west. While this is understandable for their management, this has a limitation. While the public almost always know what state they are in, and usually know what county they are in, I would expect that a survey asking which sector of the county they are in would not result in a score much greater than the random probability of 12%. So this would show that the public would need to have an education program and sources of information as to what their home and work state, county and sector codes are.

A goal of the EMO and of EAS design is to be able to implement SAME (Specific Area Message Encoding) successfully so that as much as practicable, only the selected people receive the message and others are not disturbed. When most messages are irrelevant, the public is inclined to ignore the relevant ones. An alternative approach is to focus on the use of latitude and longitude to define the selected area. This may be as rectangles where two co-ordinates define the rectangle, and where more define a polygon. I suggest an upper limit of eight points to the polygon to ensure that processing capabilities are within limits for small and reasonably priced units. Precision of the determined latitude and longitude should be such that the number of digits entered after the decimal point (preferred) or of the minutes and seconds (not preferred as it is more difficult to process) shall be compared to the message specification with the last digit being rounded up and truncated down. This gives two answers, and if either is yes or the state, county and sector codes are an affirmative, then the message shall be played to the recipients for the range 0x0-0x9 as above, and if latitude and longitude data is valid, the range 0xA-0xF shall be based on latitude and longitude only. Because of liability concerns and communication of intent, it would be best if the latitude and longitude specifications be made by the relevant Emergency Management Office rather than a communications vendor such as DBS or SDARS companies. Cellphone tower sectors can be decision making points for the SMS EAS messages to be broadcast. This saves adding software to cellphones.

Latitude and longitude are becoming of increasing interest with the decreasing cost of GPS receivers. Many of these have serial interfaces and the standard format for position data is NMEA 0183 www.nmea.org. Latitude and longitude data can be derived from street addresses using internet map services. Some of these used to display the latitude and longitude in a decimal format, but none do so now. Reintroduction of this is a matter to consider. The zip +4 postal areas are fairly small in urban areas and the Post Office could be asked to provide translation to latitude and longitude for example on their web site. This would not be appropriate for rural and security addresses.

Another source of latitude and longitude values are topographical maps, which a few people have, and cadastral maps (property surveyors maps), which local governments have. So local governments can add this data to the property tax bill given a reasonable implementation time.

The E911 Phase 2 extensions for cellphones are adding fairly precise positioning capabilities. While this might not be latitude and longitude, it should be practicable to add a translation capability in the network and cellphone menus so as to provide this to the cellphone users without adding a GPS in the cellphone. A few cellphones have GPS, but it adds to the price. This might not be available as a standard serial data format from the cellphone to another device which can receive EAS, necessitating manual transfer. To provide this translation for a small number of single requests for emergency services or individual users should not be much added processing for the cellphone companies. However to apply this continuously to a city of with moving cars would be a considerable amount of processing. So for vehicles I recommend that GPS be the preferred means of determining latitude and longitude. With the increasing installations of navigation on vehicles, it is becoming more desirable to specify locations in terms of latitude and longitude. This will develop whether or not EAS makes use of and encourages this trend. It has the advantage that it is a common data format that can be transferred between otherwise independent equipment and in the process make things simpler for users. Also most people can relate to it having had military or other navigational experience. While street maps do not have the latitude and longitude printed, it is in the source data and with the increasing use of GPS in cars, this should be added to street maps except where there is a security concern.

Tornadoes are an example of where latitude and longitude should be included because the path of the tornado can be transmitted at regular intervals. This can be additional information that people can follow in their storm cellars (with a receiver). Some may even find it worthwhile to have an NMEA0183 output on the receiver fed into a computer with map software and use that progress plot to pass the time while in their shelters.

STANDARDIZATION PROCESS; The ITU (International Telecommunications Union) is the relevant standardization body for this type of system at a world level. If the UN passes a resolution directing the ITU and other relevant bodies to proceed with this, that will expedite the process. However there are a few areas in which the present EAS system can be expanded, and that can be included at the same time. They are as follows.

INTERNET; The IETF (Internet Engineering Task Force) is the relevant standardization body here. It seems appropriate for two port numbers to be reserved for this protocol. High ones appear preferable. E.g. 64k -16. One port is for the data, last bit zero, and the other for the audio, last bit 1. A full RFP needs to be developed, but at present the approach to consider is that ISPs will broadcast WEAS messages to their local customers and themselves if local. The WEAS messages will be derived from the WEAS network, not the Internet. Also all routers should be hard or default coded to prevent messages of WEAS to be transmitted to or received from the general Internet, probably based on this port number. This will prevent hacking and minimize unnecessary Internet traffic. Routers typically have a CON (console) DE9F RS232 port that would be fine for the data. This port is rarely used at present. Audio could be input via a phone jack but that would give it a 7 or 8 bit telecomm data format sampled at 8 kHz. This will not sound so great on a Hi-Fi. Two alternative inputs would be an XLR-F or screw terminal analog balanced with a reference level of +4 dBu (dBm unterminated) or a 75 ohm terminated BNC as an AES/EBU audio of 16 bits sampled at 48 kHz. As AES-EBU is stereo, the audio shall be carried identically on both channels. These two will sound quite satisfactory on a Hi-Fi.

Then it is up to software vendors to take these messages received, which may include audio, and immediately bring it up to the users. Some applications may need to suppress this, e.g. newsroom computers, military, civil defense and some others. The default for the crawl is to be on top, and users may decide to move something over the top of it. This may be acceptable for more routine messages, but those with a Do-Not-Disturb-Override code shall always be on top. This code can be derived by it being a priority value of one greater than the normal priority code. The EAS audio shall override the normal computer audio, and the volume shall not be reduced with a Do-Not-Disturb-Override code. The reception of a Do-Not-Disturb-Override code shall cause activation of a device that is in a power save mode so as to reproduce the data and audio, perhaps also operate external alarms by some defined means.

IP telephones are becoming available from a few vendors. These are LAN devices rather than requiring a PBX, and the router has phone ports for the CO connections. They can also use IP telephony for long distance. A couple of vendors products do not have proper interoperability with each other so although it is claimed to be an open standard, that is not the current reality. These phones should be able to have EAS messages on their display if practicable and output the audio on their speaker. IP telephony is otherwise done using computers so the computer approach applies there.

DIGITAL CELLPHONES; These can receive messages, and WEAS messages should be included. Whether this is based on distribution from the cell site or the Internet connection has yet to be determined. Messaging pagers can be similarly approached. The CATS (City Alert Texting System) developed in the U.K. can be a relevant basis for this component. It is based on SMS (Short Message Service) a variant of email. If all of the capabilities of the CAP and WEAS proposal can be provided for by SMS, then the most appropriate solution may be a gateway between the two systems. A suitable addressing scheme needs provision, and other capabilities such as Do-Not-Disturb-Override for some message categories such as tsunami and lahars need provision. The State of California has a message system that will be upgraded to include the CAP protocol. Information about this is at www.edis.ca.gov.

MESSAGE WIDECASTING; In the U.K. the CATS system is used sometimes with a telephone message distribution system by BT. The CATS message refers to a telephone number for more details. The BT (formerly British Telecom) system gives out messages to people at the rate of a million messages an hour. Ordinarily such methods are ineffective because of the congestion that would result on the telephone network. I have investigated previously such unconventional approaches to telephone usage, and this sort of method can only be used if all the traffic were terminated in a distributed manner in local exchanges. Otherwise normal or emergency phone traffic would be disrupted. This is not true broadcasting so I am calling it widecasting. As I do not have the technical details from BT, I also may need to change the name. I am not aware of such a system being used elsewhere. This may be a useful complementary technology to consider.

ANALOG AND DIGITAL PHONES; The phone system is not at all configured for broadcast functions. However it is possible for WEAS messages to substitute for dial tone, and perhaps ringing tone, perhaps with the added note to avoid use of the phone system if possible

While there may be a place for this in SS7, the results could be achieved by telephone exchanges receiving and inserting WEAS signals locally. The questions remain as to how to reach business phones and whether this can be an extension to the caller ID system. If possible, it appears desirable for the Central Office or Local Exchange to use T1 or E1 lines (or faster) to transmit EAS data and voice to PBX systems. This may be fed to speakerphones, the PA system, and display messages on phone displays. This is not a capability that is designed into the presently available PBXs. Developing a well thought out standard would provide a basis for designing and implementing new systems that over time would be manufactured and installed. The telecomm business involves long term planning and this is a long term development.

DBS e.g. DirecTV, Echostar and Sky; As these cover whole countries, or multiple countries, a low data rate can be allocated and the STB (set top box) can decode this and relevant messages displayed and made into audio. The details of this can be made by the companies, or use a relevant standard from SMPTE-EBU. The various countries would have to transmit their data and voice to the uplink. See the video compression topic for more details.

VIDEO COMPRESSION; The DBS systems use this technology. It may be MPEG-2 (also known as DVB), DC2, MPEG-4+H.264, and VC1. All these systems can transmit EAS data, but only the latter start to incorporate means to present it with set top boxes. So standardization work is needed here. As MPEG-4 and VC1 are becoming more implemented, there is an economic incentive to move to these from MPEG-2. For example broadcasters will be able to transmit two HD channels or one HD and two SD (PAL or NTSC equivalent) channels from their transmitters. However this requires compatible set top boxes. As the analog shut-off is now decided as being in 2009, this is a reasonable time frame for this to be a conversion from analog to MPEG-4+H.264 or VC1 rather than to MPEG-2. However the way to incorporate EAS messages should be considered in an intelligent manner, appropriate to these newer compression technologies.

SMPTE, SCTE and ITU are the appropriate standardization organizations for this. The Society of Cable Television Engineers (SCTE) www.scte.org has defined a standard (J-STD-042-2002) which includes a section on how MPEG-2 shall handle EAS data. I could find no definition of how it shall handle EAS audio. I am enquiring of SCTE about this and the implementation at present. That there is some progress is of benefit for the development of standards for MPEG-4 and VC1.

CABLE TV; This is going through a transition from analog to digital also. The implementation of EAS here would benefit from the compression standardization previously mentioned. Then EAS messages would appear as a crawl over the program instead of switching the video to the EAS message only. That is a more elegant and viewer acceptable method. Cable TV and phone companies are also starting to compete with the phone companies offering fiber to the premises that include perhaps 500 TV channels, faster internet than cable modem, as well as phone service. Cablelabs is the standardization organization who produced the DOCSIS standard used worldwide. SCTE also defines relevant standards.

LIPSYNC; Amongst other sources, video compression systems are liable to introduce lipsync errors. This is that the sound is not delivered at the same time as the corresponding video. This is a problem for viewers. While in itself, this is outside the scope of this subject, it is an additional limitation to WEAS of existing video compression systems. MPEG2, DC2, MPEG4/H.264 and VC1 are all relevant systems. It may be advantageous to the implementation of this proposed standard in these systems to combine efforts with the effort to implement solutions to the lipsync problem. As I am on the Compression Committee of SMPTE, this relates to both of these problems.

XM or satellite radio; This has multiple audio channels on one satellite transponder. More than one may be used, but the situation is similar to DBS and can be handled as such. This is called SDARS (Satellite Digital Audio Radio Service).

MARINE; The maritime situation is covered by the Global Maritime Distress and Safety System (GMDSS) which interfaces to EAS as it presently exists. This interface needs to be maintained with the new system. Also INMARSAT has phones and data channels which could be included as there are many users on land. The division of oceans and seas is noted above.

LARGE GATHERINGS; The use of EAS in large facilities holding over 2000 people (e.g. stadiums or cineplexes of more than three screens) is an aspect to consider. These can be fully automated for "not to be disturbed" category messages. See sleeping people below. Cineplexes may have only one projectionist, so manual operation is not desirable.

AM & FM RADIO; These broadcast media are starting as a new digital format called DAB (Digital Audio Broadcast). In the U.S. this is called HD radio. A variation of this is becoming adopted for shortwave called DRM (Digital Radio Mondiale). This means that the digital codes can be processed by the microprocessor without requiring a modem. That is an additional cost and power consumption. This point is increasingly applicable to other implementations also. The modem tones presently used will become redundant and a unique form of alert to humans as the actual data transmission is kept digital. These radios will usually have a small display and the EAS message text can be displayed there.

FM analog broadcasting has a capability known as RDS (Radio Data System) internationally www.rds.org.uk and a variation known as RDBS (Radio Data Broadcast System) in the U.S. by the National Radio Standards Committee (an NAB and EIA partnership organization) www.nrscstandards.org. It transmits at 1187.5 b/s added to the stereo multiplex. EAS data can be transmitted on this data stream, although the throughput is lower. This data can be put on a small text display. This is an interesting application, which some may want to mandate for more expensive FM receivers. The cheapest ones are less than $3 and do not have a display, and may only be mono. However to mandate this would be to overlook that over 70% of radio listening is done in vehicles, where there is little or no opportunity to read a small scrolling or crawling display. This data would be better applied to determining whether the vehicle is located in the area of interest to the message. This would be in conjunction to some navigation system. Then a beep or something could alert the driver to a message which might be on some heads up display. Also whether this analog system would remain in service with an FM DAB station is not known. Basically I am advocating that better research of the applicability be done and that customer education be provided, perhaps as public service ads, rather than simply focussing on rulemaking or legislation as a solution. This was otherwise used to provide station playlist and other data which consumers could find desirable if they knew this was possible. While it may seem desirable to transmit the voice message at less than real time or using .WAV or .MP3 file formats so only the selected recipients can have the message presented to them, this would require extra memory and processing capability. While this is not ruled out, it should be studied further before a recommendation is made.

LANGUAGE ASPECTS; The code language is XML, a successor to HTML. This supports Unicode, which includes all alphabets. The messages can be in the local language (if not English), followed by English for the benefit of non-locals. One exception would be Switzerland, which may have their three languages followed by English. As the present EAS system is defined as 7 bit ASCII, which does not support Unicode with bit 7 (the 8th bit) set to zero. This needs to be replaced with the acceptance of all 8 bits being used. ASCII, as used in the US, can continue to be used for non-Unicode control message definitions. A multilingual limitation is that the audio message is currently limited to two minutes maximum length.

In the U.S., the multilingual aspect has become apparent as a result of Katrina when many Spanish only speaking people were deprived of EAS information as the Hispanic broadcaster was off the air. So English messages should be followed by Spanish messages for English broadcasters and others for priority messages. Also when other languages are being aired e.g. Italian programming, then it would be desirable if those languages could be used in the EAS messages. This might be feasible by having the automation system send commands to the EAS subsystem.

SENSOR INPUTS; This can be taken from whatever is determined to be suitable and translated to XML messages. This may be from county, city, state, national governments or regional organizations e.g. for ocean monitoring.

FUNCTIONS; The present EAS system is not only for warnings, watches and emergencies. It also conveys weather information. The NOAA coding system is compatible with EAS. The metric system needs to be adopted and given as alternate values if U.S. measure values are given. Also AMBER alerts can convey messages about kidnapped children. Such messages can be displayed on intelligent highway signs.

NOAA; The National Oceanic and Atmospheric Administration of the U.S. is implementing various global sensor systems. One is the ocean bottom sensors that can detect tsunamis. These sensor systems together form GEOSS which is the Global Earth Observation System of Systems and whose data would be available for weather and disaster management administrations of national governments. This is complementary to the WEAS system proposed here.

AGRICULTURE; Agricultural emergencies can occur such as foot and mouth disease, which are severely infectious and incurable. These can trigger a paramilitary form of response. So such emergency messages need to be conveyed. The U.S. plan may need improvement in this respect.

SLEEPING PEOPLE; There are already radios and TVs that can switch on when an EAS message is received. However they are uncommon. In part this is because most consumer radios and TVs are made or designed in Asia. They consider a worldwide market and at present EAS is not worldwide. However a part of the receiver must be active to receive the signal. This consumes some power, though newer electronics is more energy efficient. So with some education, this can be a matter for the public to decide according to their location and preferences. If funds are available, it may be of value to assist the development of ICs that can decode EAS and turn on alarm clock radios in the event of a Do-Not-Disturb-Override code.

While there can be ascertained which codes are could be assigned to awaken people or interrupt their activities, there is no code yet assigned to override a do not disturb setting. This needs consideration, and also cautious usage to avoid public criticism.

CONSUMER ELECTRONICS SECURITY; As this proposal to add the capability to enter the location latitude and longitude with an accuracy to four or more decimal places means that essentially the street address is defined, if not the apartment number. Also this detailed information may be part of a home theater system. There are two categories relevant. One are systems that have no easily downloaded software. The other are systems that incorporate a PC or Mac, which are capable of having spyware, viruses etc. downloaded without the user knowing. As the latter system category is insecure, latitude and longitude information should be stored in an encrypted form for only the home theater application to decrypt for EAS purposes. Also such data should only be accessed for changes by the user with a four character password, and not something obvious like a birthday or the house address.

Another aspect related to this is that consumers frequently do not register their purchases. While this reduces the likelihood that manufacturers will have to honor warranties, it also is an opportunity to improve the security of consumer electronics. The smarter devices could capture registration data including the serial number in a user friendly manner. The address can be used to determine the latitude and longitude for EAS purposes. If the equipment gets stolen, the latitude and longitude is evidence that shows where it was stolen from. The latitude and longitude should be at least to four decimal points accuracy. Also smarter equipment can "discover" other devices and serve to register them also. This is an opportunity for the Consumer Electronics Association to coordinate with manufacturers to provide easier registration and better tracking of stolen equipment.

EARTHQUAKE DAMAGE MITIGATION; This system is not a substitute for seismic building codes (such as in California, Japan & New Zealand), education of the public, and suitable emergency management preparations. At present earthquake prediction technology needs to improve considerably before it becomes suitable for an emergency alarm system. It is currently most suitable for news and background educational information. Nonetheless there may be improvements in these methods which could yield much more accurate results close to the time of a seismic event. At such time the availability of a rapid response alert system can be a rationale for widespread deployment of these technologies.

Currently, seismic events are first detected when the shock waves reach ground level above the epicenter. Then the shock waves propagate to reach locations further away at a high velocity. Observers have seen this as waves travelling across the ground. The IEEE www.ieee.org, has a number of papers published about predicting earthquakes based on observation of low frequency and very low frequency electromagnetic signals. If there is an adequate distribution of seismographs and an electronic, rapid transmission system to emergency management, these messages could automatically trigger EAS messages without the delay of human intervention. This could be a few seconds. Then people away from the epicenter ground level could receive a warning which may precede the shock by seconds or more. This may be an adequate time to take damage mitigation measures such as leave a brick building or slow a train. The Japanese warning system reportedly has a propagation time of perhaps five minutes. This indicates that there is a significant amount of human decision making in the path. This limitation may be a basis for Japan to consider migrating to the World Emergency Alert System proposed here. At the same time, there can be benefits from dissemination of the Japanese experience.

Some animals are sensitive to infrasonic sounds. This is too low for humans to hear. Sounds have been heard at locations where the shape of a ground cavity is like a horn so that it couples the sound to the air much more efficiently. These are also too high to reproduce well on a seismograph. Such animals have been observed to respond before seismic events occurred, perhaps tsunamis also. This is worth researching as it may provide another early warning method that can be used with EAS.

ROUTING MECHANISM; With the CAP protocol it is possible to electronically route the messages and generate alerts in response to sensor inputs. In the event of high priority events being detected e.g. earthquake or nearby tsunami, the alerts can be distributed automatically. This will require a decision making matrix and rules implemented in software at the Emergency Management Offices. Depending on an operator adds undesirable time to the alert transmission of high priority messages. The operator should check all such alerts and issue a false alarm notice if this is justifiable, also an operator confirmation message would be appropriate. More regular messages can await operator approval. In a radio or TV station, messages are normally transmitted at an opportune moment e.g. not during advertising. High priority messages however should be transmitted immediately. This is rather different from Internet routing.

OVERRIDE MECHANISM; In addition to the do-not-disturb-override previous, the mechanism needs adaption. In a broadcast environment, valid messages can generate a crawl on the video either automatically or by being triggered by a master control operator. The audio override is usually accomplished by a DC voltage operating a relay or logic switch to replace program with the EAS audio. This is dependent on the equipment manufacturer, and is accomplished before being sent to the transmitter.

In the DBS and satellite radio application, this needs to be done at the receiver. This is part of the reason why a standards development process is required. Receivers installed at fixed locations need to have the zip/postcode entered by the user. This should include the +4 digits for a resolution approaching the county sector definition method. The state, county and sector method should be an available method. However in reality who knows which sector their home or work are located in? It has been difficult enough to get people to know the +4 of their home zipcode. It may be possible to extract a default value from the authorization code, but that needs further research as I do not know if this is applicable to all authorization code systems. If this is so, it is included from the users' post/zipcode data when their receiver is being authorized. Satellite radio and RVs with DBS are an additional complication because they are mobile. If GPS location data is available, a latitude and longitude to post/zipcode lookup table appears to be a possible mechanism to provide for this. An unsuccessful lookup can generate an error message. Satellite radio and perhaps DBS also can transmit the latitude, longitude and radius, or rectangle or polygon to be covered, doing any lookup prior to transmission. An alternative to using radius, which is complex to calculate, is to define latitude and longitude rectangles and polygons, as previously discussed.

In internet connected computer networks, the addressing can be by post/zipcode. However as computers can be moved, an additional message specifying which post/zipcodes are in the EAS message area served. This message should also specify which is the local post/zipcode if the network configuration permits this, e.g. a single airport or hotel. This also applies for wireless LAN methods and wireless internet. It is inconvenient and liable to errors if the users are to be expected to enter the post/zipcode. While complex systems can be devised, they should be as simple as possible for the user to install. After all we live in a society where a method shown on prime time network TV to solve the flashing 12:00 on the VCR is to cover it with black tape. Also the manufacturers of $200 VCRs have not figured out that a 9v battery can solve that whereas the manufacturers of $20 clock radios have done so.

As there is no cable with DC, a voice override method is required. The best approach seems to be to have an override message transmitted amongst the data. Rather than an on or off command which may be missed in transmission, an override audio command is desirable. This could be repeated every 0.2 +/- 0.05 seconds and be effective for 0.5 +/- 0.05 seconds. This command shall be repeated for the duration of the audio message and begin 0.25 seconds before the beginning of the audio. So the omission of one will have no effect and the omission of two will have a maximum dropout of about 0.1 sec. The format of this message has yet to be decided.

HOME THEATER AND MORE COMPLEX CONSUMER ENTERTAINMENT;
These installations have at least one internet or cable TV or DBS connection normally. So it would be possible to extract the WEAS data and audio from at least one and display it over whatever local source is playing. This might be DVD, DVC or hard disk playback (e.g. Tivo). I am not including VHS as this is analog and is being phased out. All of these digital systems have MPEG-2 or DV decompression that operates on blocks. It would not be particularly difficult to have some rows of blocks replaced with a WEAS crawl. The audio could be likewise overridden. The implementation of this should be coordinated with consumer electronics manufacturers as these products are very price sensitive. However to back up the implementation, legislation can be adopted. As auxiliary data can be transmitted using this system, which may be used in some countries for stock tickers, weather, etc., the default should be that this data is not displayed by may be selected by a menu.

ENVIRONMENTAL IMPACT; As this approach is using mostly existing consumer electronics, the environmental impact of this additional function is negligible. One exception to this would be mainly home theater systems where additional software and perhaps some hardware would be needed. This would be an additional feature of future equipment. The other exception would be EAS equipped alarm clock radios that would have some additional hardware and software.

The common equipment dedicated would be additional electronics. This will consume power and when eventually scrapped, will add to the garbage/recycling volume. In order to minimize the environmental impact there, all equipment should be designed and built according to the RoHS (Restriction of Hazardous Substances) and WEEE (Waste Electrical and Electronic Equipment) directives of the E.U. This design and production variation does require learning about the problems of tin whiskers. While this legislation is not necessarily applicable elsewhere, it is better for the environment to implement this and it makes for equipment designs that are usable worldwide. The latter point also applies to usage of ISO metric preferred screws and other such standards. A major U.S. Dee connector manufacturer has the screws available in 3mm, which the Japanese can agree with (unlike their 2.6mm non-ISO metric thread).

ERROR CORRECTION; DVB and Navtex (part of GMDSS) have FEC (Forward Error Correction). This needs to be incorporated in a suitable manner also with enough delay so noise bursts and minor transmission dropouts (e.g. driving under a bridge) will have no effect. This is applicable to satellite methods such as DBS and XM radio. This can be accomplished by repeating the message with the same message number. Computer network and cellphone systems can have IPv4 or IPv6 based retransmission request protocol of packets with errors.

FIRE ALARMS; A dry contact with normally closed as the default can be provided from building fire alarm systems into building distributions e.g. internet, DBS as often used by hotels, cable TV and perhaps PBX dial/ringing tone override. Some PBX systems have paging so this is another possibility. This is not intended to replace fire alarm systems as required by building codes, but rather to augment them.

CLOSED CAPTIONING; The original captioning system on line 21 for NTSC TV is now being supplemented by a digital standard which is more flexible. At present I have no information on whether this standard or another is being adopted in the international (PAL/SECAM) areas. As WEAS may be selected by location in some applications, the original method of using a cable in the TV station to move the captioning to the top of the screen when EAS messages are transmitted, no longer applies. This functionality would have to be implemented in the set top box to either add the captioning correctly there or to convey the position shift to the TV or video monitor.

DATA FORMATS; These shall be defined. The recommendations are as follows;
Latitude and Longitude shall have a recommended format for an encoder and other acceptable formats for a decoder defined. This shall be in decimal (recommended) with the number of digits defining the precision. Decimal is recommended as the EAS decoders have to do arithmetic with this data and it eases the development of products to simplify the format.
Date; This shall be in the ISO preferred format of YYYY-MM-DD, and shall be of the date as of the time reference.
Time; This shall be in the HH:MM:(SS optional) format with 24 hours per day. The default reference time shall be UTC if another is not specified. If it is defined as of a time zone then the time zone code shall be followed by the UTC offset, all in brackets e.g. (EST +4), as the offset varies. This would make it compatible with some large computer networks where UCT is used for file times but local times are presented to the user.

REDUNDANY; As this proposal is to communicate by multiple methods, if one channel should fail, the others will provide some level of redundancy. Also, if one channel is compromised to transmit unauthorized messages, the population will note that other channels are not carrying the message and be less inclined to panic unnecessarily, suspecting a false alarm. The redundant architecture should be implemented in the Emergency Management core also. This also applies to sensor systems. The present EAS system is redundant in its core. In terms of emergency communications, there are also significant private networks, an example of which is that of the Church of Jesus Christ of Latter Day Saints (Mormons) who can reach their world membership within 24 hours with a combination of email, phone trees and foot travel. Another is that of the radio hams RACES. Emergency Managers are aware of these networks and they both provide redundancy and add bandwidth.

EQUIPMENT RELIABILITY AND MAINTENANCE; As this equipment should be able to operate for fifteen years non-stop, reliable design is important. For example, all electrolytic capacitors should be rated for 105°C or higher. Fans can be expected to fail so it is preferable if they could be changed without the equipment being switched off. Fan failures can be monitored and alerts given using SNMP or dry contact alarm outputs. Power supplies can be redundant. For example, ATX format power supplies as used in PCs are available with dual redundant power supplies, and even one can be powered by -48V so a redundant power distribution is possible. I have seen UPSs, generators, transfer switches and distribution panels fail and need replacement.

In other countries, maintenance of specialized equipment can be a problem because shipping and customs can be time and effort consuming. In-country maintenance may be a problem. An approach to this is to design and provide easier diagnostics methods. Equipment using microcontrollers or smaller microprocessor designs can not only have a capable and well documented POST (power on self test), but also design and documentation for signature analysis or boundary scan methods of diagnostics. The former can cost $2,000 for an analyzer, and the latter can be rather more specialized and expensive. Equipment using PCs as a design basis can also have cards which go in an expansion slot and display the POST code, which should be documented. In case of hard disk failure, CD or DVD burners with backup software are recommended.

Equipment to be used in non-air conditioned tropical environments should be tropicalized. Usually this means coating all the electronics and putting silicone grease in the connectors to keep water out. Desert environments require dust-proof sealing and higher temperature ratings. Also all service documentation should be available to authorized personnel using a web browser, as these can get lost. Given the data and stop format, and the proposed changes to use all 8 bits, the usual crystal attached to a microprocessor may not be sufficiently stable over the temperature range and the life of the unit. So an oscillator module that is a TCXO and has long term stability may be preferable.

QUALITY MONITORING; While the goal of six sigma is to design and produce the quality of delivery such that testing is not necessary to provide the quality. Nonetheless in reality it has occurred that inexperienced and unqualified staff, beyond equipment failures has disconnected EAS equipment. So a means of automated monitoring is desirable, preferably with some redundancy. It should not be difficult to develop software to work with multiple radio and TV receivers and cellphones and internet so messages can be sent via internet to central monitoring. This can provide monitoring of required weekly and monthly tests as well as message distribution. This will provide statistics beyond human monitoring at multiple points.

As computers will be able to transmit monitoring packets, this will considerably automate the monitoring process via the internet. Some computers can have cellphone reception and TV reception so monitoring messages can be for all distribution systems. Errors or dropped packets of monitoring messages can be accomplished via TCP/IP. All monitoring computers or devices should have an IPv6 address. This address should be included in the monitoring packet format for identification even if the packets are traversing an IPv4 network. In order to facilitate the deployment of this addressing it may be preferable to capture the data pertinent to the IPv6 address during sales, and assign the number to the equipment as it is passing through the test and configuration stage before shipping. This address can be put on the shipping carton to ensure deployment at the correct location. While this adds to the production cost, most of this can be automated which is preferable to the labor intensive method of doing this at the time of installation. Unassigned address equipment should have an initial address of all zeros.

LEGISLATION; This can be based on existing legislation with extensions for coding, internet, phones and language. The FCC EAS Rules are the most relevant legislation. That all signals and data paths that have EAS equipment installed must be accurately documented is another legislation item. That messages must be printed to provide evidence of correct operation may be another item. All the staff and contractors working on this program should be granted immunity from legal suits which may be made on behalf of disaster victims during and following this program provided they are meeting their planned implementation time plus a reasonable safety margin.

US SUPPORT; As this is a system developed in the U.S., support of this project by the U.S. government is essential, so there should be suitable co-operation.

FINANCE; As an example, the equipment for a radio or TV station is $US4840 analog or $US6460 digital with TV stations also needing a dedicated character generator and keyer to insert the crawl. The installation and maintenance at the radio or TV station is done by their engineers. This is not a significant expense for a country. The cost of the sensor and transmission system can vary widely and that depends on what needs monitoring. However having the valuable use for this monitoring adds to the value of that data, and this makes a better sensor and transmission implementation more justifiable. Standardization and the economics of scale encouraging competition will drive prices down. Also this will be a digital system as much as possible, which is a very economical technology. The effort to have the standards defined in an acceptable form would take a significant amount of time and reasonable budget.

NATIONAL PLANS; Just as states in the U.S. develop their own detailed plans, so it would be appropriate for nations (or states/provinces for large nations) to develop theirs. A category template could be useful for this development and for checking that there was adequate development of the plan and implementation checking by international experts. As the plan developed by each nation is part of the security infrastructure of that nation, then a possible mechanism for review is for the international expert or experts to do so for the English language version as written on paper, in a room with no recording devices, in the presence of a representative of the national EMO or CD organization. The recommendations shall be written in the same room and the only additional document to be removed from that room by the international expert or experts is a copy of the recommendations. It is conceivable that the international expert(s) could be a target for terrorists or enemy governments, so the possession of national security secrets is not desirable and should not be necessary.

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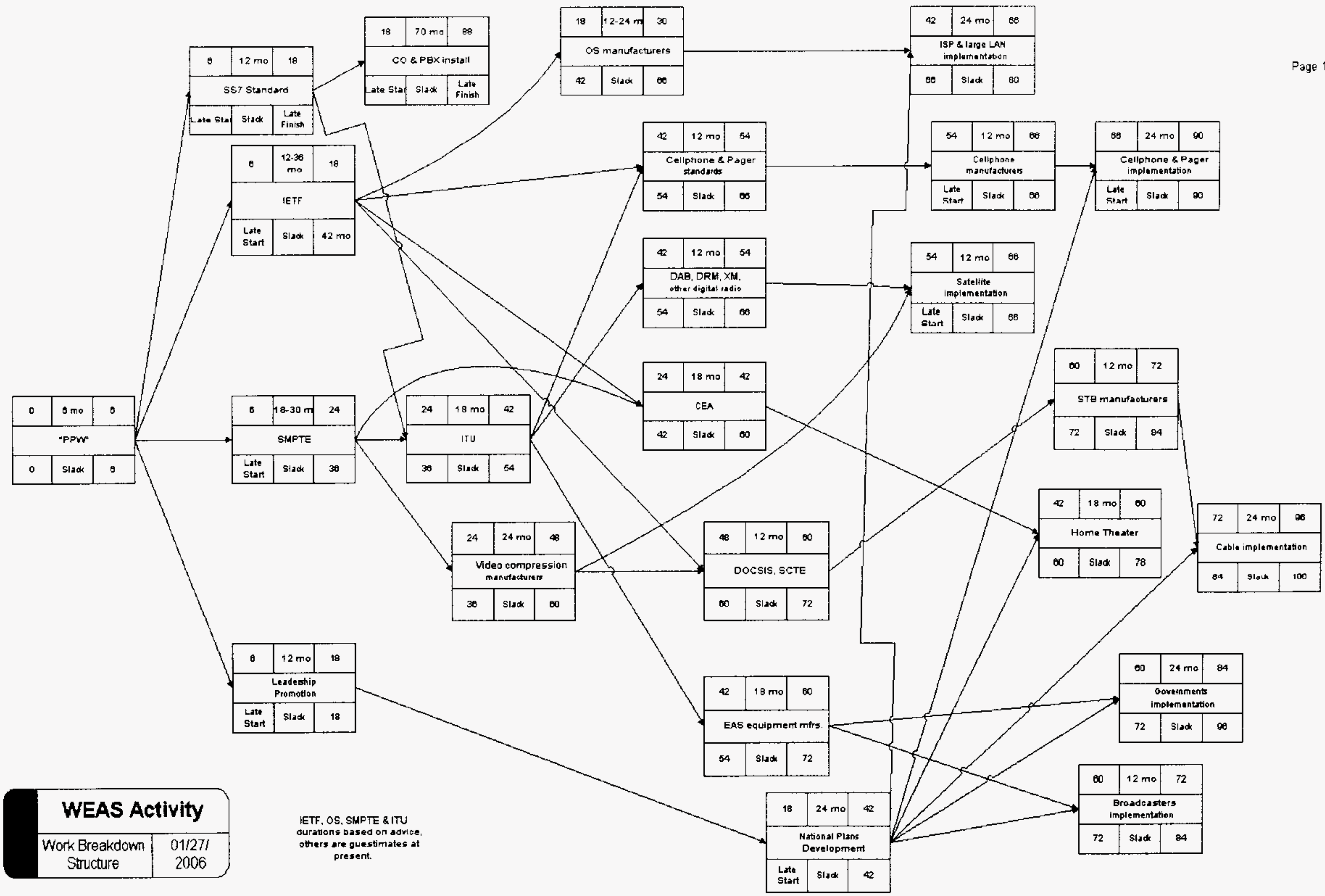
PROJECT ACTIVITY NETWORK DIAGRAM --------------------------------

This is in a separate Visio file, WEAS-sched. This should be the next page.



WEAS Activity	
Work Breakdown Structure	01/27/2006

IETF, OS, SMPTE & ITU durations based on advice, others are guestimates at present.

WBS WORK BREAKDOWN STRUCTURE.

PHASE 1 -- STANDARDS DEVELOPMENT AND PREPARATION.

"PPW"; The Partnership for Public Warning which developed the CAP (Common Alert Protocol) and came into existence during the development of the Emergency Alert System has been dissolved by the U.S. Department of Homeland Security. So I am using the quotes to indicate the association of people, perhaps as an ad-hoc group, which is equivalent to that organization. Although I have worked with someone who was involved with the development of EAS, this subject needs to be discussed with others with the approval of the appropriate authorities. There are a number of capabilities that were incorporated into the original design of EAS that may effectively address some of the points that I have raised. For example the ability to have a worldwide addressing scheme, and support for all languages. These capabilities are not in the present implementation.

The time to resolve these issues and prepare for later standards development is the first phase. I have noted 6 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate. The CAP protocol has been standardized by OASIS (Organization for the Advancement of Structured Information Standards). www.oasis-open.org.

SS7 STANDARD; The digital telecommunications signaling uses SS7, of which there are a number of flavors worldwide. This standard would need to have a definition of how EAS data and voice shall be communicated from CO (main telephone exchanges) to PBXs via T1 or E1 or higher bandwidth lines so that the PBXs can use this for PA and speaker phone announcing and (if practicable) message displaying. As nobody was prepared to offer an estimate, I have noted 12 months as a considered reasonable time to accomplish these things. Given that this is not a capability that can be added to about all currently available PBXs by a software upgrade, and that a hardware upgrade may be difficult or impracticable, the development of this as a standard is for a basis for design of future PBX and COs. This is a long term measure, but as IP telephones are not expected to rapidly replace PBXs, the future of the PBX approach has to be considered.

IETF; The Internet Engineering Task Force is to address the internet aspects of implementation. www.ietf.org. I have asked a number of IETF people for an estimate as to how long it would take to implement this phase. As nobody was prepared to offer an estimate, I have noted 12 to 36 months as a considered reasonable time to accomplish these things. This is based on a document about preparation of RFCs for the IESG.

SMPTE; The Society of Motion Picture and Television Engineers is to address video aspects of implementation. www.smpte.org. These are important later for digital terrestrial TV broadcast, satellite broadcast and cable TV implementation. Their estimate of 18 to 30 months is what I am using. Among other things, they define video compression standards. SCTE (www.scte.org and see DOCSIS) has made progress in a standards definition for an MPEG-2 system. ANSI-J-STD-042-2002. This has some unresolved questions but is an important step. It is intended for MPEG-2 application.

ITU; The International Telecommunications Union can take SMPTE standards and approve them on a fast track. www.itu.int. The time of 18 months was informed to me by SMPTE. This step is important because although SMPTE is an engineering society approved by ANSI to develop standards, ITU has representatives of countries and the authority of the U.N. to influence national governments. Also ITU can take SS7 standards developed by appropriate organizations and do likewise. While the technical details of these standards should be satisfactorily resolved before they are presented to the ITU, there are the aspects of this system that are rulemaking or legislative and also that are of a plan preparation nature. To prepare model legislation/rules and outline plans are important components to prepare this system for implementation by various countries. There is much more to this than installing equipment. Also there are the aspects of facilitating co-ordination of this between countries. This has a diplomatic aspect as well as appreciating the technology.

LEADERSHIP PROMOTION; This is the label for the activity to inform, educate and influence national governments to prepare to start their development of national plans. As nobody was prepared to offer an estimate, I have noted 12 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.

VIDEO COMPRESSION MANUFACTURERS; While it would be more precise to implement this after the ITU approval, I have put his on some faster track after SMPTE only approval. The manufacturers can most likely incorporate any ITU developments with some relatively smaller software amendments. While DVB-S is the most common standard for satellite TV, there are other formats to address with different manufacturers. Also while MPEG-4+H.264 is little adopted at present, this is mainly dependent on set top box replacement. That is a major expense for a DBS vendor. There does not appear to be any standard for the location and size of the EAS crawl. From a compression perspective, it would be best if it were defined as being on block boundaries as this should make overlay on decoded video simpler. Then terrestrial broadcasts should be adapted to be the same so that as DBS EAS crawls may overwrite them, they are at least the same place on the screen. As nobody was prepared to offer an estimate, I have noted 24 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.

OS MANUFACTURERS; These are Microsoft, Apple and the UNIX and Linux vendors. Other operating systems are specialized and not used for normal internet access. Progress is dependent on completion of the IETF standard, called an RFP. As nobody was prepared to offer an estimate, I have noted 24 months as a considered reasonable time to accomplish these things. A Linux vendor has responded that the estimated time to develop a solution is 12 to 24 months. Most of this time would be in getting universal acceptance into the kernel. Other OS manufacturers would be more influenced by the public and government support for implementation, and could be sooner.

CELLPHONE AND PAGER STANDARDS; While much of the functionality of the CAP can be duplicated in SMS, this needs resolution. Part of a solution may be definition of CAP to SMS gateways. I have already initiated discussion with the CATS (City Alert Texting System) engineering in the U.K. Progress here is dependant on the definition of both IETF and ITU standards. As SMS can only pass messages of 150 characters or less, the long messages on EAS can have a phone number for widecasting such information as CATS uses in the U.K. This would provide for things like school snow closings. It can be paid for in cellphone minutes or a unit charge by POTS (plain old telephone service). As nobody was prepared to offer an estimate, I have noted 12 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.

DAB, DRM, XM AND OTHER DIGITAL RADIO; This includes HD radio, Sirius and other satellite and terrestrial digital radio. The terrestrial approach is relevant to the Society of Broadcast Engineers of which I am a member. Most of the terrestrial standards development is by ETSI (European Telecommunications Standards Institute). www.etsi.org. I have already initiated discussion with the Sirius and XM radio engineers. Music and other channels from DBS vendors are not included as these should be addressed as part of the DBS system. They are actually unused audio channels of digital TV. As nobody was prepared to offer an estimate, I have noted 12 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.

CEA; This is the Consumer Electronics Association, www.ce.org. Their standards development is focussed on the consumer electronics aspect of systems. I have noted 18 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.

DOCSIS and SCTE; This is the data over cable standard maintained by Cablelabs and is the worldwide standard for cable modems for example. www.cablelabs.org. Progress here is dependent on both the IETF RFP and the completion of video compression implementation. SCTE, the Society of Cable Television Engineers, has released standard J-STD-042-2002 jointly with EIA, the Electronics Industries Alliance. This does make some specifications for an MPEG-2 implementation of EAS data transmission. It does not specify how the data will be displayed, a crawl like on broadcast for example. Also it does not specify how the EAS audio will be transmitted. There is a reference called an Audio_OOB_Source_ID, but that is not specified as being a PID. The implementation may bring to attention some points overlooked in the standards development. As nobody was prepared to offer an estimate, I have noted 12 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.

EAS EQUIPMENT MANUFACTURERS; Although EAS equipment will feed into the internet, the interface of voice and serial data is fairly straightforward to define. However the implementation of the WEAS standard by these manufacturers is dependent on the ITU standard definition. As nobody was prepared to offer an estimate, I have noted 18 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.

NATIONAL PLANS DEVELOPMENT; This applies to countries other than the U.S., as there already is an EAS system here. As the development of national Emergency Alert System plans are not much dependent on equipment technical details, this can proceed at the same time. The biggest dependency is that of frequency allocations for the radio equipment. A skeleton plan outline can be defined and provided to national governments for them to define the details. Also appropriate legislation will need to be configured and enacted. The FCC rules regarding EAS are the best available model for this. As nobody was prepared to offer an estimate, I have noted 24 months as a considered reasonable time to accomplish these things. I have had no input from others on this estimate.