Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 11 of the	)	PS Docket No. 15-94
Commission's Rules Regarding the	)	
Emergency Alert System	)	
	)	
Frank W. Bell	)	

Re: NOTICE OF PROPOSED RULEMAKING, Reply Comment

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Selectivity Related Issues

1) The Telecommunications for the Deaf and Hard of Hearing filing advocated for ASL (American Sign Language) to be made available to provide more detailed information

during EAS Alerts. This arises from the limited amount of information provided in the crawl, which is because of the limited duration of the FSK modem tones, which limits the amount of content. If the data was transmitted digitally, and by using a Closed Captioning scrolling method with the ability to review whole messages, would that fulfill the basic needs of this filing? A scrolling option would be an extension of current Closed Captioning along with optionally increasing the text size, having different colors for text and background, or outlining letters. These are TV features that FCC Rules should encourage. Provision of Unicode fonts for worldwide use is also desirable, and an ASCII extension filed provides for switching to Unicode. This does not preclude an organized method of providing ASL for emergency messages, perhaps organized on a national basis. This would be difficult to organize on a State basis as disasters are infrequent and 24/7 ASL staff would be needed. The distribution of ASL media may be problematic to integrate into the TV broadcasting infrastructure; but, at least initially, would be economical to provide as streaming video on the Internet. All this being stated, it is also important to understand that during an emergency, people are stressed and are less capable of processing information. So messages should be kept simple. If at all possible, select the delivery area using polygons and avoid language that people have to analyze to determine whether they are in the area that the alert is for, or not.

2) The APCO, Trilithic and NOAA/NWS filings are advocating the use of live code testing. The Named State Broadcasters Association filing is making suggestions on how to conduct live code testing. It does not comment on using digital broadcasting for EAS messages or tests that do not disturb the public. However, various other current and past filings under 04-296 have opposed such live code testing. The NY City OEM recommended that live code testing only occur two to four times a year. The occasional NPT, being infrequent and well publicized, is an exception. Nobody seems to consider that TV is now digital and that many radio stations are also HD Radio digital. This is an opportunity to rethink solutions I proposed first in 2010. By making the live code digital only, this not only addresses First Responders becoming familiar with the use of EAS, but also opens the capability of alerts to be delivered by other forms of selectivity, e.g. to polygons. By providing for polygons, many more localized alerts can be delivered without disturbing regular program content. That would make EAS more valuable, less of an annoyance to those who are not targets of alerts, and more beneficial to the public interest of providing support for funds.
3) Multilingual alerts have been regarded numerous times. One major issue is translation capability on a 24/7 basis. Mechanized translation can assist, an approach that is expected to improve. The other major issue is the distribution of alerts. Language is another form of selectivity which digital broadcasting can adapt to provide for at the receiver end. I first proposed this solution the FCC comment website in 2010. Gary Timm has (p7) strenuously opposed the multilingual survey aspect of the NPRM. This is valid given the present SECC staffing funds. Whether FEMA decides to improve this is quite relevant. When a viable technology to deliver multilingual alerts, such as I have proposed, is deployed, this issue will be practically solved.
4) User selectivity, rarely mentioned, is not provided for in the present EAS. Some people may change stations and find one that has opted out of the alert. Broadcasters, reluctant to take actions that may lose their audience, make this a problem. If EAS alerts had a prioritization scheme, like WEA, then users could “turn down the volume” by

deselecting the lower priority alerts, for example. People have many varied situations. Some are focused drivers, some are sleeping shift workers, some tired students, etc. These people need freedom to select what they consider appropriate. This does not mean they should be able to deselect life-threatening alerts. One form of emergency is school weather closings, or snow day announcements. Currently these are provided by local radio stations mostly, and the announcements can be quite lengthy. Meanwhile some people would prefer to only have regular program content instead. An adaptation of EAS to provide for this has been proposed where the alerts could be transmitted on analog radio while the HD1 channels continue regular program content. At present that unfortunately appears to be a violation of the rules. If receivers were forcibly tuned into the analog alert content, but user selectivity allowed the listener to redirect to the regularly scheduled content (except for the highest priorities), then what is objectionable about that? With digital TV, it is possible to schedule PSAs, promos or other content, e.g. at a slightly lower rate of advertisement so those not targeted for the alerts are able to continue receiving meaningful content.

5) Alaska has an average of two earthquakes a day so they often discourage discussion of EEWS with an improved EAS. Perhaps while the system was being deployed on the west coast, the implementation of selective distribution to forego over-alerting could be considered.
6) The CAP vs EAS is discussed by Gary Timm on p48-49. However this neglects the possibility of using digital broadcasting for digital data transmission and the provided selectivity.
7) The suggestion by Ed Czarnecki of Monroe to use a dummy code set for practice messages' header is useful. A schema for technically harmless codes could be:
   A. use of frequencies +/- 100Hz outside those specified at §11.31(a)(1);
   B. with a non-valid ORG code of "AAA", a
   C. with a non-valid event code of "EEE";
   D. with a non-valid PSSCCC code of "999999".
   E. with an LLLLLLLL value of "EXAMPLE" or some similar illustrative value
   F. Example *ZCZC-AAA-EEE-999999+TTTT-YYYYJJJHHMM-EXAMPLE*. The YYYY could even be 1960. This is for YYYY with digital data only, not for use with FSK tones.

Earthquake Early Warning System

10) The very rapid transmission required for an EEWS has been found impracticable by WEA, in separate proceeding 16-32. Even the use of the FEMA IPAWS server to alert near the epicenter is problematic. A regional system for this function, with the same alert also transmitted via IPAWS, appears to provide for the goal of alert delivery within 3 seconds is a most challenging alerting problem. However, an improved EAS should, and appears to be able to, provide for that. Digital broadcasting can provide more rapid alerting by data transmission. The present Japanese ETWS (Earthquake and Tsunami Warning System), as far as has been ascertained, takes over 8 seconds to deliver alerts.
11) The Wireless RERC filing did not comment on EEWS, and a reply comment with extensions would be appreciated.

Consumer Electronics

12) Consumer Electronics is rarely mentioned in any submission. However with the decreasing cost of transistors, a small addition can provide for considerable improvement in capability. This can be provided in such a manner that legacy receivers would still function in the legacy manner, albeit reducing performance and policy options in doing so. The selectivity capabilities and EEWS noted above can be implemented for a minimal cost. Then an improved EAS would become an optional feature, and not something mandated. Incorporation into ATSC 3.0 might be an exception if these matters can be resolved in a timely manner.

Standards Development

13) Engagement of Consumer Electronics Manufacturers and the development of suitable standards definitions are approaches that can succeed in the improvement of the EAS system. CAP has already started to become an ITU.int standard. There is no fundamental reason why an improved EAS could not begin this process as well. We need to recognize that consumer electronics is a world-scale business; so a world-scale EAS would need to mirror this reality. CAP is becoming deployed worldwide and has already been implemented in the countries that together contain half the worlds' population. The main issue is CAP's different profiles for different countries. It is comparatively worse than PAL-SECAM-NTSC already. Is a worldwide standard possible? First proposed in 2010, this standards development has progressed since then. My only criticism of OASIS-Open is the lack of integration for the provision of a <vehicleID> field to be included from EDXL-SitRep to improved EAS car radios (e.g. for AMBER Alert). This provision would display the plate number on the car radio screen. Mandating the design of existing consumer receivers is NOT recommended since it may become a substitute for economical and well-engineered design. However, to slightly adjust a new technology shortly before being launched MAY be mandated if the design is economical and well-engineered.
14) Another issue is EAS's categorization as an ASCII processing system, therefore without the capabilities of TCP/IP such as Unicode. A previously filed comment in March proposed an adaptation of ASCII to overcome such limitations. If Unicode can be provided for, then an improved EAS can also be adopted worldwide. The economies of scale within consumer electronics then will be applied to address the numerous problems mentioned in the notes above and within other comments.

Digital Daisy Mesh (DDM)

15) The Daisy Chain produces problems, as referred to in other comments and articles. Digital broadcasting, with TV as a Digital Daisy Mesh core, a HD Radio outer, and analog only radio stations as peripheral, is evidently a much better structure. This structure could provide delivery of messages to remote locations without overriding the local program content. Multiple languages could be delivered to radio stations for their selection. While this approach is basic; it might not readily fit all state plans. However, out- of- state broadcasters could then provide the delivery path, which would provide data carriage without interrupting regular program content. This is a more flexible option.
16) For example, most of New Jersey and Connecticut is reached by TV transmissions from the World Trade Center in New York City. So a digital EAS should be useable

for Emergency Management of those states via New York broadcasters. This should not disturb the population of the Big Apple if we utilize a Digital Daisy Mesh.

17) EEWS alerts via DDM, being data, can be transmitted and relayed rapidly, or under 3 seconds.
18) The definition of an improved EAS SHOULD allow for the data in a CAP message to be retained in the improved EAS message. This would be practically illustrated by reducing specific bytes of data to bits, in the EAS header for example. The use of <> formatting to indicate non-public content would be another useful feature. Also, including the CAP <messageID> to avoid duplication of alerts is an additional helpful feature. It would then be possible to reverse the process and regenerate an equivalent CAP message. One necessary difference in EAS and CAP would be the replacement of circles in CAP polygons with octagons in EAS for simpler processing by the 8 bit processors in consumer receivers.
19) As illustrated during Hurricane Sandy, dependence on an IP infrastructure can be problematic, as pointed out by Monroe Electronics as well. Meanwhile, only one known non-IP broadcaster went off the air, an AM radio station. This event solidifies the importance of improving EAS digitally to be a better alternative to CAP.
20) Hurricanes produce inundation, or storm surges. The NWS Hurricane Division is promising to produce valuable maps showcasing this phenomenon. However, while digital broadcasting could transmit such data, CAP may be inefficient and lack FEC (Forward Error Correction).

SECCs, State Plans and Quality Control

21) The present funding of SECCs causes various problems. Firstly, there seems to be an assumption that requirements formulated in D.C. are capable of being implemented in states where the SECC Chair may be paid for by another party. Often there is also no staff paid to address processes such as the QC process for those states.
22) The FCC is proposing a National Advisory Committee. While this would assist, it would also be limited as a U.S. only organization. So this Committee would probably be of only minor consequence to the consumer electronics industry. To contrast, OASIS-Open has been very successful in the development of CAP and the EDXL family of standards. After the ITU adopts CAP, the EDXL standards are probably going to follow. That is something the consumer electronics industry is concerned about, especially if the actual implementation can be accomplished with adding about 2c worth of memory (assuming 1 MB of code). As logically demonstrated, that definition would also work with all CAP profiles; so a radio or TV would be able to process the data in any country.
23) To analogize, the U.S. once had State Militias. They were combined to make the U.S. Military, the National Guard of each state being the modern equivalent of the state militia. Every state is certainly different, and so are the Emergency Management and the SECC in each state. The DOD now has a military that can function effectively from the North Pole to the tropics. So why cannot FEMA accomplish what the DOD has accomplished? This definitely means some standardization; but, by including variety, this should work with the current system. XchangeCore is an example of that being accomplished. What makes this more complex is the consumer electronics eventually being used. So FEMA has to go beyond the DOD and instead be an equivalent to NATO. This is possibly because, although the U.N. developed the

UNISDR, they have refused to discuss the practicalities of implementation (except for the ITU). The U.S. Federal Government has effective methodology for developing solutions in combination with local government, contractors and the public. The major impediment to worldwide implementation of U.S. developed solutions is that the U.S. has not adopted the metric system, although the auto and consumer electronics industries have. This not a major impediment, however. For example, the British military for years used kiloyards as a measure of artillery ranging, and that was not a major transition to using kilometres.

24) Military plans vary greatly; as State Plans can. The tools implemented and methodologies used for such plans need not vary much. While a variety of people benefit from EAS due to access to the State Plans (e.g. EAS Encoder/Decoder manufacturers), this does not mean they should be public. While I have accessed such plans for my research, I would not have objected if my need to know was questioned. I did not need specific details, but rather to combine them and attempt the best of breed combination while incorporating the new and improved EAS technology.

25) The FCC has had a valid need for some QC reporting, the ETRS proposal for instance. From a broadcaster QC perspective though, why is it that that a State EMO would transmit, for instance, an AMBER alert and not have any report back of the success or failure of the distribution? That is a “fire and forget” system. A whole QC technology needs to be developed; but, at present, there are not even funds for most states to have employees that monitor such a capability if it even existed. Could the IPAWS Improvement Act be applied to authorize and fund such SECC staff? If their reports could be also generated and sent to the FCC as required, and save the broadcaster the manual effort, wouldn’t that be better? Gary Timm (p8-13) has details on SEPFI and plan templates. However, the broader question of QC is not addressed, and currently it is manually made, time-consuming, and poor quality. The point about the volunteer SECCs incurring FCC legal fees is valid. Further points about the current volunteer aspects of SECCs, e.g. on p.30, are also valid. On p39, incorporating EAS into NIMS is important, but also making EAS digital for use in exercises seems to be an oversight. Whether SECCs include WEA, EEWS, IHS, and other systems is not just an FCC ruling matter; it is a staffing, funding and FEMA policy matter. The situation has greatly changed since Gary Timm and I spoke about EAS at NAB. President Obama has signed S1180, and the west coast wants EEWS. The gulf and the east coast want hurricane inundation maps, and TV broadcasters are moving towards ATSC 3.0. CAP is becoming an ITU standard; FEMA is more actively managing IPAWS. These are only a few developments. It is time for an EAS overhaul. While some of the details matter, others function under the assumption that no major changes are coming, whether or not new patentable technology is developed and involved.

26) The Boulder Regional Service Telephone Authority (PSAP) commented that EAS is not practically available for use in most circumstances. This situation is one major reason for solving the selectivity problem and making EAS more valuable to local and regional emergency management.

Security

27) The security of IPAWS is key. Unfortunately, there are many who would compromise this for more deadly reasons than a zombie hoax. This is not separate from the cybersecurity of this country. If it were within my funding capability, I would buy the

rights of Swiped by Adam Levin and provide a freely downloadable, more publicized version. The disregards to personal security mentioned in this book are major issues. An improved EAS should be part of this solution, not part of the problem.

National Activation Periodic Test

28) The National Periodic Test found issues within the current EAS and thus supports its improvement. While future digital broadcasting could obviate the need for such testing, the public needs some sort of final confirmation that their tax dollars are producing something. Therefore, this should remain even if no problems are found, for the sake of an effective QC system.

ATSC 3.0

29) ATSC 3.0 is rarely mentioned in any filing. However, the Alaska filing on p20 suggests a replacement for the EAS protocol. As broadcasting has limited bandwidth compared to the internet, efficient use of the data bits is important. Since it is possible to retain the text and audio of CAP messages in a compact, improved EAS, first proposed in 2010, this is a basis for further improvements. ATSC has a transport mechanism that can carry alerts and even awaken a receiver from standby upon reception of an alert. The similarity with the existing EAS means that it would be compatible with legacy analog-only radio stations and Public Alert receivers. The development of ATSC 3.0 is partly driven by partial South Korean implementation of ATSC 3.0 prior to the 2018 Winter Olympics. This is therefore an important opportunity since a major new broadcast technology is rarely launched, particularly one so amenable to improved public alerting to the wider market of suitable smartphone, tablets, and other devices.

30) The time frame for implementing such new alerting technology might seem short. The strong similarity of the present EAS and the improved EAS is essential to minimizing transition difficulties. When TV added color, users only had to learn two new knobs (Chroma and color phase on NTSC, chroma only on PAL). This transition could be similar, as an improved EAS could operate similarly to the present, except for new polygon selections. It would not work with legacy receivers; so the public would have to buy a new receiver with this feature to have an improved user experience. If they are buying a new receiver for ATSC 3.0 however, why not get the improved EAS at the same time?

Datacasting

31) The APTS filing illustrates many examples of datacasting. This need not replace an EAS system. The EAS header, with improvements, can be a header for datacasting, including eventCode for the datacasting format, a polygon, and the FEC format. It can be a broadcast-relay-routable form of data. This is an aspect of the Digital Daisy Mesh. These many possibilities can be made more economical for implementation into standards development. Whether this becomes merged with emergency management's use of Ham packet radios remains to be seen. While the normal ceiling of 1 Mb/s was proposed by PBS, this is an amount other TV broadcasters may not agree to. My proposal was 38.4 kb/s for TV and perhaps 1 kb/s for radio. These speeds need not require any added equipment; but they may require a software upgrade, digital daisy mesh receivers, and a data connection to the video compression or HD Radio encoder.

32) The higher data rate could possibly be used for transmitting video from a helicopter or drone to first responders with ATSC 3.0 TV tuner cards in field computers. The coverage area of TV broadcasts over lakes and the sea is usually much larger than cellphones.

FM to cellphones

33) FM reception by cellphones is possible with the many included chips, but this feature is not often activated. While this can be used for analog FM, there does not presently appear to be any reception of HD Radio by cellphones, to use of the data transmission possibility. If HD Radio is added, the improved EAS app should also be automatically included as users should not be expected to go and download it. DAB, DAB+, DRM or DMB are available on some cellphones and these could be another means of distribution of an improved EAS. The DAB, DRM and DMB methods are important for EAS in other countries.

System Reliability

34) System reliability comparisons are made in the OETS, Monroe Electronics and Triveni Digital filing. This should be sufficient to convince readers that broadcasting is reliable, and EAS improvements are not expected to be surpassed by a universal and highly reliable internet in the near future. The use of FSK, while advocated, would be improved if digital broadcast data repeated and added to the FSK content; this would result in an upgraded EAS. The reliability of EAS Encoder/Decoders is addressed in the previous filing on 03/20/2016,

Cable and Telco TV

35) For disclosure, I am a Broadcast Television Engineer formerly employed by AT&T, Comcast, ABC, and a national telecom company. Currently my TV service is by antenna and dedicated fiber from Verizon.
    A) EAS for terrestrial TV is anticipated to include new technology. This may be technology of interest to Cable and Telco TV providers which have capabilities not provided by Society of Cable Television Engineers (SCTE) standard (J-STD-042-2002). While it may be desirable to include such improvements in STB capability, it is recognized that the hardware of many STBs may not be capable of processing such capabilities, even if the software could be upgraded in others. Perhaps the solution is to include such EAS upgrade capability as included with an upgrade to ATSC 3.0 or other UHD provision (e.g. HDMI 2.0 or immersive sound). If the EAS data and audio were passed through as an option for the TV to provide the selectivity and display processing would depend on the downstream device having that capability in the future, which is not a Cable/Telco TV decision.
    B) TV via OTT or as a component of a web page, etc. is part of the question of the use of computers as distinct from STBs. Cable/Telco TV using an STB should provide an improved EAS to deliver to a TV for viewing. This includes making use of the location of the STB in latitude and longitude for polygon selection criteria. A delivery to a home theater system is included, but see the note later.
    C) Computers have multiple functions. If an improved EAS or CAP message were received by a computer, tablet, or smartphone, the operating system should be

capable of processing it accordingly while applying the selectivity criteria based on location and presenting it on the car display and audio. This is mostly an operating system issue rather than a Cable or Telco issue, who will only deliver it.

D) Home Theater systems have multiple sources, more than one of which may carry an improved EAS or CAP message. So the receiver function should be to process and present the alert selectively based on location and other criteria while avoiding the duplication of alerts. A Home Theater in an RV should be able to receive the current location data from navigation e.g. by Bluetooth from cellphone GPS or NMEA 0183 (or the decimal degree equivalent). Satellite TV is another possible source of improved EAS messages. However this covers a large area, so alerts delivered by this means or by SDRS (Sirius/XM) need to be able to use a prioritization scheme, as Ken Evan filing points out. The simplest way to implement this is by basing it on the eventCode as nothing needs to be added to the message content. While CAP provides for prioritization, this can be accomplished by adding eventCodes that have different CAP priorities.

E) The point about customers not receiving alerts related to locations they are not presently at is quite relevant. This is an important improvement to make to EAS. Alerts relating to their home location when they are some distance away, are really services better provided by social media, news, or alert service vendors.

F) The disinterest in the security certification proposal is understandable, given that cybercriminals have traditionally been quite adept at employing new methods when regulatory hurdles were effective. Nonetheless, this is a major security issue for everyone, not just EAS. So would Comcast and other Cable TV/Telco companies join forces in developing and distributing effective educational material to the public in general and more targeted to businesses and other organizations? The Swiped book is suggested as one item elsewhere. Private Public Partnership with the cybersecurity industry and government is also relevant. This is a cyberwar going on and Comcasts' and others customers are having their identities stolen, bank accounts emptied, credit cards wrongly charged, and data encrypted for ransom. These are only a few actions you need to defend against, and they can happen with data on any network. It is negligent to ignore the bigger picture.

G) I proposed a move to an IP compatible EAS in 2010, even if TCP/IP is not actually used in broadcasting. The header can be included within TCP/IP, or used over the air as a routing protocol with a Digital Daisy Mesh. CAP to improved EAS translation mostly avoids data loss and can be reversed.

H) The NAB opposition to force-tuning TV channels covering the area with EAS alerts is something that has been discussed for too long. Why it is even an issue is an indication that some Cable TV or Telco TV companies are not giving significant attention to public safety. As noted above, the Cablelabs defined a better solution in 2002; however, it does not provide the capability of 36) below. Why is this still an issue 14 years later? The NCTA and ACA objections sound unnecessary.

User Experience

36) The user experience is not a topic given much attention, despite its importance. While I have filed comments previously regarding the possibility of over-alerting smartphones

and tablets with all the various possible sources, I have not seen any other comments on the import of determining if the consumer receiver has received duplicate alerts and if we need to discard redundant alerts or content.

Other Uses of the Technology

37) One other use of an improved EAS as first outlined in my 2010 filing and developed since, is the ability to use the selectivity mechanism for distribution of varying advertisements to different receivers e.g. by polygon. For example, car dealers in different states may display and have audio for different addresses and phone numbers. There need not be an added cost beyond the different video and audio. This may require some added software in the automation system
38) Another use is the ability to use the multilingual selection capability of immersive audio to have objects that are different languages of the actors and so have user selection of language with immersive audio.
39) A problem of lip-sync has been a long-standing issue. A method to transmit an offset between the program clock used by audio and video to correct observed error is provided for.
40) Improved EAS messages at the time of clock change could correct such radio and TV clocks. That could be a solution for the flashing 12:00 that used to be seen.

In Conclusion

The decreasing price and size of transistors is enabling considerable improvements in EAS. This is better to address the higher expectations of modern public alerting. While a transition such as was initiated by the Colorado broadcast engineers who developed the current EAS is not anticipated, an evolutionary development is desirable and practical. Hopefully the changes appropriate in the FCC, FEMA, Consumer Electronics and Broadcasting can be coordinated to move towards this goal rather than some suboptimal modifications.