



Report of the 2022 CAP Implementation Workshop and Training

Background

The 2022 CAP Implementation Workshop and Training was held 19-21 September in Amsterdam, Netherlands. A Zoom Webinar was also offered by the World Meteorological Organization (WMO) Conference Services for those who could not participate in person. Both events were hosted by Alert-Hub.Org CIC and Everbridge. They were co-sponsored by the International Association of Emergency Managers (IAEM), the International Federation of Red Cross and Red Crescent Societies (IFRC), the International Telecommunication Union (ITU), the OASIS standards organization, and WMO.

The Workshop was a technical meeting intended solely for information sharing among experts. Accordingly, Workshop participants represented themselves; they did not formally represent any organizations with which they were affiliated.

The Workshop and Training events had 997 persons registered as participants. They were from 161 countries/territories, 48 international organizations, and 47 commercial companies, academic institutions, or other non-governmental organizations. Roughly 200 joined via the Zoom Webinar and 45 participated in person. The photo below shows 37 in-person participants on 19 September.



The following other documents may be also of interest:

- The [Programme](#) lists all of the Workshop agenda topics and links to the presentations;
- The list of [Speakers](#) includes speaker biographies, portraits and links to the presentations;
- The list of [Participants](#) gives name and organizational affiliation of each participant.

Report of the 2022 CAP Implementation Workshop and Training

Offers to Host the Next CAP Implementation Workshop

Workshop participants were invited to put forward offers for the location of a future CAP Implementation Workshop. The likely time frame for a 2023 Workshop is September - October.

Report Process

At the Workshop, participants agree on the process for producing this Workshop Report. The Workshop Chair, Eliot Christian, produces a draft Report in consultation with co-sponsors. The draft is shared among Workshop participants for a period of two weeks, with the Chair making revisions based on any comments received. Thereafter, the Chair publishes the final Workshop Report and link to it from the 2022 CAP Implementation Workshop [website](#).

Presentation Summaries by Agenda Item

3.1 [Risk Communications + Community Capacity Building – Case Study from Dominica](#)

The presentation for this agenda topic was given by Bapon Fakhruddin (see the [list of Speakers](#) for his biography).

This presentation focused on Dominica, one of the UN-designated [Small Island Developing States \(SIDS\)](#), where CAP implementation is under development. The context was communicating risk information in a Multi-Hazard Impact-Based Early Warning System (EWS). Bapon noted that an online survey was conducted to understand data and support needs by farming communities to enhance EWS and mobile apps for disaster preparedness. The presentation included a slide showing relative effectiveness of various mass alert notification communication systems in Dominica.

3.2 [CAP via Galileo Satellite Navigation System](#)

The presentation for this agenda topic was given by Benoit Vivier (see the [list of Speakers](#) for his biography).

Galileo, the European global navigation satellite system (GNSS), is available worldwide and will reach full operational capability in the coming months. Benoit's presentation focused on a new service whereby alerting authorities can send CAP-based alert message through the Galileo constellation. Mobile phones could then receive the emergency alerts free of charge even if other aspects of the mobile network are out of service. However, because of very limited data capacity, this would only work with predefined instructions. Benoit noted that the CAP-based emergency alerting service via Galileo is being developed through the Stellar project, run by the European Commission.

3.3 [WMO and CAP](#)

The presentation for this agenda topic was given by Adanna Robertson-Quimby (see the [list of Speakers](#) for her biography).

Adanna's presentation on behalf of WMO featured the [UN Secretary-General request of 23 March 2022](#): "to ensure every person on Earth is protected by early warning systems within five years". WMO is leading development of the Action Plan, to be proposed at COP 27. This global initiative is expected to build on the worldwide CAP infrastructure, including the WMO [Global Multi-hazard Alert System \(GMAS\)](#). Adanna noted the international [Register of Alerting Authorities](#), and

Report of the 2022 CAP Implementation Workshop and Training

reported on progress in the WMO Fast-track initiative for CAP implementations in Africa. Reference was also made to CAP training courses available online at [this link](#).

3.4 [CAP in the WMO Severe Weather Forecasting Programme](#)

The presentation for this agenda topic was given by David Koros (see the [list of Speakers](#) for his biography).

The WMO Severe Weather Forecasting Programme (SWFP) covers 80+ developing countries. Its objective is to strengthen the capacity of WMO Members to deliver improved forecasts and warnings. David stated that severe weather guidance products under SWFP are co-produced at 9:00am GMT daily by Kenya, Tanzania, Uganda, Rwanda, Burundi, South Sudan, and Ethiopia. An example "Heavy rainfall advisory message" was shown. David also noted that Kenya Meteorological Department (KMD) publishes CAP alerts ([here](#) is the KMD CAP feed in English) and he noted some challenges in that regard.

3.5 [CAP Implementation in Benin](#)

The presentation for this agenda topic was given by Diane Laourou (see the [list of Speakers](#) for her biography).

Diane's presentation began by discussing Meteo Benin and the institutional arrangements for its warning products and services. She noted key achievements relevant to CAP, which became operational at Meteo Benin on the cloud-based CAP Editor freeware in September 2021, publishing CAP feeds in French and English. Diane highlighted some challenges and opportunities in CAP implementation, and offered several recommendations.

3.6 [Updates from OASIS Emergency Management Technical Committee and OASIS Mobile Alerting Practices](#)

The presentation for this agenda topic was given by Elysa Jones and Mark Wood (see the [list of Speakers](#) for their biographies).

Elysa delivered an update on work of the [OASIS Emergency Management Technical Committee](#), which she has chaired since 2004. She began with an overview and status of the full suite of specifications from the OASIS Emergency Management Technical Committee. These include the Emergency Data Exchange Language (EDXL) Distribution Element for the wrapping and routing of structured and unstructured data, Tracking of Emergency Patients, Hospital Availability, Resource Messaging, Tracking of Emergency Clients and Situation Reporting. Elysa talked about the "OASIS Open Projects" which support shared community development of code, APIs, standards, reference implementation, etc. She also noted that OASIS Open Europe Foundation was invited to participate in the ongoing project STRATEGY EU. She commented on the EMTC CAP Subcommittee work on the Event Terms List. This was published as a Committee Note to help guide international implementers, while recognizing that many existing lists are already in place and appropriate for their audiences. Elysa ended by describing a new project within the EMTC focused on new EMTC Committee Note that will address the use of mobile device communications in combination with CAP.

Mark then delved into details about the Committee Note on Mobile Networks. An objective is to offer practical suggestions for avoiding unnecessary differences across mobile alerting implementations: to "prevent accidental incompatibility from spreading" He noted that this

Report of the 2022 CAP Implementation Workshop and Training

Committee Note for now will address only Location Based Short Message Service (LB-SMS) and Cell Broadcast (CB). Mark invites contributions from Subject Matters Experts, academia, vendors, engineers, emergency management practitioners, and others on any matter that they think is relevant. Mark also made a 45 minute presentation on this topic during the CAP Training Day.

3.7 [ITU Emergency Telecommunications and CAP](#)

The presentation for this agenda topic was given by Vanessa Gray and Amelie Grangeat (see the [list of Speakers](#) for their biographies).

Vanessa noted the roles of ITU in Emergency Telecommunications & Disaster Management. With regard to CAP specifically, she highlighted: stakeholder engagements and awareness raising; CAP regional and national training; National Emergency Telecommunication Plans; Multi-hazard Early Warning Systems; and, Emergency Telecom Initiatives and Projects. She noted that CAP will be addressed in the 2022 update of the Words into Action Guidelines on MHEWS. Vanessa also talked about the UN SG's call for all people to be protected by Early Warnings Systems within five years. In that regard, she asserted that 95% of the world's population is covered by mobile broadband networks. She reported that ITU is working on an action plan that will: promote a regulatory approach and engage MNOs; identify and share best practices and experts; deliver trainings and technical assistance; and, develop a global project and encourage financing.

Amelie presented detail on a [draft background paper on public emergency warning systems for saving lives](#). This advocates for promoting best practices in setting up early warning systems via mobile networks, using EU experience, and integrated with the use of CAP. She said it would also address identifying experts and funding to provide technical assistance.

3.8 [CAP Implementation Status in Rwanda](#)

The presentation for this agenda topic was given by Fidele Kamanzi (see the [list of Speakers](#) for biography).

Fidele's presentation was organized in three parts: Institutional Arrangement, Key Achievements, and Opportunities & Challenges. He explained that two of the key agencies for Early Warning Systems are: the Ministry of Emergency Management and Rwanda Meteorology Agency (Meteo Rwanda). He noted that Meteo Rwanda will use the freeware CAP Editor for all the indicated hazards in Rwanda. This is in testing status now. With regard to Opportunities and Challenges, Fidele explained that Standard Operating Procedures are needed for CAP Operationalization. Agencies then need to migrate procedures for early warning to new procedures that include CAP.

3.9 [CAP Implementation in Mali](#)

The presentation for this agenda topic was given by Ismahila Koumare (see the [list of Speakers](#) for his biography).

The presentation by Ismahila had five parts: Background; Current CAP Implementation; the role of Mali Meteo in Africa fast-tracking; Opportunities & Challenges; and, Recommendation. In September 2021, Mali Meteo declared operational its [CAP feed in French](#), using the cloud-based CAP Editor freeware. As part of the WMO Africa Fast-track initiative, the assistance of Mali Meteo was instrumental in implementing CAP Editor freeware in: Benin National Meteorology Agency, Cameroon Directorate of National Meteorology, Congo National Civil Aviation Agency, Guinea National Directorate of Meteorology, and Togo Directorate General of National Meteorology.

Report of the 2022 CAP Implementation Workshop and Training

Under "Opportunities", Ismahila noted that the CAP Editor Tool is easy to use, but he highlighted under "Challenges" that network connectivity is poor in some countries. Under "Recommendation", he said that WMO should encourage Met services to include their CAP alert feed URL in their entry in the Register of Alerting Authorities. He also recommended improved collaboration with local telecommunications companies as they can be very helpful for sharing weather information with the people.

3.10 [CAP Implementation at Barbados Meteorological Services](#)

The presentation for this agenda topic was given by Jonathan Alleyne (see the [list of Speakers](#) for his biography).

Jonathan began by noting that Barbados Meteorological Services (BMS) has been using the CAP system for two years. Jonathan said that CAP is an integral part of everyday national early warning system and one of the primary methods of communicating with the public of Barbados, especially in times of adverse weather conditions. He explained that BMS issues a general forecast for the entire island and Impact-Based Forecasts for predetermined zones. For each zone polygon, forecasters use a screen tool called "Apparatus" that gives dials and sliders for selecting rainfall rates, rainfall accumulations, cloud cover, shower distribution, shower duration, shower frequency and thunderstorm activity. The forecast attributes from Apparatus are then encoded to XML elements via background processes, and the forecast is disseminated via the CAP server. (Barbados Department of Emergency Management operates [this CAP feed](#) in English, French, and Spanish.) In summary, Jonathan said that implementing CAP at BMS was not very challenging given the framework already present, although maintenance of the CAP server did cause some issues during the early stages.

3.11 [Meteorological Warnings and Service in China](#)

The presentation for this agenda topic was given by Yingying Song (see the [list of Speakers](#) for her biography).

Yingying began her presentation by introducing China's National Early Warning Release System (NEWRES). She noted that there are 1.32 million Emergency Managers across 31 Provinces. This is a virtual group that includes government departments but also grass roots managers in villages and towns. At that grass roots level, warnings are conveyed through 490,000 Rural Loudspeakers plus 78,000 Rural Information Stations, in addition to dissemination via mobile communications, radio and television, emergency broadcast system, and social media (Baidu, Tencent, Alibaba, Sina, Tik Tok, TopBuzz, and Xuexi.cn). Yingying said that Tiktok is becoming more and more popular in accessing messages. (NEWRES automatically creates a video "vlog" message for the CAP warning.)

Yinying also described research by Cao Zhiyu concerning an Automatic Adaptation Strategy of Early Warning Dissemination Means. This analytic approach takes into account five factors (Warning Type, Channel, Person role, Industry type, and Land Surface) and yields a Framework of Delivery Strategy. In this presentation, she focused on the first two of the five factors. This delivery information can then be carried within the CAP message to support optimization of the means of dissemination according to local conditions. Yingying presented a proposal of a warning delivery strategy using this approach. She asserted this strategy with graded delivery of warnings would be more precise and scientific, and the economic cost of delivery would be reduced. She

Report of the 2022 CAP Implementation Workshop and Training

illustrated with two examples: one focused on Hubei Province in central China and the other focused on Fengjie County, Chongqing Municipality on the Yangtze River.

3.12 [IFRC Alert Hub and CAP](#)

The presentation for this agenda topic was given by Karin Metz (see the [list of Speakers](#) for biography).

Karin's presentation was organized in four parts: (1) What is the goal? (2) Red Cross Red Crescent's (RCRC) role in Public Alerting, (3) [IFRC Alert Hub Initiative](#), and (4) What's on the horizon? She said IFRC's Global Plan 2022 includes the statement: "We will prioritize end-to-end early warning and early action at scale". Karin explained that the RCRC National Societies are auxiliary to government and a trusted name and organization. They make a connection from the national to the local level and are leading efforts to implement [Community Early Warning Systems](#) in countries worldwide. She also asserted that the RCRC National Society should have a role as advocate for CAP. Karin noted that the IFRC Alert Hub Initiative goal is to expand the use of CAP and actionable messages for public alerting. Its core components are: to leverage RCRC's auxiliary status to engage government alerting authorities and disseminators to advocate for CAP use; to have contextualized Public Awareness Public Education (PAPE) messages integrated in emergency alerts; and, to develop a multi-hazard IFRC Alert Hub and an IFRC CAP Editor. She noted three cross cutting areas: Training and toolkit development, design of onboarding processes, research; Global level coordination (Call to Action on Emergency Alerting), the UN Emergency Warning Systems for All initiative; and, Integration into Anticipatory Action initiatives.

In terms of current status, Karin reported that IFRC is working to strengthen CAP use in 20 countries (four of which do not have CAP implemented or are in testing). She said the IFRC Alert Hub exists as a beta version at <https://alerthub.ifrc.org>. Karin also reported that the IFRC CAP Editor is expected to enter pilot testing in 2023. She concluded by stating that IFRC continues to champion CAP and is looking for collaboration opportunities and good practices.

3.13 CAP Impact Insights from Google

The presentation for this agenda topic was given by Kevin Holst (see the [list of Speakers](#) for his biography). Note: By Google policy, the presentation cannot be published.

Kevin opened his presentation by noting that CAP alerts communicate What is happening?, Where is it happening?, How bad is it?, and What actions can I take? He emphasized that because CAP alerts are standardized and structured, Google Public Alerts is able to access automated CAP feeds published by public and government agencies around the world, with the language, description and visualization provided by the publishers. This enables Google to reach users via Android notifications, Google Search, Google Maps, Google Weather (on Search) and Google Assistant.

Kevin spoke about User Experience (UX) Research wherein they involved direct users in a study. This identified four design principles for crisis products and best practices for creating hazard alerts: (1) Authoritative Content - Trust in local and government sources, (2) Easily Understandable Information - Less jargon, better understanding, (3) Visuals - Need to quickly process information, (4) Actionable - What to do and not do. His closing slide asserted that Google

Report of the 2022 CAP Implementation Workshop and Training

is committed to support the expansion of CAP around the world. (The link for Google Public Alerts sign up is <https://forms.gle/RELeweZY6kTCQePn8>.)

3.14 [Multi Hazards Risk Communication in Nepal](#)

The presentation for this agenda topic was given by Krishna Poudel (see the [list of Speakers](#) for her biography).

Krishna explained that Nepal's Early Warning System (EWS) must deal with various natural hazards (Floods, Landslides, Lightning, Earthquakes, Wind storms, Forest fires, and Transboundary air pollution). The primary organization for EWS in Nepal is the National Disaster Risk Reduction & Management Authority (NDRRMA) and the Department of Hydrology and Meteorology also has a major role. She noted some challenges of information dissemination from her media perspective, e.g., Government authorities are unable to give information about disaster to media in time; Disaster experts are not available when media require them; Authorities do not have sufficient resources and technology; and available resources and manpower are not mobilized properly. Krishna provided a list of communication channels that should be part of the management of effective communication: News Agencies, Community Radios, Newspapers, Television, Social Media, New media (online news portal), and, SMS service in mobile phones.

3.15 [CAP Implementation at meteoblue](#)

The presentation for this agenda topic was given by Leo Rocher (see the [list of Speakers](#) for his biography).

Leo's presentation opened with a slide stating that meteoblue is a precision weather company founded in 2006 out of the University of Basel, now operating internationally with customers and partners in more than 50 countries. He highlighted several reasons why meteoblue embraces CAP: Respect WMO single-voice principle for weather warnings; Going beyond weather to include floods, volcanic eruptions, earthquakes, etc.; Expanding collaboration with official actors; Driver for capacity building in developing countries; and Driver for public-private engagement. Leo explained that their CAP integration has several aspects: European official weather alerts integrated since 2017 via Meteoalarm; Extension to worldwide warnings using the sources from alert-hub.org (in 2021); Parsing CAP messages from more than 130 sources worldwide (116 countries); and Distribution via 4 channels, reaching 1M+ users daily. The four channels are: Website (<https://www.meteoblue.com>), Mobile Apps (Android & iOS), Email, and an API.

With regard to Next Steps, Leo listed: (1) meteoblue endorsed the [Call to Action on Emergency Alerting](#) and will continue promoting use of the CAP standard as a primary way to distribute severe weather warnings; meteoblue will bring private sector inputs into CAP projects and initiatives (such as IFRC's CAP editor); meteoblue will facilitate the development of alerting capabilities in developing countries by giving them access to meteoblue resources; and, meteoblue will bring inputs into further improvements for CAP through the Filtered Alert hub team.

3.16 [CAP in Italy and the STRATEGY EU Action](#)

The presentation for this agenda topic was given by Marcello Marzoli (see the [list of Speakers](#) for his biography).

Marcello talked about CAP in Italy, primarily from the perspective of the Italian National Fire Corps (CNVVF). He noted arrangements for interoperability between emergency stakeholders,

Report of the 2022 CAP Implementation Workshop and Training

highlighting agreements in place with six Regional Civil Protection Authorities (Calabria, Emilia Romagna, Lazio, Puglia, Tuscany, and Veneto).

Marcello provided an update on the STRATEGY EU action, which deals with pre-standardization in crisis management areas. This project, running from September 2020 through August 2023, involves 23 partners across a large portion of Europe. Among the main challenges are the lack of realistic environments for testing and validation of standards operational and technical interoperability and other gaps related to coordination, cooperation, logistics, and operational support in the context of crisis management. STRATEGY aims to propose, test and validate a new pre-standardization framework through the implementation of use cases involving industry, research, end users, and standards bodies. Marcello noted several CEN Workshop Agreements pertinent to emergency management. This includes the "[Guidelines for effective social media messages in crisis and disaster management](#)"

3.16 [CAP in Italy and IT-Alert](#)

The presentation for this agenda topic was given by Umberto Rossini (see the [list of Speakers](#) for his biography).

By way of background, Umberto explained that the European Parliament and the European Council published a directive on the European Electronic Communications Code (EECC) in December 2018, EU 2018/1972. Article 110 of the Directive requires all EU member states to have an effective public alarm system by June 2022. (The EU-Alert standard is ETSI TS 102 900 V1.3.1) Umberto said that the EECC Directive is implemented in Italy by a Decree of the President of the Council of Ministers on 19 June 2020: "Methods and criteria for activating and managing the IT-alert service". He described three components of IT-Alert: (1) Cell Broadcast (To send emergency messages to the population even in the event of connectivity saturation); (2) Mobile App (To send emergency messages and to instruct people in the event of a specific situation); and, (3) IT-Alert Hub (To share alarms and alerts with civil protection organizations and law enforcement agencies, traffic operators, TV and radio...).

3.17 [A CAP-enabled Public Warning Chatbot to facilitate communication during emergencies](#)

The presentation for this agenda topic was given by Rachele Gianfranchi (see the [list of Speakers](#) for her biography). She was assisted in the presentation by Koen Vogel of Everbridge/One2Many.

Rachele began by noting this work is part of the EU "[Engage Society for Risk Awareness and Resilience](#)" research project. She explained that a chatbot is software used to conduct an automated chat conversation via text or text-to-speech. To improve the accuracy and quality of its understanding of questions in text, the chatbot uses Artificial Intelligence technology. Following analysis performed by partner Tel-Aviv University (TAU), chatbots can provide communities with a useful service, alleviating overload of emergency call centers (112/911) and enhancing the capacity of responders during call surges. However, the vast majority of chatbots today provide content only for a single issue, and chatbots are not yet extensively used because of trust issues. In [this particular research](#), the chatbot is focused on CAP because it is the globally accepted protocol for public warnings and emergencies. This is especially relevant in Europe in light of the EECC Directive EU 2018/1972, Article 110, which mandates public warnings across all EU countries.

Report of the 2022 CAP Implementation Workshop and Training

Koen explained that a chatbot with information on the particular active crisis would be included in the public warning message via the CAP message, using a short URL and a trusted domain. Within the ENGAGE project, the plan is to test the chatbot in a large, public exercise simulating a landslide simulation. To accomplish this, the project needs data to “train” the chatbot and help in applying the chatbot in the trial simulation. Contact Menno Bot or Koen Vogel if you are interested in collaborating on this research project, which lasts until December 2023.

3.18 [Impact-Based Warnings and CAP](#)

The presentation for this agenda topic was given by Rainer Kaltenberger (see the [list of Speakers](#) for his biography).

Rainer started his presentation by explaining that MeteoAlarm is an impact-oriented, common framework to aggregate, display and make available hydrometeorological warnings in an easy and understandable way to the general public and to European users and re-users. He noted that the generic term "impact-oriented warning" focuses on what the weather will do in addition to what the weather will be. The warnings issued by Meteoalarm partners are published via CAP feeds and thereby disseminated to hundreds of millions of users worldwide via information providers and re-users, including Google, Apple, IBM/The Weather Company, AccuWeather, MeteoBlue, and Foreca.com, among others.

Rainer asserted there has been a paradigm shift among National Meteorological and Hydrological Services (NMHSs) toward developing and strengthening: people-centered multi-hazard forecasting and early warning systems; tailored to the needs of users, including social and cultural requirements; and disseminated over a broader set of release channels for disaster early warning. He stated that an "impact-oriented warning" has a tangible and understandable description of an expected damage scenario (information on impacts) and/or a clear advice what to do. The MeteoAlarm recommendation is that NMHSs start simple with generic damage text in the CAP description and instruction elements, telling people what the weather will do. Later, the NMHS messaging could be upgraded to comprehensive Impact-based Warnings with dynamic text generated through appropriate production processes. Rainer then delved into how to design more objective Impact-based Warning systems, with many specific suggestions pertaining to various elements of a CAP message. He ended with a set of eight take-home messages.

3.19 [Italy and the Seveso Directive](#)

The presentation for this agenda topic was given by Romualdo Marrazzo (see the [list of Speakers](#) for his biography).

Romualdo's presentation began with a slide explaining the role of the Italian National Institute for Environmental Protection and Research (ISPRA) with regard to industrial control. He noted that the European Union Seveso III directive (2012/18/EU) is aimed at the prevention of major accidents involving dangerous substances. He said that about 1,000 sites in Italy fall under the Seveso directive. In terms of Safety Management Systems, a commission is charged by Regional Fire Brigades to verify the suitability of the operator's Major Accident Prevention Policy, and part of this involves providing information to the public. Romualdo noted that there will be specific methods and protocols of managing emergency information for the workers and public concerned in the event of a major accident. This can involve sending emergency messages via CAP.

Report of the 2022 CAP Implementation Workshop and Training

3.20 [Implementing CAP in Botswana](#)

The presentation for this agenda topic was given by Samuel Ramotonto (see the [list of Speakers](#) for biography).

Samuel's presentation noted that the Botswana Department of Meteorological Services (BDMS) managed to implement cloud-based CAP editor in 2019, and BDMS now publishes [this operational CAP feed in English](#). Samuel explained that most weather hazards experienced in Botswana are heat waves, hail, heavy rains and floods. He asserted that the cloud based CAP editor tool has significantly helped BDMS to issue alerts timely and effectively. He also noted that the cloud-based version tool is free, reliable and easy to maintain as compared to a locally installed version of CAP Editor. In summary, Samuel recommends this tool to countries with limited budgets.

3.21 [In-vehicle Map Alerts via the TPEG2 Emergency Alerts and Warnings Standard](#)

The presentation for this agenda topic was given by Cordelia Wilson (see the [list of Speakers](#) for her biography).

Cordelia started by introducing the Travelers Information Services Association (tisa.org), TISA, founded in 2017, creates and maintains global, open standards for Traveler and Traffic Information Services. She noted that the Transportation Protocol Experts Group (TPEG) is a family of international standards that support real-time traffic and traveller information services. TPEG includes Traffic Flow Prediction (TFP), Weather Information (WEA), Parking Information (PKI), Road and Multimodal Routes (RMR), and Emergency Alerts and Warning (EAW). The [TPEG2-EAW standard](#) developed by TISA focuses on official Emergency Alerts and Warnings, as issued by public authorities and/or authorized agencies, in order to safely deliver alerts/warning to travelers (including drivers). TPEG2-EAW is designed to be understandable also for non-native speakers/visitors from abroad, and to be fully compatible with CAP.

Cordelia described the successful trial of TPEG2-EAW from September 2020 to September 2021, initiated by the German Federal Office for Civil Protection and Disaster Assistance. This was an Implementation of the full service chain delivery (CAP → TPEG2-EAW → on-air). The key trial results are: TPEG2-EAW supports the warning process of emergency authorities; TPEG2-EAW can be disseminated both over DAB+ and mobile internet, respecting latency requirements; and, automatic conversion of CAP messages to TPEG2-EAW is feasible. The conclusion is that TPEG2-EAW messages are effective for safe and timely warnings to the traveler. This means that CAP alerts offered by CAP Alert Hubs can go directly to in-vehicle navigation systems, such as Garmin, Tom-Tom, and those offered by car manufacturers worldwide. These CAP alerts inform drivers so they can re-route to avoid danger. This is a mature technology, embedded in millions of devices worldwide.

Teun Hendriks, chair of the TISA Technical and Standardization Committee gave a demonstration of the delivery of CAP alerts to in-vehicle navigation systems via the TPEG2-EAW standard. He pointed out that CAP message support for machine-understandable content is desirable, e.g., codes/standard lists for events and instructions would be helpful. He noted that the specification can be requested free-of-charge at <https://tisa.org/webshop/> (TISA Reference: SP22001). Also, a freely available [TPEG evaluation kit](#) provides sample Python code and examples demonstrating how TPEG2-EAW messages are structured and can be parsed, plus a utility to convert CAP messages into TPEG2-EAW messages.

Report of the 2022 CAP Implementation Workshop and Training

3.22 [Driving Awareness of Hazardous and Impactful Weather](#)

The presentation for this agenda topic was given by Eric Michielli (see the [list of Speakers](#) for his biography).

Eric started by noting that [AccuWeather](#) is the world's largest, fastest growing and most trusted weather brand, as well as a global leader in digital media and weather-related big data. He noted that one of the biggest challenges to weather enterprises is ensuring that life-saving weather warnings issued by governments reach the greatest number of people potentially impacted by hazardous weather, with enough advance notice to allow people to take proactive steps to remain safe and out of harm's way. Eric highlighted that the alerts rebroadcast by AccuWeather are consistently disseminated simultaneously to many applications, which ensures this information quickly reaches as many consumers as possible. He said that AccuWeather's technology easily allows for warnings to be sent automatically as a push notification to mobile devices. Eric also noted that AccuWeather currently distributes official government warnings to the public from more than 60 countries around the world. He said that the warning type in effect is also translated into all AccuWeather's 150+ languages and dialects, so that travelers from around the world can be aware of the type of warning regardless of the country they might be visiting. Eric also emphasized that AccuWeather takes source attribution very seriously--the AccuWeather government partner that issued the alert is prominently displayed with the alert.

Training - [Overview of Common Alerting Protocol](#)

The presentation for this training topic was given by Eliot Christian (see the [list of Speakers](#) for his biography).

Eliot's presentation covered four major topics: What is the CAP Standard, the Benefits of CAP, examples of CAP-enabled Alerting Systems, and an explanation of CAP Alert Hubs. His last slide provided links to three videos about CAP: an animation created by IFRC on [YouTube](#) (2 m 40 s); an example Volcano alert on [YouTube](#) (1 m 23 s); and the CAP for Broadcasters video at <https://drrhub.org/learn-cap.php> (40 m).

Training - [A Free, Cloud-based Tool for Creating and Publishing CAP Alerts](#)

The presentation for this training topic was given by Eliot Christian (see the [list of Speakers](#) for his biography).

The presentation by Eliot described the cloud-based CAP Editor for creating emergency alerts in CAP format and publishing those alerts on a CAP feed. This free tool, at <https://cap.alert-hub.org/>, is used today by 42 countries as an operational CAP system at national level, and another 28 have it in testing status. CAP Editor is initialized already for 320 other alerting authorities in 160 countries/territories, and it currently supports 28 languages. Anyone can use it as a "Guest", but actual publishing of alerts is restricted to persons authorized by the head of the alerting authority. The presentation includes a hands-on exercise that walks through creation of a CAP alert. Eliot offers this presentation customized to any alerting authority interested to schedule a one-hour video chat session (contact him at eliot.j.christian@gmail.com).

Report of the 2022 CAP Implementation Workshop and Training

Training - [Making GIS Features from CAP Alerts](#)

The presentation for this training topic was given by Ian Ibbotson (see the [list of Speakers](#) for his biography).

This presentation by Ian began with an overview of the work, starting with the Question: How can we easily surface CAP alerts in GIS systems? He noted that Esri / ARCGIS usage is very common and that Esri now offers a "CAP Connector" tool, designed to transform any near-real-time CAP Alert RSS feed into a dynamic GIS Feature Layer. (The Esri CAP Connector follows a specification given in the document: [Making GIS Features from CAP Alerts](#).) Such a service would greatly facilitate analysis and support important functions such as geofencing.

Ian explained that his work objective was to document the process for others while proving that the Esri CAP Connector works correctly. He showed how CAP Connector is set up within the Esri GeoEvent Server and that it yields a dynamic CAP Alerts Feature Layer as CAP alerts get ingested from, in this case, the "unfiltered" feed published by the WMO Alert Hub operated by [Alert-Hub.Org CIC](#). In conclusion, Ian said the mission was accomplished: CAP alerts from the unfiltered feed are present on the Esri map where they can be integrated as GIS features; the tool appears to have low latency; the features (polygons and circles) each have flat field mappings to CAP alert elements (and a few metadata elements). He also asserted that the work is reproducible, although with support recommended.

Training - [OpenBroadcaster: CAP alerting with Community Radio](#)

The presentation for this training topic was given by Rob Hopkins and Vincent Maggard (see the [list of Speakers](#) for their biographies).

This training was a practical session concerning CAP alerting via Community Radio. (The linked presentation is an OpenBroadcaster training module described as "How to manage, maintain and configure systems to provide community emergency alerts using Open Source Software.") Rob and Vincent explained how open source technology provided by OpenBroadcaster delivers CAP alerts. Rob demonstrated a CAP alert being converted automatically to audio for insertion into a radio broadcast stream. They talked about options to select different voices (e.g., male and female) and languages (e.g., French and English) and also a mentioned automated translation of CAP messages to indigenous languages, As reported previously, a complimentary open source CAP Alerting and media play out software IMG for the Raspberry Pi is available [here](#) from OpenBroadcaster.

Training - [CAP Over Mobile Networks](#)

The presentation for this training topic was given by Elysa Jones and Mark Wood (see the [list of Speakers](#) for their biographies).

Mark gave great detail on how Cell Broadcast works, especially in contrast to Location-Based Short Message Service. In summary, Cell Broadcast works well when the network is strained, which is characteristic of many severe emergencies. Because it selects cells rather than mobile devices, all messages are delivered within a couple seconds and even to devices that do not have a service contract. This passivity in the messaging also means there are no issue with regard to privacy. However, being passive also means Cell Broadcast does not yield any indication of how many people where there to receive the message, nor where they are located. Mark also

Report of the 2022 CAP Implementation Workshop and Training

mentioned that demonstration projects are underway for sharing Cell Broadcast Center platforms, which should make Cell Broadcast affordable for small networks such as on some islands.

Training - Google Onboarding Process for CAP Alert Feeds

The presentation for this training topic was given by Kevin Holst and Novita Mayasari (see the [list of Speakers](#) for their biographies) and Yoli Spigland. Note: By Google policy, the presentation cannot be published.

The Google representatives began by explaining how Google Public Alerts works. First, an alerting authority uses its preferred method to publish the emergency alert data on a known CAP feed. Then, Google ingests that data and shows the alerts across Google properties, such as Google Search, Google Map, and Android push notifications. This results in the published emergency information being shown to Google users, especially those in the alerting area.

To make this happen for any particular CAP alert feed, Google has a six-step on-boarding process. Step 1: Express your interest. Step 2: Provide information to Google. Step 3: Validate CAP feed and publish alerts. Step 4: Google sets up integration. Step 5: Google evaluates alert quality and performs tests. Step 6: Launch. After launch, it is important to communicate any updates in CAP to Google Public Alerts. The Google presenters provided some advice reading Best Practices and some practices that should be avoided. The Best Practices include: Consistent event categories in CAP; Succinct <areaDesc>; Clear and meaningful <description>; Actionable <instruction>; Keep it simple; and, Use precise affected <area>. The website for Google Public Alerts is <https://support.google.com/publicalerts/> and the link for Google Public Alerts sign up is <https://forms.gle/RELeWeZY6kTCQePn8>.

Training - [CAP Alert Hubs: Common Policies and Practices](#)

The presentation for this training topic was given by Eliot Christian (see the [list of Speakers](#) for his biography).

The presenter noted that the CAP standard does not address any matters of policy, nor practices such as how to present alerts to end users. These policy and practice differences can be important for users, especially re-publishers, so it would be useful to have them in a conveniently referenced document. Such a document is also expected to be useful to alerting system developers as they make various design choices. The current draft Common Policies and Practices document is available [here](#).

Training - [IFRC CAP Editor: Design Preview](#)

The presentation for this training topic was given by Paola Yela and Jessica Ports Robbins (see the [list of Speakers](#) for their biographies).

The presenters explained that the IFRC CAP Editor currently under development is designed to be a user-friendly, secure, reliable, flexible and extensible editor tool for drafting and publishing CAP alerts. It will be fully aligned with the CAP standard and the tool will be freely available. The IFRC CAP Editor will be hosted in the IFRC Cloud Solution. The current schedule calls for development in the first part of 2023, followed by a pilot deployment in the second part of 2023.