Report of the 2019 CAP Implementation Workshop

Background

The 2019 CAP Implementation Workshop was held 17-18 October, in Mexico City, Mexico. The Workshop was hosted by Mexico City Secretariat of Integral Risk Management and Civil Protection. It was 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 the World Meteorological Organization (WMO). The 81 Workshop participants came from 16 countries.

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 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, organizational affiliation, and e-mail address of each.

Ancillary Meetings

An all-day CAP Train the Trainers session was held on 16 October in the same venue.

Video of the Training and Workshop (Spanish)

Several hours of video in Spanish for each of the three days (16-18 October) is at this link.

Report Process

At the Workshop, participants agreed the process for producing this Workshop Report. The Workshop Chair, Eliot Christian, would produce a draft Report in consultation with representatives of the host and the co-sponsors (HKO, IAEM, IFRC, ITU-D, OASIS, and WMO). The draft would be shared among Workshop participants for a period of two weeks, with the Chair making revisions based on any comments received. Thereafter, the Chair would publish the final Workshop Report and link to it from the 2019 CAP Implementation Workshop website.

Presentation Summaries by Agenda Item

3.1 CAP and Public Policy in Mexico City

This presentation, "Early Warning System of the City of Mexico (Common Alerting Protocol)" was given by Secretary Myriam Urzúa Venegas on 17 October. She explained that the system is based on four principles: 1. knowledge of the risk for which the alert will be made (intensity, probability of occurrence, vulnerabilities, geographical areas and communities); 2. equipment for measuring, monitoring, transmission, acquisition and processing of the information that is required, as well as the systems to disseminate alerts; 3. dissemination and communication mechanisms; and 4. actions and procedures to optimize an adequate response to alerts.

Secretary Myriam noted four "Final thoughts". The Common Alerting Protocol allows clear and precise information to be sent to people who are at risk so that they have the opportunity to protect themselves. In emergency situations, short, standardized and regionalized messages are required for effective communication of the alert. There is no point in an early warning if the population does not know how to act when they receive it. Therefore, strengthening the response capacity is essential. Her last point was that alerts should only reach people for whom the phenomenon represents a threat.

3.2 CAP and Public Awareness

Guillermo Ayala delivered this presentation, titled "Mexico City Early Warning System" on 17 October. He explained that Mexico City is subject to a various natural hazards that have caused major disasters, and earthquakes pose the highest risk. The Early Warning System covers other natural threats such as volcano, severe weather, air quality, and ultraviolet radiation, plus notifications from civil authorities and the Mexican Health system.

With regard to CAP, Mexico's IFT (Instituto Federal de Telecommunicaciones) has the legal mandate to guide how telecommunications and broadcasting concessionaires prioritize and transmit communications in emergencies. In 2017, IFT conducted a public consultation on "Preliminary draft Guidelines by which a Common Emergency Alert Protocol will be established". IFT now has the lead role for CAP in Mexico, supported by other agencies.

3.3 CAP and CREWS - Climate Risk & Early Warning Systems

This presentation about CAP and the Climate Risk and Early Warning Systems (CREWS) initiative, was given by John Harding on 17 October. He explained that CREWS supports Least Developed Countries (LDCs) and Small Island Developing States (SIDS) and seeks to significantly increase the capacity to generate and communicate effective, impact-based, multi-hazard, gender-informed early warnings, thereby helping protect lives, livelihoods, and assets.

With regard to CAP, John delineated a CREWS vision wherein: Every CREWS country investment will include a CAP component (e.g., workshops, training, technical assistance); CAP will be linked to the operational procedures, preparedness and response plans developed under CREWS; Progress on CAP will be reported regularly; Application of CAP will be measured across all LDCs and SIDS; and, Stand-alone agreements with cell phone companies will evolve to cooperation with ITC regulators.

3.4 CAP and Google Public Alerts

On 17 October, Ruha Devanesan and Thomas Riga delivered their presentation. They noted that Google Public Alerts helps alert originators to surface timely, relevant information to people potentially impacted by the alert. Google disseminates the alerts across multiple Google "surfaces" (e.g., Search, Discover, Android) and will soon disseminate alerts via Google Maps.

Ruha and Thomas emphasized that certain optional CAP elements are mandatory for Google Public Alerts: <info>, <expires>, <description>, <area>, <web>. Google also advocates for rich, actionable, human-readable content in the CAP elements <description> and <instruction>. To help assure the security and authenticity of alert content, Google recommends use of HTTPS with an SSL certificate issued by Google Chrome-trusted certificate authority. If HTTP is used instead of HTTPS, then Google considers the XML signature as mandatory.

The presenters noted that once a CAP alert source has launched on Google Public Alerts, Google expects to be notified of important changes, including new event types, planned downtime, fresh security certificates, etc.

3.5 CAP and MeteoAlarm

This presentation was given by Rainer Kaltenberger on 17 October. Rainer opened his presentation by explaining that MeteoAlarm is a program of EUMETNET, an association of 31 European National Meteorological Services. He described Meteoalarm as an impact-oriented, common framework to aggregate and display meteorological and hydrological warnings of EUMETNET members. Rainer also stated that MeteoAlarm is supportive of the GMAS (Global Multi-hazard Alert System) concept advocated by WMO.

Created in the 2000s, and operational since 2007, MeteoAlarm provides warnings in an easy and understandable way to the general public and to European (re)users. Currently 37 National Meteorological or Hydrological Services and national partners in Europe are participating. MeteoAlarm is led by Austria's Central Institution for Meteorology and Geodynamics (ZAMG).

Rainer noted that a major redesign is underway, known as MeteoAlarm 2.0. Among the objectives is to further support EUMETNET members in delivering easily understandable impact-oriented, multi-lingual warnings. On the technical level, the redesigned system is based on microservices architecture and MQTT. The new system is currently in its design phase, with the start of implementation expected by the end of 2019. MeteoAlarm 2.0 is slated to first become operational in autumn 2020.

3.6 CAP to Protect Cultural Heritage in Italy

This presentation, about gathering and sharing data between rescue services and cultural heritage protection bodies, was given by Marcello Marzoli of the Italian National Fire Corps on 17 October. He noted that interoperability in emergency management processes began with a focus on data exchange between Fire Corps officers and Cultural Heritage experts concerning damaged buildings and churches following the L'Aquila 2009 earthquake. This led to realization that Control Centers could raise an alert whenever an incident falls within a certain distance from cultural heritage assets, so that first responders could adjust their operations accordingly and/or seek out specialized expertise.

As part of the Fire Corps interoperability system, the new Cultural Heritage service proceeds in steps. Whenever a CAP alerts satisfies certain criteria, key parameters are extracted to check

against a web service that provides details on the nearest 5-10 Cultural Heritage sites. That list of sites is checked by a Control Centre operator using information from people at the emergency location. A dedicated CAP message for any Cultural Heritage assets potentially impacted is then generated and sent to the Cultural Heritage Authority. In this way, the Cultural Heritage service enables Fire Corps officers to have reliable information on potential impacts so they can modify the incident priority, raise the awareness of the officers in place and/or contact straight away the competent Authority.

3.7 CAP from an ITU Perspective

Maritza Delgado presented on 17 October on the topic of CAP from an International Telecommunication Union (ITU) perspective. She noted that Information and Communications Technologies (ICTs) are a critical enabler for disaster management and risk reduction activities, helping to monitor hazards and delivering vital information to all parties involved in disaster management, including the most vulnerable populations and communities at risk.

Maritza asserted that the CAP standard is being leveraged worldwide to greatly improve emergency alerting so that people at risk receive timely and appropriate messages that enable them to take early actions in protection of lives and livelihoods. She highlighted that CAP is now addressed specifically in the ITU guidelines for developing a National Emergency Telecommunications Plan (NETP).

Maritza observed it remains a major challenge to help developing countries to better take advantage of CAP, through coordinated, cross-agency efforts at outreach, education of communities, and sharing of expertise. She advised that projects on early warning should be based on a multi-phase, multi-hazard, multi-stakeholder and multi-technology approach.

3.8 BE AWARE Project in Europe

José Diego on 17 October made a presentation on the "beAWARE" project, subtitled: "Enhancing decision support and management services in extreme weather climate events". He said the project seeks to provide support in all the phases of an emergency incident. It would be an integrated solution to support forecasting, early warnings, transmission and routing of the emergency data, aggregated analysis of multimodal data, and coordination between the first responders and the authorities. Jose noted that three field demonstrations are included, with the participation of end users, decision makers and first responders. The first was a Heat Wave in Greece, the second was a Flood in Italy, and the third will be a Fire in Spain.

José listed four Expected Results of the beAWARE project: Enhanced decision support and early warning services based on aggregated analysis of multimodal data and previous crisis management records; Shorter reaction time and higher efficiency of reactions; Improved coordination of emergency reactions in the field, including the use of adapted technologies; and, Contributions to the European Policy regarding disaster risks and crises management.

3.9 CAP Implementation with Social Media Channel in Taiwan

Mei-Chun Kuo delivered her presentation on 17 October. She began by noting that is difficult to integrate and use alert messages in Taiwan because different alert formats are used by the various government agencies that deal with their distinct types of hazard threats. This led to adoption of CAP in Taiwan. She also explained that Taiwan uses CAP to leverage multiple channels when delivering alerts to the public (e.g., Internet, 4G telecom, Internet of Things).

Mei-Chun noted that Taiwan developed the "One-Stop Alert Platform" that handles 36 types of alerts from the different agencies that issue alerts. She detailed features of a publicly available smartphone app provided by Taiwan's National Science and Technology Center for Disaster Reduction (NCDR), known as NCDR LINE@. In her conclusions, Mei-Chun asserted that Taiwan has found CAP very useful in natural hazard reduction.

3.10 CAP in Brazil

This presentation, subtitled "Merging Meteorological and Disaster Alerts", was given by Osvaldo Moraes on 17 October. He explained that prevention of natural disasters in Brazil spans three centers at the national level: National Institute of Meteorology (INMET), National Centre for Monitoring and Early Warning of Natural Disasters (CEMADEN), and the National Centre for Disaster and Risk Management (CENAD). Osvaldo showed in detail how CAP is used as these different centers perform their separate roles. INMET is the national institution responsible by weather forecasting. CEMADEN oversees continuous monitoring of conditions indicating imminent risk of landslides, floods, severe droughts. Any early warnings are then reported to CENAD, which retransmits them to the state and municipal departments of Civil Defense.

3.11 CAP in Canada

On 18 October, Norm Paulsen presented "Wireless Public Alerting Canada". He said Canada's National Public Alerting System (NPAS), based on CAP, pushes alerts to the public through TV and radio and to wireless devices through cell broadcast. Canada chose Nokia as the cell broadcast provider primarily to align alerting with the U.S. The system is nationally mandated and Wireless Public Alerting was successfully deployed in 2016. Norm detailed various issues being negotiated and their resulting solutions. These include a new "device based geo-fencing" feature as well as refinements in how the user experience is being improved regarding items such as update notifications, geocodes, and the problem of devices which travel into and out of a threat area.

3.12 CAP in Cuba: Perspectives and Plans for its implementation in 2020

This presentation was given by José Rubiera on 18 October. José explained that CAP is essential for Cuba due to very short lead times for weather events such as a locally generated severe storm and its associated hazard threats, including flash floods, strong winds, wind waves at the coast, hail, and tornadoes. He noted that Cuba has not yet achieved CAP implementation but recent improvements in telecommunications affordability makes it much more feasible.

José reported that CAP in Cuba is now a national project with the goal to improve weather watches and warnings by the end of 2020. This entails training specialists on issuance of CAP alerts at the provincial and national levels, establishing CAP alert feeds for the Cuban National Meteorological Service (InsMet), and, providing a CAP-aware National App for smart phones.

3.14 CAP in IFRC

This presentation, "IFRC Multi-Hazard App, WhatNow Service, & CAP Dissemination" was given by Jessica Ports Robbins on 18 October. She noted that the Hazards App enhances public access to preparedness information and improves decision-making towards safety and resilience. Red Cross and Red Crescent National Societies are able to customize the app according their common hazards in the region and based on their local languages. Hazards App provides preparedness information for 14+ types of hazards, and the IFRC Global Disaster Preparedness Center (GDPC) has worked with National Societies to release 26 Hazard apps in

13 languages. Hazards App works with CAP alerts and requires content in these elements: identifier, info/area/polygon, info/description, info/urgency, info/severity, info/certainty, sent, info/onset, and info/expires. She also explained that the Hazards App supported generation of CAP alerts, which are labeled "General Notifications".

Jessica described the WhatNow Service as a global platform of Red Cross and Red Crescent localized key messages on how individuals and households can prepare and respond to disasters. Developed by the GDPC in partnership with Google, the WhatNow Service aims to increase the speed and dissemination of disaster preparedness, response, and recovery messages.

Jessica concluded with comments on the forthcoming "IFRC Alert Hub", a free online source for published emergency alerts from national, regional and local sources. This platform will have a strong focus on multi-hazard alerting and aims to enable CAP to be leveraged for all manner of emergency preparedness and response activities, at all scales: from city to country and up to global. She predicted that consumers of the IFRC Alert Hub will include Red Cross and Red Crescent National Societies, news organizations, telecommunications providers, international and national emergency managers, and disaster relief organizations, among many others. She also noted that launching an Alert Hub is in line with IFRC's ambitions to ensure early warning messages reach "last mile" communities and it will help realize the goal that communities everywhere receive the most effective emergency alerting possible and can thereby safeguard lives and livelihoods.

3.13 CAP in India

The topic of "CAP Implementation in India" was addressed in a presentation by Saurabh Basu on 18 October. Saurabh noted challenges in India including: 23 official languages, many alerting authorities spanning 707 district-level and 36 state-level agencies in addition to national level agencies, and many other agencies working across the broad range of dissemination methods. His timeline showed C-DOT, the research and development arm of India's Ministry of Communication, starting development of the national CAP-based "Integrated Disaster Early Warning Platform (IDEWP)" in 2018. He reported that integration testing was completed in 2019 and the country-wide roll out is in process beginning with three agencies, including Indian Meteorological Department (IMD) centers.

Saurabh also noted: all telecommunications operators of India are fully integrated with IDEWP (using either SMS or cell broadcast); location-based Social Media feeds can be generated, all India Radio is on board; 65% of the population is covered in regional languages with Hindi, Tamil, Malayalam support; and, alert dissemination via television is at an advanced stage.

3.15 CAP in Mexico

Mario Ruiz delivered this presentation on 18 October. He explained that CAP is used In Mexico for several types of hazards such as Earthquakes, Hydrometeorological, Volcano, and Space Risk. The alerting systems are led by various agencies, including CONAGUA and CENAPRED, among others. Mario also noted that Mexico City operates a CAP-enabled "Emergency Multi hazard early Warning System". He detailed the use of CAP in the case of flooding and in the case of a specific social event (representation of the Passion of Christ in Iztapalapa, 2017).

Under the heading "Next Steps", Mario noted that Mexico's chambers of deputies and senators, as well as civil protection authorities, are accepting the authority of IFT (Instituto Federal de

Telecommunicaciones) to regulate messages in emergency situations. He called out developments in: transmitting smart alert messages massively via telecommunications, broadcasting and application service providers; regulating how such providers shall or shall not transmit early warnings; strengthening the telecommunications infrastructure to prioritize communications before, during and after an emergency event; and refining the methods used to disseminate warnings and notifications using CAP. Mario also listed the need for coordination in Mexico's use of CAP in three contexts: among Federal Authorities, across State and County Authorities; and for Public Hazard Warning.

3.16 Weather and Climate Ready Nations Project - CAP Implementation

This presentation was given by Shawn Boyce on 18 October. Shawn began by saying that Weather and Climate Ready Nations (WCRN) is based on the very successful Weather Ready Nations (WRN) program and partnership implemented in the US, which has transformed the utilization and delivery of early warning information to emergency managers, first responders, government officials, businesses and the public. He also introduced the Caribbean Dewetra Application: an online, spatio-temporal data fusion, decision-making platform hosted and maintained by the Caribbean Institute for Meteorology and Hydrology (CIMH).

While Dewtra does support Impact-Based Forecasting and Warning Services (IBFWS), near-real-time hydro-meteorological monitoring, and multiple hazards, the platform had limitations. For instance, auto message generation techniques were limited and improvements were required in communication and dissemination of messages.

IBFWS and CAP were introduced at the Stakeholders Communication Modes and Methods workshop in March 2018 under the WCRN program. Shawn showed screen-shots illustrating the Caribbean MyDewetra platform, which includes an upgraded Dewetra application and the new WebAlert application. WebAlert supports passing of authorized CAP messages to local stakeholders, the Barbados CAP Server, or otherwise. Shawn concluded by saying that one of the Key Takeaways should be that integration of IBFWS and CAP messaging has its challenges, but it is doable.

3.17 CAP over MQTT

Efraim Petel began his presentation on 18 October by saying his aim is to explain how MQTT (Message Queue Telemetry Transport) can be used in a CAP warning system for faster alerts. He explained that emergency alert systems typically broadcast messages from one point to many points. Such broadcasting is not well suited to HTTP because it operates one-to-one in client-server mode. He asserted that MQTT, a broadcast (one to many) protocol, has significant advantages: it broadcasts only messages actually subscribed by receivers; it has less overhead, enabling faster transmission; it offers options for confirmed reception, preventing multiple activations; and, it has a keep-alive mechanism.

Efraim detailed the components of a typical MQTT process for alerting. Alert sources publish messages into Topics and clients subscribe to Topics. The MQTT Broker accepts messages from alert sources and publishes them to any subscribed clients (which can be devices or other processes). He also explained the MQTT Connection concept (keeping a channel open through an occasional heartbeat), and the Persistent session (reconnecting a channel that had been lost for a time). With regard to confirmed message reception, Efraim noted that MQTT defines three

Quality of Service levels with progressively more messaging overhaed: **at most once** (send and forget); **at least once** (message might be delivered more than once), and **exactly once**.

Efraim illustrated the specific case of CAP over MQTT. He noted several available MQTT servers and he asserted that tests show message delivery via MQTT is at least ten times faster than the fastest case using HTTP, and MQTT can be 100 times faster and consume less battery power. He highlighted other benefits of MQTT such as simpler implementation and built-in encryption of the message payload. Efrain ended by advocating that CAP projects use MQTT.

3.18 Developments with CAP in WMO

Miriam Andrioli gave this presentation on 18 October. She began with a WMO official statement supporting CAP, issued in 2015: "Congress stressed the need for further guidance to Members on their conversion of weather warnings into CAP format and for enhanced technical assistance to Members, as needed, for the implementation of the CAP standard".

Miriam summarized a meeting in 2018 that addressed CAP in the context of "Impact based Forecast and Warning Services". She highlighted various ways that WMO supports its Members in CAP implementation, including "CAP Jump-start" arrangements and workshops conducted via the Severe Weather Forecasting Demonstration Project, the Climate Risk & Early Warning Systems initiative, and the HIGH impact Weather Lake System program, among others.

Miriam talked about its new CAP online training program (e.g., CAP Basics course). She also mentioned the cloud-based CAP editor tool now available (here), the international Register of Alerting Authorities, and the new Severe Weather Information Center 2.0. WMO's Global Multi-hazard Alerting System (GMAS) was briefly described as well.

3.19 Experiences in Baja California Sur, Mexico

In his presentation on 18 October, Ramon Ojeda related some experiences regarding the costs of severe emergencies due to lack of preparedness. He focused on two weather tragedies in Los Cabos, Baja California Sur, Mexico: hurricane Odile (2014) and thunderstorm Lidia (2017). Ramon made an impassioned argument that lack of preparedness results in profound, intangible losses as well as lost lives and property (1.2 billion US Dollars).. These include loss of respect for the authorities, loss of respect among neighbors, and loss of self-respect (evidenced by looting).

3.20 Event Terms for Use in CAP

This presentation was given by Elysa Jones and Norm Paulsen on 18 October. It focused on work of the OASIS Emergency Management Technical Committee (EM TC) which was asked to develop a consensus international list of terms appropriate to the CAP "event" element. Although the CAP standard makes the event element mandatory, its value is represented in free form text. The resulting wide variance of event values across diverse CAP alert sources makes it difficult to correlate messages that may be about the same type of event.

The EM TC requested input from over 120 implementers and each of over 300 terms was reviewed. There was outreach to Subject Matter Experts in June 2019 and an initial term list was developed. It will be presented in a Thesaurus format, with "related" terms for each term and a suggested "preferred" term for communicating with the general public. The related terms will cover a spectrum of terms from “broad” to “narrow”.

The EM TC work product from this effort will be an "OASIS Committee Note", which is informational and non-standards track. The Note will include recommended practices: for using event terms, for using event terms not on the OASIS list, for using related elements in CAP (eventCode, category, headline); for submitting new terms; and, for using terms across languages.

3.21 Update on OASIS Emergency Management Technical Committee Work

This presentation was given by Elysa Jones on 18 October. She presented on behalf of the OASIS Emergency Management Technical Committee (EM TC), chartered in 2003. Elysa's presentation had four main sections: EDXL Suite of Standards, EM TC Structure and Activities, Guiding Principles, and Standards Adoption. CAP was the first EM TC standard developed and the EMTC sought to capitalize on that success with additional standards supporting disaster preparedness, response recovery and mitigation. Those standards, labeled "EDXL", include tracking of emergency patients, hospital availability, resource messaging, message distribution and a situation reporting specification. The EM TC Structure and Activities track closely to the various standards the EM TC develops.

Elysa described ten Guiding Principles adopted by the EM TC. These include principles about: empowering people to obtain and secure their own personal data and to share information in an emergency; supporting emergencies at all scales, across types of organizations, and across all phases of an emergency; supporting smart devices; including reference implementation software; maintaining an open-source, community effort that is independent of any other organization or government; providing an open architecture; and, assuring that the emergency framework standards are freely available to all at no cost.

3.22 Update on the Filtered Alert Hub

This presentation on 18 October was delivered as a pre-recorded video by Ian Ibbotson. It focuses on how to implement an "alert hub", designed to simplify access to copies of alerts by aggregating from many different feeds into one consolidated source maintained on the global "cloud". Specifically, his video deals with the Filtered Alert Hub freeware, a cloud-based system for aggregating CAP alerts published via Internet news feeds. That software, a demonstration system, and the Team involved in the work are described at http://alert-hub.org.

In the video, Ian demonstrates how to install and configure an instance of the Filtered Alert Hub. The target platform in that demonstration is Amazon Web Services and Ian walks through the simplest install method: an Amazon Machine Image. Written instructions for this and other install methods are described in the current draft Alert Hub Installation and Configuration Guide, available here. The current draft Alert Hub Operations Guide is available here.

Offers to Host the Next CAP Implementation Workshop

Workshop participants were invited to put forward suggestions regarding the location of a future CAP Implementation Workshop. There is a tentative offer from the United Arab Emirates to host that Workshop in Abu Dhabi. No other venues were suggested during the Workshop. A possible time frame for the next workshop is September-November 2020.