Report of the 2021 CAP Implementation Workshop

Background

The 2021 CAP Implementation Workshop was held 13-14 October as an online Webinar. 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 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.

About 750 persons registered as participants in the Workshop. They were from about 140 countries, 28 international organizations, and 68 commercial companies, academic institutions, or other non-governmental organizations.

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.

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. So far, there is one firm offer (Whitehorse, Canada) and two tentative offers (Abu Dhabi, UAE, and Madrid, Spain). The likely time frame for a 2022 workshop is September - November.

Report Process

At the Workshop, participants agreed on the process for producing this Workshop Report. The Workshop Chair, Eliot Christian, would produce a draft Report in consultation with co-sponsors. 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 2021 CAP Implementation Workshop website.

Presentation Summaries by Agenda Item

3.1 IFRC Alert Hub

The presentation for this agenda topic was given by Justin Genetti (see Speakers list for biography). As reported previously, IFRC Alert Hub aims to enable CAP to be leveraged for all manner of emergency preparedness and response activities, at scales from city to country and up to global. Consumers of IFRC Alert Hub will include Red Cross and Red Crescent National Societies, news organizations, telecommunication providers, international and national emergency managers, and disaster relief organizations, among others. IFRC also wants to help

improve the impact of early warnings by strengthening the link with hazard-specific messages on what people can do to reduce risks, protect themselves and prepare for emergencies.

Justin noted that IFRC Alert Hub is at https://alerthub.ifrc.org. He presented a project timeline for the quarters of 2021: 1. Plan and design IFRC Alert Hub Phase I; 2. User-centered design process initiated; 3. Development of Alert Hub (beta); 4.Consultations with key stakeholders to design Phase II. He presented an IFRC Alert Hub screen shot that showed recent alerts on a global map. Another screenshot showed a single alert with some of the CAP elements viewable. He said the project Roadmap is focused on identification and prioritization of enhancements leading to an IFRC Alert Hub 2.0. Justin briefly showed a prioritized listing of issues and proposed solutions. He did not elaborate on these, other than to say those shown are only part of the full list.

3.2 China's National Early Warning Release System

The full title of this agenda topic presentation was "Application and Prospect of China's National Early Warning Release System (NEWRES)". The presentation was given by Cao Zhiyu of China's National Early Warning Center (see Speakers list for biography). Based on CAP, Cao noted that NEWRES (http://www.12379.cn/) transforms 76 types of early warnings from 13 different departments and releases them to the public through many different channels. He commented on three aspects of NEWRES: its operating status; its prospect; and its effectiveness.

Regarding operating status, Cao noted that NEWRES has one national center, 31 provincial centers, 343 municipal centers, and 2015 county centers. He reported that 24 provinces have completed the provincial level system (which includes the municipal and county levels), six provinces have their provincial level system under construction, and one province has not yet started construction of its provincial level system. He also highlighted two shortcomings to be addressed: a gap between the ability to accurately release early warning and the requirement of going from village to household, and platform functions lagging behind rapidly developing new information technology.

Cao's exposition of the prospects for NEWRES included some system architecture diagrams for the next generation Early Warning Intelligent Service Big Data Cloud Platform. This big data cloud platform will help NEWRES to realize early warning data management, disaster monitoring, information management, terminal management, user management, early warning customization, location push, and automatic wake up to emergency responders.

On the matter of the effectiveness of NEWRES, Cao talked about estimating the proportion of the public that can be covered by an early warning disseminated in a certain region using all the channels currently available then and there. He explained that there are three methods for making such an estimate: the principle of inclusion and exclusion, the method of weighting, and the method of maximum. Cao showed an example of such calculations of the coverage rate for an actual event in 2019.

3.3 CAP and Wireless Public Alerting Canada

The presentation for this agenda topic was given by Norm Paulsen (see Speakers list for biography). Norm presented an update on how CAP is used by Environment and Climate Change Canada. He noted that Environment Canada (EC) routinely issues Public Alerts in CAP format for all types of hazardous weather events, and that a small subset is classified as Emergency Public

Alerts. Emergency Public Alerts are flagged to be immediately presented by Broadcaster Partners (Television Broadcasters, Radio Broadcasters, and Wireless Cell Broadcasters). To accomplish that presentation, certain information is extracted from the CAP alert and reformatted to grab the receiver's attention.

Norm discussed in detail how challenging it is for Environment Canada to issue progressive alert message updates when the Broadcaster Partner style of alerting is based on presenting each CAP Emergency Public Alert message as a distinct alert. He described several new cell broadcast features in North America that could allow progressive alert message updates for evolving hazardous situations to be presented more effectively.

3.4 CAP Implementation in India

The two presentations for this agenda topic were given by Sankar Nath and Sabyasachi Majumdar (see Speakers list for their biographies). Sankar described the Multi hazard Warning System operated by India Meteorological Department (IMD). With regard to CAP, he noted that IMD's CAP feeds are now operational and automatically aggregated to the WMO Alert Hub. This is the means for IMD's CAP alerts to be carried by Google, Apple, and AccuWeather platforms.

The presentation by Sabyasachi focused on the nationwide, all-hazards public alerting system based on CAP, which is called the "Integrated Alert System". This system was developed by C-DOT and its deployment is proceeding on a vast scale. He provided details on its planned implementation for Phase I (through 2023) and Phase II thereafter. Among the challenges noted are: 22 constitutionally recognized official languages; the relation between population density and vulnerability; the digital divide with regard to smart phone penetration; addressing existing legacy Infrastructure; and the need for specific interfaces for telecom operators, TV, Radio, Siren and other dissemination media.

3.5 CAP in Italy and the STRATEGY EU Action

The presentation for this agenda topic was given by Marcello Marzoli (see Speakers list for biography). Marcello talked about CAP in Italy, with a focus on Interoperability between emergency stakeholders. In that regard, he highlighted agreements in place with Carabinieri (National police force) and with the Cultural Heritage Authority. The first has been fully operational since summer 2018 and produces 120,000 CAP messages yearly. The second will rely on a recently signed Framework which will address any emergency-related activity which could impact Cultural Heritages, nearly 3 million buildings and assets in Italy.

Marcello also 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.

3.6 AccuWeather and CAP

The presentation for this agenda topic was given by Eric Michielli (see Speakers list for biography). The full title of his presentation was: *Driving Awareness of Hazardous and Impactful Weather: Working Collaboratively with Governments to Save Lives Globally*. 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.

Eric offered recommendations for alerting authorities to improve emergency alerts to be carried on AccuWeather and its partner applications: Clearly identify **What** is happening (e.g., try to keep the hazard name simple); Refine **Where** people will be impacted (to prevent "warning fatigue"); **When** will the users be impacted (include start and end time); **How** to get updates for ongoing events (linking messages helps to remove confusion); and, Clearly communicate changes.

3.7 CAP in the U.S. Integrated Public Alert and Warning System

The presentation for this agenda topic was given by Mark Lucero (see Speakers list for biography). By way of background, Mark explained that the Integrated Public Alert and Warning System (IPAWS) was established in 2006 and is operated by the U.S. Federal Emergency Management Agency (FEMA).

Mark noted that IPAWS has four dissemination channels: the Emergency Alert System (EAS - TV/radio); Wireless Emergency Alerts (WEA); NOAA Weather Radio; and Internet-based systems (signs, apps, etc.) He said that at least 27 companies are selling CAP-based alerting tools and that 1,626 public safety agencies are using/sending CAP. Just in the past six months, 254,000 CAP alerts were posted (98% were weather-related, 2.4% triggered WEA, and 1.3% triggered EAS). Mark also noted that, IPAWS moved to the Amazon Web Services GovCloud in April 2021.

With regard to opportunities, Mark highlighted that CAP is interoperable, but systems are not necessarily interoperable. He emphasized the need to improve old interfaces for the exchange of critical information. He also stressed the necessity to demonstrate and reinforce resilience.

3.8 CAP promotion from the USAID perspective

The presentation for this agenda topic was given by Sezin Tokar (see Speakers list for biography). Sezin started by addressing four general questions: What is the Bureau for Humanitarian Assistance (BHA) within the U.S. Agency for International Development (USAID)? Why do we need hydrometeorological early warning systems (EWS)? What is an end-to-end early warning system? and, What is the role of CAP in early warning systems? Along the way, she made note of the Flash Flood Guidance System and a Storm Surge forecast initiative in the Caribbean.

Sezin then commented on USAID/BHA support in advancing CAP. She gave four examples: IFRC Alert Hub funding; support for NOAA's CAP training; promotion of the UNDRR Early Warning Early Action partnering with media; and, support for WMO to integrate CAP in EWS.

3.9 Update of the Severe Weather Information Center

The presentation for this agenda topic was given by Armstrong Cheng (see Speakers list for biography) of the Hong Kong Observatory (HKO), a WMO Center. He opened by noting that WMO's Severe Weather Information Center (SWIC), operated by HKO, provides a single and centralized source for the media to access official warnings and information issued by National

Meteorological and Hydrological Services (NMHS). He noted that WMO Congress directed that (SWIC) be enhanced for disseminating weather warnings from WMO Members in CAP format.

Armstrong reported that SWIC aggregates 85 CAP feeds in its Alert Hub as of October 2021. This Alert Hub is free and open-source software developed under the Filtered Alert Hub (FAH) project led by Eliot Christian. He explained that SWIC is moving to the newer version of the FAH freeware, which is based on Rabbit MQ technology rather than the Amazon Web Services (AWS) Lambda technology. This version can be hosted on any platform, rather than only on AWS. It will also relieve a performance bottleneck on the server side, boost the loading speed for mobile users, and result in cloud hosting costs that are more predictable.

3.10 ITU Emergency Telecommunications and CAP

The presentation for this agenda topic was given by Vanessa Gray (see Speakers list for biography). Vanessa started by introducing the roles of ITU in Emergency Telecommunications. With regard to CAP specifically, she addressed five points: 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.

Vanessa noted that ITU guidance calls on each nation to address CAP implementation as part of its National Emergency Telecommunications Plan (NETP). She also noted the Call to Action on Emergency Alerting: "To scale up efforts to ensure that by 2025 all countries have the capability for effective, authoritative emergency alerting that leverages the Common Alerting Protocol (CAP), suitable for all media and all hazards." She also mentioned an opportunity to promote CAP that is upcoming in 2022: the Words into Action Guidelines on MHEWS. These guidelines will support countries in developing a national disaster risk reduction strategy. Development of the guidelines will be led by UNDRR, with input from ITU, WMO, IFRC, et al.

3.11 Update on OASIS Emergency Management Technical Committee Work

The presentation for this agenda topic was given by Elysa Jones (see Speakers list for biography). 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 "OASIS Open Projects" which support shared community development of code, APIs, standards, reference implementation, etc., in one place, under open source licenses, with a path to recognition in international policy and procurement. Under that aegis, the EMTC established the Emergency Management Framework (EMF).

Elysa provided an update on the EMTC CAP Subcommittee work on the Event Terms List which has been published as a Committee Note. This list will help guide international implementers in choosing event terms, 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 that is focused on developing a new EMTC Committee Note. This will address the use of mobile device communications like 3GPP, in

combination with CAP, for alerting. An objective is to offer practical suggestions for avoiding unnecessary differences across mobile alerting implementations.

3.12 PDC Accelerates DisasterAWARE Hazards Coverage via CAP

The presentation for this agenda topic was given by Joel Myhre (see Speakers list for biography). As reported previously, Pacific Disaster Center (PDC) is an applied research center of the University of Hawaii with a focus on innovative alerting and Disaster Risk Reduction technologies for humanitarian assistance and disaster relief applications.

Joel talked about the DisasterAWARE® product which has been deployed globally via PDC for over two decades and is free for UN, NGO and all National Disaster Management Office (NDMO) partners. The product is leveraged by tens of thousands of international emergency managers and he said the product takes advantage of the many freely published CAP alert feeds. He pointed out that PDC is also funded by USAID and other funding institutions.

Joel gave examples of DisasterAWARE® deployments in Indonesia and the Philippines. He also talked about the 3.0 version of the PDC All-hazards Impact Model (AIM). He noted that, in 2020, the PDC Response team activated for over 36 Response events supported worldwide and crafted 1500+ analytical products for over 30 hazard types, including COVID19.

3.13 CAP implementation with Sahana software

The presentation for this agenda topic was given by Nuwan Waidyanatha (see Speakers list for biography) and its full title was: *Sahana Alerting Broker: Taking CAP to the Last-Mile*. Nuwan explained that Sahana provides high quality information management systems for emergency preparedness, response, recovery and resilience-building accessible to all. He said it is free and open source (with no licensing fees or restrictions to use) and that there have been more than 65 deployments over more than 25 countries around the world.

Nuwan gave various examples of Sahana CAP-enabled Alerting Broker-related projects and the use of last-mile ICTs for receiving those messages. Furthermore, he discussed the findings from the mixed-methods evaluation of those projects on the reliability and utility of in a multitude of countries. He also talked about the use of pictographs in support of emergency alerting and he gave various examples showing how pictograph context affects perception.

Nuwan concluded with three assertions: Emergency alerting presents organizational and social challenges that are almost never evaluated in the CAP ecosystem; Current implementations of CAP, at the national scale, have very little focus on the beneficiaries and its impact; and, it is necessary to attend to the evolution of Internet of Things and Decentralized Apps.

3.14 CAP activities in WMO

The presentation for this agenda topic was given by Erica Allis (see Speakers list for biography). She began with an overview of WMO, its organizational chart, and its Strategic Plan. This Plan includes Objective 1.1 "Strengthen national multi-hazard early warning/alert systems".

Erica listed various WMO actions relevant to CAP implementations: Training Meteorological Service staff on CAP, Choosing a tool to convert warning inputs into CAP; Working with NMHSs to ensure that converting all warnings into CAP format is mainstreamed; Ensuring that PRs nominate an Editor for Register of Alerting Authorities and following up that PRs provide a CAP

source URL; Ensuring that warnings can be displayed on the WMO SWIC; and Tracking that NMHSs develop public outreach and education. She said WMO has a target for 90% of countries in Africa to implement CAP by 2024 and at least 25 countries to implement CAP by Dec 2021.

Erica talked about the Call to Action on Emergency Alerting, which now has 16 endorsements including WMO, IFRC, ITU, UNDRR, OASIS, Alert Hub, Open Commons Consortium, MeteoAlarm, Open Broadcaster, AccuWeather, and the World Broadcasting Union, et al. Erica mentioned that IFRC, ITU and WMO recently convened a Workshop to discuss scoping for a CAP Help Desk, and she noted that WMO offers CAP Training materials online for free.

Erica described the WMO Global Multi-hazard Alert System (GMAS) which aspires to "be recognized globally by decision makers as a resource of authoritative warnings and information related to high-impact weather, water, ocean, and climate events". She mentioned the Flash Flood Guidance System (reported in detail at the 2020 CAP Implementation Workshop). She also noted that WMO Hydrology has endorsed the applicability of CAP for hydrological hazards.

3.15 Implementation status of CAP in Nepal

The presentation for this agenda topic was given by Anil Pokhrel (see Speakers list for biography). The full title of his presentation was "Towards Operationalizing CAP for Impact Based Multi Hazard EWS in Nepal". Anil started with an overview of several hazard risks and their associated EWS in Nepal: floods, landslides, lightning, earthquakes, wind storms, forest fires, and transboundary air pollution. He then described some Nepal institutions such as the National Disaster Risk Reduction & Management Authority (NDRRMA), and their roles in EWS.

Specific to CAP in Nepal, Anil noted the drafting of a national guideline for operationalizing CAP, that key alerting messages have been translated to Nepali, an action plan to implement CAP has been prepared, and the design of a CAP dashboard is underway. He sketched many opportunities for agencies within Nepal to work together on CAP. Anil ended with thoughts on overcoming challenges, such as: Exploring collaboration to jumpstart CAP-based EWS; Overcoming initial dilemmas from best practice examples from across the regions; and Partnering with WMO, IFRC, ITU, RIMES, UK MetOffice, AccuWeather, and NDMA-India, among others, for the speedy transformation of conventional EWS to CAP-based EWS.

3.16 Everbridge supports global adoption of CAP

The presentation for this agenda topic was given jointly by Menno Bot and Rachelle Gianfranchi (see Speakers list for their biographies). Menno and Rachelle noted that the Everbridge CEO, David Meredith, endorsed the Call to Action on Emergency Alerting. A list of 14 countries with Everbridge CAP implementations was shown and Mauritius was cited as a particular example.

Everbridge pointed out that proprietary alert feeds can be converted to CAP and thereby be further used, and that Everbridge is working with the 3GPP community on 5G broadcast for multimedia which will involve CAP. Four recommendations were given to accelerate implementation: Phased implementation; CAP integrations out of the box / easy to integrate; Start small and grow with usage; Learn from experience. It was stated that "Out of the 73 countries informing the WMO, only 40% currently have effective multi-hazard early warning systems", according to a 2021 Gap Report by the Alliance for Hydromet Development.

A report was presented for the Mauritius National Disaster Risk Reduction and Management (NDRRM) Centre concerning Implementation of the National Multi Hazard Emergency Alert

System. National law in 2016 mandated "NDRRMC shall implement a national multi-hazard emergency alert system to provide accurate and timely advice to the public and key stakeholders". Inputs to that system, in CAP format, include Met alerts, Police alerts, Fire alerts, and Coast Guard alerts. Output messages to the public are designed to flow via television, radio, digital boards, websites, smart apps, social media, voice dial out, and cell broadcast.

3.17 Google and CAP

The presentation for this agenda topic was titled "Crisis Alert and integrations with Common Alerting Protocol (CAP)" and it was given by Ruha Devanesan (see Speakers list for biography).

Ruha started by noting that people turn to Google in times of crisis. She then presented multiple aspects of Google support for CAP implementations. Google Public Alerts uses automated feeds from 26 public and government agencies in 18 countries. These alerts (about 130k per year) are presented for moderate to severe events and reach users via Android notifications, Google Search, Google Maps, and Google Assistant. For example, if a person's smart phone has location turned on, he/she may receive an alert notification on the home screen. Tapping on that notification will show then the full alert vai Google Search.

Ruha also explained that Google SOS Alerts are generated by Google itself for certain emergency situations for which Google does not have CAP alerts. In that case, if a person is using Google Maps it might show navigation warnings where the route intersects with an alert area for an SOS Alert that is active in the area being viewed.

Ruha ended by highlighting "What We've Learned from Crisis Alerting on Google". Her three main points in that regard are: visuals matter, especially with regard to the alerting area; actionable messaging is key; and, keep it simple.

3.18 CAP Alerting with Community Radio

The presentation for this agenda topic was given by Vincent Maggard (see Speakers list for biography). Rob Hopkins was not able to connect to the Webinar at the time. Vincent explained how open source technology provided byOpenBroadcaster delivers CAP alerts. He demonstrated a CAP alert being converted automatically to audio for insertion into a radio broadcast stream. He also noted that the technology can display text on television. Vinvent also talked about options to select different voices (e.g., male and female) and languages (e.g., French and English). As reported previously, a complimentary open source CAP Alerting and media play out software for the Raspberry Pi is available here from OpenBroadcaster.

3.19 Example CAP Implementations

The presentation for this agenda topic was given by Bapon Fakhruddin (see Speakers list for biography). Bapon talked about applications of CAP with a focus on rapid alerting to the public in three particular cases: 1. Fiji, Tonga, and Samoa; 2. Dominica; and, 3. New Zealand.

For the particular case of New Zealand Emergency Mobile Alerts (EMA's), Bapon identified four gaps: those out of service (e.g., hikers and some isolated communities) cannot receive the EMA's; sometimes there is not enough time to issue a warning; people may rely on notifications to know if they should evacuate instead of using natural warnings; and some older phones cannot receive EMA's. Bapon also offered five recommendations: install signage in areas without reception so people know what to do; ensure the public is familiar with emergency protocols; ensure multiple

streams for communities to receive messages; only sell cell phones that are capable of receiving EMA; and, identify community members who may not receive notifications and inform them in the case of an emergency.