PDC | GLOBAL

Safer world.

2019 – 2020

PDC | GLOBAL

2019 - 2020
ACCOMPLISHMENTS
REPORT

OUR IMPACT

CONTENTS

RISING TO THE CHALLENGE

A MESSAGE FROM PDC EXECUTIVE DIRECTOR RAY SHIRKHODAI

It was an unprecedented year of tragic heartbreak for the global community in 2020. From a worldwide pandemic, to large fires and ever-lasting storms intensified by climate change, there have been devastating losses to lives and livelihoods. And, for those of us involved in the non-stop humanitarian missions, it meant that we had to do more, even as we were forced to change how things get done.
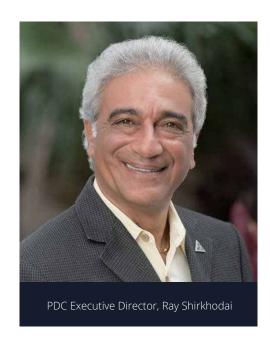
COVID-19 inflicted significant hardship on the global population. From the tragic loss of life, to the painful economic and social consequences of protective lockdown measures, it required fundamental and expedited change. For the PDC Ohana, there were no exceptions. Like thousands of others, we were faced with the need to protect our workforce while simultaneously ensuring continuity of our mission and operations.

We were among the very first to act quickly to restructure our systems to work remotely; supporting our many partners and stakeholders around the globe with the latest situational awareness and expert assessment of rapidly changing circumstances.

During the early onset of COVD-19 and throughout this ongoing event, PDC has experienced a steady and growing surge in demand for our data, analysis, and support products. In many cases, this was due to the complex nature of disaster scenarios in the COVID-19 era, forcing social distancing to be balanced against the need to assist and shelter large numbers of people. In this precarious circumstance, our predictive analysis helped responders reduce uncertainty and better prepare.

In spite of these serious challenges, Pacific Disaster Center and its many partners in disaster management, humanitarian assistance, and members of our global community rose to the challenge and worked together to protect the lives, livelihoods, and the well-being of our societies. We are proud to have been able to serve alongside you during this time and look forward to the brighter, safer world that lies ahead of our collective efforts.

Ray Shirkhodai

PDC Executive Director, Ray Shirkhodai

ABOUT PDC

For the last 25 years, Pacific Disaster Center (PDC) has responded to the most demanding needs of government and nonprofit clients worldwide as part of our mission to save lives and reduce disaster risk. As an applied research center managed by the University of Hawaii, we are continuously developing new technologies and best practices to help our many global partners effectively mitigate, prepare for, respond to, and recover from disasters. We stand by the side of government agencies, nongovernmental organizations (NGOs), and humanitarian relief organizations when it matters most. PDC also helps these organizations with proactive measures including baseline risk and national disaster preparedness assessments, mitigation strategies, exercises, and training on use of our powerful DisasterAWARE® technology. DisasterAWARE provides global risk intelligence, early warning, and the largest collection of global data and modeling resources for assessing risk and hazard impacts.

1 UNPRECEDENTED GLOBAL PANDEMIC

34 DISASTER RESPONSE ACTIVATIONS

1,500+ ANALYTICAL PRODUCTS

100+ PARTNERS SUPPORTED WORLDWIDE

BILLIONS SERVED

PDC | GLOBAL

AI FOR HUMANITY™
ARTIFICIAL INTELLIGENCE HELPING TO SAVE LIVES

Benefiting humanity through the use of AI

PDC continues to bring advancements in artificial intelligence, developing innovative applications to improve disaster management decision making and disaster risk intelligence.
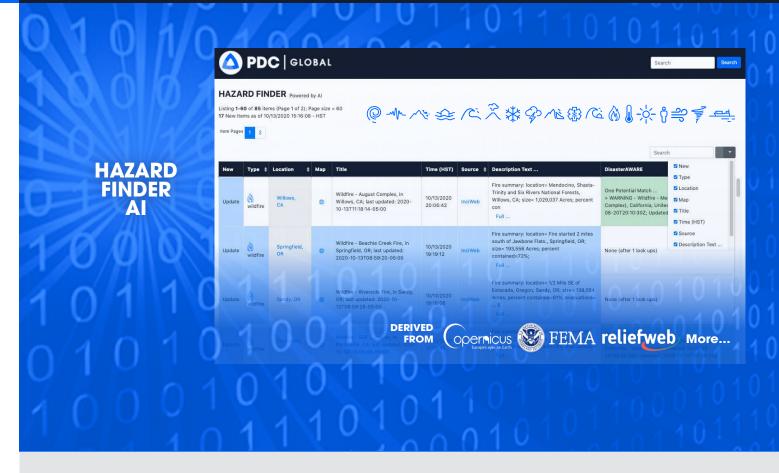
HAZARD FINDER AI (NEW)

Extend and scale global hazard detection via Natural Language Processing

In many parts of the world, especially in developing nations, disasters are under-reported due to lack of institutional capacity or consistent reporting. In 2020, PDC launched an initiative to create an expert system that analyzes daily reports from thousands of credible news outlets, looking for hazards. The initial version of AI, named Hazard Finder AI, started experimental operation in late 2020, and will be fully operational in 2Q21, massively scaling global hazard detection and reporting.

AI deep learning

Under the same initiative, PDC developed a proof-of-concept for a deep learning machine which is trained by the expert system to remove supervised training constraints. Development of this system will revolutionize global hazard detection, reporting, and tracking, along with risk reduction strategies.

HAZARD FINDER AI

DERIVED FROM Copernicus *Europe's eyes on Earth* FEMA reliefweb More...

KEY BENEFITS

⭐ All hazards supported.

Comprehensive global hazard detection—all day, every day.

Scalable to search an unlimited number of trusted online sources.

Exponentially faster at detecting hazards than manual processes.

AI FOR HUMANITY™
ARTIFICIAL INTELLIGENCE HELPING TO SAVE LIVES

AI

FIRST FIVE CONSORTIUM (AI PARTNERSHIP)

Facebook **Microsoft** **Google** **AT&T** **PDC** **DoD** **DOE**

and many more...

Under a 2020 White House initiative, the First Five Consortium took place on August 12 to formally bring together government, industry, academic, and nonprofit organizations to develop AI platforms in support of humanitarian relief and disaster response efforts. Following a White House meeting in February for use of Artificial Intelligence (AI) for Humanitarian Assistance / Disaster Relief (HA/DR) operations, initiated by the Department of Defense (DoD) Joint AI Consortium (JAIC), the Department of Energy (DOE) was tasked to formulate a vehicle for a "coalition-of-the-willing" to operationalize developmental capabilities and products to enable first responders to better respond to natural disasters and help them save lives and protect property. This resulted in the First Five Consortium, referring to the first five minutes after a disaster when new information products can play a key role in the response operations.

Co-chaired by DOE and Microsoft, PDC is one of the 10 founding members. ⭐

SMART DESCRIPTIONS AI

Natural language processing humanizes hazard information

In 2020, PDC fully operationalized its natural language processing AI program in DisasterAWARE—transforming scientific data from multiple sources into easily-understood hazard descriptions that improve situational awareness and decision making for disaster response. The technology was released in beta in 2019.

TROPICAL CYCLONE
Tropical Cyclone - Sally

BEFORE AI

A HURRICANE WARNING IS IN EFFECT FOR...
* MISSISSIPPI/ALABAMA BORDER TO THE WALTON/BAY COUNTY LINE FLORIDA
* BAY ST. LOUIS MISSISSIPPI WESTWARD TO GRAND ISLE LOUISIANA
HURRICANE CENTER LOCATED NEAR 29.9N 87.8W AT 16/0630Z
POSITION ACCURATE WITHIN 15 NM

PRESENT MOVEMENT TOWARD THE NORTH-NORTHEAST OR 30 DEGREES AT 2 KT

ESTIMATED MINIMUM CENTRAL PRESSURE 968 MB
EYE DIAMETER 30 NM
MAX SUSTAINED WINDS 90 KT WITH GUSTS TO 110 KT.
64 KT....... 35NE 20SE 0SW 25NW.
50 KT....... 70NE 40SE 30SW 50NW.
34 KT.......110NE 110SE 80SW 80NW.
12 FT SEAS..120NE 120SE 90SW 90NW.

AFTER

A tropical cyclone forecast has been issued by National Weather Service (NWS) on September 17, 2020, 09:00:00 GMT. Tropical Cyclone - Sally, is located in the Atlantic Ocean with maximum sustained winds of 165 km/h (105 mph), and wind gusts up to 140 km/h (85 mph). According to this forecast (#25), the cyclone is headed Northeast at about 19 km/h (12 mph), and is expected to remain at this strength over the next 36 hours. It is cautioned, however, that the storm's actual position may shift significantly over the next few days. Based on the current forecast (the storm's center and path), Tropical Cyclone Sally will make landfall within the next 24 hours in Alabama (United States) as a Category 2 hurricane, with sustained winds of about 165km/h (105 mph). For the extended forecast, an estimated 2.4 million people, 942,000 households, and $234.5 Billion (USD) of infrastructure are potentially exposed to moderate to severe damaging winds (with damage expected closer to the shores). All shorelines in the path of the storm are exposed to potential storm surge, and inland areas within the proximity of the storm are exposed to potential flooding. Additional updates will be provided as they become available by official sources.

ADVANCED ANALYTICS
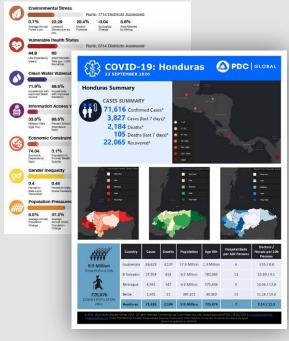## INFORMING DECISIONS FOR A SAFER WORLD

PDC's new data processing engine and analytical tools enabled us to scale our operation to better support partners worldwide. Rapid analysis of potential hazard impacts, socioeconomic vulnerabilities, as well as new and emerging risks were analyzed throughout 2020. PDC's global data holdings have facilitated improved insight into understanding the drivers of risk and resilience in communities around the world.

IMPROVED INSIGHTS FOR

- Planning and decision making
- Disaster risk reduction investments
- Estimation and anticipation of hazard impacts and humanitarian needs
- Understanding of risk factors at a global regional, national, and subnational scale

SPOTLIGHT ON GENDER EQUALITY

2020 marks the 20th anniversary of the adoption of U.N. Security Council Resolution 1325. This groundbreaking resolution spearheaded a focused look at Women, Peace, and Security (WPS). In partnership with the U.S. Department of Defense, PDC began collaboration on an analysis designed to support sustainable peace through greater inclusion, justice, and security for women.

DISASTER RISK REDUCTION, PEACE, AND STABILITY

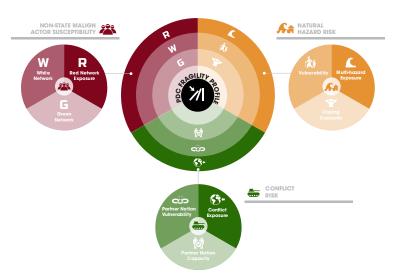### USING PDC'S TRUSTED DATA AND ANALYTICS

UNDERSTANDING NEW AND EMERGING THREATS

ADVANCED ANALYTICS
INFORMING DECISIONS FOR A SAFER WORLD

PDC'S UNIQUE FRAGILITY ANALYSIS

NON-STATE MALIGN ACTOR SUSCEPTIBILITY

NATURAL HAZARD RISK

W — White Network
R — Red Network Exposure
G — Green Network

PDC FRAGILITY PROFILE

Vulnerability
Multi-hazard Exposure
Coping Capacity

CONFLICT RISK

Partner Nation Vulnerability
Conflict Exposure
Partner Nation Capacity

PDC FRAGILITY PROFILE

Non-state Malign Actor Susceptibility
Natural Hazard Risk
Conflict Risk

U.S. Foreign Assistance

African Development Foundation
Environmental Protection Agency
Federal Trade Commission
Inter-American Foundation
Millennium Challenge Corporation
OPIC Overseas Private Investment Corporation
Peace Corps
USAID U.S. Agency for International Development
U.S. Department of Agriculture
U.S. Department of Commerce
U.S. Department of Defense
U.S. Department of Energy
U.S. Department of Health and Human Services
U.S. Department of Homeland Security
U.S. Department of Interior
U.S. Department of Justice
U.S. Department of Labor
U.S. Department of State
U.S. Department of Transportation
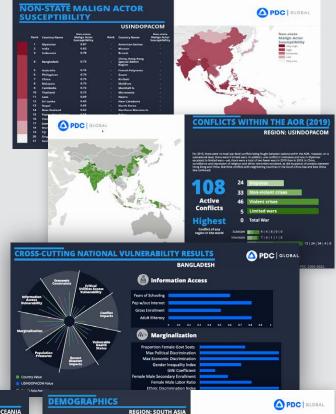U.S. Department of the Treasury

More...

RECOMMENDATIONS

USINDOPACOM partnered with Pacific Disaster Center to develop a regional and national fragility profile analysis. This unique examination was made possible by PDC's advanced suite of analytical tools, data visualization capabilities, and its robust global data holdings.

UNIQUE FRAGILITY ANALYSIS

- ✓ Helps identify specific drivers of regional and national instability

- ✓ Provides new insights into the ability of countries to withstand destabilizing shocks

- ✓ Combines PDC risk and vulnerability data with exclusive partner data to enhance outputs

- ✓ Offers recommendations for strategic investment and partnerships to help lower risk and bolster stability

NON-STATE MALIGN ACTOR SUSCEPTIBILITY — USINDOPACOM

CONFLICTS WITHIN THE AOR (2019) — REGION: USINDOPACOM
108 Active Conflicts
24 Disputes
33 Non-violent crises
46 Violent crises
5 Limited wars
0 Total War
Highest Conflict of any region in the world

CROSS-CUTTING NATIONAL VULNERABILITY RESULTS — BANGLADESH

ECONOMY — REGION: OCEANIA
Gross Domestic Product
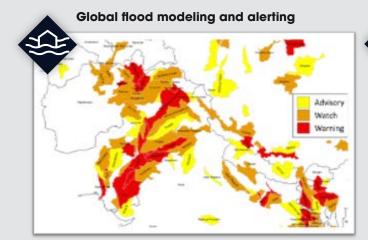$1.61 trillion

DEMOGRAPHICS — REGION: SOUTH ASIA
1.58 billion Total population

MODELING AND DATA
IMPROVING DISASTER RESPONSE

NASA AND PDC BRIDGE THE GAP IN GLOBAL FLOOD AND LANDSLIDE INFORMATION

NASA

PDC | GLOBAL

Global flood modeling and alerting

Advisory
Watch
Warning

Predictive modeling for landslides

Year after year, widespread flooding inflicts the largest cost to human life and property of any natural hazard in the world. However, global detection of floods is still lacking. Currently, floods are reported around the globe from a variety of local and national sources with varying degrees of reliability—presenting a serious gap for disaster managers. To bridge this gap, PDC and NASA are developing a flood detection methodology using NASA data as well as existing models. This information will be combined into a single, reliable source of data and integrated into PDC's DisasterAWARE for global alerting and situational awareness products.

AIRFORCE WEATHER
DATA TO ANTICIPATE AND PREPARE FOR CLIMATE SHOCKS

PDC partnered with the United States Airforce to integrate exclusive weather data into our DisasterAWARE platform.

It's partnerships like these that help our organizations fulfill our collective missions to reduce disaster risk and build a safer world. Together, we are helping decision makers better anticipate and prepare for climatological disruptions that may adversely impact communities.

GLOBAL FIRE DETECTION
MAJOR ENHANCEMENTS

- ✓ Better urban wildfire detection
- ✓ Better grassland fire detection
- ✓ Better industrial gas fire detection
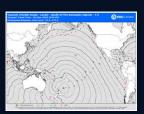 (to prevent false-positives in remote sensing)

AUTOMATED MAP PRODUCTS
FOR ENHANCED SITUATIONAL AWARENESS

U.S. Flood Warning Areas

U.S. Winter Storm Warning Areas

Global Tsunami Travel Time Map

COVID-19 RESPONSE
UNITED STATES WHOLE-OF-GOVERNMENT SUPPORT

COVID-19 Planning
NAVAJO NATION (Arizona) — PDC | GLOB

Key Demographics Snapshot

99,744 TOTAL POPULATION	**9,779** ELDERLY POPULATION (65

National Capital Region

- ✓ PDC supported Joint Staff, the DoD COVID Working Group, FEMA Interagency Geospatial Coordination, and overall national response to COVID-19. PDC participated in regular updates with FEMA, National Guard Bureau, and the U.S. Department of Defense and supported operational coordination on products.

- ✓ Regional and state products amplified COVID-19 taskforce planning and decision-making capabilities.

- ✓ Situational awareness products were widely distributed and used by FEMA leadership and interagency disaster response entities.

- ✓ Integrated dozens of data layers into PDC's DisasterAWARE to enhance DoD planning and response.

U.S. States and Territories

- ✓ PDC enhanced situational awareness through creation of weekly joint products with the U.S. National Emergency Management Agency (NEMA).

- ✓ Planning profiles were developed for all 50 states, Washington D.C. and the Navajo Nation in Arizona. Products highlighted COVID-19 emergency measures in all areas and were briefed regularly by White House Office of Intergovernmental Affairs, FEMA, State Governor's offices, and State Emergency Operations Centers.

- ✓ PDC data and analysis enabled effective mission planning in support of deployment of the U.S. Army 1st Medical Brigade—providing assessments of key demographics, health infrastructure, and emergency measures.

- ✓ Additional support provided to NORTHCOM Civil Affairs and State of Hawaii for testing site locations, daily COVID-19 case counts, and more.

COVID-19 PLANNING
THE UNITED STATES — NEMA · PDC | GLOBAL
November 05, 2020

9,463,782 CASES	**233,129** DEATHS	All States, Territories, and the District of Columbia have confirmed cases of COVID-19, except for American Samoa (as of 11/05/2020).

NEMA Status Update: States, Territories, and the District of Columbia

REOPENING SUMMARY

Stay-at-Home
- **51** orders lifted
- **3** partially lifted

Schools
- **56** States reopening
- *Note: Reopening conditions vary per state, please see details on the following pages.*

Restaurants and Bars
- **34** reopening
- **22** partial reopening

State-managed Outdoor Areas
- **54** have no closures
- **2** partial closure

Non-essential Medical
- **55** open

Non-essential Businesses
- **46** reopening all
- **10** reopening multiple sectors

MEASURES CURRENTLY IN PLACE

55 State and Federal Declarations	**56** Activated EOCs	**53** Activated the National Guard
14 Have Restrictions on Non-essential Workforce	**42** Have Mask Requirements	**33** Enacted Government Travel Restrictions

Trends in New Cases
- 🟥 Increasing
- ⬜ Flat
- 🟩 Declining
- ⬜ Insufficient Data

NEMA™

COVID-19 RESPONSE
INTERNATIONAL SUPPORT

900+ products
35+ real-time data layers

COVID-19 Global Humanitarian Mission Support

- PDC provided onsite support at U.S. Indo-Pacific Command, Southern Command (SOUTHCOM), U.S. Army Pacific, and the National Guard Bureau for COVID-19 response.

- Supported SOUTHCOM J55 strategy and planning, situational awareness, and monitoring of COVID-19 impacts on Venezuela and the surrounding region due to migration.

- PDC enhanced country-specific COVID-19 planning guidance between U.S. Embassy Freetown and the Sierra Leone Government, including the Ministry of Defense and the Office of National Security.

- Priority planning by Commands and partner nations were enhanced by exclusive subnational data provided by PDC's National Disaster Preparedness Baseline Assessment Program.

- Supported readiness planning for U.S. Afghanistan humanitarian mission, providing updates on COVID-19 as well as analysis of near and long-term food insecurity.

- Continuously integrated and updated data in DisasterAWARE to provide a common operating picture and enhanced situational awareness.
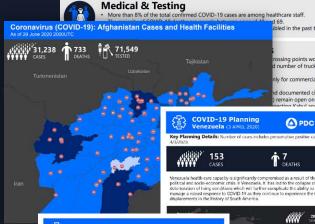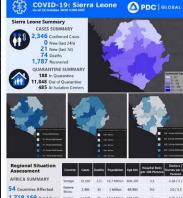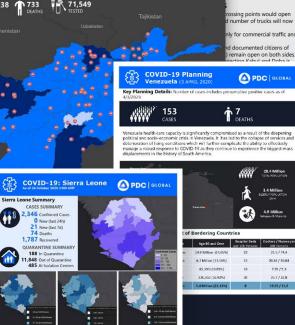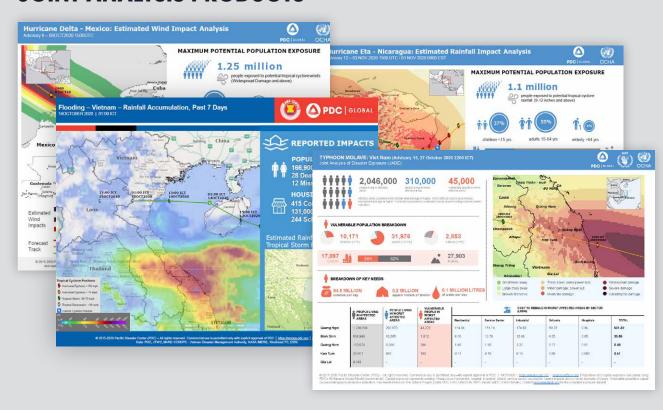
Working Groups / Panels

WHO's Global Outbreak Alert and Response Network (GOARN)

Global Information Management

Assessment and Analysis Cell on COVID-19 (GIMAC)

United Nations OCHA Information Management Working Group

Intelligent Health and AI for Good Summits

COVID-19 PLANNING — AFGHANISTAN (26 May 2020) — PDC | GLOBAL

11,831 CASES (in all 34 provinces)
220 DEATHS
32,870 TESTED

Emergency Measures & Food Insecurity

Medical & Testing
- More than 8% of the total confirmed COVID-19 cases are among healthcare staff.

Coronavirus (COVID-19): Afghanistan Cases and Health Facilities
As of 29 June 2020 2000UTC

31,238 CASES
733 DEATHS
71,549 TESTED

COVID-19 Planning — Venezuela (3 APRIL 2020) — PDC | GLOBAL

Key Planning Details: Number of cases includes presumptive positive cases as of 4/3/2020.

153 CASES
7 DEATHS

COVID-19: Sierra Leone — PDC | GLOBAL
As of 26 October 2020 2300 GMT

Sierra Leone Summary
CASES SUMMARY
2,346 Confirmed Cases
0 New (last 24h)
21 New (last 7d)
74 Deaths
1,787 Recovered

QUARANTINE SUMMARY
188 In Quarantine
11,848 Out of Quarantine
485 At Isolation Centers

Regional Situation Assessment
AFRICA SUMMARY
54 Countries Affected
1,718,169 Total Cases
41,243 Deaths
1,404,374 Recovered

KEY PARTNER ENGAGEMENTS

JOINT ANALYSIS PRODUCTS

PDC's Humanitarian Assistance Advisor Steve Recca provides lecture at Inter-American Defense College Seminar on Complex Emergencies.

2020 NOTEWORTHY PARTNERSHIP ENGAGEMENTS
World Health Organization GOARN Collaboration, First Five Consortium, International Telecommunications Union (ITU) conference, Intelligent Health AI, and AI for Good Summit.
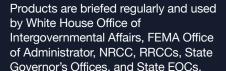
NEW CAPABILITIES AND DEMAND

PDC expanded capabilities and utilization of advanced analytical products globally through several key partnerships, including:

• ACAPS
• AHA Centre
• International Displacement Monitoring Centre
• International Federation of Red Cross
• World Food Programme
• United Nations OCHA ROAP and ROLAC

Products are briefed regularly and used by White House Office of Intergovernmental Affairs, FEMA Office of Administrator, NRCC, RRCCs, State Governor's Offices, and State EOCs.

SUPPORT TO NATO

Continued NATO disaster management engagement through leadership course development and annual conference support.
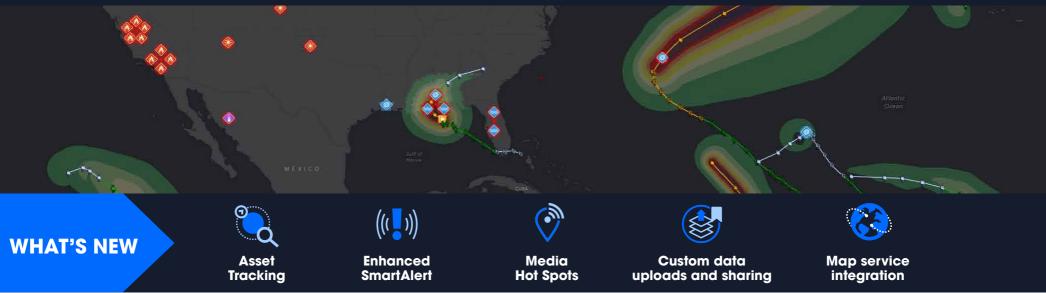
NEW DATA AND INTERNATIONAL USE

PDC strengthened data partnerships with UNOSAT, the Group on Earth Observation, Direct Relief, Facebook, and others to offer enhanced DisasterAWARE insights. It also partnered with 13 nations to integrate subnational data into DisasterAWARE to support humanitarian assistance.

In 2020, DisasterAWARE was adopted by UNICEF AND WFP emergency operations centers.

DISASTERAWARE©

Make better decisions, faster.

Asset Tracking

Enhanced SmartAlert

Media Hot Spots

Custom data uploads and sharing

Map service integration

Asset Tracking

Track your stationary or moving assets (such as buildings, personnel, or goods in transit), and receive alerts when a hazard poses a potential threat.

Enhanced Smart Alerts

Sign up to receive early warning for multiple types of hazards anywhere around the globe.

Media Hot Spots

Monitor news around the world to increase situational awareness.

Customized Solutions

PDC built and enhanced hazard monitoring and early warning capacity powered by DisasterAWARE for regional and national EOCs around the world. Key highlights include:

InAWARE
Indonesia

875 Hazards added
89 Layers added
23 COVID-19 layers

15k+ SmartAlerts

DMRS
ASEAN Region

607 Hazards added
93 Layers added
6 COVID-19 layers

145k+ SmartAlerts

PhilAWARE (beta)
Philippines

56 Layers added

ThaiAWARE
Thailand

35 Layers added

OUR IMPACT
BY THE NUMBERS (as of Nov 2020)

2020

34
Disaster response activations
to aid disaster management decisions

1,500+
Specialized maps / products
to help anticipate and understand disaster impacts

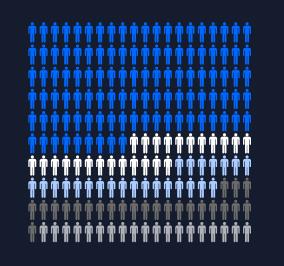**21** Tropical Cyclones **5** Earthquakes and Tsunamis **4** Wildfires **2** Floods **1** Pandemic **1** Landside

DisasterAWARE
900+
New data layers

400+
Data layer updates

DisasterAWARE
Users Trained

- **51%** U.S. DoD
- **15%** Partner Nations
- **15%** U.S. Govt
- **15%** National Guard
- **4%** Civil EM

DisasterAWARE

13,000+ Hazards reported

500k+ SmartAlerts issued

15,500+ Professional users

10% New users

DISASTER ALERT™
★★★★½
Avg mobile app rating

OUR IMPACT

BY THE NUMBERS (as of Nov 2020)

2020

20+
Major new projects around the globe

NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT PROGRAM

- **9** Nations assessed
- **11** Nations in progress
- **8** Nations planned (2021)
- **650+** New national data layers

REGIONAL AND NATIONAL CAPACITY DEVELOPMENT PROGRAM (EARLY WARNING / DECISION SUPPORT)

- **3** Existing systems supported
- **2** New national systems released in beta
- **273** New national data layers
- **159** Personnel trained, **25%** female

COVID-19 RECAP

- **900+** COVID-19 products
- **165+** countries
- **35+** U.S. / national COVID data layers
- **EXAMPLE 1,189** Indonesia hand washing stations
- **2** DisasterAWARE systems used for COVID response outside of U.S. (InAWARE and DMRS)
- **34** Indonesia provinces supported
- **2,951** Indonesia products shared
- **10+** COVID working groups worldwide

* COVID-19 had significant impact on project activities and exercises—several of which were canceled as nations grappled with the global pandemic.

- **8** Disaster preparedness exercises
- **26** Participating nations
- **13** Exercise planning events
- **3** Canceled exercises*

f
- **79K** Followers
- **2.8%** Growth (2019-2020)

Twitter
- **8.5K** Followers
- **20%** Growth (2019-2020)

- **84** News stories
- **10+** Stories covered by major news agencies

Mahalo

We send very special thanks to the many organizations with whom we had the privilege to partner in 2020. We appreciate the ongoing support.

➡ U.S. Department of Defense including INDOPACOM, NORTHCOM, SOUTHCOM, AFRICOM, JPEO-CBRND

➡ ASEAN Humanitarian Assistance (AHA) Centre

➡ United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

➡ U.S. Interagency Partners (FEMA, USAID, NASA, USGS, NOAA)

➡ World Food Programme and World Health Organization

➡ International Displacement Monitoring Center

➡ ACAPS

➡ Humanitarian OpenStreetMap Team and Yayasan Peta Bencana

➡ National Disaster Management offices of Indonesia (BNPB), Philippines (OCD), Thailand (DDPM), and others

➡ All of the many other partners with whom we've collaborated