

* Overcoming adversity and making progress

In 2012, natural disasters around the globe affected countless people and resulted in thousands of deaths and more than \$135 billion (USD) in damage to property and infrastructure.

Disaster managers were kept very busy with significant events from Hurricane Sandy in the Caribbean and the United States and Typhoon Bopha in Palau and The Philippines; earthquakes in Canada and the Pacific; to disease outbreaks like Dengue Fever in the Marshall Islands.

Through all of this, PDC not only continued to provide tools and training, products and services to assist with hazard monitoring, early warning, and all phases of disaster management worldwide, but the Center also enhanced its flagship technology. A major upgrade to DisasterAWARE—version 4.5—was released in November, which added social media, 3-D, live TV, and multi-language capabilities to the platform.

PDC remains dedicated to innovation in pursuit of disaster risk reduction.



PDC in action

Supporting disaster managers and the communities they serve to better mitigate, prepare for, respond to, and recover from disasters; PDC services include risk and vulnerability assessments, modeling and visualization, information assistance, exercise support, and capacity enhancement.

hazards and disaster events

During 2012, the United States experienced major wildfires in the west and Hurricanes Isaac and Sandy along the east coast. Additionally, Typhoon Bopha in the Philippines, and numerous other earthquakes, typhoons, floods, and tsunami threats around the globe required significant response efforts.

Even before—and continuing, during and after—the onset of a major disaster event, PDC collects reliable data and then generates and disseminates a variety of situational awareness and analytical products to assist with preparedness, planning, and response actions. PDC maps and analyses, often explicitly requested by clients, are prepared by the Center's analysts, and posted to DisasterAWARE, the early warning and multi-hazard monitoring platform, for wider dissemination to key stakeholders to facilitate understanding, coordination, and decision making.

- * **Ongoing Dengue Fever Outbreak in the Republic of the Marshall Islands, Federated States of Micronesia, and Palau:** PDC map products and assessments were provided to Joint Region Marianas through Joint Task Force-Homeland Defense (JTF-HD). (JANUARY)
- * **Tropical Storm Beryl in The Bahamas:** Disaster Management operational support was provided to NEMA in response to severe flooding and other impacts. (MAY)
- * **Urban Search and Rescue in Hawaii County:** Maps and other products were prepared for police agencies during a missing child case. Child was found unharmed. (MARCH)
- * **Heavy rains, flooding, and landslides in Hawaii:** Support at State and County levels for impact/damage assessment on Kauai and Oahu for this event declared a disaster by President Obama as FEMA-4062-DR-HI. (MARCH THROUGH MAY)
- * **Tropical Cyclone Season Coverage for Atlantic and Pacific:** Tropical Cyclone Activity Reports posted daily to the Weather Wall with notification for subscribed professionals. (MAY THROUGH NOVEMBER)
- * **Waldo Canyon Fire in Colorado:** Situational awareness products were created for daily interagency briefings showing the fire perimeter in relation to potentially threatened DoD facilities. (JUNE INTO JULY)
- * **Hurricane Isaac in Louisiana:** PDC information and tools supported preparedness and response efforts undertaken by government, military, and NGOs. (AUGUST)
- * **7.6 M Earthquake near the Philippines:** Supplied products and monitored aftermath of the event in direct support of JTF-HD Operations Center (JOC) activation, especially regarding the tsunami warning for Hawaii and other Pacific islands. (AUGUST)
- * **Hurricane Sandy in The Bahamas, Jamaica, and the eastern U.S.:** Broad support was provided to the general public, Caribbean Disaster Emergency Management Agency (CDEMA), the governments of The Bahamas and Jamaica, the American Red Cross, SOUTHCOM, NORTHCOM, Global Situational Awareness Facility (GSAF), and the National Guards of New York, New Jersey, and Rhode Island. (OCTOBER INTO NOVEMBER)
- * **7.7 M Earthquake in Haida Gwaii (Queen Charlotte Islands):** Hawaii readiness and monitoring support for this eventually non-destructive tsunami in the Pacific. (OCTOBER)
- * **Super Typhoon Bopha in Palau and The Philippines:** PDC served as Project Manager for activation of the International Charter "Space and Major Disasters" for impacts in Palau; and provided direct support for the Philippine response via EMOPS and Weather Wall. (DECEMBER)

DisasterAWARE users nearly doubled, while analytical products were foundational for planning and preparedness efforts by governments and agencies around the world.



exercise support

Having hazard monitoring tools is not enough. Building capacity and capability in their use is also required to help ensure safe and resilient communities. Those in the disaster management community know that it is critical to train and exercise the same way they would respond during a real disaster. That is why PDC is dedicated to helping partners strengthen resilience through hands-on training and exercises.

PDC support to disaster management (DM) and humanitarian assistance and disaster response (HA/DR) exercises, with participation ranging from scenario development to hazard-specific modeling, and exercise facilitation and evaluation. DisasterAWARE typically plays a prominent role in these activities. A key objective of PDC participation in our partners' exercises is to ensure the effective use of DisasterAWARE for situational awareness, hazard notification, and information sharing, especially as it relates to civil-military coordination during HA/DR missions.

- * **Exercise Key Resolve (Tonga)**, an annual PACOM exercise conducted in two parts that focused on providing support to the Kingdom of Tonga after a natural disaster. (FEBRUARY AND APRIL)
- * **PACIFEX 2012**, a distant tsunami exercise that used DisasterAWARE and PDC analytical products. (MARCH)
- * **PACOM Catastrophic Disaster Exercise**, a scenario based on a 9.3 M earthquake off the coast of Chile for which PDC provided information and analysis products. (MARCH)
- * **Hurricane Geospatial Table Top Exercise**, a sponsored event by FEMA in conjunction with a HIFLD Working Group meeting. (APRIL)
- * **Balikatan 2012 Exercise** at Camp Aguinaldo, Manila, Philippines. A sponsored event by PACOM and III Marine Expeditionary Force (IIIEMEF) from the U.S., with both the National Disaster Risk Reduction Management Council (NDRRMC) and the Armed Forces of the Philippines (AFP). (APRIL)
- * **Makani Pahili**, Hawaii's statewide hurricane exercise required months of planning meetings and other pre-exercise engagement. PDC participated by providing extensive support to both Hawaii State Civil Defense and PACOM JTF-HD. (MAY-JUNE)
- * **Guam State Hurricane Exercise Pakyo**, an exercise including Guam and the Commonwealth of the Northern Mariana Islands (CNMI), with PDC operating from the EOC in Saipan. (JUNE)
- * **RIMPAC 2012**, scenario "Restore Chianti," a tsunami exercise in Oahu that used products supplied through DisasterAWARE. (JUNE-AUGUST)
- * **Exercise Lightning Rescue 2012**, a tabletop exercise (TTX) focused on infectious disease. LR 12 was led by Hawaii National Guard (HING) and held at Marine Corps Base Hawaii on Oahu. (AUGUST)
- * **Kai Mimiki**, Hawaii's statewide tsunami exercise used PDC notifier (text messaging) and DisasterAWARE/EMOPS. (OCTOBER)
- * **CONPLAN 5003-12 Exercise**, a tabletop exercise at PACOM Headquarters to provide a framework for addressing pandemic disease outbreaks and their potential effects on operational readiness and mission activities. (OCTOBER)

PDC is making a difference around the globe, through participation in exercises and training with state, national, and international stakeholders.



global

Information Services

Global Information Services: Global Information Services expand the breadth and depth of the Center’s information offerings, fueling PDC’s decision support applications and analytical products. This project supports hazard monitoring, preparation, and response activities by investigating reliable observational data sources, integrating them into DisasterAWARE, and developing methods to identify hazardous events and to more effectively estimate and communicate their severity and potential impacts.

Socio-Economic Risk and Vulnerability Assessment: PDC’s socio-economic risk and vulnerability assessment process involves examination of a community’s risk and resilience by analyzing not only exposure to hazards, but also susceptibility to impact and the ability to withstand, respond to, and recover from shocks. Assessments incorporate social, economic, and environmental information that supports decision making across disaster management, sustainable development, and security.

Decision Support Platforms and Applications: The family of DisasterAWARE-powered applications is growing, not only in number, but also in content, reach, and ease of use. In 2012, PDC improved situational awareness and visualization products for tsunamis, enhanced its analytical capabilities for tropical cyclones, and drafted methods for estimating potential damage to residential structures caused by earthquakes. Once fully operationalized these enhancements will be applicable globally, providing vital information to better estimate potential needs for humanitarian assistance operations.



PDC also substantially improved situational awareness and analysis, benefitting all users of DisasterAWARE, including the customized deployments, EMOPS, Atlas, and the Disaster Alert mobile app. New data layers were added, including U.S. and global observational and incident information, as well as global atmospheric and surface observations.

✳ impact: Real-time hazard exposure data, along with information on the social, economic, political, and environmental factors that affect disaster outcomes, are visualized in a single interactive platform to enhance genuine situational awareness.



Thanks very much for the help... What personal service! This is an important tool for us in the Pacific, as it provides the automated email warnings from NOAA for our staff responsible for preparedness and response in FSM and RMI. Thank you for your time and assistance. It is very much appreciated, and keep up the good work.

CHRISTIAN OAKES, RECONSTRUCTION ASSISTANCE COORDINATOR
USAID-PHILIPPINES AND THE PACIFIC ISLANDS

international

International Cooperation Programs and Partnerships

PDC was funded by the development banks, USAID, and others to deliver capabilities and implement various projects for the Government of Vietnam, the Association of Southeast Asian Nations (ASEAN), and Asia-Pacific Economic Cooperation (APEC), to name a few. These engagements and projects helped extend partnerships and build partner capacities in support of DRR and humanitarian assistance missions.

ASEAN (and AHA Centre) DisasterAWARE: Under USAID funding, PDC helped to enhance the disaster monitoring capacity of the ASEAN Humanitarian Assistance Coordination Centre (AHA Centre) by deploying the DisasterAWARE-based Disaster Monitoring and Response System (DMRS). The work was closely coordinated with ASEAN and its Dialog Partners from Japan, and included comprehensive training and capacity building exercises before being put to use for coordination of monitoring and response to disasters in the region.

Vietnam Flood Monitoring and Early Warning – Phase II:

USAID OFDA awarded PDC a two-year, \$1.2 million grant to continue to enhance the ability of Vietnamese disaster management officials to monitor floods, assess their likely impacts, and reach those at risk with timely and meaningful warning messages. Under this project, PDC operationalized a Vietnam-national version of DisasterAWARE, called VinAWARE, including its deployment in Hanoi at the national Disaster Management Center (DMC). This project advances earlier work to prototype VinAWARE under USTDA funding.

Thailand DisasterAWARE: PDC was contracted by the Government of Thailand to upgrade the National Disaster Warning Center's (NDWC) DisasterAWARE platform, originally developed and deployed by PDC following the 2004 Indian Ocean Tsunami. This activity, to be completed in 2013, modernizes the Kingdom's disaster monitoring and warning capabilities.

New visualization of hazard related social media content provides a valuable assessment resource.

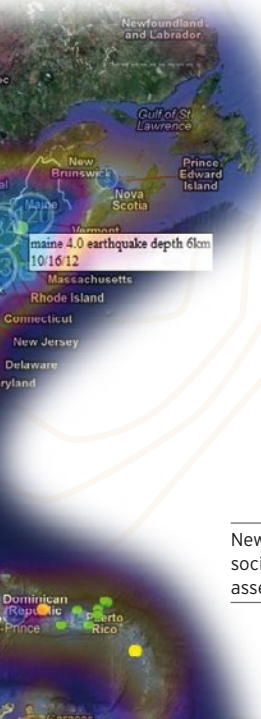


Partner Nations and Civil-Military Communications (IGOs and NGOs)

Emergency Operations (EMOPS): PDC released a major revision of its Emergency Operations (EMOPS) application this year. Improvements included incorporation of additional information content, expanded drawing and mapping capabilities, new situational awareness reports, and enhanced security features. The enhanced EMOPS application serves disaster managers in the U.S., as well as the broader international community of disaster managers and humanitarian assistance providers, for hazard monitoring and disaster response, as well as for exercises.

DisasterAWARE/EMOPS has been proven to be an effective tool for facilitating civil-military communications in HA/DR missions and is actively utilized by users from UN agencies, national disaster management organizations (NDMO), and intergovernmental and nongovernmental organizations (I/NGO) communities globally.

✳ impact: Enhanced analysis and timely delivery of accurate and actionable information better informs the life-saving decisions of those providing humanitarian assistance and disaster relief (HA/DR).



national

Comprehensive Support

PDC supported, collaborated with, exchanged data with, provided demonstrations to, and/or participated in meetings and workshops with numerous U.S. agencies involved in homeland security/defense and disaster management-related research and development. In doing so, PDC remained focused on a vision of scientific and technological advances continuing to enrich evidence-based decision making, ultimately helping to foster disaster-resilient communities at home and abroad.

PDC supported Department of Homeland Security (DHS), FEMA, COCOMs, state National Guards, and others with operational hazard monitoring, analytical products, and decision support tools. EMOPS was used to support civil-military communications during multiple events and exercises, including events in Latin America and the Caribbean. Additionally, DisasterAWARE was used by five different state National Guards (Connecticut, Maryland, Rhode Island, New Jersey, and New York) in support of the response to Hurricane Sandy.

HA/DR Dashboard: SOUTHCOM teamed with PDC to design and build a new interface for DisasterAWARE to more easily support their HA/DR operations. This “Dashboard” provides an Emergency Operations Center (EOC)-type command-level-briefing interface for selected active events and associated products. It enhances executive reporting and quick-overview situational awareness by providing various quick summary views.



PDC has so much to offer given their past experience and global efforts, it [can] be beneficial for everybody.

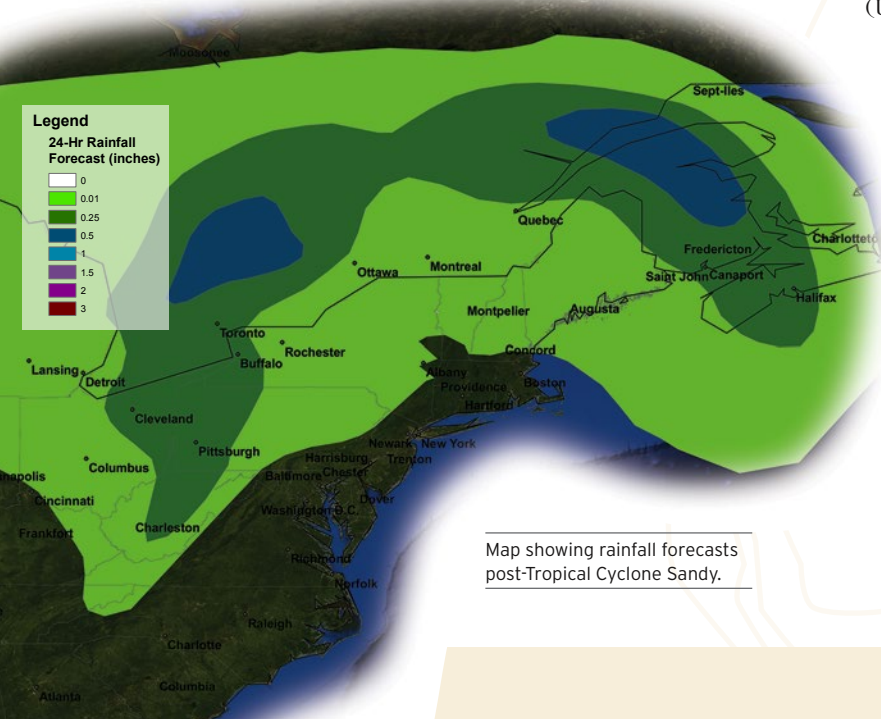
STEVE ALNESS, CHIEF, DOMESTIC PREPAREDNESS
BRANCH HSIP MANAGER/PARTNER & OUTREACH
NORTH AMERICA & HOMELAND SECURITY DIVISION

ROGUE JCTD: Funded as the Transition Manager for the Rapid Open Geospatial User-driven Environment (ROGUE) JCTD, PDC helped implement an open-source software solution for geospatial data collection and sharing in remote and/or disconnected environments. The resulting tools and technologies will be incorporated into DisasterAWARE. This activity will extend into 2014.

PACOM S&T Directorate: Collaboration with the PACOM Science and Technology (S&T) Directorate was continual, particularly, in joint technology assessments for HA/DR support. These activities included participation at the annual S&T Conference, evaluation of an integrated disaster monitoring and early warning system, and consideration of early warning technologies for the Philippines.

BioSurveillance Information Service (BioServ): Through collaboration with U.S. Army Public Health Command (USAPHC), and Naval Medical Research Unit 2 (NAMRU-2), a BioSurveillance Information Service (BioServ) prototype was created in support of DoD biosurveillance and force health protection requirements. Key global and regional information resources, including those from CDC, WHO, and Pacific Health Surveillance Network, were successfully added to the BioServ capability. In turn, BioServ is embedded in DisasterAWARE.

✳ impact: Enriched evidence-based decision making for risk reduction, supporting the nation's interests in defense, development, and diplomacy—and ultimately, helping to foster disaster-resilient communities at home and abroad.



Map showing rainfall forecasts post-Tropical Cyclone Sandy.

hawaii

Disaster Management in the Pacific

Since its inception, PDC's commitment and dedication to supporting and serving the disaster management community and people of our home state have always been top priorities. PDC works closely with State Civil Defense and actively participates in events and exercises in Hawaii. DisasterAWARE has become a key resource within the State of Hawaii Emergency Operations Center and State Warning Point, and is also in use by the Hawaii National Guard (HING) to monitor and analyze hazards impacting the state.

DisasterAWARE training was provided in Hawaii directly to user-organization groups and through participation in various interagency and multiagency homeland security and disaster risk management forums, including Hawaii Emergency Preparedness Executive Committee (HEPEC), Hawaii State Earthquake Advisory Committee (HSEAC), and Pacific Risk Management 'Ohana (PRiMO).

Collaboration with Pacific Command: PDC is working with PACOM to assist in building disaster management capacity within strategic priority nations: 1) building partner capacity in the use of geospatial data for disaster management in Nepal, and 2) enhancing partner capacity in the use of information technology for disaster management in Indonesia.

PDC also continued existing collaboration with other PACOM Direct Reporting Units by way of 1) engagements with the Asia-Pacific Center for Security Studies (APCSS); 2) providing analytical and mapping support—both in terms of development of products and provision of training; and 3) participation in the Pandemic Influenza/Infectious Disease Working Group (PI2DWG) aimed at supporting the theater CONPLAN in case of an outbreak.



Additionally, PDC supported delivery of an HA/DR Geospatial-Intelligence (GeoINT) Certification course to a multinational audience of participants from mapping agencies across the PACOM area of interest. This was accomplished through engagement with the National Geospatial-Intelligence Agency (NGA).

University of Hawaii-PACOM Partnership and APDR3 Network: Aimed at enhancing “resilience” and strengthening “whole-of-society” involvement in addressing challenges that lead to instability, the UH-PACOM partnership expanded to include other public and private partners (e.g., USAID OFDA, FEMA, NOAA, U.S. Chamber of Commerce, and philanthropic foundations), resulting in a joint MOU that established the Asia Pacific Disaster Risk Reduction and Resilience (APDR3) network. APDR3 also moved to expand its reach in the Philippines, Indonesia, and Vietnam.

✳ impact: Collaborative actions support disaster management professionals and the public as they address specialized requirements and whole-of-society approaches to address hazard events.



Information kits that promote tsunami awareness include strategies for successful outreach programs.

select conferences and workshops

January - March

National Geospatial-Intelligence Agency course on Geospatial Intelligence (MAUI AND OAHU, HAWAII)

Third U.S.-Bahamas Disaster Management Knowledge Exchange (NASSAU, BAHAMAS)

Esri Federal GIS Conference (WASHINGTON, DC)

Pacific Risk Management 'Ohana (PRIMO) Partners Meeting 2012 (OAHU, HAWAII)

April - June

Sixth International Conference on Community-based Adaptation (HANOI, VIETNAM)

Stakeholder Consultation Workshop on Flood Early Warning and Mitigation Systems Arrangement for Thailand (BANGKOK, THAILAND)

Strategic Planning Workshop on the Effects of Distant Large Earthquakes on Infrastructure in Bangkok and the Major Cities of Thailand (BANGKOK, THAILAND)

International Training Workshop 2012: Application of Information Technology on Disaster Risk Reduction and Emergency Preparedness (TAIPEI, TAIWAN)

U.S.-ASEAN Emergency Preparedness Workshop (BANGKOK, THAILAND)

July - September

37th Annual Natural Hazards Research and Applications Workshop (BOULDER, COLORADO)

USARPAC Christchurch Earthquake Workshop (HONOLULU, HAWAII)

Annual Homeland Security Summit (SAN DIEGO, CALIFORNIA)

Second Annual FEMA-NORTHCOM Public-Private Partnership Conference (COLORADO SPRINGS, COLORADO)

2012 Symposium on East Asia Security-Theater Security Cooperation: Disaster Mitigation and Resilience (OAHU, HAWAII)

The Fourth Annual Global Risk Forum International Disaster and Risk Conference (IDRC 2012): Integrating Risk Management in a Changing World (DAVOS, SWITZERLAND)

October - December

2012 National Emergency Management Association Emergency Management Policy & Leadership Forum (SEATTLE, WASHINGTON)

5th Asian Ministerial Conference on Disaster Risk Reduction (YOGYAKARTA, INDONESIA)

Regional Humanitarian Assistance Program (HAP)-Humanitarian & Civic Assistance (HCA) Workshop for Security Cooperation Office HAP & HCA Managers (QUITO, ECUADOR)

UNOCHA ROAP Consultative Workshop on Strengthening Disaster Preparedness and Response Capacity in the Asia-Pacific Region (BANGKOK, THAILAND)

partners, clients, and funding organizations

Disaster Management and Humanitarian Assistance

American Red Cross (ARC)
Asia-Pacific Economic Cooperation (APEC)

Asian Development Bank (ADB)

Association of Southeast Asian Nations (ASEAN)
Humanitarian Assistance Coordination Centre (AHA Centre)

Badan Nasional Penanggulangan Bencana-Indonesia (BNPB)

Federal Emergency Management Agency (FEMA)

Hawaii National Guard (HING)

National Emergency Management Agency (NEMA) of The Bahamas

National Science and Technology Center for Disaster Reduction-Taiwan (NCDR)

Pacific Risk Management 'Ohana (PRIMO)

South Pacific Applied Geoscience Commission (SOPAC)

State of Hawaii: Office of the Governor, county civil defense agencies, HEPEC, HSCD, DCCA, DLNR

United Nations: OCHA, SPIDER

U.S. Agency for International Development (USAID): Office of Foreign Disaster Assistance (OFDA)

U.S. Chamber of Commerce

U.S. Army Corps of Engineers (USACE): Institute for Water Resources (IWR), Pacific Ocean Division (POD)

U.S. Department of Defense: PACOM, NORTHCOM, SOUTHCOM, EUCOM, AFRICOM

U.S. Department of Homeland Security (DHS): U.S. Coast Guard

U.S. Department of State Humanitarian Information Unit (HIU)

U.S. Office of the Secretary of Defense Global Situational Awareness Facility (OSD GSAF)

U.S. Trade and Development Agency (USTDA)

Vietnam Ministry of Agriculture and Rural Development (MARD)

The World Bank (WB)

Research, Education, and Training

Asia-Pacific Center for Security Studies (APCSS)

Center for Excellence in Disaster Management and Humanitarian Assistance (COE DMHA)

Center for Strategic and International Studies (CSIS)

National Defense University (NDU)

National Telecommunications and Information Administration (NTIA)

Naval Medical Research Unit 2 (NAMRU-2)

Naval Postgraduate School (NPS)

University of Hawaii (UH)

U.S. Army Public Health Command (USAPHC)

U.S. Forest Service (USFS)

Major Data Providers

Centers for Disease Control and Prevention (CDC)

National Aeronautics and Space Administration (NASA)

National Center for Medical Intelligence (NCMI)

National Geospatial-Intelligence Agency (NGA)

National Oceanic and Atmospheric Administration (NOAA): NWS, CSC, PSC

Pacific Tsunami Warning Center (PTWC)

U.S. Department of Veterans Affairs (VA)

U.S. Geological Survey (USGS)

World Health Organization (WHO)

Private Sector

DHI

Environmental Systems Research Institute (Esri)

GNS Science New Zealand

Hawaii Hotel and Visitor Industry Security Association (HHVISA)

Kinetic Analysis Corporation

Oracle Corporation

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Pacific Disaster Center (PDC) develops and applies information and technology solutions to foster disaster-resilient communities. PDC was established by the U.S. Government and is managed by the University of Hawaii. The content of this document does not reflect the position or policy of the U.S. Government.

Front cover: U.S. Air Force photo by Master Sgt. Mark C. Olsen.

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