



ShakeAlert® System Technical Engagement Updates

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Web: ShakeAlert.org

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Topics Covered During USGS Update:

- New ShakeAlert LtOs
- Technical Engagement Strategy (TIES) Project Year 2
- Integration of GNSS into the ShakeAlert System
- Rollout of EEW in Canada

OasisPlus

POWERED BY
ShakeAlert™

Earthquake Early Warning

OasisPlus Earthquake Early Warning (EEW) alerts provide warning of incoming shaking before it reaches your building to help occupants prepare, help avoid serious injuries, and save lives. EEW alerts are delivered seamlessly via the mobile app and Management Console, further enhancing your situational awareness.

Kinematics is pleased to be a USGS partner commercially licensed to deliver **ShakeAlert**®-powered earthquake early warning alerts via the OasisPlus Platform. OasisPlus can integrate with other regional earthquake early warning systems in a similar manner.



Kinematics, Pasadena
<https://kinematics.com>



Jet Propulsion Laboratory, Pasadena
<https://www.jpl.nasa.gov>



EARTHQUAKE
WARNING
CALIFORNIA

Aligned with CEO&TE Strategic Vision Focus Area 1: *Expand and diversify ShakeAlert technical engagement and implementation.*

Methods include deep dive interviews (resulting in an actionable plan) with industries in critical sectors as defined in the ***Presidential Policy Directive 21 (PPD-21): Critical Infrastructure Security and Resilience****

Overall Goal: Continue to build the portfolio of USGS-licensed LtOs that can offer a diversity of ShakeAlert-powered products and services.

ShakeAlert® Earthquake Early Warning on a College Campus



The College of the Desert campus is located just a few miles away from the San Andreas Fault, where some of the largest earthquakes in United States history have occurred. Photo credit: Visitor2, CC BY-SA 3.0 <<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons.

managed by the U.S. Geological Survey, shaking expected, and issues ShakeAlert Messages to protect people, vital systems, and infrastructure.

earthquakes. Among the most well-known through most of the state and winds its way through the southern part of the San Jacinto Fault—

setting, as strong ground motion can knock over furniture or crumbling building facades.

ShakeAlert EEW allows people to prepare for and Hold On.

ShakeAlert® Earthquake Early Warning for Fire Stations

Menlo Park Fire Protection District uses the ShakeAlert® Earthquake Early Warning System to protect firefighters and quickly respond to 911 calls by automatically playing an audible alert, activating warning lights, shutting off gas valves, and opening firehouse bay doors when shaking is expected.



The Menlo Park Fire Protection District has integrated ShakeAlert powered alerts into its alerting system to give emergency responders additional protection against earthquakes. Photo credit: David Croker, USGS. (Public Domain)

• What is the ShakeAlert System?

The ShakeAlert Earthquake Early Warning (EEW) System, managed by the U.S. Geological Survey, rapidly detects significant earthquakes, estimates the amount of shaking expected, and issues ShakeAlert Messages. Then, ShakeAlert Licensed Operators use the information contained in these Messages to deliver automated alerts that can protect people, vital systems, and infrastructure.

• The Challenge and the Opportunity

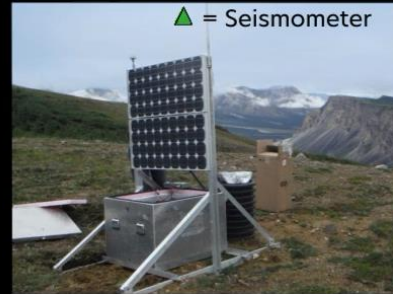
California is home to the San Andreas Fault, a massive fault system that stretches through most of the state, including the San Francisco Bay Area. The San Andreas Fault was the source of the 1989 Loma Prieta earthquake, which caused severe shaking throughout the region, killing 63 people, injuring nearly four thousand, and causing \$6 billion in damage.

Benefits of ShakeAlert EEW

"If a moderate earthquake occurs our primary concern is providing early notice to our staff. If a severe earthquake occurs there is a possibility of infrastructure damage. It is important to take damage reduction measures, such as shutting off gas and opening the apparatus bay doors so that emergency response is not impacted."

Project Manager, Menlo Park Fire Protection District

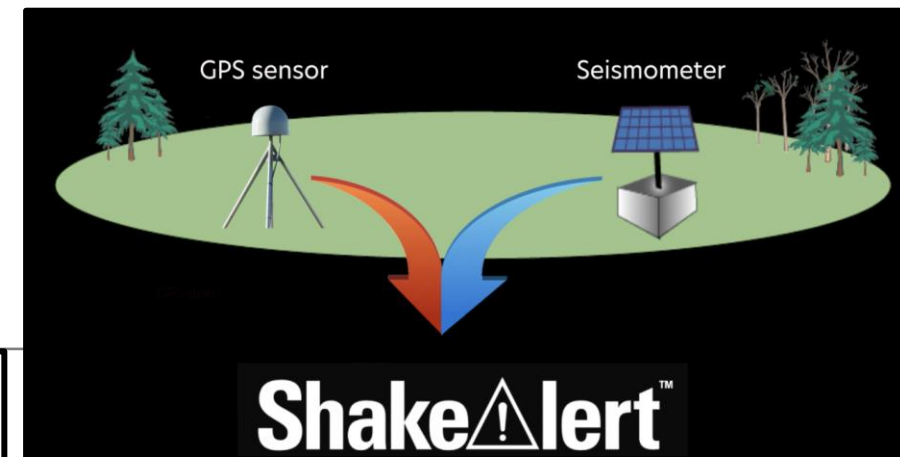
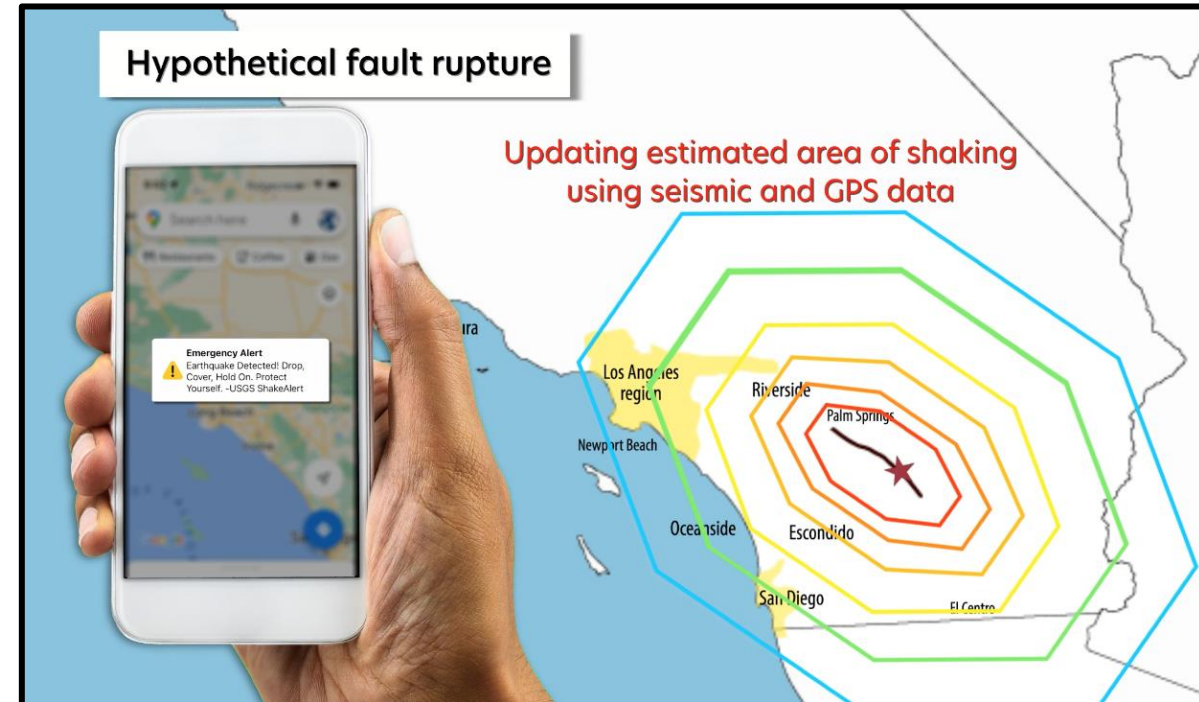
Shake!lert™ Gets a Boost



with GPS Technology



- Future major offshore earthquakes in Cascadia, which could be similar to the 2011 M9.1 earthquake in Japan, underscore the importance of incorporating satellite data stream into the ShakeAlert System.
- The GNSS-enhanced ShakeAlert System may more quickly and accurately determine the magnitude and the area of shaking from very large earthquakes resulting in faster notifications for people to take a protective action, such as Drop, Cover, and Hold On.
- When the ShakeAlert seismic sensor buildout is completed at the end of 2025 there will be a network of over 2000 ShakeAlert seismic and GNSS sensors poised to protect residents and visitors in California, Oregon, & Washington.



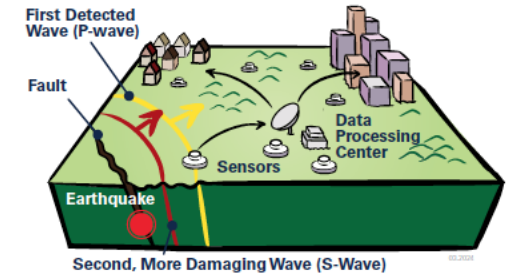
EEW in Canada

- Launched in British Columbia in spring 2024, in Ontario and Quebec in fall 2024.
- Canada and the USA share science, algorithms, real-time data, and public safety information. For example, an earthquake that is large enough to produce significant shaking in many parts of British Columbia and the US West Coast will be detected by both EEW systems.
- EEW alerts may be delivered on both sides of the Canada/US border by each country's EEW system. People near the border may receive multiple alerts triggered by either or both EEW systems.

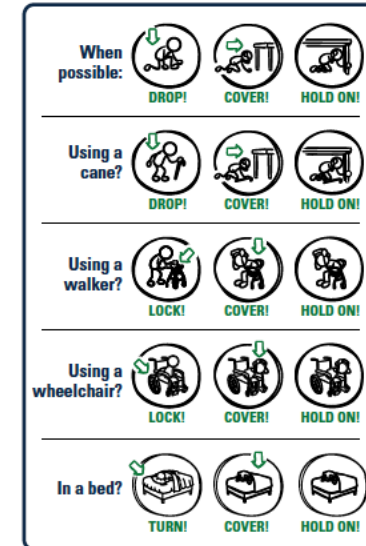
NATIONS COLLABORATE ON PUBLIC SAFETY

Earthquake Early Warning in the US and Canada

Earthquakes happen across the globe, including in the United States and Canada. The United States Geological Survey and Natural Resources Canada are collaborating to advance public safety through Earthquake Early Warning (EEW). Earthquakes threaten the safety of people and infrastructure across geopolitical boundaries. For this reason, collaboration is key to safety in these neighbouring nations, particularly in border areas.



If you **FEEL SHAKING** or **GET AN ALERT...**



What is Earthquake Early Warning?

EEW systems rapidly detect and process information from earthquakes that have already begun so alerts can be delivered to people and infrastructure, providing **seconds** of advance warning before damaging shaking is felt. **EEW is not earthquake prediction.**

During an earthquake, a rupturing fault produces several different kinds of waves that send energy away from the epicenter, like ripples from a rock thrown into a pond. Seismic stations first detect the fast-moving P-wave and that information is sent to a processing center where the location, size (magnitude), and shaking of the earthquake is estimated. The goal of EEW is to deliver an alert before the slower and usually more damaging S-waves arrive.

People may receive an alert before, during, or after shaking arrives, depending on their distance from the epicenter and the mechanism used to receive the alert. One should take immediate protective action when shaking is felt or an alert is received.

Why is Earthquake Early Warning Important?

EEW can save lives, mitigate harm, and protect critical infrastructure and systems. Many people will receive alerts through their cell phones, giving them time to take a protective action, such as Drop, Cover, and Hold On. Other protective actions may be recommended for individuals to adapt to their situation and environment. Alerts can also trigger automated safety actions, such as slowing trains, closing bridge gates, shutting water utility valves, and opening firehouse doors.

Thank you!



Questions and Discussion