



Integrated Monitoring for Secure  
Carbon Storage

# C44 Monitoring Platform

June 2026

Copyright ©2026 Carbon Guardian LLC



# Carbon Sequestration and Underground Storage



## Project Planning

Plan

- Site Selection
- Reservoir Modeling
- Permitting
- Budgeting



## MMV Platform

Monitor

- Measurements
- Data Aggregation & Analytics
- Surveillance & Detection
- Reporting and Compliance



## Carbon Ledger

Account

- Carbon Credit Yield
- Monitoring & Verification
- Carbon Credit Certification
- Registry Reporting

## 3C's of Operational Assurance

---

### Confidence

Continuous monitoring and verification is essential to maintain **public trust and regulatory confidence** in CO<sub>2</sub> storage operations.

**C44** provides independent monitoring, verification, and operational assurance across the project lifecycle.

**Independent Monitoring & Verification**

### Conformance

Surveillance and reporting requirements evolve throughout the lifecycle of CO<sub>2</sub> storage projects.

**C44** enables **operational conformance** through integrated workflows, automated reporting, and real-time performance insights.

**Operational Compliance & Reporting**

















### Containment

Long-term CO<sub>2</sub> storage requires continuous monitoring of **subsurface integrity** and operational risk.


**C44** supports early detection, risk mitigation, and intelligent alerting for containment assurance.


**Risk Detection & Alerting**


# CCS Monitoring Goals and Methods


Method	Plume Position	Top Seal Integrity	Induced Seismicity	Injection	Well Integrity	Leakage Detection
4D Seismic / VSP						
Microseismic						
Reservoir Simulation						
Geomechanics						
P, T and Volume						
Fiber-optical						
(Geo)-Chemical Sampling						

## Beachhead: Microseismic

 Event detection

 Real-time insights

 Fast deployment

 Expansion into CCUS / geothermal / frac

# Integrated Microseismic Service

One team from network design to decision-ready insights



## Network Design

Plan

- Optimize station location and number
- Meet resolution targets
- Investigate noise levels



## Monitoring Platform

Monitor

- Scalable enterprise cloud platform
- Detection and localization of events
- Automated reporting



## Technical Advisory

Advise

- Detailed event analysis
- Geologic and geomechanical context
- Actionable operational recommendations



## Instrumentation

Deploy

- Sensors and telemetry
- Commissioning and field tech services
- Collaboration with Güralp as OEM



## Data Engineering

Integrate

- Data aggregation and secure storage
- Data integration
- Storage cost optimization



## Geomechanics

Mitigate

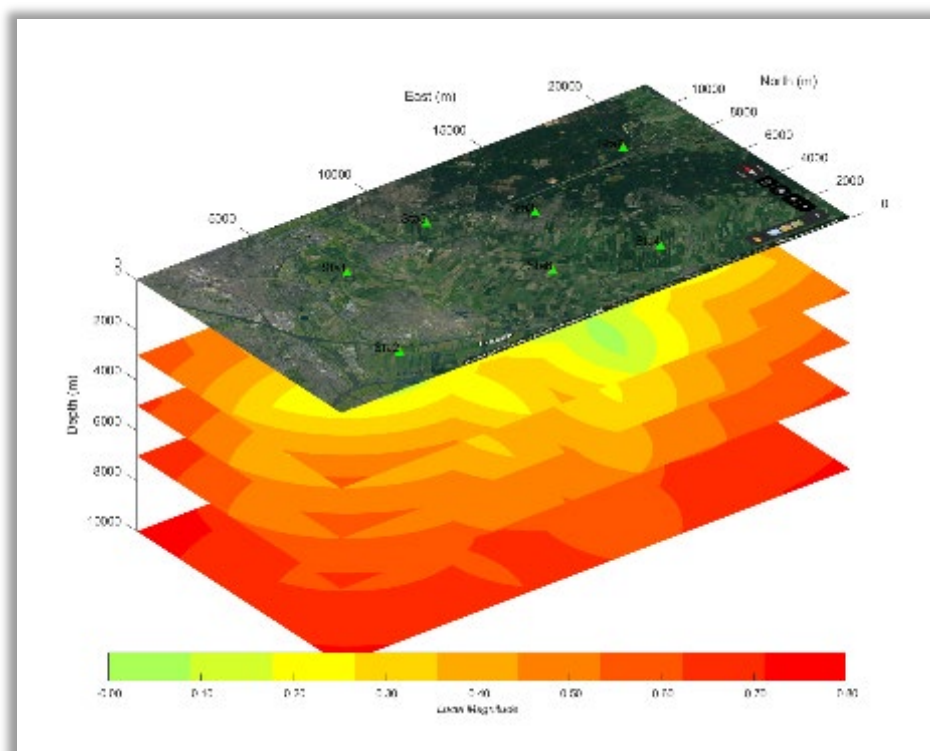
- Establish geomechanical models
- Describe slip potential of natural faults
- Provide safe operational parameters

# Integrated Microseismic Services



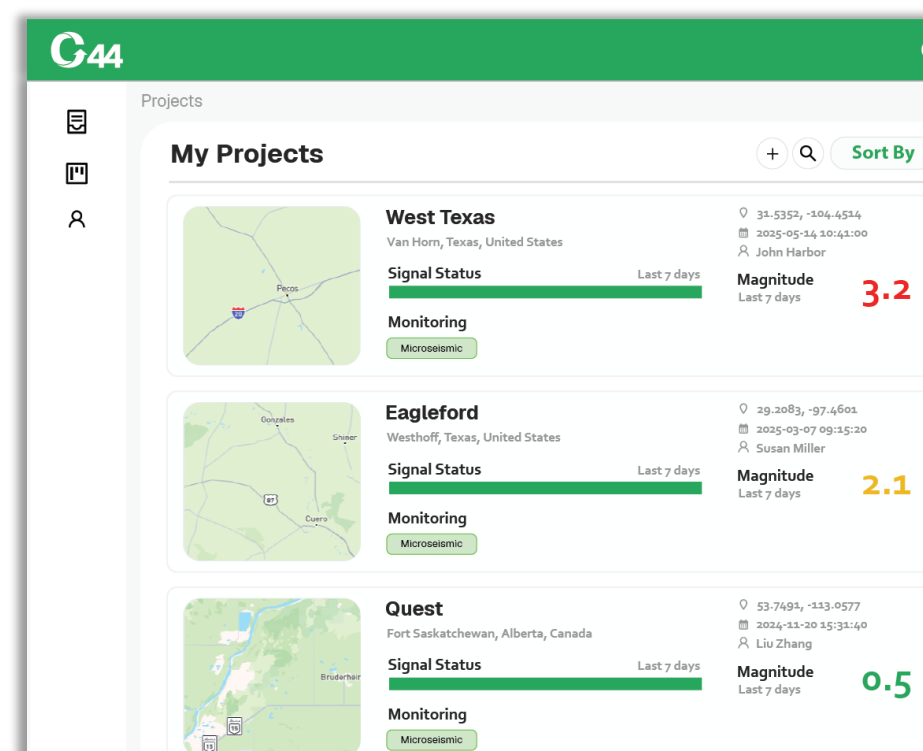
## Network Planning

- Optimize number and position of stations
- Satisfy magnitude of completeness requirements



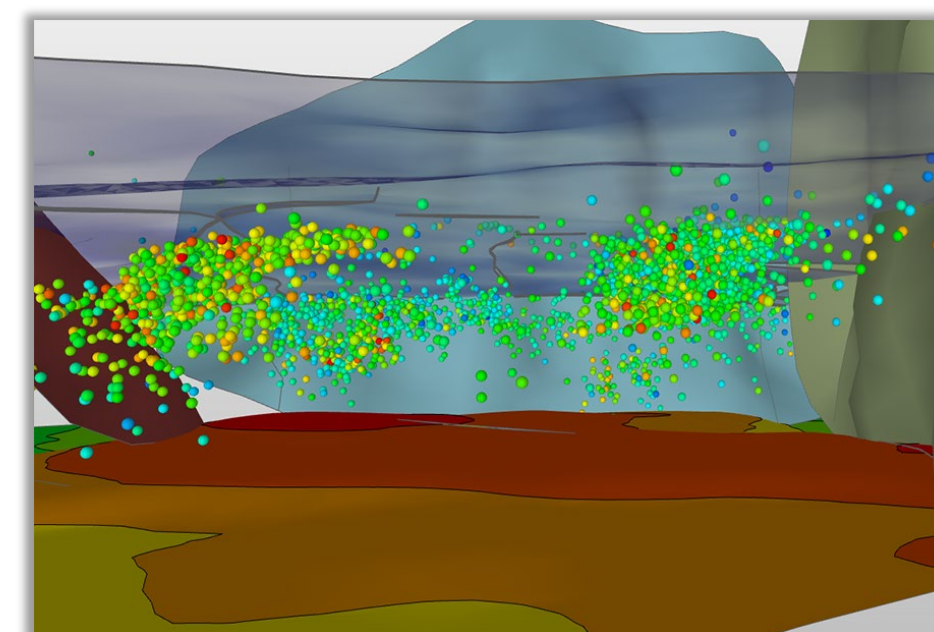
## Monitoring Platform

- Enterprise platform for seismic monitoring
- Event detection, localization and reporting



## Interpretation

- Interpretation in geological and geomechanical context
- Operational recommendations



The background features a complex, abstract design. It consists of multiple layers of wavy, overlapping lines in shades of blue and white, creating a sense of depth and movement. A prominent feature is a grid-like pattern that appears to be part of a sphere or a curved surface, rendered in a light blue and white color. The overall effect is a futuristic, digital aesthetic. 

# C44 Monitoring Platform

January 2026



## Monitoring Platform

## Enterprise Platform

- **SaaS offering** with subscription plans tailored to your needs
- Based on **Microsoft Azure** the leading cloud platform in the energy industry
- State-of-the-art **data security through 2-factor authentication and role-based access control**
- Scalable to **multiple projects**
- One **single application** for all your microseismic monitoring and reporting needs

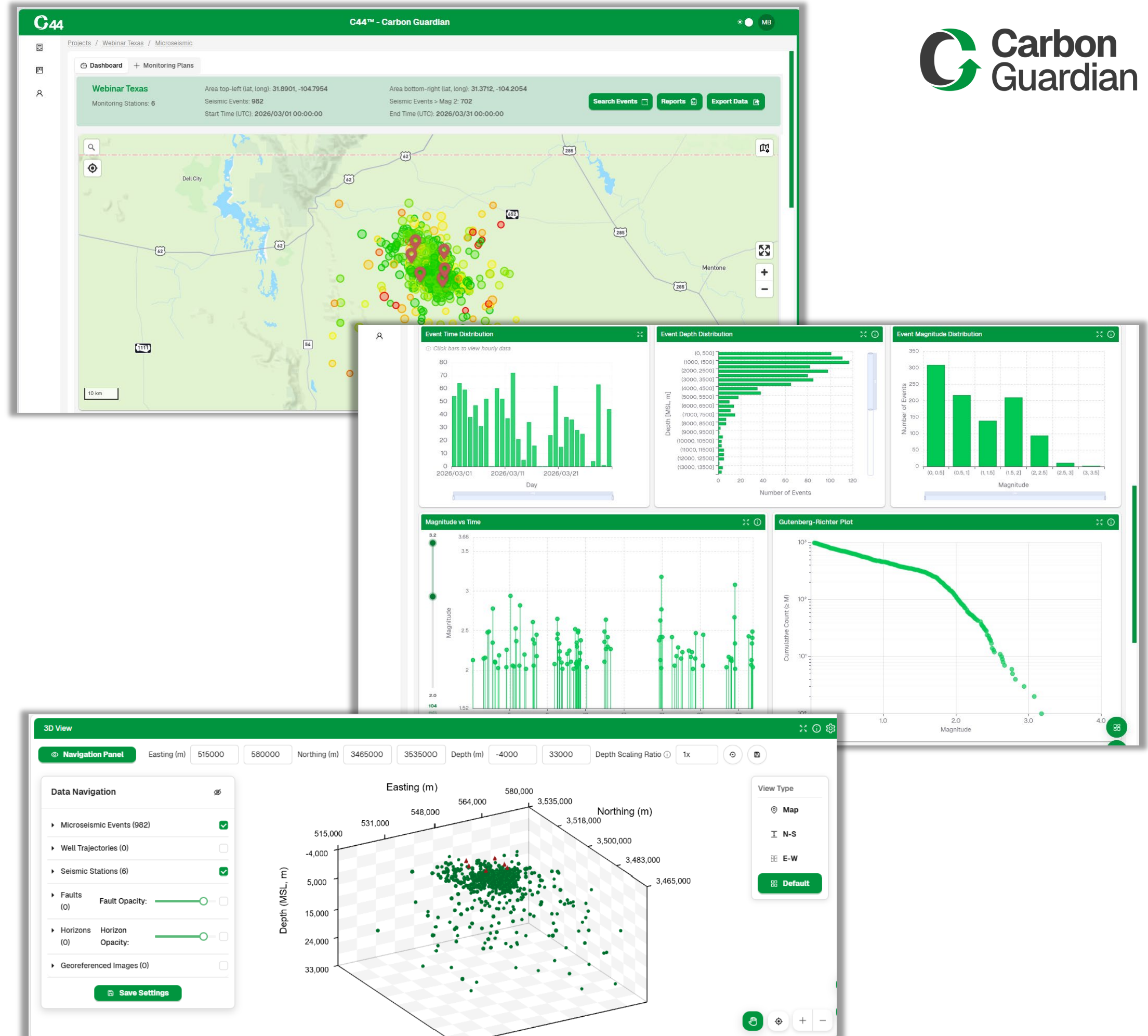
The screenshot displays the G44 Monitoring Platform interface. The top navigation bar is green with the G44 logo on the left and 'C44 - Carbon Guardian' on the right. Below the navigation bar, there is a sidebar with icons for home, projects, and user profile. The main content area is titled 'My Projects' and lists six projects, each with a small map, location, signal status bar, and magnitude. The projects are: West Texas (Van Horn, Texas, United States, Magnitude 3.2), Eagleford (Westhoff, Texas, United States, Magnitude 2.1), Quest (Fort Saskatchewan, Alberta, Canada, Magnitude 0.5), Soultz (Soultz-sous-Forets, Bas-Rhin, France, Magnitude 1.1), Balmatt (Mol, Antwerp, Belgium, Magnitude 0.3), and Delfland (Maasland, South Holland, Netherlands, Magnitude NaN). To the right of the project list is a large map of Europe with several orange dots indicating monitoring locations. The map includes a search bar, a location pin icon, and a 500 km scale bar. At the bottom of the interface, there is a pagination control showing '1 / 10 / Page' and a 'Go to Page' field.



## Monitoring Platform

# Microseismic Module

- Interactive and user-friendly **dashboard** for seamless real-time monitoring, event detection, and actionable insights
- Always informed through **customizable alerts** for data completeness and event detection
- Understand your data through **interactive map** and **3D displays**
- Efficiently comply with reporting requirements through **automated and manual reporting**

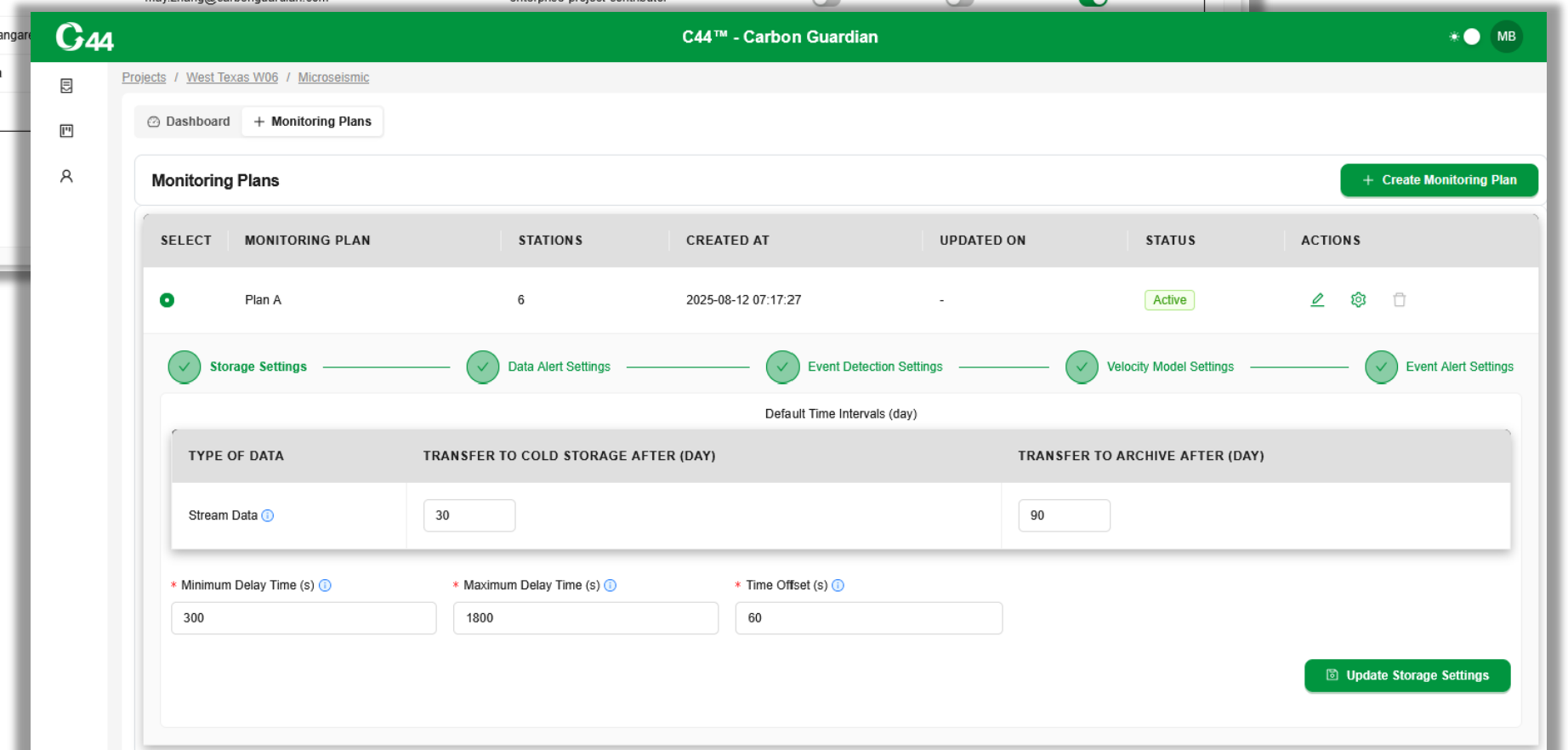
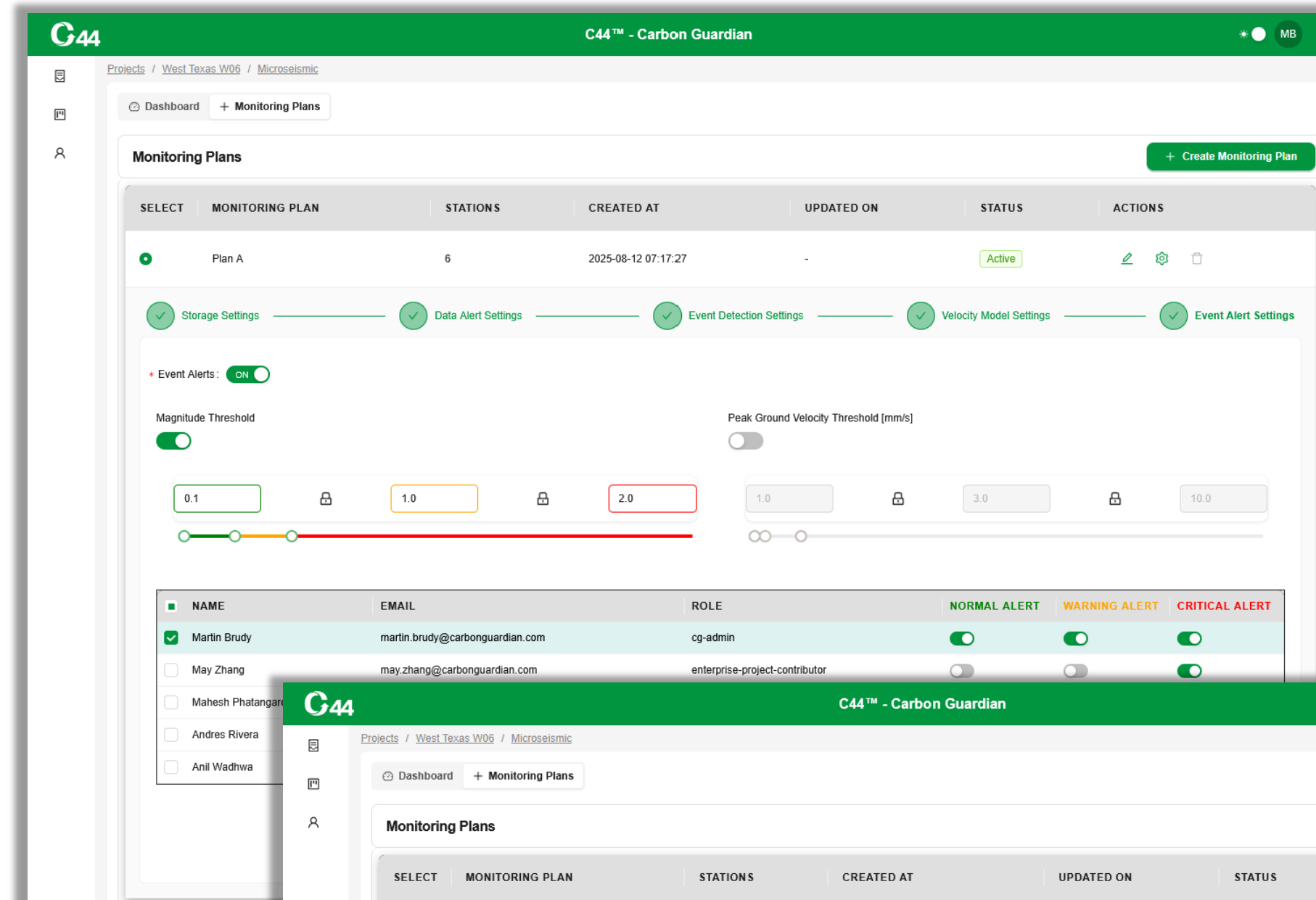




## Monitoring Platform

## Guided Workflow

- Create multiple monitoring plans efficiently using the guided workflow
- **Cost-optimized, automated data storage**
- Optimized event detection through control of all monitoring and event detection parameters
- Specify site-specific **velocity model** for optimal event localization
- Define **traffic light system** to trigger event notifications based on event magnitude or peak ground velocity





## Monitoring Platform

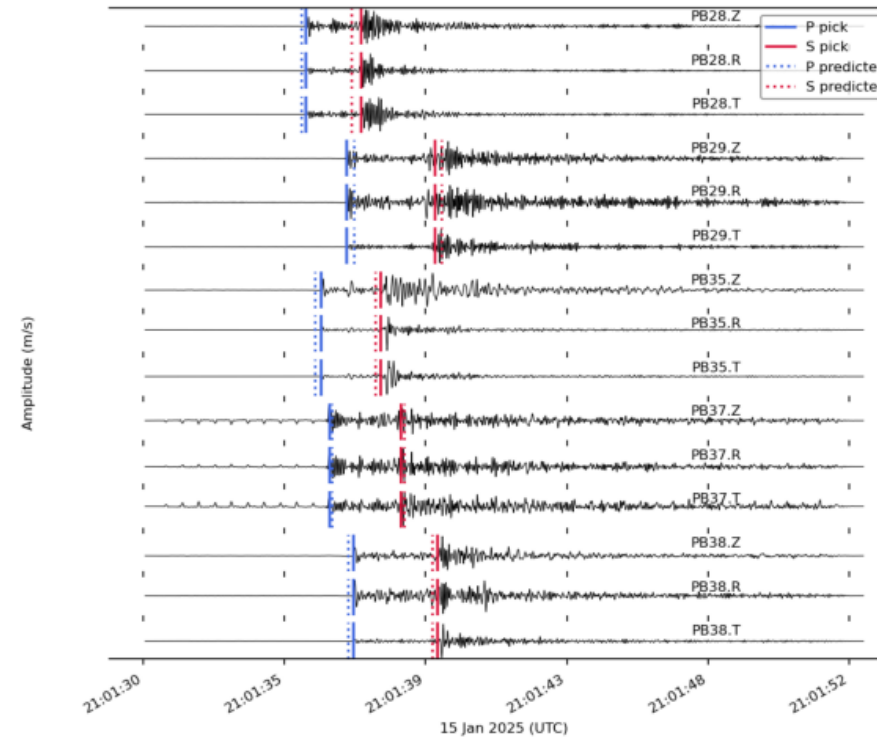
# Event Detection & Localization

- State of the art algorithms for **reliable event detection, localization and magnitude determination**
- **Uncertainty determination** for event localization
- Processing **details readily available** for all events for display and download

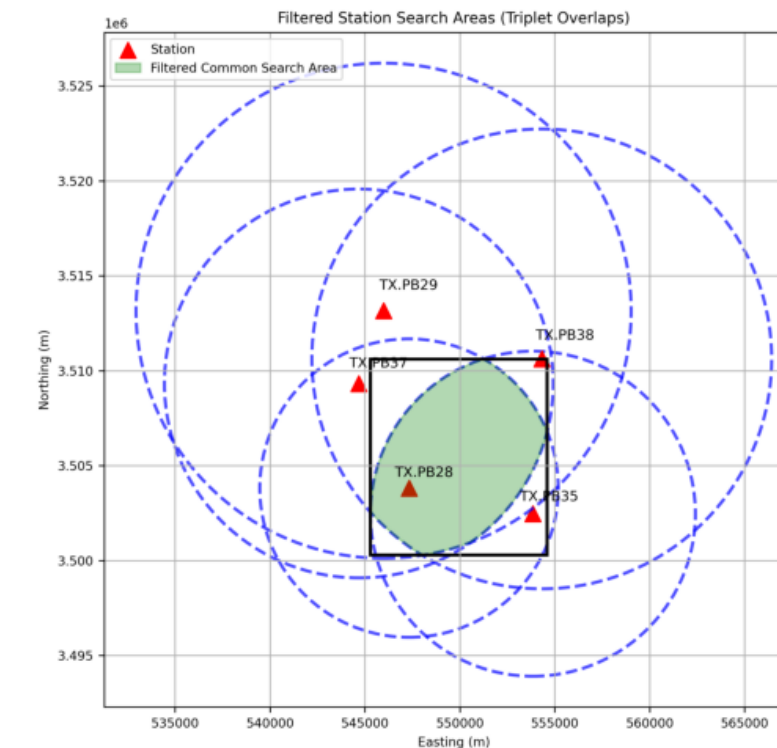


Event ID: 2025-01-15T21\_01\_35.780000  
Origin Time (UTC): 2025-01-15T21:01:33.517500Z  
Latitude: 31.6440, Longitude: -104.4937, Depth: 6.224 km  
Magnitude: 1.27 (ML)

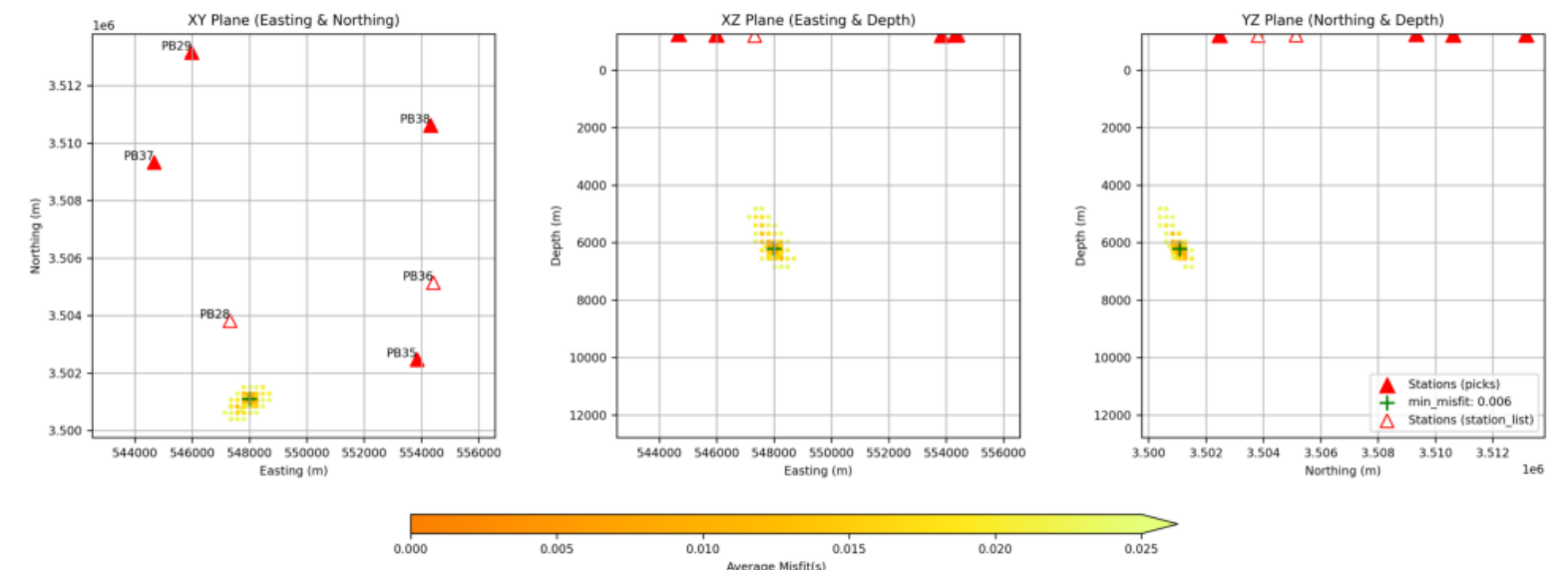
### Picks & Waveforms



### Triangulation



### Location Uncertainty





## Monitoring Platform

# Traffic Light System

- Optional part of each monitoring plan
- Based on magnitude and/or PGS threshold
- Adjustable to specific regulatory requirements
- Automated event notifications based on TLS categories

The screenshot displays the Carbon Guardian monitoring platform interface. At the top, there is a table with columns: SELECT, MONITORING PLAN, STATIONS, CREATED AT, UPDATED ON, STATUS, and ACTIONS. The first row shows 'Plan A' with 8 stations, created on 2025-08-21 14:53:57, and is currently 'Active'. Below this, there are several settings sections: 'Storage Settings' (checked), 'Data Alert Settings' (unchecked), 'Event Detection Settings' (checked), 'Velocity Model Settings' (checked), and 'Event Alert Settings' (checked). The 'Event Alerts' section is expanded, showing a toggle for '\* Event Alerts' set to 'ON'. Underneath, there are two threshold settings: 'Magnitude Threshold' (checked) and 'Peak Ground Velocity Threshold [mm/s]' (unchecked). Each has a range of values and a slider. The 'Magnitude Threshold' has values 0.1, 1.0, and 2.0. The 'Peak Ground Velocity Threshold' has values 1.0, 3.0, and 10.0. At the bottom, there is a table of users with columns: NAME, EMAIL, ROLE, NORMAL ALERT, WARNING ALERT, and CRITICAL ALERT.

NAME	EMAIL	ROLE	NORMAL ALERT	WARNING ALERT	CRITICAL ALERT
✓ Martin Brudy	martin.brudy@carbonguardian.com	cg-admin	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
✓ Andres Rivera	andres@saigeous.com	enterprise-project-contributor	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
✓ Anil Wadhwa	anil.wadhwa@carbonguardian.com	enterprise-project-contributor	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> May Zhang	may.zhang@carbonguardian.com	enterprise-project-contributor	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



## Monitoring Platform

# Reporting & Publishing

- On-demand and scheduled reports
- Based on user-specific report templates
- Option to publish (parts) of information for public access
- Technology to enable community engagement and transparency efforts



The screenshot displays the G44 Monitoring Platform interface. On the left, a 'Reports' configuration panel allows users to set report parameters:

- Title:** August 2025
- Template:** Template 1
- Report Format:** PDF Document
- Time Range (UTC):** 2025/08/10 00:00 to 2025/08/20 00:00
- Magnitude Range:** -1.0 to -1.13
- Depth Range [m]:** 0 to 10000
- Geographic Area:** Top-Left Corner (Latitude, Longitude) 31.859547, -104.40727; Bottom-Right Corner (Latitude, Longitude) 31.140727, -104.40727

The main dashboard shows a map of the 'Webinar Texas' area with seismic events plotted as colored circles. A summary box above the map provides key statistics:

- Monitoring Stations:** 6
- Seismic Events:** 982
- Seismic Events > Mag 2:** 702
- Start Time (UTC):** 2026/03/01 00:00:00
- End Time (UTC):** 2026/03/31 00:00:00

Below the map, a table displays the recorded seismic events:

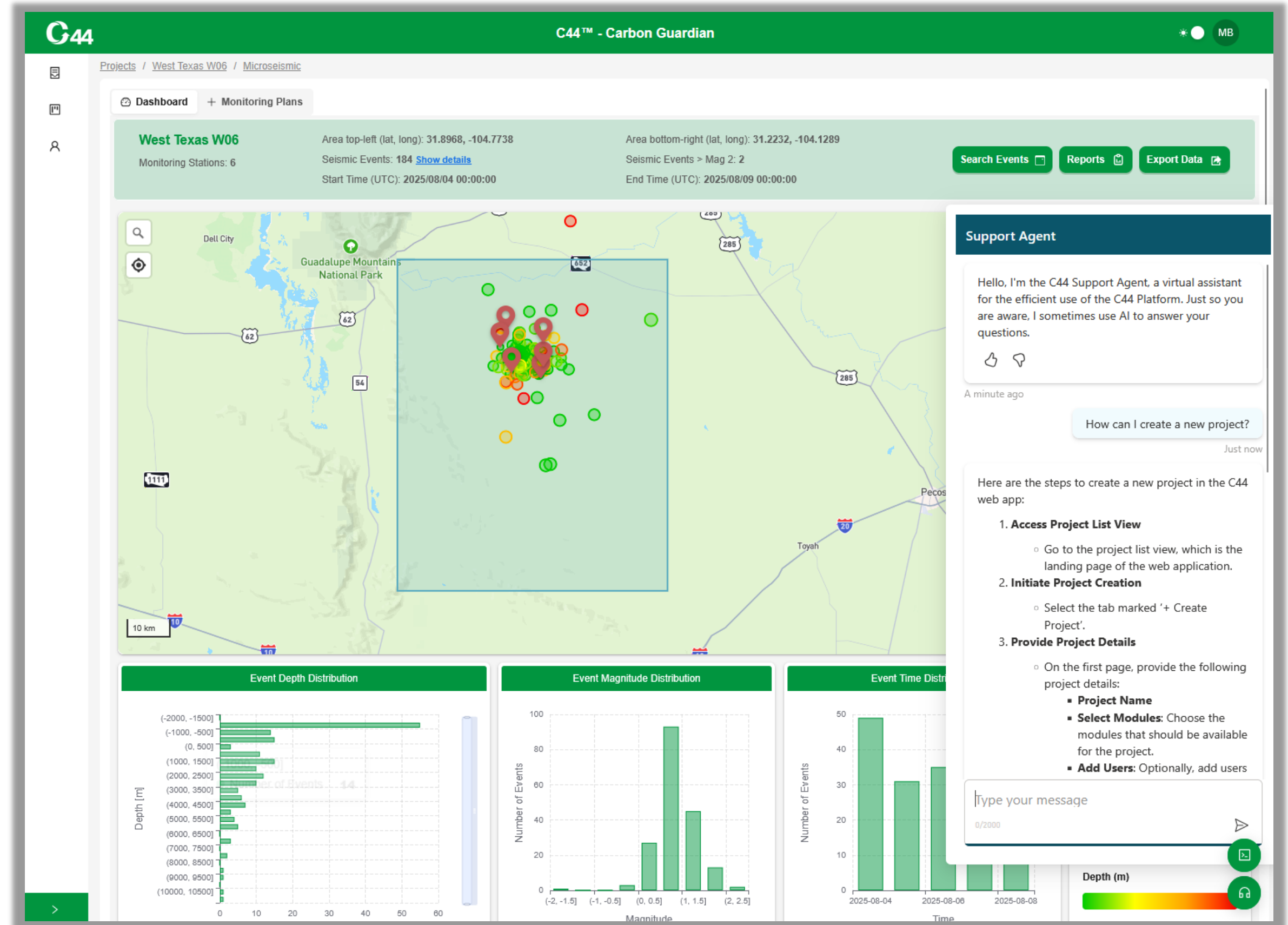
Event ID	Time (UTC)	Latitude	Longitude	Depth (MSL, m)	Magnitude	TLS Level
event_2025-08-10T00:13:04.850000	2025-08-10 00:13:04	31.71451	-104.47057	1047.0	1.58	●
event_2025-08-10T00:16:29.380000	2025-08-10 00:16:29	31.69837	-104.38541	-1078.0	0.65	●
event_2025-08-10T00:42:08.180000	2025-08-10 00:42:08	31.62391	-104.4076	-1152.0	0.81	●
event_2025-08-10T05:23:43.780000	2025-08-10 05:23:43	31.68941	-104.45875	-1060.0	0.53	●
event_2025-08-10T05:30:18.640000	2025-08-10 05:30:18	31.68292	-104.46332	-1130.0	0.93	●
event_2025-08-10T05:32:38.020000	2025-08-10 05:32:38	31.73199	-104.43092	-394.0	1.17	●
event_2025-08-10T13:52:12.620000	2025-08-10 13:52:12	31.69457	-104.45144	3013.0	1.47	●
event_2025-08-10T16:52:16.550000	2025-08-10 16:52:16	31.68772	-104.47226	-550.3190909090909	1.79	●
event_2025-08-10T16:59:25.790000	2025-08-10 16:59:25	31.6747	-104.45876	-1188.0	0.28	●
event_2025-08-10T19:14:41.570000	2025-08-10 19:14:41	31.68859	-104.4111	2081.0	1.57	●
event_2025-08-10T19:25:09.840000	2025-08-10 19:25:09	31.68985	-104.45365	87.14444444444445	0.99	●
event_2025-08-10T19:47:48.050000	2025-08-10 19:47:48	31.75747	-104.40552	5103.335555555555	0.34	●
event_2025-08-10T22:42:38.670000	2025-08-10 22:42:38	31.6915	-104.4645	-972.0111111111111	0.65	●
event_2025-08-11T03:41:45.160000	2025-08-11 03:41:45	31.65313	-104.28377	11585.444444444445	2.02	●
event_2025-08-11T05:33:51.610000	2025-08-11 05:33:51	31.712	-104.43921	997.0	0.38	●
event_2025-08-11T05:52:39.590000	2025-08-11 05:52:39	31.65908	-104.50833	-1240.0	0.52	●
event_2025-08-11T11:30:53.170000	2025-08-11 11:30:53	31.68884	-104.45346	1983.5	0.75	●
event_2025-08-11T12:27:54.780000	2025-08-11 12:27:54	31.67902	-104.47244	-780.314814814815	0.38	●
event_2025-08-11T15:56:01.920000	2025-08-11 15:56:01	31.66109	-104.43012	-1150.0	-0.21	●
event_2025-08-11T16:20:36.590000	2025-08-11 16:20:36	31.67786	-104.46413	-1241.0	0.48	●
event_2025-08-11T16:30:57.890000	2025-08-11 16:30:57	31.67074	-104.48258	-195.0	1.66	●
event_2025-08-11T16:33:03.440000	2025-08-11 16:33:03	31.68002	-104.48003	224.4	0.75	●



## Monitoring Platform

## AI Agents

- AI-based **User Support Agent**
- Build on **Copilot Studio** and based on **ChatGPT**
- Trained with proprietary information
  
- AI-supported selection of location-specific **velocity model**





**Carbon  
Guardian**