Dashboard panels (as displayed):

Day/Night Progress (Texas) — 0% Night | 19% Day

CME Speed	1133 km/s		
KP Index:	6	Aurora Potential (Kp Index)	
Solar Flare:	M1.1	CME Solar Source Latitude	43 deg (Lat)
Geomagnetic:	G2 (Moderate)	• Updated: 09:50:48 AM	

To exit full screen, press and hold Esc

Thu, Oct 23	Fri, Oct 24	Sat, Oct 25	Sun, Oct 26	Mon, Oct 27
86°F	91°F	92°F	93°F	93°F
66%	38%	35%	38%	40%
10 mph	18 mph	14 mph	1 mph	8 mph

NWS Alerts - Texas
Hover over any alert below to see the full description.

Flood Watch — SEVERE
* WHAT...Flooding caused by excessive rainfall continues to be possible.
* WHERE...Portions of North and...
You should monitor later forecasts and be alert for possible Flood Warnings. Those living in areas prone...
Expires: Fri, Oct 24, 3:00 PM CDT

Flood Watch — SEVERE
* WHAT...Flooding caused by excessive rainfall continues to be possible.
* WHERE...Portions of Oklahoma,...
You should monitor later forecasts and be alert for possible Flood Warnings. Those living in areas prone...
Expires: Fri, Oct 24, 4:00 PM CDT

Los Ebanos Texas

Temperature:	82°F
Feels Like:	87°F
Humidity:	77%
Pressure:	1015 hPa
Wind Speed:	1 mph
Wind Direction:	SW
Visibility:	6.2 mi
Cloudiness:	6%
UV Index:	7.0
Dew Point:	77°F
Wind Gust:	--
Rain (1h):	--
Total Rainfall:	0 in
Solar Radiation:	131 W/m²
Snow (1h):	--

Current Temperature
7:38 AM   6:58 PM
Clear sky
82
FRI 24 OCT 2025

Air Quality
13
GOOD

PM2.5:	3.1
PM10:	4.7
O3:	52.5
NO2:	0.8
SO2:	0.3
CO:	100.5

Air quality is good. Enjoy outdoor activities!

Air Quality Trends (Next 5 Days Forecast) — AQI, PM2.5 (µg/m³), PM10 (µg/m³)

Moon Phase
Waxing Crescent
21% Illuminated

Moon Age:	3.1 days
Distance:	238,637 mi
Next Full Moon:	11/4/2025
Next New Moon:	11/20/2025

10:30 AM   8:59 PM
Lunar Cycle Progress
New Moon   Day 3   Full Moon

● Texas USGS LIVE MONITOR
0 quakes
No recent quakes

Water Quality: Normal
Rain: 0 in/hr | Wind: 7 mph
Rio Grande nr Mission, TX: 28.4°C | 1170 µS/cm Costilla Creek Above Costilla Dam, NM: 1.7 ft / 8 ft | 2 cfs → Zacate Ck at Laredo, TX: 1.0 ft / 14 ft | 0 cfs → Rio Grande nr Castolon, TX: 2.6 ft / 10 ft | 35 cfs →

Alerts: None
9:50:23 AM

🌍 The Terrestrial & Celestial Nexus Dashboard

1. Project Overview: The All-In-One Environmental Monitor

The Terrestrial & Celestial Nexus is a real-time, cross-domain monitoring system designed to provide a unified view of every major force impacting daily life—from hyperlocal weather and air quality to global geological and space events.

This system moves beyond conventional weather reporting by integrating atmospheric, hydrological, geological, and astronomical data from over five distinct APIs and libraries into one cohesive, interactive interface. The goal is to provide unparalleled situational awareness for both immediate environmental safety and long-term planetary insight.

2. Core Dashboard Features

The dashboard is organized into interactive panels, ensuring a logical flow from local, personal data to global and celestial dynamics.

☀ Local & Atmospheric Conditions

This section focuses on data essential for daily planning and immediate safety.

Feature

Data Source(s)

Functionality

Time & Day/Night Progress

Internal Clock & SunCalc

Displays the unique local time and a visual progress bar indicating the fraction of daylight remaining, providing immediate context for the diurnal cycle.

5-Day Weather Forecast

OpenWeatherMap

Standard multi-day forecast.

Enriched Environmental Data

OWM and Visual Crossing

Displays standard OWM elements alongside critical, synthesized metrics: Total Daily Rainfall and Daily Solar Radiation.

Full AQI Data & Forecast

Dedicated AQI API

Comprehensive Air Quality Index data, including pollutant levels and a forecast graph of expected air quality changes.

NWS Weather Alerts

NWS (National Weather Service)

Real-time severe weather alerts (e.g., flood, severe weather, heat) geographically tailored to the user's location.

CME Event Tracker

NOAA/NASA (Space Weather)

Tracks current and forecast Coronal Mass Ejection (CME) events from the Sun, alerting users to potential space weather impacts on technology and infrastructure.

○ Celestial and Astronomical Data

This advanced panel provides real-time orbital and positional data for both the Moon and the entire Solar System.

Moon Phase and Age: Displays the current phase, illumination percentage, and the exact age of the moon (days since new moon) using the SunCalc library.

Real-Time Moon Position: Plots the Moon's exact position across the local sky, with positional updates occurring every minute for precise tracking.

Solar System and Sun Plot: A real-time, dynamic 2D visualization that accurately plots the geometric location of the Sun and all major planets in real time, leveraging astronomical ephemeris data.

🏞️ Terrestrial & Geological Reporting

This section integrates critical Earth monitoring systems that detail geological activity, water resources, and environmental hazards.

Hydrological Monitoring (USGS): Live data on local River Flow, Flood Status, Water Temperature, and Conductance for nearby streams and rivers.

Earthquake Mapper (USGS): Displays the current count of global earthquakes. This element is clickable, opening an interactive map for detailed visualization of recent epicenters, magnitudes, and depth.

Contaminated Sites Mapper: Dedicated interactive map and query interface for local and regional environmental hazard sites.

Satellite Tracker: Displays the real-time orbital path and location of tracked satellites on a map. Includes robust search, sorting, and click-to-view functionality for full information profiles.

3. Technical Stack & Data Synthesis

The system's innovation lies in its capacity for high-volume, asynchronous data integration.

Front-end: Built as a single-page application using vanilla JavaScript, HTML5, and Tailwind CSS for cross-device responsiveness.

Core Libraries: The SunCalc library is foundational for all celestial position and phase calculations.

Multi-API Reconciliation: The dashboard successfully reconciles disparate data formats from multiple sources (OWM, Visual Crossing, NWS, USGS, Space Weather APIs), ensuring data freshness and consistency across the entire system.

Real-time Updates: Key elements, such as the Moon's position and planetary plots, are calculated and updated every minute, providing a truly live experience.

4. Voice Announcer Description

The voice announcer utilizes the browser's native **Speech Synthesis API** (`speakNatively`), which means it uses your computer's built-in text-to-speech function—no external audio files are needed.

 The script automatically starts when the dashboard loads and is scheduled to calculate the delay until the next absolute clock time, ensuring announcements fire perfectly at the top of the hour (**:00**) and at the half-hour mark (**:30**), and then repeats every 30 minutes.

It reads several key dashboard metrics aloud, generating a phrase that typically says, "Weather conditions update: The current temperature is **[Temperature]** degrees Fahrenheit, Humidity is **[Humidity]** percent, Wind speed is **[Wind Speed]** miles per hour, Barometric pressure is **[Pressure]** hectopascals, The Dew Point is **[Dew Point]** degrees, and The UV Index is **[UV Index]**."

5. Setup and Run Instructions

The dashboard requires a modern web browser to execute the client-side JavaScript that handles all API communication and rendering.

Dependencies: Ensure all required libraries (SunCalc, mapping libraries, etc.) are loaded via their respective CDNs as configured in the main HTML file.

API Keys: Configure the required API keys (OpenWeatherMap, Visual Crossing, etc.) in the designated areas of the JavaScript.

CME Data Synchronization (CORS Bypass)

The Coronal Mass Ejection (CME) data displayed on the dashboard, along with other specialized solar physics metrics, is sourced directly from NASA and other scientific databases. When a web browser attempts to directly fetch this data from an external domain, it often encounters **CORS (Cross-Origin Resource Sharing) restrictions**. This browser-enforced security mechanism prevents the data from being loaded into our dashboard's local environment. To effectively bypass this security policy without requiring a complex, full-scale **proxy server**, we rely on a manual, server-side data extraction method.

This method involves running a dedicated Python script, such as fetch_nasa_data.py, on the server or a local machine that hosts the dashboard files. Since the script executes outside of the browser, it is not subject to CORS limitations. This script fetches the necessary data, processes it, and saves it to a local JSON file that the dashboard can then load without issue. To ensure the space weather metrics are consistently up-to-

date, this script must be run regularly, either manually or via a scheduled process like a **cron job**.

Example Cron Job Setup

If you are running the dashboard on a Linux or Unix-like environment (like a Raspberry Pi or cloud server), you can automate the script's execution using crontab. This simple example will execute your Python script every 30 minutes:

This line runs the fetch_nasa_data.py script every hour at :00 and :30 minutes.

Make sure to adjust the path (/path/to/script/) and the Python environment (python3).

0,30 * * * * /usr/bin/python3 /path/to/script/fetch_nasa_data.py

This cron setup guarantees that the CME values are refreshed on a regular basis, keeping your dashboard current without requiring any additional user interaction or complex server infrastructure.

Launch: Simply open the index.html file in any modern web browser.

Note: Due to the scope of external API calls, optimal performance is achieved when running through a local development server.