# THE ARBITER SYSTEM FOR CARBON MONITORING

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## Comprehensively monitor carbon projects. The Agrology Arbiter Carbon Monitoring System helps growers track and quantify soil carbon in real time.

The Agrology Arbiter System is the only system to continuously monitor and quantify soil carbon flux. Carbon flux data is delivered to mobile and desktop devices, and growers receive critical alerts on anomalies.

The Agrology Arbiter System issues weekly, monthly, quarterly, and annual carbon reports, enabling growers to easily report on and quantify carbon emissions.

### Carbon Monitoring

Real-time monitoring of soil carbon. Growers can monitor soil carbon sequestration and can quickly detect carbon loss via carbon dioxide emissions events.

### Weather Monitoring

Monitors and predicts nano-climate level weather. Weather forecasts and data allow the Arbiter System to attribute carbon emissions to natural occurring weather patterns or anomalous events.

### Soil Monitoring

The Arbiter system includes soil condition monitoring. This ensures that growers have data on soil moisture levels and can monitor water tables and soil conditions.

# MONITOR SOIL CARBON FLUX & GREENHOUSE GASES

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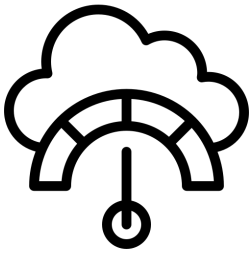
## Growers Know and Can Track What's Happening Ecosystem-Wide

Agrology helps growers who generate carbon credits monitor and track the performance of regenerative farming practices. The Agrology Arbiter Carbon Monitoring System tracks soil conditions and atmospheric gases to evaluate soil carbon flux and soil composition changes. The Arbiter System also provides extensive ground-truth data as a systems of record.

## Based on Proven Soil Flux Chamber Lineage

The Agrology Arbiter System includes two components; a concentration gradient mast and an augmented soil chamber. The Agrology Arbiter Chamber is a new approach to monitoring soil greenhouse gas flux, yet is based on based on USDA-ARS GRACEnet Design Protocols and 100 years of scientific lineage. A whitepaper on this unique soil chamber approach can be found here.

## How It Works



1. **Ground-Truth Data** – Agrology devices gather comprehensive data below and above the ground. This data is securely stored in an individually encrypted database for each customer.
2. **Insights** – Agrology's machine learning models track and interpret data to monitor complex challenges like soil carbon flux and soil microbiome health.
3. **Access** – Growers can pull data anytime from individually encrypted storage, using Agrology reports and data APIs.

## Real-Time Tracking of:

- **Soil Carbon Flux**
- **Soil Carbon Changes**
- **Soil Carbon Respiration**
- **Soil Carbon Sequestration**
- **Soil Conditions**
- **Greenhouse Gases**

## Common Uses for Monitoring:

- **Continuously track soil carbon sequestration** by evaluating soil carbon flux
- **Gather the highest quality carbon data** from an entire project geography
- **Characterize soil composition changes** including soil carbon changes, soil moisture release curves, and soil fertility/salinity
- **Get alerted** to significant soil/atmospheric events
- Have an **automatic system of record** of soil composition management programs

USDA

NSF America's SEED FUND SBIR.STTR

# TECHNICAL SPECS

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The Arbiter device installs in crop rows in under a minute and is compatible with cultivation practices.

The Arbiter device includes two components; a concentration gradient mast and an augmented soil chamber to track carbon flux, and to monitor soil carbon respiration, and other agronomic indicators.

## Hardware

- One-minute install/removal for tillage operations
- Highly chemical resistant for spray compatibility
- 3-5 year battery life with 10-minute data intervals
- Compatible with practices for multiple cultivation systems
- Designed for permanent, specialty, and commodity crops
    - Post Dimensions: 39" x 4.5" x 2"
    - Chamber Dimensions: 4" diameter x 6" height
    - Soil Probe Dimension: 6" x .5" x .5"
    - Recommended Probe Installation Depth: "'-12"
    - Weight: 5 lbs

## Software & Mobile App

- Mobile app lets users carry data into the field, even offline
- Customer data is individually encrypted
- Machine learning models monitor soil carbon flux, deliver actionable insights, predict risks before damage, and monitor complex challenges like soil carbon
- Growers view predictions, trends, alerts, and historical data through an intuitive mobile application
- Users can export and share data instantly through the app

## Lifespan & Installation

- 3-5 year lifespan, installed, maintained, serviced, and replaced by Agrology, at no additional cost
- Installed by Agrology in minutes, using lightweight hand tools

## Connectivity

- Continuous monitoring with 10-minute data collection intervals
- Data is securely relayed over LoRaWAN Wide-Area Networking Radio

## Data Points Gathered:

- $CO_2$ Chamber Flux
- $CO_2$ Soil Respiration
- Atmospheric $CO_2$
- Air Temperature
- Air Humidity
- Dew Point
- Barometric Pressure
- Volatile Organic Compound (VOC)
- Vapor Pressure Deficit (VPD)
- Applied Irrigation
- Soil Moisture
- Soil Temperature

**Agrology provides the best system for wide-area environmental data.**
**Reach out to hello@agrology.ag to learn more or download our Arbiter whitepaper here.**