Soil Moisture Networks

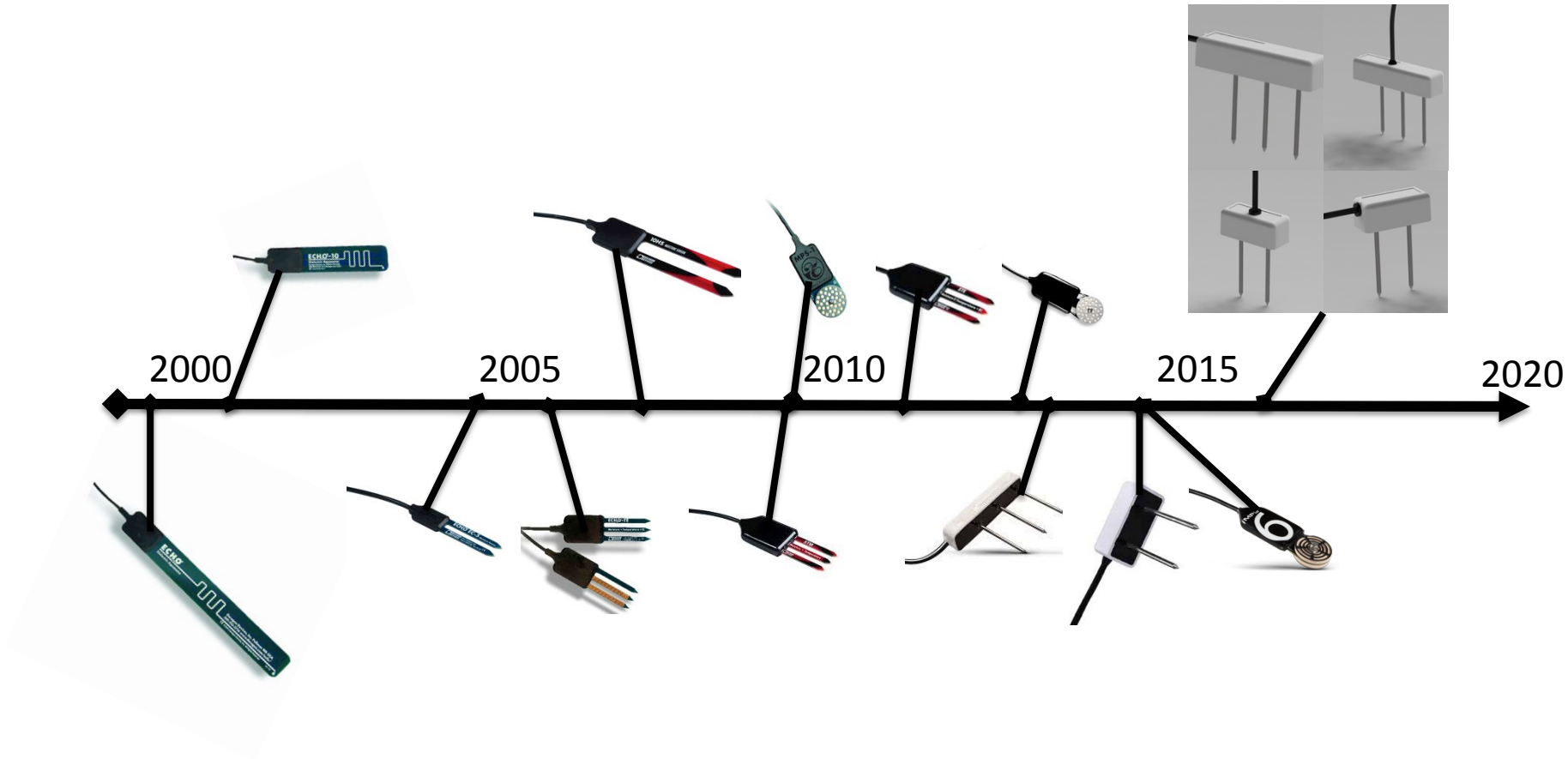
How can Decagon help?

Doug Cobos, Leo Rivera, and Colin Campbell

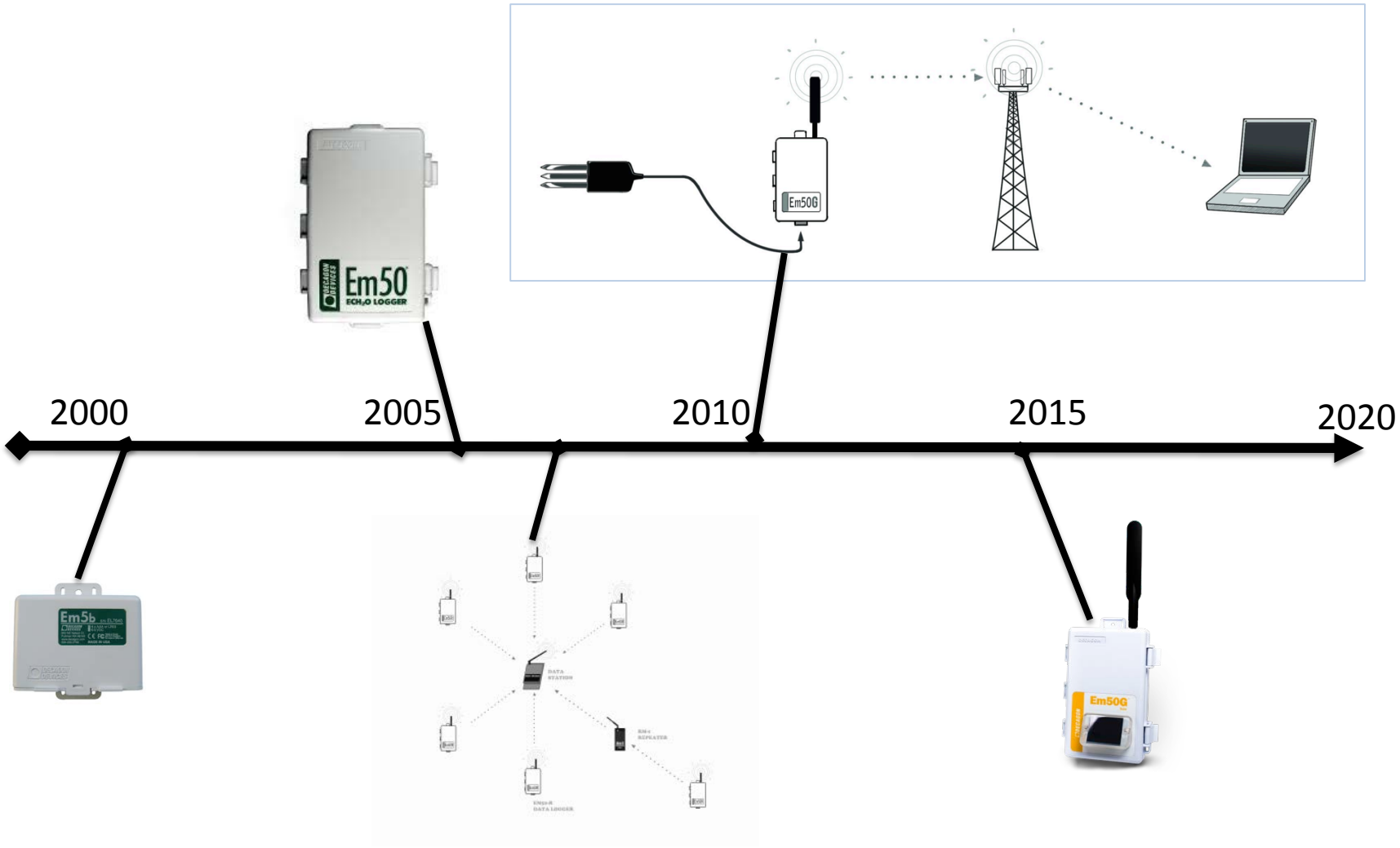
Decagon Devices

and Washington State University

Soil moisture sensor progression



System progression



Make data available to everyone!

DECAGON DEVICES

DECAGON HOME
CONTACT DECAGON
SEARCH DECAGON

National Soil Moisture Information System: Web Interface

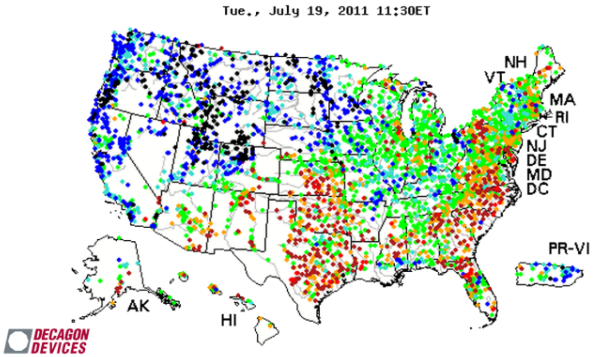
Data Category: Real-time | Geographic Area: United States | GO

ECH$_2$O Real-Time Water Data for the Nation

--- Predefined displays --- : Introduction | Group table by: -- no grouping -- | Select sites by number or name: go

News updated April, 2011

Daily Soil Moisture Conditions



Explanation

- High
- ≥ 90th percentile
- 75th - 89th percentile
- 25th - 74th percentile
- 10th - 24th percentile
- < 10th percentile
- Low
- Not ranked

The colored dots on this map depict Soil Moisture conditions as a percentile, which is computed from the period of record for the current day of the year. Only stations with at least 30 years of record are used.
The **gray circles** indicate other stations that were not ranked in percentiles either because they have fewer than 30 years of record or because they report parameters other than Soil Moisture. Some stations, for example, measure stage only.

Select a state from the map to access real-time data

Real-time data typically are recorded at 15- to 60-minute intervals, stored onsite, and then transmitted to Decagon offices every 1 to 4 hours, depending on the data relay technique used. Recording and transmission times may be more frequent during critical events. Data from real-time sites are relayed to Decagon offices via satellite, telephone, and/or radio telemetry and are available for viewing within minutes of arrival.

All real-time data are **provisional and subject to revision**.

Build Table	Build a custom summary table of the most recent data for one or more sites, states, or hydrologic regions.
Build Sequence	Build a custom sequence of graphical or tabular data for one or more sites, states, or hydrologic regions.

Questions about sites/data?
Feedback on this web site
Automated retrievals
Help

Accessibility | Plug-Ins | FOIA | Privacy | Policies and Notices

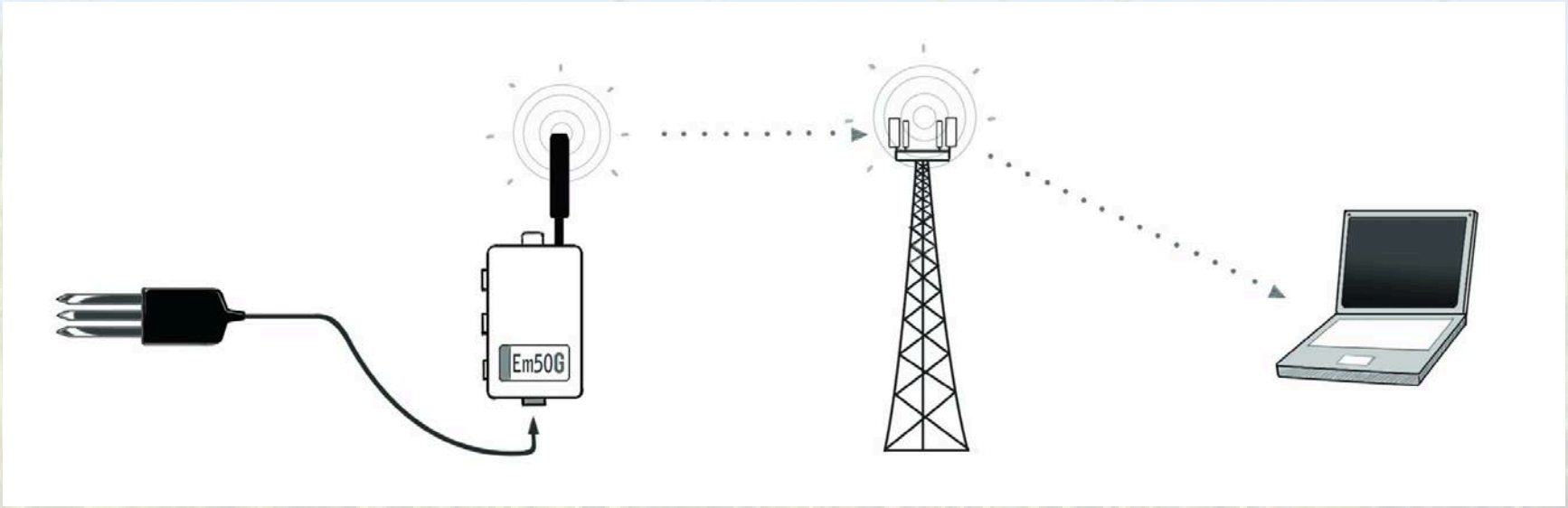
Why not address the problems and make it a reality?

The vision…

Standardized installation by Decagon

- Trained technicians with decades of experience work with PI
- Specially designed installation tools
- Complete provenance on sensors
- Sensors calibrated to each field site
- All relevant metadata added to data record
  - Defined by soil moisture network community

Automated data collection



- Cellular or satellite link pushes data to central server

Automated error checking

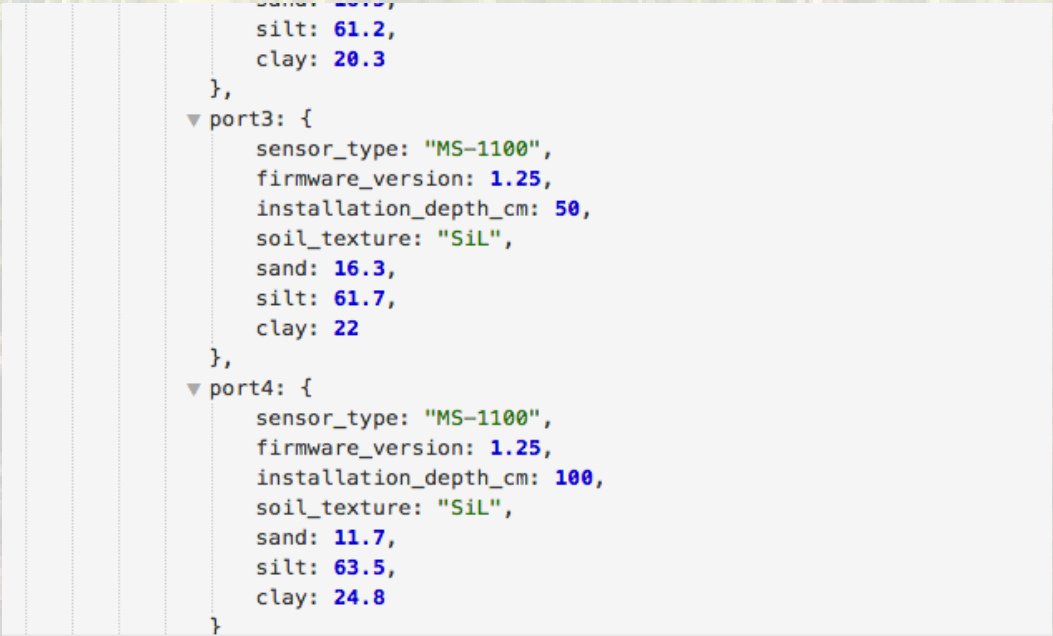
- Automated QA algorithms
  - Improved continuously by soil moisture network community
- Status of every sensor continuously evaluated and known
- Automated failure alerts (text, email)

Decagon handles maintenance

- Automatic remedial actions initiated for failures
  - Local personnel
  - Decagon mobile field teams
- Minimal data gaps
  - Down time is days, not weeks

Data availability

- All data served from centralized servers through API
- High quality data/metadata mined in real time by investigators, collaborators, government agencies, etc.

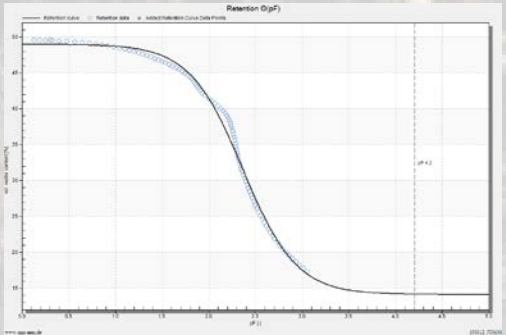


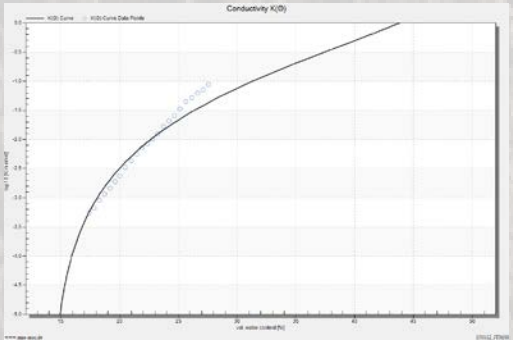
Network scalability

- All installations that participate in service can become part of the network
  - Individual organizations fund small fraction but use data from entire network
- Individual networks become part of the greater whole

Beyond soil moisture

- Ancillary measurements fully integrated into data record with complete provenance
  - K_{sat}, K_{unsat} function
  - In situ water potential
  - Soil moisture characteristic curves
  - Soil textural and profile analysis
  - Vegetation
  - Meteorology variables
  - Etc.
- Information products instead of just data

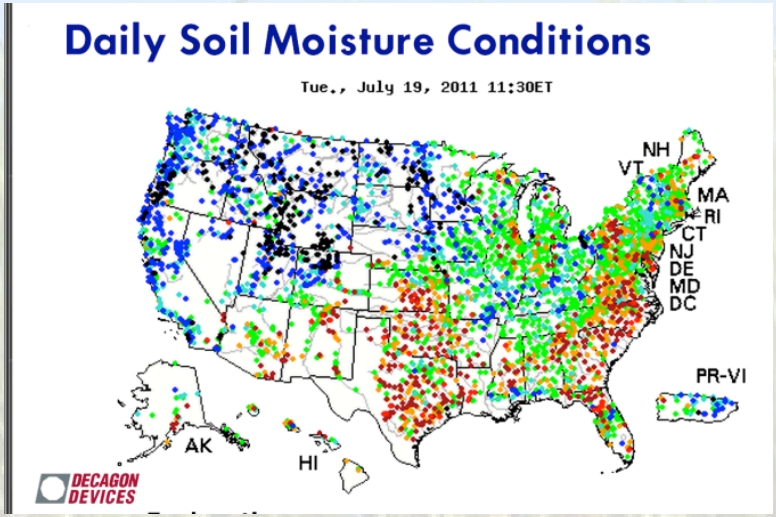




Outstanding questions

- Will academic community accept private sector collaborator in primary role?
- How can we engage other soil moisture companies?
- How can existing networks/installations and their data be integrated into this system?
  - Can we derive value from the 350,000,000 records on Decagon servers?

Thank you!



Doug Cobos
doug@decagon.com