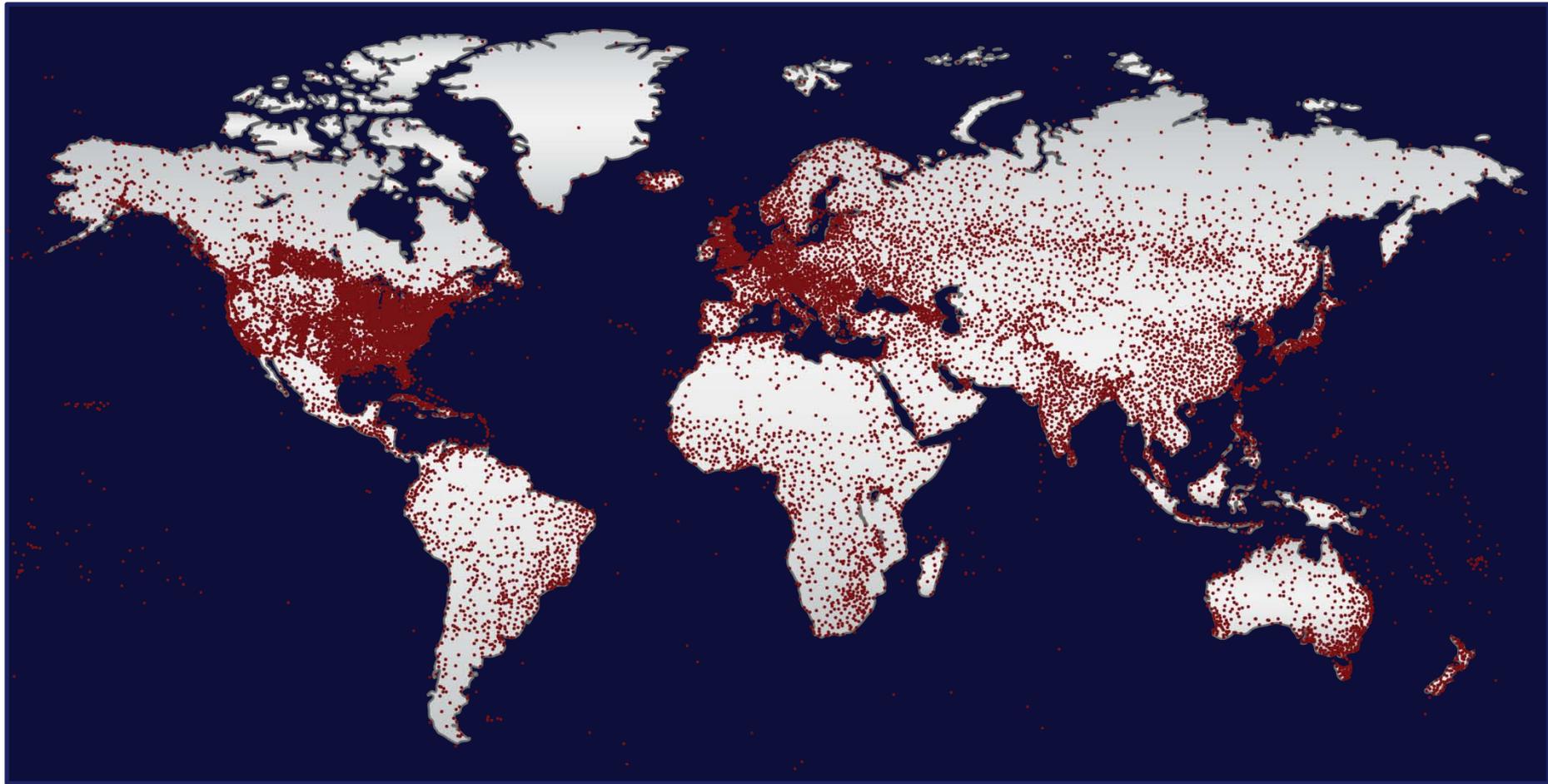




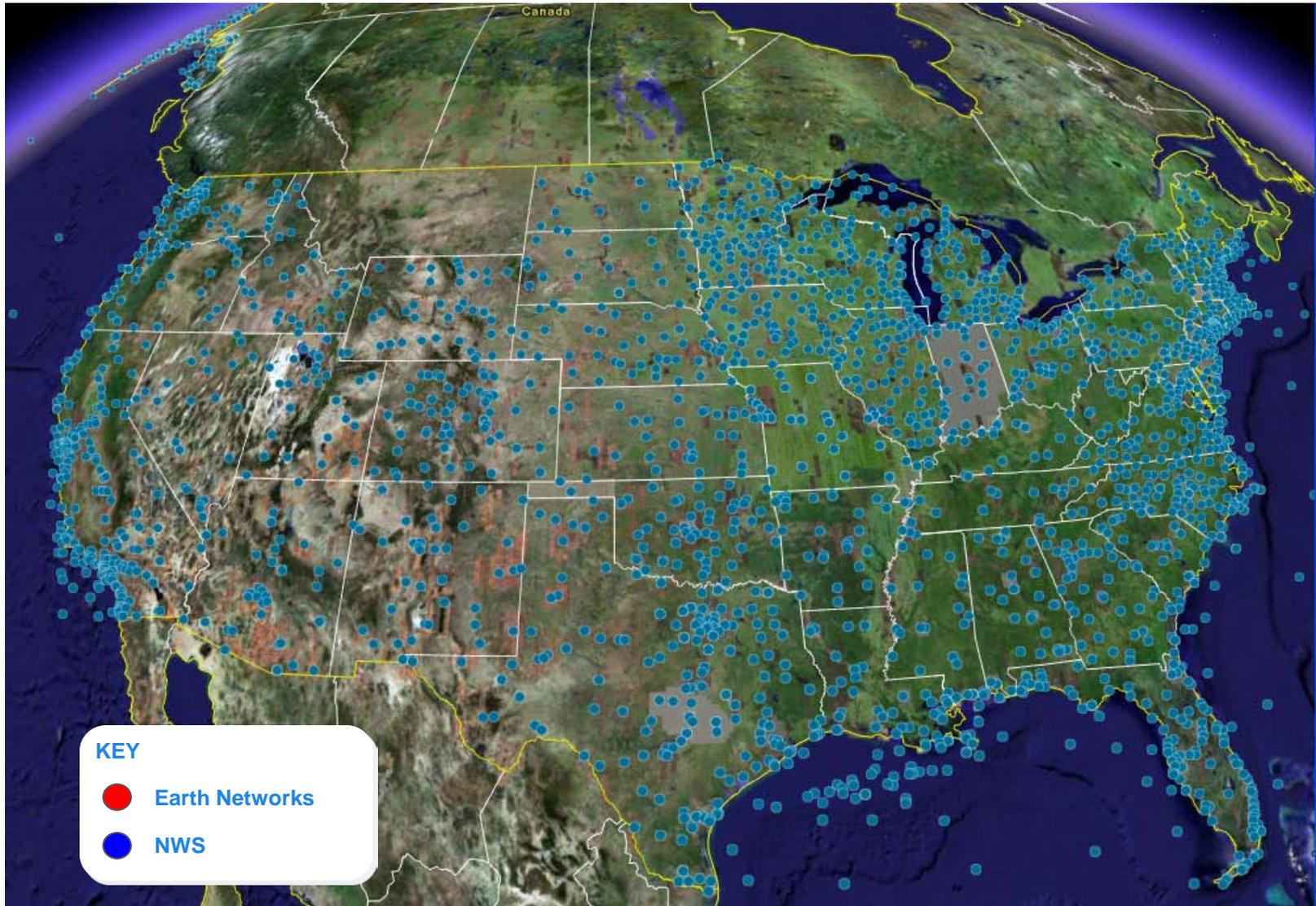


- Founded in 1993 - 170 people
- Own and operate the world's largest, most advanced weather, weathercam, lightning and greenhouse gas networks, delivering the most precise, hyper-local data.
- Broad business footprint
 - Enterprise business focuses on information/data services supported by proprietary content
 - An innovative and sophisticated digital media company
- Global expansion accelerating
- Expanding on core sensor networking experience and competency

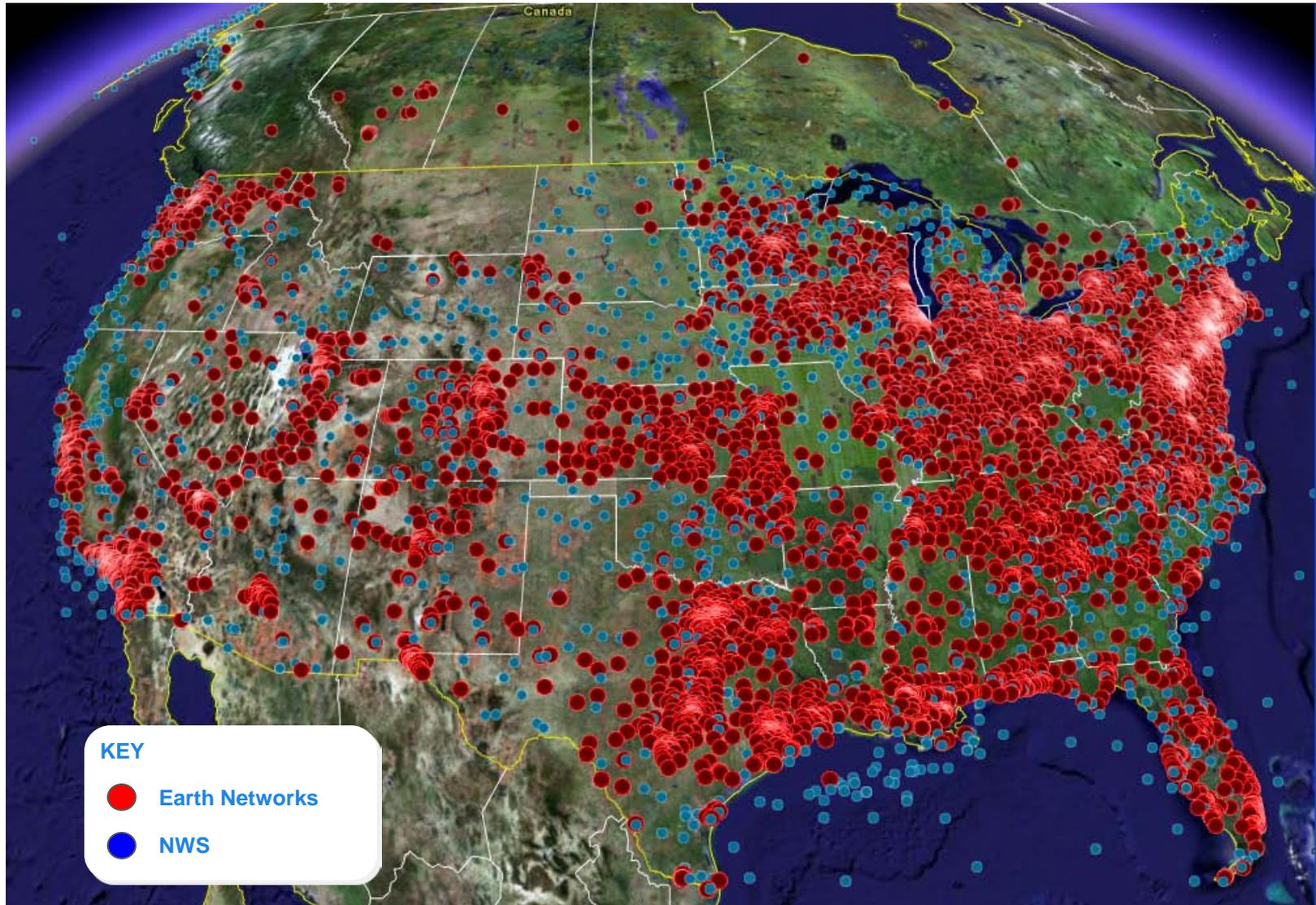
Global Observation Networks



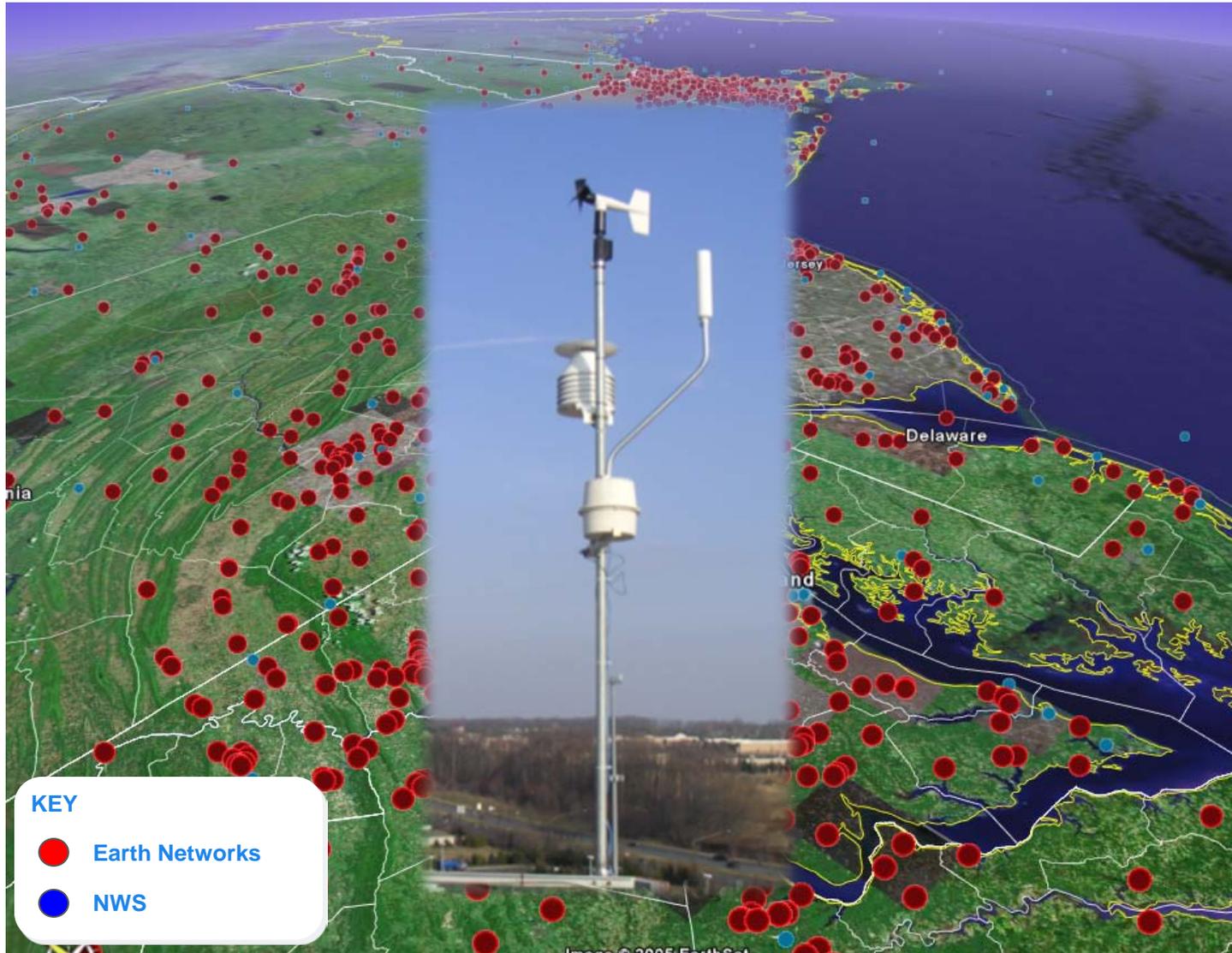
Largest Surface Observation Network



Largest Surface Observation Network



Largest Surface Observation Network

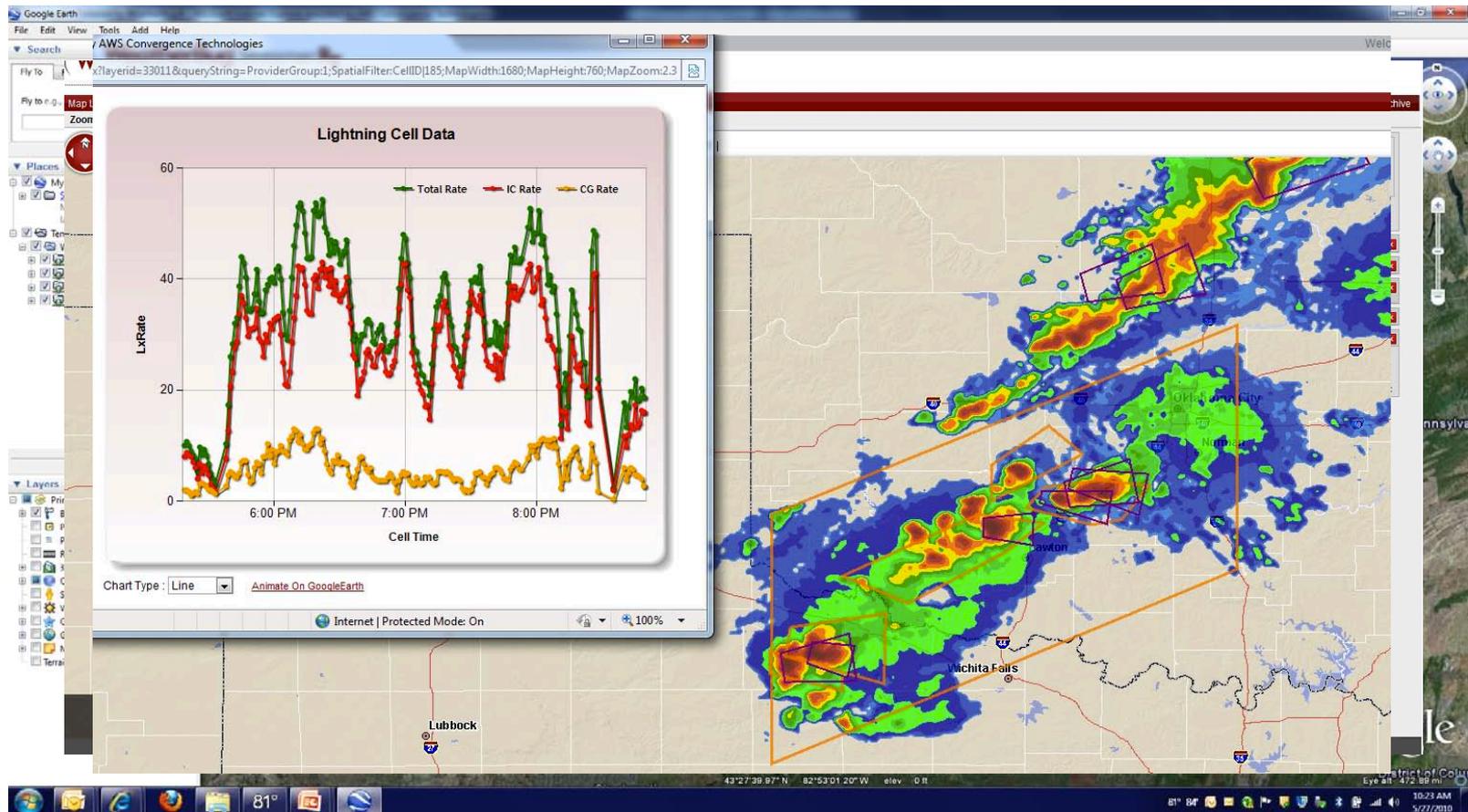


Largest WeatherCam Network

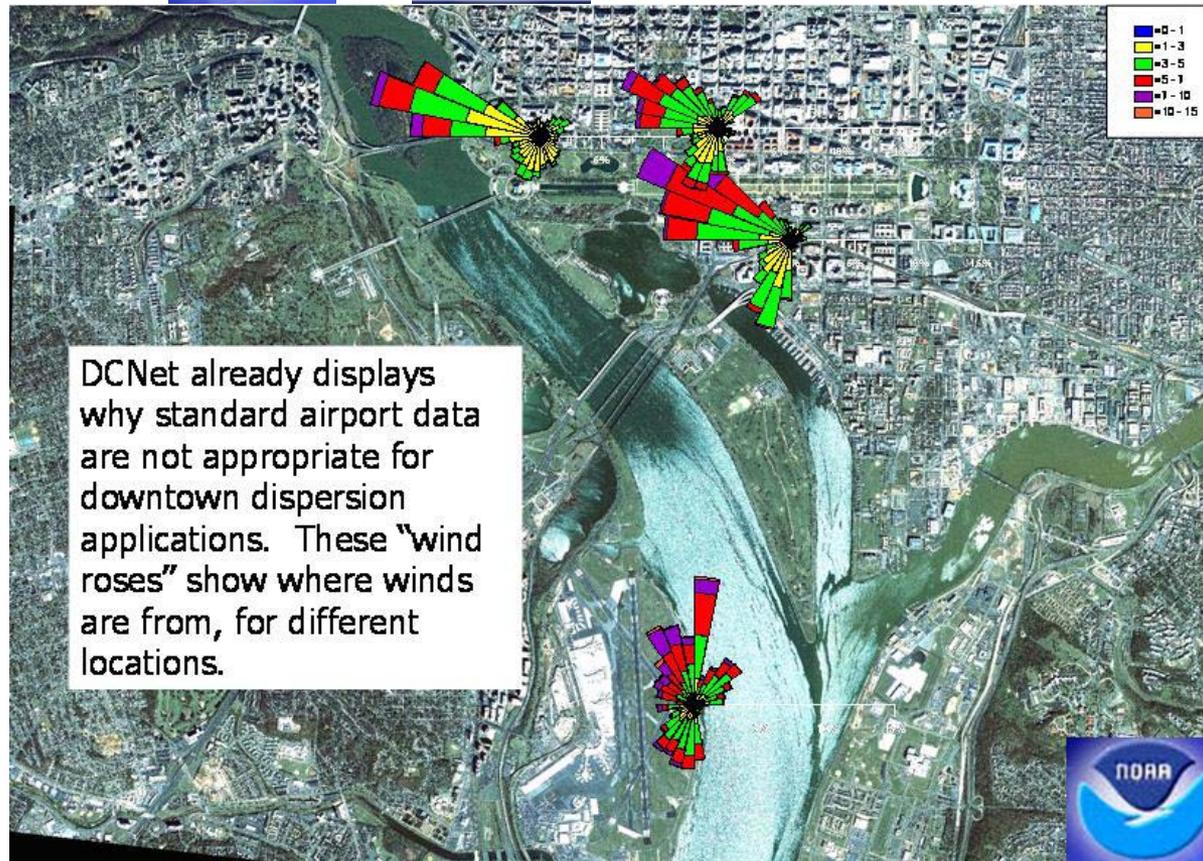


Sophisticated Total Lightning Network

Early Warning for Severe thunderstorms, Tornadoes, Microbursts, Cloud-to-Ground lightning



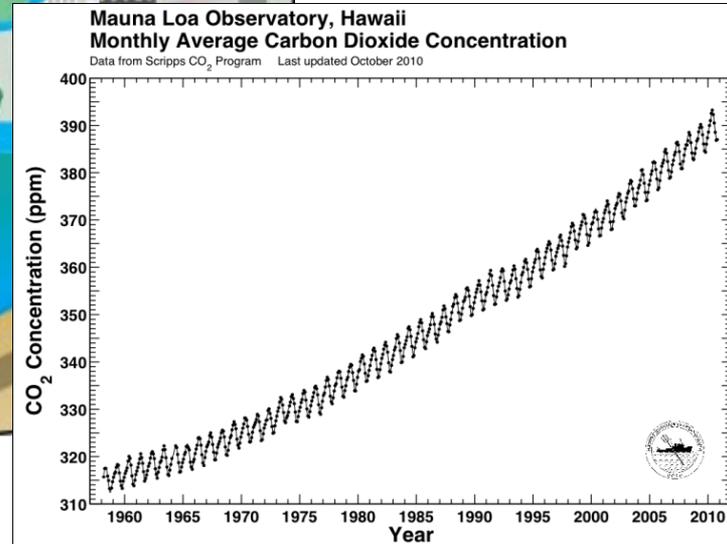
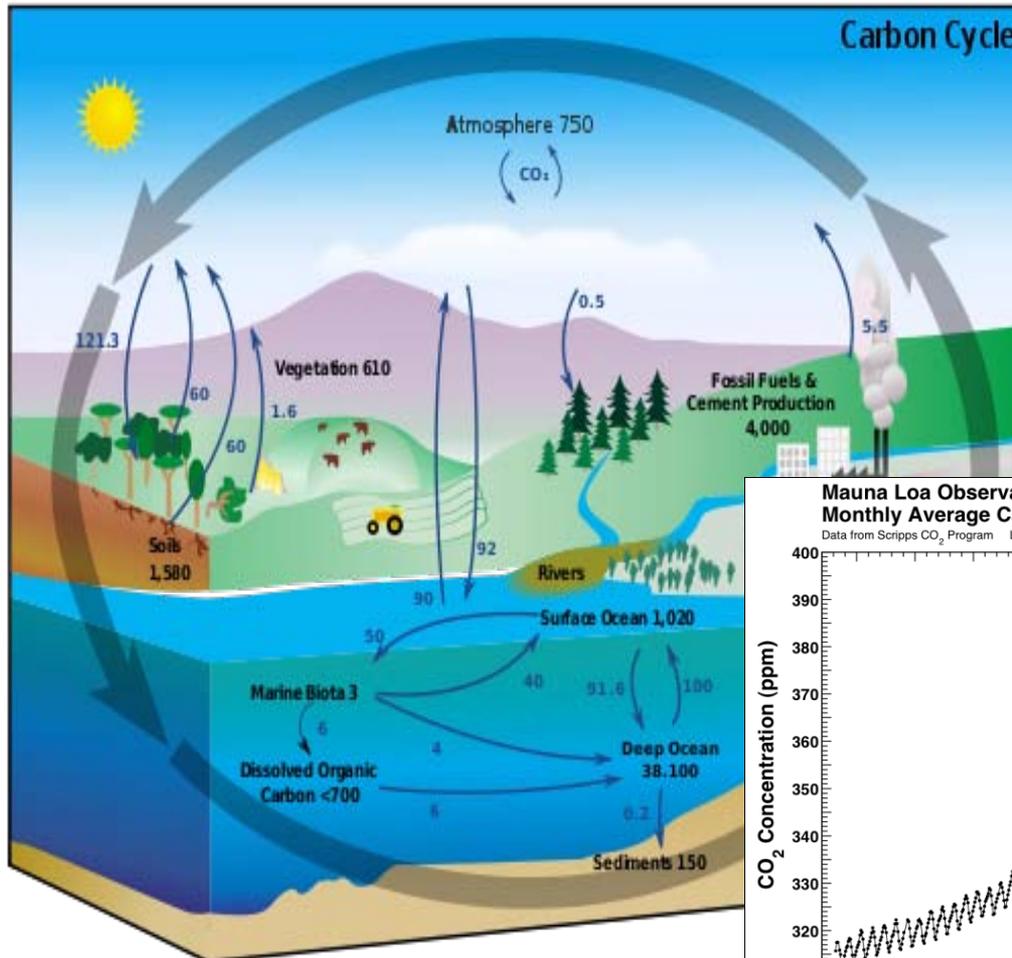
Mission Critical Data to NOAA/NWS & DOE



What Next?



Carbon Cycle Complex



International Climate Negotiations Challenges



“we must have a mechanism to review whether we are keeping our commitments, and exchange this information in a transparent manner. These measures need not be intrusive, or infringe upon sovereignty. They must, however, ensure that an accord is credible, and that we’re living up to our obligations. Without such accountability, any agreement would be empty words on a page.”⁴⁴

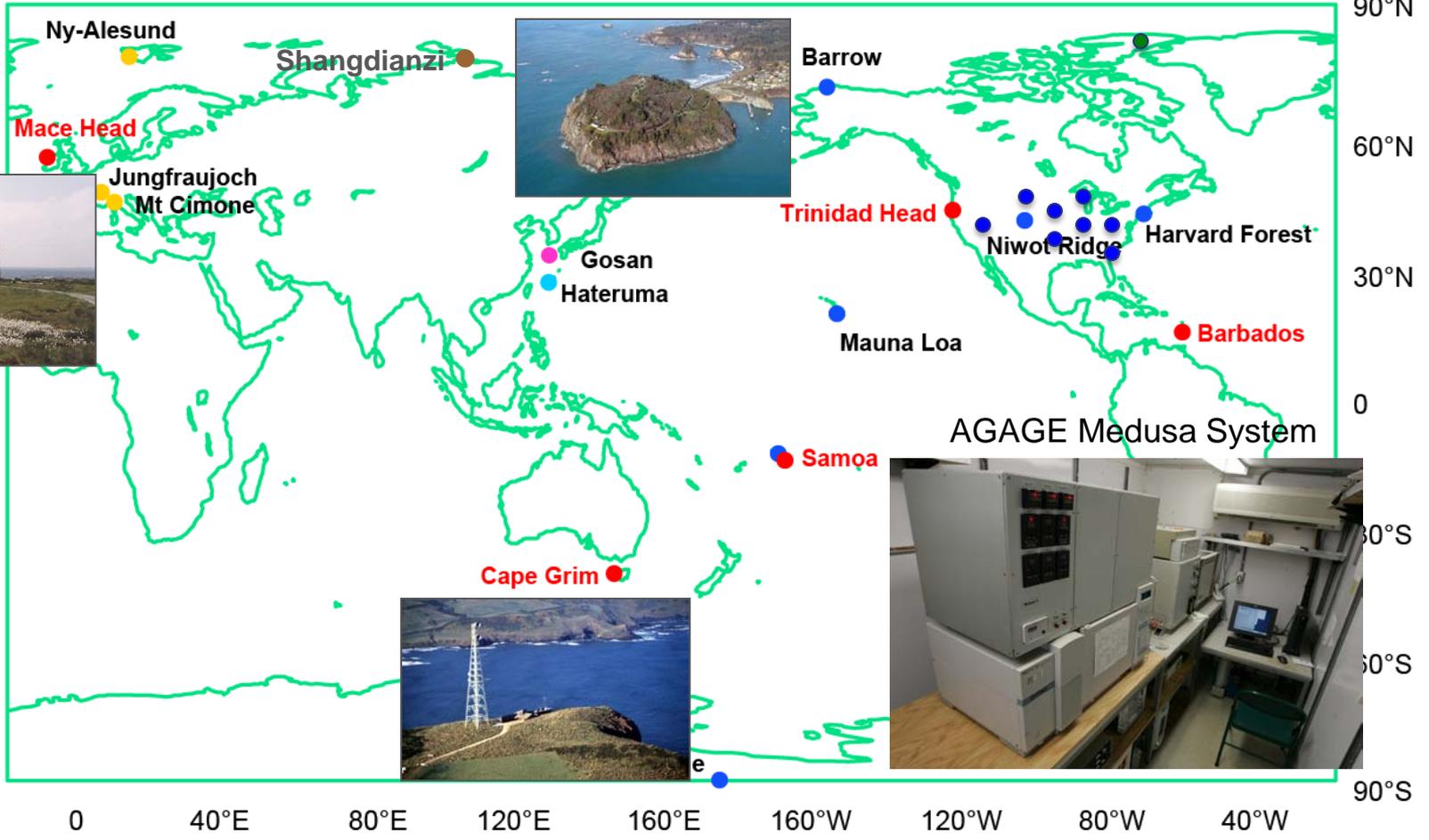
⁴⁴ Remarks by the President at the Morning Plenary Session of the United Nations Climate Change Conference, Bella Center, Copenhagen, Denmark, Office of the Press Secretary, The White House, December 18, 2009.

Lack of Measurement, Reporting and Verification (MRV) a key issue!

Existing GHG Networks



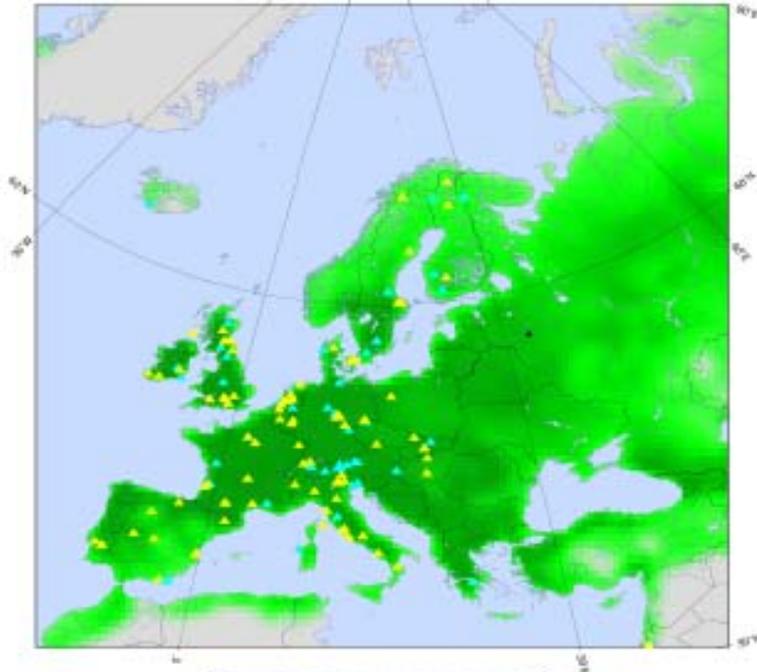
● **AGAGE** ● NOAA-GMD ● NIES ● SOGE ● SNU ● SOGE-A



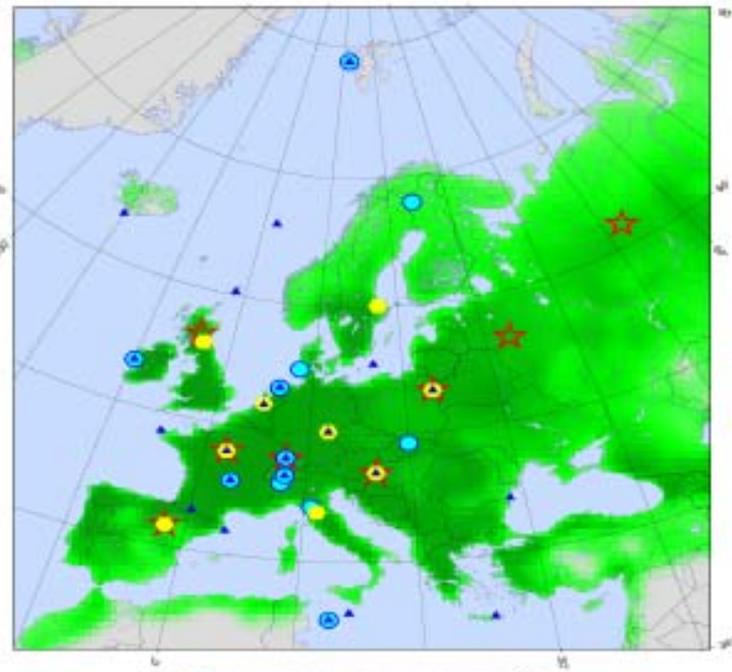
AGAGE Medusa System

EU ICOS Network

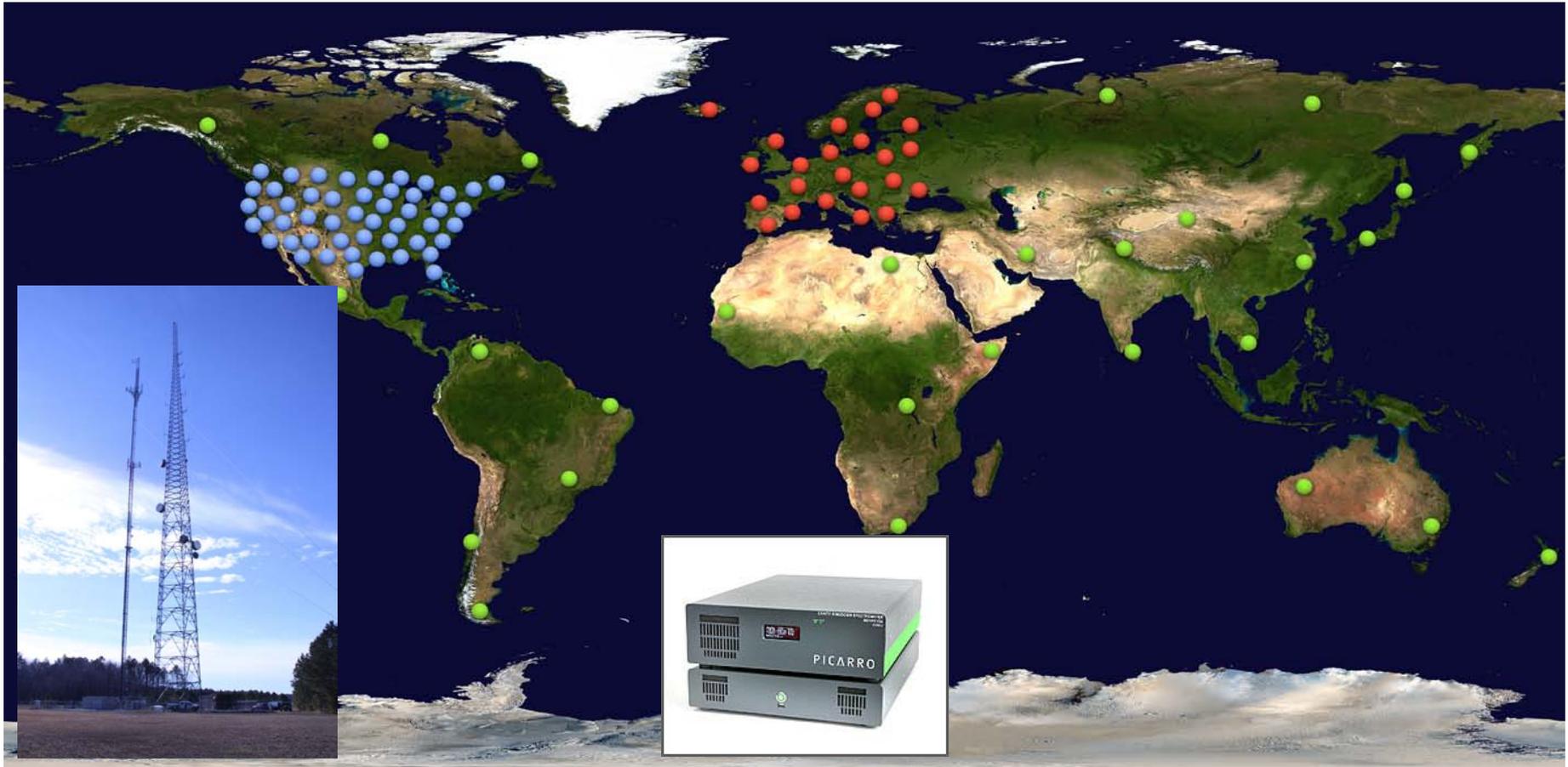
Ecosystem observation sites



Atmospheric concentration sites

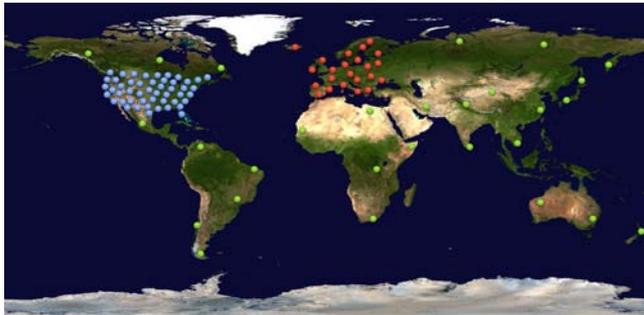


Deploy and Operate the Largest Global Greenhouse Gas Network



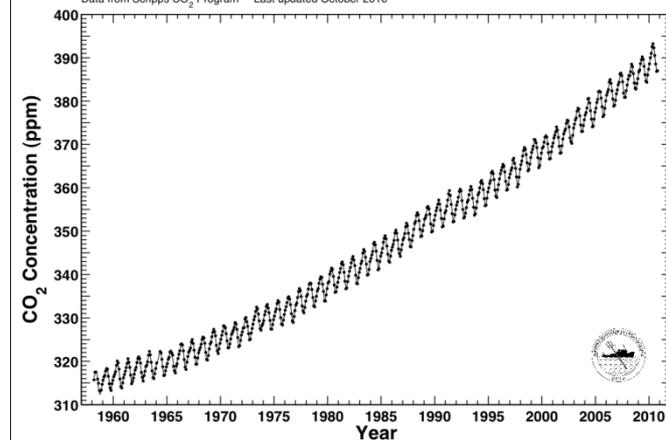
- \$25M, 5 year investment to install & operate 100 advanced GHG systems
- ~50 in U.S., ~25 in Europe, ~25 around remaining continents
- Picarro Instruments: CO₂ (carbon dioxide) & CH₄ (methane)

Our Vision for the GHG Network



- Advance Climate Science
- Measurement, Reporting and Verification (MRV) foundation for international climate treaties focused on reducing green house gas (GHG) emissions
- MRV foundations at national, regional and local scales to support climate and GHG reduction policies and/or regulations
- Provide MRV foundations for emerging market based carbon trading programs
- Support continued education of the public on climate change and the role of GHG's

Mauna Loa Observatory, Hawaii
Monthly Average Carbon Dioxide Concentration
Data from Scripps CO₂ Program Last updated October 2010



Provisional Data From: **San Diego, CA**

Earth Networks Site: **SCRIPPS**

LIVE WEATHER AND GHG DATA FROM SCRIPPS

Tuesday, May 17, 2011 3:57:38 AM +00:00 GMT -8

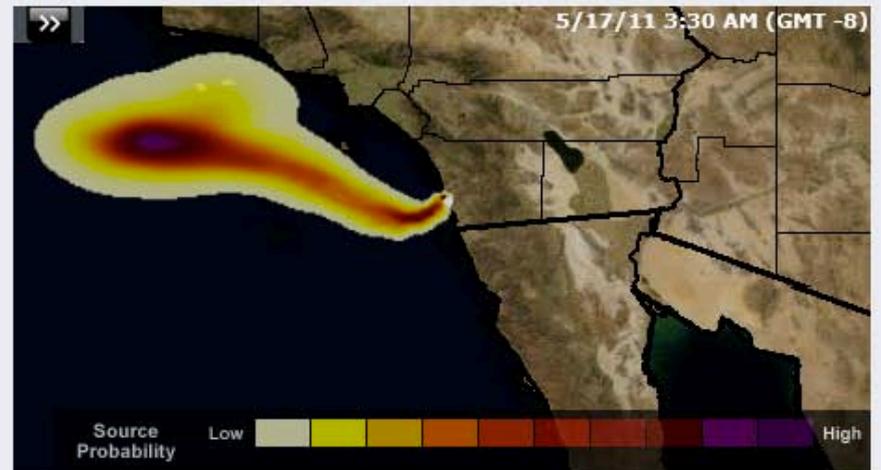
Temp
56.1°F
Switch to Celsius



	CO ₂ (ppm)	CH ₄ (ppb)
SCRIPPS	390.3	1833
Global Average	391.76	1866

Site Status: Provisional

CARBON SOURCE MAP



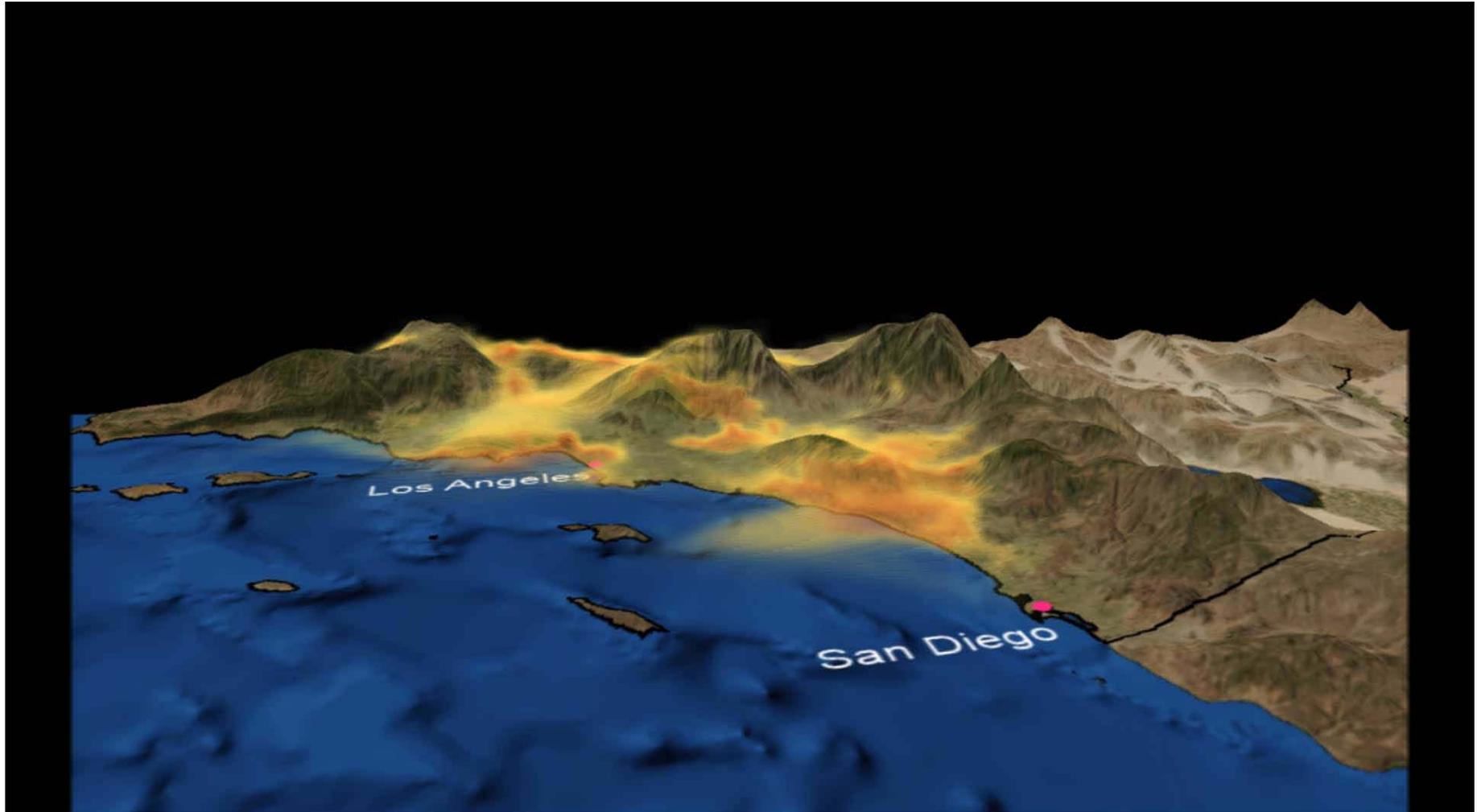
Time Interval: 10 Minutes 30 Minutes 8 Hours 24 Hours 48 Hours 1 Week

Carbon dioxide (CO₂) Levels



Carbon Weather Modeling

LA Basin forward modeling of CO₂ concentrations with weather model -
with fossil fuel emissions



How Will We Do This?



Public / Private Partnerships



MOU In Place



CRADA In Place

**SCRIPPS INSTITUTE OF
OCEANOGRAPHY**

**Earth Networks Center
for Climate Research**



SCRIPPS INSTITUTE OF
OCEANOGRAPHY

Center For Environmental Research



Dr. Ralph Keeling



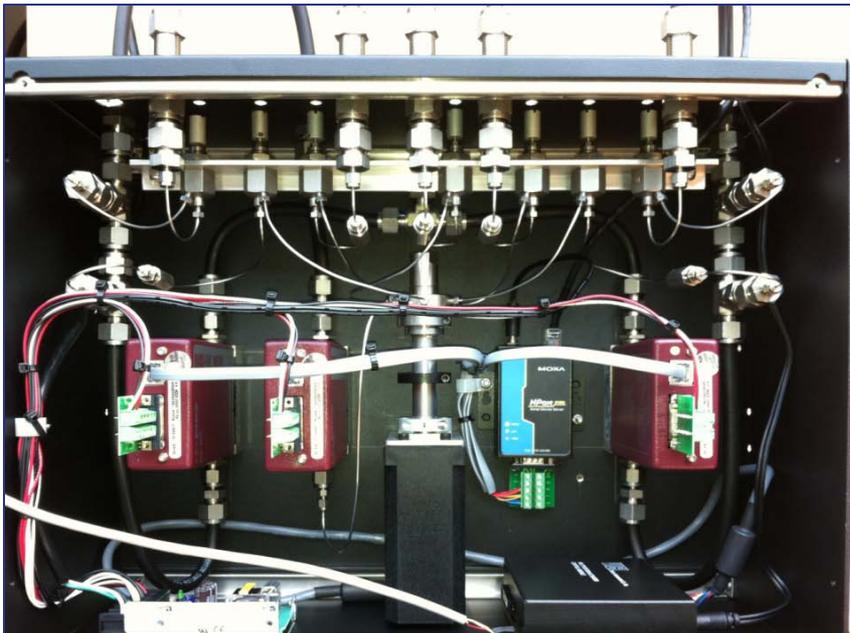
Dr. Ray Weiss

Scripps Focus:

- Network Design
- Calibration and Quality Control Design
- Atmospheric Modeling
- Cutting Edge Research

Earth Networks Calibration System

- Dual Air Calibration Tanks from NOAA (WMO Standard)
- Precision flow and pressure sensors to insure quality control
- Precision valves



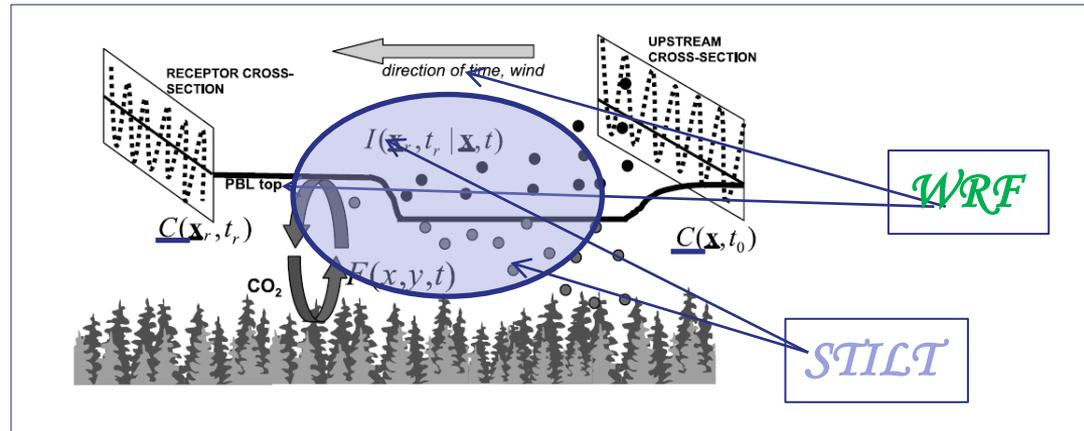
Inverse Modeling for Carbon Footprint Reports



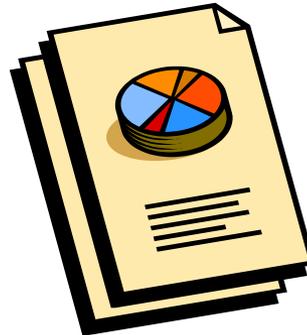
GHG & Weather Observations



Atmospheric Weather Models (run backwards)



Source: Lin, J.C., C. Gerbig, S.C. Wofsy, et al., *Measuring fluxes of trace gases at regional scales by Lagrangian observations: Application to the CO₂ Budget and Rectification Airborne (COBRA) study*, J. Geophys. Res., 109 (D15304, doi:10.1029/2004JD004754), 2004.



Carbon footprint reports document transport fluxes, emissions and sequestration for small scale regions

Atmospheric Modeling Advisory Committee



Dr. Ray Weiss

SCRIPPS INSTITUTE OF
OCEANOGRAPHY



Dr. Ron Prinn

 **Massachusetts
Institute of
Technology**



Dr. Martin Heimann



Dr. Steve Running



Regional-Scale Carbon Footprint & GHG Emissions Reports



Quantify transport fluxes,
emissions and sequestration
with associated
uncertainties





**EARTH NETWORKS
FOUNDATION**

FOR ENVIRONMENTAL RESEARCH

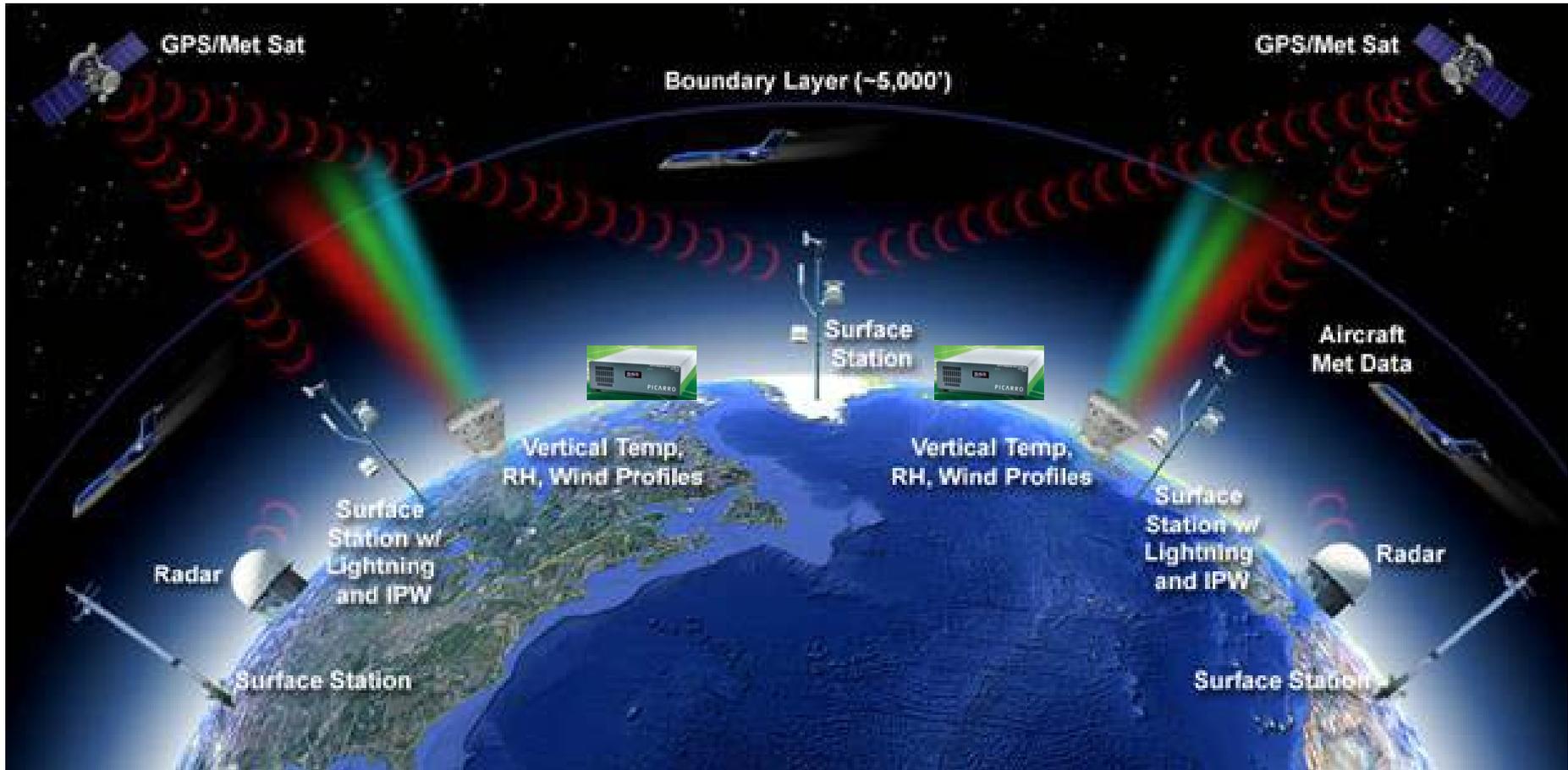
Mission:
Facilitate Scholarly Research using
Earth Networks Data



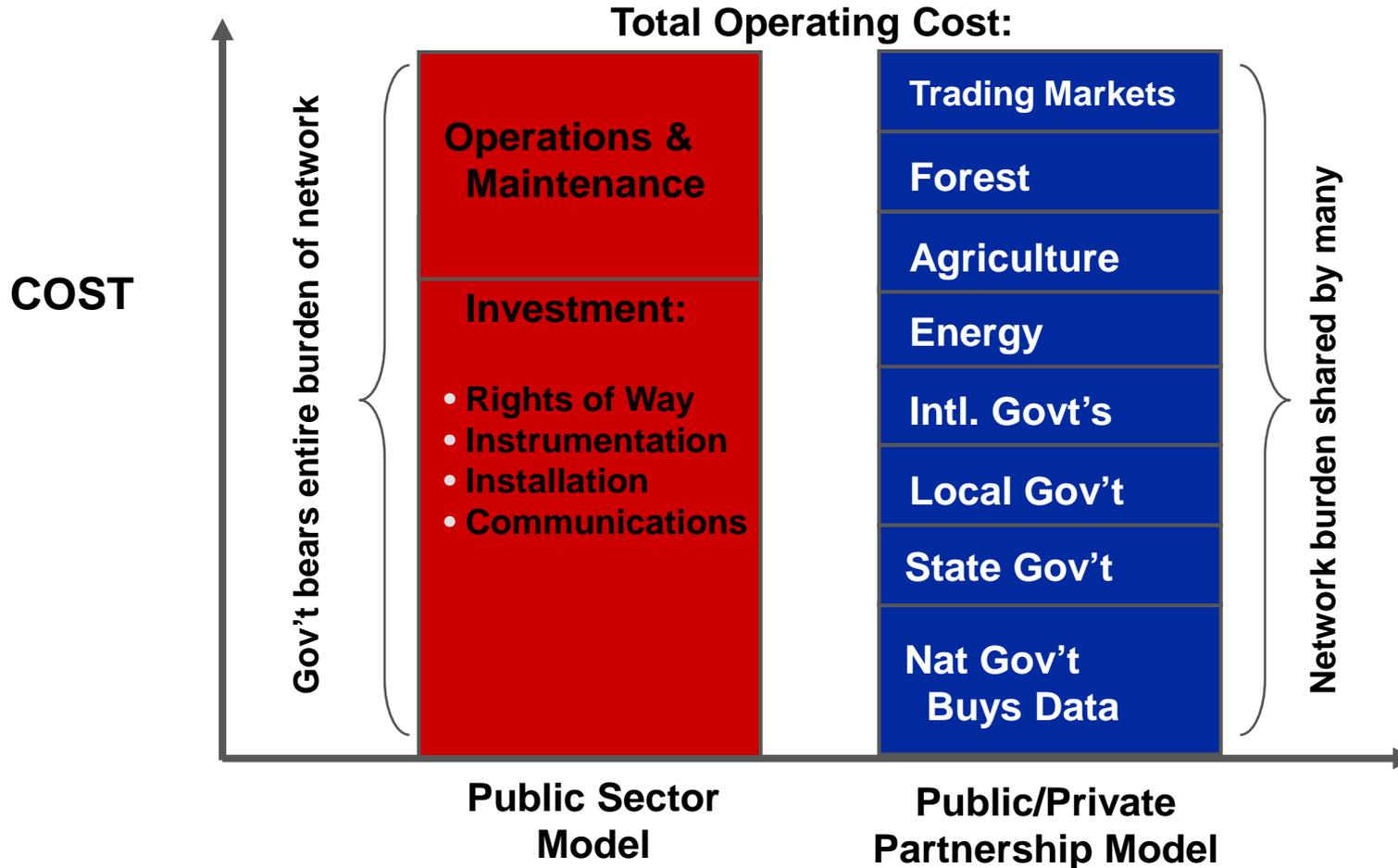
**Earth
Networks**

Taking the Pulse of the Planet

Taking the Pulse of the Planet



Earth Networks Public/Private Partnership Model



Key Partners

Federal



Business



TURN ON TOMORROW





WeatherBug brings the power of the network to more than 40 million users every month:

- Website
- Desktop app
- Mobile platforms



How NOAA Interacts



NOAA – NIST: SI Traceability
Comparisons on STDs
Instrument Development

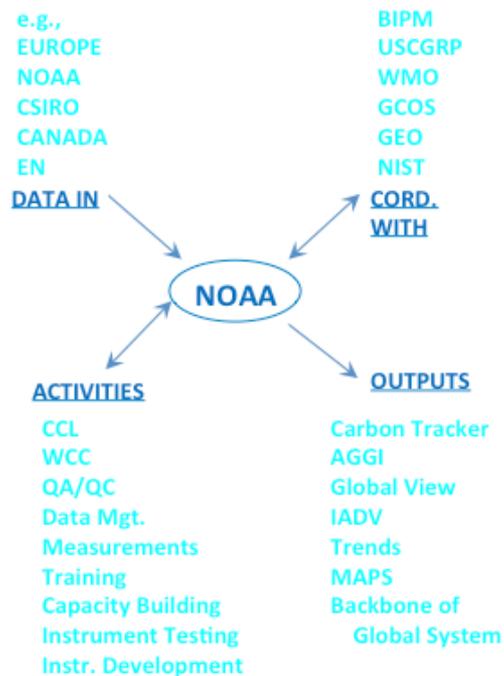
NOAA – SIO: Data Comparisons
System Design
Cal Scale Comparisons
Joint Partnerships

NOAA – EN: Provide STDS.
QA/QC Sites (Flasks)
Add Value to Data
a) Comparisons
b) Additional Gases

Evaluation of Data
a) Measurement Comparisons
b) Reanalyzes
c) OSSE's ??

NOAA – PICARRO: Compare Instruments (Lab)
Field Testing
Experimental Modifications

What NOAA Does



Benefits/Outcomes of NOAA Involvement

Healthy Global System

- Backbone of Global Network
- > 50% of Global Sites (Long Records)
- Calibration of ALL Global Measurements
- Ensured Comparability & Continuity of Measurements

Strong Growing Capabilities

- Data Mgt. & Archiving (Secure & Transparent)
- Product Development & Updates
- Support Measurements (For Attribution)
- OSSE's

Int'l Relevance

- International Engagement
 - WMO/GAW WMO/CAS
 - GCOS
 - GEO
- Free & Open Data – Full Transparency
- Support For Assessments

Education and Outreach (EN roles)

- Messaging to a much broader audience
 - Television
 - Internet
 - News papers

NOAA Core Capabilities

- Expertise
- Experience
- Transparency
- Longevity
- Connectivity
- Mission Driven
- Long-Term Commitment

SCRIPPS INSTITUTE OF
OCEANOGRAPHY
GLOBAL DISCOVERIES FOR TOMORROW'S WORLD

Mauna Loa Observatory, Hawaii
Monthly Average Carbon Dioxide Concentration

Data from Scripps CO₂ Program Last updated October 2010

