An interdisciplinary and multi-institutional collaboration for research and education via enabling cyberinfrastructure

HPWREN
High Performance Wireless Research & Education Network

UCSD

SDSC
SAN DIEGO SUPERCOMPUTER CENTER

SCRIPPS INSTITUTION OF OCEANOGRAPHY
UCSD

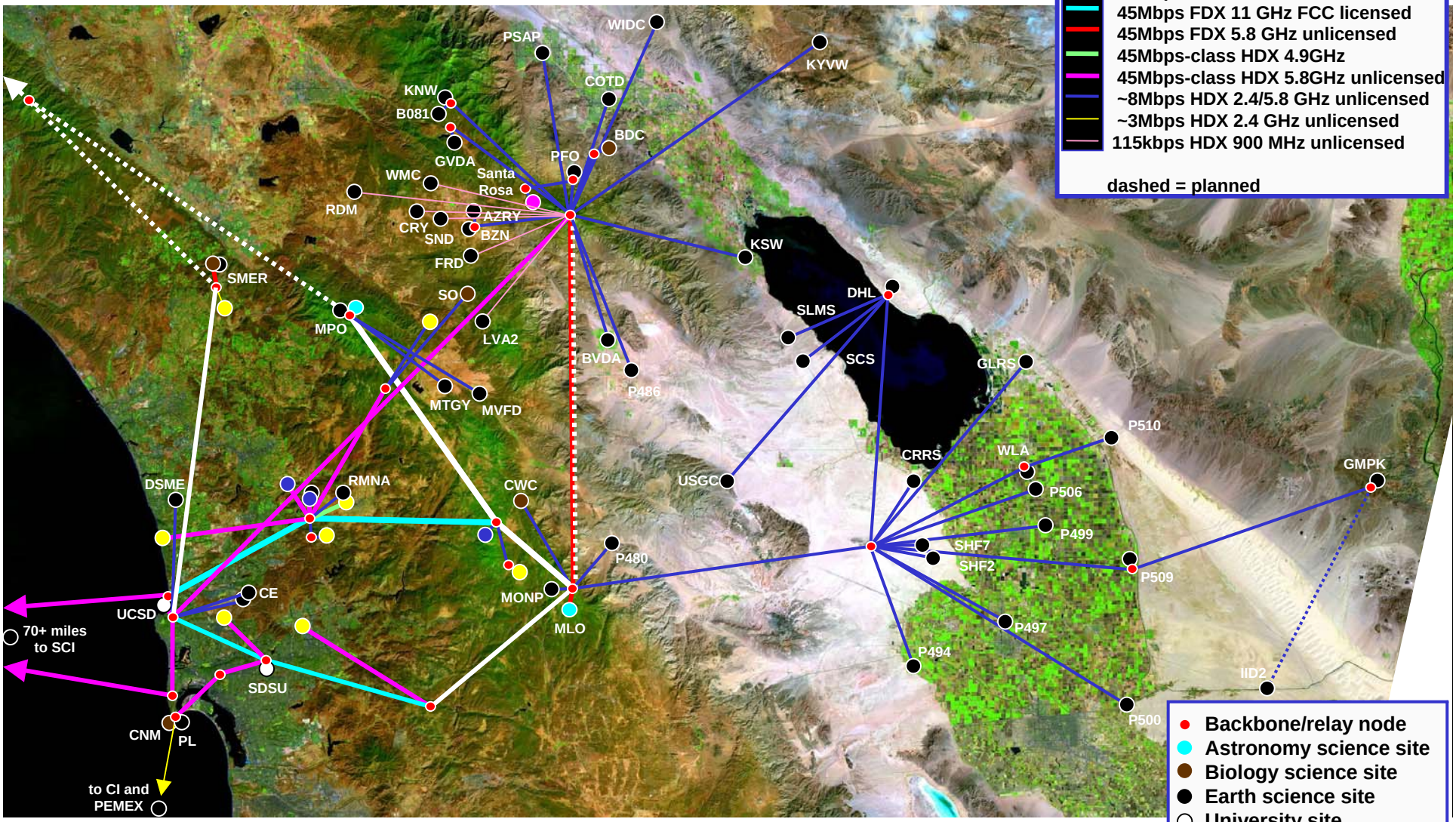
SAN DIEGO STATE UNIVERSITY

NATIONAL SCIENCE FOUNDATION

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION
CAL FIRE
SINCE 1885

NATIONAL PARK SERVICE

HPWREN topology, April 2008



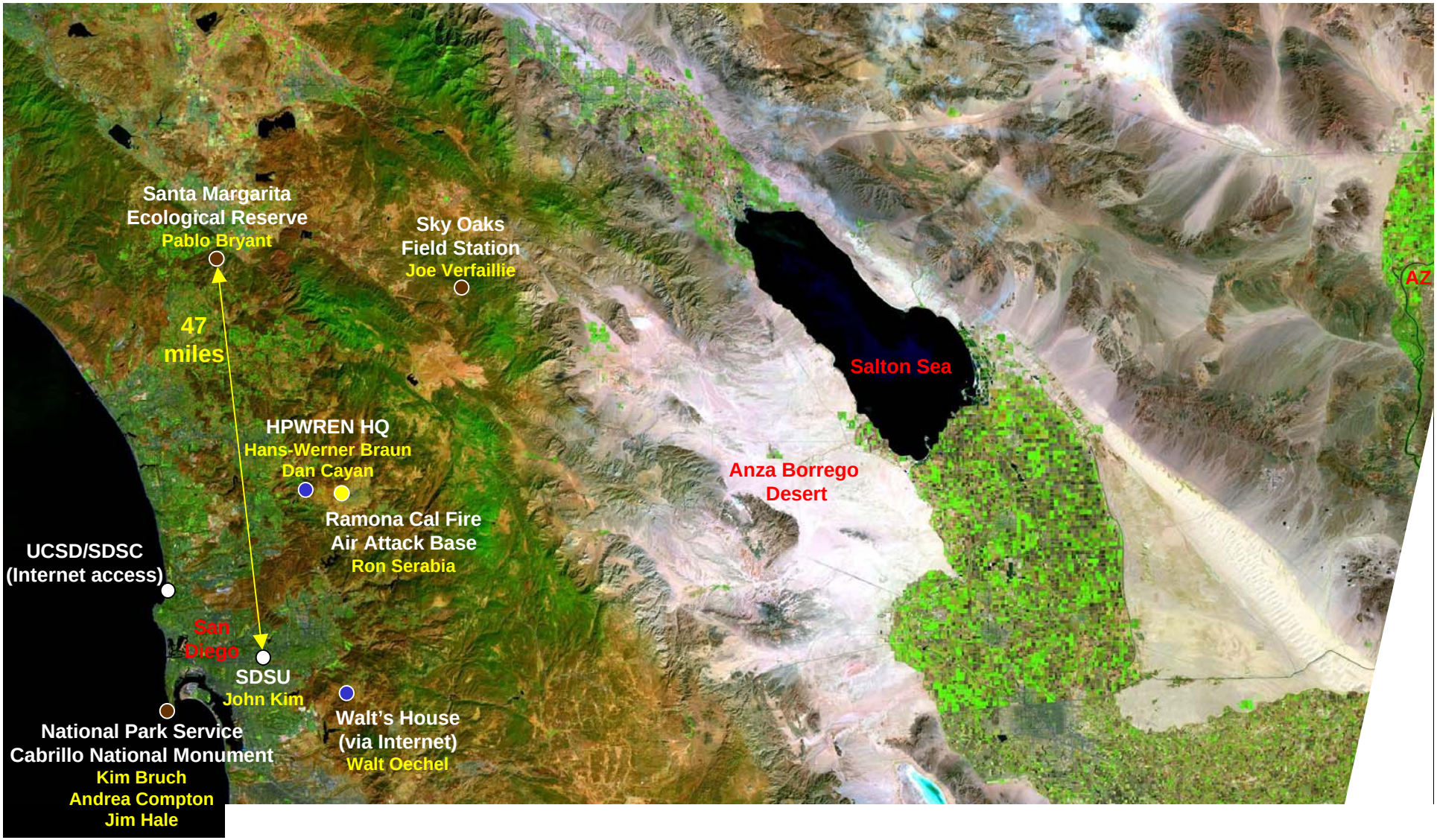
Note: locations are approximate

approximately 50 miles:

Hans-Werner Braun slide#1

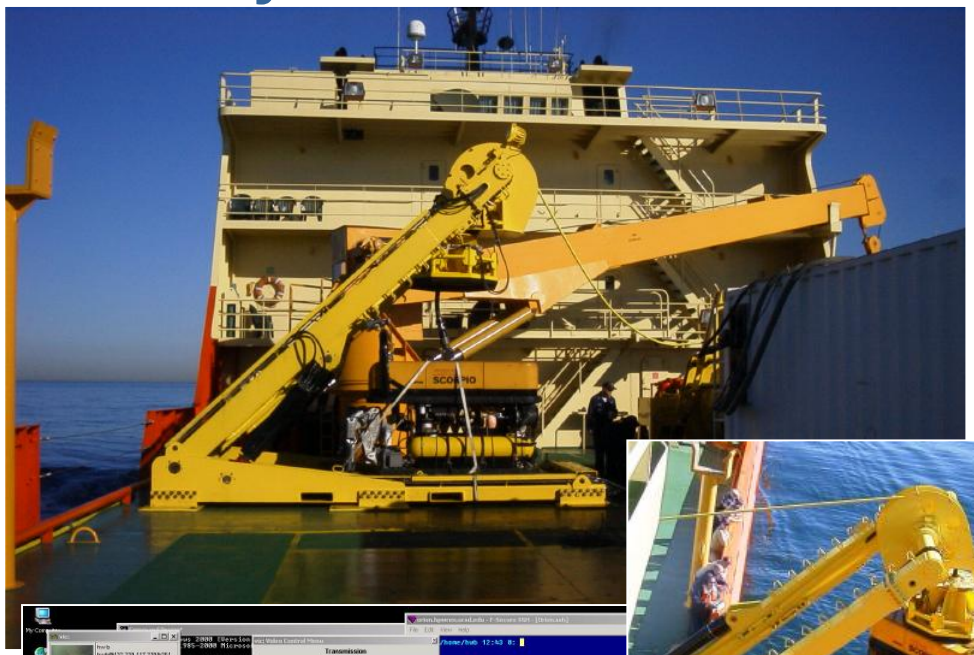
http://hpwren.ucsd.edu

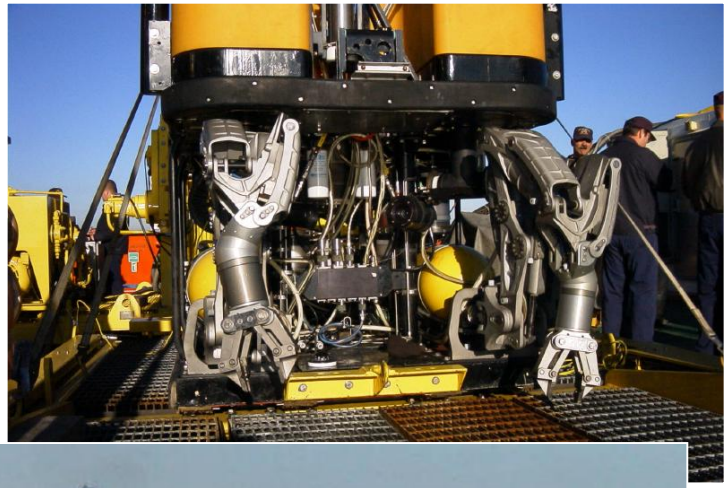
May 2, 2008 -- VTC participant locations in San Diego

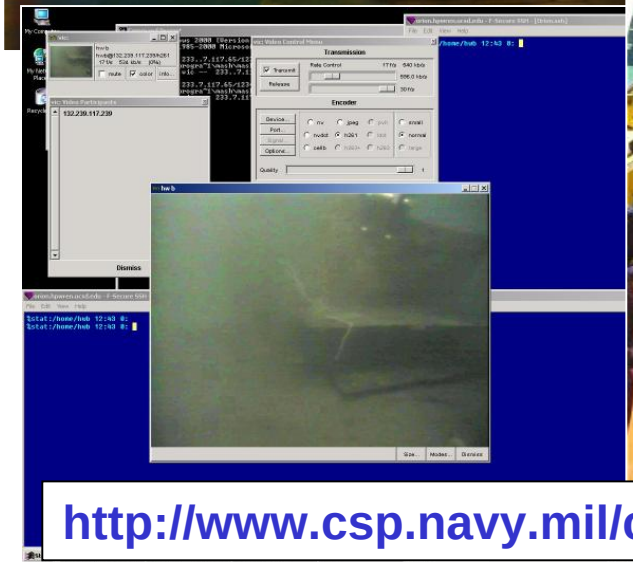


Hans-Werner Braun slide#2

U.S. Navy Deep Submergence Unit – SIO SeaLab II site February 2002



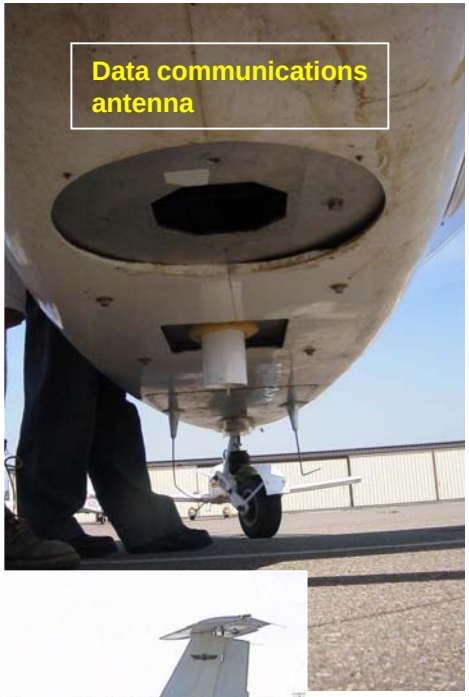


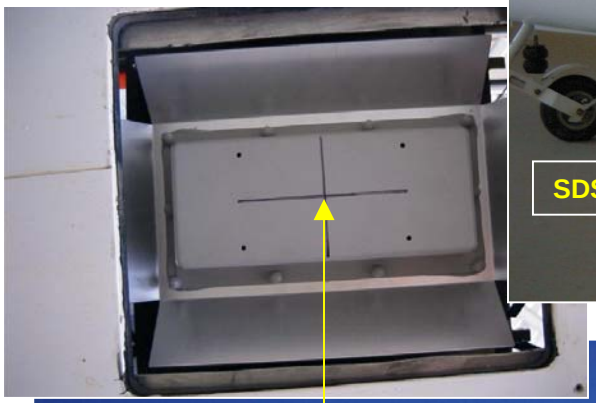


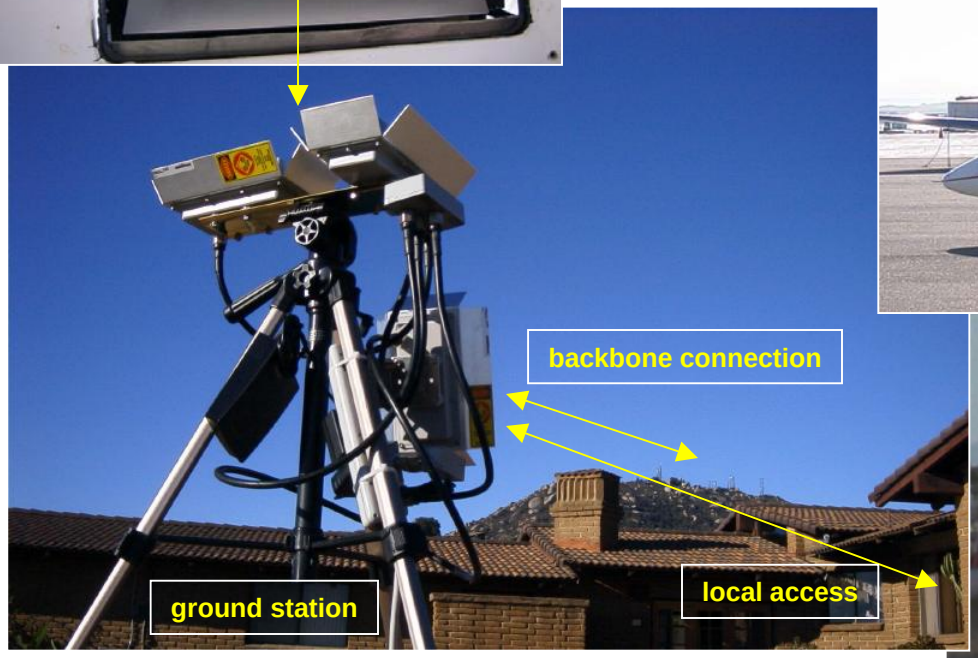
http://www.csp.navy.mil/csda5/dsu/dsu.htm

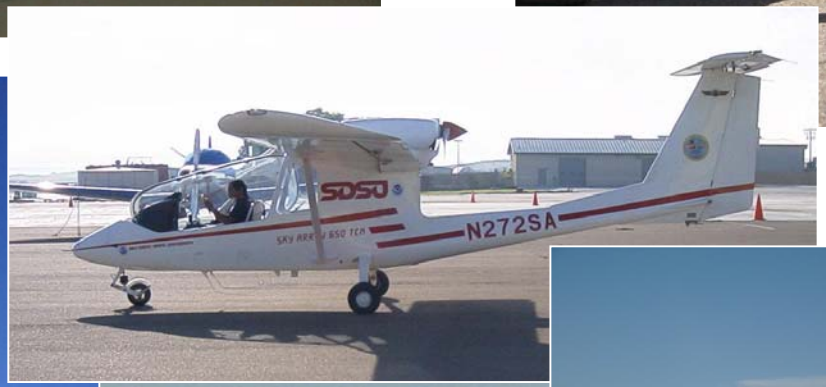
Hans-Werner Braun slide#3

Flight communications test, fixed antenna
August 2002

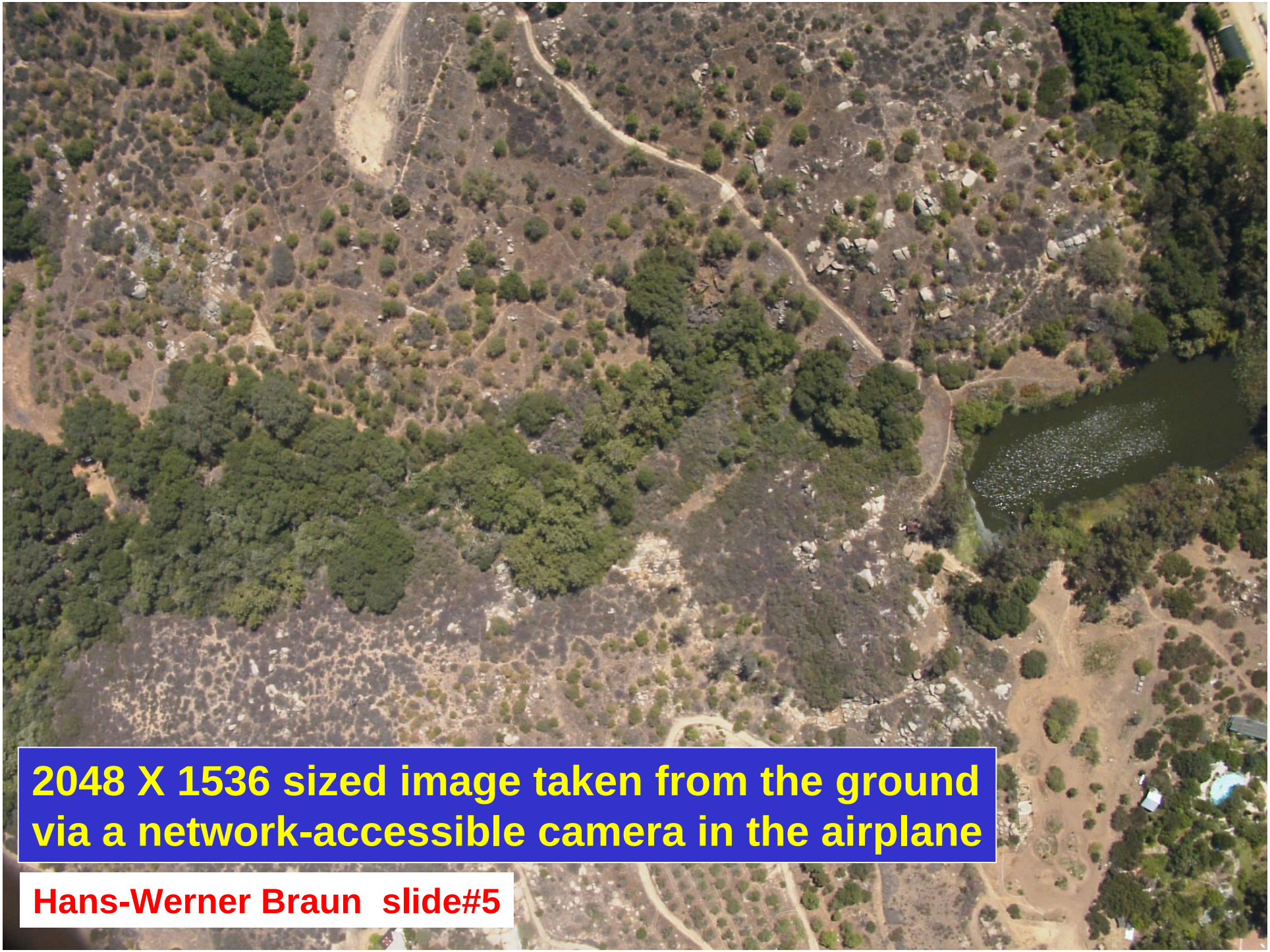








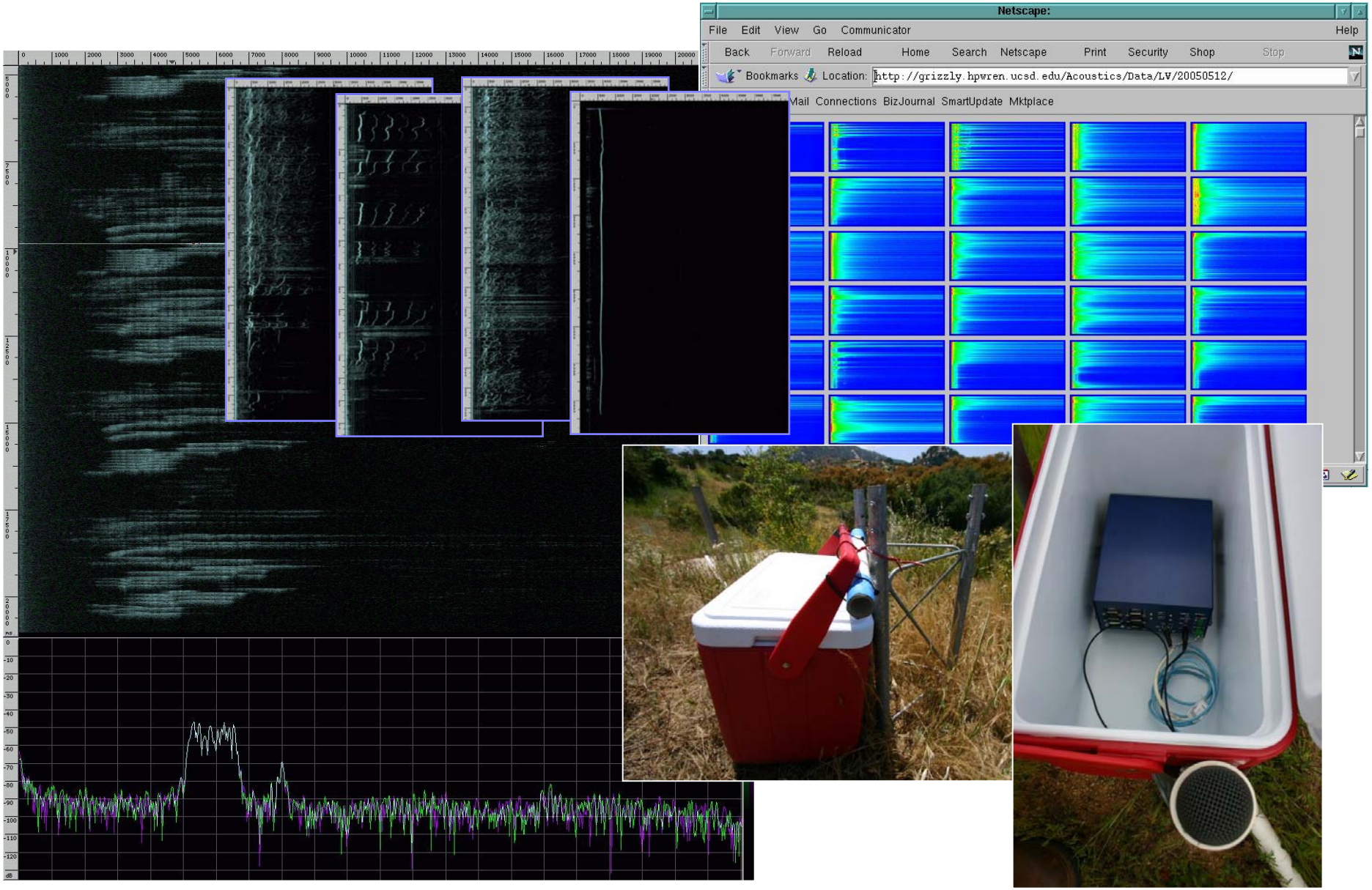
Hans-Werner Braun slide#4


2048 X 1536 sized image taken from the ground
via a network-accessible camera in the airplane
Hans-Werner Braun slide#5

Various motion-detect images

Hans-Werner Braun slide#6

Acoustics research with automated data collection



Hans-Werner Braun slide#7

***Pablo Bryant*, Research Technology Manager**
San Diego State University Field Stations Program

Discussing: *real-time water quality sensors in the river at the Santa Margarita Ecological Reserve*

Visuals:

Pablo Bryant URL: http://fs.sdsu.edu/kf/remot2/demo.php

***John Kim*, Ph.D., Ecoinformatics manager**
San Diego State University Field Stations Program
Manages the collection and dissemination of information at the program's four field stations

Discussing: *Software for management of data and metadata from ecological observatories at SDSU Field Stations*

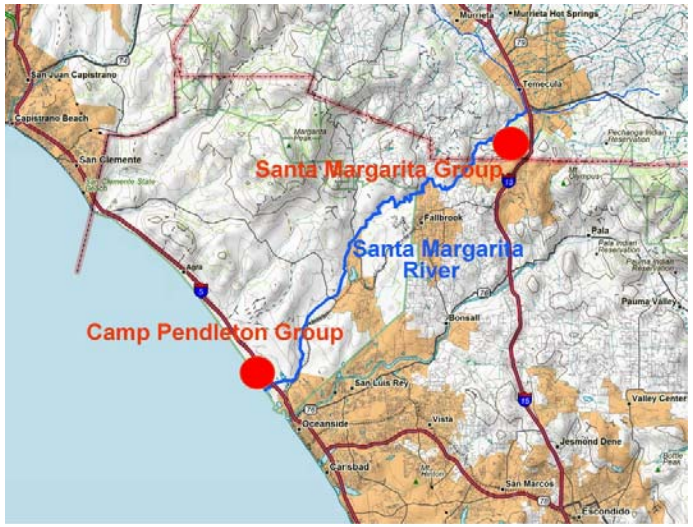
Visuals: John Kim URL: http://fs.sdsu.edu/kf/remot2

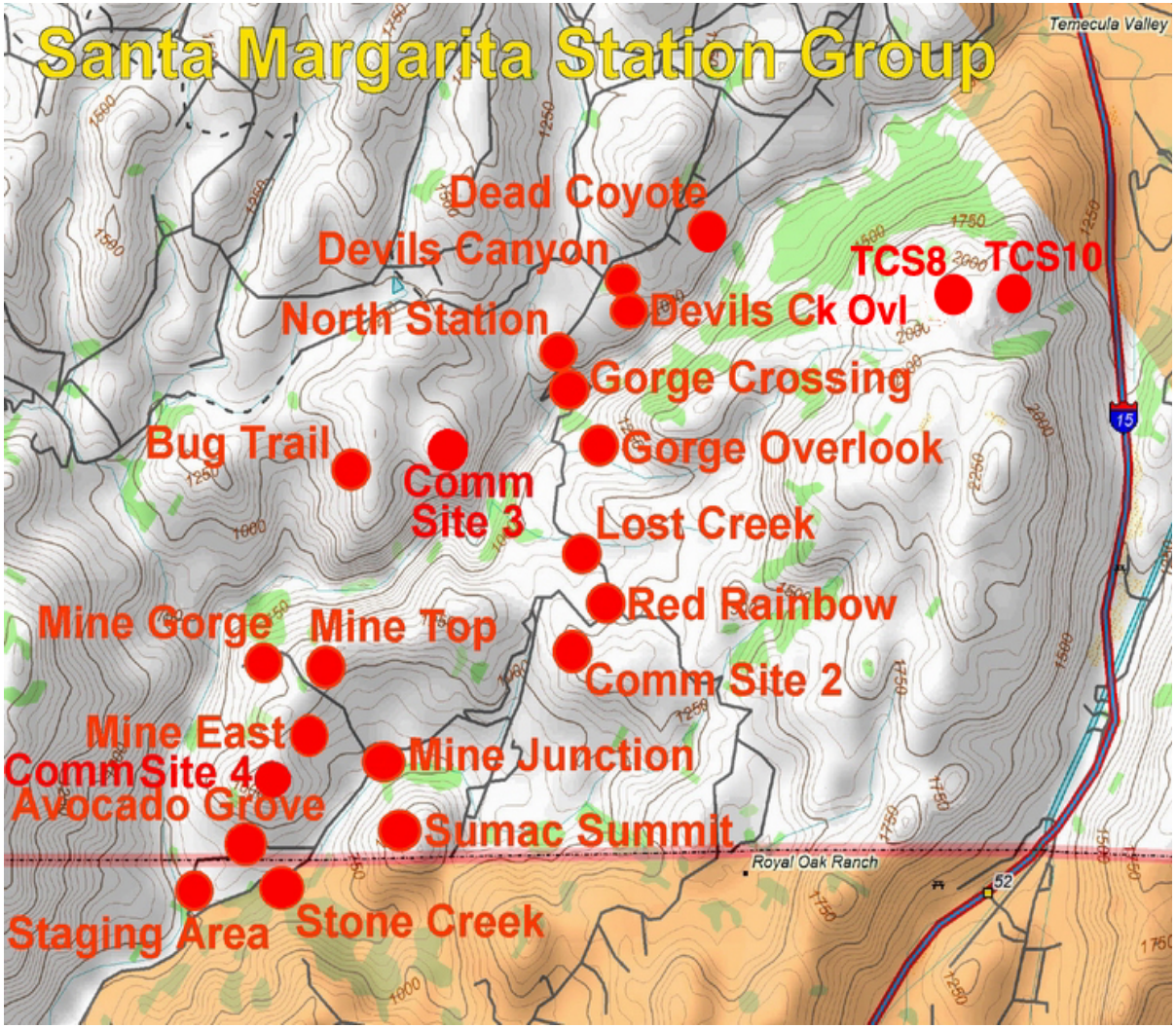
***Dan Cayan*, climate researcher**
Scripps Institution of Oceanography, UCSD and USGS
research focus on regional climate variability and climate change

Discussing: ***Observing weather at a network of meteorological stations at the Santa Margarita Ecological Reserve (SMER). Central to this effort is the DL4-Met data logger, which was developed for affordable, low power applications in settings that provide (or don't) real time communications. Our study of microclimate in this coast-to-interior transition zone is greatly assisted by our connection to the local network provided by SMER, and the broader Internet through HPWREN.***

Visuals: next five slides (slide 4 = URL)

HPWREN provides real-time access to network of 21 met stations in Santa Margarita Ecological Reserve region to study coast-interior climate transition



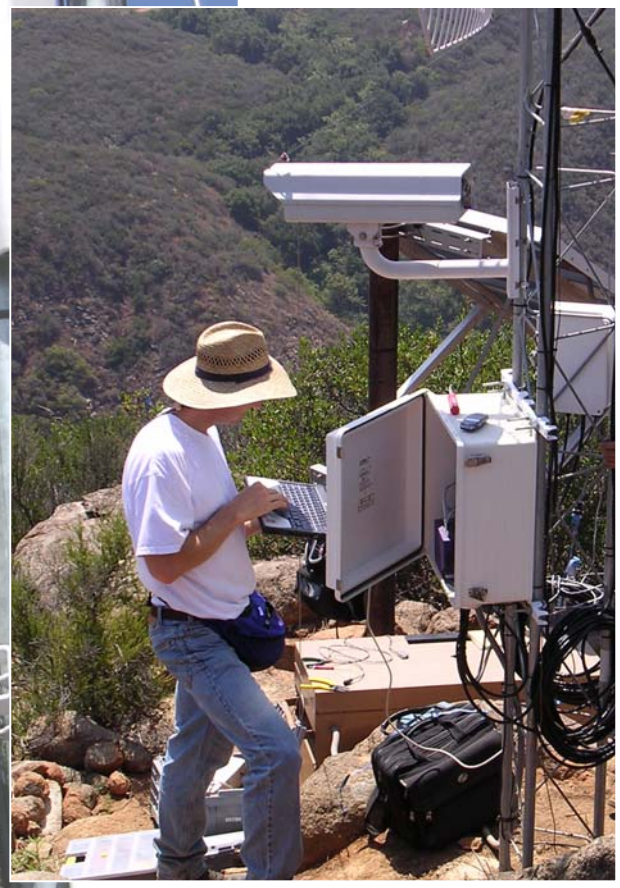


Dan Cayan slide#1

Dan Cayan, Douglas Alden and colleagues at Scripps/UC San Diego

http://meteora.ucsd.edu/weather/observations/sio_other/crd_obs.html

Douglas Alden, Scripps Institution of Oceanography
Engineer who has developed data logger and
Sensor package for low power, low cost
Meteorological and hydrological observation,
Shown here at SMER Comm Site TCS-3



Dan Cayan slide#2

DL4-Met Hydroclimate Data Logger

DL4-GP

CPU
Data Storage (SD Card)
Clock

Powered by alkaline batteries or solar power

DL4-IO1-Met Sensor Interface Board

Temperature (3)
Wind Speed and Direction
Solar Radiation
Barometric Pressure
Humidity
Precipitation (2)
Frequency Inputs (4)

DL4-IO3-GPS/COMM Serial Interface Board

RS-232 Serial Ports (2)
CMOS (3V) Serial Port (5)
GPS

900 MHz Radio Modem

Dan Cayan slide#3

Dan Cayan URL:

http://meteora.ucsd.edu/weather/observations/sio_other/crd_obs.html

Dan Cayan slide#4

Summary

Monitoring air- and watersheds at high density offers new scientific insight and improved info for decision makers

SMER met station aggregation is one of highest density networks in western U.S. It was enabled by HPWREN and the local wireless communications in SMER.

Inexpensive, small format, low power Instrumentation available

Real time data stream provides needed information to users and makes for more effective maintenance, which is difficult in wilderness areas

Platform and communications in SMER allows for easy augmentation of new sensors.

***Walt C. Oechel*, Ph. D., Distinguished Professor of Biology at San Diego State University and the Director of the Global Change Research Group. His research currently focuses on developing and understanding the predictive capability of the interconnections of terrestrial, atmospheric, and marine systems on global change.**

Discussing: *Development of the San Diego Regional Ecosystem Model -- a regional-scale, multi-disciplinary project to combine, calibrate and run a climate model, vegetation respiration model, and coastal circulation model for the San Diego region and validate the combined model on a daily basis using real-time data from ecological observatories.*

Visuals: Walt Oechel URL: http://fs.sdsu.edu/sdrem/

Joe Verfaillie (Ver-fail-lee), Technician for the Global Change Research Group and SDSU
Joe has worked for the GCRG for more than 10 years and supports students and research at remote sites in Alaska, Baja California, and San Diego at Sky Oaks Biological Field Station and Santa Margarita Ecological Reserve.

Discussing: ***Today at Sky Oaks there is a weather tower and three eddy covariance towers recording micro-meteorology and Carbon exchange data. HPWREN has enabled the instruments at this site to continue to run and collect data beyond the end of their funding by providing remote access to fix minor software problems and real time data monitoring so that four hour round trips to the site can be planned in advance.***

Visuals:

Joe Verfaillee URL#1 - Latest weather from Old Stand:
http://gcrg.sdsu.edu/weatherreports.php?scrn=oldstand

Joe Verfaillee URL#2 - Latest weather from Young Stand:
http://gcrg.sdsu.edu/weatherreports.php?scrn=youngstand

***Andrea Compton*, Cabrillo National Monument, National Park Service. Manages the Natural Resources Management and Science Division at the park, and works closely with the other two parks in the California Mediterranean Coast Network: Channel Islands National Park and Santa Monica Mountains National Recreation Area.**

Discussing: *Andrea will be discussing the cameras that have been installed at Cabrillo National Monument in partnership with HPWREN, provide an introduction to the use of those cameras and possible future applications, both internally for resource managers in the NPS as well as externally for the public and education groups.*

Visuals:

Andrea Compton URL:

http://www.researchlearningcenter.com/webcams/

***Jim Hale*, UCSD/SDSC HPWREN Technician/Programmer**

Discussing: *Camera, Solar Power, and Network Relay Site installations, with a focus on a hardware overview*

Visuals:

Jim Hale URL#1: http://hpwren.ucsd.edu/cameras
Jim Hale URL#2: http://hpwren.ucsd.edu/cameras/CNMVCSD
Jim Hale URL#3: http://hpwren.ucsd.edu/cameras/MtLaguna.html

***Kimberly Mann Bruch*, UCSD/SDSC HPWREN public information and education efforts**

Discussing: *Kimberly will briefly discuss the Live Interactive Virtual Exploration (LIVE) activities that she has been facilitating between a rural Native American reservation learning center and several HPWREN-connected science sites*

Visuals:

Kim Bruch URL#1 - Pala/Cabrillo:
http://hpwren.ucsd.edu/news/20080215

Kim Bruch URL#2 - Pala/Santa Margarita River:
http://hpwren.ucsd.edu/news/20070727

***Ron Serabia*, Fire Captain, Cal Fire, Air Tactical Group Supervisor**

Discussing: ***Ron Serabia will describe how real-time sensors, including those that automatically trigger pager/email alarms, benefit first responders, particularly firefighters.***

Additionally he will talk about ad-hoc networking needs for Incident Command Posts on large-scale incidents.

Visuals: next four slides

Ron Serabia, AA330, and November 2007 Haverford Fire

Ron Serabia slide#1

Real-time sensor implementation at an HPWREN backbone site

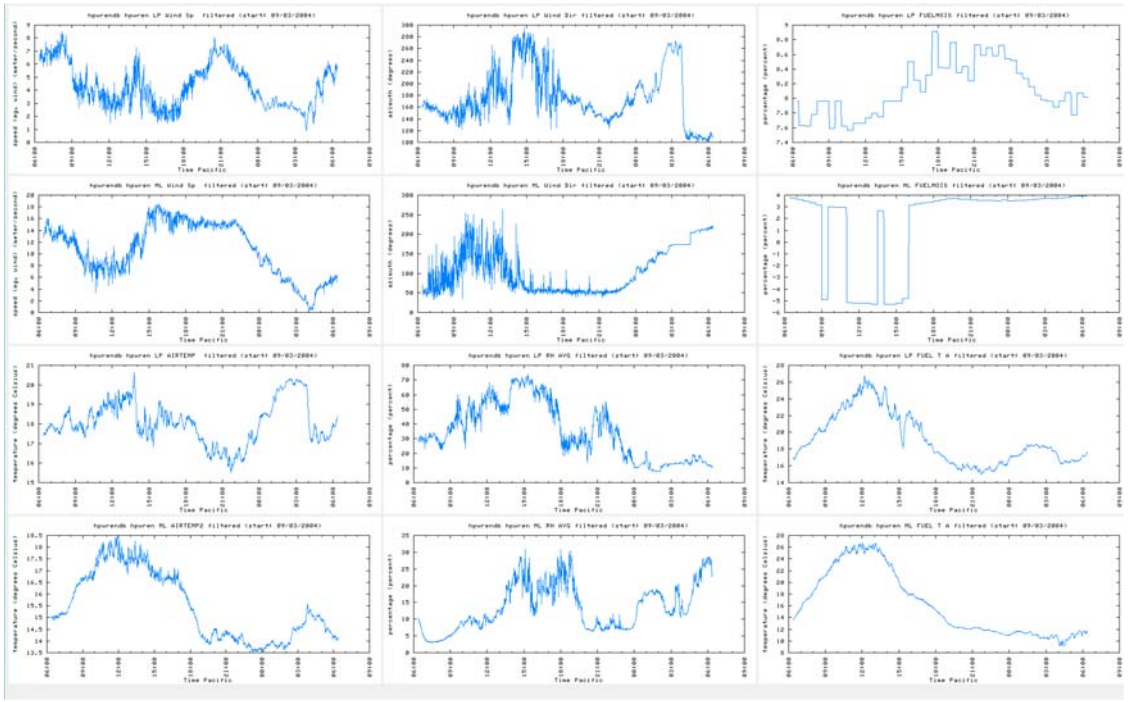
Ron Serabia slide#2

Real-time sensor data alerts

Trigger email/pager/….
if:

condition A +
condition B +
condition C

happens



several San Diego fire officers are currently being paged during alarm conditions, based on HPWREN data parameterization by a CDF Division Chief

Ron Serabia slide#3

Ad-hoc networking: CDF Incident Command Post - Volcan Fire 2005

Ron Serabia slide#4

Open discussions