

CREST-SMART: **Soil Moisture** **Advanced Radiometric Testbed at** **Millbrook NY**

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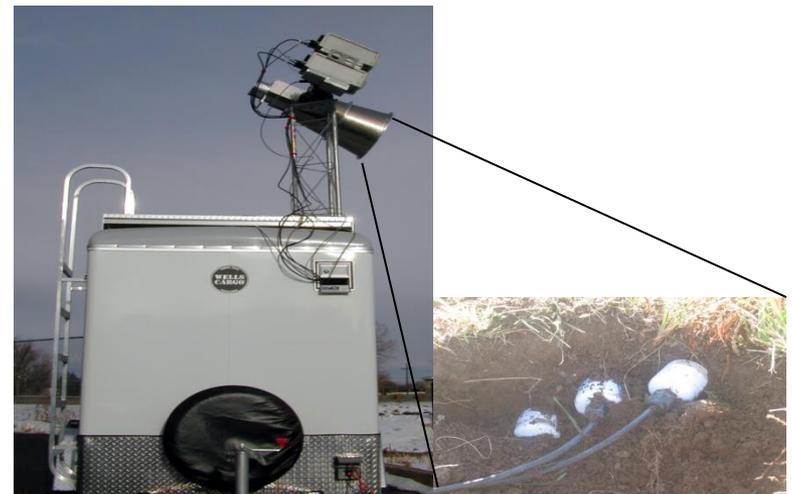
CREST-SMART

Soil Moisture Advanced Radiometric Testbed

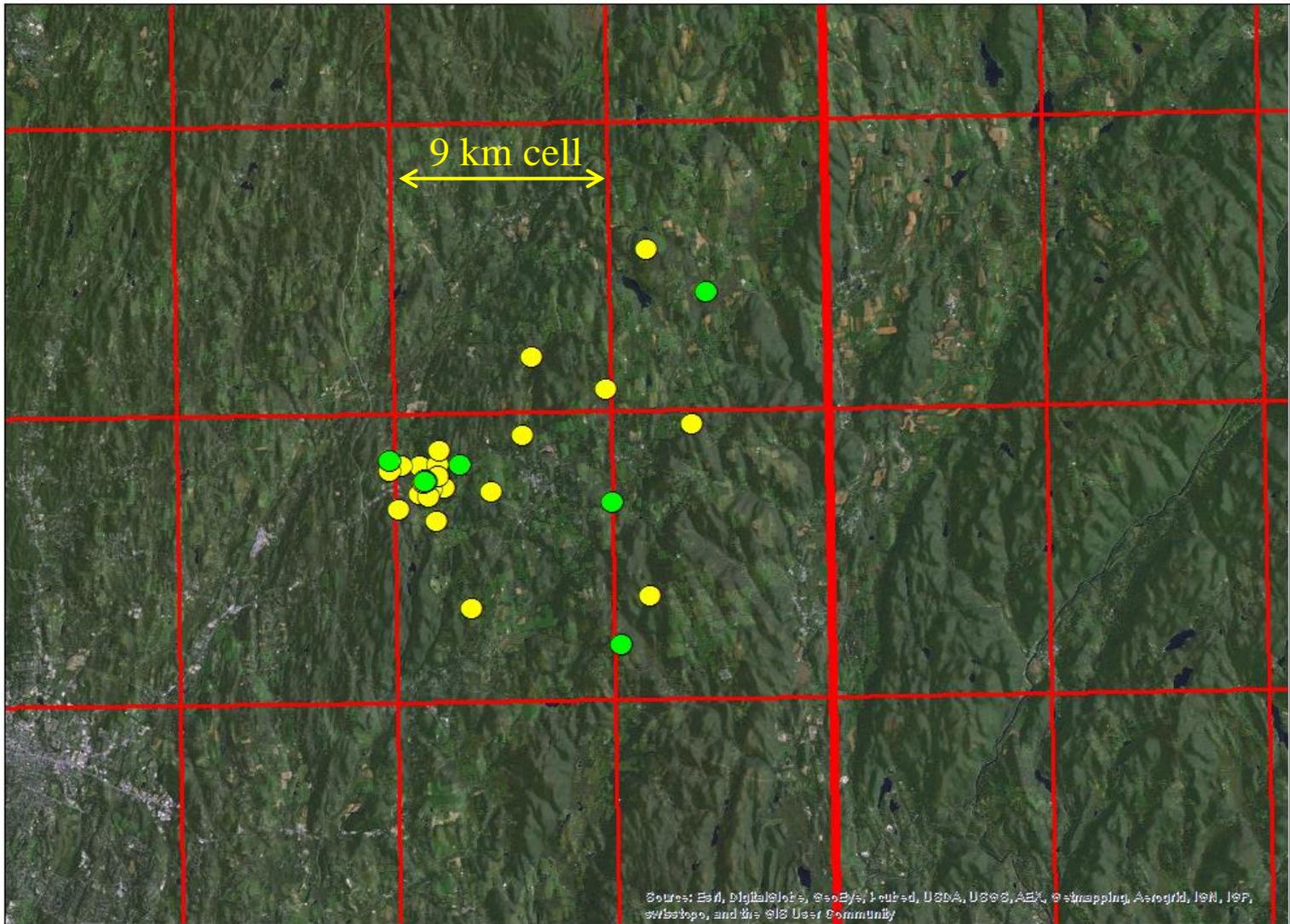


Site Description

- Type of site
 - Single point evolving to core site level (minimum of 6 stations; 6 probes per station)
- Measurements
 - L band brightness temperature (if needed 10.65, 19, 37 and 89 GHz)
 - Soil moisture at 2.5, 5 and 10 cm; Sensors used: Stevens Digital Hydra Probe II
 - Freeze/Thaw
 - NDVI, LAI
 - Precipitation
 - Air temperature
 - Streamflow
 - Gravimetric soil moisture



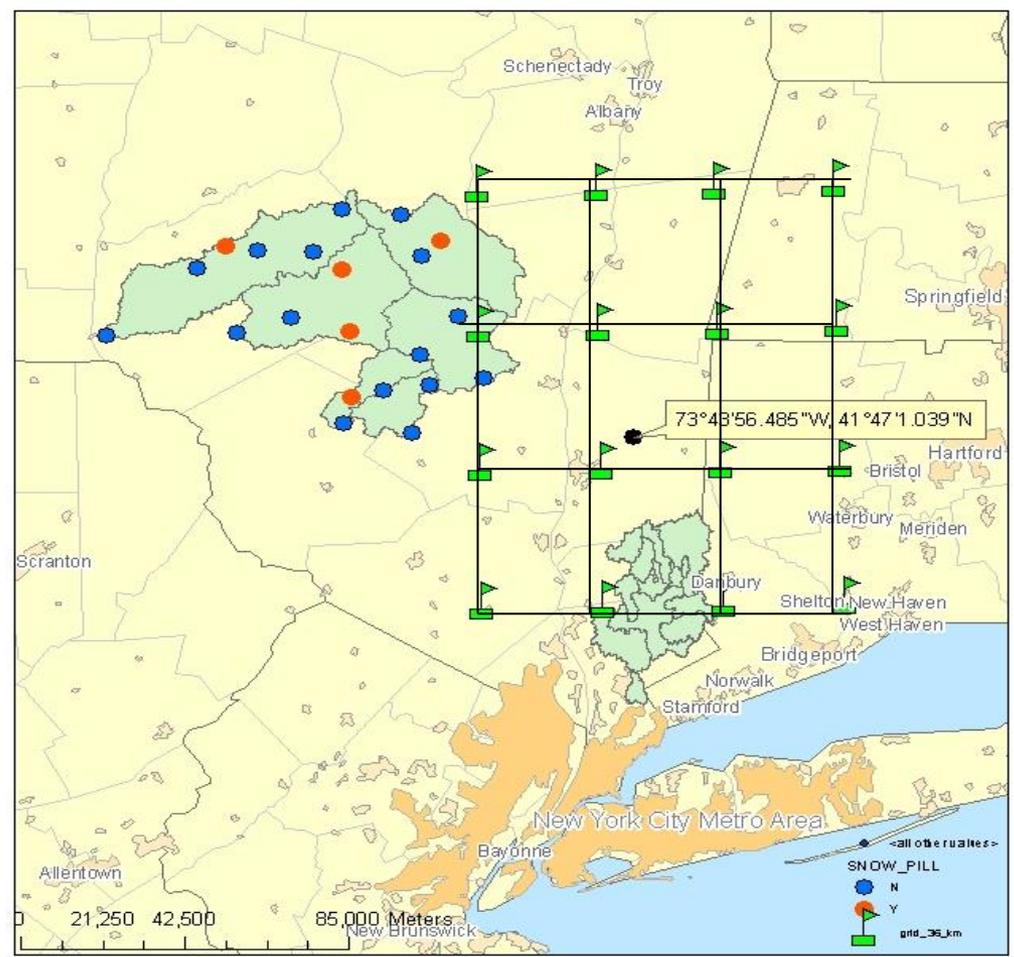
Temporary and Permanent Networks



Source: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, URS, AeroGRID, IGN, ISF, Swirephoto, and the GIS User Community

0 5 10 20 Kilometers

Other Stations available



NOAA-USDA-CREST joint field campaign in 2012

Marouane Temimi, Tarendra Lakhankar, Xiwu Zhan, Mike Cosh, Nir Krakauer Vicky Kelly, Laetitia Kumassi (graduate), Amelise Bonhomme (undergrad). A GROUND BASED L BAND RADIOMETER FOR THE MONITRING OF SOIL MOISTURE IN THE REGION OF MILLBROOK NY. Vadose Zone Journal. accepted.



Approach to calibration

- Manufacturer
- Gravimetric sampling during field experiments

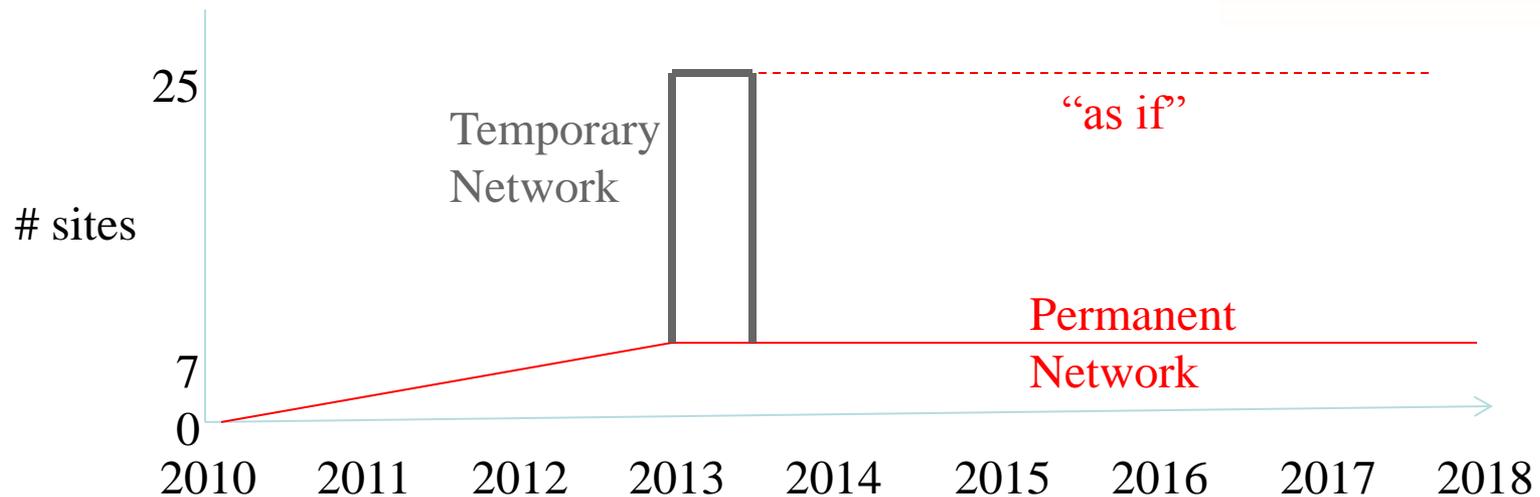


Approach to representing the SMAP product

Sensors installed at 2.5, 5, and 10 cm depth



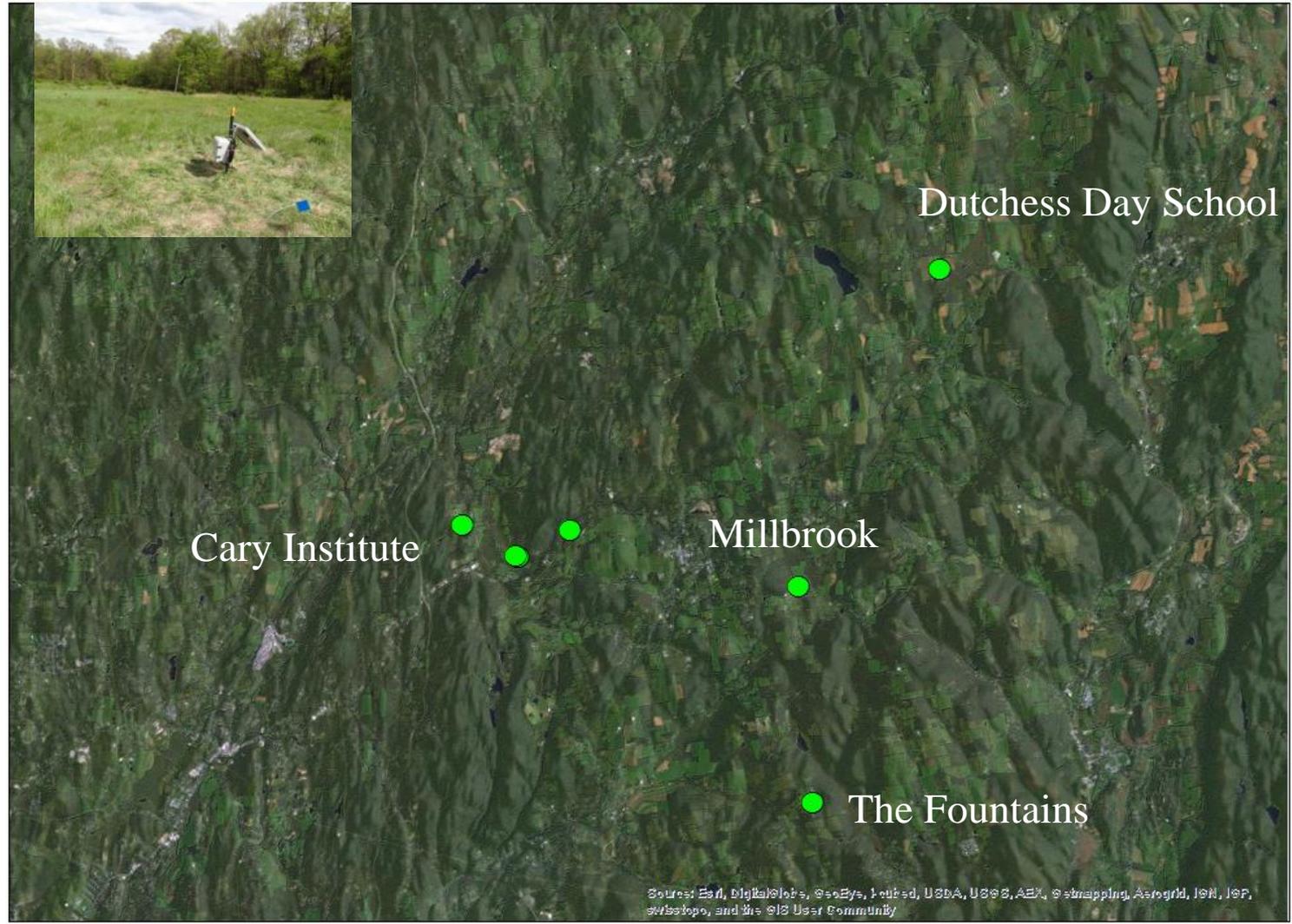
Temporary Network Installation



Permanent Sites are expensive and time consuming to operate, but by deploying a short term network, we can **extend** the accuracy of the network through the life of the network.

This is based on the concept of temporal stability which says that soil moisture patterns follow persistent patterns. If the relationship between the 7 permanent sites and the 25 temporary stations can be established, it is “as if” 25 stations are deployed through the life of the network.

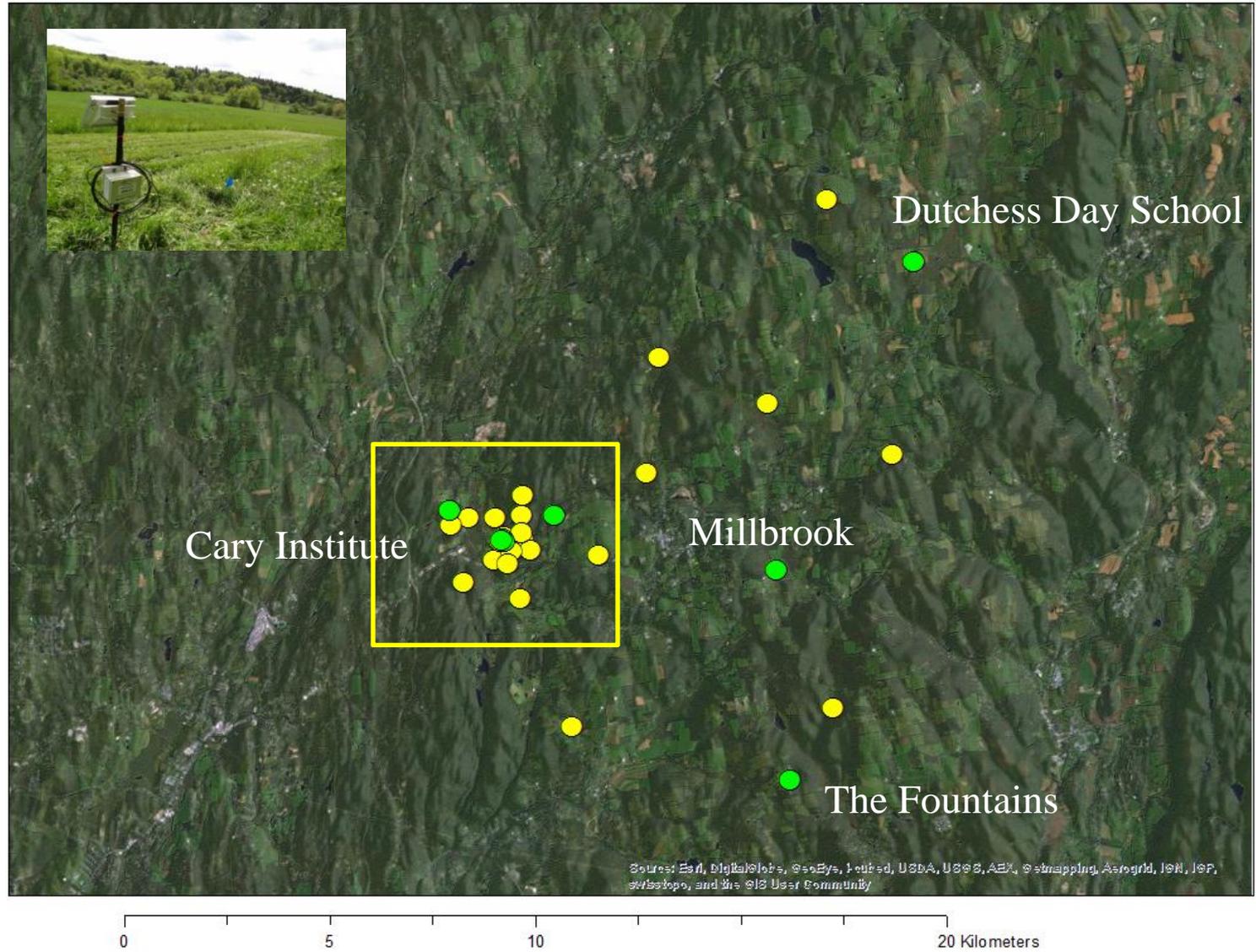
Permanent Sites

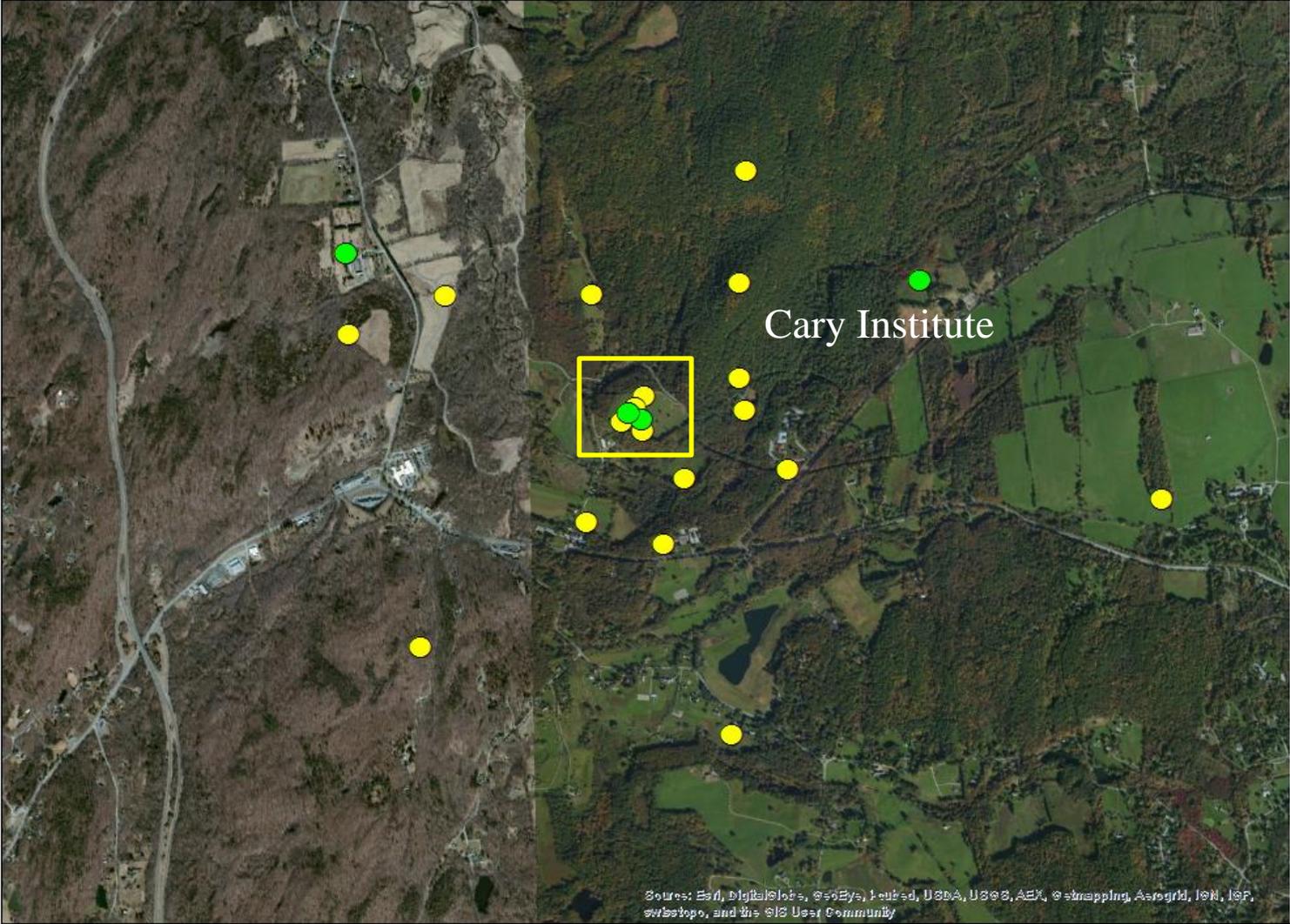


Source: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, USGS, Aero, Earthstar, GeoEye, IGN, JP, Swisstopo, and the GIS User Community

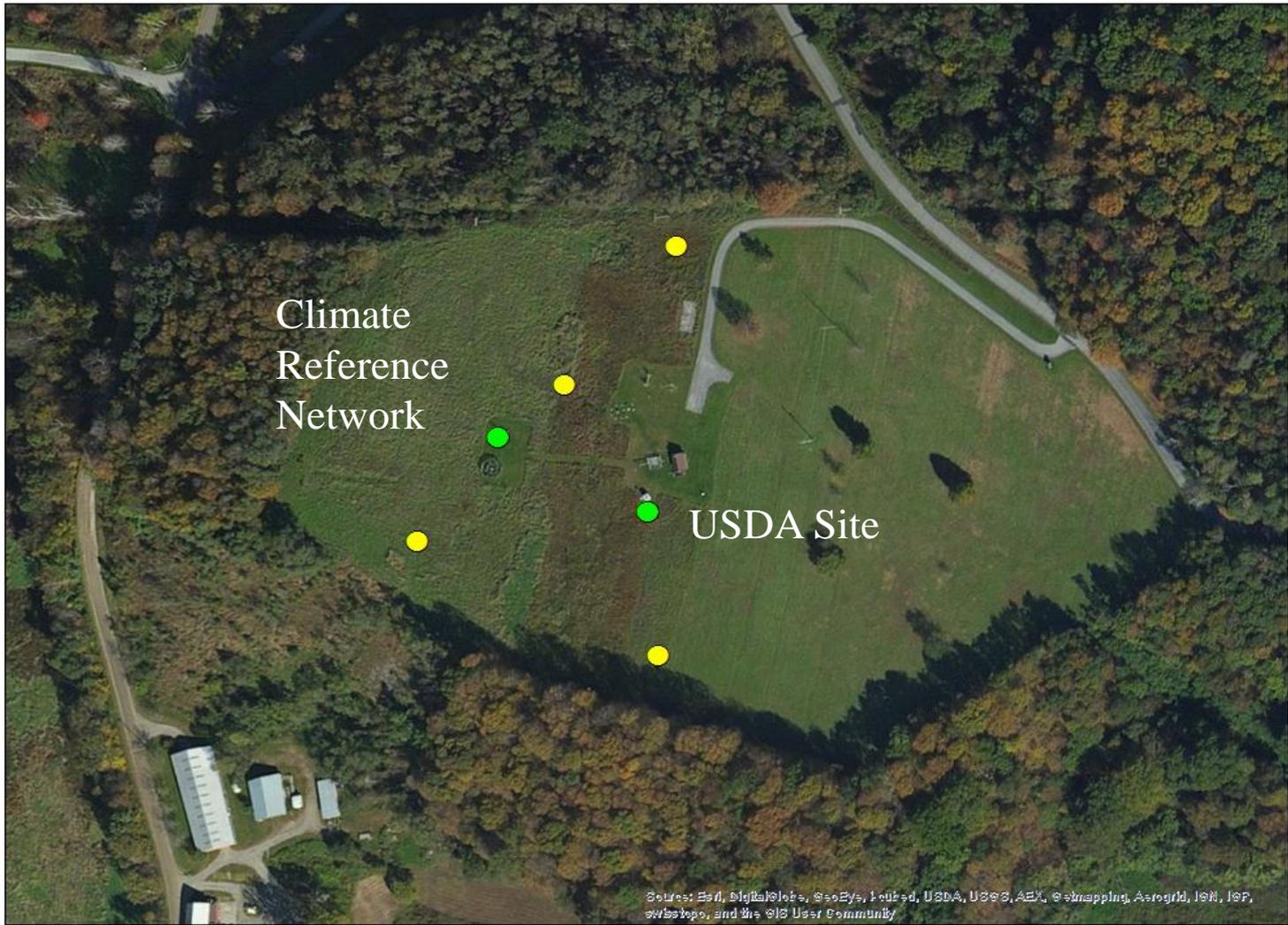
0 5 10 20 Kilometers

Permanent and Temporary Network





0 1 2 4 Kilometers



Source: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, USGS, AeroX, © mapping, Aergrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.1 0.2 0.4 Kilometers

Pre-launch field campaign

In summer 2014 to study the heterogeneity aspect further as a continuation of what we did in 2012

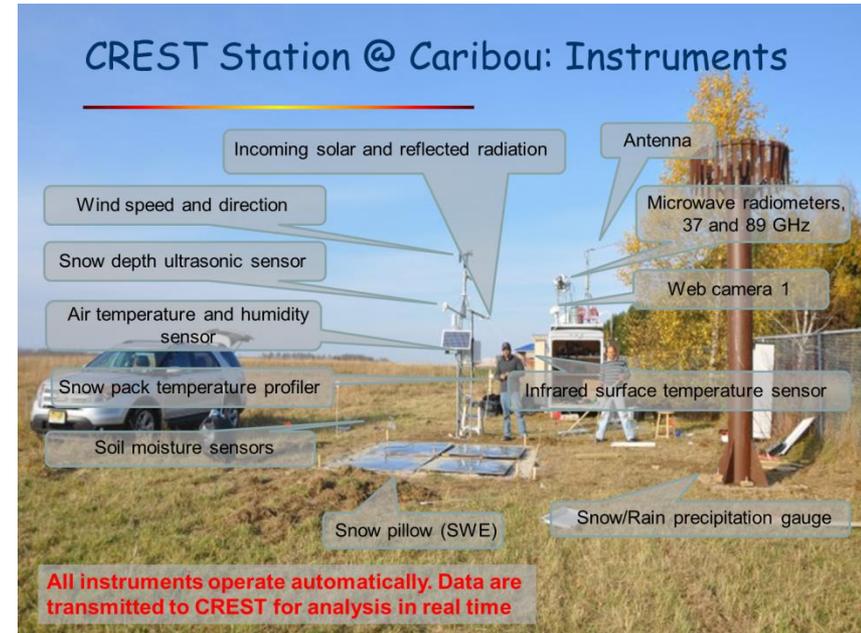
Gravimetric sampling are performed bi-monthly to verify the sensors' calibration, through 2013.

In 2014 SM measurement were communicated to SMAP team through <http://water.ccnycunyc.edu>
A script will be put in place to automatically push the data to SMAP team;

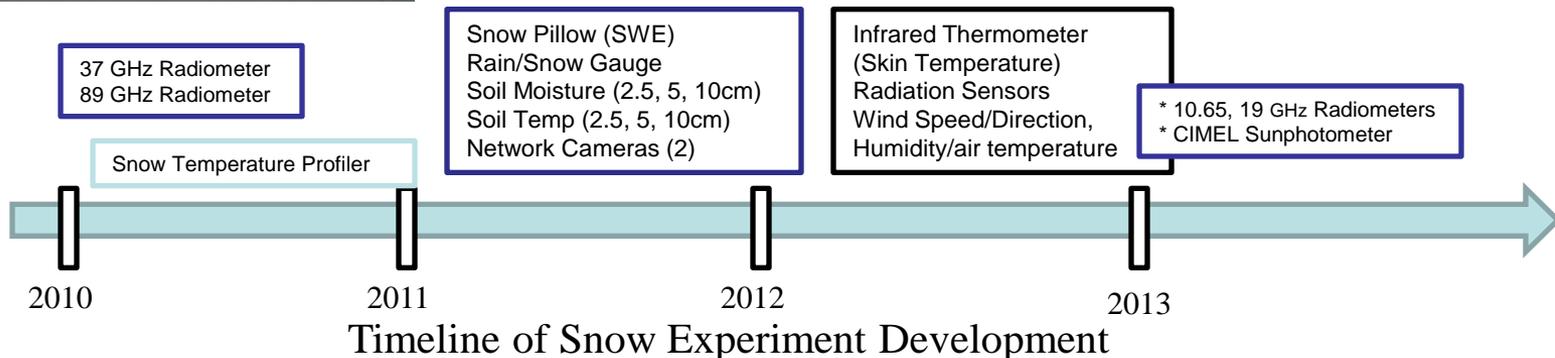


CREST-SAFE - Snow Analysis and Field Experiment

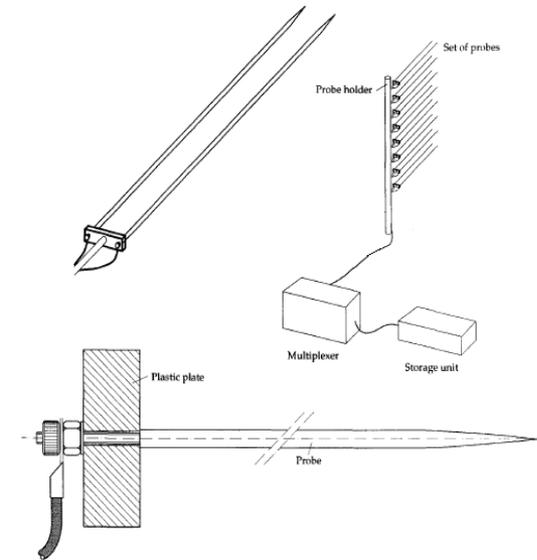
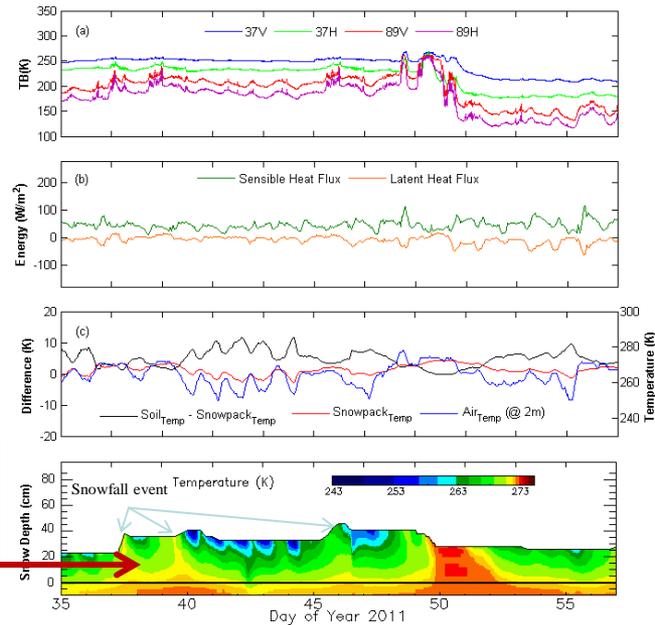
- This Field Experiment is setup near the National Weather Service office at Caribou, ME in 2010.
- This project is motivated to (a) develop, improve and validate the NOAA's Snow Retrieval Algorithms (b) develop real time and forecasted gridded snowpack data by objectively merging in-situ stationed with satellite based VIS/NIR and microwave observation.



<http://crest.ccny.cuny.edu/snow>



CREST-SAFE - Snow Analysis and Field Experiment



People involved:

- Tarendra Lakhankar, Peter Romanov, Reza Khanbilvardi, William B. Rossow, Kyle Macdonald, Alfred Powell
- Students: Jonathan Munoz, Jose Infante, Carlos Perez, Philip Boody (Student, University of Maine)

CS650
Water Content
Reflectometer



**Dielectric
Permittivity**

Questions?



07/12/2013