THE GLOBE PROGRAM

The ENSO Student Research Campaign Phase II Technology and Instrumentation

Webinar 9: May 16, 2017

Brian Campbell, ENSO Campaign Lead

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What is Technology?

The purposeful application of information in the design, production, and utilization of goods and services, and in the organization of human activities.

What is Instrumentation?

An instrument used for scientific purposes. Most are measuring instruments. They may be specifically designed, constructed and refined for a particular purpose. Over time, instruments have become more accurate and precise through testing and time.

Combine the two and we can explore just about everything on our planet and beyond!

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Examples of Improved NASA Technology related to GLOBE

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The SMAP Satellite

Technical Origami with a spinning lasso

Measuring Soil Moisture
Bringing Scientists and Engineers Together

Video

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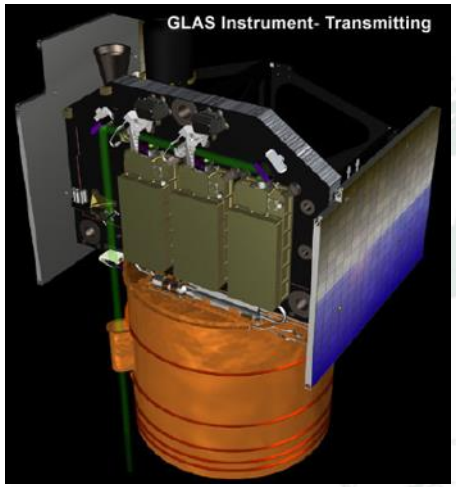
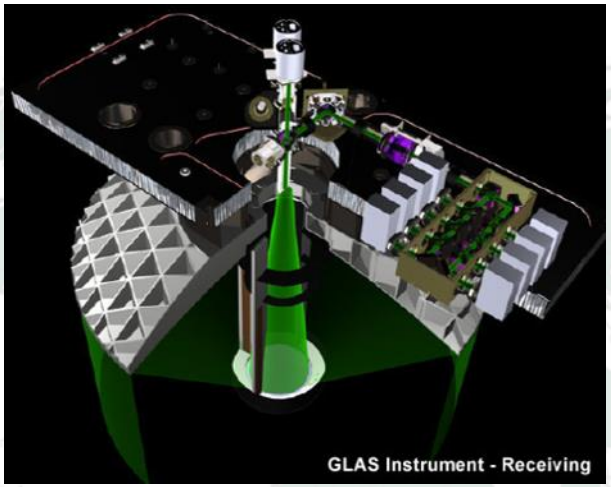
Advancing laser altimetry technology from ICESat to ICESat-2

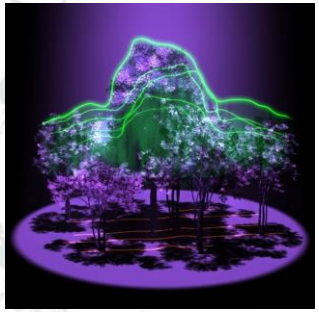


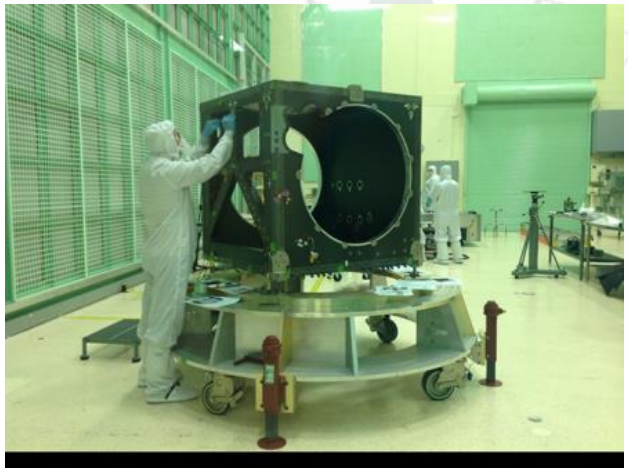


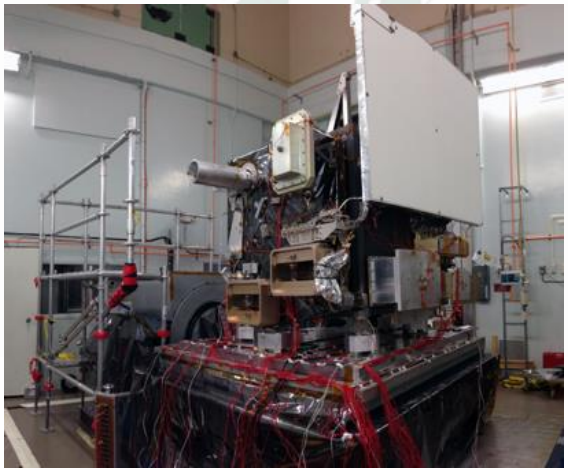
ICESat's Geoscience Laser Altimeter System (GLAS) instrument

Single laser, spaced at 170-meter intervals along Earth's surface.

40 laser pulses per second







ICESat-2's Advanced Topographic Lidar Altimeter System (ATLAS) instrument

3 lasers split into 6 beams, arranged in 3 pairs with 3.3 km between pairs

10,000 laser pulses per second

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The ENSO Data Entry Challenge

- What: To involve more students in the ENSO Student Research Campaign
- When: April 22, 2017 – July 22, 2017
- Where: At your defined GLOBE measurement site
- How: Just do what you have been doing or perhaps take additional measurements.
  - Use these protocols:
    - Precipitation
    - Air Temperature (Max/Min)
    - Surface Temperature
    - Soil Temperature
    - SMAP Soil Moisture
    - Biometry – Canopy and Ground Cover

The data collected and entered into our system during the ENSO Data Entry Campaign will help us understand how these natural cycles impact us – and how we may impact them.

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ENSO Student Research Campaign Metrics & Data Counts – Updated in advance of each Phase II Webinar

Global Data – Data Entry from Around the World

Data Collected by Ann Martin, SSAI

Phase II Only: September 21, 2016 – May 12, 2017

Protocol	Precipitation	Air Temperature (Standard/Noons/ Current/Max)	Surface Temperature (Standard/Noons)	Soil Temperature (Standard/Noons/ Dailies)	SMAP Soil Moisture	Biometry Trees & Vegetation Covers	Total
Sites	435	1,122	192	270	80	67	2,166
Observations	31,760	1,173,856	8,587	141,738	1,434	196	1,357,571

Phase I & Phase II: March 1, 2016 – May 12, 2017

Protocol	Precipitation	Air Temperature (Standard/Noons/ Current/Max)	Surface Temperature (Standard/Noons)	Soil Temperature (Standard/Noons/ Dailies)	SMAP Soil Moisture	Biometry Trees & Vegetation Covers	Total
Sites	560	1,411	243	335	132	87	2,768
Observations	57,339	2,278,423	12,521	360,206	2,619	304	2,711,412

Notes: The data counts listed above include observations from automated weather stations, especially for precipitation and temperature protocols.

2.71 million measurements

Brian Campbell, ENSO Campaign Lead