

Towards a Persistent Presence in the Ocean

Liquid Robotics

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Challenges and Opportunities ... and Inspiration

Why does it matter?

Measuring

- This month, the Mauna Lora Scientific Station in Hawaii is expected to measure the first CO₂ reading above 400ppm
- Last time the Earth experienced these levels was 3 to 5 million years ago, when Earth was much warmer
- Extends to Ocean Acidification

Deciding

- Last week representatives from 35 countries which emit most CO₂ (80% of global emissions) met in Berlin
- Angela Merkel warned: “*Waiting is not an option*”

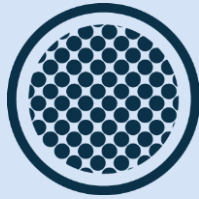
Challenge: Can we make Data coming from the Ocean



Global



Local



Dense



Timely



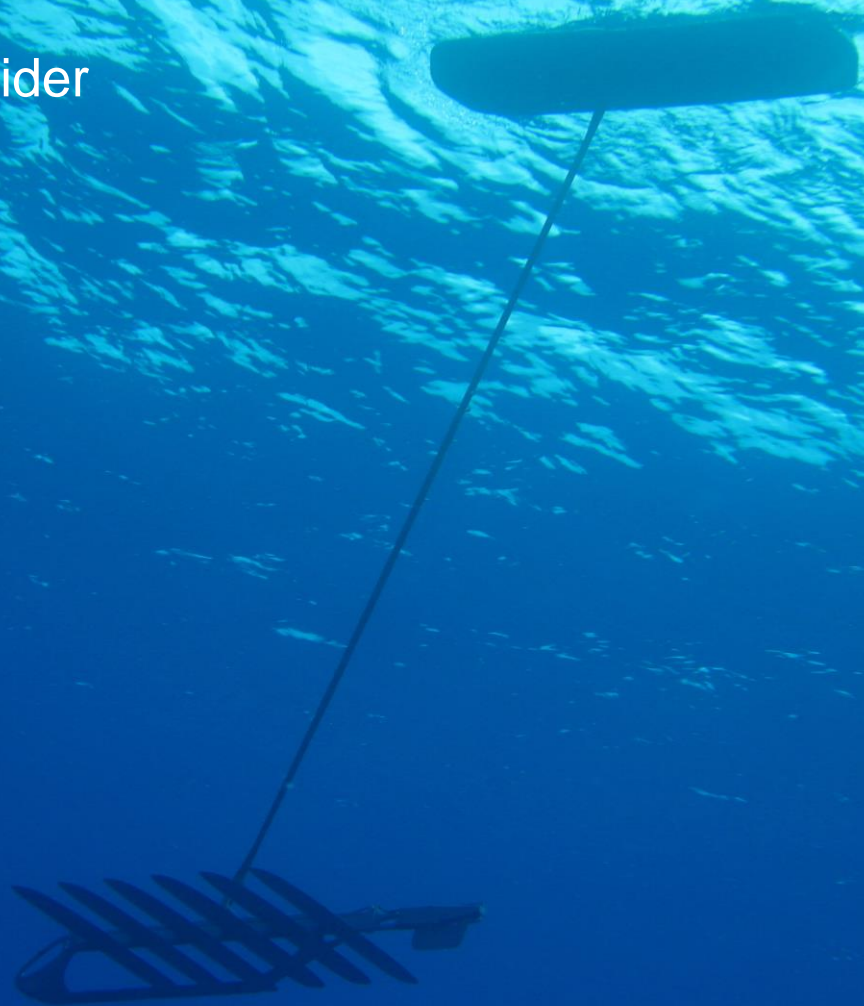
Safe



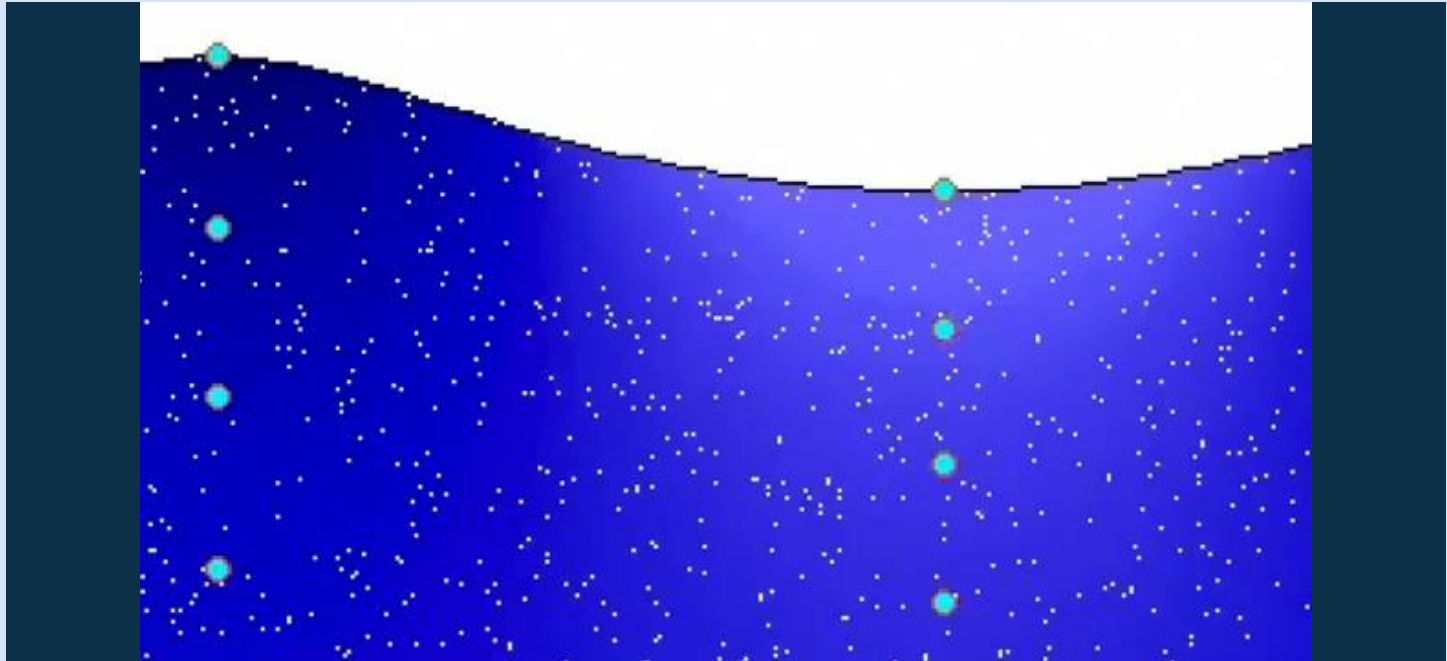
Affordable

Opportunity: Use robots to “man” the Oceans for data gathering

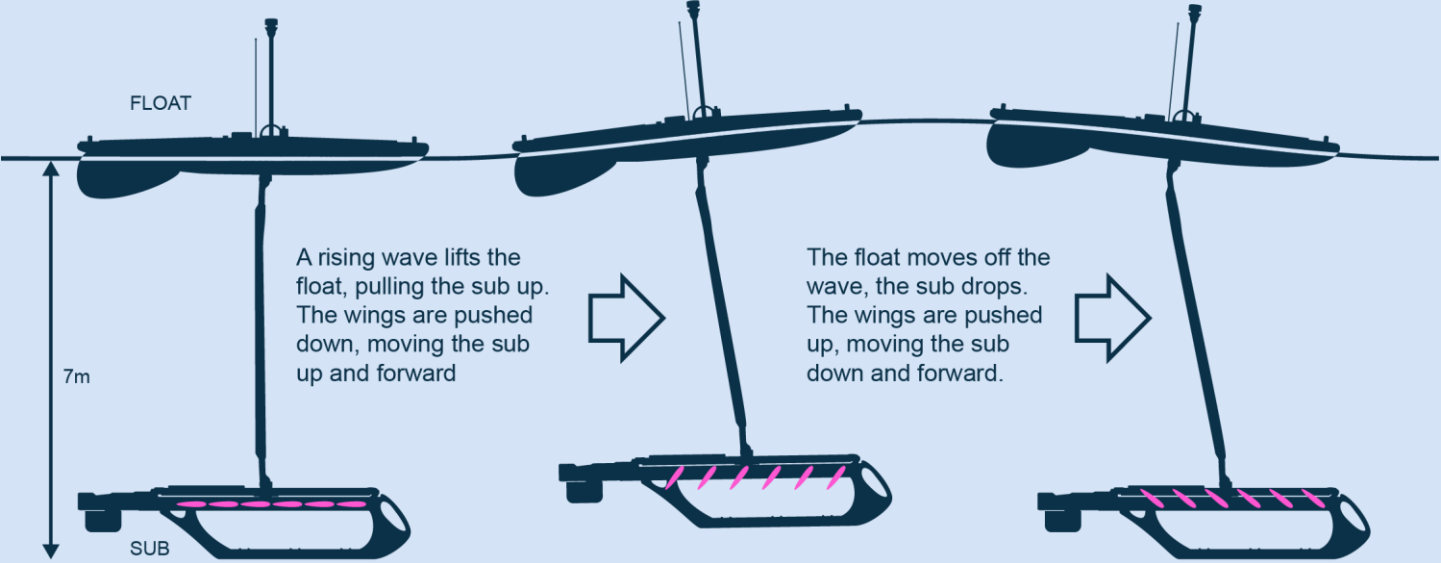
The Wave Glider



How It Works

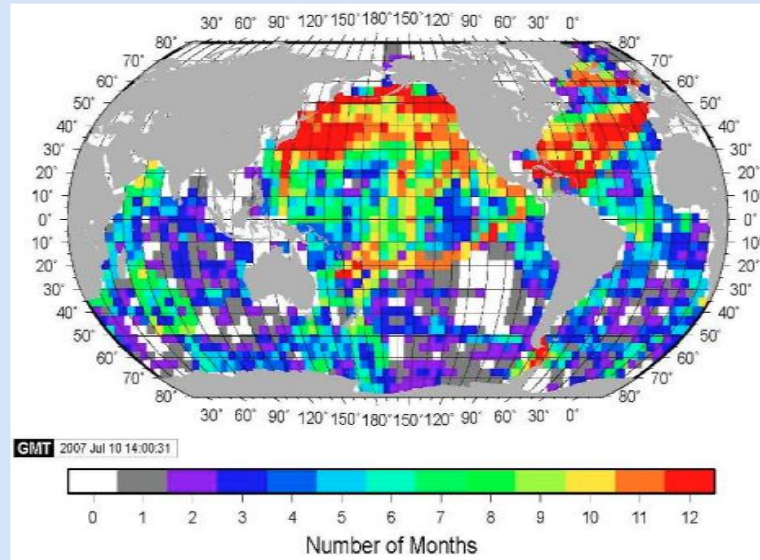


How It Works



3 U.S. and 9 foreign patents issued. 20 U.S. Provisional applications, 42 foreign applications.

CO₂ Flux - Challenge



Challenge

- Large Areas of Oceans have Little or No Measurements
- Those Areas are remote and hard to monitor

CO₂ Flux - Opportunities

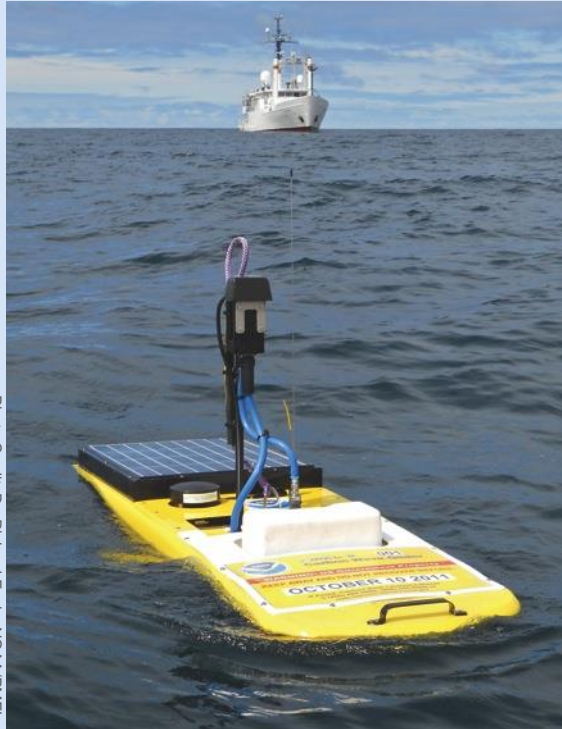


Photo Credit: Dr. Richard Feely, NOAA/PMEL

Opportunity – The Carbon Wave Glider

- Multiple Sensors
 - NOAA PMEL
 - MBARI
 - SCRIPPS
- Multiple Organizations
 - NOAA PMEL – USA *
 - MBARI – USA *
 - CSIR – South Africa *
 - CSIRO - Australia
 - Bergen University - Norway

Wave Gliders

Augmenting Access to Our Oceans

www.liquidr.com

With an unlimited Network of Ocean Data gathering Robots

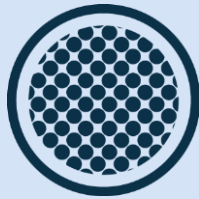
That are:



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What is important or critical to measure and monitor at sea?