



Protei

Open Source Sailing Drone

Gabriella Levine

hardware designer/multimedia artist

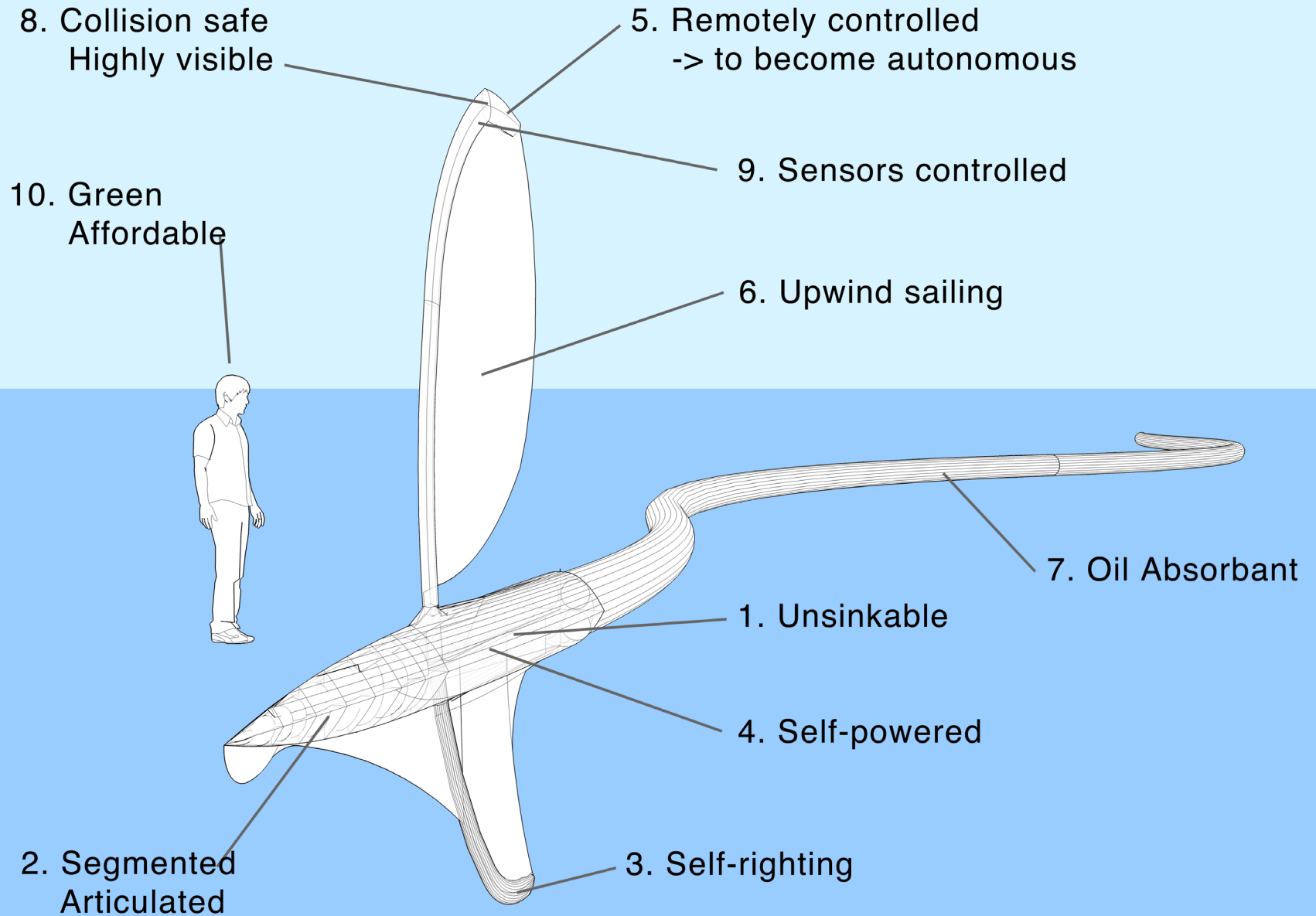
@ Lucid NYC, 2012

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MPS candidate - ITP at NYU



Protei



Gulf of Mexico:

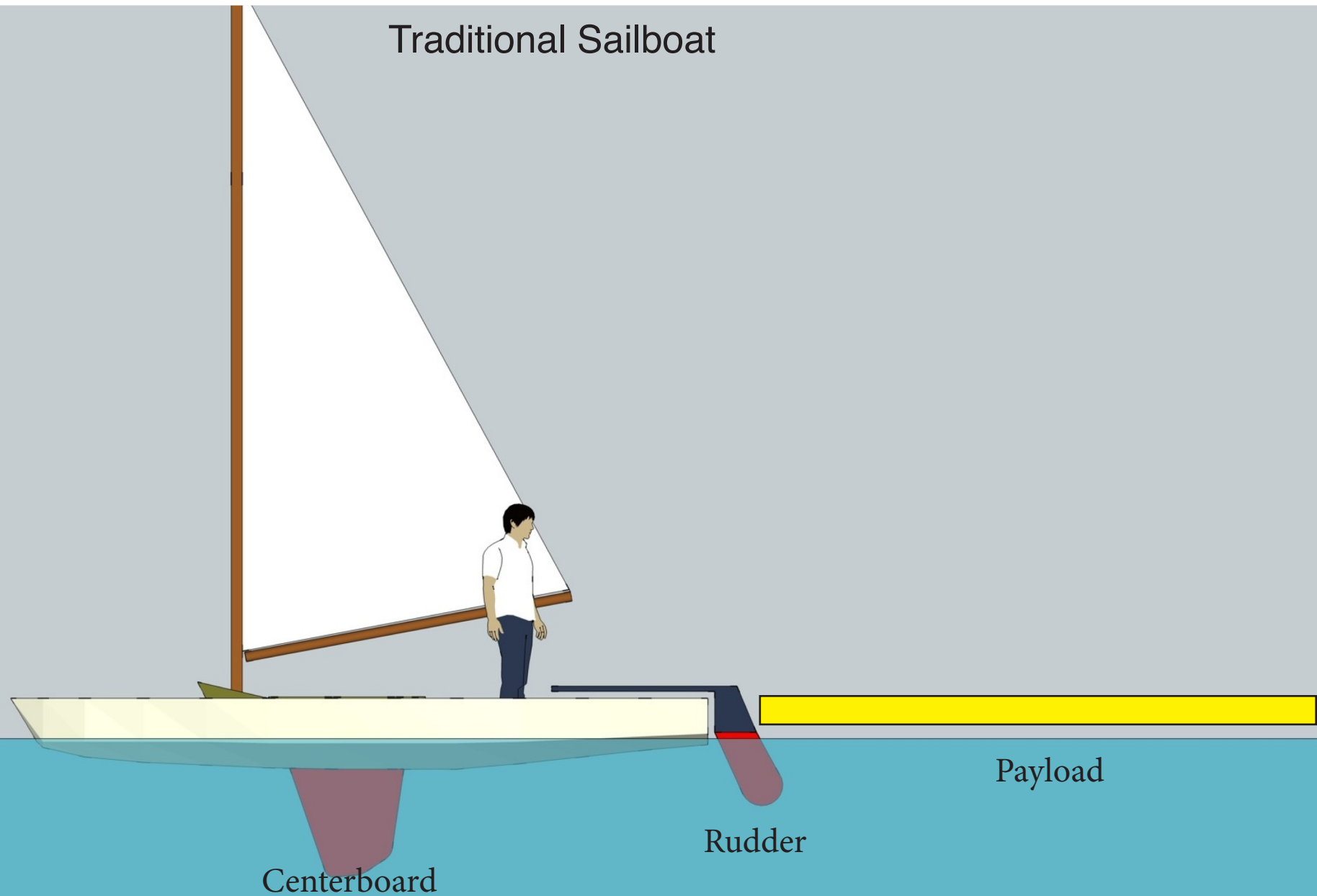
- 20 April 2010
- BP Deepwater Horizon Oil Spill
- Only 3% of oil spill was cleaned*

*ScienceMag.org, 13th August 2010

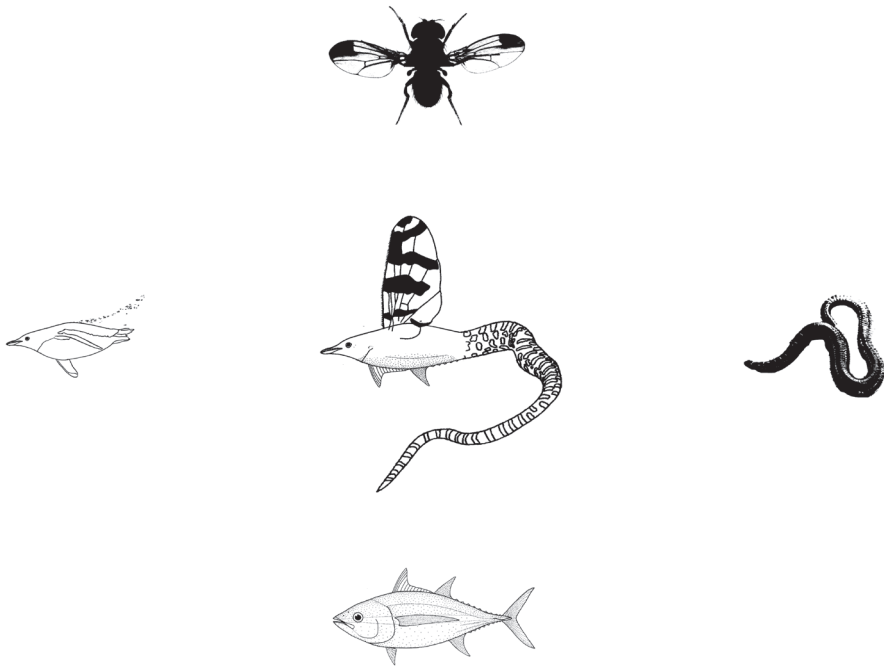


REPURPOSED MANNED FISHING VESSELS	PROTEI GOALS
Exposes crew to health risks and toxins	Unmanned and autonomous
Cannot operate during a storm	Able to operate during extreme weather conditions
Oil sensing limited to human eye sight	Sensing technologies
Not sustainable, environmentally destructive	Sustainable
Expensive	Affordable
Proprietary design	Open-source hardware

Can we achieve better steering with an articulated hull:



Can we achieve better steering with an articulated hull:



Protei mimics animal's articulation for locomotive efficiency



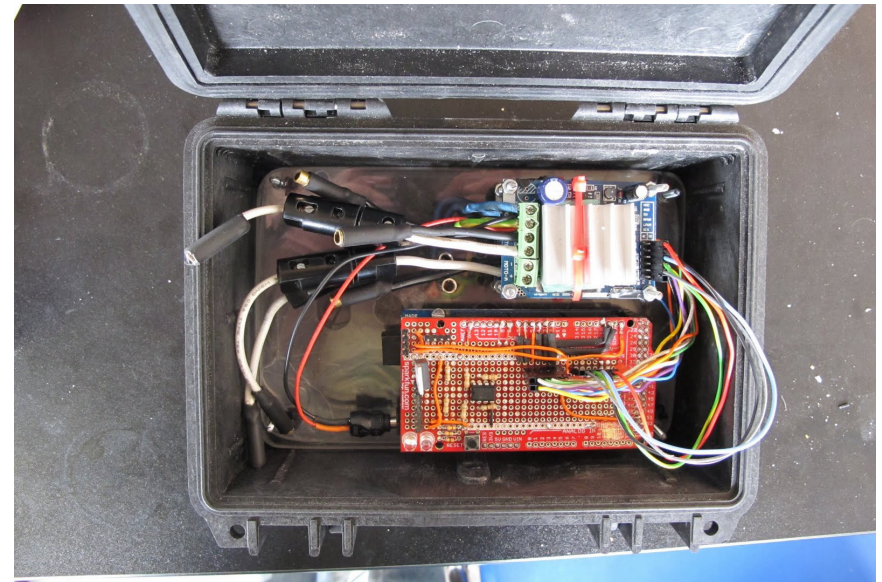
Protei prototype 2

open_source Hardware:

- Shared design
- Document and distribute information
- Anyone can build one
 - low cost design
 - shortens time frame for development
 - credit Protei.org



The Protei Handbook, available in print and online



Main Electronics Box (Arduino Mega)

Collaborative

- Multinational
- open workflow
- fleets of DIY sailing drones



Prototypes:



Protei_001



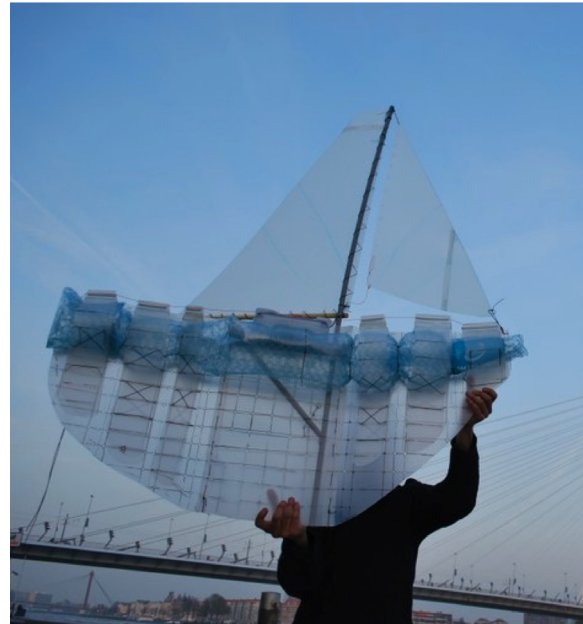
Protei_002



Protei_003



Protei_004

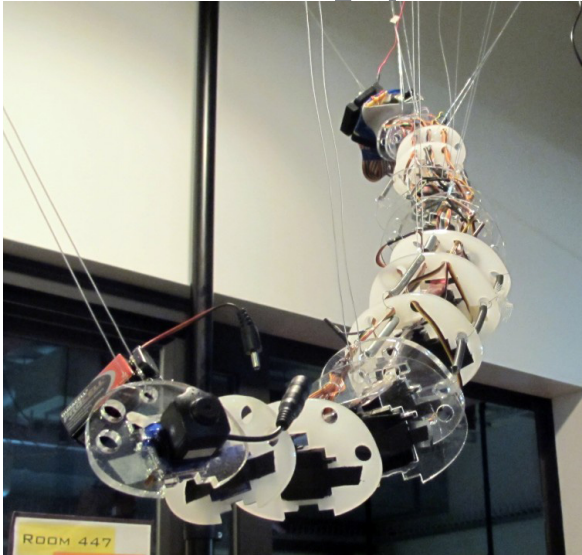


Protei_005

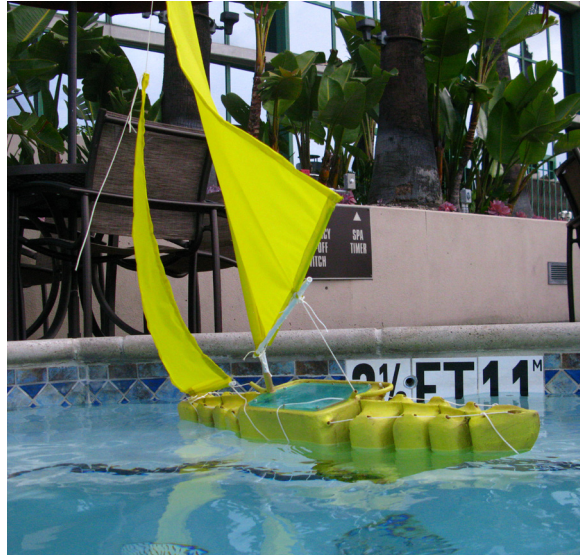


Protei_006

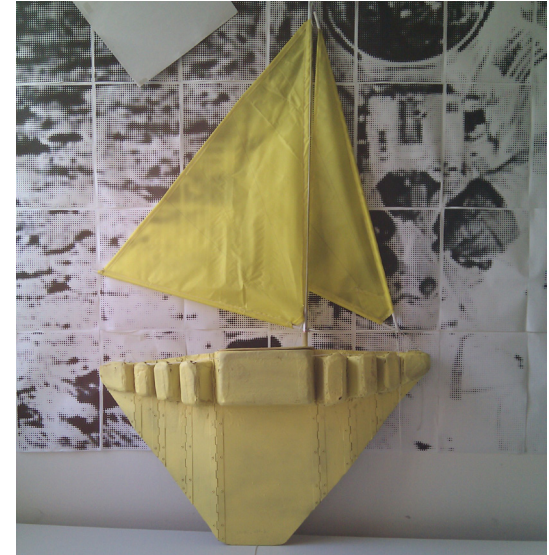
Prototypes:



Protei_007



Protei_008a



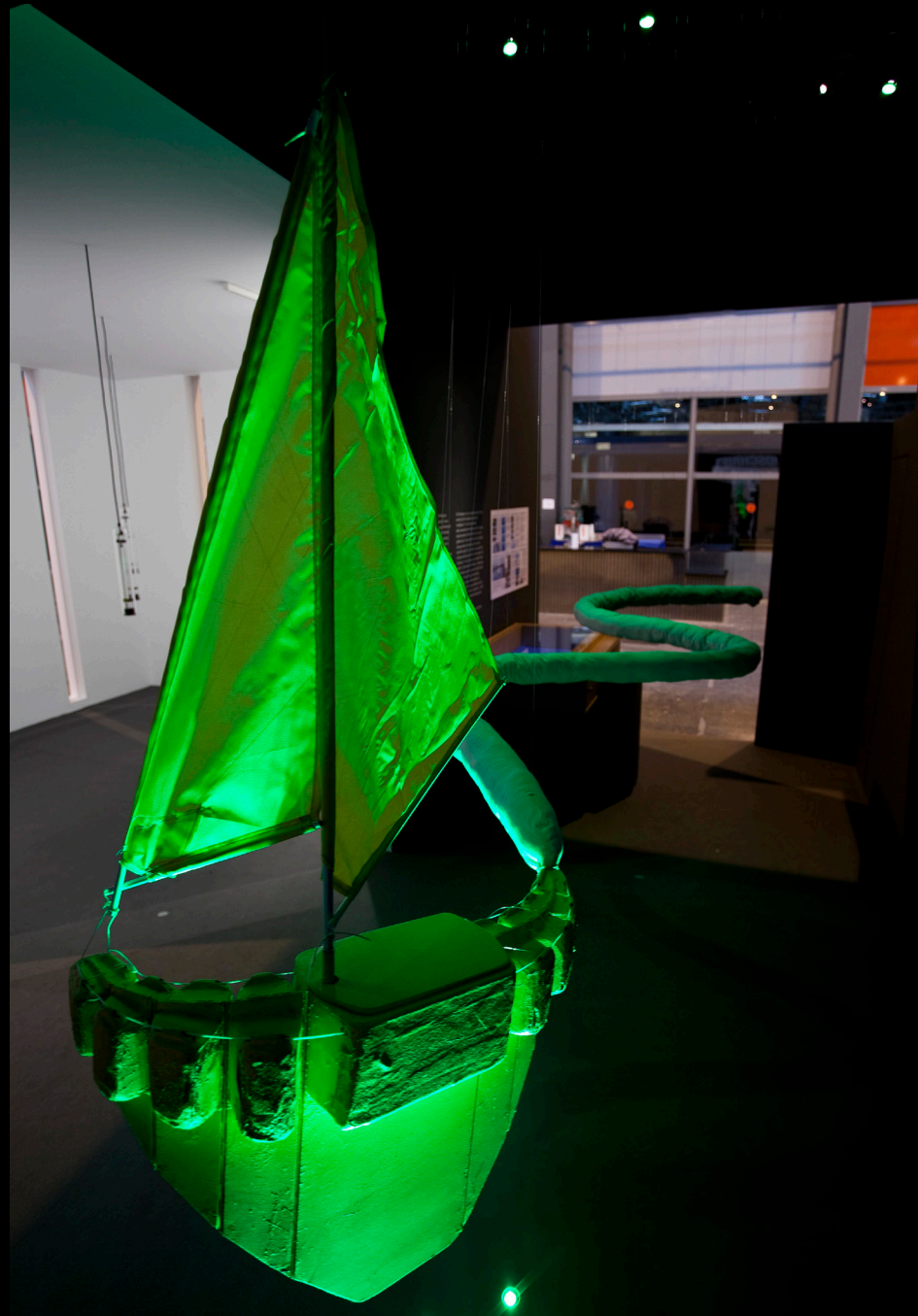
Protei_008b




Protei_009

More coming...!

Protei_008 for manufacture:



Results 2011



Protei
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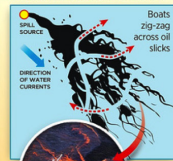
VIDA
Art and Artificial Life International Awards

OIL SPILLS **FN 5 MINUTES**

Robotic ships to the rescue

Nearly one year after the Deepwater Horizon disaster — in which cleanup technologies could only collect 3% of the spill — the environmental organization **Open Sailing** has developed an automated fleet of drones called **Protei** that promises better results at lower cost. Moreover, its open-hardware policy means anyone is welcome to modify, produce, and distribute the design.

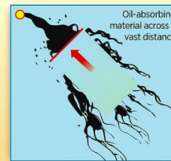
CURRENT SOLUTION



Boats zig-zag across oil slicks

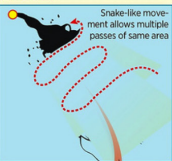
ONLY 3% OF THE SPILL RECOVERED

IDEAL SOLUTION



Oil-absorbing material across a vast distance

PROTEI



Snake-like movement allows multiple passes of same area

3 PROTOTYPES BUILT SO FAR

STEERING IN FRONT
Unlike most boats with the rudder in the back, Protei's rudder is in the front, and its flexible hull bends to turn, just like the movement of an animal.

Open hardware: not owned by one company

WHAT THE DESIGN MUST DO

- Use existing technologies for rapid deployment
- Sail semi-autonomously upwind, intercepting oil sheens going downwind
- Must be:
 - hurricane-resistant
 - able to right itself if overturned
 - floatable
 - unbreakable
 - cheap
 - easy to manufacture

ADVANTAGES

- Unmanned, no human exposed to toxins.
- Green and cheap, sailing upwind capturing oil downwind.
- Able to operate in hurricane conditions.
- Semi-autonomous: can swarm continuously, far from the coast.

NOT JUST FOR OIL SPILLS
The current design is meant for collecting oil, but it could be adapted to collect floating garbage, heavy metals in coastal areas, and toxic substances in urbanized waterways.

THE FLEXIBLE HULL
ALLOWING THE HULL TO HARNESS THE WIND'S POWER, NEVER LOSES THE PULLING POWER REQUIRED BY ITS LONG, HEAVY TAIL.

LARGE, LIGHTWEIGHT SAIL WITH GOOD PULLING POWER

ELECTRONIC SENSORS TO AVOID COLLISION, DETECT WIND DIRECTION AND POWER GENERATED

ABSORBS UP TO 35 TIMES ITS WEIGHT IN OIL

SOURCES: OPENSAILING.NET, PROTEI.ORG

RECHERCHE KIVA ADAMCZYK - INFOGRAPHIE JUSTIN STAHLMAN AGENCY GNY



Protei

Open Source Sailing Drone

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By Open_Sailing, Amorphica, randomwalks
Produced by V2_Institute for the Unstable Media

Version 2011-09-02 protei.org

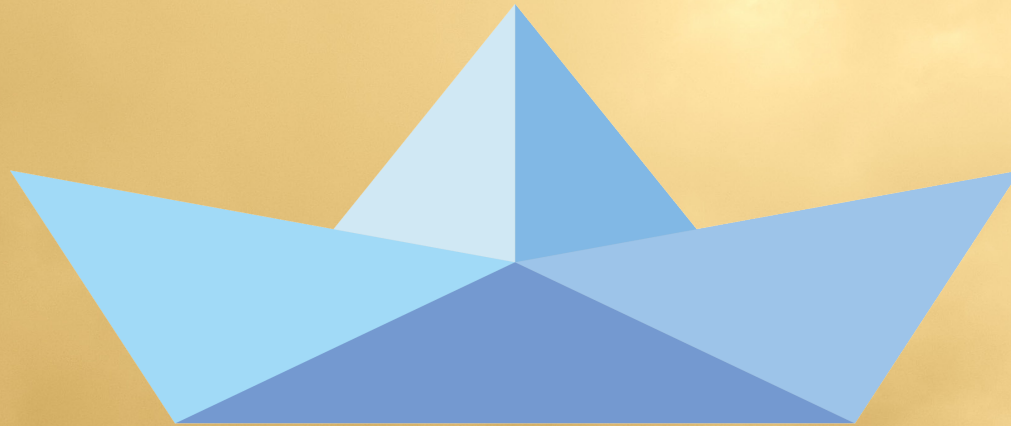


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What is Next?



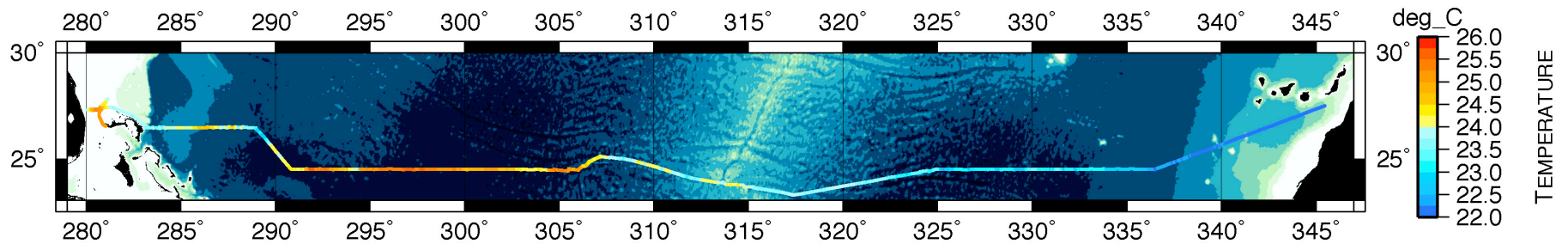
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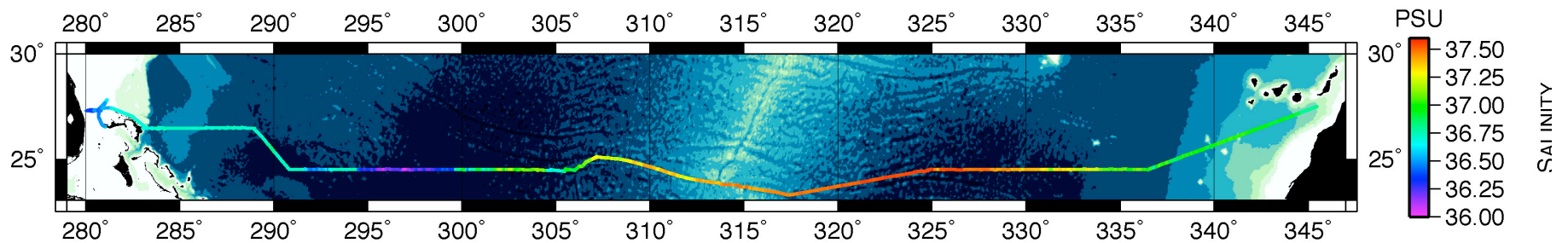


Other uses:

Underway Temperature to 15/02/10



Underway Salinity to 15/02/10



Ocean temperature and salinity data

Other uses:



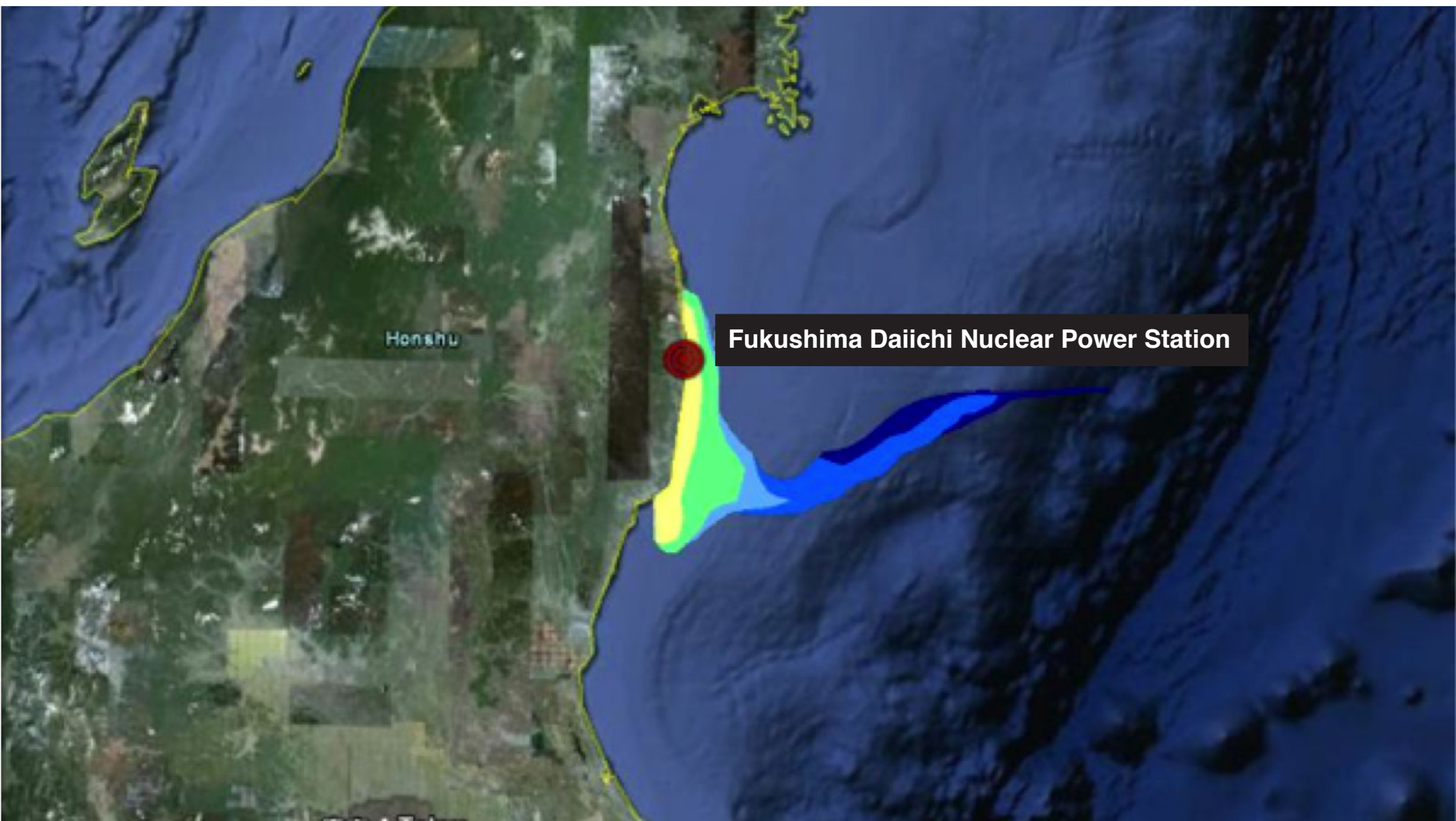
Plastic trash from the Great Pacific Garbage Patch

Other uses:



Fishery monitoring in marine protected areas

Other uses:



Radioactive plume over Japan

2012 Objectives:



RC kits

2012 Objectives:



workshops with kids

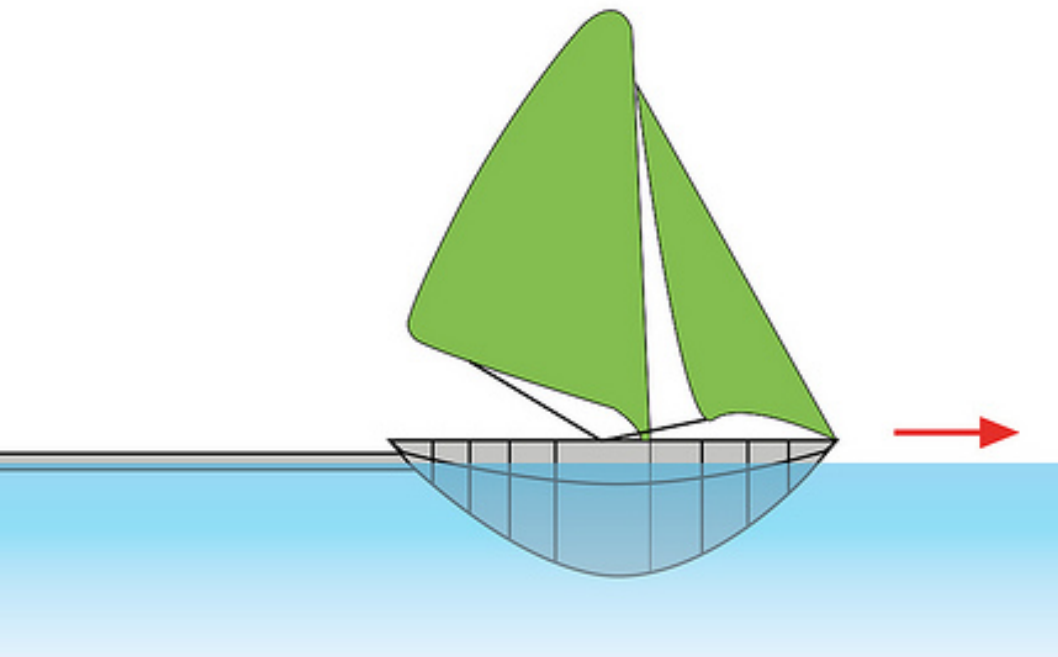
2012 Objectives:



6 meter manned version

2012 Objectives:

- Implementation:
 - Brazil, Japan, San Francisco, Brooklyn
- Economic sustainability:
 - R&D, manufacturing, distribution
- Research topics:
 - Pull tests, Upwind Capabilities

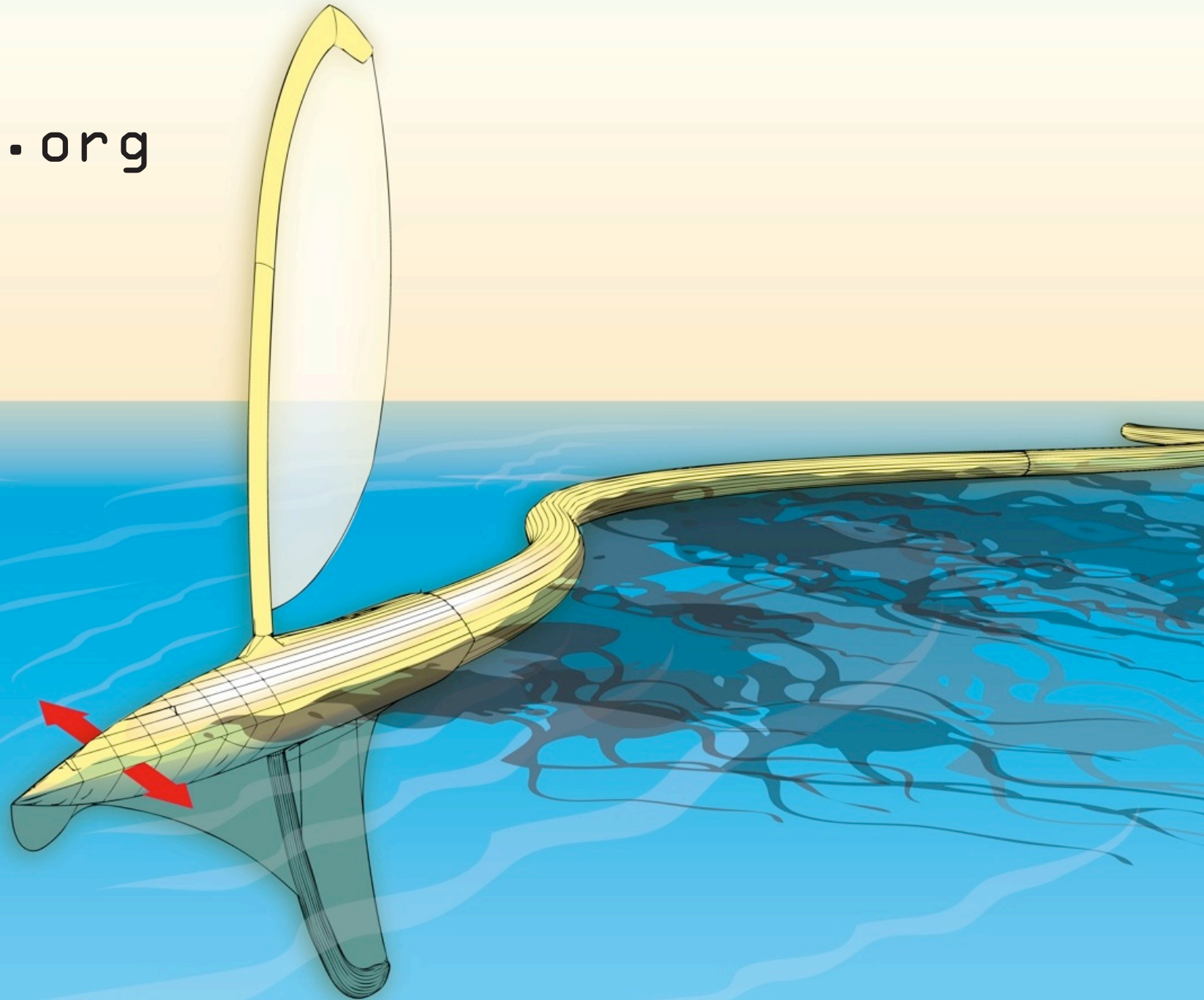


Pulling Tests



Inadequate disaster response

Protei.org



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