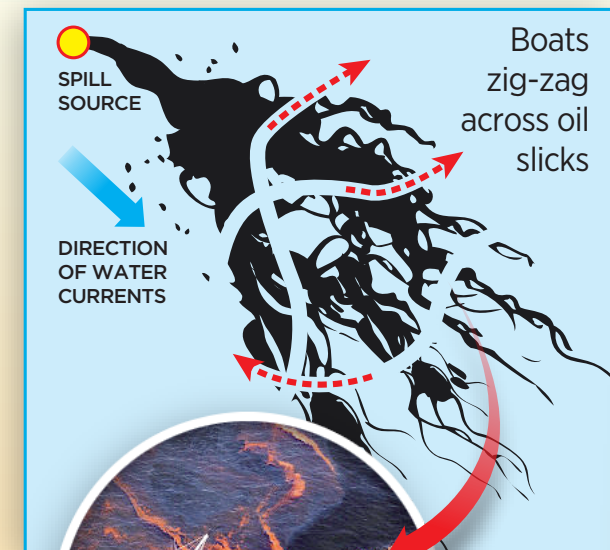


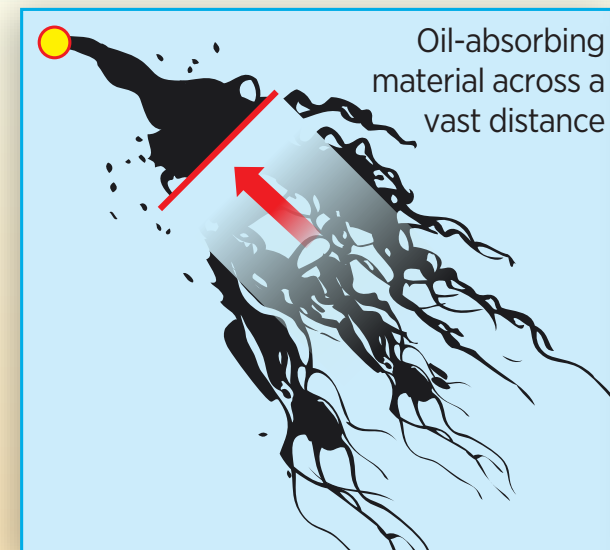
Robotic ships to the rescue

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.

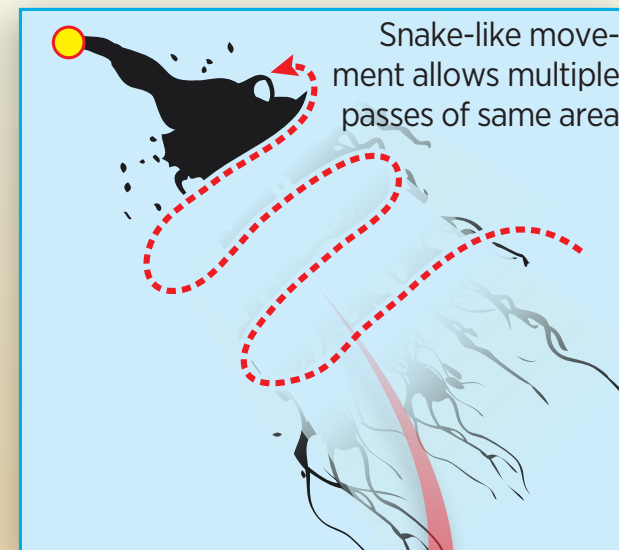
CURRENT SOLUTION



IDEAL SOLUTION

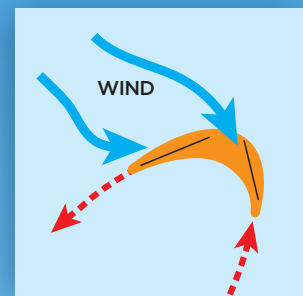


PROTEI

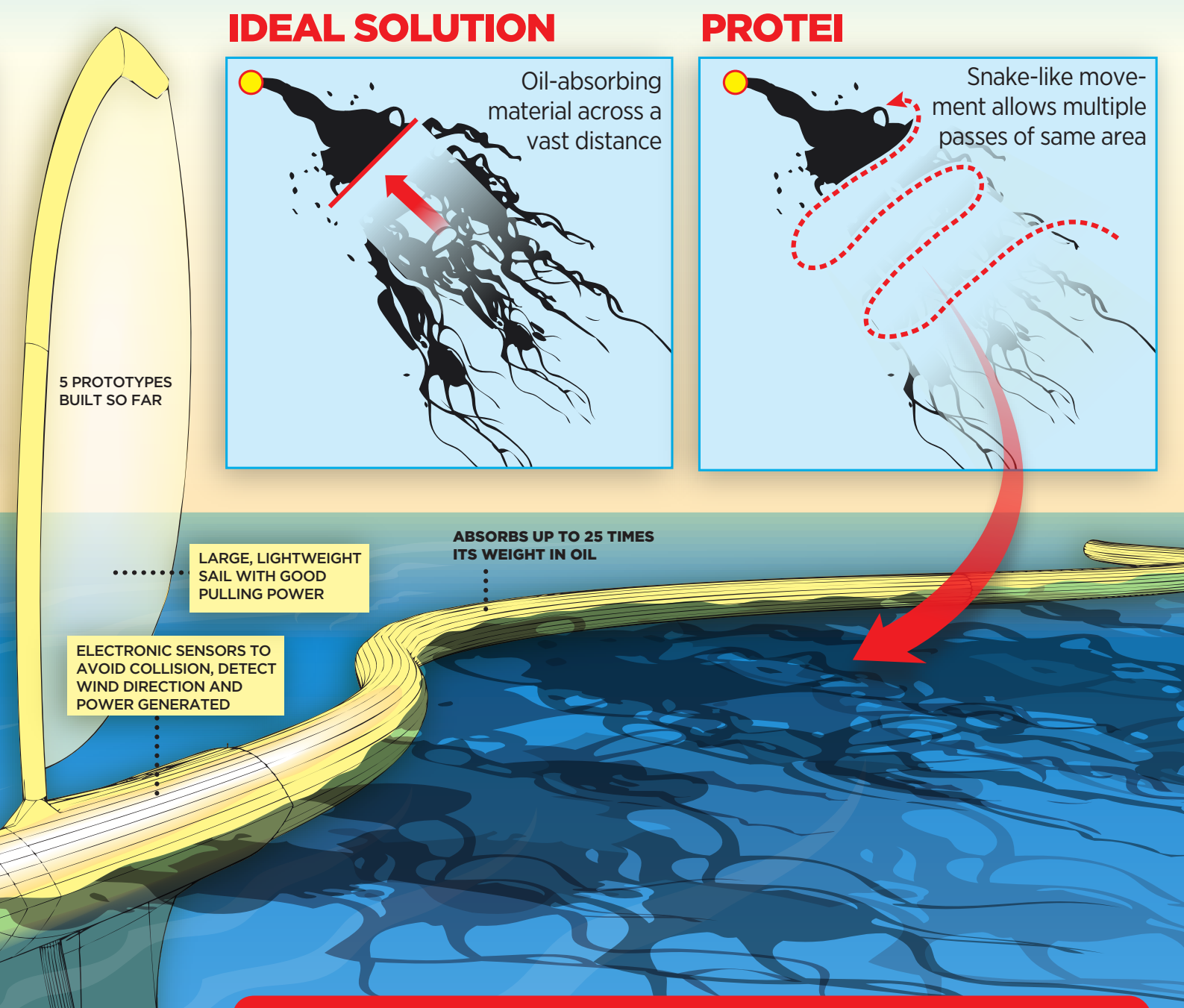


STEERING IN FRONT

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

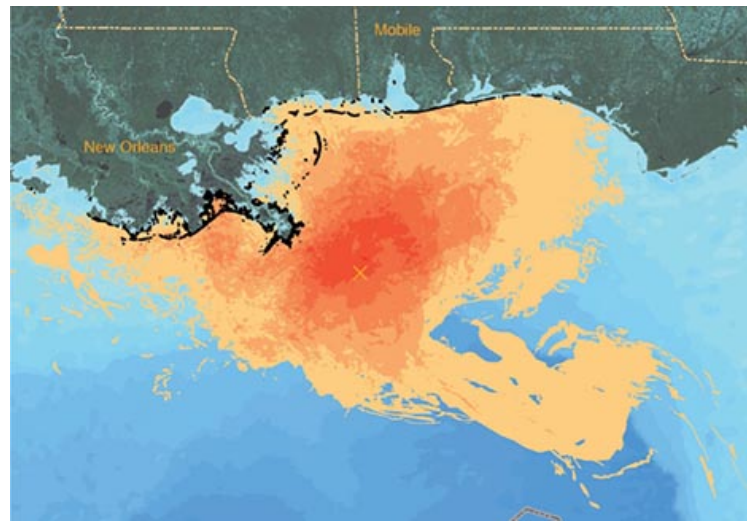
- Use existing technologies for rapid deployment
- Sail semi-autonomously upwind, intercepting oil sheens going downwind
- Must be:**
 - hurricane-resistant
 - able to right itself if overturned
 - inflatable
 - unbreakable
 - cheap
 - easy to manufacture

- 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.



Innovations - Premises



To collect light oil on the surface, repurposed fishing vessels dragged a combination of oil sorbent (white) and oil containment booms (orange). Hundreds of these vessels were deployed by fisherman who exposed their health by manually manipulating the contaminated booms. They would visually spot oil and they would not be able to operate at night, far from shore nor in rough weather conditions.



While this oil was made-man disaster, but the way it behaved depended on natural forces. Oil spilled at sea spreads and drifts downwind under the influence of surface currents. We believe that the most efficient use of an equivalent length sorbent would push it upwind to capture the oil.



A solution would be to drag successive layers of sorbent dragged upwind, capturing oil drifting downwind. But it is very difficult to move such a large unstable structure against the strong wind and surface currents.

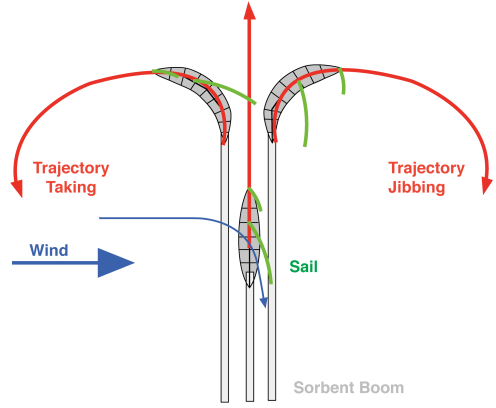


The initial concept for Protei was to pull a long oil absorbent boom behind a sail boat that would track upwind, capturing the oil drifting downwind in the successive folds of sorbent.

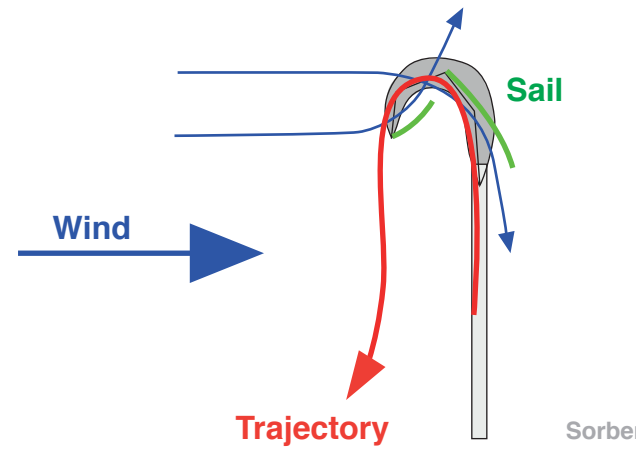
Using the power of nature to remediate a man-made disaster.



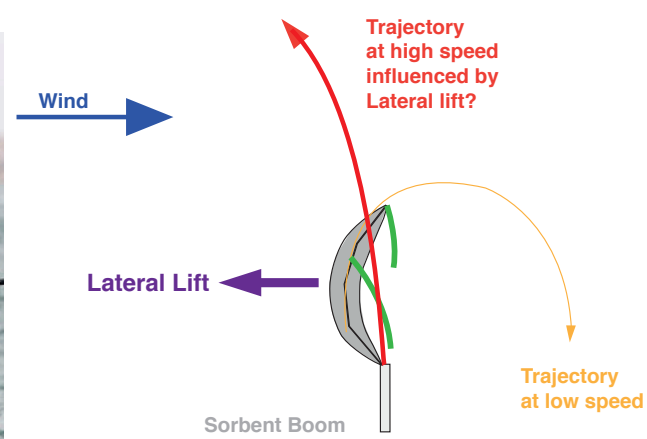




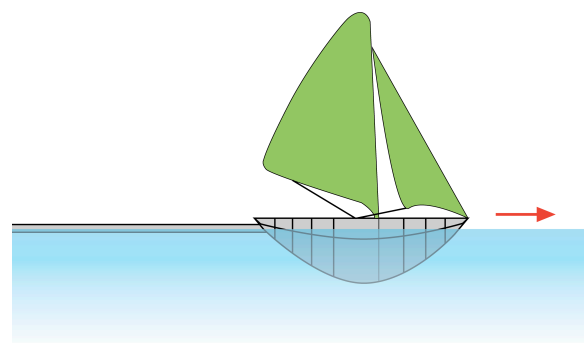
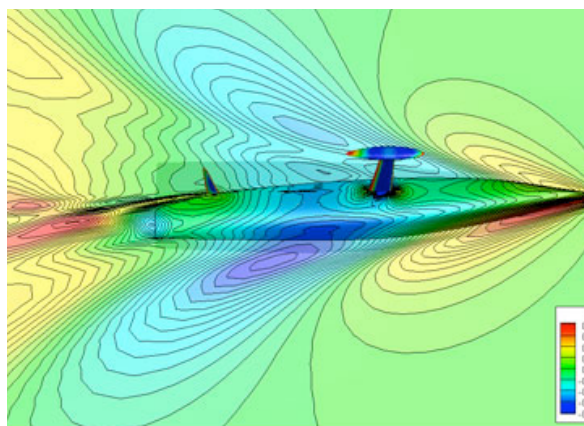
The invention of the curved hull is introducing many new innovations. It provides better **trajectory control** and reduces the turning radius. By causing the hull to curve Protei turns. Curving the hull displaces the center of gravity and the center of floatation outside the volume of the hull providing more **dynamic stability**.



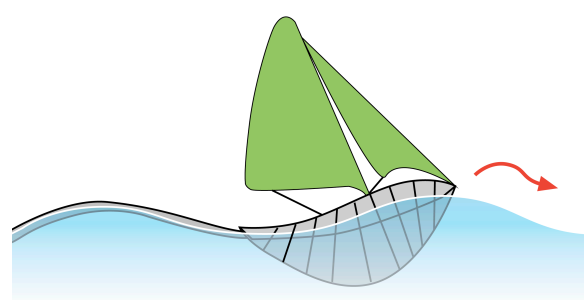
By having a main sail and a jib on a boat that curves means that the relative angle of these sails will change when turning. When tacking the jib catches the wind faster. When jibbing the main sail switches side faster. One of the major advantages of a curved hull is that both sails can never be in irons at the same time, which means you have **constant pulling power** from the sail to pull something long and heavy. (oil absorbent boom / scientific payload).



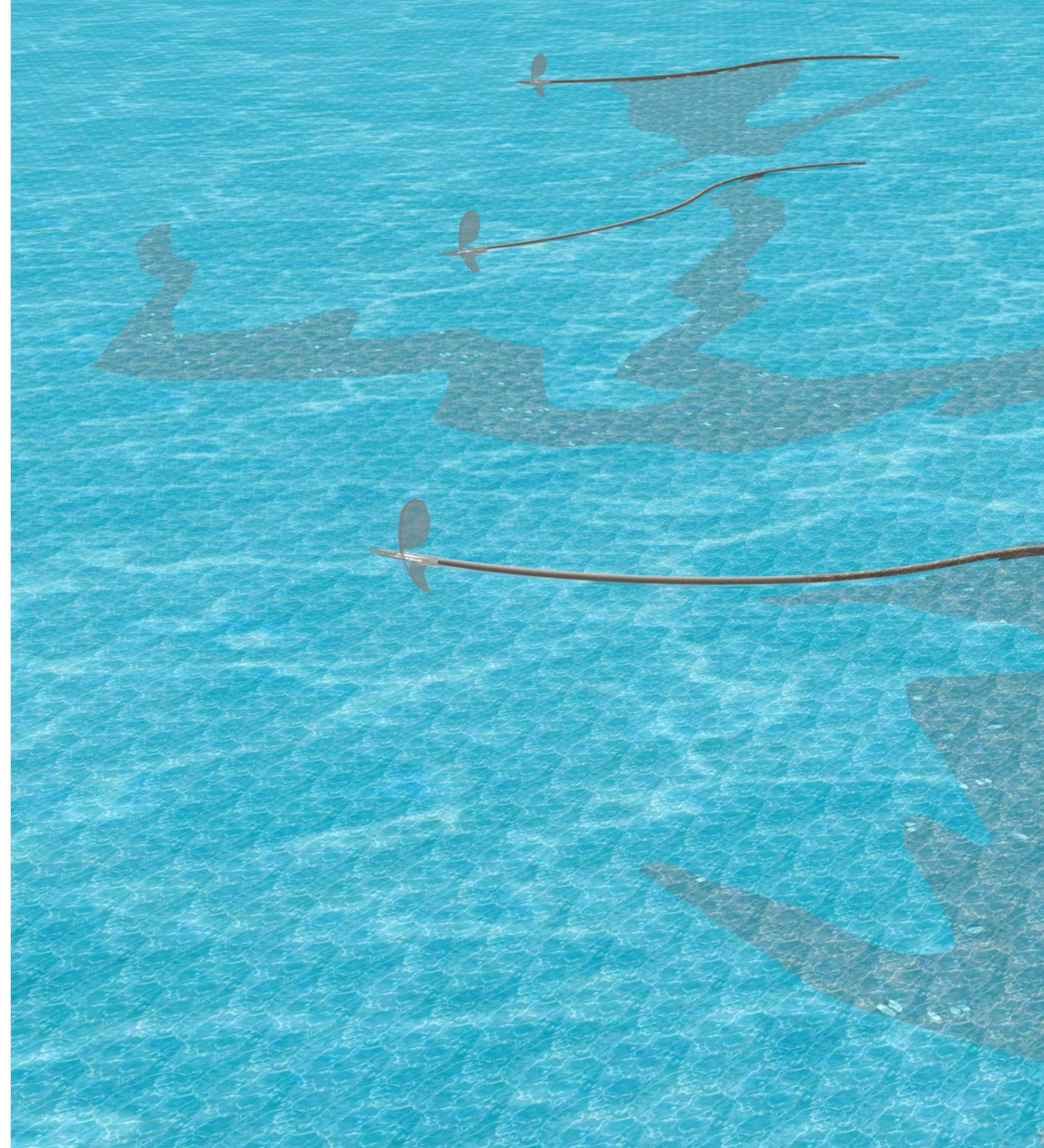
At sufficient speed a curved hull may acquire hydrofoil properties. Instead of vertical lift Protei could produce **lateral lift** meaning the possibility of sailing closer to or further away from the wind therefore more relative motion to the wind and more speed.



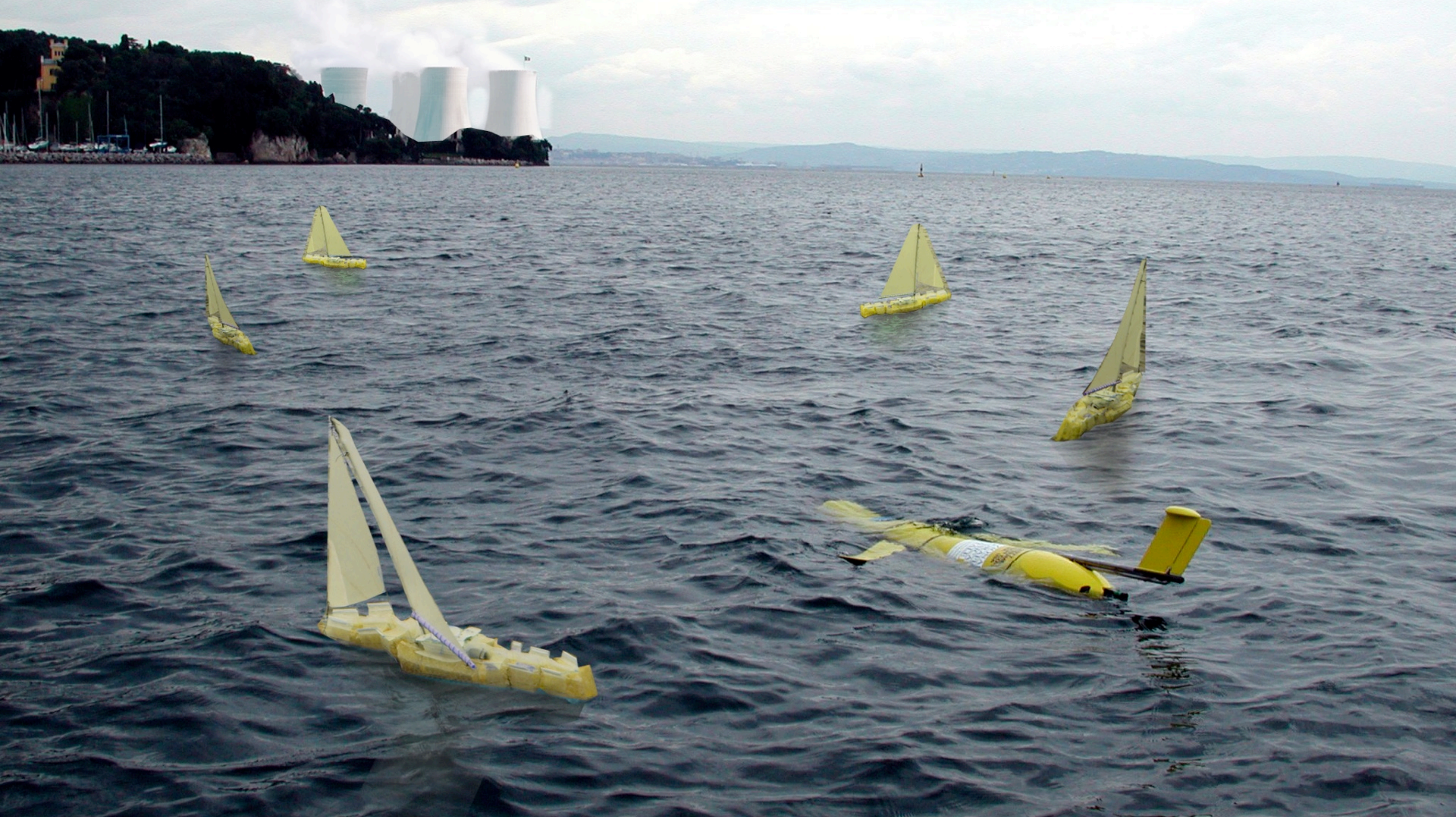
A conventional displacement boat has a centerboard and a rudder as appendages. By Protei's shape shifting hull being the centerboard and the rudder it creates **less friction and turbulence**, which we hope will achieve greater speed.



A conventional rigid hull hits the water at every wave whereas Protei's flexible hull **follows the motion of waves**. By reducing the impacts of waves, do we gain stability and speed?














	Mechanic	Physics	Electronic	AI	Admin	Communication
2012 Winter	Build Protei 1m RC	Design experiments	Test components for 1m Arduino	Design for scalability	Academic, Profit, Non Profit, IP	Networking
2012 Spring	Build Protei 1m Arduino + Android	Build Protei 6m manned	Build and lab test experiments	Build 1m Arduino + Android	Fundraising, Grant writing	Prepare launch event
2012 Summer						
2012 Autumn	Optimize Protei 1m RC for mass production	Design experiments	Protei 1m Arduino + Android	Protei 6m Arduino + Android	Manufacturing, Transport, distribution	Prepare Product Launch
2013 Winter	Protei 1m	Protei 6m	Build and lab test experiments		Fundraising, admin, sales.	Prepare Product Launch and distribution
2013 Spring						
2013 Summer			Outdoor test		Fundraising	Launch 1m Arduino + Android
2013 Autumn			Design experiments		Manufacturing	
2014 Winter			Lab test	Web App (Browser control)	Fundraising	Launch 6m Arduino + Android
2014 Spring			Analyze, write	Mobile App (phone tablet)		
2014 Summer			Outdoor test	Protei 1m Arduino + Android	Recruit, scale up, Strengthen network and operations	Marketing, Sponsorships Partnerships Investors
2014 Autumn			Design	Protei 6m Arduino + Android		
2015 Winter			Lab test			
2015 Spring			Analyze, write			
2015 Summer			Outdoor test			
2015 Autumn						

Milestones




Prototype A release of Protei 1m Remote control. We can start operations at this stage. We produce a small series affordable Protei and start experimenting in the field doing environmental sensing, experiment with swarm control, and send basic Protei to our partners abroad to "play with" and publish.

Prototype B release of Protei 6m manned. **Prototype C** release of Protei 1m Arduino + Android. Big Protei launch and fund-raiser event on the USA West Coast (San Francisco Bay Area, Monterrey)

Product A release of Protei 1m Remote Control. Ready for Christmas! We use regular toy fabrication, transport and distribution network + Open Hardware.

Product B release of Protei 6m manned. Ready for the summer! We use regular canoe fabrication, transport and distribution network.



Prototype D release of Protei 6m Android + Arduino. **Product C** release of Protei 1m Arduino + Android.

Product D release of Protei 6m Android + Arduino.

Prototypes C D new generations
Products A B new generations

Prototypes A B new generations
Products C D new generations

instructables share what you make

You [Inbox \(0\)](#) [Shortcuts](#) [Logout](#)

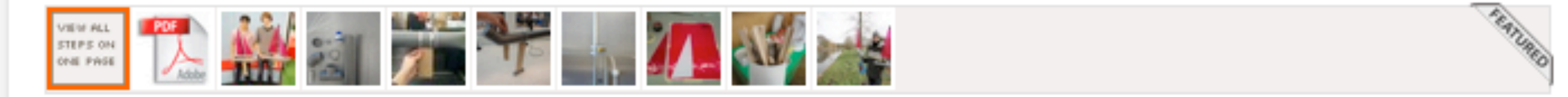
[Forums](#) [Contests](#) [Q & A](#) [submit](#)

[Food](#) [Living](#) [Outside](#) [Play](#) [Technology](#) [Workshop](#) [STORE](#) [Go](#)

[Boats](#) [Kites](#) [Water](#) [Bikes](#) [Camping](#) [Knots](#) [Skateboarding](#) [Survival](#) [Snow](#)

Fun & easy sailboat [Protei 009.1]

[Print PDF](#) [Favorite](#) [Email](#) [Facebook](#) [Twitter](#) [Flag](#)



16 Followers [Following](#) [2](#)

Author: [PRO frits297](#)
 Hi, I'm currently doing my Master in Industrial Design. I appreciate the idea of sharing and building cool things together.

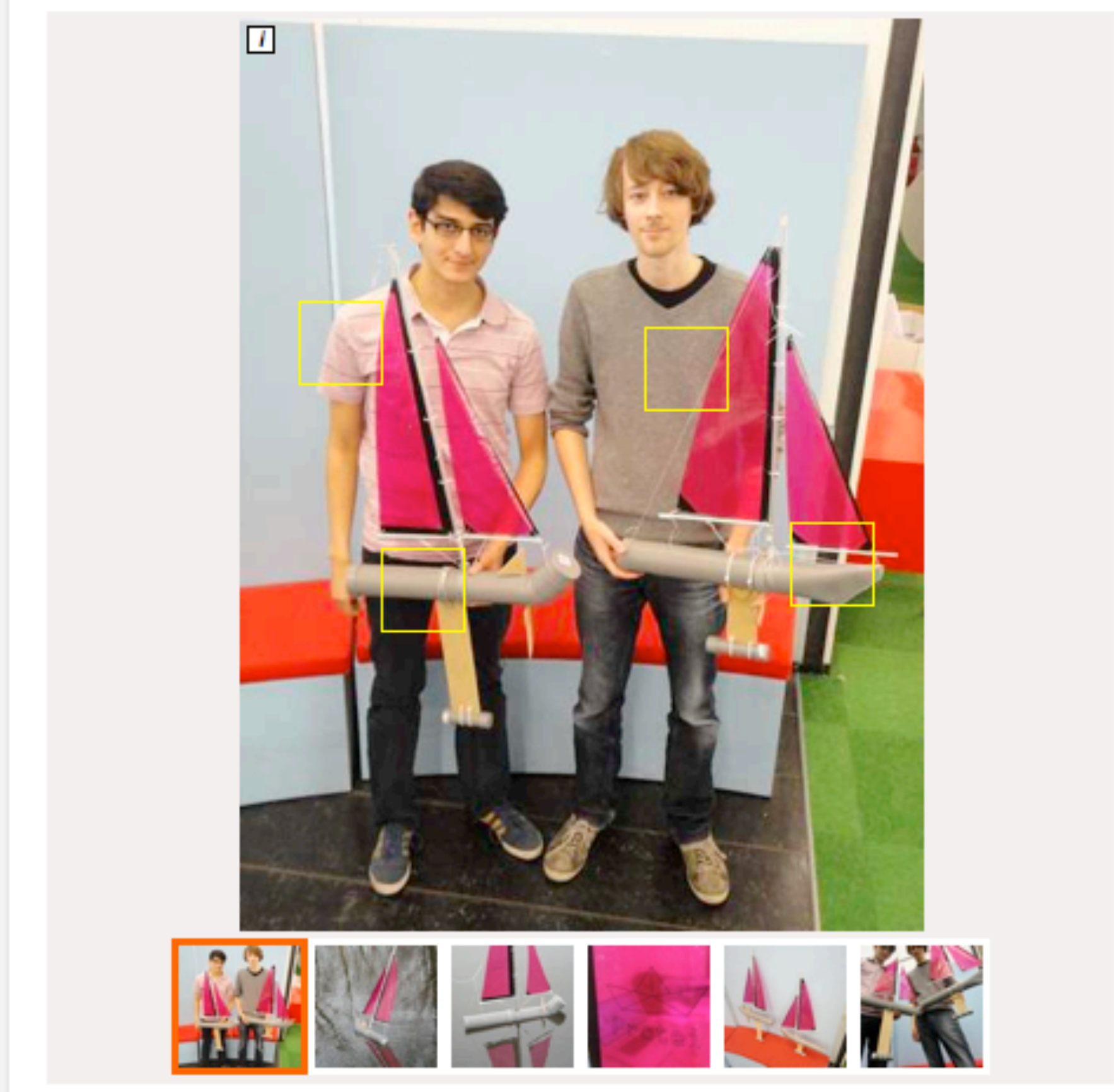
Info **Stats**



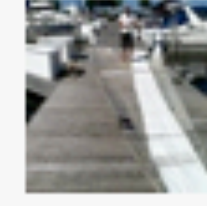
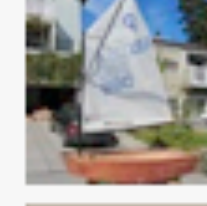

★★★★★
4.44 (4 ratings) **9,646** views

16 Followers [Following](#)

Author: [PRO frits297](#)
 Published: Feb 15, 2012
 License: [CC BY-NC-SA](#)

Related: [protei](#), [sailing](#), [yacht](#), [boat](#), [ship](#), [sail](#), [rc](#), [wind](#), [oil](#), [bp](#)



- Related**
-  **Free Yacht Chapter 11: Dismasted!** by TimAnderson
 -  **Trip Log: Outrigger Canoe Sailing the California Channel Islands** by TimAnderson
 -  **repairing a headsail** by josh
 -  **Optimist sailboat build** by superdave.morris
 -  **Model Yacht Building** by Model Yacht Building



instructables share what you make

You Inbox (0) Shortcuts Logout

Forums Contests Q & A **submit**

Food Living Outside Play Technology Workshop **STORE**

Google Custom Search **Go**

Robots Arduino Remote Control Software Apple 3D Printing CNC Electronics Lasers See More »

START VOTING!
We have 13 prizes, so please vote for more than one winner!



CONTEST ENTRY IN:

WIN A SHOPBOT CHALLENGE ENTER NOW

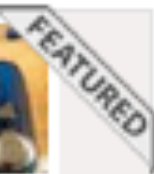
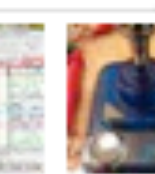
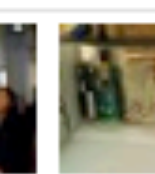
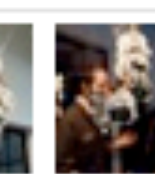
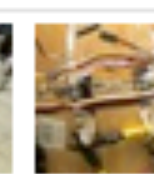
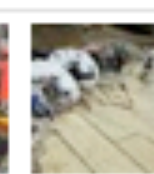
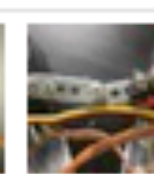
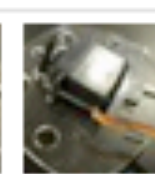
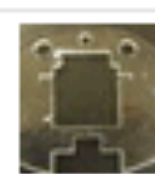
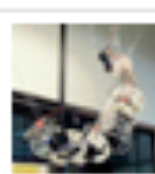
IS THIS A WINNER?

Vote

PROTEI_007

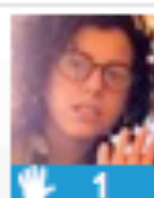
Print PDF Favorite Email Facebook Twitter Flag

VIEW ALL STEPS ON ONE PAGE



FEATURED

4 Followers



Author: **PRO** [gabriellalevine](#)

Follow

1

Info **Stats**

★★★★☆
4.36 (3 ratings)

5,846 views

4 Followers

Author: **PRO** [gabriellalevine](#)

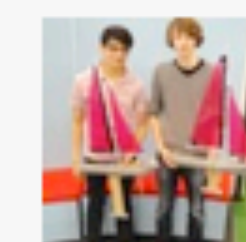
Published: Feb 6, 2012

Follow

License:

Related: [boat](#), [protei](#)

Related



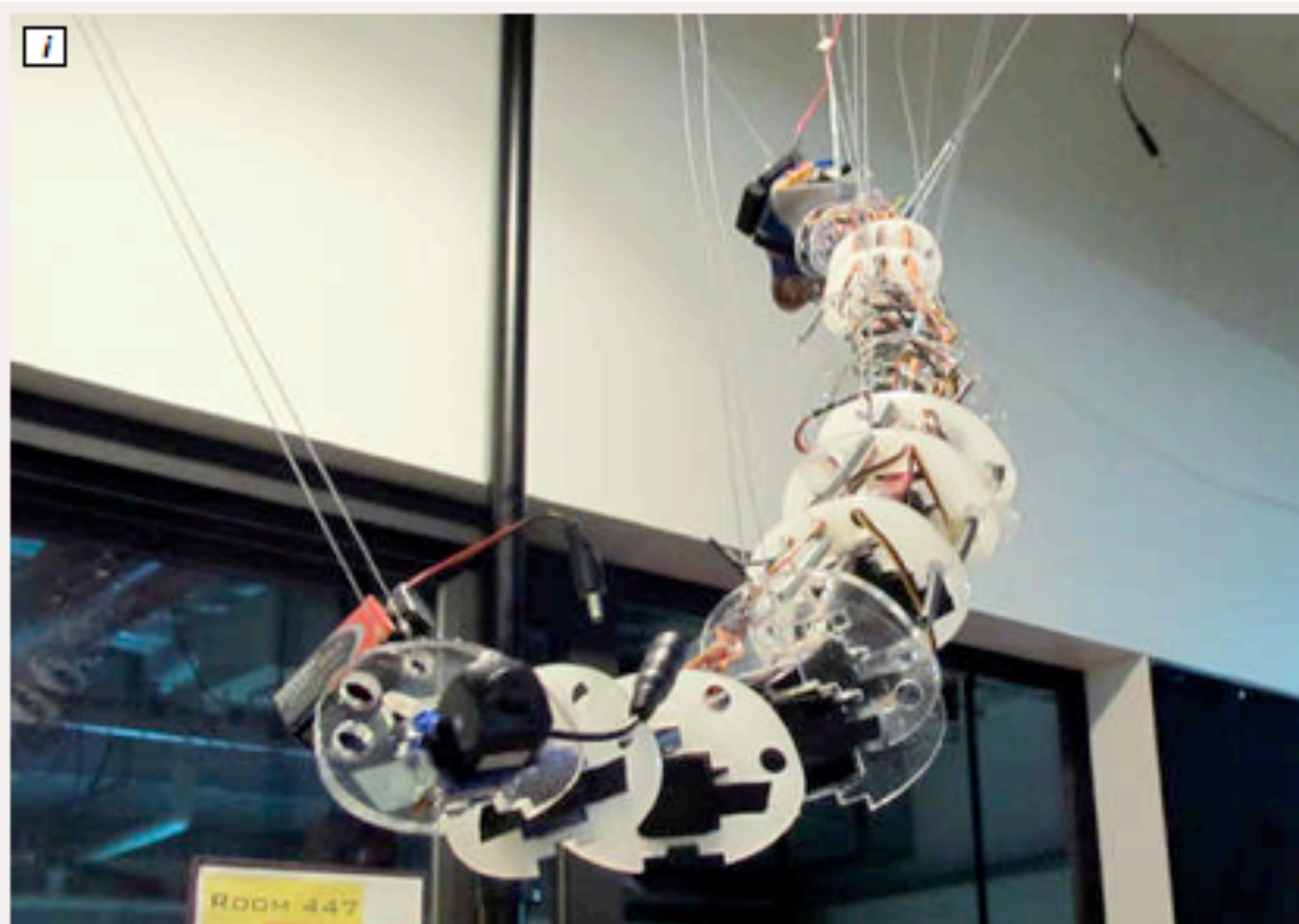
Fun & easy sailboat [Protei 009.1]
by frits297

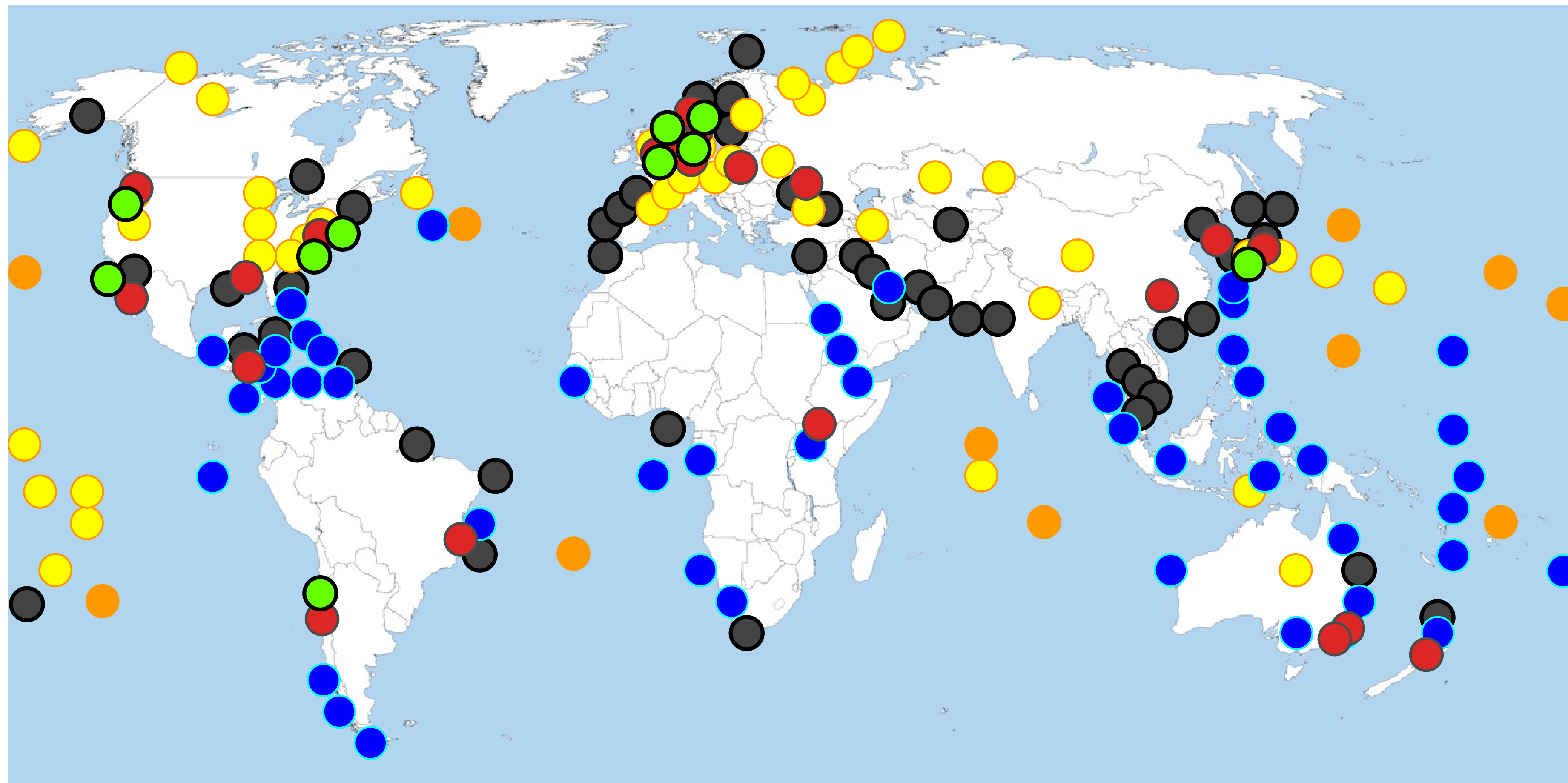


Build a robot boat using water bottles
by XicoMBD



Smooth Boat on ACAD 2000
by swany34





● Major Oil Spills, Spill risk

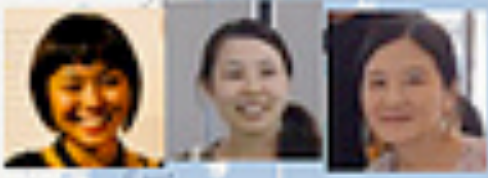
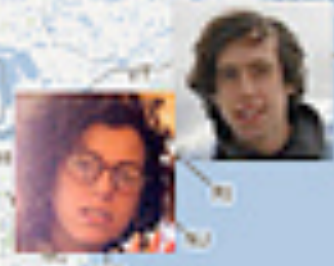
● Radioactive contamination / risk

● Plastic Debris Accumulation

● Overfishing, protected areas

● Protei Team and Collaborators

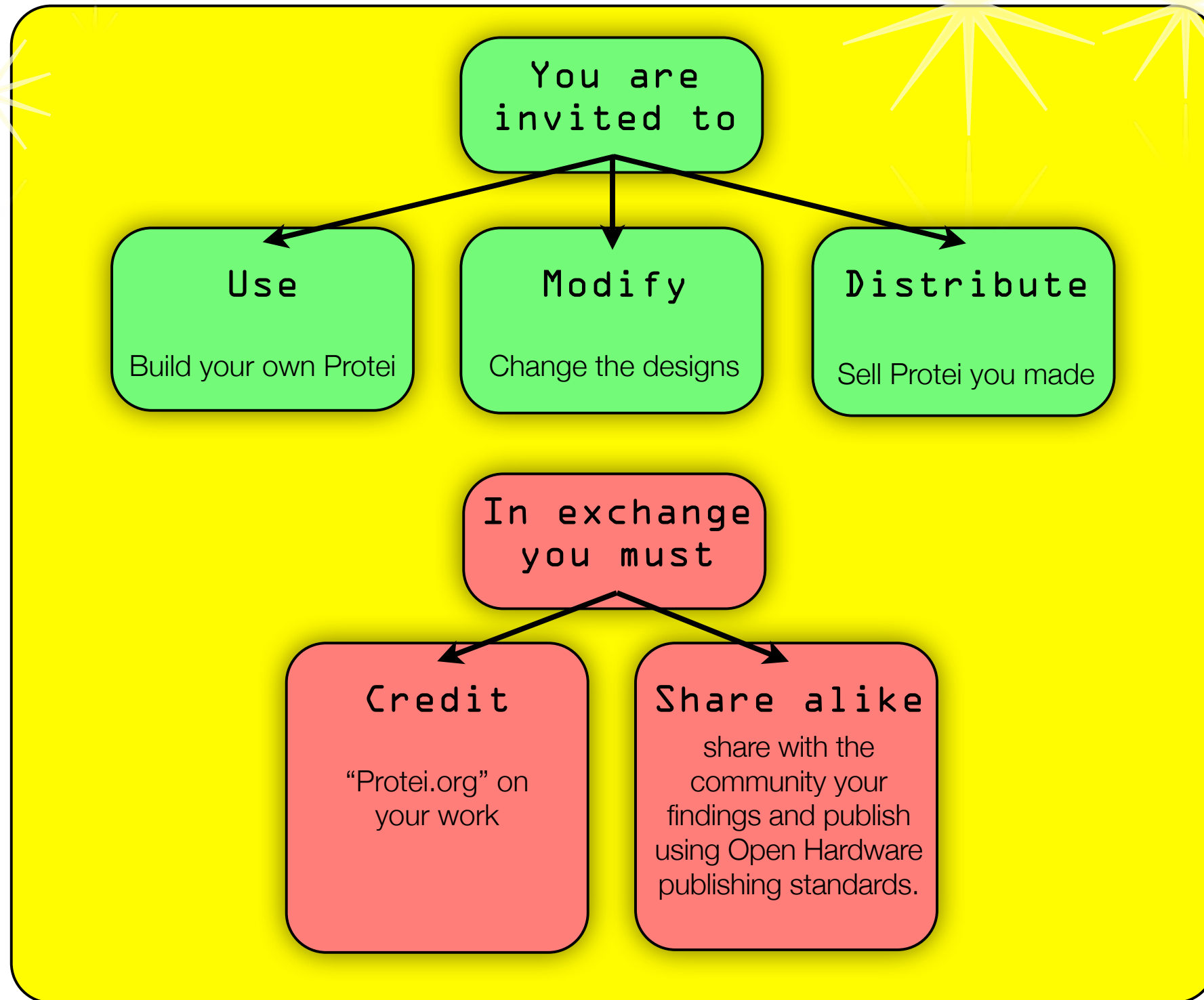
● Protei Prototyping facility



Multi-licensing

Non commercial use of Protei : Open Hardware

Golden Rules. Propagation of ownership.



Currently Protei uses a set of open source licenses to define the intellectual and industrial property of the innovations and artifacts we produce. These recent licenses are existing communities that are very dynamic and easy to collaborate with. These standards ensures that the technology propagates while preserving the originator authorship of Protei .



Object, mechanical design

open hardware

Documentation, texts, photos, videos, communication materials

Creative Commons BY-SA

Source code

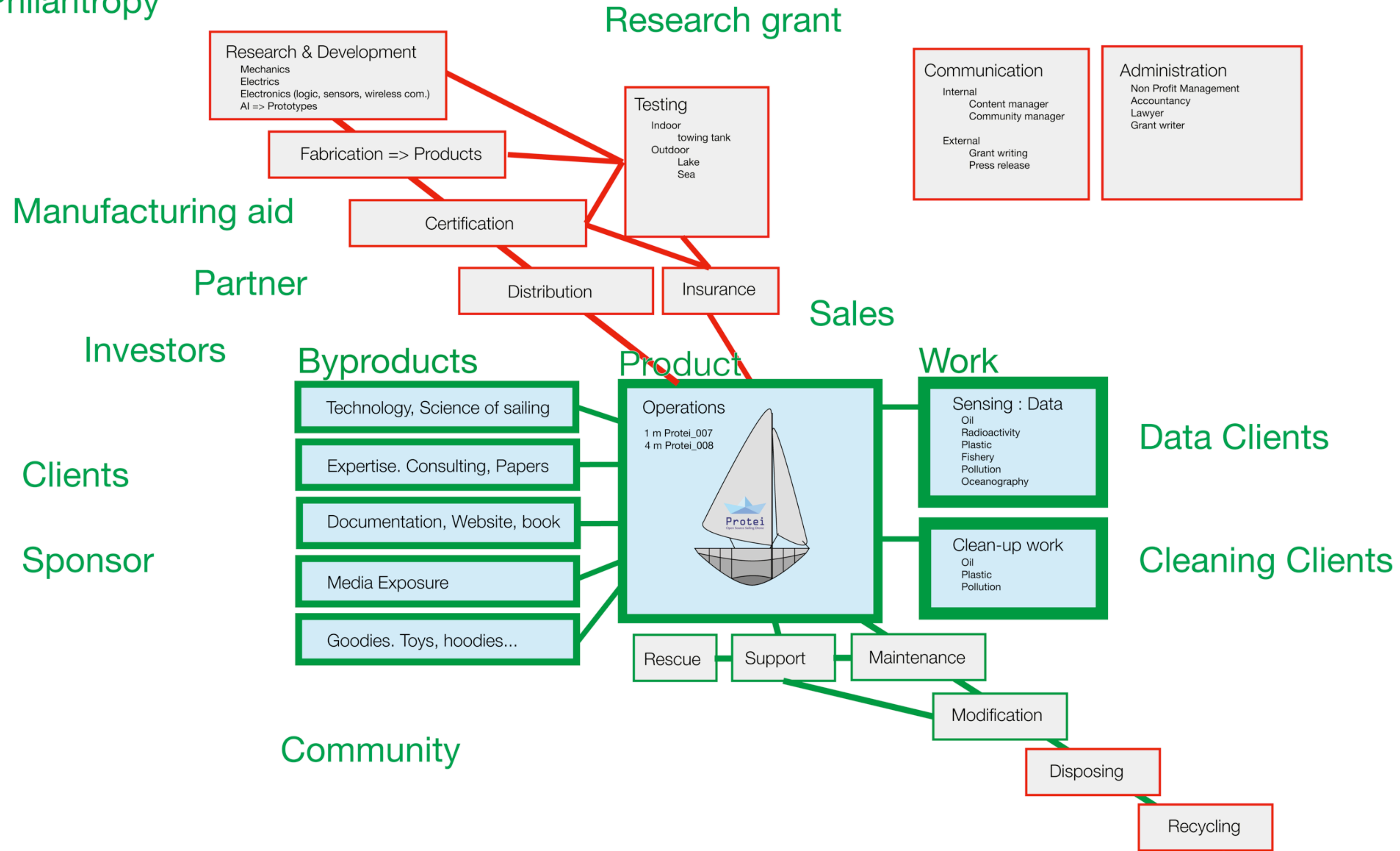
GNU General Public License, version 3 (GPL-3.0)

Name, trademark

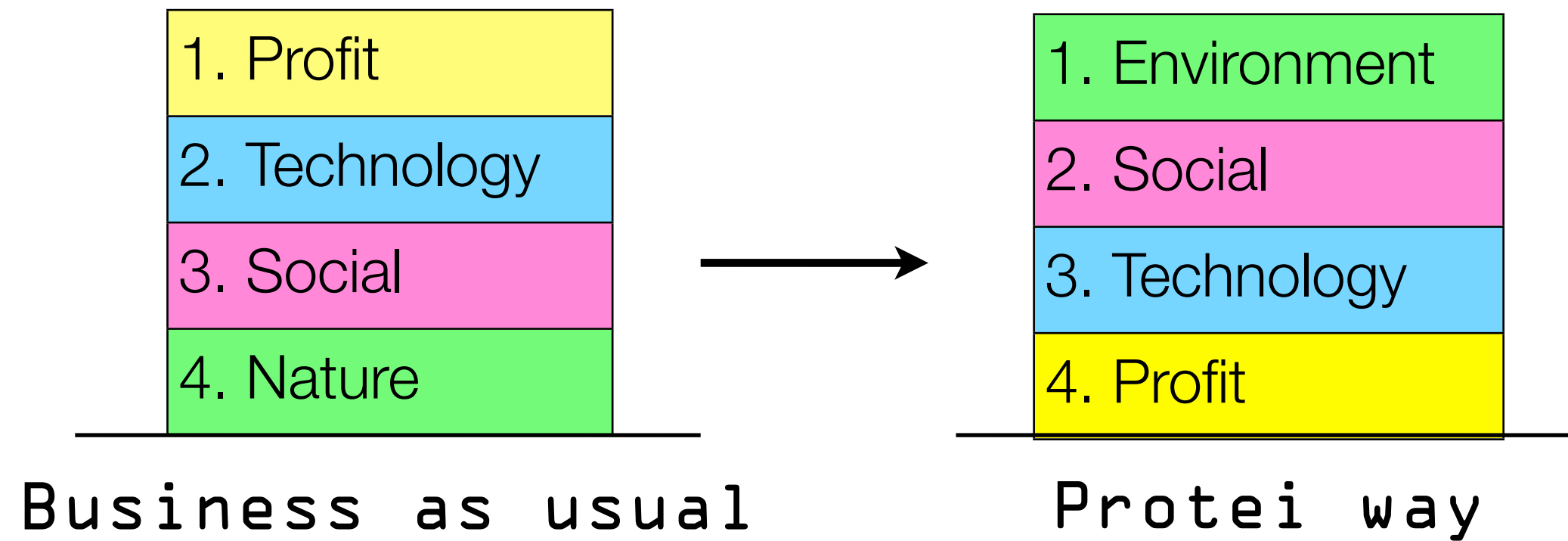
US trademark regulation #85339997

Process with cost VS product or service we can sell

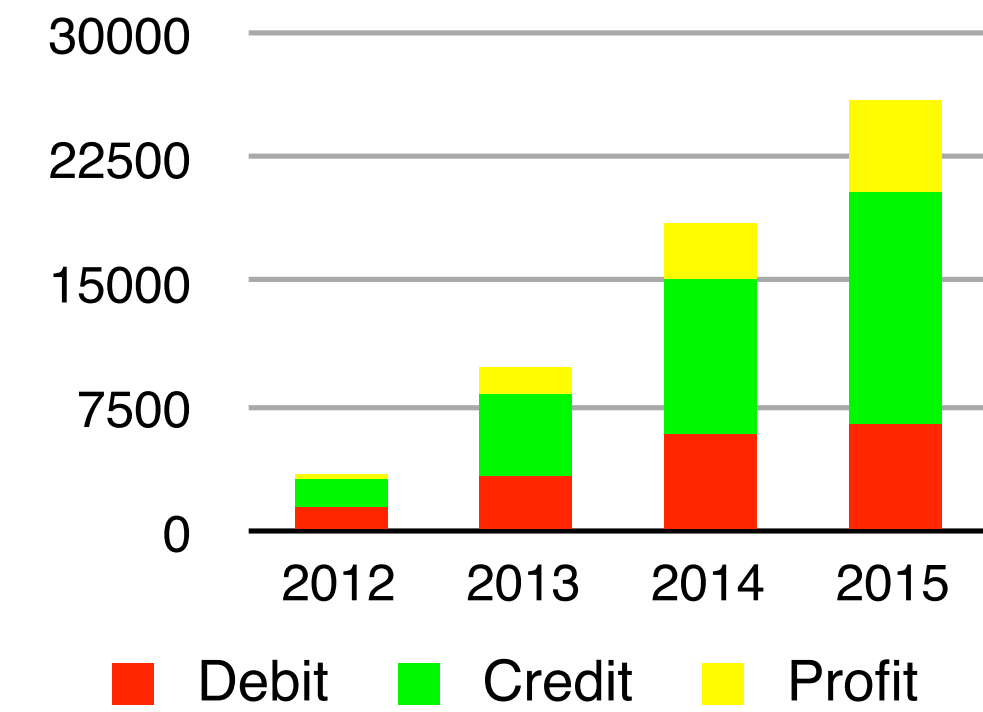
Donations (tax deductible)
Philanthropy



Projected growth & Ethics



	2012	2013	2014	2015
Debit	1420 k€	3320 k€	5850 k€	6420 k€
Credit	1695 k€	4920 k€	9280 k€	13975 k€
Profit	275 k€	1600 k€	3430 k€	5555 k€
Growth rate	-	+ 481%	+ 114%	+62%

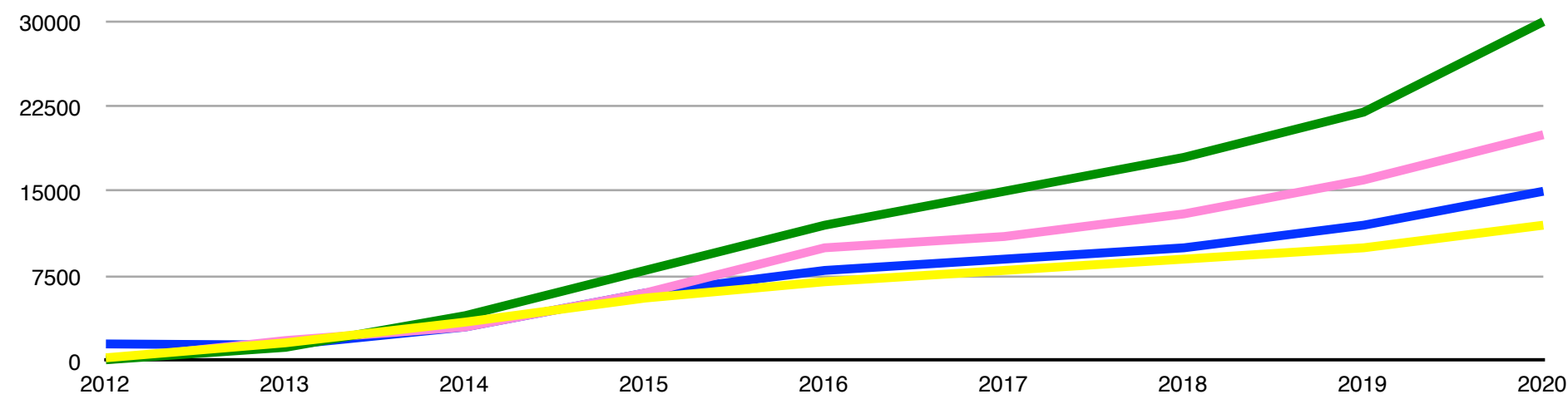


2012: Most of the revenues in 2012 are coming from sponsors and investors. We do not have a machine that is fully functional yet, but we have very exciting prototypes and many brands want to be part of this adventure at the very beginning of it.

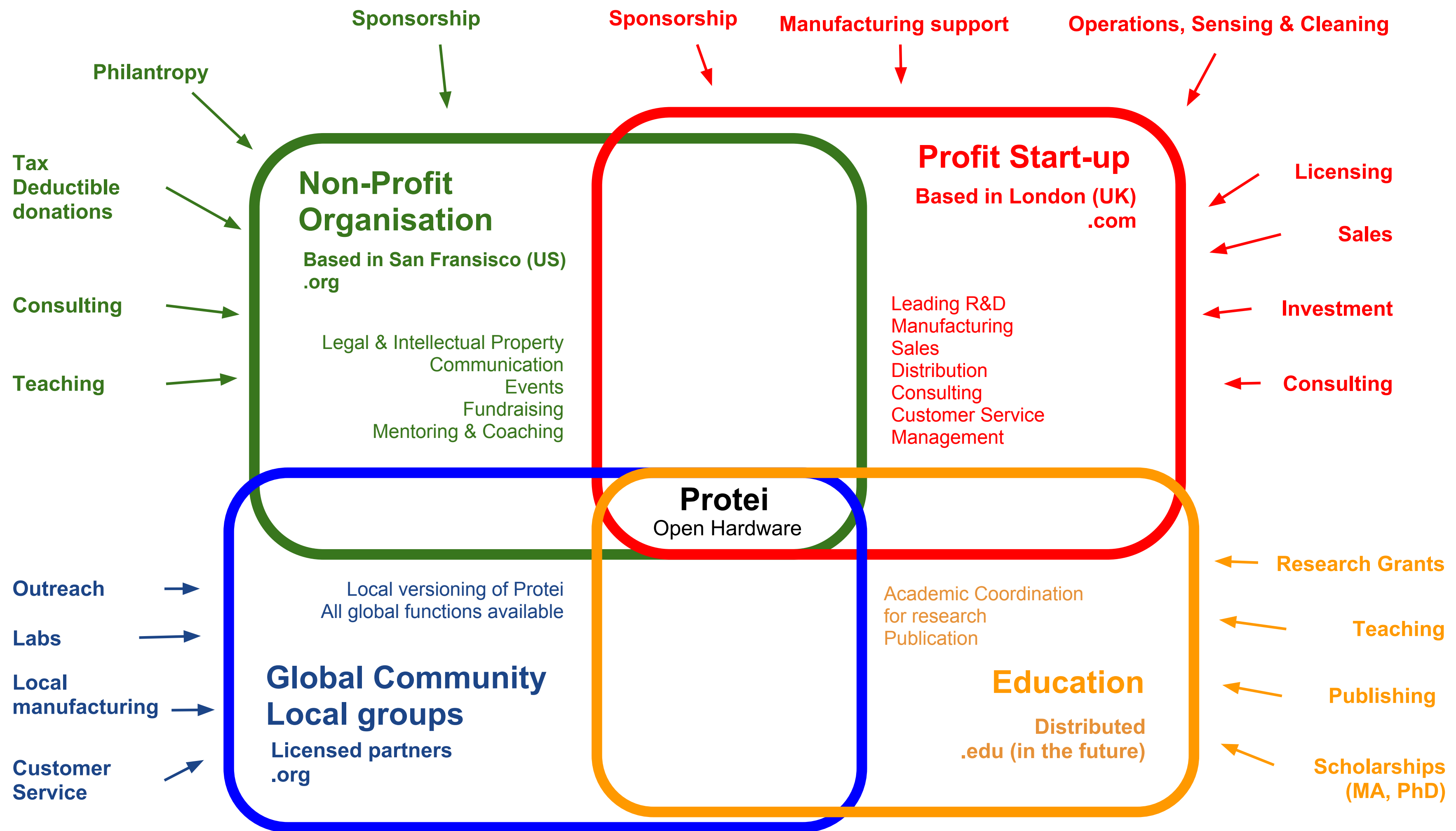
2013: We start a small industrial production of Protei. The second year, following our first proof of concept, the money comes mostly from investors and still from sponsorship. We start to have many collaborators abroad using Protei for science purposes, the technology is getting better fast thanks to our community. The general public is passionate about Protei and we are strongly involved into educational projects. Part of our production of units is getting dedicated to multiple Protei operating as swarms. Our R&D department is blooming.

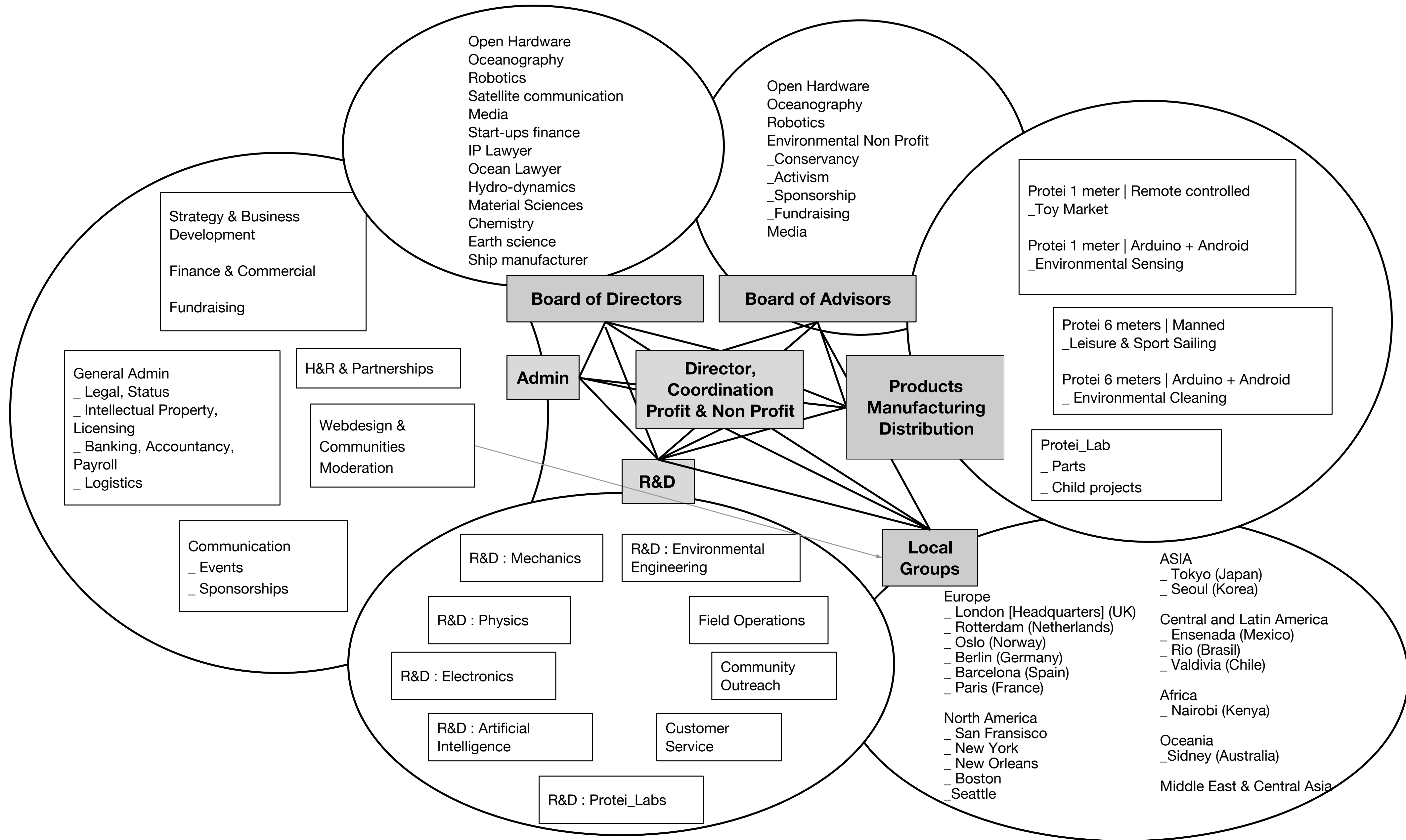
2014 : we have several Protei produced at industrial scale, so retail price are dropping, many markets are opening, we are selling much more units. We have several prototypes used for regular science applications, we are eligible for large research grants for ocean research. We have less investor money and more and more money comes from sales and operations of ocean sensing and ocean cleaning. We have now senior employees in each departments.

2015: We have proven our efficiency at sea navigating many miles and our production of units has a steady increase. We participate large international Ocean Observation programs, Protei "toy". is massively present in stores, Protei Articulated gets bought by avant-garde sailing clubs. We become a sustainable business this year, sourcing our money from sales, rental of Protei, operations of sensing and clean up, byproducts rather than donations and investors. The technology has now become a standard, we can undertake important contract and have a manufacturing chain that is optimized. Our growth rate is much less spectacular in percentile attracting less investors, but the volume of transactions is much bigger, the company more stable.



- Profit
- Environmental Impact
- Social Benefit
- Technology Development





General and specialised media covering Protei



Social Media strategy platforms we use



Collaborative tools we use

