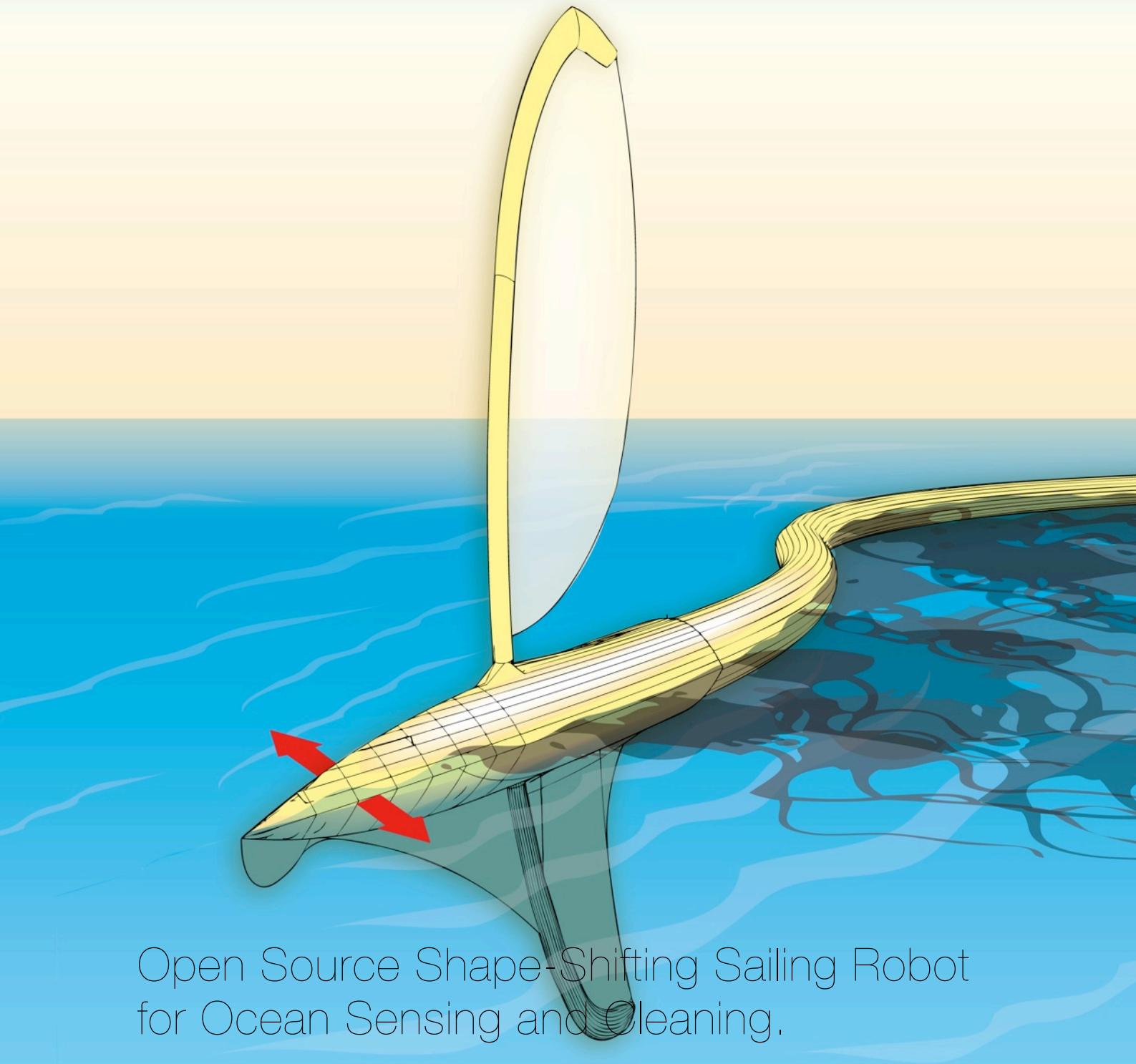


Protei™



Roadmap



Open Source Shape-Shifting Sailing Robot
for Ocean Sensing and Cleaning.

Tags : Ocean, Robot, Autonomous, Swarming, Sailing, Oil Spill, Radioactivity, Open Hardware.

2012/01/18 London, contact@protei.org | <http://www.protei.org>

Introduction

Protei - Proteus

Proteus (**Πρωτεύς**) is the son of Naiad, goddess of springs, and Oceanus, god of the oceans. Proteus is the herdsman of the sea creatures, he can foretell the future and change shape at will. From this feature of Proteus comes the adjective protean, with the general meaning of "versatile", "mutable", "capable of assuming many forms". "Protean" has positive connotations of flexibility, versatility and adaptability. "Protei" is the plural of "Proteus".

O Proteus, old man of Pallene, with the form of an actor, who at one moment takes the limbs of a man, at another those of a beast, come tell us why you turn into all shapes, so that, forever changing, you have no fixed form?

I bring forth symbols of antiquity and a primaeval age, of which each man dreams, according to his wishes.

Alciato's Book of Emblems
Emblem 183



Proteus is the son of Poseidon.
He is the herdsman of the creatures of the oceans.
He can change shape to carry his duties.
Protei changed shape to carry its duties, adapts.

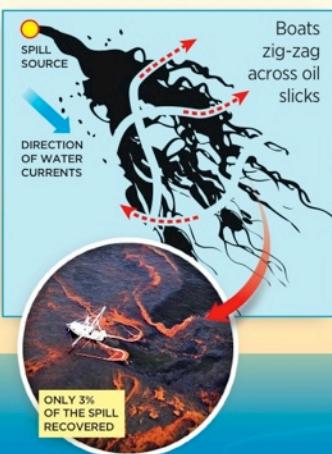
"Proteus anguinus" is the scientific name of the Olm.
The olm lives in dark caves in the north of Italy and Slovenia.
It is entirely blind and it has developed other super senses to thrive.



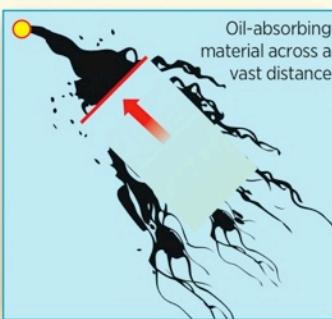
Robotic ships to the rescue

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.

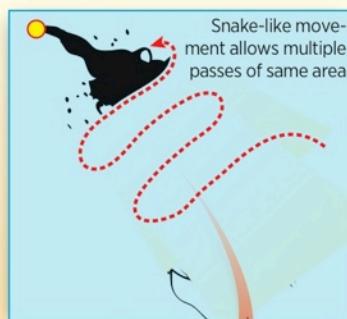
CURRENT SOLUTION



IDEAL SOLUTION

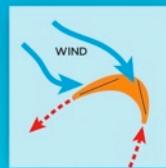


PROTEI



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



THE FLEXIBLE HULL ALLOWS THE BOAT TO HARNESS THE WIND'S POWER, EVEN WHEN TURNING DIRECTLY INTO IT. PROTEI NEVER LOSES THE PULLING POWER REQUIRED BY ITS LONG, HEAVY TAIL.

WHAT THE DESIGN MUST DO

- Use existing technologies for rapid deployment
- Sail semi-autonomously upwind, intercepting oil sheens going downwind

Must be:

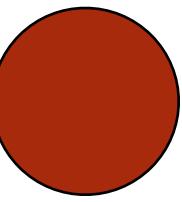
- hurricane-resistant
- able to right itself if overturned
- inflatable
- unbreakable
- cheap
- easy to manufacture

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.



Mission Statement: Open sailing.org Non Profit Organization

Nature, people, technology, Profit.

Technology for ocean study, cleaning.

75% planet surface is water

More than 80% of large fishes have disappeared.

With a fast growing population, with more than 50% living in cities less than 150 km away from the shore, we have never been so dependent of our oceans.

The oceans sequester roughly 33% of the carbon emitted by human activity, approximately two billion metric tons a year.

We need to protect ocean life, and beyond conservation help ocean thrive.

As humans, we are using technology to make this happen.

Open Source

Open Hardware

Appropriate technology

Agile development

Started as a research project by Cesar Harada at the Royal College of Art.
original goal is to develop : International Ocean Station

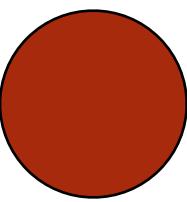
Connected child projects :

Energy_Animal

Life_Cable

Openet.org

Swarm_Operating_System



Executive Summary: Open sailing.com Ocean robotics start-up

Protei : a sailing robot to study and clean the oceans. The next age of sailing.

What is Protei

The technology. Invention and innovations.

Protei products

Applications and markets

Our current resources

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the fastest route is rarely straight

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1 meter and 6 meter sailing drone

1m / 1m

6m / 6m

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Cesar Harada

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- 1. Life cycle – inputs and outputs
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 - 2012 , 2013, 2014, 2015
 - From cost to retail price
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 - Sharing growth – Inputs and Outputs
 - What growth means
 - Externalities -> OH + appropriate technology
 - 3. Sponsoring
 - Media
 - Event
 - Pricing
 - Visibility
 - 4. Investment

Working at Protei

Vision

Technology Origins



Genesis : Where does Protei comes from?

On April 20th 2010, the Deepwater Horizon oil rig exploded, killing 11 men and injuring 17 others. For 3 months, 4.9 million barrels (780,000 m³) of crude oil gushed from the sea floor to create a 80-square-mile (210 km²) "kill zone" around the gusher. In addition of crude oil, 1,791,000 US gallons (6830 m³) of toxic oil dispersant were deployed on the surface and underwater. The dispersant most widely used were Corexit EC9500A and EC9527A, both containing known carcinogens that damage animal and human reproductive systems and developing fetuses.

As the satellite image above shows, the spill was easily distinguishable from space but scientists also reported immense underwater plumes of dissolved oil not visible at the surface.

The BP oil spill is known to be the worst environmental catastrophe in the history of the North American continent and the largest accidental marine oil spill in the history of the petroleum industry.

The spill caused extensive damage to marine and wildlife habitats and to the Gulf's fishing and tourism industries. It will affect the health of the Gulf residents for a long time.



<http://counterspill.org/disaster/bp-oil-spill>

Kasia to comment Image 2 - Map?

http://www.upi.com/News_Photos/gallery/Effects-of-Gulf-oil-spill-on-wildlife-and-nature/3269/

<http://www.thisislondon.co.uk/standard-business/article-23879917-oil-spill-compensation-payouts-on-the-rise-for-bp.do>

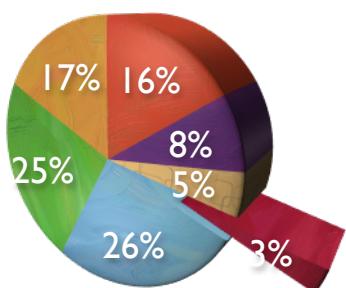
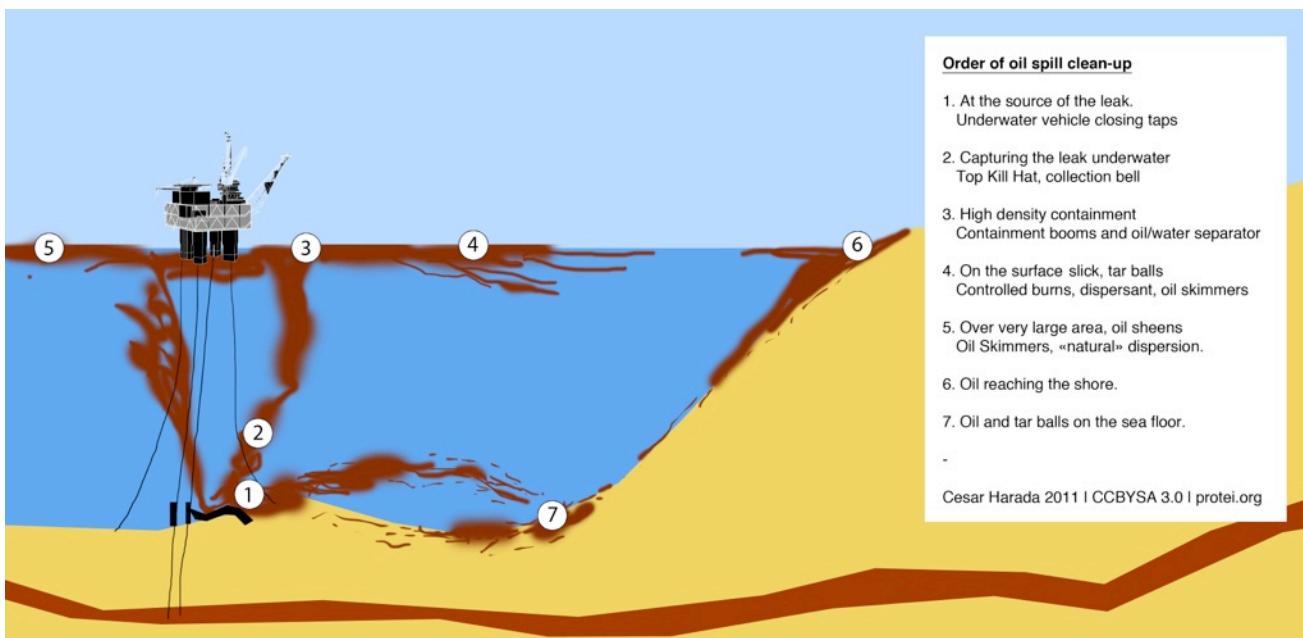
NASA 2010

Skimmer ships, floating containment booms, anchored barriers, and sand-filled barricades along shorelines were used in an attempt to protect hundreds of miles of beaches, wetlands, and estuaries from the spreading oil. Overall, the technologies used prove to be inefficient while being very expensive, often exposing the health of clean up crew and vulnerable to difficult weather conditions during the hurricane season.

The map below shows a clear correlation between the surface currents (arrows) matching the extent of the oil spill (black) and the residents reporting oil spill (red dots).

The inefficiency of the cleanup effort was largely due to the lack of examination of natural patterns and local resident knowledge. [Anne Rolfes, 2010]

Protei was born from the hope that we may clean up an oil spill more efficiently with an appropriate technology that uses natural forces and pattern (wind, surface current) and local residents knowledge and creativity.



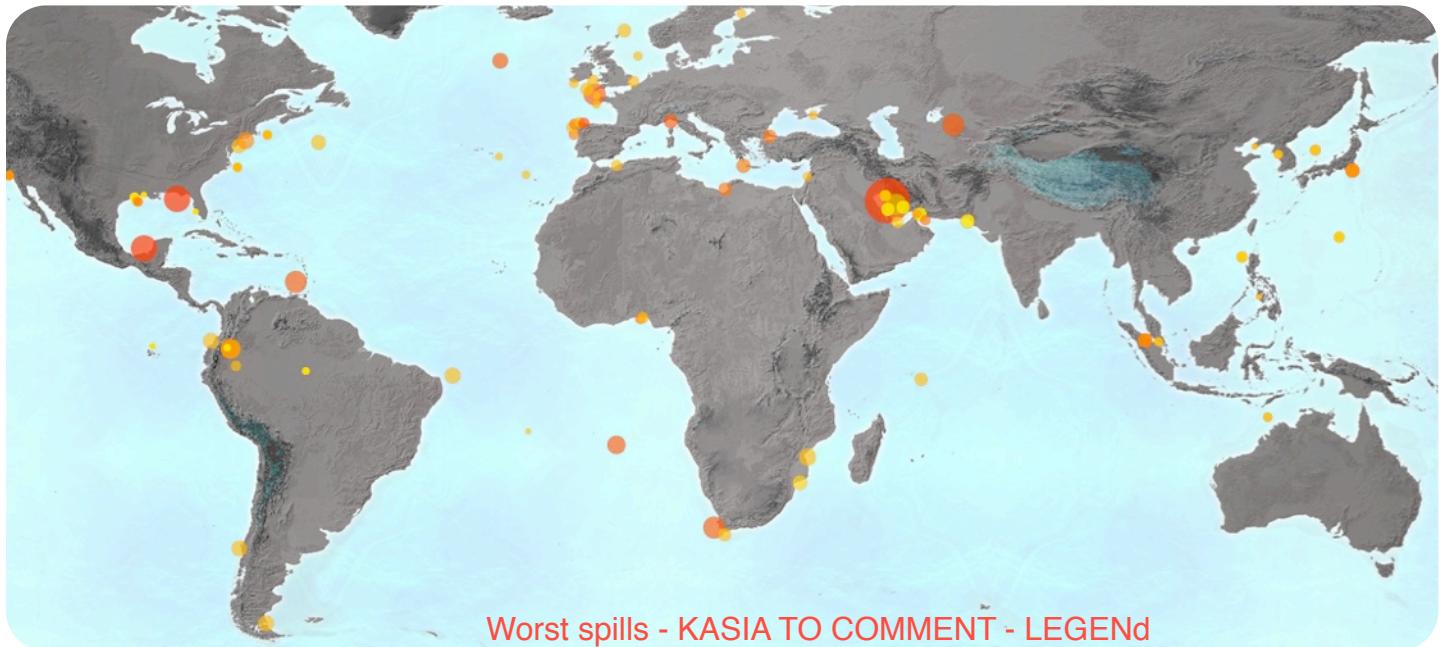
- 26% Residual remaining, sheens, tarballs, sediments
- 25% Evaporated in atmosphere, dissolved in seawater
- 17% Direct recovery from the wellhead
- 16% Naturally dispersed, mainly at the wellhead
- 8% Chemically dispersed
- 5% Burned at the surface
- 3% Skimmed from the surface (!!)

Protei would be most useful for cleaning oil spills of the fourth order, in which there is a thin sheen of oil that has spread throughout a large surface area of water, and that is travelling towards the land or the sea.

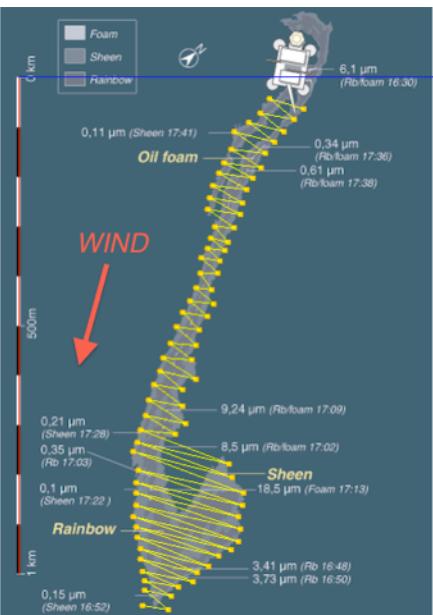
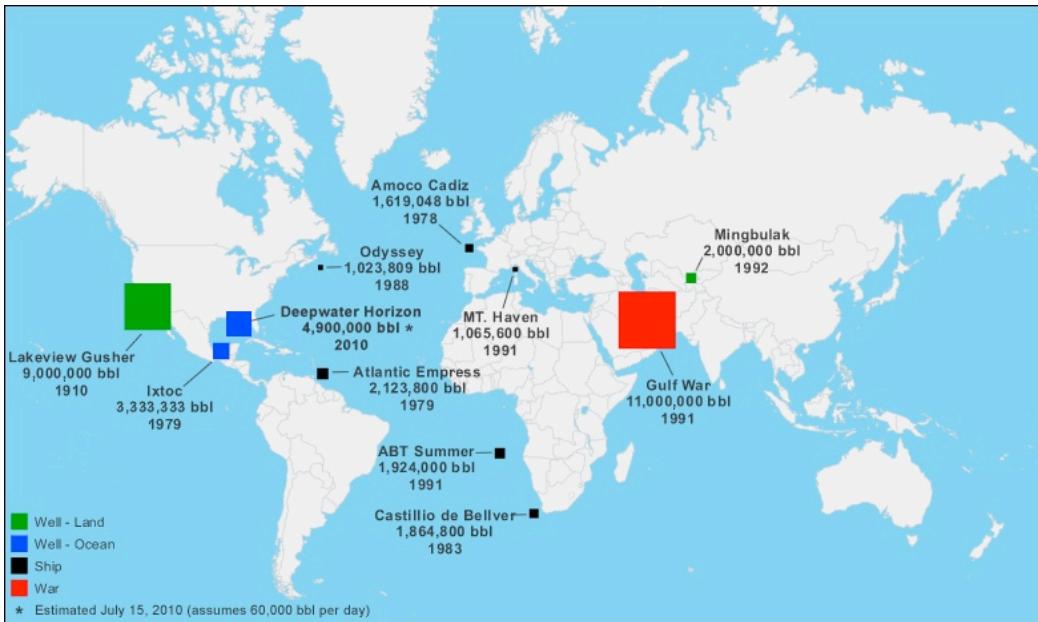
Protei would focus of collecting surface sheen of light oil.



It is not about asking "if" another oil spill will happen but "when" and "where" it will happen.



Oil tanker in Europe - KASIA TO COMMENT - LEGEND



Number of oil rigs.

Normal number of oil spilled from drilling.

Annual number of oil spills (Average)

Cost of an oil spill.

Growing population

Oil Demand

Oil stocks

Cost of drilling

Anticipated cost of oil in the future

Deeper

http://en.wikipedia.org/wiki/Peak_oil

means drilling deeper in more dangerous areas.

http://articles.businessinsider.com/2011-12-14/europe/30514951_1_arctic-oil-trk-bp-british-oil-giant-bp

Colder

Google Arctic oil reserve controversy (risk)

<http://goo.gl/K9YBz>

http://en.wikipedia.org/wiki/Arctic_Refuge_drilling_controversy

<http://dotearth.blogs.nytimes.com/2009/09/08/oil-fields-and-arctic-ecology/>

http://www.artdiamondblog.com/archives/2009/05/post_512.html

Example : Norway

http://www.theecologist.org/News/news_analysis/927048/scramble_for_arctic_oil_and_gas_puts_pristine_ecosystem_at_risk.html

Fracking and controversy

http://seawifs.gsfc.nasa.gov/OCEAN_PLANET/HTML/peril_oil_pollution.html

<http://www.itopf.com/information-services/data-and-statistics/statistics/>

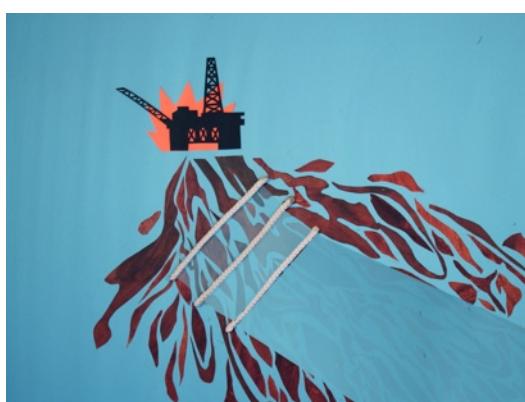
Innovations - Premises



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.

Concept Evolution

Protei is not the result of academic or scientific research.

Protei is a direct response to environmental crises, including the financial and technological inaccessibility of solutions to the general public.

It is an exploration of the concept of a flexible-hull sailing boat, and the consequences of this bio-inspired design. As the design of the individual Protei vessel improves, further versions will develop towards the behavior of multiple vessels, making up a swarm of sailing drones. As we progress, the vessel will move towards energetic autonomy, possessing sensing and decision-making skills, and eventually will evolve from a centralized swarm control to a decentralised peer-to-peer autonomy.



Protei_001

When a conventional sailboat pulls a long heavy load, it gradually loses steering (direction) and traction (pulling power). The centre board can no longer act as axis of rotation, the rudder can no longer act as a lever on this axis of rotation, resulting in the loss of steering. The energy accumulated in the sail can no longer be transferred into general motion, resulting in the loss of traction.



What we tried first was to move the rudder at the front of the vessel (Protei_001). We observed that a front-rudder on a remote controlled boat could pull a long heavy load.

Protei_002

Inspired by these results we made the hypothesis that multiple surfaces of control (rudders) would likely enhance steering, traction and fulfil the function of a centreboard as well. We build Protei_002 as a fully articulated hull sailing vessel that had remarkable sailing properties.



Protei_003

It was a very large inflatable flexible sailing boat. With its extreme light weight, and large sail surface, it had great pulling power. It gave us the confidence to scale up and envision Protei as a viable technology for autonomous sailing oil spill clean-up application.



Protei_005

Protei_005 was designed to be as small as possible, yet containing much more advanced electronics: basic environmental sensing (wind, position) and collision avoidance logic.



Protei_005.1

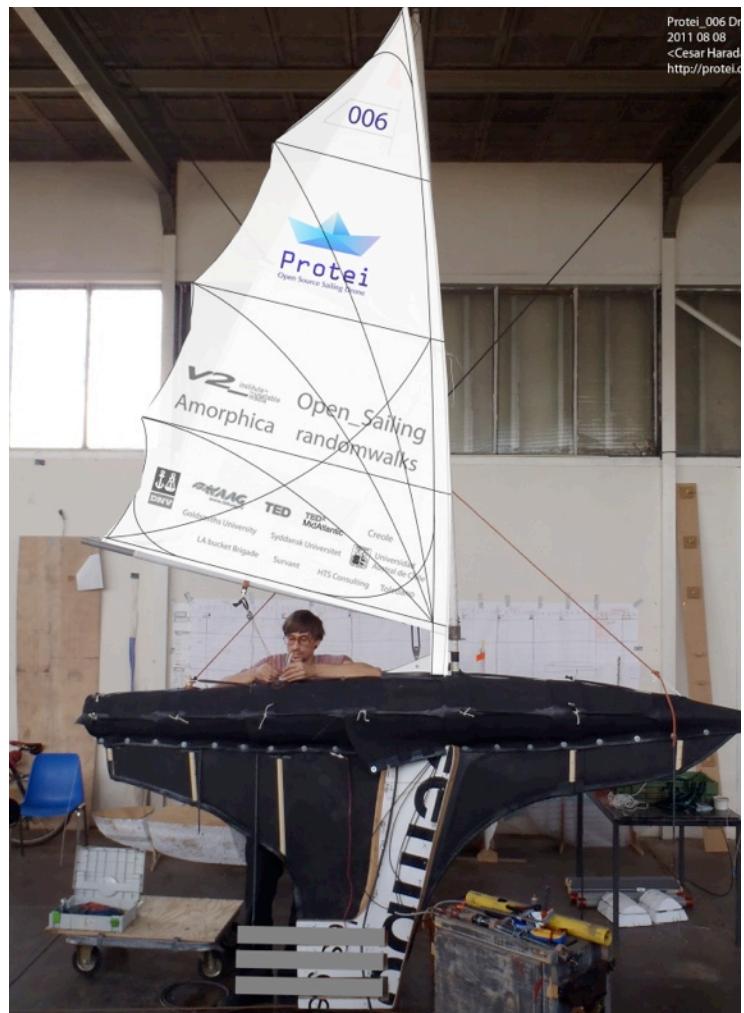
Protei_005.1 was designed as an enhanced version of Protei_002, inflatable and articulated, with a simple RC kit for all the controls. This larger version was designed to test the strength of the RC servos.



Protei_005.3

Protei_005.3 is an enhanced version of Protei_002. The hull is mostly made of foam sandwiching one layer of wood. It is divided into 3 equal sections of 38 cm each.

What is new? Our innovation



Protei_006 produced by V2_ in Rotterdam

Sailors will be surprised by this image.

This is the hull of Protei at its moment of maximum lateral flexion. The entire hull curves. A simple mechanical idea that might ignite a revolution in sailing and maritime engineering.

Protei_006 is a 3m remote-controlled boat, controlled over radio by a user within 500m and line of sight. It has a segmented, shape-shifting hull, constructed of flexible spines that run lengthwise (through cross sectional bulkheads) and bend under stress. A flexible EPDM-Foam skin encases the skeleton. There is one 4m tall sail, and a large keel that extends downwards 1.2m from the hull. The majority of the boat's ballast is housed at the lowest point of the keel, which provides most of the stability. This also enables Protei_006 to be self-righting.

For steering and control, Protei_006 has three motors. The first one spins a winch to control the trim of the sail. The other two are attached to linear actuators that each control the articulation of the bow and the stern, which curve independently. The actuators pull and release cables that run throughout the longitudinal spines of the hull.

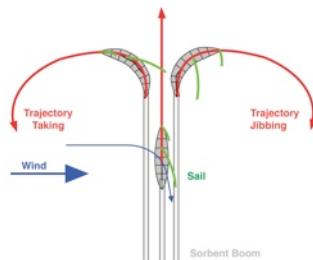
Protei_006's body is nearly cylindrical and very unstable. Most righting momentum comes from the ballast to right the vessel.

The battery and linear actuators, which provide most of the weight of the boat, are at the bottom of the keel, along with a 25kg lead ballast. The main electronics, the winch, and the GPS are housed in the waterproof, shockproof pelican cases1 compartments of the hull (which make up the separate segments). Protei_006 stores GPS data from its trips.

New properties of a shape-shifting hull?

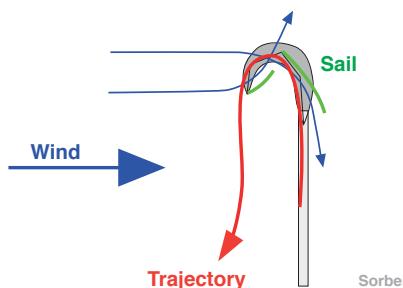
Research questions.

One invention = many innovations
shape shifting curved hull

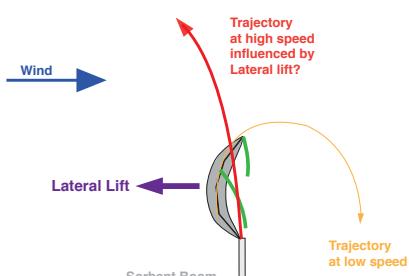


The invention of the curved hull is introducing many new innovations. It provides better **trajectory control** and reduces the turning radius.

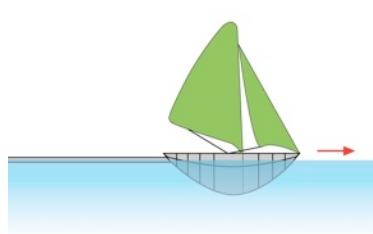
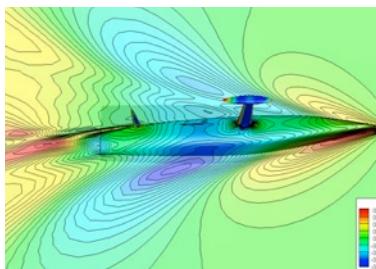
By causing the hull to curve Protei turns. Curving the hull displaces the center of gravity and the center of floatation outside the volume of the hull providing more **dynamic stability**.



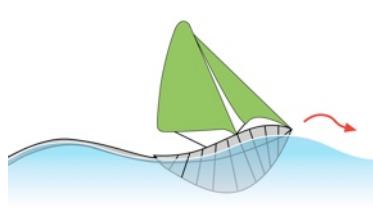
By having a main sail and a jib on a boat that curves means that the relative angle of these sails will change when turning. When tacking the jib catches the wind faster. When jibing the main sail switches side faster. One of the major advantages of a curved hull is that both sails can never be in irons 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.

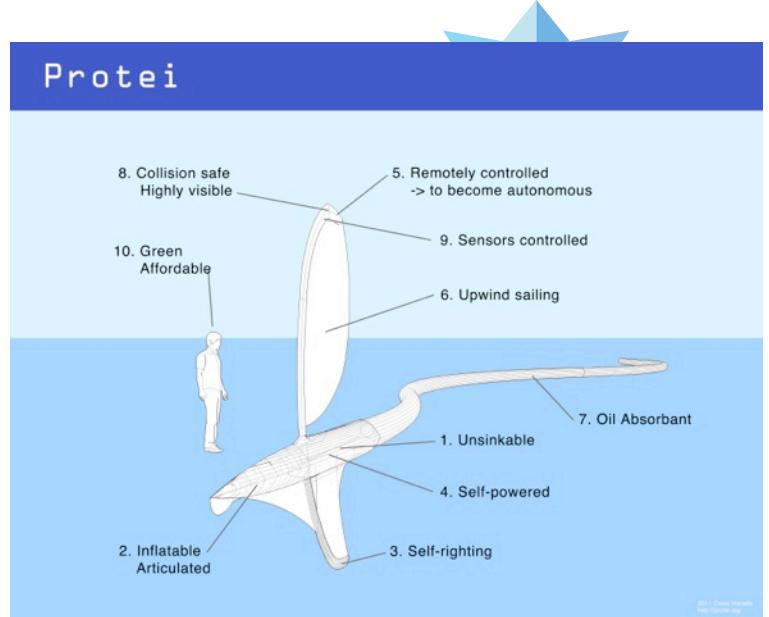


A conventional displacement boat has a centerboard and a rudder as appendages. By Protei's shape shifting hull being the centerboard and the rudder it creates **less friction and turbulence**, which we hope will achieve greater speed.



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?

Engineer stages



Protei and its criteria: Unsinkable, segmented / articulated, self-righting, self-powered, remotely controlled and developing energetic autonomy, upwind sailing, highly visible / collision safe, green & affordable.

Technical development matrix

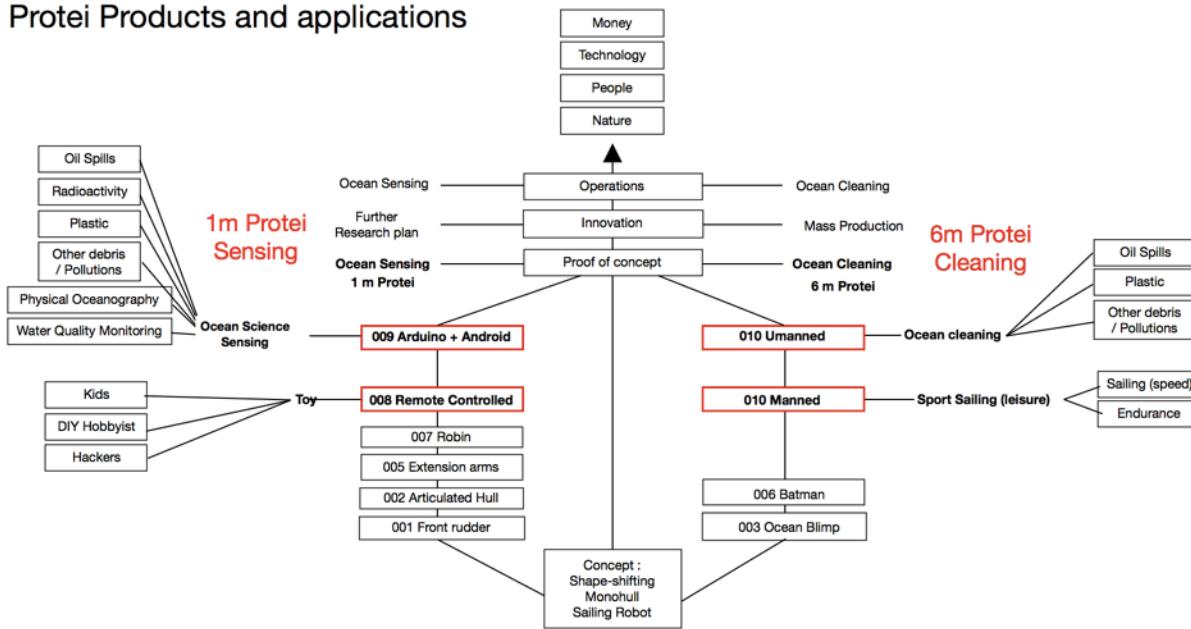
Achieved, tested and validated	Achieved, further test needed for improvement	Not addressed or not achieved
--------------------------------	---	-------------------------------

	Properties	Status	Detail	Future Need
1	Unsinkable	Achieved, tested and validated	Use of solid foam volumes	Improve sea worthiness
2A	Articulated	Achieved, further test needed for improvement	Articulated, bespoke linear actuator system in trials	Reduce power consumption for articulation
2B	Inflatable	Achieved, further test needed for improvement	Tested and rejected	More rigid inflatable material
3	Self-righting	Not addressed	Not tested	Test it! And again!
4	Self-powered	Not addressed	Battery powered	Energy harvesting from its natural environment
5A	Remote controlled	Achieved, tested and validated	Information successfully sent to controller	Increase communication range
5B	Autonomous	Not addressed	Not addressed	Autonomous agents
6	Upwind sailing	Achieved, further test needed for improvement	Boat sails in a straight line upwind	Test tacking performance
7	Oil absorbant	Achieved, further test needed for improvement	Oil absorbency tests carried out	Oil booms customizing and operation
8	Collision safe	Achieved, further test needed for improvement	Experimented with in Protei_005	Sonar, Radar and Vision
9	Sensor-controlled	Achieved, further test needed for improvement	Limit switches, GPS	Environmental sensing, actuating and forecasting
10A	Green	Achieved, further test needed for improvement	Made from recycled material	Recyclable and low footprint material
10B	Affordable	Achieved, further test needed for improvement	Not affordable for an individual, yet cheap for a large company	Production efficiency
11	Towing capable	Achieved, further test needed for improvement	Can pull a sorbent boom upwind	Test maneuvering and max towing load performance

The fastest route is rarely straight.

Protei can eventually be appropriated for other purposes, such as cleaning other chemical pollutants and material waste from the water, as well as collecting samples for ocean research. But reaching the point to use Protei on all these different applications is quite a stretch. We can make that immediate jump and we'll need to make incremental technological development. A Protei 1m for Ocean Sensing will be first developed as a toy. A Protei 6m for Ocean Cleaning will be first developed as a manned leisure sailing boat.

Protei Products and applications



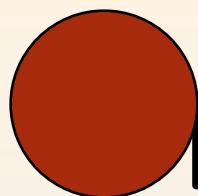
Towards a proof of Concept

We are moving fast towards a proof of concept. In 2010 we invented the technology, the concept. in 2011 we made several working prototypes. In 2012 we are building our proof of concept. In 2012 we want to start our small (1m) series production. In 2013 we want to have our large unit (6m) in production. By 2014 we hope to expand our scientific applications.



Testing session of Protei_006 in 2011 in Rotterdam.





Products



4 products, 2 sizes

1m Remote Control Toy, Hobbyist



1m Android + Arduino Ocean Sensing



Dimension cm, weight kg	90 x 15 x 130. 3kg. Plywood, fiberglass, resin, aluminum, fabric.	
Electronics	Standard RC receiver kit with servos motors	Android operated phone, IOIO Android, Arduino
Date of Prototype launch	2012 March	September 2012
Date of Product launch	2012 December	October 2013
Payload capacity	1.5kg of extra electronic "dry" payload for science and environmental measurement instruments.	
Principal features		
Applications		
target buyer		
market capacity		
shelf price		
estimated profit on one unit		

↳ Manned Sport Sailing



↳ Autonomous Ocean Cleaning



Dimension cm, weight kg	6000 x 900 x 10500. Manned 45kg, Unmanned 100kg. Plywood, carbon fibers, fiberglass, resin, aluminum, stainless steel, fabric.	
Electronics	None.	
Date of Prototype launch	2012 September	2013 December
Date of Product launch	2013 May	2014 September
Payload capacity		
Principal features		
Applications		
target buyer		
market capacity		
shelf price		
estimated profit on one unit		

1m Remote Control, Toy, Hobbyist For kids, hobbyist and hackers.



Market : Toy market

Target consumers : Kids and older hobbyists

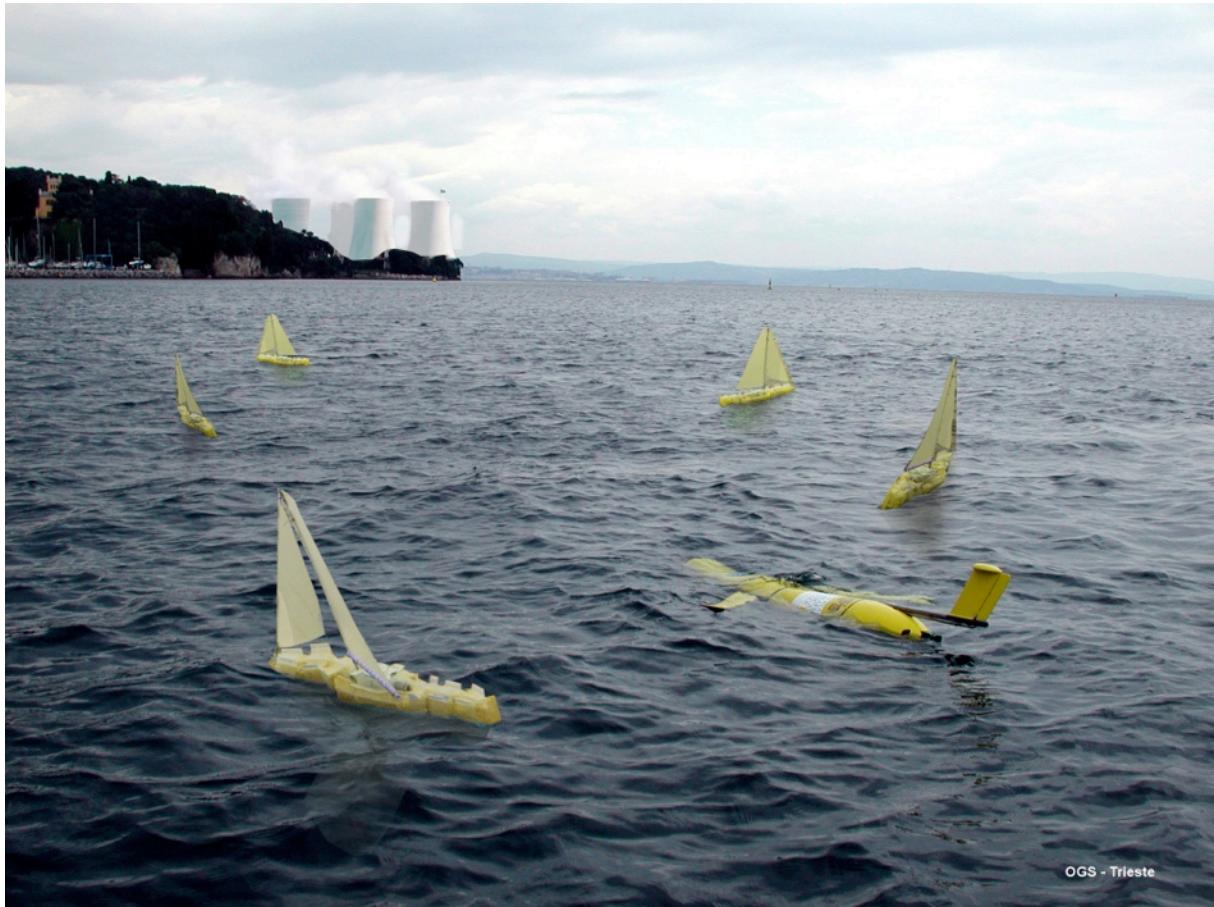
Localization : Global

Imagine on a sunny sunday, and retired man and his grandson go the pond nearby to play with their brand new shape-shifting sailing boat. That is Protei! For a few hours, they play and have tons of fun!

Market capacity	# of units / year	Cost by unit	Turnover GBP
Conventional RC Toy Sail Boat sales (GBP)	1,000,000	350	350,000,000
How many Protei we can sell / year	100,000	250	25,000,000

1m Android + Arduino Ocean Sensing

Water Quality, Reservoirs, lakes and coastal Environment.



Market : Ocean science. Coastal and inner bodies of water study.

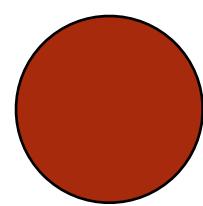
Target consumers : Water quality monitoring and Ocean Sciences.

Localization : Global

Water sampling and quality monitoring in coastal areas

Unmanned vessels, such as Protei, could aid in measuring concentrations of microscopic toxins such as PCBs. Specifically, the European Commission is rolling out an extensive water quality assessment program (Water Directive 2020), for which they need extensive samples. Protei can provide a cheap and reliable means to collect biological samples and to measure other things such as water quality.

Market capacity	# of units / year	Cost by unit	Turnover GBP
Conventional RC Toy Sail Boat sales	5000	150,000	75,000,000
How many Protei we can sell (year)	500	20,000	10,000,00



6m Manned - Sport Sailing

Speed, endurance and autonomy.



Market : Leisure Sailing, competitive Sailing

Target consumers : Sailors, Surfers, Adrenaline freaks, Sailing nerds.

Localization : Global

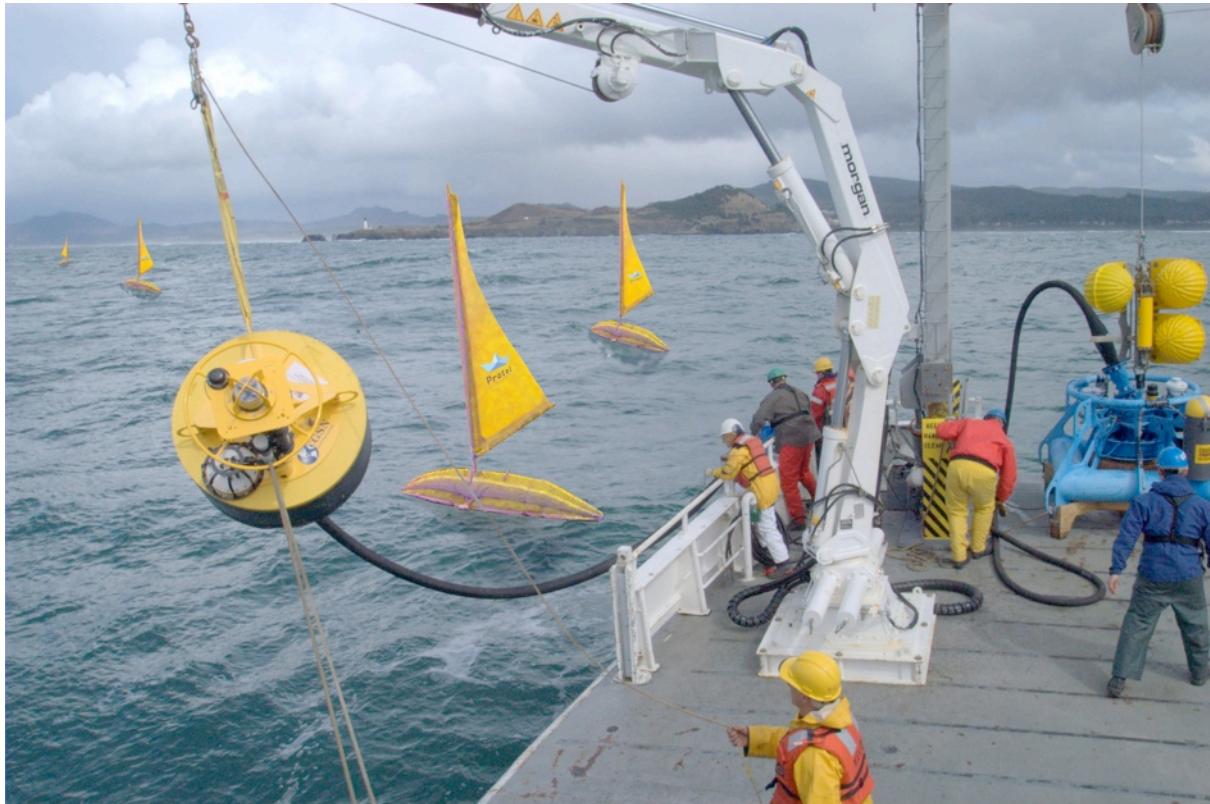
Market capacity	# of units / year	Cost by unit	Turnover GBP
Conventional RC Toy Sail Boat sales	1,333,333	100,000	20 B / year
How many Protei we can sell (year)	10,000	20,000	200,000,000

Stats from "THE U.S. BOAT BUILDING AND REPAIRING INDUSTRY: NATIONAL TRENDS AND CHARACTERISTICS, An Initial Report of the Center for Competitive Analysis July 2000"

<http://www.umsl.edu/~cca/IndustryReports/BBR-final-July2000.pdf>

6m Autonomous - Ocean Cleaning

Physical Oceanography Contributing to existing observation systems.



For example, in pirate-infested waters of the Indian Ocean, climate scientists aim to collect data about salinity, water temperatures, and weather systems in order to map global networks of deep oceans. Because of piracy threats, they are restricted from accessing about a quarter of the Indian Ocean (Fogarty, 2011). Alternatively, robotic, unmanned vessels such as Protei, can be deployed to conduct measurements from such politically unstable areas. Additionally, Protei, like other robotic vessels that are starting to be launched in the India Ocean, can aid in anti-piracy efforts.

Market capacity	# of units / year	Cost by unit	Turnover GBP
Conventional RC Toy Sail Boat sales	3000	300,000	900,000,000
How many Protei we can sell (year)	200	100,000	20,000,000

Missions

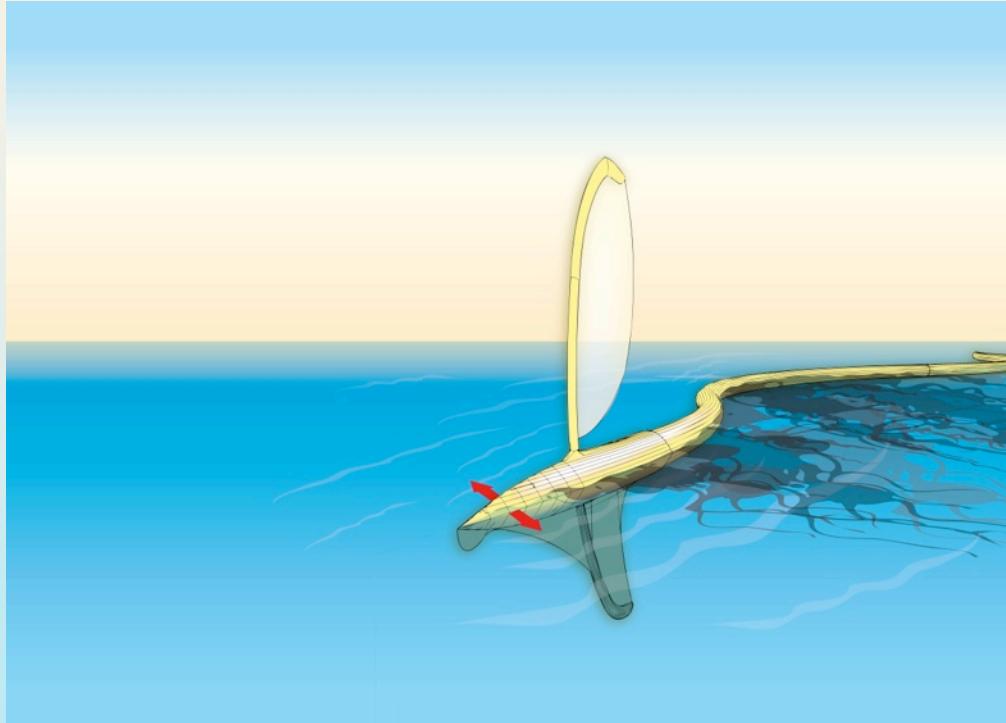
One idea, several innovations, multiple applications.



Mission 1: Oil spill



	Old Vs	New
Environment	<p>Not sustainable and environmentally destructive, requiring oil or diesel for driving power</p> <p>Booms are placed in landfills and left to degrade over a long period of time.</p> <p>Oil is broken down in three ways;</p> <ol style="list-style-type: none"> 1. The oil is burnt to extract the energy 2. Chemicals are used for extraction 3. The boom is pressed 	
Health	<ul style="list-style-type: none"> Expose crew to health risks and toxins Life expectancy of cleaners working on oil spills is reduced by approx. 21yrs. 	
Social	<ul style="list-style-type: none"> Proprietary design Causes distress and psychological problems for locals in terms of habitat and jobs. Can result in deserted towns. 	
Efficiency	<ul style="list-style-type: none"> Large number of workers required to carry out clean up Cannot operate during a storm Sensing of oil limited to human eye sight 700 boats needed to collect just 3% of oil. 	
Economic	<ul style="list-style-type: none"> Detrimental to the livelihoods of local people. Has a negative impact on tourism Huge outlay of resources required in terms of people, equipment, time and money. 	



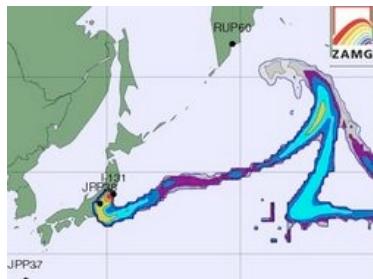
New !

Environment	<ul style="list-style-type: none"> Sensing technologies on board coupled with oil spreading prediction models Uses renewable energy: solar power for the actuation and wind energy for locomotion
Health	<ul style="list-style-type: none"> Unmanned and autonomous Less manpower needed to clean boats results in less human exposure to oil.
Economic	<ul style="list-style-type: none"> Cheaper to buy and run than skimmers currently being used. No fuel needed to run. Operational at night.
Social	<ul style="list-style-type: none"> Empowers the local community and enables them to take control of their habitat. Fishermen assemble, power and navigate clean up boats allowing them to generate revenue through selling the oil they collect. Open-source hardware
Efficiency	<ul style="list-style-type: none"> A more autonomous hull and using wind to navigate allows boats to move more effectively through water collecting more oil. Ability to work night and day. Can go further from shore. Able to operate during extreme weather conditions

Mission 2: sense and clean Radioactivity



Case study : Fukushima power plant



http://en.wikipedia.org/wiki/Radiation_effects_from_Fukushima_Daiichi_nuclear_disaster#Discharge_to_seawater_and_contaminated_sealife

<http://www.whoi.edu/page.do?pid=7545&tid=282&cid=123049&ct=162>

The release of radioactivity from Fukushima—both as atmospheric fallout and direct discharges to the ocean—represents the largest accidental release of radiation to the ocean in history.

Concentrations of cesium-137, a radioactive isotope with a 30-year half-life, at the plants' discharge points to the ocean peaked at more than 50 million times normal/previous levels.

Concentrations 18 miles offshore were higher than those measured in the ocean after the Chernobyl accident 25 years ago

“Woods Hole Oceanographic Institution chemist Ken Buesseler and two colleagues based in Japan, Michio Aoyama of the Meteorological Research Institute and Masao Fukasawa of the Japan Agency for Marine-Earth Science and Technology.”

	Old vs ...
Environment	<p>Not sustainable and environmentally destructive, requiring oil or diesel for driving power</p> <p>Booms are placed in landfills and left to degrade over a long period of time.</p> <p>Oil is broken down in three ways;</p> <ol style="list-style-type: none">1. The oil is burnt to extract the energy2. Chemicals are used for extraction3. The boom is pressed
Health	<ul style="list-style-type: none">• Exposes crew to health risks and toxins• Life expectancy of cleaners working on oil spills is reduced by approx. 21yrs.
Social	<ul style="list-style-type: none">• Proprietary design• Causes distress and psychological problems for locals in terms of habitat and jobs.• Can result in deserted towns.
Efficiency	<ul style="list-style-type: none">• Large number of workers required to carry out clean up• Cannot operate during a storm• Sensing of oil limited to human eye sight• 700 boats needed to collect just 3% of oil.
Economic	<ul style="list-style-type: none">• Detrimental to the livelihoods of local people.• Has a negative impact on tourism• Huge outlay of resources required in terms of people, equipment, time and money.

<http://www.guardian.co.uk/news/datablog/2011/mar/14/nuclear-power-plant-accidents-list-rank>

<http://www.economist.com/blogs/dailychart/2011/04/>

radioactive accidents

<http://en.wikipedia.org/wiki/>

[Lists of nuclear disasters and radioactive incidents](#)

Risk

[http://www.theatlanticwire.com/technology/2011/04/interactive-map-](http://www.theatlanticwire.com/technology/2011/04/interactive-map-nuclear-risk/36975/)

[nuclear-risk/36975/](#)

Following the Fukushima nuclear accident, the International Atomic Energy Agency (IAEA) has been compiling and analyzing sea-water sample data collected by TEPCO (the operator of the damaged plant) and MEXT, two organizations with offshore stations near the site of the nuclear power station (IAEA slides, 2011).

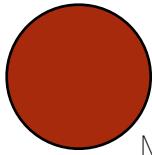
The dominant winds in the area are pushing the radioactive particles in the air towards the pacific. At the worst of the nuclear crisis, seawater was used to cool down the reactor, which was placed directly back in the ocean. The information collected at an offshore fixed site does not provide the crucial high levels of radiation close to the origin of the pollution, and many points further out at sea have no corresponding data.

We cannot make manned measurements of high levels of radiation - Drones are needed for that. Protei technology can be implemented for this type of marine environmental monitoring and mapping, as an alternative to sending humans to such potentially hazardous areas.

Most radioactive studies are carried on land, but in the case of the Fukushima nuclear accident, most of the radioactive particles are dispersed in the Pacific ocean. We have some simulations, not enough measurements.

We need disposable sensors to get very close to the leaking nuclear power plant.

	New....



Mission 3: Plastic Oceans / marine Pollution?



Toxic Waste or Energy?

Millions of tons of plastic debris breaking down into small pieces are accumulating and contaminating our oceans. We need to locate, measure and collect this plastic.

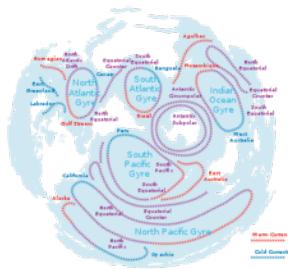
In the North Pacific Gyre, Protei could be equipped with a fine mesh net and used to collect plastic waste. It has been estimated that 15,000,000 square kilometres contain unusual accumulation of small suspended plastic particles (Marks, Kathy 2008).

As plastic waste accumulates in the gyres, the combined effect of UV light, the mechanical action of waves, the saltiness, and the acidity breaks it down. At such a small size, animals mistake the plastic for plankton and ingest it in quantities. Some animals die of accumulation and obstruction of their digestive system; Some go up the food chain and eventually end up in our plates where they return us the toxic we produced.

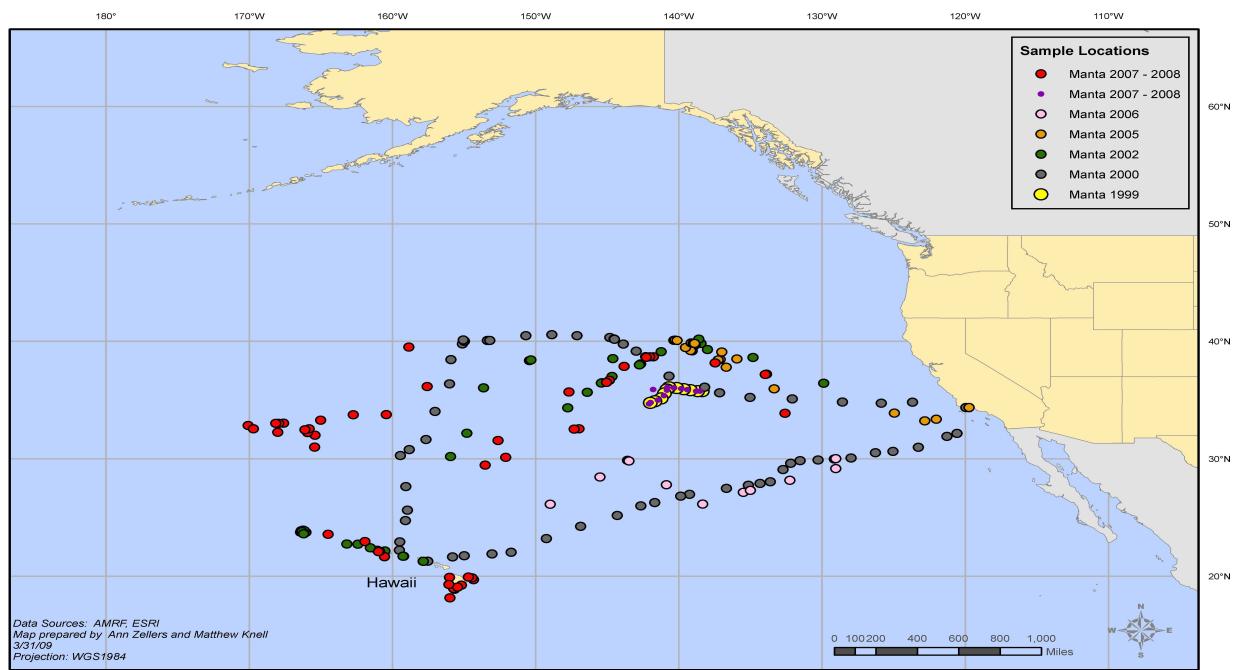


Even if we stopped producing plastic now, it will take decades for the plastic to break down into smaller bits and accumulate in the gyre. There is no point in developing a very fast plastic recovery system, but rather a system that captures the plastic at the same rate as the one at which the current circulates, hence working with the surface currents and dominant winds.

Very few technologies have been developed to solve this issue and Protei may be able to contribute since it may be capable of performing the very repetitive task of plastic collection over immense areas. One other key to the issue may be to re-qualify the plastic at sea not as a form of pollution but as a new resource, a source of energy, construction material, and therefore, profit.

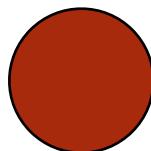


Hand collection on shore	OLD VS....	
Environment	<p>Not sustainable and environmentally destructive, requiring oil or diesel for driving power</p> <p>Booms are placed in landfills and left to degrade over a long period of time.</p> <p>Oil is broken down in three ways;</p> <ol style="list-style-type: none"> 1. The oil is burnt to extract the energy 2. Chemicals are used for extraction 3. The boom is pressed 	
Health	<ul style="list-style-type: none"> • Exposes crew to health risks and toxins • Life expectancy of cleaners working on oil spills is reduced by approx. 21yrs. 	
Social	<ul style="list-style-type: none"> • Proprietary design • Causes distress and psychological problems for locals in terms of habitat and jobs. • Can result in deserted towns. 	
Efficiency	<ul style="list-style-type: none"> • Large number of workers required to carry out clean up • Cannot operate during a storm • Sensing of oil limited to human eye sight • 700 boats needed to collect just 3% of oil. 	
Economic	<ul style="list-style-type: none"> • Detimental to the livelihoods of local people. • Has a negative impact on tourism • Huge outlay of resources required in terms of people, equipment, time and money. 	



Plastic Marine Debris Surface Sample Locations
North Pacific Gyre 1999 - 2008





Mission 4: Overfishing / Physical Oceanography

Monitoring fish stocks and protected areas.

on-demand data for more accurate ocean studies



More than 80% of large fishes have disappeared from our oceans and the human population is only growing in number.

More than 50% of human population lives in cities and less than 150 Km away from the coast. We must think long term and protect the ocean, which is our future.

Each coloured dot on the map represent an argo profiler. There is currently 3000+ profilers that provides information about salinity, temperature, oxygen level, turbidity, drift and contribute to the global observation strategy that helps predict climate change and sea-level rise for example.

Protei would be a fantastic on-demand remote sensing device.

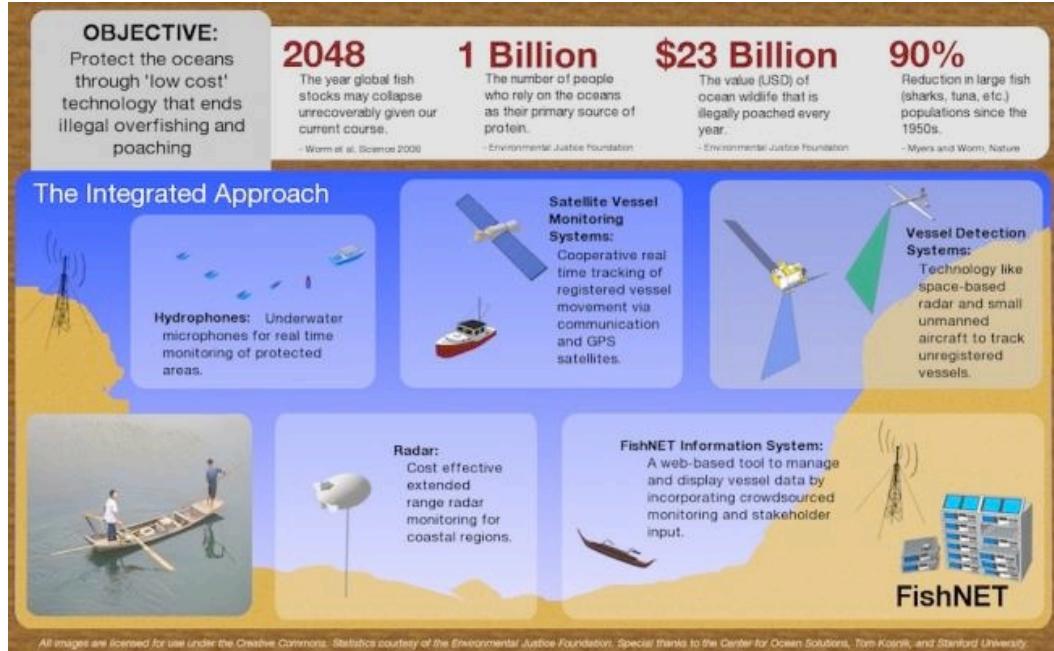
Over the last few decades advancements in digital technology and naval engineering have allowed fishing fleets to increase dramatically as a result, our precious oceans currently face an unprecedented threat of overfishing and destruction to our ecosystem. A prominent assessment carried out in 2009 showed that because of overfishing 63% of assessed fish stocks worldwide require rebuilding [Worm & Hilborn, 2009]. Without effective monitoring and control, the future of our delicate fish stocks are in danger. Both overfishing and Illegal, Unregulated and Unreported fishing (IUU) help commercial fishing to be the single greatest threat to our remote marine ecosystems [SERMA]. For all but the wealthiest countries, the many marine areas are too remote or too difficult to protect using current monitoring approaches.

Current worldwide economic losses as a result of IUU fishing have been estimated to be as much as US\$23.5 billion annually, which is 22% of total fishery production [Agnew, 2009]. The majority of IUU fishing typically targets developing nations, exploiting the lack of protection resources robbing the poorest people on the planet. An estimated one billion people [FAO, 2000] rely on oceans as a primary source of dietary protein, which makes the issue not only an economic and environmental concern but also a human rights and food security one. What is needed is a better way to watch over our oceans.

Hand collection on shore	Protei
Environment	<p>Not sustainable and environmentally destructive, requiring oil or diesel for driving power</p> <p>Booms are placed in landfills and left to degrade over a long period of time.</p> <p>Oil is broken down in three ways;</p> <ol style="list-style-type: none">1. The oil is burnt to extract the energy2. Chemicals are used for extraction3. The boom is pressed
Health	<ul style="list-style-type: none">• Exposes crew to health risks and toxins• Life expectancy of cleaners working on oil spills is reduced by approx. 21yrs.
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Efficiency	<ul style="list-style-type: none">• Large number of workers required to carry out clean up• Cannot operate during a storm• Sensing of oil limited to human eye sight• 700 boats needed to collect just 3% of oil.
Economic	<ul style="list-style-type: none">• Detimental to the livelihoods of local people.• Has a negative impact on tourism• Huge outlay of resources required in terms of people, equipment, time and money.

Protei, under remote operation from a ground site or autonomous pre-programmed path, can help by monitoring these remote marine areas or places that have been designated as protected areas. Many of the patrol vessels for developing nations remain at port due to a lack of resources to fuel them. Enforcement of the marine protected areas in many parts of the world is far too expensive for all but the wealthiest nations. The South Pacific is a perfect example of a region where robotic vessels can fill the gap. Protei can patrol the oceans; provide real-time feedback and marine situational awareness to mitigate IUU fishing.

These vessels can be incorporated into an integrated protection network to expand the capacity of governments in monitoring and controlling their EEZs. FishNET, a network of connected technologies that aims to stop illegal fishing, plans to incorporate Protei into its suite of available technologies. With input from these vessels, the integrated information database would be much stronger and capable as Protei is the perfect tool to extend the range of protection. Accompanying unmanned aircraft, underwater acoustic hydrophones, blimp/air-based relays, and satellite technologies (see image), Protei and FishNET can work seamlessly for effective fisheries and ecosystem management.

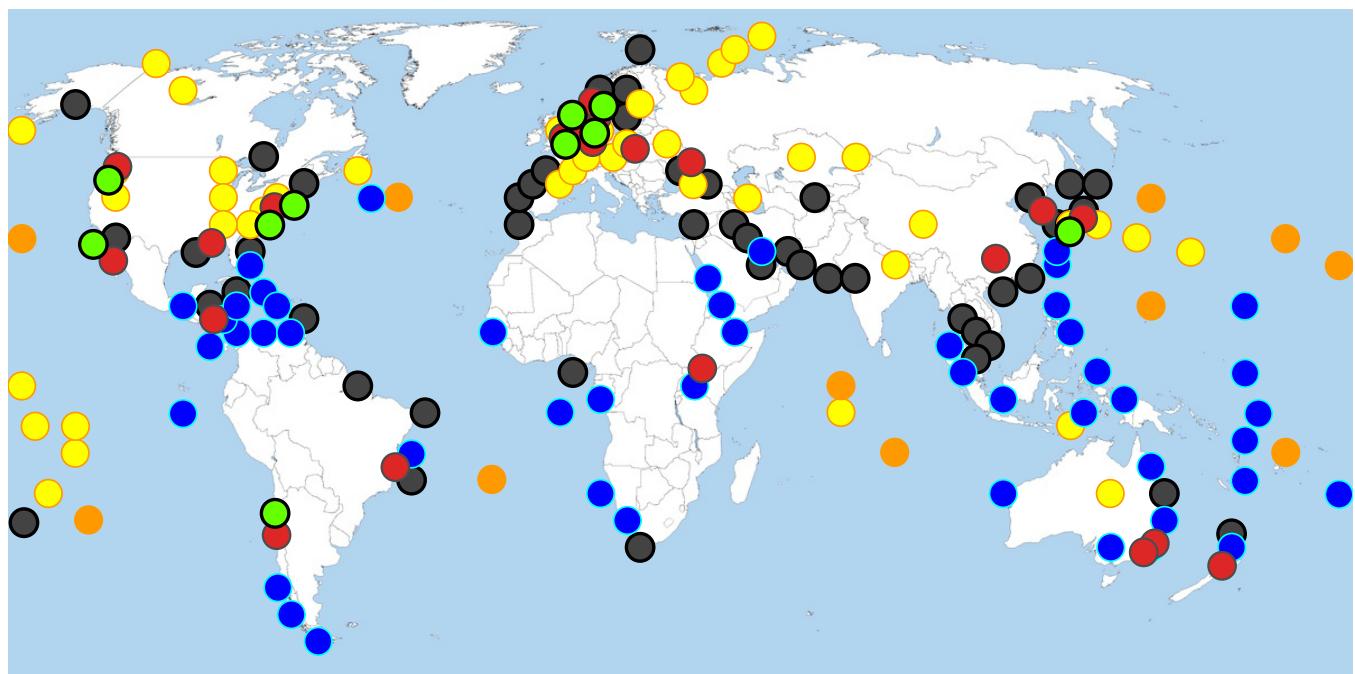


Hand collection on shore	Protei
Environment	
Health	
Social	
Efficiency	
Economic	

Map of major issues



Market and Protei network.



- Major Oil Spills, Spill risk
- Radioactive contamination / risk
- Plastic Debris Accumulation
- Overfishing, protected areas

- Protei Team and Collaborators
- Protei Prototyping facility

The Team

Protei - A Global Community



Cesar Harada



Cesar Minoru Harada 原田 実 (28) is an French-Japanese inventor and entrepreneur.



Cesar invented Protei, a ground-breaking sailing technology. Cesar is also the general coordinator of the future International Ocean Station. Former MIT Project leader, Cesar teaches Masters in Design & Environment at Goldsmiths University in London. Cesar graduated in 2009 from the Design Interactions course at the Royal College of Arts in London, his collaborative project Open_Sailing received the Ars Electronica Golden Nica award for the [NEXT IDEA].

TED Senior Fellow 2011

Visiting Tutor in Design & Environment, Goldsmiths University, London UK.
MPhil Candidate in Design & Environment, Goldsmiths University, London UK.
Social Entrepreneurs of New Orleans Accelerator Associate, USA

Fabrication team

A global network of makers and workshops.



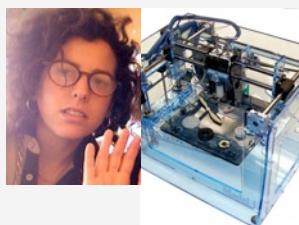
Location : London, United Kingdom | Zone : Europe
Local maker : Cesar Harada & Co

Harada has built most Protei prototypes to date and he now enjoys the big, wonderful and well equipped Goldsmiths University workshops in South London being a visiting tutor and PhD candidate.



Location : Rotterdam, The Netherlands | Zone : Europe
Local maker : Piem Wirtz & V2_

Piem is a Industrial Design graduate form Delft Institute of technology and is currently project manager at the V2_ Institute for the Unstable Media where she regularly uses a well equipped electronic laboratory, a nice wood and metal workshop. Piem is well surrounded by a lively community of makers and hackers in Rotterdam.



Location : New York, USA | Zone : North America
Local Maker : Gabriella Levine

Gabriella is a MA student at New York University / TISCH / ITP. Gabriella is maker and hardware hacker. She's been involved in countless DIY electronic project in the heart of the hyper active New York City and internationally.



Location : Oslo, Norway | Zone : Northern Europe
Local maker : Piem Wirtz & V2_

Etienne is a maritime engineer and Protei Academic Coordinator. He's working for the prestigious ocean engineering company Det Norsk Veritas and is currently setting up a fabrication unit Oslo



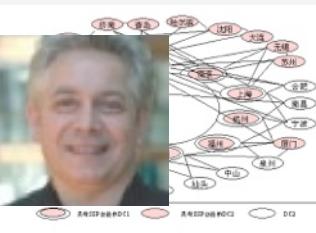
Location : Tijuana / Ensenada, Mexico | Zone : Central America
Aaron and Julia are permanent members of Amorphica Architecture and Design office in Tijuana. They coordinate Protei's activities in the region with the Universidad Autonoma de Baja California, Ensenada.



Location : Berlin, Germany | Zone : Europe
Sebastian Muellauer has been instrumental in making Protei_006 (3m). He's currently setting up a fabrication unit in Berlin in an old Industrial terrain.



Location : Japan | Zone : Asia
After the dramatic earthquake, tsunami and current nuclear crisis we have been in contact with several maker communities to develop Protei to sense radioactivity at sea in Japan. On the left, an image of Future Robotics Technology Center near Tokyo that are willing to partner in near future.

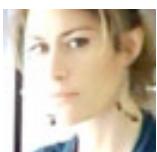


Location : Australia | Zone : Oceania
Dr Zenon Chaczko (Australia, Poland) with Peter Keen (New Zealand, UK) and Kasia Molga (Poland, UK) are producing the Artificial intelligence that is controlling multiple Protei agents. Dr Chaczko is Program Head of Information and Communications Technologies at the Sydney University of Technology.



In Korea (largest ship builder in the world) we work with randomwalks, we also have access to the East Africa cutting edge IT scene through *IHub_ in Nairobi, Kenya and many more places.

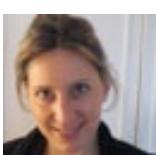
Protei Core Team.



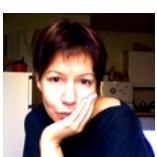
Project Manager, R&D coordination, Lisa Hyland (IR), lisa@opensailing.net
Has a degree in spatial design and is a qualified English teacher. She has worked in commercial design, print and web as both a designer and project manager.



General administrator and coordinator, César Harada's Assistant Hélène Rolin (BE), helene@opensailing.net. Studied communication and media. Experienced sailor. 4 years experience as Project Manager in charities, fine art, film production and marketing event in the UK and Internationally.



Communication and Business Strategy: Aurelie Vincent, aurelie@opensailing.net
Event coordinator / Sponsorship and Partnership / TEDx Planner at TEDx Basque Country
CEO & Founder at EMBODY / PR - Communication & Sponsoring at TEDx Paris
Past: Project Manager (World Policy Conference, FFSA, France 2025) at Euro RSCG Worldwide Events



Data Analyst and Visualization, Kasia Molga (UK/PL), kasia@opensailing.net
Artist/interaction designer working with live data visualisation, sensory and mobile technologies. Through visualising data of marine pollution, traffic and biodiversity she helps in assessing current situations of oil spills and prediction of the future disasters, gathered in a project called "Oil Compass".



Simulation and Math team, Gonzalo Tampier (Chile) gonzalo@opensailing.net
Gonzalo researches and teaches at the Institute of Naval and Maritime Sciences of Universidad Austral de Chile.



Lab Manager, Boris Debackere (BE), boris@v2.nl
Lab manager at V2 + Media and staff at the postgraduate program Transmedia (BE).



Head Engineer, Qiuyang Zhou (China, Denmark), qiuyang@opensailing.net
Mechatronics, University of Southern Denmark + Bachelor's degree of Mechanical Engineering.



Senior Ocean Engineer, Peter Keen (UK, NZ), peter@opensailing.net
Extensive technical experience in environmental observations and deep sea oceanography. Peter runs a marine science consultancy based on the Isle of Wight and is a visitor at the University of Southampton where he pursues an interest in biogeochemistry.



Engineer 1, Roberto Melendez (El Salvador, USA), roberto@opensailing.net
Student of Mechanical and Ocean Engineering at MIT (Massachusetts Institute of Technology).



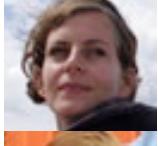
Engineer 2 : Logan Williams (USA), logan@opensailing.net
Student in Electrical Engineering at MIT.



Oil and energy Engineer , Alvaro Takiuti (Ne).
Regulatory Compliance Engineer at SBM Offshore / Gusto MSC.



Intern, Oil recovery : Francois de la Taste (FR)
2nd year student at Mines Paris Tech with a major in Engineering design and Management.



Video Documentarist: Toni Nottebohm (DE, ES) toni@opensailing.net
Video journalism, documentary filmmaking, advertisement and movie production.



Maritime architect, Fiona Crabbie
Naval Architect at Oceanco, Trainee Structural Surveyor at Babcock Engineering, Hydrodynamic Research Assistant at MARINTEK, Education: University of Strathclyde, Chalmers tekniska högskola.

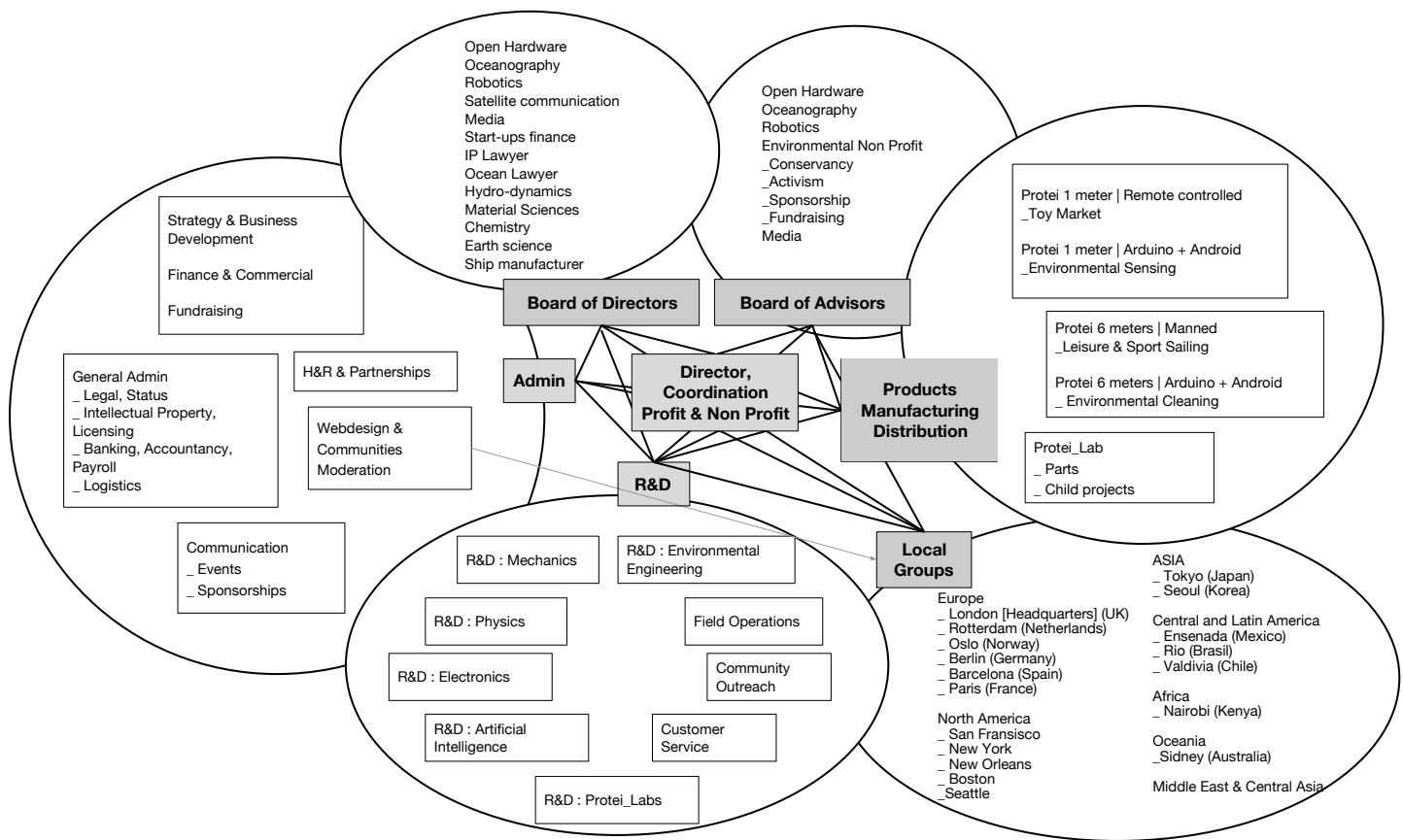


Data Analyst and Visualization, Sey Min (randomwalks, Korea), sey@protei.org
TED fellow 2011, fellowship in SENSEable City Lab, MIT, Cambridge. M.F.A in Computer Graphics and Interactive Media at Pratt Institute, NYC

Collaborators :

Matthew Lippincott Molly Danielson, Dillin Harr, Mario Saenz Kisoon Olm Sunghun, Jieun Yoo, Tyler Survant, Daniel Henneberger Maia Anthea Marinelli Daniel Henneberger Shah Selbe, Jiskar Schmitz Henrik Rudstrøm Sebastian Neitsch Fiona Crabbie Boris Debackere Kasia Molga Pinar Temiz, Julia Cerrud Giulia Garbin Alexia Boiteau Isidora Markou Hunter Daniel, Roman Yablonski, Aaron Gutierrez, Dr. Ing. Gonzalo Tampier Javier Henríquez Quezada Pr. Zenon Chaczko Philippe Noury, Joshua Updyke, Simon de Bakker, Pr. Jennifer Gabrys, Dr. Dominic Muren, Dr. Sarah Jane Pell, Narito Harada.

Organization chart



Appropriate production, transport, retail and customer service

The purpose of having Open Hardware technology is to provide Appropriate technology to local communities.

This technology is people centered; it helps local needs as well as taps into the local resources to fabricate this technology at a lower environmental impact and cost. In doing so it reduces the resources needed between point of use and making so that it becomes more environmentally sound and locally controlled. This helps to create a relationship between the maker and the people who use it thus setting up a local base for a local sustainable economy around the technology.

How can Protei help?

In Mexico and the problem of red tides uses appropriate technology with generate universities, architects and designers who take on the task of making and using this technology.

In Japan several robotic laboratories and a community of fishermen are interested in working with Protei to measure radioactivity off shore.

In the south of France a laboratory interested in testing the quality of water for recreational purposes.

In the south Pacific, the island of Palau is suffering from fish piracy. They are interested in using Protei to count fish stocks and locate the pirates to report to regulatory authorities.

In the Artic circle in the far north of Norway, Norwegian and Russian oil companies, are opening new oil fields in areas where there is no capacity of response due to very deep, cold and rough waters. Protei could provide an affordable on demand response to counteract this by intervening in less than 24hours, before it hits the coastline.

Local fabrication and distribution



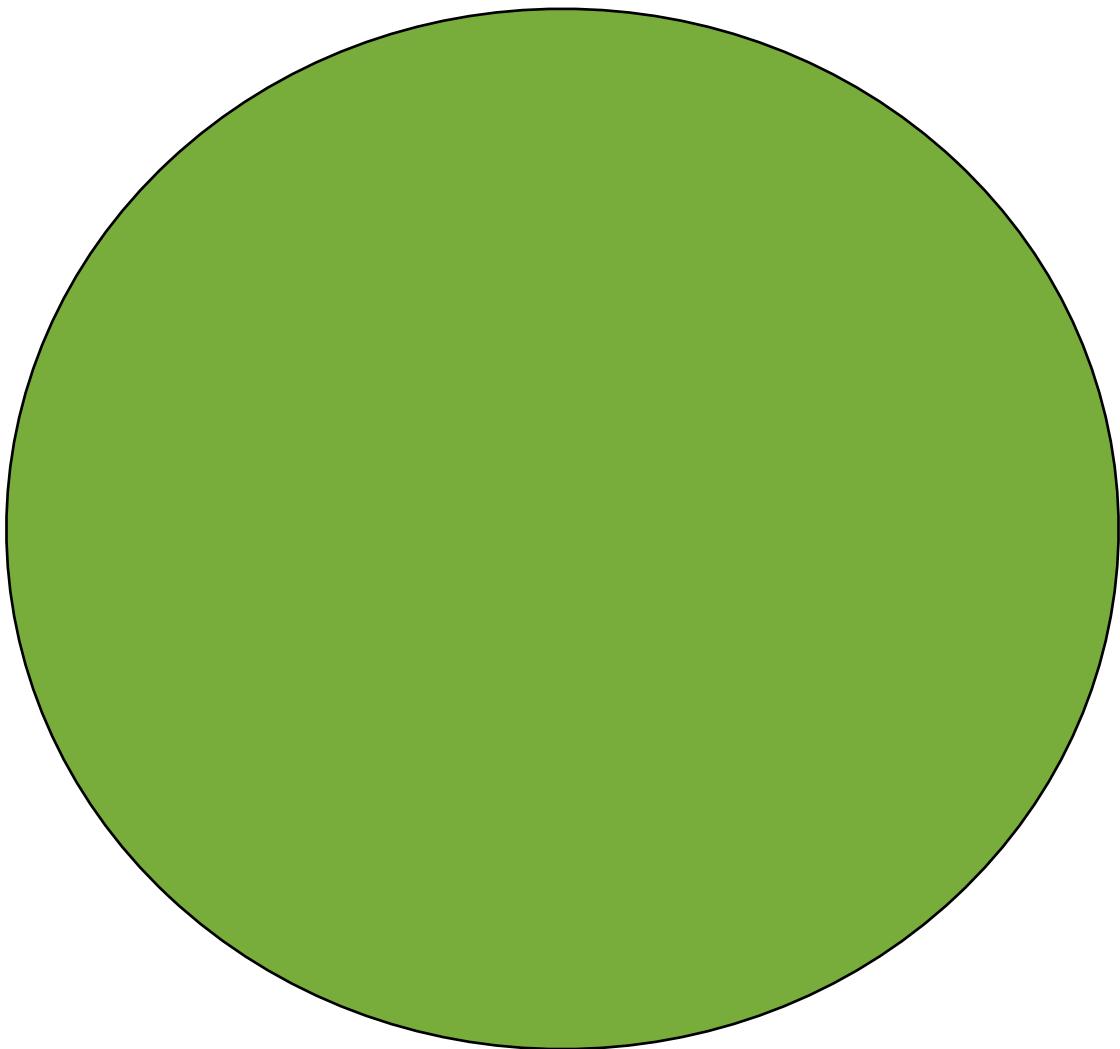
Global x Local = Glocal

After we have built and tested successfully prototypes, we are :

1. Optimizing the design for manufacturing, maximizing performance while minimizing environmental impact in the manufacturing process as well as in the "afterlife" of the product.
2. Set up manufacturing units close to the points of delivery with appropriate locally sourced materials and makers community.
3. Set up Customer services within the manufacturing units.
4. Publishing step by step instruction to make your own Protei. On Protei.org, on Instructables.com, Kickstarter.com, Itunes, pdfs
4. Set up retail agreements.
5. Set up transports and delivery.
6. Get pre-orders.
7. Manufacture on demand.
8. Deliver.

Product	Manufacturing	Transport	Retail	Customer service
Protei 1m Remote Control	Local and mass production	Air, Road	On-line stores, Toy Shops.	Hobby clubs
Protei 1m Arduino + Android	Local and mass production	Air, Road	On-line stores, Toy Shops	Hobby clubs, Electronic Societies
6m manned	Local and mass production	Road, Sea	On-line, Fairs, Boat and outdoor shops	Sailing club, Boat construction yard
6m Arduino + Android	Local and mass production	Road, Sea	On-line,	Labs, Universities

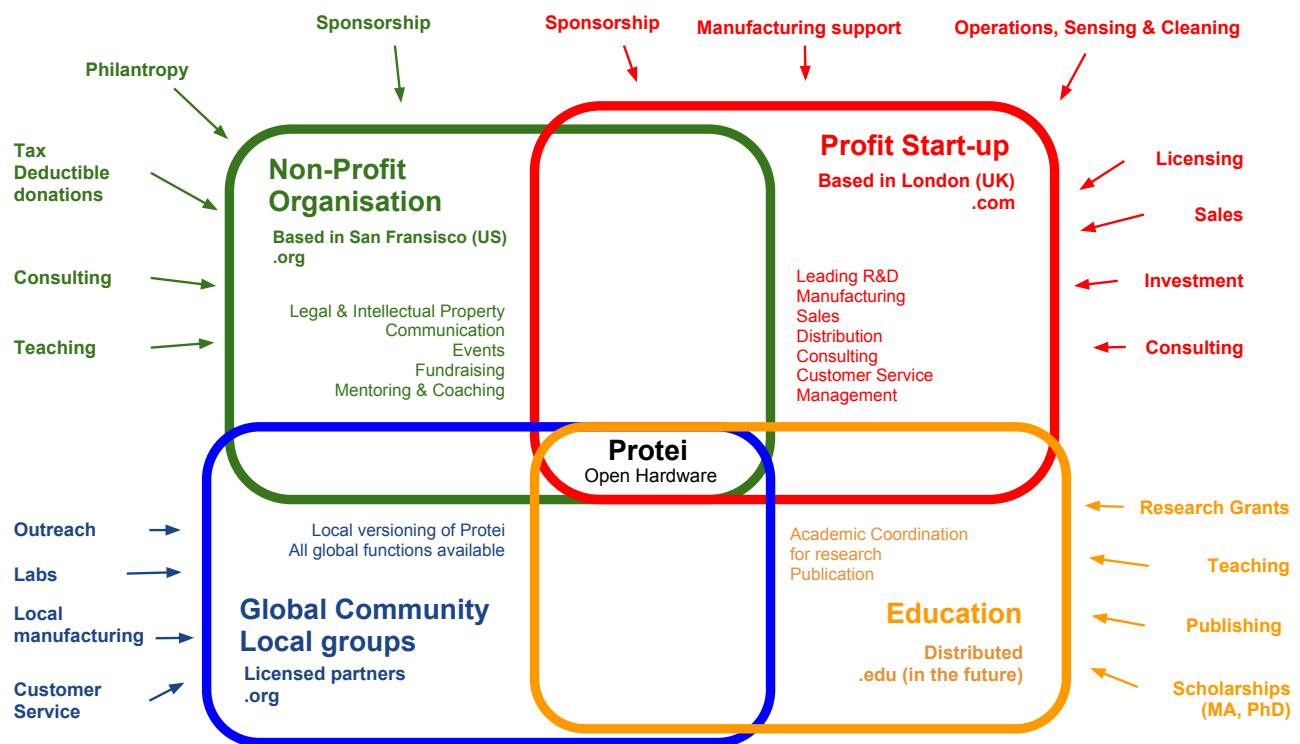
The idea is to start by one Protei main Protei unit that would do everything (Research & Development, prototyping, testing engineering, fabrication, delivery / retail, customer service) and progressively deploy multiple structures to have more functions.



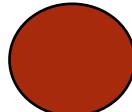
Legal



Status: Non-Profit, Profit, Academic, Partners



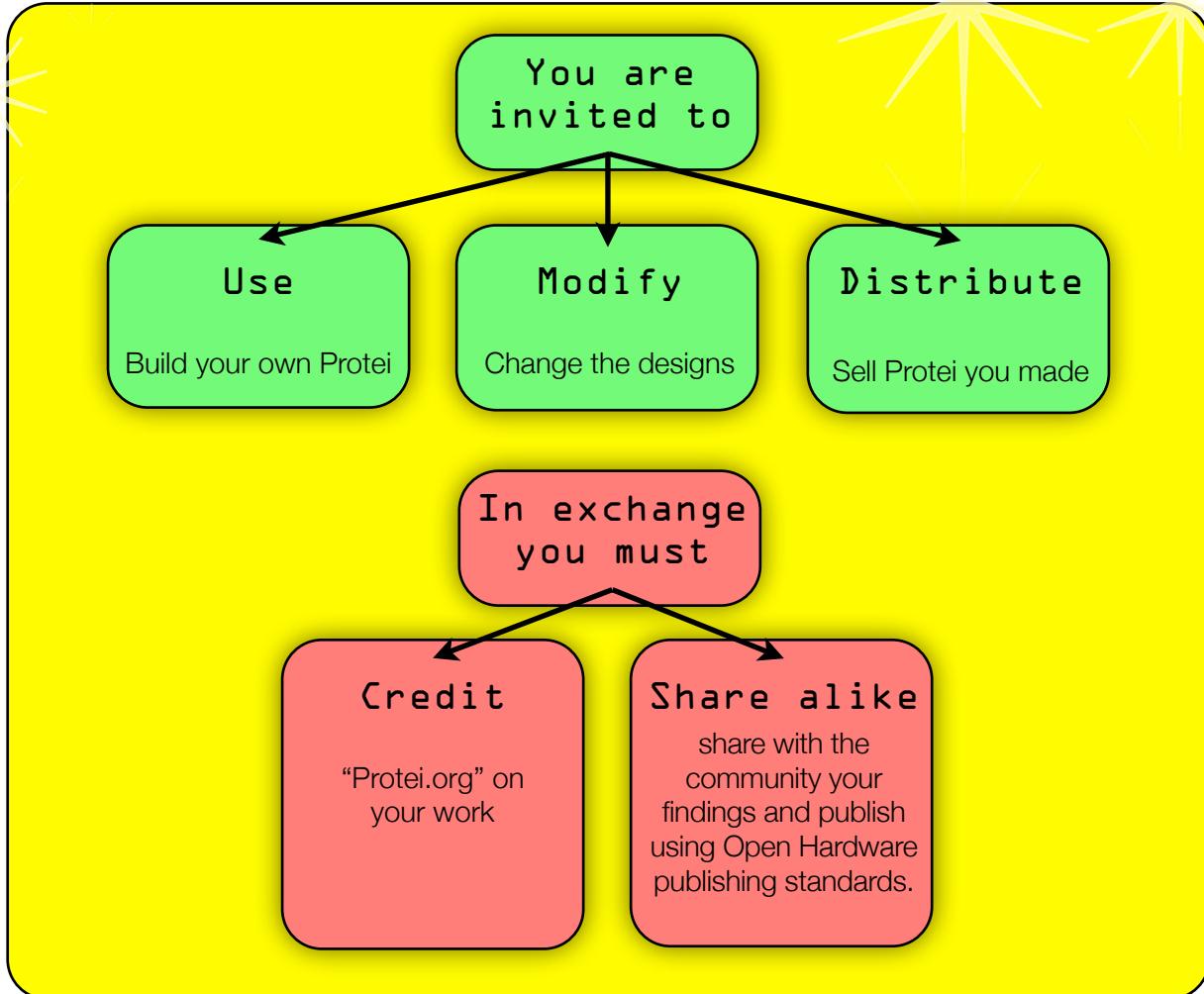
explain the graph



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 
---	--	--	---



Commercial use of Protei : Licencing

The monopoly of sharing. Success stories.

Phillip Torrone and Limor Fried presented in April 2010, 13 companies doing Open Hardware being \$1m + companies. They've estimated that by 2015, all these Open Hardware companies combined will have a turnover of over a Billion dollar by 2015. Open Hardware can be profitable, very.

If you do not believe in Open Hardware and think only the copyright system can help a technology develop, you do not know the business and Protei is not for you. If you want to learn about Open Hardware in business, please follow this link and be amazed.

goo.gl/Ycx4D

The companies listed below do more than a million \$ in revenue and are rapidly growing.

- ★ Adafruit, USA. <http://adafruit.com/>
- ★ Arduino, Italy. Over 150'000 Units sold. <http://arduino.cc/>
- ★ Buglabs, New York. <http://www.buglabs.net/>
- ★ Chumby, California. <http://www.chumby.com/>
- ★ Dangerous Prototypes, Netherlands. <http://dangerousprototypes.com/>
- ★ DIY Drones. <http://diydrones.com/>
- ★ Evil Mad Scientist Labs, Oakland. <http://www.evilmadscientist.com/>
- ★ Liquidware, Canton. <http://www.liquidware.com/>
- ★ Makerbot, Brooklyn. <http://www.makerbot.com/>
- ★ Makershed, Sebastopol. <http://www.makershed.com/>
- ★ Parallax, Rocklin. <http://www.parallax.com/>
- ★ Solarbotics, Calgary, Canada. <http://www.solarbotics.com/>
- ★ Sparkfun Electronics, doing well above 10 millions of \$ in revenue. <http://www.sparkfun.com/>

"You are what you share" Charles Leadbeater.

By opening our practice and technology, we naturally position ourselves as leaders. Ironically, by doing the best work and aggregating everyone's effort we establish a "monopoly of sharing". Not only do we create a technology, we create a community around the technology, - or to be more accurate- the community generates the technology. Our employees are our clients and vice versa, everyone contributes to make Protei better, the information circulates freely, innovation accelerates. It is not one company against the whole world, trying to sell its stuff trying to maximize the margin. No, it is a company that takes the energy of the whole world to serve the world. It is not a company with a purpose, it is a great variety of purposes that are made into a company.

Yet, we believe in compromise and use both traditional corporate methods as well as we evolve in the Open Hardware "bubble". But it is a bubble that will last. A good example of an open-source technology most of us depend on is UNIX. Today most computers run on that multitasking, multi-user computer operating system started in 1969 at Bell Labs, now protected and certified by "the Open Group" industry consortium so everyone can use it in the best way. Protei, and the innovation of a shape shifting hull is a paradigm shift.

We are not creating a new product. We are creating a new market.

Patented Commercial use of Protei Licensing

Protei is an open-source project.

Its design is constantly evolving. Protei community members are willingly participating and sharing unique skillsets. This collaboration depends on accessible information and affordable components, as well as the sharing of ideas in a open environment.

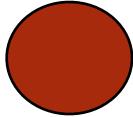
Protei is made of open-source hardwares and softwares for the control, power and communication — between the vessel and an operator on land, including Arduino, Xbee, and a variety of sensors. Many of the mechanical components and materials are extracted from consumer and industrial products, such as power drills, plumbing equipment and salvaged wood.

The entire workflow of Protei is based on an open-source approach. Rather than a hierarchical chain of command, people share their own ideas for each aspect of the project, including planning, budgeting, hardware, software, fabrication, design, and testing.

In order to successfully grow into a fleet of DIY drones that can have impact on the oceans, the team documented, distributed and shared information about the mechanical fabrication and electronic architecture. This feeds back into Protei's success, which depends on ongoing contributions to its design and functionality.

The Protei team encourages the use of these materials, and of all materials that we have documented online and elsewhere, for the purposes of furthering the development of Protei as a concept and a technology. We hope that users will document and share any and all progress made using our material. Please make sure to cite Protei by providing a link to our URL, <http://protei.org>.

The name of PROTEI is registered under the serial number 85339997 by the United States Patent and Trade- mark Office.



Strategy / Mutation

These are our main sources of income over the years, they will mutate. Being open source, it is likely that other manufacturers would start producing Protei cheaper than ourselves. In that case we'll focus back on the R&D. The goal stays clear : maximise environmental impact

2010 : Philanthropy

2011 : Sponsorship

2012 : Investment & Research Grant

2013: Manufacturing & Sales

2014 : Operations of sensing

2015 : Operations of cleaning

2017 : Consulting and improving the industry

Timescale

2012, 2013, 2014, 2015

	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 named	Build and lab test experiments	Build 1m Arduino + Android	Fundraising, Grant writing	Prepare launch event	
2012 Summer			Analyze and publish		Sponsorship Investors Partnership		
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			Analyze and publish		Manufacturing, Transport, distribution		
2013 Summer			Outdoor test		Fundraising	Launch 1m Arduino + Android	
2013 Autumn			Design experiments		Manufacturing		
2014 Winter			Lab test	Web App (Browser control)		Fundraising	
2014 Spring			Analyze, write	Mobile App (phone tablet)			
2014 Summer			Outdoor test	Protei 1m Arduino + Android	Protei 6m Arduino + Android		
2014 Autumn			Design		Recruit, scale up, Strengthen network and operations	Marketing, Sponsorships Partnerships Investors	
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.

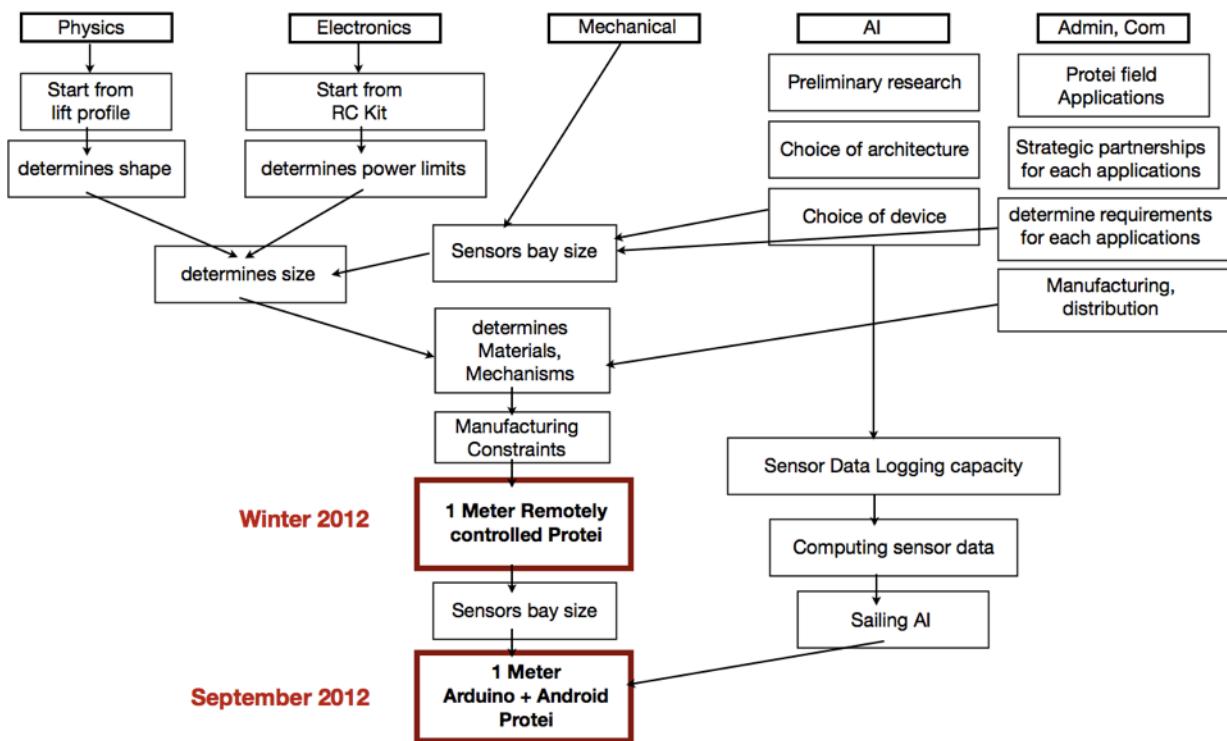
→ **Product D** release of Protei 6m Android + Arduino.

→ **Prototypes C D** new generations
Products A B new generations

→ **Prototypes A B** new generations
Products C D new generations

R&D Logic sample

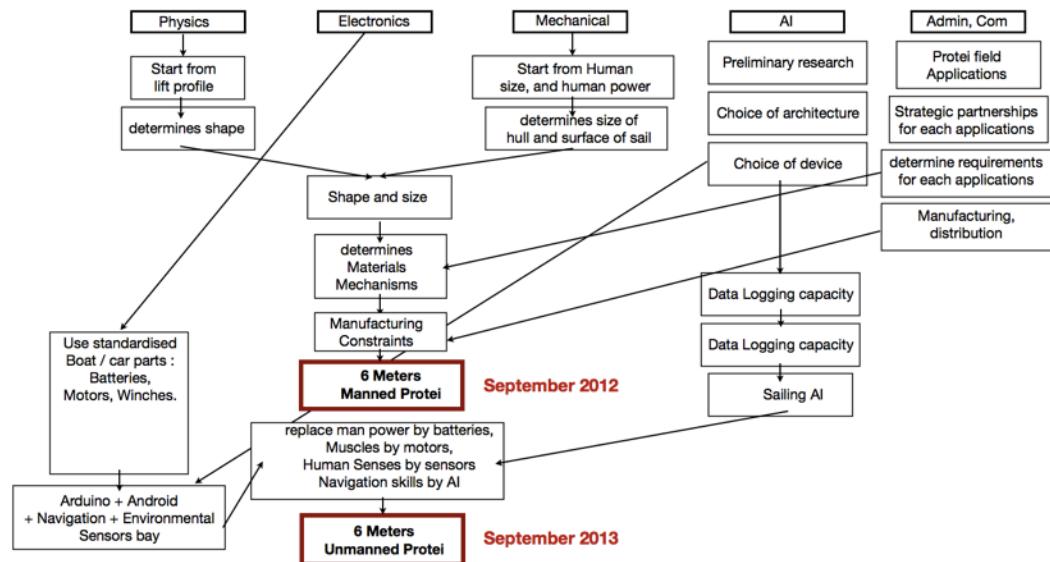
Develop Protei 1m Remote Control -> Arduino + Android



The above graphic shows the development of Protei 1m Remote Control.

The hydrofoil profile determines the shape, the RC kit the size and power. Add to this a sensor patch bay and extra room for batteries. In the upgrade, the Remote Control kit would be replaced by an Arduino + Android phone.

Develop Protei 6m Manned and Unmanned



The above graphic shows the development of Protei 6m ...

Build a 6m Protei that a human being can sail.

Replace the human muscles by motors, energy by batteries, senses by sensors and intelligence by a micro-controller

Finance

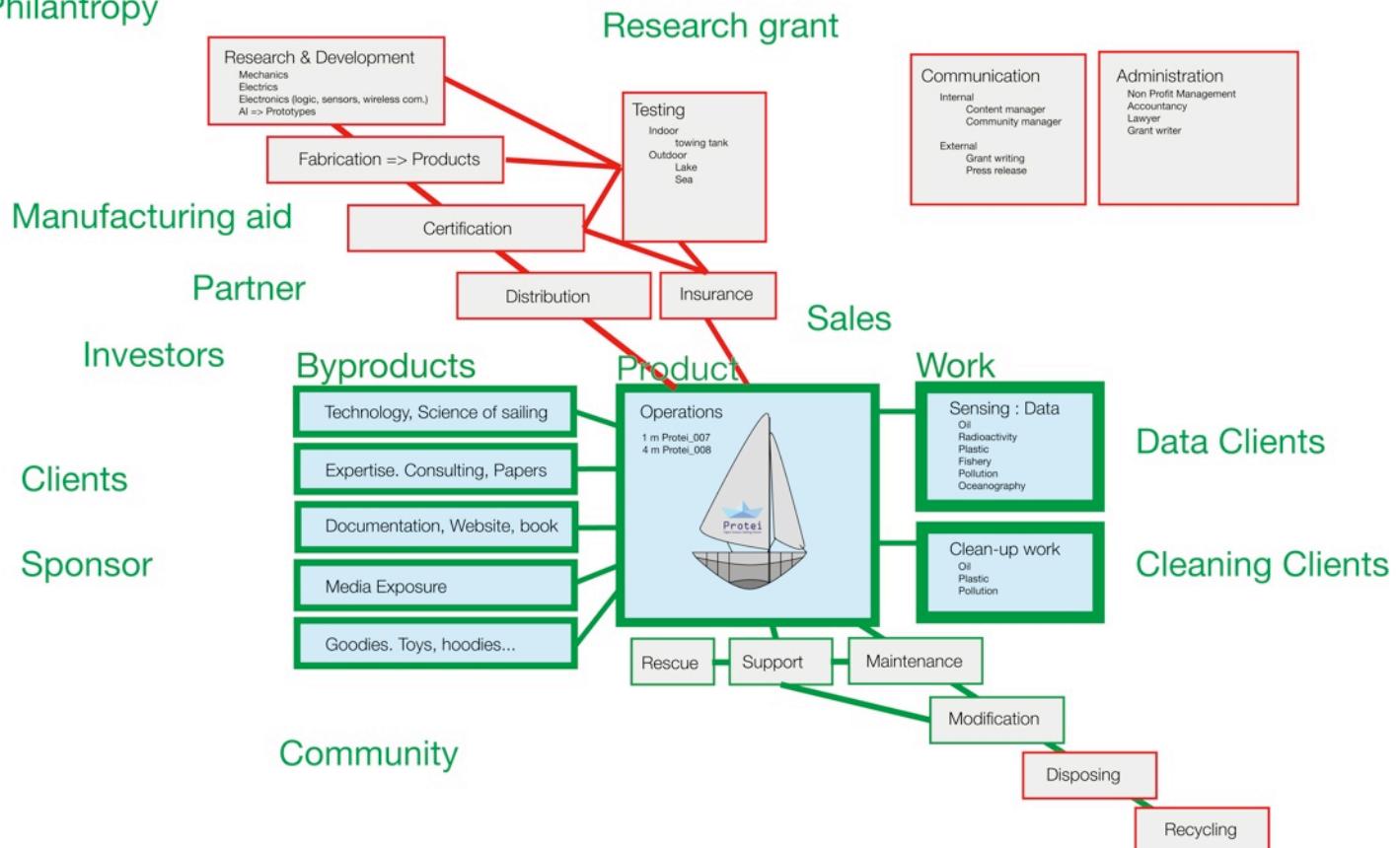
1. Lifecycle

Economical inputs and output for one machine.

Process with cost **VS** product or service we can sell

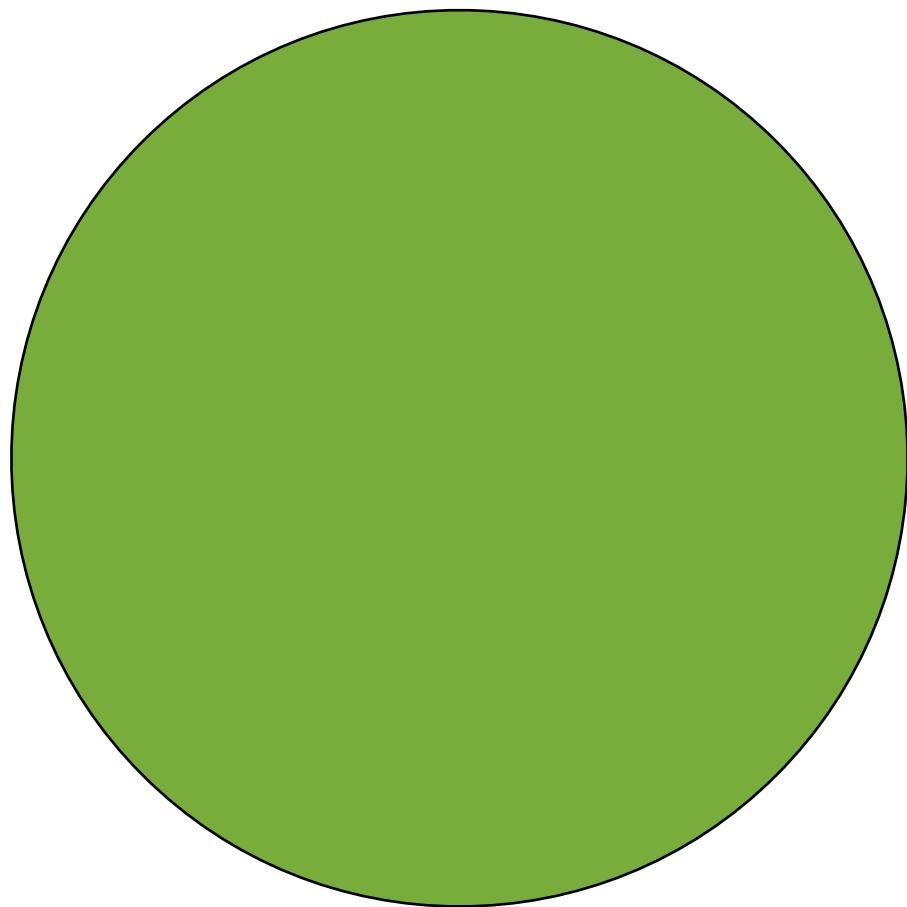
Donations (tax deductible)

Philanthropy



Explain graphs

Type to enter text



2. Plan

2012

Developing a new technology

Description	Mvt	% of total debit / credit
R&D (Mechanic, Electronic, AI, Physics, Tests)	-500 k€	35%
Admin (IP, Insurances, Certification, Community management)	-150 k€	11%
Communication (Events, Marketing)	-200 k€	14%
Manufacturing	-300 k€	21%
Transport	-50 k€	4%
Operations	-50 k€	4%
Customer Services	-20 k€	1%
Taxes, Export	-150 k€	11%
Sales	+ 125 k€	7%
Operations (Ocean Sensing, Cleaning)	+10 k€	0.7%
Byproducts (documentation, merchandise)	+ 5 k	0.3%
Sponsorship	+ 700 k	41%
Investment	+ 600 k	35%
Consulting	+ 15 k	1%
Philanthropy, Donations	+ 40 k	7%
Competitions, grants, prizes	+ 200 k	12%
Benefit 2012 : + 275k€		-

Protei 1m RC : 50 units produced, 25 sold 1k\$/piece = 25 k€

Protei 6m Manned : 10 units produced, 5 sold 20k/piece = 100 k€

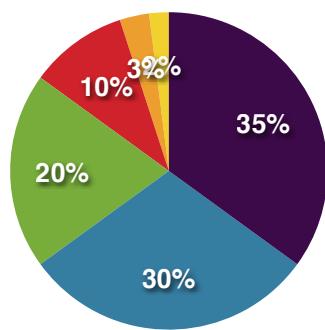
Close up on R&D, Admin & Com spendings

Total R&D Budget for 2012 : 850 k€

That includes personal, space, machines, testing.

• = 1 employee

Director 4000/monthly	Exec 3000/m	Senior 2500/m	Junior 2000/m	Intern 1000/m	Volunteer Freebies Extras	yearly budget personal	Space, tools, materials	Annual dpt. budget
Director •	Mechanical	•		•	•••	90 k€	100 k€	190 k€
	Physics	•			•••••	30 k€	40 k€	70 k€
	Electronic		•	•	•••••	30 k€	40 k€	70 k€
	AI •			•	•••••	45 k€	5 k€	50 k€
	Admin •	••			••	100 k€	50 k€	150 k€
	Com •		••	•	•••••	80 k€	120 k€	200 k€
	1m	•		•	•••	45 k€	10 k€	55 k€
	6m	•		•	•••	50 k€	15 k€	65 k€
TOTAL YEARLY BUDGET						470 k€	380 k€	850 k€



- Executive
- Director
- Senior
- Junior
- Intern
- Volunteer

Bonus for Protei Team from annual profit growth

Protei team members are interested in their company growth. For instance, in the year 2015 with a profit of 5555 k€, 15% goes to the Protei team, 833 k€. The senior level receives 20% of this, 166 k€. Between 10 employees at senior level, that is an annual bonus of 16.6 k€ / capita. That is $1.4 \times 16.6 = 23.24$ k€ / month + Extras. That is an annual 46.800 € yearly + Extras.

Extras

Protei's employees are encouraged to work outside as consultant to spread Protei technology as Open Hardware with a maximum 20% of their "normal" working time, Protei company taking 20% of their net external income as consultant (to avoid double payments).

2013

Description	Mvt	% of total debit / credit
R&D (Mechanic, Electronic, AI, Physics, Tests)	- 800 k€	24%
Admin (IP, Insurances, Certification, Community management)	- 200 k€	13%
Communication (Events, Marketing)	- 400 k€	12%
Manufacturing	- 800 k€	24%
Transport	- 300 k€	9%
Operations	- 300 k€	9%
Customer Services	- 100 k€	3%
Taxes, Export	- 420 k€	6%
Sales	+ 660 k€	13%
Operations (Ocean Sensing, Cleaning)	+ 50 k€	1%
Byproducts (documentation, merchandise)	+ 20 k€	0.5%
Sponsorship	+ 1500 k€	30%
Investment	+ 1800 k€	37%
Consulting	+ 90 k€	2.5%
Philanthropy, Donations	+ 300 k€	6%
Competitions, grants, prizes	+ 500 k€	10%
Benefit 2013 : + 1600 k€		-

Protei 1m RC : 300 units produced, 200 sold 0.9k\$/piece = 160 k€

Protei 1m Arduino + Android : 100 units produced, 0 sold

Protei 6m Manned : 50 units produced, 40 sold 15k/piece = 600 k€

2014

Economical inputs and output for one machine.

Description	Mvt	% of total debit / credit
R&D (Mechanic, Electronic, AI, Physics, Tests)	- 1500 k€	20%
Admin (IP, Insurances, Certification, Community management)	- 250 k€	5%
Communication (Events, Marketing)	- 400 k€	8%
Manufacturing	- 1500 k€	30%
Transport	- 450 k€	9%
Operations	- 800 k€	16%
Customer Services	- 200 k€	4%
Taxes, Export	- 750 k€	8%
Sales	+ 3080 k€	33%
Operations (Ocean Sensing, Cleaning)	+ 150 k€	2%
Byproducts (documentation, merchandise)	+ 30k€	0.5%
Sponsorship	+ 2000 k€	21.5%
Investment	+ 2500 k€	27%
Consulting	+ 120 k€	1%
Philanthropy, Donations	+ 400 k€	4%
Competitions, grants, prizes	+ 1000 k€	11%
Benefit 2014 : + 3430 k€		-

Protei 1m RC : 1'000 units produced, 800 sold 0.7k\$/piece = 560 k€

Protei 1m Arduino + Android : 800 units produced, 600 sold 1 k\$/piece = 600 k€

Protei 6m Manned : 200 units produced, 160 sold 12k/piece = 1920 k€

Protei 6m Arduino + Android : 8 units produced, 0 sold

Total Sales : 3080 k€

2015

Economical inputs and output for one machine.

Description	Mvt	% of total debit / credit
R&D (Mechanic, Electronic, AI, Physics, Tests)	- 1000 k€	15.5%
Admin (IP, Insurances, Certification, Community management)	- 250 k€	4%
Communication (Events, Marketing)	- 400 k€	6%
Manufacturing	- 2000 k€	31%
Transport	- 550 k€	9%
Operations	- 1500 k€	22.5%
Customer Services	- 300 k€	5%
Taxes, Export	- 420 k€	7%
Sales	+ 3160 k€	23%
Operations (Ocean Sensing, Cleaning)	+ 200 k€	1% (input from grants)
Byproducts (documentation, merchandise)	+ 35k€	0.2%
Sponsorship	+ 2200 k€	15.8%
Investment	+ 2700 k€	19%
Consulting	+ 180 k€	1%
Philanthropy, Donations	+ 500 k€	4%
Competitions, grants, prizes	+ 3000 k€	36%
Benefit 2015 : + 5555 k€		-

Protei 1m RC : 1800 units produced, 1'650 sold 0.34 k\$/piece = 560 k€

Protei 1m Arduino + Android : 1000 units produced, 800 sold 1 k\$/piece = 600 k€

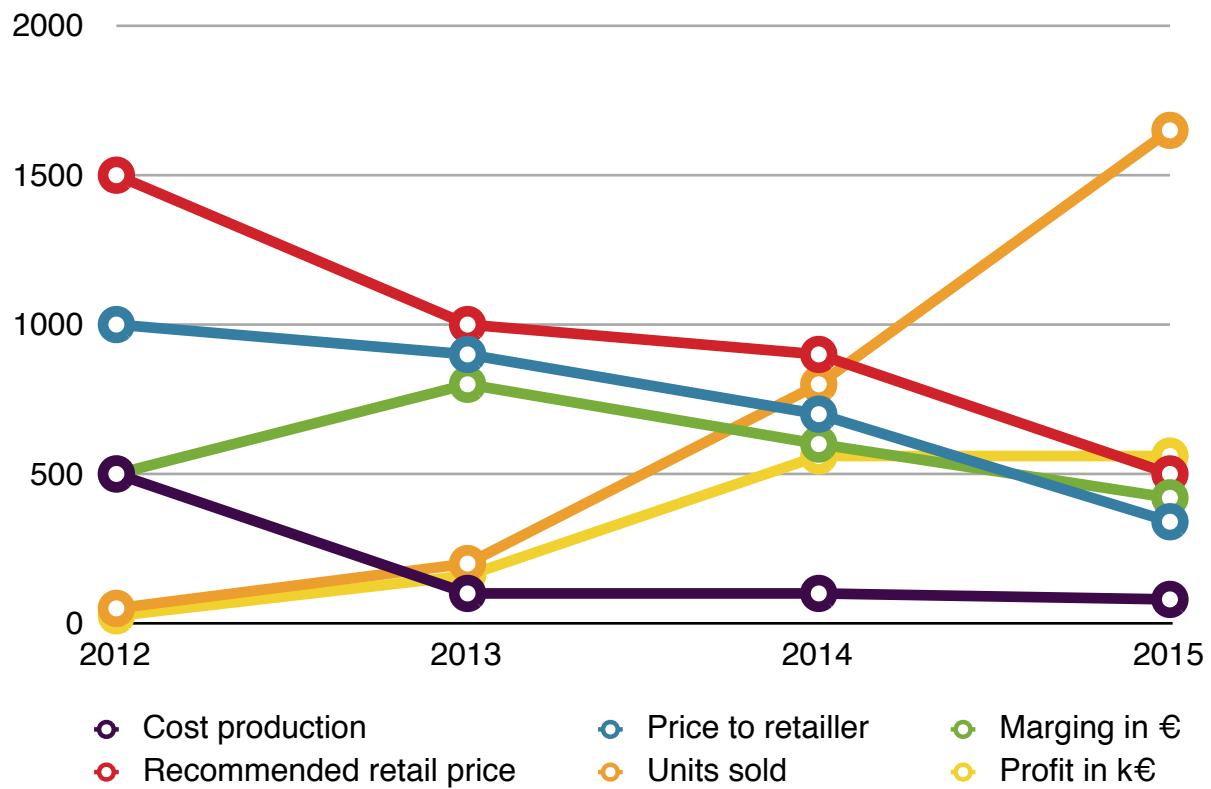
Protei 6m Manned : 300 units produced, 250 sold 10k/piece = 1920 k€

Protei 6m Arduino + Android : 8 units produced, 4 sold 20k/piece = 80 k€

Total Sales : 3160 k€

From cost to retail price

Sample of Protei 1m Remote Control

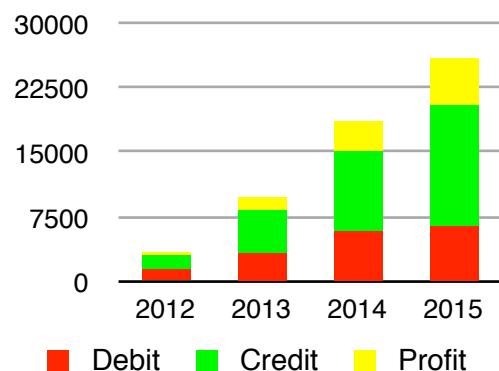


As the number of pieces produced augments, the manufacturing cost decreases. As the manufacturing cost decreases, we are able to sell our machines cheaper in larger quantities. Timing and pricing are key, as well as dates of release. Our goal is to maximize our positive environmental impact while being competitive on our sales. It also implies selling Protei at the right people for the right purpose from start. Every year, part of our production of unit is kept to be given at strategic groups and some more units for ourself for endurance test and swarm application development + Demos in public events (communication and strategy).

Growth

Reaching sustainability as a business in 3 years

	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.

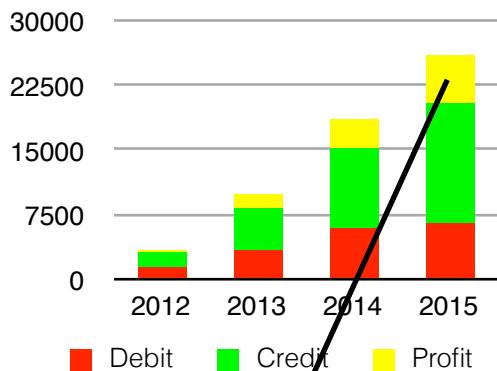
2013: We start a small industrial production of Protei. The second year, following our first proof of concept, the money comes mostly from investors and still from sponsorship. We start to have many collaborators abroad using Protei for science purposes, the technology is getting better fast thanks to 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.

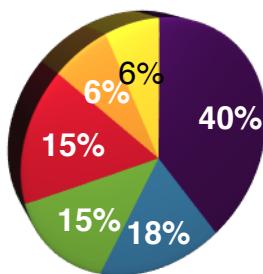
2015: We have proven our efficiency at sea navigating many miles and our production of units has a steady increase. We participate large international Ocean Observation programs, Protei "toy". is massively present in stores, Protei Articulated gets bought by avant-garde sailing clubs. We become a sustainable 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.

Sharing growth

Economical inputs and output for one machine.



	2012	2013	2014	2015
Profit	275 k€	1600 k€	3430 k€	5555 k€
Growth rate	-	+ 481%	+ 114%	+62%



- Investors
- Taxes (Non profit funding)
- Protei Team
- Protei Capital
- Protei Community
- Protei Investment

Profit distribution

Protei shares its growth with the people that make Protei thrive.

40% of annual growth goes back to our investors.

Of course, we happily participate to the location and state we are hosted by : Taxes : 18%.

15% goes to the Protei team according to their ranks (bonus).

15% goes to the capital growth of Protei.

6% goes to the large Protei community of volunteers and for projects of development based on Protei's technology.

6% goes to the growth of Protei (space, tools, partnerships)

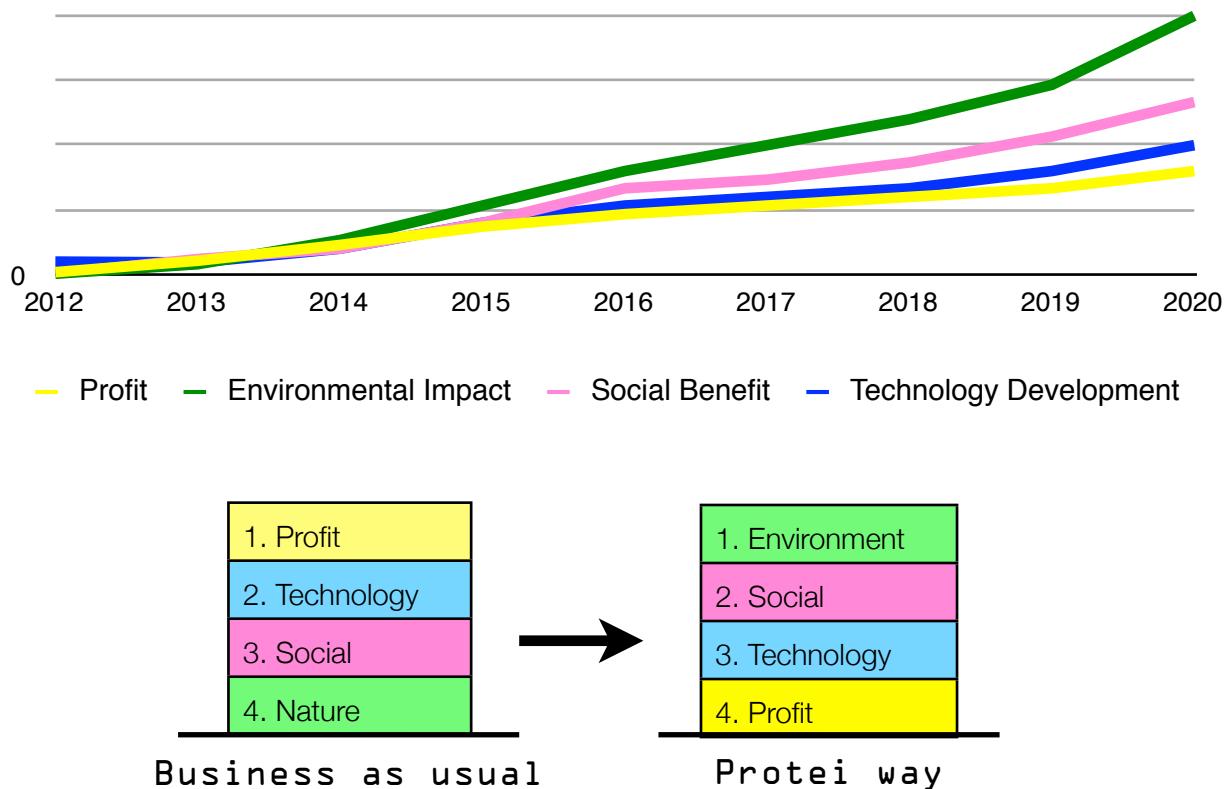
Return on Investment

The percentage indicated above is a desired distribution of growth at the horizon of Protei being a sustainable business generating most of its income with its sales, operations and byproducts (rather than investment). For the first years, the expansion of the capital of Protei may be important but largely supported by investors. It is a healthy Protei company developing mature technology that will generate really interesting returns for our investors. That means slow return on investment in the first years, much bigger ones in the following years. We want to offer a guarantee on the return on investment in the 3 first years with a minimum percentage growth on investment to be negotiated with the admin team of Protei. After 3 years, the percentile annual growth of return on investment should match the profit growth (+62%), totaling an 4 years average growth of 15.5% yearly.

Investing in Protei is also an investment in the environment, the social and technology development, for a technology that can be used by everyone for greater good.

What growth means

Economic sustainability to maximize Environmental impact, social impact, and technological development.



We have a different agenda.

Financial sustainability. It is important for us to rely on the value of the work we do (ocean sensing, cleaning, sailing for leisure, hobby) more than aid on which we may rely initially. That is why Protei is set up as a company, a non-profit, an academic structure and an informal makers network. The purpose of economic sustainability is to serve environmental purposes, for the benefit of the broader Protei community and develop a technology that can be used by us and many others.

Environmental Impact. Our interests sit outside ourselves. Our first priority is to serve environmental purposes because it impacts not only our community but the whole planet.

Social impact. We love our people as well as we love to meet new people, growing Protei community as a rich and diverse pool of people who wants to have a positive environmental impact.

Technology development. We are a technology company, and it means that we produce technology, but technology is our means, not our end. We focus on innovation generated by the community, When Protei will be a mature technology, we are eager to diversify our range of services and products on the same open-hardware and community generate innovation model.

Over the course of the next months we will develop ways to asses our environmental, social and technological impact outside Protei team.

Externalities



Open Hardware and Appropriate Technology is the combined answer.

Environmental impact and social impact are usually qualified as externalities within a company budget or business plan. Protei in its first years of development needs to clearly quantify the externalities and internalize them as an added value to the product that is here for the benefit of the environment and the community.

In some cases having this information is a requirement if we want to be eligible for carbon offsetting related grants. The idea is not to build a business and try to make it green afterwards, the idea is to build a green business with a green vision, strategy and every day choices.

The goal is not to minimize our impact on the environment. The goal is not to offset a fraction of the negative effect we have on the environment. The goal is to go way beyond offsetting. The goal is to study and "repair" our oceans. We are talking about "beyond offsetting", "beyond conservation".

Can we make a machine that by its work offsets its own fabrication?

"According to NREL (the National Renewable Energy Laboratory), the truth is a PV polycrystalline module will produce enough clean power in about four years to offset the energy required to manufacture it. You unfortunately have to consume a little energy to save a lot more."

<http://www.renewableenergyworld.com>, Feb 2011

We do not know yet the environmental cost of producing Protei on the industrial level since we have not yet come to the point where we have a design ready for manufacture, so neither do we know who is going to manufacture it - if not ourselves.

Why Open Hardware?

Why Appropriate technology?

3. Sponsoring

Proud to support Protei

Protei is proud to have you on board.

As a sponsor of Protei you will be welcomed into an international community of experts from a number of fields, each with a wealth of experience and who is highly pro-active and passionate about achieving a common goal.

You have a unique opportunity to work with us and have a direct impact on the environment and the global community. This impact is twofold, by helping local communities a global change can be achieved.

Our long-term objective is to contribute to existing observation systems and have more effective, ocean sensing equipment that will enable oceans to be monitored and protected from man-made disasters such as oil spills, radioactivity, plastic waste, overfishing and natural disasters such as red tides.

This is the key to improving water quality and ensuring longevity of our oceans.

In the medium term we are in the process of developing an ocean-cleaning device for dealing with the fore-mentioned issues when they occur. This has a direct impact initially on local communities. By assisting them and offering solutions at a local level we are empowering these communities to react and act quickly and effectively, this in turn impacts the global community and creates a faster and more efficient reaction time to these problems.

Running concurrently with these main objectives we are developing awareness of these issues firstly through the brand by targeting the recreational market. Communicating to people through sports and hobbies means increasing our target market thus greater exposure to our cause and a platform from which to inform, educate and create interest. It helps to create a personal awareness of a global issue.

Sponsorship enables Protei to realize its goals by supporting the cause as it evolves. There are three types of sponsorship, Visionary, Innovator and Pioneer. At Visionary level the sponsor joins Protei in having the largest environmental impact by providing the resources to support Protei in achieving all its goals. For the Visionary sponsor the greatest media exposure is offered to their brand in terms of advertising and visibility of brand throughout the marketing suite.

Most importantly a Visionary sponsor will have the most prominent brand placement on Protei's prototype. Images of the prototype used in publication and on the internet has already been....

Protei will continue to attract media attention and promote awareness through interviews, talks, articles, forums in a number of areas such as.....Events will include sponsors brand on posters, banners, merchandise. Brand will be prominent on web suite which includes;.com, .org, .cc, ...

Events

Celebrate together.



Protei within the Media

An innovation that gets noticed

NewScientist



TED

GOOD

theguardian



THE HUFFINGTON POST

Zeilen

FAST COMPANY

VOGUE

nature.com



VICE

Protei is generously covered by mainstream media as well as specialised press.

Public presentations

2011 Open Hardware Summit (NYC), TED2011 (LA), Wereldhavendagen (Rotterdam), TEDxMidAtlantic (Washington DC), TEDxSeeds (Yokohama), TEDxBasquesCountry (FR), TEDxSanDiego, TEDxOrlando, TEDxLoire (FR), Networked Fabrication, Universidad Iberoamericana Ensenada (Mexico), Hongik University, Seoul (Korea), Korea National University of the Arts (Korea),

Prizes, competitions : VIDA Artificial Intelligence Prize, Fundacion Telefonica (Spain), Open_Sailing won the Golden Nica at the Ars Electronica (Austria). Maker faire Label (USA)...

Exhibitions : Maker faire, New York (USA), INDAF Incheon (Korea), Tokyo Midtown Design Touch (Japan), Weather Tunnel, Translife, Triennale of New Media Art, National Museum of art Beijing (China), World Port Day & World of Witte de With (NL), ARCO Madrid (SP), haus Der Kultur der Welt (DE), Cultura Digital (Brasil), Datapolis, Prag (Czech Republic), Tracing Mobility, Haus Der Kultur Der Welt, Berlin (Ge), Surface Tension: The Future of Water, The Science Gallery Dublin (Ireland), Strata Mini Maker Faire in New York, NY (USA).

Workshops : Science gallery Dublin (Ireland), Nabi Art Center, Seoul (Korea), Department of Architecture Milwaukee (USA), Hongik University (Korea)...

General medias : CNN, VICE TV, Vogue Man Italy, Good.is, Treehugger, Guardian, FastCompany,

Specialized press New Scientist, Physorg, DIYdrones, MakerFaire Daily, Zeilen.

We have our own publications :100 Pages Protei handbooks, 4000 handouts printed and distributed in NL.

Press in general: Next Nature, Huffington Post (as part of the 18 great ideas of 2011 that will shape 2012), The Scuttlefish (Brian Lam), Kasia Molga, Oil Compass on FashioningTech, Motherboard TV (VICE), CNN (by Sean Yeaton), Motherboard.tv deputy editor (Innovations), Innovation Daily, Frog Blog, Gizmodo, Geek Week (Poland), Strata Conference, Mini Maker Faire, Maker Faire Daily, Scientific American Blog, Neuro-Science Blog, Stern Deutschland, New Scientist, Clean Technica, Physorg.com, Good.is, Treehugger, Guardian (UK), Fast Company, InMojo (Japan), Sustain at work.fr (french), gulfspilloil.com, Hack a day, Gizmologia (spanish), Oxerjen.

TV, Radio : CNN, Motherboard TV, WWOZ New Orleans (USA), Piradio.de, RadioCorax (DE)

Protei is extremely active on social medias.



Using crowd-funding and open source platforms for global



Protei in 2012

Public presentations/ talks:

Turner Contemporary, Late Night Live: Elemental, February 2012, UK.

ARUP, Engineering Company, march 2012, London.

TEDxSummit, April 2012, Doha.

Participation in Prizes, competitions :

Tech awards

Exhibitions / workshop / Event :

ARCO, Fundacion Telefonica, February 2012, Madrid. Protei 6m unmanned launch in San Fransisco Bay

Nat, Liedts-Meesen Foundation, March 2012, Belgium.

DEAF, May 2012 Amsterdam.

Pixelache, May 2012, Helsinki.

Rio de Janeiro Rio 20 +, BricoLab, Fed Uni of Rio de Janeiro , June 2012, Brasilia.

Olympics Games, Floating Futures, August 2012, London.

BLUE Ocean Film Festival, September 2012, California.

Open Word Forum, October 2012, Paris.

San Francisco Protei's launch, America's Cup, October 2012, San Francis.

TARA Expedition

Ars Electronic, September 2012,

IMAC, November 2012, Denmark

24 Hour Protei Challenge

General medias :

Specialized press:

Press in general:

TV, Radio :

Nature.com ? January 2012.

Sponsorship Pricing

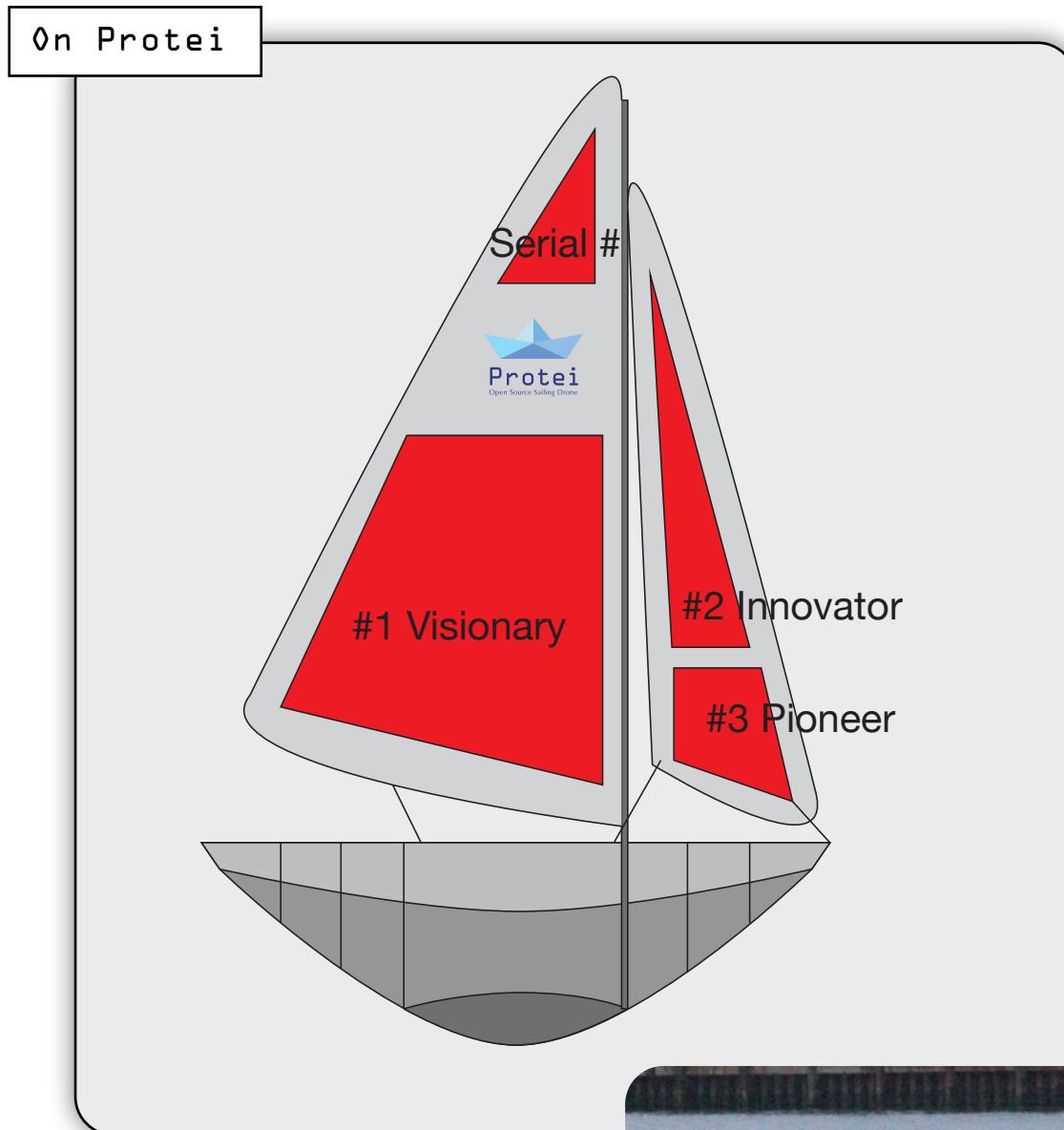
Share our exposure

Pricing as off Dec 2011, subject to change.

	Visionary	Innovator	Pioneer
	800k€	500k€	250k€
On Protei			
6m manned sail			
- prototype	x	x	x
- product	x	x	
- racing	x	x	x
6m unmanned Sail			
- Prototype	x	x	x
- Product	x		
1m RC			
- Prototype	x	x	x
-Product	x	x	
1m Arduino Android			
- Prototype	x	x	x
-Product	x		
Edition			
- advertising 1 page	x		
- adv. ½ page		x	
- Logo	x	x	x
Off Line Print / branding			
- T-shirt/ hoodie	x		
- jackets	x		
- ..			
On Line Web			
- on Protei website			
- adv.			
- link + article			
- logo			
- On your website			
On Site (Event)			
- Pop up shop	x		
- Communication visibility (Logo)	x	x	x

Sponsors visibility

Share our exposure





Our events

Protei will have a range of events to suit our different markets. For events and exhibitions we will have, banners, posters, a range of T-shirts, caps, hoodies, pens and bags.

In addition to these diaries, mugs, key rings, hats, towels, jackets and umbrellas will be sold through the website. Products will come in a range of colours with the Protei logo on the front with the sponsors / investors logo on the back. Visibility will vary depending on sponsorship / investment package.

Our Merchandise

Protei will have a range of merchandise to suit our different markets. For events and exhibitions we will have, banners, posters, a range of T-shirts, caps, hoodies, pens and bags.

In addition to these diaries, mugs, key rings, hats, towels, jackets and umbrellas will be sold through the website. Products will come in a range of colours with the Protei logo on the front with the sponsors / investors logo on the back. Visibility will vary depending on sponsorship / investment package.

Our Publications

Over time there will be a number of publications. Initially there will be a book explaining Protei technology, a parts list for machines, a user manual for products.

Again visibility will be allocated as above for both sponsors and investors.



Our website

Investors and sponsors will hold a page on our websites. This suite will reach a vast and diverse market. Initially this includes,

- .net (main holding page to other domains)
- .org (community - research development)
- .com (for commercial)
- .cc (creative commons)

In time .tv (visual streams) and .fm (sound streams) will also be added.

4. Invest in Protei

Grow with us.

Protei is offering a unique opportunity to be a part of something that will have a huge environmental impact. Protei offer a different approach to the way an environmental project is organised. What allows Protei to have the greatest impact and be cutting edge it is not just its innovative technology but also the way we do business. By working with us you will be part of new business structure, one that benefits all parties by maximizing its resources and productivity. It does this through having experts in its field who produce innovative technology and then share this information to allow others to develop and hone this technology further thus maximizing the potential of its products. Open hardware doesn't mean that a company is not competitive within the market place, by having a margin of time to develop and fabricate a product before releasing the technology on open source Protei has the market lead. Open source means more innovations, new concepts and constant progression as a company. Further to this, as a result of having some of the most talented, experts and experienced people from around the world working with Protei it has the ability to nurture and develop local projects on the side until they can become working projects. This means that employees are stimulated, fresh and motivated and that protei continues to grow and produce new and innovative products. Our groundbreaking technology means that we can primarily have a huge environmental impact through ocean cleaning and sensing; we can capture the interest of a wide target audience through products for recreation and sport. In addition we can educate, inform and be part of a community of development in the fields of mechanics, engineering, physics and artificial intelligence.

Working at Protei

Working at Protei

Almed at Employees

Be the change you wish to see. Gandhi.

Protei's community is growing all the time. What is astounding about Protei is its growth as a community. A company that started in 2010 with one visionary has grown to approximately 40 employees, freelancers and contributors. What attracts people to Protei is its unstoppable drive to make a difference to our environment and Protei is making this happen.

Protei is different

Protei's company structure is different to the traditional business model. Instead of having directors that delegate and control the progress and output of the company it is the employees that influence the direction and choose their role. An employee can choose where they would like to position themselves within the company or a project based on their experience and skill set. Further to this, while resources are allocated to the main project there are local projects that employees are welcome and encouraged to comment or contribute to. They can also start a new project and open it up to the community for comment. Once these subsidiary projects are more developed they can become working projects and an employee has the opportunity to take a lead role in its development. Further to this, Protei's community is global with a large range of experts from a number of disciplines so there is a wealth of opportunity for personal development for all employees.





WRAP UP

Open hardware
Soft engineering
Values

Vision

Open Sailing.com
Open sailing . net

Protei : Vision



SENSE

1m Arduino + Android



PLAY

1m Remote control



CLEAN

6m Arduino + Android



RACE

6m Manned