The largest ocean cleanup in history to start in 2018

Boyan Slat, the 22 year-old founder and CEO of The Ocean Cleanup, unveiled the non-profit organization's improved technology in Utrecht, The Netherlands on 11 May.

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This time last year we interviewed Boyan Slat at the Gard Summer Seminar about his mission to rid the oceans of plastic. Recently we caught up with him once more to discuss the next phase in his cleanup.

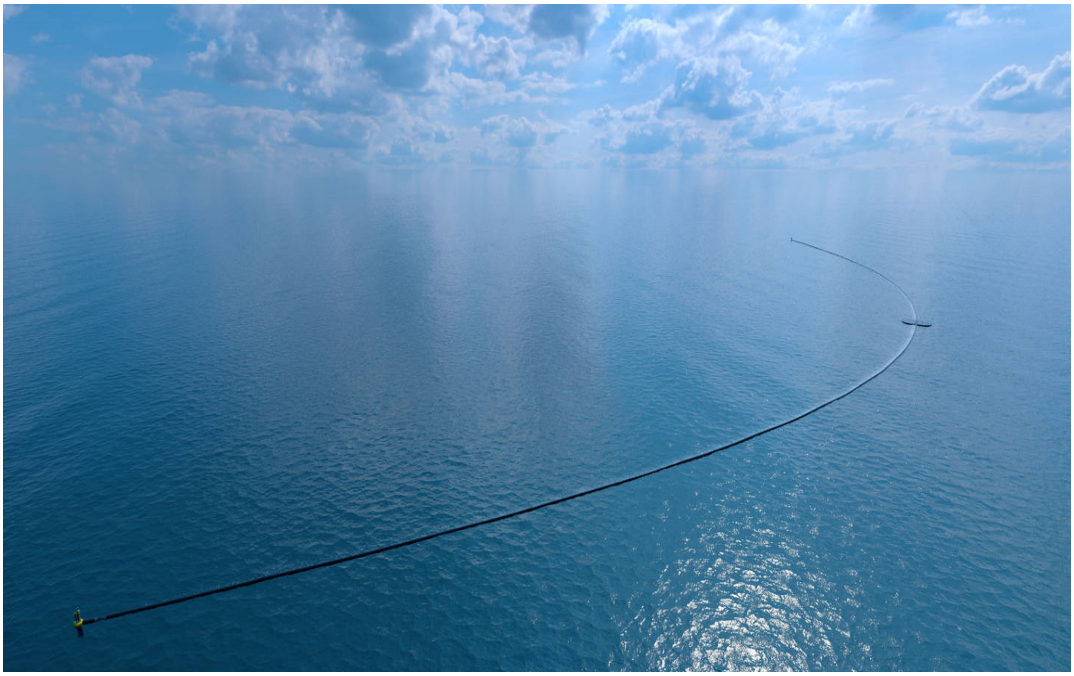
Why it is so important to clean the oceans?

There are five areas in the world where ocean currents accumulate and concentrate the plastic. The Great Pacific Garbage Patch, located half way between Hawaii and California, is the largest and most polluted one of the five.

This image shows what it is all about – as each decade passes the concentration of microplastic increases. It is getting worse fast. The only way to reverse this trend is to get out there and clean it up. It simply will not go away by itself, plastic is persistent. The Ocean Cleanup found plastic up to 40 years old during their Mega Expedition in 2015. It also gets more harmful over time. As decades pass, larger debris crumbles down into micro plastics that enter the food chain. If left to circulate, the plastic will impact our ecosystems, health and economies. By removing the plastic while most of it is still large, we prevent it from breaking down into dangerous microplastics.

What has changed in the new design?

Our idea has developed and improved substantially since the first conceptual design and the feasibility study. We believe in iterative design and engineering. Since there is no previous technology like ours, we believe the best way to move forward is to test fast and often, to look for the things that do not work as planned.



Anchoring the system to the seabed proved to be a big hurdle in the original design. While researching the ocean currents, we realized that we needed to go only a few hundred meters deep in order to slow down a floating system. So, instead of fixing one huge system to the seabed, we will slow down multiple systems by suspending a drift anchor on an approximate depth of 600 meters. And because the relative speed the plastic arrives at the mobile system is substantially lower than at a fixed structure, this has a positive impact on the capture efficiency of the system. This modular technology enables The Ocean Cleanup to accelerate production, deployment and extraction of plastic from the ocean.

The key is visibility and communication of their locations. The systems will be a few times bigger than ships and will be equipped with lights and reflectors, to make them show up on radar. They will also be equipped with Automatic Identification System (AIS), a maritime anti-collision norm, allowing ships to identify the systems and their location. Multiple smaller mobile systems will pose less of an obstruction to shipping than one massive fixed array. Solar energy will power the electronics.

How will the mobile systems withstand adverse weather?

The forces on a drifting system become substantially less in comparison to a fixed system, regardless of the weather conditions. Now, we are confident our systems will be able to survive anything the ocean can throw at them!

Will the systems catch marine life as well as plastic?

Protecting the natural environment is at the heart of what we do. It is the driver behind our efforts to remove large amounts of plastic pollution from the world's oceans. An example of this is the fact that we will use solid screens instead of nets to catch plastic debris. Vertebrates (like fish, marine mammals, sea turtles) will be able to swim under and around the solid screen. Most plankton is neutrally buoyant and therefore we anticipate the natural currents to guide the plankton under the screen. However, some (macro) plankton species like jellyfish are positively buoyant and it is possible we will intercept some of them in front of the barrier, together with the plastic. It is worth mentioning that the Great Pacific Garbage Patch is not particularly rich in plankton. In collaboration with plankton experts, we will closely monitor all planktonic life intercepted by the barrier during our pilot. By doing so, we can begin to understand the processes involved in the collection of plastic and how to limit the impact on plankton (and other sea life) in the ocean.

How will you monitor the systems?

They will be equipped with AIS, and they will be monitored on shore.

When will you start the clean-up?

The systems have yet to be tested in the open ocean. We are currently finalizing engineering, making operational preparations and conducting subsystem tests. Late 2017, we will begin the North Pacific cleanup trials, conducting several tests to test the system's stability and behavior. Based on the results of these tests, the system will iteratively be improved until it operates as intended. We expect our first operational clean-up system to be deployed in the Great Pacific Garbage Patch by mid-2018 - two years ahead of schedule - and will gradually deploy more systems until we reach full-scale deployment by 2020. The speed of roll-out depends on available investment capital, results of operational risk assessments as well as the parallel development of recycling capacity on land.

How long will it take to clean the Patch?

One system is estimated to remove 3 tons of plastic per week on average. Current projections suggest that we could clean up 50 per cent of the Patch in five years.

How are you funding the initiative?

We are a non-profit organization and are fully reliant on private donations and corporate support/sponsorships. Since November 2016 we have raised USD 21.7 million in donations from several sources. This allows us to start the ocean trials of our pilot system later this year. As the new design involves gradually adding systems to the Patch we mitigate the need for full financing upfront. We plan to recycle and resell the plastic and so hope to make at least a substantial part our operations self-sustainable in the future.

What do you say to your critics who believe the plastic problem needs to be tackled at source rather than cleaned up in the deep ocean?

As always, prevention is a better key to success but it is no substitute for removing the plastic already accumulated in the ocean. We need both. Combining the cleanup with source reduction on land paves the way towards a plastic free ocean by 2050.

Where do you see TOC in 10 years' time?

I see systems installed in all five gyres and a few more surprises!

Congratulations to The Ocean Cleanup, which Gard nominated for the Thor Heyerdahl International Maritime Environmental Award 2017, and which was presented to them at NorShipping in Oslo last week.

More information about The Ocean Cleanup can be found on their website .

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