UAE Students Create Debris-Clearing Robot

A team of students at the Abu Dhabi University (ADU) are currently at work on developing an autonomous floating robot that is capable of collecting plastic and other forms of oceanic debris without the input of a human controller. The robot works in tandem with a drone that scans for areas of rubbish from above, then relays that information to the collector below.

At present it has only been tested in laboratory conditions and still has many logistical and technical teething problems to overcome before it can be deployed in a real-world situation. But while it's still currently only at the prototype stage, the invention could be an invaluable tool in the fight against plastic pollution in the long run.

A global epidemic

At the last estimate, environmentalists believe there are now 150 tonnes of plastic pollution floating in our seas and oceans around the world. This debris causes untold damage to the marine flora and fauna which call those waterways their home, disrupting their breeding and feeding patterns, causing illness or death when ingested and generally upsetting the delicate underwater ecosystems.

Meanwhile, a less well-publicised but no less serious consequence of plastic pollution in our oceans is the effect that it has on the air above water. Scientists have recently discovered that the havoc which plastic wreaks on the aforementioned marine habitats could be killing off the bacteria that is instrumental in creating oxygen. Given that humans and animals are reliant on that gas to survive, plastic pollution could be an even graver problem than previously anticipated.

An Emirati solution

Determined to tackle this problem, a team of researchers at ADU led by Dr Mohammed Ghazal have pioneered the IntelliSeaCleaner. "There are other solutions to this particular problem but it seems the efforts are always manual – people riding in boats to pick this [litter] up," he explained. "It doesn't feel like a very sustainable solution. We're delighted with the progress we've made so far. We can see that we're onto something."

Their autonomous robot is powered by solar panels, measures just 20cm x 15cm in size and was created entirely through the use of 3D printer technology. The unit works in cooperation with a drone, which flies above the surface of the water and captures video footage of the ocean, which is relayed to the robot for analysis. The robot is then capable of plotting a course for the site in question and capturing the trash with the use of a large drag net.

Flies in the ointment

While initial tests in the laboratory have been encouraging, there is a long way to go before the IntelliSeaCleaner is ready to be used in the wild. First of all, the unpredictable conditions of the ocean – caused largely by strong winds and buffeting waves – make maintaining autonomous control of the drone a difficult challenge which must be overcome.

The team have also been experimenting with the energy consumption of the drone and the machine learning aspects of its intelligence to identify the best way for the robot to deliver its payload of plastic pollution. Possible solutions include returning to land or to a nearby vessel, where it could be manually emptied and redeployed. In any case, the Abu Dhabi team are hopeful that it could represent a huge breakthrough in the fight against plastic pollution, as well as a feasible method of cleaning up oil spills and other unwanted marine accidents in the future.