

BLUE WATER GREEN BOAT



Helping the Gowanus Canal Come Clean

Aquatic robot aids effort to save polluted NYC waterway

By Kat Long, 9/1/2013

Peering into the opaque, olive-toned water of Brooklyn's Gowanus Canal from the safety of my canoe, I spotted patches of lavender oil speckling the surface. Clumps of unidentifiable garbage floated past my paddle. Up ahead, pedestrians crossing the Union Street Bridge stopped and stared, as if wondering why I was pleasure-boating on one of the most polluted waterways in the country

I was making the same trip as the *Brooklyn Atlantis*, an experimental Aquatic Robotic Vehicle (ARV). Designed by Professors Oded Nov and Michael Porfiri at the Polytechnic Institute of New York University, the ARV is a solar-powered mobile buoy packed with sensors to sample water quality. Looking a bit like a smaller, homemade version of the Starship *Enterprise*, the *Brooklyn Atlantis*' digital camera takes pictures above and below the surface, beaming the images to a website. An army of about 600 citizen scientists can then log in to the site and tag objects in the photos, which range from shorebirds to submerged trash. The *Brooklyn Atlantis* team of Nov, Profiri, and 12 mechanical engineering and computer science students then shares the collected data with the Environmental Protection Agency (EPA) and others engaged in environmental rehabilitation efforts.

In 1869, a group of local industrialists widened the Gowanus Creek to 100 feet, dredged it for navigability, and built private docks for shipping vessels. What was once unusable swampland turned into a bustling commercial waterway between the neighborhoods of Red Hook, Carroll Gardens, and Park Slope. "This great work, in connection with the other magnificent and gigantic enterprises now going on in South Brooklyn...will do much to fulfill the destiny of Brooklyn as a commercial seat and as a place of residence," *The New York Times* crowed.

However, just 20 years later, Brooklynites had a decidedly less enthusiastic response to the canal. The 1.8-mile channel, now home to "gas works, coal yards, soap makers, tanneries, paint factories, machine shops, chemical plants and oil refineries," according to the EPA, had become choked with industrial waste. The *Times* sludge emitted a "frightful" odor, and the factories continued to dump their refuse for another century—and much of it still remains.

"There's historical pollution, like heavy metals, coal tar, and PCBs from the 1860s, locked into the sediment at the bottom of the canal," says Natasia Sidarta, volunteer coordinator for the



Gowanus Canal Conservancy, a nonprofit environmental group. “The current sources of pollution include pesticides, oils, and raw sewage overflow from rain events. People can see it and smell it.”

The EPA designated the Gowanus Canal a Superfund site in 2010, marking it as “an uncontrolled or abandoned place where hazardous waste is located, possibly affecting local ecosystems or people.” This is the giant Petri dish that Brooklyn Atlantis has been

swimming in since 2012. Since then, says Nov, “Our ARV has supplied us and the *Brooklyn Atlantis* citizen scientists with useful image data for quantifying wildlife presence, while the water quality data collected has helped illustrate water quality patterns within the canal.”

Environmental groups can use the data to better plan rehabilitation programs in and around the canal as well. An example, according to Nov, an assistant professor in NYU-Polytechnic’s Department of Technology Management and Innovation, is “if our robot is showing that the dissolved oxygen levels are too low in certain areas to sustain marine life, it may be useful to place more of a focus on rehabilitating those areas.”

The data gleaned from the ARV may have a profound impact on the community surrounding the canal. In addition to encouraging citizen scientists to become more involved in the environmental health of their neighborhood, the ARV raises awareness about the Gowanus’ pollution problem and the work already underway to bring it back to 1869 standards. The ARV’s camera can also track the progress of cleanup efforts.

One day, it might not seem startling to see canoes and kayaks regularly plying the waters. If the canal is cleaned up, “the boating experience will dramatically improve,” says Owen Foote, co-founder and treasurer of the Gowanus Dredgers Canoe Club, a nonprofit champion of public waterway access. “Hopefully it will encourage marine use, such as docking or a filling station, but no plans are in place yet.”

Nov and his team will give the ARV more short-term swims before full deployment, and if all goes well, they hope to install a fleet of five robots throughout the canal. “The technology developed for *Brooklyn Atlantis* could easily be deployed in other similar waterways,” Nov adds. “We are, in fact, considering the idea of applying this technology in other bodies of water in New York, and even other countries.”