The first Seaswarm prototype was tested in the Charles River in mid-August 2010. The vehicle's flexible conveyor belt easily adapted to surface waves and the photovoltaic-covered 'head' maximized exposure to the sun. Image courtesy of the Senseable City Lab

MIT: Robot prototype 'eats' oil

Sept. 14, 2010 - Massachusetts Institute of Technology, MIT, researchers have tested a new system to autonomously absorb oil from oil spills.

SEASWARM is a fleet of vehicles that could make cleaning up future oil spills both less expensive and more efficient than current skimming methods, according to a MIT press release. Using cutting edge nanotechnology, the robotic prototype navigates the surface of the ocean on its own collecting surface oil and processing it on site.

"We envisioned something that would move as a 'rolling carpet' along the water and seamlessly absorb a surface spill," Assaf Biderman, Senseable City Lab Associate Director, said in a MIT press release. "This led to the design of a novel marine vehicle: a simple and lightweight conveyor belt that rolls on the surface of the ocean, adjusting to the waves."

The Seaswarm robot, which is 16 feet long and seven feet wide, uses two square meters of solar panels for self-propulsion. With just 100 watts, the equivalent of one household light bulb, it could potentially clean continuously for weeks. The Seaswarm robot uses a conveyor belt covered with a thin nanowire mesh to absorb oil. The fabric, developed by MIT visiting Associate Professor Francesco Stellacci, can absorb up to twenty times its own weight in oil while repelling water. By heating up the material, the oil can be removed and burnt locally and the nanofabric can be reused.

"Unlike traditional skimmers, Seaswarm is based on a system of small, autonomous units that behave like a swarm and 'digest' the oil locally while working around the clock without human
intervention," explained Senseable City Lab Director Carlo Ratti.

Using swarm behavior, the units will use wireless communication and GPS and manage their coordinates and ensure an even distribution over a spill site. By detecting the edge of a spill and moving inward, a single vehicle could clean an entire site autonomously or engage other vehicles for faster cleaning.

"We hope that giant oil spills such as the Deepwater Horizon incident will not occur in the future, however, small oil leaks happen constantly in off shore drilling," Ratti said. "The brief we gave ourselves was to design a simple, inexpensive cleaning system to address this problem."