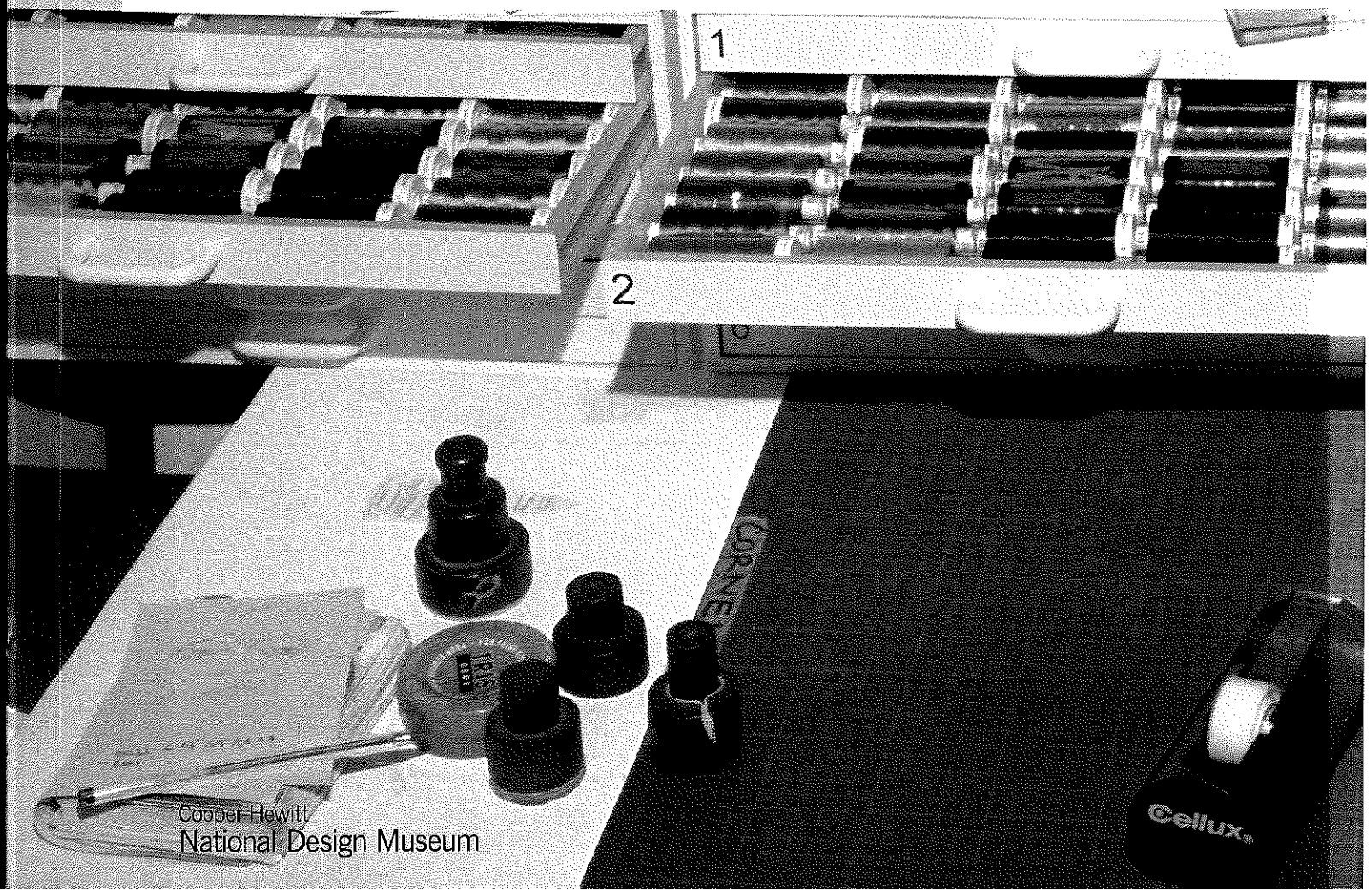
DESIGN LIFE NOW

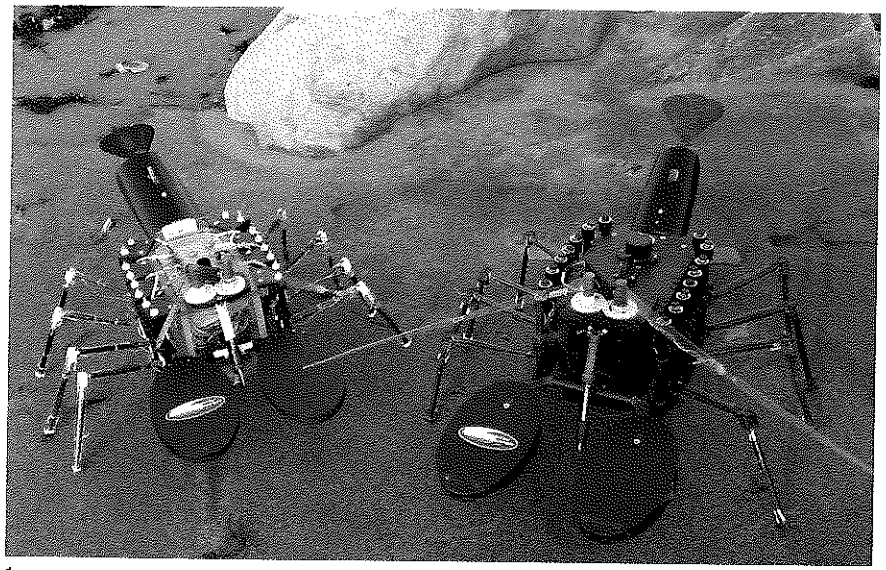
NATIONAL DESIGN TRIENNIAL 2006



Cooper-Hewitt
National Design Museum

JOSEPH AYERS

NORTHEASTERN UNIVERSITY
NAHANT, MASSACHUSETTS



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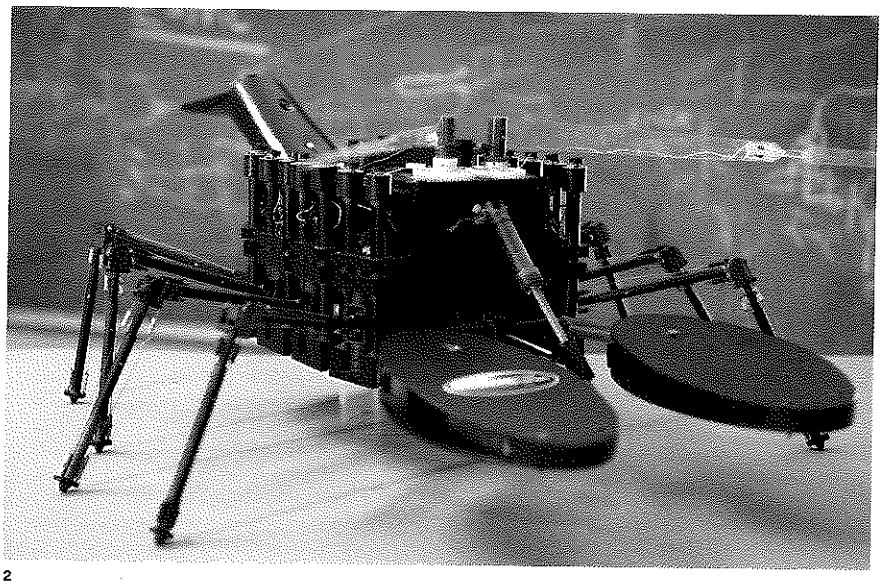

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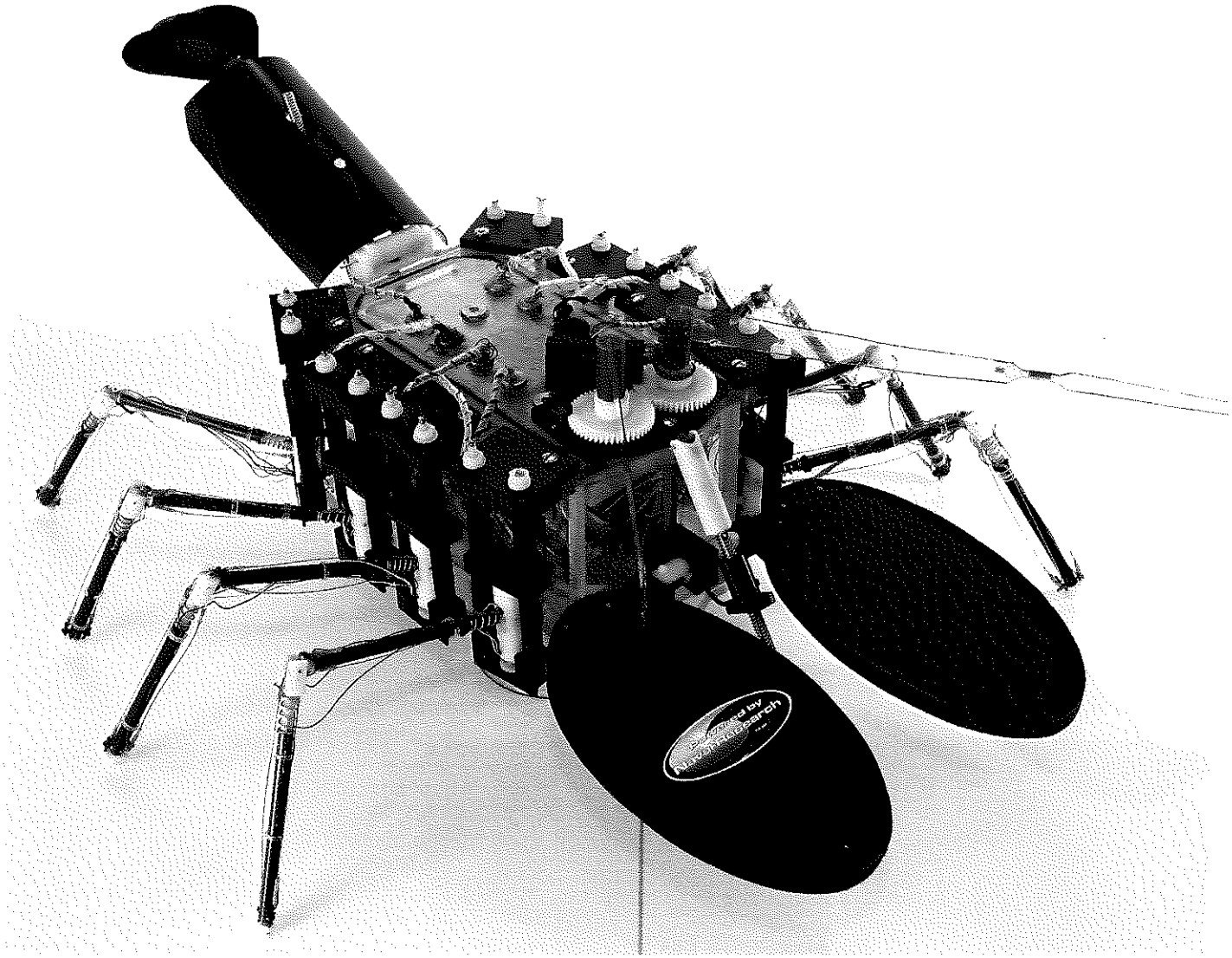
Robolobster, an underwater robot crustacean with eight plastic legs, fiberoptic antennae, and an industrial-strength plastic shell, is remarkably similar to a living lobster in both its form and the manner in which it behaves. Invented by Dr. Joseph Ayers, a marine biologist and neuroscientist at the Marine Science Center at Northeastern University, it was developed in collaboration with Massa Products Corporation, an innovator in electro-acoustic products.

The Robolobster's groundbreaking new design is an example of biomimicry, an emerging science that develops solutions to human problems through the imitation of biological organisms and processes. Lobsters have the ability to adapt and maneuver in almost every type of environment, and Ayers and his team have adopted the lobster's strategies for their robots.

Between 1999 and 2002, with the support of the Office of Naval Research and the Defense Advanced Research Projects Agency, Ayers created the first two generations of robotic lobsters, with the goal of understanding how a lobster's nervous system controls its movements in the water in response to the variable conditions of its environment. The success of the project has led to a third-generation Robolobster that will be autonomous and controlled by an electronic nervous system. The intent is to design a robot capable of conducting mine countermeasures, collecting marine-science data, and patrolling for underwater pollution.

A lobster's body shape, weight, and buoyancy are optimal for walking underwater. Their natural inclination to prey on sea life near the coast theoretically translates to an artificial lobster being able to trawl for mines in harbors and along coastlines. According to the Office of Naval Research, it is particularly difficult to search for mines in these shallow waters due to crashing waves and currents which cause low visibility. In the future, Robolobsters will be fitted with sonar for detecting mines acoustically, chemical sensors to detect trace amounts of explosive material leaking from the mines, and optical sensors that visually detect mines. In each of these cases, the robot will detect the mines autonomously, without human direction, potentially saving thousands of lives.

1 First- and Second-generation Biomimetic Underwater Ambulatory Robot (Robolobster), 2005. **SPONSOR** Office of Naval Research. **PHOTO** John F. Williams
2 First-generation Biomimetic Underwater Ambulatory Robot (Robolobster), 2005. **SPONSOR** Office of Naval Research. **PHOTO** John F. Williams
3 Second-generation Biomimetic Underwater Ambulatory Robot (Robolobster), 2005. **SPONSOR** Office of Naval Research. **PHOTO** John F. Williams



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