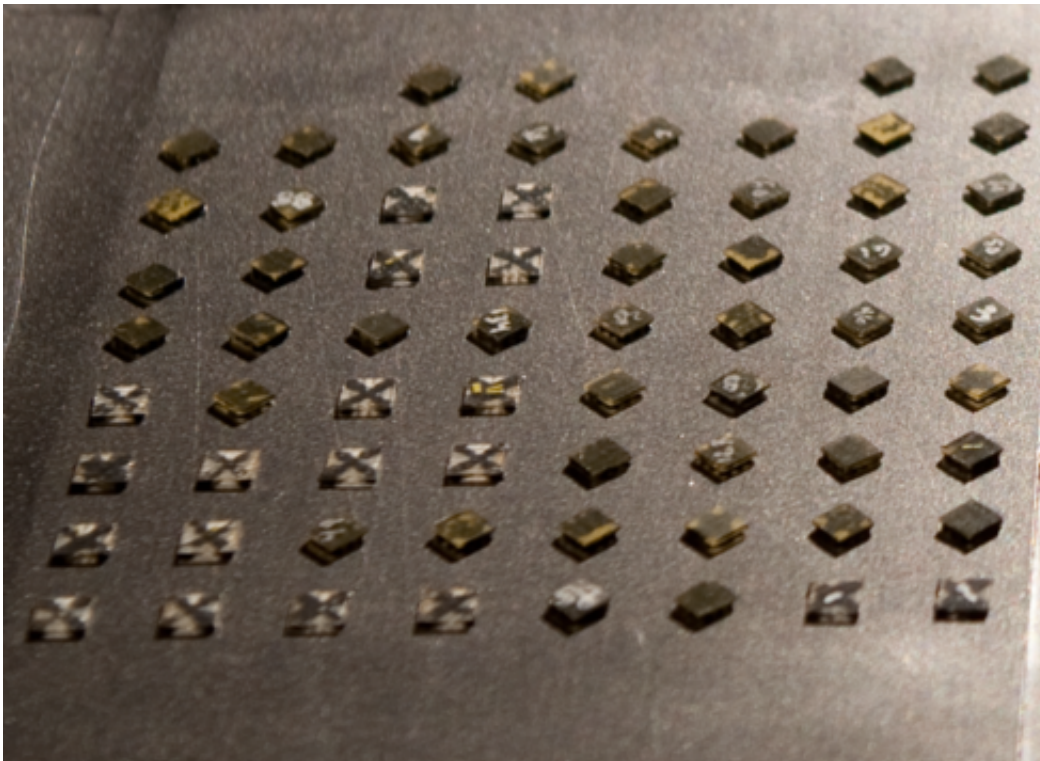


SRI microrobots show fast-building factory approach (w/ video)

April 17 2014, by Nancy Owano



(Phys.org) —SRI International, a research center that conducts client-sponsored research and development for government and other organizations, is attracting attention for work on what micro-factories might accomplish in the future, with micro-robots coordinated to go to work building products. SRI's ant-like microrobots in large numbers can

reliably handle solid and liquid materials, including electronics. The micro-robots were designed to suggest a better way to assemble components and small structures.

IEEE Spectrum [reported](#) on what these swarms of magnetically actuated microrobots, can accomplish when they work together, noting how they are versatile and able to collaborate in large swarms. SRI's robots are built from simple, low-cost magnets. Quoted in *Technology Review*, Annjoe Wong-Foy, senior research [engineer](#) at SRI, said, "We can scale to many more robots at low cost."

The SRI technique involves printed circuit boards (PCBs) that drive and control the micro-robots, This is a distinguishing SRI feature. *IEEE Spectrum* said driving their robots around on [circuit boards](#), including flexible ones, can keep the magnetic fields localized; they are not only finely controllable but fast.

Tom Simonite in *Technology Review* on Wednesday wrote about the design: "They can move only when placed on a surface with a specific pattern of electrical circuits inside," he wrote. "Sending current through the coils beneath exerts a force on the magnets and steers the robots around." Wong-Foy wrote software to do that, and used it to choreograph the movement of tiny robots in a complex circulating pattern, showing it should be possible for them to work in large teams.

Simonite said Wong-Foy's robotic workers have already proved capable of building towers 30 centimeters long from carbon rods and other platforms able to support a kilogram of weight. The robots work with glass, metal, wood, and electronic components.

SRI currently is applying its micro-factory technology to the DARPA Open Manufacturing program. DARPA said it created the program "to lower the cost and speed the delivery of high-quality manufactured

goods with predictable performance."

The program aims for a manufacturing framework that captures "factory-floor and materials processing variability and integrates probabilistic computational tools, informatics systems and rapid qualification approaches."

In a video showing the microrobots in action. The video showed the ant-like robots climbing straight up walls, and travelling in any orientation on flex circuits. The video also showed 73 robots performing coordinated moves, at 19 moves/sec each. The total system rate was 1386 moves/sec. Also shown were two robots gluing together carbon fiber rods.

SRI's patented "Diamagnetic Micro Manipulation (DM3)" technology is available as a research platform for universities and other researchers to explore new applications for [micro-robots](#). Potential applications include pick-and-place manufacturing solutions, rapid prototyping of parts, electronics manufacturing, such as optoelectronics and hybrid circuits, microfluidics, lab on a chip, and tissue manufacturing, compact diagnostic and inspection equipment and anti-fouling devices.

SRI International was founded as Stanford Research Institute by Stanford University in 1946 and SRI became independent of the university in 1970.

More information: www.sri.com/work/projects/micr...-smart-manufacturing
www.darpa.mil/Our_Work/DSO/Pro...n_Manufacturing.aspx

© 2014 Phys.org

Citation: SRI microrobots show fast-building factory approach (w/ video) (2014, April 17)

retrieved 20 March 2024 from <https://techxplore.com/news/2014-04-sri-microrobots-fast-building-factory-approach.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.