Sci/Tech
Computers & Tech
Environment
Internet
Science & Space

Also see:

COLUMN SITESEEING
COLUMN DEEP SPACE
BLOG SCITECHBLOG
BLOG LIBLOG

In this week's Sci/Tech section:

DualDisc: Double the format, double the fun
Australia's most unwelcome guest
Eco-firms see growing profits
If placebos work, should doctors use them?
A tiny robot swarm - fiction no longer
Heading off Eco-Armageddon
Climate change could sour US maple sugaring
Where do they all come from?
On the horizon

XML What is this?

SPECIAL PROJECTS

A tiny robot swarm - fiction no longer

By Robert C. Cowen

The cartoon superheroes were frustrated. They confronted a menacing robot that quickly repaired any damage they inflicted. It was made up of a swarm of microscopic robots - so-called nanobots - that could change its function and shape at will. Suddenly the swarm became fluid and flowed away.

That cartoon scenario may seem entertaining. But the reality is startling. Engineers at the National Aeronautics and Space Administration want to pull off a similar trick. They are testing a robot that they hope to shrink to nanobot size and eventually form what NASA calls "autonomous nanotechnology swarms" (ANTS). The researchers aim to give ANTS enough artificial intelligence to make smart decisions as well as know intuitively when and how to walk and swarm.

NASA invites you to consider the versatility of a nanobot swarm that has "abundant flexibility" to change shape as needed.

Descending through the Martian atmosphere, for example, it could form an aerodynamic shield. On the ground, it could become a snake to slither over difficult terrain. It could grow an antenna to send back data on anything interesting it encounters. It also would heal itself if damaged.

Human bodies replace damaged cells with new ones, notes Steven Curtis, lead researcher for ANTS, a joint project of Goddard Space Flight Center in Greenbelt, Md., and Langley Research Center in Hampton, Va. "In a similar

In the Monitor
Monday, 04/11/05

Anti-Japan protests jar an uneasy Asia
Save the pay phone - a suddenly endangered species
Colorado case reopens debate about tenure
What's next in evening news? Stay tuned
COMMENTARY: Avoiding an Israeli In-Your-Face

Read these and the rest of the Monitor's headlines by e-mail.

 Summer on Antarctic Ice

more projects...

Most-viewed stories:
(for 04/10/05)
04/08/05
US unready for rising threat of 'moles'
04/08/05
A small, sturdy band of 'John Paul priests'
04/11/05
Anti-Japan protests jar an uneasy Asia
04/08/05
Culture war hits local pharmacy
04/07/05
A tiny robot swarm - fiction no longer

way, undamaged units in a [nanobot] swarm will join together, allowing it to tolerate extensive damage and still carry on its mission," he says. (Sorry superheroes, you won't be able to blow away the real thing, either.)

Prospects like this give vivid meaning to Richard Feynman's 1959 vision of a nanotech world. Units in that world come in 1 to 100 nanometer (billionths of a meter) sizes. It's the world of atoms and molecules and, now, of nanobots. The famous physicist had urged scientists to look into that world for new frontiers: "We have new kinds of forces and new kinds of possibilities, new kinds of effects."

That was a dream back then. Now, even though its major payoffs are decades away, nanotechnology already is a big deal. Worldwide government funding of nanotech research reached $3.6 billion last year with some 40 nations joining in, according to National Science Foundation (NSF) figures. For fiscal 2004, the US National Nanotechnology Initiative put up $960 million with states and local government adding roughly another $500 million. United States private industry is estimated to more or less match the federal funding.

Nanotech should bring amazing new materials such as carbon-based structures many times stronger than steel. It should transform aspects of medicine, transportation, and environmental monitoring. Yet it is difficult to foresee all its future wonders.

Currently, some 475 nanotech-based products such as tennis rackets, bottles, and various instruments already are available.

But this brave new world has its risks.

"Nanotechnology operates at the very foundation of matter, at the first level of organization for both living and anthropogenic systems," writes Mihail Roco, who leads the NSF nanotech program, in last month's Environmental Science and Technology journal.

There is worldwide concern about - and research into - the possible ecological and health effects of letting loose entities with the ability to produce Dr. Feynman's "new kinds of effects" at that basic material level.

While there's no crystal ball to show the nanotech future, you might tune in to some children's cartoons on TV for a hint of what's to come.

Subscribe for free.

Write a letter to the Editor

Printer-friendly version

Permission to reprint/republish

Links of interest

- Mutual Funds Quarterly: A gusher amid gloom, Utilities generate electrifying returns, and Low-risk bond strategies

- Spring gardening: Rocket ships of color, Grandmothers' gift, Heavenly hydrangeas
- Tax-time got you down? Check the Salary Wizard for earnings ideas

Most-read stories (for 04/10)

- US unready for rising threat of 'moles' (04/08/05)
- A small, sturdy band of 'John Paul priests' (04/08/05)
- Anti-Japan protests jar an uneasy Asia (04/11/05)
- Culture war hits local pharmacy (04/08/05)
- A tiny robot swarm - fiction no longer (04/07/05)

Write a letter to the Editor | Printer-friendly version | Permission to reprint/republish

back to top