news SCAN

MIXING SCIENCE WITH POLITICS

A 1999 National Research Council report criticized the U.S. State Department's lack of attention to science and technology in foreign policy. The department responded by appointing a science and technology adviser to the secretary of state and increasing fellowships that place external scientists in the department for up to a year. The American Association for the Advancement of Science will sponsor 15 Diplomacy Fellows in 2003–2004. These positions usually attract scientists with a few years of postdegree experience. The American Institute of Physics began one fellowship for mid- to late-career professionals in 2001, and the Institute of Electrical and Electronic Engineers begins two this year. Separately, staff at technical agencies such as the National Science Foundation can become "detailees" on temporary assignment at embassies.

Atkinson to get the new program going. He has had to bridge several institutional cultures that assume science should stay out of politics: foreign officers worry that scientists will be loose cannons, and scientists fear that political engagement will harm their careers. By mid-January, Atkinson had won the support of more than a dozen professional society presidents, along with as many universities, several foundations and three State Department undersecretaries. In mid-February, the executive organizing committee was to have met to consider a proposal for a three-year pilot program that would annually fund five senior science fellows.

The plan builds on efforts by Norman P. Neureiter, science and technology adviser to Secretary of State Colin Powell, to beef up the visibility of science in the department over the past two years. He says that the Senior Science Fellowships, as the venture is called, would contribute in an important way by attracting a new level of high-powered, mid-career people who formerly would not have considered abandoning tenured posts and active labs for a year. Nominated by their universities, scientists would be chosen for their communication skills, adaptability and foreign-policy interests—not just their research prominence. Fellows would need to recognize that State Department decisions are propelled by the political process, not necessarily scientific data, Neureiter observes.

He acknowledges that integrating the fellows into the agency will be difficult. So rather than foist fellows' expertise on unappreciative embassies or Washington bureaus, the project would rely on work plans developed by foreign-service offices themselves. For instance, a group of embassies might request a plan to develop an international collaboration in biomedicine or ask for a review of ocean treaties to see whether they were supported by the latest research findings.

A physicist now working in the State Department as a technical adviser (and who requested anonymity) remarks that more science is sorely needed but has his doubts that a fellowship would do much good. "There's a general belief that scientists should be locked in their rooms and asked for technical advice but not policy advice," he laments. Pointing to areas such as dirty bombs, birth control, AIDS and global warming, he adds: "When ideology comes up against scientific understanding, it can be very frustrating."

Sally Lehrman is based in San Francisco.

DEFENSE

Connect the Pings

STEALTH RADAR FROM CELL-PHONE RADIATION

BY WENDY M. GROSSMAN

WIDESPREAD CELL-PHONE USE may enable the development of stealth radar.

NANCY HONEY *Photonica*

The law of unintended consequences: build a cellular-phone network and get a sophisticated surveillance system along with it. At least that is what may happen in the U.K., thanks to England's contract research and development firm Roke Manor Research and aeronautics company BAe Systems. The two are working on a way of using the radio waves broadcast by the world's mobile-phone base stations as the transmission element of a radar system. They call it Celldar.

Radar works by transmitting radio pulses (or pings) and listening for an echo. Measuring the Doppler shift of the echo can give an object's distance and speed. Celldar proposes to take advantage of U.K. base stations, which transmit radio waves from known locations in a known microwave frequency band. Instead of erecting a radar transmitter, a Celldar operator would only need to set up passive receivers that can measure the cellular-network radio waves reflected from nearby objects and process the data. Because they would not transmit, Celldar receivers can, according to BAe Systems, be smaller and more mobile than traditional systems—and undetectable. Celldar operators would not require the cooperation of the cell-phone-network operators, either.

The physics itself is nothing new. It dates back to research carried out in the 1930s by Scottish meteorologist Robert Watson-Watt and the engineering team that developed Chain

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SEE YOU WITH RADAR?

Despite concerns of a new government surveillance tool, the Celldar project is unlikely to have implications for personal privacy. Reflected signals and multiple targets in a crowded city would make it impossible to use Celldar to follow a perambulating individual. What's more, cell phones increasingly offer a much easier way to track users: they have built-in abilities to transmit detailed location information under the U.S.'s enhanced 911 rules. Mobile-phone companies also hope to make money from selling location-based services and so will probably design phones to store more position data. Plus, security cameras have proliferated since September 11, 2001. All those avenues of personal surveillance make Celldar irrelevant by comparison.

Home Radar. This system of coastal radar towers went up just in time to give Britain early warning of the air attacks of World War II.

Distinguishing the moving target from myriad signal reflections is more of a problem for the narrow-bandwidth, low-power radiation emitted by mobile-phone masts than it is for traditional radar transmissions. BAe Systems says the keys to Celldar are the algorithms devised at Roke Manor to turn the cell-phone data into useful information and the emergence of widespread, cheap computing power. But neither Roke Manor (part of Siemens) nor BAe Systems will go into much detail about the technical innards of Celldar, which has attracted funding from the British Ministry of Defense. Given the companies' secrecy, no one really knows if Celldar will work. Mark R. Bell, an electrical and computer engineer at Purdue University, believes it is feasible; the main challenge will be the weak signal strength of the base stations (compared with radar systems). "It is really going to push signal-processing technology very, very hard," he remarks.

Roke Manor has suggested only military applications so far: monitoring coastlines, spotting tanks and stealth aircraft, or tracking people in open areas, such as the perimeter of a military base. Roke Manor claims that the system might enable such high-security installations to deploy fewer cameras, keeping one or two that can be trained on the locations Celldar pinpoints.

The implications for stealth aircraft are intriguing: Celldar may force some design changes. BAe Systems says, for example, that today's stealth aircraft were not designed to evade multistatic radar (radar with multiple transmitters) or cell-phone frequencies. Existing stealth planes should be detectable by Celldar.

Celldar is not the only passive radar project around. Lockheed Martin's Silent Sentry uses ordinary television and FM radio waves, and researchers at the University of Illinois at Urbana-Champaign are trying to incorporate automatic target recognition into the system. Passive radar might go beyond defense-related uses: Robert K. Vincent, a geologist at Bowling Green State University, has proposed using the radiation from telephone microwave towers to detect tornado touchdowns. That would provide earlier warnings for those in a tornado's path—an unintended consequence that no one could complain about.

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PRIMEVAL PRIMATE: *Carpolestes simpsoni.*

PALEONTOLOGY

Out on a Limb

A STUNNING NEW FOSSIL SHOWS HOW SIMIANS GOT THEIR START BY KATE WONG

Living primates exhibit a dazzling diversity of forms—from the saucer-eyed bush babies of sub-Saharan Africa to Borneo's proboscis monkey (the Pinocchio of primates) to humans, the cosmopolitan bipeds. They are united, however, in having large brains, forward-facing eyes, nails instead of claws, an ability to grasp and an ability to leap. For almost three decades, evolutionary biologists have puzzled over how modern primates came to possess this distinctive suite of characteristics. Some workers reasoned that these features evolved to permit predation on insects, others proposed that they enabled the procurement of fruit from the tips of tree branches, and still others envisioned these traits as adaptations to a mode of locomotion combining grasping and leaping. But the scrappy fossil record of early primates—mostly teeth and isolated skeletal bones—left researchers hard put to test these hypotheses.

A spectacular find from the badlands of Wyoming is bringing some answers to light. Paleontologists recently uncovered a nearly complete 55-million-year-old skeleton of a mouse-size creature known as *Carpolestes simpsoni*. Like modern primates (or euprimates, as they are termed), it has long fingers and toes, as well as nails on its opposable digits—good for grasping spindly tree limbs. But