project, Congress quickly drafted a criminal ban on many types of cloning research. Congress set that debate aside last spring but indicated it might take it up again later (*Science*, 16 January, p. 315 and 20 February, p. 1123). Hogan, a member of a 1994 National Institutes of Health (NIH) panel that proposed guidelines for human embryo research, agrees that "it's theoretically possible" to do what ACT claims to have done. But the company's announcement reminds her of the Seed case because "it smells to me of sensationalism" and seems "likely to inflame an uninformed debate."

Why did ACT publicize this experiment now? Some observers think the company wanted to ride the PR bandwagon created by the 6 November announcements by the labs that had isolated human embryonic stem cells using more traditional culture techniques. One group, led by developmental geneticist John Gearhart at The Johns Hopkins University, extracted primordial germ line cells from fetal tissue and kept them growing through 20 passages (transfers from one plate to another) for more than 9 months. The other group, led by Thomson at the University of Wisconsin, established a culture of stem cells derived from early human embryos. Thomson, whose cell line has survived 32 passages over 8 months, published molecular data suggesting that the cells may continue dividing "indefinitely."

Michael West, president and chief executive officer of ACT since October, says it is "pure coincidence" that ACT's news came out within a week of these announcements. West—noting that ACT won't benefit immediately, for it doesn't sell public stock—says that after becoming ACT's CEO last month, "I learned about the work that had been done in 1996 … and I wanted to develop this technology." But he says he "didn't feel comfortable" moving ahead with nuclear DNA transfer experiments without getting a reading on how future U.S. laws and regulations might affect the field. "So I decided, 'Let's talk about the preliminary results,' " says West. "Let's get NBAC to help clear the air."

West notes that some information on ACT's mixing of human and cow cells was already public. In February, the World Intellectual Property Organization in Geneva had published Robl's application for a patent on "Embryonic or Stem-like Cell Lines Produced by Cross Species Nuclear Transplantation" (WO 98/07841). It describes the Robl-Cibelli experiment of 1996 and stakes broad claims to stem cell technology based on transferring human or animal DNA into an animal oocyte. After being approached by the staff of CBS's news show *48 Hours*, West says, he arranged to discuss the research in exclusive but simultaneous releases to *The New York Times* and CBS. The CBS report aired on 12 November.

Robl confirms it was West, and not the scientific staff at ACT, who initiated the announcements. "I wouldn't have had the guts to do it," Robl says, although he agrees it is important to debate ethical concerns that might impede the technology.

These ethical concerns may get an airing next month. Senator Arlen Specter (R–PA), chair of the appropriations subcommittee that approves the budget for NIH, is planning a hearing on 1 December. There, NIH director Harold Varmus and developers of new human cell technologies are expected to testify about federal restrictions on the use of embryonic and fetal tissue and their impact on biomedical research. That discussion may now be expanded to include questions about ACT's single experiment. **–ELIOT MARSHALL**

With reporting by Elizabeth Pennisi.

CREDIT: (TOP) SPACE RESEARCH INSTITUTE, RAS; SOURCE: (BOTTOM) ANSER

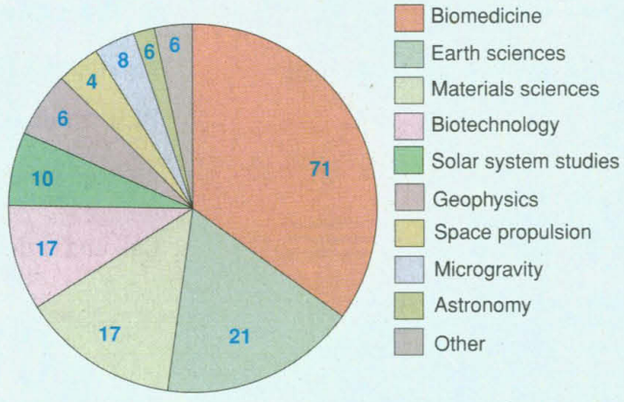
RUSSIAN SPACE SCIENCE

## Station Launch Hides Lingering Woes

**MOSCOW**—Valery Bogomolov welcomes the scheduled launch today of the first piece of the international space station as a sign of the world's commitment to space exploration. But the launch is also a bitter reminder to Bogomolov, deputy director of Russia's premier space biology facility, the Institute for Biomedical Problems (IBMP), of his country's recent decision to sell NASA thousands of hours of station time earmarked for research by Russian cosmonauts for the $60 million needed to complete a key station component (*Science*, 9 October, p. 206). "It was very sad for us, and for Russian science," says Bogomolov, whose institute is scrambling to plan experiments on the ground that were meant to be done in space. "We had no warning."

**Still grounded.** Managers hope to get the Spectrum-X-Gamma mission into orbit by 2001.

As the rest of the space community readies its payloads for the $50 billion international space station, Bogomolov and his Russian colleagues must resign themselves to a limited role until at least 2003, when they will vie for a share of research time aboard the completed station. And the lost opportunity is only one of several continuing crises for Russian space science. The launch of the Russian-backed Spectrum-X-Gamma spacecraft, a $500 million international effort to study x-rays, is running almost a decade behind schedule. Even a last-ditch effort to postpone the dismantlement of the Mir space station, allowing some biology




**Miraculous results.** Biomedicine got the largest slice of Russia's $20 million of research on Mir, both in dollars and number of projects (in blue).

to continue, may not survive in Russia's harsh fiscal environment. Russia is propping up "a Potemkin space program," asserts Houston-based space consultant James Oberg. "It's a hollow shell."

In an effort to keep some life in that shell, the Russian Space Agency (RKA) last week backed off plans to bring the 12-year-old Mir space station down to Earth next summer. Russian government officials and legislators are now hammering out a proposal for the 1999 budget, due out next month, that would seek to fund both Mir and international space station operations. "What if there is a problem with the international space station?" asks Bogomolov. "We're very interested in keeping [Mir] as an option for research." Adds Sergei Shaevich, space station manager at the Khrunichev Research Center in Moscow, "There's $100 million worth of new equipment on Mir now."

Western experts see some merit in that argument, pointing to solid NASA-funded Russian research aboard Mir. The 3-year, $20 million program, which wrapped up last year, served as a test-bed for research on the international station, funding peer-reviewed work involving 60 institutes (see pie chart). The program also "sustained scientists through a difficult period," says Dick Kline, director of the ANSER Center for International Aerospace Cooperation, a nonprofit think tank in Arlington, Virginia.

But Kline and others don't see how Russia can afford the estimated $100 million to $200 million needed next year to operate and supply Mir along with the roughly $130 million that Russia is supposed to contribute to the international space station. "It's a good idea, if not for the fiscal realities," says Kline. NASA officials are hoping to persuade the cash-strapped RKA not to divert funds to Mir. "We want them to devote their resources only to the international space station," says NASA spokesperson Dwayne Brown.

Some of the projects begun aboard Mir, including monitoring the physiological stresses on cosmonauts performing heavy labor in space, were slated to continue aboard the service module, a Russian-built station component to be launched next summer. But now that Russia has given up its research time, "we won't be able to perform these experiments," says IBMP chief scientist Lyudmila Buravkova. In the meantime, she says, IBMP staff members are designing ground-based surrogates. But even these may have trouble finding funds in next year's budget.

A financial miracle also may be needed to save Spectrum-X-Gamma. Slow delivery of key components has delayed the astrophysics observatory, originally planned for launch in 1992. Now the question is whether Russia can afford the Proton rocket needed to put it into space. If Spectrum-X's debut were to slip much beyond 2001, asserts Roald Sagdeev, a Russian space expert at the University of Maryland, College Park, it would be so eclipsed by three other observatories scheduled to be launched over the next 3 years—the United States' AXAF, Europe's XMM, and Japan's Astro-E—that "it would make no sense at all" to put it up.

Project officials disagree. "We believe Spectrum-X still has a role to play," says Alan Wells, director of the Space Research Center at the University of Leicester in England, pointing to its unique polarimeter for studying binary x-ray pulsars and supernovas and EUVITA, two telescopes that will explore the largely uncharted far-ultraviolet region. "Our concern is just to get it up there."

There's a glimmer of hope for space biologists, says Sagdeev: NASA could invite Russians to collaborate on U.S.–funded station projects. But one agency official complains that RKA's refusal to join a multilateral space life sciences working group has impeded joint studies. RKA officials declined to comment.

NASA, meanwhile, hasn't yet divvied up the spoils from its deal, which doubles the 5000 hours available for research during the 5 years of station construction. "It's awful to take advantage of someone else's disadvantage, but this is a unique opportunity for us to improve our science," says NASA's Neal Pellis, a station biology manager keen to study how microgravity influences gene expression.

The careers of many Russian scientists will hang in the balance as Russia decides the fate of Mir and RKA and NASA debate the terms of joint research. A lengthy delay will also threaten the Russian program's decades of expertise. As Kline puts it, "You can't suddenly say, 'Let's have world-class research again.'" –RICHARD STONE

CREDIT: NASA

JAPAN BUDGET

## Science Gets Share Of Stimulus Package

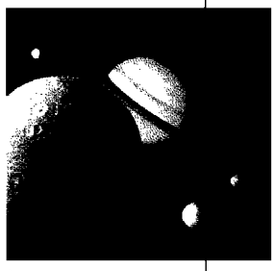
**TOKYO**—A new housing complex for exchange students, renovated research labs and equipment, and a faster track for some big new science projects are expected to be elements in Japan's latest, and largest, attempt to spend itself out of a prolonged recession.

The $195 billion package, the outlines of which were approved by the cabinet on 16 November, includes $145 billion in stimulus spending and another $50 billion in tax breaks. It eclipses the $138 billion stimulus package enacted just last April (*Science*, 1 May, p. 669). In reality, however, both packages are likely to fall short of those totals because they depend in part on loans to consumers and small businesses and contributions from financially strapped local govern-

## ScienceScope

### NASA TAPS SPACE COMMANDER

NASA has a new chief space scientist. On Monday, agency Administrator Dan Goldin named Edward Weiler as associate administrator for the Office of Space Science. Weiler had served as acting head since late September, when his popular predecessor Wes Huntress stepped down. Weiler takes control of a $2.1 billion R&D program that includes high-profile research on extraterrestrial life and the origins of the solar system.



NASA scientists are giving Weiler a warm welcome. "Ed Weiler will be a very effective champion for space science," says Scott Hubbard, deputy director of space at the Ames Research Center in Mountain View, California. Researchers credit Weiler with injecting new energy into NASA's astrobiology program and spearheading efforts to recover and repair the Hubble Space Telescope.

### ETHICS PANEL URGES SCRUTINY OF MENTAL HEALTH RESEARCH

Brushing aside research agencies' worries about increasing regulation, a presidential panel this week called for tighter control of the way mental patients and other people with impaired judgment are enrolled in drug tests and other experiments that don't directly benefit them.

In a final report approved on 17 November, as this issue of *Science* went to press, the National Bioethics Advisory Commission (NBAC) urged the federal government to create a new standing committee to act as a kind of permanent rulemaker and appeals board in this field. NBAC also proposed that the Institute of Medicine conduct a thorough study of the ethics and science of controversial types of mental health research—including trials in which patients are exposed to "challenges" that exaggerate their symptoms or in which medication is abruptly withdrawn.

The National Institutes of Health objected last month that some of these recommendations would impede research (*Science*, 30 October, p. 857). But NBAC's chair, Princeton University President Harold Shapiro, disagrees. He says he's heard "many assertions" but seen "no convincing evidence" that research would be hurt by such changes.

**Contributors: Jennifer Couzin and Eliot Marshall**