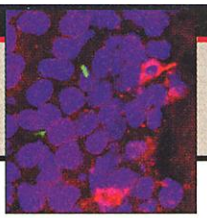
PAGE 1314



A new TB model?

1317

Clearing the air in Asia

ASTRONOMY

Space Telescope, Teamwork Top Priority List for Next Decade

Most scientific disciplines would have a hard time anticipating their needs for the next 10 years. And picking priorities among a slew of projects competing for a limited budget is even harder. The exception is astronomy, where the size, cost, and scope of the tools required makes the exercise essential. Last week the U.S. community issued its latest blueprint, a 164-page compendium of projects designed to persuade the federal agencies that will foot the bill.

The study,* by a panel of the National Research Council (NRC), urges the government to spend $4.7 billion through 2010 on a new generation of ground- and space-based observatories, many to be built in partnership with other countries. Its top choice is the Next Generation Space Telescope (NGST), a proposed $1.3 billion observatory with a mirror nearly four times as large as that of the current Hubble Space Telescope. Led by Christopher McKee, an astronomer at the University of California, Berkeley, and Princeton University astronomer Joseph Taylor, the panel also makes a plea for private and public observatories to set aside their differences and proposes a National Virtual Observatory to store vast amounts of astronomical data. In addition, the panel urges NASA to place greater emphasis on medium-sized missions.

Generation Next. Artist's conception of the Next Generation Space Telescope, which leads the academy's wish list.

If the past is any guide, the exercise should pay off handsomely. The previous study, a 1991 effort chaired by Princeton astronomer John Bahcall, recommended $4 billion worth of initiatives, most of which have either been built or are under construction. The secret, say science managers, is to select a limited number of priorities. "This is not just a typical 'Please send money' report," says William Wulf, president of the National Academy of Engineering and NRC vice chair. "This represents tough choices." One such choice involved dumping a proposed Space Ultraviolet Observatory because its technology, according to McKee, is not advanced enough.

PRIORITIES FOR U.S. ASTRONOMY

Major Initiatives

1) Next Generation Space Telescope
2) Giant Segmented Mirror Telescope
3) Constellation-X [ray] Observatory
4) Expanded Very Large Array
5) Large-Aperture Synoptic Survey Telescope

Moderate Initiatives

1) Telescope System Instrumentation Program
2) Gamma Ray Large Area Space Telescope
3) Laser Interferometer Space Antenna
4) Advanced Solar Telescope
5) Square-Kilometer Array Technology Development

Small Initiatives

National Virtual Observatory

The listed projects closely match the intentions of NASA and the National Science Foundation (NSF), agency officials say. "I'm delighted with this report—it's fantastic," says Anne Kinney, science chief of NASA's origins program, which oversees the $1.7 billion Terrestrial Planet Finder, ranked third among space-based missions and a personal favorite of NASA Administrator Dan Goldin.

The list of a dozen moderately sized missions is topped by the Gamma Ray Large Area Space Telescope, a joint NASA and Department of Energy effort with 30 times the sensitivity of instruments aboard the soon-to-be-jettisoned Compton Gamma Ray Observatory. Smaller missions were not ranked, except for the first: a National Virtual Observatory to enable "a new mode of research" for astronomers by providing a one-stop shop for data as well as a potent tool for public education. The panel also called for agencies to put a stronger emphasis on funding astrophysical theory, data archiving and mining, and laboratory astrophysics.

A more daunting task is reorganization of the U.S. optical community, now divided between independent and government-funded observatories. "All facilities, whether nationally or independently operated, should be viewed as a single integrated system," according to the report. Whereas the solar and radio astronomy communities work together closely, those in the optical community tend to go off on their own, say researchers.

The report recommends fixing the problem by having NSF fund instruments at private observatories in exchange for viewing time by outside astronomers. Past efforts have had limited success, say several researchers and NSF officials. "I still think it is a brilliant suggestion worth pursuing," says Hugh Van Horn, director of NSF's astronomical sciences division, who hopes the panel's support will help bring the two communities together. Toward that end, the report proposes that the National Optical Astronomy Observatories, a Tucson, Arizona, organization operated by the Association of Universities for Research in Astronomy (AURA), divest itself of its solar observatory and make unity its major focus. AURA president Bill Smith says he's in "total agreement" with the recommendations.

But striking the right balance may be difficult. Joseph Miller, director of the independent Lick Observatory based in Santa Cruz, California, says many independents feel the idea is "grossly unfair," as NSF grants would come with strings attached and with an unfavorable ratio of time in exchange for dollars. Miller, who backed a similar proposal in 1995, says the concept could work with a revamped formula and if new monies are found to pay for the effort.

On the space-based end, the panel urges NASA to accept more diversity in mission sizes. Large efforts such as NGST are well supported, it notes, and advocates of smaller missions can tap programs such as Explorer and Discovery. But nobody is watching out for medium-sized missions, panel members say. "They often slip through the cracks," says Blair Savage, an astronomer at the University of Wisconsin, Madison, who served

CREDITS: (TOP TO BOTTOM) SOURCE: NATIONAL RESEARCH COUNCIL; LOCKHEED MARTIN

* books.nap.edu/catalog/9839.html

on the panel's policy subcommittee. To emphasize this need, the panel included five moderate-sized space initiatives in its report. Whether they will all fit in NASA's limited budget is another matter: Although NGST and the Terrestrial Planet Finder are included in the agency's long-term budget as well as the strategic plan, several others are in the plan but not the budget.

Not everyone is happy with the NRC study. Jon Morse, an astronomer at the University of Colorado, Boulder, complains that the committee excluded the Space Ultraviolet Observatory because it favored a larger and more complex spacecraft, making it too ambitious for this decade. But Morse hasn't given up: This week he's meeting with NASA engineers and scientists to improve the observatory's chances of making the cut in the next decadal report. **–ANDREW LAWLER**

CALIFORNIA

UC Teaching Assistants Win First Union Contract

The University of California (UC) system has agreed to a union contract covering some 8000 teaching assistants (TAs), capping a 16-year fight by graduate students for a labor agreement with their employer. The contract, between UC and the United Auto Workers (UAW), includes an immediate 1.5% pay raise and creates a mechanism for overtime pay as well as limits on the workweek. However, it exempts academic matters from the collective bargaining process, removing a major sticking point among faculty during the yearlong negotiations that ended last week. The pact must still be ratified by each of the system's eight general campuses.

"TAs are choosing unions," exults Christian Sweeney, a union spokesperson and a graduate student in history at UC Berkeley, about similar efforts by graduate students at the University of Washington and the University of Illinois, Urbana-Champaign, that so far have come up short. The UC agreement covers a small minority of UC's 39,000 graduate students and excludes some 8000 research assistants, most of whom are paid through research grants. University officials don't anticipate a major disruption of academic life. "It's unlikely to have a significant impact" on graduate education in science at UC Los Angeles, says psychiatrist Robin Fisher, associate dean of the graduate school.

The key issue in the lengthy California battle has been whether teaching assistants are primarily students or employees. The university argued that they were not employees and could not form a union. But in December 1998, the state Public Employee Relations Board ordered the university to allow a vote on unionization among TAs as well as undergraduate tutors and readers. After a systemwide strike (*Science*, 11 December 1998, p. 1983), the students voted to join the UAW-affiliated Association of Graduate Student Employees.

Work in progress. Union pact tackles conditions for grad students at Berkeley and other UC schools.

The new contract gives the university "sole authority on all decisions involving academic matters" and exempts "workload" disputes from arbitration while limiting how often the usual workload of 20 hours per week can be exceeded. It also establishes arbitration for settling nonacademic complaints about health and safety, discrimination, and sexual harassment, and provides for the eventual full remission of tuition fees. Most TAs now earn about $13,500 a year, and UC spokesperson Mark Westlye says he doesn't know where in the budget the extra money for the raises and tuition will come from.

Peter Miller, a union organizer at the University of Illinois, says the impetus for unionization has come from arts and humanities grad students, who get less money from research grants and spend more years teaching than do science majors. One UC scientist who requested anonymity calls the agreement "a reasonably good compromise," although he thinks everyone would be better off without it: "The TA-faculty relationship has been good; there wasn't much of anything that really needed to be fixed."

With UC grad students now in the UAW fold, Sweeney says, the number of unionized grad students in the country has doubled to about 20,000. Although the University of Wisconsin and several other public universities have had graduate student unions for some time, most administrations still oppose unionization. Illinois graduate students voted 3 years ago for a union that the university refuses to recognize, and the University of Washington has rebuffed student attempts to unionize on the grounds that state law does not allow it. "Our TAs are students first; they are only employed as a result of their continuation of successful educational pursuits," says Steven Olswang, vice provost of the University of Washington. New York University is appealing an April ruling by a regional office of the National Labor Relations Board that graduate students can be regarded as employees.

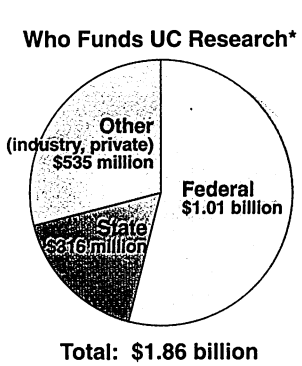
Although Olswang argues that union membership undermines the collegial relationship and tips it toward the adversarial, UC has apparently decided to make the best of the situation. Says Westlye, "Now that we have unionization, we will proceed in as copacetic a fashion as we can." **–CONSTANCE HOLDEN**

CALIFORNIA

State Ready to Create 3 Research Institutes

Lured by $300 million in state money, California university officials are scrambling to compete for three planned interdisciplinary research institutes that would be set up under a bill speeding through the state legislature. The legislation—introduced this winter as a way to enhance the state's already strong science and technology base—has won bipartisan support and could be approved as early as next week.

Even before the bill is approved, researchers are putting



CREDIT: (TOP) R. HOLMES/CORBIS; (BOTTOM) SOURCE: UNIVERSITY OF CALIFORNIA