and then crossing the Allenby Bridge into Jordan, where they caught a flight to Turkey. "We were not sure until the last minute whether it would work," says Yahya.

Archaeologist Ann Killebrew, who recently moved from Haifa to Pennsylvania State University, University Park, and serves as co-coordinator of the project with Yahya, says that the project is intended to "emphasize sharing sites rather than owning them." The group has chosen to begin work at three sites: Acre (ancient Akko) in northern Israel and Beitin and Al-Jib on the West Bank. Acre, which dates at least from biblical times and was subsequently occupied by Assyrians, Greeks, Romans, and others, is "the best-preserved Crusader city in the world," says Killebrew. And the villages of Beitin and Al-Jib, the sites of the biblical cities of Bethel and Gibeon, respectively, also harbor elaborate Bronze Age water systems and even earlier evidence of occupation during the Chalcolithic (Copper Age) period.

In the original plan, joint teams would eventually work at each site. But given the restrictions on travel between Israel and Palestine, the project leaders say that each team will have to work separately for the time being. "We have a virtual collaboration," says Yahya. "We are in contact by e-mail all the time. And as soon as the situation changes, we will be delighted to carry out joint activities."

With the political situation so dismal, project members say they have no choice but to move ahead with their project. "The worst thing to do would be to wait for better times," says University of Haifa archaeologist Mina Weinstein-Evron. "If we wait for better times, there will never be better times."

–MICHAEL BALTER

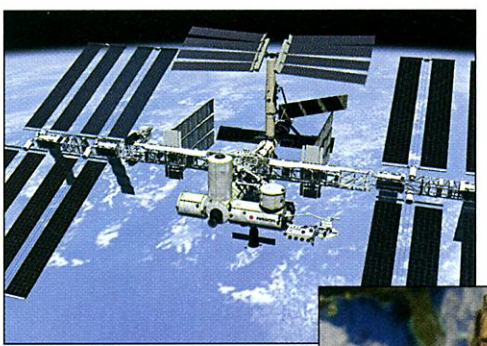
SPACE STATION RESEARCH

Bigger Is Better for Science, Says Report

A blue-ribbon panel has told NASA that the research program planned for the international space station will lack scientific credibility unless the controversial station is expanded beyond the size and scope currently envisioned. The report, by a team of NASA-appointed researchers, is a clear rebuke to plans by the Bush Administration to limit the orbiting laboratory's crew and size, and it could prove politically troublesome in NASA's budget negotiations with the White House and Congress.

In March, NASA Administrator Sean O'Keefe asked Columbia University endocrinologist Rae Silver to head a 20-person panel that would recommend research priorities for the orbiting facility (*Science*, 24 May, p. 1387). Last week, Silver laid out the results in a sometimes stormy 3-hour presentation to NASA advisers and officials. The report, to NASA's Advisory Council, recommends 15 high-priority research areas using facilities such as a centrifuge and animal and plant habitats. But although scientists who support work on the station are hailing the panel's message, some agency officials, advisers, and panel members themselves feel that the report is flawed and that some of the recommended priorities are skewed. "They ducked the hard questions," groused one agency adviser.

O'Keefe did not endorse the findings but said he was "encouraged" by them. Charles Kennel, director of the Scripps Institution of Oceanography in San Diego, California, and chair of the advisory council, said his group agrees that expanding the station beyond what's known as "core complete" is "essential" and plans to incorporate the panel's findings into the council's own recommendations, due in September. Although Silver's task force was technically independent, Silver showed O'Keefe a draft list of priorities last month, and the panel worked closely with NASA's office of biological and physical research. Silver, however, says NASA officials "did not affect our deliberations."



More is more. A panel led by Rae Silver (*right*) says science would be better served by a space station larger than the version now planned.

Some panelists are unhappy with how the panel ranked various fields represented on the orbiting laboratory. Nearly half of the 32 areas were rated "first priority," including radiation health, cell and molecular biology, and fluid stability and dynamics. Developmental biology, fire safety, and two other fields fell into the second tier, and biotechnology and structural biology joined two other fields with a third-place ranking. Evolutionary biology and materials synthesis and processing were among eight areas in fourth place. Only one specialty—biology-inspired microfluids technology—was recommended for termination, with the panel saying that it does not require experiments in low-Earth orbit.

"I have serious concerns about the way [the ranking] was done," says Noel Jones, a retired protein crystallographer and one of three physical science panelists who either dissented or wrote minority opinions. "It was very arbitrary," he says, with "no set of uniform criteria" for setting priorities. Another critic, Andreas Acrivos, an engineer at the City University of New York, concluded that the report was "strongly slanted towards the biological-medical areas." Silver dismisses such complaints as self-serving. "People are concerned that their own areas might be lopped off," she says.

The report urges NASA to build and launch quickly major facilities such as a large centrifuge. "If you don't have a centrifuge, you might as well be a biologist from 200 years ago … running around with a notepad," Silver says. Plant and animal facilities also should be installed as soon as possible, she adds, and a science officer should be appointed to coordinate station research.

One recommendation was more political than scientific. "NASA should cease to characterize [the station] as a science-driven program" if it does not go beyond the current plans for a scaled-back lab, the report states. Because of management problems and cost overruns, O'Keefe has restricted the station to a three-person crew rather than the original design that could accommodate six or seven astronauts and more instrumentation. But Silver says that NASA's own data show that the core complete version, maintained with four annual shuttle launches, would leave virtually no room for scientific payloads later in the decade.

The station's supporters embraced the call for a more robust facility. "It is past time for the NASA administrator to stop pretending core complete … is a viable or desirable goal," declared Representative Ralph Hall (D–TX). But former senator and current NASA adviser John Glenn, NASA chief engineer Dan Mulville, and retired aerospace executive and NASA adviser Tom Young worry that the Silver panel's conclusion could threaten rather than bolster support for the station within Congress, which each year debates the project as part of NASA's budget. The panel's complaint that current plans can't be justified on scientific grounds "could be used to kill the whole program," says Glenn, and Mulville warned that the White House could use the report to argue that "if there's no research, there's no reason to continue the program."

CREDITS: (TOP TO BOTTOM) NASA; BILL INGALLS/NASA

Some researchers say that NASA should have learned at least one lesson from the Silver panel: Don't rush such a complex task. "These people had two meetings and were under tremendous pressure," says one scientist engaged in a lengthy National Research Council study of station science. Adds Acrivos: "That's just not enough time to do a good job." Despite its limitations, the report gives O'Keefe a rationale to ask for more station funding—if he chooses.

–ANDREW LAWLER

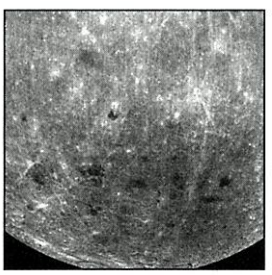
SOLAR SYSTEM EXPLORATION

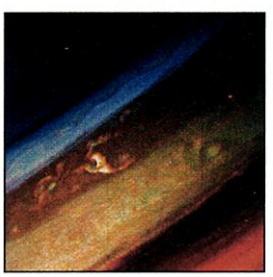
Panel Plots Clear Path For Planetary Program

For the first time in its 40-year history, U.S. planetary science has a long-term, comprehensive road map for exploring the solar system. First stops would include the distant Kuiper belt and Pluto, Jupiter's icy moon Europa, and, to the surprise of many researchers, an ancient lunar crater. Now researchers must convince NASA, the White House, and Congress that those trips are worth the money.

The plan, drafted by the National Research Council (NRC) and laid out last week in a 417-page study, marks a radical shift in the way NASA plans solar system missions. In the past, the space agency has taken a piecemeal approach to planetary exploration, inviting scientists to pursue specific targets but never asking their advice on the big picture. That approach has resulted in tensions in recent years, as rival groups have pushed their own proposals and the field has suffered growing pains (*Science*, 4 January, p. 32). The NRC panel has tried to bring order to those competing claims by setting clear priorities—ranking 12 missions out of 27 candidates—and justifying them scientifically. The 15-member committee grouped potential missions into three classes: small ones costing less than $325 million, medium-sized ones costing between $325 million and $650 million and launched every 18 months, and larger flagship missions, flown once a decade (see table).

Convened by NASA and modeled on NRC's decadal astronomy panels, the committee—which formed a half-dozen subcommittees to tackle specific areas—solicited input from hundreds of planetary scientists scattered across the country. So far, reviews have been enthusiastic. "People are very supportive," says Mark Sykes, a University of Arizona, Tucson, astronomer who helped coordinate community input to the panel. "This was not just a backroom potboiler ... everyone had an opportunity to contribute." Adds panel member Joseph Burns, an astronomer at Cornell University in Ithaca, New York: "We felt it was very, very important to get the community to buy into this."





Take a number. The NRC report divides missions by cost and ranks those in the crowded middle-priced group.

NEXT STOPS IN THE SOLAR SYSTEM*

Small
Cassini extension

Medium
Kuiper Belt–Pluto Explorer
Lunar South Pole with sample return
Jupiter Polar Orbiter with probes
Venus In Situ Explorer
Comet with sample return

Large
Europa Geophysical Explorer

*This list excludes planned missions to Mars.

CREDITS: (TOP TO BOTTOM) USGS/NASA; JPL/NASA; NSSDC/JPL/NASA

One extremely satisfied customer is astrophysicist Alan Stern of the Southwest Research Institute in Boulder, Colorado. Stern is leading a $488 million project with Maryland's Applied Physics Laboratory to visit Pluto and the Kuiper belt by 2020. Rejected by NASA 2 years in a row, the mission has the unstinting support of Senator Barbara Mikulski (D–MD), who chairs NASA's spending panel, and other lawmakers. Last year Congress funded the mission against the wishes of the Administration, and Stern says that being named NRC's top priority for medium-class missions provides further momentum.

But hurdles remain. The NRC panel placed greater emphasis on Kuiper belt objects than on the Pluto system. Panel head Michael Belton believes that Stern's plan could still fill the bill, and Stern says the mission will examine one to three Kuiper belt objects as well as Pluto and

ScienceScope

Venus Trip An aborted European plan to send a mission to Venus has been resurrected. Last week, the European Space Agency's (ESA's) Science Programme Committee agreed to aim for the original launch date of November 2005 for Venus Express, the first flight to Venus since NASA's Magellan surveyed the planet in 1994.

Venus Express was cancelled 2 months ago after David Southwood, ESA's director of science, concluded that ESA's member space agencies could not meet the necessary tight schedule (*Science*, 31 May, p. 1585). But a reevaluation has made the agency more optimistic. Planetary scientist Fred Taylor of Oxford University says the ESA Council responded to a "massive wave of support" for the mission from scientists, politicians, and the general public.

However, one dark cloud remains: Budget woes might prevent Italy from making what ESA expects will be a substantial contribution to the Venus Express payload. The Italian Space Agency plans to decide by mid-October.

Mission Impossible? The surreal hunt for radioactive Soviet leftovers in the Republic of Georgia is entering a dangerous new phase. Officials in the strife-torn country are trying to track down abandoned canisters packed with strontium-90 before terrorists—or unwitting members of the public—lay their hands on the potent radioactive material.

In February, the International Atomic Energy Agency helped the Georgians recover two canisters, bringing the total number safely secured to six (*Science*, 1 February, p. 777). But last month, a 2-week follow-up search for as many as six more thought to be missing in the mountains near the breakaway Abkhazia region came up empty.

Officials now believe that the outstanding canisters, once the heart of thermogenerators used for remote radio relay stations, might be in territory outside Georgian army control. Negotiations are under way toward deploying a joint Georgian-Abkhaz team, with atomic agency support, to search for the canisters in what one official calls "lawless territory overrun with criminal groups." One key sticking point remains: "No one can guarantee the safety of the team in the field," says Zurab Saralidze, deputy director of the Institute of Physics in Tbilisi.

Contributors: Jocelyn Kaiser, Daniel Clery, Govert Schilling, Richard Stone