Europeans Decide on a Trip to Saturn

The European Space Agency has selected a joint mission with NASA to Saturn's moon Titan for its first planetary venture

Paris

THE EUROPEAN SPACE AGENCY has decided to take its first major step in planetary exploration hand-in-hand with the U.S. National Aeronautics and Space Administration (NASA) by agreeing to support a proposal to mount a joint orbiter/probe mission to the ringed planet Saturn and its largest moon, Titan.

The decision to support Cassini was made at a meeting in Paris of ESA's Science Program Committee. It was the culmination of a fiercely fought competition that has been taking place over the past several years among various proposals vying for adoption as the agency's next major scientific project.

Cassini was one of five short-listed candidates and had for some time been considered the favorite. However, right up to the last moment it had to fight off strong claims being made for its closest rival, a pair of missions planned to visit various asteroids and comets over a 5-year period known as the Vesta project.

The mission is named Cassini after the 17th-century French-Italian astronomer Giovani Domenico Cassini, who discovered four of the planet's moons and the large division between its two outer rings, which already bears his name.

The 17th-century Dutch physicist Christian Huygens, who discovered Titan, will likewise have his name given to the probe that will be built by European scientists to descend into Titan's nitrogen-rich atmosphere. This is considered by many planetologists to resemble the chemical environment of the early terrestrial system, in particular since it has a "hydrological system" with methane performing the role played by water on Earth.

NASA has already submitted to the Office of Management and Budget a budget request, which it hopes will be passed on to Congress by the White House next month, for funds to cover the development of a companion orbiting vehicle, based on its new-generation Mariner Mark II interplanetary platform.

The orbiter will be used both to relay radio messages to earth from the probe as the latter descends for 2 to 3 hours through Titan's atmosphere, and subsequently to make its own observations of Saturn and Titan. It will overfly the latter's surface at least 30 times at a height of 800 to 1000 kilometers during its planned 4 years of operation.

Under plans originally proposed in 1982 by two European scientists, which have been under discussion for the past 5 years between the two agencies, NASA would also provide launchers for the two vehicles. Launch is currently planned to take place in April 1996, with arrival at Saturn (after both an asteroid and Jupiter flyby) scheduled for October 2002.

Responsibility for the scientific activities on both vehicles will be shared, and experiments will be allocated through open competition. It is believed that a memorandum of understanding between the agencies will specify that U.S. scientists will eventually be given responsibility for roughly two-thirds of the science carried out by the orbiter, and European scientists for the same proportion on the probe.

The main concern now of Europe's space scientists is to see the U.S. part of the Cassini mission approved by Congress.

No precise figures are being made public by ESA for the costs of its participation on Cassini, although these are expected to be roughly in line with the $250 million (in 1984 prices) the agency originally established as a guideline for eligible projects. (NASA's projected costs to cover the launch, the orbiter, and the use of deep space tracking facilities, are said in Washington to be in the order of $1.5 billion.)

ESA scientists, however, are confident that the Cassini mission will prove good value for money. Titan has offered a rich and tempting source of scientific data ever since the discovery in 1943 that its atmosphere contained methane, and appetites were further whetted by the subsequent spectroscopic observations by NASA's Voyagers 1 and 2 spacecraft at the beginning of the 1980s, which revealed the additional presence of hydrocarbons, nitriles, and oxygen-bearing compounds.

"The Cassini mission to the Saturnian system is the next logical step in the detailed systematic exploration of the outer solar system," says J.-P. Lebreton of the European agency's space science department at Noordwijk in the Netherlands. "Saturn's planet-sized moon Titan, with its intriguing atmospheric composition, is an especially interesting target."

There has been considerable disappointment in Europe's astronomy community that neither of the two candidate missions its members had proposed to the agency—a high precision gamma-ray telescope (GRASP) and an ultraviolet space observatory (LYMAN) that would have been developed jointly with NASA—were selected for support.

This disappointment is said to be particularly keenly felt among Britain's astrophysicists. The United Kingdom has recently come under considerable criticism for vetoing a planned 5% a year real increase in the agency's space science budget. But there are hopes that a compromise will soon be reached between Britain and the other twelve ESA member states, following the British government's decision last month to increase funding for basic science after almost a decade of level budgets.

The main concern now of Europe's space scientists is to see the U.S. part of the Cassini mission approved by Congress. The potential pitfalls of depending too heavily on transatlantic collaboration were made painfully clear in 1981, when NASA unilaterally backed out of a planned joint solar-polar mission because of budget pressures.

ESA is already protecting itself. Agency officials say that, if congressional support is not forthcoming, then they reserve the right to take another look at the other four options discussed at last month's meeting of the science program committee.

Many space scientists, however, are hoping that this will not be necessary. "Planetary missions in Europe have always had something of a rocky ride," says Johannes Geiss of the University of Bern, chairman of the space science committee of the European Science Foundation. "The ESF has helped pave the way for joint projects across the Atlantic, and, having been accepted by ESA, we very much hope that Cassini will also be approved by the U.S."

The proposals for the Vesta missions,

which lost out to Cassini in the competition, have been developed primarily by France's National Center for Space Studies (CNES) and the Soviet space agency Intercosmos, and are intended as a follow-up both to the ESA's successful flyby of the comet Halley, and the Soviet-launched Vega spacecraft.

A major participation by ESA in Vesta had been heavily championed by CNES and its director-general, Frédéric d'Allest, who is keen to strengthen still further the close ties that have existed for over 20 years between the French and Soviet space programs.

President François Mitterrand, visiting the Soviet space center at Baïkonour on 28 November to watch the departure of the French astronaut Jean-Loup Chrétien on board the Soyouz TM-7, for example, announced that closer cooperation in space activities had been a central topic of his discussions with Soviet leader Mikhail Gorbachev.

The two countries have confirmed earlier proposals to mount a joint mission to Mars. And the Vesta mission is still planned to go ahead, but now essentially on a bilateral basis—with, it is expected, the Soviets now picking up the largest share of the bill.

■ **DAVID DICKSON**

Galeev to Head Space Research Institute

Scientists at the Soviet Academy of Science's Space Research Institute (IKI), which is the dominant player in that country's program of space science and planetary exploration, have elected a new director: Alec Galeev, the former head of IKI's plasma physics division. Galeev succeeds Roald Sagdeev, whose 14-year tenure as director made him one of the most powerful and influential scientists in the Soviet Union.

Galeev has been a protégé and colleague of Sagdeev's since they first worked together at the Siberian science city of Novosibirsk, some two decades ago. However, the succession was by no means automatic. The same Academy reforms that now limit institute directors to two 5-year terms, and that led to Sagdeev's stepping down this past summer, also call for new directors to be elected by the members of their institutes.

Galeev accordingly had to run against at least two other candidates in an open election campaign. He emerged victorious in September, although outside observers are not certain what his vote margin was. His appointment was officially confirmed by the Academy in October. He has also been made a corresponding member of the Academy.

The 55-year-old Sagdeev, meanwhile, is still working at IKI. He expects to be chief scientist on the Soviets' Mars 1994 mission, which will explore the surface of that planet with unmanned rovers and balloons. He is active in the International Foundation for the Survival and Development of Humanity, a new organization devoted to issues of peace and the environment. And he is said to be looking into the possibility of setting up a new institute to look at arms control from a scientific perspective.

■ **M. MITCHELL WALDROP**

Superconductor Rumor

A rumor of the discovery of a new high-temperature superconductor was heating up the superconductivity community this past week, but as *Science* went to press there was no substantiation.

According to the rumor, which was reported by a number of superconductivity researchers, workers at a U.S. laboratory have fabricated a material that becomes superconducting at 200 K or above, much higher than the current record of 125 K. Some versions of the rumor had the critical temperature as high as room temperature or about 300 K.

People who heard the rumor said that President Reagan is supposed to hold a news conference to announce the discovery sometime before Christmas, perhaps as early as the second week of December. Because of the President's alleged role in announcing the discovery, most people guessed that the supposed discovery took place at a government laboratory, but the rumor was not clear on this point.

Researchers at government labs who were contacted by *Science* said they had no knowledge of the discovery, although some had heard the rumor. Roger Poeppel, head of ceramics processing at Argonne National Laboratory, had a typical response: "Nobody that I know knows anything about it."

■ **ROBERT POOL**

Germany Drafting Biotechnology Law

Bonn

The West German government is preparing legislation that would turn voluntary guidelines governing research involving recombinant DNA into a set of legally binding regulations. The law, which should be drafted by next spring, will also give state governments a role in implementing the regulations.

The law is being drafted by the Ministry of Health in response to a directive issued last week by the West German cabinet. The regulations will define "levels of danger" for different types of experiments, and, according to Health Ministry spokesman Gernot Schubert, approval of experiments will depend on "how facilities are constructed, what equipment is used and who is doing the research."

Most experiments conducted in so-called "contained areas" will be approved by individual German states, but approval of "high-risk" biotechnological experiments will be a matter of national government scrutiny.

The release of genetically manipulated organisms into the environment will only be permitted after a "state commission" has determined that all "dangers for humans and environment" can be excluded according to "current scientific knowledge." Government approval in some cases will place additional conditions on experimentation.

The process of approving biotechnological experiments is expected to be difficult and complex. But, according to Schubert, the new law will allow flexibility to decide from case to case and rely on "expert evaluation."

■ **DON KIRK**

Don Kirk is a free-lance writer based in Bonn.

Jim Watson on the Budget

With budget deficits and major new weapons systems the focus of political attention in the nation's capital these days, Nobel laureate James D. Watson, director of the Cold Spring Harbor Laboratory, has come to the defense of basic biological research with his well-known directness.

The budget for the National Institutes of Health "must be approximately doubled in real terms by the year 2000," Watson writes in his annual report for the lab. Where will the increase come from? Easy. "The monies can and should come from the bloated military-industrial complex, which increasingly is producing weapons that either do not work as promised or have costs totally incomparable with any addition they may give to true national security."

Not surprisingly, Watson sees gold in DNA and rejects the notion that the science budget is inevitably a zero sum game. "If we do not rise to the occasion and do the science that can be done today, then other nations, particularly those in the Orient, will fill the vacuum. . . . The aspirations of the youth of Singapore, for example, will not be limited to the assembly of Apple computers. . . . "

■ **BARBARA J. CULLITON**