NASA ponders "faster, cheaper" way to send scientific mission to Pluto

Washington. The new head of the US National Aeronautics and Space Administration (NASA) has thrown his weight behind a proposed mission to Pluto that would demonstrate the feasibility of his philosophy of "better, faster, cheaper". The mission, which would be the first to reach the most distant planet in the Solar System, is moving rapidly through the ranks of the agency and may even appear this winter as a new start in the agency's proposed budget for the fiscal year 1994 that begins on 1 October, 1993.

Mission designers at the Jet Propulsion Laboratory (JPL) in Pasadena, California, have developed a concept for a 150-kg spacecraft that could travel the nearly 5 billion km to Pluto in as few as seven or eight years. The mission, called the Pluto Fast Fly-by, is small compared to the 800-kg Voyager probes or the 1,500-kg Galileo now on its way to Jupiter and relies on brute force to accomplish its goal. It would use the largest expendable launcher in the US fleet, the Titan 4/Centaur, to send two nearly identical spacecraft on a direct path to Pluto.

The onboard science instruments would be kept to a minimum: most likely a camera, infrared and ultraviolet spectrometers and a radio science experiment. The second spacecraft would arrive months after the first fly-by, providing a backup and allowing both hemispheres of the planet and its satellite Charon to be photographed at close range. Each spacecraft would observe Pluto and Charon for about a month, with the closest encounter lasting only a matter of hours.

What distinguishes this mission from other ideas waiting for funding is the strong interest shown in it by Daniel Goldin, who succeeded Richard Truly in April as administrator of NASA. Goldin was so taken with the idea after hearing it described during a visit to JPL in May that he directed NASA's Solar System Exploration Division to speed up its studies. What had been a typical review was turned into a 60-day study.

That timetable may allow it to be included in the 1994 budget request that NASA will submit next week to the White House. It would be the first in a new class of intermediate-sized missions, says Wes Huntress, head of NASA's planetary division.

That approach is seen as a way to cope with Washington's current climate of fiscal austerity, a situation that earlier this year caused the cancellation of an ambitious mission known as Comet Rendezvous/Asteroid Fly-by (CRAF). The agency has proposed a new 'Discovery' series of low-budget missions, including a small Mars lander and a

rendezvous with a near-Earth asteroid, that would cost no more than \$150 million each.

The cost of intermediate-class missions would be a maximum of \$400 million, says Huntress, not counting the launch vehicle, which in the case of a Titan/Centaur adds another \$350 to \$400 million. (The agency

some time around 2015 as the planet recedes from the Sun. In addition, some 40 per cent of Pluto's surface will be in permanent shadow by 2020, a function of its pole being pointed towards the Sun.

A group headed by planetary scientist Alan Stern at the Southwest Research Insti-

The best views of Pluto and Charon, its moon, from Earth, left, and from the Hubble Telescope, right, are still a far cry from what scientists want to see.

could save money by using a Soviet Proton launcher, if it can resolve certain technical issues.) By comparison, the budget for the proposed Cassini mission to place an orbiter around Saturn rose to \$1.7 billion before NASA decided to scale back the project last spring.

One way to hold down the cost of the Pluto mission would be to take advantage of recent advances in the miniaturization of spacecraft components, including the use of a star tracker developed for the Pentagon's Strategic Defense Initiative that weighs one-tenth as much as similar devices used on past interplanetary spacecraft. Making this and other lightweight hardware durable enough for a ten-year flight into deep space would significantly reduce the mission's cost. The project also plans to borrow a leftover communication antenna from the Viking project to Mars in the 1970s.

Perhaps the most significant savings would come from speeding up the development cycle for the project and keeping the engineering teams small. If work begins as soon as 1994 or 1995, the spacecraft could be ready for launch as early as February 1998 — less than half the development time for such recent missions as the Hubble Space Telescope and Galileo.

There are good scientific reasons to launch the Pluto fly-by mission as soon as possible. Researchers would like to study Pluto's tenuous atmosphere before it disappears

tute in San Antonio, Texas, has studied several proposed missions to Pluto during the past several years, but none has been this far along in the agency's approval process. Two years ago, the group for a time considered a large, Cassini-sized spacecraft before it was judged to be too big, slow and expensive. Alternatively, a proposal for a tiny, 35-kg Pluto spacecraft equipped with a camera and little else was dismissed as not being big enough. The fly-by strikes a happy medium, says Stern. "We don't want to do a 'photo op'", he says. "We want to do first-rate science, and the 150-kg mission satisfies our highest scientific priorities."

Stern believes that missions such as the Pluto Fast Fly-by are the best hope for an active US planetary programme. "We were asked to do things differently and we did", he says. "I think this mission will be a test of whether the US wants to remain in the planetary business."

Tony Reichhardt

Correction

A CONTAMINANT in a batch of L-tryptophan being investigated as the cause of an outbreak of eosinophilia-myalgia syndrome (EMS) was incorrectly described in a recent article in *Nature* (358, 96; 1992). Its correct name is 3-phenylamino-L-alanine. Researchers at the National Institute of Hygienic Sciences in Tokyo first discovered the contaminant in high-performance liquid chromatographs.