Down to the Wire with Halley

Given the air of fiscal austerity in Washington these days, the odds of the Reagan Administration's financing a $300 million spacecraft to fly by Halley's comet look slimmer than ever. But until the Administration actually says "No," the space science community is going all out to win approval for the mission. The answer will have to come within the next few weeks. At the Jet Propulsion Laboratory in Pasadena, California, planning and design work for the mission is well along, but the schedule is very tight, says project manager Raymond L. Heacock. If the spacecraft is to meet the comet in 1986, it must be launched in the summer of 1985, which means that JPL must start letting contracts no later than next January. This, in turn, will be possible only if the Halley mission is included as a new start in NASA's fiscal year 1983 budget, which is being drawn up now.

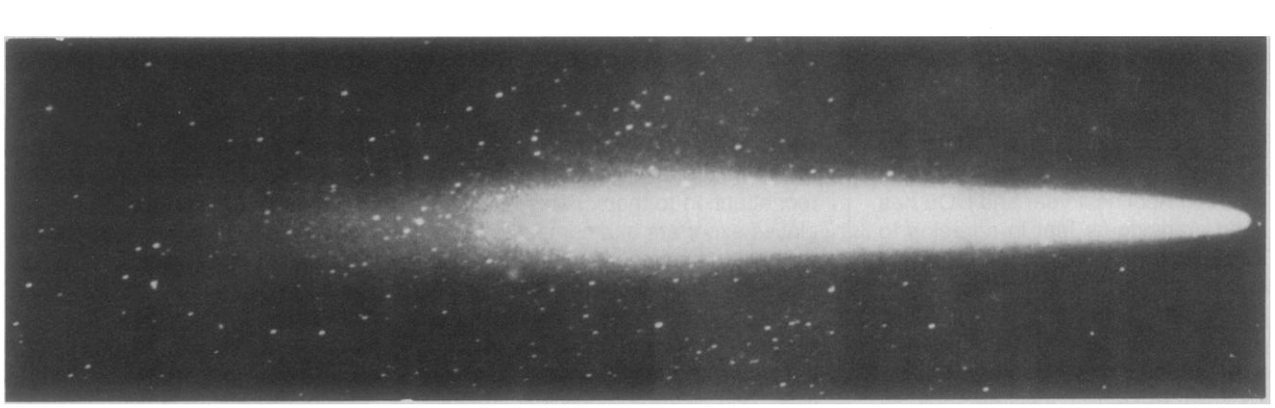
Laurence Soderblom of the U.S. Geological Survey, chairman of NASA's Space Science Advisory Committee, voices a widespread frustration in the space science community: "It's absolutely insidious, crazy, tragic that we ever got ourselves into a position where we can't do a Halley mission." But in fact, a big part of the problem is that NASA headquarters has never really pushed for Halley. With the space science budget being squeezed every year by the immense cost of the space shuttle, agency officials have been more concerned about preserving such high priority missions as the Galileo orbiter/probe mission to Jupiter and the Venus Orbiting Imaging Radar.

Proponents of a Halley mission counter that the comet represents a once-in-a-lifetime opportunity: no other young, active comet has an orbit that is predictable enough for planning a mission. These are the kind of comets that are thought to retain pristine material from the formation of the solar system, and whose dynamics are most interesting.

Proponents have also stressed national prestige. The European Space Agency is going to Halley with its "Giotto" spacecraft. The Japanese are going. The Russians are going. So why aren't we going? Besides, they say, the United States has a big lead in navigation and imaging technology. Its close-ups of the comet, the best by far, would give the country a public relations coup on a par with the Voyager missions. (In fact, without such images most people will probably be disappointed in Halley. On this trip its most spectacular displays will occur on the far side of the sun from the earth.)

During the recent Voyager 2 encounter with Saturn, JPL director Bruce C. Murray forcefully argued the case for Halley to presidential adviser Edwin Meese and NASA administrator James M. Beggs. Not surprisingly, Meese and Beggs have remained noncommittal, pending submission of NASA's budget proposal. But presidential science adviser George A. Keyworth is interested in the mission, and has asked NASA to prepare a list of options for how it might be done. The space agency's reply is expected to include the following:

- JPL's $300 million "baseline" mission. During the 60-day "observatory phase" before encounter the spacecraft would monitor the comet's development with some 3000 long-distance images. During the 3-hour "encounter phase" it would attempt to image the kilometer-sized nucleus. It would also perform in situ measurements of the comet's composition and its particle and field environment.
- A somewhat less expensive imaging/sample-return mission. This version is attractive, says Jeffrey D. Rosendhal, deputy head of NASA's Office of Space Science, because it would complement the other three missions. It would retain the observatory and encounter phase imaging, which is unique, while dropping the in situ experiments that duplicate those planned for ESA's Giotto. The dramatic idea of a sample return came up only last June, very late in the game, says Rosendhal. The spacecraft would capture a few milligrams of comet material on what is essentially a sticky surface, then proceed on a trajectory that would carry it back to earth some 5 years later. Unfortunately, he adds, the sample-return technology is new, poorly understood, and risky.
- A swing by Halley with the Galileo spacecraft as the latter heads toward Jupiter. This is the least attractive option, says Rosendhal. It would mean sending Galileo on a long, slow loop around the sun, with a several-year delay in its arrival at Jupiter. Only long-distance imaging would be possible, and from a bad angle at that. But if the Administration cancels development of the high-thrust Centaur booster, which is required to get Galileo to Jupiter on a more rapid trajectory, this version of the Halley mission might be a way of salvaging something. On the other hand, doing Galileo in this way would add another $300 million to its cost—not far below the $445 million price tag for Centaur, and almost exactly the price of the baseline Halley mission.—M. MITCHELL WALDROP



A view of Halley's comet taken on 12 May 1910.

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