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# 1986: A Vintage Year for Space Science

If all goes as planned, it appears that the coming year will be an extraordinarily good one for space science. In addition to the ongoing program of space research, a number of major space events that were started years ago will, largely by chance, all come together during 1986.

Mankind's first encounter with the planet Uranus will take place on 24 January. The Voyager 2 spacecraft, now 3 billion kilometers into its grand tour of the solar system, will pass within about three planetary radii of the Uranus cloud tops. Various telescopic observations show remarkable things happening at Uranus. The planet is tipped on its side with its south pole now pointing toward the sun; it is surrounded by a series of threadlike rings that demonstrate a surprising stability; and Uranus fluctuates brightly in ultraviolet light by means of a power source that is not understood. Our experience with Jupiter and Saturn has convincingly demonstrated both the inadequacy of research limited to observations from Earth and the superiority of nature's imagination over that of even the more inventive researcher. We may see another such demonstration at Uranus.

The next major event is a flyby of Comet Halley by six spacecraft from four nations. Although the spacecraft were launched months apart, all but one will pass Halley during an 8-day interval in March. The Soviet spacecraft Vega 1 will pass close to the comet on Thursday, 6 March. On Saturday, Suisei, the first of two Japanese spacecraft arrives. The second Vega will fly by on Sunday. The week continues with a distant encounter on Tuesday by Sakigake, the second Japanese spacecraft. Then, on Thursday, 23 March, the European probe Giotto will make a daring attempt to pass close to Halley's nucleus. The International Comet Explorer, an American spacecraft and veteran comet chaser that 6 months earlier flew through the tail of Comet Giacobini-Zinner, is the last. Because it arrives 2 weeks later than the others, it will pass only in the distant vicinity of Halley. Comet Halley will also be observed from Earth orbit by the Astro 1 telescope assembly and by the Spartan-Halley experiment. Although Halley's comet may well disappoint the general population, most of whom will not even be able to find it in their night sky, space scientists look forward to this brief period in March with justified anticipation.

Launches of several important new spacecraft are scheduled for 1986. These hold the promise of years of fruitful data acquisition for whole communities of space scientists. In May, there are two: the first is Ulysses, which will first go to Jupiter and then roam through the as yet unexplored regions over the poles of the sun. The second is Galileo, which will go to Jupiter, there to split into two spacecraft. One section will plunge through the clouds to explore Jupiter's dense atmosphere below, while the other section orbits the planet to examine in detail its moons, planetary magnetic field, and radiation belts. On its way to Jupiter, Galileo may be sent near the asteroid Amphitrite in December, thus closing the year with a first close-up look at one of the large bodies in the asteroid belt.

In terms of its potential scientific value, the launch of the Hubble Space Telescope by the space shuttle is perhaps the grand event of the year. The space telescope is expected to be the most influential astronomical instrument ever put into space. It will operate for years, examining selected portions of the universe with such clarity and precision that it is regarded by some astronomers as an advance rivaling Galileo's first use of the telescope for astronomy nearly 400 years ago.

The science of space is still in an early phase in which much of the solar system is yet to be explored and understood. We have not reached a level of predictive understanding that enables us to solve distant astrophysical mysteries by application of knowledge obtained from solar-system research. Our capability to generalize and extrapolate in space science is bound to be improved by the events of 1986.—A. J. DESSLER, *Director, Space Science Laboratory, NASA Marshall Space Flight Center, Huntsville, Alabama 35812*