Asoka Mendis to participate in Halley's Comet probes with scientists in Moscow and West Germany

March 3, 1986

UCSD COMET EXPERT TO PARTICIPATE IN HALLEY'S PROBES

When Soviet and European spacecraft begin sending data back to Earth during their encounters with the celebrated Halley's Comet, University of California, San Diego theoretical physicist Asoka Mendis will play an important role.

The rendezvous will take place in early March when the comet streaks away from the sun in its elliptical orbit that will take it to the far reaches of the solar system. Scientists hope to learn more about the comet's magnetic field, rotation period, the distribution of its dust and its chemical composition.

Mendis will work with scientists in both Moscow and Darmstadt, West Germany, to interpret data and photographs relayed by the spacecraft. He may be the only U.S. scientist participating in both missions.

Mendis, as one of the world's foremost comet experts, has analyzed data from a good number of comets, but he says "the real fun will be with Halley's Comet. For the first time, hopefully, we'll see the center of a comet--the so-called nucleus. Nobody has actually seen the 'dirty snowball.'"

The "dirty snowball" refers to the irregular hunk of frozen gases and dust that form the comet's compact nucleus. It is believed to be no more than several miles across.

Mendis will join scientists at the USSR's Space Research Institute to monitor the March 6 and March 9 flybys of Vega I and II. He is part of a group that will analyze data on the composition of the comet's atmosphere and nucleus, provided by a three-channel spectrometer.

On March 13, Mendis will be among scientists gathered at the European Space Administration in Darmstadt to observe the spacecraft Giotto's extremely close (within 350 miles) encounter with Halley's. He'll work with data coming from a plasma analyzer, which measures electrons and heavy ions in the vicinity of the comet. He expects these measurements to provide important clues to the nature of solar wind interaction with small celestial objects.

The two Soviet probes will serve as "pathfinders" for Giotto, according to Mendis. "We don't know the exact position of the comet along an orbit within 500 kilometers (310 miles)," he said.

The Soviets will pinpoint the position of the comet within a few miles and relay that information to the European space agency so that it can make final corrections on Giotto's route.

"This is an exciting instance of international cooperation in the interest of science," he said.

Each spacecraft will carry eight to ten specialized instruments. Among the tasks they are programmed for are the measurement of solar wind, magnetic field and ion composition and the detection of electrons and dust. Solid-state television cameras mounted on the spacecraft will provide "close-ups" of the comet's core.

"The dirty snowball will be much dirtier than we anticipated earlier. It will be dark and patchy," Mendis said.

From visual and infrared ground-based observations of Halley's, scientists learned that its albedo, the fraction of light that a celestial body reflects, is very low. The comet absorbs approximately 90 percent of the light that bathes it, an indication that the comet's surface is encrusted with dirt particles and rocks.

Drawing on the conventional wisdom of the physics and chemistry of comets and solar radiation effects, Mendis and UCSD physicist Maximus Marconi have built a model of the comet's dusty atmosphere. "The people who developed the instruments for the spacecraft needed to know the type of environment the spacecraft will encounter out there," he said.

The comet probes give Mendis and his colleagues a unique opportunity to test their theoretical model. He said the data being relayed from the three Halley's probes will be complementary, enabling scientists to build a comprehensive model of the comet's atmosphere, ionosphere and plasma tail.

Why study comets? "I believe they are fundamental to the understanding of the solar system. They are debris left over from the formation of the solar system, and they've undergone very little change since they formed. They're a very pristine material. So, understanding the chemical composition and the physical structure of comets would be basic to our understanding of how the solar system formed," Mendis said.

Note: Dr. Mendis left for Moscow March 1. After his return, he will be available to discuss initial findings with the media on March 19 at 10 a.m. The location of the briefing will be announced.

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(March 3, 1986)