

Japan's moon Orbiter finally Shows Up
James Oberg, Astronomy magazine, April 2007

With Chinese and Indian lunar probes in their final months of launch preparations, a third Asian contender in the lunar orbit arena has suddenly reappeared after being widely considered out of the race: Japan's "Selene" orbiter. It is now scheduled for launch aboard a powerful H-2A booster from the Tanegashima Space Center in August, just ahead of the Chinese "Chang-eh" mission.

In a previous incarnation, "Selene" was to carry a set of impactor probes that were to survive high-speed landings on the far side. Careful testing convinced Japanese space scientists that the design would not work, so they were removed from the 'mother ship' - and offered free to any other spacefaring nation that wanted to tinker further with them.

In place of the landers, the probe will now carry two sub-satellites that will act as communication relays between the main probe and Earth during those portions of each orbit when the probe is behind the moon. Live retransmission will allow scientists to detect real-time trajectory wobbles that allow them to map mass concentrations ('mascons') below the surface.

Meanwhile, the three-ton "Selene" and its suite of fourteen scientific instruments was still always intended to fly, with or (as now) without the lander probes. The Japanese space agency had invested 55 billion yen (about \$450 million US) in building it, and although financial arrangements had not yet been worked out for operating the launch site as a government-commercial partnership, that was merely a familiar earthside budget battle.

"Selene" will orbit the Moon at an altitude of 100 kilometers and send data for at least a year. This guarantees overlap with the operations of both the Chinese and Indian probes. It will observe the lunar surface and remotely probe beneath it. In an official statement, its mission is to collect information on "the formation of the moon and its transitional history up to today," tackling questions that scientists had not been smart enough to even ask prior to the Apollo landings. "Moon science is full of unknown territory," says Shinichi Sobue, the head of the Selene project development team.

In addition to mapping the distribution of elements and geographical formations, Selene will study the gravitational field to examine underground structures and the distribution of iron and other heavy metals in detail. While of value to science, Japanese officials have also said that mapping resources for future exploitation is also a goal of the project.