SMART-1 celebrates its first year in space

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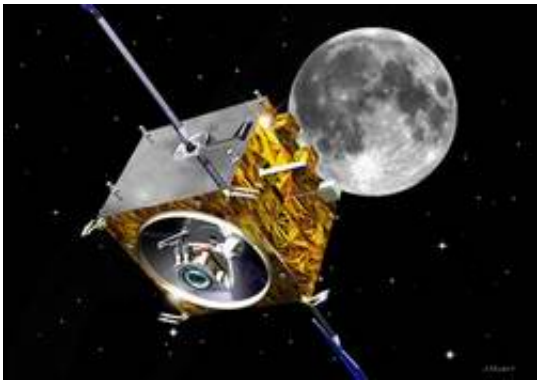

One year after its launch on 27 September 2003, the SMART-1 spacecraft is in excellent health and preparing for the manoeuvres that will bring it into orbit around the Moon mid-November.
The first mission phase, the aim of which was to test several innovative technologies, has been successfully completed. It included, in a first for Europe, testing of primary solar-electric propulsion and of a miniaturised payload for cruise science experiments, telecommunications and spacecraft navigation.

The ion engine went into action three days after launch and slowly placed SMART-1 safely above the radiation belts that surround the Earth. From there, SMART-1 started spiralling around our planet to eventually come closer, through ever wider orbits, to the so-called 'Moon capture' point. During this transfer phase, the ion engine fired its

thrusters for periods of several days to progressively raise its apogee (the maximum altitude of its orbit) to the orbit of the Moon.

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So far, the SMART-1 ion engine has operated for about 3300 hours and covered a distance of some 78 million kilometres, with only 52 kilograms of propellant. With this successful demonstration, SMART-1 is paving the way for future deep-space missions, using a solar- electric engine as primary propulsion. It will be applied to long, energy-demanding interplanetary missions in the Solar System, reducing the size and cost of propulsion systems, while increasing manoeuvrability and the mass available for scientific instrumentation. ESA plans to use primary solar-electric propulsion for its future BepiColombo and Solar Orbiter missions.

During its first year in space, SMART-1 has also successfully tested new space communication techniques. For the first time, SMART-1 has used very short radio waves (called Ka band at 32 Gigahertz, with the KaTE instrument) to communicate with Earth. These enable far more information to be transmitted over deep space than the commonly used frequencies and in a shorter period of time.

Another SMART-1 achievement is the successful testing of a laser communication link experiment with ESA's optical ground station in Tenerife, Canary Islands in February of this year. This laser technology, in which Europe is a leader, has already been applied to

telecommunications satellites, but this was the first time a laser link had been used to communicate with a distant, rapidly moving spacecraft.

Both techniques will be crucial for future science missions where huge amounts of scientific data have to be transferred back to Earth over large distances in space.

During its cruise, SMART-1's miniaturised payload, consisting of seven instruments weighing only 19 kilograms in total, has been tested. All instruments onboard SMART-1 were operated and performed successfully in a number of science experiments. This was excellent preparation for the next phase of the SMART-1 mission: an unprecedented scientific study of the Moon, exploring in-depth the mysteries of our Earth's natural satellite.

With all these achievements to celebrate after its first year in space, SMART-1 is now preparing for the next big milestone, the lunar capture which is expected to take place less than two months from now.

About SMART-1:
SMART-1 was launched on 27 September 2003 from Kourou, Europe's spaceport in French Guiana, onboard an Ariane-5 rocket. It is the first in a series of 'Small Missions for Advanced Research in Technology', designed to demonstrate innovative and key technologies for future deep-space science missions. In addition to its technological objectives, SMART-1 is Europe's first lunar mission and will perform a detailed scientific study of the Moon.

Source: ESA