UNMANNED SATELLITES ON POSTAGE STAMPS: 47, THE SOHO SATELLITE

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This is the forty-seventh in a series of articles about unmanned satellites on postage stamps. This article features the SOlar and Heliospheric Observatory (SOHO) satellite. SOHO was launched from Cape Canaveral on 2 December 1995. Several of SOHO's instruments are still operational as this is being written and published.

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SOHO was a joint mission of the European Space Agency (ESA) and NASA as part of the International Solar-Terrestrial Physics (ISTP) program. It was launched from Cape Canaveral and directed by NASA's Goddard Space Flight Center (GSFC) in Greenbelt MD.

The SOHO mission studied the Sun from a halo orbit at the Earth-Sun L1 Lagrangian point, about 1.5 million kilometers sunward of the Earth, or about 1% of the way from Earth to the Sun. A halo orbit is one in which a spacecraft will remain in the vicinity of a Lagrangian point, following a circular or elliptical loop around that point.

Lagrangian points are positions in interplanetary space where a satellite affected only by gravitational forces can remain approximately stationary relative to two larger objects (such as with respect to Earth and the Sun in the case of SOHO). Lagrangian points mark positions where the combined gravitational pull of the two large masses on a small object provides precisely the centripetal force required for it to revolve with them. They are analogous to geosynchronous orbits in that they allow an object to be in a "fixed" position in space rather than in an orbit in which its relative position changes continuously. The L1 point in particular lies on the line connecting Earth and the Sun. This means that the SOHO satellite follows an orbit in space in which it is constantly between Earth and the Sun, but much closer to Earth because its mass is much less than that of the Sun.

SOHO was a three-axis stabilized (non-spinning) spacecraft with one end pointed toward the Sun at all times. Several instruments were used to investigate physical processes in the Sun's chromosphere and corona and to measure the solar wind. SOHO also investigated the interior structure of the Sun. A highlight of the mission

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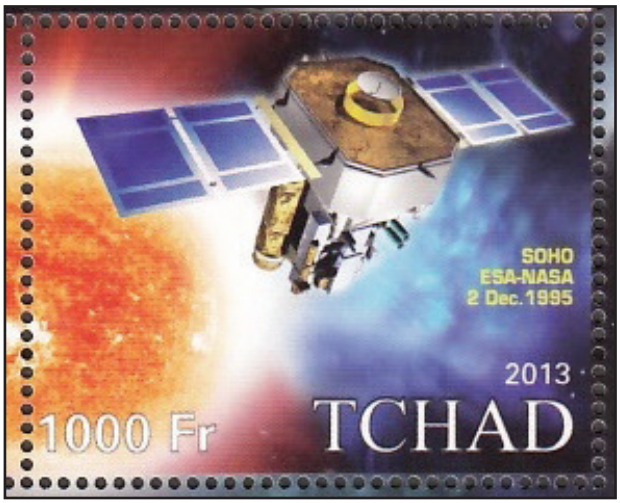
was the discovery of "tornadoes" on the solar surface. These whirlwinds are typically the size of Earth and have much higher wind speeds than those on our planet.

SOHO provided the first detailed views of the solar atmosphere, along with movies of coronal mass ejections (gigantic eruptions of magnetized plasma from the solar corona). This information was used to improve space weather forecasts. Instruments on later spacecraft have made similar solar measurements. They are a vital part of solar monitoring for space weather.

SOHO has two solar panels extending from the spacecraft body. The body is about 3.6 m by 3.6 m. With the solar array deployed, the satellite measures about 9.5 m in length. Its mass at launch was about 2 metric tons (~2000 kg).

SOHO appears on a large number of postal items from about 15 countries, often as one of several spacecraft featured on a sheet of stamps. Interestingly, few if any of those countries had anything directly to do with the SOHO mission. Images of selected postal items with good representations of SOHO accompany this article.

A checklist of postal items showing the SOHO satellite (http://rammb.cira.colostate.edu/dev/hillger/soho.htm) is available on the Website developed by the authors for the un-manned satellites featured in this series of articles (http://rammb.cira.colostate.edu/dev/hillger/satellites.htm). E-mail correspondence is welcome. Don Hillger can be reached at don.hillger@colostate.edu and Garry Toth at gmt.varia@gmail.com.



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