Un-manned Satellites on Postage Stamps : 5

By Guest Contributors Don Hillger and Garry Toth

The SMS/GOES series

This is the fifth article in our series, in which we feature the satellites in the Synchronous Meteorological Satellite (**SMS**) and Geostationary Operational Environmental Satellite (**GOES**) series. SMS-1 was launched on 17 May 1974 and the series continues through GOES-12 launched 23 July 2002. The change in name from SMS to GOES took place after SMS-2, with the launch of GOES-1. Of all the satellites, only GOES-G suffered a launch failure and was destroyed. Several more satellites in the GOES series (GOES-N to GOES-Q) will be launched through 2010, after which the U.S. geostationary satellite series will be redesigned with improved instrumentation.

All SMS/GOES were launched into geosynchronous orbits at the required 35,800 km altitude above the equator, where they remain stationary with respect to the earth. This is the preferred orbit for the weather observation role of the SMS/GOES series. Typically two such geostationary satellites are operated by the National Oceanic and Atmospheric Administration (NOAA) at one time: one positioned to view the eastern U.S. and western Atlantic with a sub-satellite point at 90°W over the equator, and the other to view the western U.S. and eastern Pacific with a sub-satellite point at 135°W. These two positions together allow full coverage of the Western Hemisphere as well as large portions of the Atlantic and Pacific Oceans. Full-disk images of the earth can be obtained every half-hour from current GOES, with smaller-area images available every 5 minutes during special Rapid Scan Operations.

SMS/GOES satellites through GOES-7 were cylindrical spin-stabilized spacecraft. Starting with GOES-8 a three-axis stabilized spacecraft design was used. With GOES-N to be launched in 2004, the three-axis design will change slightly with new multi-satellite procurement for continuing the GOES series. On spinning satellites the earth is viewed during only a small fraction of each spin via a camera that spins with the spacecraft. Images are constructed from successive scan lines as the camera steps to the next line with each spin. In contrast, on a non-spinning craft the imaging cameras have more time available to point at the earth. This increases the signal, reduces noise in the data, and allows greater spatial and temporal resolution in imagery and data. Current GOES instrumentation includes a 5-spectral-band Imager that collects visible imagery at 1 km resolution and infrared imagery at 4 km resolution (at the earth's surface at nadir). A 19-spectral-band Sounder instrument also takes measurements at 10 km spatial resolution.

In addition to weather images, there are instruments on board GOES for measuring solar X-rays, particles emitted by the sun, and the earth's magnetic field.

SMS-1 L May 17 1974 by Delta by C Canaveral (wt 627 kg) into synchronous orbit over the equator off S America, provided the first day-and-night stormwatch, with either weather or infrared pictures every 30 min. It was also used from Sep 1974 to receive and transmit data provided by 20 balloons released in French Guiana. Drifting round the world at 30 km, the balloons each carried 64 instrumented packages of 400g wt. When dropped on command by parachute, these packages transmitted wind, temperature and humidity data back to their carrier balloon, which sent the information on via SMS or Nimbus 6. SMS-2 L Feb 6 1975, and placed over the equator 15° SE of Hawaii, meant that the 2 spacecraft together could cover the W Hemisphere. One of its tasks was to keep watch on California's forest areas, including the famous redwoods, to give warning within 90 min of fire outbreaks.

GOES-1 view of N and S America

GOES First of 3 launches was Oct 16 1975 by Delta from C Canaveral. Wt 293 kg. Incl 70°W. Identical with SMSs, and renamed once more because of their operational status.

Source Turnill : Observer's Spaceflight Directory

These aspects of space environment monitoring are critical to dependable operation of the earth's telecommunications links and power grid. Other features of GOES include relaying environmental data from collection systems located within the view of the satellite. Search and rescue capabilities for ships and planes are also part of the GOES system.

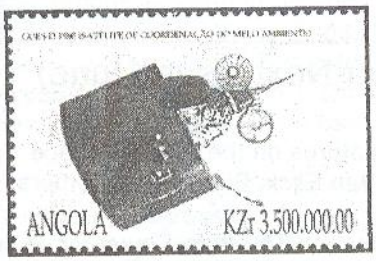
A table listing the complete SMS/GOES series with launch dates and images of postal items featuring these satellites is available on the Website developed by the authors: **http://www.cira.colostate.edu/ramm/hillger/satellites.htm.** A checklist and images of several postal items also accompanies this article. E-mail correspondence with the authors is welcome. Don Hillger can be reached at **hillger@cira.colostate.edu** and Garry Toth can be reached at **garry.toth@ec.gc.ca**.

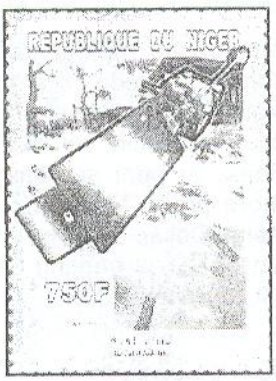
Checklist of Postal Items Showing SMS/GOES

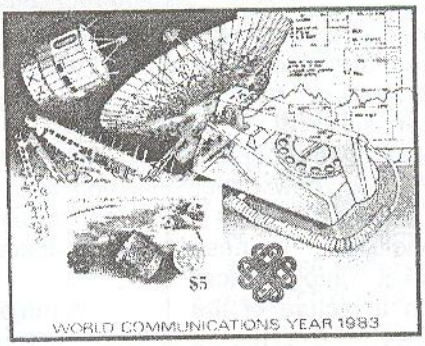
Country	Catalog Number*	Type of Item**	Year	Notes on Content***
Angola	1110c	Part of SS6 (1110a-f)	1999	GOES-D
Angola	1110f	Part of SS6 (1110a-f)	1999	SMM (not SMS)[1]
Cayman Islands	628		1991	Three-axis GOES
Chad	708d	Part of SS6 (708a-f)	1997	SMS/GOES[2] (not GEOS)
Niger	Unknown	Part of MS6	2001	Three-axis GOES
North Osetia	Local	Part of MS6	1997	Three-axis GOES
St. Lucia	611	SS1	1983	SMS/GOES
United Nations (Geneva)	None	Meter	1988	GOES-4/7 or GMS
Venezuela	1426e	Part of SS5 (1426a-e)	1989	Poorly-depicted SMS/GOES

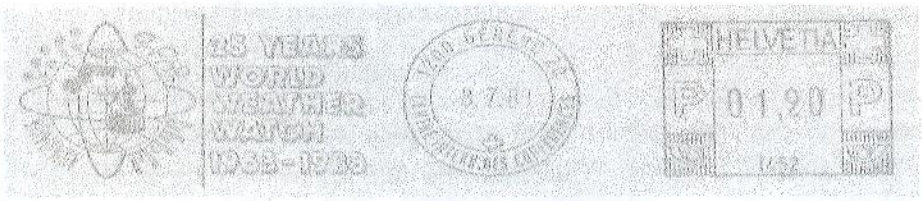
* *Scott* catalog number.
** SS# = souvenir sheet, MS# = miniature sheet, where # = number of stamps in sheet, and the numbers in parentheses are the catalog numbers of the stamps in the sheet.
*** SMS/GOES (GOES-1 through GOES-7) were spin-stabilized spacecraft; three-axis spacecraft started with GOES-8.

[1] Solar Maximum Mission (SMM), not SMS as indicated on the stamp.
[2] SMS/GOES, not Geodynamics Earth Observation Satellite (GEOS) as indicated on the stamp.









See also page 34 for another article in this series which was first published in *The Astrophile* for 2003 and which is republished here by kind permission of the authors and The Editor.