Un-manned Satellites on Postage Stamps : 7

By Guest Contributors Don Hillger and Garry Toth

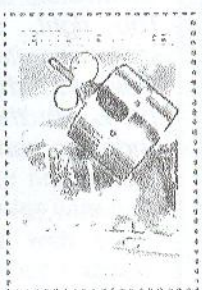
The GMS, INSat, GOMS, and FY-2 series

This is the seventh in a series of articles about un-manned satellites on postage stamps. This article features the geostationary weather satellites in the **GMS, INSat, GOMS, and FY-2 series** operated by Japan, India, Russia, and the People's Republic of China respectively. (The current U.S. GOES and European Meteosat geostationary series were covered in the previous two articles.) All these satellites were launched into geosynchronous orbits at the required 35,800 km altitude where they remain stationary with respect to the earth. Together these satellites, since they are positioned at different longitudes above the equator, give full coverage of the earth's weather, except near the poles where the geostationary viewing angle is too shallow to give useful information. All of the geostationary satellite series to be discussed have visible and multi-band infrared imaging capabilities with real-time broadcast of the data to ground stations in view of the satellites.

There have been five satellites in the **GMS** (Geostationary Meteorological Satellite, also called Himawari or "sunflower") series, the first of which was launched in 1977 and the last in 1995. These satellites were launched by the National Space Development Agency of Japan (NASDA) but are operated by the Japanese Meteorological Agency (JMA). The GMS series was based on the early spin-stabilized GOES design. However, part of the satellite is despun so that the antennas can point toward the earth at all times, while the body of the spacecraft spins at 100 rpm. Full-disk visible and infrared images of the earth are created from scan lines collected during each spin of the satellite. With a 140°E subpoint at the equator, in line with Japan, the satellite views an area from Hawaii to India. GMS, like GOES, also monitor the solar environment, collect data from earth-based platforms, and have search and rescue capabilities.

India's contribution to geostationary weather observation is **INSat** (Indian National SATellite), several of which have been launched, the first, INSat-1A, in 1982 and the most recent, INSat-3A, in 2003. INSats are multi-purpose satellites, with both communications and weather remote-sensing capabilities. The satellites are three-axis stabilized so that the instruments always point toward the earth, similar to the current GOES series. INSats are positioned at the equator generally near 74°E, in line with India. Although an important part of global weather observation, INSat data are not readily shared with other countries. To partially compensate for this problem, Meteosat-5 was moved to near 63°E in 1998. The communication capabilities of INSat are used to relay radio and TV programming, as well as provide search and rescue services.

Russia's three-axis geostationary weather satellite, **Elektro**, is also called **GOMS** (Geostationary Operational Meteorological Satellite). Only one GOMS was launched, in 1994, after numerous delays due to both hardware and software problems. After being placed into position at 76°E, problems continued to plague the GOMS, and no useful images were obtained. There were many other objectives of the Elektro series, similar to those of other geostationary weather satellites. A three-satellite system was planned, but it is believed that the program has been cancelled and no further satellites will be launched. This is in contrast to the large number of successful Russian polar-orbiting Meteor weather satellites, which will be covered in the next article in this series.



China's first planned spin-stabilized geostationary weather satellite FY-2 (Fen Yung or "wind-cloud") was to be launched in 1994, but a fire and explosion at final checkout destroyed the spacecraft, killed one worker, and injured 20 others. A successful launch took place in 1997, and the satellite was positioned at 104°E. The FY-2 series is quite similar to the Japanese GMS-5, providing visible, infrared, and water vapor imagery. More satellites are planned, as part of the comprehensive weather services planned for the 2008 Olympic Games in Beijing. China's polar-orbiting FY-1 weather satellites will be covered in the next article in this series.

Checklist of Postal Items Showing GMS, INSAT, GOMS, and FY-2

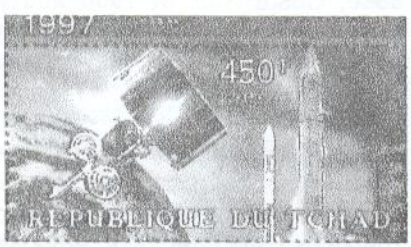
Country	Cat. No..*	Type**	Year	Notes
GMS (Japan)				
Chad	708b	Part S/S-6 (708a-f)	1997	GMS-1
China (Taiwan)	2222		1981	GMS
Hong Kong	421		1983	GMS (1)
Japan	1564		1984	GMS
Japan	2548		1996	GMS (2)
Korea (South)	1572	Also booklet of 4	1990	GMS
Korea (South)	2020	Also booklet of 10	2000	GMS
Maldive Islands	1575		1991	GMS-5
Niger	Unknown	Part of S/S-6 (a-f)	2000	GMS
Sri Lanka	1234		1998	GMS
Thailand	1472	Also booklet of 5	1992	GMS
Vanuatu	566		1992	GMS-4
INSat (India)				
Chad	Unknown		1998	INSat-2B
India	1020		1983	INSat-1
India	1848		2000	INSat-3B
Niger	Unknown	Part of S/S-6 (a-f)	2000	INSat-1A
Venezuela	1576i	Part of S/S-10	1997	INSat-1B
GOMS (Russia)				
Niger	Unknown	Part pf S/S-6 (a-f)	2000	GOMS
FY-2 (People's Republic of China)* **				
Benin	1177 (selvedge)	Part of S/S-8 (1177a-h)	1999	FY-1
Niger	Unknown	Part of S/S-6 (a-f)	2000	FY-2

(1) Full-disk water vapor image (2) Full-disk visible image

* *Scott* Number, unless indicated with Mi or BL for Michel

** S/S# = souvenir sheet, M/S# = miniature sheet, where # = number of stamps in the sheet, and the numbers in parentheses are the Scott numbers of the stamps in the sheet.

***The Chinese FY-1 series are polar-orbiting satellites.



A table and images of several postal items showing these satellites are presented both here (as originally printed in the *Astrophile*) and on the Website developed by the authors: http://www.cira.colostate.edu/ramm/hillger/satellites.htm.

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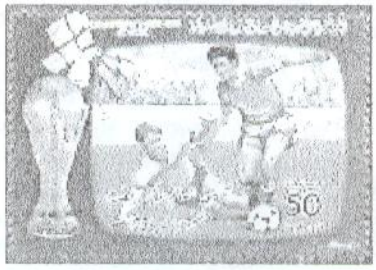

See also page 34 for another article in this series which was first published in *The Astrophile* for 2003 and which is republished here by kind permission of the authors and The Editor.