UN-MANNED SATELLITES ON POSTAGE STAMPS: THE ATS SERIES

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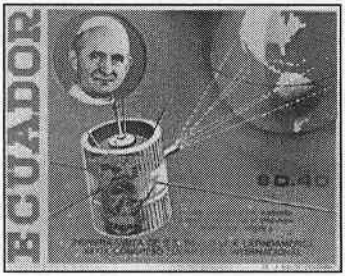
This is the fourth in a series of articles about un-manned satellites on postage stamps. This article features the six satellites in the Applications Technology Satellite (ATS) series. ATS-1 was launched on 7 December 1966 and the series continued thru ATS-6 launched on 30 May 1974.

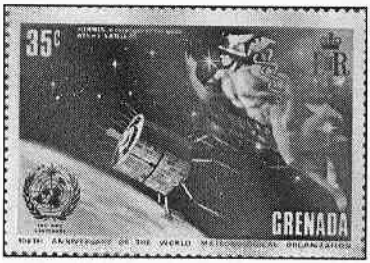
All but ATS-2 were intended for geosychronous orbits at the required 35,800 km altitude where they remain stationary with respect to the earth. This is a preferred orbit for both the communications and weather-observation roles of the ATS series.



Only ATS-2 was intended for a medium-altitude orbit. The complete series with launch dates is given on the website developed by the authors for the satellites featured in these articles: **http:www.cira.colostate.edu/ramm/hillger/satellites.htm**. A table of all postal items known to show the ATS series accompanies this article and is also available on the website.

The ATS series was created to explore new technologies and techniques for communications, meteorology, and navigation. Many ideas planned for an Advanced Syncom satellite series (never launched) were incorporated into the ATS program. ATS-1 through ATS-5 were designed around a basic cylinder shape about 1.5 m in diameter and generally less than 2 m tall, with the spacecraft gradually increasing in size throughout the series. However the functions of the various satellites were quite different.

ATS-1 and 3 were spin-stabilized satellites with a phased array of 8 antennas extending from both the top and the bottom of the cylinder body. The longer whip antennas on one end started out at an angle but bent toward the vertical axis. The antennas on the other end were shorter and angled from the vertical. A spin-scan cloud camera took advantage of the satellite spin to scan across the earth one line at a time. An image of the side of the Earth facing the satellite was collected as the camera stepped from one scan line to the next with each rotation of the satellite. The spatial resolution of (visible-only) images ob-

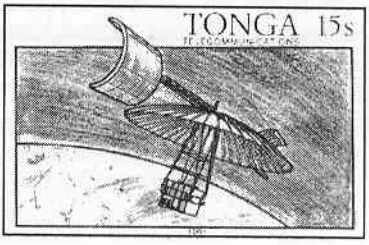


tained from ATS-1 and 3 was 3.2 km. Full-disk images of the earth could be obtained every half hour: ATS-1 produced the first full-disk cloud cover images, and ATS-3 produced the first true-color images from geostationary orbit.

The communications capabilities of ATS were used to relay weather facsimile (WEFAX) data from a central facility to Automatic Picture Transmission (APT) ground stations within view of the satellite. The satellites drifted slowly westward relative to the Earth in their geostationary orbits: ATS-1 started over Ecuador and drifted toward the Pacific, while ATS-3 started over the Atlantic and drifted toward South America. ATS-1 and 3 were used to relay educational programs and provide communications services, as indicated on many of the stamps that show this series.

ATS-2, 4 and 5 were also of cylindrical design but were gravity-gradient attitude-stabilized using long booms, some of which were over 35 m in length. The goal was to move away from spin-stabilized spacecraft to three-axis stabilization. These satellites conducted communications experiments, space environment investigations, and new imaging techniques for meteorological data retrieval. ATS-2 and 4 did not achieve their desired orbits and were only partially usable. ATS-5 could not be stabilized in orbit, greatly limiting the experiments that could be performed.

ATS-6 was a completely different design than the previous satellites in the series, being three-axis stabilized. Attached to the central Earth Viewing Module was a 9 m diameter dish antenna and two 8 m long booms with semi-circular panels of solar cells at each end. Experiments on ATS-6 included a high-resolution radiometer for meteorology, space environment sensors, as well as communications technology experiments ranging from direct educational broadcasts to relays between other satellites.



Images of several postal items showing ATS series are presented with this article. ATS-1 or 3 is shown on most of the stamps.

Only the stamps from Ecuador are known to show a gravity-gradient ATS (ATS-2, 4, or 5), not ATS-3 as indicated on the stamps. In addition, only 3 countries are known to have issued stamps showing ATS-6: Mongolia, Tonga, and Venezuela, as indicated in the table.

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Checklist of Postal Items Showing ATS series

Country	Cat. N0.*	Type of Item**	Year	Notes on Content
Ecuador	772		1969	ATS-2/4/5 (not ATS-3)[1]
Ecuador	772e	Imperforate SS3 (772,A,C)	1969	ATS-2/4/5 (not ATS-3)[1]
Grenada	494		1973	ATS-3
Grenada	567		1974	ATS-1/3
Grenada Grenadines	25		1974	ATS-1/3
Grenada Grenadines	25a	MS5 + label	1974	ATS-1/3
Liberia	665		1974	ATS-1/3
Panama	490	Overprint on 464	1968	ATS-3
Mongolia	C75		1975	ATS-6
Panama	490A	Overprint on 464D	1968	ATS-3
Panama	490B, i490B	SS2 (464B,E), gold overprint on 464f [perforate (BL96a) and imperforate (BL96b) in different colors]	1968	ATS-3
Panama	C366		1969	Not ATS-3[2]
Panama	C366a	SS1 (C366)	1969	Not ATS-3[2]
St. Lucia	609		1983	ATS-1/3
Tonga	783b	From strip of 3 (783a-c)	1991	ATS-6
Venezuela	1185		1978	ATS-6

*_Scott_ number, unless indicated with Mi or BL for _Michel_

**SS# = souvenir sheet, MS# = miniature sheet, where # = number of stamps in sheet

[1]Design is ATS-2/4/5, not ATS-3 as indicated on the stamp.

[2]Design is Intelsat-1/Early Bird, not ATS-3 as indicated on the stamp.