Planetary Environments Part 1: Introduction

by Garry Toth and Don Hillger (Un-manned Satellite Philately)

This is the first in a planned series of articles about planetary environments in a philatelic context. The authors, both meteorologists, have built extensive philatelic websites for terrestrial *Weather and Climate* and *Un-manned Satellites*. At one point we were intrigued by stamps such as Gambia *Scott* 3646d (Fig. 1) with its theme of "Planetary Meteorology." The spacecraft in the stamp is the Japanese *Akatsuki* Venus Climate Orbiter (VCO). We were drawn to the similarities between terrestrial meteorology and that of other bodies in the solar system, and so started to study what we have come to call "Planetary Environments": the atmospheres, weather systems and climates of other bodies in the solar system, including the various types of liquid or ice at or near the surface of some of the planets or moons. This work led to the building of our *Planetary Environments* web page, which will be the source of some of the images used in these articles. Hundreds, if not thousands, of stamps have the solar system as their theme. One nice example is Marshall Islands *Scott* 582 (Fig. 2), whose 12 stamps depict the solar system through artistry, mythology, and symbolism.

Fig. 1 Gambia *Scott* 3646d, *Michel* 7126, from Scott 3646 MS4, 2015

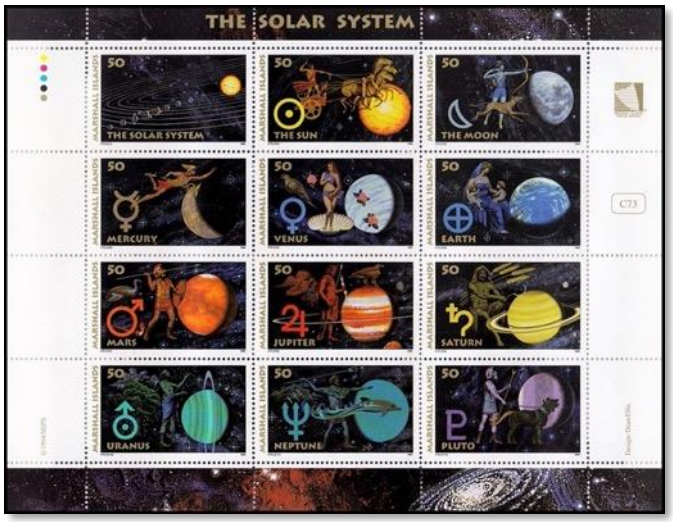

Fig. 2 Marshall Islands *Scott* 582 MS12, *Michel* 530-541 MS12, 1994.

In this introductory article we present, with philatelic illustrations, a brief overview of planetary observations, from ground-based telescopes through spacecraft. Subsequent articles in this series will consider the planetary environments of each planet (including Pluto), and some moons. Most of this knowledge has been provided by spacecraft, to

which we will necessarily refer, but they will play a strong supporting role rather than the primary role, which will fall to the details of the various planetary environments. Space weather is a separate area of study. It can be thought of as the effects of various forms of solar energy on planetary bodies and their nearby space environments. In this series we will refer to space weather only in the context of its effects on planetary environments. For more information on space weather, the interested reader can refer to the authors' Space Weather web page or their publication *Space Weather: A Philatelic Journey*, which is available as American Topical Association Handbook 166, in print or DVD formats.

Fig. 3 Indonesia *Scott* 2182 MS3, *Michel* BL250, 2009.

Ignoring the naked eye, astronomy can be traced back to Galileo's telescope and his observations with it, starting in 1609. In 2009, the International Year of Astronomy (IYA) celebrated the 400th anniversary of that momentous event. Fig. 3 presents one of the many postage stamps issued for the IYA: Indonesia *Scott* 2181, whose three stamps feature Galileo, his telescope, and the IYA logo. A mighty tree of astronomy grew from the seed planted by Galileo. In Fig. 4 is a block of 6 stamps, United States *Scott* 3409a-f (from 3409 MS6), featuring modern telescopes which can conduct both deep space research and observations of bodies in the solar system. Stamps 'c', 'd' and 'e' depict the optical observatories Keck, Tololo and Mount Wilson. Radio telescopes are found in stamp 'b' (the Very Large Array) and stamp 'f' (Arecibo, which unfortunately collapsed on 1 Dec 2020). Stamp 'a' shows the well-known HST (*Hubble Space Telescope*), which, released into a low-Earth orbit by the *Space Shuttle Discovery* in April 1990, revolutionized astronomical observations from its perch in space. Readers interested in NASA's four orbiting "Great Observatories", one of which is the HST, can see our article "NASA's Great Observatories," *Astrofax*, 30(1), (Spring 2022), 1-11.

Fig. 4 United States *Scott* 3409a-f block of 6, from 3409a MS6, *Michel* 3361-3366 block of 6, from *Michel* BL55, 2000.

Before space-based platforms, one way to get a telescope above much of Earth's atmosphere was to launch it as the payload of a stratospheric balloon. The Stratoscope-2 series of balloons did just that. For example, in scientific flight #7 on 26 March 1970, the balloon carried an optical telescope with a 91.4 cm (36") mirror to around 25 km altitude in an "overnight flight to study spiral nebula[e] and to photograph planets Uranus and Jupiter" (as stated in part of the text in the balloon launch cover in Fig. 5). The authors are also aware of one postage stamp that depicts the telescope carried by the Stratoscope-2 series. Issued in 1979 by Oman State, it is unlisted by the major stamp catalogues (Fig. 6, stamp 'g' from an MS8).

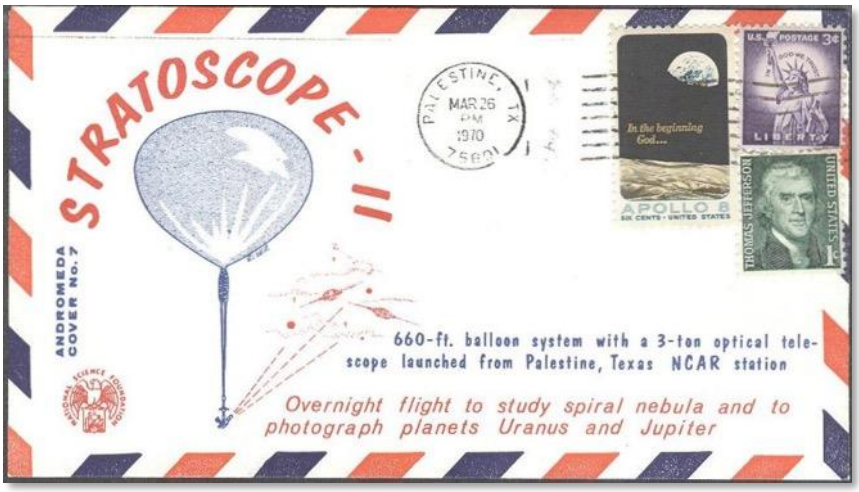

Fig. 5 Stratoscope-2 balloon launch cover, 26 March 1970, Andromeda Cover #7 cachet.

Fig. 6 Oman State, unlisted, year 1979, stamp 'g' from a MS8, depicts the optical telescope carried by the Stratoscope-2 balloons.

A few research rocket missions were also related to planetary observations. One example was the Scout rocket launched on 21 June 1971 to an altitude of 377 km from Wallops Island, which carried the PAET (Planetary Atmospheric Entry Test). With future interplanetary missions in mind, the goal was to test techniques of making upper atmospheric measurements with pressure, temperature, and humidity sensors as well as accelerometers, radiometers, and a mass spectrometer. The results were used in support of later spacecraft missions to Mars (*Viking-1/2*), Venus (*Pioneer-Venus-1/2*, also known as *Pioneer-12/13*), Jupiter (*Galileo*) and Saturn (*Cassini-Huygens*). In Fig. 7 is a rocket launch cover for this mission. It has an Orbit cachet with a summary of the mission's goal: "to determine planetary atmosphere structure and composition of Mars, Venus and Outer Planets".

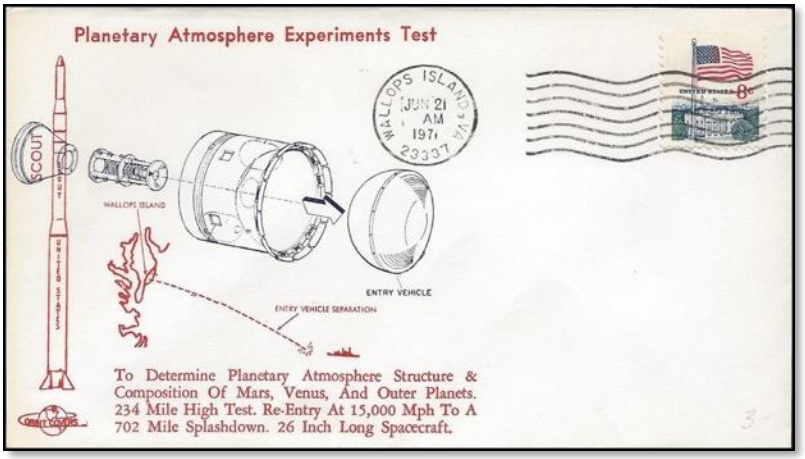

Fig. 7 Scout rocket launch cover, 21 June 1971, Orbit Covers cachet.

The Space Era began with the launch of *Sputnik-1* on 4 October 1957. Within a few years, the first interplanetary spacecraft had flown to the Moon and the closer planets. The Soviet *Luna-1*, launched 2 January 1959, was the first spacecraft to fly by the Moon, on 4 January 1959. The American *Mariner-2*, launched 27 August 1962, was the first to fly by another planet (Venus) on 14 December 1962. *Mariner-4*, launched 28 November 1964, was the first to fly by Mars, on 15 July 1965. More and more spacecraft were launched until the whole solar system, from Mercury through Pluto, had been visited by at least one of them.

The bulk of our information about planetary environments comes from such spacecraft and we will refer to some of them in subsequent articles in this series. Several are presented in Uganda *Scott* 1484A, from 1994 (Fig. 8). Its 8 stamps depict 7 interplanetary spacecraft from the 1970s and one, the "Galileo Entry Probe", that was released into Jupiter's atmosphere on 13 July 1995 (the *Galileo* mission began with its launch and deployment from the *Space Shuttle Atlantis* on 18 Oct 1989). Many other interplanetary and lunar missions took place both before and after those illustrated in Fig. 8. A fine summary of the missions through 2016, titled *Beyond Earth: A Chronicle of Deep Space Exploration, 1958-2016*, is available online as a pdf.

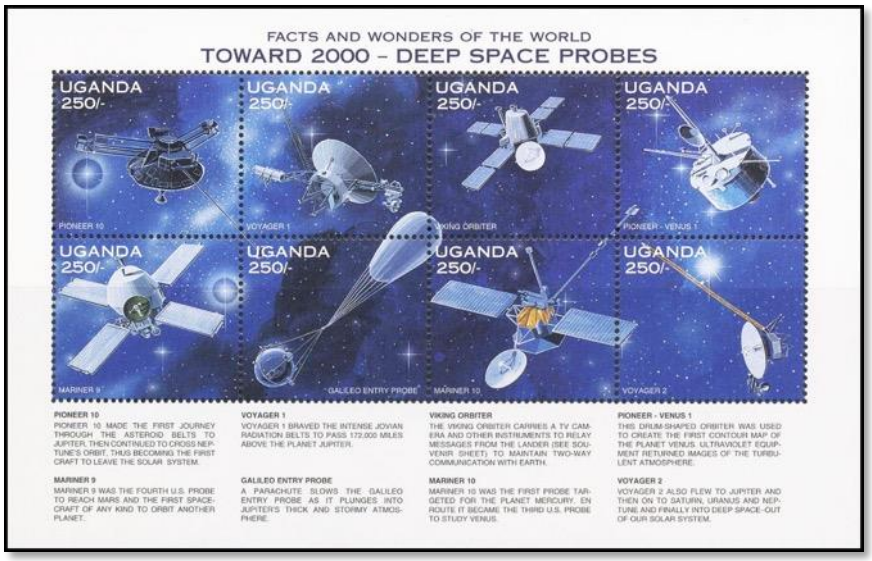

Fig. 8 Uganda *Scott* 1484A MS8, *Michel* 1855-1862 MS8, 1997.

Each planet (or moon) is different, so each poses its own scientific questions. Much has been learned about them over the past years and decades and centuries, but so much more remains to discover! The goal of this series of articles is to present, in a philatelic context, the basics of what is known about planetary environments in our solar system. The next article will consider Earth's Moon, our closest heavenly neighbor and therefore the easiest to observe, and the only one so far visited by humans. Its forbidding environment with a rough cratered surface and a near vacuum for an atmosphere has some similarities with the planet Mercury, which will be featured in the third article in the series. Thereafter we shall proceed outward in the solar system, from Venus to Pluto.

About the Authors
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We have researched and written extensively about weather, climate, and unmanned spacecraft on stamps and covers, as well as some other topics. See our complete list of our publications, with electronic reproductions.

What is the first stamp ever to show a comet?

by Dušan Hubner

This article first appeared in the March 2019 (#120) issue of the UK Astro Space Stamp Society *Orbit Magazine*

I have studied my copy of the ATA handbook (#167) "What's First?" (https://americantopical.org/Sys/Store/Products/34984) with eager interest, until I came across the topic "Comets." I paused here, because I was sure that I had older stamps with a comet in my collection, than the mentioned Belgium 1966 stamp (Sc 669).

I checked it and I was right, there does exist an older one. It's a 1939, Second World War Slovak state postage stamp (Slovak, Sc 9, 11, 34-37). And what's better, in it you see the famous Halley's comet displayed - the second topic, which must be corrected.

Known stamps (with Sc catalogue numbers): 34 - blue color, value 40h, 35 - dark green, value 60h, 36 - purple, blue-purple, value 1Ks, 37 - dark blue / brown, value 2Ks