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## Preface

Since October 4, 1957, when the first artificial Earth satellite, *Sputnik 1*, was launched, thousands of books and articles have been written for telling in every detail all aspects of the history of space exploration, perhaps the greatest adventure of human history.

There is no topic that has not been treated and it is difficult to find anything new to say. But, despite all that has been published, there is still place to write about space exploration in an original and enjoyable way, for example, through philately.

This book presents an historical and philatelic overview of one of the major topics of astronautics: the exploration of the Earth from space. It introduces and describes in detail the research fields in which artificial satellites, manned spaceships, and orbital stations have contributed to build a new image of our planet and its environment.

The atmosphere and ionosphere, the geomagnetic field, the radiation belts and magnetosphere, the weather and climate, the Earth's resources, the structure of the depths of the oceans and the characteristics of sea surface environments, the shape, dimensions, and movements of the planet Earth. These are some of the subjects illustrated here in considerable detail through postage stamps and other postal documents for philately, issued in many different countries throughout the world.

It is not, however, an encyclopedic work or an atlas of space exploration based on postage stamps instead of the usual illustrations, it is rather a series of data notes and discussion of the content of given stamps, cancellations, space covers, maximum postcards and complete sets, all relating to Earth observation from space.

The book consists of ten chapters. The first is a prologue in which we outline the main stages of astronautics, with particular reference to human missions in space. Chapter 2 presents some topics that have been the subject of research since the launch of the first satellites: the geodesy, the study of the shape and the size of Earth and monitoring of slow movements of its surface. Here we limited to only consider the satellites whose mission was mainly geodesic. We have neglected the contributions of navigation and localization satellites such as the Transit or GPS systems along with other topics such as "search and rescue" and surveillance, which can constitute together with the main topic of satellite communications the object of a next project.

In Chap. 3, we talk about the environment in which many of the satellites operate: the envelope of gas surrounding the Earth, the atmosphere. The final part of the chapter deals with the most delicate part of this envelope, the so-called ozone layer, and describes many missions that have helped scientists to understand the phenomenon of ozone depletion and to take measures for its protection. Another highly valuable part of our atmosphere, the ionosphere, is discussed in a separate chapter. The large magnetic cavity that protects the Earth from energetic particles from the Sun and from space, the magnetosphere, is discussed in Chap. 5 of the book. Knowledge of the magnetosphere and its many components is one of the areas where greater has been the contribution of satellites and until the beginning of the space era very little was known on the subject. Chapter 6 is devoted to meteorology, one of the oldest and most popular application fields of space exploration. In the following chapter, we deal with a subject that for years has worried the technicians responsible for the construction of space vehicles, that of cosmic dust and micrometeorites that fall to Earth continuously. Today, thanks to the observations made by satellites, we know that the danger posed to astronauts by these small bodies is very low although a mass of about 40,000 tons of micrometeorites falls onto Earth every year.

Chapter 8 is devoted to the study of Earth's resources from space. Geology, monitoring of agricultural, forest and water resources, the study of soils, the search for mineral deposits and oil, land use planning, and control of natural disasters and environmental degradation are just some of the topics to which the satellites give increasingly important contributions.

An additional chapter deals with the aspect of cartography and mapping from space.

The book concludes by examining one of the most precious and delicate elements of our planet: oceans. About 71 % of the planet's surface is covered with water, and the oceans contain approximately 96.5 % of all Earth's water. The oceans influence almost all aspects of life on Earth, and since the early steps of space exploration many missions have been dedicated to learning more about the so-called sixth continent.

The ten chapters are preceded by an introduction in which we give some technical information on stamp collecting with some topics, addressed to non-specialists, which aim to introduce the different types of items belonging to philately.

Readers will appreciate the pictures of postage stamps, here all in color, numbering over 1130. Stamps are reproduced in full scale. For graphic reasons, the sheets, leaflets, envelopes, postcards, space covers, and special cancellations are generally reproduced in slightly reduced scale, always adequate, however, to ensure full understanding of the captions to be seen in these postal documents.

The material used to illustrate the topics comes exclusively from the author's collection. Obviously it would not be possible to use all the philatelic items that hundreds of postal authorities around the world have produced in the last seventy years to celebrate the events of the conquest of space.

The author has therefore carefully chosen and studied every issue throughout the world that could have a bearing on relevant events in the history of Earth exploration, so as to ensure additional in-depth information and also to highlight any links between the single chapters.

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