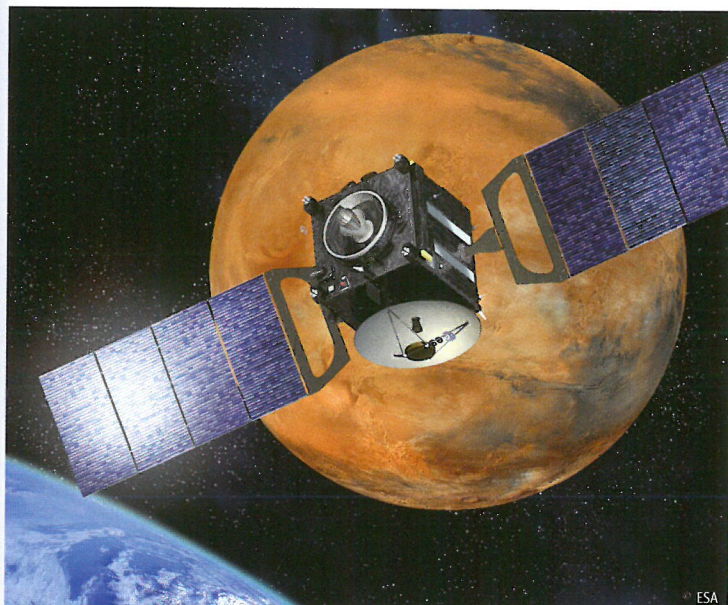


BIRA-IASB - BELGIAN INSTITUTE FOR SPACE AERONOMY

Promoting research among users and society

Officially recognised by the international scientific community since 1954, aeronomy is the science of terrestrial, planetary and cometary atmospheres. A discipline with a bright future to which the BIRA-IASB provides its dynamics and know-how.

Combining scientific research and the development of scientific services destined for society and users, this is the credo of the *BIRA-IASB*, which intends to place fundamental research in the service of society. More than ever, research is turning to valorisation; valorisation that takes into account potential economic and social applications of the works carried out.



Mars Express, artist impression of Mars Express

On this basis, the *BIRA-IASB* has developed two major research domains. The first one involves the chemistry and physics of planetary atmospheres, more precisely of the Earth, Venus, Mars and cometary atmospheres. Resolutely multidisciplinary, aeronomy tries to better understand the evolution of the chemical composition of the atmospheres (gas content and other components) and therefore takes its place at the centre of current concerns about climate change, air pollution and air quality. Aeronomy therefore aims to grasp the complexity of the processes at work in the upper atmosphere.

The second research domain conducted by the *BIRA-IASB* involves interactions between the sun and the earth and interplanetary space plasma. For that matter, space

exploration fully benefits from the research carried out in this area: the propagation of radio waves in the ionosphere, dangerousness of the radiation belts for astronauts and electronic equipment on spacecrafts, etc. Similarly, telecommunications are at the centre of research conducted on the impact of atmospheric braking and of magnetic storms on the course of satellites.

Aware of the practical use of its work, the *BIRA-IASB* has therefore developed, in addition to the base of valorisation scientific research, a approach with a double objective: helping researchers to devise applications that can be used by the greatest numbers and emphasising, among politicians and the general public, the importance of public investment in research, and this in balance with fundamental research.

State-of-the-art observation technology

Aeronomy deploys observation methods on Earth as well as in space: ground stations, stratospheric balloons, satellites, shuttles and space stations. At the same time, *BIRA-IASB* researchers take part in major international for involving the measurement of UV rays, ozone, etc. In full development, space instruments are the subject of European collaboration in the framework of the European Space Agency (ESA) and also in a bilateral framework.

Spectroscopy, observations through occultation, measurements in the laboratory and modelling work, complete the range of tools used. In fact, laboratory models re-creating a virtual atmosphere are required for the proper interpretation of teledetection measurements, and, consequently, for the determination of measured gases and aerosols. Capitalising on the most advanced calculation methods, these models are scientifically and operationally qualified to predict the evolution of medium- and long-term changes: a major asset to define the steps to be taken in the fight against global warming and to become a major player in key sectors such as "chemical weather".

A range of scientific services in full expansion

Internationally recognised for its global competences in terms of atmospheric research, the *BIRA-IASB* is strongly developing its research on the action of sun rays, largely responsible for ionisation and dissociation phenomena that can be observed in the planetary atmospheres. Satellites and airplanes are also highly affected by the eruptions of ionising solar particles: in this respect, *BIRA-IASB* space-weather expertise will lead to significant commercial prospects.

This is precisely the objective of the valorisation of research in atmospheric chemistry and physics: by making use of its instruments able to measure ozone, UV rays or air quality, the *BIRA-IASB* offers a range of concrete and easy-to-use products.

This opening strategy is supported by the B.USOC (Belgian User Support and Operation Centre), in charge of meeting expectations of potential users in search of microgravity applications. The B.USOC will also, on behalf of the ESA, manage the operations of the solar sensors on the SOLAR platform on the international space station starting with the flight of the European COLUMBUS module in 2008.

For its users, the international space station (ISS) is the preferred site for the experimentation with measurement instruments in a microgravity environment. Being linked to NASA, the B.USOC provides for the preparation of experiments, the operational nature of the instruments used and ensures their promotion in view of their use on board satellites. This new prospect will boost the B.USOC's essential role in the promotion strategy of the *BIRA-IASB*.

Multiple partnerships

Very involved in international scientific research networks, the *BIRA-IASB* takes active part in the activities



Visible UV measurement instruments at the Uccle station

of the European Space Agency and contributes to the formulation of new proposals in the context of the 7th European framework programme for research and technological development. Similarly, the *BIRA-IASB* is an active party in the second leading European Commission project: GMES (Global Monitoring for Environment and Security), of which the fourth pilot project, focused on the atmosphere, should allow to provide politicians and the general public with services measuring ozone, aerosols, the UV index, air quality, etc.

The *BIRA-IASB* is already developing these products in cooperation with industrialists and numerous Belgian universities (University of Liège, UCL, KU Leuven, Universities of Ghent and Antwerp, etc.).

The *BIRA-IASB* intends to fully participate in the International Heliophysical Year: it will therefore organise an open-doors day aimed at better informing the general public about its activities in early October 2007, which coincides with the 50 year anniversary of the launch of Sputnik. At a time when issues linked to climate change and to the impact of human activities on the atmosphere have become critical, the *BIRA-IASB*'s mission is to initiate young people in the working of the atmosphere and more generally to give rise to scientific vocations in order to better prepare the future.



Jungfrau Station



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