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STATUS OF THE CURRENT ESA EARTH OBSERVATION MISSIONS

CGMS is informed of the status of the current European Space Agency Earth Observation missions. Two of them, MSG and Metop are in co-operation with EUMETSAT. The success of the Envisat mission, launched in 2002, is well established, with a constant increase of user demand for data and services. Currently, over 1300 scientific projects are served with Envisat data. Data accessibility is constantly upgraded, through Internet and Telecom satellites multicast. The 2007 Envisat symposium attracted about 1000 participants from all over the world.

Today, the Envisat mission has exceeded the original foreseen 5 years lifetime and is expected to continue nominal operations until 2010. ERS-2, the second operational ESA EO mission, launched in 1995, continues to satisfy the steady increasing data demand despite the failure of the gyroscopes and the low rate recorders for which workaround solutions have been successfully implemented. Finally, PROBA, an experimental ESA satellite, provides remarkable hyperspectral data since 2001.

STATUS OF THE CURRENT ESA EARTH OBSERVATION MISSIONS

1. INTRODUCTION

The Earth Observation Directorate of the European Space Agency (ESA) is currently running a number of programmes. Two of these, MSG and Metop are in co-operation with EUMETSAT. The ERS satellites, ERS-1 launched in 1991 and ERS-2 in 1995, have build up large archive exceeding 1,2 PByte of data, which is being harmonized with ENVISAT archive. Workaround solutions, recovering the ERS-2 mission following the Gyro- and recorder failure, allowed a mission continuation satisfying the increasing data demand. The regional LBR operations has been overcome by extending the network of acquisition stations. Envisat was successfully launched in 1st March 2002. The success if the Envisat mission is well established, with a constant increase of user demand for data and services. Currently, over 1000 scientific projects are served with Envisat and ERS data. Data accessibility is constantly upgraded through Internet and Telecom multicast. Several thematic workshops and symposia have been organized, increasingly attracting participants form all over the world. Today, the mission is expected to exceed the original foreseen 5 years lifetime. PROBA is covering the Science mission since 2003.

2. STATUS OF THE ERS MISSIONS

The ERS-1 spacecraft, which ceased its operations in March 2000, is regularly tracked to predict and avoid possible interference with the orbits of other missions. All ERS services are provided by ERS-2, which remains operational.

All Low Bit Rate (LBR) instruments were operated on a global basis until the 22 June 2003, where the failure of the onboard recorders discontinued the global LBR observations of the ERS missions. Since then the ERS-2 LBR mission is continued within the visibility of ESA and other ground stations, which network continues to increase.

Due to a reduced pointing accuracy caused by the gyro failures, the Wind Scatterometer data distribution was interrupted from 17th January 2001 to the 21 August 2003; it is back into operations since 22 August 2003.

Currently all LBR data are distributed nominally. SAR is operated in response to user requests with a drastic increased production with about 4 times the throughput with respect to 2000, before the gyros failed.

The Platform, Payload and the Instrument Data Handling and Transmission (IDHT) system, beside the recorders, are working nominally and despite the advanced mission lifetime no significant aging has been observed.

In order to ensure a homogenous data access covering 15 years of continuous observations, the formats of the products are being aligned to those of Envisat.

The instruments and platform of ERS-2 are in very good heath and all instrument data meeting the specifications. After 12 years operation more than half of the fuel is still available. Based on current available information the ERS-2 mission could continue until 2010 satisfying user demands, still allowing de-orbiting of the satellite.

The most complete information about the ERS mission, system, instruments, its products, user services and latest news can be found at http://earth.esa.int/ers/

3. STATUS OF THE ENVISAT MISSION

The Envisat mission proceeds very satisfactorily, although it has reached its nominal 5-year lifetime on 1st March 2007. The satellite continues to provide overall stable performances, with some instruments having even improved their performance versus last year (Altimeter RA-2, Atmospheric Chemistry instrument MIPAS). The current nominal operations are expected to last another three years, i.e. until 2010. Various technical options are currently under study to further extend the mission beyond 2010, responding to the major recommendation received from the user communities during the 2007 Envisat Symposium, i.e. to prevent any data gap between Envisat and next generation satellites.

The Envisat Symposium, which took place from 23 to 27 April in Montreux, Switzerland, was a success both in attendance (1000 participants and several exhibitors) and in quality of the presentations. Some major results related to climate change were presented, e.g. the first global measurements of greenhouse gases by Envisat Sciamachy demonstrating the fast growing concentration of carbon dioxide (CO_2) and the seasonal variation of methane (CH_4) concentration. Another example is the quantification of the increased velocity of the large glaciers in Greenland and Antarctica as measured by ERS and Envisat SAR instruments.

The Symposium demonstrated that the Envisat mission has fully fulfilled its objectives established in the early 90s:

- to provide continuity of the observations started with the ERS satellites;
- to enhance the ERS mission, notably ocean and ice missions;
- to extend the range of parameters observed to meet the need for increased knowledge of the factors determining the environment;
- to make a significant contribution to environmental studies, notably in the area of atmospheric chemistry and ocean studies.

The most complete information about the Envisat mission can be found on the mission web site at http://envisat.esa.int/ . This includes a specific document describing the access to the data, which has been further simplified. Access to all data of the Low Bit Rate instruments such than NRT and archived SCIAMACHY or GOMOS data is possible on Internet, for free, after a simple registration. This is also possible for a large part of the MERIS and ASAR Medium Resolution data.

In addition, the MIRAVI website (http://miravi.eo.esa.int) gives a new opportunity to the general public to have free access to Quasi Real Time Envisat MERIS images.

4. STATUS OF CHRIS/PROBA

The Earthnet/Third Party Mission (TPM) programme element has been running for 30 years in April 2007. It enables harmonized access to non-ESA missions for the benefit of European users. Currently, ESA provides access to data from 20 Third Party Missions and more than 25 instruments. One of them is CHRIS/Proba:

Following a successful year of exploitation in 2006, a new Science Program has been elaborated and implemented for 2007. The 2007 program addresses major objectives identified by ESA including furthering hyperspectral multi-angular mission concepts, wetland monitoring , retrieval studies, vegetation and coastal studies, lichen field studies in deserts, atmospheric studies/cloud heights and support to disaster monitoring as part of the International Charter on Space and Major Disasters. In 2007 more than 30 new scientific projects have been started, also those using Envisat and CHRIS data in synergy.

http://earth.esa.int/missions/thirdpartymission/proba.html

Due to the expanding archive contents of CHRIS Proba with more than 10.000 data products available worldwide, scientists make increasing re-use of archived imagery.

5. INTERNATIONAL CHARTER ON SPACE AND MAJOR DISASTERS

Following the UNISPACE III conference held in Vienna, Austria in July 1999, the European and French space agencies (ESA and CNES) initiated the International Charter "Space and Major Disasters", with the Canadian Space Agency (CSA) signing the Charter on October 20, 2000. Since its signing, the International Charter on Space and Major Disasters has been providing important EO satellite data input to natural hazards post-crisis management around the world, with both increasing Charter activations and participating space agencies as data providers.

6. REFERENCES

Further information about the various ESA missions can be found on the following WWW addresses which offers the possibility to download many supporting relevant documentation:

http://www.esa.int
http://earth.esa.int
http://earth.esa.int/missions/thirdpartymission/proba.html

Complementary to this report is the information contained in the “CGMS Consolidated report”.