

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 2200 scientific projects are served with Envisat data. Today, the Envisat mission has exceeded the original foreseen 5 years lifetime and is expected to continue nominal operations until 2010. Technical solutions to further extend the Envisat mission until 2013 with a different orbit cycle are under preparation. ERS-2, the second 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.

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1. - INTRODUCTION

Envisat marked six years of operations on 1 March, and the mission's success story continues. The number of Envisat data users continues to grow, addressing all aspects of Earth Observation, from Earth science (2200 scientific projects) to pre-operational GMES services.

ERS-2, the 'veteran' of European Earth Observation from space, is not getting tired yet. After 13 years of operations, ERS-2 is still providing very relevant data to the Earth science community. The value of the 17 years of data gathered by the ERS-1, ERS-2 and Envisat missions is regularly exploited for studies related to climate change.

Finally the experimental ESA **PROBA** mission has reached 7 years of operations.

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.

The ERS-2 mission proceeds satisfactorily and is now in its 13th year in operations. Despite its age, ERS-2 continues providing large amounts of data requested by users. The latest example is the ERS-2/Envisat Tandem Phase allowing inter-satellite SAR Interferometry. The Tandem Phase started on 27 September 2007 when ERS-2 was put in a 2-km shifted orbit with respect to Envisat for Northern Hemisphere, and quickly provided preliminary results related to:

- Velocity of Arctic fast moving glaciers made possible by the exploitation of the 30 minutes difference between Envisat and ERS-2 data acquisition,
- Low relief Digital Elevation Model, of particular interest for many low elevation delta regions,
- Improvement of the general understanding of SAR Interferometry (e.g. coherence behaviour, atmospheric effects).

The ERS-2/Envisat Tandem Phase ended on 12 February 2008, as planned, when ERS-2 was left drifting back to its nominal orbit. A second ERS-2/Envisat Tandem Phase is envisaged in 2008/2009.

Though the ERS-2 satellite is performing well, an important anomaly prevents the operations of the ATSR-2 instrument since February 2008. The investigations so far still indicate that increased friction of the instrument scan mirror bearings prevent the mirror to turn properly or leave the mirror in a blocked position.

The ERS-2 Low Bit Rate station network, essential for the mission since the lost on the on-board recorder in 2003, has been extended with a station in South Africa. A total of 9 stations are supporting the ERS-2 Near Real Time and off-line downlink needs.

In order to ensure a homogenous data access covering 17 years of continuous observations, the formats and processing algorithms of the ERS products were aligned to those of Envisat.

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 continues to provide outstanding contributions both to Earth Science and to operational applications, but was affected by a failure within the Radar Altimeter instrument.

In January 2008, the Envisat Radar Altimeter (RA-2) has lost the capability to operate its secondary frequency (S-band) whose purpose was to compensate the range error on altitude measurements caused by the propagation of the radar signals through the ionosphere. The instrument primary frequency (Ku-band) is in excellent shape, therefore the negative impact of the S-band loss on Envisat altimetry data will be mitigated by the use of ionospheric models.

The amount of acquired High Bit Rate data (ASAR and MERIS) has even increased with respect to the past thanks to the activation of acquisition stations in Canada, in partnership with the Canadian Space Agency. As a result, more MERIS data can be acquired over North America and made quickly available to users, not only in Canada but also in USA where the demand for MERIS data is growing.

The International Polar Year 2007-2008 is benefiting as well from the increased data acquisition with an enlarged ASAR data take over the polar areas. A good example of this is the observation of the break-up of the Wilkins Ice Shelf in Antarctica since March 2008: daily ASAR coverage was easily accessible to scientists, at no cost, thanks to the ESA data rolling archives on Internet. Such type of SAR observations has never been so complete and quickly available.

The Envisat nominal operations are expected to last until October 2010, when the on-board hydrazine will be almost completely consumed. A three years Envisat mission extension (i.e. until 2013) is technically possible with a lowering of the Envisat orbit altitude and without orbit inclination control.

The most complete information about the Envisat mission can be found on the mission web page 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 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 7 years of exploitation, a growing hyperspectral user community is being served with CHRIS/Proba data. 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. More information on CHRIS/Proba can be found at:

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

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” and in CGMS-36-ESA-WP-02 regarding future missions.