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THE ESA EARTH OBSERVATION PROGRAMMES

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The Earth Observation programmes developed in the last decades by the European Space Agency have been contributing significantly to the understanding and monitoring of the Earth.

Key programmes such as METEOSAT and ERS-1 are providing each day data to the users community.

The ESA Council Meeting held at Ministerial level in November 1992, reflecting the overall need for more observations of the Earth and its Environment, has approved a strategy for the new ESA Programmes, in particular:

- ENVISAT for launch in 1998
- METOP and METEOSAT Second Generation, both in cooperation with EUMETSAT and for launch in the year 2000

The paper will briefly summarize the results obtained so far by the satellites developed by ESA and will present the status and perspective of the new Earth Observation Programmes.

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THE EUROPEAN POLAR PLATFORM FOR THE ENVISAT-1 MISSION

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Environmental issues have grown in importance since few years because of increasing awareness of potential long lasting effects and of its international nature. The European Space Agency has been active in this field since the 1970s, however recently it has stepped up activities in order to better contribute to the international efforts for monitoring of the Earth Environment by increasing the importance of Earth Observation Missions in its Long Term Plan. In order to support the foreseen future missions in Polar Orbit, ESA has initiated the development of the Polar Platform since a few years, in the frame of the Columbus Programme, so that in the future more efforts could be put in the development in the instruments rather than in the satellite bus.

The ESA Council at Ministerial Level held in Granada in 1992, approved the first mission of the Polar Platform for a launch in 1998. This mission is called Environmental Satellite-1 (ENVISAT-1).

The Council further decided the start of activities on a second mission for operational meteorology (METOP-A) also using the Polar Platform.

The first Polar Platform will carry about 2000 kg of payload instruments which will operate in the optical and in the Radiofrequency spectra.

The Platform will rely on key elements of the ESA infrastructure such as the Ariane 5 Launcher and the Data Relay Satellite System to ensure global coverage of observation.

The development of the Polar Platform is well advanced with System Preliminary Design Review held in 1992.

The Industrial consortium is led by British Aerospace Space System and is now in full deployment with nearly 800 people working across Europe.

The paper will present the Polar Platform configuration and design selected for ENVISAT-1, as well as its development status with special emphasis on the hardware already manufactured.

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THE SPOT 5 MISSION

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Since the launch of its first satellite, in 1986, the SPOT system makes regular images of the earth available for commercial applications. SPOT 4, to be launched in 1996, will improve the system performances with the addition of a Medium IR channel. The next step is foreseen in 1999 with SPOT 5, which will improve further the system with a twice better resolution and an along track stereo imaging capability. It will then be possible to get 1 : 50 000 scale or 25 000 scale standard maps and digital elevation models, under accessibility conditions considerably better than those allowed by the current off-track stereo capability.

SPOT 5 is designed such as to re use the platform and instrument developments of SPOT 4 to the maximum extent. The fore/aft stereo is realised simply by tilting the instrument on top of the satellite. Two configurations are still being contemplated, one with two instruments and one with three instruments, offering wider mission capacity. The fore/aft stereo imaging imposes that the satellite observe tougher requirements of geometric image quality.

The enhanced instrument, E-HRVIR, encompasses a 5 m resolution panchromatic band, in addition to the recurring four HRVIR ones. The focal plane assembly is therefore re-designed. The optical performances of the recurring telescope at the new resolution have been validated by tests and will be secured by some structural and optical in depth analysis and improvements in required.

To cope with the variable data rate modes and the anticipated mission scenario profiles, a novative payload data management system is designed, based on a solid state recorder. The platform subsystems are kept identical to those of SPOT 4 and the payload module structure may need to be adapted in case of a solution with three instruments.

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A SPACE SYSTEM INTEGRATING EARTH OBSERVATION AND MOBILE COMMUNICATIONS FOR EQUATORIAL REMOTE AREAS.

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It was a common sense that forest management is an integral part of Global, Regional, National, and local management actions. However, there is an immense technological gap to support local management actions. The quality of the local control is important for successful national and global results for environmental monitoring and sustainable development. The mapping change control without local actions only mean follow very well the forest coverage reduction. Concerning this, new space systems concepts need be made available.

The proposed system integrates two constellations of light and low cost satellites. The first one is an Equatorial Communications system (ECO - 8) and the second one is a polar orbit system for World Observation and Monitoring WOM - 8. The WOM involves eight satellites, and portable data receiving and processing equipments. The use of on board data compression make feasible the UHF transmission of the Earth Observations Data. Using fixed wide field antennas, the data are received directly from the remote sensing satellite for digital processing. It is proposed a system for global coverage with a temporal resolution of two pass per day. The ECO - 8 involves eight satellites in an equatorial constellation at 2000 Km. The system can supply low orbit communication for equatorial countries. An equatorial belt from latitude around 30 degrees south to 30 degree north is covered. The area includes all remote regions near the equator. Where low orbit communication can play important role.

The direct access of information eases illegal procedure enforcements, logistic for early actions and daily monitoring of special ecological reserve areas. Integrate the remote sensing satellite technology and the satellite based remote area communications permit early and efficient actions in remote forests with follow up the central managements. The space technology is available today and through international cooperation involves low investments.

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