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THE EUROPEAN SPACE AGENCY

EARTH OBSERVATION PROGRAMME BOARD

The Earth Explorer Opportunity Missions

The ESAC Recommendations

1. Introduction

Delegations have been circulated under separate cover a copy of the report of Earth Sciences Advisory Committee (ESAC) which details the results of the Committee's assessment of the responses to the Call for Earth Explorer Opportunity Missions. Annexed to that document are the reports of the Joint Assessment Panels. Delegations are asked to note that, contingent on the details of the outcome of the meeting of Council at Ministerial level, a paper will be produced for the Programme Board, which will explain the Executive's proposals for the implementation of the first Earth Explorer Opportunity Missions.

It will be recalled that the Call for Earth Explorer Opportunity Missions (i.e. ESA/PB-EO(98)53, *The Earth Explorer Opportunity Missions: Call for Proposal*) was released on Monday 13 July 1998. The deadline for the receipt of proposals was Tuesday 1 December 1998 by which time twenty-seven proposals had been received. These were listed in ESA/PB-EO(99)2, *The Call for Earth Explorer Opportunity Missions*.

In the interim all twenty-seven proposals have, in accordance with the procedures laid down in the Call, been subjected to detailed scientific and technical assessment. This has been carried out by the ESAC, with the support of three Joint Assessment Panels and the Executive, using the seven criteria listed in the Call (i.e. ESA/PB-EO(98)53). Some forty external experts have assisted in the evaluation.

Five proposals have been listed by the ESAC for selection for implementation in order of priority. All these are judged to comply with the two boundary conditions associated with this particular Call, namely:

- The total cost to the Agency for the full realisation of an Earth Explorer Opportunity Mission must not exceed an absolute financial ceiling of 80 MEuro (1998 prices).

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- It must be feasible to launch any selected Earth Explorer Opportunity Mission by the year 2002 (assuming implementation as foreseen in the Call).

In addition, the three Joint Assessment Panels have produced individual assessment reports for each of the twenty-seven proposals which, in many instances, made specific recommendations. These are attached to the ESAC report.

2. Summary of the Selection Procedure

As indicated above, each of the twenty-seven proposals for Earth Explorer Opportunity Missions has been subjected to detailed review and evaluation by one of three Joint Assessment Panels prior to review by the ESAC itself. There were three of these panels, namely:

The Ocean, Cryosphere and Solid Earth Joint Assessment Panel

The Land Joint Assessment Panel

The Atmosphere Joint Assessment Panel

Each one was chaired by a member of the ESAC and made up of a mixture of external scientists and the internal technical experts. Each panel was asked to produce individual assessments of a subset of the twenty-seven proposals. Their individual reports are attached as Annexes to the report of the ESAC. As usual, care was taken to ensure that members of the Panels were not associated with individual proposals.

The ESAC was asked to endorse (or otherwise) the twenty-seven individual assessments. In addition, it was asked to assess (with supporting rationale) the proposals as a group selecting up to six (in order of priority) for Phase A/B study. The criteria and boundary conditions listed in ESA/PB-EO(98)53, *The Earth Explorer Opportunity Missions: Call for Proposals*, were used to assess the proposals. The reports of the three Joint Assessment Panels are attached (as annexes) to the ESAC report.

3. Recommendations of the Earth Sciences Advisory Committee

The unanimous recommendations of the Earth Sciences Advisory Committee for the selection of Earth Observation Opportunity Missions for Phase A/B study (in order of priority) are as follows:

1. **CRYOSAT (COP33)** – this would provide the data required to advance understanding of the ice sheets and the marginal ice zones. This information is linked strongly not only to sea level rise but also, more importantly, to the role of fresh water in the climate system and the stability of the Earth's climate to influxes of fresh water into the oceans and the impact of fresh water on ocean circulation. The CRYOSAT mission would consolidate Europe's leading position in space altimetry.

2. **SMOS (COP16)** – this mission addresses the lack of global observations of salinity and soil moisture which is retarding progress in many important areas including oceanography and the transfer of energy between the land surface and the atmosphere. The need for these data had been highlighted for a long time in major international scientific initiatives. Implementing the SMOS mission would give Europe a clear lead in this new area.

3. **ACE (COP13)** – this mission seeks to remedy the lack of global knowledge of temperature changes in the upper troposphere and lower stratosphere. This is not only important in the detection of climate change but also for predicting the evolution of ozone levels. However, the ESAC considered that the inclusion of COALA should be reconsidered.

4. **SWARM (COP09)** – this mission would provide new observations of the Earth's magnetic field consolidating and complementing the observations of CHAMP and OERSTED. These data should enhance the quantitative understanding of the Earth's magnetic field. The implementation of the SWARM mission would consolidate Europe's position in space measurements of the Earth's magnetic field.

5. **SWIFT (COP27)** – this mission will further understanding in an important area, namely the links between stratosphere dynamics and stratosphere chemistry, by providing wind data in the lower stratosphere. These data could also enhance the performance of numerical weather forecasts. It will open the way for Europe and Canada to establish an expertise in direct wind measurements from space.

In addition, the three Joint Assessment Panels have commented on each of the twenty-seven missions. In many instances these assessments include specific recommendations for action and indeed almost all of these have been endorsed by the ESAC. The ESAC has in addition made some further recommendations of its own. Many of the scientific and technical recommendations will form the basis of future preparatory activities undertaken by the Agency.

4. Concluding Remarks

The PB-EO is invited to note the recommendations contained in the ESAC report for the selection of Earth Explorer Opportunity Missions for implementation (in order of priority).

Subsequent to the Council Meeting at Ministerial level on 11-12 May, the Executive will provide a paper detailing its proposals for implementation.