

# Introducing the ‘Living Planet’ Programme

– The ESA Strategy for Earth Observation



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**European Space Agency**  
**Agence spatiale européenne**

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# Introducing the 'Living Planet' Programme

## – The ESA Strategy for Earth Observation

### Why a Strategy?

The ESA budget committed so far for Earth Observation will be decimated by 2001 (see Fig. 1). At present, no plans exist beyond the Envisat and Metop spacecraft currently being built. Now is the time to plan for the future.



Up to now, programmes like Meteosat, ERS and Spot have put Europe in a leading World position in Earth Observation, in Earth science and in allied space technologies. Europe has taken advanced positions on environmental issues at the recent Kyoto Meeting. Europe should avoid relying entirely on others to obtain the data to sustain its independent stances, to fulfil its international obligations, as well as to manage its own environment better. Crucial decisions are needed now in order to secure the future.

### Objectives of the Strategy

In Toulouse in 1995, the ESA Council at Ministerial Level set the course for the Agency's Earth Observation strategy and issued a 'Proposal for a European Policy for Earth Observation from Space', put forward jointly by ESA, the European Commission (EC) and the European Organisation for the Exploitation of Meteorological Satellites (Eumetsat). In January 1998, the European Parliament voiced its very strong support for action.

Three fundamental objectives were set in Toulouse:

- developing our knowledge of the Earth
- preserving the Earth and its environment
- managing life on Earth in a more efficient way.

and the principle of two types of Earth Observation missions was adopted: *Earth Explorers* for research, including the demonstration of associated new observing techniques, and *Earth Watches*, prototype operational missions serving the operational applications-oriented needs of the market.

In response, ESA set up a Strategy Task Force and an Ad Hoc Industrial Working Group, which helped to establish the 'Living Planet' Programme.

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## How will the Strategy Respond?

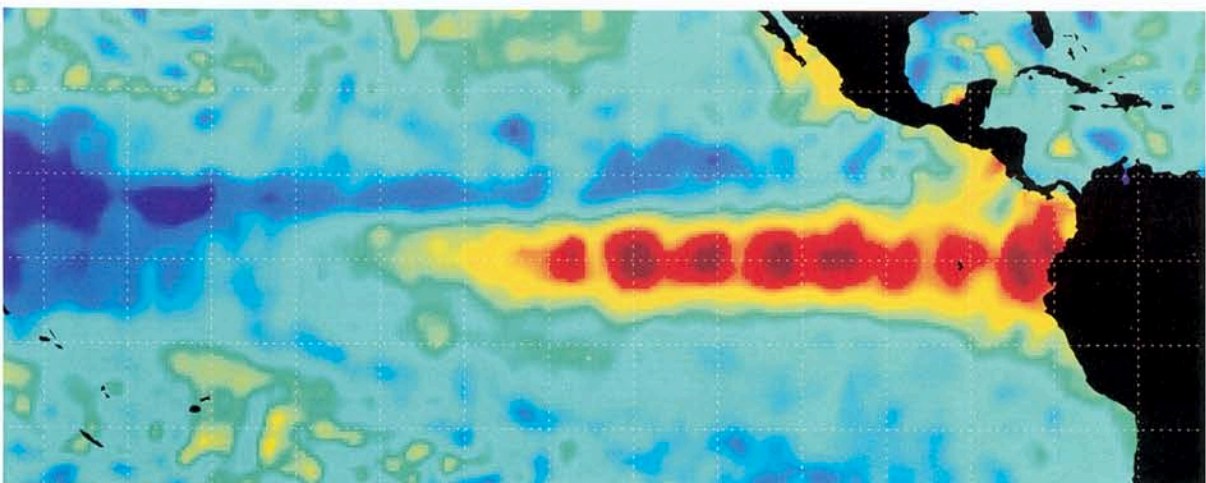
'Living Planet' contributes to all of the four axes of the overall Agency strategy given in the Director General's proposal to the Council at Ministerial Level:

- the pursuit of scientific knowledge
- dedication to the enhancement of the quality of life
- an independent capability for Europe as the key to cooperation
- promotion of a European industry of innovation and added-value services.



Thus, 'Living Planet' is a cornerstone of the ESA programme. Earth Observation's most basic use is for the management of the Earth and its environment, hence underpinning the quality of life. It can contribute greatly to validate conformance with legislation and international environmental conventions and put Europe in a position to be able to speak independently on issues of global concern. Nevertheless, fundamental challenges remain for scientists and researchers in order to improve our capabilities. The long-term strategic need for Earth Observation information worldwide only underscores the need to promote an effective industry in Europe and thereby retain the associated highly skilled employment.

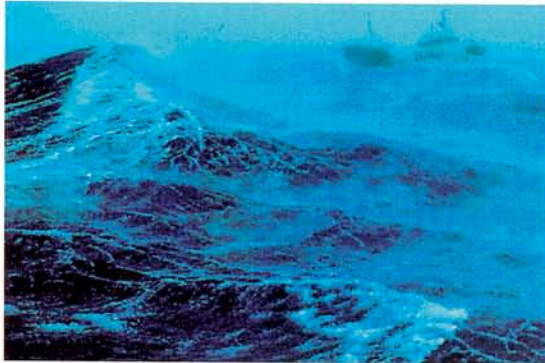
'Living Planet' is part of a European system for Earth Observation. It will take into account the broad spectrum of national activities in Earth science and applications, and provide a reference for those activities. Predicting changes in climate and forecasting human-induced changes in the environment require an in-depth scientific understanding of the phenomena, aiming at continuous improvement of the model of the Earth system. 'Living Planet' will enable Europe, its researchers and its industry to advance the use of space for obtaining the required critical information in the fields of environmental and climate change, and also of resource and disaster management, sea, air and land transport, regional and development policies. It will contribute to substantial advances in technology and scientific knowledge and provide an essential tool to enhance the welfare and well-being of European citizens. It will be a political tool in fulfilling Europe's obligations towards developing countries.



Sea-surface height anomaly in the Pacific Ocean due to El Niño, observed with ERS's Radar Altimeter

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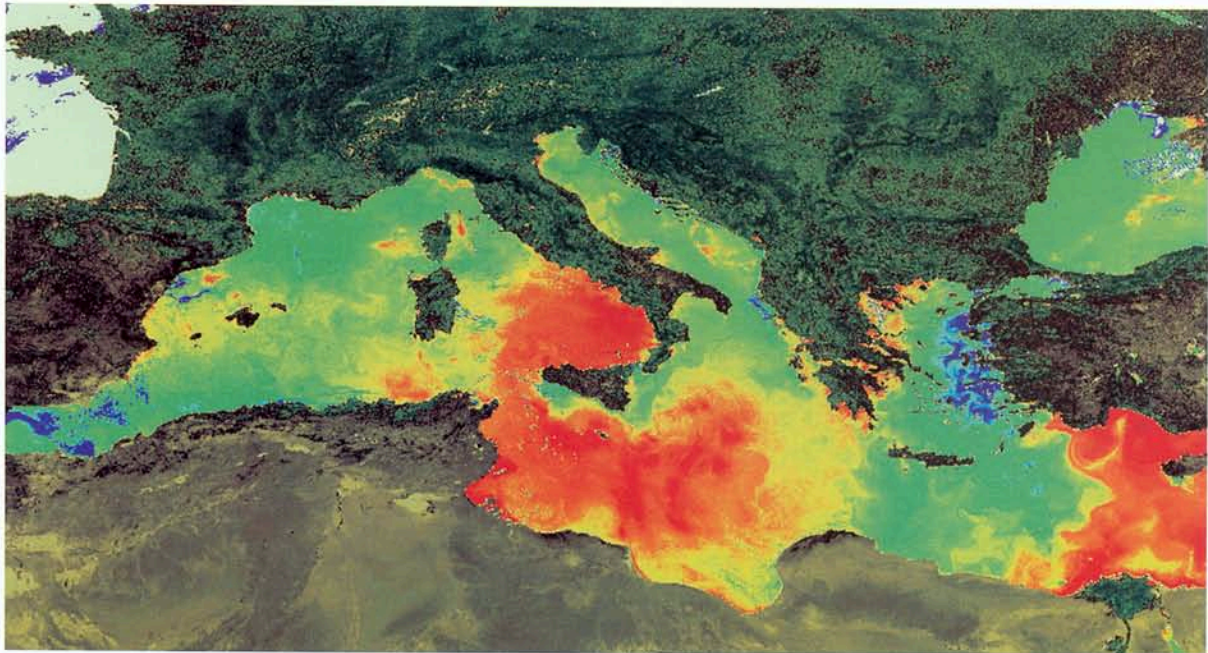
Many of these objectives are strategic and the implementation of a strategy cannot be left solely to the private sector. Although it is apparent that industry is ready to take its own risks and invest its own resources, in order to secure its competitiveness in the present international context, even in times of constrained budgets it is nevertheless essential for public money to be spent on Earth Observation.



In addition, the US policy of 'anchor tenancy' aimed at supporting private initiatives in Earth Observation places European industry in an impaired situation and hampers its competitiveness and promotion of European Industry; the 'Living Planet' Programme provides such means.

Furthermore, the competitive consequences of the blurring outside Europe of the civil/military boundaries pose a challenge to Europe that can be met through partnerships with industry. The resulting synergy will be an important efficiency driver and a source of savings.

The Programme will be driven by the users' needs. This will ensure that industry becomes more user-conscious, as well as cost-effective and entrepreneurial. News modes of dialogue with industry have already been opened. In its principle, the Programme builds on the tri-lateral coordination and cooperation between ESA, the European Commission and Eumetsat that has been further strengthened since the Toulouse Ministerial Council Meeting, and good lines of communication with the Commission and Eumetsat are already being set up.



Sea-surface temperatures in the Mediterranean, observed with ERS's Along-Track Scanning Radiometer

## How the Strategy will be Implemented Cost-effectively

Benefiting from the heritage established in Europe by missions such as ERS, Spot and Envisat, the programme will provide the scale and continuity required for a drastic improvement in efficiency.



New and more efficient management methods using smaller spacecraft built within capped cost envelopes, leaner management teams, and exploiting fuller partnerships with industry, particularly in Earth Watch applications, will underpin the new approach. Missions will be substantially cheaper than what is presently done and will be more frequent, more focussed and based on advanced, as well as recurrent technologies. As a consequence, the budget foreseen will be 25% less than the current ESA annual expenditure for Earth Observation.

The Programme will be implemented through two kinds of funding schemes. First, an overall envelope optional programme rising to about 360 M€ per year. The envelope concept would avoid disruption and discontinuity in the provision of the required data, and underpin all activities (science, research, applications and technology) in Earth Observation for Participating States. The voluntary scale of contributions encompassing five years will fund research missions, prepare future technological developments and fund exploitation of these missions as well as develop the market and prepare for future exploitation by operational entities. Secondly, there will be a series of optional projects for Earth Watches, funded by ESA to the order 100 M€ per year. These will be funded in partnership with Industry or service entities. The overall funding plan for the 'Living Planet' Programme is sketched in Figure 1.

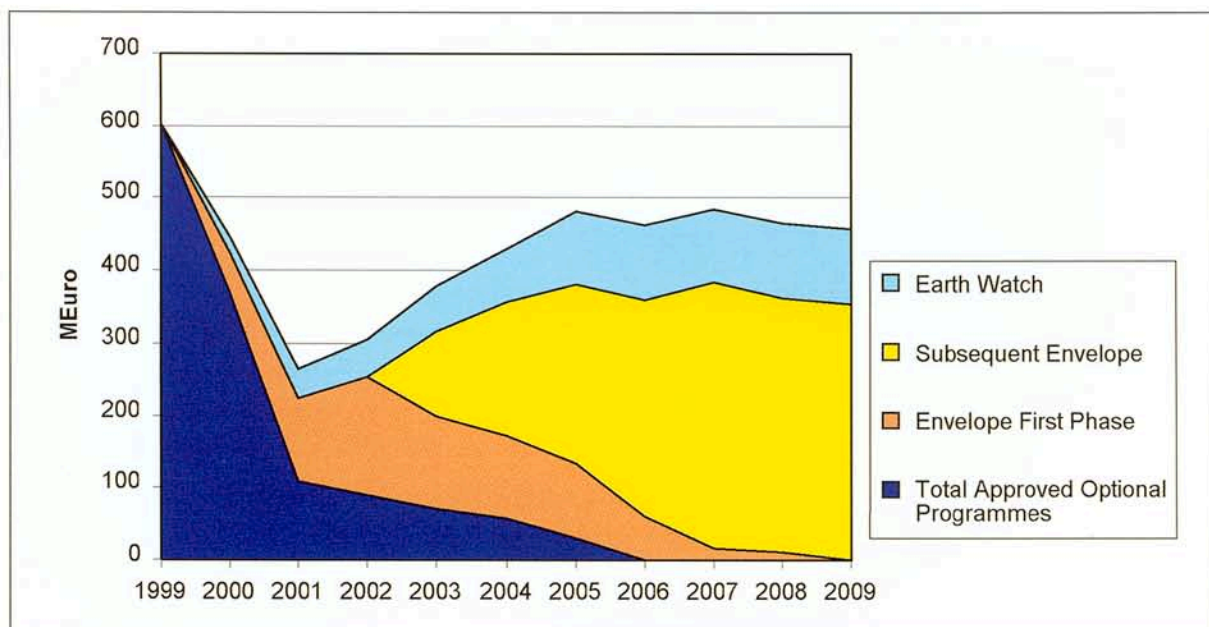


Figure 1. The future plan for ESA Earth Observation contributions, to support the 'Living Planet' Programme, as contained in the ESA Long-Term Plan (1998 economic conditions). The blue-coloured area represents the existing commitments. These reduce by over a factor of six in the next two years. The first envelope funding (coloured beige) is now ready for decision by Ministers. This step will mark the inauguration of the 'Living Planet' Programme



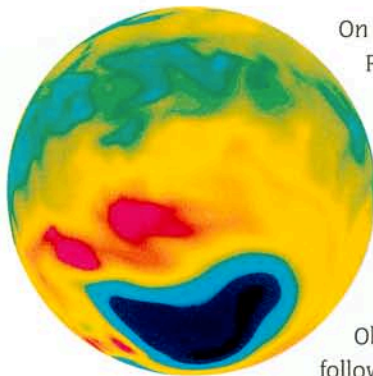
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The Research missions (Earth Explorers) will be selected via a broad consultation of the science community. Earth Watch elements of the 'Living Planet' Programme will develop the ESA contribution to a European Earth Observation Applications System. In consultation with Member States, the European Commission and Eumetsat, it is the intention to develop an industrial capability to take on the global market.

The Programme should run parallel with and be complementary to national programmes and give maximum common advantage to players across Europe. Already under the auspices of the first spending on Earth Watch, industry is being charged by ESA to look at ways to implement a European Earth Observation Applications system.

The 'Living Planet' builds on the past, but offers new ways of working for the future. If the envisaged partnerships are to be successful, the Agency and its delegate bodies must be more effective in decision-making procedures and in implementation and this, again, is in line with the overall policy of the Director General.

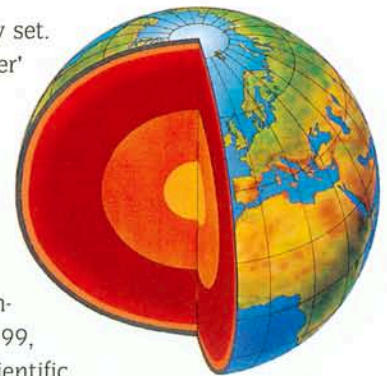
## The Content of the Programme



On the research front, the first priorities are already set.

Phase-A studies are under way for 'Earth Explorer' missions to study:

- Atmospheric Dynamics
- Land Surfaces
- Gravity
- Atmospheric Radiation.



The first two will be recommended to ESA's Earth-Observation Programme Board (PB-EO) later in 1999, following presentation to and review by the scientific community (in Granada, Spain, in October 1999).

All have World-leading capability. All make fundamental contributions to improving our understanding of basic environmental processes. All have long-term potential for applications.

In summer 1998, the first 'Call for Opportunity Missions' was issued. These are an entirely new venture for ESA. The Call elicited an overwhelming response, illustrating the creativity waiting to be tapped in the European science community. The missions will be a testbed for new ways of working, which are going to be essential if these missions are to be implemented quickly and effectively for less than 100 M€.

On the applications front, the Earth Watch Outline Mission Proposals showed Industry's willingness to exploit past investments in radar, multi-spectral techniques and visible and infrared sensor technology, and to move to the provision of Earth Observation operational services. Major themes for service development identified by Industry's response to the Call are natural hazard management (such as fires, floods, landslides), land use (agriculture, forestry, desertification) and mapping, and coastal-zone management.

**Table 1. The 'Living Planet' Programme**

**What is different?**

- Offers a long-term view and continuity
- Responds to the user needs
- Contains more focussed and cheaper missions (50%)
- Is 25% cheaper than the present set of missions and hence adds value for less money
- Delegates tasks and management to Industry or other entities
- Reinforces industrial competitiveness
- Puts more emphasis on international cooperation and technological preparation
- Secures exploitation of missions
- Reduces complexity and administration

**What is new?**

- Financial frame: envelope for science (Earth Explorer), development and exploitation; optional for applications missions (Earth Watch)
- Based on partnership with Industry for applications missions
- Serves as a reference programme for Europe
- Assumes full coordination, harmonisation and integration with other European national programmes
- Supports Europe's commitments to international treaties
- Helps transition to operational entities
- Helps to develop the market for applications



Industry has been set the grand challenge of assessing its own investment strategy and of developing a plan for how Earth Watch will contribute to a European Earth Observation Applications system. The challenge is to bring together all players in an effective response to opportunities opening up in a global market.

**Decisions Required**

Underpinning Europe's Earth Observation aspirations as the new century begins, 'Living Planet' squares several circles. It matches the requirements and political imperatives of Europe and yet takes account of reduced funding possibilities. It fosters faster smaller activities, whilst also adopting a long-term view. It develops a competitive Earth-science programme and, at the same time, fosters new applications and encourages the development of added-value industries. Whilst remaining an optional programme, it introduces the planning and programmatic efficiency seen in the mandatory programme.

A decision is needed now by the ESA Council at Ministerial Level to start building up the envelope programme for the first five years and establish the sound programmatic and financial basis required to implement a strategy.

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## Europe Working Together

The new ESA strategy has been drawn up in consultation with other European Organisations with interests in the civil uses of Earth Observation.  
The distinct roles of the three major European Organisations – the European Commission, Eumetsat and ESA – are:



### The European Commission

Definition of, use of, and legal and political framework for information derived from Earth Observation for Government purposes.



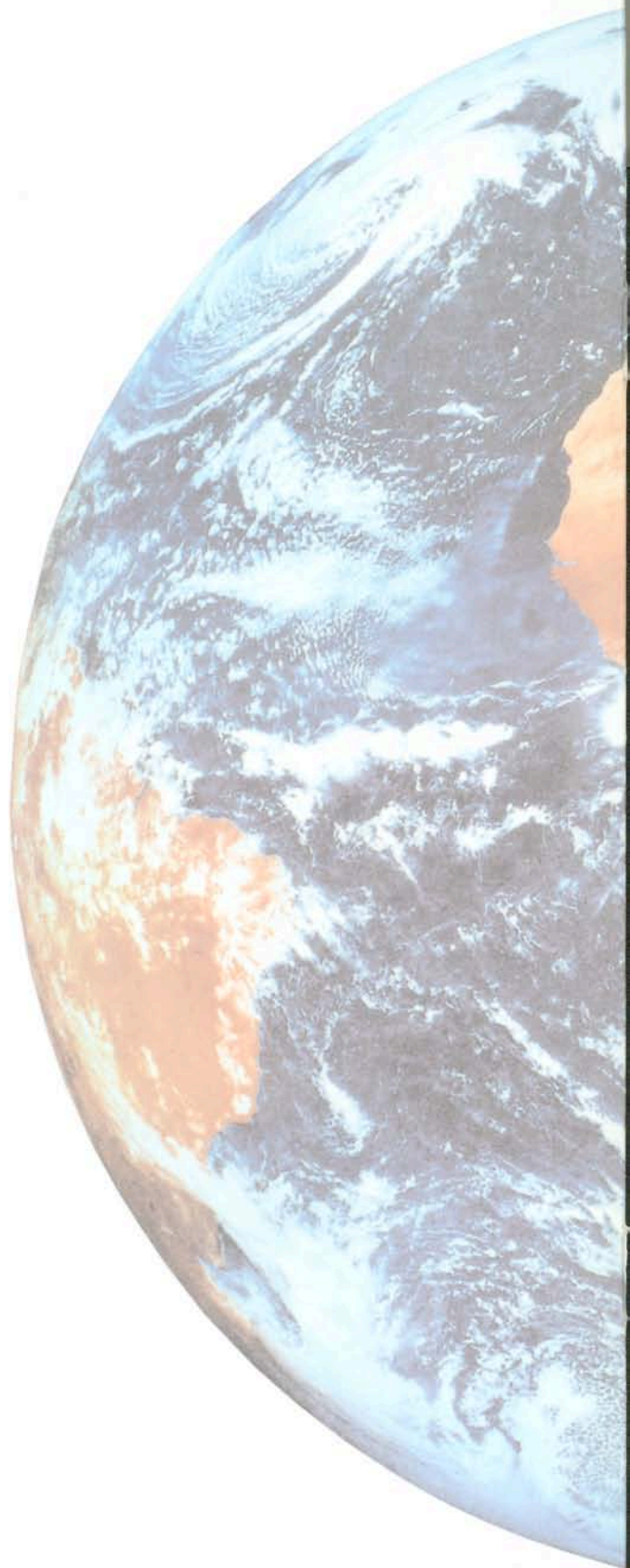
### European Organisation for the Exploitation of Meteorological Satellites

Definition, procurement and distribution of Earth Observation data for meteorological and climatological use.



### European Space Agency

Research & development (of space systems and applications), industry, policy, and programmes coordination between Member States and Europe.



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