



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 27.9.2000
COM(2000) 597 final

**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE
EUROPEAN PARLIAMENT**

Europe and Space: Turning to a new chapter

COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

Europe and Space: Turning to a new chapter

In 1999, European Ministers^{1, 2} called on the European Commission and the Executive of the European Space Agency to elaborate a coherent European Strategy for Space. The European Parliament³ welcomed this initiative, emphasising the importance of introducing for the first time a Community dimension in Europe's political approach to space. The EU Council and the ESA Council at Ministerial level thereby provided a basis for a joint consultation of all interested parties concerned and enabled the preparation of a comprehensive document on a strategy for space that can be subscribed to by European states, irrespective of whether they are member of ESA or part of the Union.

Parts of our society have become critically dependent on the use of satellites and space-based technologies. An autonomous and competitive capability to develop and manage space-based infrastructures and to collect and use the information deriving from these systems is an increasingly important asset for an enlarging and further integrating Union with a greater political weight on the global scene.

Space-based information is going to be a significant element for success in the knowledge economy of tomorrow. In the public sector, at the level of the Union, it is likely to play an increasing role in the implementation of a wide range of EU policies such as for environment, transport, telecommunications, culture, research, agriculture, fishery, regional development and international relations.

Through the emergence of new markets for satellites and notably for downstream services and user equipment there are also enhanced possibilities to generate revenues. The development of these markets and the position of the European industry in them depend both on the regulatory environment and the availability of the appropriate space infrastructure. In the face of global competition, industry would benefit from the political and economic weight of the Union in the development and the regulation of these markets.

Space presents a security dimension, which has thus far only been dealt with, at European level, in the context of the WEU. The forthcoming integration of the WEU into the EU and the new steps taken at the European Summit in Helsinki towards the development of a Common European Security and Defence Policy (CESDP) are prompting the European Union to take space capabilities into account, for instance in decision-making for the planning and monitoring of the Petersberg Tasks⁴ (conflict prevention and crisis management).

Against this background and together with ESA, the Commission has mapped out a comprehensive document on a European Strategy for Space. This Communication presents this joint document on the strategy, which is built around three objectives:

¹ Resolution ESA Council at Ministerial level, Brussels, 11 and 12 May 1999

² 2112th EU Council meeting – Research (Brussels, 2 December 1999)

³ EP Resolution, 18 May 2000 on the Communication of the Commission on the Commission working document 'Towards coherent European approach for space' (SEC (1999)789 – C5-0336/1999 – 1999/2213(COS)).

⁴ Petersberg Declaration, WEU Council of Ministers, Bonn 19 June 1992.

- Strengthening the foundation for space activities: preserving independent and affordable access to space, and ensuring a broad technology base with the industrial capability for designing, manufacturing, and operating satellite systems and the associated ground infrastructure.
- Enhancing scientific knowledge for a better understanding of our planet and its atmosphere, the solar system and the Universe.
- Reaping the benefits for markets and society through a demand-driven exploitation of the technical capabilities of the space community. This requires the involvement of end-users from the planning phase until operational deployment in a constructive dialogue between all parties concerned from the public and the private sector, at the national and at the European level.

Thus far, space activities in Europe have been largely focussed on the first two objectives, although the capabilities exist to meet all three, which are, overall, inseparable. The challenge is to organise the various activities in different legal and institutional settings, but in a coherent fashion. This challenge is notably present in realising a civil global navigation satellite system, GALILEO⁵, and in building a strong enough political momentum to streamline various satellite initiatives and projects in Europe and creating European-wide opportunities for the use of satellites in Global Monitoring for Environment and Security - GMES.

The strategy and the Commission's role

The strategy as proposed in this communication is a further milestone in establishing a coherent approach for space in Europe. It is not intended as a detailed road map for programming space activities in the coming years. It should rather provide a strong political support for public and private actors to act in the field of space and a reference for their individual and co-operative efforts for building a coherent and effective space infrastructure with the associated services. It should also constitute a basis for consulting and mobilising society at large on the benefits that can be derived from space-based information and knowledge.

The strategy's success will depend on its endorsement by all actors in Europe and on their commitment, in particular that of Member States, to implement it and develop it further.

The Commission envisages taking an active role in the implementation of the strategy by:

- Establishing the right political and regulatory conditions for space activities, in line with and in support of Community policies;
- Acting as an animator to catalyse joint research and development efforts of all actors in line with the objectives of a European Research Area;
- Bringing together all actors and competencies around common political objectives in projects of a European-wide interest. This role is articulated concretely in initiatives with a Community dimension such as GALILEO and eventually a capacity for a Global Monitoring for Environment and Security.

⁵ Galileo: involving Europe in a new generation of satellite navigation services. COM(1999) 54 final, 10 February 1999.

The Commission will further lead the development scenario for GALILEO in association with ESA, Member States and industry. It will prepare the ground for a political initiative for GMES that should result in the definition of an information and monitoring system, integrating observation satellites and responding to Europe's policy needs.

Building on its achievements and its technical expertise, the European Space Agency will remain the principal programming and funding agency through which Member States realise joint research and development projects in the area of space.

The Commission is ready to enter a new operational relationship with ESA to work together under their respective competencies for the implementation of this strategy. Therefore it is envisaged that Commission and the ESA Executive continue to jointly develop the strategy for space and issue a joint annual report on space .

For this purpose the Commission and the ESA Executive will set up a joint task force. The task force will also, among other tasks, reflect on a possible unified setting for Member States to review the strategy and its implementation on a regular basis, in order to propose permanent arrangements before the end of next year. Furthermore, it will elaborate proposals for framework arrangements for the management of joint projects and outline a coherent approach with respect to candidate countries.

It is now for national, European Union and ESA decision-makers to provide guidance for an effective implementation of the strategy and its further development. Together with ESA, the Commission is looking forward to the discussions in their respective Councils.

Joint Commission – ESA document on a European strategy for space

1. Space today	6
2. Tomorrow's Europe	7
3. Space as a strategic component of our common future	7
4. A strategy to meet needs and opportunities	9
4.1.Strengthening the foundation	10
4.2.Enhancing scientific knowledge	11
4.3.Reaping the benefits for markets and society	12
4.3.1. Satellite communications	12
4.3.2. GALILEO	13
4.3.3. Monitoring for Environment and Security	14
4.3.4. Common European Security and Defence Policy aspects	16
5. Implementation	16
5.1.Working together	16
5.2.Industrial aspects	17
5.3.International aspects	18

1. SPACE TODAY

Space is often seen as the last frontier of mankind's curiosity; an area of pioneering technology developments associated with science, exploration, defence and international prestige. Today, satellite communication services and TV broadcasting, satellite navigation and positioning and world-wide weather forecasts drawing on globally operated satellite systems have become part of everyday life. Satellite applications and services for travel and transport, environment monitoring, land-use, search and rescue, and verification of international treaties are some examples that provide new motives for space activities.

Europe has built up a scientific and technological competence as well as a competitive industry resulting in an impressive series of space missions and commercial successes. The Ariane launcher has captured 50% of the commercial launch market and figures prominently as a symbol for Europe in the world. The European Space Agency (ESA) has played a key role in these successful developments.

Markets associated with satellites, launches and satellite services have developed and new ones are emerging. Current estimates for the turnover in 2002, including derived services in downstream markets, are € 60-100 billion for satellite telecommunications, € 5-10 billion for satellite navigation receivers and positioning services, € 2 billion for commercial launches, and € 0,5-2 billion for satellite imagery⁶. World-wide annual turnover in satellites and launchers is estimated at € 40 billion. The total annual consolidated turnover of the European space industry is of the order of € 6 billion, directly providing highly qualified employment to 40.000 people in Europe⁷.

The space industry devotes a considerable portion of its effort to research and technological development, which are integral parts of the industrial process. For the leading space-faring nations of the world, the majority of turnover in launchers and satellites is publicly funded. In particular, the contract volume from the US Department of Defence alone is three times higher than the total public spending in Europe, and the total US public spending more than five times higher. This provides the US industry with a driver for technology development, generating a broad publicly funded technology base for which there is no equivalent in Europe.

Against this background, European Ministers called on the Commission and the Executive of ESA to work together on an updated approach to space and to elaborate a European strategy for space. This request was supported by the European Parliament, which recognised the importance of adding a new dimension to Europe's effort by addressing space also in the political context of the Union.

This strategy, to be endorsed by the EU Council, the European Parliament and the ESA Council should open a new chapter in Europe's approach to space, becoming the reference for European space activities.

⁶ Figures compiled from various sources, i.e., State of the Space Industry' 1999 Report' Euroconsult' Eucosat database 1999

⁷ Figures compiled from various sources, i.e., Euroconsult' Eurospace

2. TOMORROW'S EUROPE

The EU has emerged as a world economic power facing the challenge of redefining its own borders through enlargement, which will lead eventually to a Union of more than half a billion people. In parallel Europe is confronted with globalisation and the need to preserve its cultural identity, diversity and value systems.

As regards the challenge of globalisation, EU leaders made a strong commitment at the European Council in Lisbon in March 2000. The EU's new strategic goal for the next decade is to "become the most competitive and dynamic knowledge-based economy in the world", thereby "regaining the conditions for full employment and to strengthen social cohesion".

Enlargement of the EU will reinforce Europe's global influence and create the need to act as a coherent force in world affairs. Through enlargement, the EU is not only creating a larger common market, but is also increasing its political weight in foreign and security policy affairs with twice the population of the US and four times that of Japan. The decision of the European Council in Helsinki⁸ to extend the number of candidate countries for EU membership to 13, is an important change in the global strategic situation. An enlarged Union will have to respond to growing expectations with respect to its Common Foreign and Security Policy, in the interest both of Europeans themselves and of their partners.

At a time when public opinion is ever more sensitive to the impact of globalisation on the environment, health, labour standards and cultural diversity, the EU is starting to work out the political, economic and social dimensions of global security. With its model for regional integration as a guarantee for peace, the Union is a positive factor for peace around the world.

To address the social and economic dimensions of this challenge, Europe has also to master knowledge and technology. Research, technological development and education are principal driving forces for competitiveness and employment. In a knowledge-based society, they are more than ever the engines of progress and the foundations for economic and social stability.

Whereas European integration has for many years largely been an economic process, the Union is now also engaged in a political process, with a growing awareness of the need to project its model of society into a wider world.

As a consequence, the provision of the necessary instruments for economic development, communications, transport and energy infrastructure, environment protection, and peacekeeping cannot be left to others. Europe has to engage in developing the content and the rules for these instruments, to make them available to its own citizens and to the world, in full and open co-operation with all possible partners.

3. SPACE AS A STRATEGIC COMPONENT OF OUR COMMON FUTURE

Global information and communications constitute the nervous system of the knowledge society. Satellites, with their ability to cover and to connect virtually every point around the world, are critical to the effective functioning of this neural network.

- Communications satellite systems provide economical alternatives to terrestrial infrastructure for various services throughout the world and offer solutions for areas

⁸ European Council Helsinki December 1999

without adequate terrestrial infrastructure. Whereas borders may stop terrestrial communications links, satellite systems provide the means to transfer information across frontiers. They can therefore deliver pan-European or even global information services, thus providing the possibility to co-operate effectively for the development of societies within and outside Europe.

- Navigation and positioning satellite systems form an innovative and seamless global infrastructure for travel and transport, associated services and a multitude of other sectors' applications. They in fact provide highly accurate and reliable time signals, which will become a global reference to synchronise networks for telecommunications, energy, transport, financial transactions etc.
- Observation satellite systems deliver a continuous flow of near-real-time data about any part of the globe, in compliance with international law. This is of vital importance for meteorology and global change studies, treaty verification, identifying environmental problems at regional and global levels, agricultural monitoring, for early warning of crises and for arms control. Here satellites are a unique source of information and can play a pivotal role in EU decision-making for the planning and monitoring of the Petersberg Tasks (conflict prevention and crisis management).

Furthermore, space adds a new dimension to many fields of science and technology, contributing to a better understanding of the world in which we live. Science in space has become an integral part of scientific progress in modern society.

In all these instances, satellite-based services are of strategic value to Europe, where economic, societal and political factors are inseparably mixed:

- a economic factor, because of the strong leverage effect of the space segment. Even when business is big, the investment for space hardware contribution remains small in the total value-chain of communications and information services – but it is nevertheless the enabling part of the system.
- a societal factor, when parts of society become critically dependent on their service such as communications, navigation and positioning. This applies to the areas without adequate terrestrial infrastructure, as well as to the densely populated regions of the globe.
- a political factor for security as well as an instrument of global influence, since an independent satellite capability ensures control over the use of the information gathered.

Satellite systems have also proven to be a strategic asset for exporting and promoting EU-developed technologies. They have been instrumental, for example, in achieving the worldwide success of the DVB (Digital Video Broadcasting) standard.

Dual-use (civilian-military) aspects of satellite systems have not so far figured highly on Europe's agenda. But through the Satellite Centre of the Western European Union (WEU), Europe has gained some experience in dual-use. Integration of the WEU Satellite Centre in the EU may open new avenues for shared utilisation.

There is no doubt that satellite communications and information systems will play an increasing role in the information- and knowledge-based society. To ensure freedom of action, Europe must play a role in defining and shaping such systems, as well as in setting

rules and standards for the future. This will give a voice in determining how they are used, and in stimulating social demands (e.g. for telemedicine, tele-education or tele-working).

Considering space as a whole reveals the commonality of the applied technologies and the strong links between the various space-related activities. An effective space strategy should therefore embrace the following elements:

- independent and affordable access to space
- a broad research and technology base with the industrial capability for designing, manufacturing, and operating satellites systems
- an adequate ground infrastructure
- a regulatory framework for a harmonious development of the information society, including aspects of frequency management and orbital slots
- organised market access and an export control regime.

4. A STRATEGY TO MEET NEEDS AND OPPORTUNITIES

Because of its strategic importance in the economic, societal and political dimensions and its contribution to scientific progress, governments are steadily investing in space. This investment has two major objectives, namely to fulfil governmental and political needs such as defence, science or public services; and to develop the infrastructures of a modern society, in turn stimulating new markets and services.

The progressive integration of satellite systems and services in our society has created opportunities to generate revenues in markets for satellites and launch services. These revenues are generated through a complex interplay between the policy maker - needing space tools for political purposes, industry - manufacturing space systems for its customers, and user equipment suppliers and service providers - for whom satellites are enabling instruments.

Significant turnovers in the downstream markets suggest that it is time for public authorities to reduce their role. However, the strategic dimension and the dual-use aspects of space mean that technology is not developed in a totally free market. Therefore, the further development of the space sector today actually calls for a renewed public commitment and a continuing role for public authorities – including national, multinational and intergovernmental contributions, as well as the political commitment of the Union.

Nevertheless, considering the enhanced possibilities of return on investments, space must, wherever possible, attract additional investments by stimulating the commitment of industry and the private sector through public/private partnerships (PPPs). In the shift towards a competitive, dynamic and knowledge-based economy, Europe must develop a way for the different actors to work together and seize opportunities, which address the needs of markets and society.

Opening new markets requires a constructive interaction between the partners within the PPPs. This can only be initiated by establishing and nurturing a dialogue to elaborate the strategic aspects of space-based communications, information systems and services in the context of the information society.

All of these considerations lead to the conclusion that a comprehensive strategy for space must pursue the following three objectives:

- (1) strengthening the foundation,
- (2) enhancing scientific knowledge, and
- (3) reaping the benefits for markets and society.

These three objectives are inseparable and must be pursued together. The challenge for Europe is to organise this in different legal and institutional settings but in a coherent fashion.

4.1. Strengthening the foundation

Space Technology

A broad technological base supported by technology and demonstration programmes is a prerequisite for the timely development of new services and the continuing global competitiveness of Europe's space industry. 'Time to market' and 'driving the standards' are two key factors of success. Differences between the time cycles for technology development and the speed of market evolution mean that space technologies must be defined and developed in anticipation of the needs.

Considering the investment gap between the European space sector and its competitors in space systems and terrestrial solutions, a strong and innovative approach to space technology must be adopted. This needs to be based on a fruitful dialogue between technology providers and users and, for instance, operators involved in the information society. In some cases, space technologies can drive new services – whilst in others, new services are driving technologies. Such a dialogue should allow synchronising the time to market with the different driving forces, so as to ensure coherence of the overall technology chain from space to ground.

Thanks to ESA, EU and national research and technology development programmes a solid technology base exists in European industry, research centres and academia. The efforts to coordinate these programmes should be encouraged. Furthermore, the dialogue with the user community should be reinforced to ensure that opportunities for new services are not missed, taking into account Europe's strengths – especially its world-leading position in mobile communications, and the introduction of new mobile services and multimedia applications.

To that end, the technology development process should be pursued through the implementation of three different but co-ordinated activities:

- development of basic technologies, to be pursued essentially with public support;
- early demonstration of developed technologies through pilot projects and validation activities, in which the public sector and commercial operators jointly participate; and
- development of applications and services to be driven by market considerations and user demand.

These different types of technological activity will be developed taking into account the different degrees of industrial involvement at each level as well as the specific role of SMEs in the innovation process.

Access to space

Access to space is a prerequisite and an enabling factor for Europe to undertake projects and develop services that rely on space assets. It must also remain affordable. European launchers have to maintain a competitive position in the world market for launch services, which is constantly and rapidly evolving.

The arrival of new launchers on the world scene requires a continuous adaptation of the European offers. Maintaining the competitiveness of Ariane 5 is therefore a priority, notably through improvements of the launcher aiming to decrease the specific launch cost. In the medium term, adding European-manufactured small and medium launch vehicles should complete the range of launch services. As a preparation for the future, timely development and preparatory in-flight demonstrations should be undertaken for new systems that may be required for longer term competition. Maintaining the European spaceport in Kourou at an appropriate standard is inextricably linked with this.

The development of innovative technologies, new vehicles and stages and the associated ground infrastructure will continue to require public support. The condition of affordability for Europe also makes it necessary to pursue complementary private investments, whenever there can be a return-on-investment in a reasonable timeframe.

4.2. Enhancing scientific knowledge

Space systems provide unique means to explore the solar system and the universe, provide a constant flow of readily comparable global data for the understanding of our planet and its atmosphere, and give access to microgravity. They also are powerful and attractive stimulants for the education of students and researchers in various technical fields, and are an integral part of the instruments of the scientific community. Space science thus contributes also to technological innovation, industrial competitiveness as well as education and training.

It is therefore important for Europe to pursue cutting-edge themes of space science, and space-based contributions to the understanding of the climate and our planet:

- the behaviour of our Sun and its influence on the Earth; the origins of the solar system and the evolution of its planets including our own; the origin and evolution of stars, planetary systems and Earth-like planets – including the possibility of discovering life on them; the structure, evolution and destiny of the universe, and the fundamental laws that govern it,
- and, of growing importance, the investigation of the phenomena of global change and all major Earth-sciences themes: Earth's interior, its physical climate, its geosphere/biosphere, the atmosphere and the marine environment, and their impact on mankind.

Europe has acquired capabilities in all space areas, including human space flight. It is participating as partner in the International Space Station (ISS), as a sensible alternative to developing a complete space and ground infrastructure for human space flight through its own means. It should now concentrate on optimising use of the ISS as a European research infrastructure for all disciplines in space science – especially life and physical sciences, applied research, technology development and validation – and as a powerful educational tool and a test bed for the “next step” in human space exploration: the exploration of the solar system.

The ESA programmes – Horizons 2000 for Space Science, Living Planet for Space-based Earth Science – and the exploitation of the International Space Station, in particular for life- and physical sciences are considered as the programmatic references for space-based science activities in Europe. The activities are driven by scientists, and Member States put priorities on the basis of well-organised peer reviews. The pre-eminent European scientific efforts can be embraced in the European Research Area, following the European Parliament's view that the European Union must adopt a more balanced approach to space by strongly supporting both the scientific and the practical use of space research.

4.3. Reaping the benefits for markets and society

The important new element in the strategy concerns the exploitation of the technical capabilities of the space community with the objective of seizing market opportunities and meeting the new demands of our society.

An optimal combination of space-based systems and conventional terrestrial infrastructure, as well as the integration of future space-based information and communication systems and services, creates new perspectives. Such advances are key assets for any political entity in the modern world seeking to secure sustainable development.

Effective exploitation requires the involvement of end-users from the planning phase until operational deployment. Again, its success will depend on a constructive dialogue between all concerned parties from the public and the private sectors, at national and European level.

Satellite communications – involving sales of satellites, ground stations and transponder time, communication services as well as the purchase of launches – constitute the largest single source of revenues in the commercial space sector. In view of the clear prospects for a return on investment, industry and private investors can be expected to identify opportunities and make the strategic choices. Other satellite applications, with limited or very long-term prospects of return on investment, require politically driven initiatives to federate the demand. Here public authorities need to take the lead and seek the commitment of European industry.

Meteorology has developed as a concrete example of such approach. In weather forecasting services the role of satellites is well established. The European contribution is achieved through EUMETSAT, and is part of a truly global data service provision.

GALILEO, currently in its definition phase, is an example of a concrete project that should provide Europe with a civil global navigation satellite system. As yet Europe has to seek a coherent approach for observation needs, and ideas are taking shape around an initiative for Global Monitoring for Environment and Security (GMES). This initiative covers aspects of the global environment and civil security, while at the same time offering possibilities to meet requirements that will originate from Europe's Common Foreign and Security Policy.

4.3.1. Satellite communications

With the emergence of strong and successful EU operators in the telecommunications and information technology sector, covering a range of fixed, mobile and broadcasting applications, industry itself has assumed responsibility for identifying and defining commercial market opportunities in the development of space-based infrastructure.

Building on their position, operators and industry are today actively preparing the systems needed to compete in new markets being opened by the very fast growth of Internet-based

applications. These developments will provide broadband Internet access and interactive services through enhanced satellite broadcasting systems.

However, the success of the satellite sector is fragile. After the strong consolidation wave that the space industry has experienced world-wide over the past decade, only a handful of satellite manufacturers remain active and capable of delivering complete “turnkey systems”. For satellite operators the choice of suppliers is therefore limited, and might also be affected, as far as export licence regimes are concerned by political decisions taken outside Europe. In that context, achieving sustainable competition in the commercial marketplace requires a strong European industry – which, in turn, demands a clear European commitment on the part of all actors to streamline R&D activities in this field.

Even if satellite communications have a commercial market orientation, Europe should continue to facilitate the development of downstream applications. Indeed, social/collaborative policies in the EU (education, health, regional development, collaboration with third countries, e-Europe) may constitute frameworks where satellite communications can actively contribute to the targeted objectives.

Also, satellite communications is facing fierce competition from terrestrial services in commercial applications. While the full liberalisation of telecommunications markets in the Union has provided opportunities for the deployment of alternative technologies, satellite systems are by nature trans-national and require a strongly harmonised European licensing regime in order to benefit from regulatory incentives. There may thus be a need for a harmonised European approach to the role and place of satellite communication services vis à vis those provided through terrestrial network infrastructures. The Commission initiative towards an improvement of the spectrum policy framework in Europe should be seen as a step in this direction⁹.

Furthermore, there is a need for monitoring the full implementation of the WTO (World Trade Organisation) agreement on basic telecommunication services (including the reference paper on these services). In upcoming negotiations –such as GATS 2000 – there will be opportunities for achieving more commitments on satellite services and to ask for third countries to remove existing Most Favoured Nation (MFN) exemptions in these areas.

At the Community level, the Satellite Action Plan¹⁰ implemented in close co-operation with satellite communication operators provides a framework for these and other questions.

4.3.2. GALILEO

Building on experience gained within EGNOS¹¹ for the development of an augmentation system for GPS and GLONASS, Europe has recognised the importance of having a global navigation satellite system conceived as a civil system, and has launched the definition phase of GALILEO.

GALILEO plays a crucial role in the creation of an integrated European system, securing adequate performance and economic value in various areas, including transport, timing, energy and telecommunications. It will be used in all modes of transportation for navigation,

⁹ Proposal for a Decision of the European Parliament and the Council on a Regulatory Framework for Radio Spectrum Policy in the European Community COM (2000)407, 12 July 2000

¹⁰ EU Action Plan:Satellite communications in the Information Society, COM(97)91 final, 5 March 1997

¹¹ EGNOS: the European Geostationary Navigation Overlay Service

traffic- and fleet-management, tracking, surveillance, emergency and infomobility applications. The enhanced performance of GALILEO compared with current systems, in terms of its superior technical and operational parameters, is a major asset. It will provide Europe with sovereignty in safety-critical applications and telematic infrastructure.

GALILEO brings together the European political determination and financial commitment. It offers an opportunity to mobilise the private sector through Public Private Partnerships, combining the policy and regulatory roles of the Commission and the technical and programmatic skills of ESA with the commitment of the space industry and service providers. The challenge now is to substantiate the economic and strategic case in an international context.

A crucial element in the successful completion of the definition phase shall require the agreement on the setting up of a single public-sector entity that can assume organisational responsibilities. In addition, organisational and institutional framework of GALILEO Public Private Partnerships will be set up so as to allow the roles of the public sector and the private sector to evolve over time to protect their respective interests. This framework is expected to associate the public sector, private investors and users, in order to guarantee an economically viable infrastructure and at the same time deliver a protected service to the consumer.

Special attention is paid to international co-operation, in particular to the potential of collaboration with the Russian Federation, which can contribute frequency sharing and extensive expertise in this domain. Similarly, the USA has much to offer in terms of co-operation on frequency sharing, experience, standardisation, but also stimulating competition. Various other countries have expressed an interest in participating in GALILEO, an open system in a European framework.

GALILEO, as a civil infrastructure, does raise security questions associated with making a global navigation satellite system available to the world. These concerns will be addressed during the definition and validation phase.

4.3.3. Monitoring for Environment and Security

In the past decade Europe has shown leadership in the fields of environment and sustainable development. With the approach of the 10th anniversary of the Rio Conference, the Community is now committed¹² to establishing a strategy integrating the concept of sustainable development across all areas of EU policy. At the same time, the growing importance of an EU Common Foreign and Security Policy has led to a focus on the interplay between the human dimension of environmental policy and the broad issues of European security, both in a geopolitical context and in terms of the wellbeing of individual citizens.

“Environment and Security” embraces a broad framework of policy concerns and a wide spectrum of environmental effects, both at European and global level, calling for co-operation within an integrated and coherent response framework. The additional responsibilities of a larger Europe in the global context will create a need to develop an independent capacity supporting regional environmental and security policies. For this purpose, Europe can build on the experience gained in various settings, in order to devise a structured approach to the collection, analysis and dissemination of data. Another question is the establishment of a policy for coherent information pooling and management.

¹² European Council conclusion environment and sustainable development. Helsinki European Council, 10-11 December 1999.

Space-based information provides a powerful platform to develop monitoring of both environment and security concerns and to support analysis of individual issues and their inter-relationships. A number of competing and complementary space-systems initiatives, which could be configured to provide monitoring and information services, are in the definition phase.

A Global Monitoring for Environment and Security (GMES) initiative should provide the common link between Europe's political requirements on the one hand, and the advanced technical and operational capabilities provided by observation satellites on the other. The definition of European environmental and security information requirements within the broad scope of GMES could create a strong enough political momentum to streamline various—ESA, national, bi-lateral – satellite initiatives and projects in Europe. At the same time it will be necessary to identify gaps and to mobilise resources for new initiatives related to the exploitation of space-based information and establish a move towards effective co-ordination and an overall coherent plan of action.

Preparatory activities within GMES have brought together representatives of the Commission, ESA, national space agencies, Eumetsat and industry with the aim to establish a rationale for acquiring independent access to space-based information. This can only come about through co-operation between all European actors, addressing:

- political aspects driven by environment, security and research policies, but also including input from EU policies for enlargement, external relations, humanitarian aid and development of third countries;
- technical aspects – which will involve seeking a common orientation on issues related to the identification of information products on the environment, collection of space-based data, information processing and distribution, and ensuring the appropriate satellite infrastructure;
- institutional/organisational aspects to examine the possibilities of task sharing between the players in Europe and in the international arena, including economic aspects regarding the opportunities offered by a public/private partnership.

Three concrete themes for initiating the practical aspects of the development of such an initiative have been identified:

- global change,
- environmental stress, and
- natural and man-made disasters.

The framework embraces both the information needs of horizontal thematic concerns (e.g. water), and policy concerns (e.g. security in terms of the general welfare of the European citizens).

The complexity of the issue calls for a concrete initiative, building on the preparatory activities, to bring all actors together to ensure that Europe develops a coherent approach to space-based observation. In the initial phase this joint effort should establish a portfolio of information products and a comprehensive overview of space system initiatives. It should also examine the question of a common mechanism for data and information pooling.

These actions should benefit from the full support of existing programmatic tools of the Commission and ESA and include the active participation of Member States. They should rapidly lead to the formulation of concrete proposals as part of a European action plan.

4.3.4. Common European Security and Defence Policy aspects

The European Council in Helsinki constitutes a major step in the development of the new Common European Security and Defence Policy (CESDP). The formation of a rapid reaction force under the EU's political responsibility has led to the creation of new decision-making structures and calls for an optimisation of Europe's intelligence assets.

To meet the CESDP objectives, the EU should be able to call on a range of military (initially established by the WEU) and civil (established by the EU) means for intelligence gathering and crisis management. The exploitation of dual-use possibilities and the consolidation of Member State plans for communications, intelligence gathering and observation satellites could provide significant benefits. By establishing a focused and policy-driven framework for co-ordinating relevant research and development efforts, GMES can contribute to providing Europe with coherent global observation and monitoring capabilities.

With the forthcoming integration of the WEU, its Satellite Centre is due to be transferred to the European Union. It will be a true asset provided the Centre maintains the dual nature of its tasks and its capacity for civilian services. The Centre may also be called upon to perform new tasks and to participate in genuine intelligence work for the purpose of applying the space-related aspects of the CESDP on the basis of arrangements, which remain to be defined.

5. IMPLEMENTATION

5.1. Working together

Over the years the European Space Agency, governed by its Convention, has progressively developed its relationship with the European Commission. Now working with the Commission on a European Strategy for Space, it is becoming Europe's Space Agency in a wider sense, with a socio-economic dimension that will require it to take up additional tasks.

It is imperative, therefore, that the Commission and ESA develop an appropriate operational arrangement for working together on the implementation of this strategy. Indeed, there is a need for formal links between the Union and ESA, which would allow a straightforward practical implementation of common activities. Although ad-hoc solutions (Tri-partite Agreement¹³ and the joint GALILEO Programme Office¹⁴) allow the pursuit of common projects, a more sustainable path should be established for implementing a common European strategy.

¹³ A formal agreement based on former article 228 of the EC Treaty was concluded 18.6.1998 between the European Community, ESA and EUROCONTROL for the development of the European contribution to a global navigation satellite system (GNSS) (Council decision of 18.6.1998, OJ L 194 of 10.7.98, p. 15). This arrangement made possible the juxtaposition of respective contributions in view of having a single European programme

¹⁴ The GPO represent a temporary structure aiming at consolidating results of respective industrial activities required for the definition of Galileo. It was jointly established on the 4th of May 2000 by the Commission and the Executive of ESA

Today, the European Strategy for Space features two projects that differ from traditional space projects: the global navigation satellite system GALILEO and an information collection and processing infrastructure for Global Monitoring for Environment and Security. While it is important to preserve and adapt ESA's current flexibility and know-how in space activities, the implementation of these projects requires it to assume further responsibilities.

These must embrace the possibility to deal with a European initiative financed from multiple-sources and executed in different frameworks and institutional settings. The pursuit of common objectives in these projects will obviously require the establishment of a clear operational framework to allow ESA to act, in addition to its activities as a space agency for its Member States, as the implementing agency for the development and procurement of the space segment and ground segments associated with such initiatives. The Commission and ESA are ready to enter a new operational relationship to work together under their respective competencies for the implementation of this strategy. Therefore it is envisaged that the Commission and the ESA Executive continue to develop the strategy for space jointly, monitor its implementation and issue a joint annual report on space.

For this purpose the Commission and the ESA Executive will set up a joint task force. Amongst others the task force will stimulate the reflection on a possible unified setting for Member States to review the strategy and its implementation on a regular basis, in order to propose permanent arrangements before the end of next year. Furthermore, it will elaborate proposals for framework arrangements for the management of joint projects and outline a coherent approach with respect to candidate countries.

At the technical level the research and technical centres of ESA and of national space agencies play a key role in implementing the strategy. These centres have contributed to the European space successes and have experience and know-how that will enable the use of European resources to be optimised. This will be imperative in establishing ways of working together and co-ordinating and distributing the work involved in space programmes.

The development of the new role for ESA will benefit from the establishment of closer relations between the space agencies in their capacity to elaborate and implement space programmes. This new relationship is under discussion between ESA and the national space agencies.

The ESA Council's decision to work towards a "Network of Technical Centres" to enhance the effectiveness of the space research centres in Europe is a significant step. The progressive approach is illustrated by the start-up in 2000, of two pilot networks of centres (for flight operations and for project reviews). The objective is to have all functions of the technical centres integrated into relevant networks by 2003 at the latest.

The right balance of activities and responsibilities between the different centres will permit fruitful and dynamic exchanges of know-how and optimised use of European resources, equipment and facilities. Pursuance of this approach is of particular importance for future developments of GALILEO, GMES. In the context of its initiative "Towards a European Research Area" the Commission can, where appropriate, play an active role and assist with the creation and the implementation of networks for projects and initiatives adopted in the EU framework.

5.2. Industrial aspects

As a strategic asset for Europe, the space industry requires a political approach. Through the creation of large space companies, European industry is consolidating to face the challenge of the US industrial giants in this sector, confirming the need to unify Europe's political approach to space.

To accompany the evolution from the build-up of industrial capability into its consolidation, which is necessary to succeed in global competition, it will be important to foster a sustained dialogue between policy makers and industry building upon existing successful fora.

This dialogue should increase awareness of industry's priorities and preoccupations while helping to ensure a proper balance between the respective interests of system integrators, operators, larger suppliers, SMEs (small and medium-sized enterprises) and downstream added-value industry. A wide range of policies, including competition rules, are of direct relevance in this context.

SMEs require special attention, as they play a key role in fostering innovation. Their low-cost structures and market-oriented behaviour is necessary to capitalise quickly on market opportunities and to compete effectively. They could benefit from a co-ordinated action between the ESA technology transfer programmes and the Community programmes for innovation.

In view of the multiple-source financing, the principles of procurement will have to be outlined to ensure that the rules of the sources are respected and that the overall procedures are consistent and coherent.

Public Private Partnerships as part of an industrial approach

The enhanced opportunities to recover investments in space give rise to a growing demand for greater private investment in space-related projects, mainly during their deployment and operational phases.

In this respect, the PPP provides one model that can help in committing the public sector as well as the complete industrial chain to an operational project. GALILEO is Europe's pioneering example, from which similar constructions may be developed for information systems and services based on observation satellites in the context of GMES.

The arrangements for Public Private Partnerships in projects for the deployment of large infrastructures based on satellite applications go well beyond financial commitments. Indeed, the partnership concerns the establishment of both the economic and the political bases for the projects. A commitment on the public side might include the adaptation of the regulatory environment, such that it allows investors and industrial partners to facilitate the generation of return on their investments (e.g. signal encryption required to have a robust/guaranteed signal shall justify a charging mechanism for the commercial use of the system).

5.3. International aspects

Space activities with their global dimension develop in a context with a wealth of international issues, such as:

- co-operative scientific space missions,

- aspects of international trade (“fair competition”) and market access through the regulatory environment (WTO, export control, licensing, allocations of frequencies and orbital slots within the ITU)
- co-ordination of a European position with respect to the United Nations.

Europe has to show coherence vis à vis third countries. The European Union provides a political framework for co-operative activities, notably for strategic activities like GALILEO and eventually GMES. It is already effective in various other areas of European activity, such as the harmonisation of telecommunications.

The association of Canada to ESA, the EU-Russia Dialogue on Space ¹⁵and the longstanding co-operation with the USA in space science and the International Space Station are specific examples of special relations with third countries that need to be reflected in determining the most efficient way to embrace space in the EU policies for international co-operation.

¹⁵ Under article 67 of the Partnership and Co-operation Agreement with EU support of space R&D in Russia via the ISTC International Science and Technology Center, established by treaty signed 27.11.92 by EU, J, RF, US, see also Council Regulation (CEE) 3955/92 (OJ L 409, 31.12.92), and Euratom Regulation CEE-2053/93 (OJ L 187/11 29.07.93).

FINANCIAL STATEMENT

1. TITLE OF OPERATION

Communication from the Commission: “Europe and Space: turning to a new chapter”.

2. BUDGET HEADING(S) INVOLVED

B6-1, B6-2 JRC specific RTD Programme (staff and specific EC credits).

3. LEGAL BASIS

Council Decision 1999/174/CE of 25.01.1999 (JRC Specific RDT Programme).

4. DESCRIPTION OF OPERATION

4.1 General objective

The Communication proposes an outline of a strategy for space built around three objectives:

1.- Strengthening the foundation for space activities preserving independent and affordable access to space, and ensuring a broad technology base.

2.- Enhancing scientific knowledge for a better understanding of our planet and its atmosphere, the solar system and the Universe.

3.- Reaping the benefits for markets and society through a demand-driven exploitation of the space capabilities.

The national and European space agencies successfully pursue the first two objectives. The new element in this strategy is the third objective, which introduces for the first time the EU dimension in space, with EU policies as driving forces.

4.2 Period covered and arrangements for renewal

This communication envisages setting up a joint task force with ESA. This Task force should deliver its output before December 2001.

5. CLASSIFICATION OF EXPENDITURE OR REVENUE

5.1 Compulsory/Non-compulsory expenditure

5.2 Differentiated/Non-differentiated appropriations

5.3 Type of revenue involved

6. TYPE OF EXPENDITURE OR REVENUE

Credits destinés à la couverture des dépenses de personnel relatives aux agents prévus pour l'exécution des activités du CCR.

7. FINANCIAL IMPACT

7.1 Method of calculating total cost of operation (relation between individual and total costs)

The task force will use the existing staff resources of the JRC Space co-ordination Unit (1A, 1B, 1C and 3 END) and will not require any additional staff. The tasks of the Unit are very similar to the one proposed and are only widening the scope of its activities. ESA will cover participation by its own resources.

7.2 Itemised breakdown of cost

Commitment appropriations EUR million (at current prices)

Breakdown	2000	2001	2002	Total
Staff Cost	<i>pm</i>	<i>pm</i>	<i>pm</i>	<i>pm</i>
Missions	<i>pm</i>	60	<i>pm</i>	60
Studies	<i>pm</i>	100	<i>pm</i>	100
Total	<i>pm</i>	160	<i>pm</i>	160

The annual breakdown of financing is provisional, and will depend on the evolution of the Task Force. The work should begin end of December.

8. FRAUD PREVENTION MEASURES

The fraud prevention measures contained in each of the instruments that are proposed to finance the different operations will apply. These include inspections, reporting, monitoring and evaluation.

9. ELEMENTS OF COST-EFFECTIVENESS ANALYSIS

9.1 Specific and quantified objectives; target population

The Commission envisages taking an active role in the implementation of the strategy by:

- Establishing the right political and regulatory conditions for space activities, in line with and in support of Community policies;
- Acting as an animator to catalyze joint research and development efforts of all actors in line with the objectives of a European Research Area;
- Bringing together all actors and competencies around common political objectives in projects of a European-wide interest. This role is articulated concretely in initiatives with a Community dimension such as GALILEO and eventually a capacity for Global Monitoring for Environment and Security.

The Commission is ready to enter a new operational relationship with ESA to work together under their respective competencies for the implementation of this strategy. Therefore it is envisaged that Commission and the ESA Executive continue to jointly develop the strategy for space and issue a joint annual report on space.

For this purpose the Commission and the ESA Executive will set up a joint task force. The task force will also, among other tasks, reflect on a possible unified setting for Member States to review the strategy and its implementation on a regular basis, in order to propose permanent arrangements before the end of next year. Furthermore, it will elaborate proposals for framework arrangements for the management of joint projects and outline a coherent approach with respect to candidate countries.

9.2 Grounds for the operation

In 1999, European Ministers called on the European Commission and the Executive of the European Space Agency to elaborate a coherent European Strategy for Space. The European Parliament welcomed this initiative, emphasizing the importance of introducing for the first time a Community dimension in Europe's political approach to space.

The EU Council and the ESA Council at Ministerial level thereby provided a basis for a joint consultation of all interested parties concerned and enabled the preparation of a comprehensive document on a strategy for space that can be subscribed to by European states, irrespective of whether they are member of ESA or part of the Union.

Parts of our society have become critically dependent on the use of satellites and space-based technologies. An autonomous and competitive capability to develop and manage space-based infrastructures and to collect and use the information deriving from these systems is an increasingly important asset for an enlarging and further integrating Union with a greater political weight on the global scene.

Space-based information is going to be a significant element for success in the knowledge economy of tomorrow. In the public sector, at the level of the Union, it is

likely to play an increasing role in the implementation of a wide range of EU policies such as for environment, transport, telecommunications, culture, research, agriculture, fishery, regional development and international relations.

Through the emergence of new markets for satellites and notably for downstream services and user equipment there are also enhanced possibilities to generate revenues. The development of these markets and the position of the European industry in them depend both on the regulatory environment and the availability of the appropriate space infrastructure. In the face of global competition, industry would benefit from the political and economic weight of the Union in the development and the regulation of these markets.

Space presents a security dimension, which has thus far only been dealt with, at European level, in the context of the WEU. The forthcoming integration of the WEU into the EU and the new steps taken at the European Summit in Helsinki towards the development of a Common European Security and Defence Policy (CESDP) are prompting the European Union to take space capabilities into account, for instance in decision-making for the planning and monitoring of the Petersberg Tasks (conflict prevention and crisis management).

9.3 Monitoring and evaluation of the operation

The operation will be monitored and evaluated on the basis of the following criteria:

- annual report on the progress in the implementation of the strategy with ESA
- proposal for permanent arrangement for a unified setting for Member States to review the strategy and its implementation on a regular basis

The organisational structure put forward is designed to ensure the cost-effective management of the project including effective monitoring and evaluation.

Performance indicators selected

- * output indicators (measurement of resources employed)
- * impact indicators (measurement of performance against objectives)
- Details and frequency of planned evaluations
- Assessment of the results obtained (where the operation is to be continued or renewed).

10. ADMINISTRATIVE EXPENDITURE (SECTION III, PART A OF THE BUDGET)

Not applicable. There will be no expenses on Part A of the Budget.