The ESA Council at Ministerial Level

Edinburgh, 14-15 November 2001

The Director General's Proposal for ESA's Policy and Programmes

A. Rodotà

Space services are part of everyday life. TV broadcasting, weather forecasting, protection of the environment, financial services, and car-navigation all rely on globally operated satellite systems. At the same time, space is a vital tool for scientific research, serving the advancement of our understanding of the origins of life, the development of the Universe, and the complexity of the terrestrial ecosystem.

The resources offered by space also contribute significantly to meeting many of the challenges facing the Europe of today. I am thinking here of:

– safeguarding and further improving the well-being, security and prosperity of every citizen,
– protecting the environment and ensuring sustainable development, and
– preserving Europe's cultural identity, diversity and value systems,

in short, becoming 'the most competitive and dynamic knowledge-based economy in the World'.

To meet these challenges, Europe must do more than continue to exploit space effectively, drawing wherever possible on the results already achieved. It must also strive to improve the overall efficiency of the entire European space sector, which includes the efforts of scientists, industrialists, public agencies (national as well as ESA), and service companies.

Within this challenging environment, the European space community is already producing value for Europe. I am thinking in particular of:

– first-class science
– a large share in the World market for space infrastructure and services
– major contributions to public-service provision for citizens.

First-class science

Even with a continuing decline in the budget for science programmes, the European science missions have achieved significant results in the last six years:

– Soho has explored the Sun's internal structure, providing insights into the workings of the solar nuclear fusion reactor and the solar dynamo.
– Cluster is giving us a comprehensive vision of space weather.
– ISO has discovered the ubiquitous presence of water molecules in the Universe.
– XMM-Newton has greatly expanded our understanding of the composition of the enormous high-speed jets emitted by young stars.

A large share in the World market

Worldwide expenditure on space is estimated at around 70 billion Euros in 2001. The public sector still accounts for a very significant proportion of that spending, though the commercial sector is moving rapidly towards a share of about 50%.

Out of total public expenditure of about 38 billion Euros, the United States' share stands at 76%, the figure for Europe being just 14%, equally divided between ESA and the national programmes. The rest of the World spends 10% of the total.

Although in interpreting these figures account has to be taken of variations in purchasing power from one country to another, the fact is that Europe's investment is about one fifth of that of the United States. Even so, Europe has been able to secure a steady increase in its companies' share of the World commercial market – although the USA had a start of almost ten years.

In the early eighties, Europe launched no commercial payloads at all and was completely out of the market for commercial satellites, a market that had come into being some seven years before. Today, twenty years on, thanks to

substantial public investment in developing Ariane and building the first European communications satellites (ECS and Marecs), European companies have gone on to take:
– 56% of the global commercial launcher market, and
– 27% of the global commercial satellite market.

European companies have been equally successful in the telecommunications-services marketplace. They currently account for about 28% of the overall market and are increasingly globalising their business with the acquisition of large overseas international operators.

Public-service provision for citizens
There are at least three areas in which the contribution of space to the everyday life of citizens is both evident and, increasingly, vital.

The first is meteorology. Even though Eumetsat, the Agency that operates meteorological services, is currently a non-profit organisation, studies point to an indirect return on investment in excess of 8. Through the Meteosat and MetOp satellites, which ESA and Eumetsat have been jointly developing for a number of years, Europe is also contributing, together with the USA, Russia, China, India and Japan, to a global network disseminating meteorological information all around the World.

The second example is the use of Earth-observation data for disaster monitoring. The International Charter on Space and Major Disasters, initially signed by ESA and CNES, and later by ISRO, CSA and NOAA, seeks to provide a unified system for acquiring space data and delivering it to people dealing with natural or man-made disasters.

The third example is the contribution being made by space to the information-society infrastructure, providing a complementary but nonetheless important means of access to the Internet, and its enabling role for new services such as telemedicine and distance learning.

These enormously valuable results were achieved through the combined efforts, at European level, of the scientific community, industry and the space agencies.

What specific contribution has the European Space Agency made to the emergence of such first-class capabilities and the achievement of such outstanding results? I would like to focus on what I see as the three main strands of this specific ESA input:
– Programme management
– Technical management
– Internal efficiency.

Programme management
The evolution of mission cost per tonne is a good indicator of ESA's increasingly effective management of space – and in particular satellite – programmes. Mission cost per tonne has been in steady decline since the early eighties, falling by about 40%, with a roughly stable level of risk and innovation in the various programmes.

This in turn means that ESA has, over the last fifteen years, demonstrated its ability to put progressively larger payload masses into space per year, a clear pointer to the growing through-put of the entire European space sector. No such positive trend is to be found in the NASA programmes.

Technical management
It is important to underline that better performance in programme management has been obtained by ESA maintaining product quality. The following are just a few indicators demonstrating the technical quality of the Agency:
– ESA has never had any catastrophic satellite mission failures (compared with a 30% failure rate in NASA programmes).
– ESA has negotiated insurance premiums at about 50% of market rates.
– ESA satellites usually exceed their estimated and planned lifetimes (for instance, ERS-1).

Last but not least, I want to underline the recent recovery of our Artemis satellite, which, together with the earlier recovery of Soho, testifies to the excellence of our technical teams.

Internal efficiency
A lot of effort has been devoted to improving the Agency's internal efficiency. Two indicators confirm the gains in efficiency that have been made.

The first is the amount of budget managed per staff member. For programmes directly managed by ESA, the chart shows a steady yearly increase of 8.2% in recent years, compared to a 2.2% increase obtained by NASA. This has been accompanied by very tight cost control applied to ESA programmes.

The second indicator is the deviation of programme costs at completion from the costs initially estimated. Comparing the status of overruns on major ESA programmes in 1997 and in 2001 clearly demonstrates the effectiveness of the efforts devoted by managers at the Agency to proper control of all programmes, while at the same time organising industrial competition and an acceptable geographical distribution of contracts. Here

again, if we compare our results with the data coming from NASA, we can be more than proud of our achievements.

I have perhaps taken too long over showing the results of the European space sector and the Agency in recent years. But I find it important, when you are about to decide on the future of the European space sector and on new investments for Europe, for you to feel convinced of the absolute necessity of these investments and of ESA's dedication to efficient, responsible use of taxpayers' money.

I would like to stress that all the reported achievements have been made possible by the continuous efforts of each and every Agency staff member and the intelligent support received from our Member States.

The Agency is now at a crossroads: it has to operate in a rapidly evolving space and industrial sector. European citizens have new requirements, and users have new demands with regard to space. Moreover, the context in which space activities are conducted is likely to be dramatically changed by the events of 11 September.

A few years ago, ESA initiated a comprehensive assessment of how it should evolve to meet the challenging demands of the future. This has already led to important results – first of all in the new relationship with the European Union. We are very proud that space has become firmly established on the European agenda and delighted that the President of the Commission will be addressing the ESA Council today.

Additional effort is now required to make space one of the pillars of tomorrow's Europe and to make ESA the Space Agency of Europe. This will translate into additional tasks for ESA. In order to maintain the quality of its work in response to these new demands, it will be necessary to slightly increase the general budget. This Council will hopefully give a clear indication in that direction, together with full support to the programmatic lines aimed at providing services to all European citizens.

I would like to come back to the events of 11 September, tragically echoed on Monday, since they have potential implications for the Agency. We have to consider whether those events put the very basis of our policies in question, or whether they simply mean that those policies have to be pursued in a number of additional directions? The Agency has already started deliberations on the matter, but it is too early to present conclusions, just a few preliminary observations.

This crisis is, indeed, a great test for Europe and does require a political response. The increasingly close links between the European Union and ESA will enable Europe to use space as a means to achieve its common foreign and security policy objectives. Technology is not an objective per se, but space technology, integrated with other technologies, will prove essential and even critical in the context of these policies. International peace and security are essential values to be preserved and space can make significant contributions to this crucial objective.

Within the complex situation emerging from the September events, it is furthermore evident that worldwide inequalities will have to be addressed in greater depth. Space systems have contributions to make in reducing inequalities: providing means of conveying education and information, supporting sustainable development, improving water and natural-resource management, enabling prevention, forecasting and management of natural and man-made hazards.

Most of the programmes proposed today for your attention address these issues. They are essential to the future of Europe. Decisions need to be taken now to ensure that Europe can use space to implement its policies in an independent manner. You,Ministers, are today called upon to take those decisions, supporting the programmes and giving the Agency the means to execute them successfully. esa

The Programmes and Budgets

The Programmes tabled for decision in Edinburgh covered the Level of Resources (Science and General Budget), Earth Observation, Telecommunications and Satellite Navigation, the International Space Station, Launchers and the start of a new European long-term initiative for the robotic and human exploration of the Solar System.

LEVEL OF RESOURCES

The Level of Resources determines the funding available for the basic activities of the General Budget and for the Science Programme.

General Budget
The General Budget covers corporate and administrative costs, technical activities such as the basic General Studies and Technological Research Programmes, plus Earthnet and Education (funding of fellowships, etc.).

The total of Member State contributions to the General Budget for the period 2002–2006 amounts to 775 MEuro.

Science Programme
The funding for the next five years should cover:
- the maintenance of scientific missions already launched (Hubble Space Telescope, Ulysses, Cluster-II, SOHO, Huygens/Cassini, XMM-Newton)
- approved scientific missions in the development phase (Integral, Rosetta, Mars Express, Smart-1, Herschel-Planck), and
- new missions under study or to be chosen and initiated within this period (i.e. the Cornerstones BepiColombo, GAIA and LISA
- with Smart-2, and the Solar Orbiter flexi-mission)

The total contribution received for the Science Programme for 2002–2006 amounts to 1869 MEuro.

EARTH OBSERVATION

Earth-Observation Envelope Programme, EOEP-2
The EOEP implements Earth Explorer Core and Opportunity missions and also funds mission exploitation, instrument redevelopment and support for market development. Earth Explorer missions such as Cryosat, the Gravity-field and steady-state Ocean Circulation Explorer (GOCE), the Soil Moisture Ocean Salinity (SMOS) mission and the initiation of full implementation of the Atmospheric Dynamics Mission (ADM-Aeolus) are major achievements of the first phase of this programme. The second phase, EOEP-2, will give the Earth Science community and industry a stable outlook whereby one new mission will be launched each year. It will also cover the preparation of Earth Watch missions.

The financial commitments received from Member States for EOEP-2 amount to 926.44 MEuro for the period 2003–2007.

Earth Watch Programme
The Earth Watch initiative will include a number of Earth-observation missions supporting public and private-sector applications such as mapping, natural-resource management, major risks and security, geology, etc. Earth Watch will also cover the requirements of the Global Monitoring for Environment and Security (GMES) initiative, currently being drawn up with the European Commission, addressing in particular global change, natural and man-made hazards, environmental stress and monitoring of treaty commitments.

The following financial commitments received from Member States for Earth Watch Slice-1 cover the period 2002–2006:
- GMES service elements: 83 MEuro.
- Thematic L/X-band SAR element based on the joint proposal from the British and German space agencies (BNSC/DLR) for Infoterra/ TerraSAR: 25 MEuro.

– Consolidation of the infrared element based on the Spanish CDTI Fuegosat proposal: 9 MEuro.

TELECOMMUNICATIONS

Advanced Research in Telecommunication Systems (ARTES) Programme
Several actions/projects have been identified to further increase the competitiveness of European industry in satellite telecommunications, many of which are continuations and amplifications of ongoing activities within ESA's ARTES Programme:

ARTES 1: Preliminary Studies and Investigations
Funding for 2002–2006: 27.22 MEuro

ARTES 3: Satellite Multimedia (also covering mobility and inter–satellite links)
Funding for 2002–2006: 213.3 MEuro

ARTES 4: ESA/Industry Telecommunications Partnership (dealing with part of the technology and user-segment activities)
Funding for 2002–2006: 165.3 MEuro

ARTES 5: Advanced Systems and Telecommunications Equipment (consisting of technology, user segment and in-orbit demonstration)
Funding for 2002–2006: 53.85 MEuro

ARTES 8: Large Platform Programme
Funding for 2002–2006: 133.85 MEuro

Additional funding for the ARTES programme yet to be allocated to specific activities: 350 MEuro

Galileo Programme
Europe's global navigation system, Galileo, is a joint initiative of the European Commission and ESA and will deploy a full constellation of navigation satellites by the end of 2008, with superior technical and operational capabilities compared with the American GPS and Russian Glonass systems.

After a Definition Phase (end 1999 – end 2000) devoted to overall system design, Galileo is now entering its Development and Validation Phase (2001–2005). The in-orbit validation of the system is based on the deployment of a limited constellation of three to five satellites and a representative ground-control segment and test receivers.

ESA's contribution to the Galileo Development and Validation Phase is 527.87 MEuro. A similar contribution is expected from the European Union in December.

The full Galileo system will consist of some 30 satellites in medium Earth orbit at 24 000 km altitude, and the associated ground infrastructure. The cost of the overall Galileo project is estimated at some 3 BEuro. Financial schemes for the deployment and operational phase are currently being finalised.

HUMAN SPACEFLIGHT AND MICROGRAVITY

ISS Exploitation Programme Continuation
The objectives of the Programme are to develop European operational capabilities in the key areas required for long-term human space exploration, to build up the knowhow necessary to master the operation of a complex human outpost in space, and to support exploitation of the ISS by the European user community.

Exploitation Period 1 (2002–2006) covers activities such as partial funding of the first Ariane-5 and full procurement of the third Ariane-5 for the ATV, plus ATV procurement activities, including the first production unit. Period 1 of ISS exploitation is composed of fixed and variable cost activities.

The finances available for this programme amount to 846.69 MEuro.

Human Spaceflight Studies, Technology and Evolution Preparation (STEP)
The objectives are the improvement of existing ISS services, the reduction of operational costs and the preparation of future infrastructure capabilities. It is conceived as a framework programme structured in periods of three years, with contributions on a 'pay as you go' basis.

The first three-year period of activities (2002–2004) is funded with 12.4 MEuro.

ISS Commercialisation Utilisation Programme
This Programme is designed to lay the foundation for commercial utilisation of the ISS, to stimulate commercial utilisation to generate revenues and thus reduce the contributions payable by participants in the ISS exploitation programme, and to promote the image of the ISS in order to attract a larger community of users.

This Programme will be submitted for approval when the overall ISS situation is clarified.

ISS Additional Flight Opportunities Programme
This Programme's objectives are to maintain and develop an active and experienced

European Astronauts Corps, offering further flight opportunities. The Programme, which envisages the procurement from Russia of four Soyuz flights to and from the ISS in the period 2003–2006, will be submitted for approval in connection with the submission of the European astronaut policy in Spring next year.

ELIPS Programme
The Programme's objectives are to maximise the benefits to society of ISS utilisation, to promote European competence and competitiveness in the life and physical sciences, to pursue basic scientific research in the life and physical sciences and also industrial and commercial applications in space, and to set up a coherent framework for European activity in this area.

The financial envelope for Period 1 of the Programme (2002–2006) amounts to 166.52 MEuro at 2001 economic conditions.

LAUNCHERS

Ariane-5 Research and Technology Accompaniment (ARTA-5) Programme
The objectives of the ARTA-5 Programme are to maintain the reliability and level of qualification of the Ariane-5 launcher throughout its operational lifetime, to eliminate any design flaws and weaknesses that might appear during operational use, and to improve knowledge about the functional behaviour of the launcher in flight.

The four-year extension of the ARTA-5 Programme (2003-2006) is funded with 302.97 MEuro (2001 e.c).

Ariane-5 Infrastructure
This Programme, covering the fixed costs of the ELA-2 (Ensemble de lancement no. 2) and ELA-3 launch complex facilities, covers the period 2002–2004.

The three-year extension is funded with 131.45 MEuro (2001 e.c.).

Guiana Space Centre, CSG (Centre Spatial Guyanais)
The agreement on CSG management and funding has until now covered the upkeep and operating costs of the Centre's range facilities to ensure long-term stability of the strategic investment in Europe's assured access to space.

The new proposal covering CSG's fixed costs for the five-year period 2002–2006 has a budget of 423.2 MEuro (2001 e.c.).

Ariane-5 Plus
The objective of this Programme is to ensure that Ariane-5 evolves and remains competitive on the World market by increasing its performance and versatility, and bringing down the launch price.

The Ariane-5 Plus Programme has been broken down into three steps. The first step, decided at the Council Meeting in June 1998, covered the first year of activities. The second was decided at the Council Meeting at Ministerial Level in May 1999 and covered the initial development of the Vinci engine, initial ground segment upgrading and full development of the versatile version of the existing upper stage, together with completion of the Ariane-5 ESC-A version (first launch planned for mid-2002), raising its lift capacity to geostationary transfer orbit to 9 tonnes.

The third step will round off the Programme, and will see the completion of Vinci engine development, completion of the ground segment upgrade, and completion of the Ariane-5 ESC-B version and its first launch (planned from 2006), bringing the GTO lift capacity to 12 tonnes.

The completion of the Ariane-5 Plus Programme has a budget allocation of 699.14 MEuro (2001 e.c.).

AURORA PROGRAMME

Aimed at developing a European long-term plan for the robotic and human exploration of bodies in the Solar System, in particular those holding promise of traces of life, the Aurora Programme activities will be pursued in co-ordination with European and international partners. Relevant technologies and mission scenarios will be developed in the three-year preparatory period.

The overall financial commitment for the first three-year period is 14.1 MEuro (2001 e.c.)

ESA Press Release

15 November 2001

The Ministers responsible for space affairs in the countries that make up the European Space Agency – its Fifteen Member States and Canada – today concluded a two-day meeting in Edinburgh of the Agency's ruling Council by endorsing the next stages in a series of ongoing programmes and committing to new initiatives that will help keep Europe at the forefront of space science and technology, Earth monitoring from space, telecommunications, satellite navigation, launchers, human space flight and planetary exploration.

In particular, ESA and its Member States made significant progress in shaping a range of future-oriented programmes, with major decisions aimed at enhancing Europe's role in the space sector.

The Agency signalled its strong commitment to closer cooperation with the European Union. A first Resolution highlighting the importance of a balanced, ambitious space programme serving Europe's citizens was adopted unanimously.

The Members agreed on a Declaration embodying financial commitments for the development of Galileo, Europe's satellite-navigation system. ESA now looks forward with confidence to the European Union Transport Ministers' approval of their contribution to Galileo at their December meeting. Galileo is a major component of Europe's transport policy and will be deployed in partnership with the business sector. It will offer a wide range of independent navigation services for commercial and private users, and promises to generate new commercial services in areas such as road-vehicle navigation and air-traffic control.

Further collaboration with the European Union will focus on the Global Monitoring for Environment and Security (GMES) Programme, which will address such issues as global change, natural and man-made hazards, environmental trends and monitoring of treaty commitments. Earth observation is today an essential resource for surveillance of the environment and the management of natural resources. GMES and a number of other Earth-observation projects were approved as the first elements in a series of applications missions within the Agency's Earth Watch initiative.

The Delegations also decided to back a programme that will see the Ariane launcher, which for many years now has held more than half of the World market for commercial launches, evolve in terms of power and versatility. ESA is confident that Ariane will remain the World's number one choice for carrying commercial satellites into orbit. The European strategy for independent and affordable access to space is based on the provision of competitive European launch systems. The Ministers stressed that to make that strategy work the right balance has to be struck between the respective roles, responsibilities and financial commitments of the public and private sectors. Restructuring of the launcher sector in Europe would be another key factor.

Concerning the ongoing discussions in the United States on the future configuration of the International Space Station (ISS), the European Ministers sent a clear message to the ISS partners confirming that ESA will fulfil all of its obligations, and by the same token expects NASA to keep to the International Treaty. ESA's main focus of interest is an intensive scientific research programme calling for specific onboard resources, one being the presence of full-size crews. One of the Resolutions passed by the Ministers, concerning ISS utilisation, provides the financial resources required by ESA, but makes release of the final 60% conditional on NASA's confirmation of the original agreement.

The Science Programme is the backbone of ESA's activities – its highly successful missions have made Europe a World leader in space science. The outcome of the meeting ensures that science at ESA will remain a European flag carrier, contributing to our knowledge-based society.

Telecommunications satellites provide services that enhance many aspects of our lives, and Europe already provides more than a quarter of the World's commercial platforms. The ongoing ARTES Programme will lead to new services and offers the prospect of continuing commercial success in a rapidly evolving market.

Europe now needs to exploit the strategic potential of space systems more effectively to further its scientific, economic, social and political objectives. The Ministers acknowledged this in Edinburgh by renewing and expanding ESA's mandate to establish closer ties with the European Union.

The process of wedding the public policy objectives of the European Union and the capabilities of the European Space Agency got underway some years ago. ESA is increasingly committed to closer cooperation with the European Union to further its aim of putting space at the service of European citizens, and also to focus attention on space at the highest political level in Europe. Pursuing these goals, ESA and the EU are now engaged in the development and implementation of a truly European space policy. The foundations of that policy were laid in November last year, when the ESA and EU Councils endorsed a joint document on a European Strategy for Space.

As Europe grows, ESA is bound to grow too: the recent accession of Portugal, the interest expressed by Greece in becoming a Member State, and the intensifying cooperation with Central and Eastern European countries, all testify to the continuing vitality of the Agency and its programmes.

The cooperation extends beyond Europe, with last year's renewal by Canada of its long-standing Cooperation Agreement with ESA and an expansion in the Agency's joint work on facilities and programmes with the United States. Japan and ESA are also working together closely in Earth observation and science. The existing cooperation arrangements with Russia will be further developed in areas of benefit to Europe. Ventures involving emerging space-faring nations – notably in the Asia-Pacific region and in Latin America – are also on the ESA agenda.

Outstanding space programmes are only possible with a strong technology base, which is the key to the competitiveness of European industry in World markets. The Ministers sought therefore to underline the importance of deriving maximum benefit from technology, with measures to encourage technology transfer and spin-off.

The Ministers expressed appreciation for ESA's efforts in coordinating communication and education programmes and in encouraging young people to widen their career horizons. They urged the Agency to make European citizens more aware of the knowledge and benefits they can derive from European-led space research.

The closing Press Conference: from right to left, Minister Edelgard Bulmahn of Germany, who chaired the Edinburgh Ministerial Conference, Mr Antonio Rodotà, ESA Director General, and Mr Franco Bonacina, ESA Spokesman

Council in Session

Lord Sainsbury hands over the Chair to Mrs Edelgard Bulmahn

Welcome by the Lord Provost of Edinburgh, the Rt. Hon. Eric Milligan

The participating Ministers, together with EC President Romano Prodi


FINLAND


CANADA


PORTUGAL


AUSTRIA


SWITZERLAND


ITALY


FRANCE

OBSERVERS

Arrival of Mr Romano Prodi

The closing Press Conference