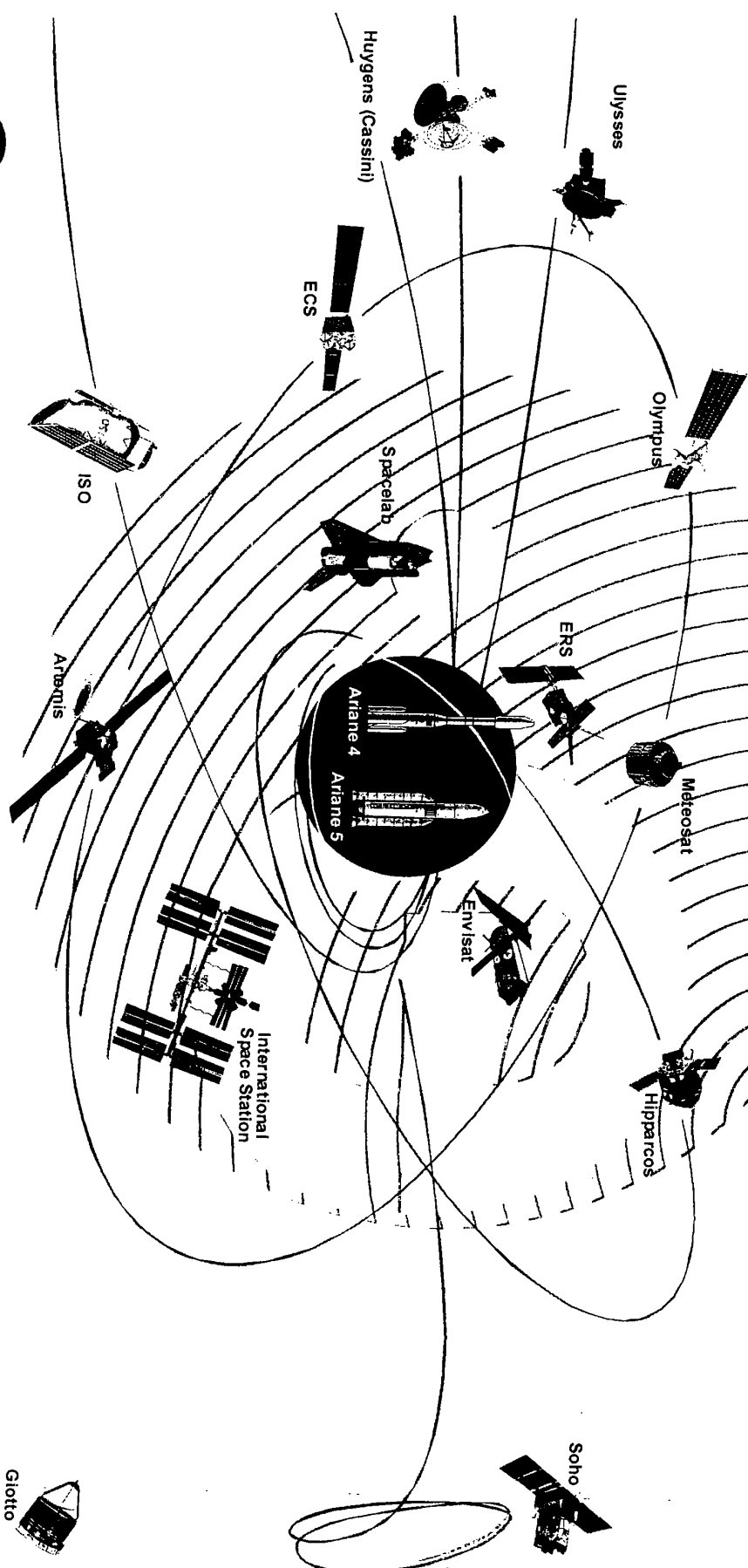


ESA

Hvad er ESA? Hvad gør ESA?



Udvalget for Videnskab og Teknologi
Ad UVT alm. del - Bilag 14
Offentlig

September 2004

Purpose of ESA

Article 2 of ESA Convention

Provide for and promote, for exclusively peaceful purposes, cooperation among European states in the fields of:

Space research and technology

Space applications

for scientific purposes and for operational space applications:

- by elaborating and implementing a long-term European space policy
- by elaborating and implementing space activities and programmes
- by elaborating and implementing an industrial policy



Programme Overview

Mandatory

- **Basic activities**
Studies of future projects, technological research, common technical investments (facilities, laboratories, infrastructure), education
- **Science**
Scientific missions: solar system science, astronomy and fundamental physics

Optional

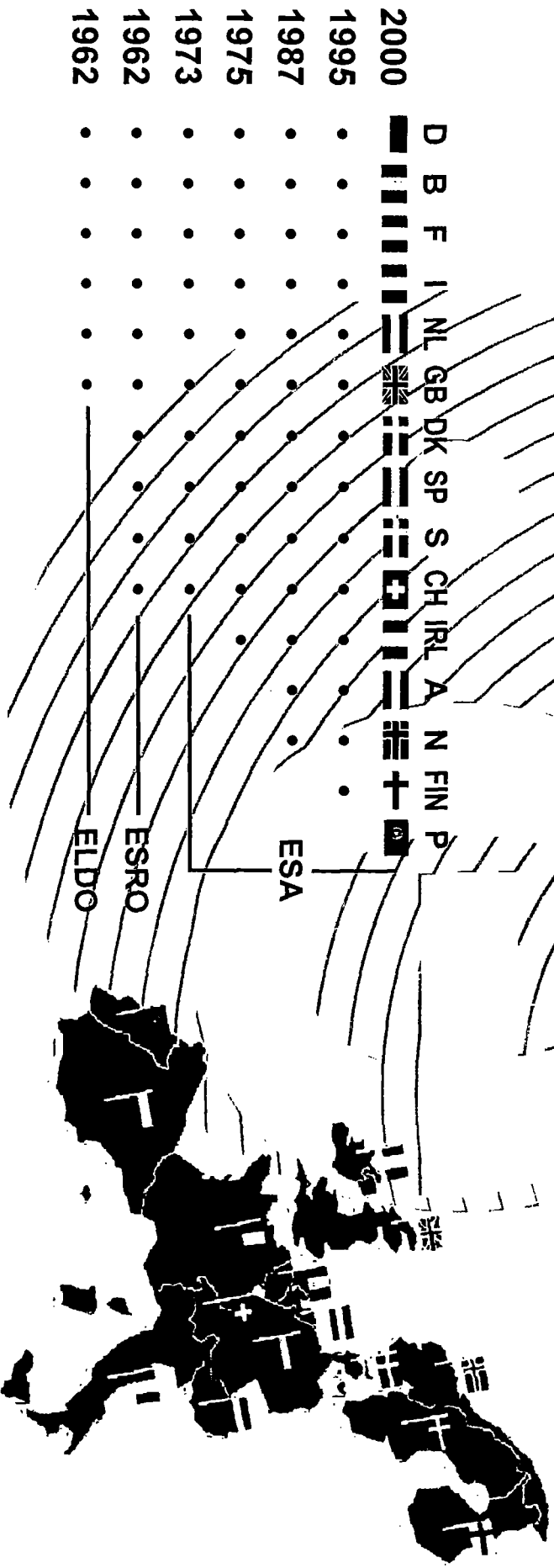
- **Applications**
Satellites and services for:
 - Telecommunications, navigation, data relay
 - Earth observation including climatology and meteorology to monitor land, oceans and the atmosphere
- **Launchers: Ariane, Vega**
- **Human spaceflight and microgravity: various elements for the International Space Station and microgravity research**



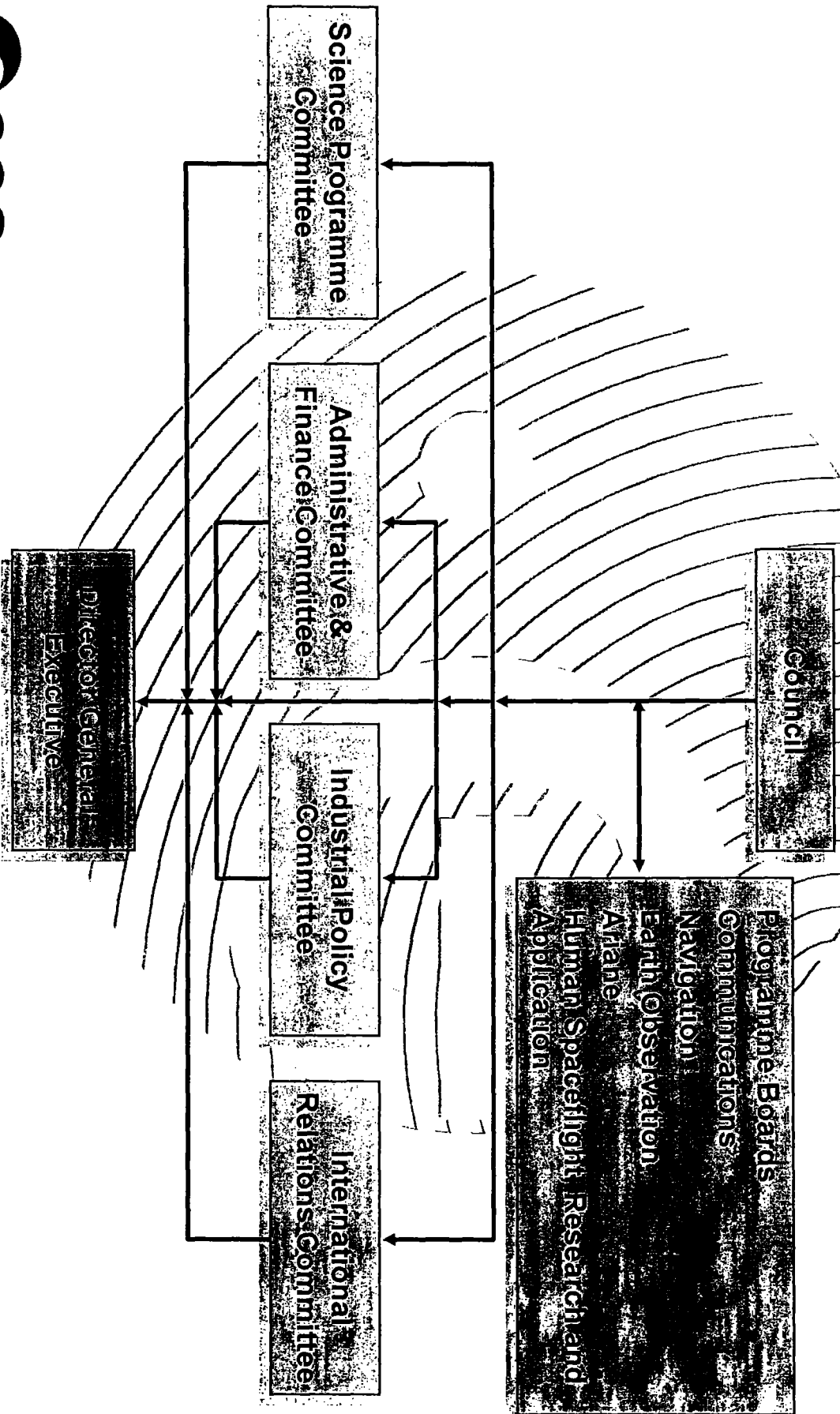
ESA Member States

ESA has 15 member states:

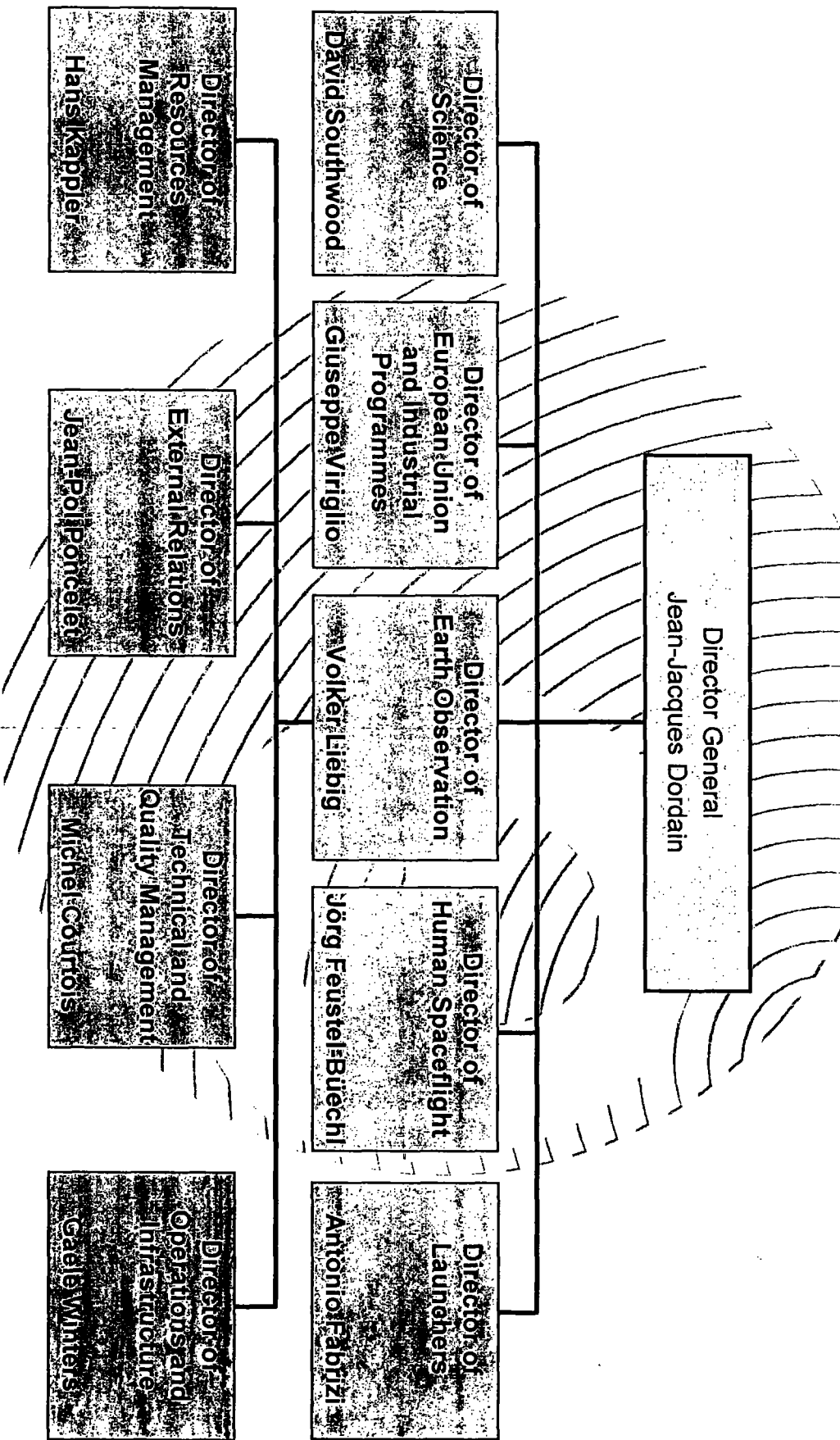
- Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Norway, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom.
- Canada takes part in some projects under a cooperation agreement.



Governing Bodies

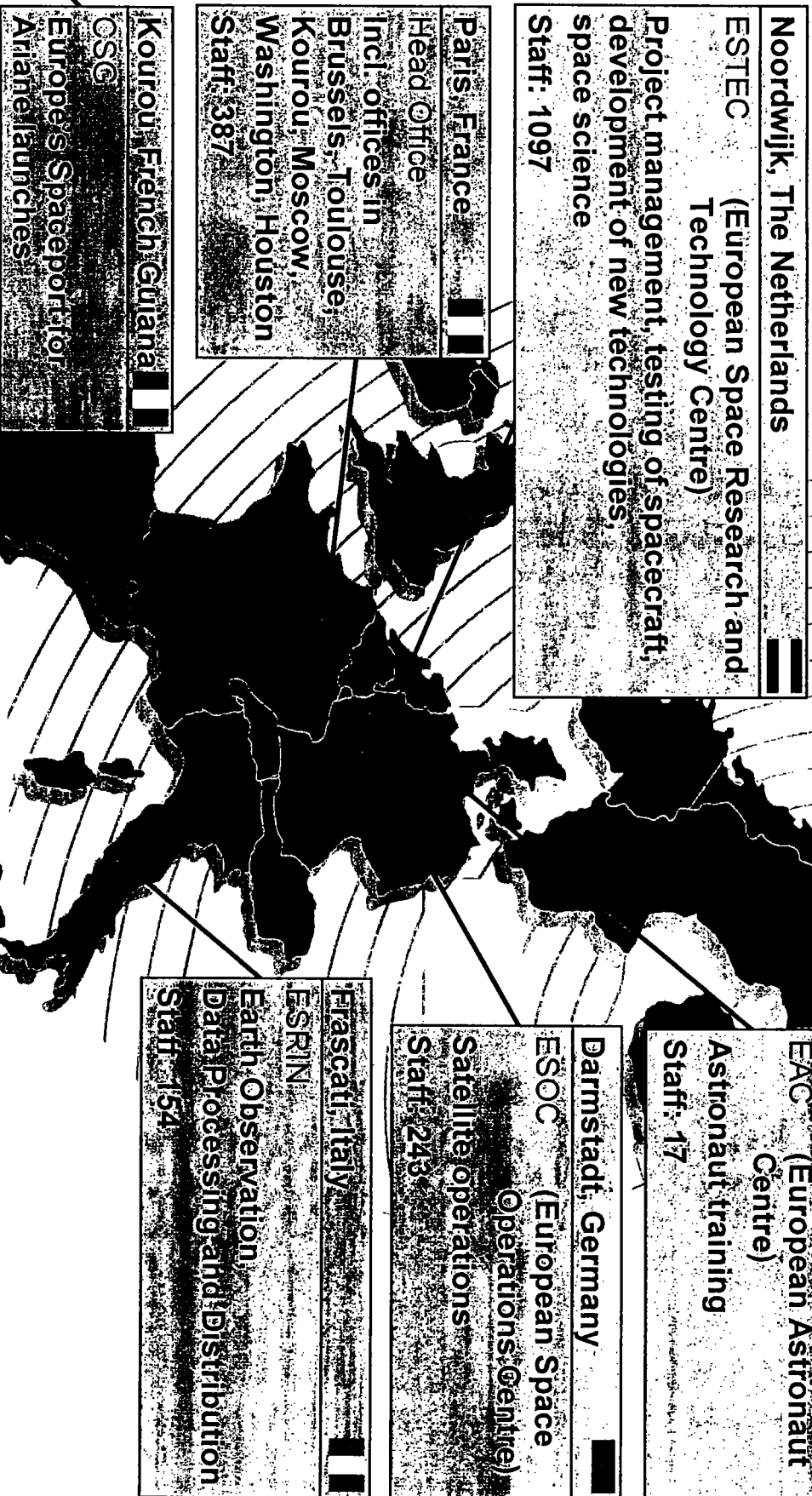


ESA Organigramme



Establishments

Permanent ESA staff: 400



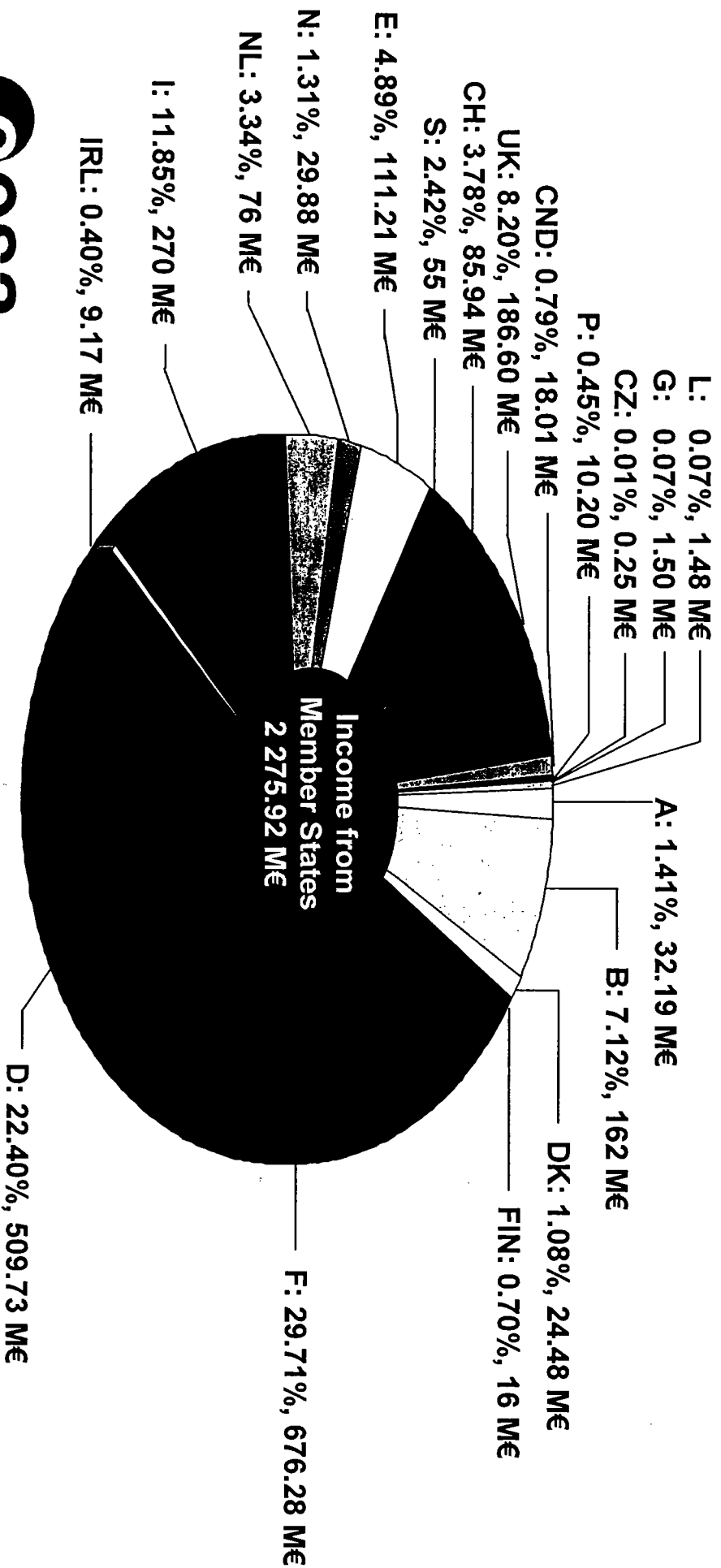
(Status: Mar 2004)



Budget for 2004

Income from member states and participating states

Income from member and participating states	: 2 275.92 M€
Other income	: 422.40 M€
Total:	2 698.32 M€



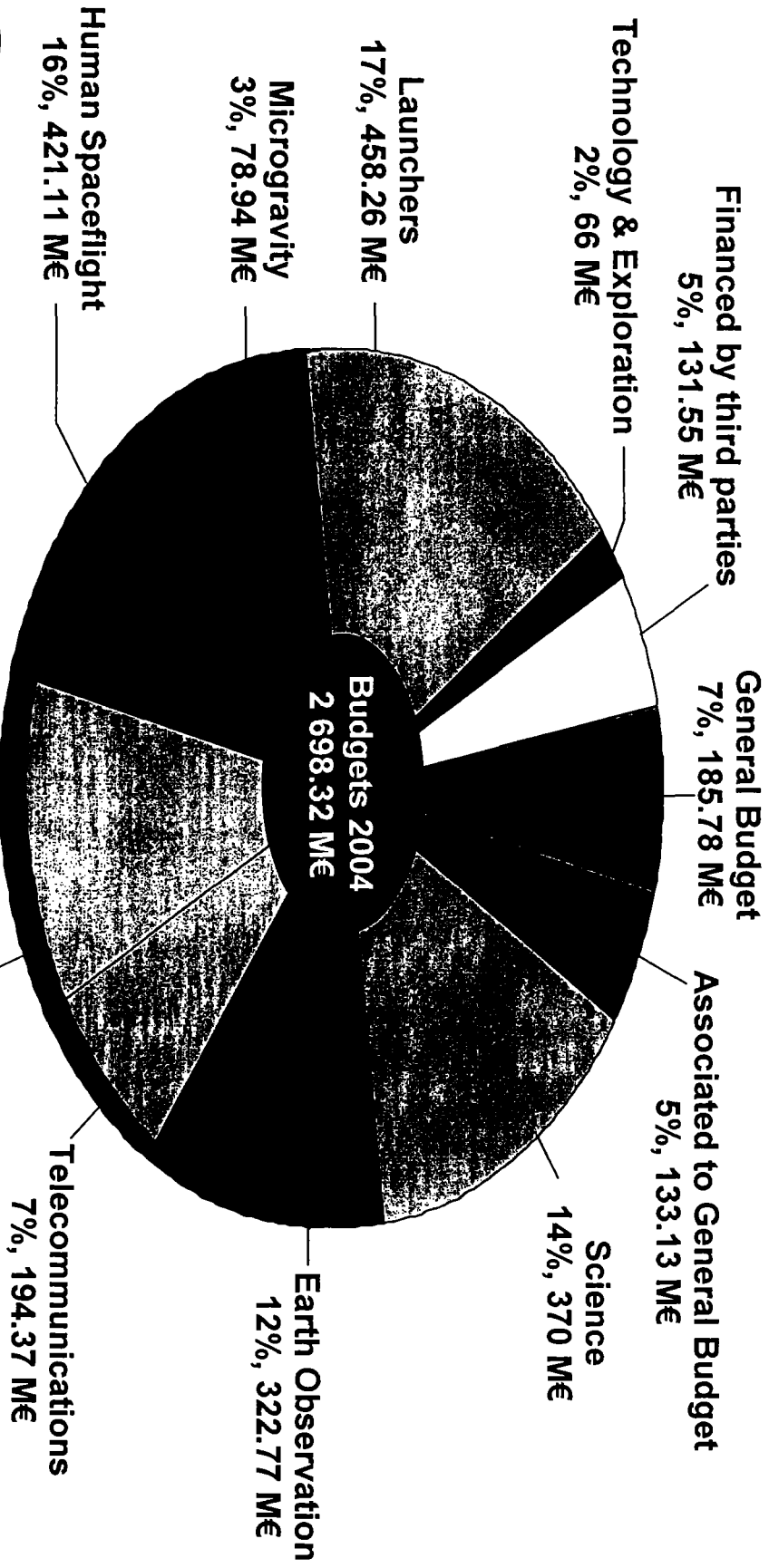
M€: Million of Euro

BUD 01 - Feb 2004

Budgets for 2004

Breakdown by programmes

Approved programmes	: 2 566.78 M€
Programmes financed by third parties	: 131.54 M€
Total	2 698.32 M€



M€: Million of Euro

BUD 02 - Feb 2004

Industrial Policy

A permanent dialogue with industry

About 90% of the European Space Agency's budget is spent on contracts with European industry, mainly for research and development activities.

The objectives of ESA's industrial policy are:

Support competitiveness

Make Europe independent to implement its space programmes, and become a world leader in key areas, which leads to self-sustaining economic growth and high-quality employment for Europe.

A balanced European space industry

Composed of large systems integrators, small and medium industries, equipment and component suppliers, so that the expertise needed to develop space programmes is distributed in a complementary way.

Fair access

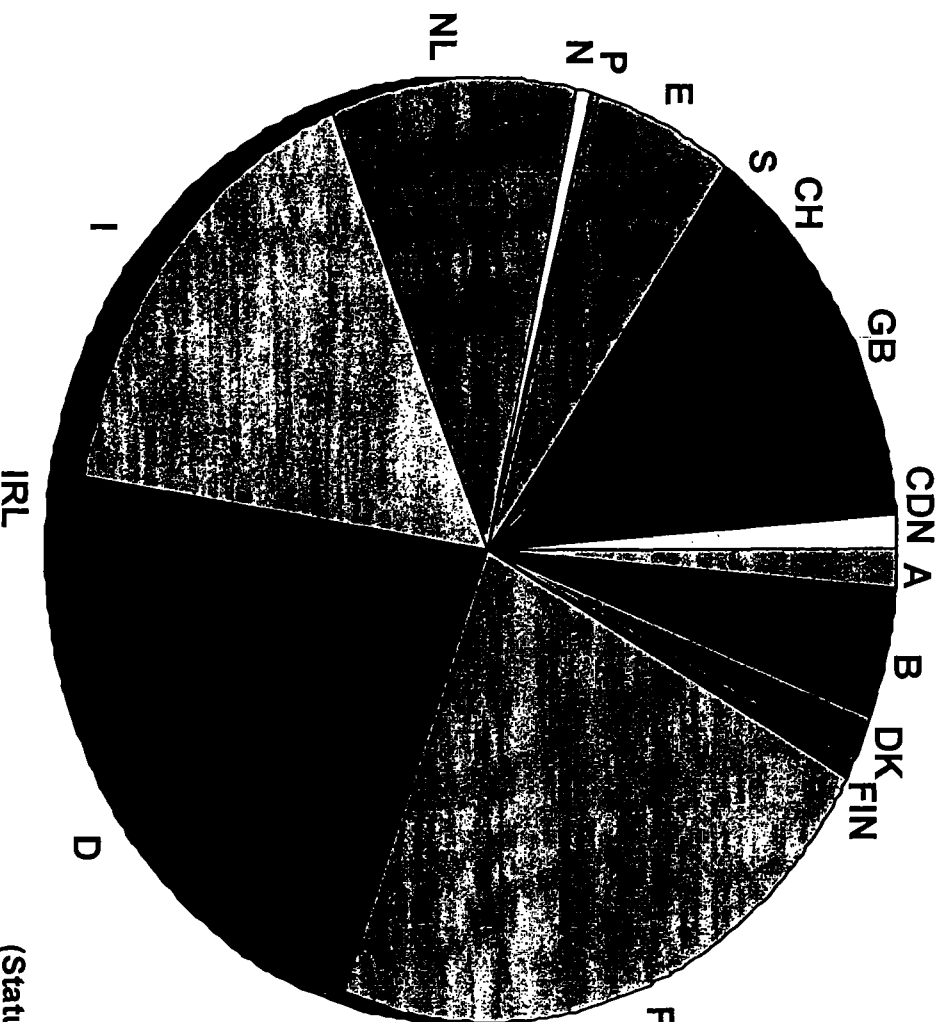
ESA has set up various means to improve the access to ESA activities, such as a code of best practices for the selection of subcontractors and an industrial Ombudsman.



Staff by Nationality

Total international staff in post : 1898

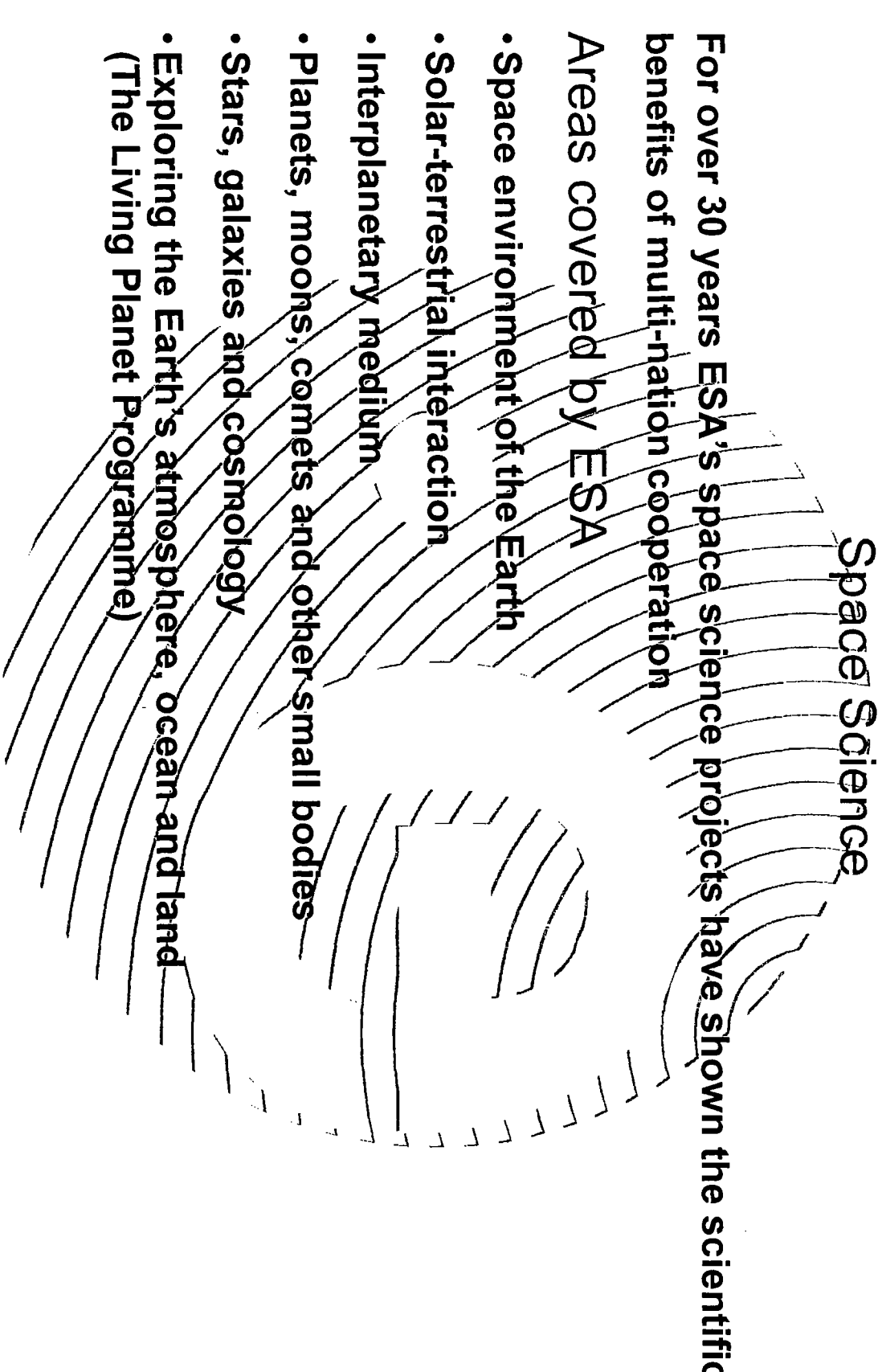
34	Austria
85	Belgium
27	Denmark
15	Finland
446	France
362	Germany
21	Ireland
335	Italy
120	The Netherlands
22	Norway
8	Portugal
136	Spain
45	Sweden
27	Switzerland
191	United Kingdom
1	Greece
24	Canada



(Status: Mar 2004)

STAFF 02 - May 2004





Space Science

For over 30 years ESA's space science projects have shown the scientific benefits of multi-nation cooperation

Areas covered by ESA

- Space environment of the Earth
- Solar-terrestrial interaction
- Interplanetary medium
- Planets, moons, comets and other small bodies
- Stars, galaxies and cosmology
- Exploring the Earth's atmosphere, ocean and land (The Living Planet Programme)



Scientific Satellites The new millennium

Project	Mission	Launch date	Launcher
INTEGRAL *	International gamma-ray astrophysics laboratory	17 Oct 2002	Proton
MARS EXPRESS	Orbiter to Mars with lander "Beagle 2" to reach Mars in late December 2003	2 June 2003	Soyuz-Fregat
SMART 1	Orbiter to the Moon as technology mission	27 Sep 2003	Ariane 5
ROSETTA	Rendez-vous with comet Churyumov-Gerasimenko in November 2014	2 Mar 2004	Ariane 5
VENUS EXPRESS	Orbiter to Venus	Nov 2005	Soyuz-Fregat
HERSCHEL	Far-infrared and submillimetre space observatory	2007	Ariane 5
PLANCK	Cosmic microwave background observer	2007	Ariane 5

*ESA/Russian Space Agency/NASA Project



Rosetta spaceprobe

On the shaker table in the ESA Test Centre in 1999; launched: 2 March 2004



Earth Observation

Satellite technology is vital in the battle to understand, monitor and protect the Earth

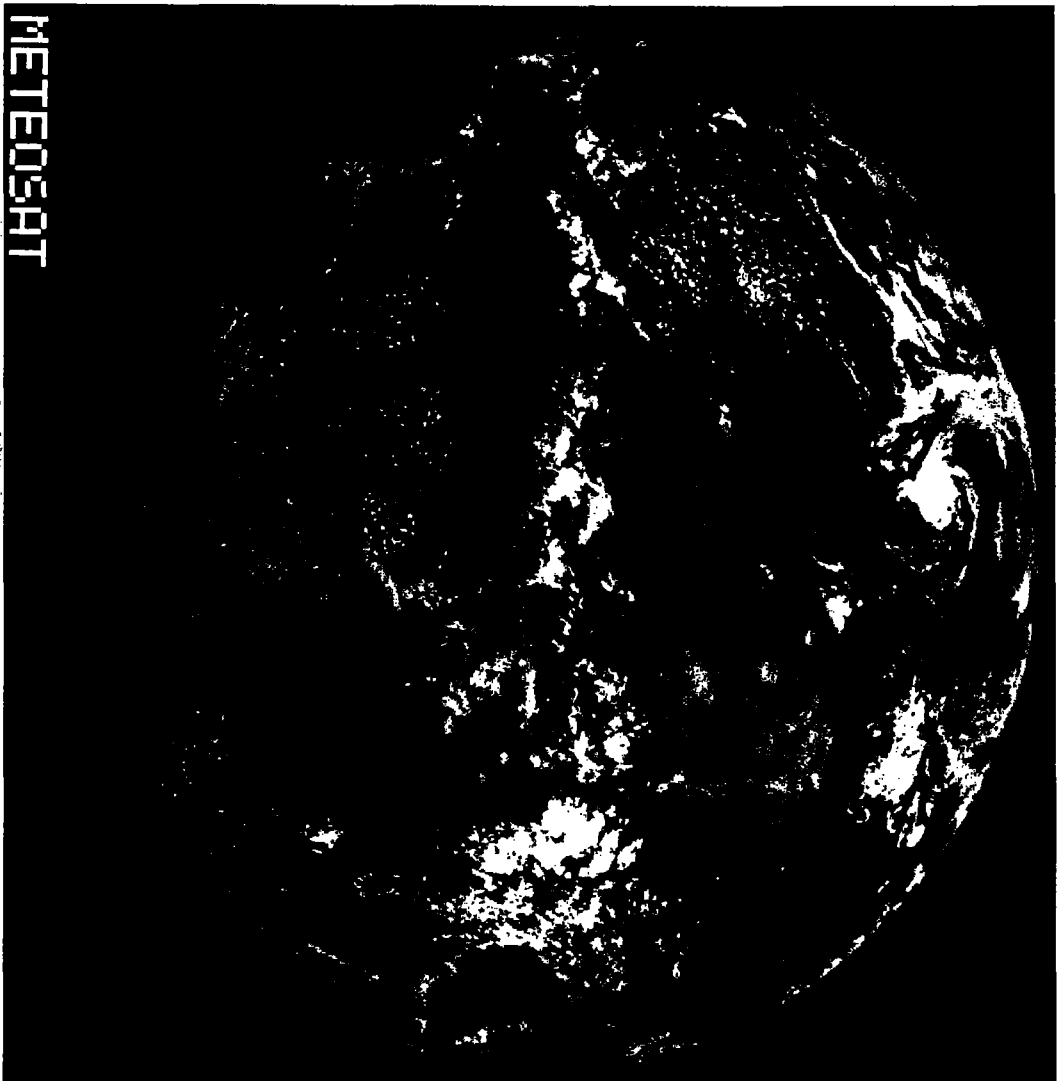
Only from space do we get the total picture

Remote sensing spacecraft and weather satellites, together with advanced data transmission, processing and analysis offer new insights into areas that affect the Earth and its life:

- Remote sensing of land, sea and atmosphere
- Pollution and the environment
- Land use and mapping
- Maritime navigation
- Resource management and crop monitoring
- Weather forecasting and climatology



Image of the Earth
As seen by Meteosat



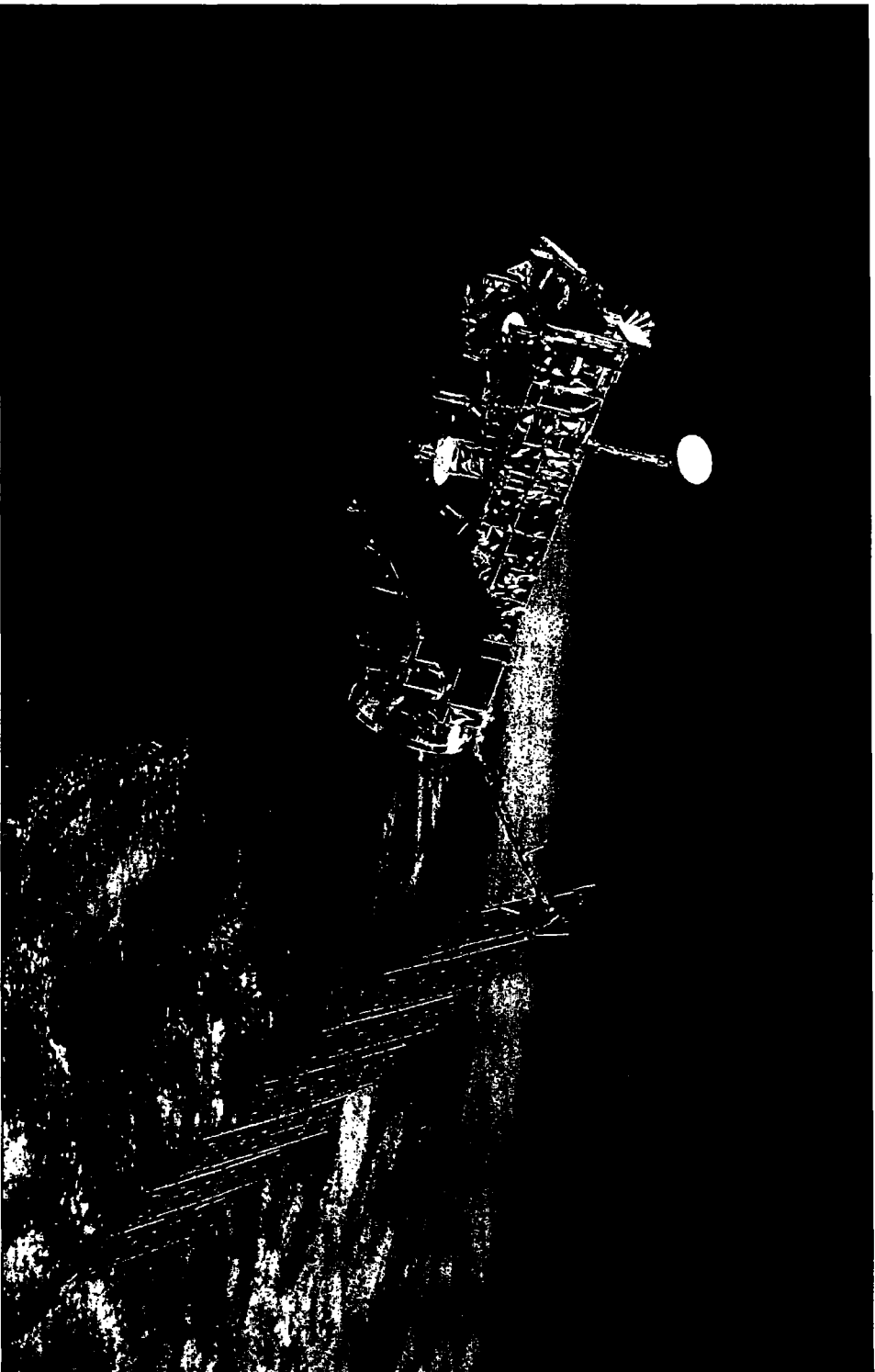
METEOSAT



Amsterdam and Surroundings
ERS-image taken in May 1995

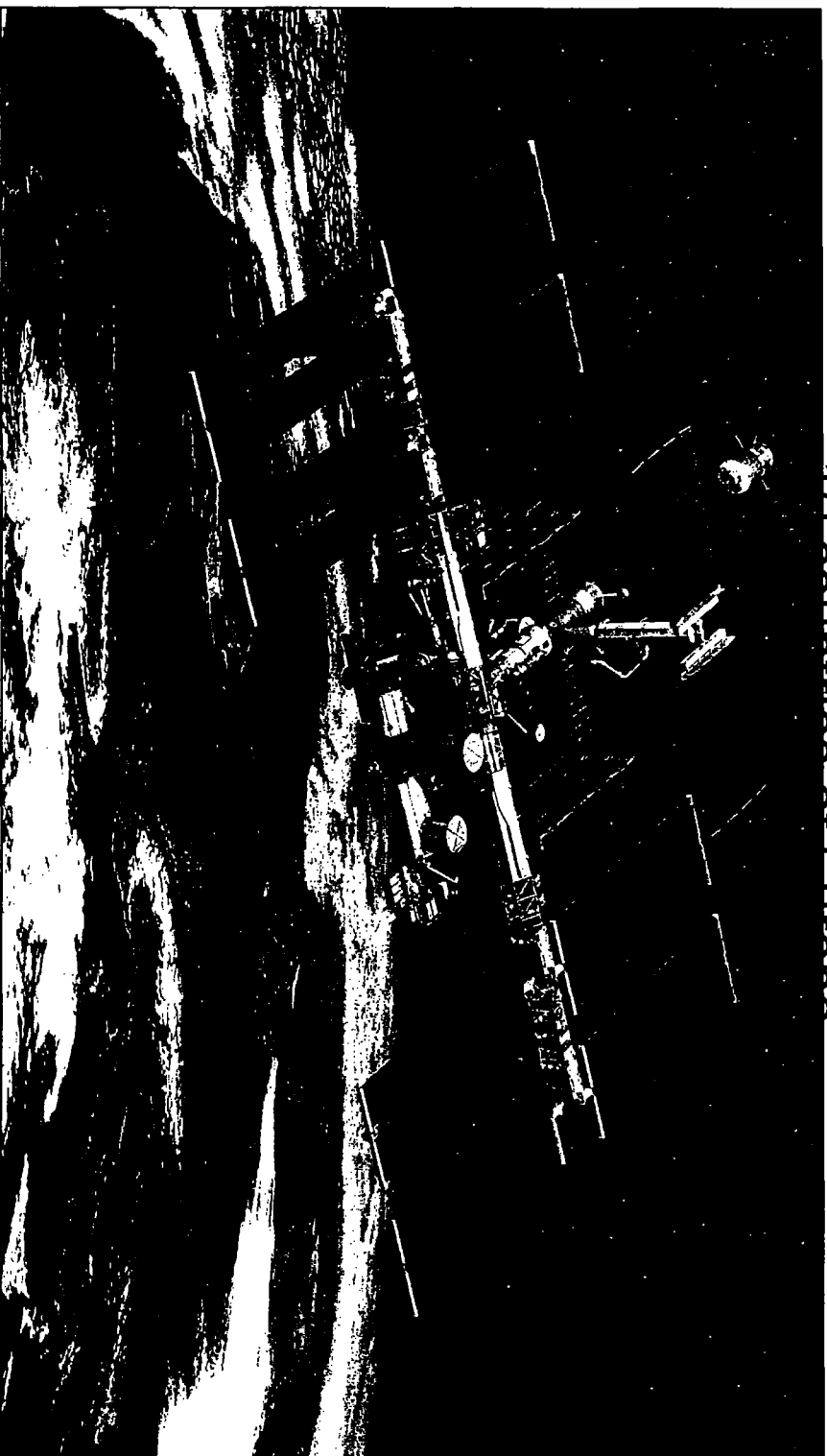


Impression of Envisat
Launched in 2002



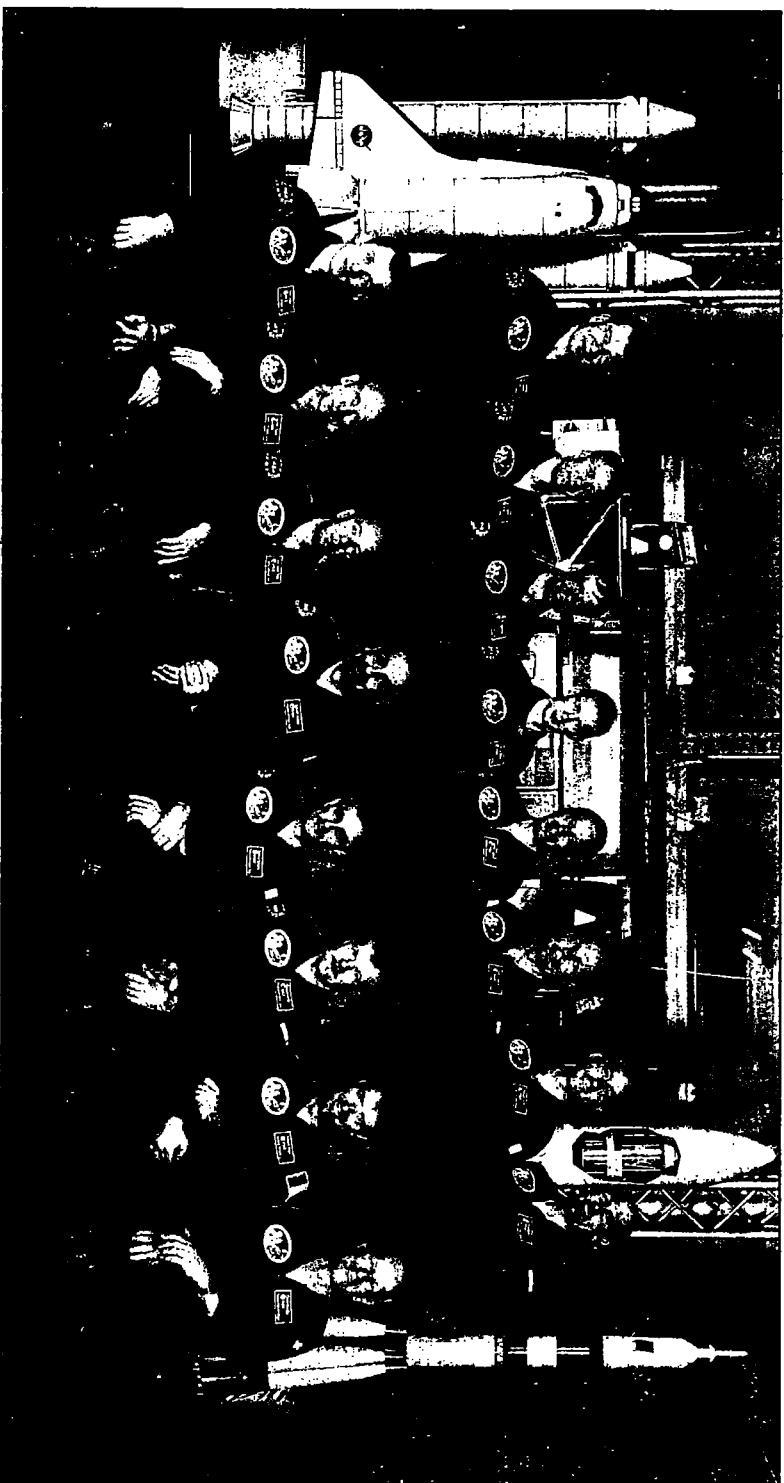
Human Spaceflight Programme The International Space Station

Cooperation programme between the US, Japan, Canada, Russia, Brazil and



The ESA Astronaut Team

The complete group consists of 15 persons



Front row, from left: Pedro Duque, Gerhard Thiele, Jean-François Clervoy, Umberto Guidoni, Léopold Eyharts, Reinhold Ewald, Roberto Vittori, Claude Nicollier.

Top row: Paolo Nespoli, Thomas Reiter, Christer Fuglesang, Frank De Winne, Michel Tognini*, Hans Schlegel, Philippe Perrin, André Kuipers.

* Head of Astronaut Team, non-active



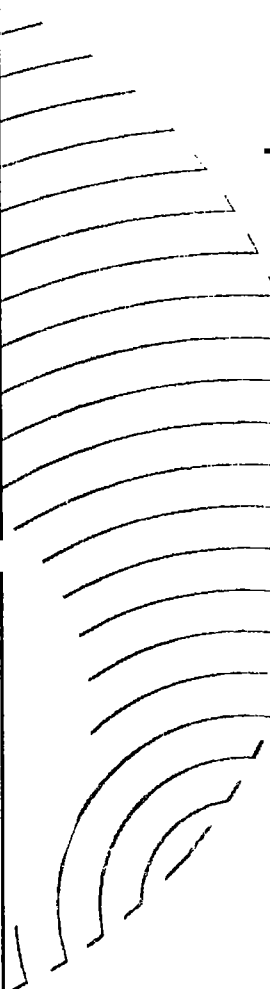
Space Telecommunications and Navigation

General objectives

- Maintain and expand European competence through development of advanced communication and navigation systems and technologies**
- Stimulate innovative use of satellite services through experimentation and demonstration**
- Assist European service providers to develop new services**
- Develop European space communications, broadcasting-satellite navigation and data relay satellite infrastructure**



Space Telecommunications



Services

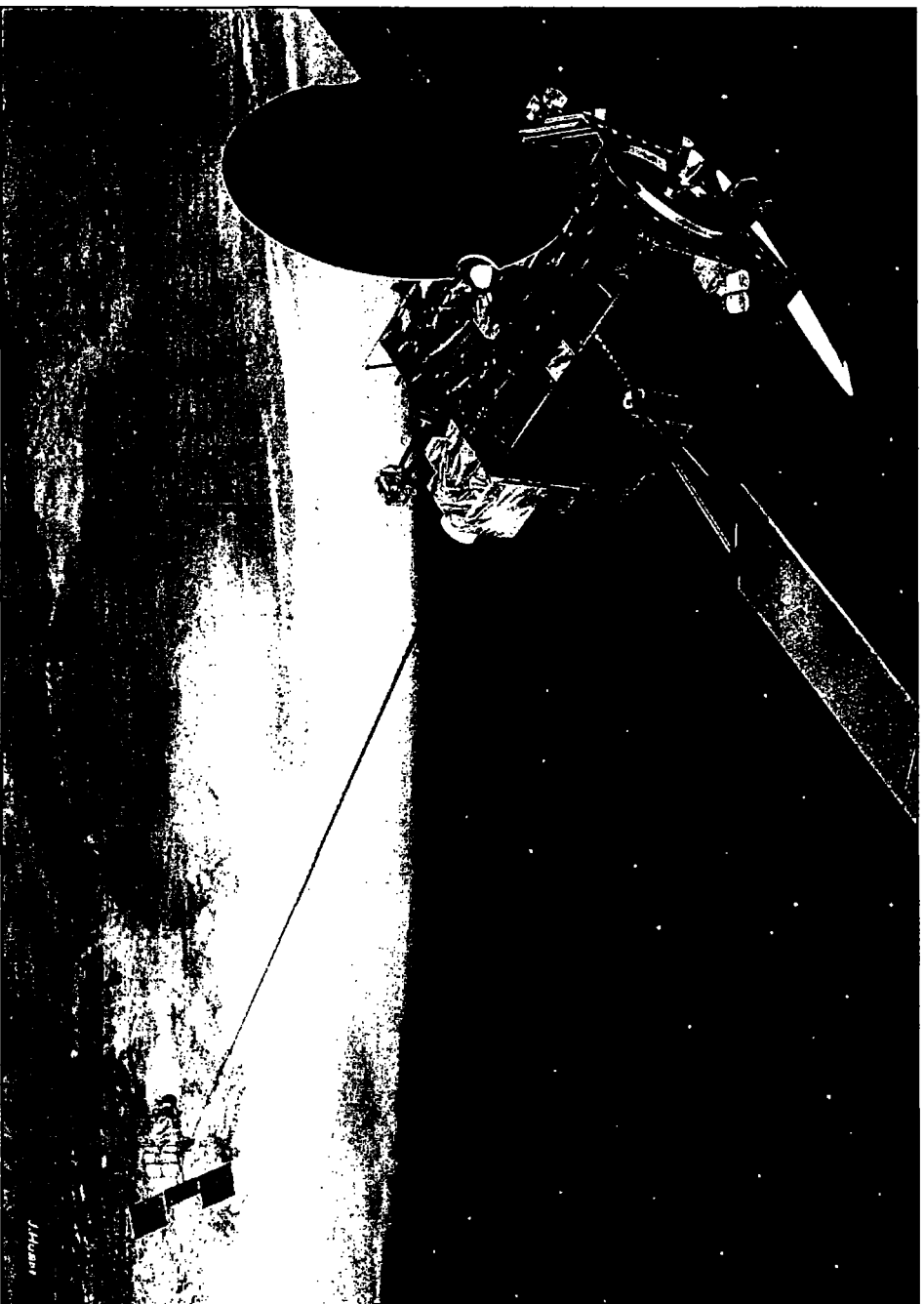
- Telephony and telex
 - Radio and television distribution
 - Data transmission
 - Electronic mail
 - Video conferencing
 - Communications with mobiles
- The European Mobile Services (EMS) payload is operational on Italsat F2, an Italian spacecraft

Spacecraft

- | | Launch date |
|-------------|-------------|
| • OTS | 11.05.1978 |
| • Marecs-A | 20.12.1981 |
| • ECS-1 | 16.06.1983 |
| • ECS-2 | 04.08.1984 |
| • Marecs-B2 | 10.11.1984 |
| • ECS-4 | 19.09.1987 |
| • ECS-5 | 22.07.1988 |
| • Olympus | 12.07.1989 |
| • Artemis | 21.07.2001 |



Artist's Impression of Artemis
Launched: 12 July 2001



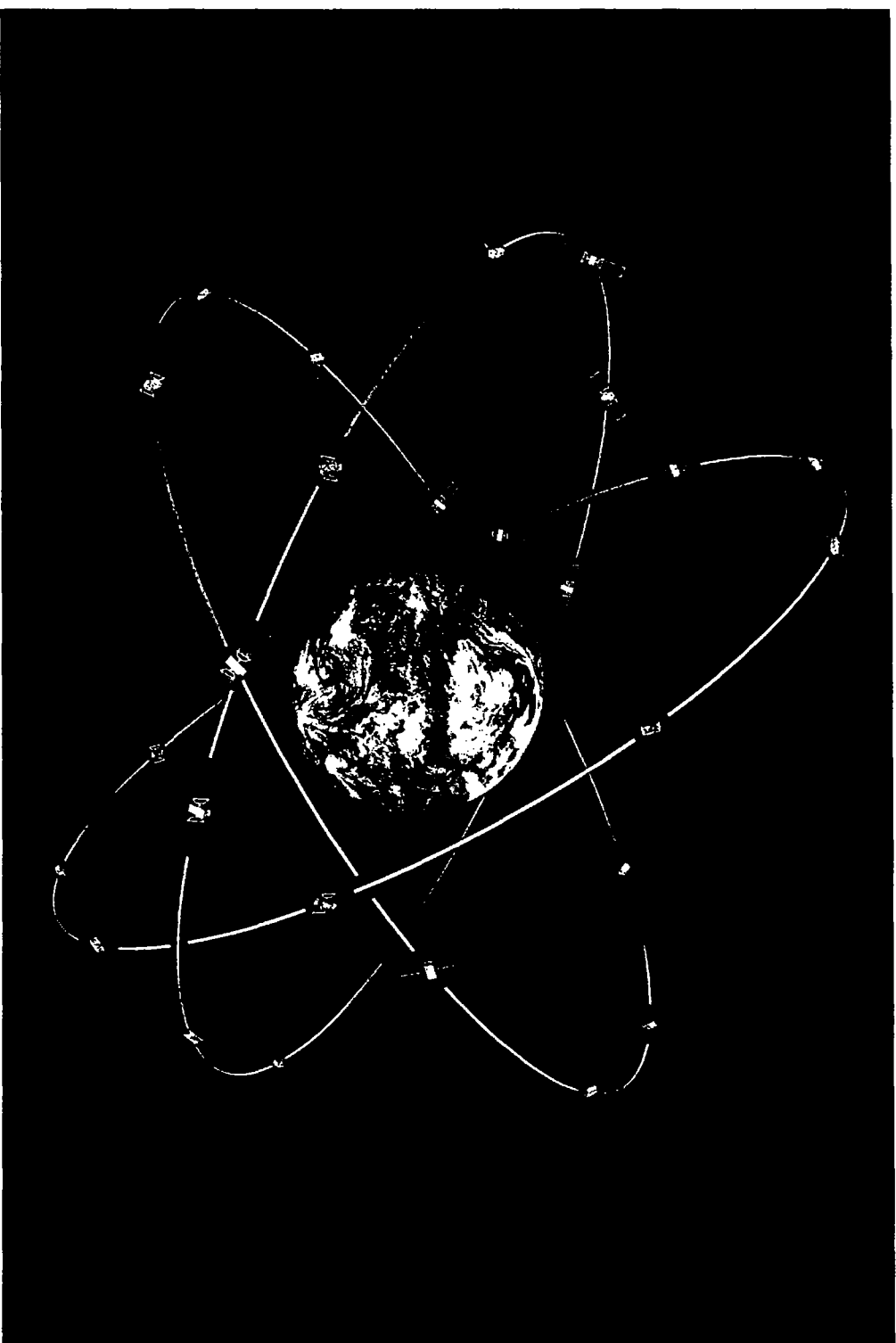
Navigation

The European Initiative Galileo

- Galileo will be a global navigation satellite infrastructure under civil control, to be operational by 2008.
- Galileo will provide position accuracy down to the metre range
- Galileo will offer state of the art positioning and timing accuracy and guaranteed special services to its commercial and institutional customers
- Galileo shall consist of 27 satellites (and 3 reserve spacecraft) in medium Earth orbit at an altitude of 23 616 km, occupying three circular Earth orbits
- Galileo will provide European sovereignty in future traffic management in the air, on the water and on ground
- Galileo is a joint initiative of the European Commission and the European Space Agency



Galileo Space Segment



Launchers

Launching spacecraft is a highly competitive, worldwide industry

Development of launchers started a new era of transportation

It is where the business of space begins:

- Satellites into orbit
 - Men to the Moon
 - Spacecraft to the outer reaches of the solar system
 - Satellite users need reliable and cost-effective launchers
- Europe holds a strong position in the forefront of the launch business:
- Arianespace serves more than 50% of the commercial world market with the Ariane launcher



The Ariane 1-5 Family

The customized versions



1980	Ariane 1	1835 kg*							
1986	Ariane 2	2275 kg*							
1984	Ariane 3	2650 kg*	2 solid boosters						
1988	Ariane 4 (40)	2005 kg*							
1988	Ariane 4 (42R)	2760 kg*	2 solid boosters						
1988	Ariane 4 (44R)	3270 kg*	4 solid boosters						
1988	Ariane 4 (42L)	3360 kg*	2 liquid boosters						
1988	Ariane 4 (44LP)	4050 kg*	2 solid boosters + 2 liquid boosters						
1988	Ariane 4 (44L)	4510 kg*	4 liquid boosters						
1997	Ariane 5	6800 kg*	18000 kg in low orbit						

* Payload mass in geostationary transfer orbit



Vega: Europe's small launcher in 2006

For small and medium-sized spacecraft to polar and low Earth orbit

