ESA and you

41 years of cooperation in space

The European Space Agency (ESA) was set up in 1975. Then, it had 11 Member States. Today it has 22, working together to fulfil the objectives set in its founding Convention.

30 May 1975. 10 pioneering countries sign ESA's 'birth certificate': Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom. Ireland, a signatory in December 1975, is likewise a founder member. At that time the Member States considered that, faced with the two space superpowers -- the United States and the Soviet Union -- no European country going it alone could compete with them. Space exploration requires the pooling of human, technical and financial resources. The establishment of ESA was a global first, which was to bring Europe international recognition and support for its industry.
As the gateway for Europe's access to space, ESA is active in a whole host of different areas. The ESA Council brings together European ministers at regular intervals to broadly map out the programmatic way ahead and make corresponding financial commitments. It convenes meetings of the Member States' representatives four times a year.

The Council has also met in joint session with the Council of the European Union to coordinate European space policy. The Galileo global navigation satellite system and the Copernicus Earth observation programme are both being delivered thanks to that coordination.

22 States, one Agency

In 2016 ESA has 22 Member States: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, the United Kingdom, the Tchech Republic. Seven of them have their own national space agency: Austria (FFG), France (CNES), Germany (DLR), Italy (ASI), Poland (POLSA), Romania (ROSA), the United Kingdom (UK Space Agency). For the remaining 15, some members have a dedicated space department at ministerial level or ESA provides them access to space. ESA has signed cooperation agreements with 7 other EU states: Bulgaria, Cyprus, Latvia, Lithuania, Malta, Slovakia, Slovenia. An association agreement was signed with the latter in 2016. Discussions are ongoing with Croatia. A cooperation agreement links ESA and Canada since 1979.

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12 euros per year per citizen: to do what?

12 euros per year per Member State citizen: the ESA budget amounts to 5.25 billion euros in 2016. That is nearly nine times less than the US budget for space.

This budget is two-thirds (71.2%) funded by the Member States. They make «Mandatory» contributions to the Science Programme and to ESA's running costs, proportional to national gross domestic product (GDP). The other programmes -- Human Spaceflight, Launchers, Telecommunications, etc. -- are «Optional», funded à la carte by countries wishing to participate. The remaining 28.8% of the ESA budget is funded by Institutional Partners like the intergovernmental organisation Eumetsat and the European Union. On the expenditure side, about 85% of the budget is allocated to European industry. The remaining 15% represents ESA's running costs, including its installations and staff expenditure. The «fair geographical return» principle applies: ESA expenditure in each Member State is pro rata to the financial contributions made by each of the «22», whether for research or spacecraft development and manufacture.

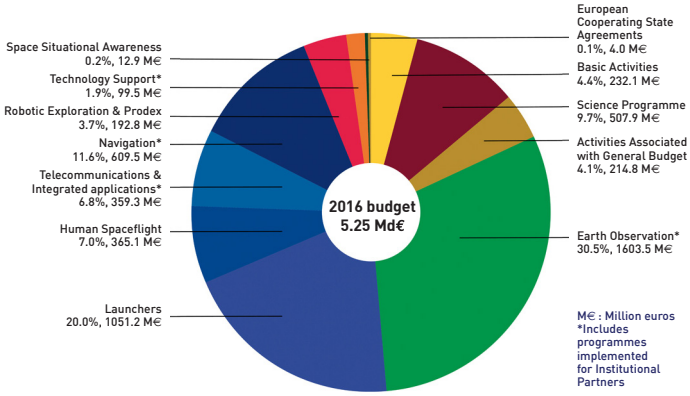
First, Earth Observation

Among ESA's priorities, Earth Observation takes up 30.5% of budget funds. This strategic field covers the development and putting into orbit of satellites under the European Copernicus programme, as well as data collection and processing operations. With 20% of the ESA budget, Launchers also occupy a significant place in European space strategy, as they deliver autonomous access to space. This heading covers the development and operations of Europe's family of launchers and their dedicated infrastructures at Europe's Spaceport in Kourou, French Guiana. In third place, Navigation takes up 11.6% of ESA's budget: this concerns operations for the development and launch of the in-orbit constellation of navigation satellites under the Galileo and EGNOS programmes.
Next come the Science Programme (9.7% of budget); mission training and support for ESA Astronauts (7%); Telecommunications and Integrated Applications (6.8%); Robotic Exploration of space and development of science experiments (3.7%); Technology Support, including setting up business incubation centres (1.9%). Lastly, Space Situational Awareness is allocated 0.2%. The Agency's running costs and other costs account for 8.6% of expenditure.

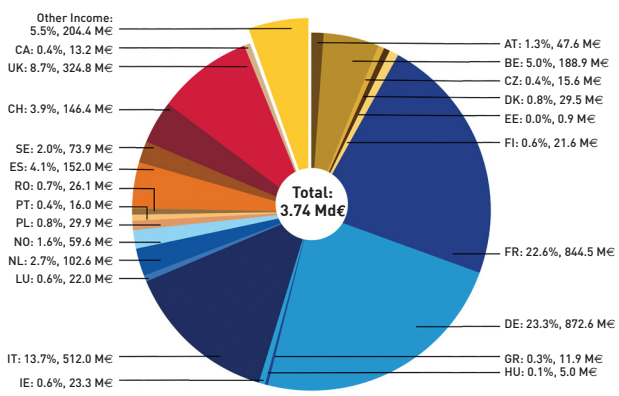
Return on investment

The ESA Charter of Values stipulates: «Our programmes are funded by the Member States' governments and, through them, millions of European taxpayers. Competence is therefore vital, at all levels, to ensure that those programmes are carried out to the highest standards, meeting the needs of European society and its governments, and that funding

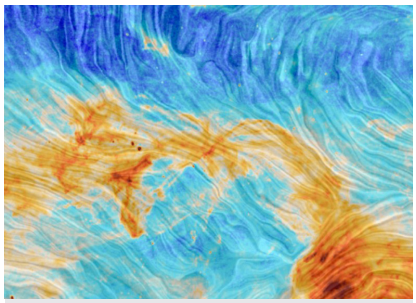
2016 ESA budget breakdown



Financing share from member states (programmes for other institutional partners excluded)



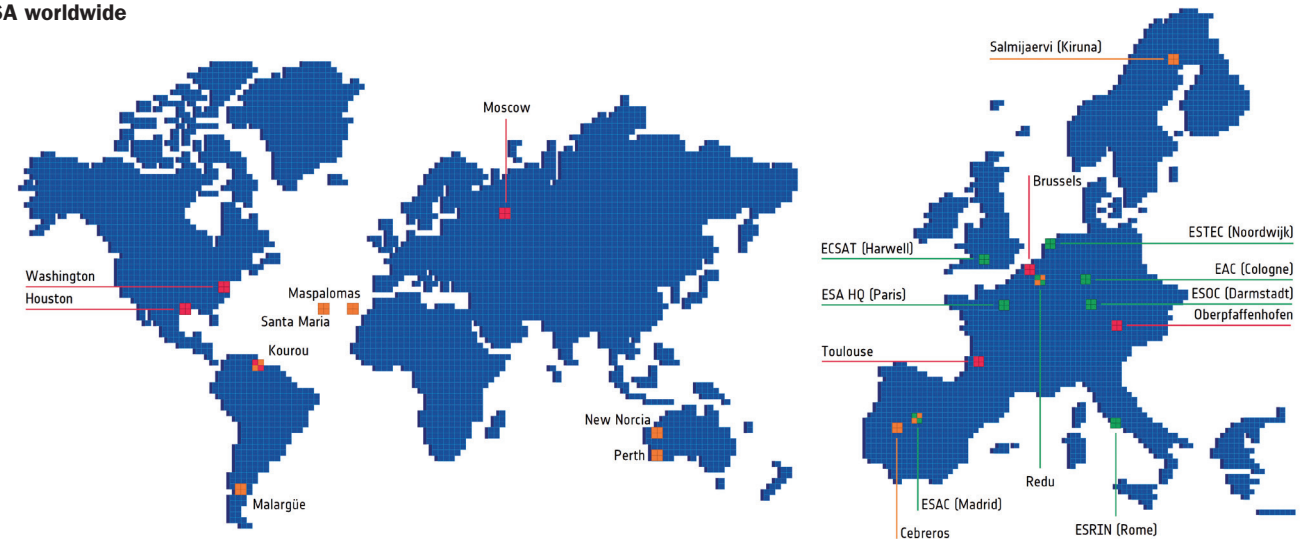
received from the Member States is used responsibly and to good purpose.»
There exist return-on-investment indicators for Member States' contributions. In 2015 the European Association of Research and Technology Organisations (EARTO) accordingly published a report calculating that for every euro invested by a state in an organisation like ESA, it gets four euros back via the various tax circuits. A UK study in 2015 of the benefits of UK membership of ESA confirmed this 1:4 ratio, which is boosted by economic «spin-offs» worth 6 to 12 times the amount of the original investment.



From Rosetta to Planck, via Galileo

Over 40 years of ESA history cannot be recounted in a few lines. But as a brief recap, the Agency has launched 14 iconic missions to the solar system, 9 of which are still under way. Notably Rosetta and Gaia. On these missions, ESA has launched 11 orbiters and 3 space telescopes: Planck, Herschel and Gaia. In all, around 250 launches have been carried out from Europe's Spaceport in Kourou, French Guiana: most of them Ariane 1 to 5 launches, plus Soyuz and Vega too. With Ariane 6 due soon. For the years ahead, ESA is planning an ambitious and wide-ranging set of programmes.

ESA worldwide



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"Returning to the Moon: a stepping-stone to Mars"

For Jan Woerner, ESA's Director General, space still has much to offer humanity.

Jan Woerner has been the Director General of ESA since 1 July 2015. An engineer by training, from 2007 to 2015 he chaired the Executive Board of the DLR (Deutsches Zentrum für Luft-und Raumfahrt), the German Aerospace Center.

IS IT STILL POSSIBLE FOR SPACE PROGRAMMES TO CONTRIBUTE ANYTHING NEW TO SOCIETY? HAVE WE NOT ALREADY REACHED THE LIMITS OF WHAT SPACE CAN OFFER HUMANITY?
The benefits of space activities and their importance to society at large have considerably increased as the decades have gone by. Today we are the beneficiaries of this trend, for example with more precise weather-forecasting, whatever the place or time. Space also brings us reliable tools and data that help us to perceive planetary-scale challenges. Satellites help track the spread of epidemics like Ebola, consequently making possible rapid alert and response. Satellites are also a means of providing access to education in remote areas, notably thanks to e-learning. These are just three examples, but the potential of space applications to contribute to the development of humanity at large and respond to the challenges of modern society extends far beyond that.

THE ISSUE OF SECURITY IS ONE MATTER OF CONCERN FOR EUROPE'S CITIZENS. WHAT IS THE STATE OF PLAY AND THE AIM OF THE SPACE PROGRAMMES THAT ARE ADDRESSING THIS CONCERN TOO?
In Europe most space programmes relating to security are being undertaken at national level. But ESA and the EU are also jointly turning towards programmes having a security dimension, like Galileo, Copernicus and soon probably also SSA/SST and GovSatcom.
At European level ESA is responding to demands for increased security, by and for space systems. Citizens expect their governments to guarantee their protection and cyber security, and space programmes are playing a key role in responding to this demand of society.

ARE THERE PLANS TO RETURN TO THE MOON OVER THE COMING YEARS?
The Moon is an extremely interesting subject for scientific exploration. Since humans first landed on the Moon in 1969, the various space-faring nations have regularly sent robotic missions there. For fifteen years now, we have had a continuous human presence in space in low Earth orbit: the crew on board the International Space Station. The time has come to move on to the next stage. The Moon being a stepping-stone for the exploration of Mars, there is every likelihood that further lunar missions, both robotic and crewed, will be devised. Further activities carried out on what is the heavenly body closest to Earth will surely inspire and motivate forthcoming generations to engage with technical and science subjects.

IN THE SPACE SECTOR OF THE FUTURE, WHAT ROLE WILL BE PLAYED BY THE PRIVATE-SECTOR OUTFITS WHICH HAVE RECENTLY GOT INVOLVED? WHAT ARE THE RISKS AND THE ADVANTAGES OF SUCH A DEVELOPMENT FOR SOCIETY AT LARGE?
It is expected that private-sector firms will play a growing role, particularly in the exploitation of profitable space activities, as is the case for example with telecoms and certain R&D activities. Such activities traditionally used to be carried out by space agencies funded from the public purse. But they are increasingly becoming an attractive proposition to private finance, especially now that investment in developing space technologies seems less risky. This transfer of responsibility offers an opportunity for state agencies to concentrate on specific aspects of technology R&D, such as advanced propulsion systems and materials. However, if the management of space capacity and the benefits it delivers were to leave the state sector, that could lead to less sustainable and less ethical utilisation of space resources and increased inequality within society.

IN WHAT AREAS IS ESA UNDERTAKING COOPERATION WITH INTERNATIONAL PARTNERS?
International relations serve in the first instance to provide support for the Agency's programmes. They can also serve to reinforce Europe's position as a global actor, to promote European values via focused projects in the areas of Earth science, environmental protection, sustainable development, education, access to knowledge and data as well as support for developing countries.

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