

Socio-economic impact assessments of ESA programmes

Charlotte Mathieu

Head of the Industrial Policy and Economic Analysis Section

25 June 2019

FCC Week, Brussels

THE EUROPEAN SPACE AGENCY



ESA facts and figures



- Over 50 years of experience
- 22 Member States
- Eight sites/facilities in Europe, about 2300 staff
- 5.6 billion euro budget (2018)
- Over 80 satellites designed, tested and operated in flight



Purpose of ESA



“To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications.”

Article 2 of ESA
Convention



Member States

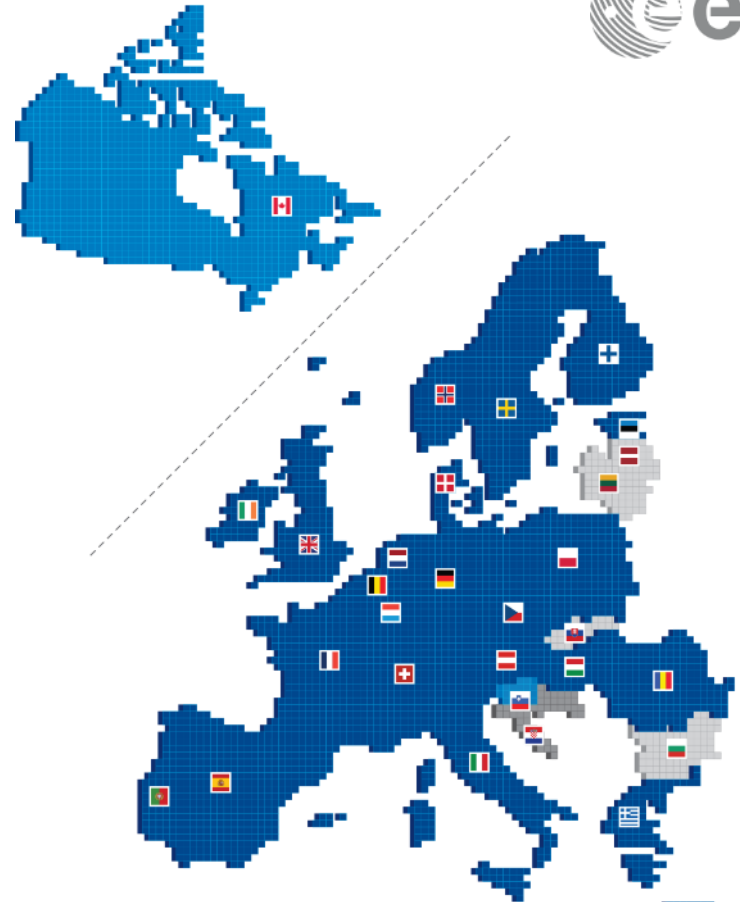
ESA has **22 Member States**:

20 states of the EU (AT, BE, CZ, DE, DK, EE, ES, FI, FR, IT, GR, HU, IE, LU, NL, PT, PL, RO, SE, UK) plus Norway and Switzerland.

7 other EU states have Cooperation Agreements with ESA: Bulgaria, Croatia, Cyprus, Latvia, Lithuania, Malta and Slovakia.

Slovenia is an Associate Member.

Canada takes part in some programmes under a long-standing Cooperation Agreement.

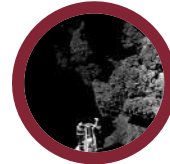


Activities



ESA is one of the few space agencies in the world to combine **responsibility** in nearly all areas of space activity.

* Space science is a **Mandatory** programme, all Member States contribute to it according to GDP. All other programmes are **Optional**, funded 'a la carte' by Participating States.



space science



human spaceflight



exploration



earth observation



space transportation



navigation



operations



technology



telecommunications



ESA budget for 2018: by domain



Navigation*
14.0%, 782.6 M€

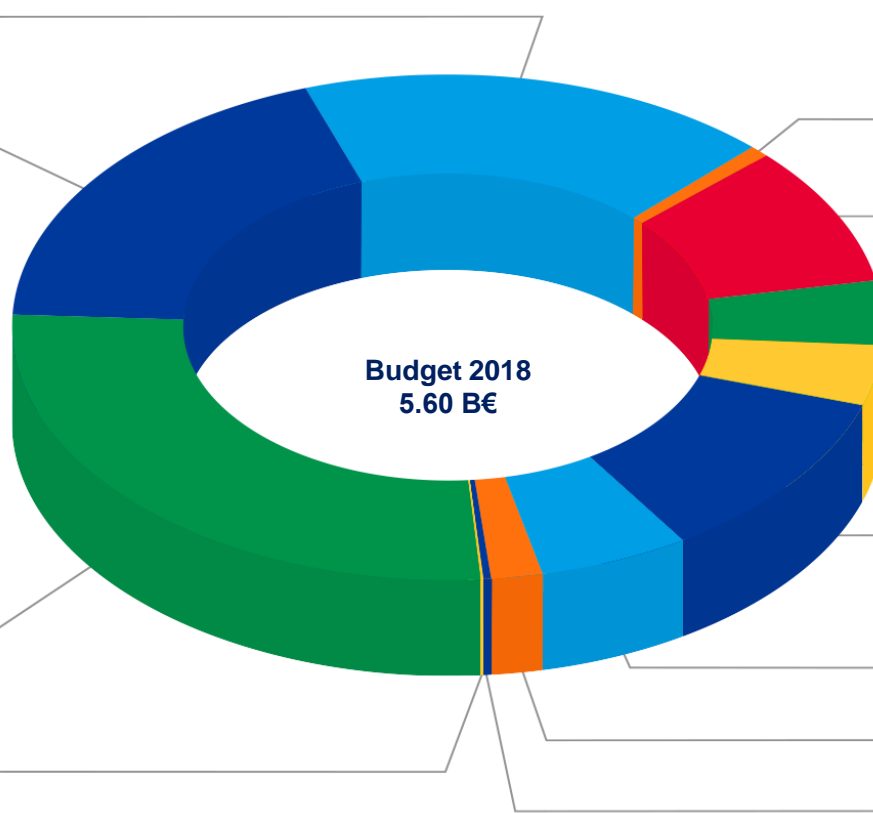
Space Transportation*
19.8%, 1,110.7 M€

B€: Billion Euro
M€: Million Euro

***includes programmes implemented for other institutional partners**

Earth Observation*
26.0%, 1,455.8 M€

European Cooperating States Agreements
0.1%, 6.9 M€



Prodex
1.2%, 65.4 M€

Scientific Programme
9.2%, 518.2 M€

Basic Activities
4.2%, 237.2 M€

Associated with General Budget
3.9%, 218.4 M€

Human Spaceflight, Micro. And Expl.
13.1%, 731.9 M€

Telecom & Integrated Applications*
4.9%, 275.0 M€

Technology Support*
3.2%, 177.9 M€

Space Situational Awareness
0.4%, 22.9 M€

Budget 2018
5.60 B€





About 85% of ESA's budget is spent on contracts with European industry.

ESA's industrial policy:

- Ensures that Member States get a fair return on their investment;
- Improves competitiveness of European industry;
- Maintains and develops space technology;
- Exploits the advantages of free competitive bidding, except where incompatible with objectives of the industrial policy.

- The European space industry sustains around 40 000 jobs
- Europe is successful in the commercial arena, with a market share of telecom and launch services higher than the fraction of Europe's public spending worldwide
- European scientific communities are world-class and attract international cooperation
- Research and innovation centres are recognised worldwide
- European space operators (Arianespace, Eumetsat, Eutelsat, SES Global, etc.) are the most successful in the world



The Council is the governing body of ESA.

Each Member State is represented on the Council and has one vote.

Every three years, Council meets at ministerial level ('Ministerial Council') to take key decisions on new and continuing programmes and financial commitment.



Socio-economic impact assessment of ESA programmes

Substantial impacts of investments in space



- Directly or indirectly, space-related activities affect (nearly) all countries, industries, firms and individuals.
- Space research has brought the world new materials, new technologies and new ways of communication.
- Applications are used in a wide range across the economy and society in general: in consumer products, in manufacturing industries, in the development and delivery of professional services, in government services, in intelligence and in defence.
- Space programmes take place on the edge of knowledge. It is often unclear what the outcomes will be, and how firms will apply these possibilities.
- Knowledge generation and sharing increase the pace of innovation and decrease production costs.



Growing interest for socio-economic impact assessments



- Innovation and efficacy of public policy in research are called upon to support growth in Europe and to sustain employment and entrepreneurial capacities.
- The strategic dimension of space is no longer enough to claim unconditioned support of public funding.
- Governments need evidence on these socio-economic impacts and that the investments in space create jobs and build the competitive European economy of the future, while providing strategic tools to implement sovereign policies.



Assessment of the socio-economic impact of ESA programmes



*To inform the decision-making process on the
impacts of programmes on the economy and society*

Growing importance of socio-economic impact assessments of ESA programmes

- Unprecedented effort at ESA for Space19+
- 10 independent, external studies
- Raised awareness and increased expertise

Since the last Council at Ministerial level in 2016:

- From *ex post* to *ex ante* assessments
- From large infrastructure programmes to programmes of different natures and sizes

Socio-economic impact assessment of ESA programmes for Space19+

Socio-economic impact assessments are being conducted on most ESA programmes.

- Science and Exploration Pillar
 - Scientific Programme
 - European Exploration Envelope Programme (E3P)



- Safety and Security Pillar
 - Secure Satcom
 - Clean Space
 - Planetary Defence



Socio-economic impact assessment of ESA programmes for Space19+

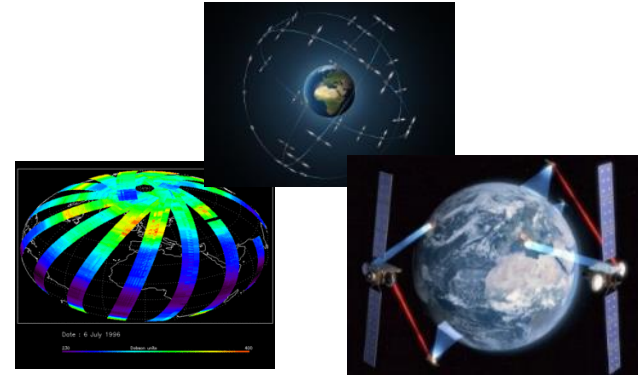


- Applications Pillar

- Telecommunications programmes: PPPs, Business Applications and Core Competitiveness
- Earth Observation programmes: FutureEO, Customised EO and Operational EO

- Enabling and Support Pillar

- Launchers: Ariane 6, Vega C, micro-launchers
- Technology Programmes : GSTP, TRP and ITI
- Ground systems engineering and operations and Innovation in Operations



Methodology

- Methodology consolidated since 2012, in line with recognised standards
- Harmonised approach, tailored to the programmes
- Independent results for each study
- Conservative assumptions
- Direct comparison between all the results possible to a limited extent

- Definition of the **impacts and indicators** tailored to the programme
- Definition of the **assessment methodology** of each indicator tailored to the programme (qualitative and quantitative)
- Analysis of **sources of data** and relevant **stakeholders** (incl. scientific community, Member States, ESA, industry, research organisations and society)

Types of impacts

Economic

Scientific

Technological



Societal

Strategic

Example - Scientific impact of ESA programmes

- Production volume and quality
Number of refereed papers, number of citations, etc.
- Interest from scientific community
Number of unique users accessing the scientific data, volume of data downloaded, etc.
- Knowledge transfer
Knowledge cross-fertilisation, industrial cross-fertilisation, etc.
- International cooperation of scientists
International co-authoring, etc.

Example - Strategic impact of ESA programmes



- International cooperation
Scientific RoI, etc.
- Industry competitiveness
Number of patents, etc.
- European non-dependency
Level of criticality of the knowledge acquired



Example – Societal impact of ESA programmes



- Public inspiration
Active and passive users inspiration, etc.
- Education
Number of PhD theses, etc.
- Environment and sustainability
Contribution to space weather programme, etc.



Example – Economic impact of ESA programmes

- GVA / GDP impact
Economic multiplier, jobs supported, etc.
- Jobs attractiveness
Number of applications received, etc.
- Innovation and technology transfer
Spin-offs, spill-overs, etc.

Example of economic impact - Future EO (Earth observation envelope programme)



- Every € spent in ESA Future EO programme → creation of 3.8 € in ESA Member States economy over 2013 – 2030 :
 - 1.9 € in GDP increase
 - 1.9 € in innovation spill-overs (2.9 for SMEs)
- More than 60% of the investment recovered in tax revenues
- For each new job in the space sector
→ about 1.3 additional jobs in the wider economy



ESA Space Economy website



The screenshot shows the ESA industry portal website. The top navigation bar includes links for 'EUROPEAN SPACE AGENCY', 'ABOUT US', 'OUR ACTIVITIES', 'CAREERS AT ESA', 'FOR MEDIA', 'FOR EDUCATORS', and 'FOR KIDS'. The main header features the 'industry portal' title and the ESA logo. Below the header, there are navigation tabs for 'ESA', 'BUSINESS WITH ESA', 'BUSINESS OPPORTUNITIES', 'HOW TO DO', 'SME', 'GSEF', and 'ESA GRAND CHALLENGE'. The main content area displays a case study titled 'CASE STUDY SHOWS ECONOMIC VALUE OF COPERNICUS EARTH OBSERVATION DATA'. The case study includes a date '4 September 2018', a brief description of the economic benefits of Copernicus data, and a photograph of a farm. The text describes the Copernicus Earth observation programme and its role in providing data for various services. It also mentions that benefits are expected to increase as more Sentinels become operational and that a series of case studies have been conducted to assess economic benefits. The case study is part of a series of reports on the benefits of Sentinel data for various applications, including winter navigation, forest management, and pipeline infrastructure monitoring. The specific case study mentioned is 'Flyer: Farm management in Denmark'.

www.esa.int/About_Us/Business_with_ESA/GSEF



Thank you for your attention
Questions?