Horizon 2020 Work Programme for Research & Innovation 2018-2020

ESF-ESSC, Geneva, 23 May 2018
SUMMARY

1. Horizon 2020
2. Horizon 2020 focus areas
3. Horizon 2020 rules for participation
4. European Union Space Programmes
5. Space research in Horizon 2020
7. Space in EIC pilot
8. Space in ARF - ISEP
10. Next steps: beyond Horizon 2020
1 HORIZON 2020

European Union programme for research and innovation for 2014-2020
WHAT IS NEW IN HORIZON 2020?

• **A single programme** bringing together three separate programmes/initiatives*

• **Coupling research to innovation** – from research to retail, all forms of innovation

• **Focus on societal challenges** facing EU society, e.g. health, lean energy and transport

• **Simplified access**, for all companies, universities, institutes in all EU countries and beyond

* The 7th Research Framework Programme (FP7), innovation aspects of Competitiveness and Innovation Framework Programme (CIP), EU contribution to the European Institute of Innovation and Technology (EIT)
HORIZON 2020 BUDGET (IN CURRENT PRICES)
€ 79 billion from 2014 to 2020

- **Industrial Leadership**: EUR 17.0 billion
- **Societal Challenges**: EUR 29.7 billion
- **European Institute of Innovation and Technology**: EUR 2.7 billion
- **Other**: EUR 3.2 billion
- **Euratom (2014-2018)**: EUR 1.6 billion

2013 figures
# Horizon 2020 Priorities

### Priority 1. Excellent science
- European Research Council (ERC)
- Future and Emerging Technologies (FET)
- Marie Skłodowska-Curie Actions
- Research infrastructures

### Priority 2. Industrial leadership
- Leadership in enabling and industrial technologies (LEIT)
  - Information and Communication Technologies (ICT)
  - Nanotechnologies
  - Biotechnology
  - Advanced manufacturing and Processing
  - Space
- Access to risk finance
- Innovation in SMEs

### Priority 3. Societal challenges
- SC1 - Health, demographic change and well-being
- SC2 - Food security, sustainable agriculture and forestry, Marine, Maritime and Inland water research, and Bioeconomy
- SC3 - Secure, clean and efficient energy
- SC4 - Smart, green and integrated transport
- SC5 - Climate action, Environment, Resource efficiency and Raw materials
- SC6 - Europe in a changing world – Inclusive, Innovative and Reflective societies
- SC7 - Secure societies – Protecting freedom and Security of Europe and its citizens
2 HORIZON 2020 FOCUS AREAS
• **BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE**
  • Contributes to the goals of the *Paris Agreement*
  • Total indicative budget (2018-2020): **EUR 3343 MILLION**

• **BOOSTING THE EFFECTIVENESS OF THE SECURITY UNION**
  • Contributes to developing the EU as a Security Union
  • Total indicative budget (2018-2020): **EUR 1000 MILLION**

• **DIGITISING AND TRANSFORMING EUROPEAN INDUSTRY AND SERVICES**
  • Addresses the priorities of the Digital Single Market Strategy of the EU and helps seizing the opportunities offered by digital technologies
  • Total indicative budget (2018-2020): **EUR 1689 MILLION**

• **CONNECTING ECONOMIC AND ENVIRONMENTAL GAINS – THE CIRCULAR ECONOMY**
  • Directly support the circular economy policy
  • Total indicative budget (2018-2020): **EUR 940 MILLION**
3 HORIZON 2020 RULES FOR PARTICIPATION
**Minimum conditions**
- Standard collaborative action
  At least three legal entities each established in a different Member State or an Associated Country
- ERC, SME instrument, programme co-fund, coordination and support, training and mobility action
  One legal entity established in a Member State or in an Associated Country

**Additional Conditions**
- In the work programme

**International participation**
- Open for all legal entities established in third countries and for international organisations
- Restrictions only possible if introduced in the work programme (for reciprocity reasons; for security reasons)
4 EUROPEAN UNION SPACE PROGRAMMES
Space Programmes

Multiannual Financial Framework 2014-2020

- HORIZON 2020: ~1,479 M€
- Copernicus: ~4,291 M€
- Galileo: ~7,071 M€
- EGNOS: ~12,841 M€
COPERNICUS

- The most advanced Earth Observation system in the world, created to answer big societal challenges (e.g. climate change, natural disasters, development)

- 3 components: space, services, in-situ

- 7 Sentinels currently in orbit; 6 satellites under development for timeframe 2025

- All 6 services up and running operationally, serving a growing community of users world-wide

- More than 50,000 users registered; more than 5 million products and more than 6 Petabytes downloaded

- Launch of Data and Information Access Services (DIAS)
<table>
<thead>
<tr>
<th><strong>THE SENTINELS</strong></th>
<th><strong>Sentinel Mission and Status</strong></th>
<th><strong>Key Features</strong></th>
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<tbody>
<tr>
<td><strong>Space Component</strong></td>
<td><strong>SENTINEL-1:</strong> 9-40 m resolution, 6-day revisit at equator</td>
<td>Polar-orbiting, all-weather, day-and-night radar imaging</td>
</tr>
<tr>
<td></td>
<td>S-1A in Orbit S-1B in Orbit</td>
<td><strong>SENTINEL-2:</strong> 10-60 m resolution, 5-day revisit time</td>
</tr>
<tr>
<td></td>
<td>S-2A in Orbit S-2B in Orbit</td>
<td><strong>SENTINEL-3:</strong> 300-1200 m resolution, &lt;2-day revisit</td>
</tr>
<tr>
<td></td>
<td>S-3A in Orbit S-3B in Orbit</td>
<td><strong>SENTINEL-4:</strong> 8 km resolution, 60 min revisit time</td>
</tr>
<tr>
<td></td>
<td>1st Launch Q4 2022</td>
<td><strong>SENTINEL-5p:</strong> 7-68 km resolution, 1-day revisit</td>
</tr>
<tr>
<td></td>
<td>In orbit</td>
<td><strong>SENTINEL-5:</strong> 7.5-50 km resolution, 1-day revisit</td>
</tr>
<tr>
<td></td>
<td>1st Launch in 2021</td>
<td><strong>SENTINEL-6:</strong> 10-day revisit time</td>
</tr>
<tr>
<td></td>
<td>July 2020</td>
<td><strong>SENTINEL-3A</strong> in Orbit S-3B in Orbit</td>
</tr>
</tbody>
</table>
Monitoring the State of the Earth System Environment...

... Six cross-cutting Thematic Services
EGNOS
- Augments the GPS signal over Europe, EU owned and fully operational since 2011
- 2 main components: (limited) space segment with payloads on geostationary satellites, a ground segment with more than 40 stations all over Europe
- Delivers services, in particular for aviation and Safety-of-Life

GALILEO
- EU owned worldwide satellite navigation system ("EU GPS")
- 3 main components: a space segment, a ground segment and a service provision infrastructure
- 22 satellites in orbit
- Ground segment in its initial version completed
- Initial services declaration – December 2016
EUROPE'S CONTRIBUTION TO SATELLITE NAVIGATION

EGNOS
• Satellite Based Augmentation System
• Improves GPS (and Galileo) performance
• European/regional coverage
• 3 services

Fully operational since 2011

Galileo
• Autonomous infrastructure
• Performances and features better than GPS
• Global coverage
• 5 services

Initial services since December 2016
5 SPACE RESEARCH IN HORIZON 2020
Horizon 2020 budget (in current prices): € 79 billion

**SPACE IN H2020**

- **Industrial Leadership**: EUR 17.0 billion
- **LEIT-Space**: EUR 1.479 billion
- **Excellent Science**: EUR 24.4 billion
- **Societal Challenges**: EUR 29.7 billion
- **European Institute of Innovation and Technology**: EUR 2.7 billion
- **Other**: EUR 3.2 billion
- **Euratom (2014-2018)**: EUR 1.6 billion
**Priority 1**  
**Excellent science**
- European Research Council (ERC)
- **Future and Emerging Technologies (FET)**
- Marie Skłodowska-Curie Actions
- **Research infrastructures**

**Priority 2**  
**Industrial leadership**
- **Leadership in enabling and industrial technologies (LEIT)**
  - Information and Communication Technologies (ICT)
  - Nanotechnologies
  - Biotechnology
  - Advanced manufacturing and Processing
  - **Space**
- **Access to risk finance**
- **Innovation in SMEs**

**Priority 3**  
**Societal challenges**
- SC1 - Health, demographic change and well-being
- SC2 - Food security, sustainable agriculture and forestry, Marine, Maritime and Inland water research, and Bioeconomy
- SC3 - Secure, clean and efficient energy
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**Others H2020 Work Programmes**  
**integrating Space**
- European Innovation Council (EIC) pilot
- Access to Risk Finance (ARF): InnovFin Space Equity Pilot (ISEP)
EU AGENCIES INVOLVED

- Research Executive Agency (REA)
- European GNSS Agency (GSA)
- Executive Agency for SMEs (EASME)

TASKS include: Handling of calls and submission of proposals, evaluation process, grant agreement preparation, grant agreements signature, handling submission of reports, reviews, payments, audits...

Full detailed description can be found in the General Annexes 20 – part D of the Work Programme 2018-2020
Horizon 2020 Space 2018-2020 'calls'

Horizon 2020 Participants Portal:

STRUCTURE OF CALLS AND TOPICS

The 'problem'
Identifies the aspects of the challenge that needs to be tackled. WP text does not outline the expected solutions to the problem, nor the approach to be taken by the applicant ("non-prescriptive" approach).

The 'problem in detail'
Provides more details on the specific challenge by specifying a perimeter to the problem described.

The 'change' to be achieved
Provides a broad description of what is the impact to be achieved through the projects to be funded. The dissemination and exploitation of future research results are vital for the impact.
**TYPES OF ACTIONS AND FUNDING RATES**

- **Research and innovation actions (Funding rate: 100%)**: Projects aiming to establish new knowledge, new or improved technology by possibly including basic and applied research, technology development, testing and validation on a small-scale prototype.

- **Innovation actions (Funding rate: 70% - exception: 100% for non-profit legal entities)**: Projects aiming to produce plans, arrangements or designs for a new or improved product, design, process or service by possibly including large-scale product validation and market replication.

- **Coordination and support actions (Funding rate: 100%)**: Projects consisting of accompanying/complementary measures (standardisation, awareness-raising, communication, policy dialogues, networking, studies, etc.).

WP 2018-2020 BUILDING BLOCKS

Maximising benefits of space for society and EU economy

- **SPACE-EO**
  - EO market uptake
  - Copernicus mission and services evolution

- **SPACE-EGNSS**
  - EGNSS market uptake
  - EGNSS infrastructure, mission and services evolution

- **SPACE-BIZ**
  - Support to space hubs
  - Space outreach and education
  - EIC Horizon Prize on "Low cost Space Launch"
  - InnovFin Space Equity Pilot (ISEP)
  - SME-instrument
  - FTI – Fast Track to Innovation

Globally competitive and innovative space sector

- **SPACE-TEC**
  - Technologies for European non-depend. and competitiveness
  - Strategic research clusters
  - Generic space technologies
  - EO and SatCom technologies
  - In-orbit validation/demonstration

- **SPACE-SCI**
  - Scientific instrumentation and technologies for exploration
  - Scientific data exploitation

Access to space & Secure and safe space environment

- **SPACE-TEC**
  - Access to space

- **SPACE-SEC**
  - Space weather
  - Exploring concepts for space traffic management
  - Space Surveillance and Tracking (SST)
  - Near Earth Objects (NEOs)

+ under "other actions": ESA engineering support, REA/GSA project monitoring, studies & communication and support to the Space NCPs network

European Commission
INDICATIVE BUDGET BREAKDOWN (2018-2020)

H2020 Space
2018-2020
budget:
~ €709 M

By Space

Security

Technology and science

Miscellaneous
*Miscellaneous: Proposal evaluation, project monitoring, support to the NCP network; studies and communication activities

Flagships, Entrepreneurship

In add.
By EIC & ARF

By EIC & ARF

SME Instrument

EIC prize

ISEP
Overall, these two activities will help to maximise the uptake of Galileo and EGNOS and to exploit the potential of the European GNSS industry, and contribute to growth, competitiveness and jobs in this sector, while capturing public benefits.

To facilitate access to opportunities for applicants the following list includes dedicated 'Applications in Satellite Navigation – Galileo' activities in related calls and topics from other calls of H2020, in addition to those in this call:

**Societal challenge 4 - Transport:**

- MG-2-9-2019: Integrated multimodal, low-emission freight transport systems and logistics (Inco Flagship)
- LC-MG-1-2-2018: Sustainable multi-modal inter-urban transport, regional mobility and spatial planning
- MG-2-6-2019: Moving freight by Water: Sustainable Infrastructure and Innovative Vessels
- MG-2-8-2019: Innovative applications of drones for safety in transport
- MG-3-2-2018: The Autonomous Ship
- DT-ART-01-2018: Testing, validation and certification procedures for highly automated driving functions under various traffic scenarios based on pilot test data
- DT-ART-04-2019: Developing and testing shared, connected and cooperative automated vehicle fleets in urban areas for the mobility of all
- DT-ART-02-2018: Support for networking activities and impact assessment for road automation

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5.iii. Leadership in Enabling and Industrial Technologies - Space

**Important notice on the Horizon 2020 Work Programme**

This Work Programme covers 2018, 2019 and 2020. The parts that relate to 2019 and 2020 are provided at this stage on an indicative basis. Such Work Programme parts will be decided during 2018 and/or 2019.

SPACE IN THE EUROPEAN INNOVATION COUNCIL (EIC) PILOT
**EIC PREPARATORY PHASE — WP 2018-20**

- **Future & Emerging Technologies (FET-Open)**
  - To develop breakthrough technologies from research base
  - No predefined topics, collaboration required (> 3 partners)
  - Grants ~€3 million

- **SME instrument**
  - SMEs with business plans to roll out marketable innovations
  - 13 topics, no required collaboration, must comply with SME definition
  - Phase 1 (€50 K lump sum); Phase 2 (<€2 million grant)

- **Fast Track to Innovation (FTI)**
  - Accelerate market uptake of innovations
  - Small consortia (3-5, majority private)
  - ~€2 million grant

- **Prizes**
  - Recognition Prizes (iCapital ~ €1.5 million, Women Innovators ~ €0.35 million)
  - EIC Prizes ~ €30 million
EIC HORIZON PRIZES

- Innovative Batteries for eVehicles (€ 10 million)
- Fuel from the Sun: Artificial Photosynthesis (€ 5 million)
- Early Warning for Epidemics (€ 5 million)
- Blockchains for Social Good (€ 5 million)
- Low-Cost Space Launch (€ 10 million)
- Affordable High-Tech for Humanitarian Aid (€ 5 million)
8 SPACE IN ARF — INNOVFIN SPACE EQUITY PILOT (ISEP)
**CHALLENGE**

Optimise benefits space can bring to European society and economy

• How?
  
  o Better exploit possibilities of space data, space technologies, potential of Copernicus, EGNOS, Galileo

  o Foster dynamic space innovation system, more favourable regulatory and business environment

• Leading to…

  o Private sector has more appetite to invest in space domain

  o Firms develop more innovative, space-related products and services
• **Key element**
  o Better access to risk finance for innovative 'space' enterprises

• **Approach**
  o Invest in VC funds focused on innovative SMEs/small midcaps aiming to commercialise new products / services linked to space data / spacetech

  o EU investment pot of € 50 mn combines:
    - € 20 mn from 'LEIT – Space'
    - € 30 mn from 'Access to Risk Finance'

  o € 20 mn in 2018, €15 mn in 2019, €15 mn in 2020
9 WORK PROGRAMME 2018-2020
Status & Implementation calendar
## Work Programme 2018

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<th>Topic 2018</th>
<th>Description</th>
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<td>DT-SPACE-01-EO-2018-2020</td>
<td>Copernicus market uptake</td>
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<tr>
<td>LC-SPACE-02-EO-2018</td>
<td>Copernicus evolution – Mission exploitation concepts</td>
</tr>
<tr>
<td>LC-SPACE-03-EO-2018</td>
<td>Copernicus evolution – Preparing for the next generation of Copernicus Marine Service ocean models</td>
</tr>
<tr>
<td>DT-SPACE-07-BIZ-2018</td>
<td>Space hubs for Copernicus</td>
</tr>
<tr>
<td>DT-SPACE-08-BIZ-2018</td>
<td>Space outreach and education</td>
</tr>
<tr>
<td>SPACE-10-TEC-2018-2020</td>
<td>Technologies for European non-dependence and competitiveness</td>
</tr>
<tr>
<td>SPACE-11-TEC-2018</td>
<td>Generic space technologies</td>
</tr>
<tr>
<td>SPACE-12-TEC-2018</td>
<td>SRC – Space robotics technologies</td>
</tr>
<tr>
<td>LC-SPACE-14-TEC-2018-2019</td>
<td>Earth observation technologies</td>
</tr>
<tr>
<td>SPACE-15-TEC-2018</td>
<td>Satellite communication technologies</td>
</tr>
<tr>
<td>SPACE-16-TEC-2018</td>
<td>Access to space</td>
</tr>
<tr>
<td>SPACE-20-SCI-2018</td>
<td>Scientific instrumentation and technologies enabling space science and exploration</td>
</tr>
</tbody>
</table>
H2020 Space call 2018 evaluation schedule

6 March 2018: Closing of Call

18-22 June 2018: Ethics screening

17 July 2018 (tentative*): Inform applicants

Remote evaluations
23 April – 25 May 2018

Central evaluations
28 May – 15 June 2018

6 November 2018
GAP ending

Receipt of proposals
Eligibility check
Allocation of proposals to evaluators
Training of experts

Individual evaluation
Individual Evaluation Reports
(done remotely)

Consensus group
Consensus Report

Panel Review
Panel report
Evaluation Summary Report
Cross-readings
Panel ranked list

Finalisation
Final ranked list
Evaluation results sent to applicants
Initiation Grant Agreement Preparation

GAP
All Grant Agreements signed

Time-To-Inform (TTI): 5 months
*Legal limit for TTI is 6.8.2018

Time-To-Grant (TTG): 8 months
Horizon 2020 Work Programme 2018-2020 updates

Spring update: 2019 budget

- **16 July 2018**: adoption

Autumn update: 2020 budget, includes full text for 2020 topics

- **February 2019**: adoption (exact date to be confirmed)
## WP 2018-2020 Implementation calendar

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<tr>
<th>Themes</th>
<th>Opening dates</th>
<th>Deadlines</th>
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<tr>
<td><strong>EO, BIZ, TEC, SCI</strong></td>
<td>31 October 2017</td>
<td>6 March 2018</td>
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<tr>
<td><strong>EO, BIZ, TEC, SEC, EGNSS</strong></td>
<td>16 October 2018</td>
<td>12 March 2019, 5 March 2019</td>
</tr>
<tr>
<td><strong>EO, BIZ, TEC, SCI, SEC, EGNSS</strong></td>
<td>TBD 2019</td>
<td>TBD 2020</td>
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10 NEXT STEPS

Beyond H2020 (Work in Progress!)

Timeline

• 2 May 2018
  - Commissioners adopt EU budget for the future
  - Budget proposals are presented to the European Parliament

• 14 May 2018
  - Future budget presented to the EU Council of Ministers

• 6 June 2018
  - European Commission's legislative proposals for spending programmes (2018) 321 (2#3)

• 23-26 May 2019
  - European elections
EU budget for the future

RESEARCH & INNOVATION

- **Horizon Europe (97,6 billion of Euro)**
  - EU's flagship programme to support research and innovation

EUROPEAN STRATEGIC INVESTMENTS

- **Invest EU (38 billion of Euro)**
  - Union's new investment instrument

SPACE

- **European Space Programme (16 billion of Euro)**
  - finances the deployment and exploitation of European space infrastructures and related services
Space research and guidance documents
http://ec.europa.eu/growth/sectors/space/research/horizon-2020/

Published work programme 2018-2020
http://ec.europa.eu/research/participants/portal/
ADDITIONAL INFORMATION

Link to the additional information file
Space Strategy for Europe
A Space Strategy designed to deliver on 4 strategic priorities:

• Maximise the benefits of space for society and the EU economy

• Foster a globally competitive and innovative European space sector

• Reinforce Europe's autonomy in accessing and using space in a secure and safe environment

• Strengthen Europe's role as a global actor and promote international cooperation
EGNOS IS **FULLY OPERATIONAL**

- EGNOS Open Service is **operational since October 2009**
- Its Safety of Life service has been declared **operational in March 2011**
- The EGNOS Data Access Service (EDAS) was declared **in July 2012**
GALILEO SERVICES

Open Service (OS)
- Freely accessible service for positioning, navigation and timing

Public Regulated Service (PRS)
- Encrypted service for greater robustness and higher availability

Search and Rescue (SAR) - contribution
- Assists locating people in distress and confirms that help is on the way

Commercial Service (CS)
- Authentication and high accuracy services for commercial applications

Safety-of-Life (SoL) - contribution
- Provides vital integrity information for life-critical applications