

# **Opportunities in the programmes of "Future Emerging Technologies" and "Leadership in Enabling and Industrial Technologies"**

APPEC, Astroparticle in Horizon 2020

Zagreb, 29/09/2015

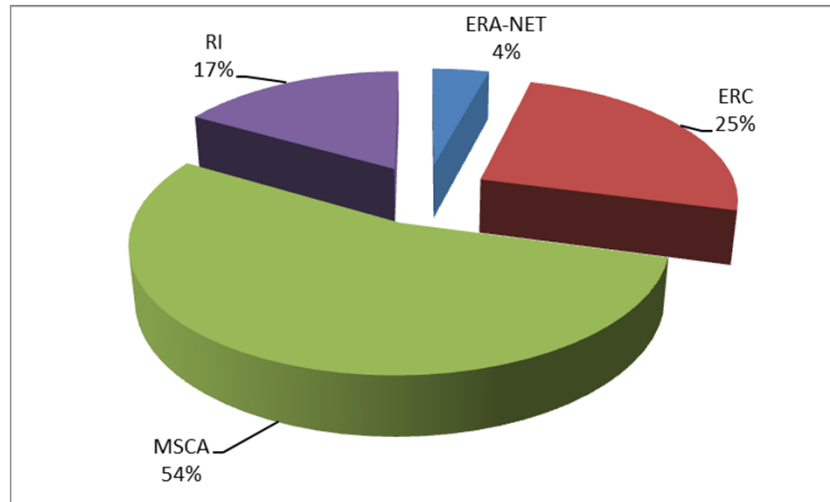
Gaëlle Decroix

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CEA/Physical Science Division

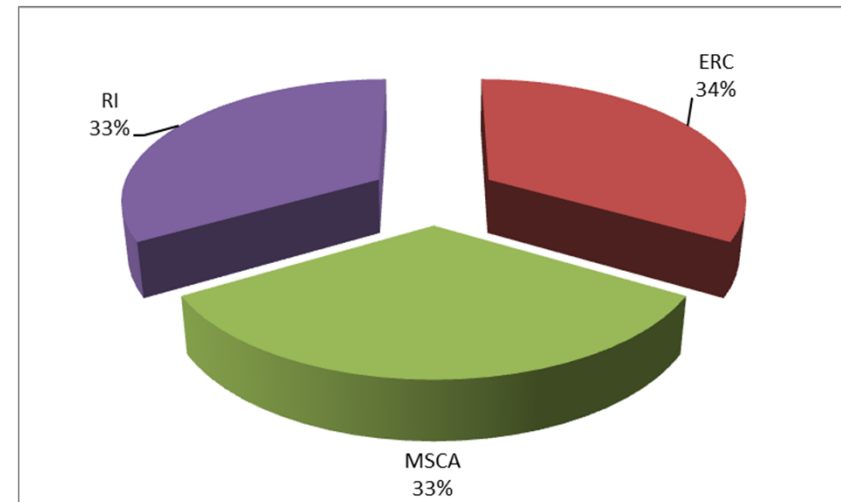
# Astroparticle projects in FP7 / H2020

25 FP7-projects ...



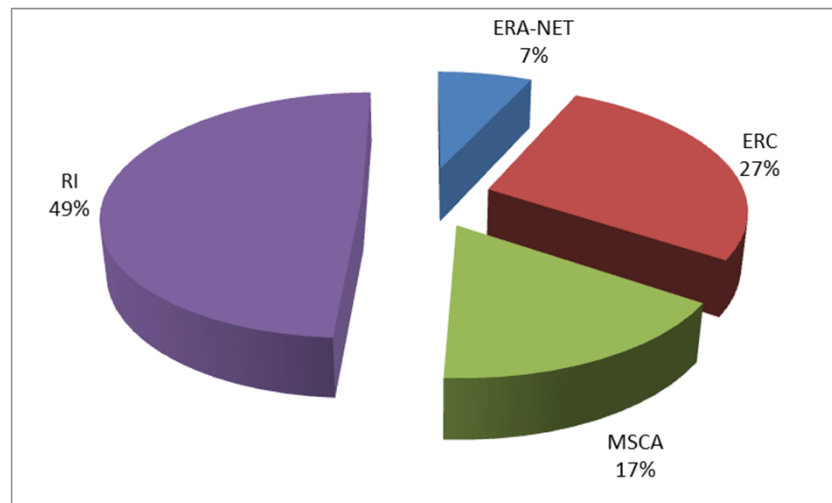
FP7 eCORDA extraction date: 2015/03/24

3 H2020-projects ...



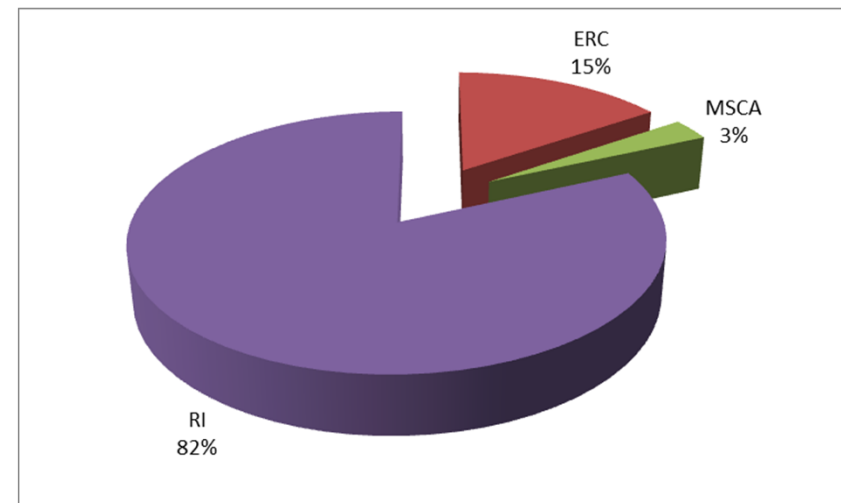
H2020 eCORDA extraction date: 15/07/2015

.. for a global EU contribution 34,2 M€



FP7 eCORDA extraction date: 2015/03/24

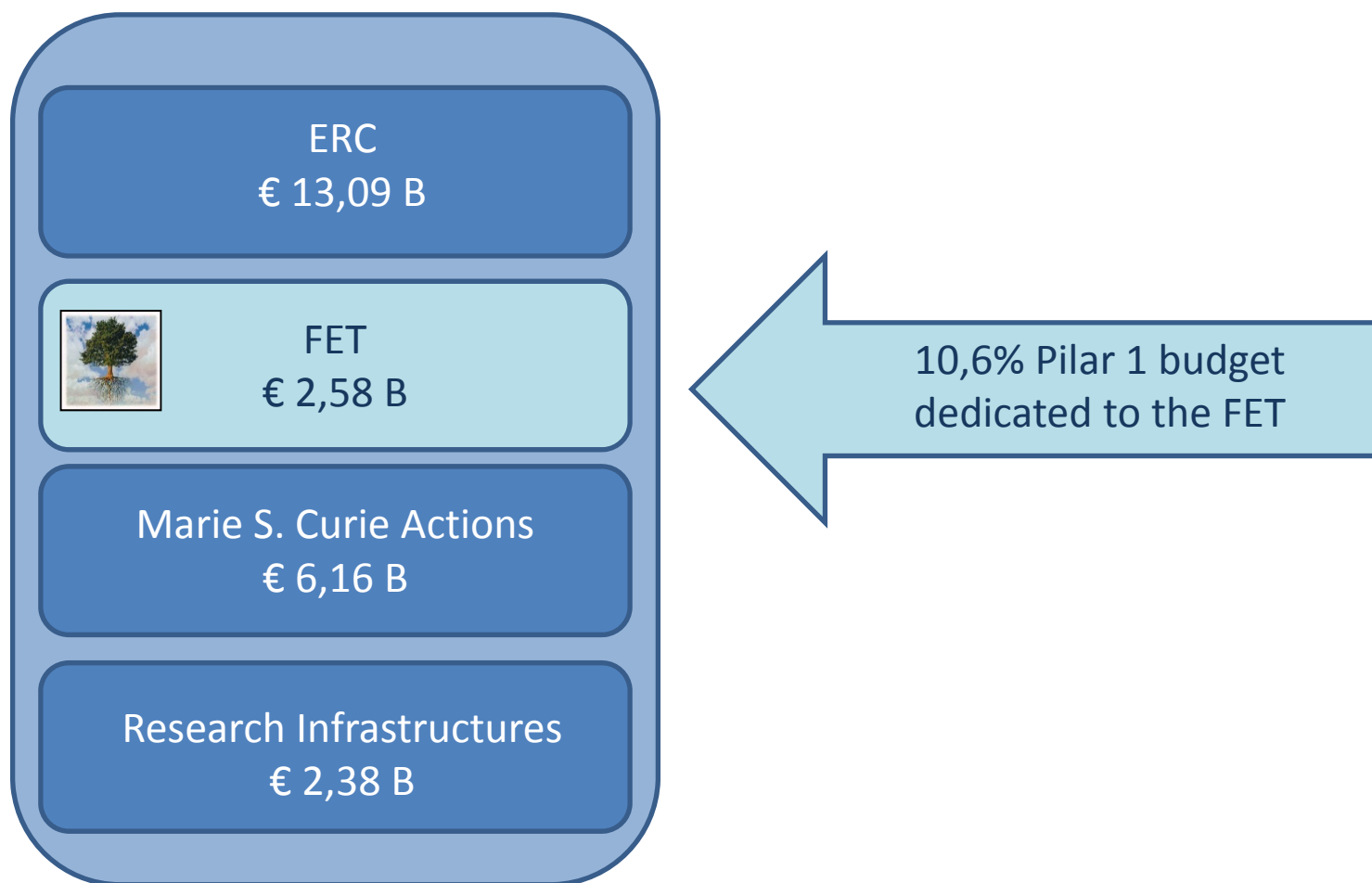
.. for a global EU contribution 5,2 M€



H2020 eCORDA extraction date: 15/07/2015

# The Future Emerging Technologies - FET

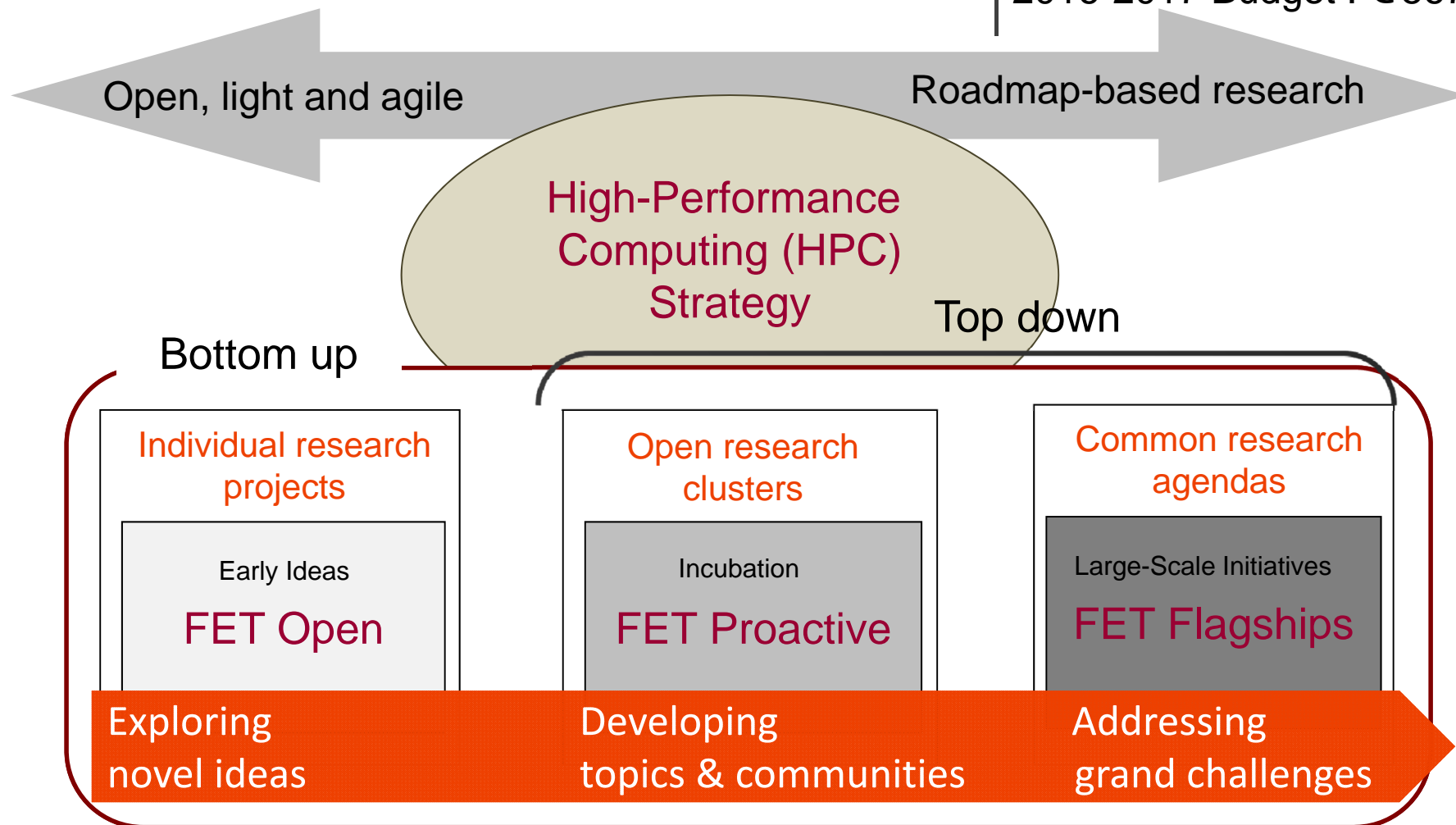
**Pilar 1 - Excellence Science 24,2 Md€**  
**32,4% of the global budget**

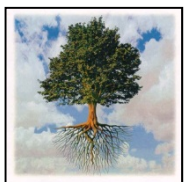




# The Future Emerging Technologies - FET

Total Budget : €2,58 Bn  
2016-2017 Budget : €567 M





# FET 2014-2015: competitive calls !

Total budget : €2,7 Bn  
2014-2015 budget : €457 M

## High-Performance Computing (HPC)

Budget : 97,4 M€  
RIA : 81 proposals  
CSA : 2 proposals

19 RIA selected and financed  
2 CSA selected and financed



JTC 2015  
Budget : 18 M€  
108 proposals

## FET Open

Budget 2014 : 80 M€  
RIA : 643 proposals  
CSA : 32 proposals  
24 RIA selected (3,7%)  
4 CSA  
Budget 2015 : 80 M€  
Deadlines : 30/03/2015  
& 30/09/2015

## FET Proactive

3 topics:  
• Global Systems Science  
• Knowing, doing, being  
• Quantum simulation  
Budget : 10, 15, 10 M€  
Propos. 52, 110, 22  
Selected: 3, 4, 3  
Total EU cont. : 31,7 M€

## FET Flagships

2014 : 2 FPA, 1 CSA  
selected  
2015 : Core project  
89 M€ par Flagship



# FET : WORKPROGRAMME 2016-2017

FET Open - Novel ideas for radically new technologies

FET Proactive - Nurturing emerging themes and communities

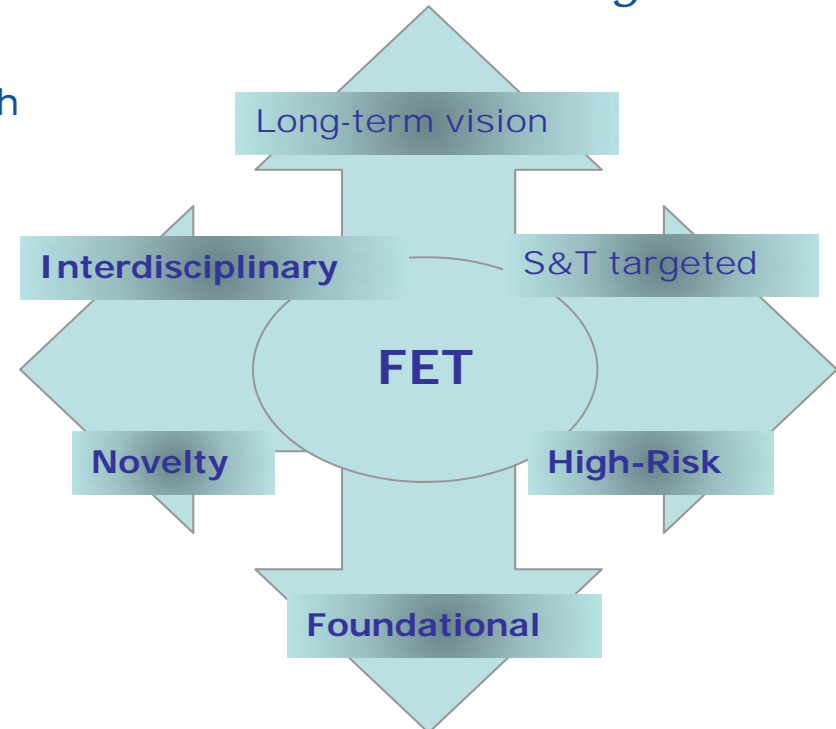
FET Proactive - High-Performance Computing

FET Flagships - Tackling grand interdisciplinary science and technology challenges

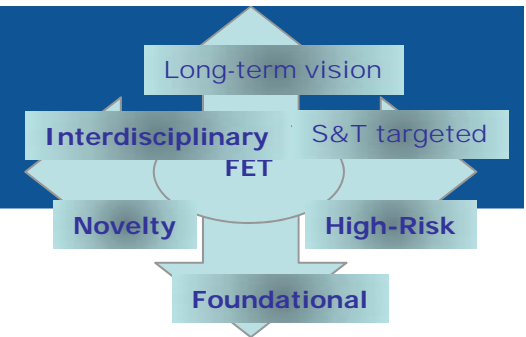


## Call FET-Open : novel ideas for radically new technologies

- **'Open is open'**
- All technologies, no thematic restriction
- *FET gatekeepers define the kind of research that FET is looking for*
- Scope defined by the 6 gatekeepers
- Bottom-up, but targeted - not blue sky research
- Collaborative research
- *Total budget: 160M€ in 2014-15*  
*En croissance sur 2016-2017*
- Research and Innovation Action
- Coordination and Support actions (CSA)



# FET Gatekeepers



**Long-term vision:** a new, original or radical long-term vision of technology-enabled possibilities going far beyond the state of the art

**Breakthrough S&T target:** scientifically ambitious and technologically concrete breakthroughs plausibly attainable within the life-time of the project

**Novelty:** new ideas and concepts, rather than the application

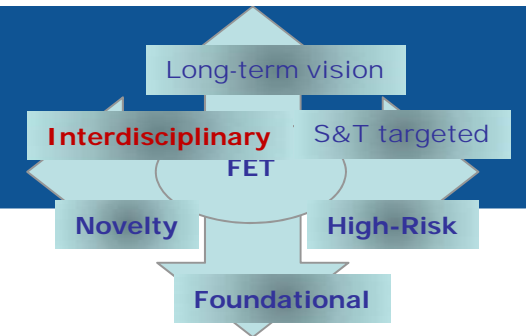
**Foundational:** the breakthroughs must be foundational in the sense that they can establish a basis for a new line of technology not currently anticipated

**High-risk:** the potential of a new technological direction depends on a whole range of factors that cannot be apprehended from a single disciplinary viewpoint

**Interdisciplinary:** the proposed collaborations must aim to advance different scientific and technological disciplines together and in synergy towards a breakthrough



# FET Gatekeepers



To better understand what is the interdisciplinarity, get on the FET web site :

<http://ec.europa.eu/digital-agenda/en/news/fet-living-interdisciplinarity>



## *FET OPEN Action RIA (FETOPEN 1)*

- Actions de recherche et développement

## *FET OPEN Action CSA (FETOPEN 2 et 3)*

- Conférences, groupes de travail, communication...

## *FET OPEN Action Launchpad (FETOPEN 4)*

- Nouvel outil de financement, durée max 18 mois, montant max 100k€
- Proposition courte (7 pages)



## FETOPEN 1 - Research projects

### Specific challenge

*Exploration of new foundations for radically new future technologies*

***Supporting a large set of early stage, high risk visionary science and technology collaborative research projects*** Agile, risk-friendly and ***highly interdisciplinary research*** approach

*Recognising and stimulating the driving role of ***new high-potential actors*** in research and innovation, such as women, young researchers and high-tech SMEs*

### Project size: 2 to 4M€

- **1 step submission and evaluation of a 16 pages proposal**

### Budget: 252M€

Deadlines	11/05/2016	17/01/2017	28/09/2017
Budget	84 M€	84 M€	84M€



# FET OPEN - 1: submission

*Soumission / evaluation : 1 step*

*Part A on line : administrative information*

*Part B : the proposal 16 pages max*

- Cover page (1 page)
- Section 1: S&T Excellence
- Section 2: Impact
- Section 3: Implementation

*Other Information*

- Members of the consortium
- Ethical issues



# FET OPEN - 1 : evaluation criteria

## ***S/T quality*** weight 60%, threshold 4/5

- Clarity of targeted breakthrough and its relevance towards a long-term vision.
- Novelty and foundational character.
- Specific contribution to progress in science and technology.
- Quality and effectiveness of the S/T methodology and workplan.

## ***Impact*** weight 20%, threshold 3,5/5

- Appropriateness of measures envisaged towards getting a transformational impact of the results on science, technology and/or society.
- Appropriateness of measures envisaged for the dissemination and/or use of project results.

## ***Implementation*** weight 20%, threshold 3/5

- Quality of management.
- Quality of the participants and of the consortium as a whole.
- Appropriate allocation and justification of resources (person-months, equipment, budget).



## FETOPEN 2,3 - Coordination and Support Activities

*Specific challenge: The challenge is to make Europe the best place in the world for collaborative research on future and emerging technologies that will renew the basis for future European competitiveness and growth, and that will make a difference for society in the decades to come.*

*Scope: Proposals shall address one of the following topics:*

***Communication, Exchange, Conference***

*Project size: 0,3 to 0,5M€ per topic*

*Budget: 4,5M€*

Deadlines	11/05/2016	17/01/2017
Budget	3M€	1,5M€



## FETOPEN 4 - Innovation Launchpad

NEW

*Specific challenge: To fund further innovation related work to verify and substantiate the innovation potential of ideas arising from FET funded projects and to support the next steps in turning them into a genuine social and economic innovation*

*Instrument = **coordination and support action***

*Project size: 100k€ for actions no longer than 18 months*

- **evaluation of a 7 pages proposal**

*Budget: 3M€*

*End date at most one year before the deadline of the submission*

Deadlines	28/10/2016	27/10/2017
Budget	1,2M€	1,8M€



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FET Proactive - Nurturing emerging themes and communities

FET Proactive - High-Performance Computing

FET Flagships - Tackling grand interdisciplinary science and technology challenges



# FET Proactive in WP2016-17



- Thematic areas
  - To mature novel areas
  - To structuring emerging communities
  - To build up new interdisciplinary research around these emerging novel areas
- 
- Budget: 80M€
  - Deadline : 12/04/16
  - RIA project
  - Duration 5 years
  - EC contribution : 4-10M€

# FET Proactive in WP2016-17



Online consultation -> 10 topics under 4 areas

## **Area 1 - Future technologies for societal change (20M€)**

- Being human in a technological world,
- New science for a globalised world

## **Area 2 - Biotech for better life (30M€)**

- Intra- and inter-cell bio-nano-chem technologies,
- Bio-electronic medicines and therapies,
- Cognitive neuro-technologies,

## **Area 3 - Disruptive information technologies (30M€)**

- New computing paradigms and their technologies,
- Quantum engineering,
- Hybrid opto-electro-mechanical devices at the nano-scale,

## **Area 4 - New technologies for energy and materials (20M€)**

- Ecosystem engineering,
- Complex bottom-up construction



## ***Area 1: Future technologies for societal change (20M€)***

*Being human in a technological world: Interdisciplinary explorations of potentially impacts (individual, organisational, economical, cultural, societal...) of future technologies on humanity. Visions relatively unexplored (hyperconnectivity, hybridisation of nature, life extension, real/virtual blending...). Include ethical and social aspects.*

*New science for a globalised world: Tools and methods (mathematical, technological, social/organisational,...) for the collaborative study, projection and engineering of large scale open socio-technological and ecological systems characterised by complexity and inherent uncertainty.*



## ***Area 2: Biotech for better life (30M€)***

*Intra- and inter-cell bio-technologies: New technologies to enable the study and engineering of processes within and between biological cells, with purposes such as sensing, signalling, imaging, regulating, curing.*

*Bio-electronic medicines and therapies: Using adaptive nerve or brain stimulation for precise regulatory control of organs or other biological processes inside the human body, in order to restore or maintain healthy conditions (bio-electronic medicines, drug-free therapies, adaptive drug release...).*

*Cognitive neuro-technologies: Integrated interdisciplinary approaches combining theory and novel technology-based experiments for understanding the circuits and pathways of higher-level cognitive functions (motivation and reward, memory, knowledge, reasoning and decision making, emotion...).*



## ***Area 3: Disruptive information technologies (30M€)***

*New computing paradigms and their technologies:* new foundations for computing, including bio-, nature- and socio-inspired ones that can encompass also aspects of communication, interaction, mimicry or differentiation (adaptation, learning, evolution), as well as non-technological aspects like organisational or physical/virtual architectural ones, and tailored to future and emerging challenges and requirements in highly interdisciplinary settings and for new kinds of mathematical and computational approaches in science.

*Quantum engineering:* reproducible, economical and scalable approaches, architectures and techniques for designing and realising devices and systems that exploit quantum phenomena, such as superposition and entanglement, for achieving new or radically improved functionalities (for instance in sensing, precision measurement, transduction, secure communication, control, simulation and computation) and demonstrated in the context and boundary conditions of a specific application area (for example in the biological, medical, materials, process, energy or standards domain).

*Hybrid opto-electro-mechanical devices at the nano-scale:* new working principles and their first-time validation in nano-, molecular- or atomic-scale devices based on the interaction and mutual control of multiple physical degrees of freedom to achieve new or radically improved functionalities and application scenarios under plausible operating conditions. The interacting degrees of freedom are those involved in e.g. nano-optics, nano-scale electromagnetism, nano-mechanics and phonons and fluctuations.



## ***Area 4: New technologies for energy and functional materials (20M€)***

Ecosystem engineering: New models, materials, processes, devices and systems for extreme energy and resource efficiency and recovery, and footprint management into circular ecosystems (energy, raw materials, waste, water,...). New technologies for extremely efficient energy generation (artificial photosynthesis, transfer, conversion, high-density storage...).

Complex bottom-up construction: New technologies and methods for self-organisation, assembly and adaptation of materials and physical devices/systems with complex functionality (including for instance energy storage, conversion or recovery), complex composition and/or spanning a range of scales (nano, meso).



## ▪ **FETPROACT 2 - 2017: FET ERANET COFUND**

Budget : 5M€ en 2017

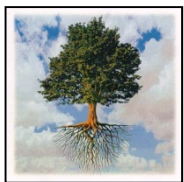
## ▪ **FETPROACT 3 - 2016 : FET ERANET COFUND in Quantum Technologies**

Budget : 10M€ en 2016

### Topics

- New principles, experiments, technologies, devices and systems that exploit quantum phenomena (entanglement, superposition...)
- Demonstration and critical assessment of these advancements
- Exploration of advanced quantum enabled applications in areas of scientific, industrial or societal interest





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# High Performance Computing



## Key EU developments in 2012-2013

- *Communication from the EC: "High-Performance Computing: Europe's place in a global race" (2012)*
  - **Council Conclusions on High-Performance Computing (Competitiveness Council – 2013)**
- *Establishment of the European Technology Platform on High-Performance Computing (ETP4HPC - 2013)*
  - **ETP4HPC - Strategic Research Agenda**
  - **Public-Private Partnership with ETP4HPC\***



[www.etp4hpc.eu](http://www.etp4hpc.eu)

\*expected Dec-2013

# HPC in FET: Critical technologies

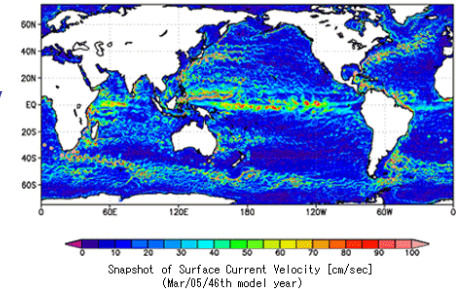


# Addressing Societal Challenges

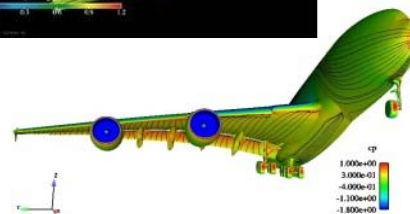
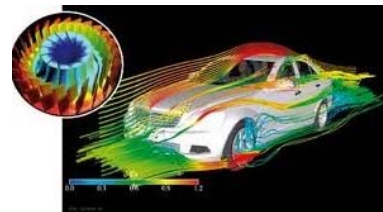
Health,  
demographic  
change  
and well-being



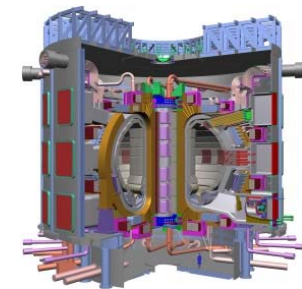
Climate action,  
resource efficiency  
and raw materials



Smart, green and  
integrated transport  
Engineering



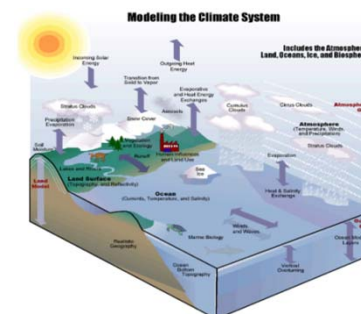
Secure, clean and  
efficient energy



Inclusive, innovative and  
secure societies



Food security, sustainable agriculture,  
marine research and the bio-economy



# An integrated HPC approach in H2020



- HPC strategy combining three elements:
  - (a) Computer Science: towards **exascale** HPC; [HPC in FET]
  - (b) Achieving excellence in HPC **applications**; [e-infrastructures]
  - (c) Providing **access** to the best supercomputing facilities and services for both industry and academia; [e-infrastructures]
- complemented with training, education and skills development in HPC





## FETHPC 1 - 2016: Codesign of HPC systems and applications

Specific challenge: Achieve world-class extreme scale, power-efficient and highly resilient HPC platforms through a strong co-design approach driven by ambitious applications and in close cooperation with the scientific disciplines and stakeholders.

### Expected impact

- Contribution to the realisation of the ETP4HPC Strategic Research Agenda
- Proof-of-concept through integrated pre-exascale prototypes
- Covering important segments of the broader and/or emerging HPC markets
- Impact on standards bodies and other relevant international research programmes.

Project size : RIA , EC contribution : 10-20M€

Budget & Deadline : 41M€ -> Deadline: 27/09/2016





## FETHPC 2 - 2017: Transition to Exascale Computing

Specific challenge: Take advantage of the full capabilities of exascale computing, through high-productivity programming environments, system software and management, exascale I/O and storage in the presence of multiple tiers of data storage, supercomputing for extreme data and emerging HPC use modes, mathematics and algorithms for extreme scale HPC systems for applications

### Scope :

- a. High productivity programming environments for Exascale
- b. Exascale system software and management
- c. Exascale I/O and storage in the presence of multiple tiers of data storage
- d. Supercomputing for extreme data and emerging HPC use modes
- e. Mathematics and algorithms for extreme scale HPC systems and applications working with extreme data

Project size : RIA , EC contribution : 2-4M€

Budget & Deadline : 40M€ -> Deadline: 26/09/2017





## FETHPC 3 - 2017: Exascale HPC ecosystem development

Specific challenge: To develop a sustainable European Exascale HPC ecosystem

Scope :

- a. Coordination of the Exascale HPC strategy and International Collaboration
- b. Excellence in Exascale Computing Systems

Project size : CSA, EC contribution: 1-2M€

Budget & Deadline : 4M€ -> Deadline: 26/09/2017



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FET Flagships are highly ambitious, large-scale, long-term, science-driven, goal-oriented, roadmap-based research initiatives, which will:

- ✓ provide strong scientific, technological and IPR basis for establishing areas of European leadership and bringing substantial benefits for society
- ✓ help overcome fragmentation and increase the impact of European research and innovation efforts and which will require:
  - cooperation among a range of scientific communities/disciplines, with industries and with the involvement of representatives from the civil society
  - a long-term commitment of all key stakeholders sharing a common scientific vision and under a strong leadership



## Graphene & Human Brain Project selected



Call for  
Preparatory Actions  
21 → 6  
July 2010

Stimulating ideas &  
structuring the  
scientific community  
2009 - 2010

Preparatory  
Phase Pilots  
05/2011 -  
04/2012

Flagship  
selection  
6 → 2  
end 2012

FP7 ramp-up phase  
10/2013- 03/2016

### SCIENCEWORLD REPORT

Home Space & The Future Nature & Environment Health & Medicine **Tech** Physics Human V

#### Brain Simulation and Graphene Research Receive Billion Euro Each

0 Comments  7  3  Share  E-mail  Print  
Mark Hoffman First Posted: Jan 28, 2013 09:57 AM EST

The result of the highly anticipated decision of which two research projects will receive a one billion Euro research grant, the largest single research award ever, from the European Commission were announced by the European Commission's Vice-President Neelie Kroes today.



The first project is the [Human Brain Project](#), led by neuroscientist Henry Markram at the Swiss Federal Institute of Technology (EPFL) in Lausanne, which aims to simulate the human brain in a supercomputer, in order to aid medical advancement in brain disorders.

Like Us on [Facebook](#)  

The second, called [Graphene Project](#), is led by theoretical physicist Jari Kinaret at Chalmers University of Technology in Gothenburg, Sweden. Its goal is to develop the awesome



# FET FLAGSHIP : the process

- Cofinancing European Union / Member State (100 M€/ year during 10 years)
  - 'Core project ' : is totally financed by the EU 'Core Project'
  - ERANET : cofinced EU / MS
- 1<sup>st</sup> Stage : Launch of the Flagship @ FP7 (30 months = October 2013 – March 2016)
  - **Core Project = Collaborative project – coordinated support action CP-CSA**
  - **ERANET**
  - **Establishment of a Framework Partnership Agreement (FPA)**
- 2<sup>nd</sup> Stage : Maturity @ H2020 , new governance (> 2016)
  - core project widening
  - satellite projects
  - financing increasing

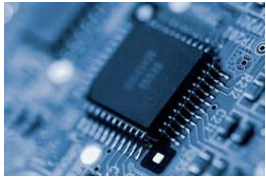


## FETFLAG-1 2016: Partnering environment for FET flagships

- **Specific Challenge** = to support funding and coordination of partnering projects (PP) of the 2 flagships
- **Scope**
  - **a) ERA-NET Cofund Action**
  - **b) Coordination and Support Actions** the EC long-term commitment to support the Flagships, and
  - the partners' commitment to establish, maintain and implement the strategic research agenda of each of the Flagships
- Budget per type of instrument: 8M€ for a) and 1 M€ for b)
- Deadline = 29/02/16

# Leadership in Enabling and Industrial Technologies (LEIT)

- Pilar 2 – (LEIT) 16,4 Bn€ - 22% of the global budget
- A common approach to enabling and industrial technologies:
  - ❑ ICT
  - ❑ KETs :
    - ✓ micro and nano- electronics, photonics (included in ICT)
    - ✓ nanotechnologies, advanced materials, advanced manufacturing and processing, biotechnology
  - ❑ Space
- Innovation: Emphasis on technology development, industrial-scale pilots and demonstrators, prototyping and product validation -> TRL 3-4 up to 7, with centre of gravity from 5-6
- To bring the technologies closer to the markets
- Specific support for "cross-cutting KETs"
- Strong focus on leveraging private sector investment
- Important role of PPPs to implement KET related activities
- Focus area : Industry 2020 in the circular economy cPPS SPIRE & FoF



# LEIT - ICT

1. A new generation of components and systems: engineering of advanced embedded and resource efficient components and systems
2. Next generation computing: advanced and secure computing systems and technologies, including cloud computing
3. Future Internet: software, hardware, infrastructures, technologies and services
4. Content technologies and information management: ICT for digital content, cultural and creative industries
5. Advanced interfaces and robots: robotics and smart spaces
6. Micro- and nanoelectronics and photonics: key enabling technologies



## Budget

	Total budget	Year 1	Year 2
CH1: Components and Systems	84,0	58,5	25,5
CH2: Advanced computing and Cloud Computing	71,0	45,0	26,0
CH3: Future Internet	253,2	77,2	176,0
CH4: Content technologies	278,0	123,0	155,0
CH5: Robotics	164,0	72,0	92,0
CH6: Micro-Nano and Photonics	181,0	66,0	115,0
Manufacturing	116,0	83,0	33,0
Internet of Things	114,0	79,0	35,0
Cyber-Security	43,0	23,5	19,5
Open Disruptive Innovation	126,0	60,0	66,0
Fast track to Innovation	17,9	17,9	0,0
RRI/SSH and creative dialogue	15,0	15,0	0,0
Horizontal Innovation	30,0	4,0	26,0
International Activities	35,8	15,8	20,0
Horizontal support	42	22,7	18,65
<b>Total</b>	<b>1570</b>	<b>762,6</b>	<b>807,7</b>
ECSEL	321	153	168
Total with ECSEL	1891	38 914	978

# Key Enabling Technologies (KETs)

**Biotechnology:** aims to apply biotechnology research to the development of competitive, sustainable and innovative industrial products and processes. Priority areas include: cutting-edge biotechnologies as future innovation drivers (including synthetic biology and bioinformatics); biotechnology-based industrial processes driving competitiveness and sustainability; and innovative and competitive platform technologies (including metagenomics).

**Micro- and nano-electronics, photonics:** aims to look at the grand technological challenges in information processing and communications based on memory and logic devices, circuits and architectures for advanced CMOS technologies.

**Nanotechnologies, Advanced Materials and Advanced manufacturing and processing:** various priority areas: bridging the gap between nanotechnology research and markets; nanotechnology and advanced materials for more effective healthcare; nanotechnology and advanced materials for low-carbon energy technologies and energy efficiency; cross-sector potential of nanotechnologies and advanced materials to drive competitiveness and sustainability; Safety of nanotechnology-based applications and support for the development of regulation; Addressing generic needs in support of governance, standards, models and structuring in nanotechnology, advanced materials and advanced manufacturing and processing.

**Cross-cutting KETs activities** will also bring together and integrate different KETs and reflect the interdisciplinary nature of technological development.

# Public Private Partnership (PPPS)

PPPs are a way of implementing technological roadmaps in particular areas and achieving leverage of private funding.

## Special features

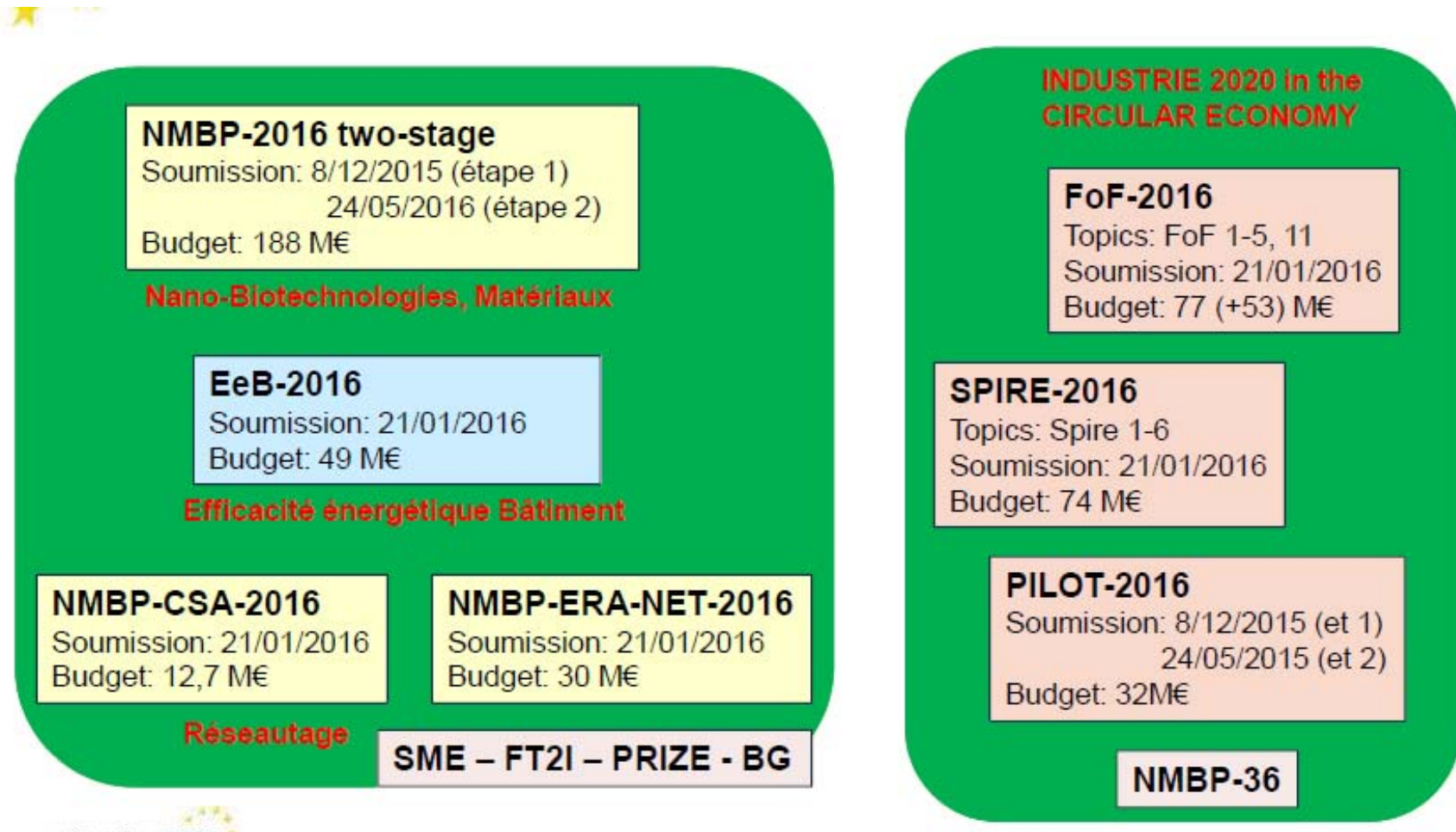
- Leading role of industry in defining research priorities
- Ad-hoc Industrial Advisory Groups
- Multi-annual Roadmap allows long-term investment plans
- Increased use of SME-targeted and Demonstration projects
- ~45-50% industry participation, of which ~20-25% SMEs
- ~70-80% of funding has gone to beneficiaries outside PPP industry associations



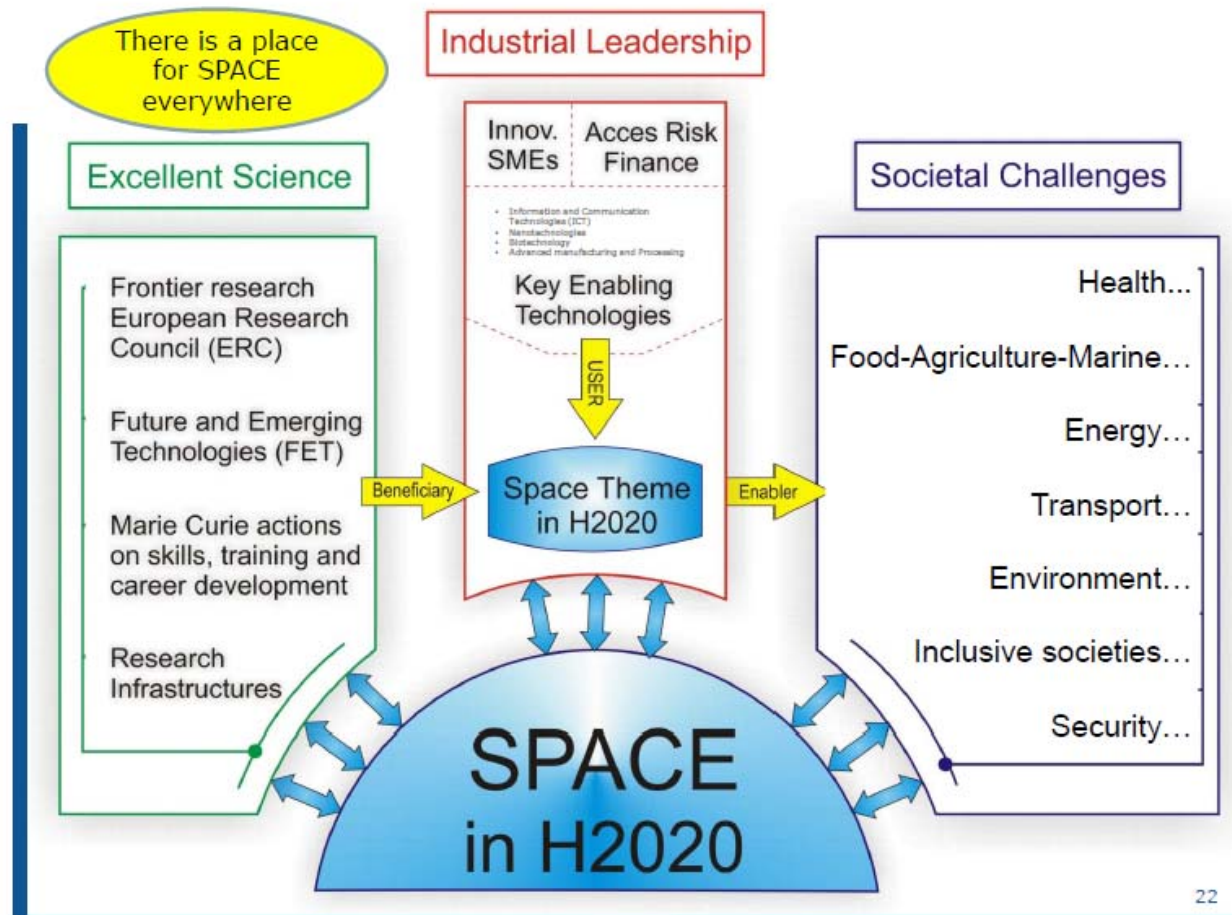
# Public Private Partnership (PPPS)

- **Factories of the Future (FoF)**: aims to help European manufacturers to adapt to global competitive pressures. *cross thematic*
- **Energy-efficient Buildings (EeB)**: aims to drive the creation of a high-tech building industry which turns energy efficiency into a sustainable business, fostering EU competitiveness in the construction sector on a global level. *cross thematic*
- **Sustainable Process Industries (SPIRE)**: aims to optimise industrial processing, reduce the consumption of energy and resources, and minimise waste. *cross thematic*
- **Robotics – SPARC (2014) – covered by ICT**
- **Photonics – Photonics 21 (2013)** : to develop and deploy photonics technologies within the various applications fields such as ICT, lighting, industrial manufacturing, life science, safety as well as in education and training. **covered by ICT**
- **European Green Vehicles Initiative (EGVI)** : to develop a competitive and resource efficient transport system with significantly less CO2 emissions
- **Advanced 5G Network for the Future Internet (5G)** : to stimulate the development of network internet infrastructure to ensure advanced ICT services for all sectors and users **covered by ICT**
- **High Performance Computing**
- **Big Data**

# LEIT - NMBP



# SPACE





## Horizon 2020 LEIT-Space specific programme

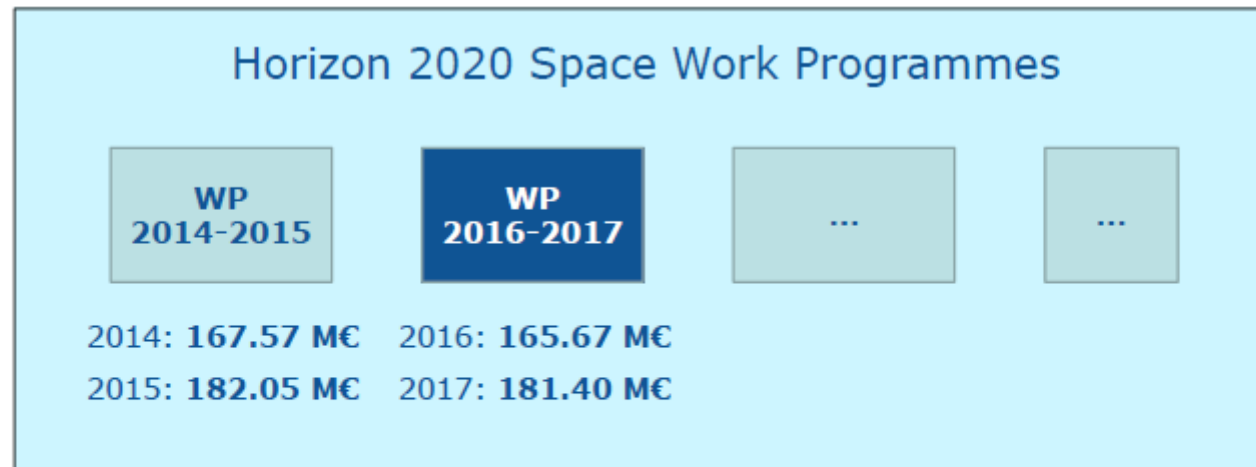
- Enabling European competitiveness, non-dependence and innovation of the European space sector
  - ✓ Safeguard and further develop a competitive, sustainable and entrepreneurial space industry and research community and strengthen European non-dependence in space systems
  - ✓ Boost innovation between space and non-space sectors
- Enabling advances in space technologies
- Enabling the exploitation of space data
- Enabling European research in support of international space partnerships

*For more information please consult Council Decision of 3 December 2013, [OJ L 347/993](#).*



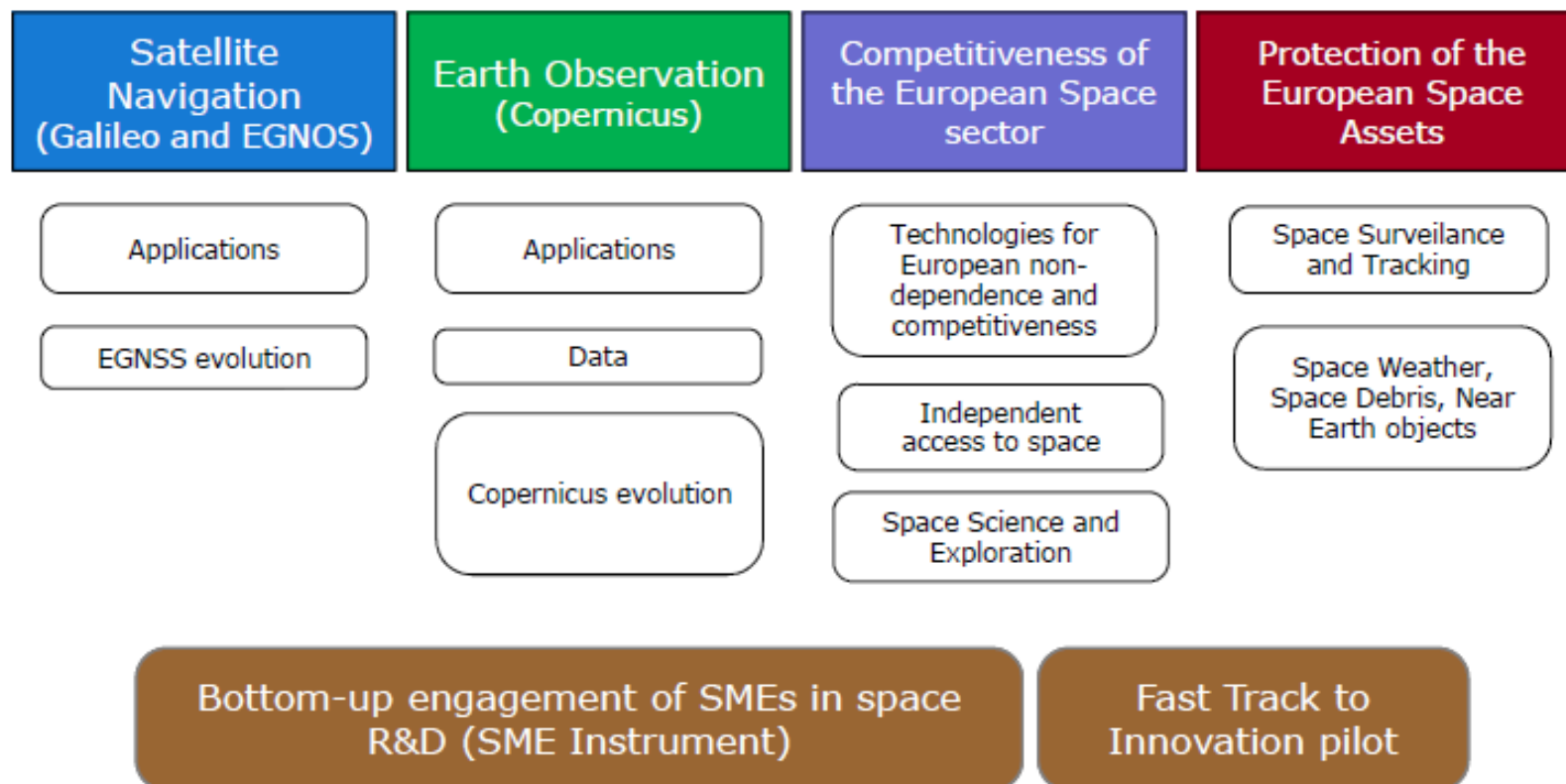
## Horizon 2020 LEIT-Space work programmes

Horizon 2020 is being implemented through a sequence of **biennial** work programmes (WP)





## Horizon 2020 LEIT-Space implementation building blocks

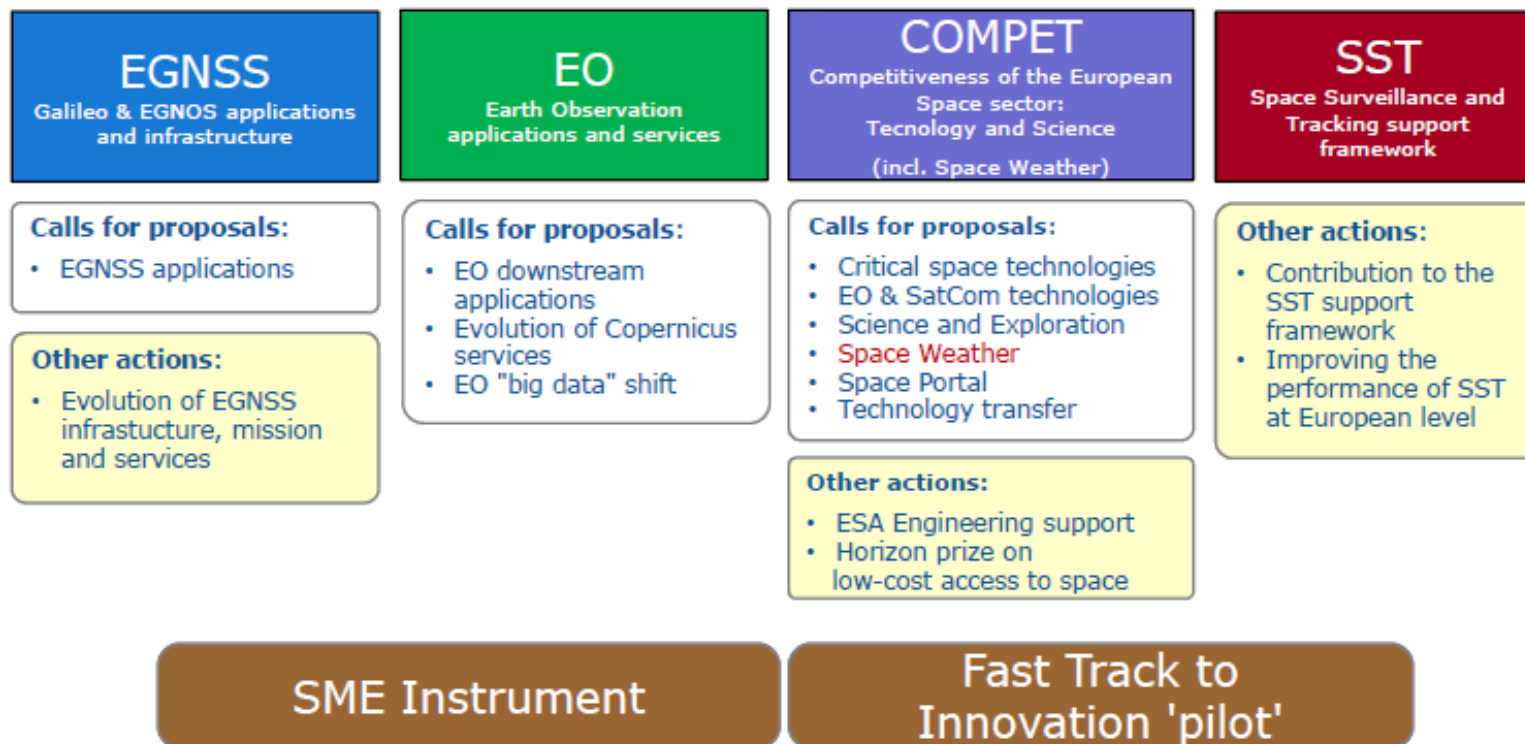


Space



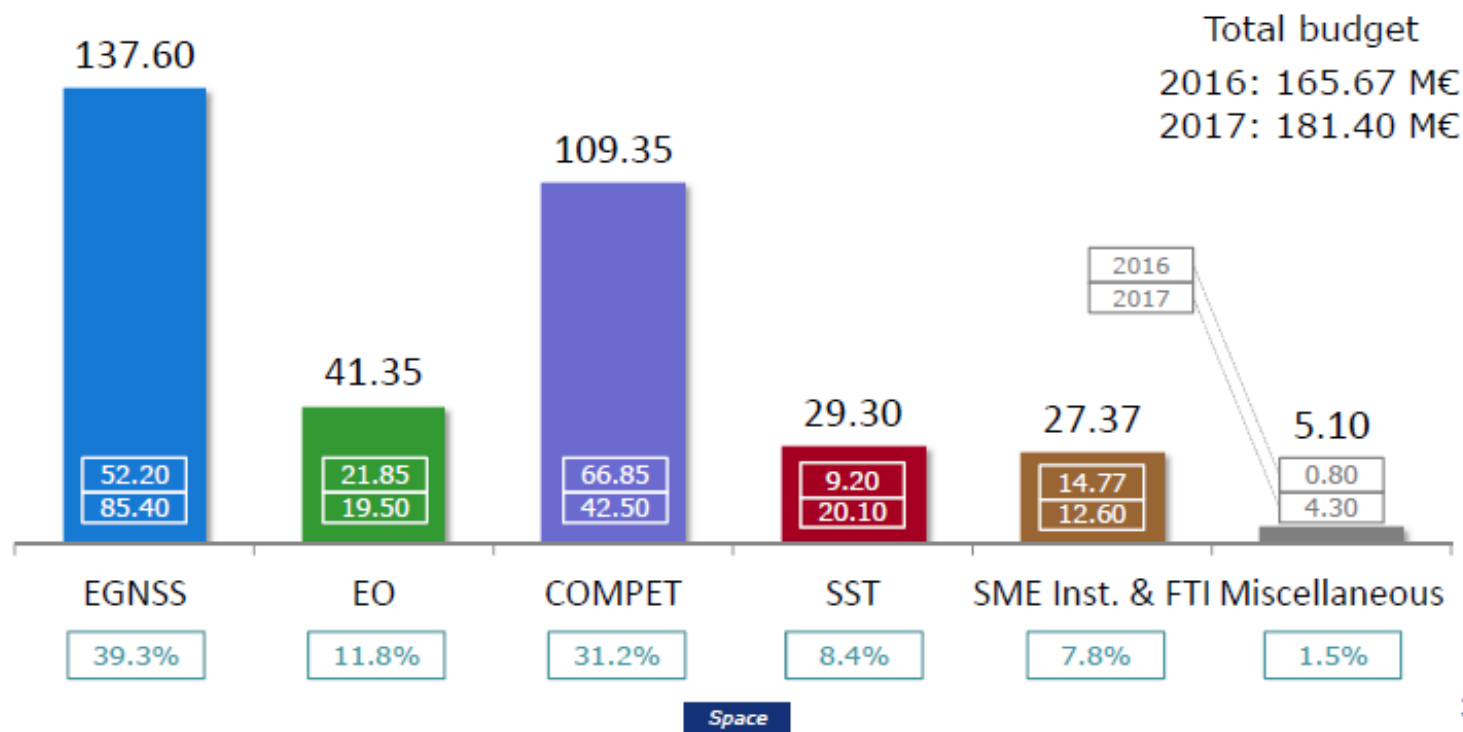


## Horizon 2020 Space 2016-17 WP structure



## Horizon 2020 Space WP 2016-17 indicative budget

**LEIT-Space 2016-2017 WP indicative budget** (figures in M€)  
Calls for proposals + "Other actions"



36



# Competitiveness of European Space Sector



Recommended project size  
Indicative budget  
Type of action

COMPET-5-2016

## Scientific Instrumentation

*Scientific instrumentation is understood in this context as mission payloads that perform scientific tasks*

*Proposals may cover different stages of development of scientific instrumentation from concepts, to breadboarding and prototype demonstration.*

*Proposals are particularly welcome that develop novel and advanced technologies, such as new sensors and other sub-systems that may be used in scientific instrumentation*

*Projects should address planned and future European scientific and exploration missions, as well as collaboration in the context of third country missions as a European contribution to global efforts.*

1.5 to 3 M€

**3 M€**

Research and  
Innovation Actions

Space



# FET : WORKPROGRAMME 2016-2017

## ANNEXES

Astroparticle projects in FP7

Astroparticle projects in H2020

# Astroparticle projects in FP7

- 1 ERA-Net project

Project Number	Project Title	Project Acronym	Project Status	Project Signature Date	Project EC Financial Contribution	Research Work Programme	Project Instrument/ Funding Scheme	Keywords Project Abstract
235489	Deepening and Broadening of Astroparticle Physics European Coordination	ASPERA-2	CLO	08/07/2009	2 382 504	ERA-NET proposals of a horizontal nature	CSA-CA	strategic planning, coordination, regions, funding, knowledge transfer, technology transfer, SME, basic research, interdisciplinarity, Astroparticle Physics,

- 6 ERC projects

Project Number	Project Title	Project Acronym	Project Status	Project Signature Date	Project EC Financial Contribution	Research Work Programme	Project Instrument/ Funding Scheme	Keywords Project Abstract
267985	Electroweak Symmetry Breaking, Flavor and Dark Matter: One Solution for Three Mysteries	DAMESYFLA	ONG	21/01/2011	1 439 400	ERC	ERC-AG	Theories beyond the Standard Model, Particle phenomenology, Collider physics, Flavor physics, Electroweak Theory, Supersymmetry, Dark Matter
267117	Dark Matters	DARK	ONG	25/05/2011	2 499 990	ERC	ERC-AG	astroparticle physics
267352	Exploring the Terauniverse with the LHC, Astrophysics and Cosmology	TERAUNIVERSE	ONG	25/02/2011	1 928 700	ERC	ERC-AG	LHC, Beyond the Standard Model, TeV, high-energy astrophysics, supersymmetry, extra dimensions, phenomenology, string theory
200888	Massive Neutrinos: Investigating their Theoretical Origin and Phenomenology	MANITOP	CLO	25/08/2008	790 800	ERC	ERC-SG	neutrino physics, astroparticle physics, lepton flavor violation
278234	New Directions in Dark Matter Phenomenology at the TeV scale	NEWDARK	ONG	13/06/2012	1 462 200	ERC	ERC-SG	Dark Matter theory, Dark Matter phenomenology, collider physics, charged cosmic rays, gamma rays, cosmology.
277591	The Moment of Truth for WIMP Dark Matter	WIMPS KAIROS	ONG	31/10/2011	1 248 120	ERC	ERC-SG	Astroparticle physics, WIMPs, Dark Matter searches

# Astroparticle projects in FP7

- 13 MSCA projects

Project Number	Project Title	Project Acronym	Project Status	Project Signature Date	Project EC Financial Contribution	Research Work Programme	Project Instrument/ Funding Scheme	Keywords Project Abstract
321582	Neutrinos and other probes for new physics	NEUPROBES	ONG	28/08/2012	100 000	Marie-Curie Actions	MC-CIG	PHY, P102 Particle physics, phenomenology, astroparticle physics, neutrinos, dark matter, dark energy, P301 Astronomy - Astrophysics and Cosmology
224898	High-energy cosmic neutrinos astronomy using a Mediterranean undersea telescope	NEUTEL-APC	CLO	02/06/2008	45 000	Marie-Curie Actions	MC-ERG	Cosmic Neutrino Detection; High Energy Physics; Astrophysics; Particle Physics
236122	Active Rejection of Background in Rare Event Searches	ARBRES	CLO	16/10/2009	165 445	Marie-Curie Actions	MC-IEF	Astrophysics, Nuclear physics, Astroparticle physics, Galactic Dark Matter, Neutrino physics, Double Beta Decay, Low temperature devices, Bolometers, Radioactivity
220240	Search for the sources of ultra-high-energy cosmic rays with the Pierre Auger Observatory: from Auger South data to seamless integration of trigger and aperture for Auger North for full-sky coverage	AUGERCRSOURCE	CLO	09/07/2008	141 386	Marie-Curie Actions	MC-IEF	Physical sciences, Astroparticle Physics, Cosmic Ray Physics and instrumentation, Cosmic Rays Sources and Origin, Extensive Air Showers
253119	Flavour, unifications and experimental tests	FLUENT	CLO	09/08/2010	205 854	Marie-Curie Actions	MC-IEF	Unified description of elementary particles and their interactions, Theoretical high-energy physics, Quantum field theory, Physics of flavour, Neutrino physics, Experimental high-energy physics.
220754	Investigating Neutrinos in Cosmology and Astrophysics	INCA	CLO	10/12/2008	143 204	Marie-Curie Actions	MC-IEF	Astrophysics, Cosmology, Neutrinos, High-energy Astroparticle, Multi-messenger astronomy
221061	Characterization of extragalactic background light with the MAGIC telescope system	MAGICANDEBL	CLO	29/05/2008	151 936	Marie-Curie Actions	MC-IEF	Astrophysics, Cosmology
237036	Full sky neutrino astronomy with the Deep Core of IceCube	NEUTRINOSICDC	ONG	01/04/2009	172 686	Marie-Curie Actions	MC-IEF	Physical sciences - neutrino - astroparticle - high energy astrophysics - cosmic rays - galactic sources - IceCube
299582	On the trails of new neutrino properties	NUTRAILS	CLO	29/03/2012	231 547	Marie-Curie Actions	MC-IEF	Particle Physics, Neutrinos, Physics beyond the Standard Model, Astroparticle Physics
328652	Quantum Resolution of Gravitational Singularities	QM-SING	ONG	24/04/2013	183 470	Marie-Curie Actions	MC-IEF	Fundamental interactions and fields, Relativity, High Energy Physics, String Theory, Supergravity, General Relativity, Black Holes

# Astroparticle projects in FP7

- 13 MSCA projects

Project Number	Project Title	Project Acronym	Project Status	Project Signature Date	Project EC Financial Contribution	Research Work Programme	Project Instrument/ Funding Scheme	Keywords Project Abstract
220839	High energy neutrino astronomy with IceCube: towards the detection of neutrinos from Gamma Ray Bursts (GRBs)	HE NEUTRINO ICECUBE	CLO	08/08/2008	215 260	Marie-Curie Actions	MC-IOF	Physics, Astrophysics, astroparticle physics, neutrino astronomy, Gamma Ray Bursts, cosmic ray origin, non-thermal emission, high-energy astrophysics
248037	Probing the relativistic jet composition in high energy active galactic nuclei	HE-COSMIC-SOURCES	ONG	17/11/2009	100 000	Marie-Curie Actions	MC-IRG	Physical sciences; astroparticle physics; extragalactic sources; ultrahigh energy cosmic rays; cosmic gamma rays; cosmic neutrinos; non-thermal radiation processes; broadband modeling
289442	INVISIBLES	INVISIBLES	ONG	13/12/2011	3 823 903	Marie-Curie Actions	MC-ITN	Physical sciences, Phenomenology, Neutrinos, Dark Matter, Interface Particle-Astroparticle Physics-Cosmology

- 4 Research Infrastructures projects

Project Number	Project Title	Project Acronym	Project Status	Project Signature Date	Project EC Financial Contribution	Research Work Programme	Project Instrument/ Funding Scheme	Keywords Project Abstract
262053	The Preparatory Phase for the Cherenkov Telescope Array (CTA-PP)	CTA-PP	ONG	30/11/2010	5 197 776	Research Infrastructures	CNI-PP	Astronomy, Astrophysics, Gamma-ray astronomy, High energy astrophysics
212343	Design of a pan-European Infrastructure for Large Apparatus studying Grand Unification and Neutrino Astrophysics	LAGUNA	CLO	08/12/2008	1 700 000	Research Infrastructures	Design Study for RI	underground science, particle and astroparticle physics, fundamental particle properties
284518	Design of a pan-European Infrastructure for Large Apparatus studying Grand Unification, Neutrino Astrophysics and Long Baseline Neutrino Oscillations	LAGUNA-LBNO	ONG	31/08/2011	4 900 000	Research Infrastructures	Design Study for RI	Deep underground science, particle physics, astroparticle physics, long baseline neutrino oscillations
212525	Preparatory Phase for a Deep Sea Facility in the Mediterranean for Neutrino Astronomy and Associated Sciences	KM3NET-PP	ONG	12/11/2008	5 000 000	Research Infrastructures	Integrating Activities	Astroparticle physics; high energy neutrino astronomy; deep sea science and technologies; research infrastructures.

# Astroparticle projects in H2020

- 3 on going projects

Project Number	Project Title	Project Acronym	Project Status	Project Signature Date	Project EC Financial Contribution	Research Work Programme	Project Instrument/ Funding Scheme	
637506	New Directions in Theoretical Neutrino Physics	nuDirections	ONG	01/04/2015	806 600	ERC	ERC-STG	Neutrino oscillations, Sterile neutrinos, Supernova neutrinos, Quantum decoherence
661103	Indirect Probes of New Physical Phenomena in Space	NewPhysicsInSpace	ONG	09/03/2015	148 583	Marie S.Curie Actions	MSCA-IF-EF-RI	astroparticle physics, cosmology, astrochemistry
676134	Cherenkov Telescope Array: Infrastructure Development and Start of Implementation	CTA-DEV	ONG	09/07/2015	4 257 813	Research Infrastructures	INFRA-DEV-1	Cherenkov Telescope Array, Observatory, Very High Energy (VHE) gamma ray astronomy, site infrastructure, deployment planning, hosting agreements, local outreach