



## Press Communication

# EU Particle Physics & Astronomy commit to the Research Data Revolution making the European Open Science Cloud a reality

First quarter 2019 sees the exciting launch of one out of the five successfully retained INFRA-EOSC-04-2018 Cluster projects, which the European Commission supports with €16 million to boost the implementation of the European Open Science Cloud (EOSC).

### About EOSC:

European Open Science Cloud (EOSC) is a cloud for research data in Europe allowing for universal access to data; a single online platform where all European researchers will be able to: (i) find, access and re-use data produced by other scientists; (ii) deposit, analyse and share data they have been paid to produce.

EOSC will help increase recognition of data intensive research and data science. Its architecture is developed as a data infrastructure commons serving the needs of scientists, providing both common functions and localised services delegated to community level.

EOSC will federate existing resources across national data centres, European e-infrastructures and research infrastructures by gradually opening up its user base to the public sector and industry.



**ESCAPE – « The European Science Cluster of Astronomy & Particle Physics ESFRI Research Infrastructures »** answers the EOSC ambition in bringing **People, Data, Services, Training, Publications, Projects & Organisations**, all together in an integrated and federated environment. The project is led by the **IN2P3**, the national institute of nuclear and particle physics within **CNRS**, the French public research organisation, with a consortium of 31 partners including 27 European partner institutions, two pan-European research organisations, and two SMEs.



**Why the ESCAPE as an acronym?** Dr. Giovanni LAMANNA, Director of the IN2P3 laboratory LAPP - Laboratoire d'Annecy de Physique des Particules and Principal Investigator of the ESCAPE project, highlights that:



*"ESCAPE stands for **European Science Cluster of Astronomy & Particle physics ESFRI research infrastructures**. To address the critical questions of open science and long-term reuse of data for science and for innovation, it is important to put together a cluster of ESFRI projects and pan-European international research organisations that share aligned challenges of data-driven research, have demonstrated capabilities in addressing various stages of data workflow and conduct fundamental research through complementary approaches. It is the first time that many of the greatest European scientific facilities in physics and astronomy have combined forces to make their data and software interoperable and open, committing to make the European Science Cloud a reality. This is an important milestone for European scientific research. The name ESCAPE was chosen because our cluster aims to let data and research fly out from confinement."*

Multi-messenger astronomy and accelerator-driven particle physics are two pillars of the ESCAPE project. Through the combination of the experimental investigations of the two extremes, from the largest-scale structures in the observable Universe to the most fundamental particles, the astronomy-related projects and the accelerator-based particle physics facilities will open together new paths towards the understanding of the Universe. A deluge of data is expected in the next years by the next generation facilities prioritised in the **European Strategy Forum on Research Infrastructures** (ESFRI<sup>1</sup>), and other world-class projects. This €16 million funding boost will help Europe's world-leading research infrastructures work together to find common solutions to their data challenges, their data interoperability, their data access and to accentuate the openness of Fundamental Science research to the full international community, from professionals to the public.

**People:** European astronomers and particle physicists are celebrating the €16 million boost for Open Science today, through ESCAPE. ESCAPE is not just about providing tools for the expert European science community. Members of the public will be able to **access world-class data and participate in science discovery**, through citizen science mass participation experiments.

**Data:** Many of Europe's greatest laboratories and research infrastructures are combining forces to make all their data **findable, accessible, interoperable and reusable**, through the European Open Science Cloud (EOSC). Users are invited to contribute to define the main common functionalities of EOSC and the needs of their own community. European astronomers and particle physicists are committing to build EOSC through ESCAPE.

**Training:** ESCAPE's work-plan emphasises a strong component of training – the aim is to attract and educate young scientists towards Open Science and data stewardship, in using the newly developed tools and methodologies. The EOSC will be developed to serve the needs of scientists and to respond to the global cultural change recognising research data as a significant output of

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<sup>1</sup> The ESFRIs are the major facilities identified in the European Strategy Forum for Research Infrastructures.



research that needs appropriately curated throughout and after the period conducting the research.

**Services:** ESCAPE will extend the concepts of the astronomical Virtual Observatory seamlessly into the domains of solar physics, particle physics and astroparticle physics. ESCAPE will leverage the long-standing expertise of the particle physics community in **large-scale distributed computing and data resources**, building new tools to deal with the data avalanche from the next generation of facilities to create a giant “data lake” of up to multi-Exabytes federating national and regional data centres. A new **science analysis platform will be built**, so users of the EOSC can tap into **existing software** and bring their own, using the power of high-performance and high-throughput computing. Finally, ESCAPE will create a **new open source software repository**, to maximise software re-use and co-development, to identify open standards for software release, to investigate data mining tools and new analysis techniques. The ESCAPE **domain-based repository** will be part of the global EOSC catalogue of scientific software.

**Projects:** ESCAPE builds on the successes of an earlier EU-funded cluster project, ASTERICS<sup>2</sup>, which built some of the fundamental infrastructure, data management and scientific software solutions as well as policies for interoperability and joint scheduling.

The funding was made through the European Union's Horizon 2020 Framework Programme, which is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding over 7 years (2014 to 2020).

**Organisations:** ESCAPE's domain expert and skilled consortia of facilities is broad, and knowledgeable. It includes ESFRI projects/landmarks such as the Cherenkov Telescope Array (**CTA**), the Extremely Large Telescope (**ELT**), the European Solar Telescope (**EST**), the Facility for Antiproton and Ion Research in Europe (**FAIR**), the High Luminosity-Large Hadron Collider (**HL-LHC**), the cubic-kilometre-sized Neutrino Telescope (**KM3NeT**) and the Square Kilometre Array (**SKA**). Two pan-European International Organizations, the European Organization for Nuclear Research (**CERN**), and the European Southern Observatory (**ESO**), are also members of the ESCAPE cluster. The European Virtual Observatory (**EURO-VO**) is also actively engaged in this endeavour. ESCAPE also brings on board other world-class established astronomical observatories, such as those operated by ESO (e.g. **APEX ALMA**, the **Paranal** and **La Silla** observatories), research infrastructures such as the European Gravitational-Wave Observatory (**EGO-Virgo**) and the Joint Institute for VLBI ERIC (**JIV-ERIC**).

### **The complete list of ESCAPE partners**

Centre National de la Recherche Scientifique (CNRS), European Organization for Nuclear Research (CERN), ASTRON, CWI and NIKHEF institutes of the Stichting Nederlandse Wetenschappelijk Onderzoek Instituten (NWO-I), Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), European Southern Observatory (ESO), The Square Kilometre Array Organization (SKA), Facility for Antiproton and Ion Research in Europe (FAIR GMBH), Koninklijke Sterrenwacht van België (ORB), Università degli Studi di Roma Torvergata (UNITOV), Leibniz-Institut für Astrophysik Potsdam (AIP), Istituto Nazionale d'Astrofisica (INAF), Instituto de Fisica de Altas Energias (IFAE), Stiftung Deutsches Elektronen-Synchrotron

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<sup>2</sup> <https://www.asterics2020.eu/> Astronomy ESFRI & Research Infrastructure Cluster



(DESY), Universidad Complutense de Madrid (UCM), Max-Planck-Gesellschaft zur Förderung der Wissenschaften EV (MPG), Stiftung Kiepenheuer-Institut für Sonnenphysik (KIS), Ruprecht-Karls-Universität Heidelberg (UHEI), GSI Helmholtzzentrum für Schwerionenforschung GmbH (GSI), The University of Edinburgh (UEDIN), Istituto Nazionale di Fisica Nucleare (INFN), Joint Institute for Very Long Baseline Interferometry, a European Research Infrastructure Consortium (JIV-ERIC), European Gravitational Observatory / Osservatorio Gravitazionale Europeo (EGO), The Open University (OU), Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC), Instituto Nacional de Técnica Aeroespacial Esteban Terradas (INTA), HITS GGMBH (HITS), Cherenkov Telescope Array Observatory GGMBH (CTAO GGMBH), Rijksuniversiteit Groningen (RUG), Surfsara BV, TRUST-IT Services (TRUST-IT), OROBIX Srl (OROBIX).

**Source Image:**

The Physical Science ESFRI projects in astronomy, astroparticle and particle physics that form the focus of the ESCAPE cluster (from left to right and top to down): [ELT](#), [CTA](#), [FAIR](#), [KM3NeT](#), [SKA](#), [HL-LHC](#), [EST](#)