

Destination Earth

Destination Earth aims to develop a high precision digital model of the Earth to model, monitor and simulate natural phenomena and related human activities.



As part of European Commission's Green Deal and the Digital Strategy, Destination Earth (DestinE) will contribute to achieving the objectives of the twin transition, green and digital.

DestinE will unlock the potential of digital modelling of the Earth system. It will focus on the effects of the climate change, water and marine environments, polar areas, cryosphere, biodiversity or extreme weather events, together with possible adaptation and mitigation strategies. It will help to predict major environmental degradation and disasters with unprecedented fidelity and reliability.

By opening up access to public datasets across Europe, DestinE represents also a key component of the European strategy for data.

Users of DestinE will be able to access vast amounts of natural and socio-economic information in order to:

- Continuously monitor the health of the planet: For example, to study the effects of climate change, the state of the oceans, the cryosphere, biodiversity, land use, and natural resources.
- Support EU policy-making and implementation: For example, to assess the impact and efficiency of environmental policy and relevant legislative measures.
- Perform high precision, dynamic simulations of the Earth's natural systems, focusing on

thematic domains such as marine, land, coasts, and atmosphere.

- Improve modelling and predictive capacities: For example, to help anticipate and plan measures in case of storms, floods and other extreme weather events and natural disasters.
- Reinforce Europe's industrial and technological capabilities in simulation, modelling, predictive data analytics, artificial intelligence (AI) and high performance computing (HPC).

At the heart of DestinE will be a user-friendly and secure cloud-based digital modelling and simulation platform. This platform will provide access to data, advanced computing infrastructure including HPC, software, AI applications and analytics. It will integrate digital twins — digital replicas of various aspects of the Earth's system — on topics such as extreme weather events, climate change adaptation, oceans, biodiversity and more.

DestinE will allow users to access to thematic information, services, models, scenarios, simulations, forecasts and visualisations. The underlying models and data will be continuously assessed to provide the most reliable scenario predictions for the users. The platform will also enable application development and the integration of users' own data. DestinE will initially serve public authorities and will gradually open up to a larger range of scientific and industrial users, to spur innovation and enable the benchmarking of models and data.

Implementation

The DestinE initiative is coordinated by the European Commission, in close collaboration with the Member States, scientific communities and technological expertise. The initiative will be jointly implemented by three entrusted entities: European Space Agency (ESA), the European Centre for Medium-Range Weather Forecasts (ECMWF) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) over the next 7-10 years, starting in autumn 2021.

The operational core platform, the first digital twins and related services will be made operational as part of the Commission's Digital Europe Programme. Horizon Europe will provide research and innovation opportunities that will support the further development of DestinE. There will be synergies with other relevant EU programmes, such as the Space Programme, and related national initiatives.

Digital twins

A digital twin is a digital replica of a living or non-living physical entity. The digital twins of DestinE will give both expert and non-expert users tailored access to high-quality information, services, models, scenarios, forecasts and visualisations on climate adaptation models, extreme weather events, natural disaster evolution and more. Digital twins rely on the integration of continuous observation, modelling and high-performance simulation, resulting in highly accurate predictions of future developments.

Preparing for DestinE

The first stakeholder workshop on DestinE was organized in November 2019 to announce the initiative and collect feedback from potentially interested stakeholders. It brought together a large number of potentially interested parties from public authorities and the industrial and scientific communities.

To explore the potential application areas and parallel initiatives, the Joint Research Centre conducted a Study on DestinE use cases analysis and a Survey on digital twin initiatives in EU countries, with contributions from the ESA, ECMWF and EUMETSAT, Commission services and agencies.

A further series of open stakeholder workshops took place:

- In October 2020, two workshops on user specifications for the first two Digital Twins (extreme natural events and climate change adaptation (Summary Report .pdf).
- In November 2020, a workshop on DestinE system architecture design.
- In February 2021, a Policy user engagement workshop was organised for discussing the two priority twins with potential policy users and their use case proposals.

Timeline

DestinE will be developed gradually through the following key milestones:

- By 2024: Development of the open core digital platform and the first two digital twins on extreme natural events and climate change adaptation.
- By 2027: Integration of additional digital twins, like the digital twin of the ocean, to serve sector specific use cases into the platform.
- By 2030: A 'full' digital replica of the Earth through the convergence of the digital twins already offered through the platform.

A European Green Deal

A European strategy for data

Communication: Shaping Europe's digital future (.pdf)

Factsheet: Destination Earth

Brochure: Destination Earth

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NEWS ARTICLE | 10 June 2021

Call for applications for the selection of members:
the Strategic Advisory Board for the Destination
Earth Initiative - deadline 2 August 2021

The Directorate General for Communications
Networks, Content and Technology of the
European Commission launches a call for

applications concerning the Strategic Advisory Group on the Destination Earth initiative.

BROCHURE | 19 March 2021
Destination Earth

This brochure gives you a quick overview of Destination Earth: the digital twin of the Earth helping us towards a sustainable future.

EVENT REPORT | 26 February 2021
Destination Earth initiative 3rd User Engagement Workshop - Summary Report

The purpose of the 3rd DestinE User Engagement Workshop, held on 11 February 2021, was to build a common understanding on how to ensure that DestinE results are useful for policy users and initiate a process towards co-design of future Digital Twin services between developers and policy users from EU & global institutions as well as from EU Member States.

EVENT REPORT | 02 February 2021
Destination Earth (DestinE) Architecture Validation Workshop - Summary Report

The purpose of the DestinE Architecture Validation workshop, held on 26 November 2020, was to present the state-of-play and the progress made regarding the design of DestinE's architecture, receive targeted feedback from experts on specific matters related to it, and refine the proposed architecture approach.

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Event report

26-02-2021

Destination Earth initiative 3rd User Engagement Workshop - Summary Report

02-02-2021

Destination Earth (DestinE) Architecture Validation Workshop - Summary Report

30-11-2020

Workshops reports on Elements of Digital Twins on “Weather-induced and Geophysical Extremes” and “Climate Change Adaptation”

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Event

11-02-2021

Destination Earth initiative 3rd User Engagement Workshop

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Destination Earth (DestinE) Architecture Validation Workshop

22-10-2020

Elements of a Digital Twin on Climate Change Adaptation - Workshop on the Destination Earth initiative

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Quantum

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High Performance Computing

High performance computing refers to computing systems with extremely high computational power that are able to solve hugely complex and demanding problems.

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