ECMWF – DESTINATION EARTH

SCOPE OF ENERGY APPLICATIONS UNDER DESTINATION EARTH

Jörn Hoffmann, ECMWF

Webinar: Enhancing climate resilience in the European energy sector with DestinE

November 12, 2026

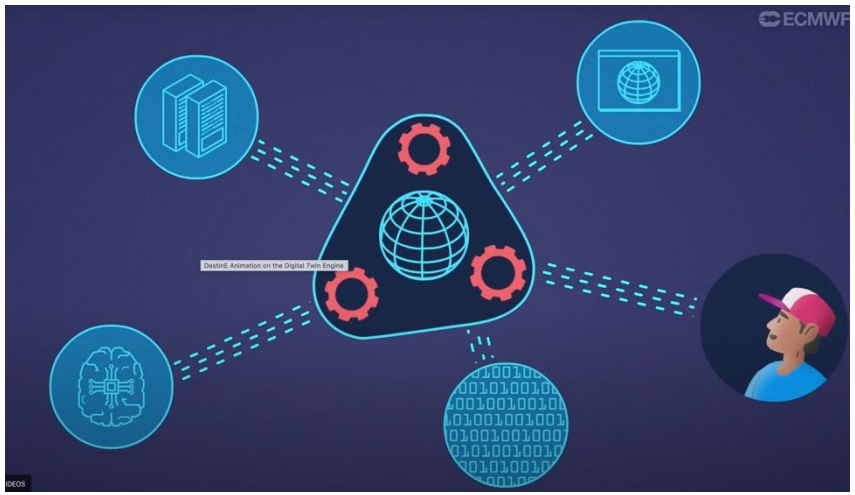


Funded by the European Union

Destination Earth implemented by ECMWF esa EUMETSAT

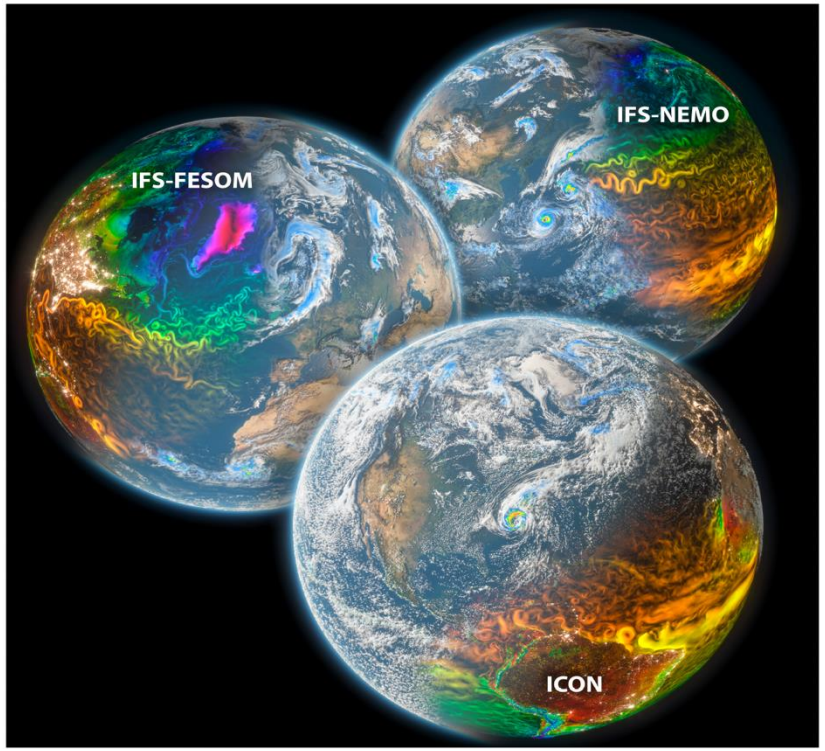
OPERATIONALISING DIGITAL TWIN TECHNOLOGY

Software tooling & services

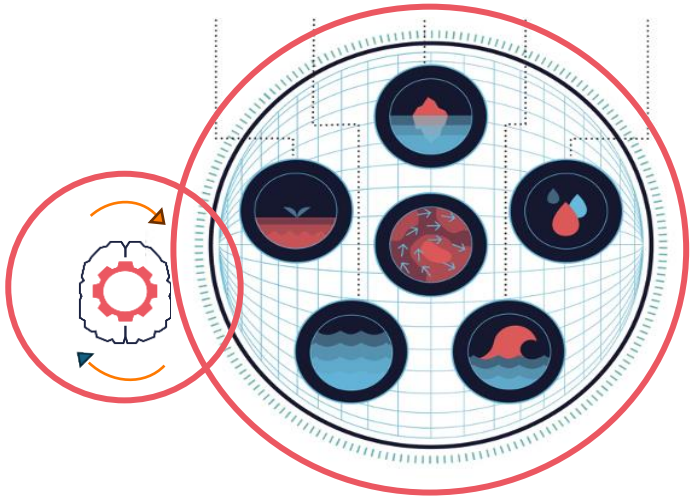


Digital twin engine

Next generation modelling systems – physics & AI-based



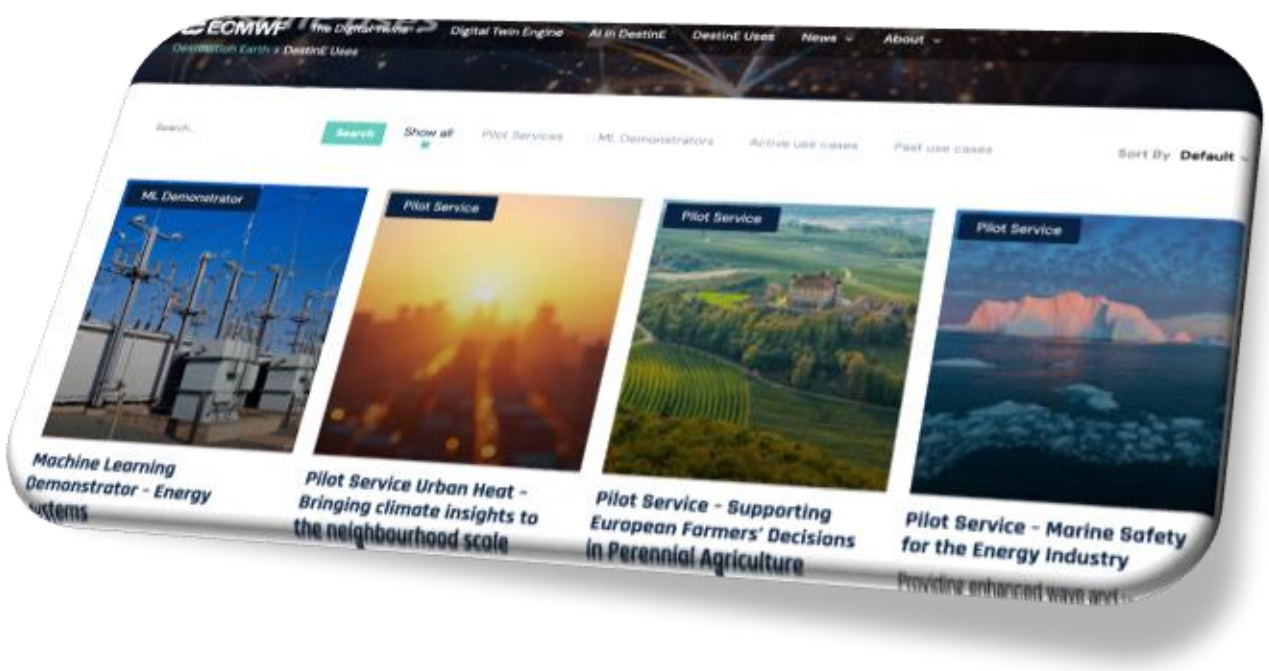
Digital twins



AI models & solutions

Pilot Services & Partnerships

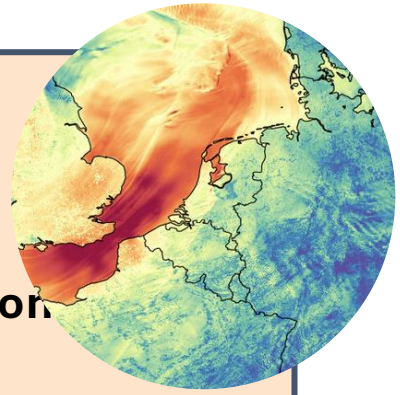
- 6 pilot services in energy, flood, maritime, urban heat, agriculture
- 7 ML Demonstrators: energy systems, data fusion, flood nowcasting, water temperature, agentic hydrological modelling
- Applications in DT workflows: energy, floods, frost, air quality, hydrology, …
- Strategic Partnerships
- Technology Readiness Assessment with geophysical and biodiversity digital twins



https://destine.ecmwf.int/destine-uses/
https://destination-earth.eu/use-cases
https://platform.destine.eu

Digital Twin Workflow Apps

Wind-/solar extremes on-demand



Why?

Support renewables operation

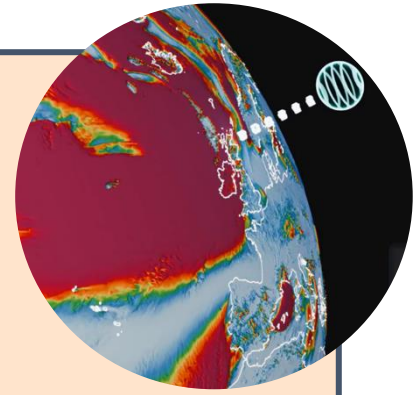
What?

Tailored detection (power ramping, storm cut-out, thunderstorm severity) triggers on-demand hectometric runs

Users

TSE, plant operators, asset planners, energy traders, NMHS

Energy indicators



Why?

Support energy sector planning for future climates.

What?

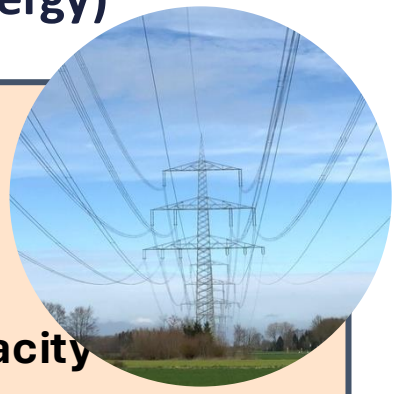
Deliver hydro-meteo indicators in Climate DT workflow

Users

Energy producers, grid planners

Pilot Services (energy)

Dynamic Line Rating



Why?

Optimize use of power lines through use of weather-dependent ampacity

What?

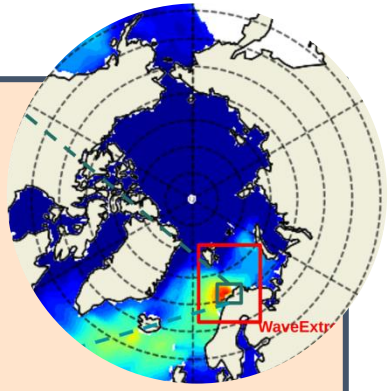
Develop a pilot service that provides weather parameters for TSO-operated models

Users

- Elia Group (TSO)

RMI propheSea GeoSphere Austria

Marine Safety for the Energy Industry



Why?

Support safe operation of offshore wind parks

What?

Provide short-term forecasts of extreme wave and vessel icing conditions (Barents Sea)

Users

Equinor

ILMATIETEEN LAITOS Meteorologisk institutt

Machine Learning Demonstrators (energy)

Energy Systems



Why?

Support optimization of electricity grids in Europe

What?

Provide a tool to help manage energy grids under different meteorological conditions

Users

TenneT, Amprion, Stadtwerke Ulm Netze Gmb e.DSO

TRANSNET BW

TenneT

Stadtwerke Ulm/Neu-Ulm Netze GmbH

DLR

AARHUS UNIVERSITY

Renewables Grid Initiative

Freshwater Temperature



Why?

Rising water temperatures impact water-intensive industries

What?

Water temperatures under different climate scenarios, and event storylines

Users

Energy producers, industrial water users, policy makers and permitting bodies

propheSea

RMI

anteagroup

Looking ahead

Supporting EUCRA-2

- Pan-European risk indicators
- Storyline-based risk assessment

Supporting ENTSO-E

- Advancing energy systems

… and more to come