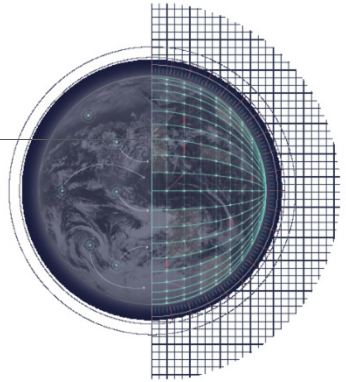
DestinE formal announcement



Key initiative, announced in:

- A European Green Deal (2019)
- A European strategy for data (2020)
- Shaping Europe's digital future (2020)

Aim and goals

Develop a **very high precision digital model of the Earth (Digital Twin)** of the Earth to monitor and simulate natural and human activity and to develop and test scenarios for

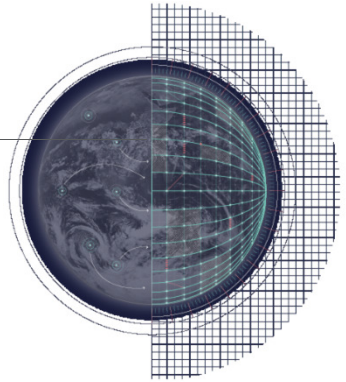
- more sustainable development and achievement of the EU green deal objectives
- saving lives
- avoiding large economic downturns
- **support EU policy-making and implementation**
- reinforce Europe's industrial and technological capabilities in advanced computing, simulation, modelling, predictive data analytics and Artificial intelligence (AI)

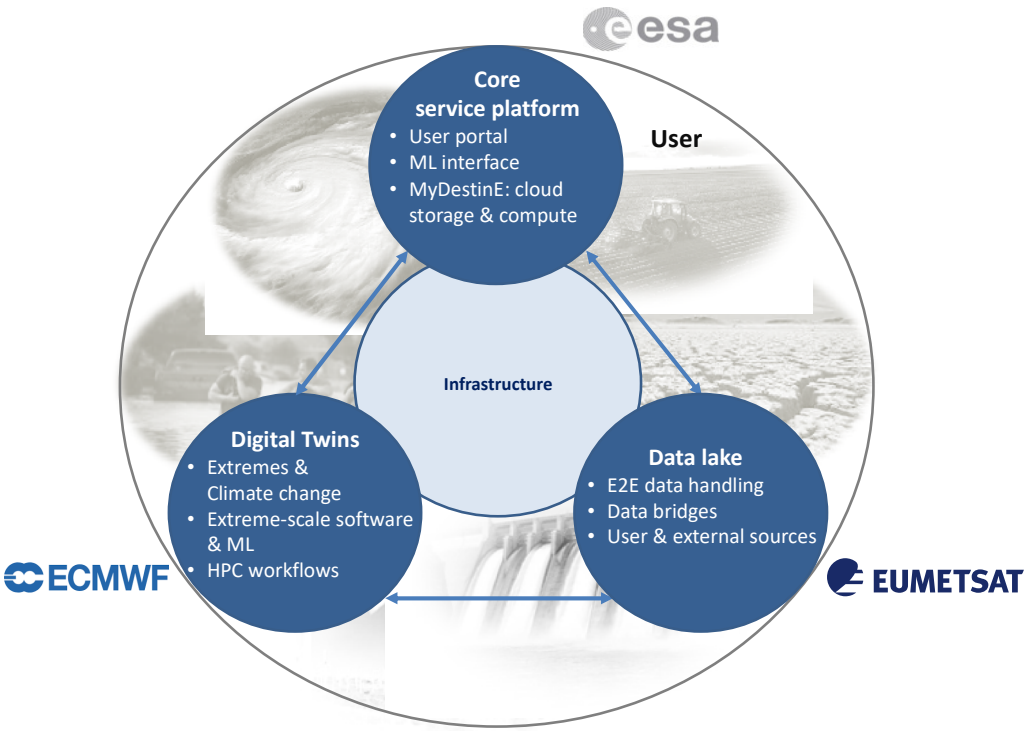
Courtesy Grazyna Piesiewicz, DG-CNECT

Directorate-General for Communications Networks, Content and Technology is the Commission department responsible to develop a digital single market to generate smart, sustainable and inclusive growth in Europe

European Commission

High-priority Digital Twins in DestinE

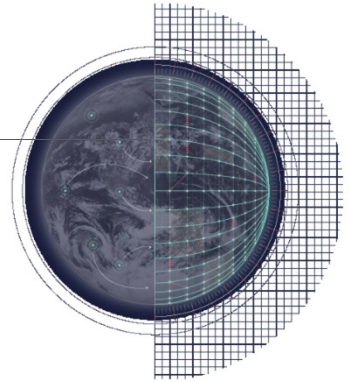


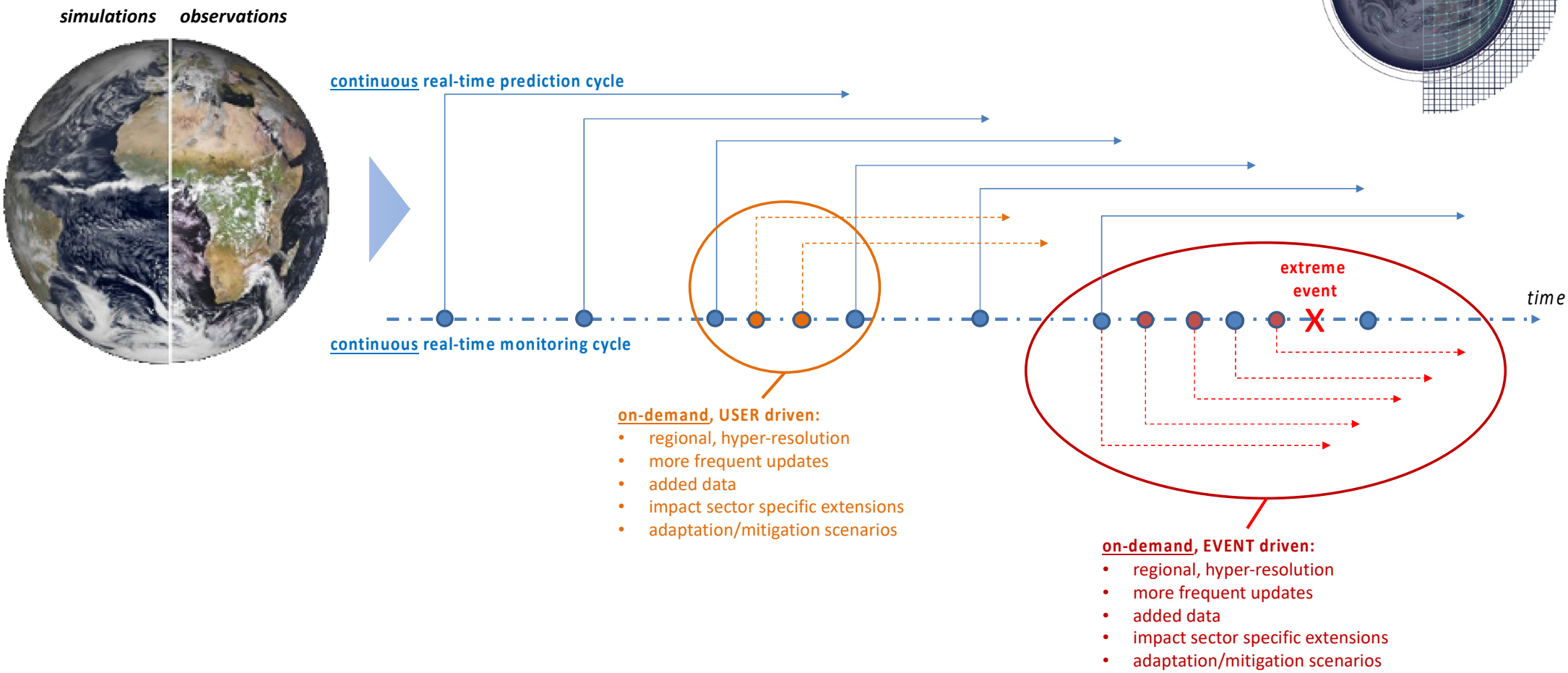


Weather-induced and Geophysical Extremes:
"Environmental extremes at very high spatial resolution and close to real-time decision-making support at continental, country, coastline, catchment and city scales in response to meteorological, hydrological and air quality extremes"

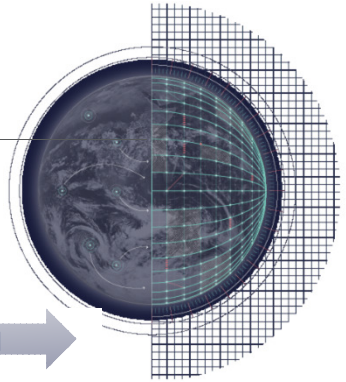
Climate Change Adaptation:
"Climate change adaptation policies and mitigation scenario testing at decadal timescales aiming at a real breakthrough at the level of reliability at regional and national levels, for understanding the causes and explaining the feedback mechanisms of change, and predicting possible evolution trajectories"

Digital Twin production modes





Going beyond the Scalability Programme

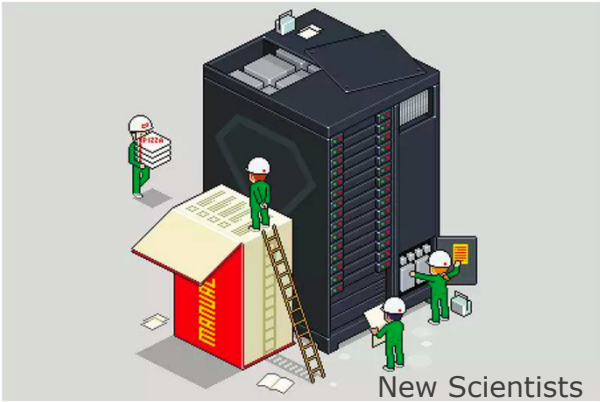


Input data = ~10^8 observations/day + IoT; Output data = PBs/day; Compute = ~100 PFLOP/s:

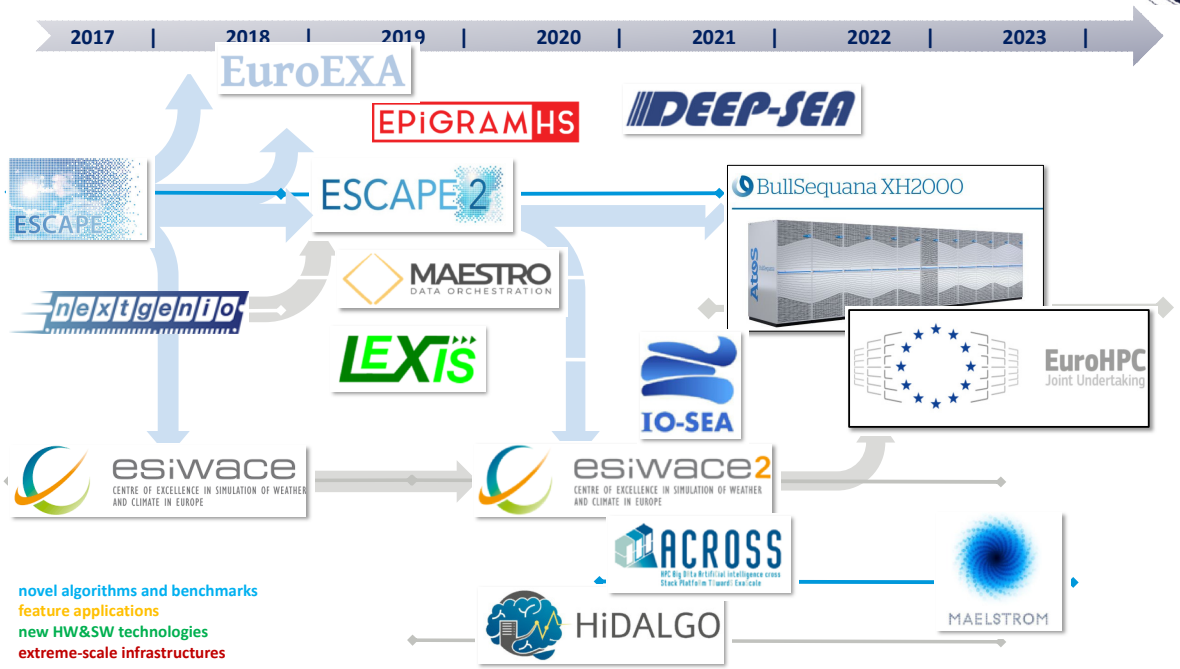
FEATURE 10 October 2018

Could the world's mightiest computers be too complicated to use?

China, Japan and the US are racing to build the first exascale computer – but devising programmes clever enough to run on them is a different story



Totto Renna



Configurations that are step change ahead of current operations

Opportunity to take forward/accelerate science and system development work that we wanted/needed to do anyway e.g. readiness for future HPC

DestinE candidate implementation

- **Lead and business owner: European Commission (DG CONNECT)**
- **Strategic partnership** with ESA-ECMWF-EUMETSAT
- Responsibilities:
  - **ESA : key role of system integrator and implementer of the core platform**
  - ECMWF: Digital Twin implementer
  - EUMETSAT: responsible for the big data lakes and data integration
- Formal organization: "**contribution agreements**" by summer 2021

2021-2023

- **Operational cloud-based platform**
- **First two digital twins**

2023-2025

Platform integrates the next operational digital twins and offers services to public sector users

2025-2027+

Towards a full "digital twin of the Earth" through a convergence of multiple digital twins on the platform

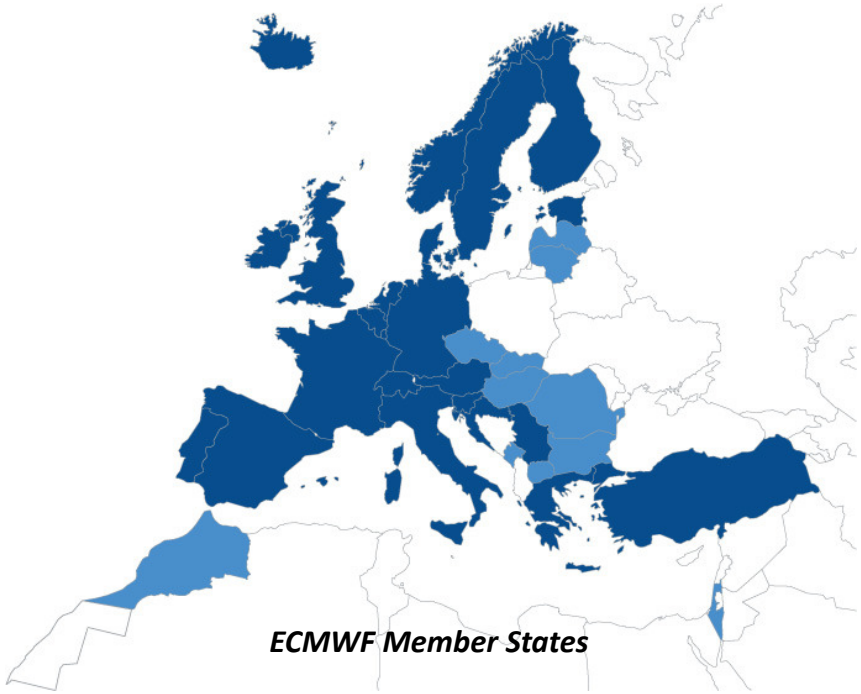
More detailed information:
- ECMWF MS WG March 16th
- Special ACCORD PAC meeting?

Courtesy Grazyna Piesiewicz, DG-CNECT

Partnership is essential

DestinE will engage in continuous partnerships to co-evolve its components and deliverables → complementarity!

- Science
- Technology
- Services
- Infrastructures



ECMWF Member States

ECMWF

esa

EUMETSAT

UN environment programme

Copernicus Europe's eyes on Earth

EuroHPC Joint Undertaking

WORLD METEOROLOGICAL ORGANIZATION

TCI TransContinuum Initiative

European Commission