

DESTINATION EARTH – A Digital Twin for Policy Support, Science & Industry

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Accessible and interoperable data are at the heart of data-driven innovation. This data, combined with digital infrastructure (e.g. supercomputers, cloud, ultra-fast networks) and artificial intelligence solutions, facilitate evidence-based decisions and expand the capacity to understand and tackle environmental challenges.

The Commission will support work to unlock the full benefits of the digital transformation to support the **ecological transition**. An immediate priority will be to boost the EU's ability to **predict and manage environmental disasters**. To do this, the Commission will bring together European scientific and industrial excellence **to develop a very high precision digital model of the Earth**.

*The European Green Deal,
COM(2019) 640 final, Brussels,
11.12.2019*

Concept

- The Destination Earth initiative aims to develop a very **high precision digital model of the Earth**.
- It will be a multi-dimensional representation of our planet enabling users to interact in a holistic manner with the vast amounts of **natural and socio-economic information** gathered about the Earth.
- Users will not be limited to moving through space, but can also travel through time, thus become **capable to assess not only the impact of challenges, but also the efficiency of proposed solutions**.

A **core product** will be developed, consisting of several building blocks:

a. Infrastructure

- Data centre, AI applications/services centre, connectivity
- **Access initially prioritizing public authorities (COM/MS) but also open to scientific/industrial actors**

b. Data

- Copernicus data
- Data from public/private providers (e.g. ESA, ECMWF, Eumetsat ...)
- **Data from sensors, IoT and social media (“citizen science”)**

c. AI-enabled applications /data analytics software

d. “Horizontal” support actions

- E.g. to define common standards/principles applicable to all DTs used for EU Policy Support

Definition of the Core Product

- **Developing the full capabilities of the new digital continuum** (smart sensors, IoT, big data, AI, HPC, cloud computing)
- Identifying first the **low-hanging fruits**:
 - Focus on current **EU policy priorities** (e.g. environmental sustainability, climate adaptation, food & water security)
 - Developing a few top priority **Digital Twins**
- Core can then be **incrementally expanded** according to policy priorities towards a **full model** (long-term commitment).

Science for Policy

- Digital twins as a tool to support better (policy) decisions
- Under the new digital continuum, we have a world driven by objective/subjective knowledge generated continuously and more & more by machines (“AI”)
- Continuous change → non-ergodic system → non-pre-determined interactions/outcomes
- **A twin of Earth is thus not a system of Physics**
- Implications for using it for (Digital) Governance:
 - *Not only crisp number answers but primarily scenarios*
 - *Rather on what to avoid (adaptation) than what to do (risk)*
 - *General results, not (too) specific ones (e.g. CC event attribution)*
 - *Trust in decisions made by machines?*

R&D needs

- *Deliver breakthrough in accuracy & realism*
- *Fully integrate downstream impact sectors for decision-making*
- *Optimal synergy between observations, incl. "weak signals", and models*
- *Include rigorous handling & visualisation of reliability, verifiability, robustness of information for continuous trust-building*