



BioDT and DestinE

*Collaboration to strengthen the
development of Digital Earth Twins*

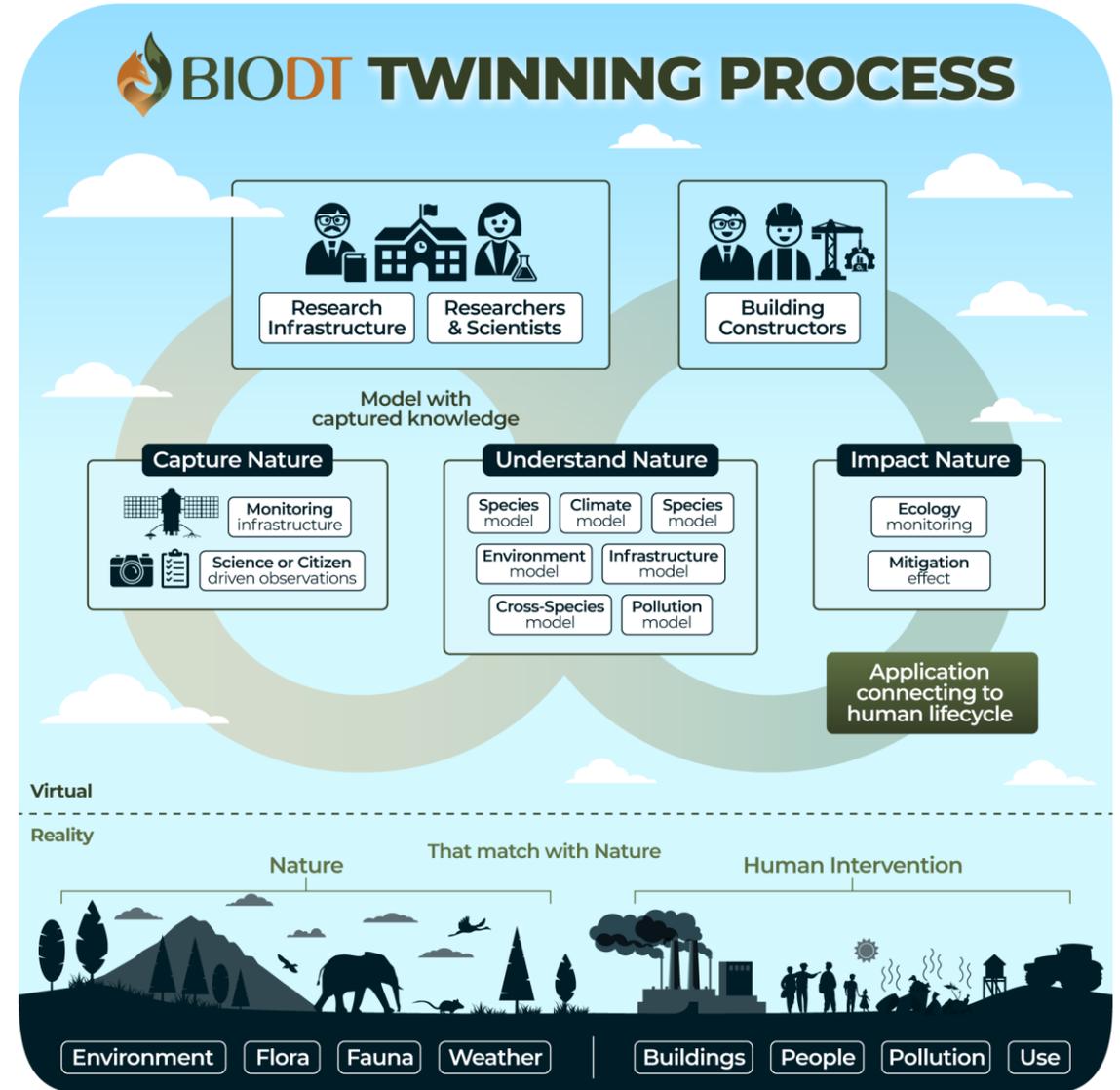
BioDT Webinar Series (04 April 2023)
Jeroen Broekhuijsen - TNO



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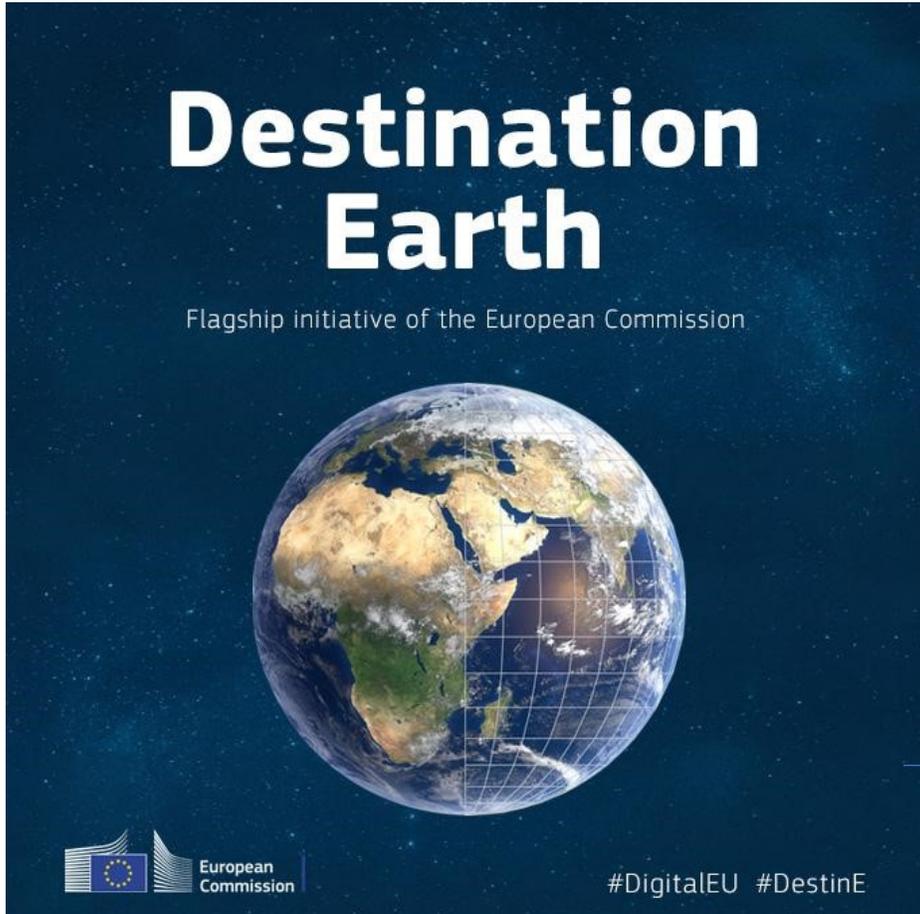
Goal of BioDT

Support Research Infrastructures for biodiversity by making a first **prototype digital twin** that **drives both science & uses cases** and **connects EU twins & initiatives**



Big Questions linked to Sustainable Development Goals

- 🔥 How will climate change affect biodiversity?
- 🔥 What can we do to mitigate loss of biodiversity?
- 🔥 How can we adapt to the new status-quo?
- 🔥 Will we be able to produce enough food?
- 🔥 Can we stay healthy?
- 🔥 Do we want to make Biodiversity and financial interests comparable?



Initial Twin

Current
Twin Prototypes

Next Calls

Climate Change
Extreme Weather



- BioSphere
- Marine Life Biodiversity
- Ocean
- Hydrology
- CryoSphere
- Land Surface
- Atmosphere
- Localized City Twins
- EU Power grid
- And more...

- 🔥 Twin integration patterns

- 🔥 Embedded: directly integrated in the Destination Earth system

- 🔥 Tightly-Coupled: integrated in a workflow where new digital twins interface with the Destination Earth digital twins

**Current
Twins!**

- 🔥 Loosely-coupled: as post-processing applications without own Destination Earth-system

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When?

How?

	<p>Biodiversity RIs, RI nodes, data providers and researchers</p> <p>RIs, universities, research organisations; the end-users that will contribute to developing the DT, enhancing its use cases, and testing its functionalities</p>
	<p>Policy makers</p> <p>EU, Member States, Local governments, intergovernmental organisations (UNESCO, FAO, etc.)</p>
	<p>Industrial actors incl. SMEs</p> <p>Sectors related to biodiversity, such as agri-food, tourism, healthcare.</p>
	<p>Civil society and citizen scientists</p>

	<p>Biodiversity RIs, RI nodes, data providers and researchers</p> <p>Better understanding of nature: High quality models, increased data coverage, more species aspects, increased science collaboration, widening field of biodiversity</p>
	<p>Policy makers</p> <p>Achievable policy: clear biodiversity metrics, mitigation strategies, socio / economic aspects of biodiversity, scenario planning</p>
	<p>Industrial actors incl. SMEs</p> <p>Engineering compliance supporting policy: Impact minimalization, design for diversity, changing role in ecosystem, Biodiversity services,</p>
	<p>Civil society and citizen scientists</p> <p>Nature Enthusiasm: Engaging with nature, helping data coverage, taking samples, stimulate local biodiversity, activate mitigation strategies</p>

- 🔥 Virtual environment for science

- 🔥 Set up personal data, experiment & validation
- 🔥 Low-code/less-code environment
- 🔥 Default scale-up to HPC/Cloud facilities
- 🔥 Fast results & experimentation
- 🔥 Easy transition of results

- 🔥 Sustainability supportive operations for industry

- 🔥 Tools that create yield AND support nature
- 🔥 Compliance by default for new permits
- 🔥 Tools offering mitigation services
- 🔥 Tools offering adaptation services

First aspects in development

- 🔥 Future planner for policy makers

- 🔥 Interactive environment
- 🔥 Evaluate future scenario's
- 🔥 Establish weights for social / economic / biodiversity
- 🔥 Based on proven models
- 🔥 Driving SDGs

- 🔥 Engagement for citizens

- 🔥 Create understanding of new policy
- 🔥 Activation & engagement apps

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**Still requires
much work**

- Sustainability supportive operations for industry

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To achieve these possible futures

- 🔥 Collaborate & create common:
 - 🔥 Language / way of speaking / way of working
 - 🔥 Set of goals/types and uses
 - 🔥 Interoperability & interfaces
 - 🔥 Leap in scientific scale & understanding
 - 🔥 Data, environments, code, validation tools
 - 🔥 Make twins far simpler to make and use
 - 🔥 Availability of data
 - 🔥 ...



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