

iImagine: A Cutting-Edge AI-Platform for Aquatic Sciences

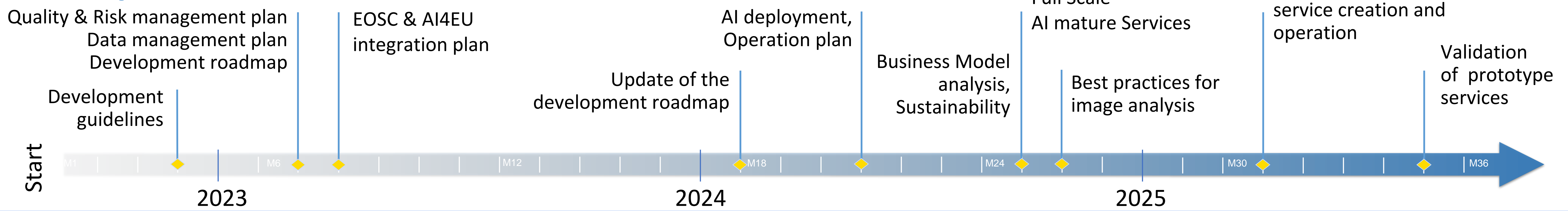


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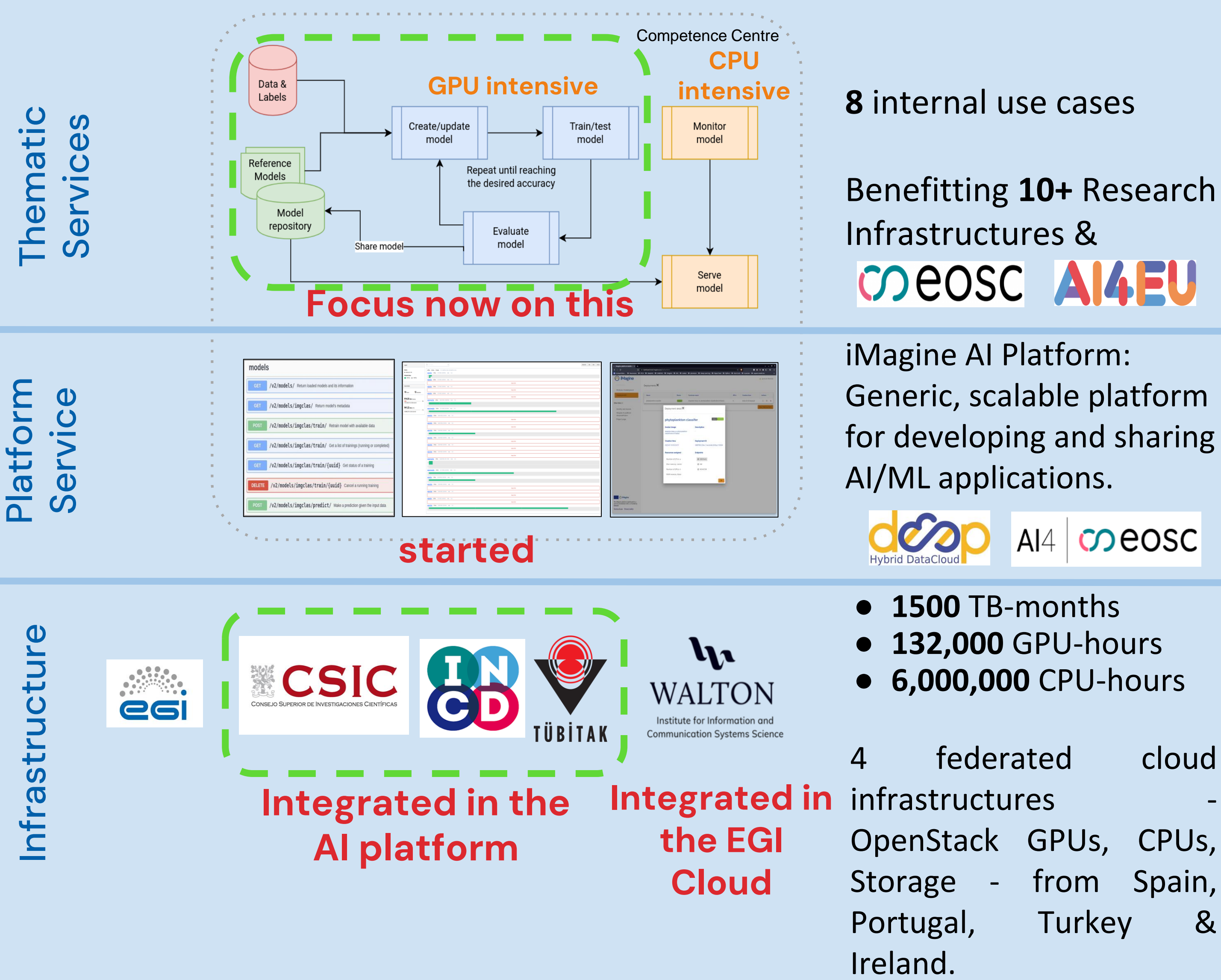
Project Coordinator: [G. Sipos](#) (EGI), Scientific Coordinator: [D. Schaap](#) (MARIS), AI Platform Coordinator: [A. López García](#) (CSIC), Competence center: [V. Kozlov](#) (KIT)

OBJECTIVE: Image analysis in aquatic science deals with large amounts of unlabeled data and a high diversity of data types. The data is rapidly increasing and is captured in changing environments. To advance image analytics and increase research performance, a dedicated **iImagine AI framework and platform** is established, operated, and validated. The platform is connected to **EOSC** and **AI4EU**, giving researchers in aquatic sciences **open access** to a diverse portfolio of AI-based image analysis services and image repositories from multiple RIs, working on and of relevance to the overarching theme of **'Healthy oceans, seas, coastal and inland waters'**.

Roadmap

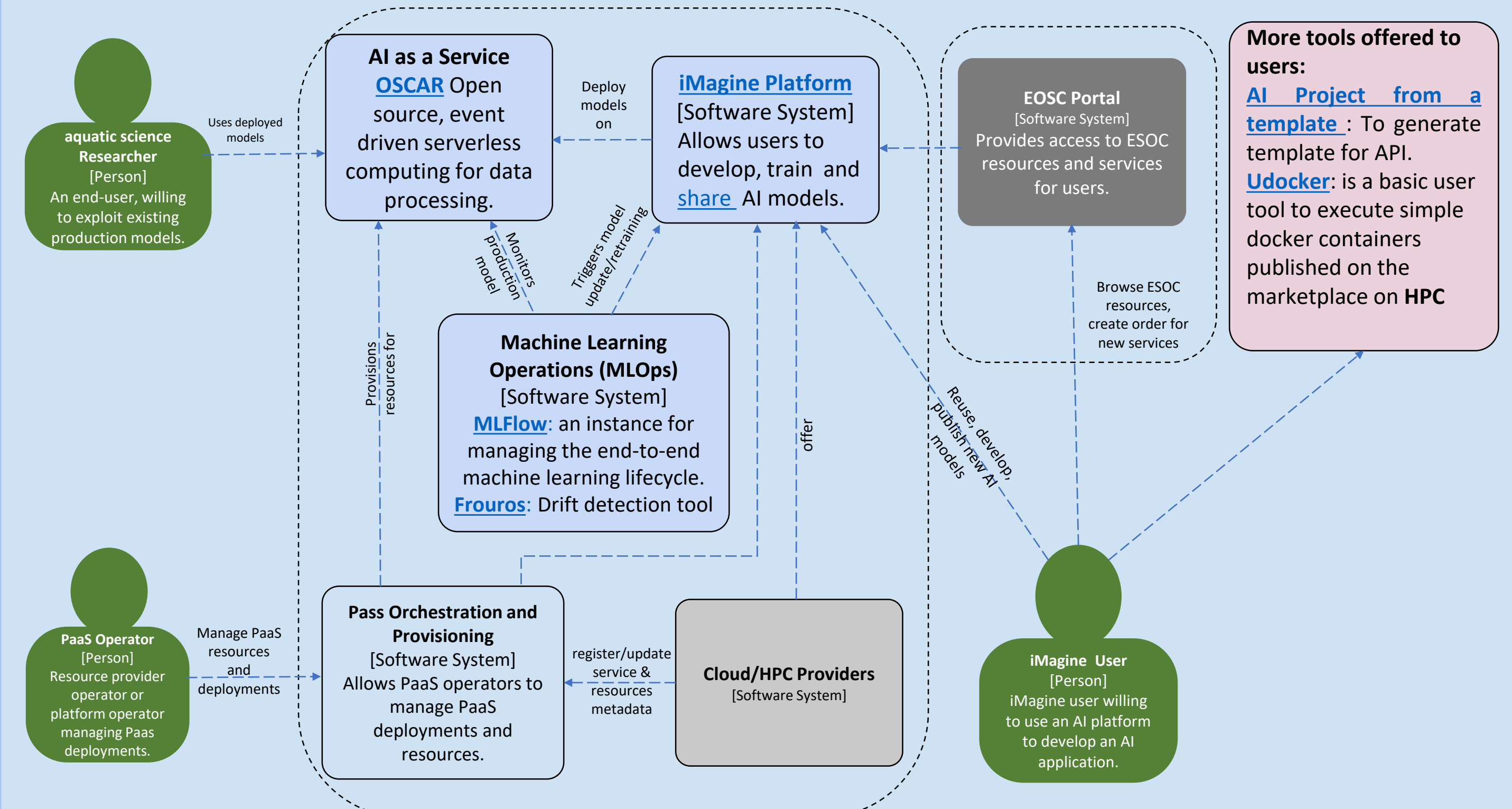


iImagine Approach



Platform Components

The **iImagine platform** is based on the **AI4OS** software stack, which is being further developed in the **AI4EOSC** project. Below is the general overview of the available system.

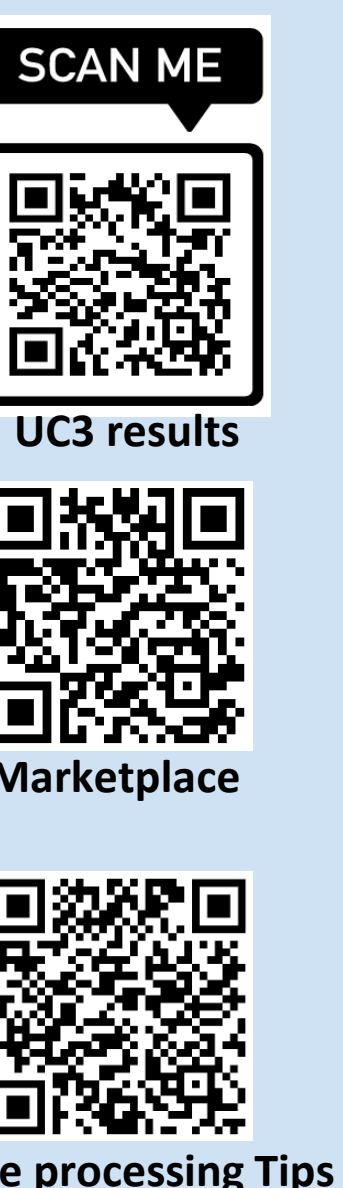


Preliminary Results

- **Assessment of annotation tools**
 - o [Biigle](#), [CVAT](#), [Labelbox](#), [Labelstudio](#), [Roboflow](#)
- **Preparation of training datasets:**
- Given the fundamental role of **datasets** in **AI**, users have created various datasets as part of this project. Some already publicly available datasets:
 - o [Beach monitoring dataset](#)
 - o [Phytoplankton identification dataset](#)
- **Publication of AI modules on the iImagine platform**

Published as Docker images to ensure the reproducibility of results.

 - o UC1: [Classification](#) of marine waste
 - o UC2: [Phytoplankton species classification](#)
 - o UC3: [AI-based fish detection](#) algorithm based on YOLOv8
 - o UC5: [Identify plankton species](#) at the level of 87 classes.
 - o UC6: [Underwater noise classification](#)
 - o General-purpose AI modules, e.g [FasterRCNN](#), [YoloV8](#)
- **Developing best practices**
 - o E.g. [Tips for AI-based image processing](#)
- **Onboarding three external use cases**



Use Cases (UC)

Five operational and **three prototype** AI image analysis services, with open-access image repositories, demonstrate value and promote widespread adoption among researchers and users.

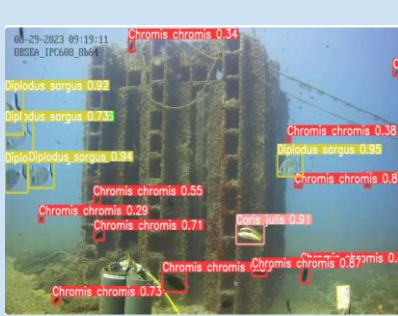
Aquatic Litter Drones: (DFKI, MARIS, OGS): Monitoring system for Aquatic Litter Pollution



Zooscan – EcoTaxa pipeline (Sorbonne Université): Taxonomic identification of zooplankton using Zooscan



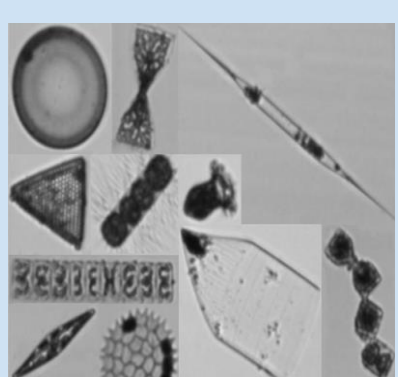
Marine Ecosystem Monitoring: (EMSO ERIC, UPC, IFREMER, MI): Ecosystem Monitoring by means of video imagery from cameras



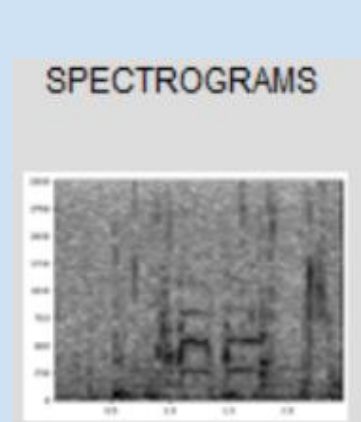
Oil Spill Detection (CMCC, OrbitalEOS, UNITN): Oil spill detection from satellite images



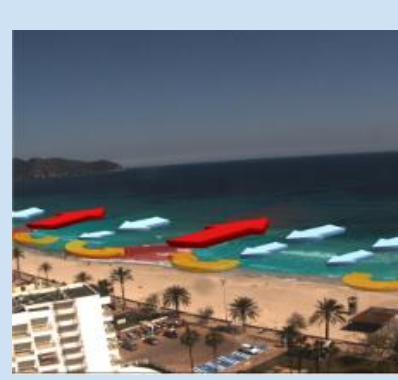
Flowcam phytoplankton identification (VLIZ): Taxonomic identification of phytoplankton using FlowCAM images



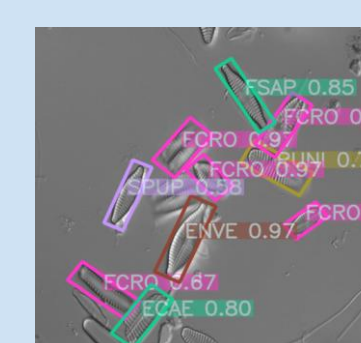
Underwater noise identification (VLIZ): Identification of sound events from acoustic recordings



Beach monitoring (SOCIB): Posidonia oceanica berms and rip-currents detection from beach monitoring systems



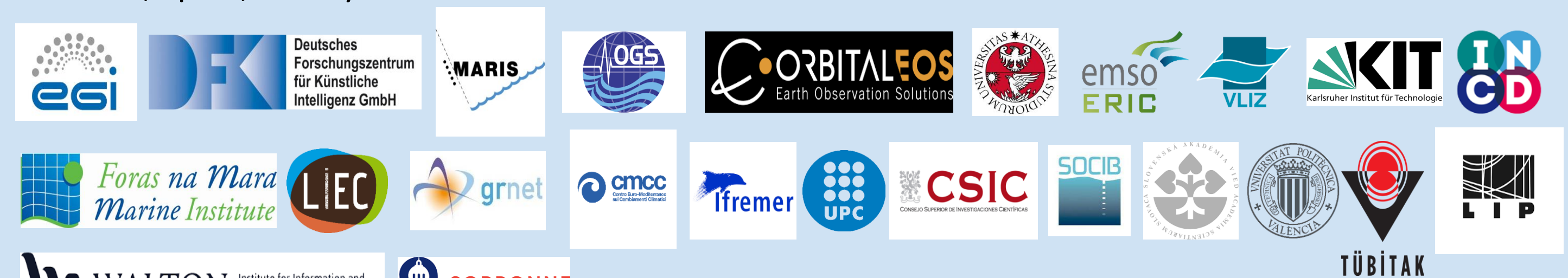
Freshwater diatoms identification (UL-LIEC): Diatom-based bioidentification using automatic pattern recognition on microscope images



Project Facts

Project time: 9.2022 – 8.2025 (36 months)

24 partners from 11 countries: Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Slovakia, Spain, Turkey



Communication:

https://twitter.com/eu_imagine
<https://zenodo.org/communities/imagine-project>
<https://www.imagine-ai.eu>

