



# Competence Centre

WP3 – AI technical integration and support

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iMagine RP1 review  
December 5th 2023

# Outline

- Use cases overview
- Competence center for users:
  - Definition & Synergies
  - User support and Monitoring
- Use cases status
- Summary and outlook

# Use cases overview (mature UCs)

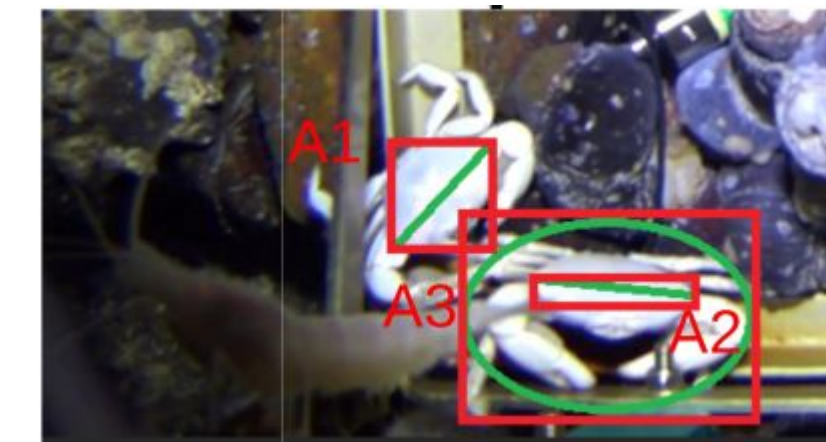
**Aquatic Litter Drones** (DFKI, MARIS, OGS):  
Monitoring system for Aquatic Litter  
Pollution



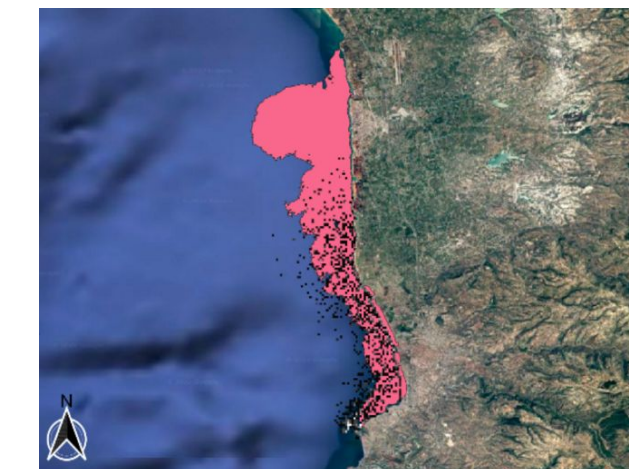
**Zooscan – EcoTaxa pipeline** (Sorbonne Université):  
Taxonomic identification of zooplankton using Zooscan



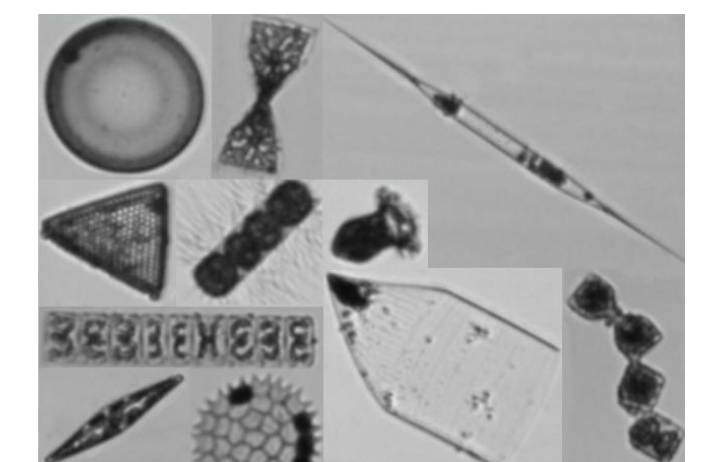
**Marine Ecosystem Monitoring**  
(EMSO ERIC, UPC, IFREMER, MI):  
Ecosystem Monitoring by means of video imagery from  
cameras at EMSO sites



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

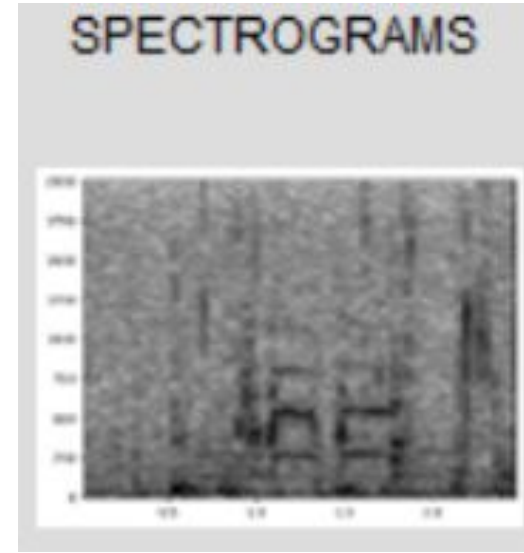


**Flowcam phytoplankton identification** (VLIZ):  
Taxonomic identification of phytoplankton

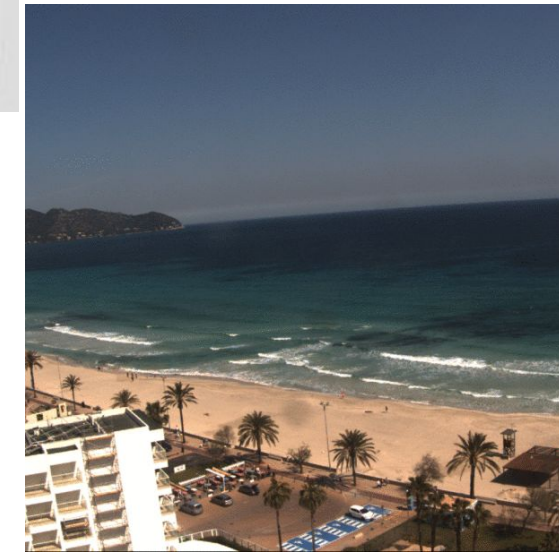


# Use cases overview (prototype, external)

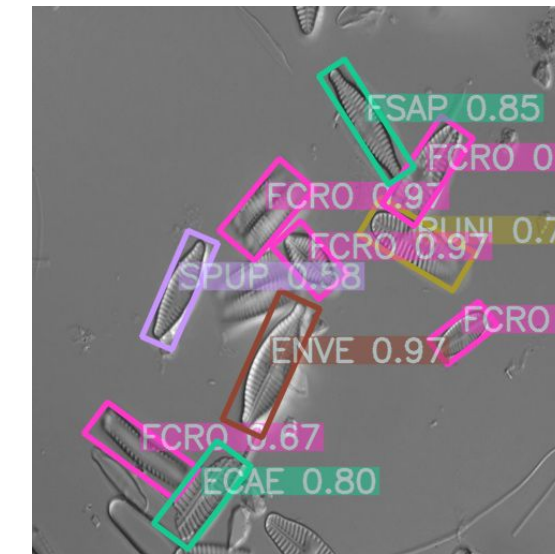
**Underwater noise identification** (VLIZ):  
Identification of sound events from acoustic recordings using spectrograms



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

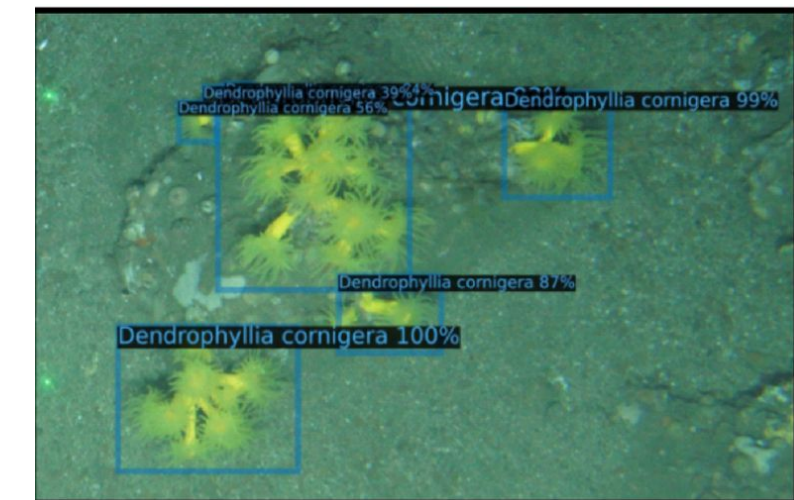


**Freshwater diatoms identification** (UL-LIEC):  
Diatom-based bioidentification using automatic pattern recognition on microscope images



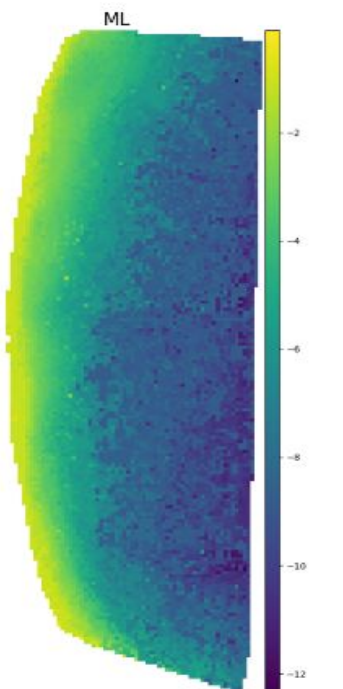
From Nov. 2023:

**Improving knowledge about Cold Water Coral Reef** (IEO, CSIC) Use AI to precisely delineate areas of living coral and dead coral



**Satellite-Derived Bathymetry** (ICMAN-CSIC)

Nearshore bathymetry for coastal studies





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# Competence Center



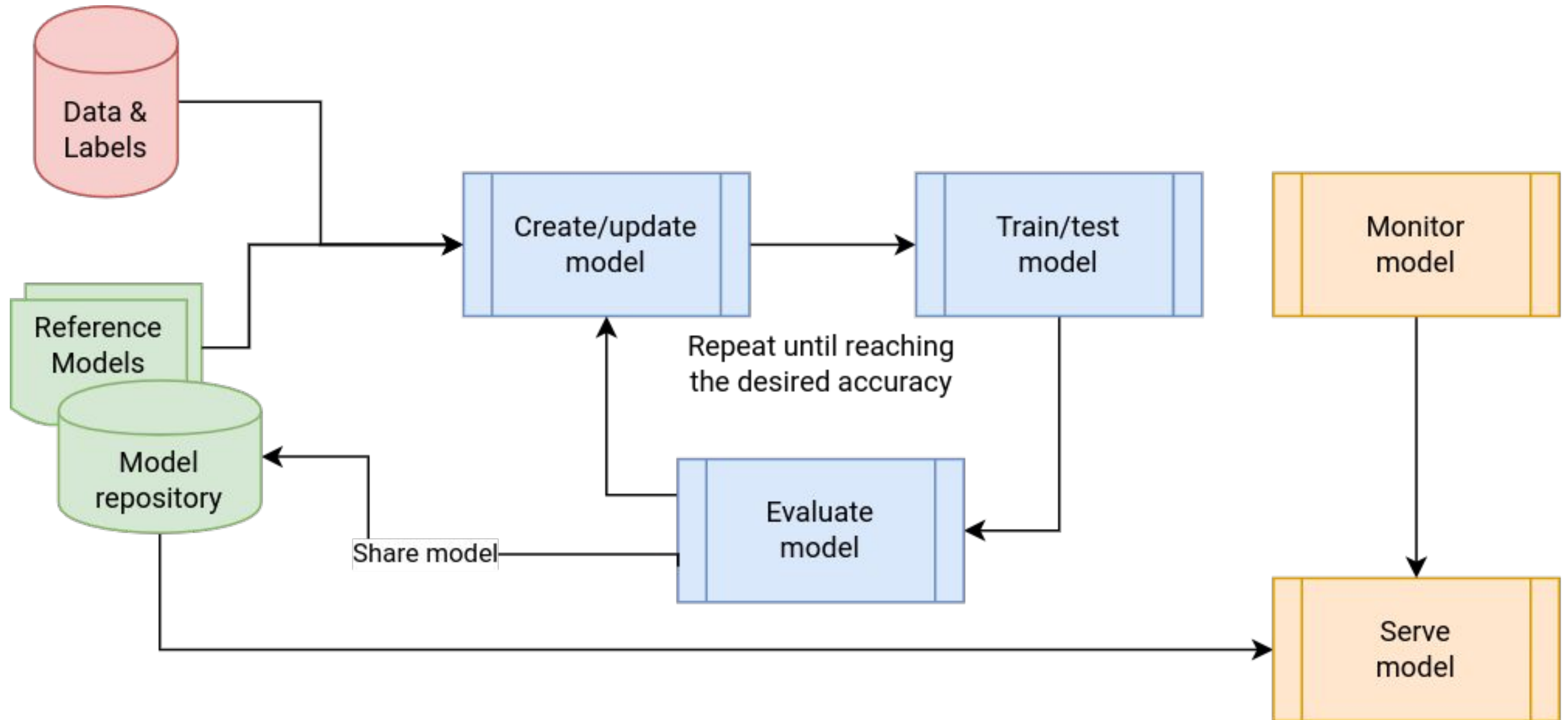
## Competence



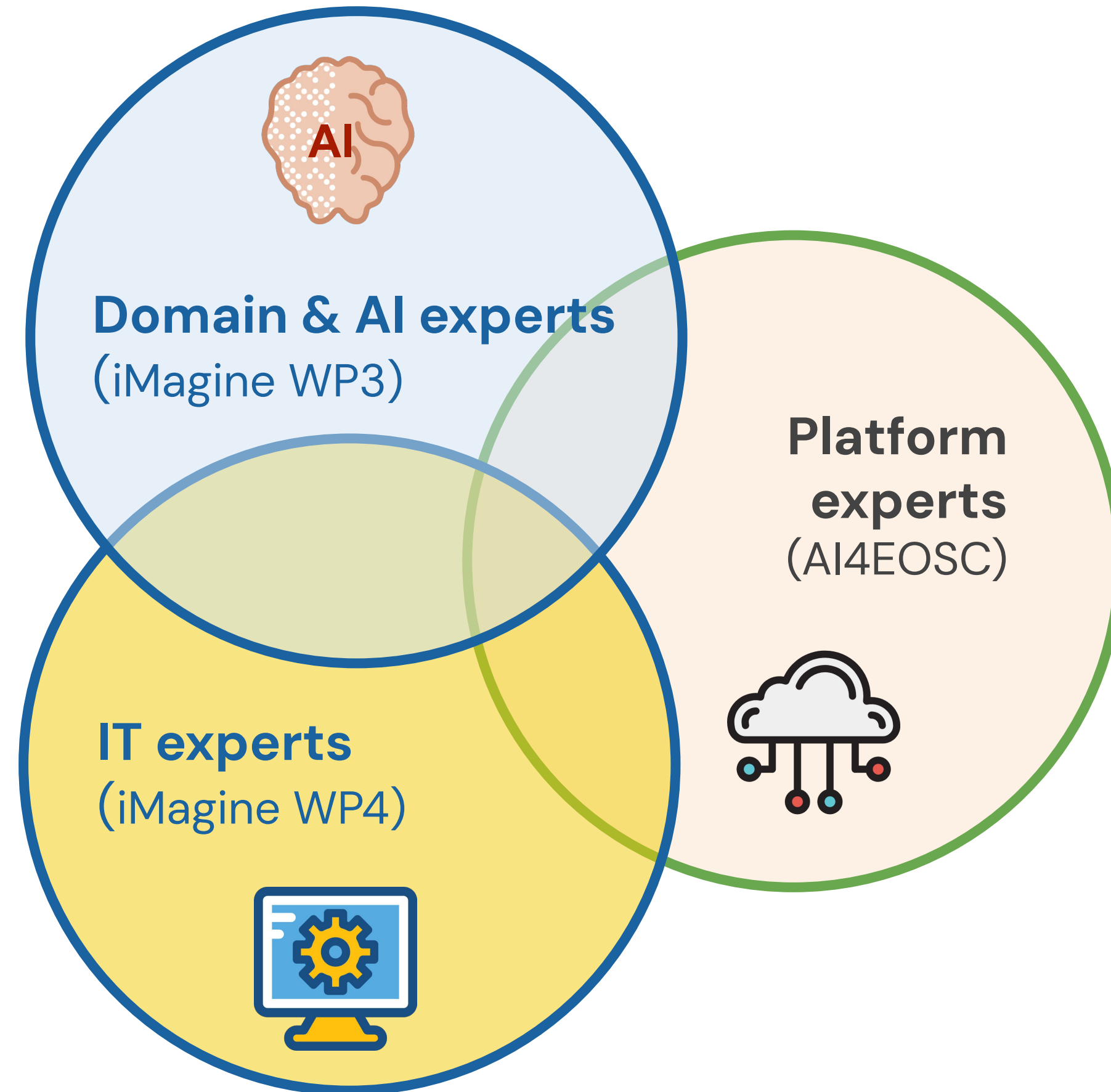
## Center

- AI IT experts and domain experts from the iImagine:
  - WP3: marine and freshwater application experts
  - WP4: AI framework / IT experts
- Monitoring and supporting of Use cases through:
  - Regular meetings
  - Annual Competence Workshops (x3)
- Provide input for a Best Practices documentation
- Support in standardisation and in improving quality of data sets

# Competence Center: support whole AI/ML development cycle



# Competence Center Synergies

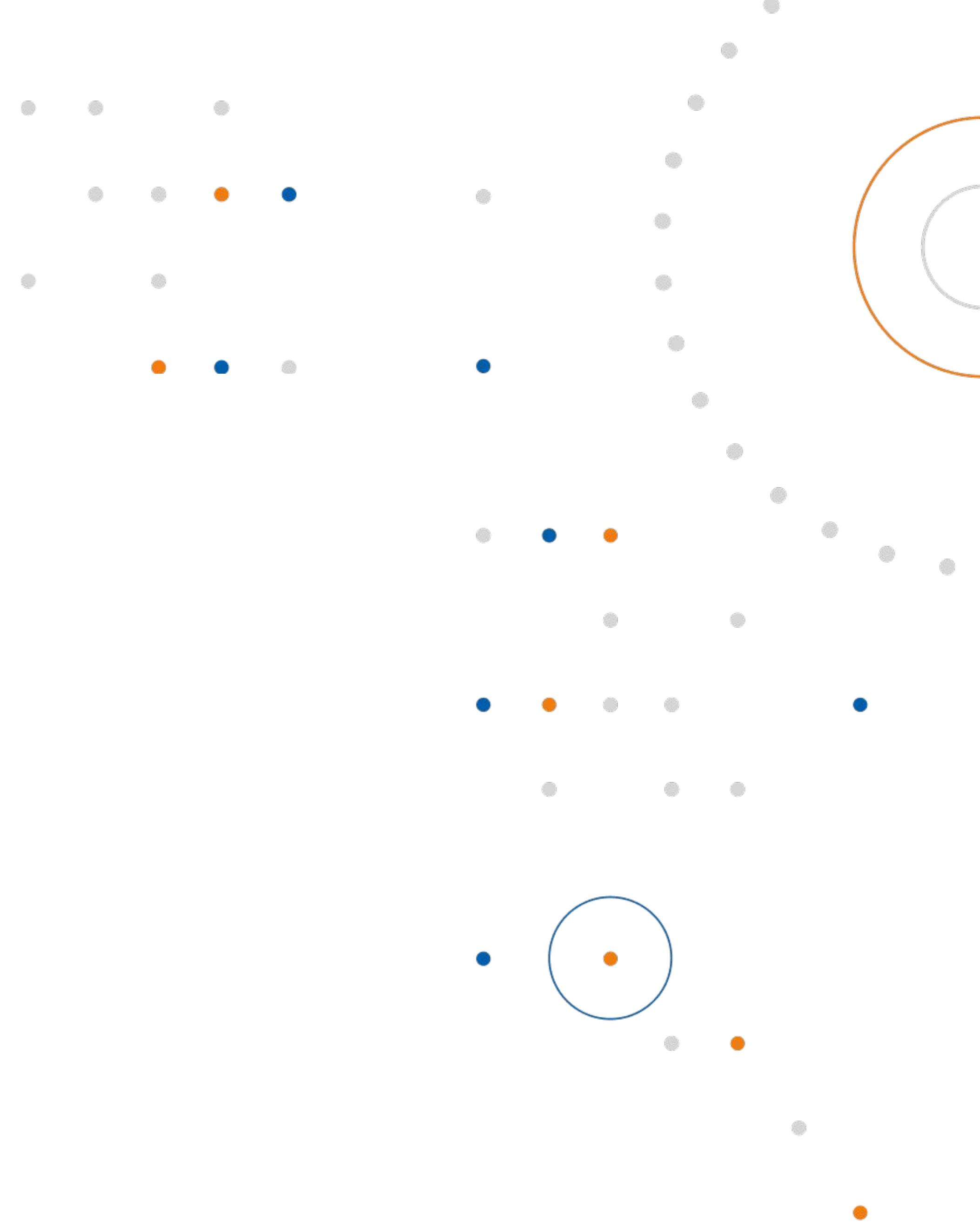






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# **Competence Center: user support & monitoring**



# Competence Center: support via communication channels

- Bi-weekly 1.1,5-h [meetings](#) with all iImagine UCs regularly attending
- E-Mail list to foster communication (imagine-wp3)
- E-Mail list for the Platform support (imagine-ai-platform-support)
- Confluence pages ([WP3](#), [WP4](#)) to improve knowledge exchange
  - [WP3 Library](#): space to collect links and references of interest
- iImagine AI Platform [public pages](#) for User guide, Access, Tips, etc

# Competence Center: support via special events

- Thematic WP3 meetings, e.g.:
  - iImagine AI platform [webinar](#) (December 2022)
  - LabelBox annotation tool [meeting](#) (March 2023)
- Annual Competence Workshops:
  - 30.1 – 31.1.2023 [meeting](#) in Villefranche-sur-Mer, France
  - 19–20.3.2024 meeting planned in 2024
  - (to be organised) in 2025
- Dedicated events:
  - [EGI Conference 2023](#), Training (AI4EOSC): “Bring your AI model to EOSC” with remote connection and recordings for iImagine
  - AI4EOSC platform: [User Workshop](#) (November 2023)



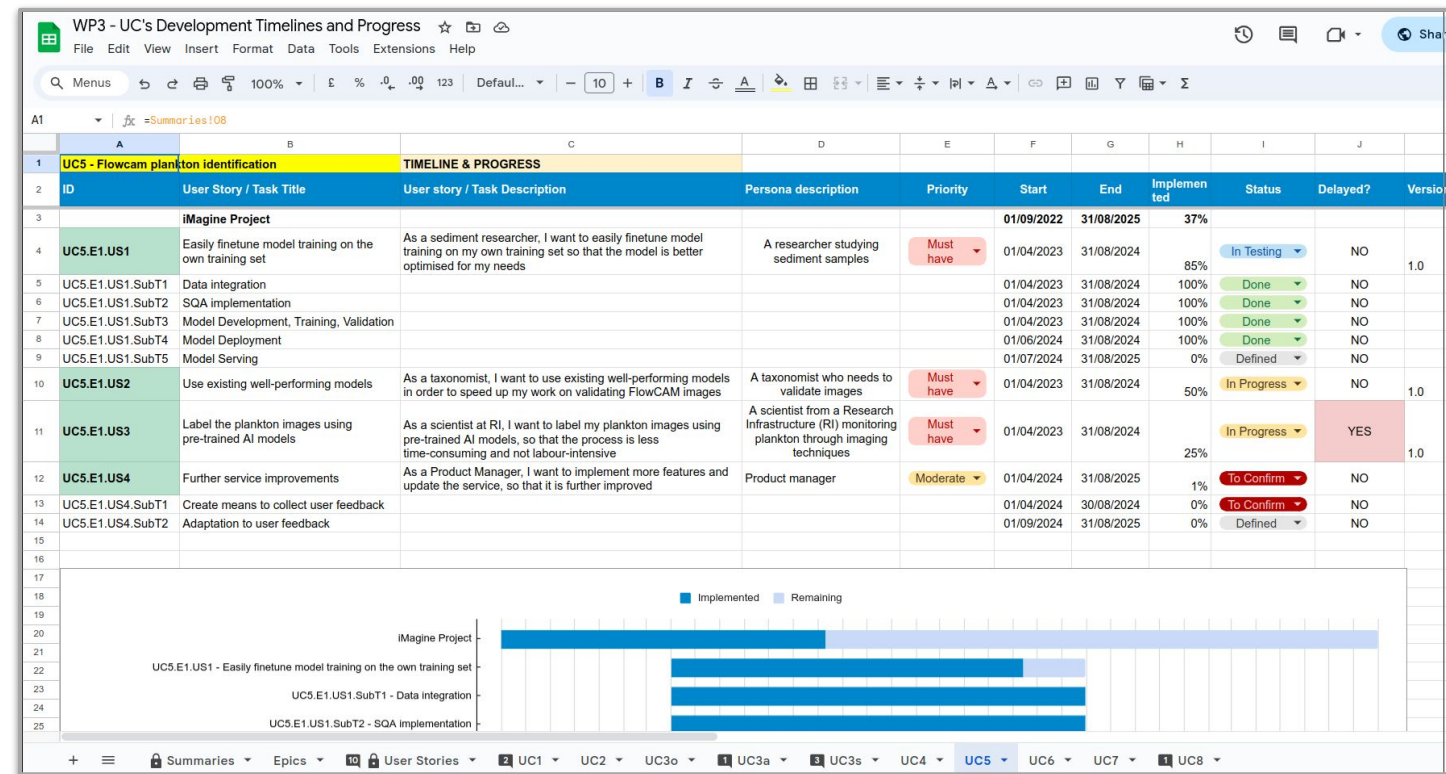
# Competence Center: monitoring of the progress

## D3.1

Technical development roadmap  
for the AI image analysis use cases

iImagine Deliverable D3.1

- Use cases analysis based on the 'Persona-Epics-User stories approach
- Development roadmaps
- Gathering user requirements



ID	User Story / Task Title	User story / Task Description	Persona description	Priority	Start	End	Implement	Status	Delayed?	Version
4	UCS.E1.US1	Easily fine-tune model training on the own training set	As a scientist researcher, I want to easily fine-tune model training on my own training set so that the model is better optimized for my needs	Must have	01/09/2022	31/08/2025	37%	In Testing	NO	1.0
5	UCS.E1.US1.SubT1	Data integration			01/04/2023	31/08/2024	100%	Done	NO	
6	UCS.E1.US1.SubT2	SQA implementation			01/04/2023	31/08/2024	100%	Done	NO	
7	UCS.E1.US1.SubT3	Model Development, Training, Validation			01/04/2023	31/08/2024	100%	Done	NO	
8	UCS.E1.US1.SubT4	Model Deployment			01/06/2024	31/08/2024	100%	Done	NO	
9	UCS.E1.US1.SubT5	Model Servng			01/07/2024	31/08/2025	0%	Defined	NO	
10	UCS.E1.US2	Use existing well-performing models in order to speed up my work on validating FlowCAM images	As a taxonomist, I want to use existing well-performing models in order to speed up my work on validating FlowCAM images	Must have	01/04/2023	31/08/2024	50%	In Progress	NO	1.0
11	UCS.E1.US3	Label the plankton images using pre-trained AI models	As a scientist from a Research Infrastructure (RI) monitoring plankton through imaging techniques	Must have	01/04/2023	31/08/2024	25%	In Progress	YES	1.0
12	UCS.E1.US4	Further service improvements	As a Product Manager, I want to implement more features and update the service, so that it is further improved	Moderate	01/04/2024	31/08/2025	0%	In Contemplation	NO	
13	UCS.E1.US4.SubT1	Create means to collect user feedback			01/04/2024	30/08/2024	0%	In Contemplation	NO	
14	UCS.E1.US4.SubT2	Adaptation to user feedback			01/09/2024	31/08/2025	0%	Defined	NO	

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### UC3o - EMSO-OBSEA, Status notes

TelCo: <https://jitsi-sdm.scc.kit.edu/imagine-wp3>, bi-weekly, Fridays, 10-11h CE(S)T  
 Conventions for every meeting, newest meeting entry comes on top:  
 year-month-day as e.g. 2023-03-17 (style "Heading 2").  
 May put an additional optional title (e.g. 2024-xx-yy Deployment)

Please, answer:

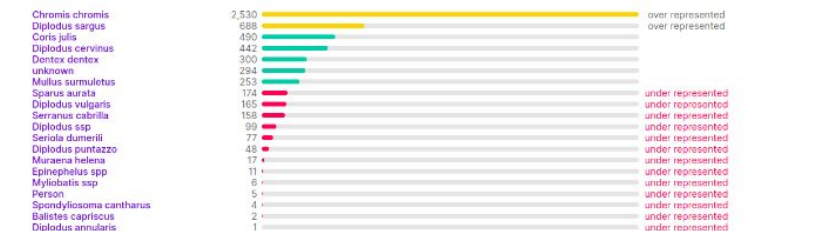
- What tasks did you work on since the last meeting? "Worked on" (style "Heading 3")
- What challenges have you met? "Challenges" (style "Heading 3")
- What do you plan to work on until the next meeting? "Next steps" (style "Heading 3")

Mark **higher priority tasks** in Bold + Redish background  
 Don't forget to update **WP3 - UC's Development Timelines and Progress**

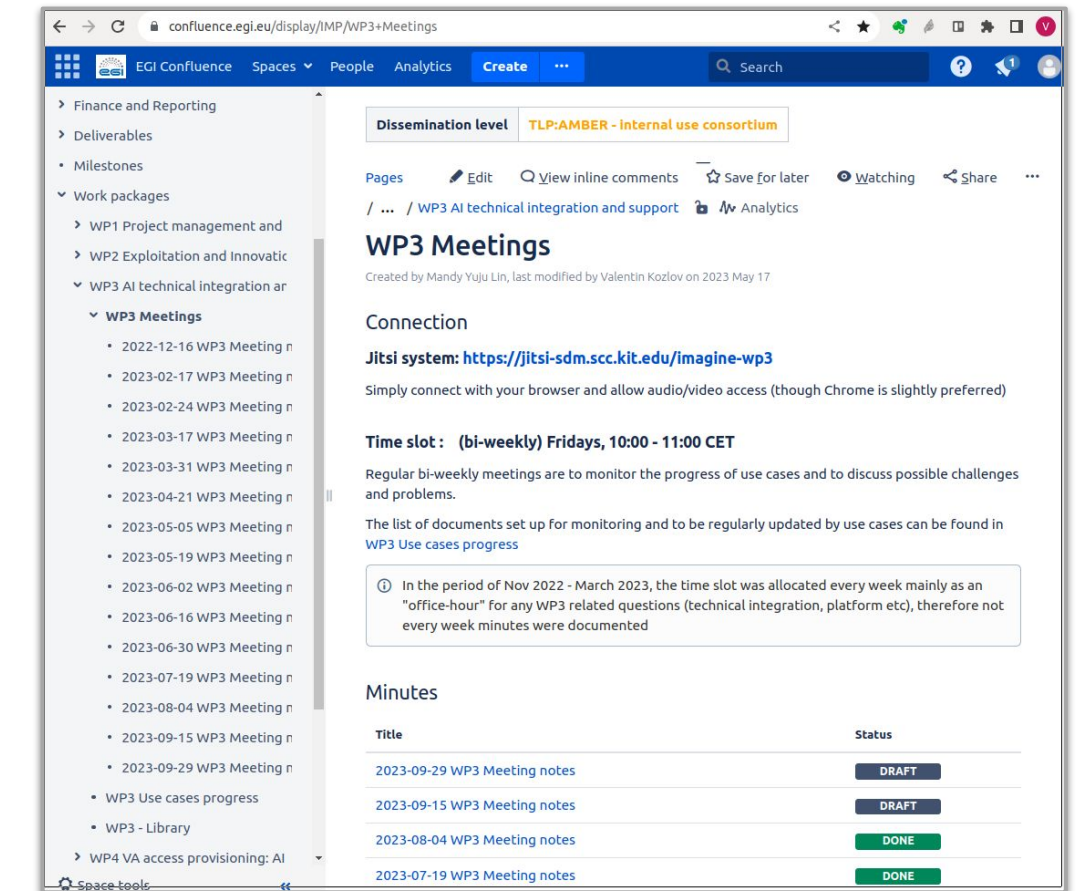
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2023-09-29 Further work with our dataset an YOLOv8

Slowly but steadily labelling more data, dataset available at [roboflow](https://roboflow.com). Right now the principal obstacle is finding enough data for underrepresented classes:



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Dissemination level: TLP:AMBER - Internal use consortium

### WP3 Meetings

Connection

Jitsi system: <https://jitsi-sdm.scc.kit.edu/imagine-wp3>  
 Simply connect with your browser and allow audio/video access (though Chrome is slightly preferred)

Time slot: (bi-weekly) Fridays, 10:00 - 11:00 CET

Regular bi-weekly meetings are to monitor the progress of use cases and to discuss possible challenges and problems.

The list of documents set up for monitoring and to be regularly updated by use cases can be found in WP3 Use cases progress

In the period of Nov 2022 - March 2023, the time slot was allocated every week mainly as an "office-hour" for any WP3 related questions (technical integration, platform etc), therefore not every week minutes were documented

Title	Status
2023-09-29 WP3 Meeting notes	DRAFT
2023-09-15 WP3 Meeting notes	DRAFT
2023-08-04 WP3 Meeting notes	DONE
2023-07-19 WP3 Meeting notes	DONE

Use case Development Timelines and Progress  
Sheets

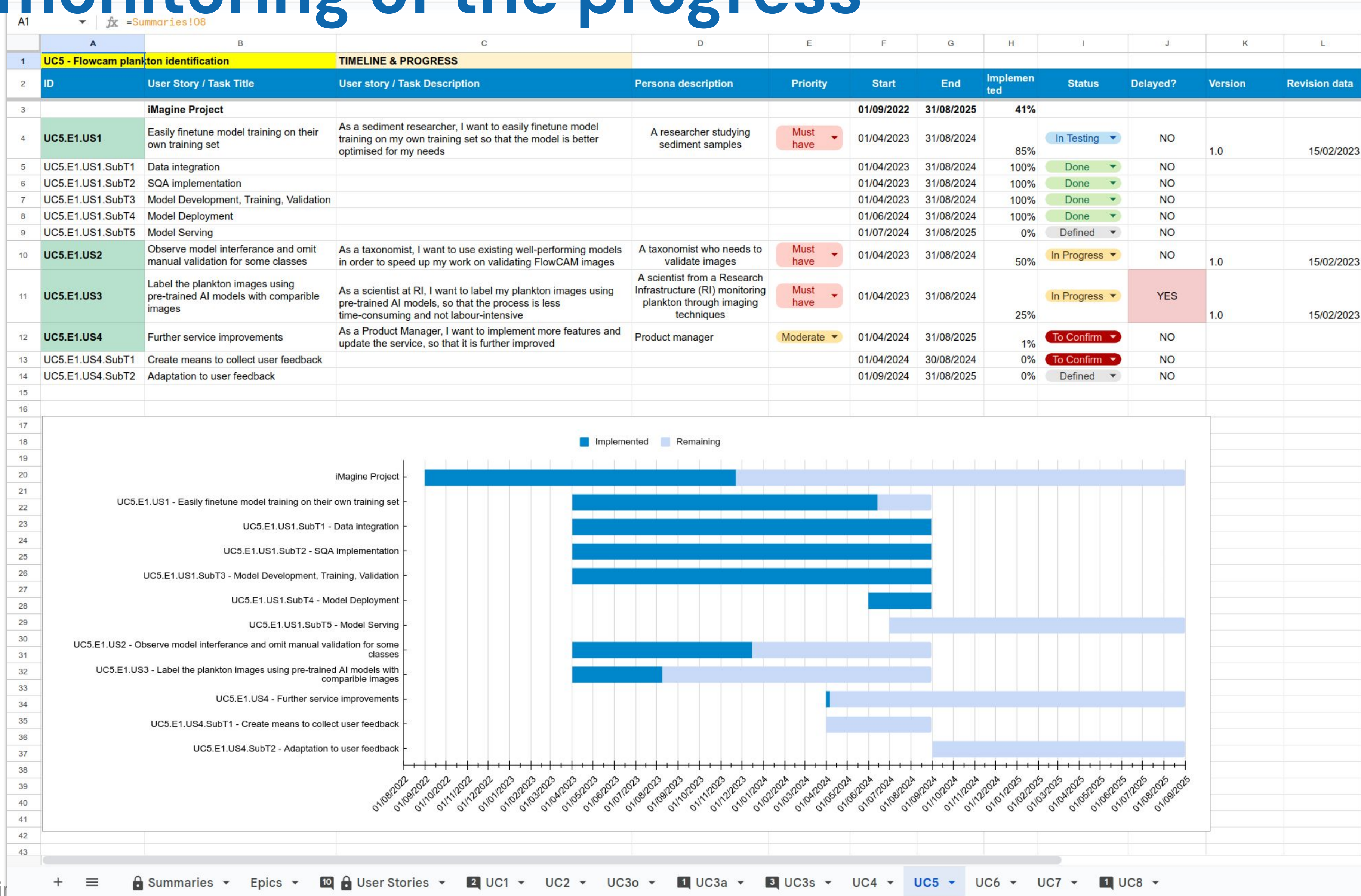
Updated for the bi-weekly meetings

Status Notes per Use Case  
(aka Never Ending minutes)

Updated for the bi-weekly meetings

Minutes of the bi-weekly meetings

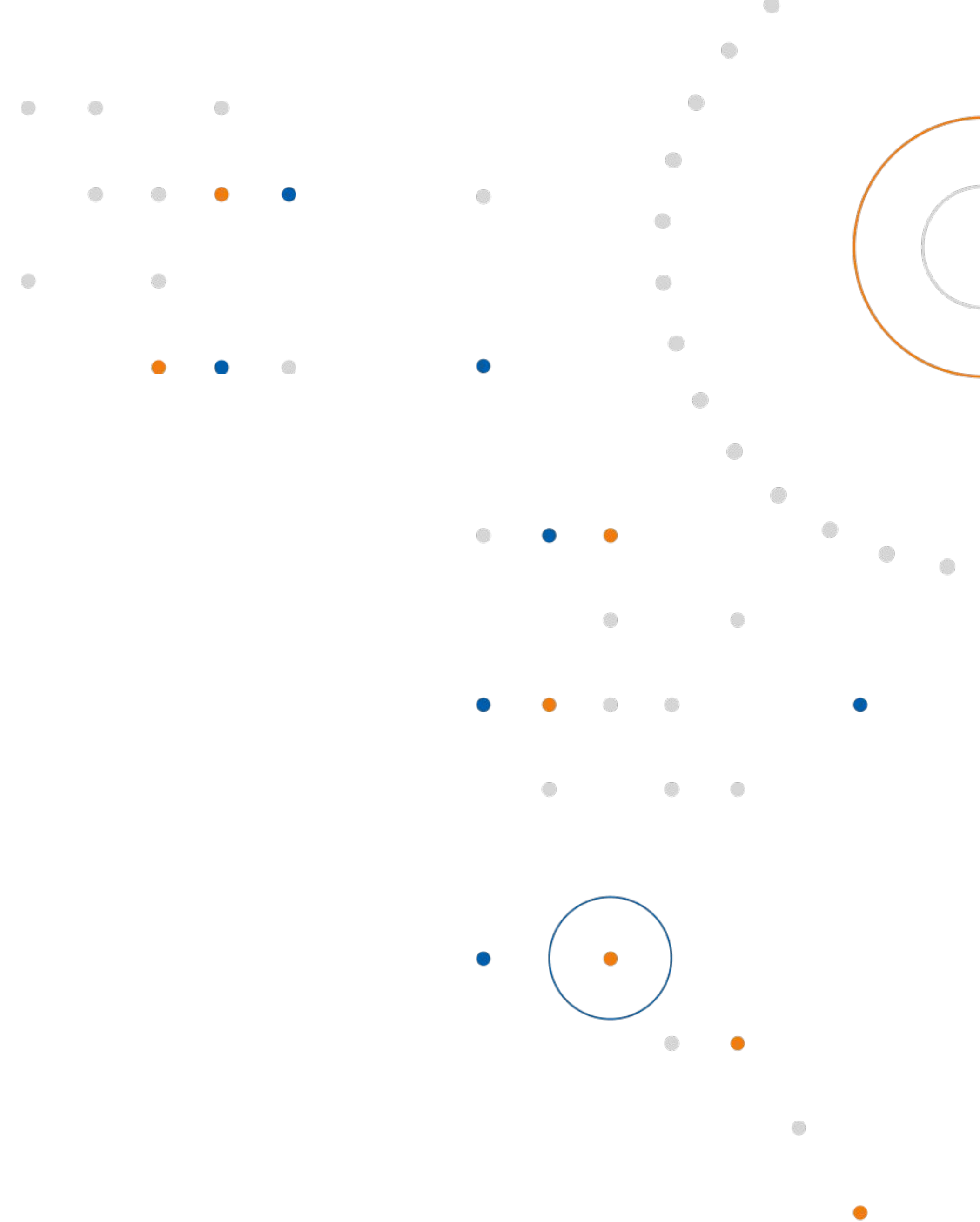
# Competence Center: monitoring of the progress



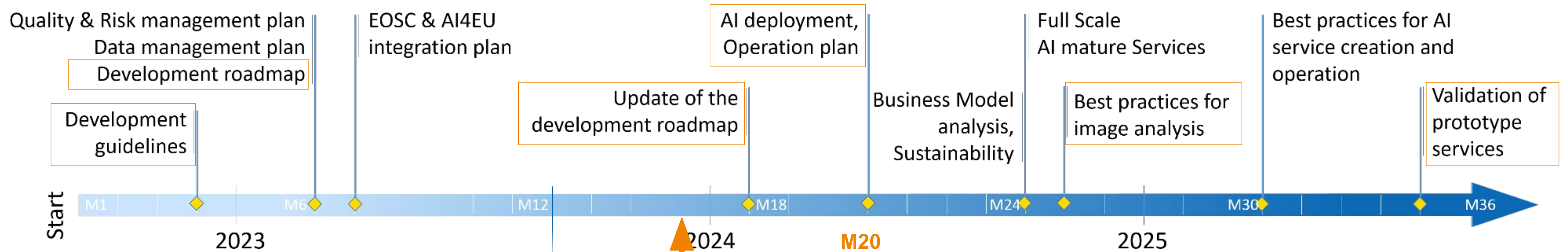


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# Use Cases Status



# Competence Center Timeline

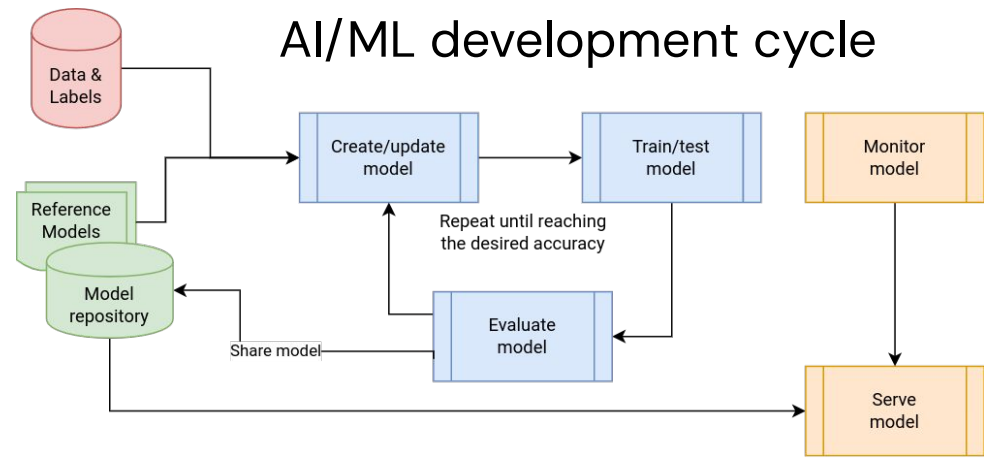


RP1

we are here, M16

Either *mature* or *prototype* services are still in the **development**  
 But the *mature* services will deploy their AI solutions  
**in ca. 4-5 months**

# Competence Center, next steps: possible input for Best practices



well established by all use cases

Best practices:

- Metadata standardisation, though still scientific field dependent
- FAIR assessment of repositories: possible usage of the [SQAaaS Platform](#)
- Customisation of FAIR evaluators as e.g. [FAIR\\_eva](#)
- List of repositories: [Data management plan](#)

Best practices:

UCs already assessed a number of annotation tools:

- [LabelBox](#)
- [roboflow](#)
- [CVAT](#)
- [Biigle](#)
- [LabelStud.io](#)

worth sharing that experience (see e.g. [“Tips for AI-based image processing”](#))

Best practices:

Summarize what AI methods and models are found best in the aquatic domain (see e.g. [“Tips for AI-based image processing”](#))

Best practices:

- How to leverage the platform best (see e.g. [D4.1](#))
- Model in production monitoring (e.g. [Frouros](#))
- FAIR repositories for labelled data publishing

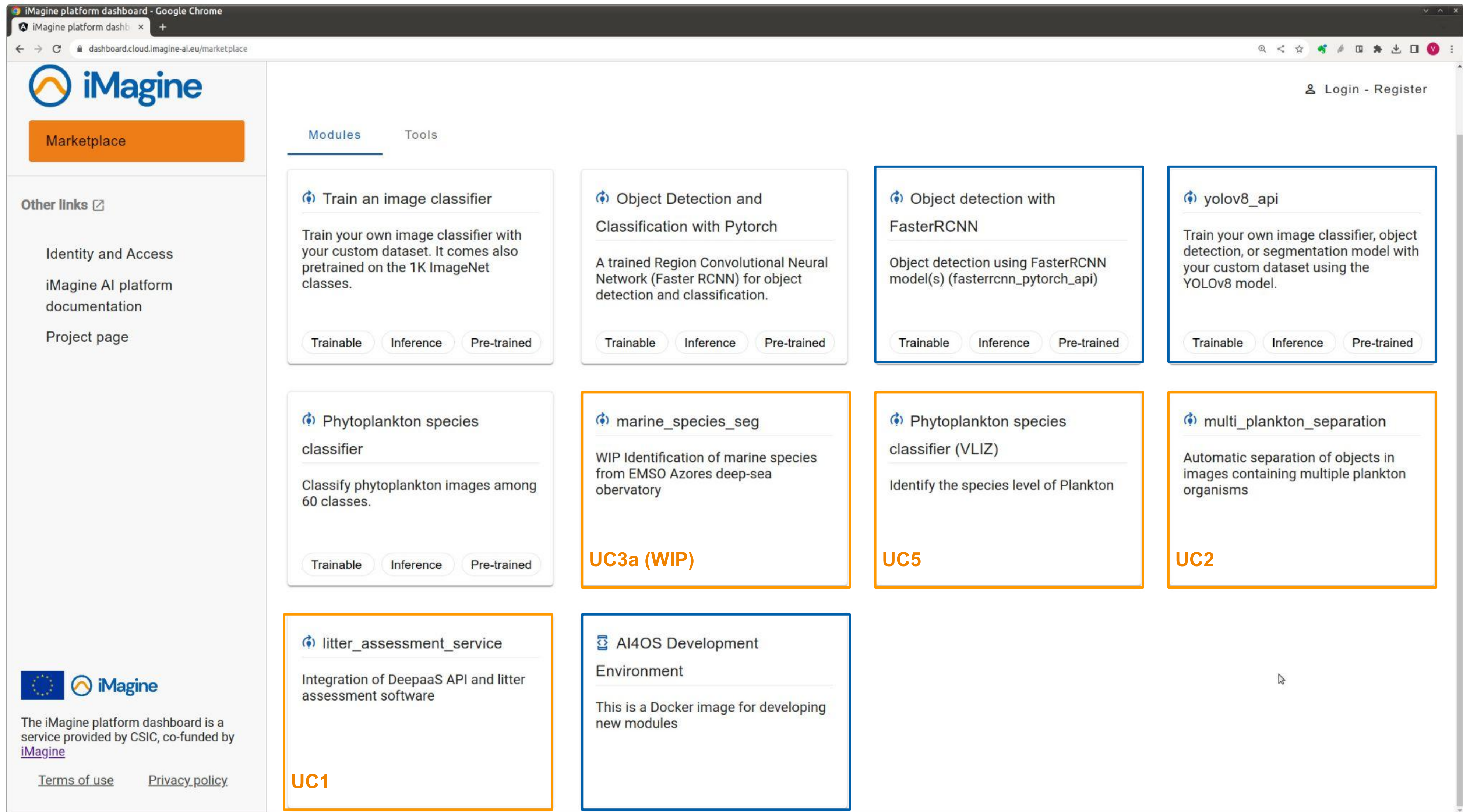


# Feedback collected, actions taken

Demand	Action
Data management and labelling	=> Adding annotation tools (e.g. CVAT) Platform updates (2024) annotation tools assessment
AI models for object detection	=> Added general purpose AI modules (e.g. <a href="#">FasterRCNN</a> , <a href="#">YoloV8</a> ) on the marketplace
AI experiment tracking	=> A test <a href="#">instance</a> of <a href="#">MLflow</a>
Model inference	=> A test <a href="#">instance</a> of <a href="#">OSCAR</a> for inference

- ✓ The Competence Center is a strong concept for co-development
- ✓ AI is a moving field – Partnership with a developer project (AI4EOSC) is a great advantage

# Competence Center: getting to the marketplace



The screenshot shows the iImagine platform marketplace dashboard. The page is titled "iImagine platform dashboard - Google Chrome" and the URL is "dashboard.cloud.imagine-ai.eu/marketplace". The dashboard features a sidebar with the iImagine logo, a "Marketplace" button, and "Other links" including "Identity and Access", "iImagine AI platform documentation", and "Project page". The main content area is divided into "Modules" and "Tools" tabs. The "Modules" tab displays a grid of modules, each with a title, description, and status tags (Trainable, Inference, Pre-trained). The modules are:

- Train an image classifier**: Train your own image classifier with your custom dataset. It comes also pretrained on the 1K ImageNet classes. (Trainable, Inference, Pre-trained)
- Object Detection and Classification with Pytorch**: A trained Region Convolutional Neural Network (Faster RCNN) for object detection and classification. (Trainable, Inference, Pre-trained)
- Object detection with FasterRCNN**: Object detection using FasterRCNN model(s) (fasterrcnn\_pytorch\_api). (Trainable, Inference, Pre-trained)
- yolov8\_api**: Train your own image classifier, object detection, or segmentation model with your custom dataset using the YOLOv8 model. (Trainable, Inference, Pre-trained)
- Phytoplankton species classifier**: Classify phytoplankton images among 60 classes. (Trainable, Inference, Pre-trained)
- marine\_species\_seg**: WIP Identification of marine species from EMSO Azores deep-sea observatory. (UC3a (WIP))
- Phytoplankton species classifier (VLIZ)**: Identify the species level of Plankton. (UC5)
- multi\_plankton\_separation**: Automatic separation of objects in images containing multiple plankton organisms. (UC2)
- litter\_assessment\_service**: Integration of DeepaaS API and litter assessment software. (UC1)
- AI4OS Development Environment**: This is a Docker image for developing new modules.

The dashboard also includes a footer with the European Union flag, the iImagine logo, and the text: "The iImagine platform dashboard is a service provided by CSIC, co-funded by iImagine". Links for "Terms of use" and "Privacy policy" are also present.

# Summary and Outlook

- Complete image annotations (i.e. prepare training datasets)
- Accomplish the Minimal Viable Product (MVP)
- Publish MVP in the iImagine Marketplace
  - mature use cases – Q1 2024
  - prototypes – before M34 (June 2025)
- Foster knowledge exchange through dedicated events
- Work on the Best practices documents



**iMagine**

**Thank you!**

**Questions?**

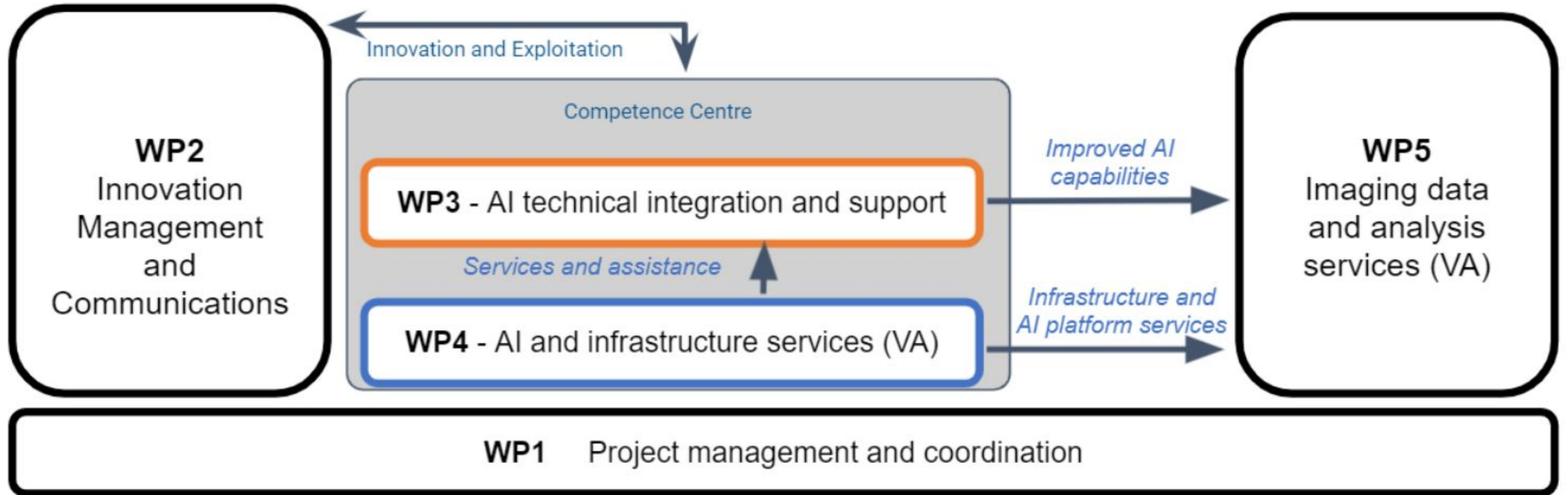
<https://www.imagine-ai.eu>



liMagine receives funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101058625

# BACKUP SLIDES

# Competence Center in the Project structure



# Background, ecosystem, collaborations

