

Challenge 5

Uncalibrated Monocular VSLAM

Update Meetings

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Jan Duchscherer

Pattern Recognition & Machine Learning
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Team

Florian Beck



FB

Valentin Bumeder



VB

Lukas Röß



LR

Christopher Kirschner



CK

Jan Duchscherer



JD

Async Kick-Off

Update Meeting 1

1. Apr 2026

Team Leader

Team Leader: Valentin Bumeder

- Coordinates the project scope, weekly alignment, and contribution hand-offs.
- Responsible for limiting over-engineering and scope creep by keeping the team focused.
- Monitors and adjusts workload distribution.
- Keeps the work-package split and reporting surfaces aligned across slides and report.
- Responsible for uploading the weekly update slides.
- Tries to keep the best overview of the different work packages and the overall project status.
- Provides mental support.

Team Charter

- Communication happens through GitHub issues and pull requests, with short sync notes in the weekly update deck.
- Status updates are shared in weekly team-internal meetings.
- Meetings focus on concrete progress, blockers, upcoming experiments, and design decisions.
- Early mock and interface definitions to allow parallel work on different components.
- Aim for hackathon-style sprints early on.

Challenge Clarifications

- Target use case: off-device processing of a live smartphone video stream from an emergency-call setting.
- Assumed modality in the target setting: monocular RGB video only.
- The smartphone primarily acts as the capture device; operator-facing visualization is off-device.
- [ARCore](#) is a baseline and logging aid for comparison.
- For self-recorded data, ground truth may come from [Record3D](#) / iPhone RGB-D or offline [COLMAP](#), not necessarily from ARCore.

Goals

- Evaluate methods on [ADVIO](#) and on a custom self-recorded dataset with raw video and baseline [ARCore](#) logs.
 - Define the custom-dataset GT source up front: [Record3D](#) / iPhone RGB-D where available, otherwise offline [COLMAP](#).
- Deliver an installable and reproducible benchmark scaffold for off-device uncalibrated monocular VSLAM.
- Compare at least two state-of-the-art VSLAM methods on trajectory, point cloud, and dense reconstruction quality, as well as latency and memory usage.
 - Use [evo](#) for trajectory evaluation and [Open3D](#), [PyTorch3D](#) or similar packages for 3D metrics.
 - Explicit evaluation priorities: trajectory > point cloud $\stackrel{?}{\geq}$ dense reconstruction > 3DGS reconstruction.
- Deliver a streaming real-time demo of the best-performing benchmarked method on a smartphone video stream.
 - Treat [Nerfstudio](#)-based 3DGS visualization as an optional stretch goal.
- Deliver a raw-video capture and logging workflow plus a final recommendation for the most suitable pipeline in this challenge setting.

Non-Goals

- Do not implement a full mobile app from scratch.
- Do not reimplement a full SLAM system from scratch.
- Do not build production-style streaming infrastructure before narrowing down the benchmark candidates.
- Do not make operator-facing UI or 3DGS visualization a hard dependency for the core benchmark.
- Do not over-engineer fully-typed, modular, and generic pipelines before having a better overview of the problem space and the concrete requirements.
- Do not train or fine-tune new models unless benchmarking clearly requires it.

Project Proposal

Update Meeting 2

15. Apr 2026

Work Packages & Responsibilities

ID	Description	Owner
WP1	Repository and environment scaffolding	Ja
WP2	Data capture and ARCore logging workflow	?
WP3	Method integration	?
WP4	Trajectory evaluation	?
WP5	Dense reconstruction evaluation	?
WP6	Reference reconstruction pipeline	?
WP7	Benchmarking and reporting	?

Reference Links

Timeline (rough)

- Weeks 1-2: repo bootstrap, work package split, report and slide setup.

Florian Beck: Proposal Notes

Template Content

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Figure 1: Example image placeholder for a contributor-owned draft slide.



Figure 2: Second placeholder visual to exercise slide merging with figures.

Christopher Kirschner: Proposal Notes

Work Package

- Read @murai2025mast3rs`lam` and summarize the integration-relevant assumptions for the benchmark wrapper.

Challenges

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Next Steps

- Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor.

Status Quo

Update Meeting 3

29. Apr 2026

What was done?

WP-ID	Member	Description
WP2	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
...		

What were the challenges?

WP-ID	Member	Description
WP2 / WP4	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
...		

What are the next steps?

WP-ID	Member	Description
WP3 / WP4	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
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Status Quo

Update Meeting 4

22. May 2026

What was done?

WP-ID	Member	Description
WP2	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
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What were the challenges?

WP-ID	Member	Description
WP2 / WP4	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
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What are the next steps?

WP-ID	Member	Description
WP3 / WP4	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
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Status Quo

Update Meeting 5

12. Jun 2026

What was done?

WP-ID	Member	Description
WP2	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
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What were the challenges?

WP-ID	Member	Description
WP2 / WP4	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
...		

What are the next steps?

WP-ID	Member	Description
WP3 / WP4	Jan Duchscherer	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
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