Project Name	Robot Visual Perception
Online team meeting	https://fau.zoom-x.de/j/62836031488
Production system (if any)	Service Provided (later in the Project)
Test system (if any)	Local Webcam
GitHub repository	https://github.com/amosproj/amos2025ws04-robot-visual-perception
GitHub feature board	https://github.com/orgs/amosproj/projects/92
GitHub imp-squared backlog	https://github.com/orgs/amosproj/projects/95
Team T-shirt (white)	https://www.shirtinator.de/s/E_eIf-EIT4iidRVnqM8J5w
Team T-shirt (black)	https://www.shirtinator.de/s/R0CANDdWTRCOvCohq_encA
Additional materials	https://discord.gg/VDqD2Zfb
Team maling list	oss-amos-proj4@lists.fau.de
	https://happy-amos.appspot.com/
	Please use our mailing list for written communication. Only CC teachers (university) and coaches on specific topics, as the mailing lists are very long.

Last Name	First Name	GitHub User Name	Email Address
Hilgers	Felix	fhilgers	felix.hilgers@fau.de
Samdani	Sarib	saribx	saribstudent@gmail.com
Chinbat	Anuun	anuunchin	anuun.ch@gmail.com
Goldschmidt	Georgina	bu31punu	dzsini.lost@gmail.com
Zinn	Benedikt	BenediktZinn	benedikt.wh.zinn@gmail.com
Badura	Emil	Tenebrae311	badura@tu-berlin.de
Assenbaum	Paul	Paul2607	paul.assenbaum@fau.de
Mantsch	Christoph	Christoph-Mantsch	christoph.cm.mantsch@fau.de
Asadi	Zohreh	zohrehasadi00	z.asadi@campus.tu-berlin.de

		Product Owner					
#	Meeting Day	Review	Planning	Software Developer	Release Manager	Scrum Master	Comment
1	2025-10-22	Felix Hilgers	Benedikt Zinn	Everyone else	Paul Assenbaum	Georgina Goldschmidt	(Tuesday 21. Discord for Release process example)
2	2025-10-29	Benedikt Zinn	Felix Hilgers	Everyone else	Anuun Chinbat	Georgina Goldschmidt	
3	2025-11-05	Benedikt Zinn	Felix Hilgers	Everyone else	Sarib Samdani	Georgina Goldschmidt	
4	2025-11-12	Felix Hilgers	Benedikt Zinn	Everyone else	Sarib Samdani	Georgina Goldschmidt	
5	2025-11-19	Felix Hilgers	Benedikt Zinn	Everyone else	Anuun Chinbat	Georgina Goldschmidt	
6	2025-11-26	Benedikt Zinn	Felix Hilgers	Everyone else	Emil Badura	Georgina Goldschmidt	
7	2025-12-03	Felix Hilgers	Benedikt Zinn	Everyone else	Emil Badura	Georgina Goldschmidt	Mid-term due
8	2025-12-10	Benedikt Zinn	Felix Hilgers	Everyone else	Paul Assenbaum	Georgina Goldschmidt	
9	2025-12-17	Felix Hilgers	Benedikt Zinn	Everyone else	Christoph Mantsch	Georgina Goldschmidt	
10	2023-01-11	Benedikt Zinn	Felix Hilgers	Everyone else	Christoph Mantsch	Georgina Goldschmidt	
11	2023-01-18	Felix Hilgers	Benedikt Zinn	Everyone else	Zohreh Asadi	Georgina Goldschmidt	
12	2023-01-25	Benedikt Zinn	Felix Hilgers	Everyone else	Zohreh Asadi	Georgina Goldschmidt	
13	2023-02-01	Felix Hilgers	Benedikt Zinn	Everyone else		Georgina Goldschmidt	
14	2023-02-08	Benedikt Zinn	Felix Hilgers	Everyone else		Georgina Goldschmidt	Demo day!
15	2023-02-15	Felix Hilgers	Benedikt Zinn	Everyone else		Georgina Goldschmidt	Retrospective
Product owners, software developers, and Scurm Master are set and ideally don't change over time; the critical part is the Release Manager role you need to define here							

Goals	Development of a visual perception system for robots with an accuracy of >= 90%
Meeting norms	Zoom-Meetings in the meeting room of the university. Joining the meeting is mandatory, with exceptions (like sickness, etc.). As an exception, showing up to 10 minutes late is fine if the team is informed via discord. Happiness Index: has to be completed at the end of the meeting (amos happy). Stand-up-mails: containing -> things done, problems encountered, things up next. -> For SDs: min 2x per week -> For POs: min 1x per week
Working norms	Issues on Github in the “Feature board” project of the repository. Definition of Done: If specified in the issue that the feature has to be tested, tests have to be written for that feature, documented (in code or later in the wiki) Git-branches: The latest commit on the main-branch has to be tagged. Only 2 “in progress” tickets per person at one time.
Coordination norms	Developers can create issues but not put them onto the “Feature board”. If blocked by a different task, discuss it as soon as possible. Communication should happen via Discord & mail. Criticism should be constructive. Language should be respectful at all times, both verbal and written communication.
Communication norms	Developers can create issues but not put them onto the “Feature board”. If blocked by a different task, discuss it as soon as possible. Communication should happen via Discord & mail. Criticism should be constructive. Language should be respectful at all times, both verbal and written communication.
Consideration norms	
Cont. improvement norms	
Rewards	Online coffee or lunch meet at some point.
Sanctions	Document absence. Repeated absence is addressed with the missing person directly but will later be escalated to professors.
Signatures	
Scrum Master	Georgina Goldschmidt
Product owner	Felix Hilgers

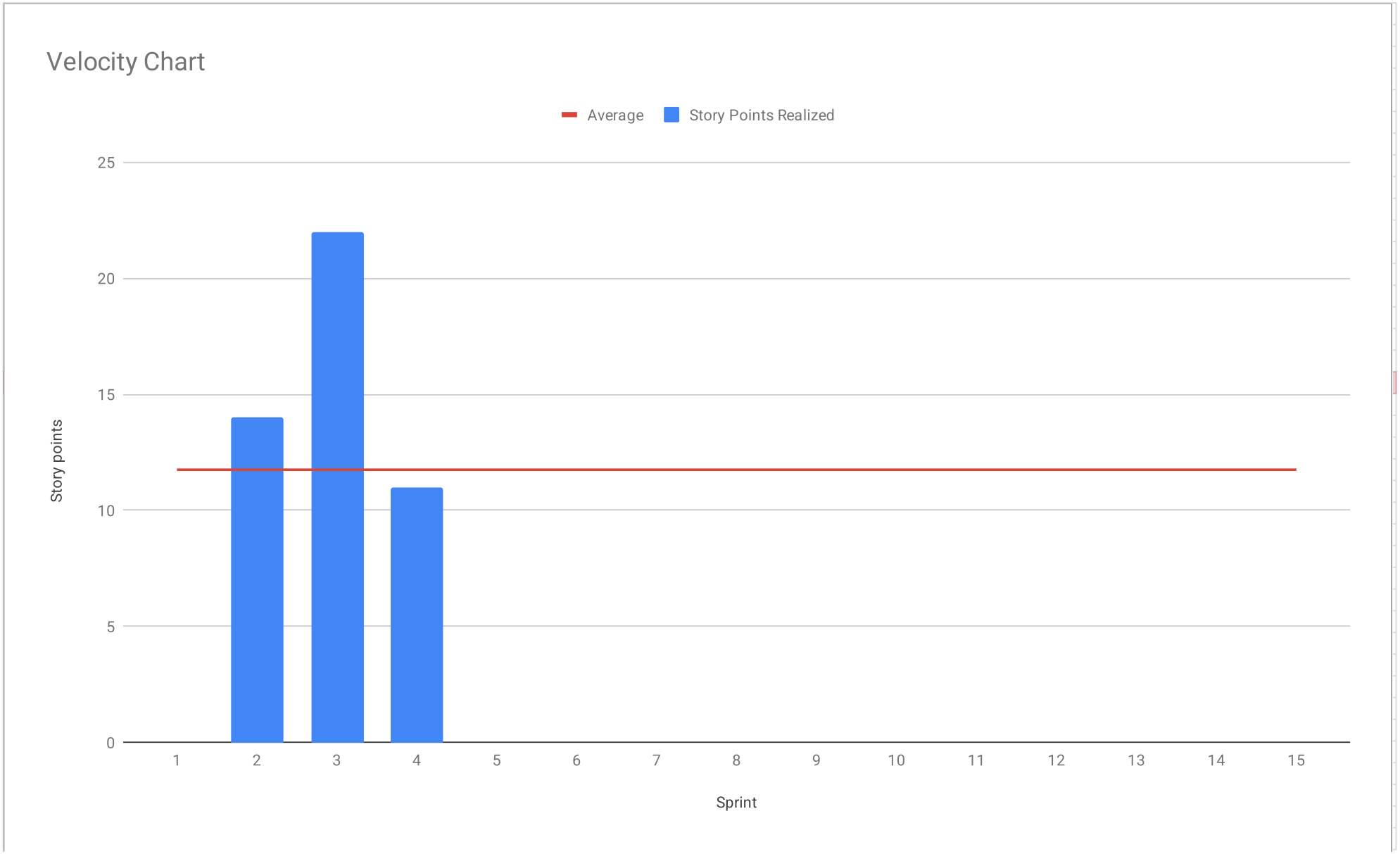
Product owner	Benedikt Zinn
Software developer	Sarib Samdani
Software developer	Emil Badura
Software developer	Anuun Chinbat
Software developer	Paul Assenbaum
Software developer	Christoph Mantsch
Software developer	Zohreh Asadi

Product Vision	Project Mission
Optibot helps people when operating robots equipped with a single camera. It gives real-time distance estimates for known objects inside the field of view of said camera without relying on other sensors. The software stack is easy to integrate with already existing WebRTC based systems, making it easy to enhance existing robot networks.	The mission of this project is to create a containerized system that processes a WebRTC stream as an input and outputs a stream of metadata. This metadata will contain the objects detected in a certain frame of the video stream, their bounding boxes in the image & the estimated distance. This information can be overlayed over the existing video stream in a React component. All components of the project have well definied interfaces and can easily be integrated into existing architectures.

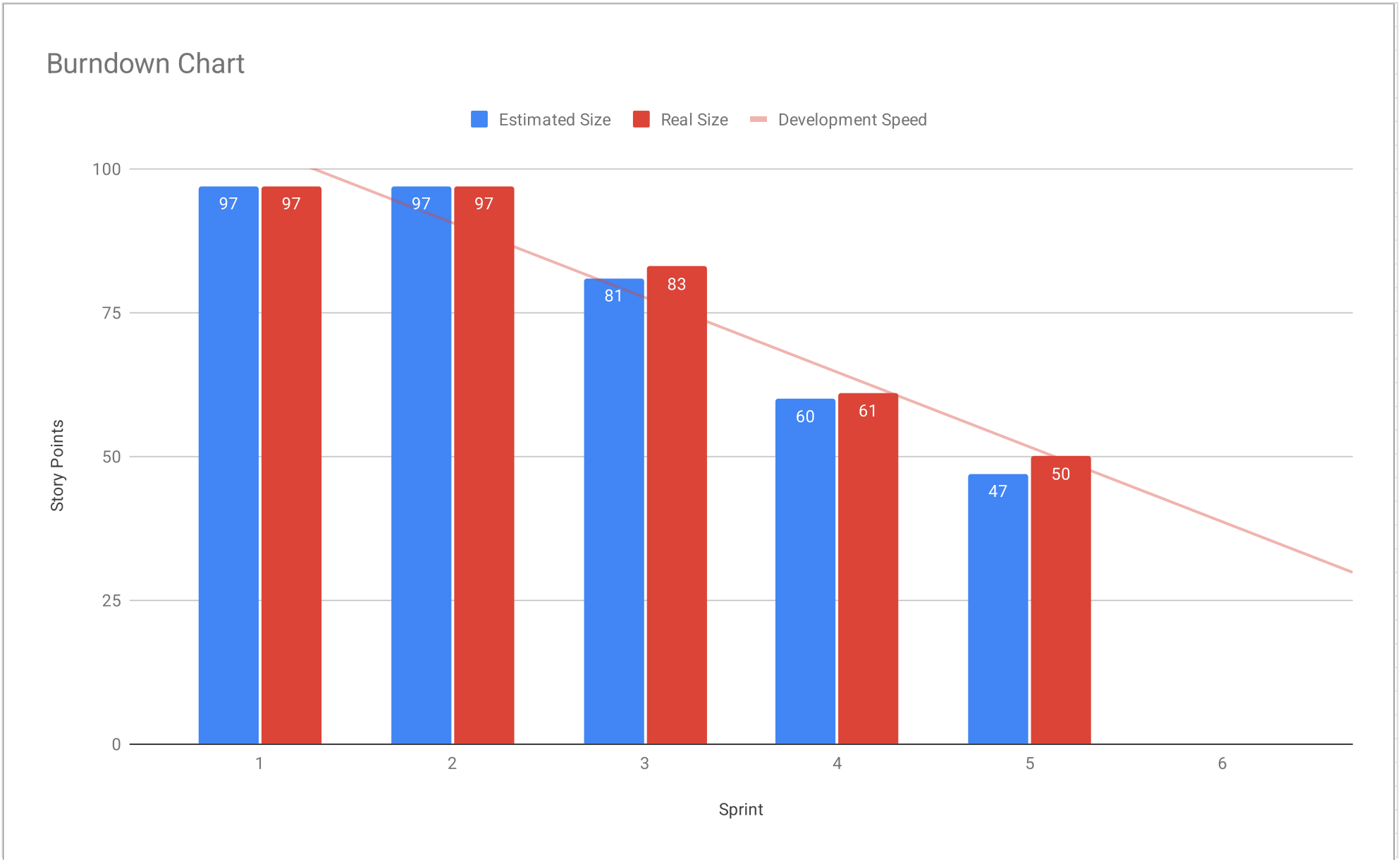
Term	Definition

Sprint #	Sprint goal
1	Meeting with industry partner and getting things started (and the T-shirt of course)
2	Start work on individual components and research unclear topics
3	Combining components into a first working prototype
4	Refining prototype and splitting out components
5	Finishing the Implementation of the Initial Architecture
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Sprint #	Story Points Realized
1	0
2	14
3	22
4	11
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	


Velocity Chart
Average
Story Points Realized
25
20
15
10
5
0
Story points
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Sprint

Sprint	Goal	Feature Name	Est. size	Est. remaining	Real size	Real remaining
Release						
Total			97	97		
Sprints						
1	**Meeting with industry partner and getting things started (and the T-shirt of course)**		0	97	0	97
2	**Start work on individual components and research unclear topics**		16	97	14	97
3	**Combining components into a first working prototype**		21	81	22	83
4	**Refining prototype and splitting out components**		13	60	11	61
5	**Finishing the Implementation of the Initial Architecture**		47	47	0	50
6						
Features						
1	**Meeting with industry partner and getting things started (and the T-shirt of course)**					
2	**Start work on individual components and research unclear topics**					
		Setup Architecture	5		5	
		Serve Webcam as WebRTC stream	5		5	
		Setup Initial CI Pipeline	3		3	
		Discuss Team Distribution Preferences	3		1	
3	**Combining components into a first working prototype**					
		Keep BOM up to date	2		2	
		Setup REUSE licensing	2		3	
		Update Architecture document	2		2	
		Create Object Detection Example	3		3	
		Prepare Build Process Review	2		2	
		Prepare Depth Estimation	5		5	
		Research Object and Depth Estimation	5		5	
4	**Refining prototype and splitting out components**					
		Metadata Transport	5		3	
		Split Backend Responsibilities	3		3	
		Improve Code Quality	5		5	
5	**Finishing the Implementation of the Initial Architecture**					
		Remove Redundant Calculations	3			
		Automate SBOM Generation	3			
		Utilize Library for detecting Object dimensions	5			
		Create a React Video Component	3			
		Investigate and Fix startup TIme	5			
		Fix Windows Development setup	3			
		Create a React Video Overlay	3			
		Build Process Video	1			
		Setup Docker Compose	3			
		Update Container Images	2			
		Use Metadata in the Frontend for Drawing the Overlay	5			
		Create Initial Video Router / Dispatching Service	8			
		Separate Model Downloading from Running	3			


Burndown Chart
Estimated Size
Real Size
Development Speed
100
75
50
25
0
Story Points
97
97
97
97
81
83
60
61
47
50
1
2
3
4
5
6
Sprint

Sprint	Goal	Feature Name	Est. size	Est. remaining	Real size	Real remaining
Release						
Total			0	0		
Sprints						
1			0	0	0	0
2			0	0	0	0
3			0	0	0	0
...				0		0
Features						
1						
2						
3						
		PLEASE CREATE THE BURNDOWN CHART ON A NEW TAB USING THE DATA FROM THIS TAB				

#	Feature Definition of Done	Sprint Release Definition of Done	Project Release Definition of Done
	Code has been reviewed by at least one SD	All Software Components are functioning	Architecture documentation has been updated
	Feature has been reviewed by at least one PO	Sprint release notes have been generated from all merge-requests since the last release	Tests exist for all mayor features
	Build scripts have been adapted if necessary	All container communication is working	All tests are passing
	CI Pipeline Passes		
	Code has been merged to main		
	BOM has been updated if necessary		

Type	Link / reference

#	Context	Name	Version	License	Comment	Status	Change Info
1	Frontend (React UI)	npm:react	18.3.1	MIT	UI framework	In Use	
2	Frontend (React UI)	npm:react-dom	18.3.1	MIT	DOM renderer for React	In Use	
3	Frontend (React UI)	npm:typescript	5.6.3	Apache-2.0	Type system for JavaScript	In Use	Version updated: 5.4.5 → 5.6.3
4	Frontend (React UI)	npm:vite	6.0.3	MIT	Build tool and dev server	In Use	Version updated: 5.2.0 → 6.0.3
5	Frontend (React UI)	npm:websocket	1.0.35	MIT	WebSocket client for metadata	Planned	
6	Frontend (React UI)	npm:webrtc-adapter	9.1.2	BSD-3-Clause	Cross-browser WebRTC compatibility	Planned	
7	Frontend (React UI)	npm:axios	1.7.2	MIT	HTTP client for REST API	Planned	
8	Frontend (React UI)	npm: zustand	4.5.3	MIT	State management	Planned	
9	Frontend (React UI)	npm:three	0.169.0	MIT	for 3D-visualization	Planned (optional)	
10	Frontend (React UI)	npm:@types/react	18.3.12	MIT	TypeScript definitions for React	In Use	New component
11	Frontend (React UI)	npm:@types/react-dom	18.3.1	MIT	TypeScript definitions for React DOM	In Use	New component
12	Frontend (React UI)	npm:@vitejs/plugin-react	4.3.4	MIT	Vite plugin for React support	In Use	New component
13	Frontend (React UI)	npm:eslint	9.17.0	MIT	Code linting	In Use	New component
14	Frontend (React UI)	npm:prettier	3.4.2	MIT	Code formatting	In Use	New component
15	Frontend (React UI)	npm:vitest	2.1.5	MIT	Unit testing framework	In Use	New component
16	Frontend (React UI)	npm:@typescript-eslint/eslint-plugin	8.16.0	MIT	ESLint rules for TypeScript	In Use	New component
17	Frontend (React UI)	npm:@typescript-eslint/parser	8.16.0	MIT	TypeScript parser for ESLint	In Use	New component
18	Backend (FastAPI API)	pypi:uvicorn	0.38.0	BSD-3-Clause	ASGI server for FastAPI	In Use	Version updated: 0.30.1 → 0.38.0
19	Backend (FastAPI API)	pypi:fastapi	0.115.10	MIT	Web framework for API	In Use	Version updated: 0.115.2 → 0.115.10
20	Backend (FastAPI API)	pypi:websockets	13.1	BSD-3-Clause	WebSocket server for real-time metadata	Planned (optional)	
21	Backend (FastAPI API)	pypi:grpcio	1.66.1	Apache-2.0	gRPC for AI service communication	Planned (optional)	
22	Backend (FastAPI API)	pypi:httpx	0.27.0	BSD-3-Clause	Async HTTP client	Planned	
23	Backend (FastAPI API)	pypi:pydantic	2.12.3	MIT	Data validation for FastAPI	In Use	New component
24	Backend (FastAPI API)	pypi:aiortc	1.14.0	BSD-3-Clause	Python WebRTC implementation	In Use	New component
25	Backend (FastAPI API)	pypi:av	16.0.1	BSD-2-Clause	Audio/Video processing for aiortc	In Use	New component
26	Backend (FastAPI API)	pypi:ruff	0.7.0	MIT	Fast Python linter	In Use	New component
27	Backend (FastAPI API)	pypi:pytest	8.3.3	MIT	Testing framework	In Use	New component
28	Backend (FastAPI API)	pypi:mypy	1.13.0	MIT	Static type checker	In Use	New component
29	WebRTC Signaling	go:pion/webrtc	3.2.35	MIT	Go WebRTC library for signaling service	Planned (optional)	
30	WebRTC Signaling	go:gorilla/websocket	1.5.2	BSD-2-Clause	WebSocket library for Go	Planned (optional)	
31	Image Analysis (Python)	pypi:opencv-python	4.9.0.80	Apache-2.0	Computer vision library	In Use	Version updated: 4.10.0.84 → 4.12.0.88
32	Image Analysis (Python)	pypi:numpy	1.26.4	BSD-3-Clause	Numerical operations	In Use	Version updated: 2.1.1 → 2.2.6
33	Image Analysis (Python)	pypi:torch	2.3.1	BSD-3-Clause	PyTorch ML framework	Planned	
34	Image Analysis (Python)	pypi:torchvision	0.18.1	BSD-3-Clause	Computer vision models for PyTorch	Planned	
35	Image Analysis (Python)	pypi:midas	3.1	MIT	for depth recognition	Planned	
36	Image Analysis (Python)	pypi:ultralytics	8.2.14	APGL-3.0	for computer vision	Planned	
37	Infrastructure/Deployment	docker:python	3.11-slim	PSF	Base container for Python services	Planned	
38	Infrastructure/Deployment	docker:golang	20-alpine	MIT	Base container for Go service	Planned	
39	Infrastructure/Deployment	docker:nvidia/cuda	12.4.1-base	NVIDIA Software License	GPU acceleration for AI inference	Planned (optional)	
40	Infrastructure/Deployment	helm:kubernetes	1.13.0	Apache-2.0	Container orchestration	Planned (optional)	
41	Infrastructure/Deployment	prometheus/prometheus	2.54.0	Apache-2.0	Monitoring and metrics	Planned (optional)	
42	Infrastructure/Deployment	grafana/grafana	11.1.0	AGPL-3.0	Visualization dashboards	Planned	

Last Name	First Name	Value					
Hilgers	**Felix**			**7.50**	**NOK**		
Samdani	**Sarib**	3					
Chinbat	**Anuun**	3					
Badura	**Emil**	21		0	No size		
Assenbaum	**Paul**			1	Trivial size		
Mantsch	**Christoph**			2	Small size		
Asadi	**Zohreh**	3		3	Medium size		
				5	Large size		
Goldschmidt	**Georgina**			8	Very large size		
Zinn	**Benedikt**			13	Too large (size)		
How to play planning poker							
1. Everyone type their number into their value field, don't hit return yet							
2. Someone, perhaps a product owner, count down 3.. 2.. 1..							
3. Then, everyone hit return to submit their value							
						no cap yet	