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List of Publications

2022 
Journal Articles

[J1] S Leutenegger, 
OKVIS2: Realtime Scalable Visual-Inertial SLAM with Loop Closure, 

Conference and Workshop Papers

[C1] N Merrill, Y Guo, X Zuo, S Leutenegger, X Peng, L Ren and G Huang, 
Symmetry and Uncertainty-Aware Object SLAM for 6DoF Object Pose Estimation, 

[C2] D Henning, T Laidlow and S Leutenegger, 
BodySLAM: Joint Camera Localisation, Mapping, and Human Motion Tracking, 
*European Conference on Computer Vision (ECCV)*, 2022.

[C3] S Boche, X Zuo, S Schaefer and S Leutenegger, 
Visual-Inertial SLAM with Tightly-Coupled Dropout-Tolerant GPS Fusion, 

[C4] Y Ren, B Xu, CL. Choi and S Leutenegger, 
Visual-Inertial Multi-Instance Dynamic SLAM with Object-Level Relocalisation, 

[C5] B Xu, A Davison and S Leutenegger, 
Learning to Complete Object Shapes for Object-level Mapping in Dynamic Scenes, 

2021 
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[J1] B Xu, AJ Davison and S Leutenegger, 
Deep Probabilistic Feature-metric Tracking, 

[J2] M Popovic, F Thomas, S Papatheodorou, N Funk, T Vidal-Calleja and S Leutenegger, 
Volumetric Occupancy Mapping With Probabilistic Depth Completion for Robotic Navigation, 

[J3] N Funk, J Tarrio, S Papatheodorou, M Popovic, PF. Alcantarilla and S Leutenegger, 
Multi-Resolution 3D Mapping With Explicit Free Space Representation for Fast and Accurate Mobile Robot Motion Planning, 

Conference and Workshop Papers
2020
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[C1] A Dai, S Papatheodorou, N Funk, D Tzoumanikas and S Leutenegger,
Fast frontier-based information-driven autonomous exploration with an MAV,

[C2] D Tzoumanikas, Q Yan and S Leutenegger,
Nonlinear mpc with motor failure identification and recovery for safe and aggressive multicopter flight,

[C3] U Bonde, PF Alcantarilla and S Leutenegger,
Towards bounding-box free panoptic segmentation,
German Conference on Pattern Recognition (GCPR), 2020.

[C4] Z Landgraf, F Falck, M Bloesch, S Leutenegger and AJ Davison,
Comparing view-based and map-based semantic labelling in real-time SLAM,

[C5] T Laidlow, J Czarnowski, A Nicastro, R Clark and S Leutenegger,
Towards the Probabilistic Fusion of Learned Priors into Standard Pipelines for 3D Reconstruction,

[C6] J Ortiz, M Pupilli, S Leutenegger and AJ Davison,
Bundle adjustment on a graph processor,

[C7] D Tzoumanikas, F Graule, Q Yan, D Shah, M Popovic and S Leutenegger,
Aerial Manipulation Using Hybrid Force and Position NMPC Applied to Aerial Writing,
2020.

2019
Journal Articles

[J1] D Tzoumanikas, W Li, M Grimm, K Zhang, M Kovac and S Leutenegger,
Fully autonomous micro air vehicle flight and landing on a moving target using visual–inertial estimation and model-predictive control,

[J2] K Zhang, P Chermprayong, D Tzoumanikas, W Li, M Grimm, M Smentoch, S Leutenegger and M Kovac,
Bioinspired design of a landing system with soft shock absorbers for autonomous aerial robots,
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[J1] E Vespa, N Nikolov, M Grimm, L Nardi, PH Kelly and S Leutenegger,  
Efficient octree-based volumetric SLAM supporting signed-distance and occupancy mapping,  

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[C1] M Bloesch, J Czarnowski, R Clark, S Leutenegger and AJ Davison,  
CodeSLAM—learning a compact, optimisable representation for dense visual SLAM,  
Proceedings of the IEEE conference on computer vision and pattern recognition, 2560-2568, 2018.
[C2] M Li, N Songur, P Orlov, S Leutenegger and AA Faisal,  
Towards an Embodied Semantic Fovea: Semantic 3D scene reconstruction from ego-centric eye-tracker videos,  
2018.
[C3] W Li, S Saeedi, J McCormac, R Clark, D Tzoumanikas, Q Ye, Y Huang, R Tang and S Leutenegger,  
InteriorNet: Mega-scale multi-sensor photo-realistic indoor scenes dataset,  
2018.
[C4] J McCormac, R Clark, M Bloesch, A Davison and S Leutenegger,  
Fusion++: Volumetric object-level slam,  
[C5] R Clark, M Bloesch, J Czarnowski, S Leutenegger and AJ Davison,  
Learning to solve nonlinear least squares for monocular stereo,  
[C6] R Clark, M Bloesch, J Czarnowski, S Leutenegger and AJ Davison,  
Ls-net: Learning to solve nonlinear least squares for monocular stereo,  
2018.

2017

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[J1] P Oettershagen, A Melzer, T Mantel, K Rudin, T Stastny, B Wawrzacz, T Hinzmann, S Leutenegger, K Alexis and R Siegwart,  
Design of small hand-launched solar-powered UAVs: From concept study to a multi-day world endurance record flight,  

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[C1] J McCormac, A Handa, A Davison and S Leutenegger,  
Semanticfusion: Dense 3d semantic mapping with convolutional neural networks,  
[C2] R Lukierski, S Leutenegger and AJ Davison, 
Room layout estimation from rapid omnidirectional exploration, 

[C3] L Platinsky, AJ Davison and S Leutenegger, 
Monocular visual odometry: Sparse joint optimisation or dense alternation?, 

[C4] J Czarnowski, S Leutenegger and AJ Davison, 
Semantic texture for robust dense tracking, 

[C5] T Laidlow, M Bloesch, W Li and S Leutenegger, 
Dense rgb-d-inertial slam with map deformations, 

[C6] J McCormac, A Handa, S Leutenegger and AJ Davison, 
Scenenet rgb-d: Can 5m synthetic images beat generic imagenet pre-training on indoor segmentation?, 

[C7] R Clark, J McCormac, S Leutenegger and A Davison, 
Meta-learning for instance-level data association, 

2016

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[J1] M Bloesch, H Sommer, T Laidlow, M Burri, G Nuetzi, P Fankhauser, D Bellicoso, C Gehring, S Leutenegger, M Hutter and others, 
A primer on the differential calculus of 3d orientations, 

[J2] T Whelan, RF Salas-Moreno, B Glocker, AJ Davison and S Leutenegger, 
ElasticFusion: Real-time dense SLAM and light source estimation, 

Book Chapters

[BC1] S Leutenegger, C Hürzeler, AK Stowers, K Alexis, MW Achtelik, D Lentink, PY Oh and R Siegwart, 
Flying robots, 

Conference and Workshop Papers

[C1] E Johns, S Leutenegger and AJ Davison, 
Pairwise decomposition of image sequences for active multi-view recognition, 
[C2] P Bardow, AJ Davison and S Leutenegger,
Simultaneous optical flow and intensity estimation from an event camera,

[C3] E Johns, S Leutenegger and AJ Davison,
Deep learning a grasp function for grasping under gripper pose uncertainty,

[C4] J Zienkiewicz, A Davison and S Leutenegger,
Real-time height map fusion using differentiable rendering,

[C5] H Kim, S Leutenegger and AJ Davison,
Real-time 3D reconstruction and 6-DoF tracking with an event camera,

[C6] J Zienkiewicz, A Tsiotsios, A Davison and S Leutenegger,
Monocular, real-time surface reconstruction using dynamic level of detail,

2015
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[J1] S Leutenegger, S Lynen, M Bosse, R Siegwart and P Furgale,
Keyframe-based visual-inertial odometry using nonlinear optimization,

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[C1] M Milford, H Kim, M Mangan, S Leutenegger, T Stone, B Webb and A Davison,
Place recognition with event-based cameras and a neural implementation of SeqSLAM,

[C2] P Oettershagen, A Melzer, T Mantel, K Rudin, R Lotz, D Siebenmann, S Leutenegger, K Alexis and R Siegwart,
A solar-powered hand-launchable UAV for low-altitude multi-day continuous flight,

[C3] M Milford, H Kim, S Leutenegger and A Davison,
Towards visual slam with event-based cameras,
The problem of mobile sensors workshop in conjunction with RSS, 2015.

[C4] R Lukierski, S Leutenegger and AJ Davison,
Rapid free-space mapping from a single omnidirectional camera,
[C5] T Whelan, S Leutenegger, RF. Salas-Moreno, B Glocker and AJ. Davison,  
ElasticFusion: Dense SLAM Without A Pose Graph,  

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[C1] J Nikolic, J Rehder, M Burri, P Gohl, S Leutenegger, PT Furgale and R Siegwart,  
A synchronized visual-inertial sensor system with FPGA pre-processing for accurate real-time SLAM,  
[C2] P Oettershagen, A Melzer, S Leutenegger, K Alexis and R Siegwart,  
Explicit model predictive control and l 1-navigation strategies for fixed-wing uav path tracking,  
22nd Mediterranean Conference on Control and Automation, 1159-1165, 2014.
[C3] S Leutenegger, A Melzer, K Alexis and R Siegwart,  
Robust state estimation for small unmanned airplanes,  
2014 IEEE Conference on Control Applications (CCA), 1003-1010, 2014.

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[PhD1] S Leutenegger,  
Unmanned solar airplanes: Design and algorithms for efficient and robust autonomous operation,  
ETH Zurich, 2014.

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[J1] M Bloesch, M Hutter, MA Hoepflinger, S Leutenegger, C Gehring, CD Remy and R Siegwart,  
State estimation for legged robots-consistent fusion of leg kinematics and IMU,  

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[C1] J Nikolic, M Burri, J Rehder, S Leutenegger, C Huerzeler and R Siegwart,  
A UAV system for inspection of industrial facilities,  
Design and control of a spherical omnidirectional blimp,  
[C3] L Marconi, S Leutenegger, S Lynen, M Burri, R Naldi and C Melchiiorri,  
Ground and aerial robots as an aid to alpine search and rescue: Initial sherpa outcomes,  
2012
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[J1] S Leutenegger and others,
Image Keypoint Detection, Description, and Matching, 

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[C1] L Marconi, C Melchiorri, M Beetz, D Pangercic, R Siegwart, S Leutenegger, R Carloni, S Stramigjoli, H Bruyninckx, P Doherty and others,
The SHERPA project: Smart collaboration between humans and ground-aerial robots for improving rescuing activities in alpine environments,

[C2] S Leutenegger and RY Siegwart,
A low-cost and fail-safe inertial navigation system for airplanes,

2011
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[J1] S Leutenegger, M Jabas and RY Siegwart,
Solar airplane conceptual design and performance estimation,

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[C1] S Leutenegger, M Chli and RY Siegwart,
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2011 International conference on computer vision, 2548-2555, 2011.

[C2] P Fankhauser, S Bouabdallah, S Leutenegger and R Siegwart,
Modeling and decoupling control of the coax micro helicopter,

2010
MastersThesis

[M1] P Fankhauser and C Gwerder,
Modeling and control of a ballbot,
Eidgenössische Technische Hochschule Zürich, 2010.

2009
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[J1] A Noth,
Designing solar airplanes for continuous flight,
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[C1] C Bermes, S Leutenegger, S Bouabdallah, D Schafroth and R Siegwart,
New design of the steering mechanism for a mini coaxial helicopter,

[C2] C Bermes, S Leutenegger, S Bouabdallah and R Siegwart,
Design and Comparison of a Steering Mechanism for an Autonomous Coaxial Indoor Helicopter,

2007

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[J1] S Leutenegger, C Bermes and S Bouabdallah,
Mechanical design and realization of a steering mechanism for a coaxial helicopter,

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[C1] DJ Bell, S Leutenegger, K Hammar, L Dong and BJ Nelson,