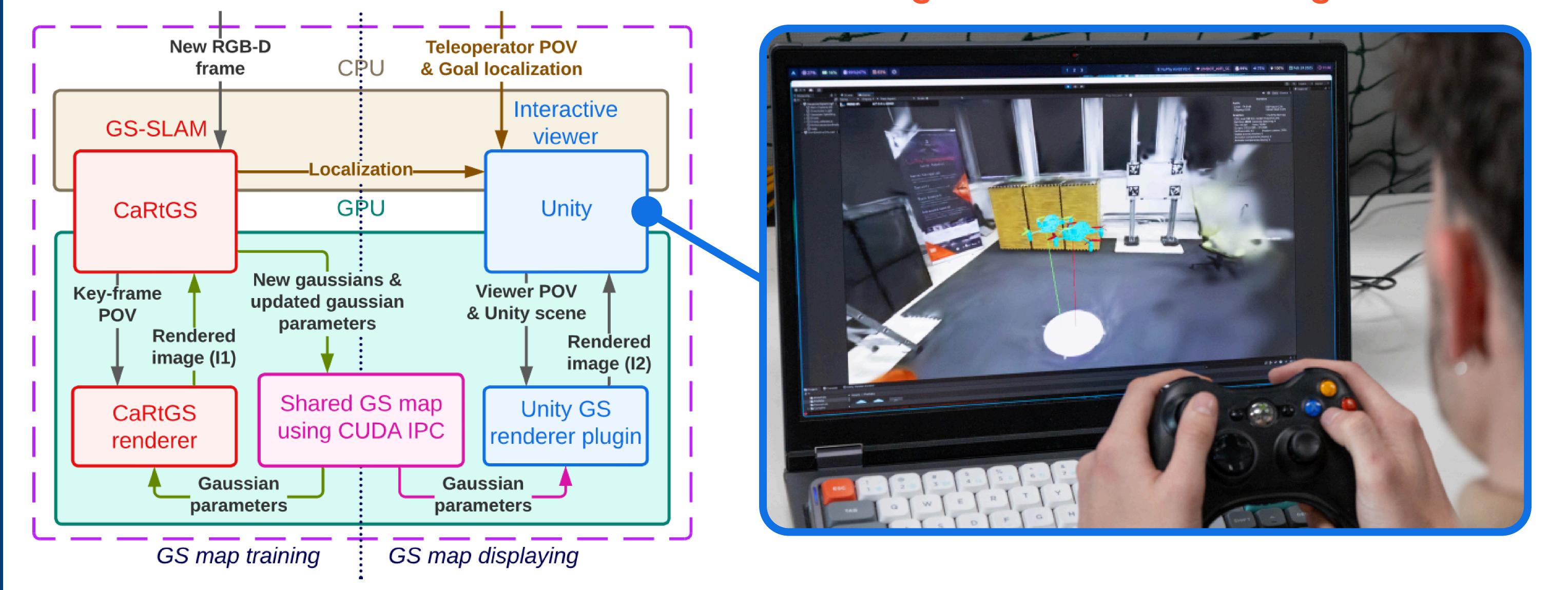


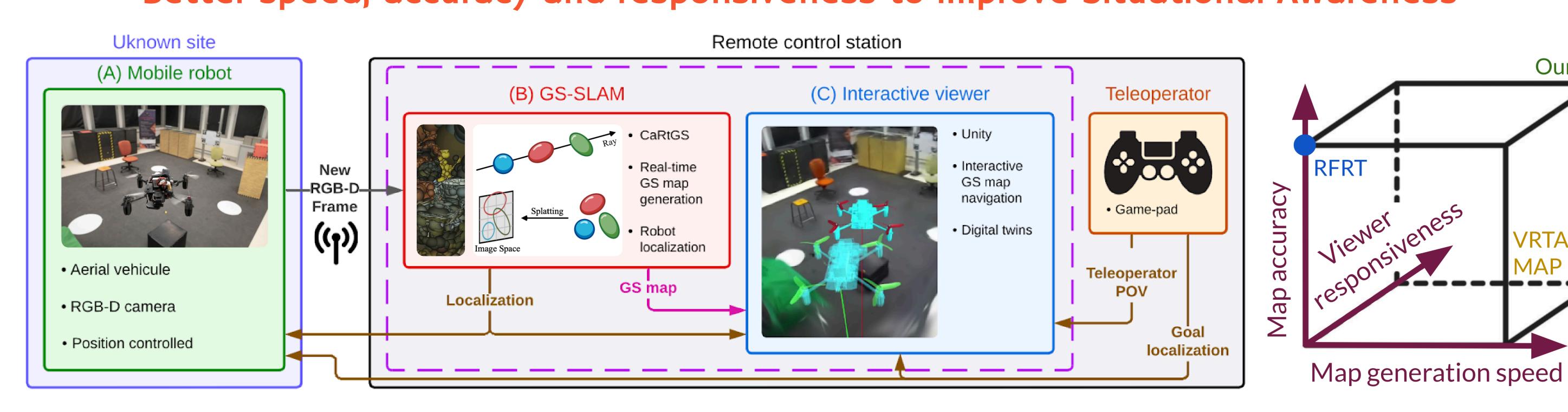
Real-time Photorealistic Mapping for Situational Awareness in Robot Teleoperation

Ian Page, Pierre Susbielle, Olivier Aycard and Pierre-Brice Wieber Framatome, Gipsa-lab and INRIA

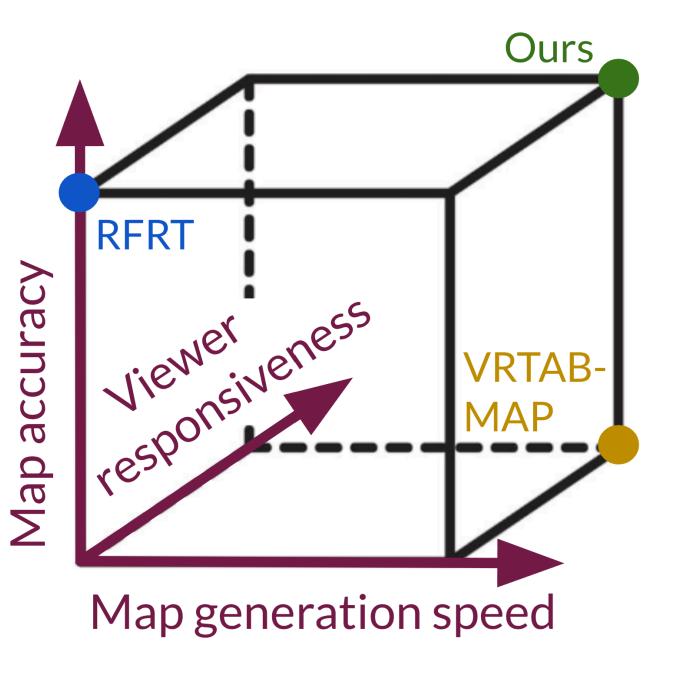
Online map-based teleoperation with GPU-integrated Gaussian Splatting SLAM



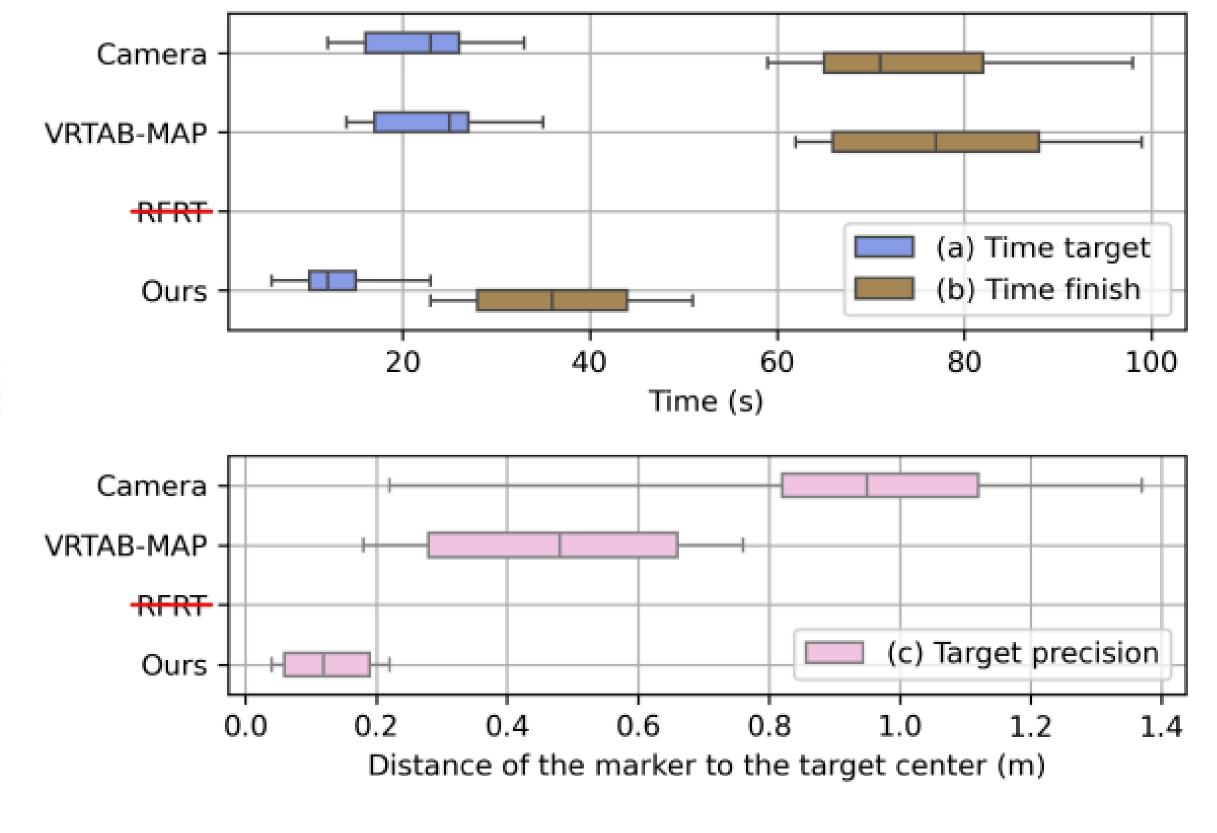
Better speed, accuracy and responsiveness to improve Situational Awareness



Faster and more precise teleoperation



0.95 30 FPS 0.90 25 0.85 - 0.80 VRTAB-MAP PSNR PSNR - 0.75 S RFRT PSNR Ours PSNR VRTAB-MAP SSIM 0.70 15 RFRT SSIM ····· Ours SSIM - 0.65 0.60 10 100 FPS 0.55 20 100 60 80 120 Time (s) since received RGB-D Frame (On-camera) t = 0st = 5st = 105s**RGB-D** frame **VRTAB-MAP RFRT RFRT** Ours Ours (Ground truth) **PSNR** = 27.8 **PSNR** = 16.6 **PSNR = 21.4 PSNR** = 27.6 **PSNR** = 11.2 SSIM = 0.61SSIM = 0.72SSIM = 0.84SSIM = 0.92SSIM = 0.94



Our teleoperation system makes no compromise by combining the map generation speed of VRTAB-MAP with the rendering quality of RFRT and a fluid, responsive interface.

- RFRT: M. Wilder-Smith, V. Patil, and M. Hutter, "Radiance fields for robotic teleoperation", 2025.
- VRTAB-MAP: H. Stedman, B. B. Kocer, M. Kovac, and V. M. Pawar, "Vrtab-map: A configurable immersive teleoperation framework with online 3d reconstruction," pp. 104–110, 2022.
- P. Stotko, S. Krumpen, M. Schwarz, C. Lenz, S. Behnke, R. Klein, and M. Weinmann, "A vr system for immersive teleoperation and live exploration with a mobile robot," pp. 3630–3637, 2019.





