

# STRELKA: HILTI SLAM Challenge 2023

Eduard Zalyaev, Roman Voronov, Artem Voronov, Ramil Khafizov and Ramil Khusainov

## I. INTRODUCTION

This report provides an overview of our system used to complete the HILTI- 2023 SLAM Challenge. The system consists of front-end (online) and back-end (offline) parts. The key contributors to this work are on the authors' list.

## II. SYSTEM OVERVIEW

In our work we used the following modules:

- 1) Filter based lidar-inertial odometry. Causal method with high frequency (approx. 30 Hz for Intel Core i9-8950HK CPU @ 2.90GHz  $\times$  12 and AMD® Ryzen 5 3600 6-core processor  $\times$  12, 16 Gb RAM) odometry output.
- 2) Factor-graph optimization incorporating loop-closures.
- 3) Point cloud based full bundle adjustment.

All authors are with Center for Technologies in Robotics and Mechatronics Components, Innopolis University, Innopolis, Russia. E-mails:  
edzaljaev@gmail.com,  
r.voronov@innopolis.university,  
a.voronov@innopolis.university,  
r.khafizov@innopolis.university,  
ramil.khusainov@gmail.com.