CTU-CRAS-NORLAB at DARPA SubT Challenge – Publications

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November 2021

This short text summarizes the main publications of CTU-CRAS-NORLAB team during DARPA SubTerranean Challenge.

Team Description

The CTU-CRAS-NORLAB team joins two universities, three departments, and four research groups. Czech Technical University has been represented by the following groups: Vision for Robotics and Autonomous Systems (VRAS), Multi-robot systems (MRS), both from Department of Cybernetics, and Computational Robotics (ComRob) from Department of Computer Science. Laval University is represented by Northern Robotics Laboratory (NORLab). The work performed within the DARPA SubT Challenge has been centered around PhD students and the joint work pushed many PhD theses well forward. Several topics were also supported by undergraduate students while they were working on their bachelor and master theses. While many system-related tasks were performed jointly, and many tasks have been shared among several groups, the main responsibilities were roughly allocated as follows:

- VRAS group: Project management, communication sw (shared database), object detection and localization, terrain negotiation, tracked robots, payload design, . . .
- MRS group: UAV control, mapping, planning, UAV hw development, . . .

http://robotics.fel.cvut.cz/cras/darpa-subt/
http://cyber.felk.cvut.cz/vras
http://mrs.felk.cvut.cz
https://comrob.fel.cvut.cz
https://norlab.ulaval.ca
• ComRob: Multirobot exploration, communication hw, legged and wheeled robots. System calibration, ...

• NORLab: 3D mapping and localization for ground robots.

Publications

• Tunnel circuit system paper

• Tunnel and urban circuit system paper

• MRS UAV system

• Decentralized exploration

• Decentralized exploration

• Communication modeling
• Predicting terrain shape

• Tunnel domain UAV approach

• Urban domain UAV approach

• Cave domain UAV approach
  Pavel Petracek, Vit Kratky, Matej Petrlik, Tomas Baca, Radim Kratochvil and Martin Saska. **Large-Scale Exploration of Cave Environments by Unmanned Aerial Vehicles.** *IEEE Robotics and Automation Letters* 6(4):7596-7603, October 2021. [http://dx.doi.org/10.1109/LRA.2021.3098304](http://dx.doi.org/10.1109/LRA.2021.3098304)