Digitalization of Decommissioning

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Objectives

- Integrate 3D LiDAR scanner (Trimble X7) with autonomous robot (Spot)
- Develop 3D models and facility "walkdowns"
- Incorporate autonomous navigation and frontier exploration software
- Develop radiation detection features for additional data collection



Trimble X7/ Spot dog configuration

Background

- Initial steps of the decommissioning process involve site characterization and surveying, using historical records and physical investigation
- Introduces risk of injury and/or radiation poisoning to surveyors and professionals
- Digitalization of the decommissioning process transfers task to robots and LiDAR scanners

Spot test snapshot and 3D scan

Geiger-Müller counter testing
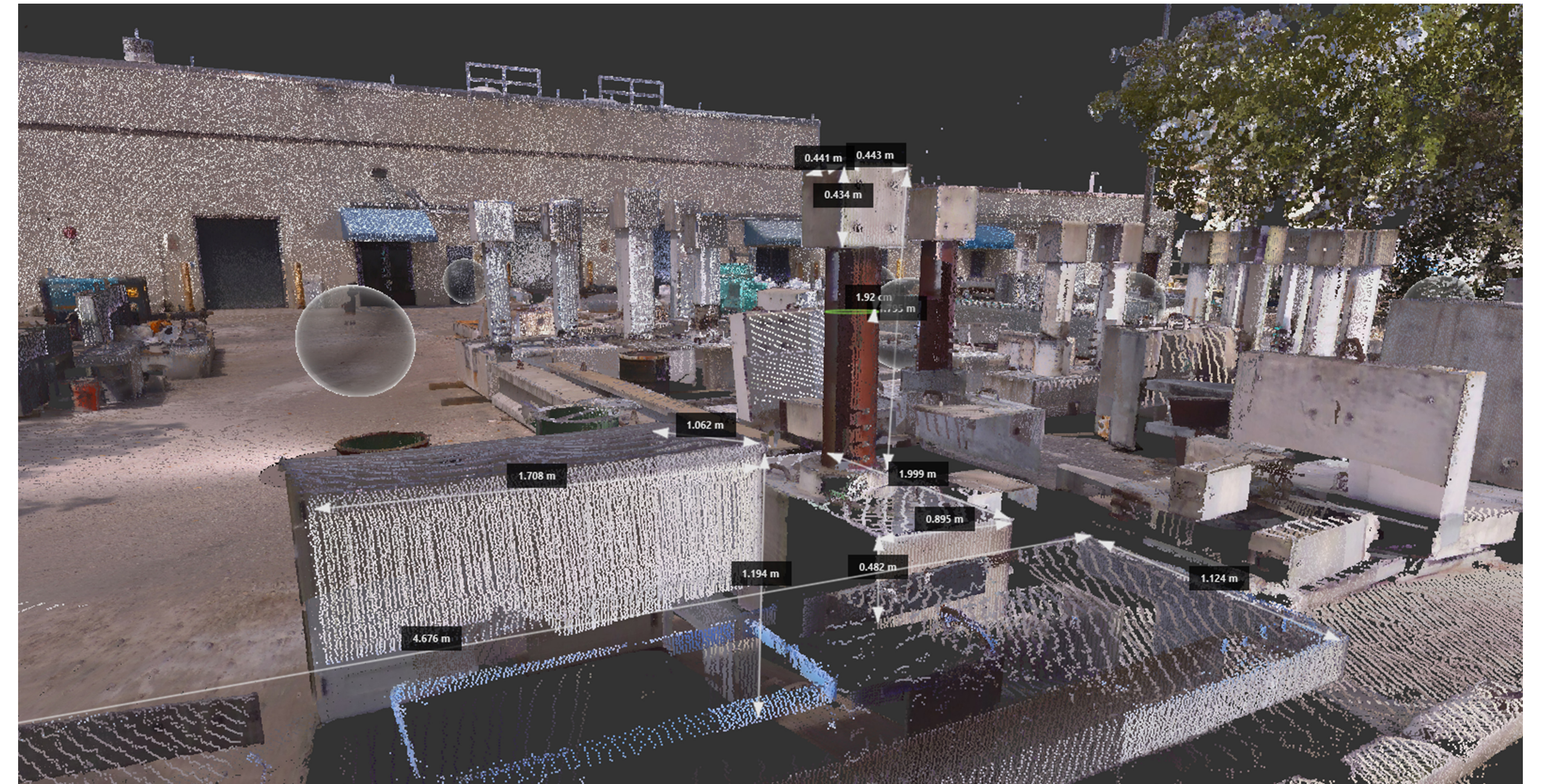
FIU Concrete Bay Area 3D scan

Methodology

- Test the Trimble X7's 3D laser scanning capabilities both stationary and fixed onto Spot
- Test Spot dog's maneuverability through simulated environments and difficult terrain
- Run simulations using custom navigation/scanning software

Doral construction site 3D scan

Results

- Trimble X7 scans produce detailed 3D point clouds maps for remote surveying
- Spot testing showcases that the robot can traverse difficult terrain with relative ease
- Research into autonomous navigation configuration and radiation detection installation is ongoing
- Geiger-Müller counter configured for Spot arm for simulated testing

Path Forward

- Continue developing more sophisticated walkdowns
- Configure and test autonomous navigation/exploration software for the Spot
- Connect the Trimble X7 to the Spot CORE for self-initiated scans
- Incorporate Geiger-Müller counter for radiation detection testing

Acknowledgements

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