

**Robotics and Imaging @  
Elettra Sincrotrone  
Trieste**



Elettra Sincrotrone Trieste

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# Elettra Sincrotrone Trieste

- Multidisciplinary research center located near Trieste (Basovizza)  
(400+ employees, 100000 m<sup>2</sup>, 5000 light hours per year, 10 user-support labs, 20+ beamlines, 1000 users per year)

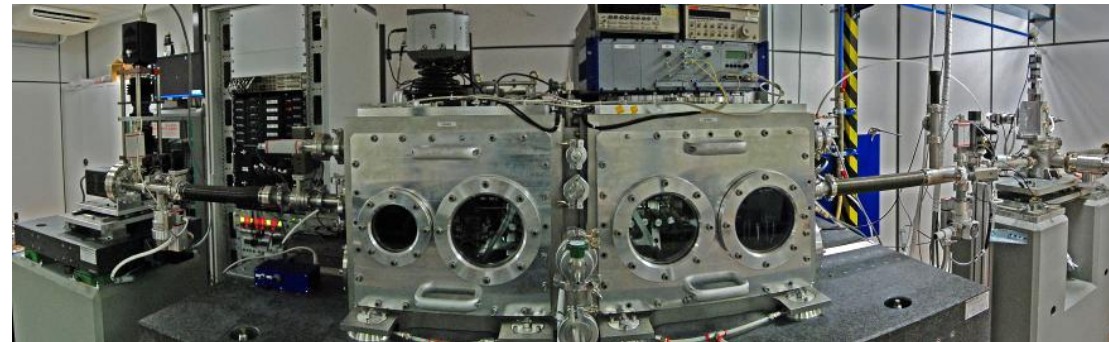
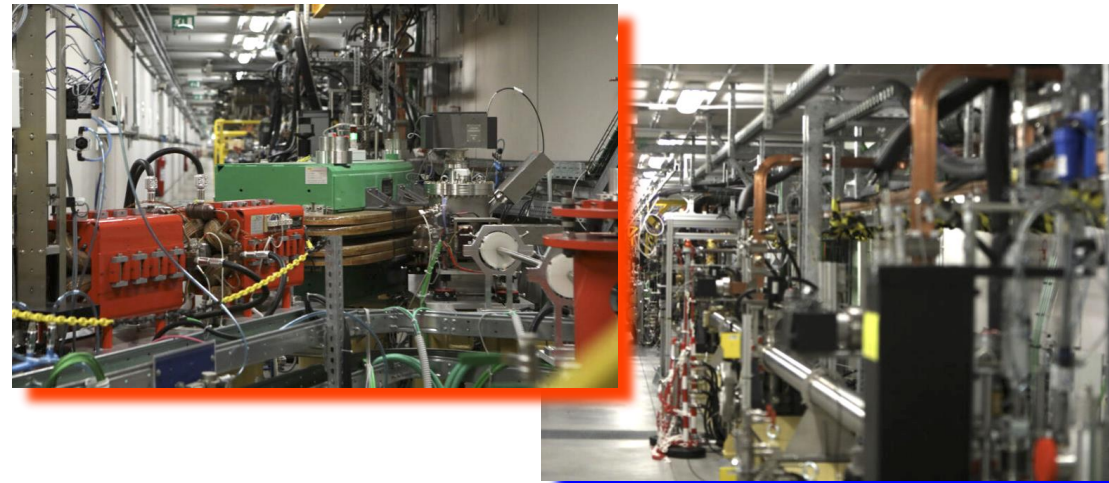
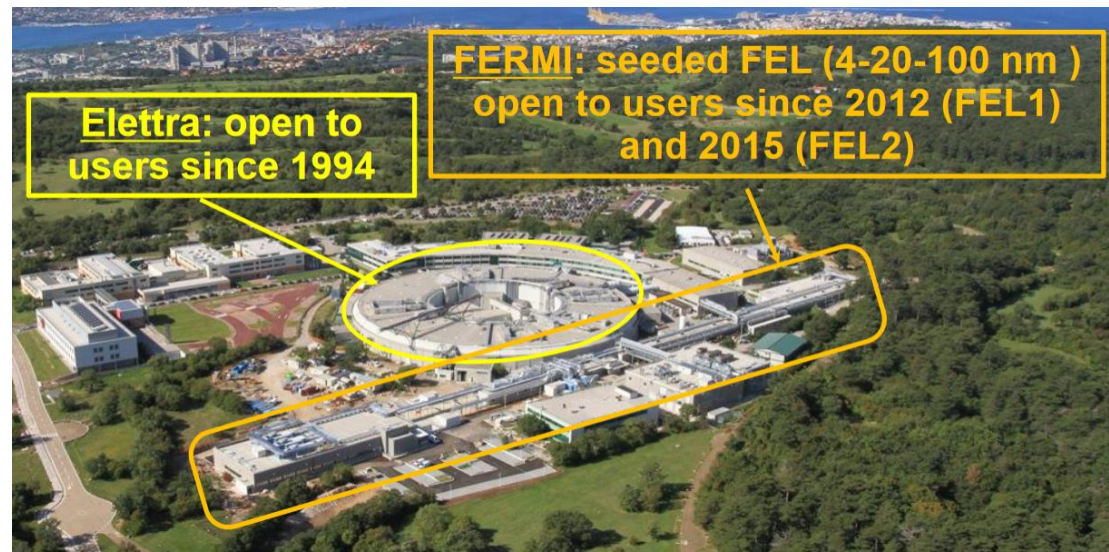
- Base and Applied research on batteries, nanotechnologies, nanomaterials, biology, cultural heritage...

- Two main assets:

- **ELETTRA**: 3<sup>rd</sup> generation light source operating in **top-up** mode
- **FERMI**: **seeded** Free-Electron-Laser

- Planned upgrade: **ELETTRA 2.0**

- Increase brilliance and coherence fraction
- Diffraction limited storage ring in h-plane
- New beamlines exploiting coherence
- FERMI 2.0 also planned

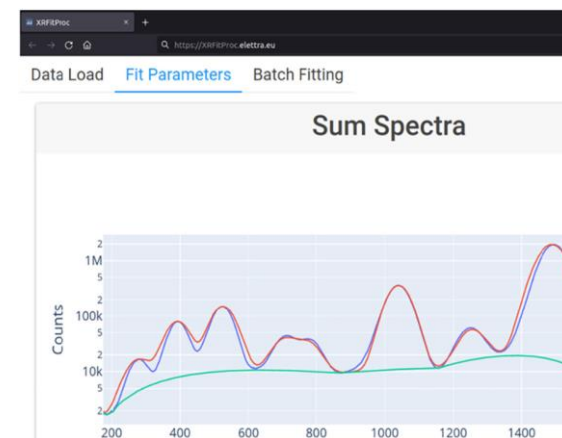
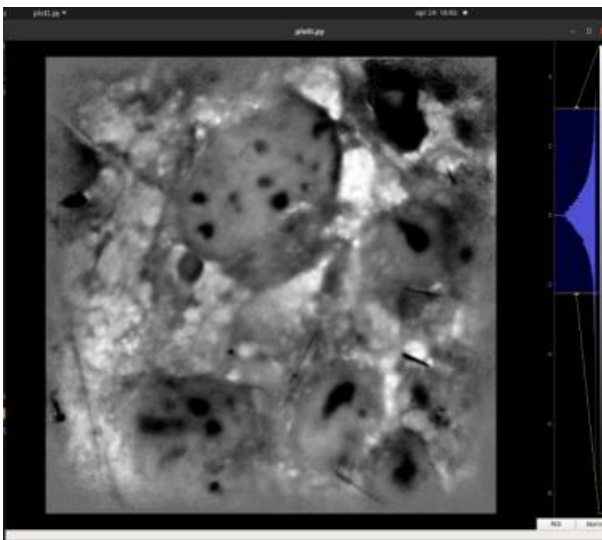




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## IT Group

- Data Storage, HPC and Networking
- Accelerator and Endstation control systems (TANGO)
- Scientific Computing and Data Analysis
- Additional Activities:
  - GPU accelerated ML-based Computer Vision
  - Robotics (full-stack, ROS)

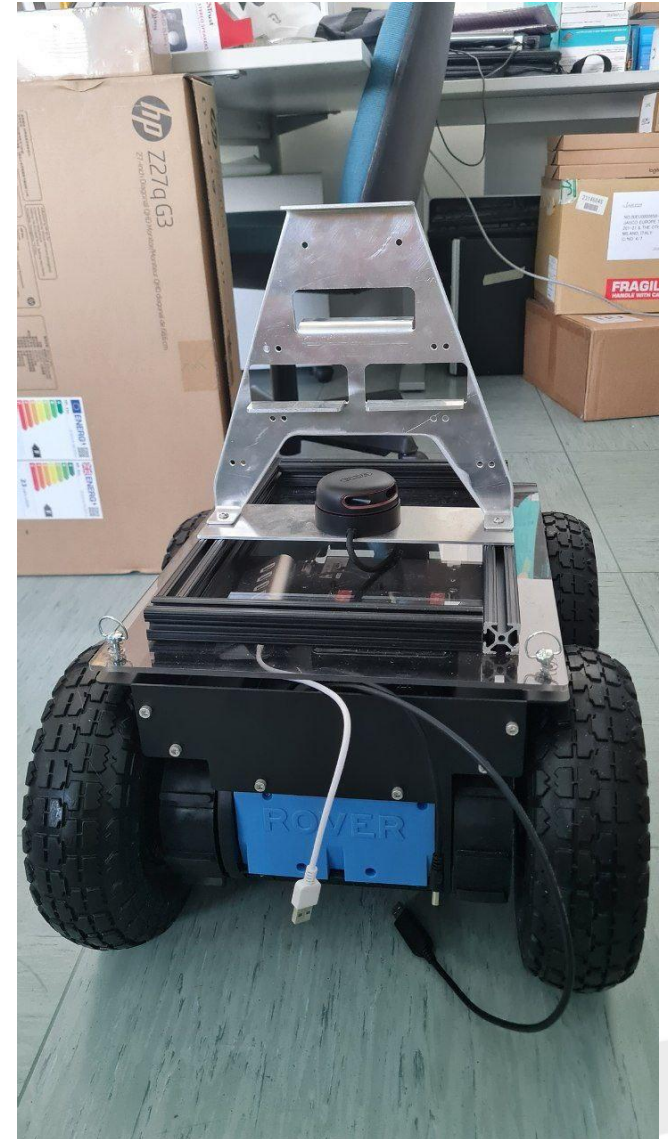




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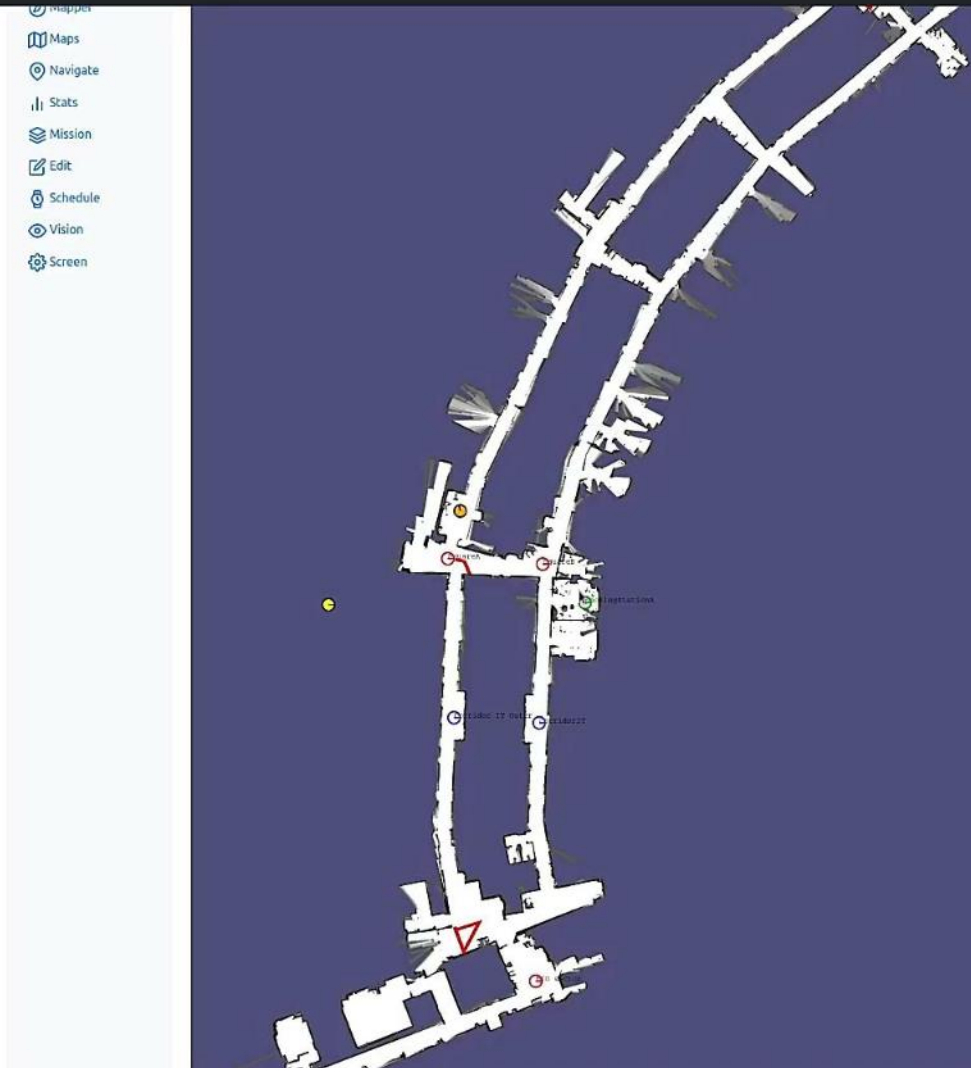
# Robotic Activities: Inspection/Cargo Robot Prototypes

## Autonomously Navigating Mobile Robots





# Robotic Activities: Inspection/Cargo Robot Prototypes Autonomously Navigating Mobile Robots



Trajectory planning/2D LIDAR localization stack based on customized algorithms and patched Google Cartographer



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# Robotic Activities: Inspection/Cargo Robot Prototypes

## Advanced AI-based Obstacle Detection



AI solutions used to avoid the photogrammetric recognizable obstacles invisible for 2D LIDAR



CERTIFIED  
MANAGEMENT SYSTEM

UNI EN ISO 9001:2015  
UNI ISO 45001:2018

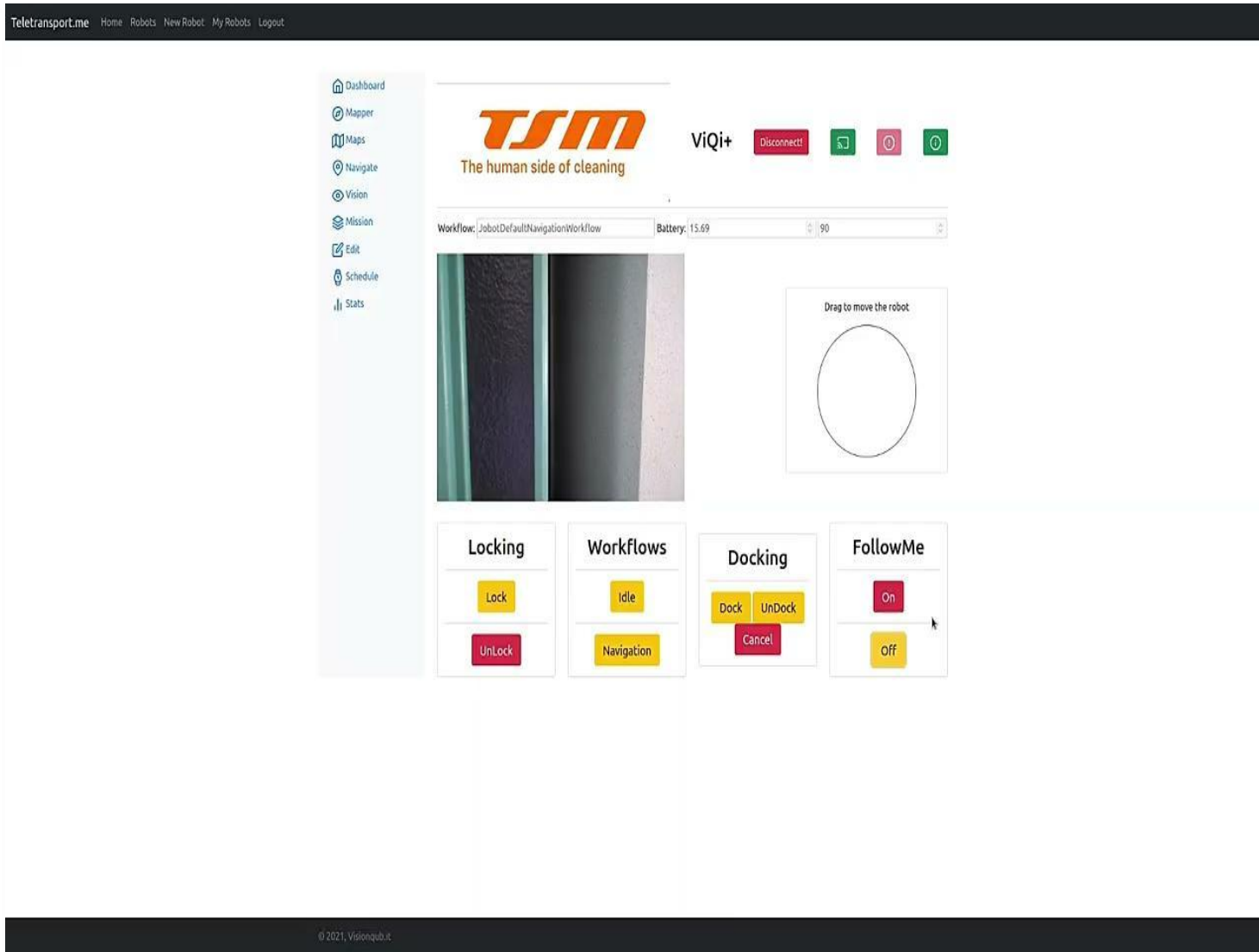


Androids for remote  
access

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# Robotic Activities: Inspection/Cargo Robot Prototypes Follow-Me Solution



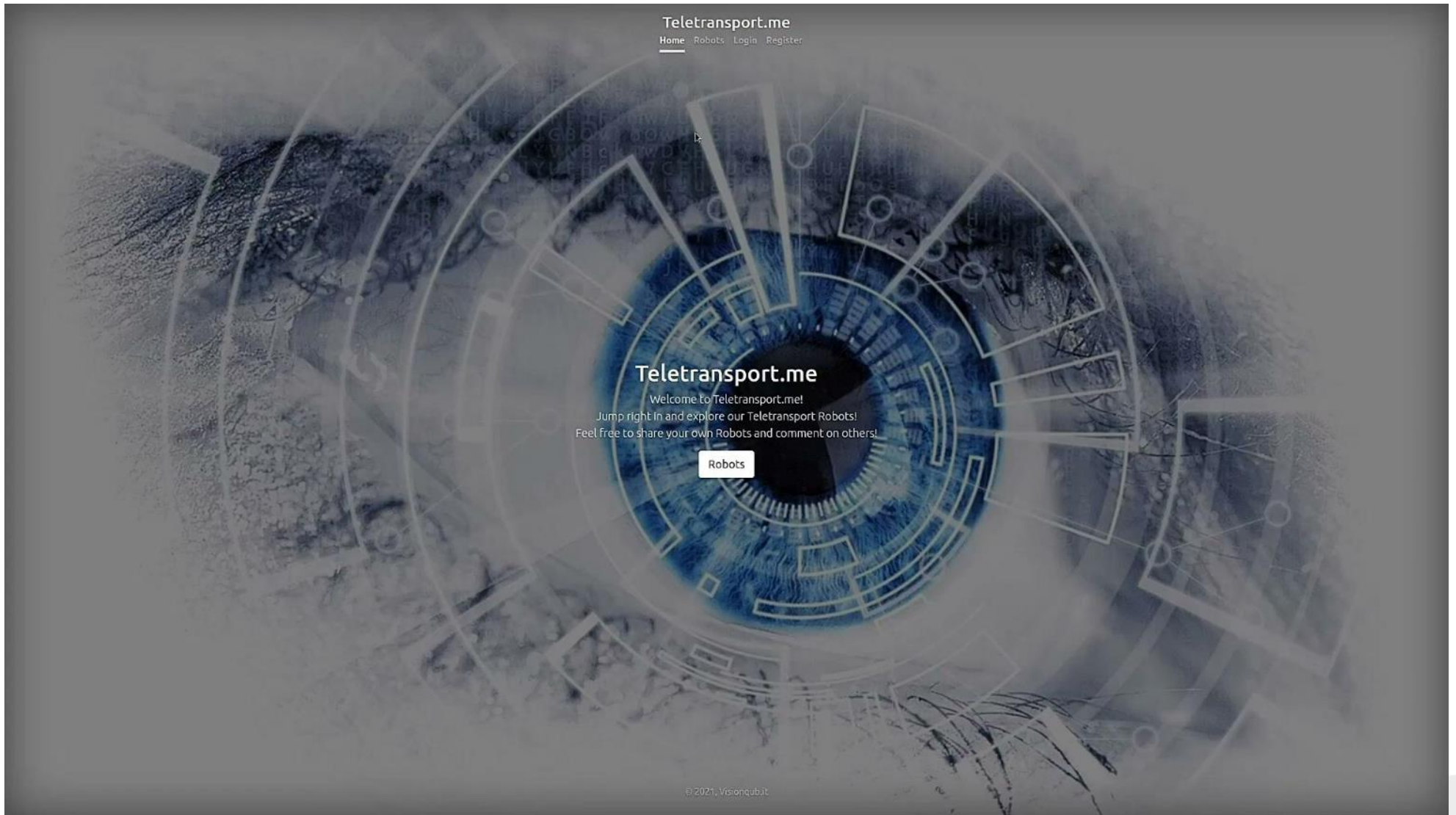
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2D LIDAR also used to detect user's legs and do Follow-Me with virtual joystick control for smooth movement



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# Robotic Activities: Inspection/Cargo Robot Prototypes User-Friendly Web Interface Prototype



Web-based interface for workflow control and customisation, with automated ROS node subsets control



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DIGITAL  LEAPS

# THANK YOU!



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