Digital twins and Ontology for Robot Assisted Decommissioning Operations

DORADO

Robots and drones in nuclear decommissioning

UGV ClearPath Jackal and Spot with mounted sensors

Abdenour Benkrid (IFE), Omar Zahra (IFE), Dag Fjeld Edvardsen (Catenda)
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Key role of robotics

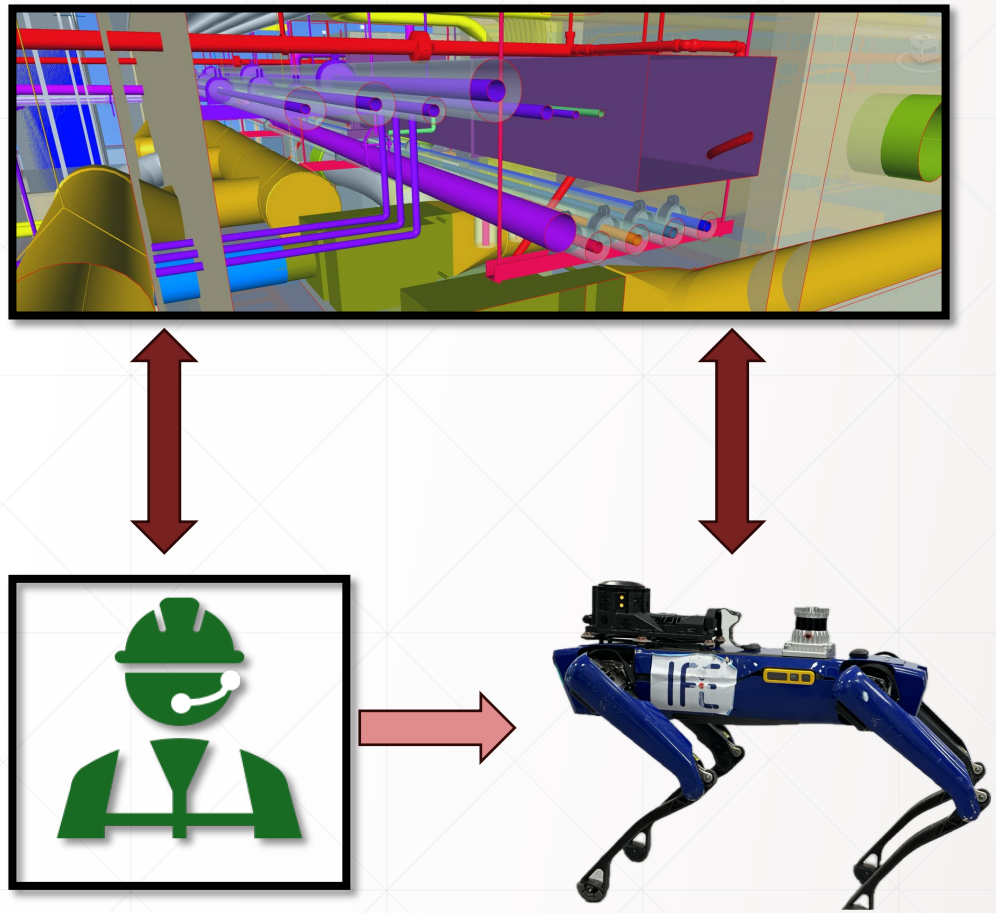
Acts as mobile sensing platform

Collects crucial data for digital twin creation and maintenance

Enables remote monitoring of hazardous areas

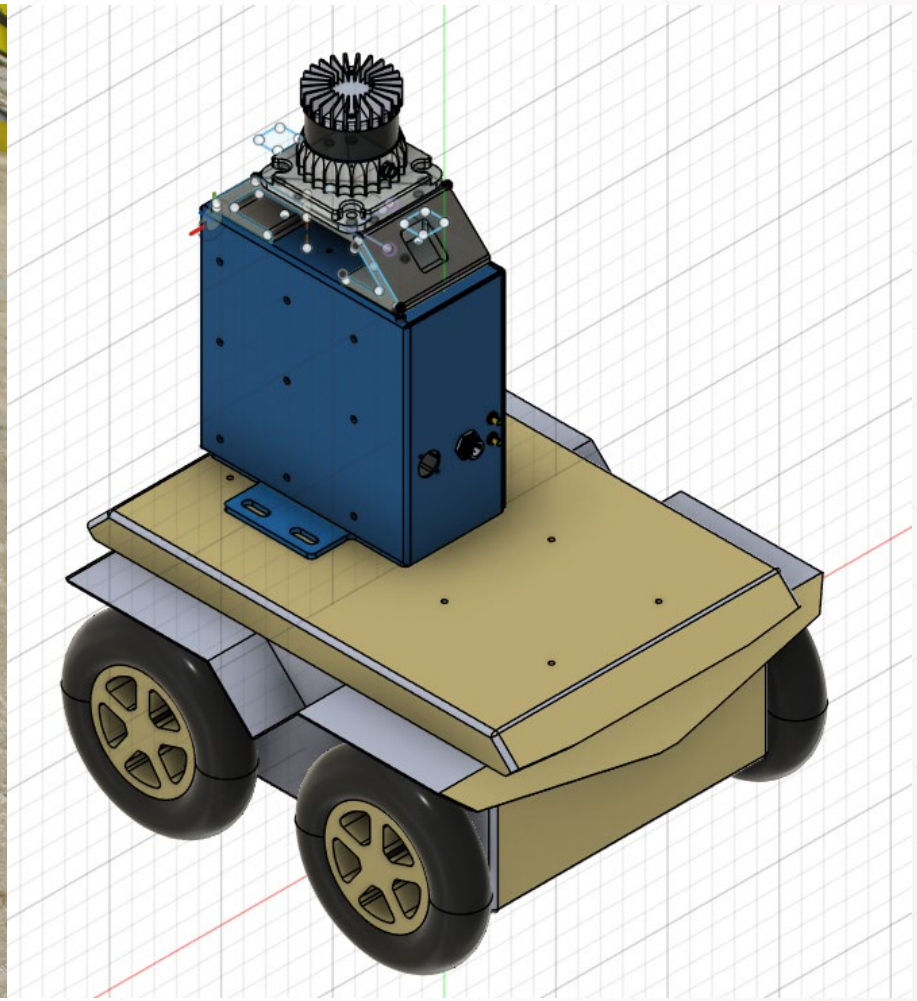
Integration with the Digital Twin

- Robotic inspections feed data directly into digital twin
- Continuous updates ensure accurate representation of facility
- Enables simulation and predictive modeling for better and safer decommissioning
- Comprehensive data collection supports informed planning
- Updated instructions for the robot mission planning

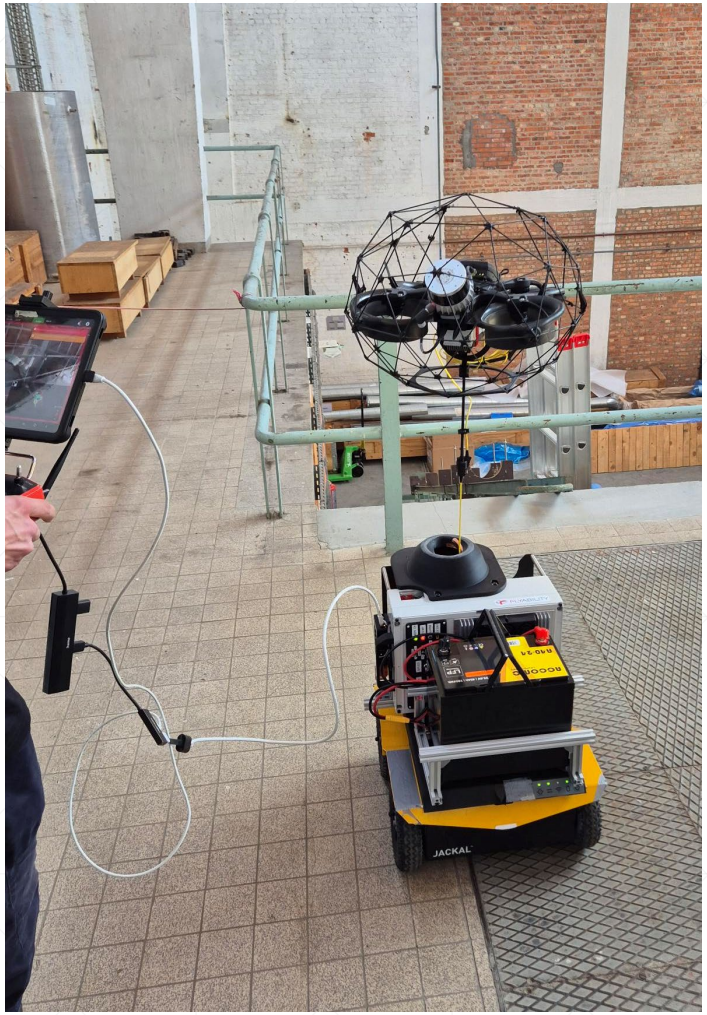


Jackal as a mobile sensing platform

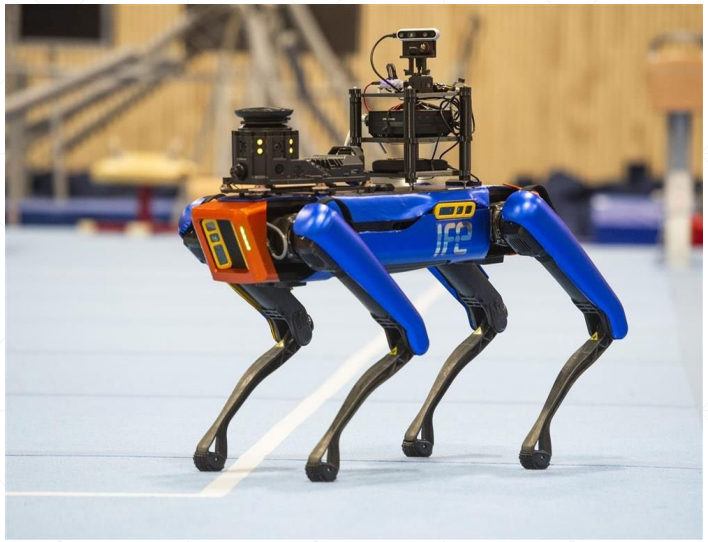
Jackal with the sensor mounted

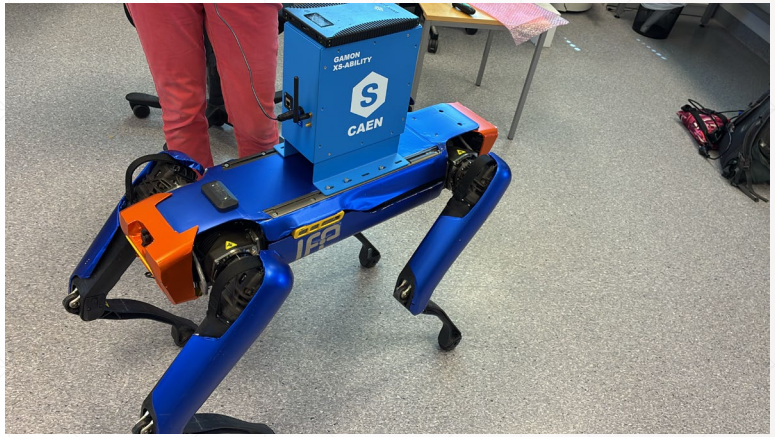


Jackal and Elios3



Spot from Boston Dynamics as a mobile sensing platform





Robot Route Optimization

- Ontology enables modelling the system with various relationships (spatial, temporal, etc.) and interdependencies within the environment.
- Conduct context-aware mission planning and control.
- Enable adaptively assign tasks and respond to changes in the decommissioning environment.
- Integrates with AI and sensor fusion module for real-time safety monitoring and risk assessment (for workers and for the robot).