



A Mixed-Reality Simulator for an Autonomous Delivery System Using Platooning.

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- Context
- State of the Art
- Project "SURATRAM"
 - Mixed-Reality
 - Mixed-Reality Simulator
 - Advantages
 - Robot
 - Unity Simulation
 - ROS
- Results
- Conclusions and Future Work











• Système Urbain et Rural Autonome de TRAnsport de Marchandises













	HiL	 Testing the controller code on hardware. Interoperability with other components indeterminate.
	SiL	 Converting controller to code. Testing using simulated plant model.
	MiL	 Modelling the plant and controller for simulation. Plant model does not consider all variables.







MERGED REALITY (MR)

Real and the virtual are intertwined



Interaction with and manipulation of both the physical and virtual environment.











Mixed-Reality Simulator



















Unity Simulation



























Vehicle-Hardware-In-the-Loop Simulation





Advantages of Mixed-Reality Simulator







Experiments and Results





- Data Transmission Delay
 - From Unity to ROS
 - Actuation/Processing Delay
 - From ROS to Unity
- Deviation from Real World Position
- Accuracy of SLAM Algorithm



From Unity to ROS







From ROS to Unity



Deviation from Real World Position



































ARTS



- Replicate using the Hyundai Kona.
- Extend project to ROS2.
- Program physics of the robot in Unity.
- Addition of a Kalman Filter in simulation.
- Integrate wheel encoders.





Thank you for your attention.

