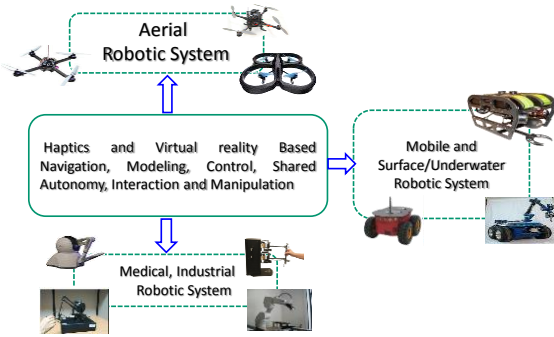


Haptic Interfaces for Robot Teleoperation

Reem Ashour, Shafiqul Islam, Jorge Dias, Lakmal Seneviratne
Khalifa University Robotics Institute

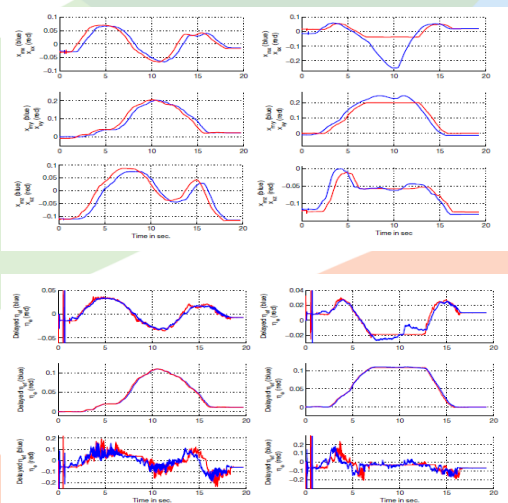
Bilateral Shared Autonomous System



- The remote human control of navigation and manipulation tasks in uncertain environments can be very difficult.
- This project develops novel haptic and virtual reality based human robot interfaces for remote human control of robot navigation and manipulation tasks.
- The proposed technology allows humans to use robotic systems in uncertain environments for both direct and remote navigation and manipulation tasks. These include the inspection of safety critical infrastructure such as aircraft, oil and gas pipelines, power and communication line, offshore oil platforms, and nuclear power plants.

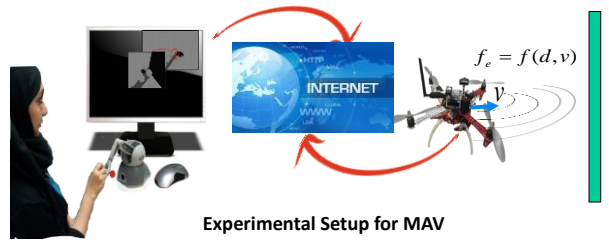


Experimental Setup for Robotic Arm

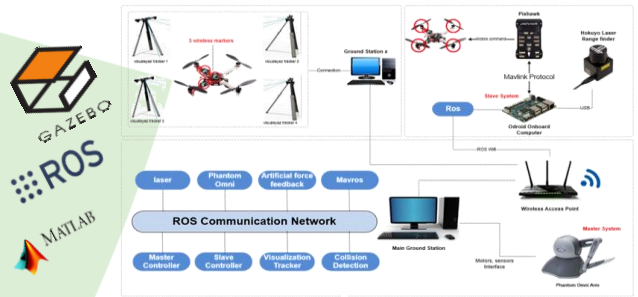


Experimental results for Robotic Arm

Haptics and Virtual Reality Based Control for MAVs



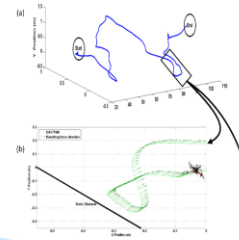
Experimental Setup for MAV



System Architecture for MAV



Real Time Experiment for MAV and UGV



Experimental results for MAV

Outcomes

- Interface model including human operator, master manipulator, master controller, slave manipulator, slave controller and environment.
- Interaction and manipulation models of the uncertain environment
- Robust adaptive control algorithm for UAV.
- Gazebo, and Matlab simulations
- Experimental Validation