

vSTING Module

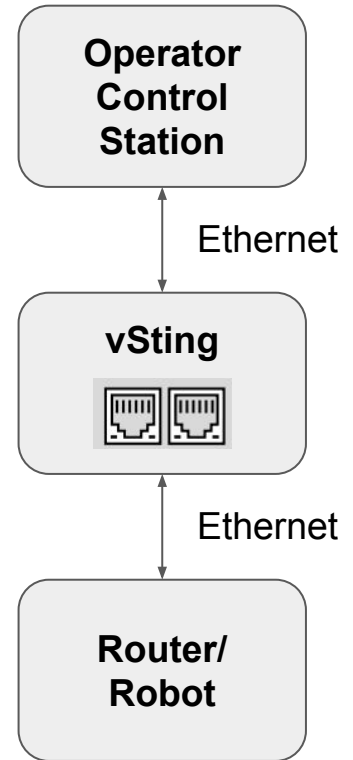
Realtime Wireless Network Emulation for
Evaluation of Remotely Operated Mobile Robots

Setup Procedures



vSTING Module

- The module simulates the effects of network degradation
 - latency, packet loss, bandwidth limit, ...
- Developed by TU Dortmund [1]
- Plug-and-play: The module is just a small box plugged in-between your Ethernet connection from operator station to robot
- vSTING Module Connections
 - Ethernet-Port 1: Operator Control Station
 - Ethernet-Port 2: Router or cable to robot



[1] Patchou, Manuel, et al. "Realtime wireless network emulation for evaluation of teleoperated mobile robots." 2022 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR). IEEE, 2022. [PDF Download Link](#)

Setup Instructions for Teams

- Detailed Instructions to set up the vSTING module on custom hardware available on Github <https://github.com/tudo-cni/vsting-sa>
 - See Section “Install on Personal Computer”
- Requirements: Linux PC with two Ethernet ports
 - E.g., via usb ethernet adapter(s)



Support & Troubleshooting

- Post your questions in the dedicated forum thread
 - <https://rri.forum.robocup.org/t/vsting-network-degradation-support-thread/188>
- The TU Dortmund will provide support via online meetings on at least two dates
 - Ask your questions
 - Live support for setup via screen sharing
 - Follow the forums for the announcement of dates



RoboCup Bordeaux Procedures

- One pre-configured vSTING module per operator booth
- Plug in Ethernet cables for network degradation
 - Update: For 2023: Multiplier equivalent to 1-2 points on the readiness assessment board
2024: 2x multiplier
- Do not use the module for a standard run without network constraints
- Constraints for 2023:
 - Data rate limit of 10 Mbps
 - Latency of 100 ms with +/- 80 ms jitter
 - Equivalent to the old Wifi standard IEEE 802.11b
- Expect much higher degradation for 2024, which can be easily simulated via the vSTING module



Fallback

- If you can not set up the vSTING module for your own testing in your lab, set your wifi router to IEEE 802.11b to achieve similar constraints

