**3.1.1 Controller Requirements**

3.1.1.1 The rover navigation controller shall provide interfaces for on-board control, and remote control by the operations team.

*Ease of use and control for all functions.*

1. When in remotely controlled mode, the speed must be limited by the rover navigation controller to 3 km/h with a target speed of 5 km/h

*This is because in the remote-controlled mode, that there is a likely delay ≧ 20ms in information transfer from the controller to the operations centre.*

2. For the on-board control, the rover navigation controller should limit the speed to 5 km/h with a target speed of 10 km/h

*Observe that the speed is higher in on-board control as the navigation is based on real front views, side-camera views, and the sensory information.*

3.1.1.2 When receiving commands from multiple sources, the rover navigation controller prioritizes and arbitrates the commands received from all sources to ensure that the most appropriate source is used.

*Note: This is intended to avoid situations where rover controller will receive contradictory commands from multiple sources*. *The navigation controller shall maintain a copy on-board of all the priority constraints of all sources.*

3.1.1.3 A safe mode switch is available to turn the remote control off when the latency or jitter is too high.

3.1.1.4 An emergency stop switch is provided on-board to interrupt all functions and movements automatically, even if the rover is in the remotely controlled mode.