Fact Sheet TMV-X

The TMV-X rover

The TMV-X (terrestrial monitoring vehicle) is a highly mobile leg-wheel hybrid rover. Its sealed housing makes it water proof and ideal for the use in difficult outdoor environments.
The TMV-X has an efficient on-board PC, which can be used to process the sensor data from the Lidar, the Cameras, IMU and RTK-GPS, so that the system can operate in unknown terrain.

TMV-X does not rely on an external power supply, but can operate for multiple hours with its on-board batteries. The powerful motors allow the system to carry payloads of multiple kg in mass.

The system can be tele-operated via video link. An autonomous version that performs waypoint navigation with local obstacle avoidance is available (TMV-A-X).

Size	0,935 m x 0,560 m x 0,5 m
Weight	16kg
Payload	3 kg
Power Supply	Lithium Polymer Batteries: 2 x 32V 5000 mAh
Speed and range	Max. 2 m/s / 3km range
Actuation	∫ 4 x 200 W DC-Motor + planetary gear 66:1 ∫ Camera Tilt Head Servo
Sensors (built in)	∫ Velodyne HDL32E Lidar ∫ Stereo Camera ∫ IMU: Xsens Mti ∫ GPS
Payload sensors (optional)	∫ Omnidirectional Camera
Communication	∫ WLAN Access Point ∫ Long Range radio RF Modem 868Mhz
On board PC	∫ Quad Core

Rich sensor suite

The TMV-X has a rich sensor suite, which allows the system to generate 3D environment maps, and provide visual feedback for teleoperation. The equiped Velodyne HDL-32E Lidar has 360 deg field of view while looking 10 deg upward and 30 deg downward. With range of 70 m, it can create detailed 3D information on the environment of the TMV-X. The stereo camera system can be used to provide visual feedback for teleoperation. Due to its tilt head, it can also be used for close up inspection of objects. The Xsens IMU provides orientation information up to 1 deg accuracy, as well as a compass for heading information.

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Software

The onboard-software handles all the communications and management of the sensors and the power and drive subsystem. The sensor information can be used for direct tele-operation of the vehicle. The software is also able to perform some pre-processing of the sensor data, which includes partial 3D map generation from multiple scans.

To access the system state, sensor information, and generated maps, a software interface is provided. This can be used to transmit tele commands for speed and direction as well as receive real-time information from the system. Telemetry information can be received over the long-range link. The sensor data is transmitted over WLAN.

The TMV-X rover in action

Bird View Camera (option)

To improve the operator awareness for tele-operation, an optional omnidirectional camera can be used. This camera provides a near 360 degree view with 45 deg upward and downward looking. This camera view allows the operator to see both the vehicles leg-wheels and the surrounding, and get a bird's eye view on the scene. This camera is modular, and can be mounted onto other carrier platforms as well.