PUBLIC CRUISER

GNSS RTK SYSTEM

Two GNSS (GPS/GLONASS/Galileo) antennae are linked to the GNSS RTK system, that provides precision positioning down to a centimeter. When between buildings, under bridges or otherwise without satellite signal, four odometry sensors on the wheels and an IMU system (accelerometers and gyros) track movements of the Public Cruiser´s chassis even more accurately than the GNSS, and the two systems double-check each other.

VELODYNE 270 DEG LIDARS

Four Velodyne 270 deg Lidars, one in each top corner, map the surroundings in 3D with a resolution down to one cubic centimeter (approx. half-inch cubic) out to 70 meters.

LONG RANGE LIDAR

Six long distance SCALA LIDARs survey the front, rear and sides out to 200m. A stereo camera and long range LIDAR, on each side in the front end of the cruiser, allows tracking of traffic possibly crossing the Public Cruiser's path. These four cameras are kept clean with high-pressure washer fluid and air.

STEREO & NIGHT-VISION CAMERAS

10 cameras, **4 of them stereo to see depth** and recognize objects hundreds of meters away, are primarily used to understand road signs, traffic lights, lane markings and railroad crossings, as well as understand faces and gestures of drivers, pedestrians and bikers, recognize emergency vehicles and to double-check the LIDAR 3D map of the world around the Public Cruiser. **Two are infrared** to detect otherwise unregistered objects such as clear glass or dull black surfaces in the night, as well as ice and leafs covering the road. **Four night-vision mono cameras** check the sides of the Public Cruiser and makes sure there are no blind angles for bikes and overtaking cars etc. to disappear in.

CLEAR VIEW WITH WIPERS

Our cameras and LIDARs are behind glass to make protection and cleaning easier, with anti-scratch Gorilla Glass coating, **specially constructed wipers and high-pressure windshield** washer fluid nozzles. The glass is uniformly bend to minimize distortion, which the system also corrects automatically for, both during factory/repair calibration and ongoing combined sensor calibration based on the total world model. This makes the Public Cruiser more reliable than other similar vehicles in bad weather and adverse conditions, such as snow, insect impacts or dust from road works.

RADARS

Four radars, located in the corners of the vehicle, determine the speed and position of fast objects and give long-range low-resolution vision even in bad weather.

V2X device [OBU] allows the Public Cruiser to connect with all sorts of intelligent infrastructure, from traffic lights to ambulances.

All the above systems feed into our total world model in the Public Cruiser's triple redundant computer system, which allows the Public Cruiser to understand the reality around it, act accordingly and learn dynamically from the reactions around it and other Public Cruisers in similar environments.

THE CONTROL CENTER

If the Public Cruiser finds that something in the reality around it is new to it, it will slow down or come to a halt at the side of the road and allow the humans in the control center to take over temporarily.

4G, plus MTPAS and similar high priority telecommunication protocols, combined with satellite data-link backup, ensures that the Public Cruiser can always communicate with the control center.
Control center drivers can remote control the vehicle to navigate it past unexpected challenges, in the same process learning other Public Cruisers to possibly navigate the same challenge autonomously later.

Using video projection, control center employees can also service customers during the drive, when hailing the vehicle on the street, and communicate human-to-human with others in the traffic as needed through a projected image on the side or windshield of the Public Cruiser - projection of recordings of such communication may in some cases also be used by the autonomous driving system for its own communication in the traffic.