

## **6. Advance Driver Advisory System (ADAS)**

Advance Driver Advisory System (ADAS) shall be provided in each patrol, ambulance, and maintenance vehicle.

The ADAS system shall consist of following components fitted in each vehicle:

- i. GPS tracker,
- ii. Industrial grade rugged (Waterproof) dashboard mounted 10" Tablet,
- iii. Dashcam (dual camera) with video calling and inbuilt recording feature,
- iv. Body cam 1 nos. for each vehicle,
- v. Front view varifocal cameras (mounted on vehicle),
- vi. Rear view varifocal cameras (mounted on vehicle),
- vii. LPU with Storage mounted in vehicle,
- viii. UPS,
- ix. High speed wireless connectivity
- x. Buzzer for call / incident alert

The ADAS shall provide real time connectivity of TMC and sub-centres with the patrol and maintenance vehicles. Separate high speed multi operator embedded SIM shall be provided for GPS tracker, industrial grade rugged waterproof 10" tablet, Dashcam, body cam, and LPU.

The LPU and storage shall be compact in size and only fan-less industrial grade controller shall be provided.

The system shall provide live monitoring of all cameras installed in patrol and maintenance vehicles (including body cam) from TMC & sub-centres.

The ADAS shall aid the TMC/Sub-centre in disseminating the required information to the patrolling / maintenance team in real-time. The tablet shall have GPS map to assist the driver in identifying the incident location with estimated travel time, route, alternate route, etc.

The ADAS shall also provide the option to the driver of one vehicle to connect with other emergency / maintenance services vehicles of the stretch and also provide option to conduct video conference call among them and with TMC/Sub-centre.

The vehicle staff shall be able to log the incident/event details through the tablet.

The vehicle staff shall have the option to select any and all of the cameras simultaneously to view in the tablet.

The ADAS application on the tablet shall be locked and the users shall not be able to access other features/applications of the tablet.

The tablet shall go in sleep mode when not in use to save the battery and optimize the usage.

The LPU shall sound an alert / alarm in the TMC & Sub-centre in case any of the component is turned off / removed / disconnected / low battery / faulty / etc.

The Dashcam and other cameras shall be ON at all the time and recording shall be stored in local storage of the camera as well as the LPU for a minimum period of 30 days. The TMS & Sub-centre shall have the option to retrieve any video from the LPU wirelessly and the live feed of all the cameras of all the vehicles shall be available in realtime. There shall be option to record the live video of all the cameras in the TMC and Sub-Centres.

The cameras shall be integrated with Road Condition Monitoring module for collection of road condition data and statistics.

## **6.1 ADAS Camera Specifications**

### **6.1.1 General**

- a. The IP camera shall be POE/POE+ powered bullet type with inbuilt IR of 60 meters.
- b. The Camera shall have inbuilt SD card slot and shall be provided with at least 128 GB class 10 SD card.
- c. The shutter speed of the camera shall be 1/4 second to 1/100000 seconds for capturing the motion detection even during low light condition and provide proper image.
- d. The face detection function shall be activated as soon as the motion detection is triggered.
- e. The camera shall detect any object addition, object removal, and line crossing.
- f. Whenever any event is triggered, the camera shall record the event on SD card also.

### **6.1.2 Lens**

2 MP Full HD motorized varifocal lens with minimum 5-45 mm motorized auto-focus function having optical defog feature and auto focus covering suitable range of focal length shall be provided and mounted on the camera. The range of the camera shall be minimum 60 meters. The resolution shall be full HD at 60 FPS.

### **6.1.3 Night vision capability**

Cameras shall have inbuilt IR illuminator of 60 meters for night vision functionality. External IR illuminator shall be acceptable in case of box cameras, however inbuilt IR shall be preferred. The minimum illumination shall be of 0.01 lux for colour image with automatic gain control on in auto/ manual mode. The camera shall be capable of recording black and white video even in 0.001 lux with IR up to a distance of 60 meters.

### **6.1.4 Image enhancement capability**

Camera shall have hue light compensation, back light compensation, and three-dimensional digital noise reduction features. The camera shall support true wide dynamic range of minimum 120 dB.

### **6.1.5 Camera Housing**

The camera shall be housed in a suitable housing to protect them from solar radiation, UV, dust and rain. The field of view of the camera shall not be obstructed by the housing. Picture quality or optical performance shall not be degraded by the housing. The Housing shall have IP-67 or higher rating for Weather-proof, and NEMA 4X-rating or IK10 or higher rating for Vandal-proof.

### **6.2 ADAS LPU and Cabinet**

- a. ADAS LPU shall be a fan-less industrial grade rugged compact CPU housed in a compact cabinet together with power supply and network equipment. The cabinet shall be suitable for mounting in the vehicle.
- b. The cabinet shall be electrically and mechanically isolated and shall have a degree of protection of IP 55 or higher specified in IEC 60529. If necessary, the cabinet may be provided with a ventilation fan for controlling internal temperature, but the protection code requirements shall be met.
- c. A right hinged door shall be provided on the front to realize easy maintenance work.
- d. The turning direction of the handle shall be counter-clockwise.
- e. The power supply unit shall be provided with a circuit breaker.
- f. The anti-lightning and surge protection complying with the IEC 61643-1 shall be provided.
- g. The cabinet shall be finished with the anticorrosive treatment.
- h. The EPC Contractor shall state the details of the anticorrosive treatment and painting.
- i. The Cabinet shall have door open alert feature and alarm to be sounded locally as well as the Central Control Centre.
- j. The Cabinet shall have suitable built with appropriate locking arrangements to protection from theft, vandalism etc.
- k. The cabinet shall be of suitable size to accommodate the equipment to be housed in the cabinet and shall be designed to meet the environmental conditions at the site and cooling, heating, ventilation requirement for the equipment, etc.