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राष्ट्रीय ग्रामीण अवसंरचना विकास एजेंसी
(ग्रामीण विकास मंत्रालय, भारत सरकार)

National Rural Infrastructure Development Agency
(Ministry of Rural Development, Govt. of India)

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31 January 2022

Sub: Installation of GPS system in key machinery and equipment engaged during execution of road works under PMGSY & RCPLWEA.

Dear Madam/Sir,

During the construction of PMGSY roads, many construction equipment like tippers, rollers, excavators, motor graders, etc are used. Proper operation of equipment/ machinery for the specified period is essential to achieve quality as per the specifications during the execution of roads. But, there is no mechanism to monitor the operation of the deployed equipment by the PIUs/ SRRDAs, other than manual inspection. It is not possible that PIU engineer can be present at the site all the time. Hence, a tool for monitoring the deployed equipment is required for ensuring proper quality.

1. In this context, to enhance transparency during road construction and maintenance, it has been decided to implement the GPS enabled VTS (Vehicle Tracking System) on the equipment/ vehicles which are used during road construction such as tippers, rollers, excavators, motor grader, etc. GPS-enabled VTS (Vehicle Tracking System) will be instrumental in enhancing productivity during construction and in improving the quality of work.
2. Detailed guidelines for implementation of GPS enabled VTS (Vehicle Tracking System) are enclosed. States are requested to implement the GPS enabled VTS (Vehicle Tracking System) on all the important construction vehicles/ machinery/ equipment deployed by the contractor/ PIUs for execution of PMGSY (including RCPLWEA) works.
3. The VTS system for road construction should be made functional **latest by 1st May 2022 for all the ongoing road works of PMGSY-III**. Payments to contractors will only be possible once VTS system is established on construction related vehicles and VTS reports are uploaded on OMMAS. SRRDAs should start the process of selecting the vendor and establishing the control room immediately. SRRDAs are free to decide as to which activities/ infrastructure they want to purchase, and which they want to hire from the market. It is advisable that those equipment/ infrastructure which are prone to become obsolete very fast should be taken on hire basis so as to keep pace with emerging technology and bring economy in cost.

With regards,

Yours sincerely,

(Dr. Ashish Kumar Goel)

To,

1. Additional Chief Secretaries/ Principal Secretaries/ Secretaries in-charge of implementing PMGSY & RCPLWEA (All States/UTs).
2. CEO /E-in-C /Chief Engineers of SRRDAs/RCPLWEA (All States/UTs)

Detailed guidelines for the implementation of the GPS enabled
VTS (Vehicle Tracking System)

GPS enabled VTS (Vehicle Tracking System) is nowadays being quite prevalent and also very economical. Many Government organizations are already using GPS System for enhancing transparency in their operations, such as NHAI, FCI, NDMC, Municipal Corporations, health departments (ambulances), etc. Features of GPS System are as follows:

- The GPS signal is available anywhere on the globe. Hence users will not be deprived of GPS facilities anywhere (even if mobile signal is not present).
- The GPS system gets calibrated on its own and hence it is easy to be used by anyone.
- It provides users with location-based information. This will provide location, movement, speed, etc related data which can be monitored at the control room, or on mobile/ tablet devices by SRRDA, PIU, contractors, etc.

2. Advantages of GPS enabled VTS (Vehicle Tracking System) are as follows:

Tracking - Vehicles that are on the system are displayed in tracking. The tracking status is categorized into Running, Idle, Halt.

Live Maps - The movement of all the running vehicles can be seen on map at a time.

Tracking Vehicles list- List of all vehicles in the fleet which are in running status with the latest tracked time

Passive and Active Tracking - Active systems will collect and send information in real-time whilst passive systems will collect and save all the data, which will be made available to be retrieved later. When a mobile signal isn't available, the information will be saved to the device and will be sent once it is possible to do so.

Less Paperwork: While everything goes digital, there is less paperwork for the division to handle.

Improved Administration: Vehicle tracking systems facilitate administration. All of the time saved on admin can be used for other processes that need more attention and this can lead to greater efficiency and transparency in the system.

3. Further, in this context, the Ministry of Road Transport and Highways has also provided the list of approved vehicle location tracking device manufacturers at their official website (for details please refer to <https://morth.nic.in/list-approved-vehicle-location-tracking-device-manufacturers> for the same). This list is only indicative. There are other vendors available in the open market. The SRRDA should follow a transparent and competitive process to select the most suitable vendor of their work.

4. **Scope of work:**

The Scope of Work should broadly comprise the following activities:

- Ability to locate a vehicle at a given time.

- Facility to auto-generate routes for the vehicles based on origin and destination point.
- Facility to track defined vs. actual movement of vehicles, capture deviations if any.
- Facility to view vehicle movements real-time on digital maps and provide information on current location on demand.
- Facility to view vehicle details of a particular vehicle on an interactive GIS Map supporting latitude, longitude location records generated by GPS device. This should include all possible types of map view like a roadmap, terrain, and other applicable views.
- Facility for users to access and view position/location information on GIS maps near real-time through a web interface with historic data displayed on maps.
- Facility for playing back the recorded details of the vehicle movement along the authorized route.
- The system should have analytics features as per requirements.
- Web-based Vehicle Tracking Software and customize the same as per the requirements to operate and maintain the GPS-based Vehicle Tracking devices installed in Vehicles.
- It is assumed that the entire route of a vehicle is covered by GPS and a leading mobile network. But there might be some parts of the route where there is no network coverage. So the system must work in off-line mode too for these areas and will provide the data once the vehicle enters the mobile network zone.
- The Bidder shall be responsible for updating and upgradation (if required) of all Software and Hardware for the successful operation of the project during the contract period.
- All data generated during the operation period shall be the property of the SRRDA & NRIDA. The vendor is also required to submit the data every 3-5 days, this data will be submitted on GeoSadak i.e. <https://geosadak-pmgsy.nic.in/> a web-based GIS application of NRIDA.
- The successful bidder has to share the API/data/ specific MIS as per the requirements of SRRDA / NRIDA without any additional charges.
- All the supporting accessories and associated software, monitoring dashboard will be provided by the bidder, and apart from the quoted in the financial proposal, no other cost will be entertained by the SRRDA thereafter.
- Dynamic reporting system. Provide the following customized MIS report as per requirements of SRRDA/NRIDA. Some of the reports are as follows:
 - Live location of the Vehicle
 - Working Hour/ Efficiency reports
 - Detailed Activity reports
 - Vehicle Summary
 - History Report (showing path taken by vehicle)
 - Trip-wise Report
 - Vehicle stoppage report.
 - Monthly monitoring summary etc.

- Management Dashboard and Analytics: Bidder shall be responsible for developing a management dashboard with key performance indicators in easy to view graphical and colorful format depending on user credentials. The dashboard shall be supported with analytical reports in terms of machine levels, system failure trends, etc.
- Training Design & Execution of Training to the stakeholders for successful implementation and operation.
- The application should provide the location and history of the vehicles in the GIS map. The tracking data will be kept live in the system for at least 6 months. There will be a provision to support archive and restore functions for older data.
- The setup Control room at SRRDA level for live tracking of the vehicles
- Provide a graphical interface to make quick position-related assessments. The application shall support dynamic monitoring of vehicles moving out of their defined routes and be able to raise alerts to the control station.

Note: SRRDAs are free to define scope of work for purchase and for hire separately.

5. GPS Vehicle Tracking System Workflow

A GPS-enabled vehicle tracking device is installed on each vehicle such as like excavators, motor graders, dozers, etc. to collect and transmit tracking data via a cellular or satellite network. A GPS tracking system uses the Global Navigation Satellite System (GNSS) network. This network incorporates a range of satellites that use microwave signals that are transmitted to GPS devices to give information on location, vehicle speed, time, and direction. So, a GPS tracking system can potentially give both real-time and historic navigation data on any kind of vehicle journey.

The tracking hardware is installed inside the vehicle in such a manner that it is not visible from outside the vehicle. Hence, it works as a secret unit that continuously sends the coordinates to the monitoring center. GPS tracking unit is a device that uses the Global Positioning System to determine the precise location of a vehicle to which it is attached.

A vehicle tracking system combines the installation of an electronic device in a vehicle with purpose-designed software to allow the user to monitor the vehicle, collecting data in the process from the field and delivering it to the base of operation. The system consists of a GPS receiver that provides the real-time location of the vehicle. This real-time data is stored in the database.

The vendor will setup a GPS Device on the vehicle and this device will provide the live location of the vehicle and mapped the data on Google MAP. The vendor does have their own GPS Vehicle Tracking System wherein the following three types of users which will use this system:

- (i) NRIDA Level User
- (ii) SRRDA Level User
- (iii) PIU Level User

Above mentioned users are having different rights to view the live tracking or history of the vehicles :-

- NRIDA level user will have all the rights he/she can view the live tracking of the vehicle PAN India level
- SRRDA level users will have all the rights he/she can view the live tracking of the vehicle at their State level only
- PIU level users will have all the rights he/she can view the live tracking of the vehicle at their PIU level only

The System Administrator will provide these rights, therefore the user will enter the system through proper Authorization and Authentication. Following features will have in the GPS Vehicle Tracking System:

- In case if the GPS Device may be tweaked/alterd, alert SMS will be sent at users registered Mobile No. or at Mobile App.
- Through the Vehicle Tracking System, users are able to track the live location of the vehicles, print reports at any time. Users are also able to see the historic data later on. Further, this data will be ported on GIS Web-based application Geo Sadak through Web API.
- A control room will be set up at the SRRDA level so that SRRDA is able to monitor the system at the PIU level and take decisions accordingly.