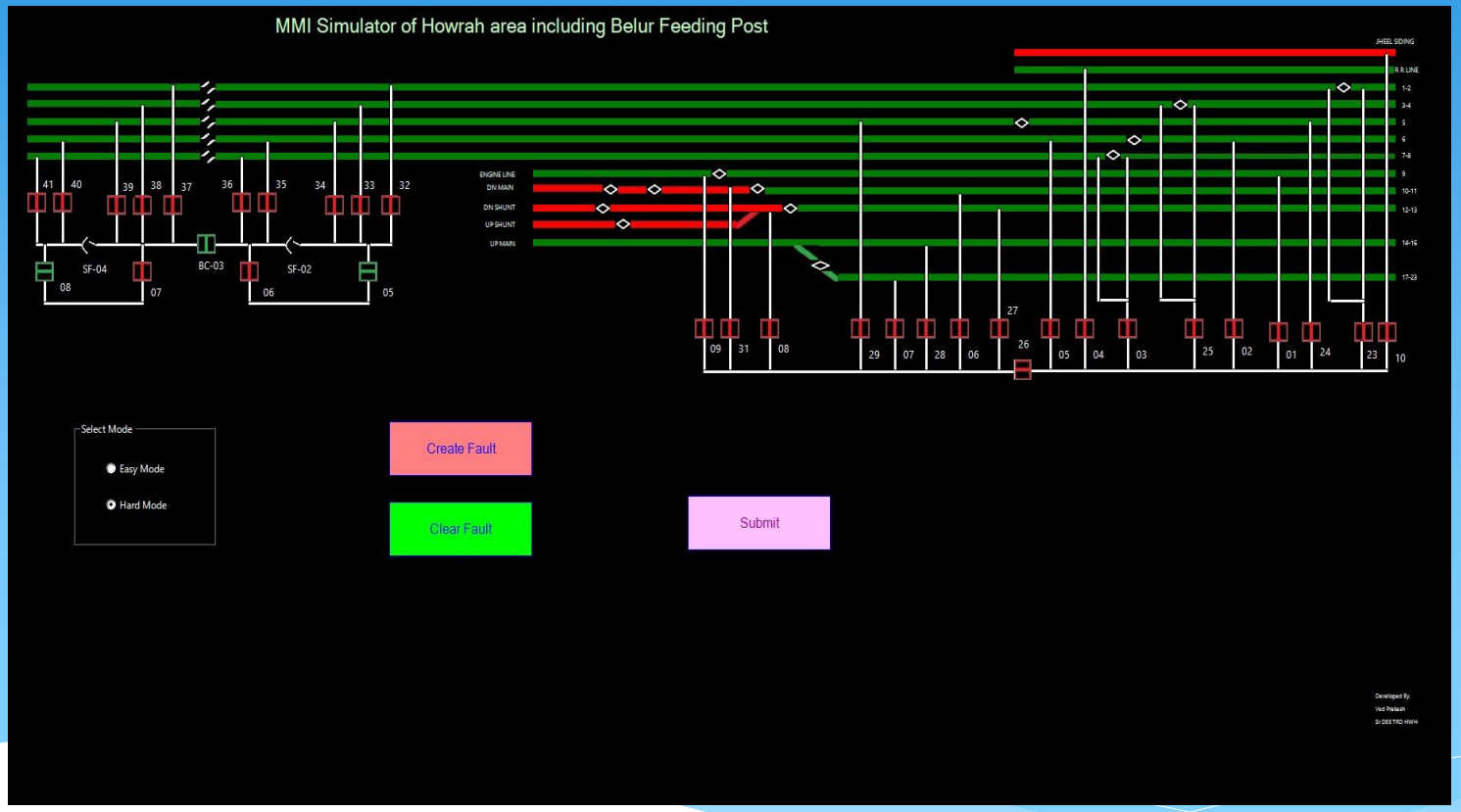
Efficient and Quick Fault Findings Simulation Software for TPC Personnel

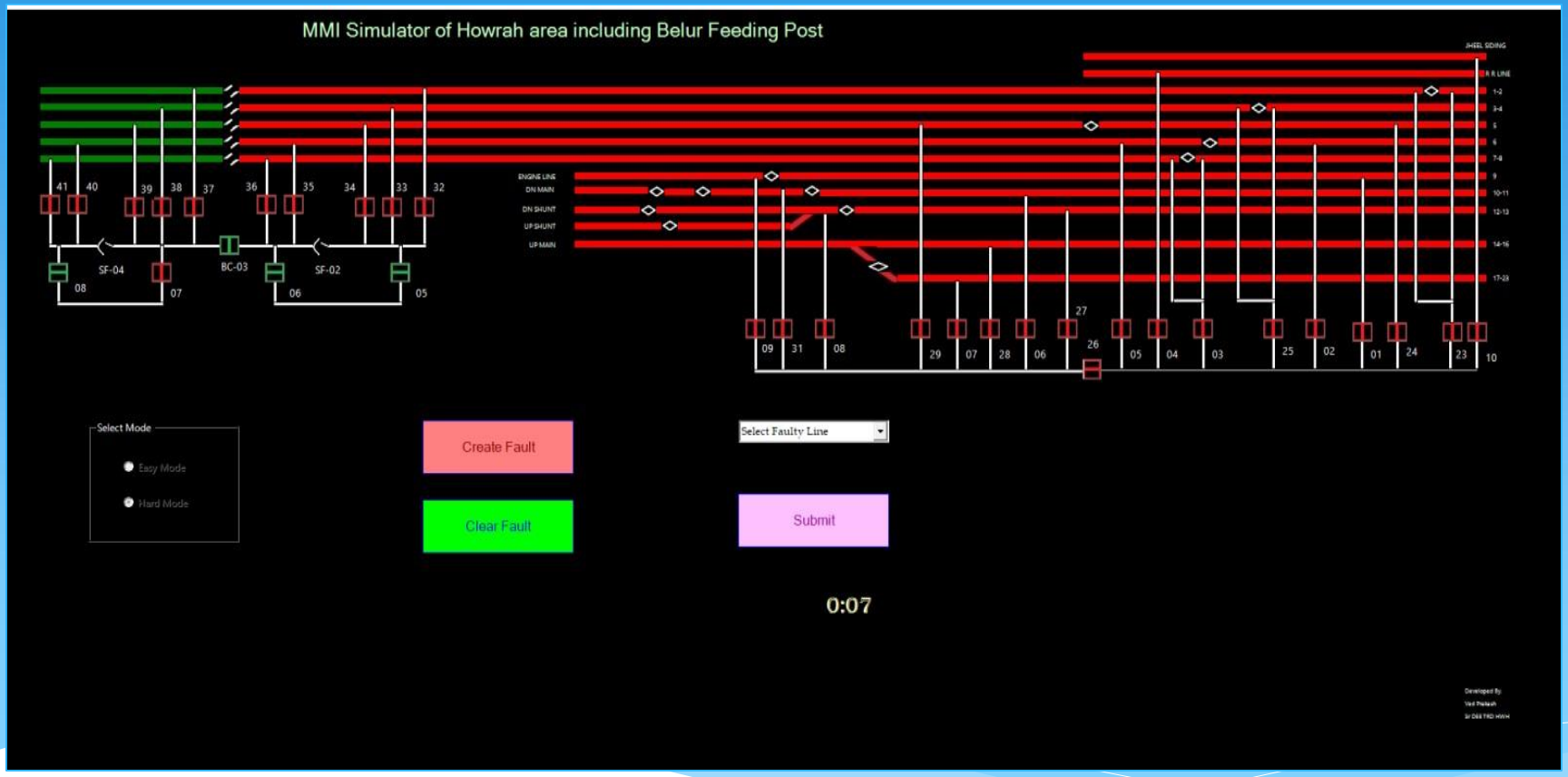
OBJECTIVES

1.	To identify the equipment, line, section and other details in SCADA interface
2.	To habituate with user interface of SCADA System and operating procedure without disturbing the running system.
3.	To create a fault automatically through the simulation software.
4.	It has two modes, easy mode and hard mode for initial and experienced performer.
5.	Continue to monitor his performance with respect to time, how quick the fault he cleared.
6.	AT the time of actual fault situation the controller is mentally prepared and uses its experience to quick segregation of fault.
7.	It is to minimize the punctuality loss and efficient performance from the operating point of view.

Figure shows Healthy section without any fault and the sections show (Green).



To create a fault and CB-6 tripped and all section shows faulty with red color.



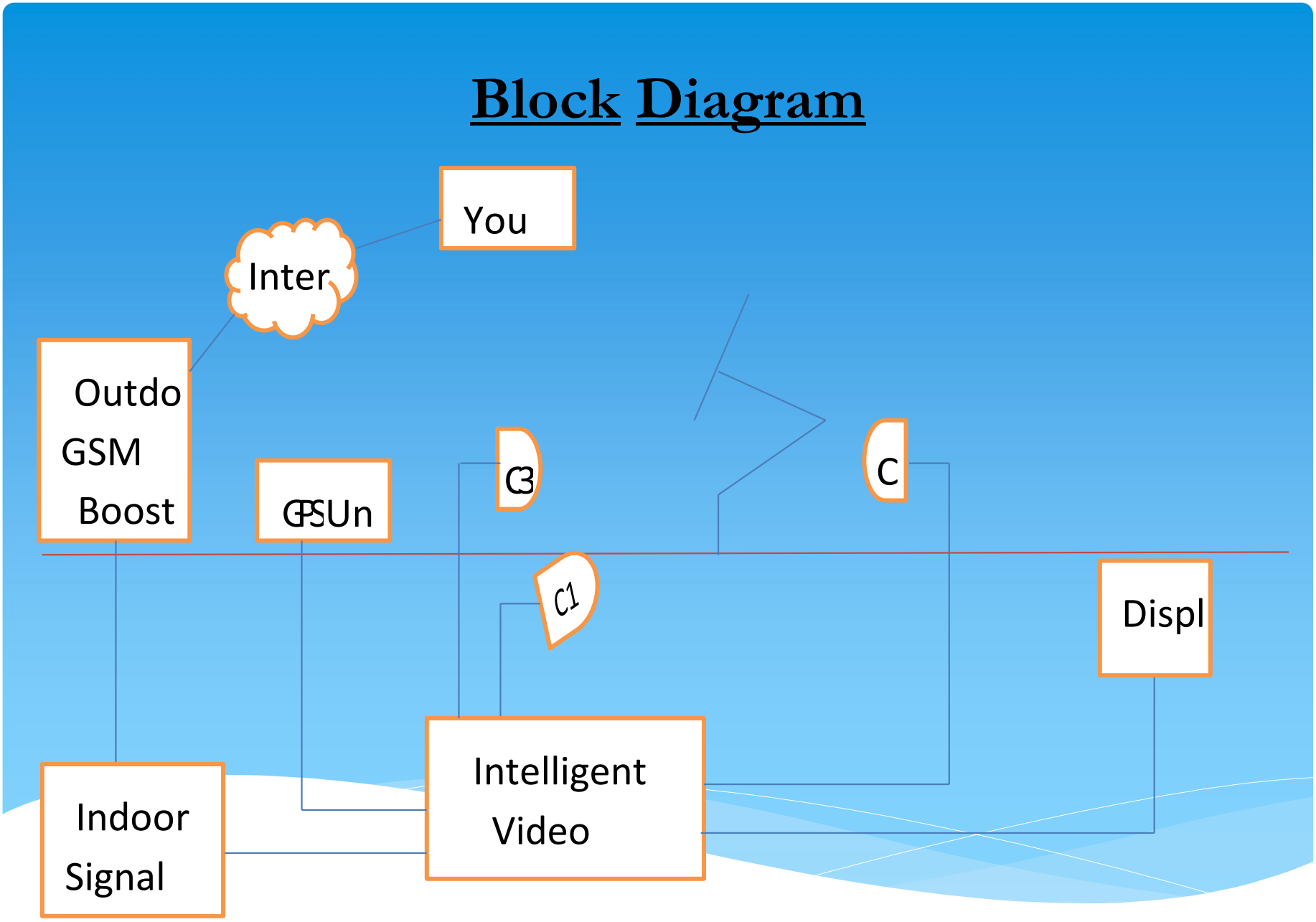
Open different BM then CB-06 again charged and identified faulty area (Red) segregated from healthy section (Green).

Remote live monitoring of overhead equipment maintenance/inspection/breakdown restoration work from remote

ADVANTAGES

1.	Hotline checking from the contact wire level without any OHE representative.
2.	Maintenance activities can be monitored from TPC, officers & Depot Incharge's desk lively with recording facility.
3.	Analysis of time study of any maintenance activity to eliminate the idle time.
4.	Violation of any safety measures can be monitored.
5.	Direct assistance, suggestion, instruction may be given from the control room to any breakdown side when Tower wagon worked.
6.	Continuous recording of all maintenance activity may be used for training purpose.
7.	The video also uploaded in HWH/TRD YouTube channel for other official & public from anywhere.
8.	One of the most important features of the Camera, that video can be captured & transmitted through internet at night also.

Block Diagram



YouTube link:-

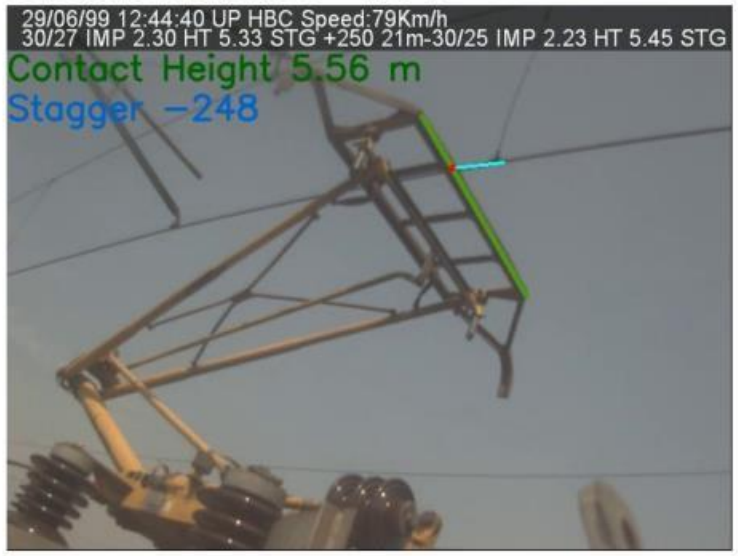
https://www.youtube.com/watch?v=MZedElCfcIg&feature=youtu.be

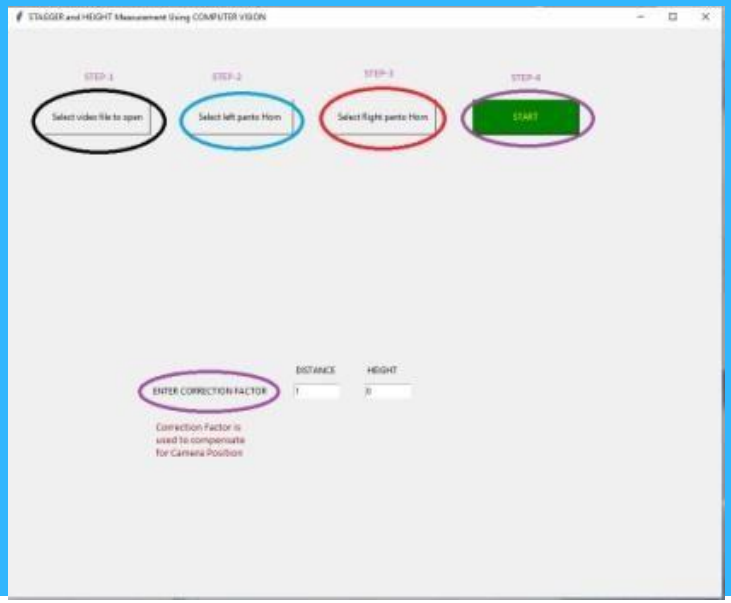
https://www.youtube.com/watch?v=AlC003k-ApE

https://www.youtube.com/watch?v=ReKb5Q-0aw8

ONLINE HEIGHT AND STAGGER MEASUREMENT AT THE TIME OF HOT LINE CHECKING

A Software developed to find out stagger and contact wire height on line, when Tower wagon moved on site without taking any power block. At that result, the exception reports are to be identified and action taken more quickly at the time of hot line checking.





TRACK MOUNTED SCISSOR LIFT

Track Mounted Self powered Motorized Ladder trolley innovated by team TRD Howrah. It is low cost solution and substitute of Tower wagon.

COUNTER WEIGHT LIFTING SCISSOR JIG

A scissor Jig was developed by TRD/BMAE Depot. The Jig helps to add in the counter weight from Tower wagon at the time of ATD replacement. With the help of Jig we can add the counter weight with minimum effort and less man power for maximum utilization of block hours.

DROPPER MAKING JIG

At the time of 160 KMPH OHE modification work the all dropper are replaced by new. Huge number of dropper has been made previously at the depot as a preparatory work for optimum utilization of block. To reduce man power a dropper making Jig has been developed indigenously by TRD/BMAE Depot. By utilizing pulley of 03 pulley ATD and SPS, the Jig has been made. It is easy to straightening the dropper wire and necessary formation of dropper made.

MODIFICATION OF SNT/SP

To maintain uninterrupted supply of power, a s well as tariff rate of PAW is much less than PNE/TSS & RPH/TSS. For using more economical power, 02 Nos. extra BM (931A & 932A) has been added with existing infrastructure in SNT/SP for feed transfer UP/ML, DN/ML respectively from Pandabeswar side to Prantik side.

Extension of Gantry - I

Extension of Gantry - II

Provision of 02 nos. BM

Cross feeder and drop jumper connection

Implementation of solar energy for OHE power at TRD Depot Nabadwipdham of HWH Division of Eastern Railway.

The depot is given power from one 10KVA AT from OHE. Consumption for this depot is normally done from traction power with a load of 7 X 240V X 0.9=1.512KW (Approx.) during day time. or local power from station building of WBSEDCL.

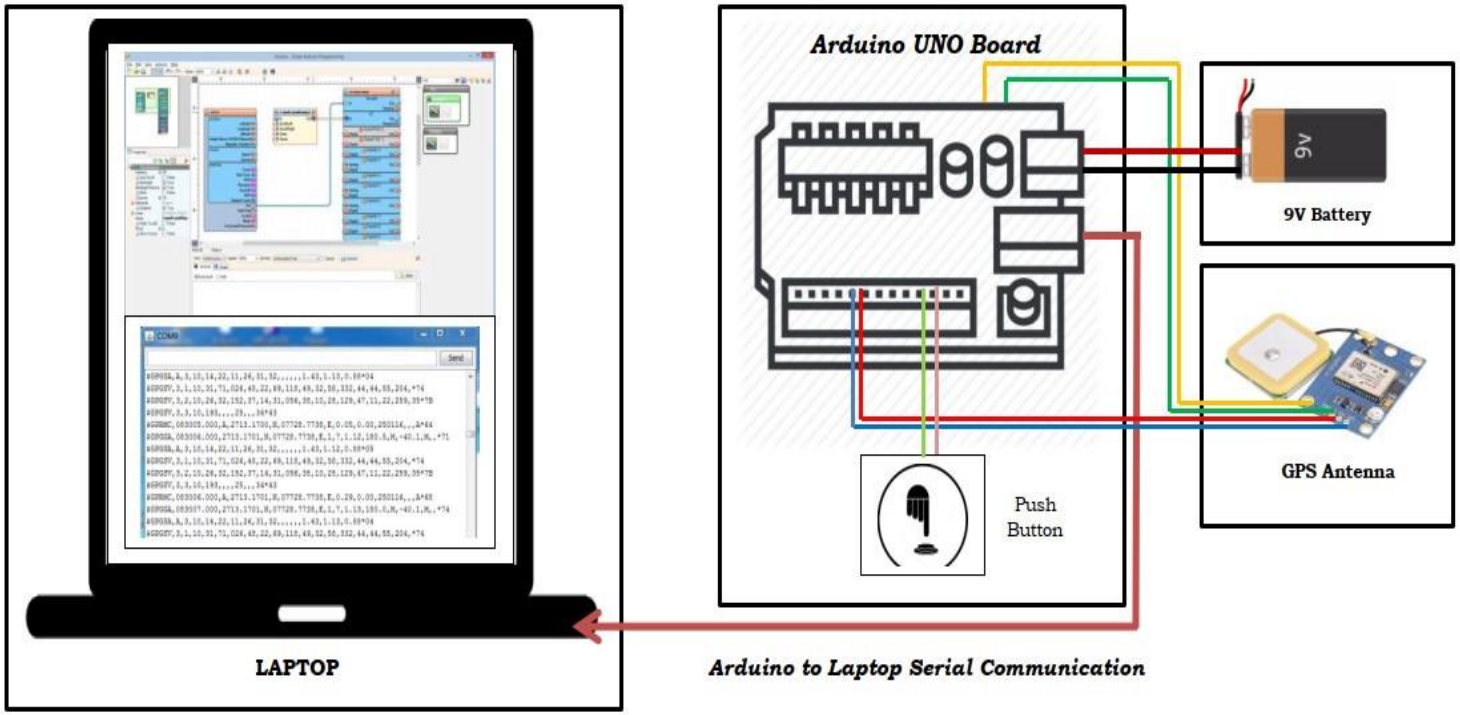
At TRD depot Nabadwipdham, has got large roof area and with abandoned solar exposer. It is a place which can be explored for Railways green energy initiative.

As a pilot project, 3KVA single phase solar panel may be installed on approx. 25Sq. m area to generate power from solar energy and directly feed to OHE grid.

Area of the roof top and shed in this area is available 1024Sq.mtr. where further expansion may be possible in future. Thus we can substantially bring down the cost of traction energy with the help of renewable energy. Also, this will earn the Railways substantial carbon credit.

Considering codal life of the panel 25Years, huge saving of energy will be accumulated by this green energy revolution.

DATA LOGGING SYSTEM USING ARDUINO PROGRAMME



1. *Complete connections of **Arduino board** and **GPS Antenna** to the **Arduino programming interface** through Laptop.*
2. ***CoolTerm Software** needs to install in LAPTOP to view the Arduino Programming **O/P through CoolTerm** software.*
3. *For Collection **GPS data of TRD mast**, we need to press the **"Push Button switch"** when the system is located nearest to the specified mast.*
4. *We can collect GPS data mush much faster than the earlier Data Logging System.*
5. ***CoolTerm** Captures the **GPS data sequentially** and saved in a .txt format.*
6. *We need to **convert** the **.txt** file to **.CSV** file to prepare the compatible location based file.*
7. *Final GPS file needs to save in **.ITF** file for using it, in our **Olivir-G sytem**.*
8. *If we use this system we can save **manpower** and **time**.*

GPS mapping of OHE masts by using Arduino

Current collection test using OLIVER-G is being done on each line every six months to locate spark points on contact wire. To perform current collection a GPS data file is fed to the OLIVER-G software which helps in decoding the current location and thus helps in localising the spark locations.

At present the GPS data file which is being used for OLIVER-G is created by moving at each mast location on foot and then entering the OHE parameters of the location on the GPS data logger. Thus, the whole exercise takes a long time and a lot of manpower.

A new system for mapping of GPS locations has been designed by Eastern Railways to map all locations while moving on Tower Wagon at a comfortable speed of 50Kmph; leading to saving of manpower and time. The equipment uses only the following components: -

- Arduino Uno Microcontroller board
- UBLOX NEO-6M GPS module
- Serial data reading software CoolTerm

Details of the components used

- The **Arduino Uno** is an open-source microcontroller board, based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.

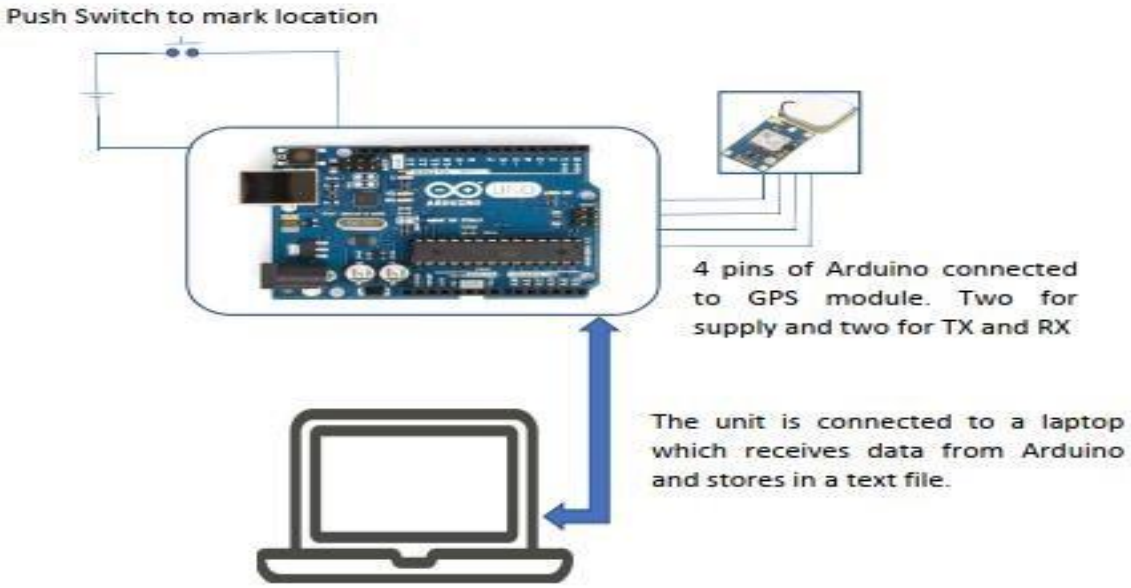
- The **UBLOX NEO-6M** module is a complete GPS module that is based on the Ublox NEO-6M. This unit uses the latest technology from Ublox to give the best possible positioning information and includes a l built-in 25 x 25mm active GPS antenna with a UART TTL socket. A battery is also included so that a GPS lock can be obtained faster. Its features are as follows

  - ✓ 5Hz position update rate
  - ✓ Operating temperature range: -40 TO 85°
  - ✓ Rechargeable battery for Backup
  - ✓ The cold start time of 38 s and Hot start time of 1 s
  - ✓ Supply Voltage: 3.3V
  - ✓ Configurable from 4800 Baud to 115200 Baud rates. (default 9600)

- ✓ SuperSense ® Indoor GPS: -162 dBm tracking sensitivity
- ✓ Support SBAS (WAAS, EGNOS, MSAS, GAGAN)

- **Coolterm is** a simple serial port terminal freeware application that has been used in this project to exchange data with Arduino and Computer. However, a software is also under development by Eastern Railway which can make the project more user-friendly and will reduce the requirement of manpower from two to just one.

Block Diagram



Working

When the equipment is switched ON the GPS module gets connected with the GPS satellites. Once the connection is established, an LED in the GPS module starts blinking, indicating that it is receiving GPS data. The GPS data is then sent to Arduino which parses the data and decodes the Latitude and Longitude values. Whenever a location passes, a push button is pressed which is detected by the Arduino which sends the Latitude and Longitude values to the computer through serial communication. The Coolterm software reads the data and stores the value in a text file along with a serial number which can be used later for cross referencing and creation of excel table. The data thus stored in text file is then imported in an excel table where other details can be input and either .xlsx file or. itf file or .csv file can be created based on the requirement of OLIVER-G.

Further works on perfecting the same is 'ON'.

Eastern Railway is planning to send one such gadget to each Railway for trial purpose; if agreed to.

How to work with new GPS Data Logger

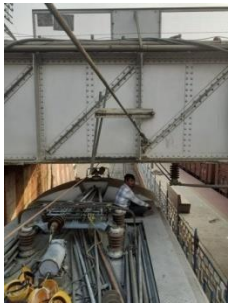
1. First install Record GPS.exe file in computer.
2. Location in division for each section is to be saved in text file i,e .txt
3. Switch on new GPS Data logger and after getting GPS Signal (blinking red LED in GPS), connect it to Laptop/PC.
4. After connecting, double click Record GPS.exe file
5. One window is opened after click, from there port and baud rate (115200) have to be selected.
6. Then import text file as per requirement which is earlier saved in computer.
7. After import, click connect button and connected will be appeared in computer screen.
8. Then click Record GPS button and GPS data will be automatically appeared against every location.
9. After that export to data file for saving the GPS data and GPS data will be saved in CSV.txt format.
10. After saving, open an Excel file and import data from CSV.txt and using tab, comma and colon in other spaces and saved the Excel file. Additional document will be added in separate column as per requirement.
11. For some division, this Excel file is saved as excel worksheet 1997-2003 for their working. Some division uses ITF file for current collection, in order to get ITF file following conversion will be required.

A.xlsx -------A.csv (by rename) ; A.csv -----A..txt (by rename) ; A.txt --- A.itf (by rename)
ITF file will be opened in notepad for viewing.

OHE MODIFICATION WORK UNDER SAINTHIA ROB

Commissioning of OHE was not possible under Sainthia ROB 122 between KAN – PKR, due to low head room clearance at the time of Railway Electrification. OHE was anchored on both ends and under ROB there was no OHE zone. For electric traffic movement, pantograph lowering caution board had to be provided at different locations of Sainthia ROB. According to indication, Loco pilot had to lower the pantograph and proceed the dead OHE zone only by dynamic inertia. Due to such arrangement there were multiple causes of pantograph entanglement either due to late lowering of pantograph by crew or due to pantograph's problem. Total 35 cases of pantograph entanglement happened at this place.

To avoid such repetitive failures of pantograph and OHE as well as to reduce the stress of Loco pilots, a dead OHE was designed under the ROB which provided continuity of contact wire and thus the lowering of pantograph was not required. The arrangement was commissioned in all the lines under Sainthia ROB. After providing such type of dead OHE under ROB 122 no pantograph entanglement case has occurred till now. This has been introduced for the first time in Indian Railwys.








THANK YOU