



AN OVERHEAD LINE AND EQUIPMENT INSPECTION DEVICE IITM Technology Available for Licensing

PROBLEM STATEMENT

- Generally, it is noted that the manual process of inspection of over headlines is **very tedious** and a **time-consuming procedure**.
- An overhead line with **faulty alignment** can entangle with the **running trains pantograph and break**.
- Further, Indian Railways **do not have an automated inspection system to detect such faults and prevent such a failure**.
- Hence, there is a need to mitigate above challenges and present invention provides solutions by addressing above issues in efficient manner.

INTELLECTUAL PROPERTY

IITM IDF Ref. 1004; IN Patent No: 435986

TECHNOLOGY CATEGORY/ MARKET

Technology: Overhead line & equipment inspection device; **Industry:** Railways; **Applications:** Automated Inspection System; **Market:** The global **inspection machines** market is projected to grow at a **CAGR of 4.7 %** during 2022 to **2027**;

TRL (TECHNOLOGY READINESS LEVEL)

TRL- 4, Proof of Concept ready & validated

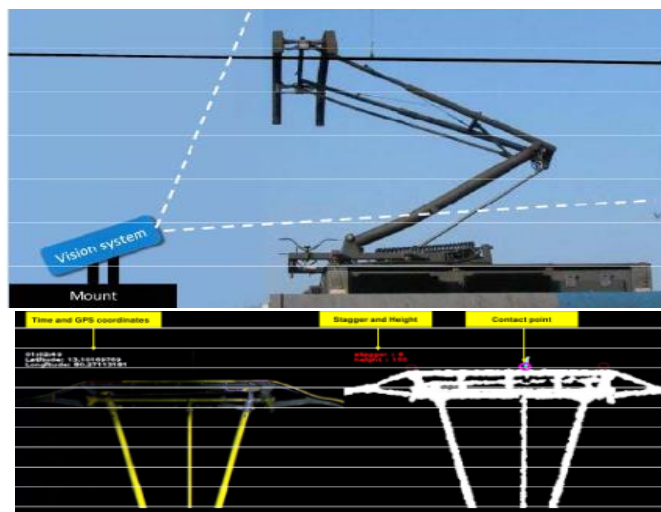
TECHNOLOGY

- The present invention describes a **system for inspection of pantograph overhead lines associated operably on railway electric traction system**, which has pantographs mounted on the roof of the trains contacting the overhead suspended catenary delivering power to the electrically powered train.
- The system includes
 - a) a **sensor** being a depth sensor which is an **infrared based vision camera**;
 - b) a **motion sensor** to **identify and process**

the parameters of pantograph and overhead lines.

- The parameters include a **stagger, height** of plurality of overhead lines, **thickness** of overhead lines, **detection of spark at contact points** of overhead lines with the pantograph, & **pressure exertion** of pantograph on the overhead lines. (Refer figures.1 & 2)
- Said system is operationally associated with **GPS receiver for identifying the GPS coordinates of the vehicle**.

FIGs.1 & 2: Illustrates prototype of the claimed system and operating during night



The solution broadly consists of following components :

- Vision System
- GPS Receiver
- Onboard data-collection
- Cloud-based Datacenter
- Mounting

RESEARCH LAB

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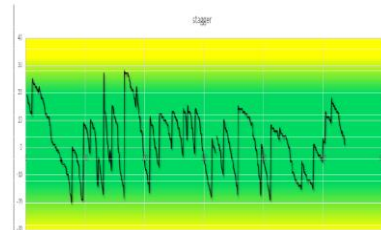
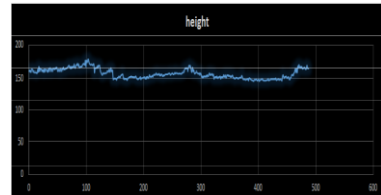
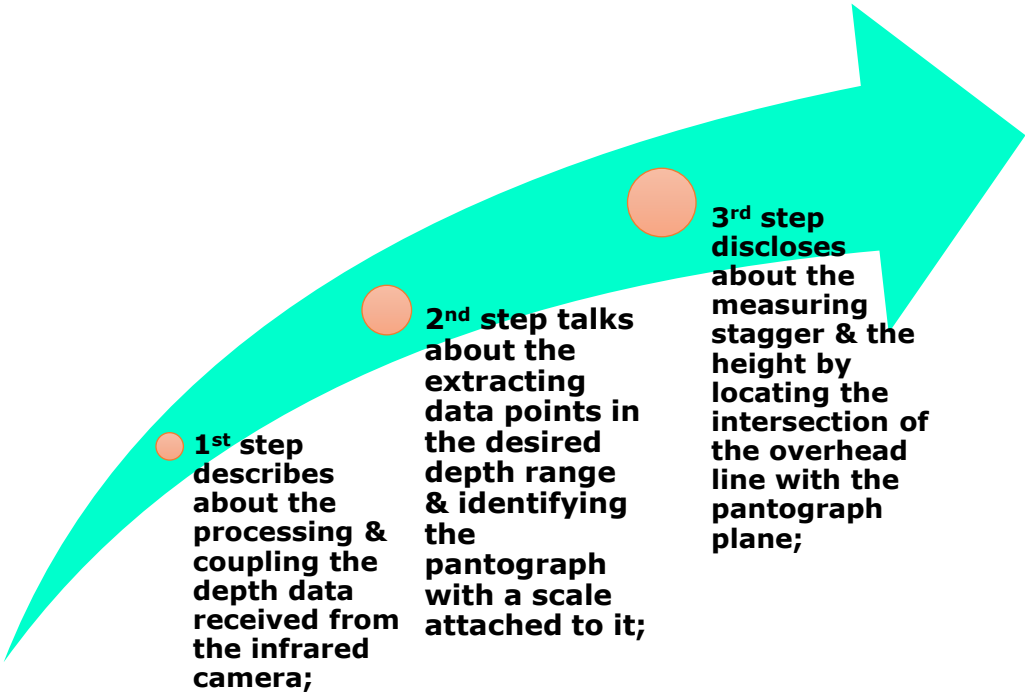
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Industrial Consultancy & Sponsored Research (IC&SR)

Smart Chart of Method for Inspection of Pantograph Overhead Lines Including Experimental Result Simulation Images



KEY FEATURES / VALUE PROPOSITION

❖ Technical Perspective:

1. The depth sensor and the motion sensor are enclosed in a casing and is mounted on any vehicle including **electric train, railway engine, railway EMU, train, trolley bus, moving platforms.**
2. The system is operationally associated with **cloud-based data Centre** which offers **centralized data processing, analyzing & reporting system.**
3. Mapping the **measured parameter with GPS coordinates** allows **convenient maintenance.**
4. Claimed system can work **during the night making it easier to integrate with the existence maintenance schedule of the railways** which usually happens during the night due to low traffic.
5. Claimed device can work on trains **travelling at speeds up to 120kmph.**

❖ Industrial Perspective:

1. Provides a hermetically sealed surgical tool assembly to connect to a **disposable surgical tool tip end effector** for a **tele-operated surgical robot** applicable in surgical units in the Hospitals/Medical Institution.
2. **Completely automated inspection system** right from **data collection** to reporting & storage, in **effect saving time** and **increasing the efficiency of maintenance processes.**
3. Total cost and marginal cost of manufacture **is lower than other existing systems.**

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