

Smart and Secure Trolley system

NOTE: Funded by CIAL

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As a countermeasure to the trolley being lost or stolen from various departments faced by the CIAL, we'd like to propose a couple of solutions for the same. The first one being the cost effective system consisting of the GSM&ZIGBEE module and the other being the RFID security system.

These set of trolleys are efficient and can provide location of the trolley and the current user and so it can be traced back. Specially designed mechanisms are employed to make it tougher to be thieved.

Having very less maintenance costs and these trolleys being practically free to be powered due to the availability of the new solar powered system, these trolleys are the ideal fit to the current situation.

GSM/ZIGBEE MODULE

The GSM/ZIGBEE MODULE is a compact system which is to be mounted on the trolley in such a way that it wouldn't cause an inconvenience to the users or the personnel during usage or stacking. A small compact casing is to be placed on the trolley. This casing consists of a GSM module, an optional GPS module along with a ZIGBEE antenna. The receiver section is to be placed at the loadout section. Continuous interaction between every ZIGBEE MODULE will be maintained at all times. If any interference in the same will make the GSM module send an alert to the controller. Precise location reporting is available in this security system.

PROS AND CONS

- Cheaper to setup as a whole
- Easy installation

- Comparatively more secure
- Easy location tracking and pin pointing
- Lower maintenance cost
- Requires charging time and personnel
- A better investment

Estimated cost

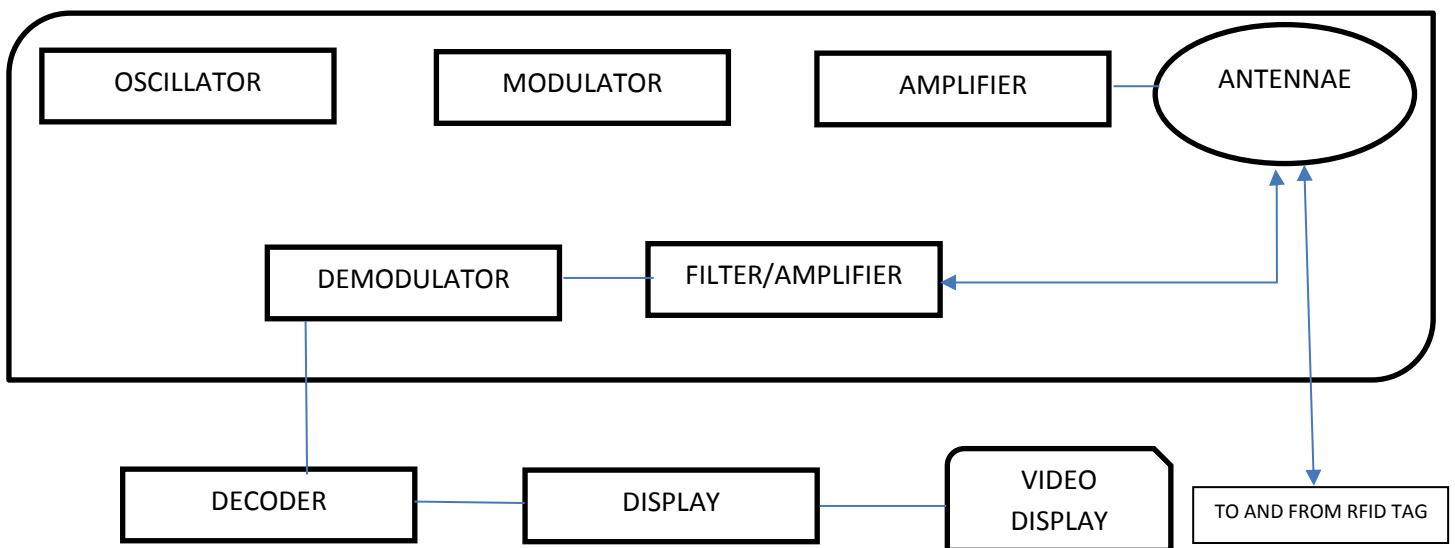
The cost for this system would be around Rs. 3000 as preparation cost for an individual trolley.

Antenna setup cost would vary depending on the perimeter of the location.

Charging costs can be omitted due to the availability of the innovative solar power technology

RFID SECURITY SYSTEM.

Since the GSM/ZIGBEE type of security has a disadvantage of charging at regular intervals, an alternative system which uses UHF radiations is used. A programmed micro strip antenna with unique ID is embedded or placed on the trolley in such a way that it can't be easily tampered with. Proper detectors are kept at every exit and would sound an alarm as the trolley passes through it. But this system has a disadvantage that the alarms are sounded only when the trolley has crossed the exit. Also additional modifications like locking mechanisms cannot be implemented in this system.



PROS AND CONS

- High initial setup costs
- Requirement for an enclosed area for reduction in number of detectors
- Easy installation
- Comparatively less secure
- Maintenance cost is very less if damage to the detectors are ignored
- Safety for the detectors are a concern

ESTIMATED COSTS

RFID tags are really cheap and their costs will be negligible.

The requirement of detector pairs in multiple areas would add to cost and the unavailability of the boundary will add to the trouble.

Costs of the detector poles vary but then pole type detectors have an approximate cost of Rs.1.5 lacs per pair smaller variants also exists but it depends on the requirement and the budget.

The cost per trolley will come between 150 to 200 Rs