Intelligent Vehicle Actuated Wireless Road Traffic signal Controller

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Traffic Signal Controller

Introduction

• An equipment used to control traffic at road intersections

• Traffic Signal Controller equipment occupies pavement space
  – Obstruct pedestrians movements.
Installation issues

- Cutting road surface
- Laying underground RCC Hume pipe
- Pulling armored cable.
- All the said activities damage good roads
- Often the roads are not brought back to its original condition after the civil work.
- Getting permission
Conventional Controller installation
Going wireless is an effective alternative

Advantages

– No digging

– Easy installation

– Minimum disturbance to road users
Selection of Wireless band

• Licensed band
  – Secure
  – Every installation will require clearance from authorities. May not be practical

• Unlicensed ISM band
  – Heavily crowded
  – Possibility of getting jammed
  – Need additional care for secured operation
Challenges

- Packet Drops
- Delay between Primary and secondary lamp poles
- Cross talks between near by junctions.
- Wireless failure
Wireless Traffic Signal Controller (WiTraC)

- State-of-the-art Traffic Signal Controller
  - Use unlicensed ISM band
  - Operates on Solar Power
    - Optimized for 12VDC Operation
  - Power Saving
    - Power efficient LED signal aspects
    - Brightness control for signal lamps
    - Selective switching of night flash
  - Miniature design
    - Pole mounting
WiTraC installation

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Salient Features

• Vehicle Actuated
  – Inductive loop detector and above ground detector compatible

• ATCS Compatible
  – Compatible to CDAC Composite Signal Control Strategy, CoSiCoSt
    • Developed and tuned to Indian traffic condition of high heterogeneity and poor lane discipline
    • Indian Patent 239258

• GPS Enabled
Modes of Operation

- Pre-timed
- Full Vehicle Actuated
  - With or without stage skipping
- Semi-Actuated
  - With or without stage skipping
- ATCS
- Combination of the above modes in any order
- Hurry Call
- Manual
- Forced Flash
Other Features

- Cable-less Synchronization
  - Pre-timed
  - Vehicle Actuated
- Remote Administration
  - Hurry Call
  - Forced Flash
  - Junction Off
  - Plan Download
- Wireless Police Panel
Power Saving

• PWM Based Intensity Control
  – Up to 50% Power saving during night

• Selective Switching of Flashing lamps
  – Primary
  – Secondary
  – Tertiary
  – Combination of the above
Safety Features

• Self diagnosis on Power up and runtime
• Green-Green Conflict Monitoring
• Lamp failure / Short circuit Monitoring
• Battery Voltage Monitoring (Solar Power)
• Fallback on secondary frequency in case of wireless signal jam
• Automatic selection of Flashing program on error conditions
• Error logs sent to traffic monitoring centre, if networked
Cost Saving Factors

35% to 40% Cost saving at a typical 4-arm junction

• Road cutting and refilling
• Micro-tunneling where road cutting not possible
• Savings on armored cable and laying
• Plinth for traffic signal controller
• Optimum solar panel and battery
• Disturbance cost
• Maintenance cost due to cable damage / battery etc.
  – Delay, Disturbance & Cost
Field Implementations

1. CDAC Keltron Junction, Trivandrum
2. Vellayambalam Junction, Trivandrum

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1. Savarkar Bhavan Junction, Pune
Thank You