Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: Road Tunnel Emergency Exit based V2I CamCom Model

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Re:

Abstract: This documents introduce the road tunnel emergency EXIT based V2I Vehicle CamCom Concept models for Vehicular Assistant Technology (VAT). This proposed VAT using Image Sensor Communication to operate on the application services like ITS, ADAS, IoT/IoL, LED IT, Emergency EXIT, Digital Signage with Advertisement Information etc.

Purpose: To Provided Concept models of Vehicle CamCom for Vehicular Assistant Technology (VAT) Interest Group

Contents

- Road Tunnel Emergency EXIT

- Problems and Safety Measures in Road Tunnels

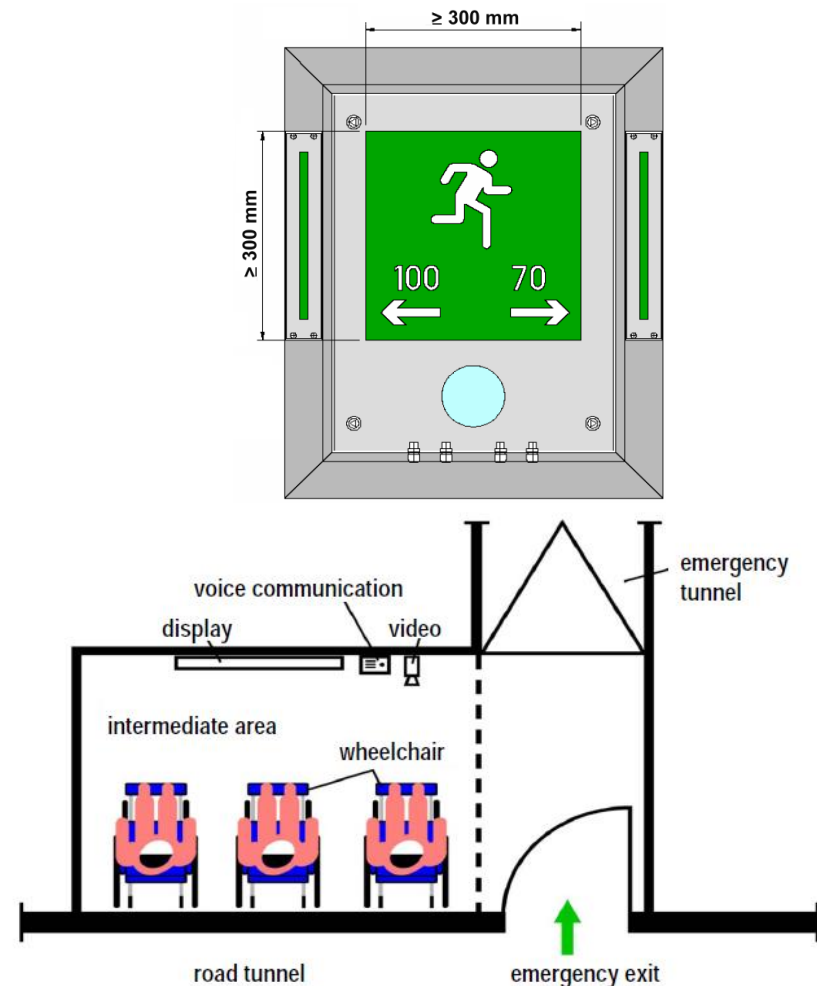- Emergency EXIT-CamCom Link for Road Tunnel

- Conclusion

Road Tunnel Emergency EXIT

- Road Tunnel Emergency Conditions
  - Vehicle Breakdowns and Accidents
  - Fire and Smoke Spreading
  - Electrical System Fail
  - Disabled or drunken or unhealthy people loosing control of Vehicle when equipping and operating road tunnels
  - Any other natural disasters
- Emergency Aids in Road Tunnel
  - Emergency Walkways
  - Fire Extinguishers
  - Emergency Phones and Emergency Telephone Boxes
  - Emergency Exit Doors
  - Emergency route change exits, and etc.
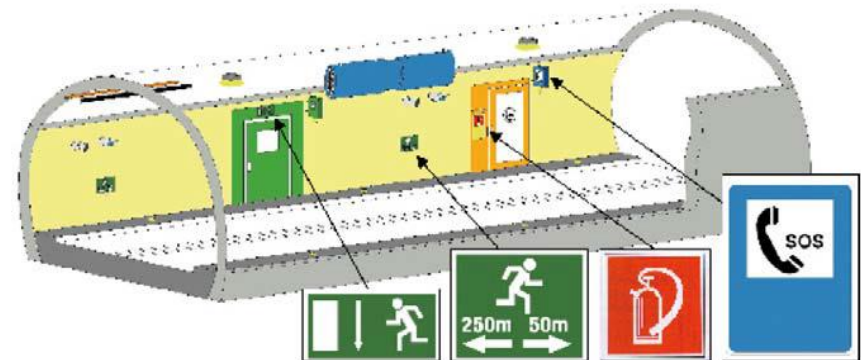
Problems and Safety Measures in Road Tunnels

- Possible Problems in Road Tunnel at Emergency Conditions
  - Accessibility of emergency walkways
  - Accessibility and usability of emergency phones and emergency telephone boxes
  - Locating the emergency exits
  - Opening the emergency exit doors
- Safety Measures in Road Tunnels
  - Escape route signs with orientation light
  - mounted every 25 m or less
  - in the future with a tactile marking

Emergency EXIT-CamCom Link for Road Tunnel

V2I Emergency EXIT - CamCom Link

- Advantages
  - Provides Safety Evacuation Assistance
  - Real-Time Environmental Condition Information Sharing
  - Guides to Emergency First Aid Centers

- V2I CamCom Link between Road Tunnel Emergency EXIT and Vehicle Front View Camera
  - Emergency EXIT used for Indicating Tunnel emergency EXIT route as well as Emergency LED based CamCom Tx
  - Uses Modulation Techniques
    - OOK
    - Multilevel PPM
    - Inverted PPM
    - Sub Carrier PPM
    - DSSS SIK
  - Vehicle Tracking Emergency EXIT sing Front view camera work as Rx
  - Road Tunnel Tx Transmits
    - Exit Locations, Location to Travel to get main entrance, direction to travel and Tunnel Environment Conditions Informations
    - Location Informations
    - Real-Time Traffic Informations Inside Tunnel and Near Area
    - First Aid Information
    - Near by Fire Station, Hospitals informations
  - Provide high end evacuation assistance information to escape and ensures roadway human safety measures

Conclusion

- Proposed the Road Tunnel Emergency EXIT-CamCom Link Technology Use Case Model

- Provides Safety Evacuation Assistance with first AID support centers help information use of Emergency EXIT to CamCom Technology

- Easy Integration support with ITS using Mobile Infrastructure Technology in Emergency Situations

- Novel road safety system and directly related to human and material safety