

# Securing Intelligent Transportation Systems

Anwesh Tuladhar, Ximeng (Simon) Ou  
atuladhar@mail.usf.edu, xou@usf.edu



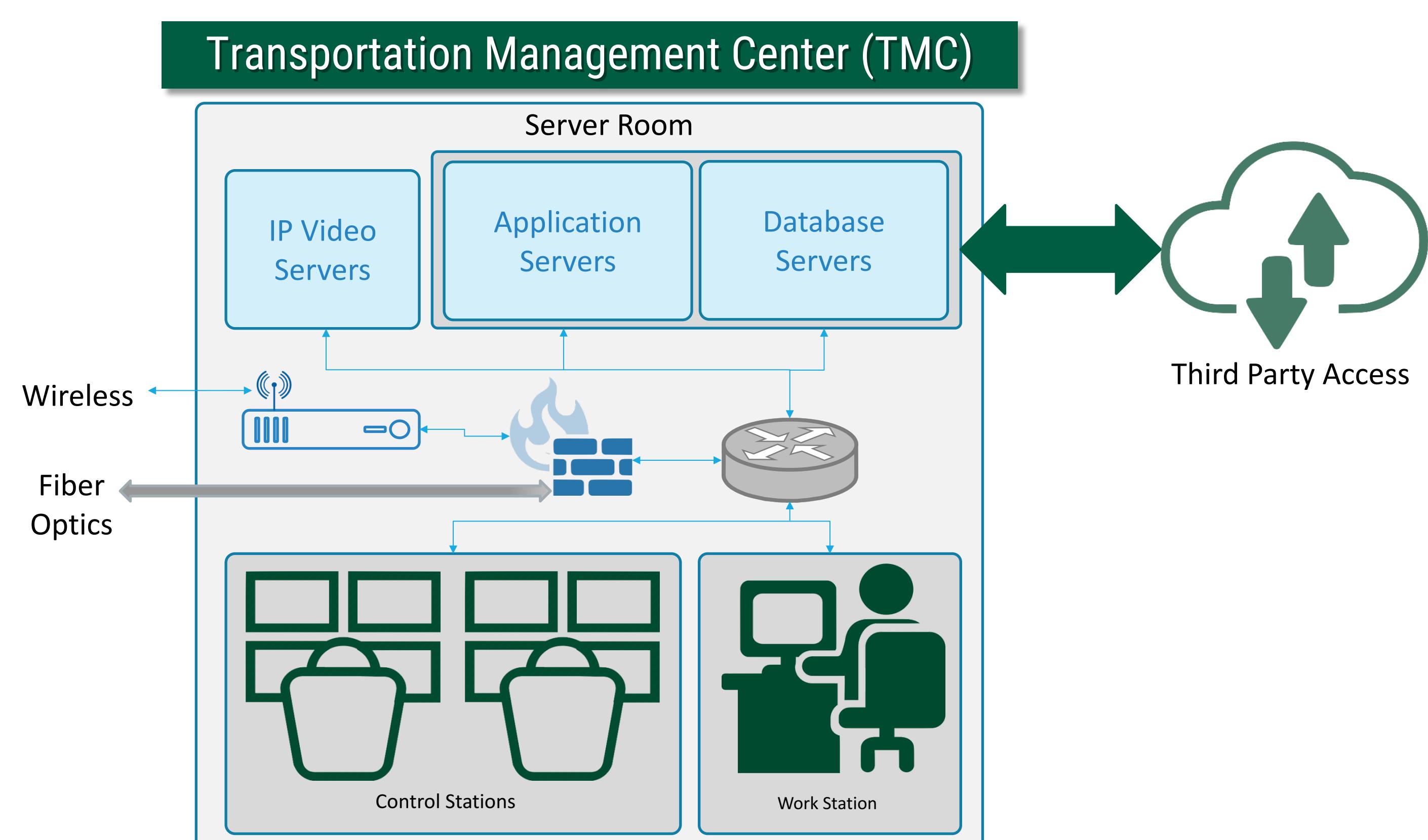
Department of Computer Science and Engineering

## TMC Functions

- Daily Operations: Signal timing and scheduling, Incident management, Traveler information
- Special Event Management
- Emergency Management
- Equipment Failure Monitoring
- Third party involvement
  - Network Management
  - Application maintenance and updates: Traffic management software (Centracs)
  - Data sharing: For congestion management and traveler information (Waze)

## Collaboration with City of Tampa

- We are currently working with the City of Tampa Traffic Management Center to better understand the real world ITS system. As a part of this collaboration, we participate in the daily activities of traffic engineers such as: *Reversal of express lanes, Monitoring intersections, Planning and programming signal timings* into a test bed.

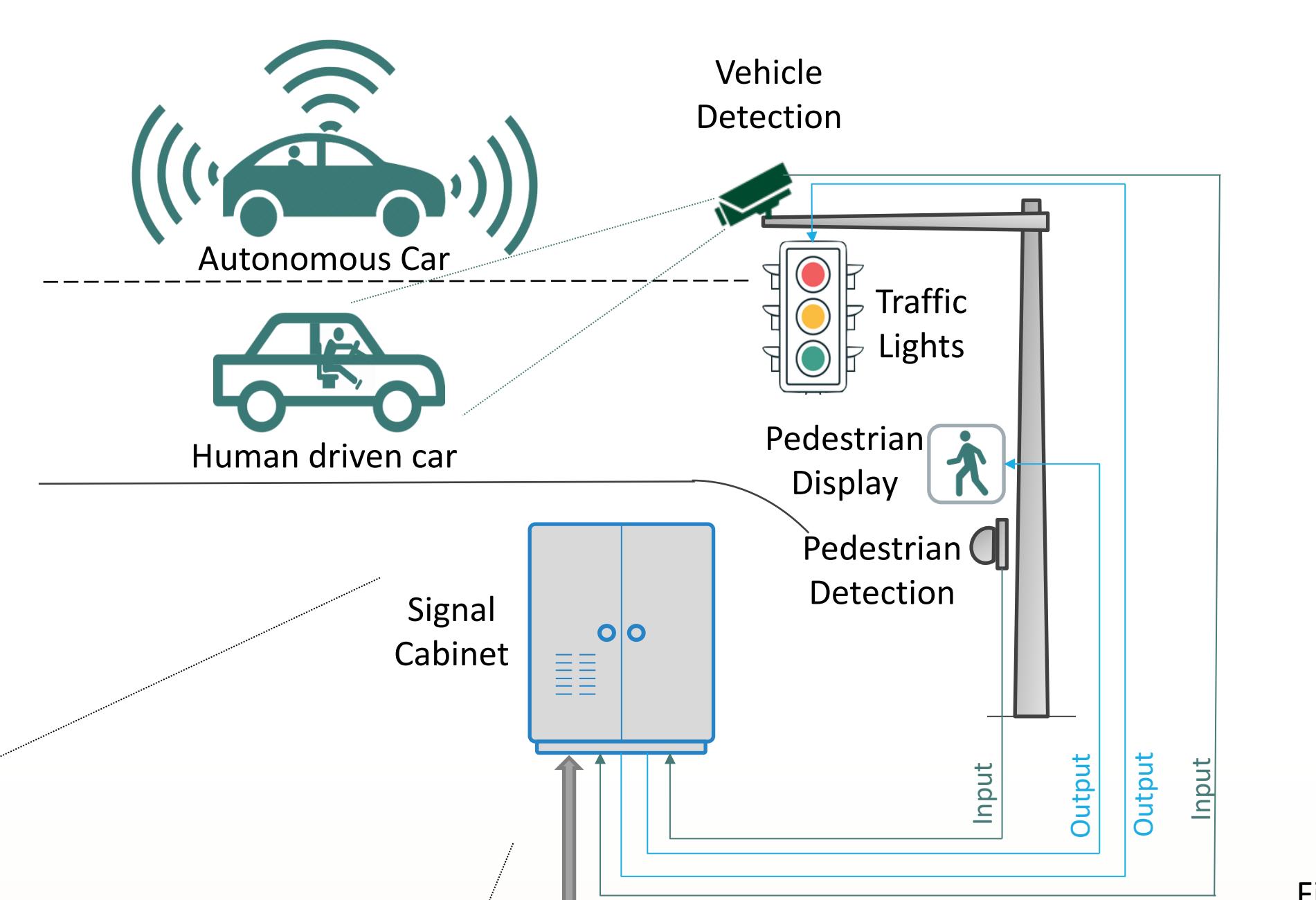


In-vehicle networks has been well studied !?



Security claim:  
Network is  
Isolated.

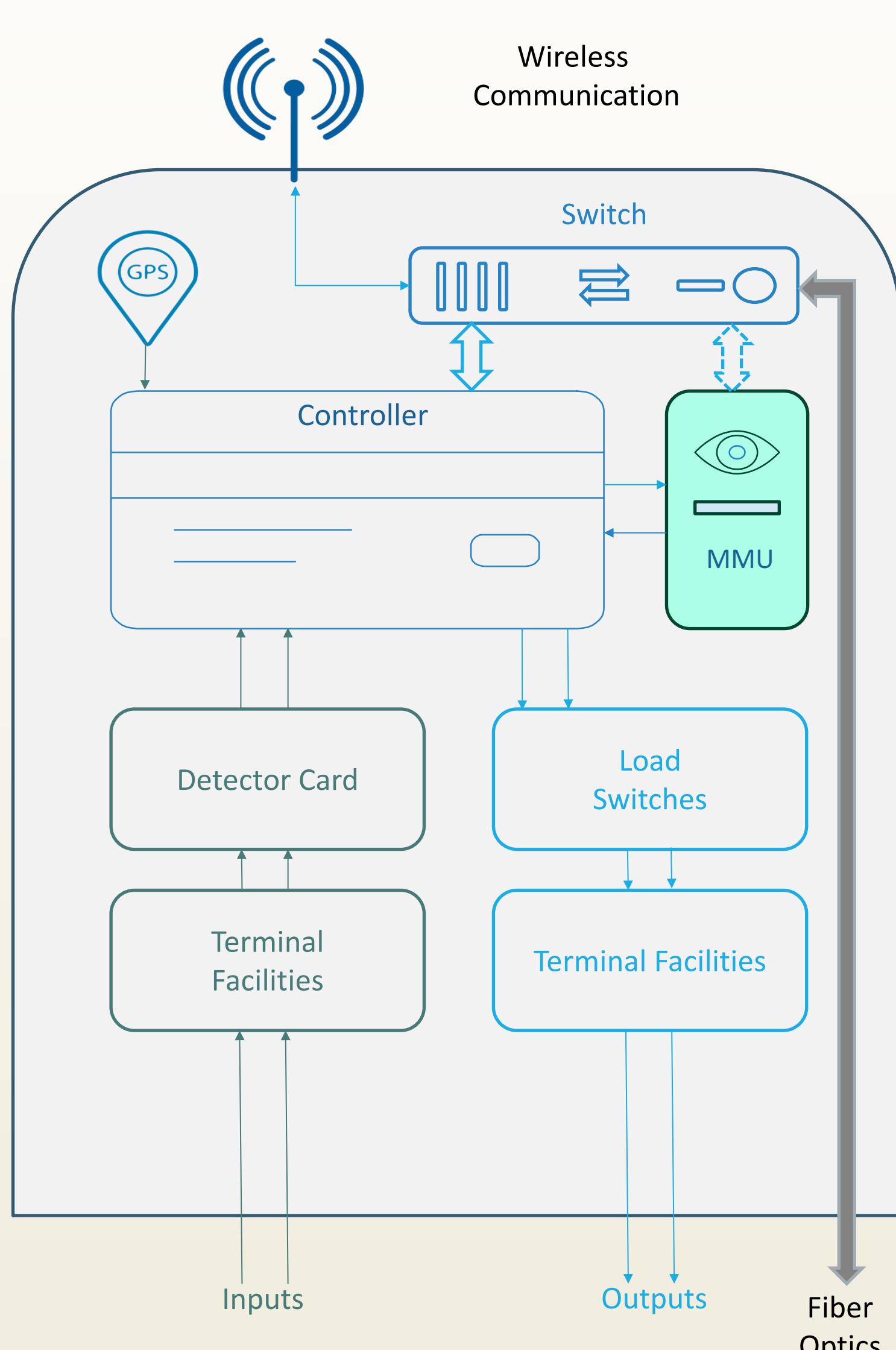
Intersection



Wireless sensors have been hacked!



Signal Cabinet



Security Claim:  
Proprietary  
protocols.

## Roadside Equipment Functions

- Controller: Orchestrate traffic based on the signal timing plan and sensor inputs.
- Malfunction Management Unit (MMU): Watchdog for the controller. (Conflict/Fault Monitor)
- GPS: Global time synchronizer to avoid drift.
- Wireless Communication: Relay data to a network hub
- Switch: Facilitate communication between TMC and the cabinet.
  - Feedback messages from controller for remote monitoring
  - Upload/download signal timing information
  - Firmware updates

## Challenges

- No longer an *isolated* network.
- V2X communications: Authentication, Identification, Verification, Bandwidth requirements.
- Securing the Enterprise network and IoT infrastructure in tandem.

## Acknowledgements



This research is supported by the National Science Foundation under Grant No. 1638301. Any opinions, findings and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.