

# Integrating advanced traffic control cabinet (ATCC) with traffic simulation (CILS-ATC)

## A practical platform to facilitate traffic signal design and deployment with the ATC traffic signal equipment

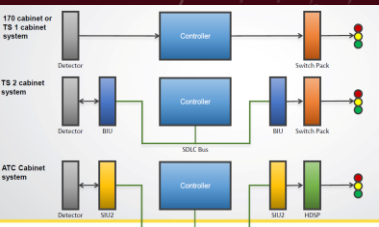
Dr. Pengfei Li (Taylor), P. Eng.  
Assistant Professor, CEE department  
Mississippi State University  
Nov-2017

[Pengfei.li@cee.misstate.edu](mailto: Pengfei.li@cee.misstate.edu)



# Outline

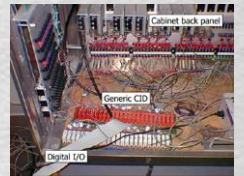
- Background: Advanced traffic control (ATC) standards
  - ATC cabinet
  - ATC traffic signal controller
- Motivations
- Architecture of CILS-ATC
- Demonstrations
- Potential benefits for the industry and agencies





# What is Advanced Traffic Control ( ATC) standard?

- In a nutshell, ATC standard is the next generation of traffic signal standards
  - More computing power in traffic signal controller for the advanced control mechanism in future
  - More flexible for integrating future technologies, such as connected vehicle
  - Modern architecture (compact with minimal wiring)
  - Support much more phases (32 per CMU) and detectors within one cabinet (up to 120 channels) compared with NEMA or Caltrans





# Motivations for pursuing ATC standard

- Let us start with a true story....

- It is wise to track and upgrade to the latest traffic signal technology in time even though the old cabinet or controller are stilling working well.

**Any old equipment will be phased out eventually due to: discontinued support, discontinued part supply, discontinued software upgrade, etc.**

- In general, agencies are interested in the new technology but they have concerns:

- Comparable price?
- New efforts for staff training?
  - Right for this reason, some agencies are still buying signal equipment with old standards.
- New benefits out of those new technology?



# Historical gap between traffic signal design and deployment

- Traffic signal operations uniquely involves multiple (and different ) domains
  - computer architecture and technology
  - Communications
  - traffic engineering
- There is no single training program covering all relevant knowledge
- As a result, we often see:
  - Traffic engineers are eager to know traffic signal equipment better but they do not have sufficient opportunities due to the liability concerns
  - Traffic signal technicians wish to expand traffic signal knowledge but they cannot try new locations or configurations except those locations where they work



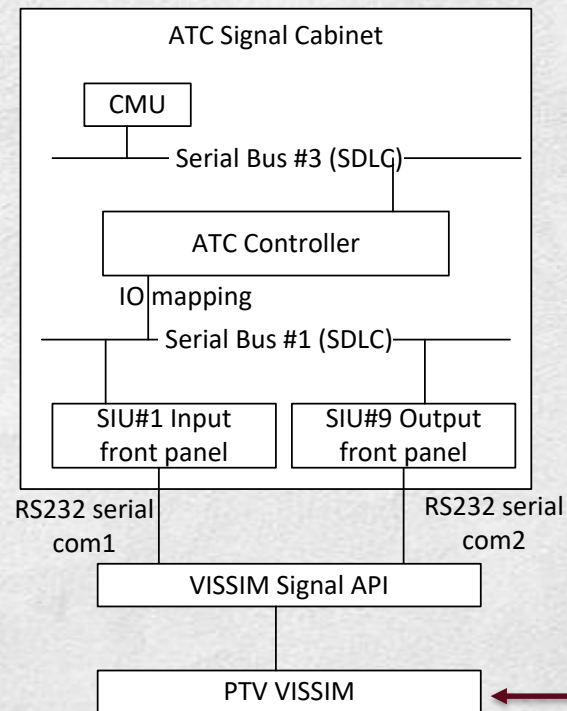


# CILS-ATC: A full-spectrum training and testing platform for ATC traffic signal systems design and deployment

- Traffic engineers design traffic signal timings based on traffic simulators
- Technicians work on controllers and cabinets to make them work as designed in the field.
- 
- ATC-CILS couples both traffic simulator (design) and cabinet (deployment) to address concerns both from engineers and technicians



# Architecture of CILS-ATC



It can be replaced with open-source traffic simulator, such as ETFOMM

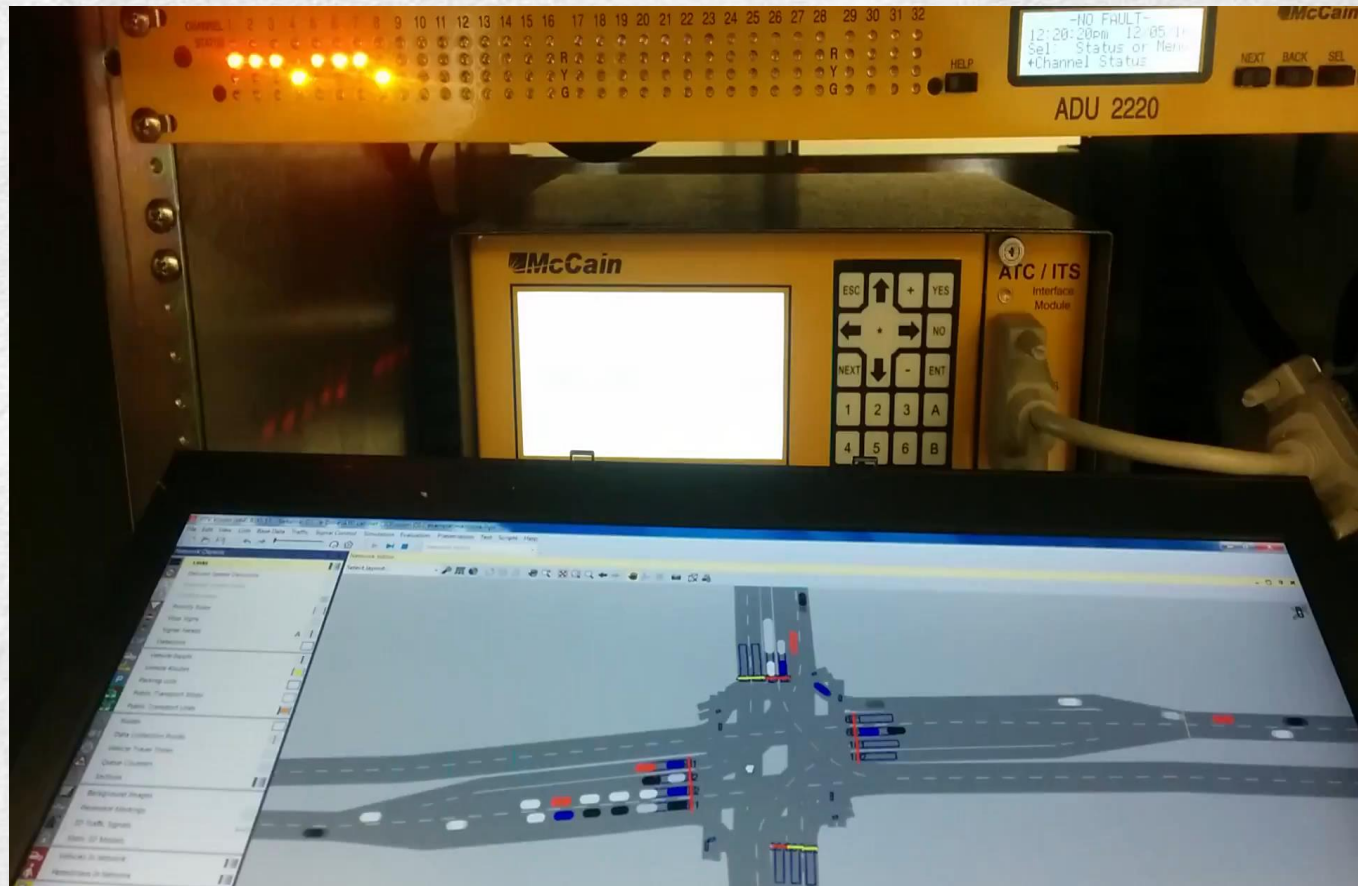
Therefore, to make a traffic signal system work, one must have:

- (1) correct phases and phasing sequence to guarantee acceptable mobility and safety (observed from traffic simulation);
- (2) properly configured traffic cabinet (otherwise, the CMU will keep flashing)



# Demo 1: Matching phase status

forestry  
Education  
philosophy honors  
agronomy History  
economic development art  
business Pride  
science agriculture  
Tradition bulldog  
english engineering  
Starkville Community  
design Research  
architecture economics  
Student Life music  
chemistry veterinary  
landscape geography  
alumni Technology  
mathematics  
foreign language aerospace  
Information biology





# Demo2: Matching detector calls



Education forestry  
philosophy honors  
agronomy History  
economic development art  
business Pride  
science agriculture  
Tradition bulldog  
english engineering  
Starkville Community  
design Research  
architecture economics  
Student Life music  
chemistry veterinary  
landscape geography  
alumni Technology  
mathematics  
foreign language aerospace  
Information biology





# Benefits to us

- To **engineers**: All new traffic signal timing will be absolutely deployable
- To **technicians**: Conducting in-house configuration of cabinets for various intersections, enhancing their skill sets
- To **agencies**: greatly facilitate the training for new traffic signal engineers and technicians and gain confidence in purchasing and deploying new ATC systems



# How can we help to promote ATC deployment with the CILS-ATC?

- We could help agencies, companies and distributors to facilitate the training, designing and deployment of new ATC signal systems with CILS-ATC.
- We could help install in-house CILS-ATC for agencies (contingent on the permission of EDI)





# Acknowledgement

- Arizona State University
- EDI Traffic
- Scott Clark and Ron Amaya, Clark Trans Solutions (Arizona distributor of McCain signal equipment)
- Temple Inc., Decatur, AL



forestry  
Education  
philosophy honors  
agronomy History  
economic development art  
business Pride  
science agriculture  
Tradition bulldog  
english engineering  
Starkville Community  
design Research  
architecture economics  
Student Life music  
chemistry veterinary  
landscape geography  
alumni Technology  
mathematics  
foreign language  
Information aerospace biology

# Thank you and Questions?

- Contact: [pengfei.li@cee.msstate.edu](mailto:pengfei.li@cee.msstate.edu)

