



*An Overview of*  
**ATC**  
**CABINETS**

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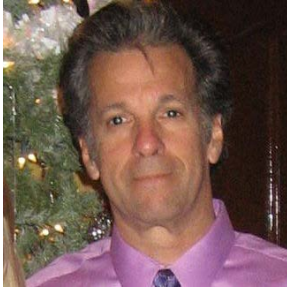
# AGENDA

- Introduction
- ATC Cabinet Overview
- Brief Development Overview
- Features and Benefits
- Assemblies & Components
- Panel Q & A

# PANEL INTRODUCTION

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# Panel of Experts



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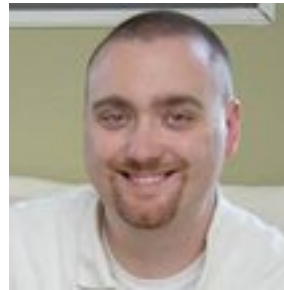
**Nathan Welch**  
MCCAIN, INC.  
DIRECTOR OF SALES



**Craig C. Gardner, PE**  
INTELIGHT INC.  
PRESIDENT/CEO



**Jim Rose**  
ECONOLITE CONTROL  
PRODUCTS, INC.  
HARDWARE ENGINEERING  
MANAGER



**Brent Katauskas**  
MOBOTREX  
ENGINEERING MANAGER

# CABINET OVERVIEW

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# Cabinet Overview

- The ATCC is an open architecture traffic control cabinet based on the ITE/NEMA AASHTO ITS Cabinet v1 standard.
- It offers significant improvements to conventional cabinets in modularity and compact size, motorist safety, technician safety, and diagnostics.
- This cabinet is intended to update or replace all cabinet types; NEMA TS-1, NEMA TS-2, ITS v1, and Caltrans 33x.



Photo courtesy of McCain Inc.

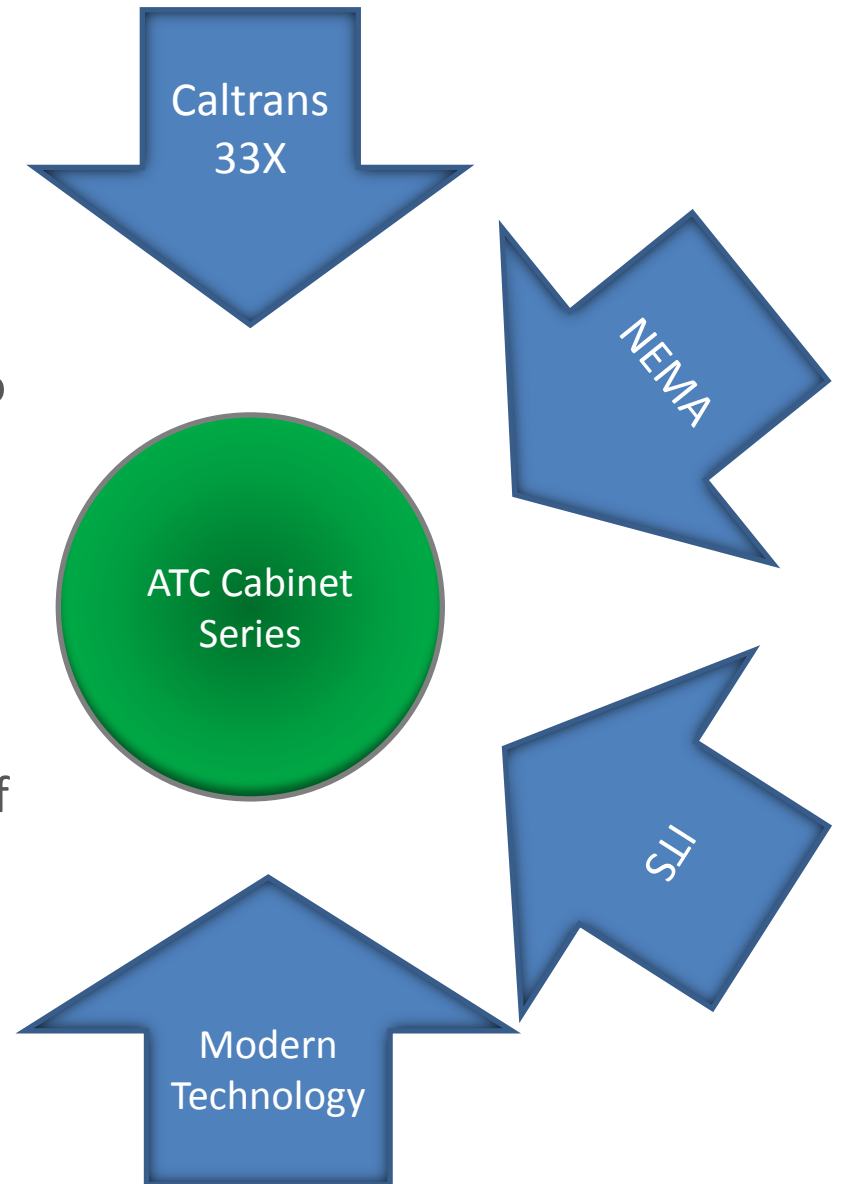
# Cabinet Overview

## Best of All Worlds

- Combines existing standards and the latest technological advancements to increase cabinet reliability, functionality, and ease of maintenance.

## Why “ATC”?

- The ATCC Standard is a component of the ITE/NEMA/AASHTO suite of ATC standards. It is intended to update the ITS Cabinet standard v1 to version 2.

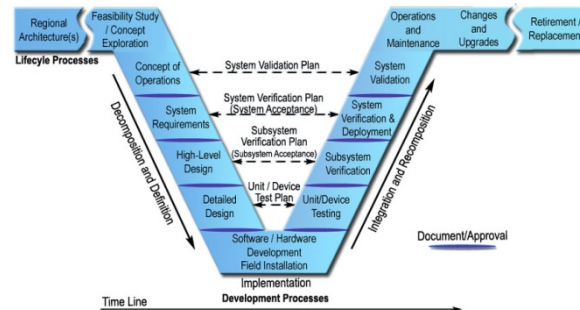


# BRIEF DEVELOPMENT HISTORY



# Brief Development History

- The ATCC *architecture* is based on the ITS Cabinet ITE/NEMA/AASHTO Standard v01.02.17b, published in 2006.
- This next phase ATCC work (v2) was developed using the FHWA Systems Engineering Process to develop the Concept of Operations (ConOps), Systems Requirements, capture user needs and requirements, and produce a high level design.
  - USDOT Work Order 14-0701, Tasks 7-12
- Goal of the v2 project was to refine v1 and adapt the lessons learned, and to support low voltage DC operation.
- In 2011 the WG lost funding and three manufacturers continued the program to bring the high level design to the detail level and produce working equipment.



# Brief Development History

- The ITE/NEMA/AASHTO funding was restored in late 2015 and the standards Working Group restarted development of a draft standard in January of 2016.
- A final published national Standard is expected in Q4-2016.



- To date, three OEM companies are in cabinet production with close to 100 ATC Cabinets deployed across the US including several low voltage DC cabinets.

# FEATURES AND BENEFITS

# Design Objectives

- Compact size
- LED signal compatibility
- Technician and Motorist Safety
- Modular rack mounted configurable design
- Accommodate small, large, or multiple intersections
- Low Voltage Operation



# ATCC Features (Size Matters)

Put twice the equipment in the same space, or the same equipment in half the space.

- Compact double density size, 19" rack mounted
- High Density Components
- 16 or 32 channel Output capacity (16 channels shown)
- 120 channel Input capacity
  - 48 channel quad-density input assembly option



Photo courtesy of McCain Inc.

# ATCC Features (LED Signals)

The ATCC Output technology is an *enabler* for higher energy efficiency.

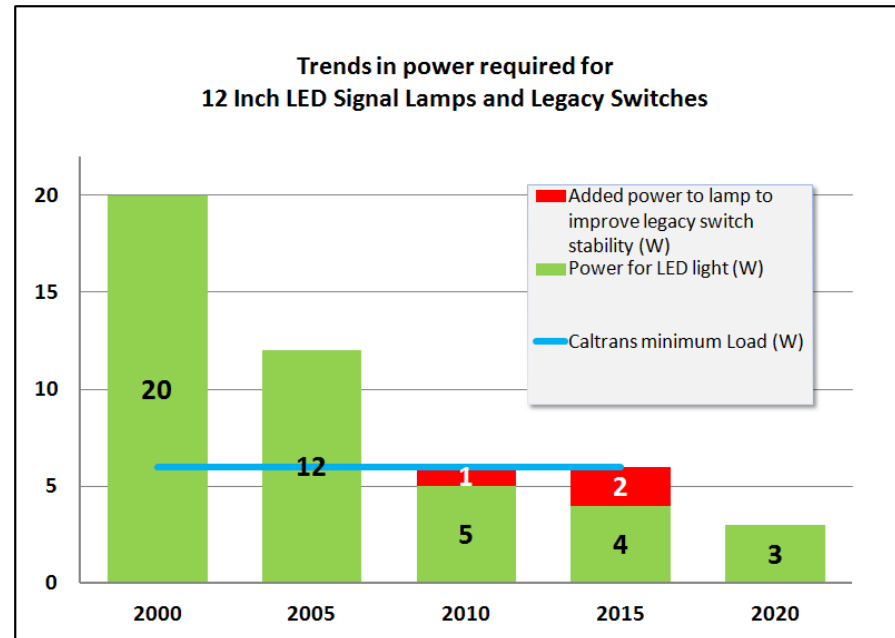
- *True LED compatibility.* Switch Packs will support Ultra low power LED signals less than 2 watts.
- *Higher energy efficiency* within the cabinet, Switch Packs utilize FET devices minimizing heat and waste, with no leakage current.
- Battery backup becomes more cost effective.



# ATCC Features (LED Signals)

- Conventional Triac based 10 Amp load switches have forced LED signal designers to maintain a minimum load for reliable field operation.

The LED revolution is not over yet!



Graph courtesy of Schneider-Electric

# ATCC Features (Motorist Safety)

Load Current monitoring detects a dark approach *immediately*.



## Improvements for Fail-Safer design

- Flasher Output Monitor
- CMU Output Override
- 24Vdc Override
- All assemblies except FOTA and SA can be replaced with intersection still in flash
- Pluggable surge protection on Mains, Inputs, and Outputs



# ATCC Features (Technician Safety)

## Technician Safety

- High voltage (over 50 V) components are not exposed, per NEC

## NFPA 70 Requirements

- Low Voltage cabinet further promotes Technician safety in the cabinet, as well as citizen safety when downed wires are present.



# ATCC Low Voltage Configuration

The same ATC Cabinet design can also support Low Voltage DC operation

- Spend less on PPE requirements
- Improved operational efficiencies
- Component costs are reduced
- Reduce liability risks
- Minimize regional electrician licensing issues
- Knocked down poles and cabinets will not have high voltage wires exposed to the public



Photo courtesy of Intelight Inc.

# ATCC Features (Architecture)

- Modular Assembly design
  - Modular construction facilitates a wide variety of configurations and allows for future expansion
- Easily handle advanced operations:
  - Adaptive
  - Bicycle detection
  - Count data
  - Texas Diamond
  - RWIS, etc....
- Competitive Procurement
  - Open architecture allows for interchangeable assemblies and components between manufacturers
  - Same *cabinet* design can support either 120 Vac or 48 Vdc operation.



# ATCC Features (Size & Modularity)

## Modular rack mounted configurable design

- Accommodate large or multiple intersections, down to small CBD or HAWK configurations. Configurations can be considered to optimize any application.



Photos courtesy of McCain Inc.

# ASSEMBLIES AND COMPONENTS

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# ATCC Assemblies

- 19" or 14" Rack Mounted Modular System
  - ATC Controller with Serial Bus
  - Output Assembly
  - Input Assembly
  - Serial Bus / DC Bus Cable Assembly
  - AC Clean Power Cable Assembly
  - Input and Output Termination Panels



Photo courtesy of Safetran

# ATCC Block Diagram

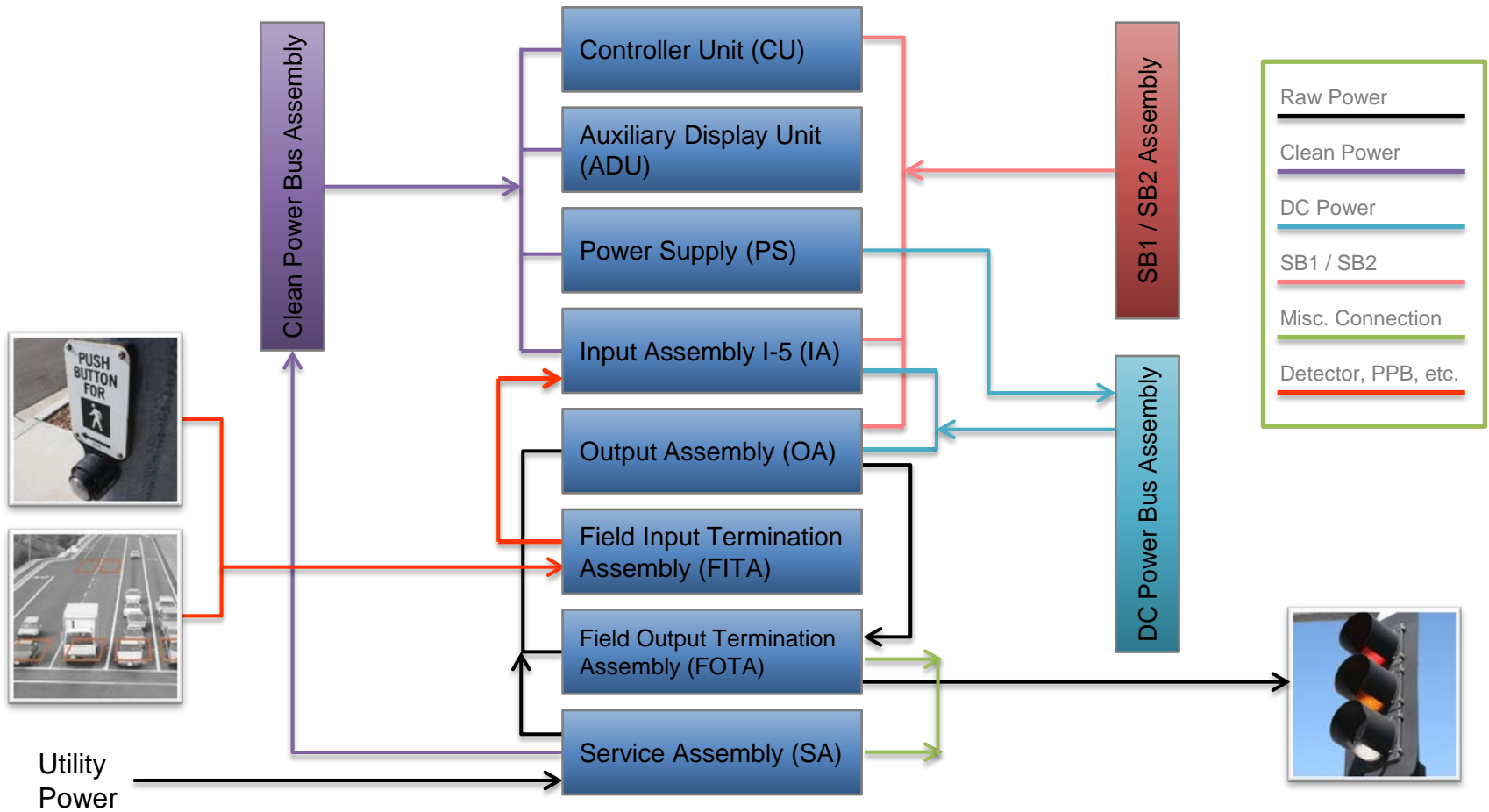


Diagram courtesy of McCain Inc.



# Output Assembly

## Output Assembly Houses

- Model 2212 Cabinet Monitor Unit (CMU2)
- Model 2202 High-Density Switch Pack (HDSP)
  - *16 channel version*
  - *32 channel version*
  - *8 channel Combo version*
- Model 2218 Serial Interface Unit (SIU)
- Main Contactor (MC)
  - 48 VDC coil
  - Mercury-free



Photos courtesy of McCain Inc.



# Input Assembly

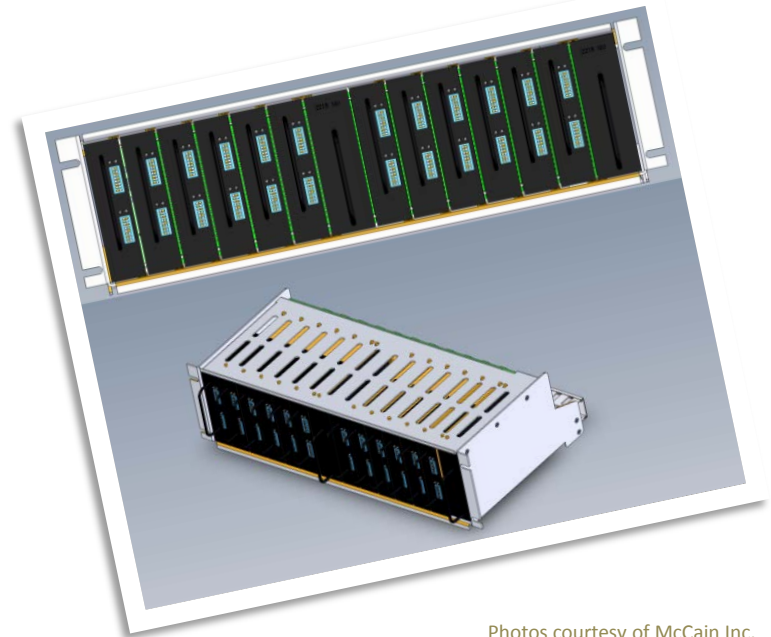
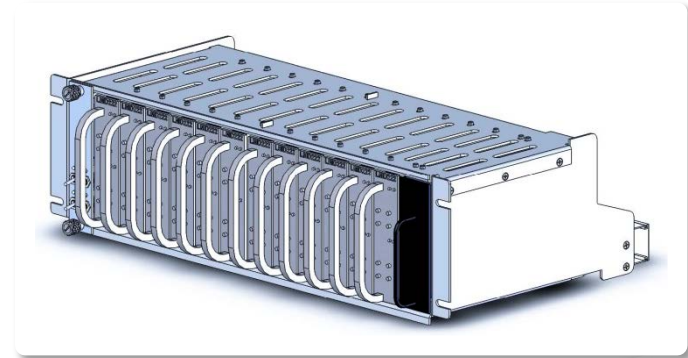
## 24-Channel Input Assembly

- Houses twelve 2-channel devices, or six 4-channel devices, or a combination of 2 & 4 channel devices

- *Detector fault status provided*
- *Supports 120 input channels*

## 48-Channel Input Assembly

- Houses twelve 4-channel half width devices



Photos courtesy of McCain Inc.

# ATCC Key Components

- Cabinet Monitor Unit (CMU)
- Auxiliary Display Unit (ADU)
- High Density Switch Pack / Flasher Unit (HDSP-HDFU)
- Serial Interface Unit (SIU)
- Cabinet Power Supply (PS)
- High Density FTR



Photo courtesy of Eberle Design Inc.

# ATCC Components (HDSP)

- Card based *two channel* Switch Pack, interchangeable with the Four Output Flasher
- Output *Voltage and Current* measured for each output (6), reported to CMU via SB#3
  - Six outputs rated at 5 mA to 1 Amp (1-120 watts)
- LED compatible to <2 watts, no leakage
- CMU controlled output over-ride for fail-safer operation
- “ID” indicators driven by CMU based diagnostics for simplified trouble-shooting
- 120 Vac (HV) and 48 Vdc (LV) versions



Photo courtesy of Eberle Design Inc.

# ATCC Components (CMU, ADU)

- The CMUip-2212 is a modular signal monitor *capable of monitoring 32 channels.*
  - Voltage and current data is received from each HDSP and HDFU device via SB #3.
  - All configuration programming is provided in the *Datakey*, a non-volatile memory device.
- 
- The ADU2220 provides a modular CMU display capability for access to the *SmartMonitor*<sup>®</sup> technology.



Photo courtesy of Eberle Design Inc.

# ATCC Components (FTR)

## *Combat the Elements*

### HD Flash Transfer Relay

- Hermetically sealed nitrogen enclosure
- LED indicator reports actual contact status
- DC coil voltage

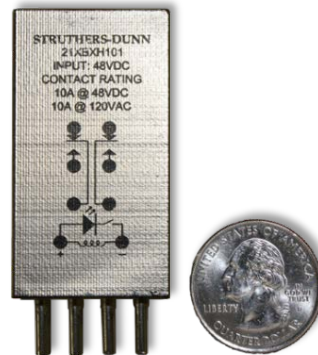
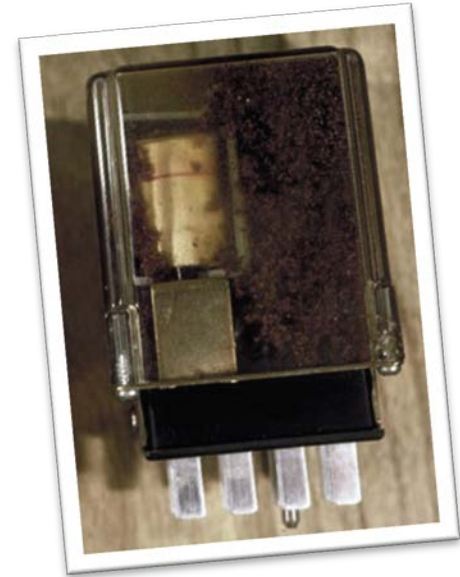


Photo courtesy of Struthers-Dunn

# ATCC Components (Surge)

## *Combat the Elements*

- Pluggable SHA1250 Surge/Filter
  - LED health indicators
- Pluggable Input and Output Transient protection devices
  - Loop Inputs
  - Field Outputs
  - Mains Inputs
- Pluggable means testable



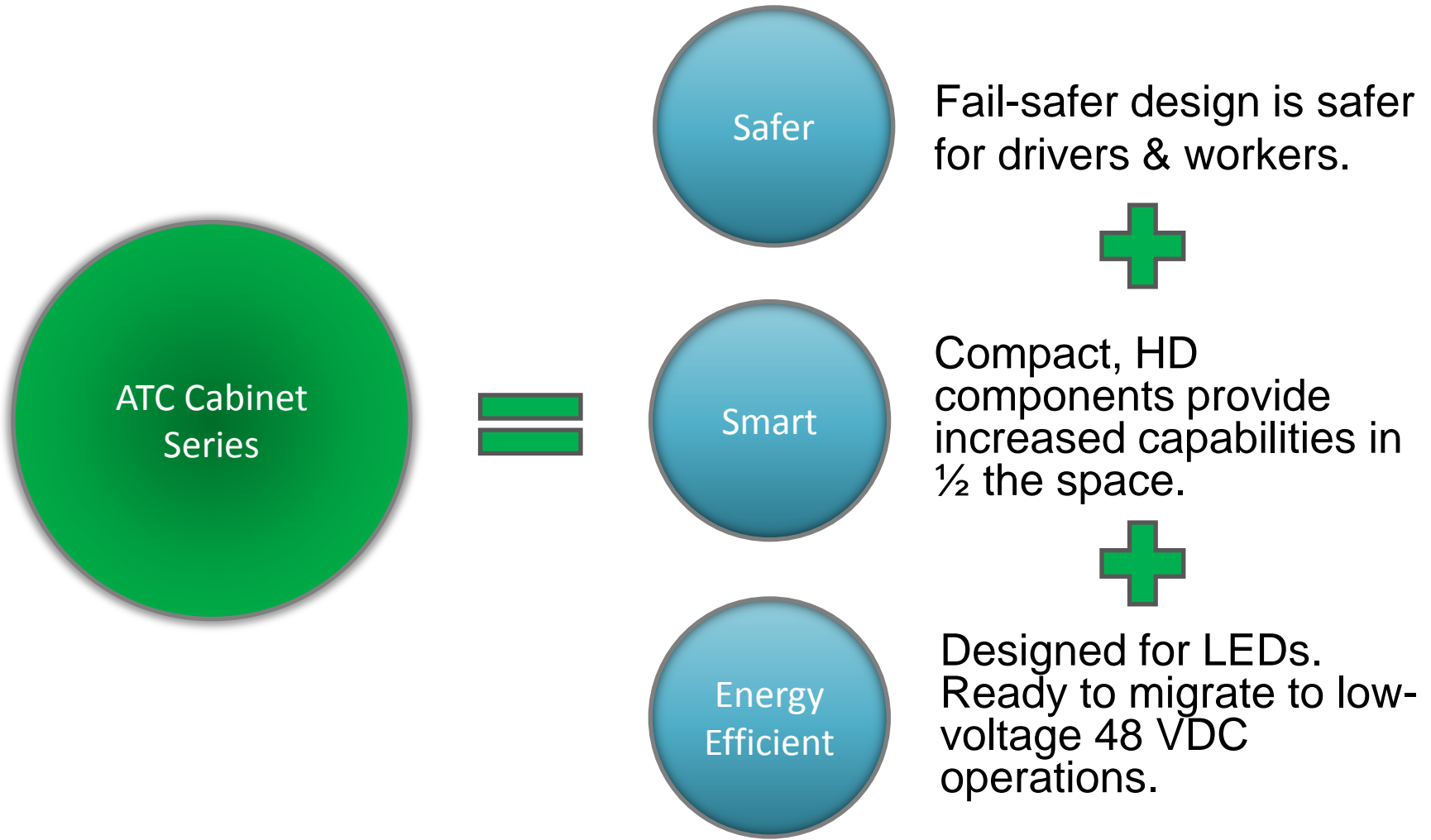
Photo courtesy of Emerson

# SUMMARY

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# ATCC Summary



Graphics courtesy of McCain Inc.



# ATCC Status

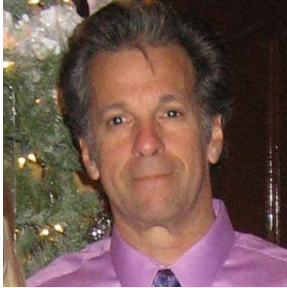
- Equipment Availability
  - Three OEM manufacturers in production (HV & LV)
  - One additional OEM manufacturer in design
- Many projects already deployed, close to 100 cabinets
- Six CU local software suppliers
  - Four currently qualified for ATCC software
- Funding has been reinstated for the ITE/NEMA/AASHTO Working Group to complete the ATCC Standard
  - <http://www.ite.org/standards/ITScabinet/v2.0.asp>
- Standards documents in draft development



# Q & A

Want to Know More?

# Panel of Experts



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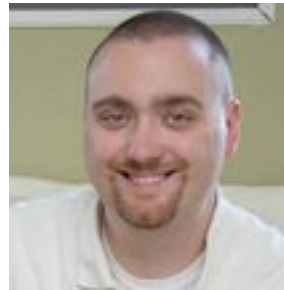
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**Brent Katauskas**  
EAGLE TRAFFIC CONTROL  
SYSTEMS  
ENGINEERING MANAGER

# ATCC Contacts



## Q&A

- Eberle Design
- Intelight
- McCain
- Struthers-Dunn
- Mobotrex
- Econolite

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