

# AMPS Communication

## Analog Model Power System Modernization

Sponsor: Normann Fischer  
Lead Instructors: Amrit Dahal,  
Touraj Assefi  
Mentor: Brian Johnson

### Problem Statement

The current Analog Model Power System (AMPS) uses equipment which is becoming obsolete. The purpose of our project is to upgrade the protection equipment to more modern, Ethernet based technology, and to document the system to make it a user friendly and modern teaching tool.



Old Relay Rack

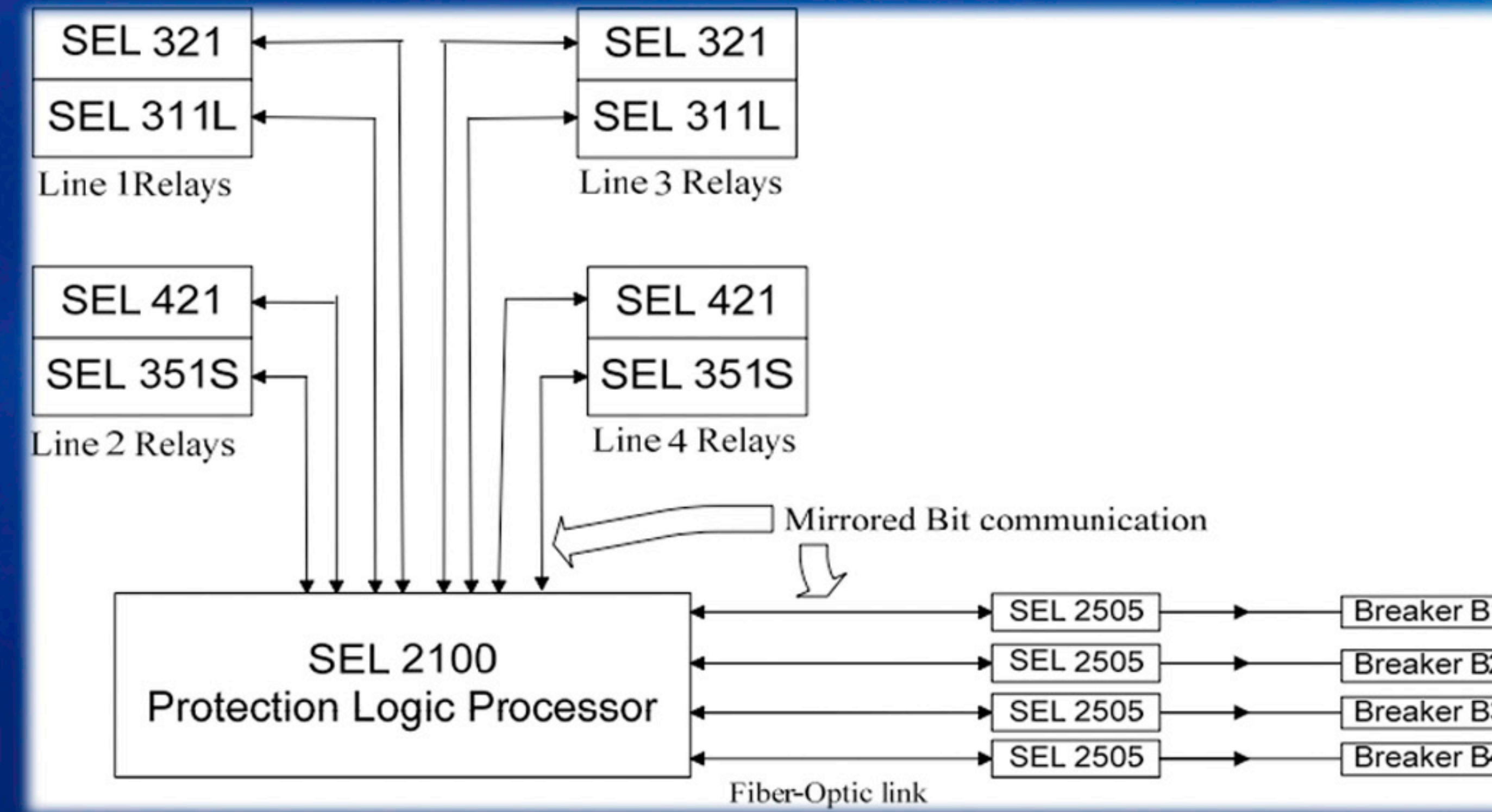
### Goals

- ✓ Design and research potential hardware options
- ✓ Mount and wire protection equipment from SEL
- ✓ Configure communications network
- ✓ Design and implement trip logic for 2440
- ✓ Configure basic relay functionality
- ✓ Documentation
- ✓ Technical presentation at Expo 2014

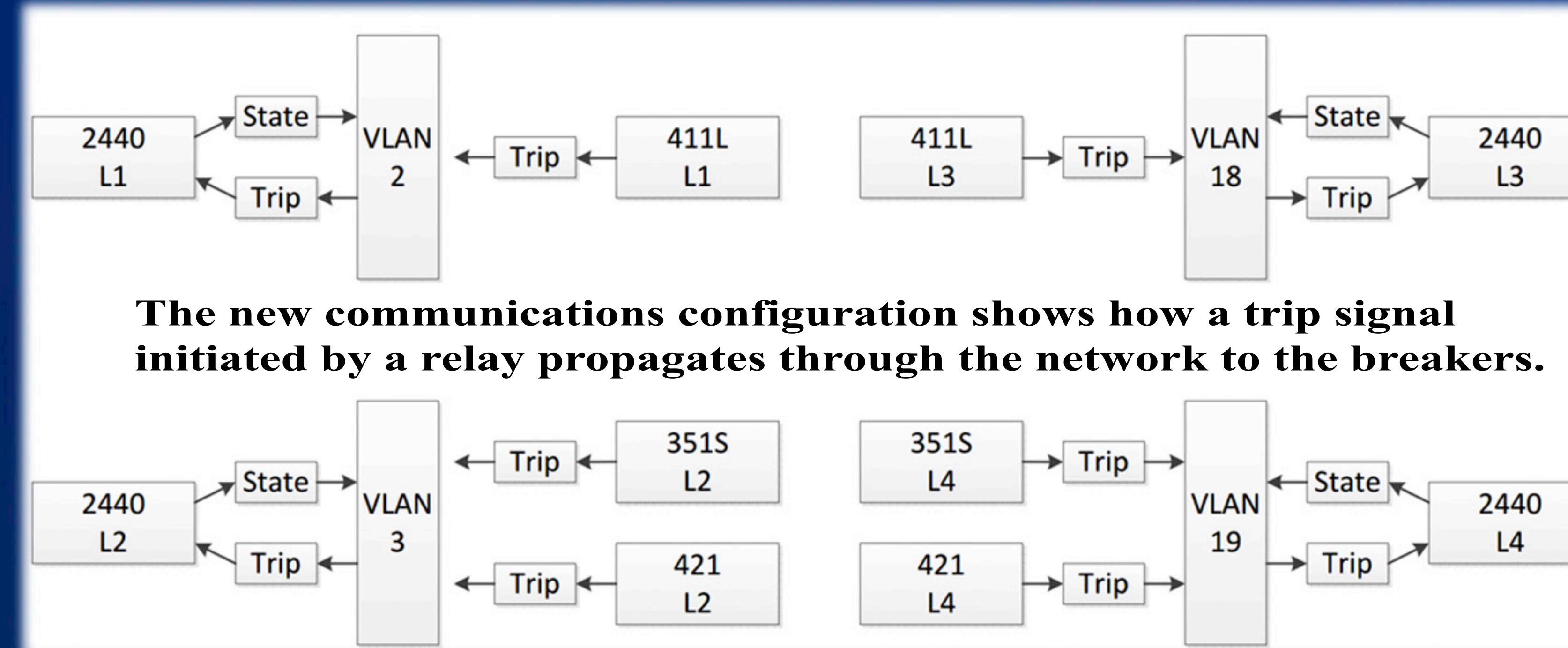
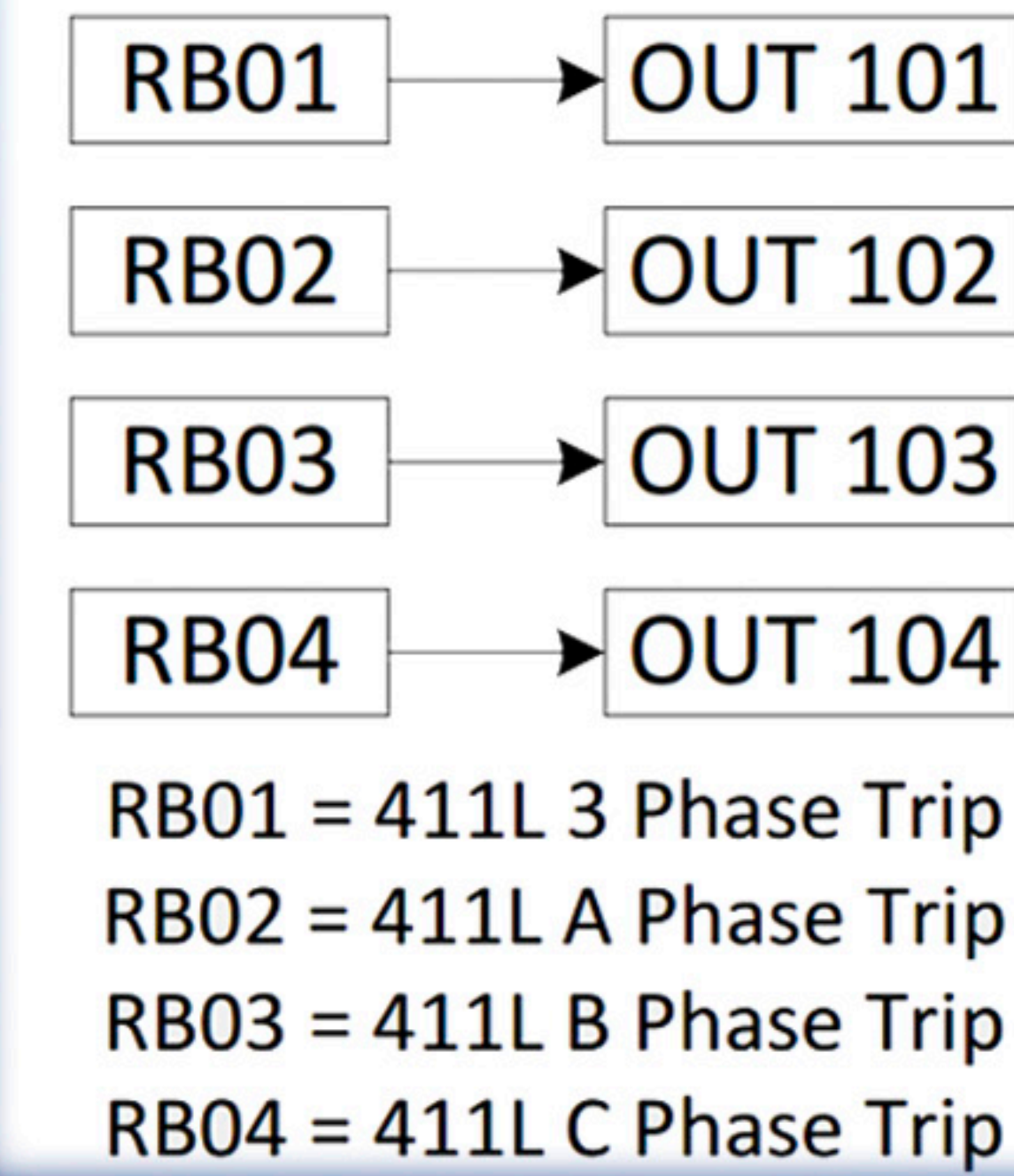


Team: Corneliu Turturica  
Fahad Alhajeri  
Garrett Stauffer  
Jorge Rios

### Old Communications Diagram

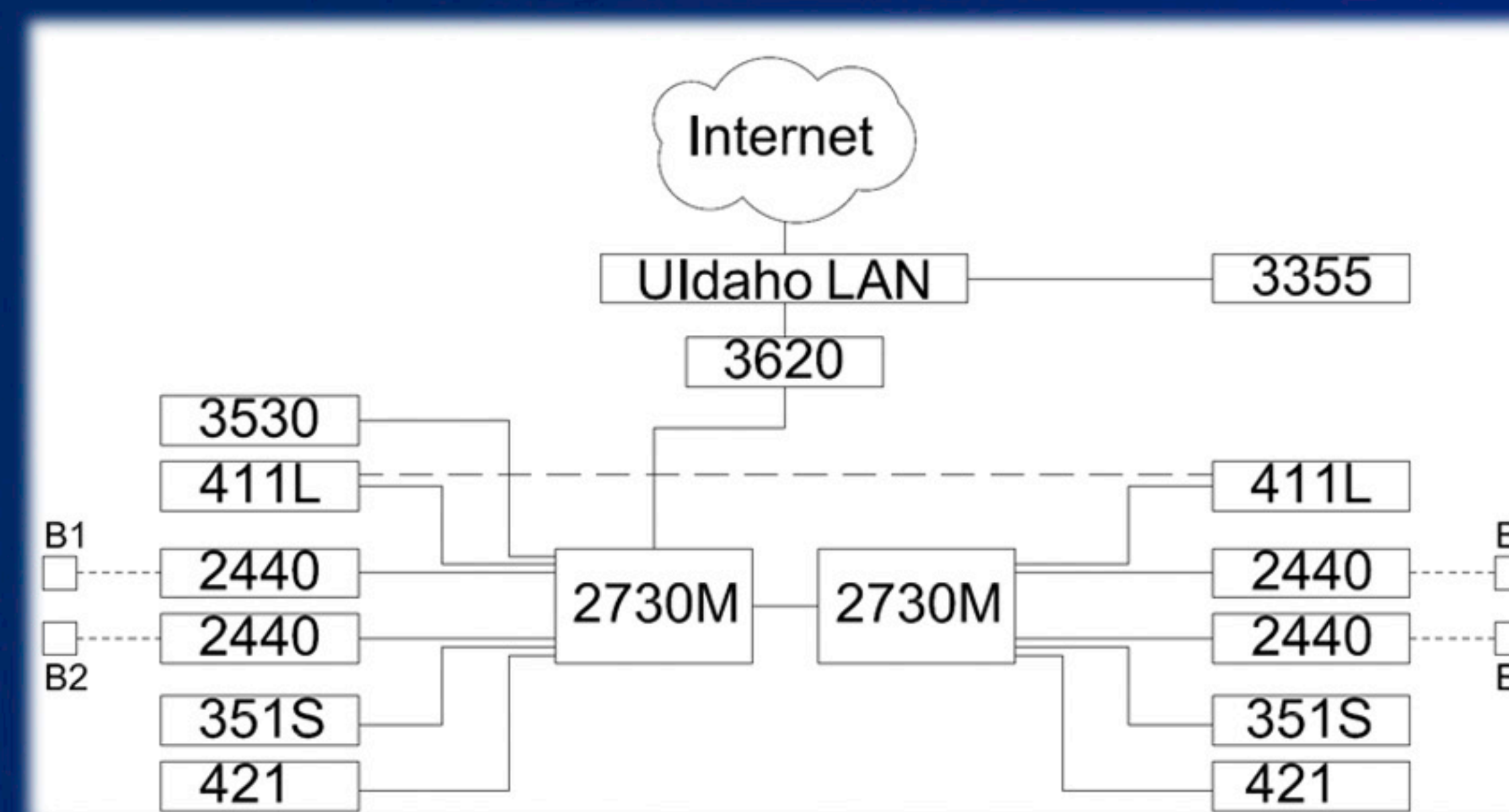


### 2440 L1 and L3



The new communications configuration shows how a trip signal initiated by a relay propagates through the network to the breakers.

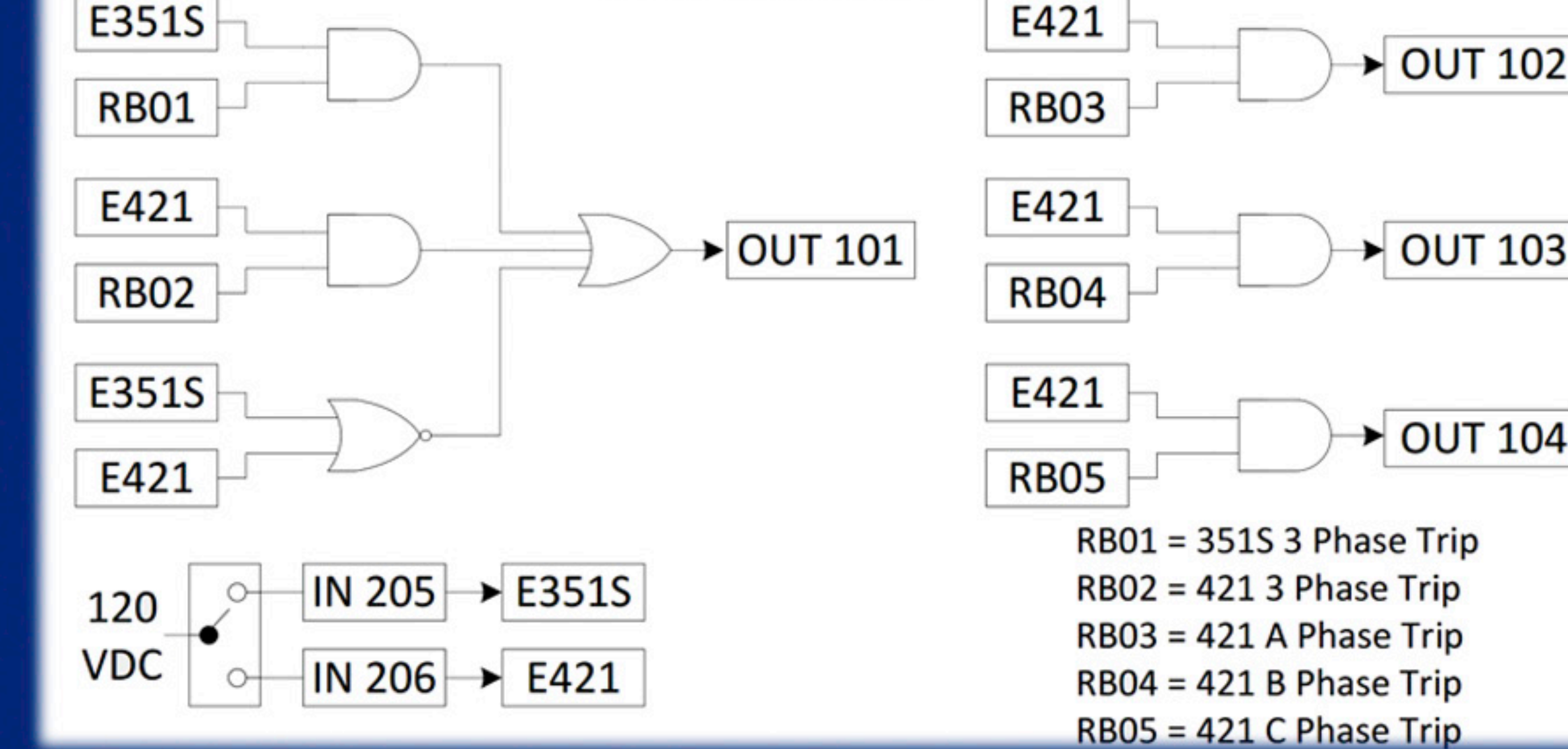
Lines 1 and 3 only have one relay. The schematic above shows the outputs on the 2440's that will trip phase A, phase B, phase C, and all 3 phases.



### New Relay Configuration

The 351S's and 421's on the lower line are now new ethernet and IEC 61850 compatible relays. The old ones used serial communication.

### 2440 L2 and L4



RB01 = 351S 3 Phase Trip  
RB02 = 421 3 Phase Trip  
RB03 = 421 A Phase Trip  
RB04 = 421 B Phase Trip  
RB05 = 421 C Phase Trip

This trip logic is implemented in the 2440's for lines 2 and 4. These lines have the option to use the 351S's or the 421's. We used a mechanical selector switch to switch between relay pairs.