

2016

Fluid Routing System: Industrial Automation and Simulation

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Sponsor: Newport News Shipbuilding

Sponsor Mentors: Wayne Cribb, Paul Summa, Andrew Limbaugh, Walter Rose

ELECTRICAL AND COMPUTER



Fluid Routing System

Industrial Automation and Simulation

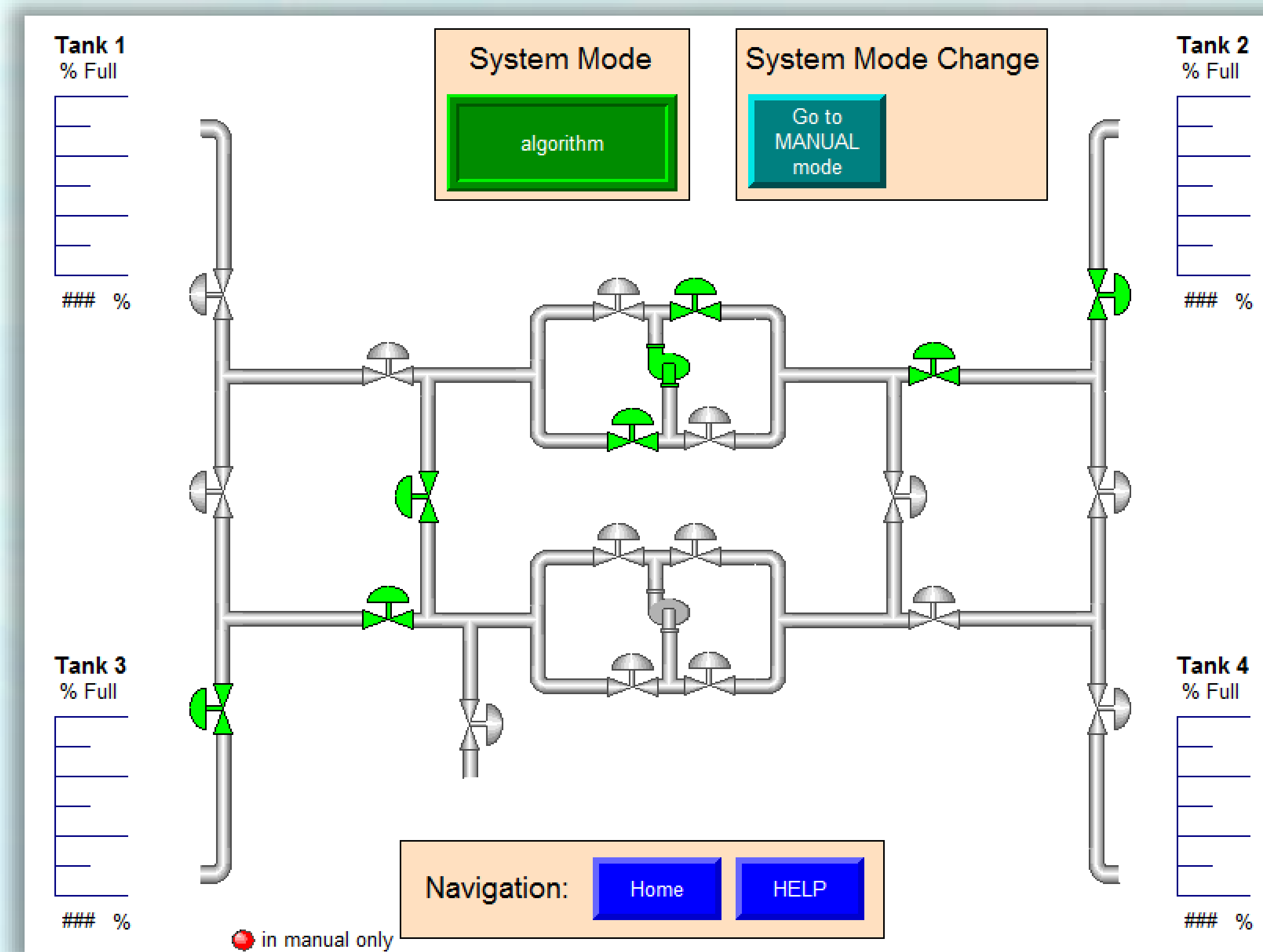
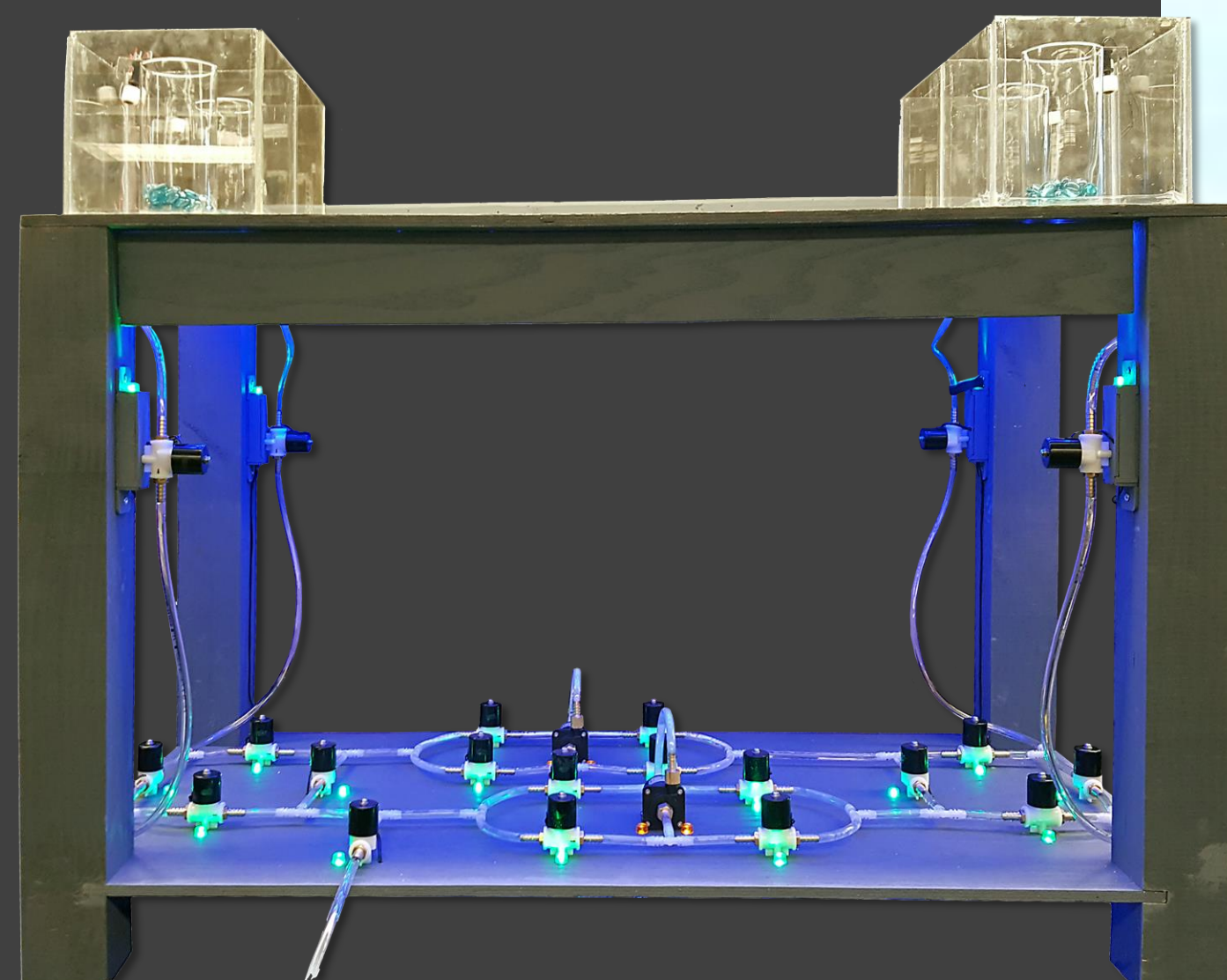
CAPSTONE DESIGN EXPO 2016

Overview

Automatic Routing of Complex Fluid Networks

Newport News Shipbuilding builds the biggest ships in the world. These ships store and deliver millions of gallons of fluids via computer-controlled networks of pipes, valves, pumps, and tanks.

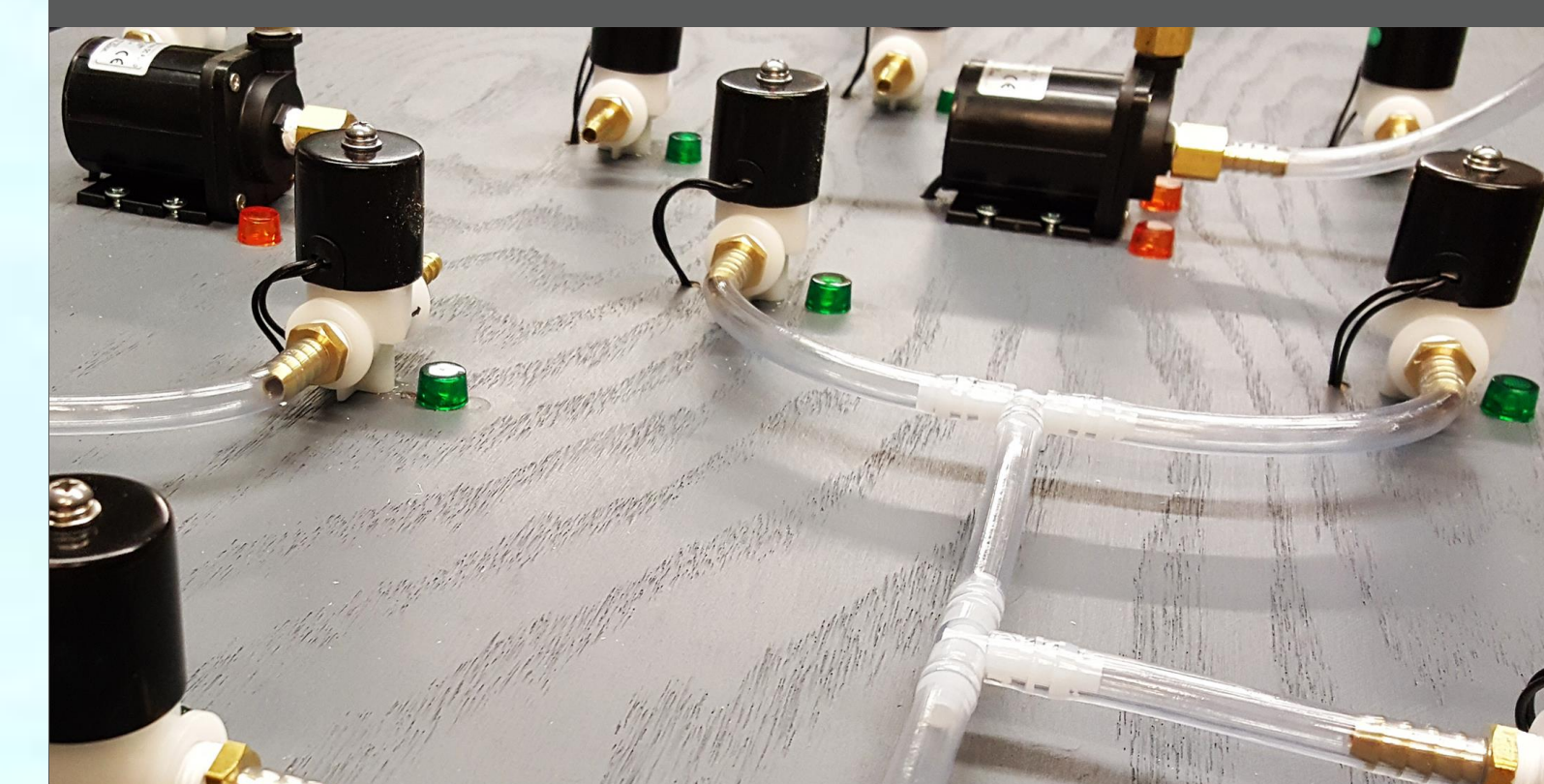
Given a need to demonstrate these systems on a small scale, we designed a fluid network that not only can show how shipboard systems work, but also how an added routing algorithm can help increase efficiency in such a network.



Areas of Effort

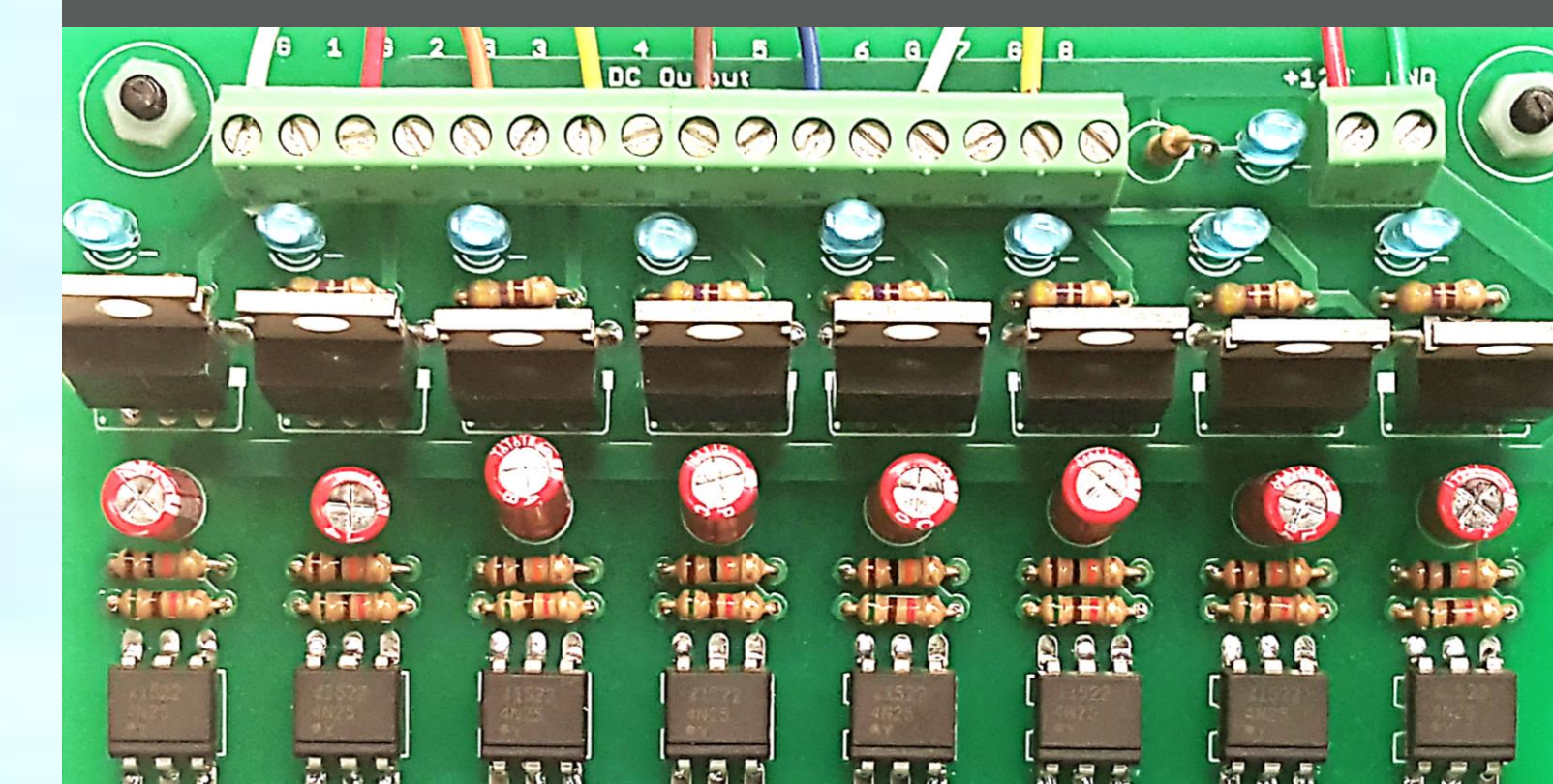
Core Task | Mandatory for Project

Build a working physical model of a fluid network



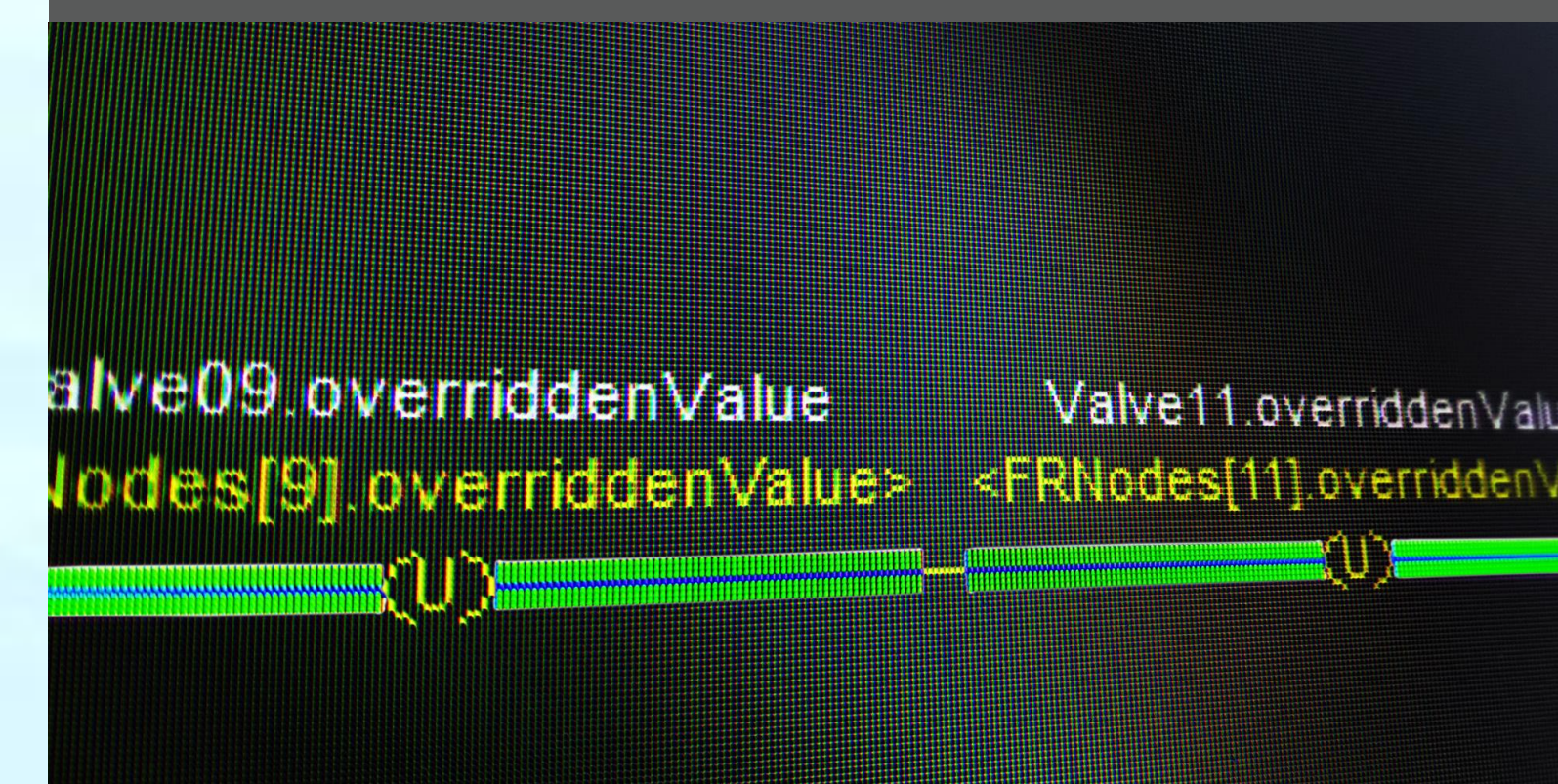
Core Task | Mandatory for Project

Develop electrical interfaces to connect the model to a PLC



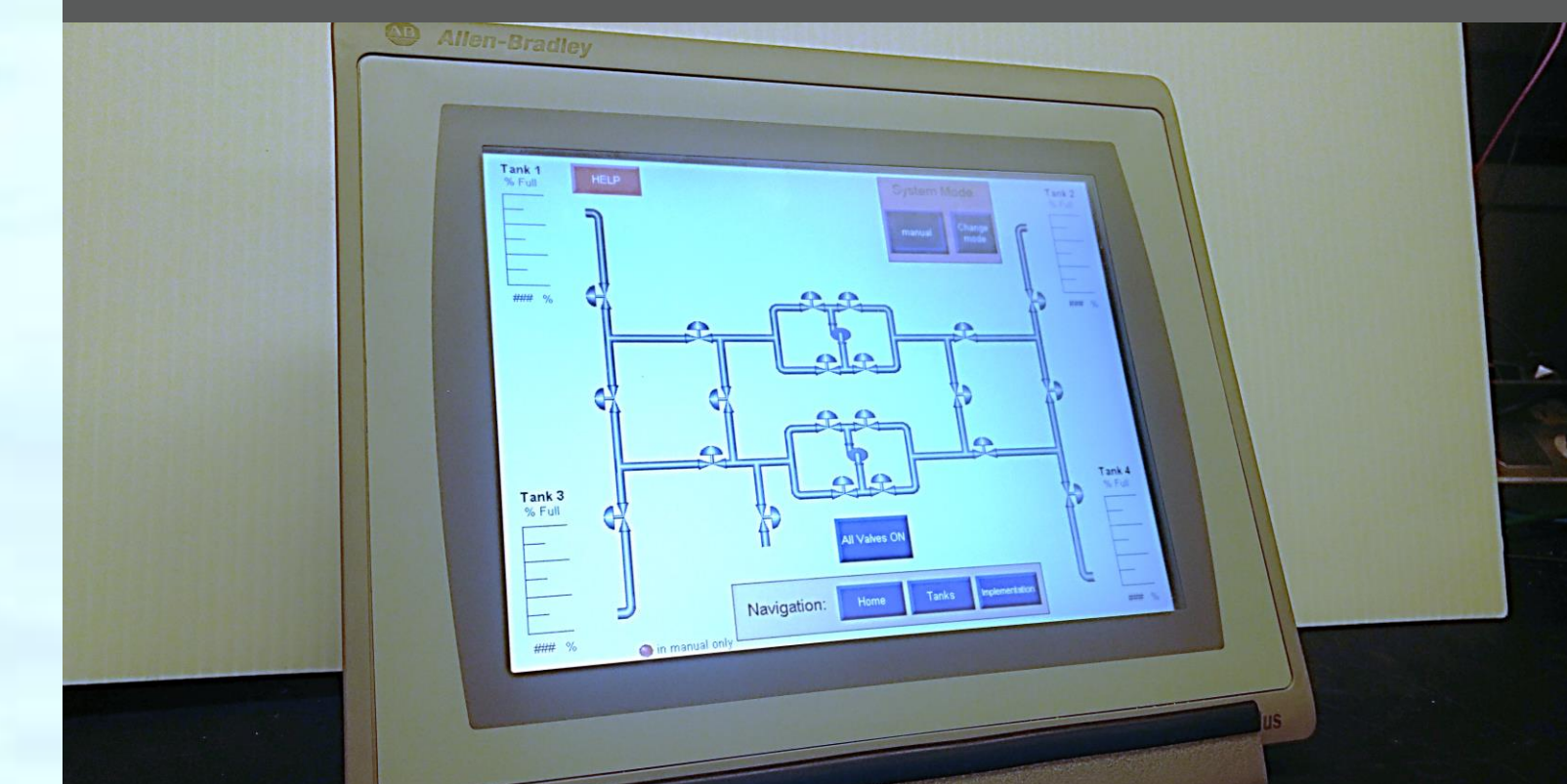
Core Task | Mandatory for Project

Write PLC code to control the system

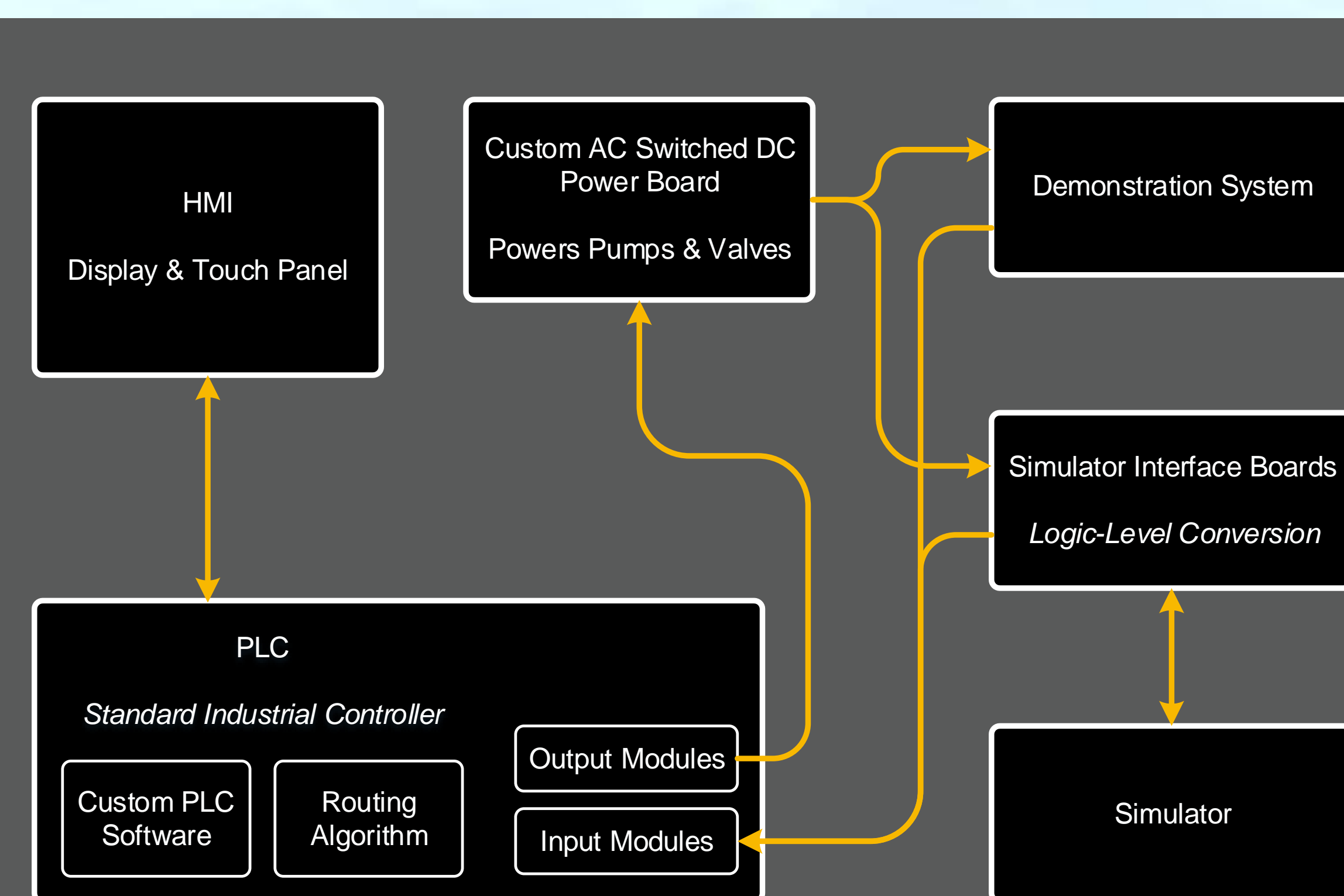


Core Task | Mandatory for Project

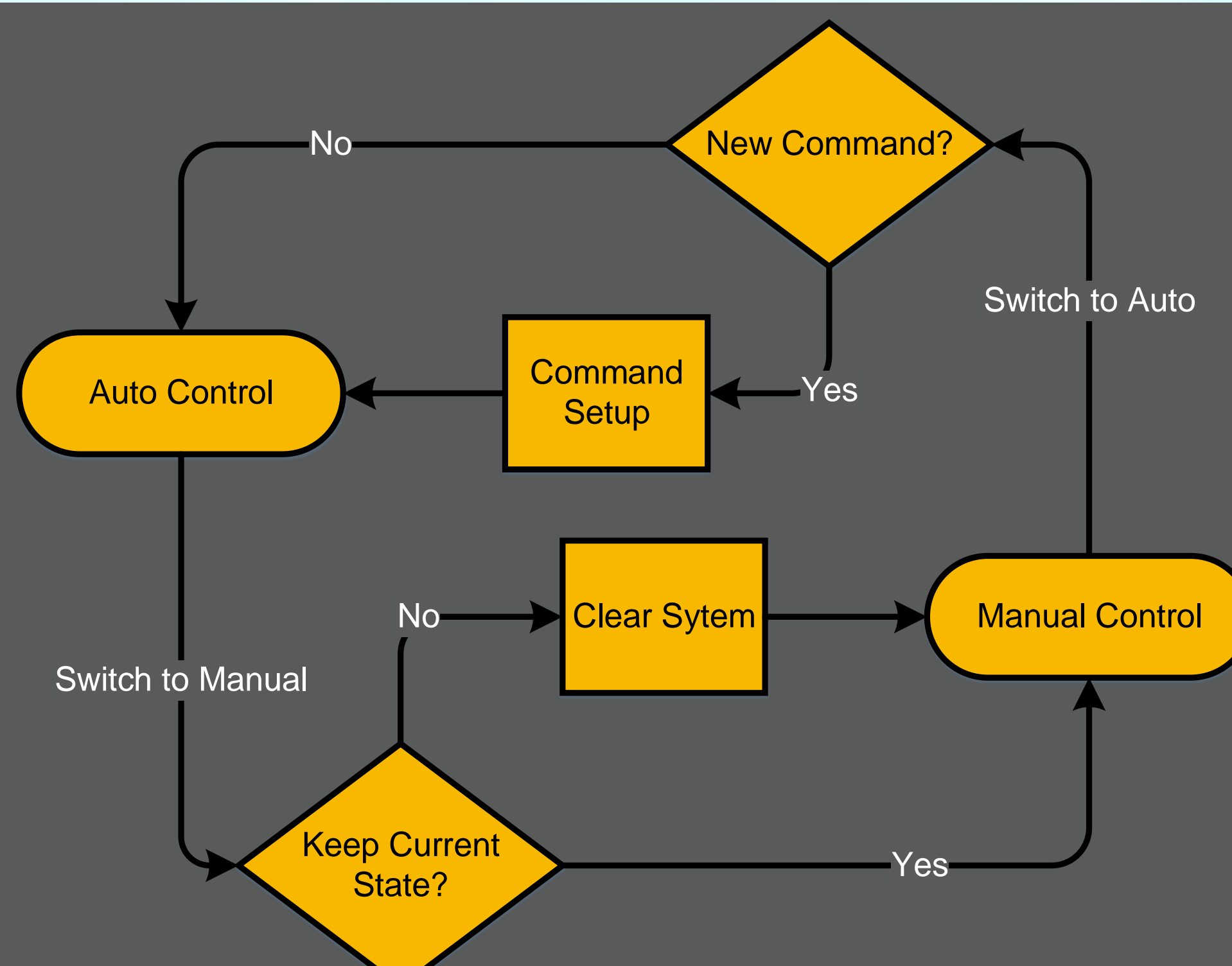
Develop a remote operator display



System Diagrams



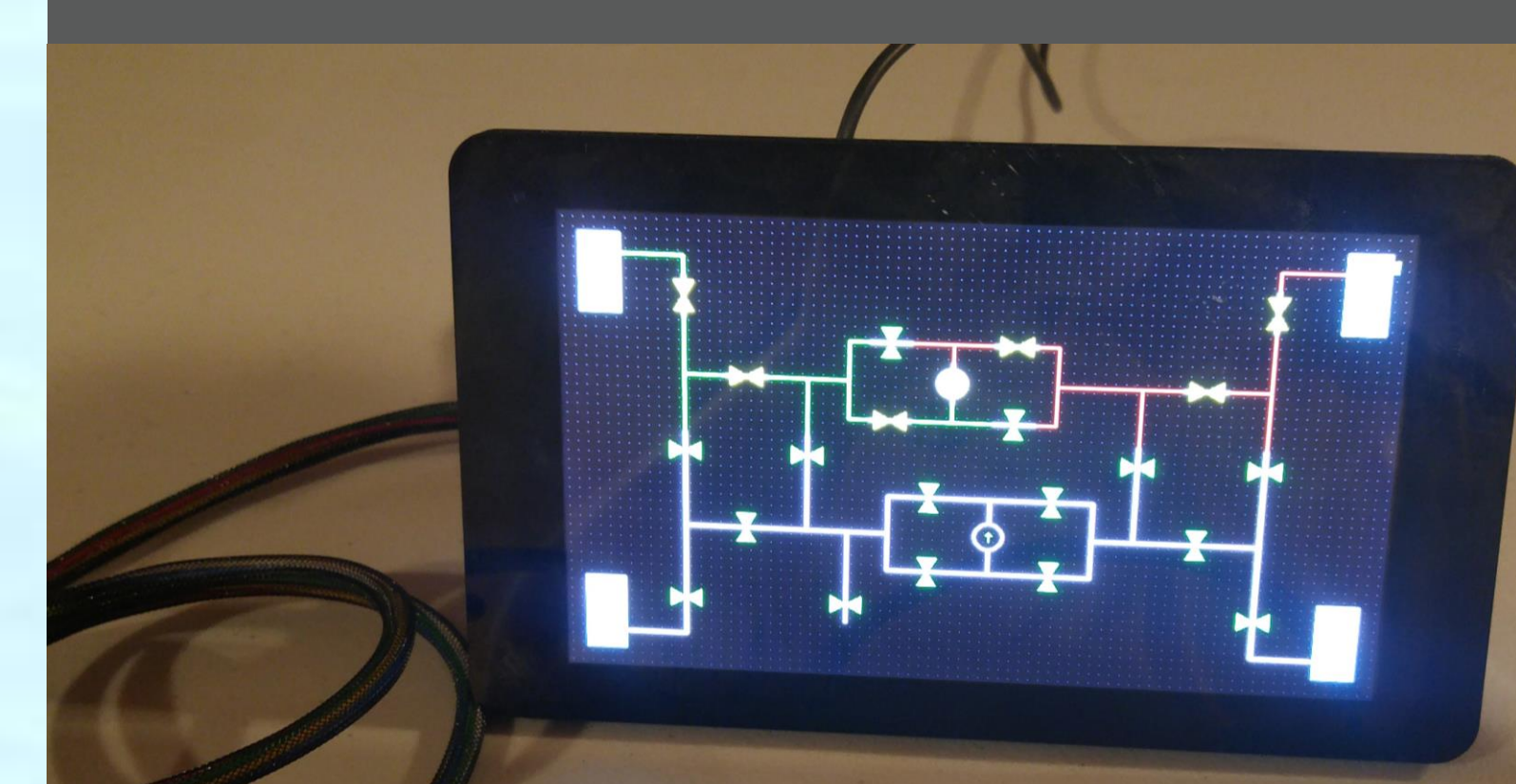
Hardware Connections



Operational Workflow

Student-Driven Task | Extra Tasks from Student Interests

Simulate the hardware layer



Student-Driven Task | Extra Tasks from Student Interests

Develop an automatic route decision-making module

