Virtual Conveyor System Simulation - Austin Shelton

Project Overview

Modern manufacturing relies heavily on conveyor systems for efficient product movement.
However, physical testing and operator training can be expensive and risky.

This project proposes a **fully virtual conveyor system** that allows users to:

- Safely control conveyors through virtual control stations
- Monitor operations using a real-time HMI
- Simulate complex conveyor interactions
- Syrnchonize mulitple applications to achieve full system integration

Project Objectives

The virtual conveyor system will enable:

- Safe and cost-effective testing
- Real-time system monitoring
- Operator training in a simulated environment
- Integration of PLC logic, simulation, and HMI platforms

Key Features

1. PLC-Based Conveyor Control

- Develop ladder logic % structuredText using Studio 5000
- Control motors, sensors, and safety interlocks
- Ensure proper sequencing of conveyor operations

2. Virtual Control Stations

- Create virtual control stations using FactoryTalk View
- Provide start,stop, jam and speed control
- Display conveyor status in real time

3. Emergency Stop & Safety Logic

4. System Integration

- Synchronize PLC logic, Emulate3D, FactoryTalk, and Ignition
- Ensure real-time communication across platforms
- Test system reliability under different scenarios

5. Documentation & Reporting

- Maintain full project documentation
- Include PLC logic diagrams and HMI screenshots
- Prepare presentation and demo materials

Development Roadmap

The project will be completed over two main sprints:

- Sprint 1: Core system functionality
- Sprint 2: Advanced logic, safety, and full integration

Sprint 1 Deliverables

PLC Ladder Logic

- Implement basic start/stop control
- Configure motor and sensor logic
- Define I/O addresses for integration

Virtual Control Stations

- Develop FactoryTalk View interface
- Add start/stop buttons and indicators
- Test PLC connectivity

Sprint 2 Deliverables

Conveyor Sequencing

- Implement multi-line routing logic
- Test automated product flow

User Interaction Enhancements

- Enable switching between control stations
- Improve operator feedback
- Test multi-user scenarios

Full System Integration

- Synchronize PLC, Emulate3D, FactoryTalk, and Ignition
- Test end-to-end operations
- Resolve timing and communication issues

Final Phase

Testing, Documentation & Polishing

- Perform full system testing
- Fix bugs and optimize performance
- Prepare:
  - Technical documentation
  - Diagrams and screenshots
  - Final demo and presentation materials

Questions?

Thank you for your time!