Automation in Sugar Industry

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Introduction

- ✓ Worldwide sugar factories are being modernized and automated in response to the need for efficient production and the ability to compete globally.

- ✓ Continuous control and precise handling of all parameters is required to ensure consistent product quality and reduce production costs.

Automation & control layout

- LEVEL 0
  Field instruments such as temperature , pressure, level ,f low sensors and control valves.

- LEVEL 1
  Distribution boxes, terminal blocks where field termination takes place.

- LEVEL 2
  Control panels consists of power supplies, I/O Modules, controllers.

- LEVEL 3
  HMI unit, Engineering stations, operator stations

Automation Strategy

- ✓ Merits and Demerits:
  - ✓ Correct selection of automation equipment
  - ✓ Correct selection of instruments
  - ✓ Right automation partner
- ✓ Choose wisely

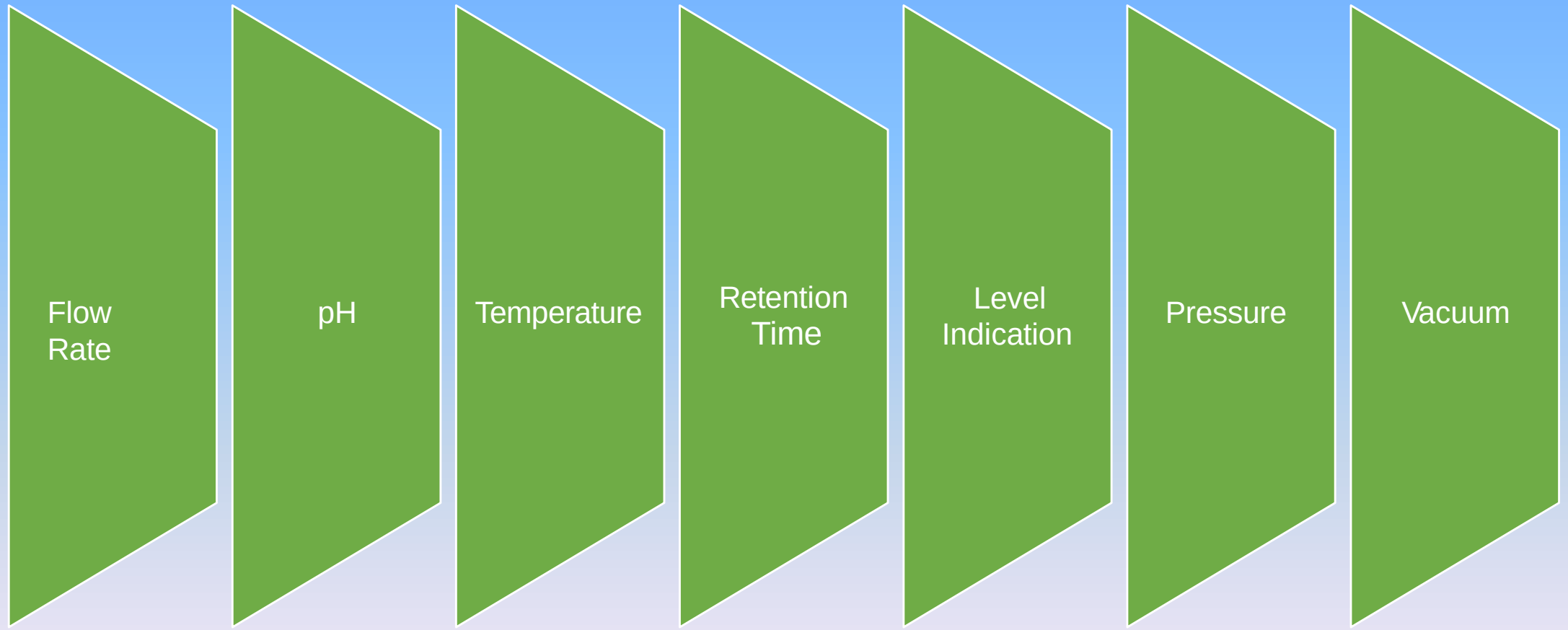
Role of Automation in Sugar Processing

Key issues:

- ✓ Perishable raw material
- ✓ Heat sensitive product
- ✓ pH sensitive product
- ✓ Flow Rate
- ✓ Fuel and Energy
- ✓ Sugar recovery and quality

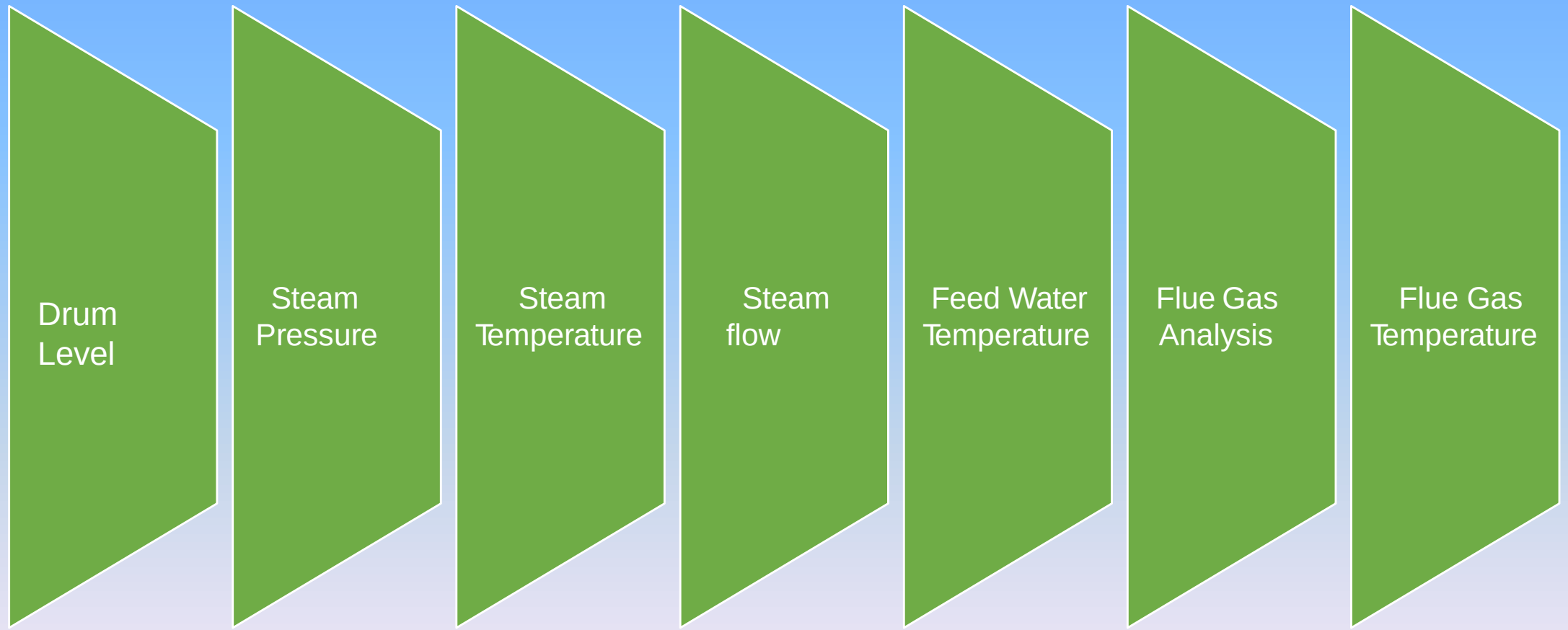
Role of Automation in Sugar Processing

- ✓ Impact of Operating Parameters on sugar recovery and quality:

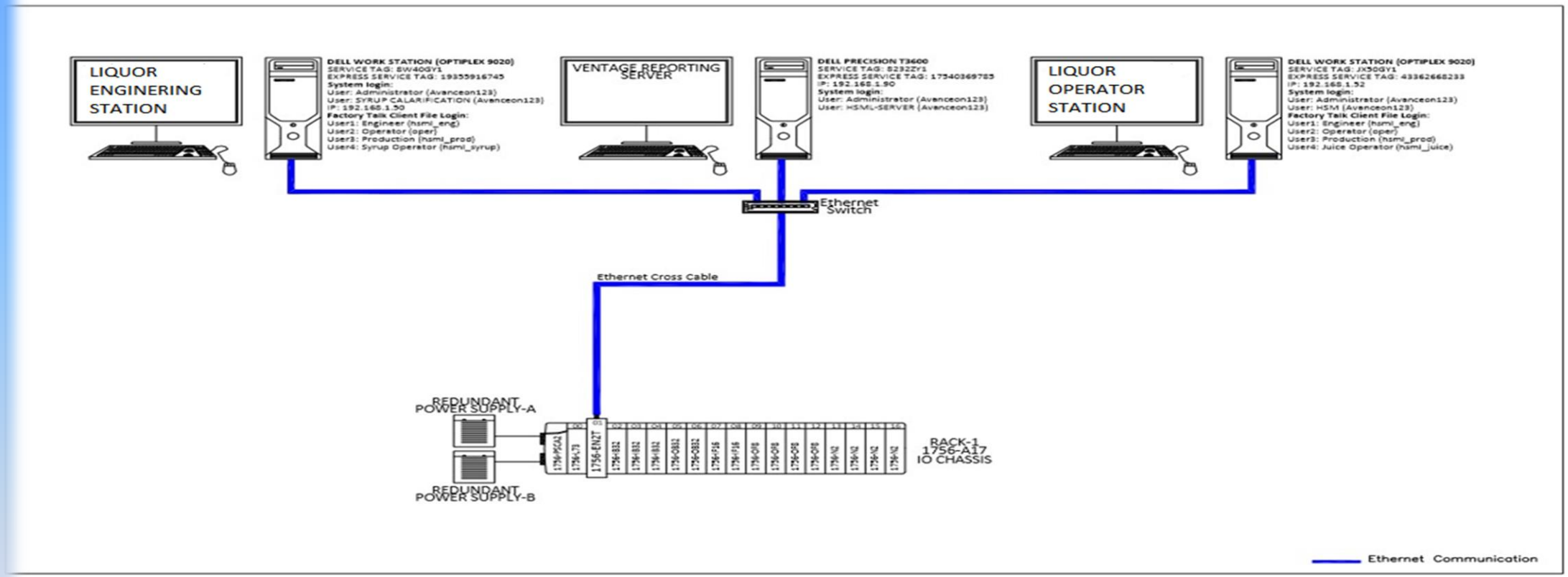


Automation for Utilities

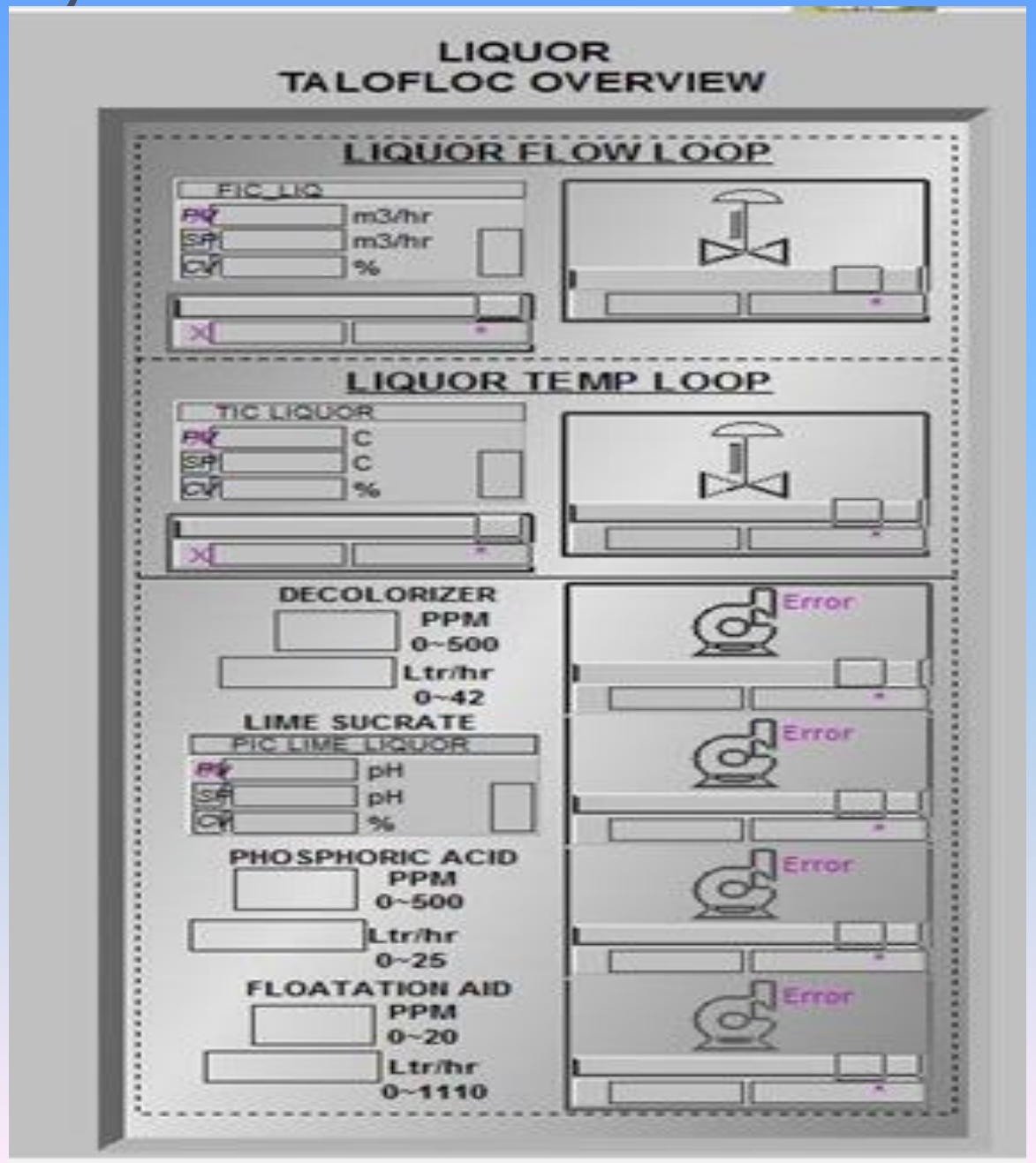
- ✓ Control of Key Parameters in Boiler Operations



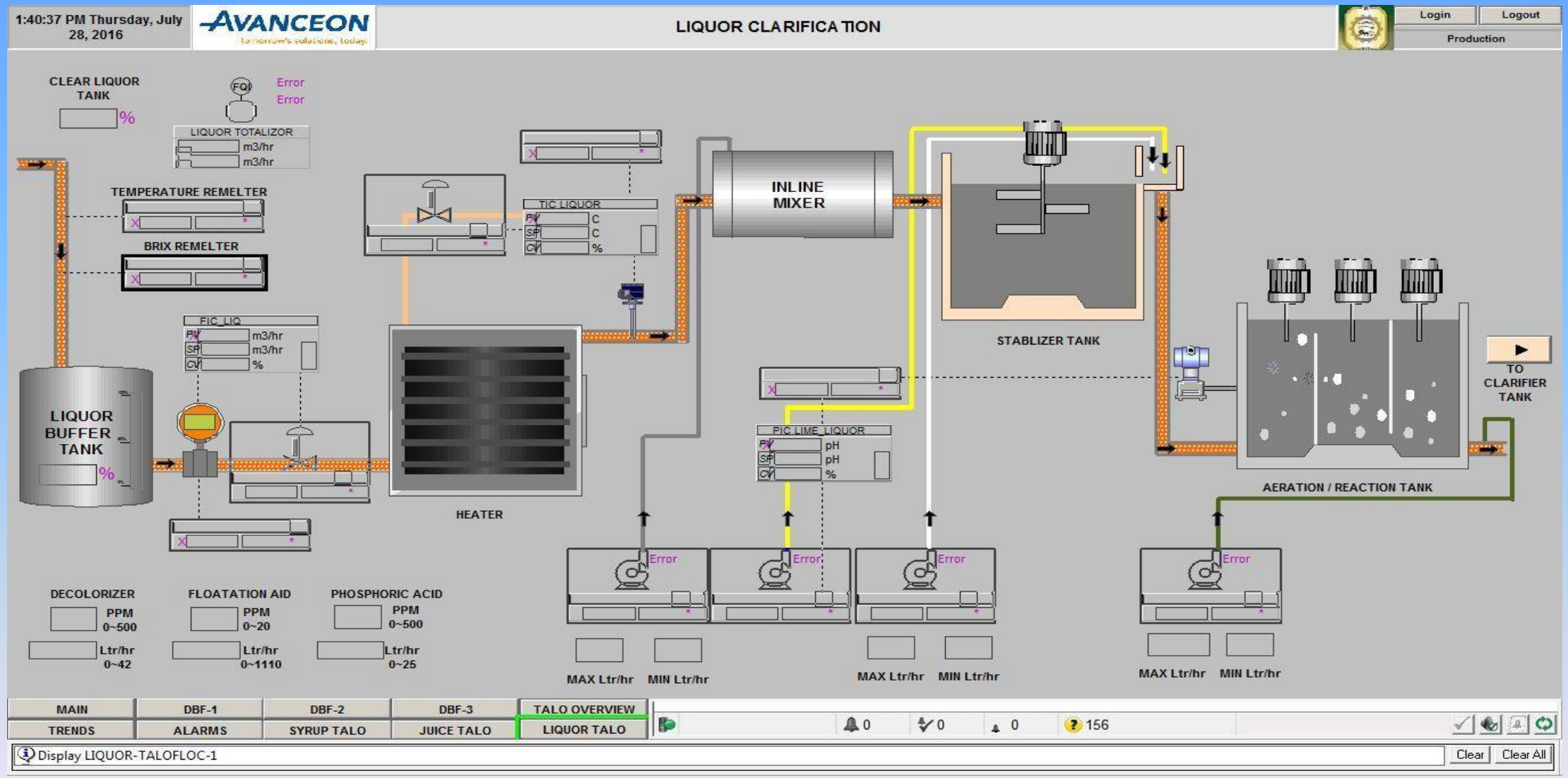
System Architecture



HMI Displays



HMI Displays



Impact of Automation

- ✓ Implementation of a need-based process control system leads to:
  - ✓ Capacity Optimization
  - ✓ Improved Plant Efficiency
  - ✓ Reduced Energy Cost
  - ✓ Improved Product Quality
  - ✓ Reduced Production Cost
  - ✓ Reduced Maintenance Cost
  - ✓ Reduced Down Time
  - ✓ Man-Power Savings

Falling Film Evaporators Automation

- Falling film evaporator is the modified form of conventional evaporator, FFE s long tubes are much suitable for low temperatures..Uniform distribution of juice in the tubes is the key factor for its efficiency..Juice flows down with the tube's wall as a thin film in the direction of gravity, finer and faster moving film results high heat transfere coefficient.
- For safe and reliable operation of FFEs we need to automate the process ,which includes
  - Juice Flow
  - Juice Level
  - Emergency Hot Water
  - Vapor pressure
  - Exhaust steam temperature
  - Condensate tank level
  - Juice transfere tank level

Falling Film / Conventional Evaporators Automation

- ✓ Better control of these parameters affects sugar recovery and quality.
- ✓ The way an evaporator plant works has a crucial impact on heat economy of the sugar factory.

Continuous Pan Automation

- ✓ Efficient crystal growth requires accurate monitoring and control of all parameters in each compartment of the continuous vacuum pan through automation.
- ✓ Each compartment of the continuous vacuum pan is controlled through individual set points in order to establish the required Brix .
- ✓ Grain flow control
- ✓ Brix control
- ✓ Brix sensors auto wash
- ✓ Temperature control
- ✓ Vaccum control

Phosphatation Process Automation

- Monitoring and control of:
  - Liquor Flow Rate
  - Liquor Brix
  - Liquor Heating
  - Process Chemical Dosing
  - pH Control
  - Level Control
  - Retention Time
- Continuous and precise monitoring and control of all the parameters is required to ensure consistent product quality and sugar losses.

Skills and Training

- ✓ Present day process control systems are interactive

- ✓ It is imperative that Automation Solution Providers also facilitate the training and guidance for Sugar Mill operators, through:
  - ✓ Training Modules
  - ✓ Operational Support
  - ✓ Operational Manuals

Conclusions

- To achieve cost reduction in the shortesttime
- Return on Investment can be phenomenal and quick
- Move towards becoming internationally competitive

Question & Answers

Thank You for Your Valuable Time