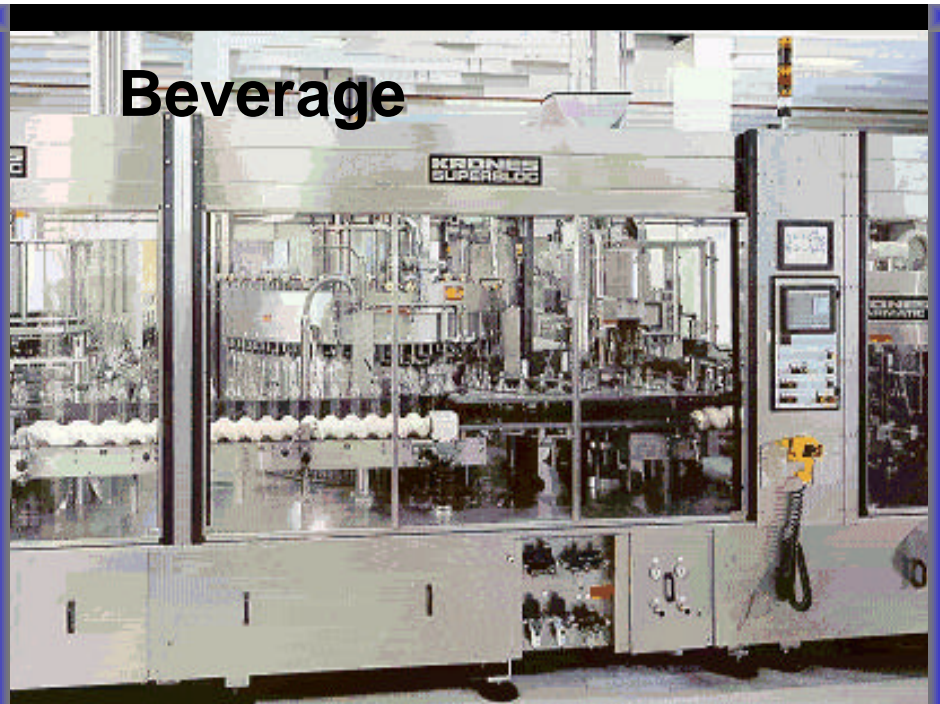# Ethernet - The Last Mile
for Industrials

Automotive Assembly

Beverage

Paper & Wood Products

Primary Chemical

Automotive Assembly

ProfibusDP
DeviceNet
Interbus
ControlNet

Sensoplex	Seriplex
Modbus+	ET-200
ET-100	S908
Remote I/O	DataHighway

Beverage

DeviceNet
ProfibusDP
Foundation Fieldbus
AS-interface
HART

ET-100	RemoteI/O
DataHighway	Modbus

Paper & Wood Products

HART
Foundation Fieldbus
AS-interface
ProfibusDP
Modbus

ProfibusDP	RemoteI/O
DataHighway	DE

Primary Chemical

HART
Foundation Fieldbus
AS-interface
ProfibusPA
Modbus

ProfibusDP	RemoteI/O
DataHighway	DE
Sensoplex	

Automotive Assembly

Automated Cell Level Control
Supervise Cell Control
Inspection
Enterprise Access
Monitoring
Maintenance

Beverage

Enterprise Access
Monitoring
Maintenance
Inspection
Resource Management

Paper & Wood Products

Supervised Cell Control
Monitoring
Maintenance
Inspection
Enterprise Access
Automated Cell Control
Resource Management

Primary Chemical

Supervised Cell Control
Monitoring
Maintenance
Inspection
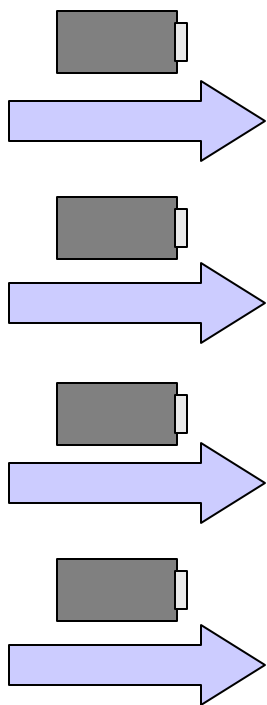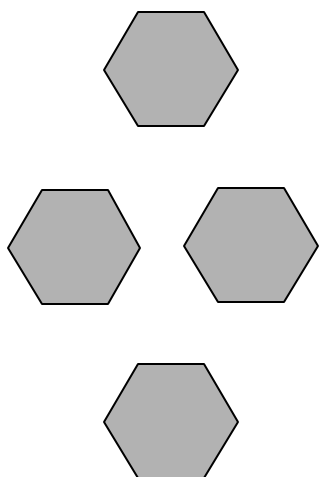**Enterprise Access**
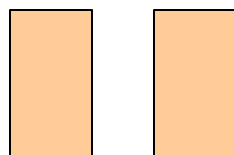**Resource Management**

Automotive Door Cell - Applications

| Automated Guide Vehicles with Vision | Material Handling Robots | Weld and Seam Robots | Inspection and Material Handling Robots | Automated Guide Vehicles with Vision |

Fixture Tables

Weld and Seam Controllers
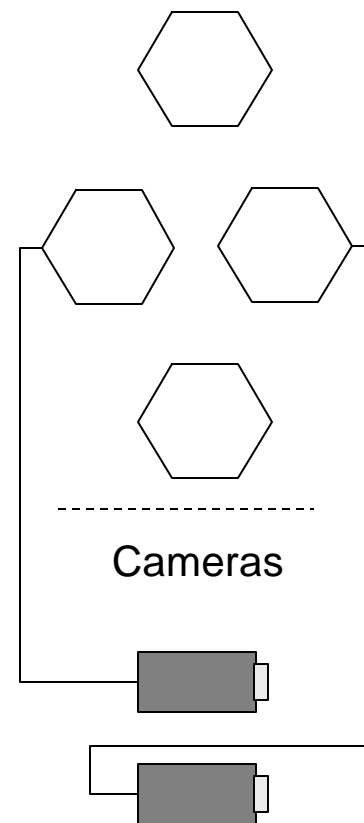
Cameras
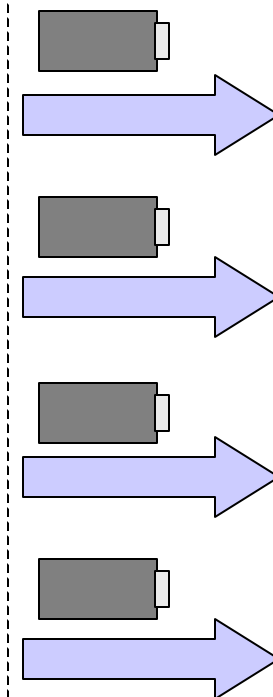
Automotive Door Cell - System Interface

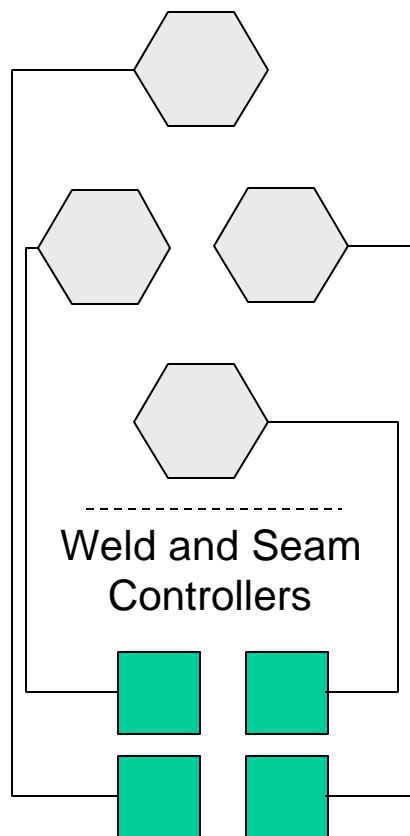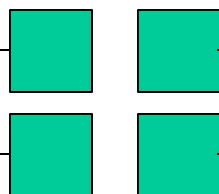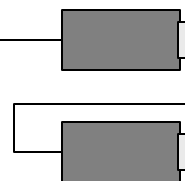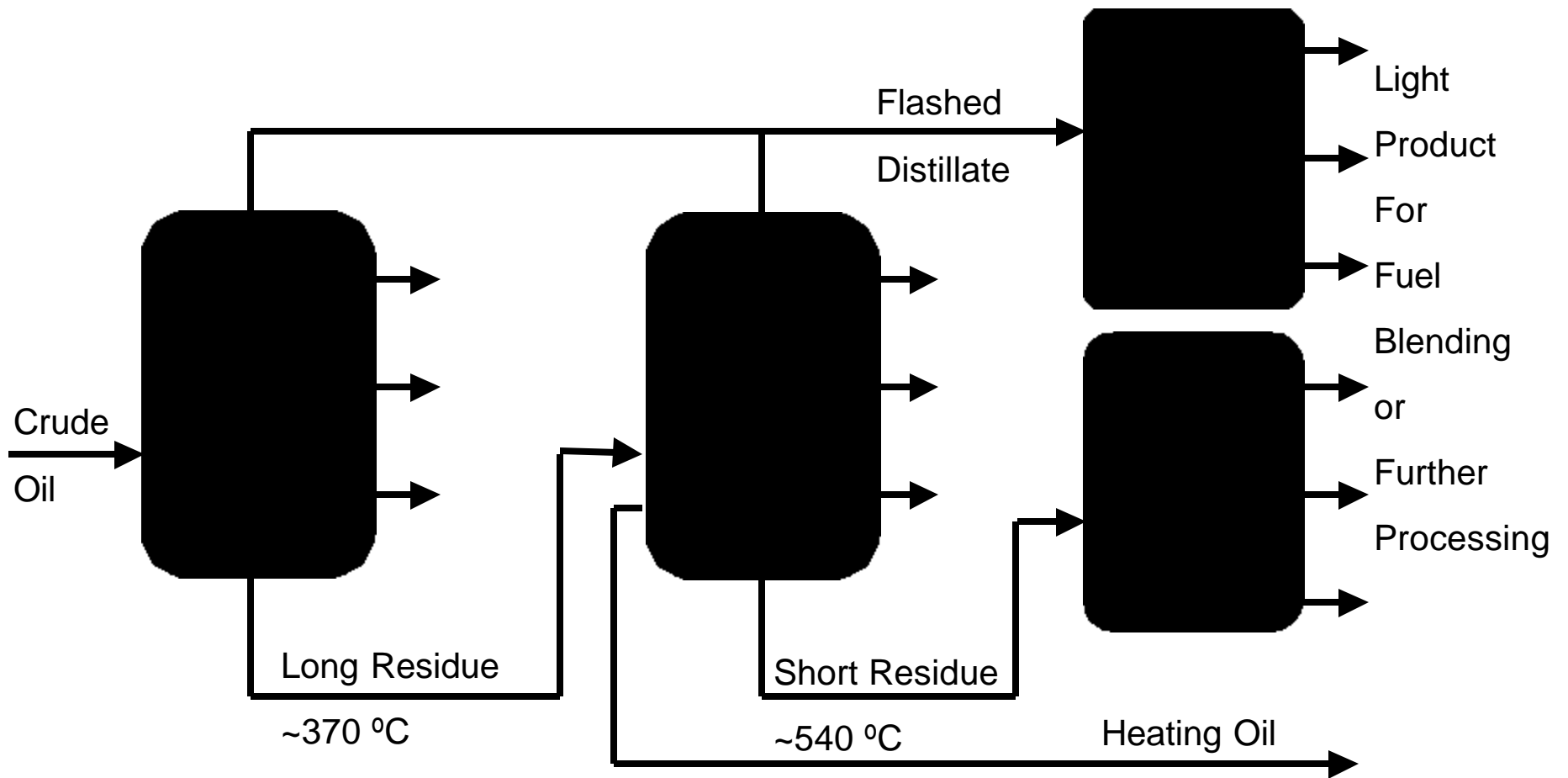| Automated Guide Vehicles with Vision	Material Handling Robots	Weld and Seam Robots	Inspection and Material Handling Robots	Automated Guide Vehicles with Vision
ERP - Stock Planning	**ERP - Planning Assembly Instructions**	**ERP - Planning Assembly Instructions**	**ERP - Planning Data Logging Stock**	**ERP - Stock Planning**
Operations Supervision Intra-cell Inter-cell	**Operations Supervision Intra-cell**	**Operations Supervision Inter-cell**	**Operations Supervision Intra-cell**	**Operations Supervision Intra-cell Inter-cell**
Maintenance Diagnostics Resource Management	**Maintenance Diagnostics Resource Management**	**Maintenance Diagnostics Resource Management**	**Maintenance Diagnostics Resource Management**	**Maintenance Diagnostics Resource Management**

bus stop®
Your fieldbus connection

interlinkBT™

Distillation, Cracking, Converting

Crude Oil

Long Residue

~370 ºC

Flashed Distillate

Short Residue

~540 ºC

Heating Oil

Light Product For Fuel Blending or Further Processing

Refining - System Interface

Incoming Crude Oil	Atmospheric Distillation	Vacuum Distillation	Residue Converter	Catalytic Cracking	Storage/ Blending
ERP - Raw Stock	**ERP -**	**ERP -**	**ERP - Depends**	**ERP - Catalyst Stock**	**ERP - Finished Stock**
Operations Supervision Intra-cell Inter-cell	**Operations Supervision Intra-cell Inter-cell**	**Operations Supervision Intra-cell Inter-cell**	**Operations Supervision Intra-cell Inter-cell**	**Operations Supervision Intra-cell Inter-cell**	**Operations Supervision Inter-cell Inter-cell**
Maintenance Diagnostics Resource-Management	**Maintenance Diagnostics Resource-Management**	**Maintenance Diagnostics Resource-Management**	**Maintenance Diagnostics Resource-Management**	**Maintenance Diagnostics Resource-Management**	**Maintenance Diagnostics Resource-Management**

What Ethernet Offers

- Better connectivity to the enterprise systems
    - Recipes and build instructions
    - Content data logging
        - Material content
        - Operator content
    - Inspection
        - Testing/sorting
        - "Go - No Go" comparisons
    - Work-in-process availability
    - Inventory and distribution

- Better transportation for large messages

- A more truly international standards because of IEEE

What Do Industrials What?

- All Temperature All Weather Ruggedness
    - Suggestions to other organization
    - Temperature & Environmental Ingress can be dovetail with ethernet to the home requirements
    - Vibration, Insertion Count, Noise - Industrials need to enhance

- Determinism
    - Full Duplex and Priority Messaging enables enough determinism for cell level control
    - If EPONs or other technology is used that makes use of Time Multiplexing
        - Fixed attendance and fixed length TDMA at phy level would enable determinism at a control level for industrials
            - Maybe this could dovetail with video delivery to the office/home

What Do Industrials What?

- Timestamp (use of a system clock or GPS clock)
    - Useful in process application to know when an action starts and rates
        - Possible suggestions to other IEEE 802 groups for recording service levels and for billing

- VLAN
    - Industrials are just starting to appreciate the value of VLANs
        - More standardization if possible
        - Won't object to more VLANs - quantity