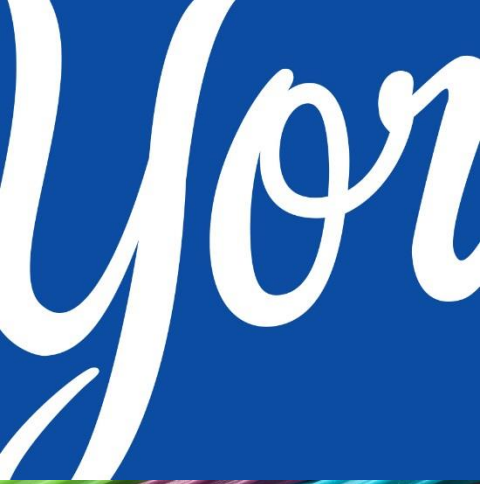


Chocolate PI

OSI Soft Regional Food & Beverage User Conference

October 23, 2014

HERSHEY
THE HERSHEY COMPANY

Hershey History

- Leading manufacturer of Candy, Gum and Mints.
- Growing presence in South/Central America, Asia and India.
- Over $7.0 billion in annual revenues - across 7,000 SKUs.
- 14,500 employees
- The company has nine plants in the United States as well as facilities in Canada, Mexico, India, Brazil, and Asia.

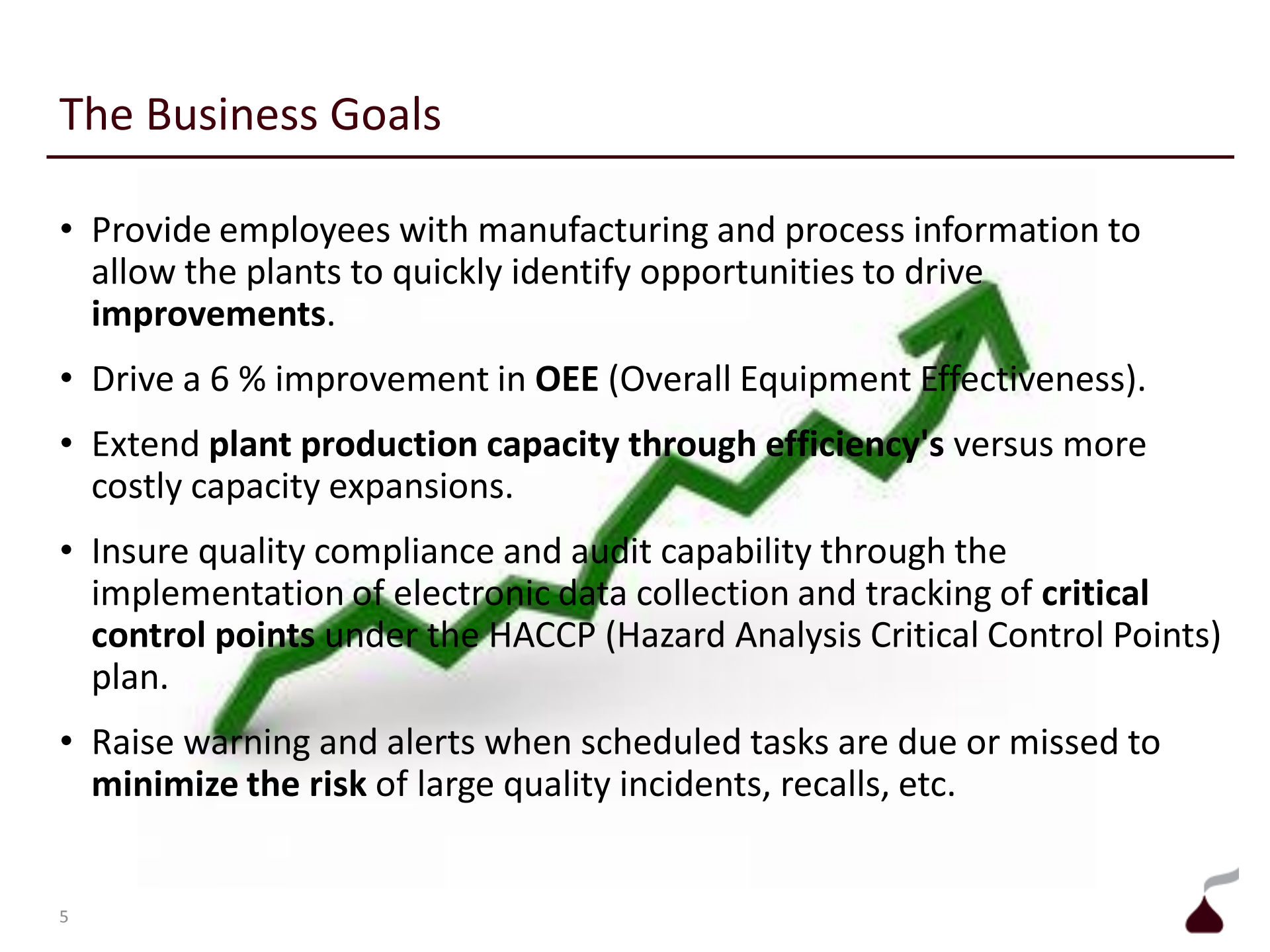
Tradition of Philanthropy- Doing Well by Doing Good

Year	Event
1894	Milton S. Hershey establishes the company.
1905	The Hershey Chocolate factory begins operations and Hershey Trust Company was established.
1909	Mr. Hershey and his wife Catherine establish a boarding school for orphan boys.
1918	After Catherine's death, Mr. Hershey transferred the bulk of his wealth into a trust fund for the school.
Today	The Milton Hershey School has grown to nearly 2,000 boarding students from pre-K through High School.

Hershey is a Leader in Supply Chain Sustainability

- Improving the lives of Cocoa farmers and their families by delivering supplemental nutrition to fight malnutrition among school children in Ghana.
- Driving responsible cocoa sustainably through *CocoaLink* and *Learn to Grow* to enable our 21st Century Cocoa Sustainability Strategy (100 percent sustainable cocoa by 2020);
- Committed to sourcing 100 percent traceable palm oil by 2015
- Protecting the environment and reducing cost through focused energy conservation, zero waste to landfill and recycling earning recognitions such as the Dow Jones Sustainability Index.

The Business Goals



- Provide employees with manufacturing and process information to allow the plants to quickly identify opportunities to drive **improvements**.
- Drive a 6 % improvement in **OEE** (Overall Equipment Effectiveness).
- Extend **plant production capacity through efficiency's** versus more costly capacity expansions.
- Insure quality compliance and audit capability through the implementation of electronic data collection and tracking of **critical control points** under the HACCP (Hazard Analysis Critical Control Points) plan.
- Raise warning and alerts when scheduled tasks are due or missed to **minimize the risk** of large quality incidents, recalls, etc.

Delivering a Flexible Platform
AIM-Accessible Information for Manufacturing

- Hershey's AIM platform is a key component of Hersheys ongoing pursuit to create a "continuous improvement" culture. Hershey's AIM platform is helping to enable the cultural shift.
- AIM provides a rich, interactive UI that engages the operators in the active monitoring and maintenance of their process and equipment performance.
- Leverage the OSI PI System for real time plant data acquisition, storage, aggregation and retrieval. Provide engineering and maintenance with detailed process and machine downtime data.
- Utilizes SAP's MII shop floor platform to collect, aggregate and deliver required performance metrics.
- Deploys SAP's Business Objects reporting platform for Executive Level Dashboards.

Defining Key Manufacturing Metrics

OEE

Quality

Schedule **Labor**

Efficiency **Notes**

Waste	**Rework**	**Overweight**	**Composition**
Downtime	**Line Speed**	**Case count**	**Pounds**

Defining Application Components

Manufacturing Reporting

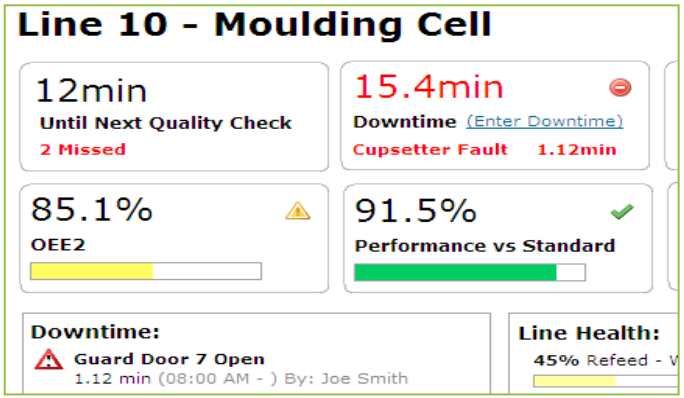
Quality Checking

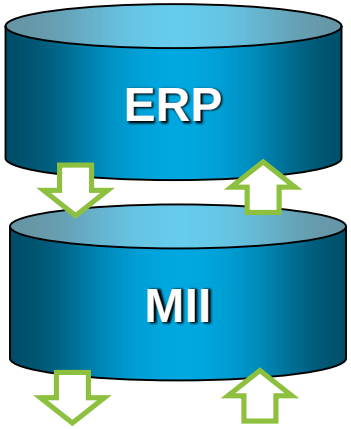
Maintenance CIL

Alerts, Escalation

Mobile Dashboards

Scoreboards





Automated Data Collection

OSIsoft.

Role Based Dashboards

- Operators
- Supervisors
- Quality Assurance
- Maintenance
- CI Managers
- Plant Manager
- Executives

Operational Analytics

- Plant Level, Line, Shift
- Period of time
- Trends, comparison

KPI Reporting –

Downtime
- Maintenance Waste/Rework
- Labor
- Mean Time Between Failure

Non-Productive time
Line speed
Overweight
Batch
Schedule conformance
Quality Notes
Ingredient Composition

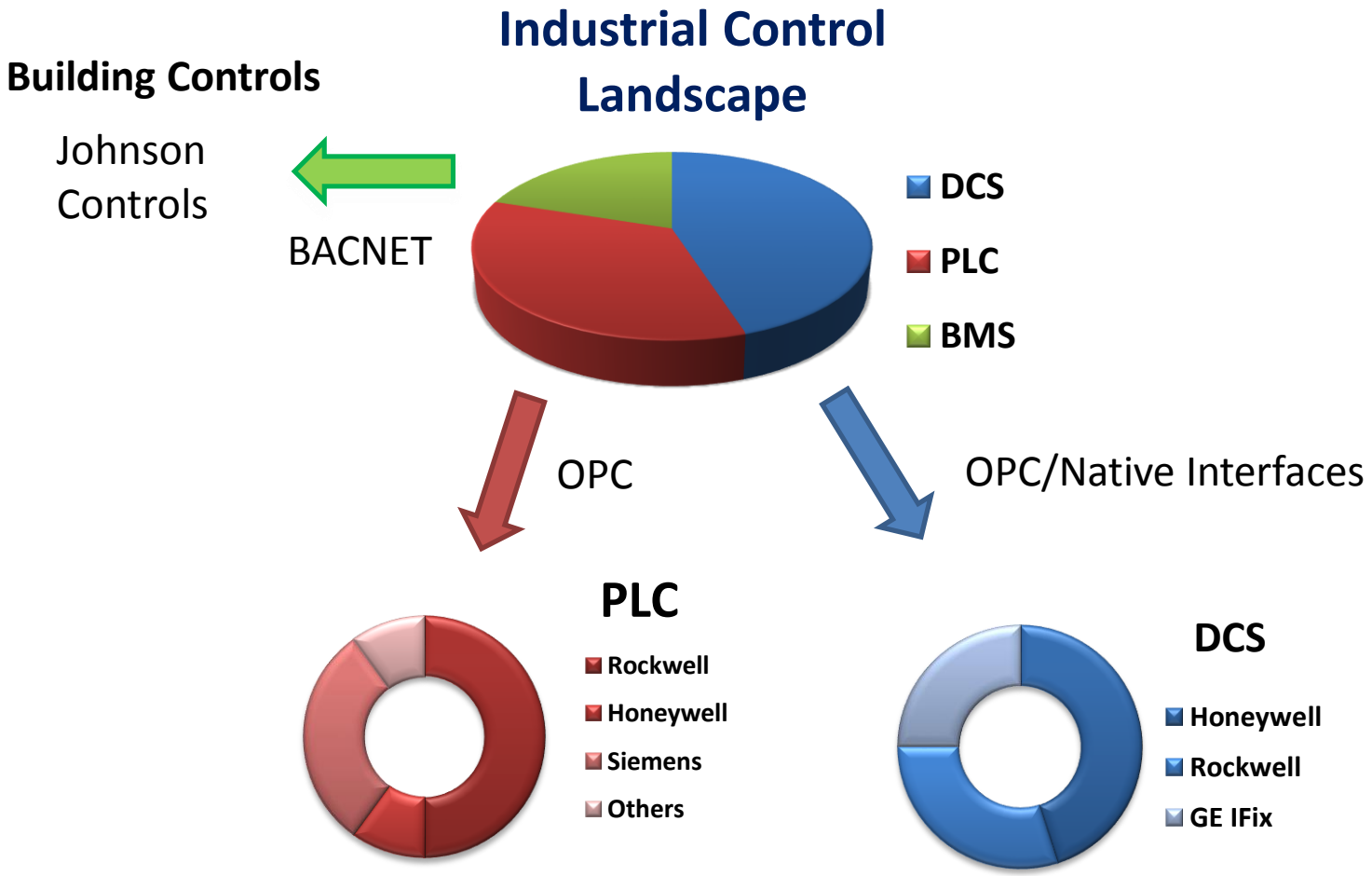
Defining the Target Audience

Stakeholder	Time	Scope	Focus
Global Ops Staff	Month	All Plants	Reported results
VP, Mfg VP, CI	Weekly	Plant to Plant	Predicting results
Plant Manager	Daily	Plant, Lines	Managing results
CI Manager, CI Engineer	Time span	Lines	Analyzing results and trends
Supervisor	Shift	My Line	Impacting results
Line Operator	Hour	My cell	Impacting my cell
Engineer, Plant Technician	Time span	Sensor level	Trouble-shooting

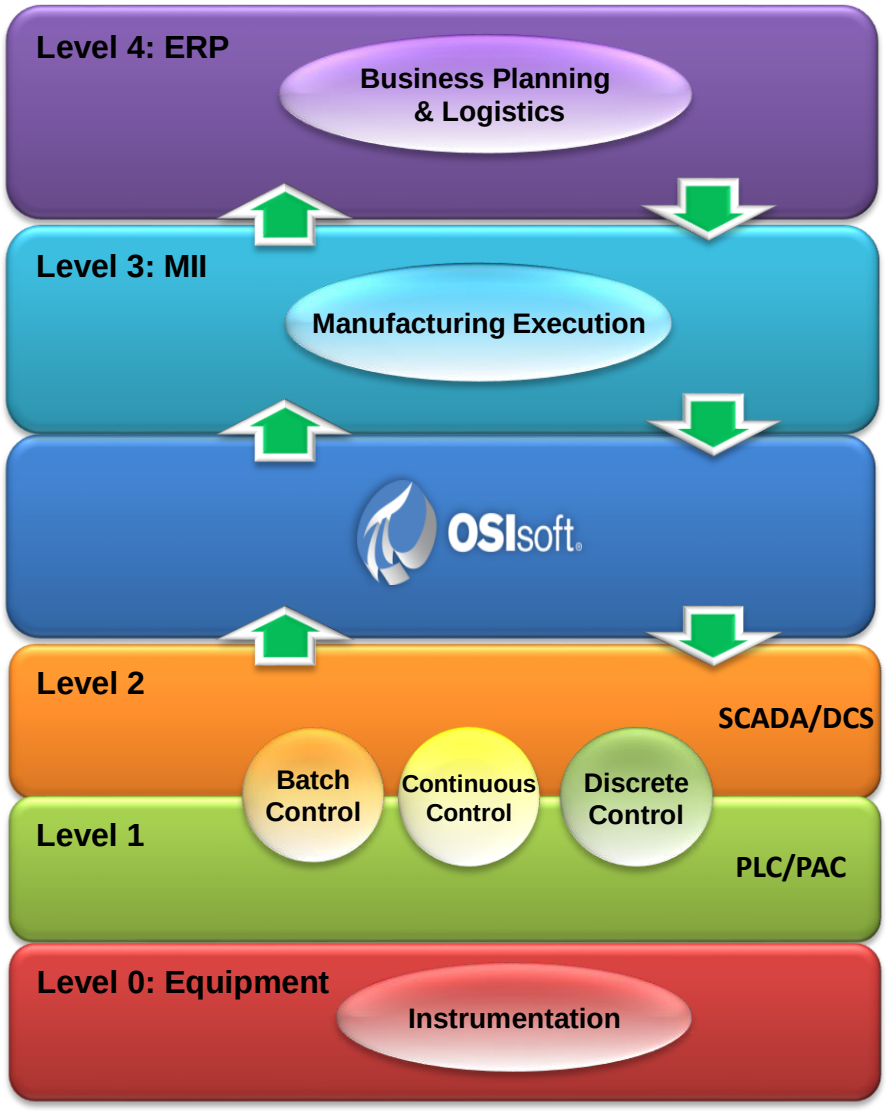
Overcoming Integration Challenges

Disparate systems	• Plants and equipment have been acquired independently, over time.
Product, Process and Equipment variability	• Large variety of products, processes, plants, equipment and automation.
Multiple user and system targets	• Diverse worker skill levels. • Multiple systems, platforms and business information requirements.
Industrial Control Security	• Need to provide controls data integration while still providing tight industrial control security. • Increasing external threats.

Disparate ICS Systems Challenge



Disparate Systems -Solution



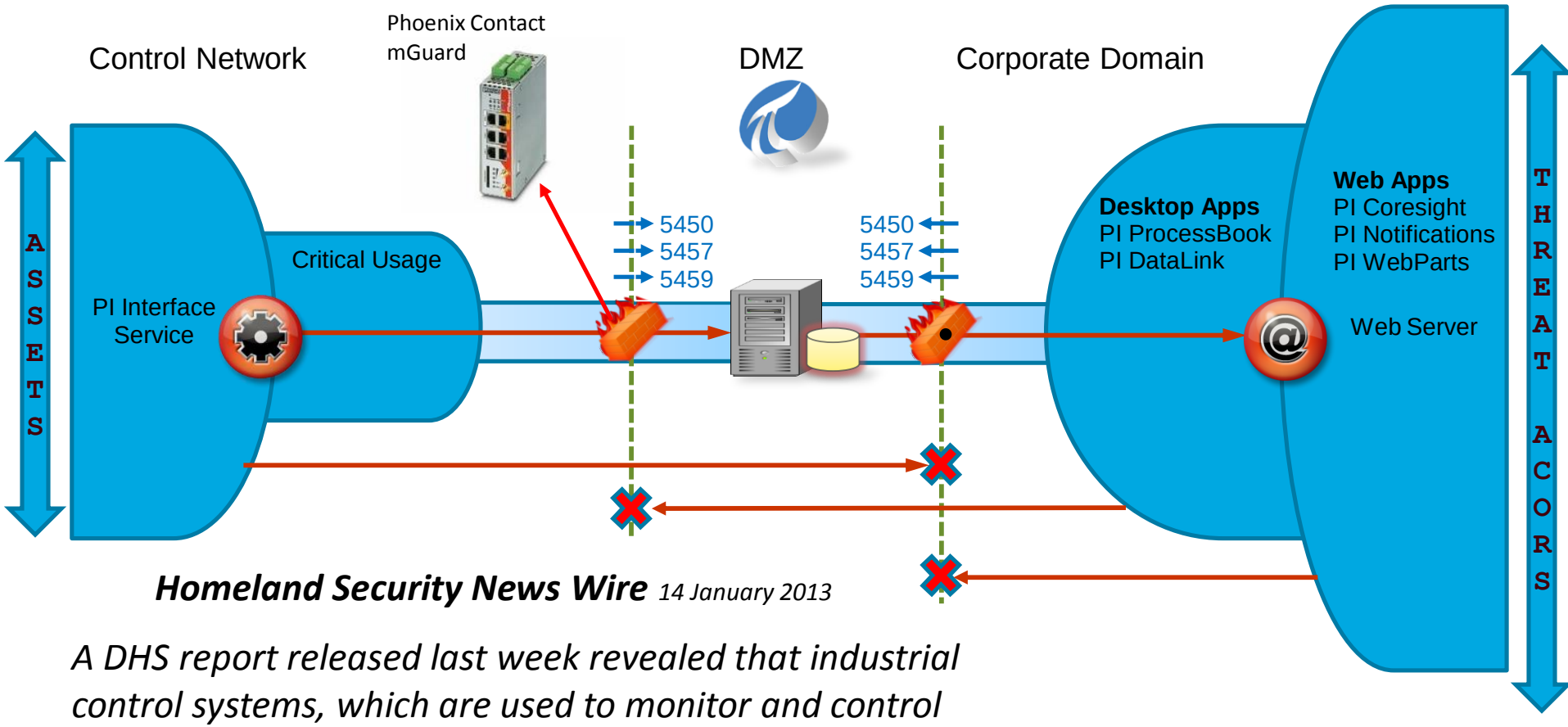
OSIsoft.

PI System

This is the layer where Engineers and Maintenance personnel focus…

When information is provided to these groups in real-time, changes in plant or business conditions can be sensed with the proper scope, analyzed in the proper perspective, and result in action being taken quickly enough to benefit the entire organization.

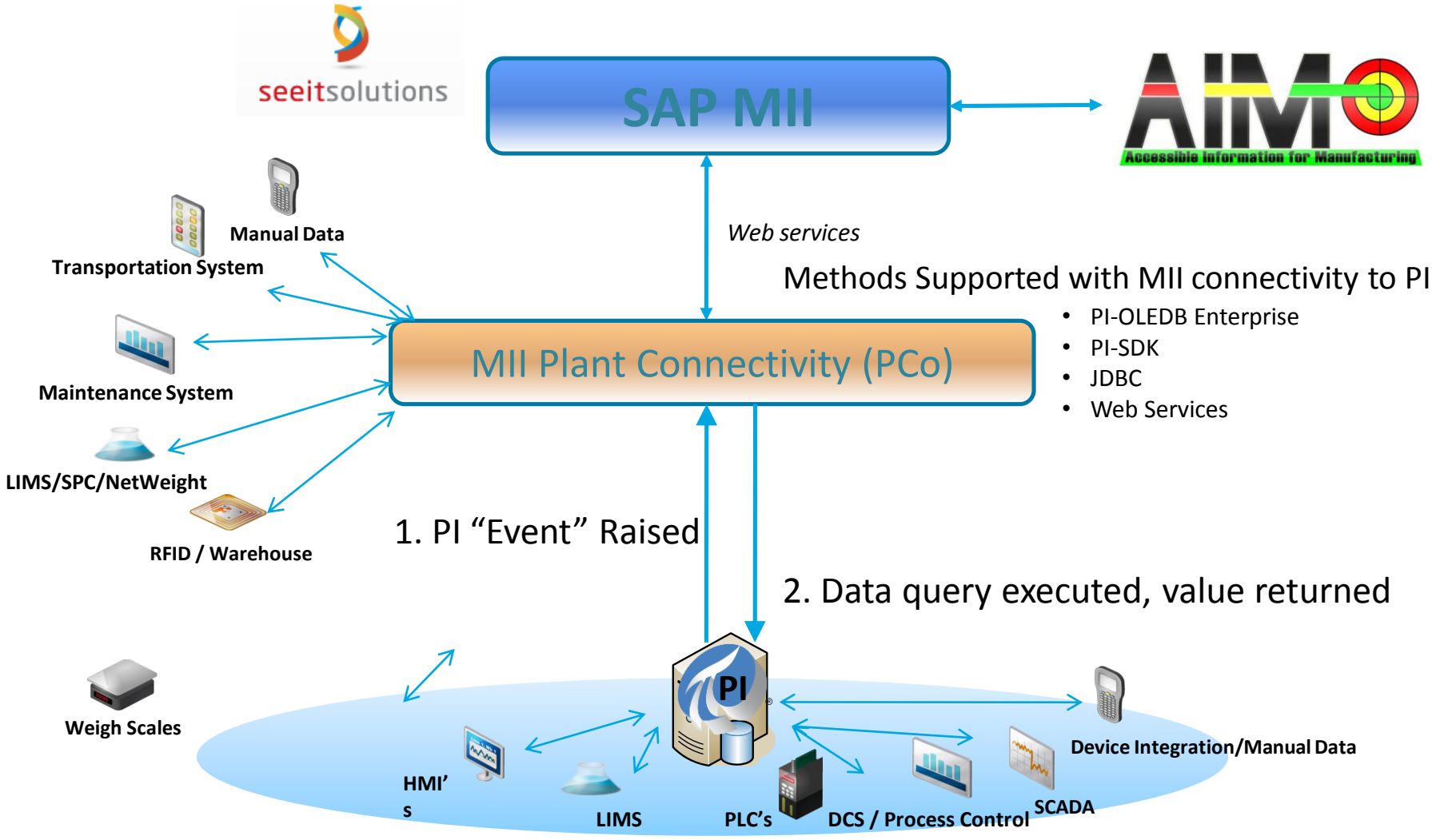
Industrial Control Security Considerations



Homeland Security News Wire *14 January 2013*

*A DHS report released last week revealed that industrial control systems, which are used to monitor and control critical infrastructure facilities, were hit with **198** documented cyber attacks in **2012**, and many of these attacks were considered serious.*

The PI / MII Connection



The PI System / SAP MII Partnership

- The PI System
  - Handles integration with Industrial Control Systems (ICS)Layer.
  - Acts as the central data exchange point between the Industrial Control systems and the Enterprise.
  - Provides Quality, Engineering and Maintenance groups with granular data for real-time analysis (1ms sample rates are not unusual) and real-time exception based event identification.
- SAP MII
  - Aggregation and summarization of information across all levels of the solution stack. (PI, MII, MES and SAP ERP).
  - Acts as the central data collection and exchange between the shop floor and the business ERP systems.
  - Provides all levels of the organization with near real time KPI's dashboards.

Managing Data Conversion, Calculation and Preparation

- PI Analytics is the place to pre-process data to minimizing **network** when all inputs for the calculation are already stored in PI.
- Efficient access to PI Analytics provides precision data to aid work flows, scheduled tasks and critical transactional processing needs.
- PI ACE provides the ability to create complex calculations.
- SAP PCo (Plant Connector) gathers data for MII via PI calculations that are either time-scheduled or "event based"
- MII is used collect, aggregate and summarize data from all levels of the application stack. WinSPC, VisiTrak, SAP R3, PI, SAP LPR (Hershey Line Production Reporting).

PI PE

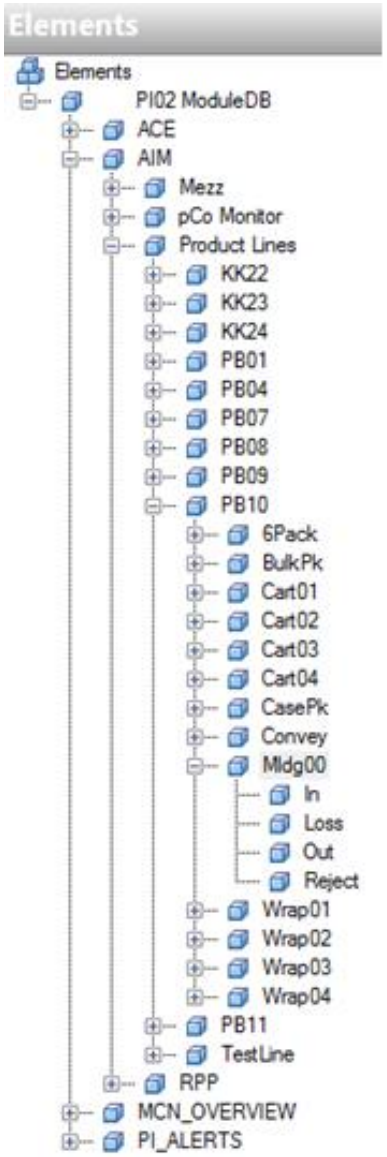
PI ACE

PI AF Analysis

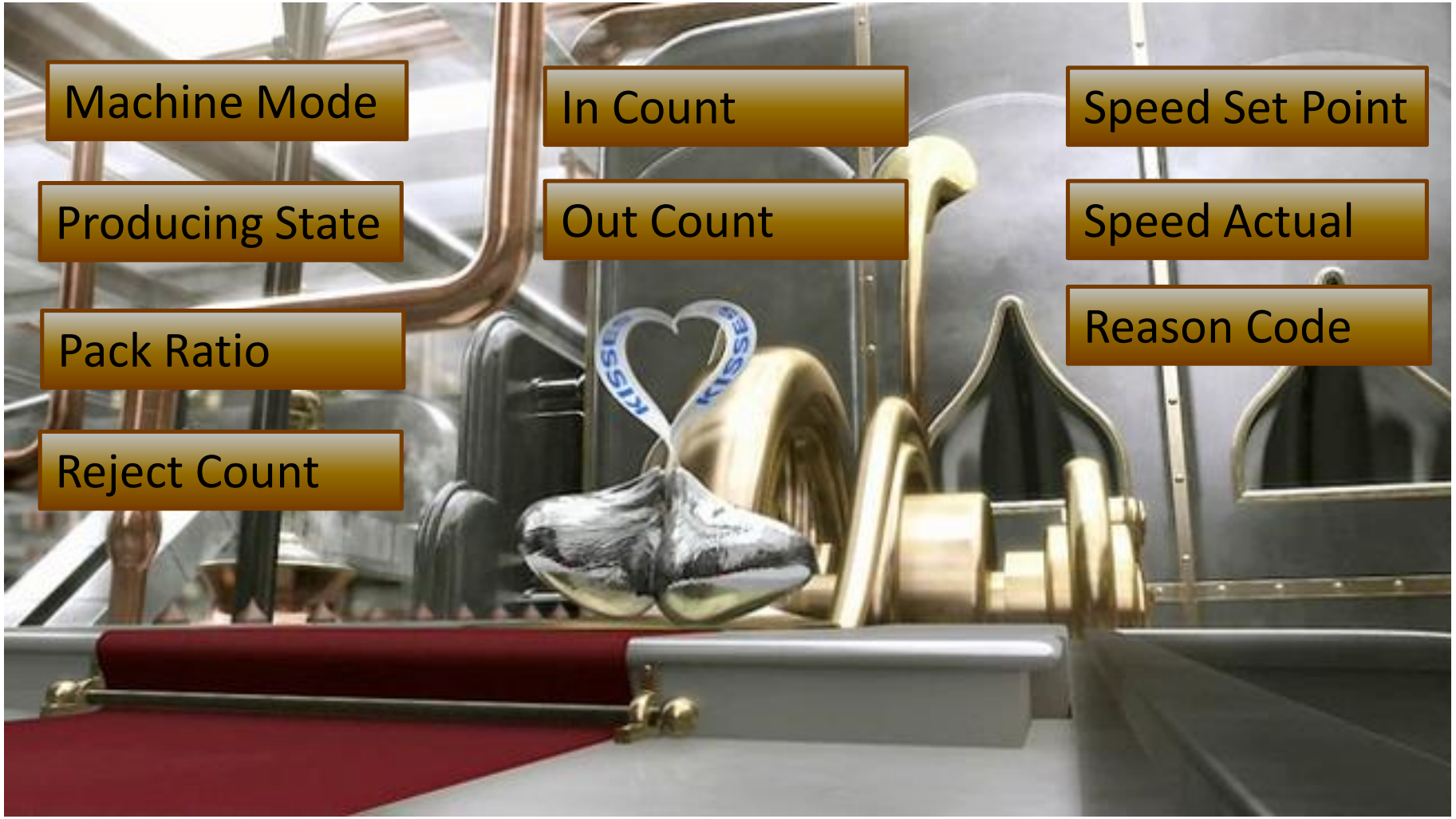
MII Expressions

Defining Manufacturing Cells and Lines

- PI AF supports the definition of consistent representations of assets and/or equipment. AF objects are used for analysis that yields critical and actionable information.
- AIM uses AF to create highly configurable manufacturing cell data structures.
- AIM cell definitions and states are based on the PackML standard.
- AIM lines are made up of multiple machine cells.
- Each Cell is support by a minimum of 9 tags



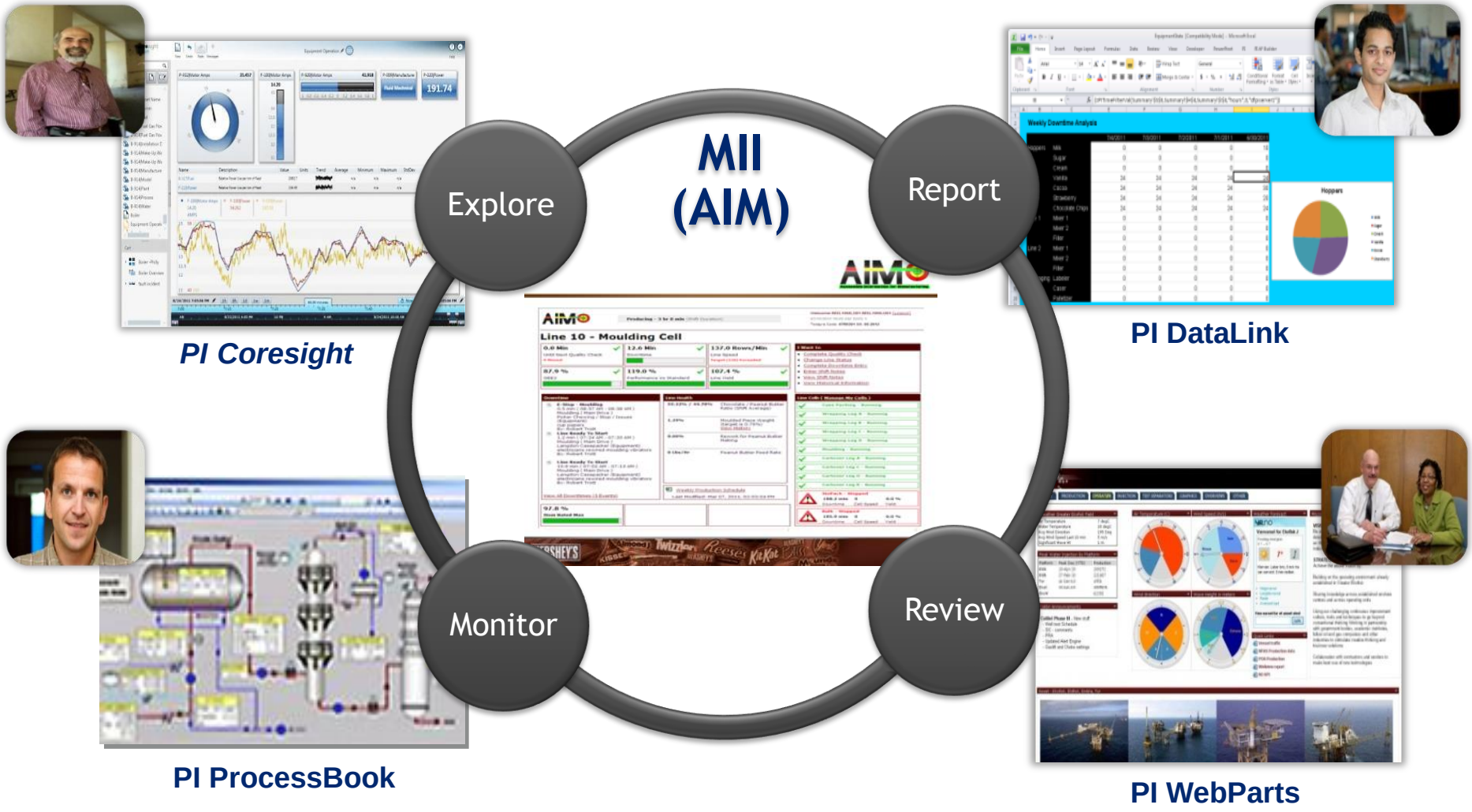
Manufacturing Cell Tag Definitions



Manufacturing Cell Production States
PackML Standard

State	Description
EXECUTING	The cell is processing materials
STOPPED	The machine is powered and stationary. This state is typically operator initiated
SUSPENDED	The machine is capable of running but no upstream materials are present for processing.
HOLDING	The machine is capable of running but downstream material blockages or cell issues bring the machine to a controlled stop
ABORTED	Machine is in a Fault Condition. The Stop command will force transition to the Stopped state.

Client Data Viewing Options



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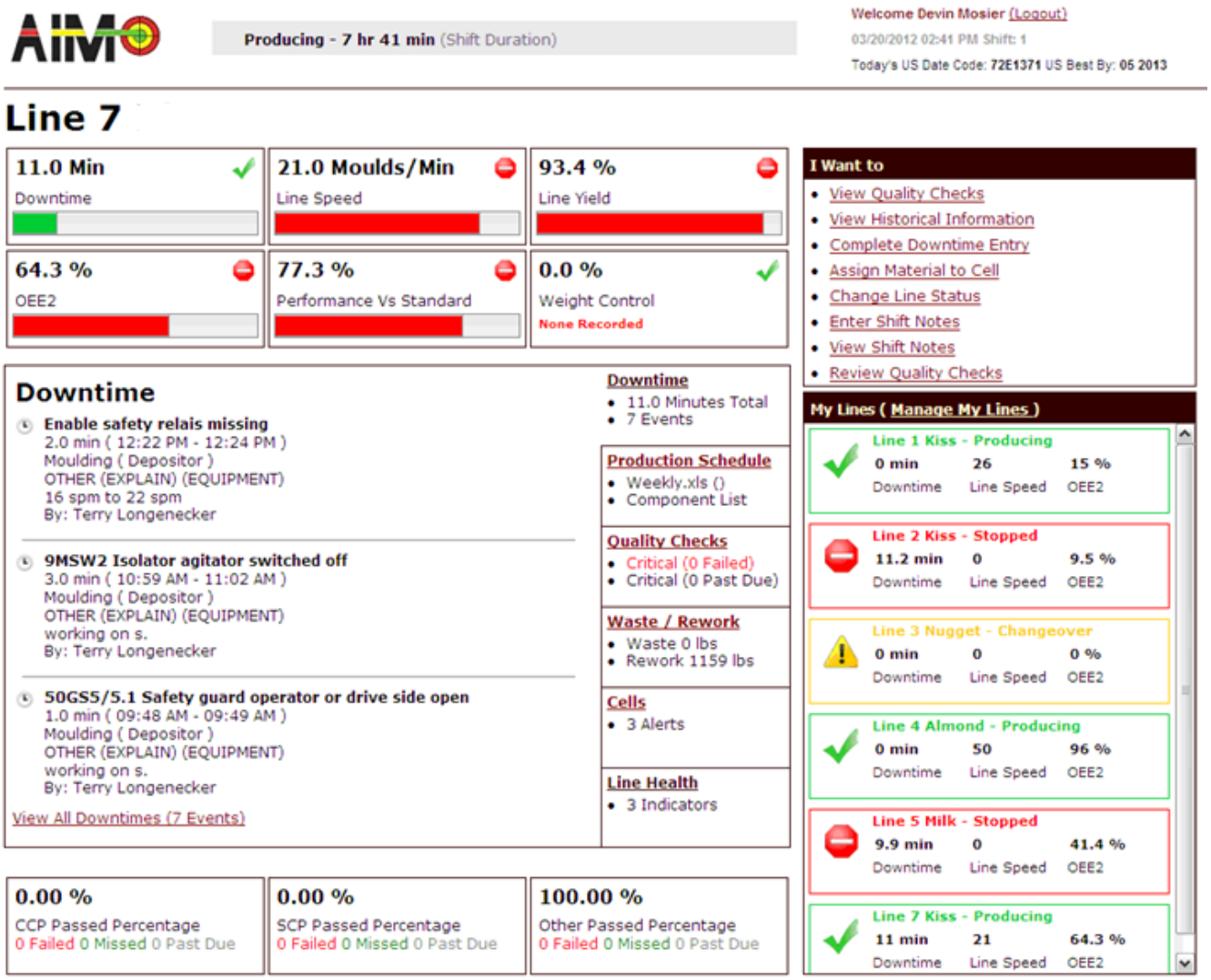
AIM- Operator/Supervisor Line View



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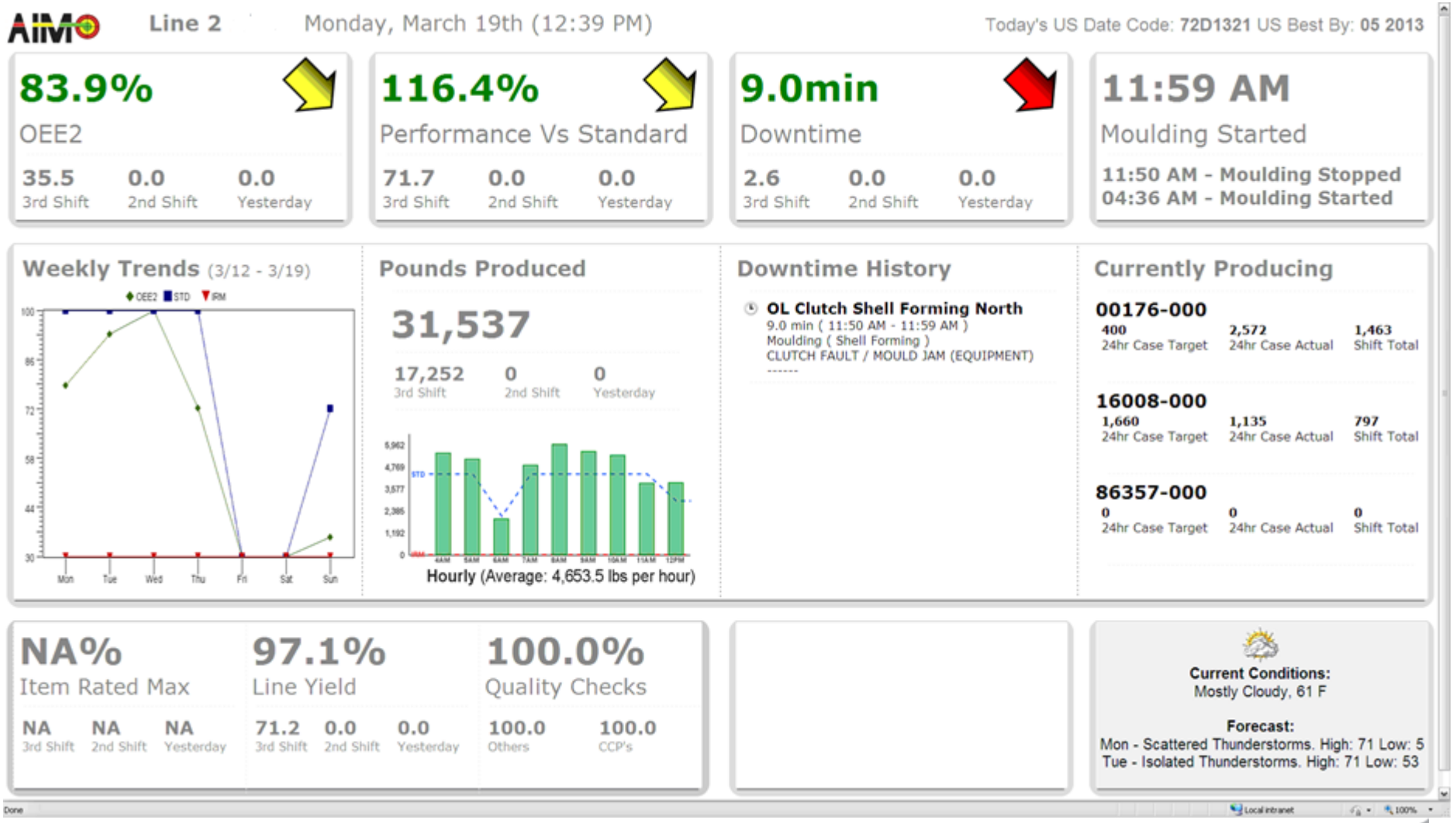
AIM - Plant Dash Board

Monday, March 19th (11:30 AM)

Line Status			Shift OEE2 (trend)	Shift Downtime (min)	% Standard
Line 2	-	Producing	84.0%	0	116.5%
Line 5	-	Producing	84.2%	20	107.6%
Line 3	-	Producing	77.3%	0	105.9%
Line 7	-	Producing	64.7%	4	77.7%
Line 1	-	Changeover	0.0%	0	0.0%
Line 4	-	Cleaning	0.0%	0	0.0%

AIM - Line Dash Boards



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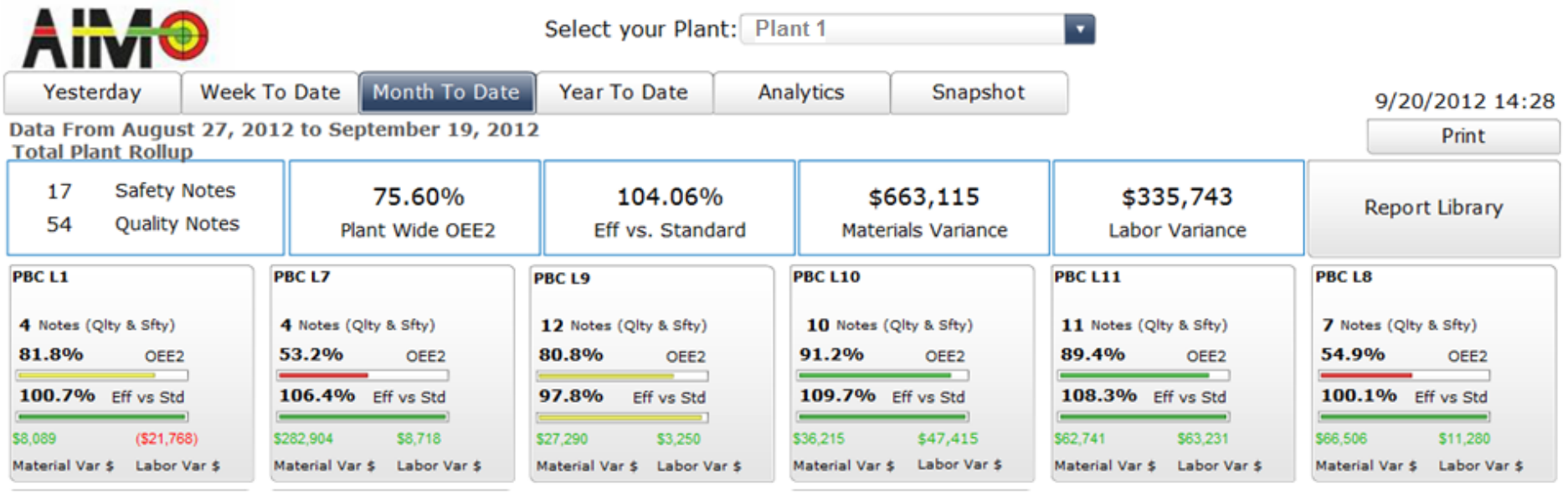
AIM - Plant Manager Dashboard



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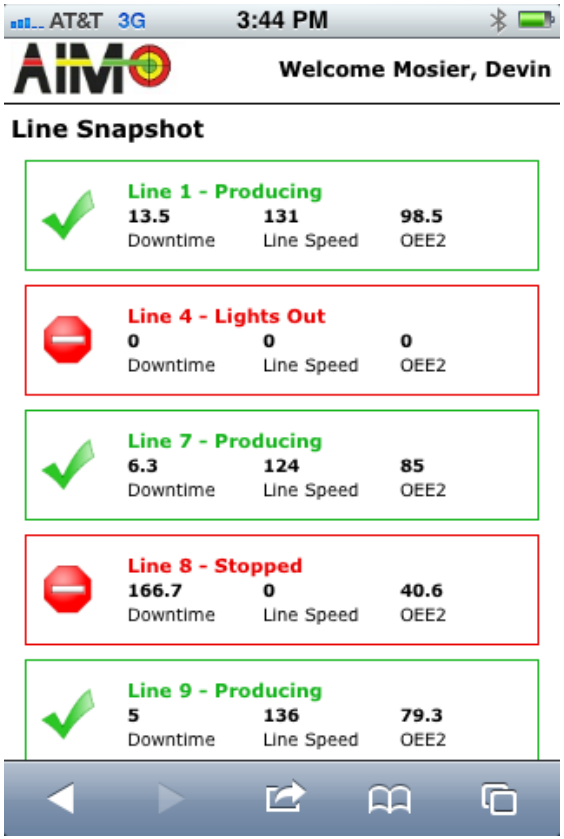
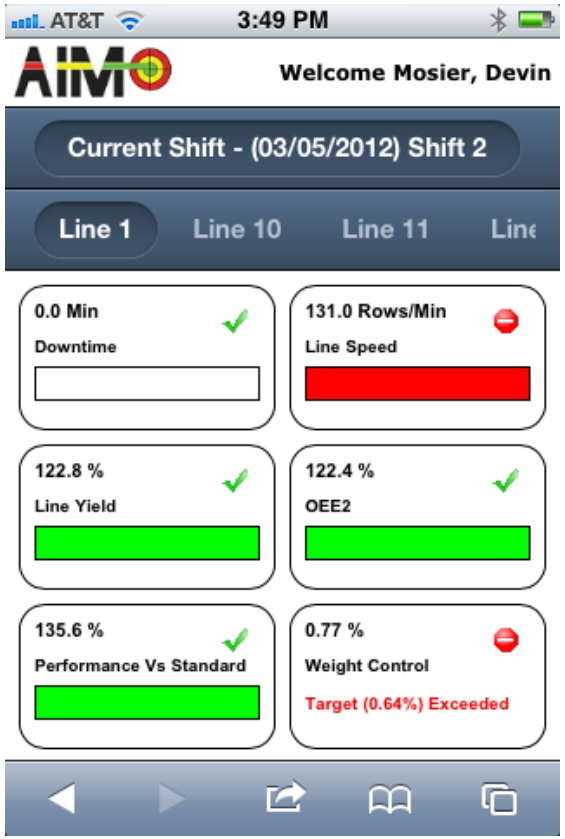
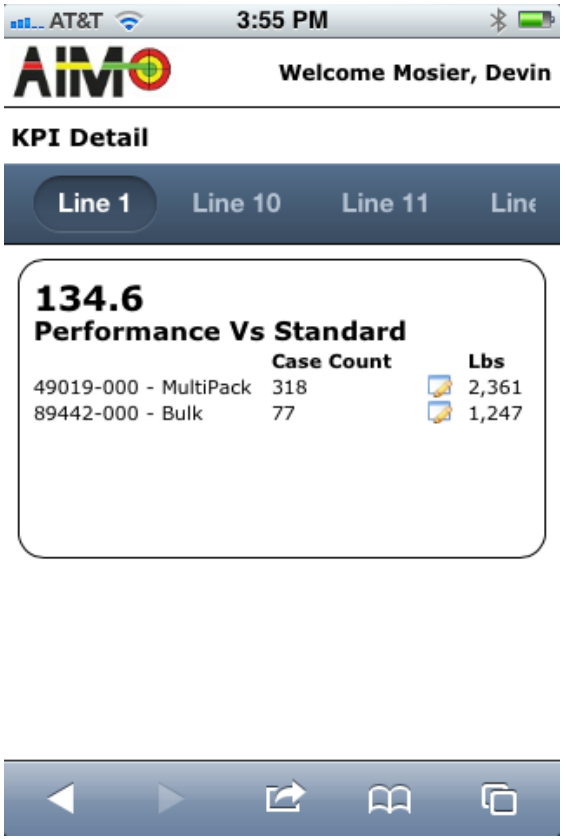
AIM - Mobil Dashboards







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Where are we in our Journey?

- Hershey has deployed PI and AIM at three of our large North American sites.
  - One Plant a year since 2012
- Next Up
  - Deployment at one of our large plant is Mexico - 2015.
- Future Opportunities
  - Integration of batch events
  - Energy measurement
  - Additional maintenance integration.
  - Expanded process monitoring of critical control points
  - Manufacturing systems and control network monitoring.