Remote Monitoring & Diagnostics System for an LNG Loading Arm with the PI System Infrastructure

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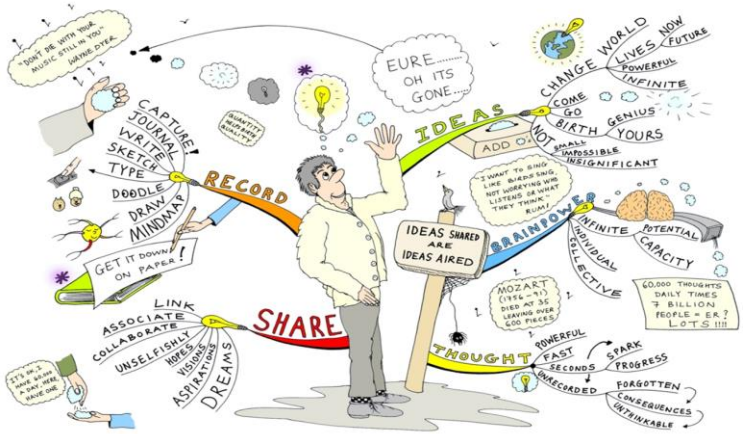
Hunt LNG

Agenda

- About Hunt LNG & Peru LNG
- LNG Loading Faculty/Arm Overview
- Business Challenge
- Solution
- Results and Benefits
- Summary



Peru LNG Overview

- 1st LNG plant in South America
- Commissioned in June, 2010
- 4.4 MTPA Capacity
- Gas is supplied from Repsol YPF and Petrobras developed fields near the Camisea fields via a 34-inch (860 mm) supply pipeline runs 408 kilometres
- The LNG plant is operated by Peru LNG which is a consortium of Hunt Oil Company (50%), SK Energy (20%), Shell (20%), and Marubeni (10%)

LNG Loading Arm – A Complex & Critical Asset

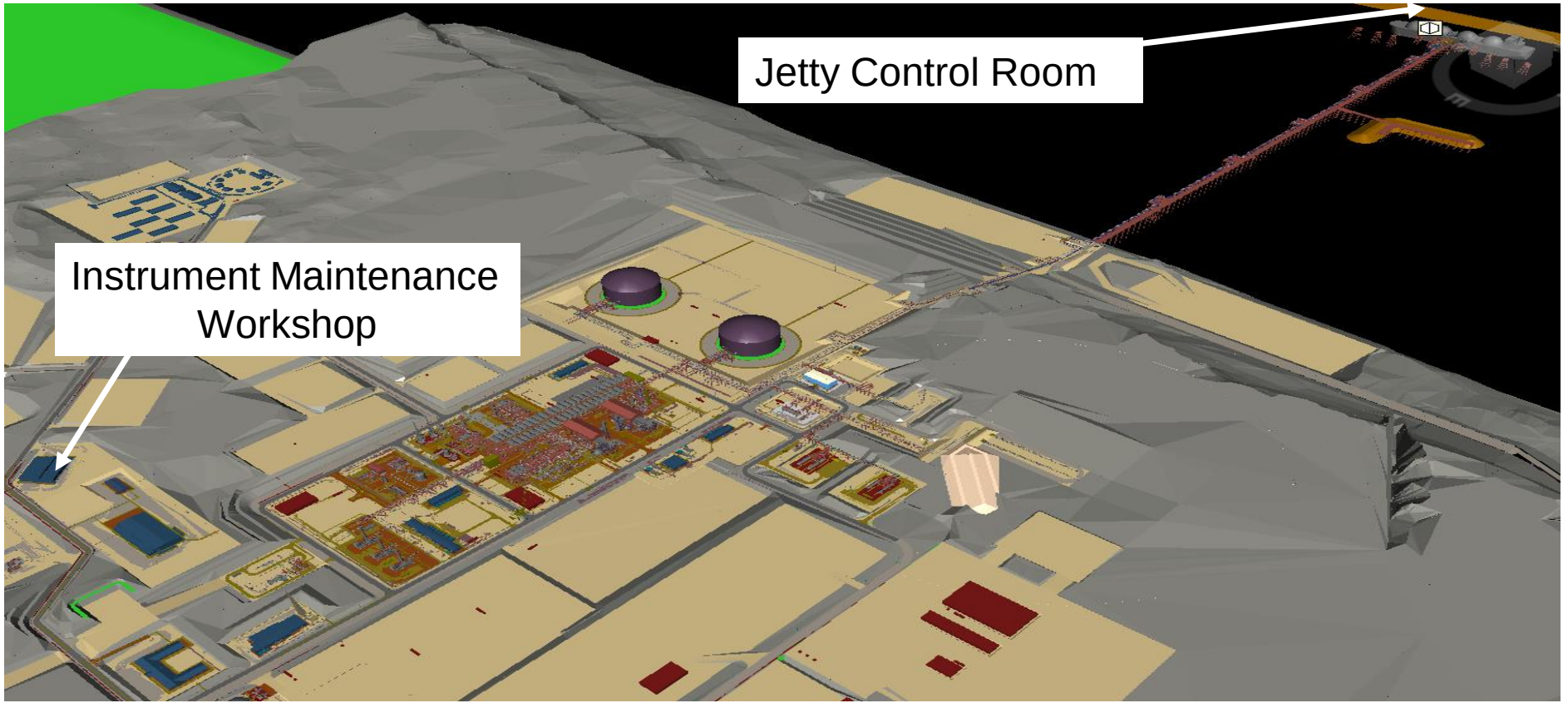
		Type	Common	On Each Arm	Total on 4 Arms	TOTAL
		IS NAMUR	2	23	92	94
		Control Units on CP	37	3	12	49
		Control lights on CP	20	9	36	56
PLC station I/Os	Normal	Digital Inputs (+24Vdc)	44	18	72	116
		Digital Outputs (+24Vdc / 0,5 A)	36	10	40	76
		Digital Outputs (+24Vdc / 2 A)	0	0	0	0
		Digital Outputs (Relays)	5	25	100	105
		Analog Inputs	7	2	8	15
		Analog Outputs	4	0	0	4
PLC station I/Os	Safety	Digital Inputs (+24Vdc)	7	8	32	39
		Digital Outputs (+24Vdc / 2 A)	4	3	12	16
		Analog Inputs	0	0	0	0
		Analog Outputs	0	0	0	0
TOTAL			166	101	404	570

Business Challenge – Time is

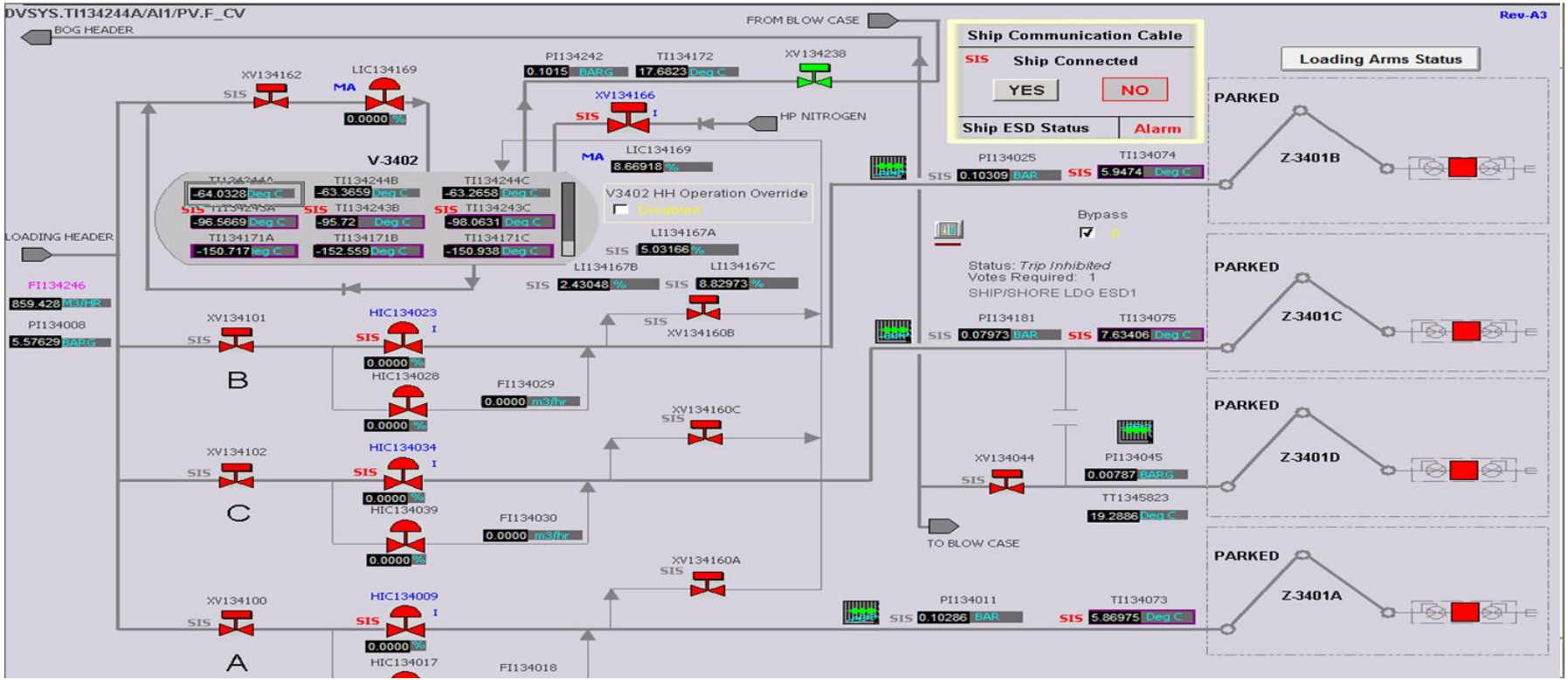
- Loading Arm issue resolution delayed due to:
  - No Limit switch status in any HMI
  - Limited field data in the HMI including limit switches
  - Distance between loading arm and instrument maintenance shop
  - Different descriptors in DCS and PLC/HMI for same failures
  - Very difficult to troubleshoot and resolve issues in a timely manner

Inability to quickly resolve loading arm issues resulted in over 700 hrs downtime/yr (~2%) resulting in increased demerge cost and lost capacity equating to over $1M/yr

Illustration of Challenge



Loading Arm HMI - Limited Infomration



Many descriptions, one Failure

DESCRIPTION IN HMI FROM FMC	Low Pressure in HPU ACCU on Berth1
DESCRIPTION IN DCS	Low Oil Press in HPU ACCU
DESCRIPTION IN TRAINING MANUAL	Low oil pressure in HPU Accumulator
DESCRIPTION CONTROL LOGIC DIADRAM	Oil Low pressure

We had to be fortune tellers to see what the instrument alarm refers to……

And now what to do?

Low Pressure in HPU ACCU on Berth1

Low Oil Press in HPU ACCU

Oil Low pressure

Low oil pressure in HPU Accumulator

Solution – Leverage the PI System to:

Identify Tag number

Identify place in plant

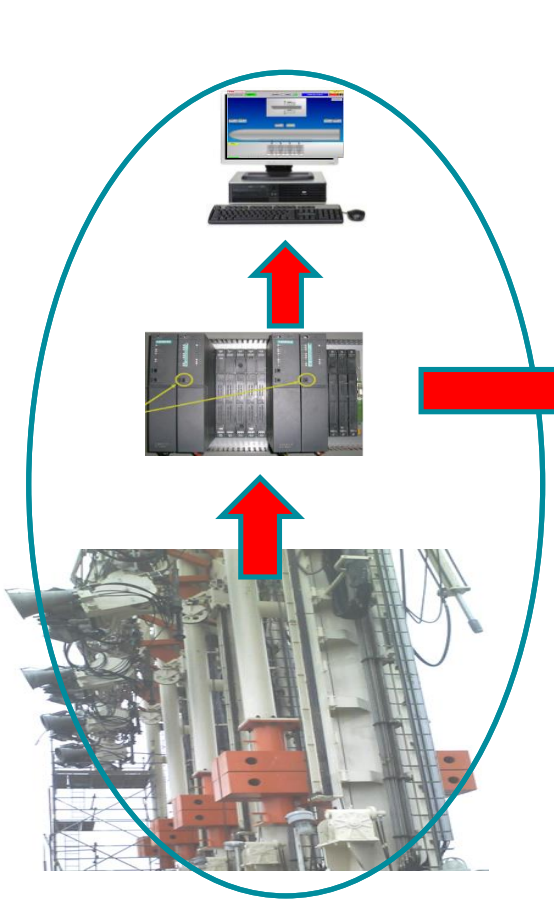
Find information quickly

Colabórate with stakeholders

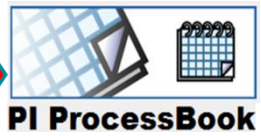
Identify location in plant from any part of the network

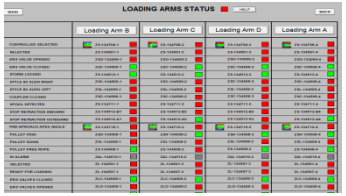
Solve the problem in less time

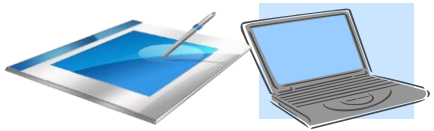
Solution Overview- PI System to the Rescue!



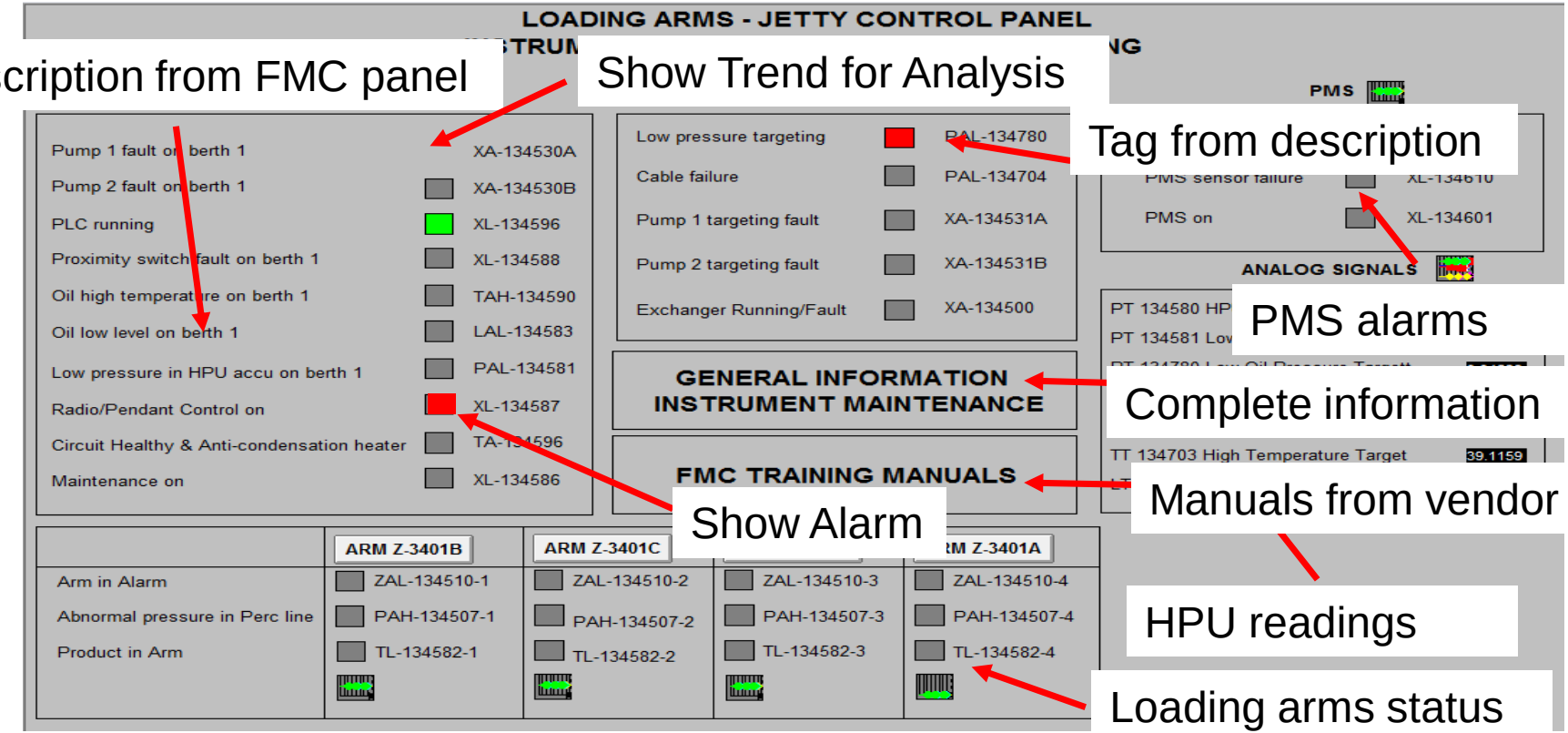
Predictive Maintenance



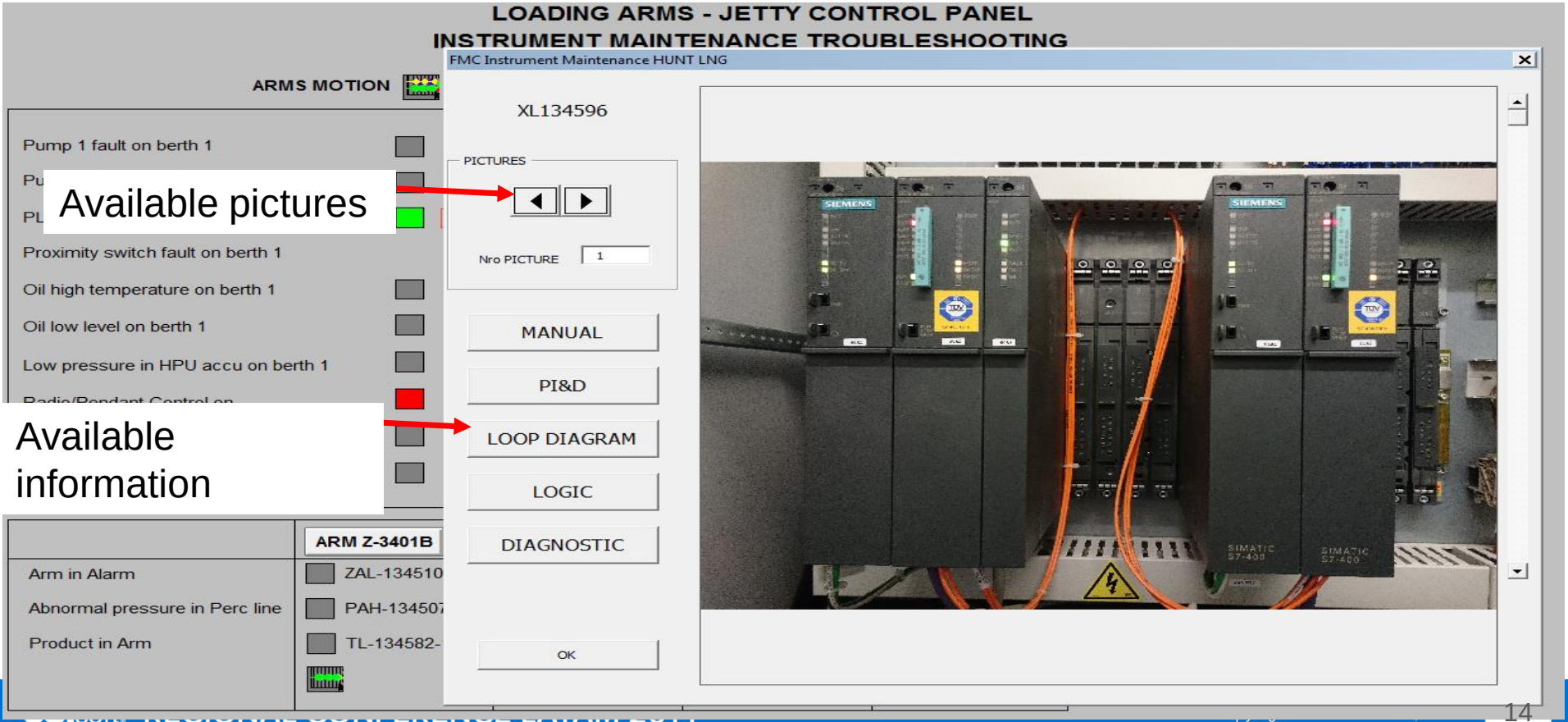




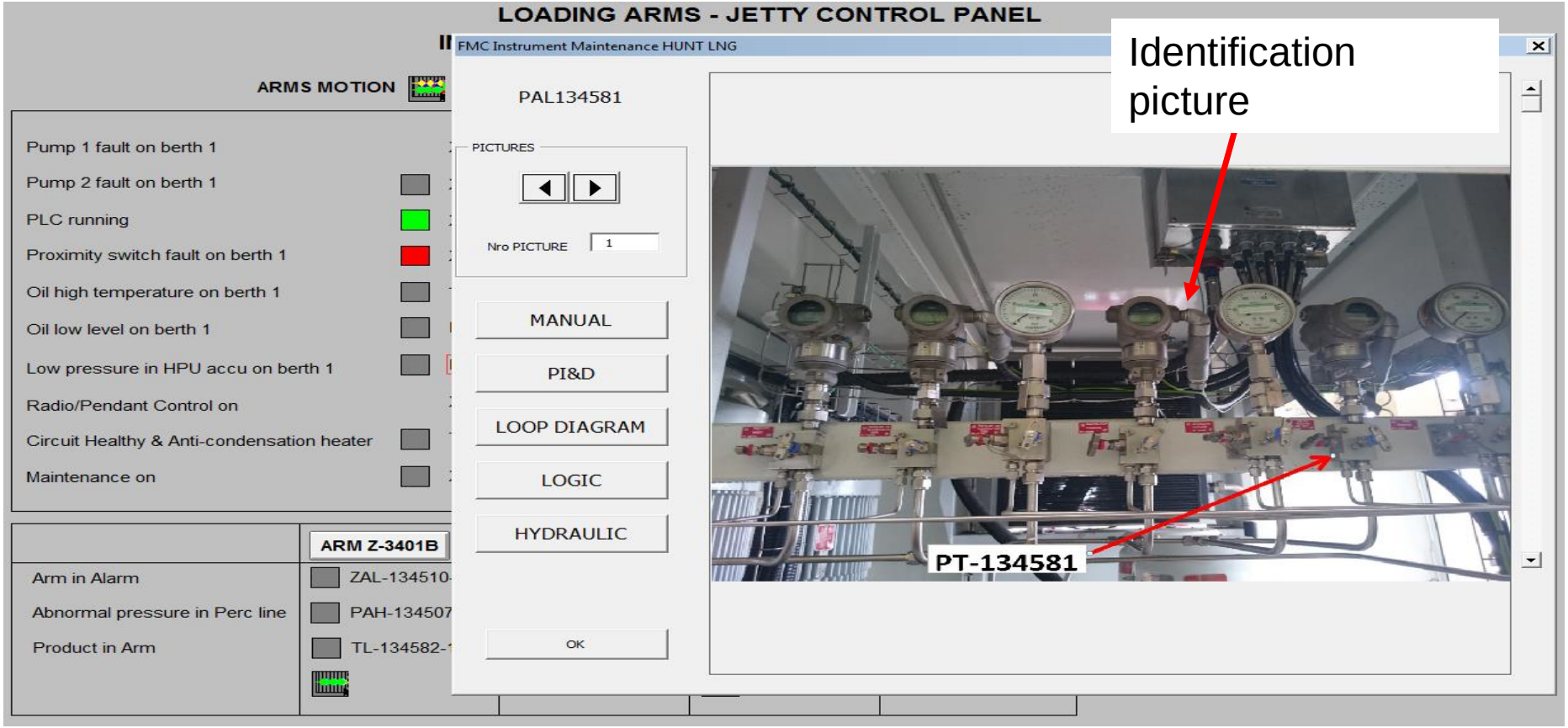
Loading Arms Monitoring Screen



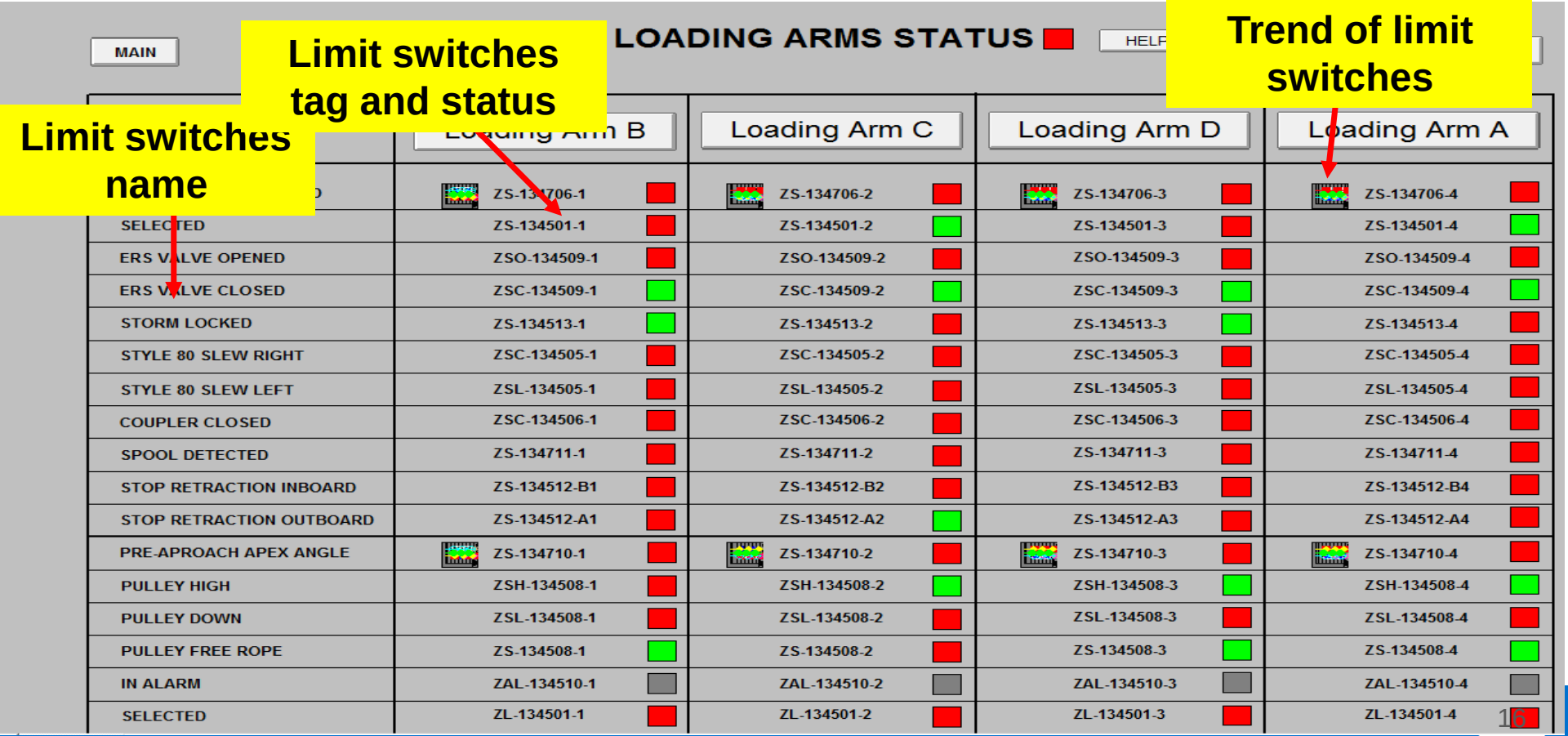
Window Application per tag



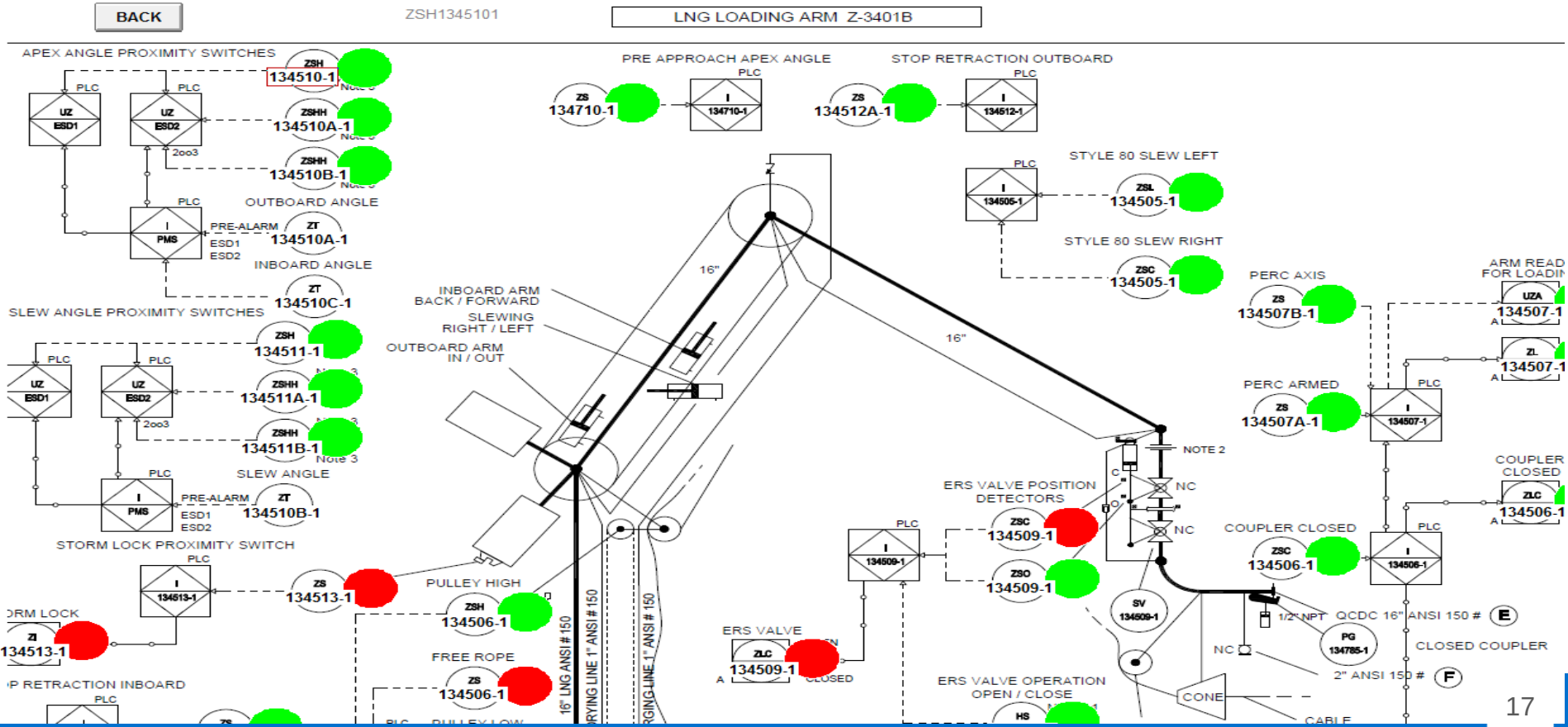
Using Pictures to Help Identification



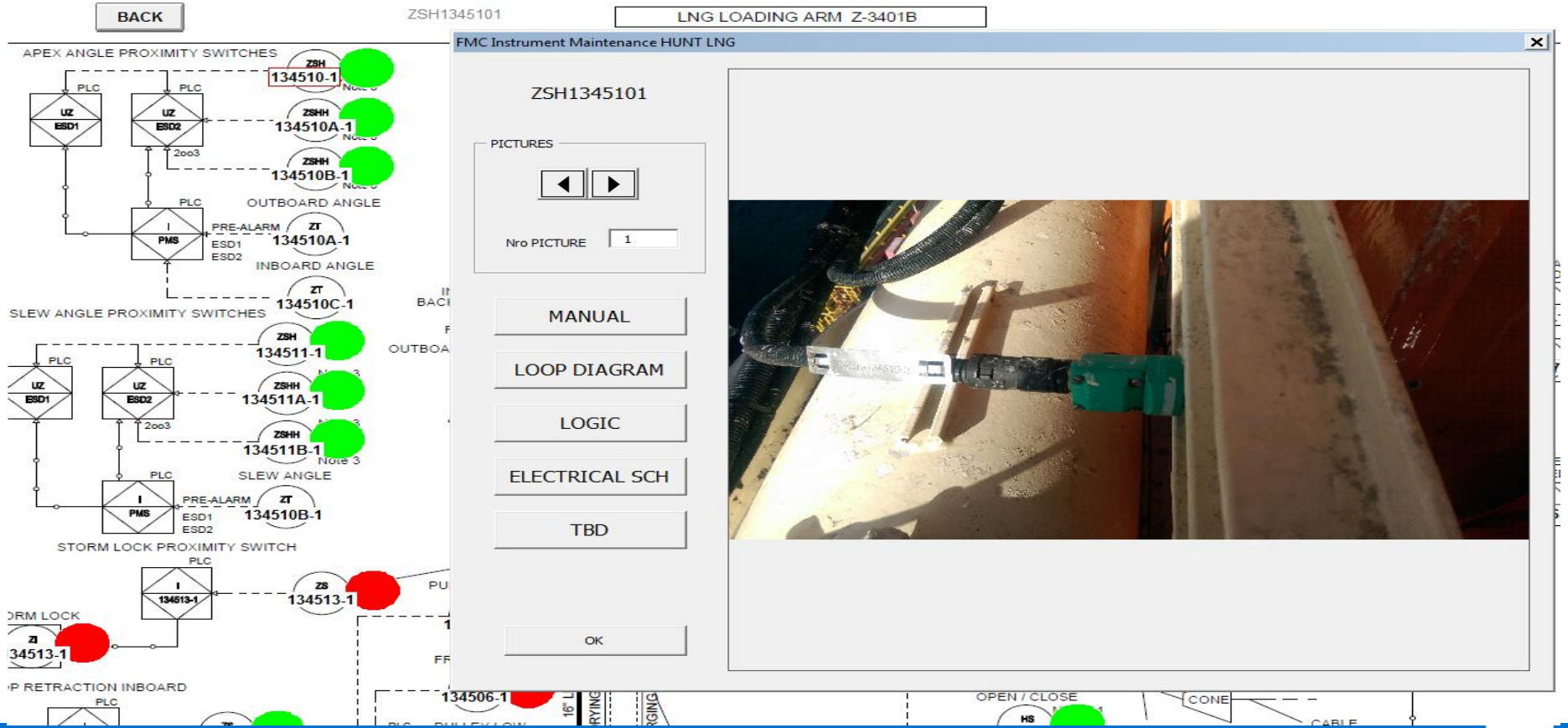
Limit switches overview for Loading Arms



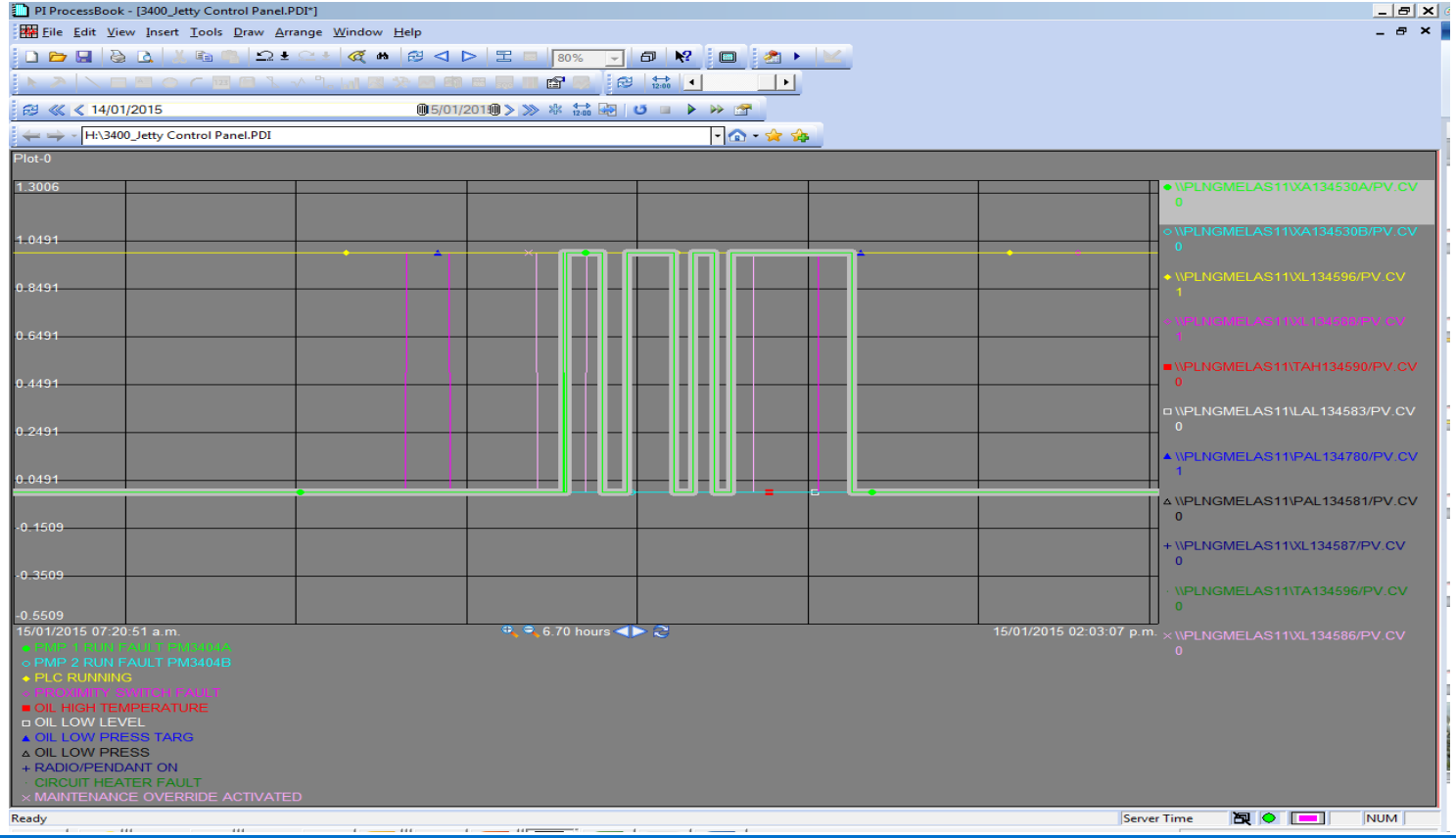
Limit switches locations overirew



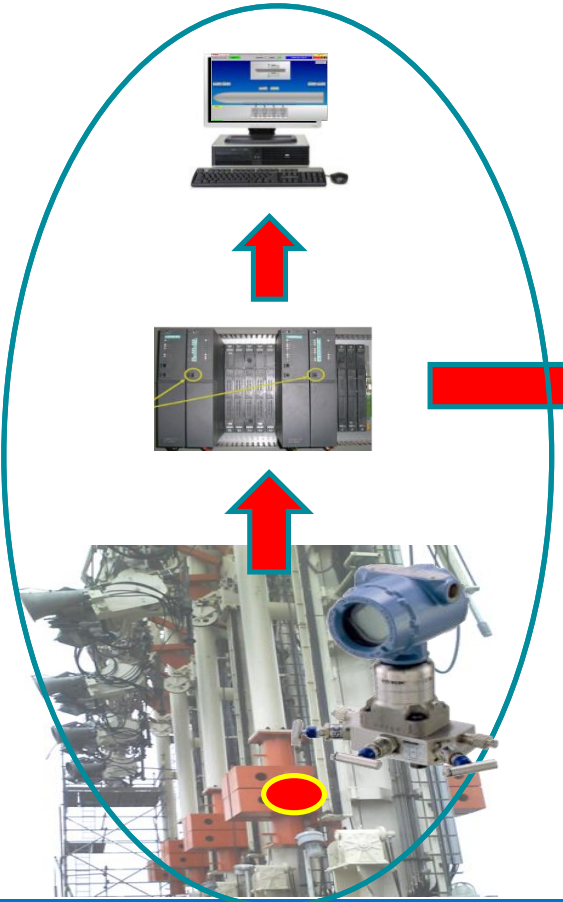
Window application per limit switch



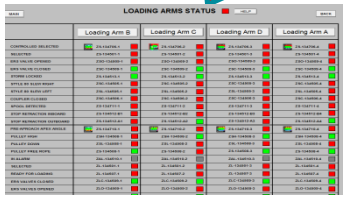
Limit Switches Trends

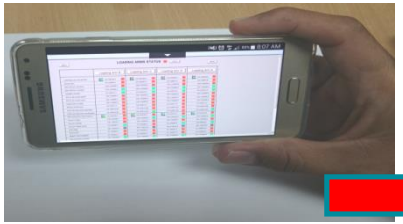


Send Notification if there are some Failures



Predictive Maintenance





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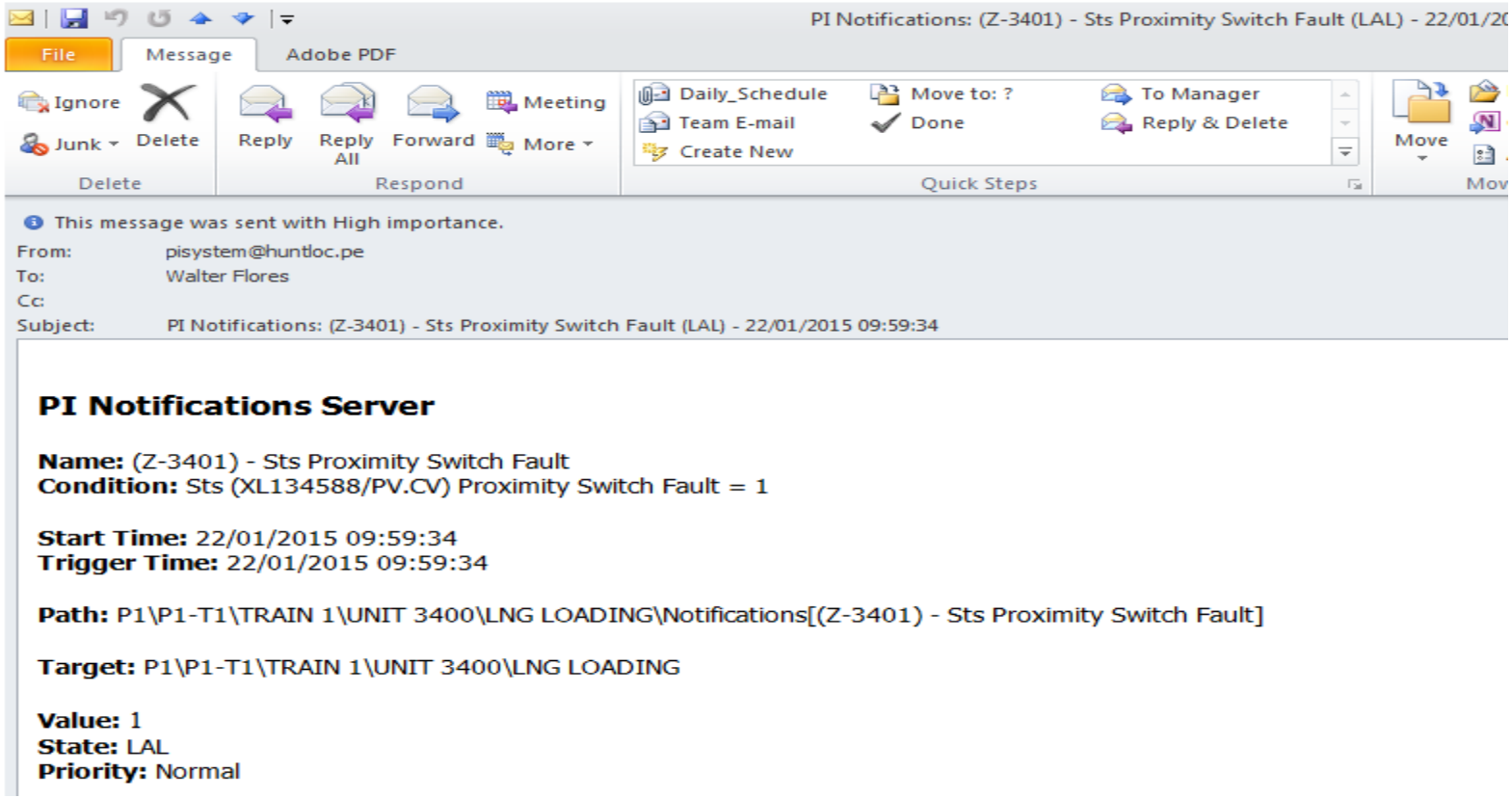


Results and Benefits

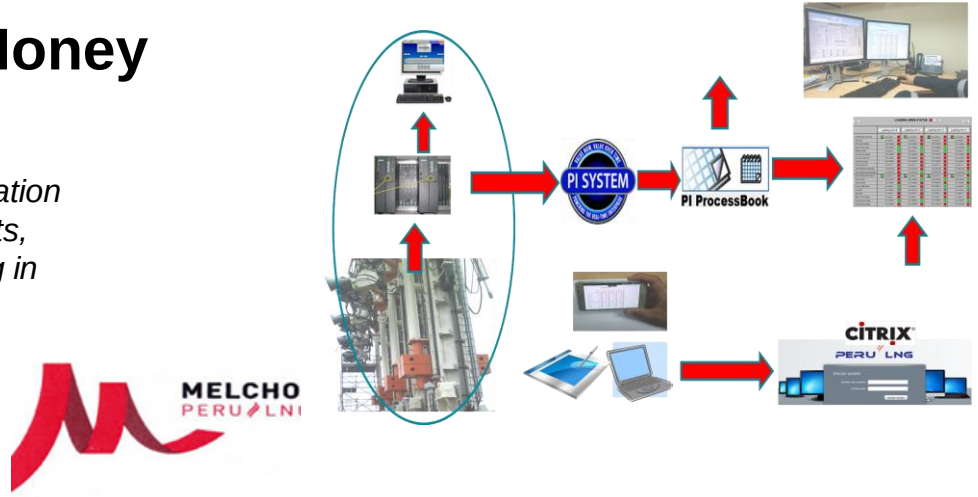
- Deduced LNG Carrier demurrage
- Reduced LNG Loading arm downtime by >700 hrs/yr
- Increased LNG loading capacity by >2%
- Improved overall plant utilization
- Annual savings are estimated to be >$1MM/yr

Leveraging the PI System to solve this business challenge is illustrative of the “art of the possible” and value now, value over time

When Loading LNG, Time is Money

"Using the PI System to integrate, normalize, analyze, visualize and notify instrument alarms and related information on 4 LNG loading arms reduced downtime, demerge costs, and increased LNG loading capacity by over 2% resulting in annual savings >$1M/yr".

Mr. Walter Florez, Instrument Maintenance Supervisor
Hunt LNG



Business Challenge

- Inability to quickly troubleshoot LNG loading arm issues due to lack of data and information in context led to:
  - Increased demurrage
  - Decreased LNG loading & plant capacity

Solution

- Use the PI System to integrate, normalize, analyze, visualize, and notify enabling a proactive, efficient approach to LNG loading arm issues

Results and Benefits

- Reduced loading arm downtime by >2% resulting in:
  - Decreased LNG carrier demurrage
  - Increase LNG loading utilization and capacity
  - Annual savings >$1MM/yr

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THANK YOU

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