Combining Lab Automation Solutions with the Best Rapid Process Improvement Tools

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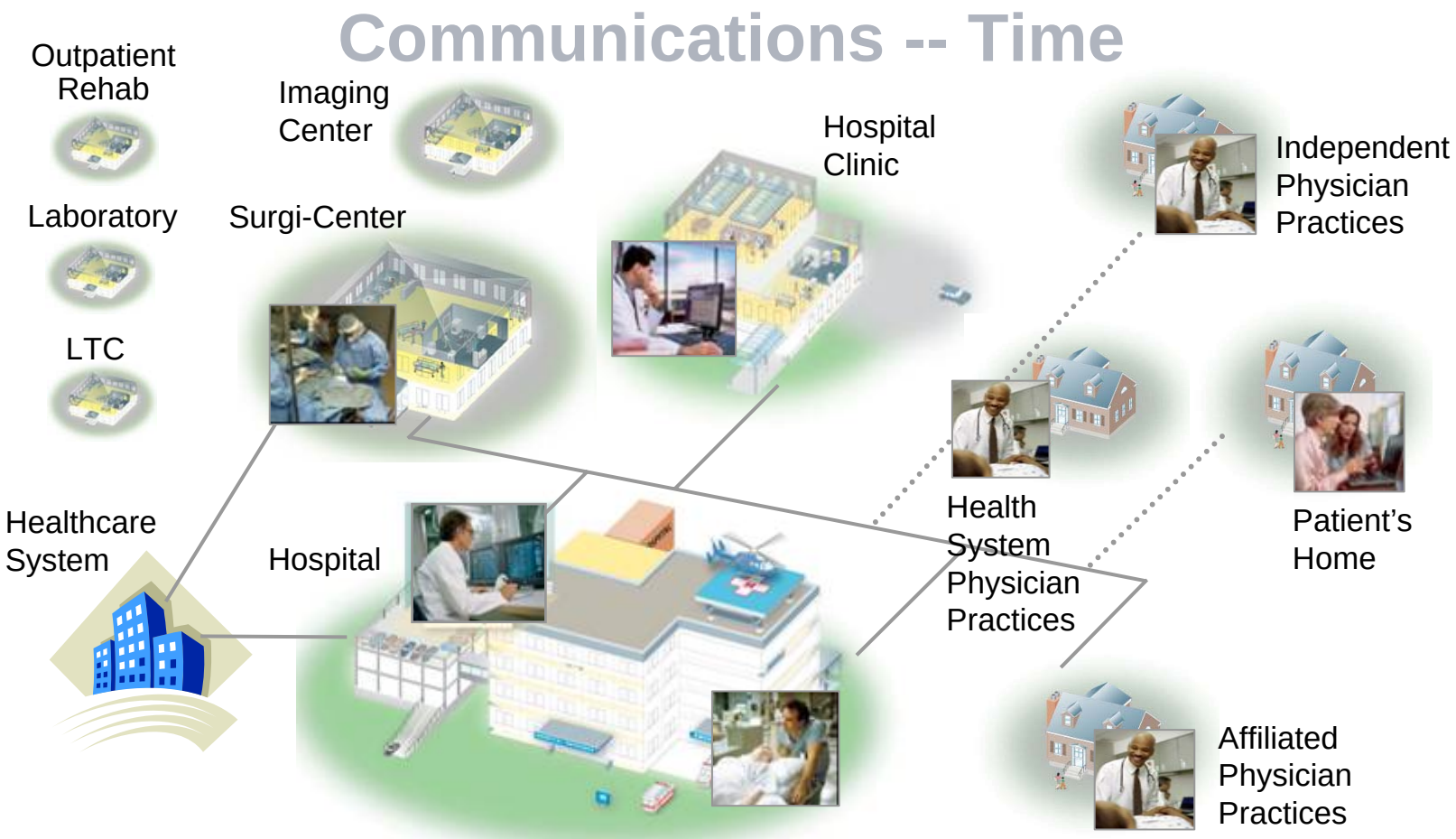
Lab Quality Confab on Quality Management in Diagnostic Medicine

Our Healthcare Enterprise is Complex



Grounding

Automation is playing an important and strategic role in all regions of the world.

Global Drivers:

EMPLOYEE SAFETY - PRODUCTIVITY – Predictable TAT

Regional Drivers:

- Japan & Korea (early adopters) – lab consolidation
- U.S. – skilled labor shortages
- Europe – consistent turn around times / process improvement
- Canada – standard work process
- Latin America – quality
- Asia Pacific – most of the above

Background - Lab Automation Challenges

Many issues and performance problems occur at newly installed automation sites – Why?

Markets Served

Hospital Laboratory

- 24/7 with variety of peak workloads
- STAT demand
- Key Metrics: STAT TAT
- Backup Capability: **High**

HV Reference Laboratory

- 16/6 with peak loads from 1500 to 0800 hours
- Little to No STAT demand
- All work to be completed typically by 0700 hours
- Key Metrics: Pending W/L
- Backup Capability: **Low**

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Today's Objectives

Review common problems encountered with Automation Installations

Provide you with a problem resolution approach using the Rapid Process Improvement and Tools

Agenda

- SIEMENS Rapid Process Improvement Approach
- Grounding – Automation Challenges
- Case Study – Findings – Solutions
- Looking Ahead – What’s next?

Quality Driven Approach

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Lean
Six Sigma

Customer Support		Manufacturing
Education	Consulting	R & D
Service	Marketing	IT

One Goal

“Taking Diagnostics To The Next Level. Together”

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Rapid Process Improvement
{ Kaizen }

Process ➔ Identify key processes opportunities where solutions can be quickly implemented ***without significant capital investments***

Focus ➔ Continuous Improvement

- Eliminating Waste

Strategy ➔ Working together at all levels and across the organization to improve a process or address a problem with an actionable and executable plan.

Analytical Processes and Tools

- Value Stream Mapping
- The Five Why's
- Fish Bone

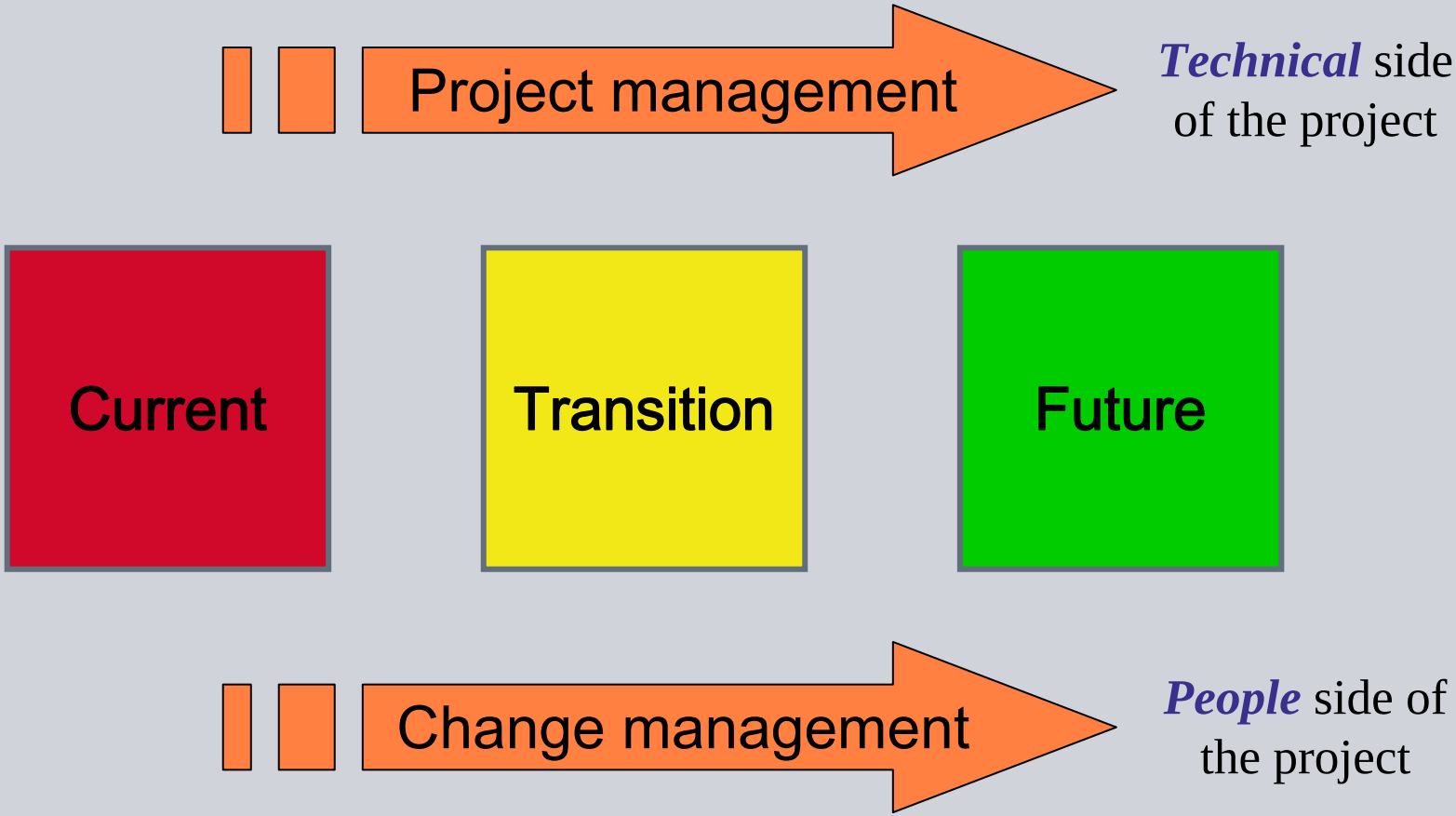
Automation Challenges / Implementation

Going from Instrument W/F to Automation W/F

- Change Mgt.
- Flows & Processes
- Menu Mapping
- Quality Control
- Customized Training

Early Team Acknowledgements

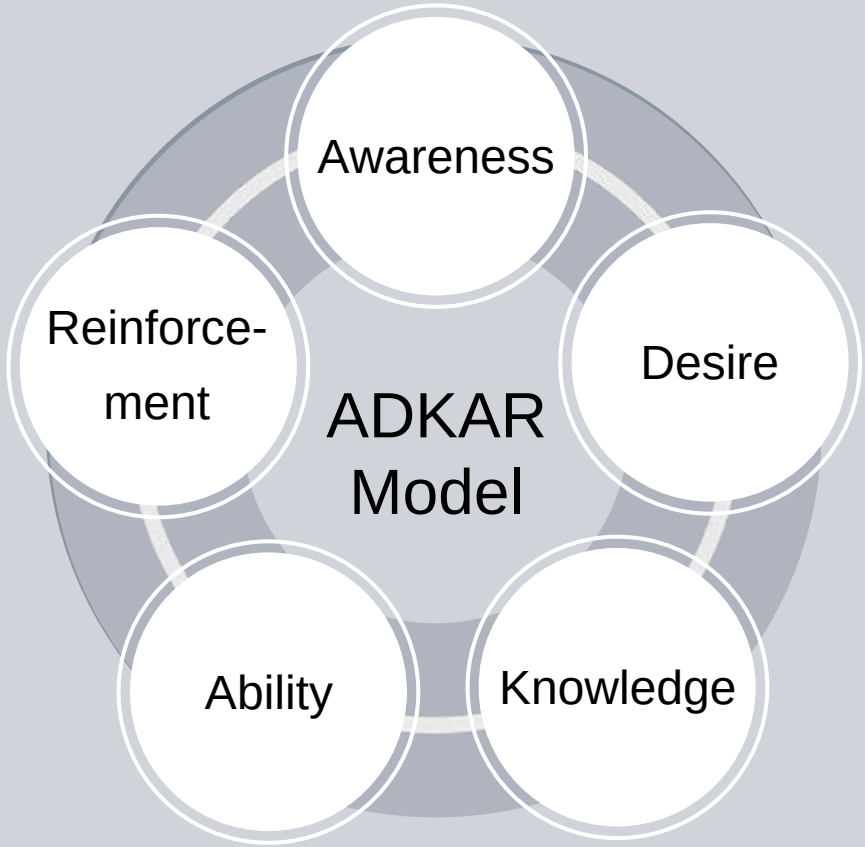
Needs for both Project and Change Management



Change Management

Consequences of not managing the people side of change

- Lower productivity
- Passive resistance
- Active resistance
- Turnover of valued employees
- More people taking sick days or not showing up
- People finding work-around's
- People revert to the old way of doing things



Recommendation:

- Implement an Effective Change Mgt. Program

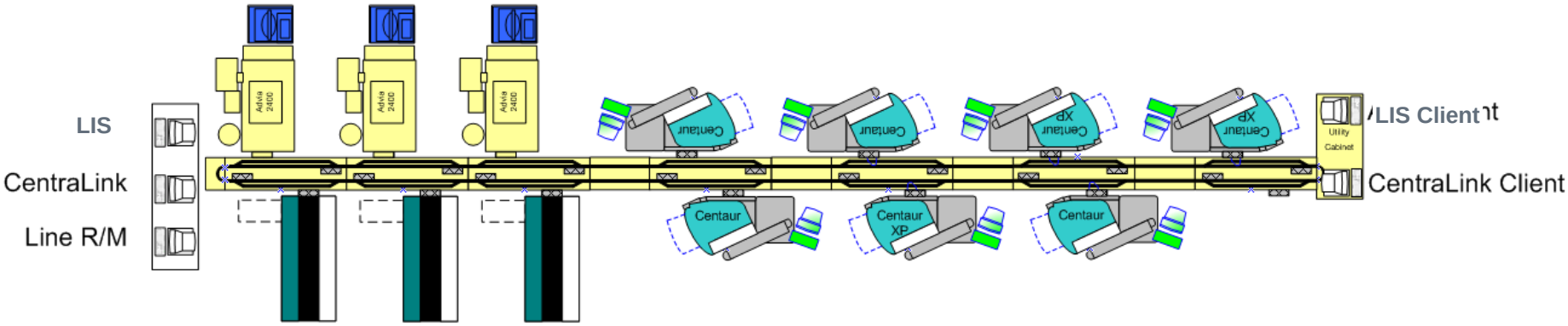
Case Study

Automation Optimization

3 Advia 2400s
Expected Capacity:
~415 Tubes/ Hour
>8,800 Tubers/Day

21 hrs / day

7 Centaur XP/ Classics
Expected Capacity:
~535 Tubes/ Hour
> 11K Tubes/Day



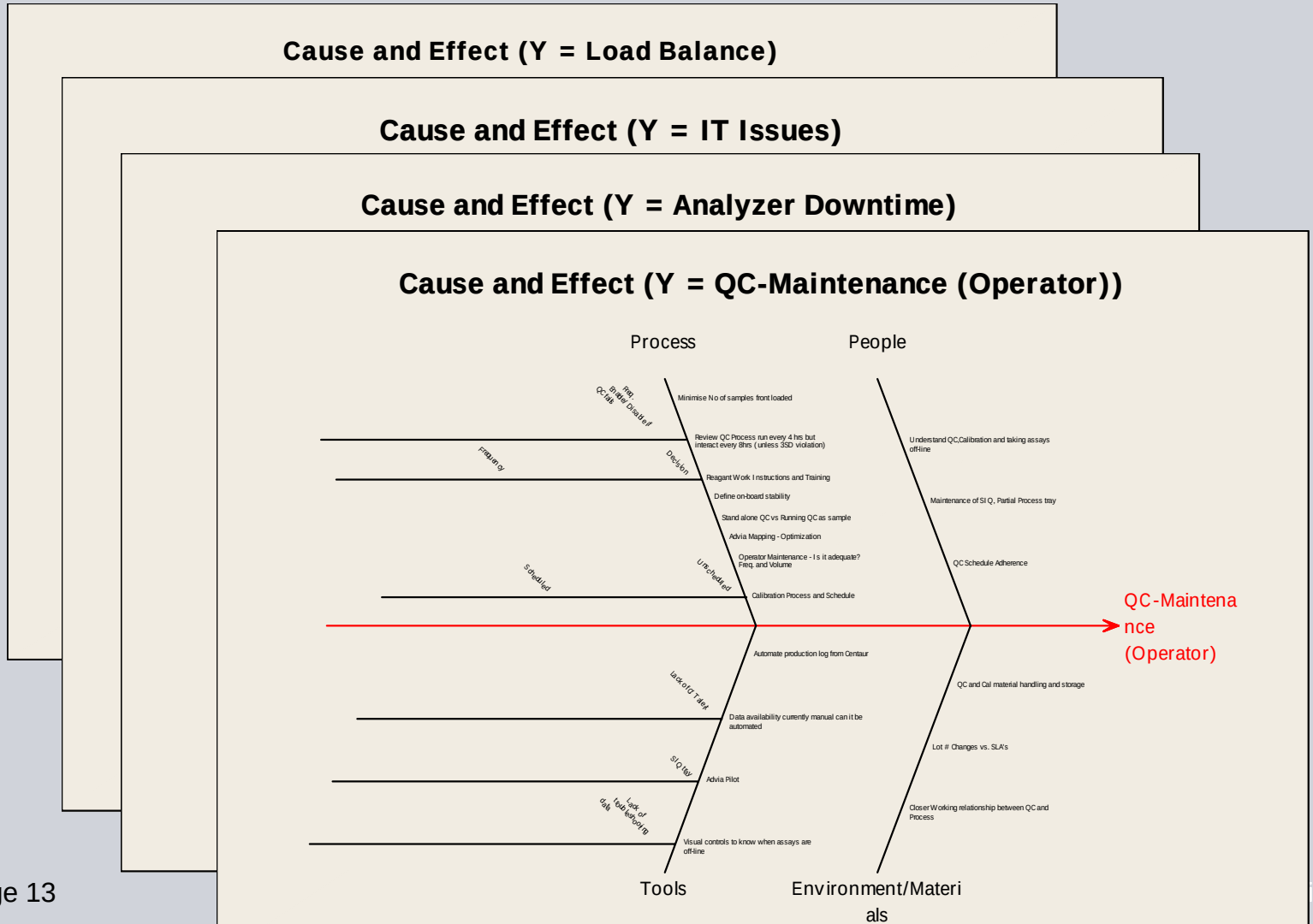
3 Sample Managers
Expected Capacity:
~925 Tubes/ Hour (Load)
>20K Tubes/Day

23 hrs / day

~ 20K tubes/day

Problem Classification & Priority Setting

Complex Operation with Multiple Levels of Interdependencies



Capacity

Conduct an Analysis based on current Test Mix

Identify Actionable Steps that can Increase Throughput

Achieving Operational Excellence

Capacity Analysis based on Work Flows

Process

- Obtain Data – LIS, LabCell (Instruments, Automation Line, and Sample Managers)
- Monitor operations and document any anomalies or key factors that may affect output

Compile Data by Instrument / Workstation

- Considerations – Total Chemistry volume processed

Measurement Period

- 24 hours on two different high volume dates

Facts:

Automation Output Interdependencies

System Capacity is dependent upon many related interactions including:

- **Tube/Test Mix**
- **Tube Arrival Times**
- **System Operations (hours)**
- **System Downtime**
- **Barcode Dependability**
- **Order Availability (Scanning)**
- **Test Maps**
- **Repeat Rates & Add-Ons**

System	Avg. Tests/hr	Avg. Tubes/hr	Systems	Tubes/ System	Operation Hrs	Tot. Tubes	Tot. Test
ADVIA Centaur	130	75	7	525	21	11,025	19,110
ADVIA Chemistry	1,053	135	3	405	21	8,505	66,339
Total	1,183	210	10	930	21	19,530	85,449

Note: This capacity is based on 23.5 hours per day of track operations (excl. Mondays) and analytical instruments on line for 21 hours per day with specimen loads available

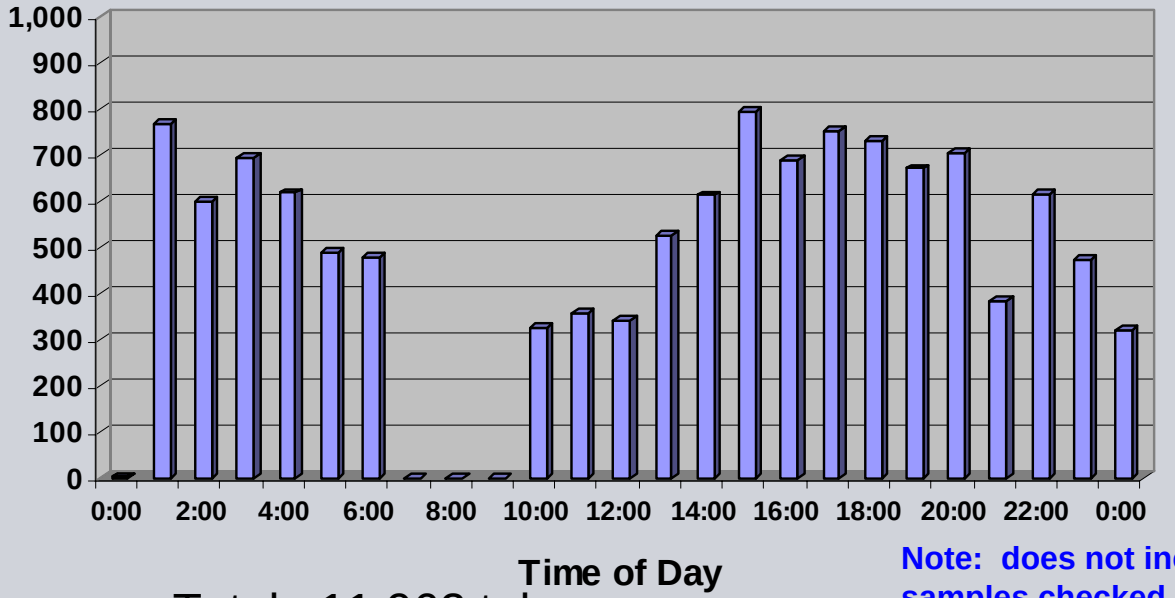
Measurement: Automation

Sample Manger Loading (log files)

Hour	No.
0:00	323
1:00	771
2:00	600
3:00	695
4:00	619
5:00	489
6:00	480
7:00	0
8:00	0
9:00	0
10:00	324
11:00	358
12:00	340
13:00	526
14:00	613
15:00	795
16:00	691
17:00	752
18:00	734
19:00	672
20:00	707
21:00	382
22:00	618
23:00	473
Total	11962

Throughput is Lower than expected

Number of Unique Samples
Checked Into ADVIA LabCell By Hour (May 6/7)



Total: 11,962 tubes

Hours: 20.2 hours

Average Throughput: 592 tubes/hour

Note: does not include samples checked into the line more than once for repeats, dilutions, re-routing, sorting, etc.

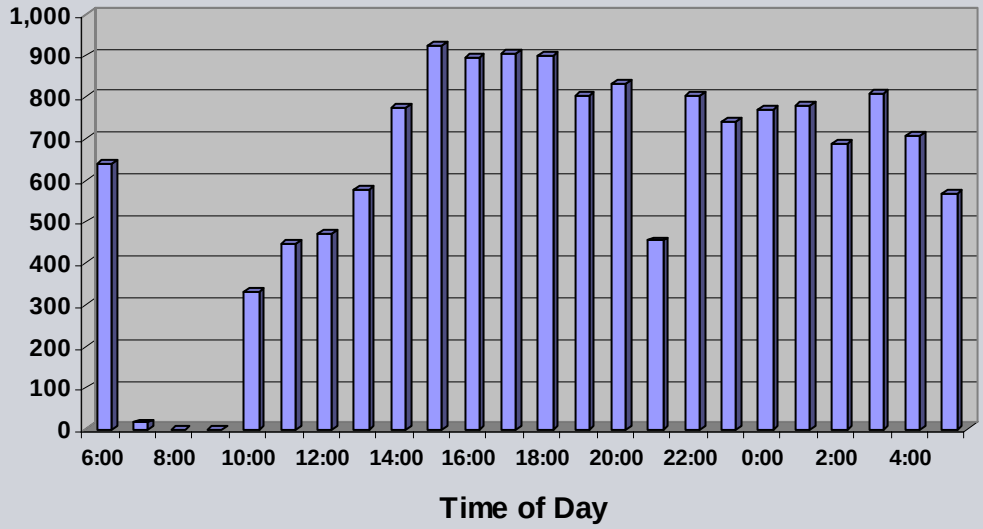
Data Source: **Wonderware Logger File, 7 May 2008**

Measurement: Automation

Actual Total Sample Loading

Capacity Exceeds 900 samples / Hr.

Number of Samples Loaded Onto ADVIA LabCell By Hour (May 6/7)



Hour	No.	Repeats	Totals
6:00	480	159	639
7:00	0	15	15
8:00	0	0	0
9:00	0	0	0
10:00	324	9	333
11:00	358	91	449
12:00	340	133	473
13:00	526	51	577
14:00	613	163	776
15:00	795	128	923
16:00	691	206	897
17:00	752	155	907
18:00	734	165	899
19:00	672	133	805
20:00	707	128	835
21:00	382	72	454
22:00	618	186	804
23:00	473	268	741
0:00	323	448	771
1:00	771	9	780
2:00	600	90	690
3:00	695	116	811
4:00	619	87	706
5:00	489	77	566
Total	11962	2889	14851

Total Check Ins: 14,851 tubes

Hours: 20.2 hours

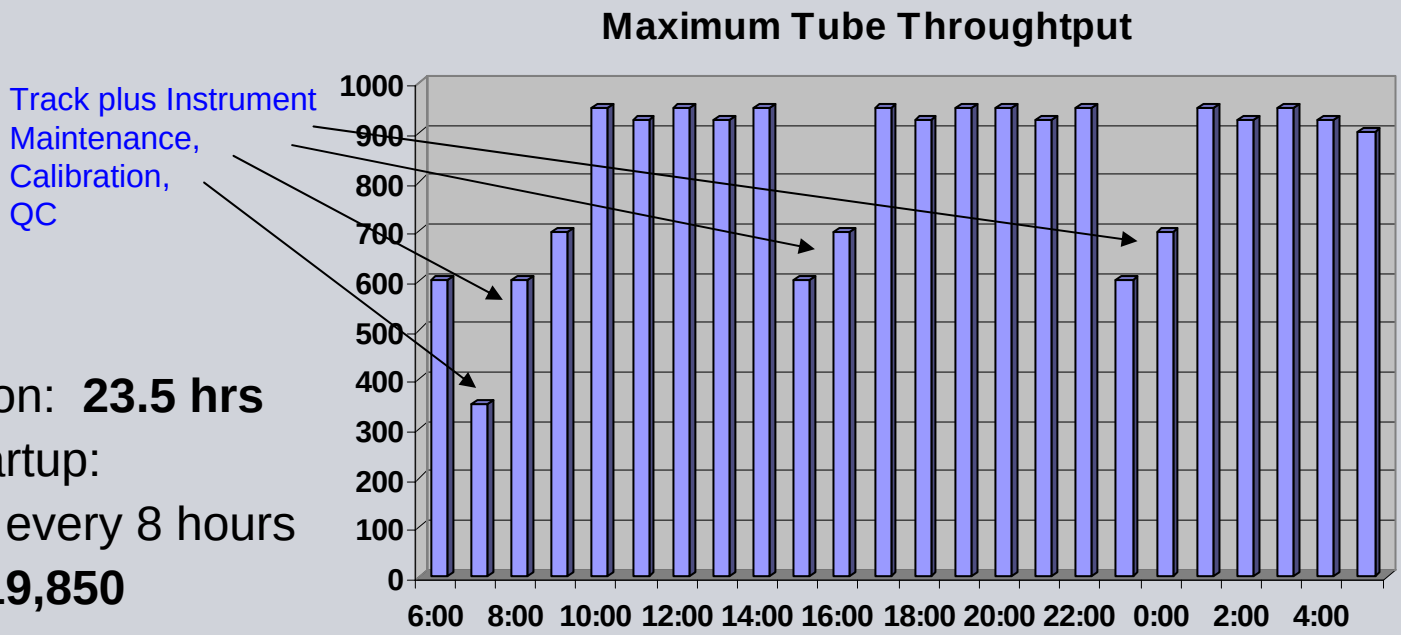
Average Throughput: 735 samples/hour

Note: Includes samples checked into the line more than once for repeats, dilutions, re-routing, add-ons, sorting, etc. (19.8%)

1200 clinical repeats, 400 dilutions, etc.

Data Source: WWL Files, 7 May

Expected Tube Capacity / Throughput by Hour



Track Operation: **23.5 hrs**

Inst. Maint/Startup:

Staggered every 8 hours

Total Tubes: **19,850**

Hr	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00
Tubes	600	350	600	700	950	925	950	925
Hr	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
Tubes	950	600	700	950	925	950	950	925
Hr	22:00	23:00	0:00	1:00	2:00	3:00	4:00	5:00
Tubes	950	600	700	950	925	950	925	900

Data Source: WWL Files

Percent Capacity Achieved on ADVIA Automation (with repeats)

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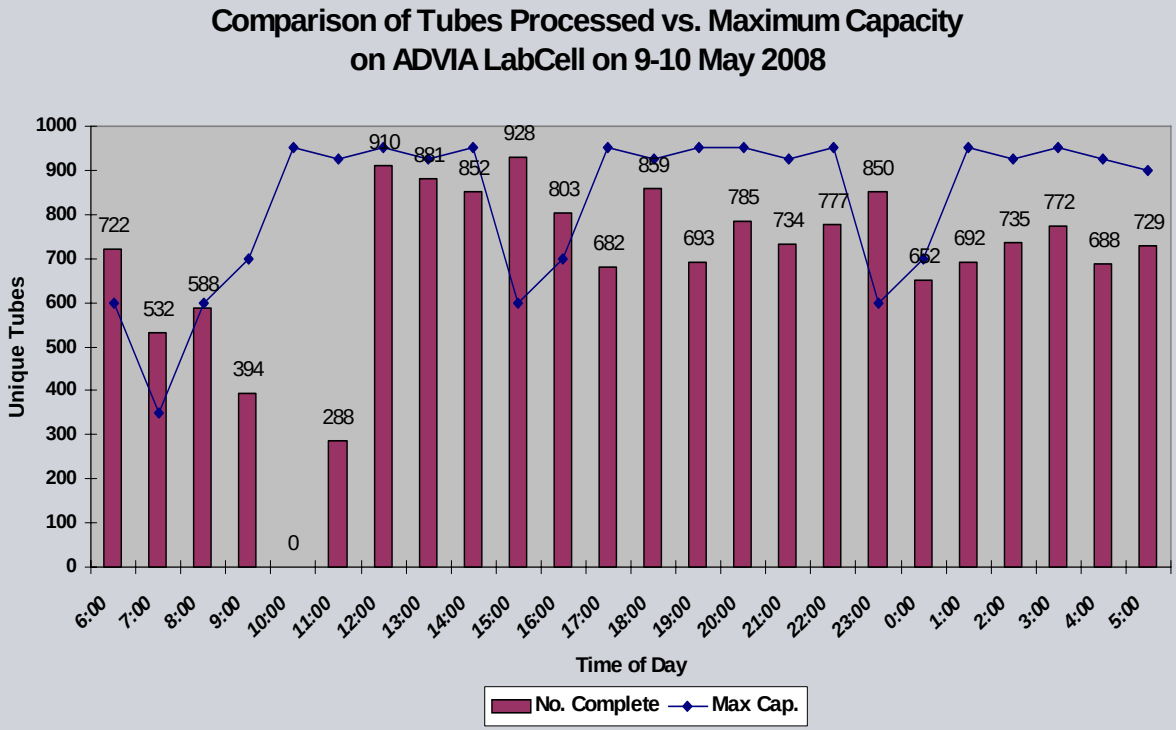
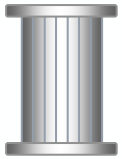
Hour	No. Complete	Repeats	Total No.	Max Cap.
6:00	560	162	722	600
7:00	464	68	532	350
8:00	392	196	588	600
9:00	320	74	394	700
10:00	0	0	0	950
11:00	243	45	288	925
12:00	781	129	910	950
13:00	688	193	881	925
14:00	720	132	852	950
15:00	748	180	928	600
16:00	592	211	803	700
17:00	565	117	682	950
18:00	683	176	859	925
19:00	603	90	693	950
20:00	632	153	785	950
21:00	540	194	734	925
22:00	624	153	777	950
23:00	701	149	850	600
0:00	527	125	652	700
1:00	560	132	692	950
2:00	657	78	735	925
3:00	623	149	772	950
4:00	572	116	688	925
5:00	578	151	729	900
Total	*13,373*	*3,173*	*16,546*	*19,850*



Loaded 16,546 tubes on the Automation System

Based on tubes with reruns, repeats, add-on orders, and SIQ tubes

*Note: This capacity is based on **23.5 hours** per day of track operations (excl. Mondays) and analytical instruments on line for 21 hours per day with specimen loads available*



Capacity and Workload Summary

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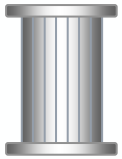
Improvements in Operation will Increase Capacity

- Reduction of no-reads
- Reduction of tubes in the SIQ (800-1,000/day)
- Reduction in operator enable/disable systems
- 23.5 Hours Automation Track Operation
- Maintaining Two Chemistry systems on-line
- Changing start-up procedures
- Reducing unnecessary repeats, add-ons

Automation Capacity

- Adding an additional Sample Manager will increase capacity up to 26,500 tubes, enable sorting to the offline ADVIA 2400, and provide a backup.



Operational Excellence

Execute New QC Program

Maximize Line Operations -- Develop and Implement Rules regarding Overall Automation Operations

Optimize Test Mapping

Optimize Supply Chain and Stocking – reduce lead times

Recognize and Reward broadly

Knowledge Transfer

Product Training & Education

Conduct Needs Analysis for the entire line for Service and Users

Develop Customized Programs for Service and Users

Deliver Training

Performance Monitoring

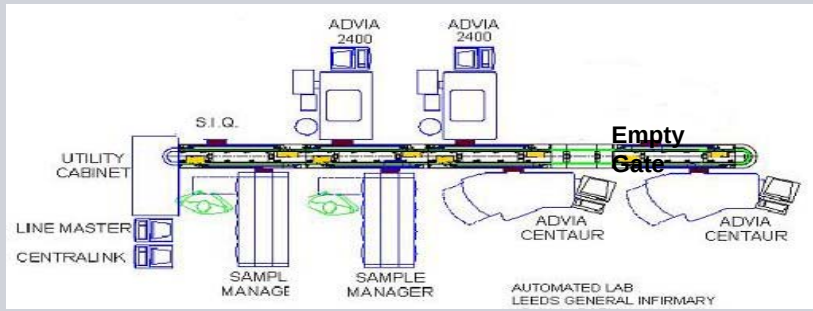
Identified Needed Tools for Effective Support

Dashboard

Visual Controls and Work Instructions

Develop New Service and Support Tool for Performance Monitoring

File Generation
File Processing
Report Generation



Establish Visual Controls:

- Automatic File Processing
- Real time analysis for Problem Analysis
- Productivity analysis

Overall Findings

The Ultimate Key to Success requires a comprehensive upfront and executed plan that includes these essential elements:

- Understanding and Focus on customer's operations, capabilities, and future projections in order to clearly identify needs / gaps
- Planning, staffing, and training before the installation
- Effective project management
- Effective handoffs and smooth communications across each participating function within DX
- Assisting the customer with "Change Management"
- Implementing programs and tools that enable the customer to manage the entire line for optimal performance (does not exist today)
- Customized training plan
- Focus on "Workflow Optimization" after installation

Questions