

THE INTEGRATION OF SMART DEVICE TECHNOLOGIES INTO INSTRUMENTATION TO OPTIMIZE PLANT PERFORMANCE

AWWA Partnership Conference

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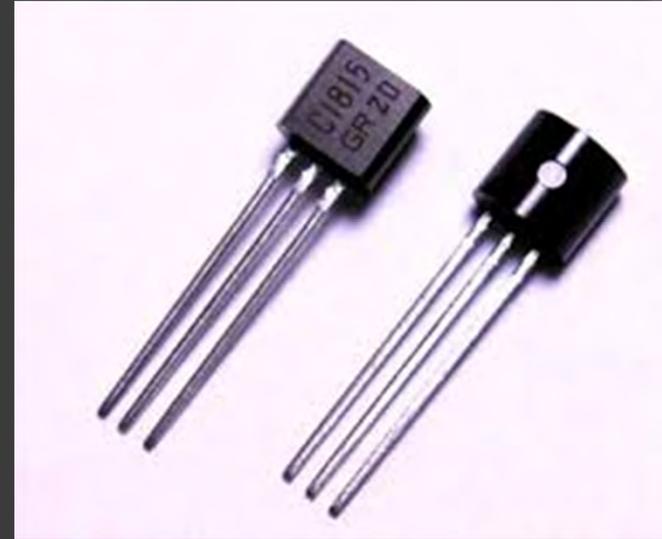
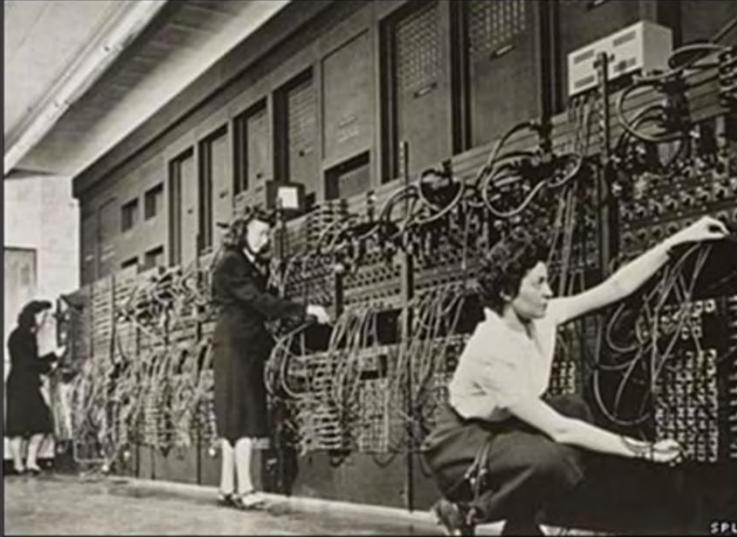
October 29, 2015



Overview

- ① A Brief Look at History and Instruments
- ① Instrument Analytics
 - What is the Job of an instrument?
 - How they typically are used
- ① The direction of culture and instrumentation
- ① An example of integration

What are some of the greatest inventions/discoveries of all



The optimization of an invention!



Optimization of the Telephone



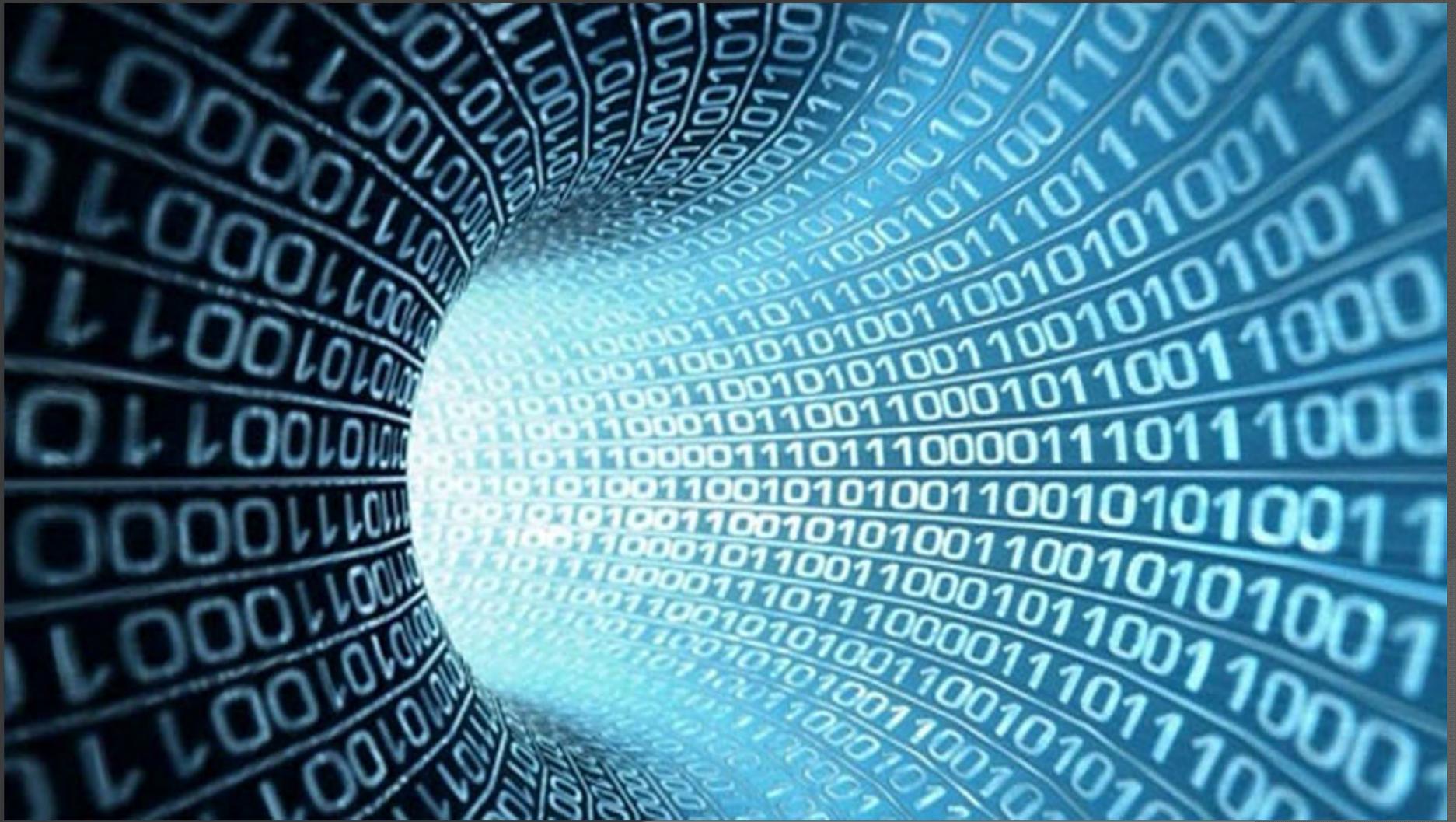
There are more smart devices than humans on earth

- In October 2014 there were 7.22 million devices
- Worlds Population is 7.19 to 7.22 Billion
- Smart Devices are multiplying 5 fold faster than humans
- Smart devices are economical



Source: www.independent.co.uk

We live in the “Age of Information!”



The world has become..



So what does that mean for the operator?



Their role has evolved

- ⦿ “Old” Role:

- Limited data
 - Difficult to access
 - Difficult to process and draw conclusions
- Decisions
 - Based on historical analysis
 - Based on experience
 - Individual judgement “the art”

A common concern with this “Old” Role



The New Role

- ◎ The data broker!
 - Take data and turn it into information
 - Which information is meaningful and how can it be effectively used
 - Instantaneous access to information to make judgements



The Path to Optimization



For optimization to be realized, the time it takes to acquire the data and then turn it into useful (decision making) information is critical.

The Job of an On-Line Instrument

- ⦿ Perform a measurement
- ⦿ Communicate the result
- ⦿ Do not turn data into information
 - Data has to be processed
 - Takes significant investment of time and effort



Requirements of On-Line Instrumentation

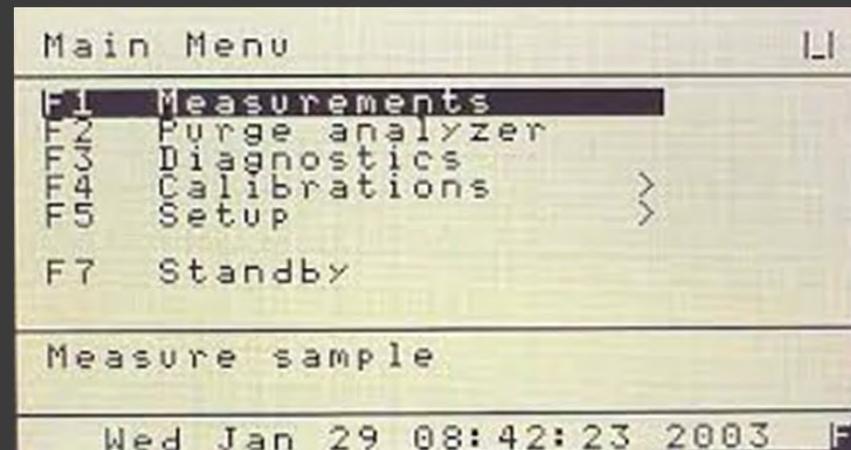


- Reliably operate over time
- Require calibration and verification programs
- Require maintenance
- Must have a user interface

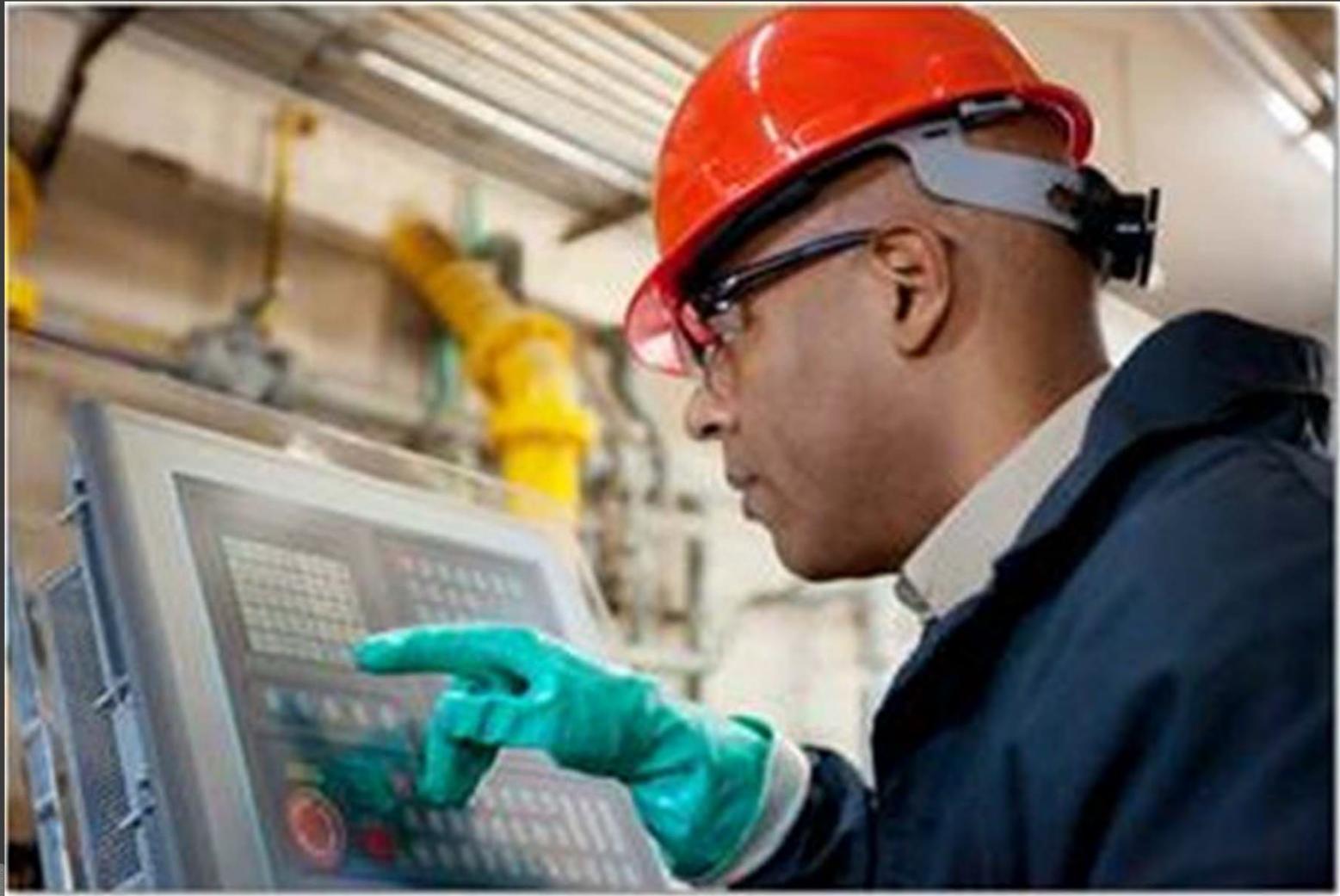
User Interface for Process Instruments

The controller is primary the user interface

- Physical Interface
 - Operator must physically interface with the instrument



How can the link between the operator and the instrument be optimized?



The Smart Interface

- Economical
- Convenient
- Secure
- Massive storage
- High processing speed
- Rapid communication speed
- Simplistic
- Reliable
- Replaceable



An Example of Integration





Filter 6

0.096

NTU

S/N: 26035

Sp-66-Eff



1/11



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CFE 007



Flow: On



Outputs: Active

F/W:

Z007

0.083
NTU

S/N: 45022



Connected



Alarm: OK



Calibration



Verification



Data/Stats



Logs

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- Turbidimeter Settings -

[Date and Time >](#)

[Measurement Parameters >](#)

[Name and Asset Tag >](#)

[Outputs >](#)

[Security >](#)

[Verification Pass/Fail >](#)

- Application Settings -

[Audio >](#)

[Language >](#)

[Screen Orientation >](#)

- Resources -

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- Relay 1 -

Enable



Low Alarm



High Alarm



Loss of Power



Loss of Flow



Set Low Alarm Value:

 NTU

(Enter a value from 0-100)

Submit

Set High Alarm Value:

 NTU

(Enter a value from 0-100)

Submit

Set Low Alarm Deadband Value:



Loas

Outputs are currently held for:


minutes

Hold outputs for:

 **18** 
minutes

Cancel this timer/hold and
reactivate the outputs:

[Reactivate
Outputs](#)

[← Back](#)

[Submit →](#)

[← Back](#)

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CFE 005



Flow: On



Outputs: Active

F/W:

ALM

0.170
NTU

S/N: 24617



Connected



Warning!



Calibration



Verification



Data/Stats



Logs

 Back



Warning:

Alarm started at:
9/28/15 11:20 AM

Alarm duration:
2:45

The turbidimeter alarm has been triggered.
Please add your initials below and tap
'Acknowledge Alarm.'

An alarm log will be created for record
keeping purposes. Acknowledging the
alarm will not fix any problems that
triggered the alarm. It will only turn off
the alarm and create a log.

Initials are required:

 Back



CFE 007



Flow: On

Z007

0.100
NTU



Connected



Outputs: Active

F/W:

S/N: 45022



Alarm: OK

Statistics:

02/12/2014 - 03/06/2014

Maximum Value:	0.1687 NTU
Minimum Value:	0.0564 NTU
Range:	0.1687 NTU
Average Value:	0.0638 NTU
Standard Deviation:	0.0194 NTU
Number of data points:	164
Median Value:	0.0585 NTU

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[Export](#)

[Filter](#)



CFE 007



Flow: On



Outputs: Active

Z007

0.108 NTU

S/N: 45022



Connected



Alarm: OK

Date	Time	Value	Unit
1/3/2014	14:51:55 PM	0.1687123404	NTU
1/3/2014	14:52:55 PM	0.1603350572	NTU
1/3/2014	14:53:55 PM	0.149320042	NTU
1/3/2014	14:54:55 PM	0.1425202864	NTU
1/3/2014	14:55:55 PM	0.1361840684	NTU
1/3/2014	14:56:55 PM	0.1359822742	NTU
1/3/2014	14:57:55 PM	0.1358885224	NTU
1/3/2014	14:58:55 PM	0.1140782278	NTU



1



Export

Filter

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CFE 007

Z007



Flow: On



Outputs: Active

F/W:

0.115
NTU

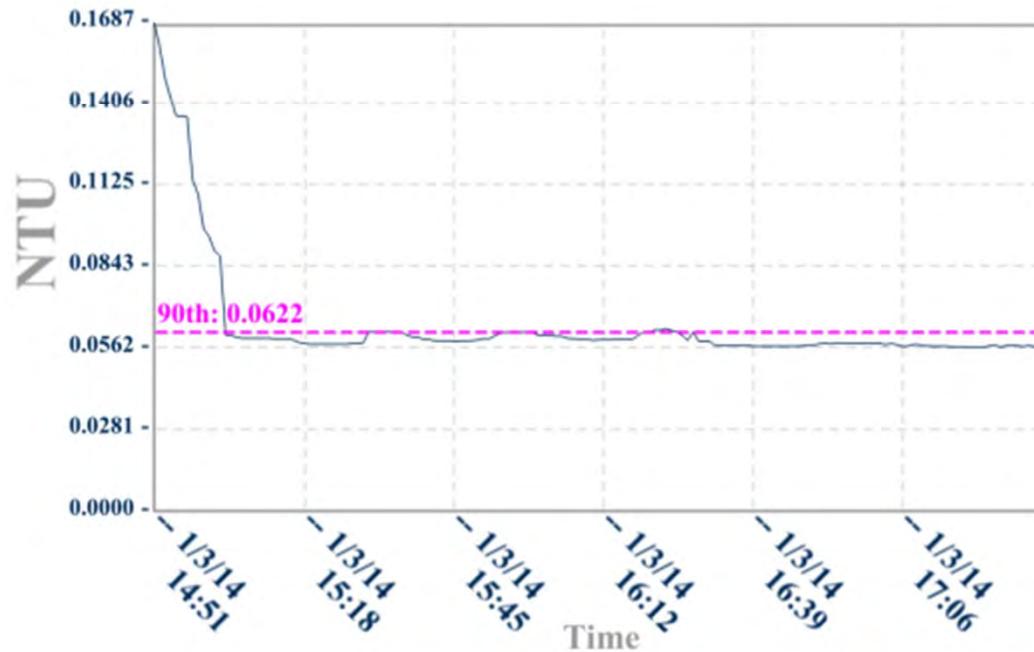
S/N: 45022



Connected



Alarm: OK



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Graph
Settings

Export

Filter



CFE 007

Z007



Flow: On

0.099
NTU



Connected



Outputs: Active F/W:

S/N: 45022



Alarm: OK

Toggle the Following Graph Lines:

Maximum Value:	<input checked="" type="checkbox"/>	Minimum Value:	<input type="checkbox"/>
Range:	<input type="checkbox"/>	Average Value:	<input checked="" type="checkbox"/>
Standard Deviation:	<input type="checkbox"/>	# of Data Points:	<input type="checkbox"/>
Median Value:	<input type="checkbox"/>	Upper Control Limit:	<input type="checkbox"/>
		Lower Control Limit:	<input type="checkbox"/>

Percentile: 25th 50th 75th 90th 99th Custom

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CFE 007

Z007



Flow: On



Outputs: Active



0.116
NTU

F/W:

S/N: 45022



Connected



Alarm: OK

Upper Control
Limit



Lower Control
Limit



Percent
Compliant



Percentile



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Smart device integration is coming fast!

