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Petrolchimico

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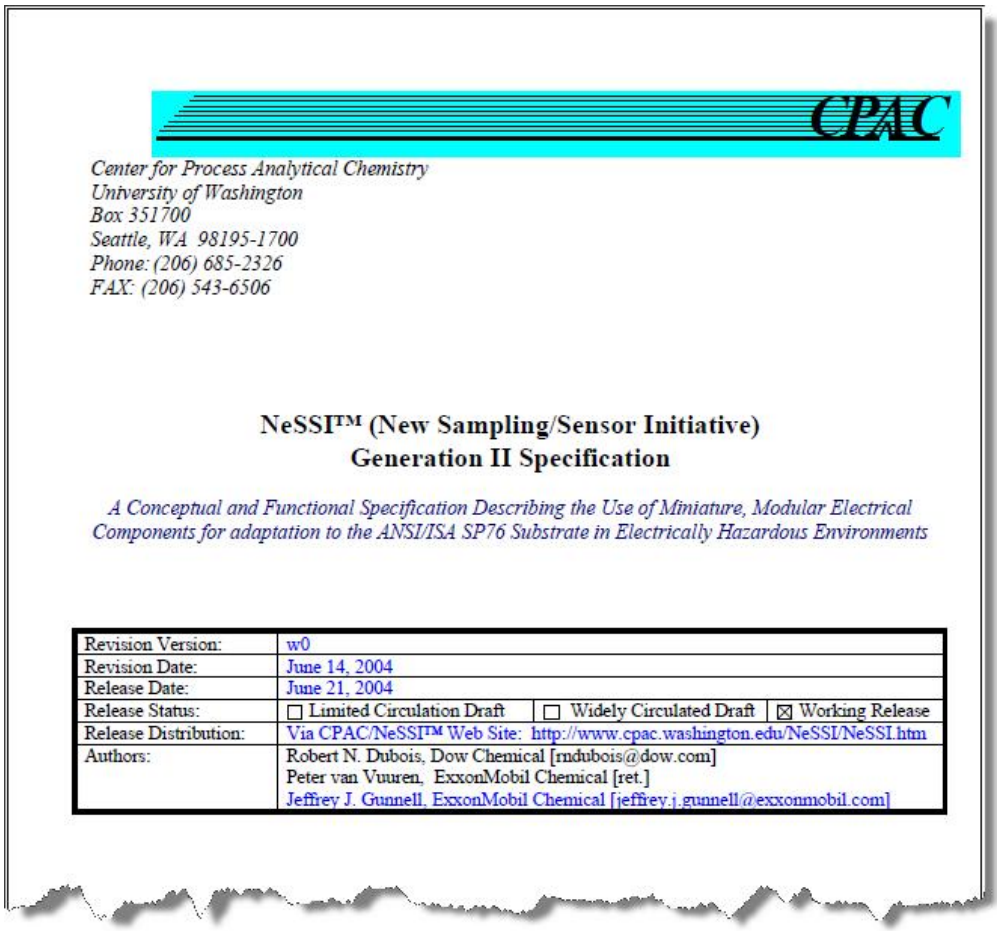
Generation 2 (Standard Connectivity)

Achieving Full Process Analytical System Integration

NeSSI™ Generation 2 (Standard Connectivity)
Agenda

- Introduction
- System Requirements
- The NeSSI™ Value Proposition
- Managing Industry Perceptions
- Field Applications

NeSSI Generation 2
Introduction



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NeSSI™ (New Sampling/Sensor Initiative)
Generation II Specification

A Conceptual and Functional Specification Describing the Use of Miniature, Modular Electrical Components for adaptation to the ANSI/ISA SP76 Substrate in Electrically Hazardous Environments

Revision Version:	w0
Revision Date:	June 14, 2004
Release Date:	June 21, 2004
Release Status:	☐ Limited Circulation Draft ☐ Widely Circulated Draft ☒ Working Release
Release Distribution:	Via CPAC/NeSSI™ Web Site: http://www.cpac.washington.edu/NeSSI/NeSSI.htm
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- Based on the use of the miniaturized, modular analytical systems designed to the ANSI/ISA SP76.00.02-2002 standard substrate (Gen 1)
- Integration of electrical components on IS communication bus

System Requirements
Communication Bus

Maintenance on demand *requires remote diagnostic and alarming capability*.

- Sensing and control devices (Pressure, flow, temperature, valve actuation, **ΔP**, **SAM**)
- A means of defining different SHS alarm states
- A means of transmitting the SHS status and alarms

Basic Remote Capability

- Sensing/control devices are inside a heated SHS enclosure
- Class 1 Division 1 Groups A,B or Zone 0,1 Group IIC hazardous ratings
- Harsh corrosive environments and extended elevated temperatures
- Small device footprint (1.5” x 1.5” or 1.5” x 3”)

Application

- Reasonable ROI including TCO, continuous focus on safety
- Integration into existing plant network & analyzer infrastructure
  - Open communication standard that fits in the OSI network model
  - Does not compromise plant network robustness or security

End User

System Requirements

Intrinsically Safe Method of Protection

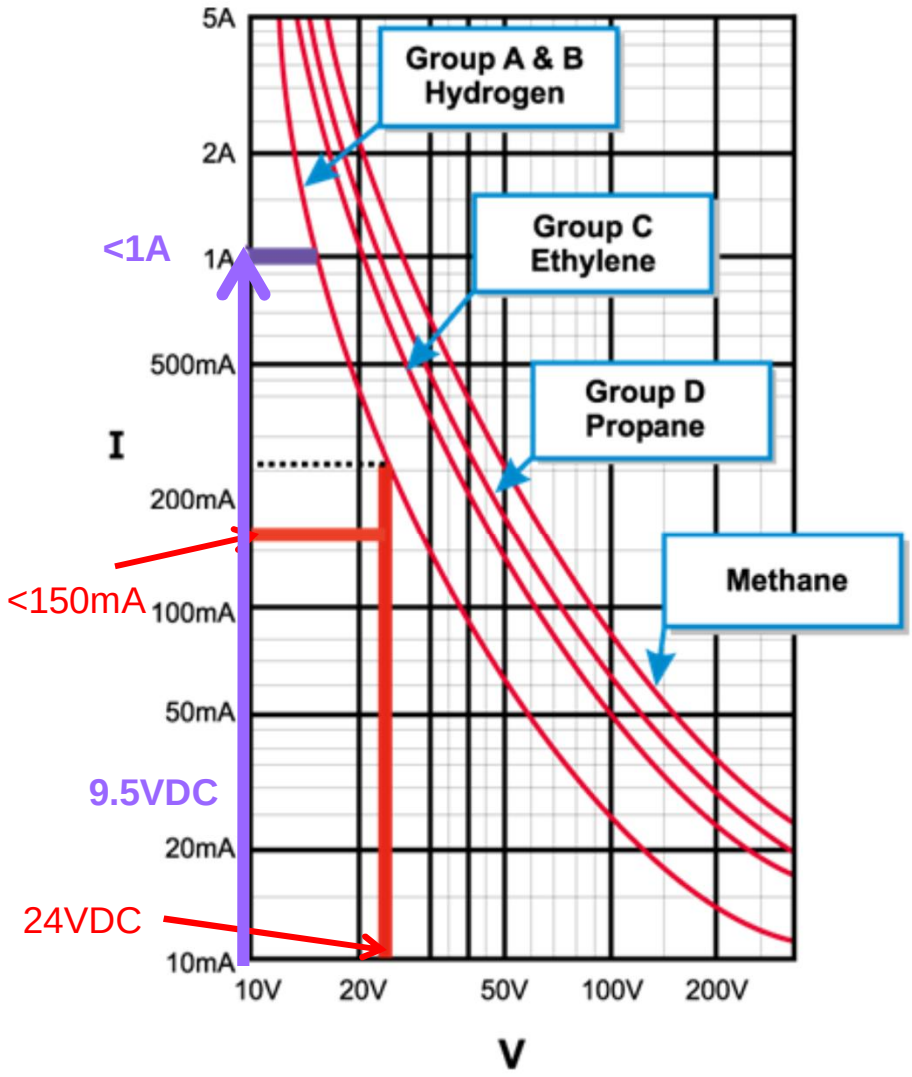
It's all about voltage!!

Group A (Hydrogen) service dictates that any 24VDC device must draw less than ~150mA (w/ safety factor included)

Allows for 9.5V which allows up to 1000mA of current with safety factor included, 8.5W total

All digital devices only require 5.0V or 3.3V, therefore large numbers of digital sensors can be put on one power rail.

Resistive Energy Curve to Ignite Specific Gases In Presence of Oxygen and Ignition Source



System Requirements

Sensor Actuator Manager (SAM)

A stand alone or embedded device

- Communication bridge between C1D1 (Zone 1) and C1D2 (Zone 2) for CAN communications
- Integrated analog I/O to digitize 4-20mA or 0-10 VDC devices
- Obtains inventory of all CAN networked devices using electronic data sheets
- Monitors total system “inventory” and health/status
- Has a basic application interface that can pass alarm triggers and set points down to devices and pass alarms and data up to GC
- Future upgrade path for CAN device metadata to provide system configuration data up to HMI at GC interface or “stand alone SAM”

System Requirements

Network Topology from Sample Tap to DCS

DCS

Maintenance PC

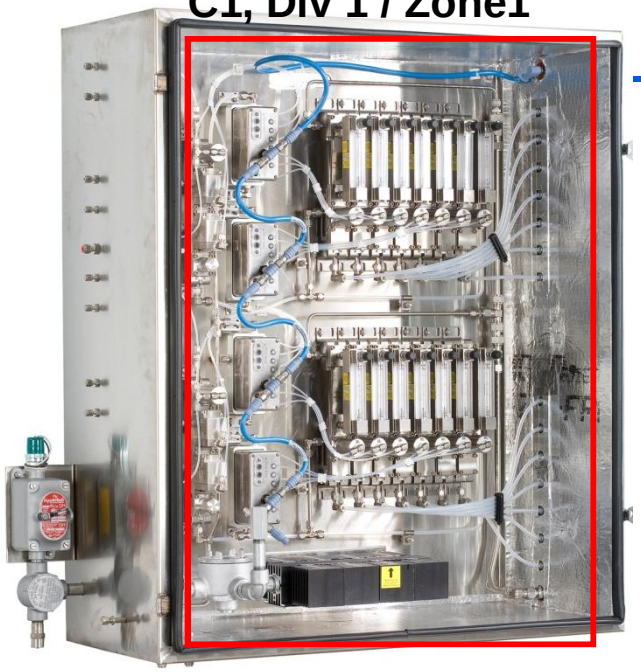
Analyzer LAN

C1, Div 2 / Zone2

IS Comms

Div 1 / Zone 1 only

C1, Div 1 / Zone1



IS Power

Div 1 / Zone 1 only

Critical Data Reporting

SHS Status and Health, Analyzer Sample Flow

Bypass Filter Health Monitoring

- ΔP across bypass filter monitored to indicate and alarm on filter blockage
- Low, low-low, high and high-high alarms for this value can be set and are available remotely via OPC

Analyzer Sample Flow

- DMT directly measures the flow of sample to the analyzer
- Displayed on the PGC5000 UI and can be monitored to indicate a potential low flow condition
- Low, low-low, high and high-high alarms for this value can be set and are available remotely via OPC

The NeSSI™ Generation 2 Value Proposition

Time, Money and Safety

- Maintenance on demand vs scheduled maintenance and predictive vs reactive
  - More efficient use of limited analyzer technician time
- Remote access to critical process data
  - Off specification product flaring
  - Environmental fines
  - Employee safety (priceless)
- Remote diagnostics and control
  - Valve switching and flow measurement
  - Flow control
- Standard vs Custom designs
  - Less time to engineer a system (no variability in design)
  - Less expensive to maintain

Managing Industry Perceptions

NeSSI is Too Complex

Discrete I/O

- Multiple single wiring runs through IS barriers
- Multiple stainless valve tubing runs

Serial Bus/Network

- One daisy chain loop
- One signal cable to DVM inside SHS enclosure

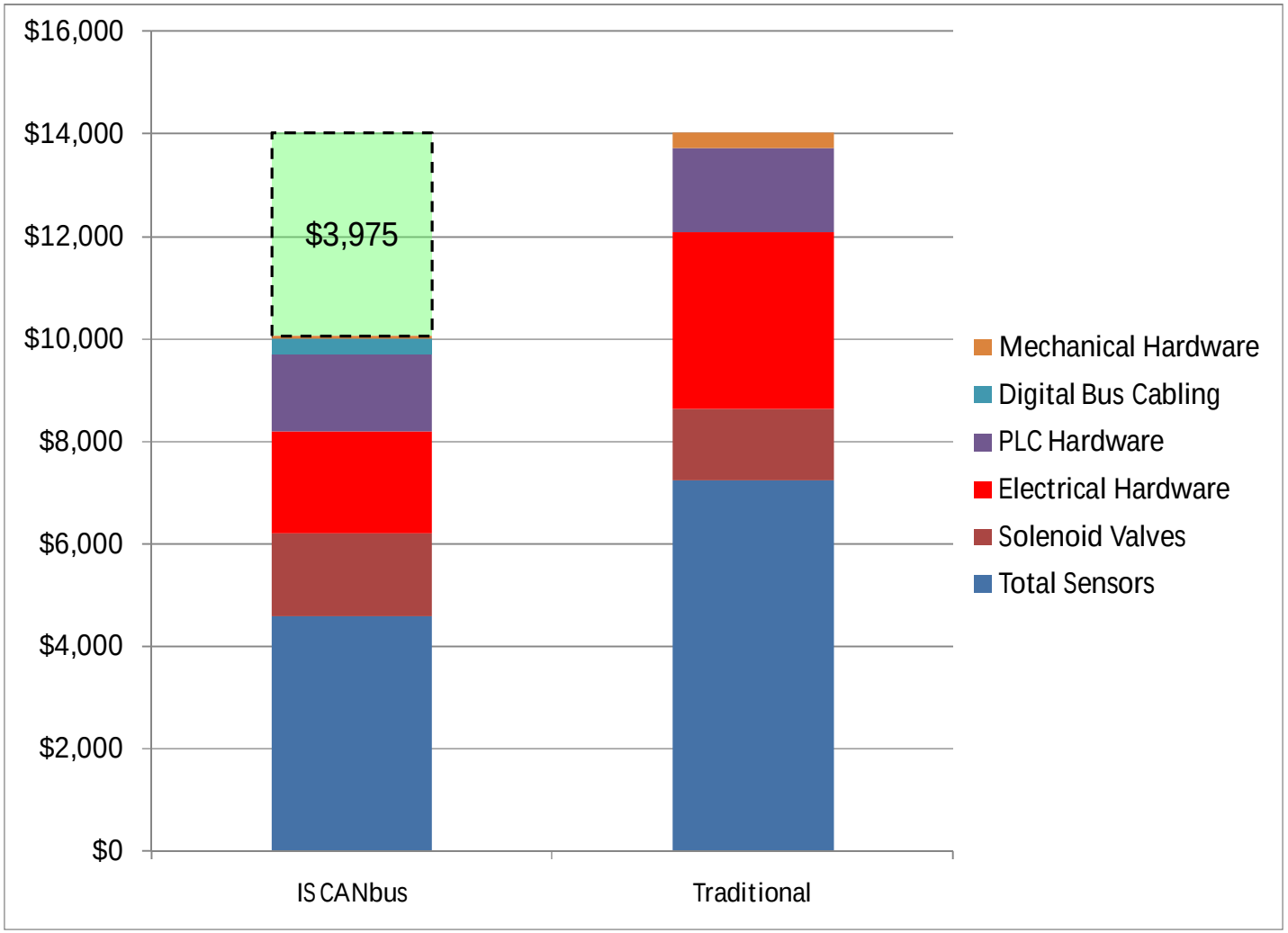
Managing Industry Perceptions

NeSSI is too expensive

- Full analog system vs IS communication bus
  - Discrete wiring is expensive
  - IS barriers are expensive
  - Limited information less efficient use of technicians time

IS CANbus Value Proposition

Upfront capital cost for 2 stream vapor SHS

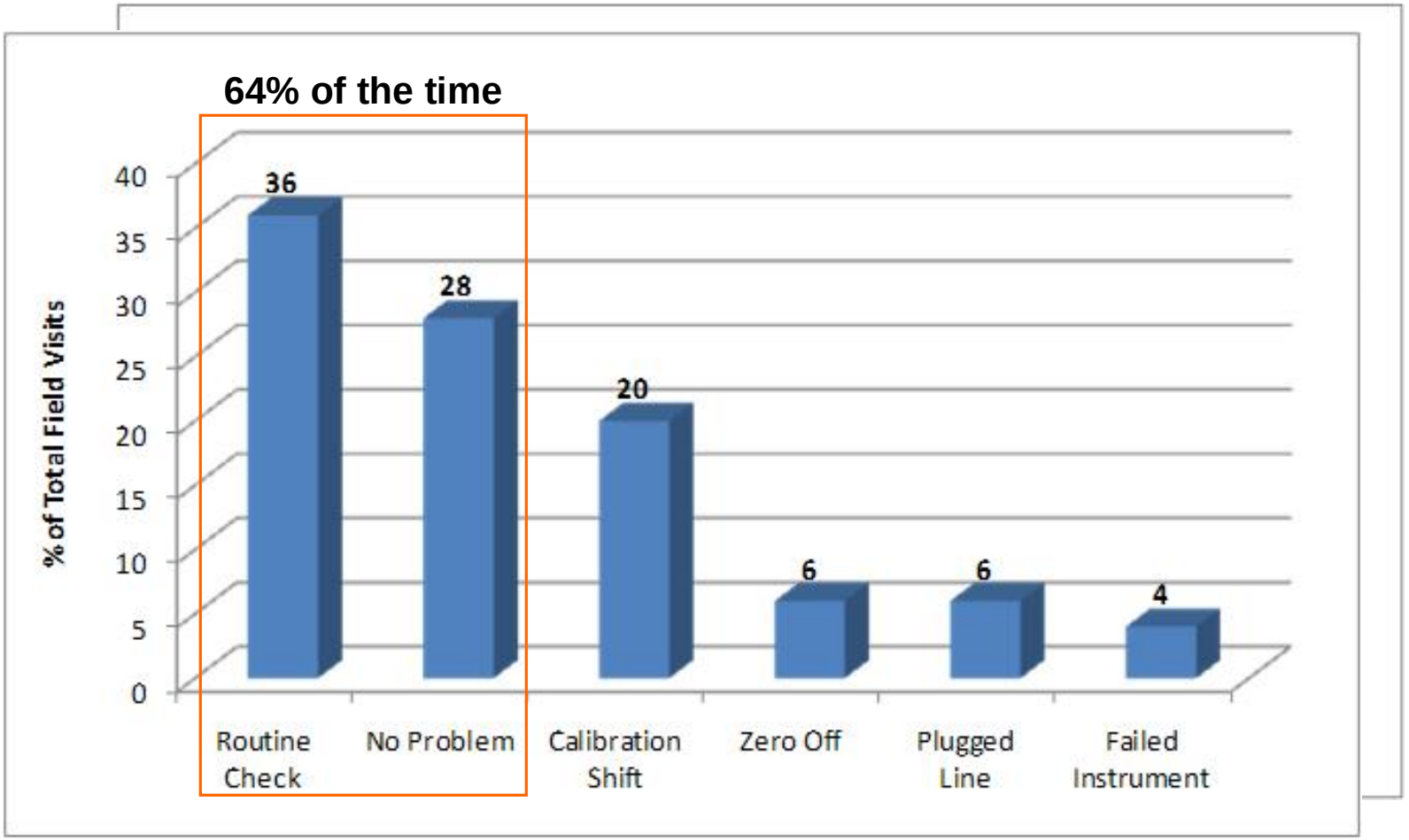


Traditional system was instrumented with PLC and 4-20mA pressure and flow devices with IS barriers

Digital NeSSI™ system exhibited a 28% upfront cost decrease due to elimination of IS wiring, barriers, extra fittings and tubing

IS CANbus Value Proposition

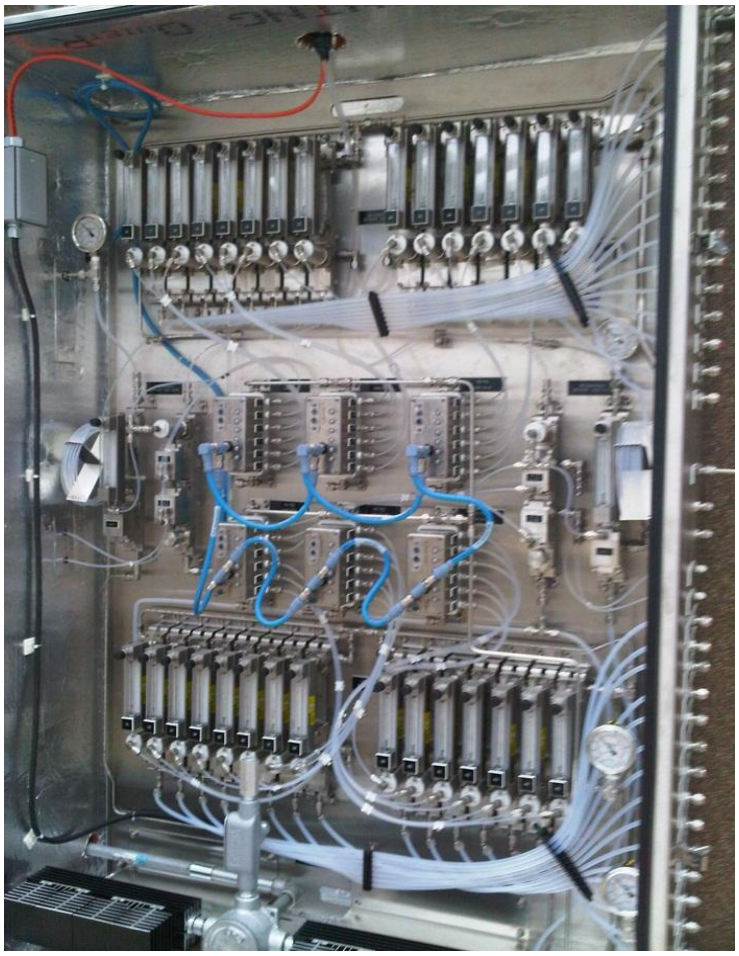
Cost of Ownership



Breakdown of reasons for field visits captured in digital field bus study

Field Applications

NeSSI Generation 2 System



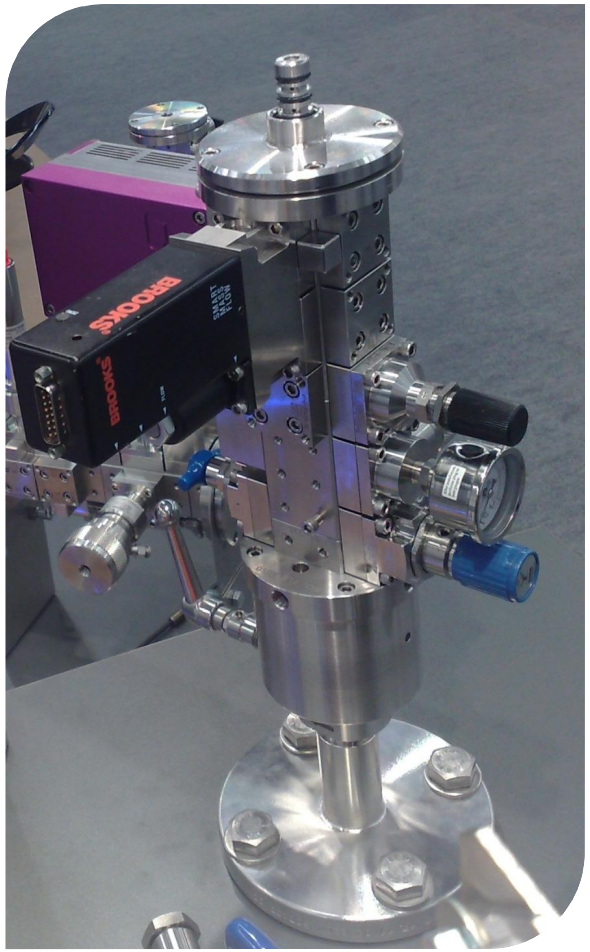
Ambient Air Monitoring System

- VCM and EDC
- 141 streams total

End User Value

- 3 fiber optic cable runs instead of 141 stainless steel pneumatic signal lines with
- Digital stream switching valve communication with PGC for inclusion in method and alarms

The Future
NeSSI Generation 3



- NeSSI™ Generation 1 and 2 technology enablers for Generation 3
- Integration of micro/mini analytical devices with digital SHS components on ANSI/ISA SP76.00.02-2002 standard substrate
  - At-line and wireless
- Represents an opportunity to drastically reduce the infrastructure costs associated with traditional process analytical systems

QUESTIONS?

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