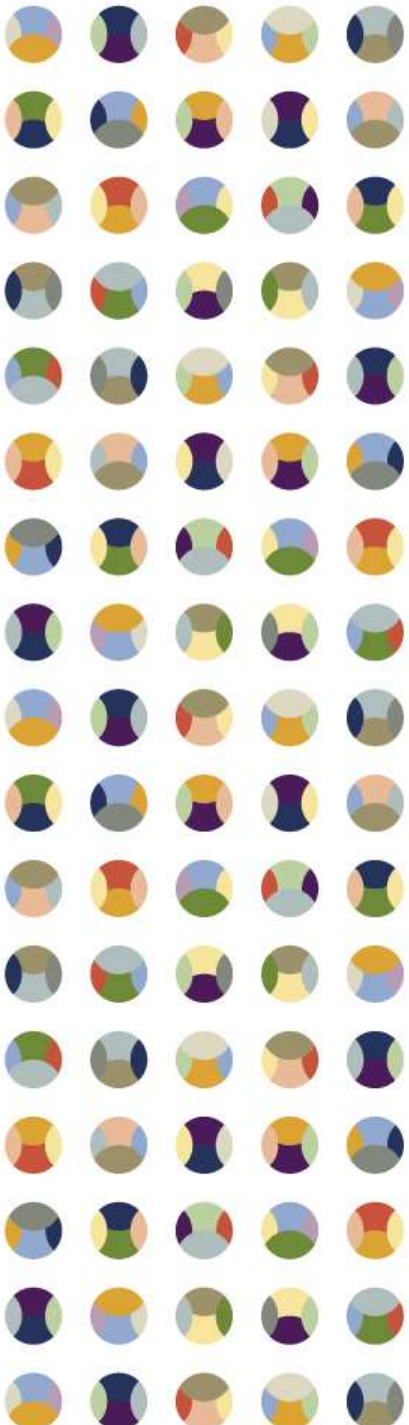


NIDays

WORLDWIDE GRAPHICAL SYSTEM DESIGN

CONFERENCE

May 18th, 2010
Helsinki, Finland

NATIONAL INSTRUMENTS

Welcome

Rudy van Gompel
Managing Director

Do More Innovation with Graphical System Design

Aku Wilenius
Technical Marketing - Nordic Countries

Engineering Grand Challenges

Advance health informatics

Engineer the tools of scientific discovery

Reverse-engineer the brain

Provide energy from fusion

Engineer better medicines

Provide access to clean water

Enhance virtual reality

Restore and improve urban infrastructure

Develop carbon sequestration methods

Advance personalized learning

Make solar energy economical

Prevent nuclear terror

Secure cyberspace

Manage the nitrogen cycle

Source: National Academy of Engineering

A Partnership in Innovation

Your Domain Knowledge
+
Graphical System Design
=
More Innovation

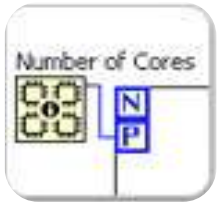
DESIGN → PROTOTYPE → DEPLOY

Do More

[with NI LabVIEW]

NATIONAL INSTRUMENTS

LabVIEW™ 2009



Multicore Processors

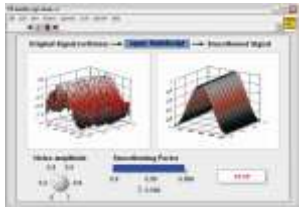
Personal Supercomputing

FPGA Technology

Rapid Embedded Design and Prototyping

Wireless Systems

Intelligent Distributed Systems



Real-Time Math

Deterministic Algorithm Deployment

NATIONAL INSTRUMENTS

Fixed-Point Casting Functions

Data Value References

New Dynamic Data Express VI

Command-Line Differencing

Using Xpath to Query XML Documents

Group Digital Signals Express VI

TDMS and NI-DAQmx Logging Integration

RSS-Driven Getting Started Window

VI Snippets

Guaranteed Downcasting of Classes

New System Directory VIs

Enhanced Curve-Fitting Functionality

LabVIEW DataFinder Toolkit

New VI Analyzer Tests

Sound VIs on Mac

Native Recursion

New Signal Processing VIs

Enhanced Icon Editor

SSL Security for Web Services

NATIONAL INSTRUMENTS

LabVIEW™ 2009

CPU Information Palette

VI Hierarchy Window Enhancements

Quick Drop Improvements

Bus/Line Configuration in Digital Waveform Graph

Partial Differential Equation Palette

Generate .NET Interop Assemblies

Domain Account Manager Enhancements

Probe Watch Window

New In-Place Element Structure I/O Nodes

New Matrix Functions

Feedback Node Configuration Options

LabVIEW MathScript RT Module

Parallel For Loops

New 2D and 3D Plots

TDMS File Format Improvements

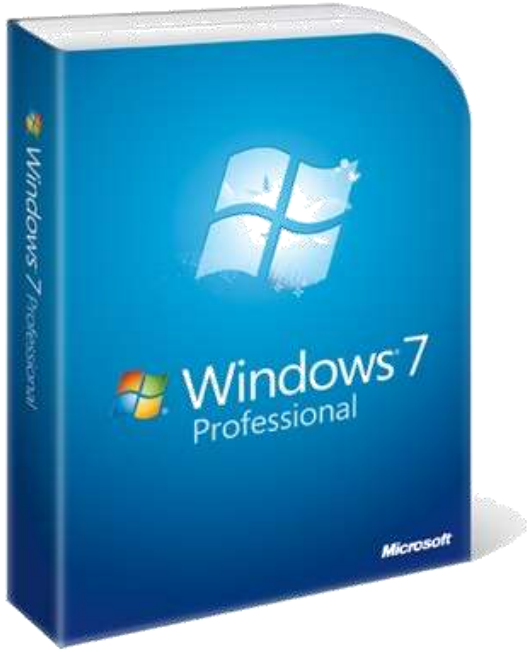
Search Algorithm Enhancements

Enhanced Block Diagram Cleanup

NATIONAL INSTRUMENTS

Supporting Windows 7

- Tested LabVIEW 2009/driver support
- Increased USB DAQ throughput
- Improved multicore/multitasking
- Enhanced performance with 64-bit



NATIONAL INSTRUMENTS

Graphical Scripting for LabVIEW

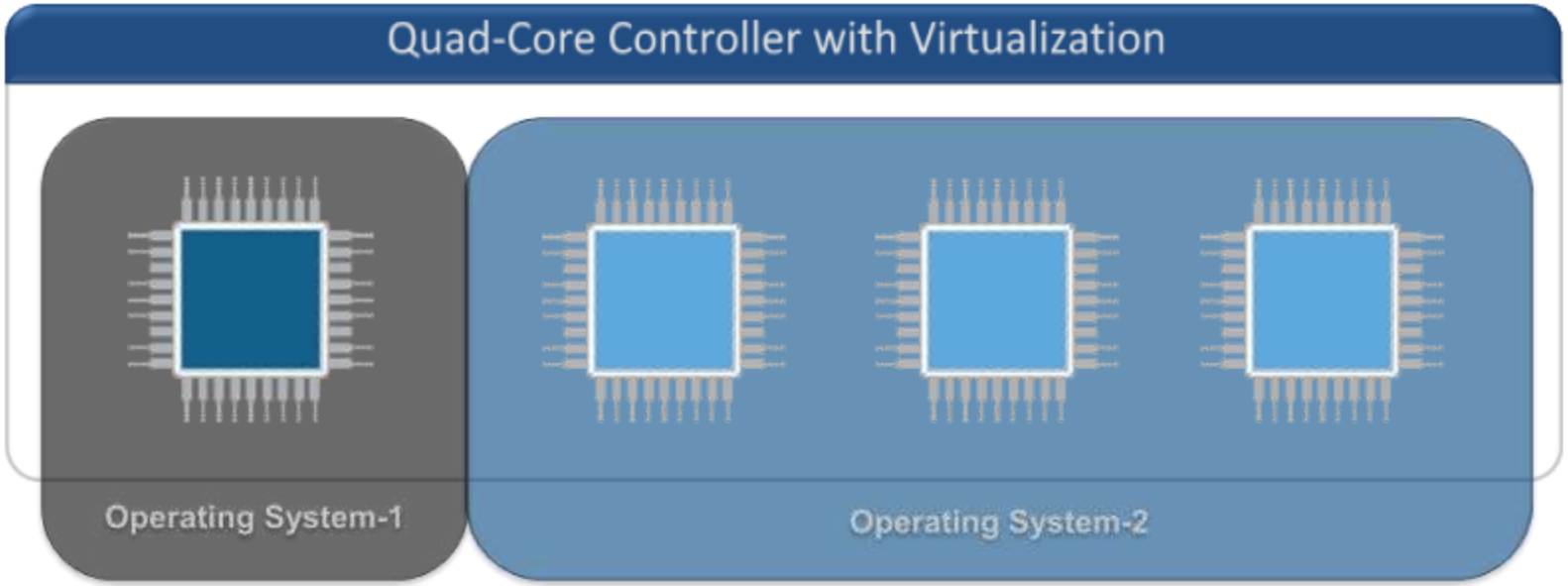
Samuli Bergström and Peter Huhtala

Do More

[Multicore]

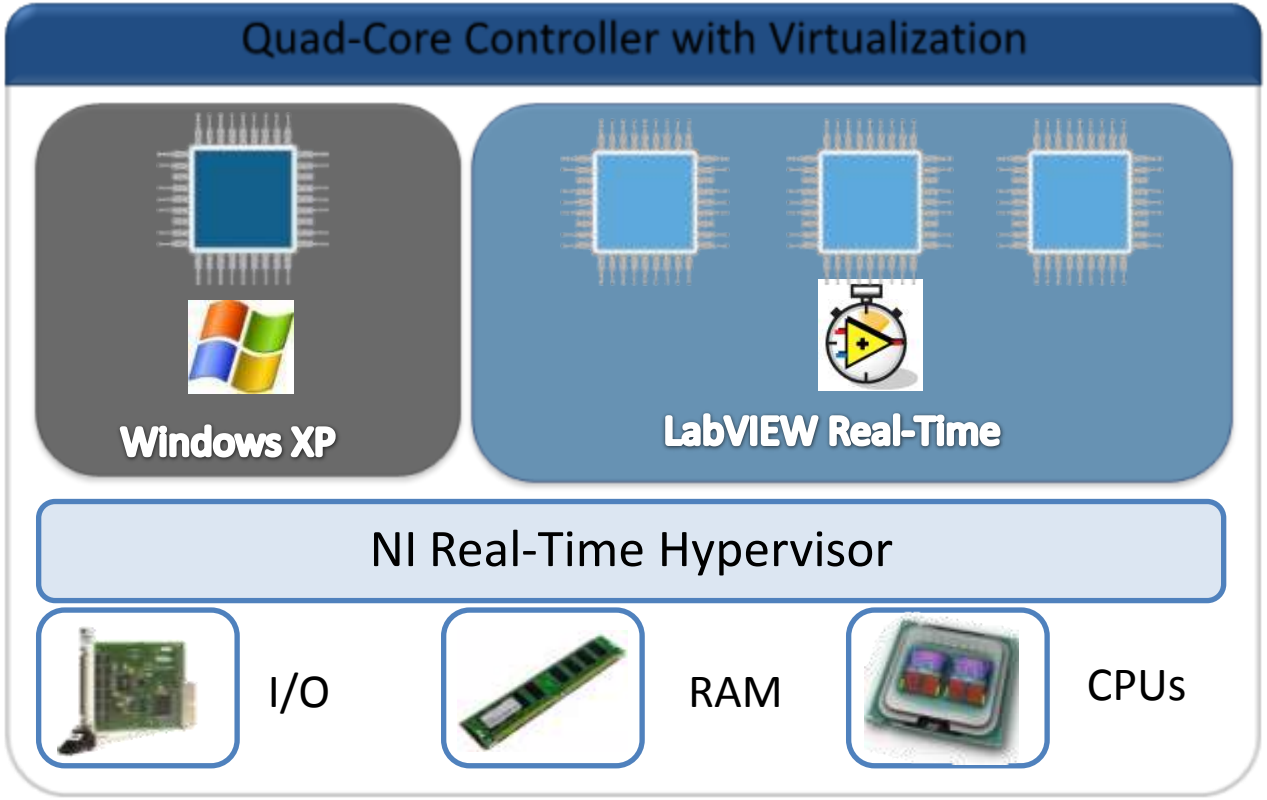

Applications
Graphics
Services
Windows XP
LabVIEW Real-Time
Determinism
Real-Time I/O
Timing

Evolution of Multicore



NI Real-Time Hypervisor

Run LabVIEW RealTime and Windows XP simultaneously



Available on multicore PXI and industrial controllers

NATIONAL INSTRUMENTS

Do More

[Data Acquisition]

20 Years | NI Data Acquisition

NuBus

1988

1989

PCI

1995

1996

ISA

E Series

PXI

1998

R Series

2003

M Series

USB

PCI Express

2004

2005

NI Wi-Fi DAQ

Ethernet DAQ

2006

2008

PXI Express

NI CompactDAQ

NATIONAL INSTRUMENTS

Introducing | NI X Series Multifunction DAQ

- 16 PCI Express and PXI Express devices
- Enhanced **NI-STC3**
  - 4 enhanced counters
  - **100 MHz** timebase
  - Independent analog/digital timing engines
- Higher throughput and lower latency
  - Native x1 **PCI/PXI Express** interface
  - **8 DMA channels** for parallel data stream

NATIONAL INSTRUMENTS

New Features | NI CompactDAQ

- Three AI timing engines
- Built-in BNC triggers
- Four counters
- Locking USB cable
- 9 to 30 VDC power
- Four-slot option

SC Express | Signal Conditioning

High Channel Count DAQ Systems

1 Increased Accuracy

- Up to 24-bit resolution
- Delta-Sigma A/D converters
- Anti-aliasing filters per channel

2 High Bandwidth

- PCI Express - Dedicated bandwidth/device
- Dynamic strain measurements
- ADC per channel

3 Best-in-Class Synchronization

- 100 MHz reference clock built-in chassis
- ns synchronization with DAQmx Multi-Device
- Automatic synchronization with DSA & X Series

4 Easy to Use

- Same DAQmx driver as DAQ & DSA
- New Bridge Channel Type in DAQmx
- Modules & Terminal Blocks auto-recognized

NATIONAL INSTRUMENTS

Do More

[Wireless Measurements]

Wireless Application Areas

Environmental Monitoring

Air/ Climate | Water/ Soil | Indoor Monitoring

Resource Monitoring

Power Monitoring | Solar Monitoring | Wind Farm Monitoring

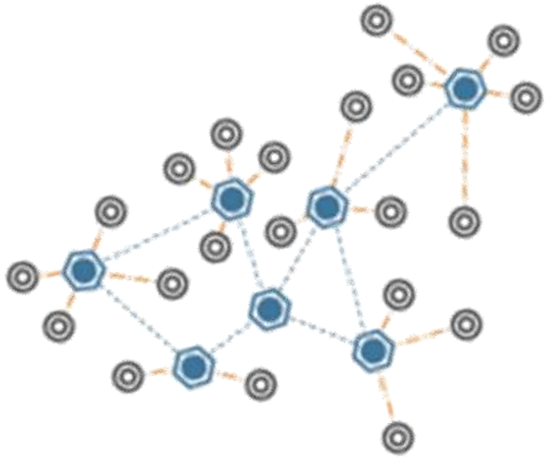
Industrial Measurements

Structural Health Monitoring | Machine Condition Monitoring | Process Monitoring

NATIONAL INSTRUMENTS

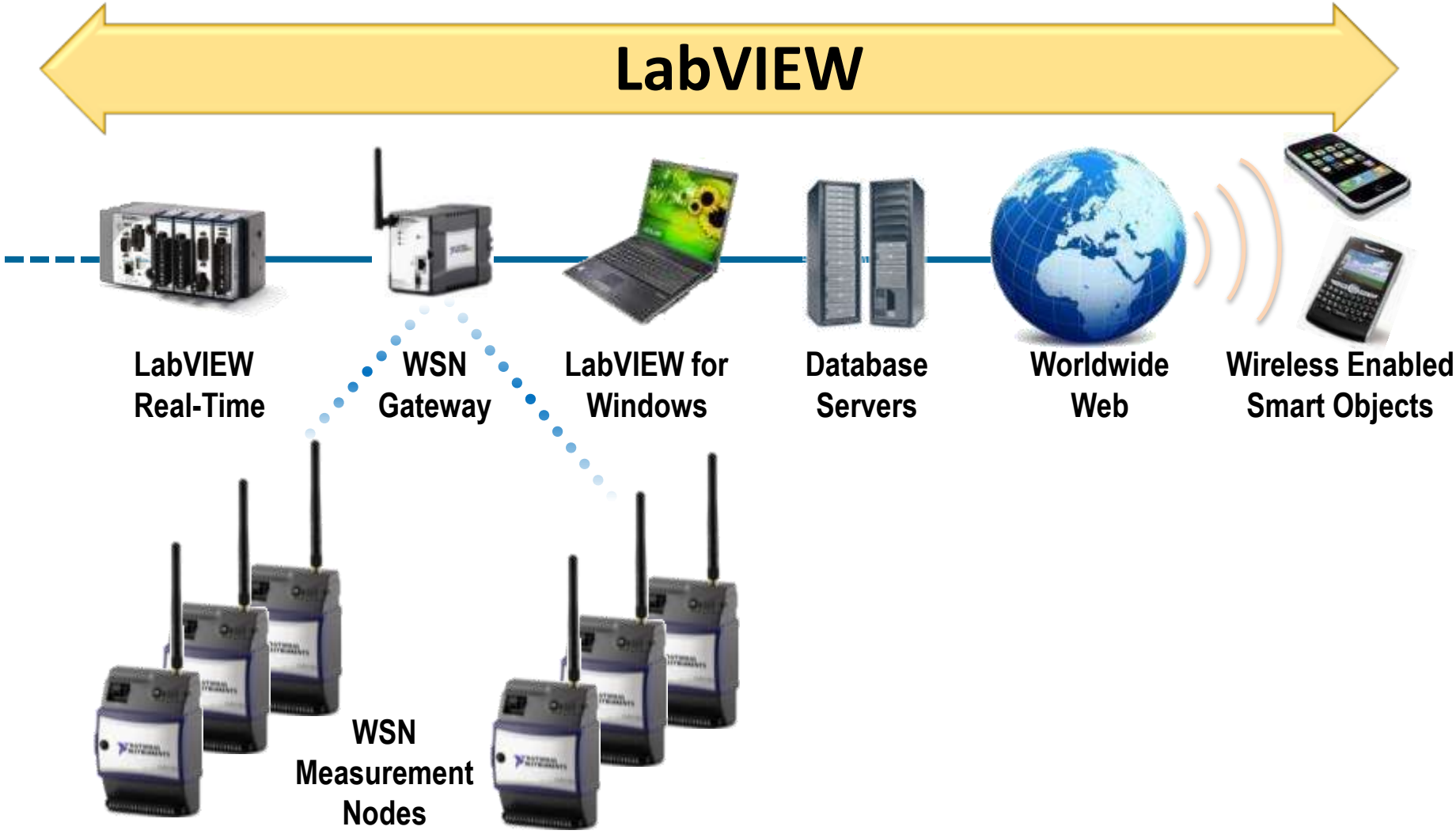
NI Wireless Sensor Networks

Low Power. Reliable.



- 16-bit voltage input node
- 24-bit thermocouple node
- Up to 3-year battery life
- 2.4 GHz, IEEE 802.15.4 radio
- Programmable nodes

WSN System Architecture

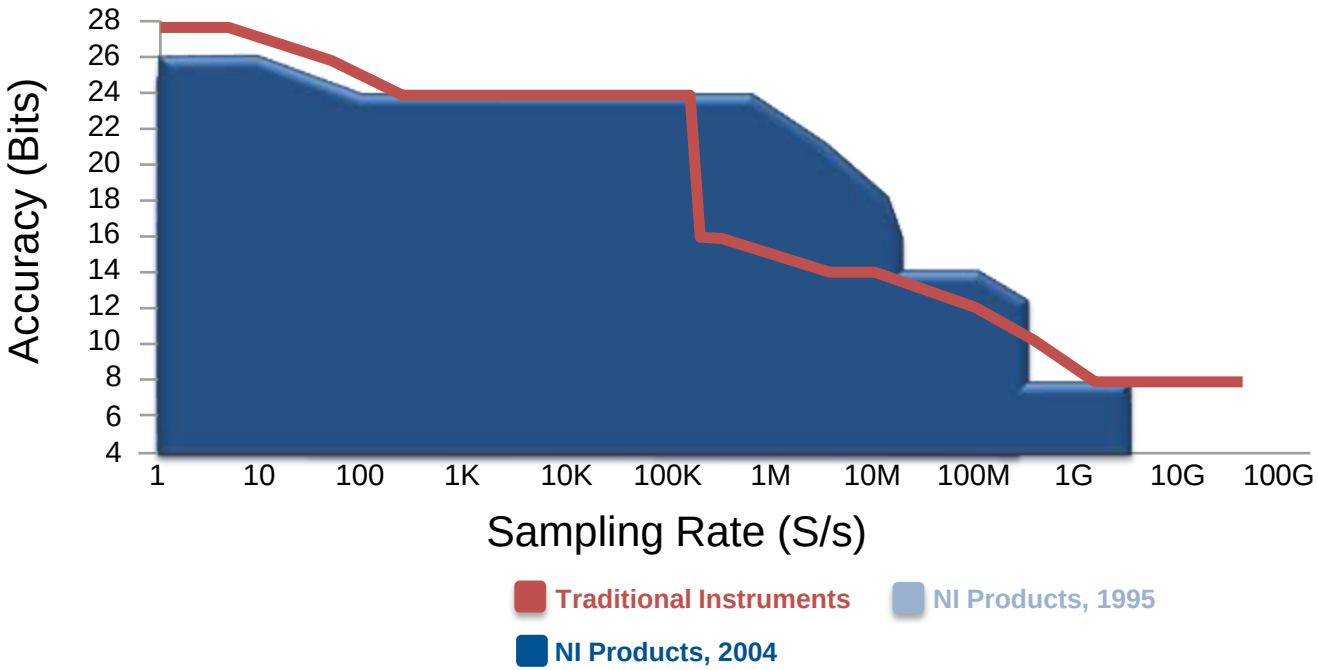


Do More

[Automated test]

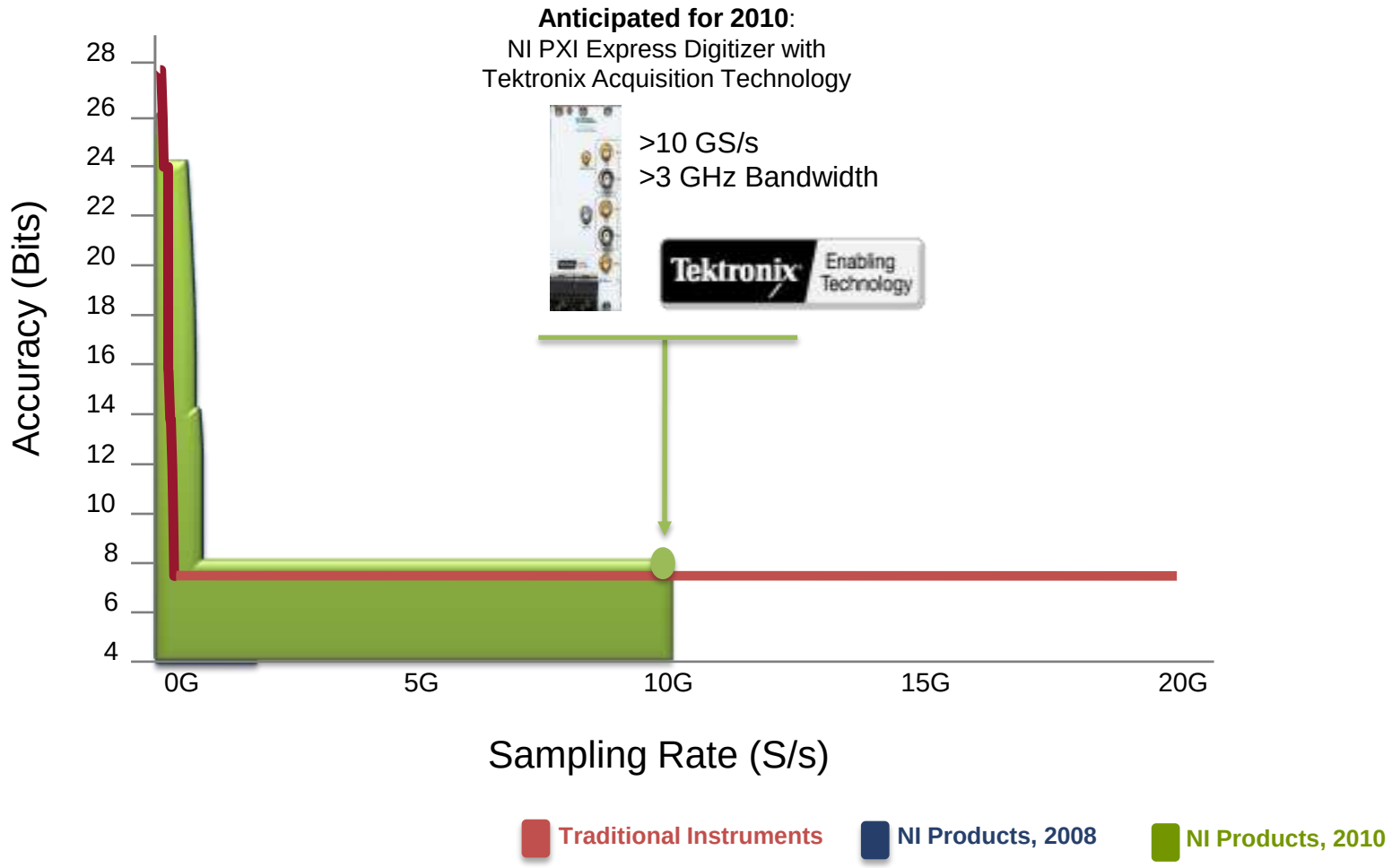
Leif Johansson
Business Development Manager

Expanding Measurement Capabilities



NATIONAL INSTRUMENTS

Expanding Measurement Capabilities



NI PXI Semiconductor Suite

Source Measure Unit

High-Speed Signal Insertion Switch

High-Speed Digital I/O

RF 6.6 GHz VSA/VSG

WGL/STIL Importing Software

New Source Measure Unit | Semiconductor Test

Features:

- 10pA measurement sensitivity
- Up to +/-100V and up to +/-100mA
- 4-quadrant operation
- Remote (4-wire) sense, guarding

Recommended applications

- Leakage test on discrete components
- Parametric measurements on semiconductor chips
- IV characterization and other physical measurements

NI PXI -4132

Precision Source Measure Unit

NATIONAL INSTRUMENTS

New Digital Instruments | Semiconductor Test

Features

- 100/200 MHz Maximum Clock Rates
- 32 bidirectional digital lines (SW controlled)
- Selectable Voltages of 1.2, 1.5, 1.8, 2.5, and 3.3V
- x4 PXIe streaming bandwidth (Up to 660MB/s)
- Onboard High Precision clock with sub-Hertz resolution (DC to 200 MHz)

NI PXI -6544/45

200 MHz Digital Waveform Analyzer/Generator

NATIONAL INSTRUMENTS

New Digital Instruments | Semiconductor Test

Differences from 6544/45:

- 200/400 Mbps maximum data rates
- Selectable Voltages of 1.2 - 3.3V (100mV steps) 22 voltage levels
- Per channel, per cycle state control (1, 0, Z, L, H, X)
- Onboard Hardware Compare
- Peer to Peer Streaming
- Serial Triggering

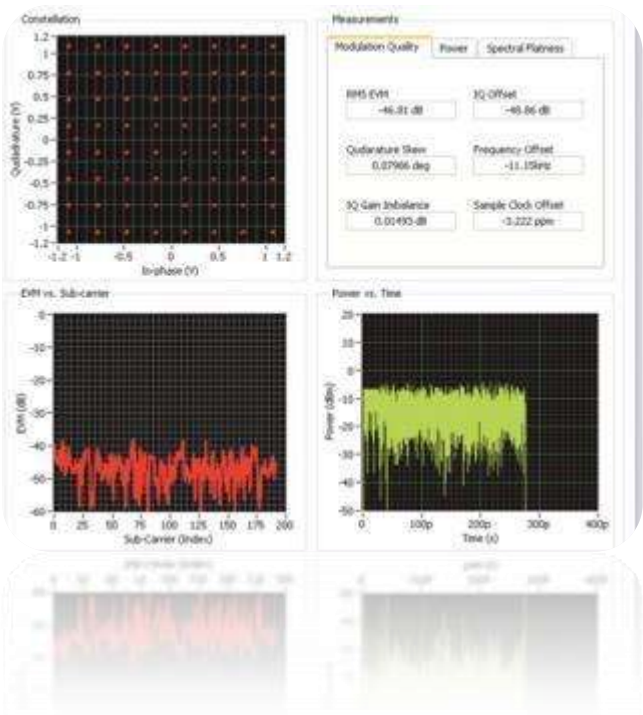
NI PXI -6546/47

400 Mbps Digital Waveform Analyzer/Generator

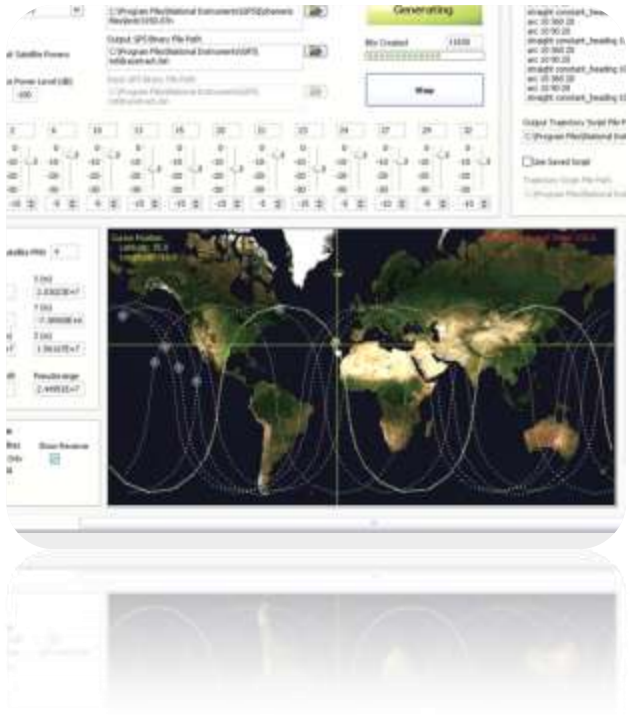
NATIONAL INSTRUMENTS

New RF Toolkits | LabVIEW and LabWindows™/CVI

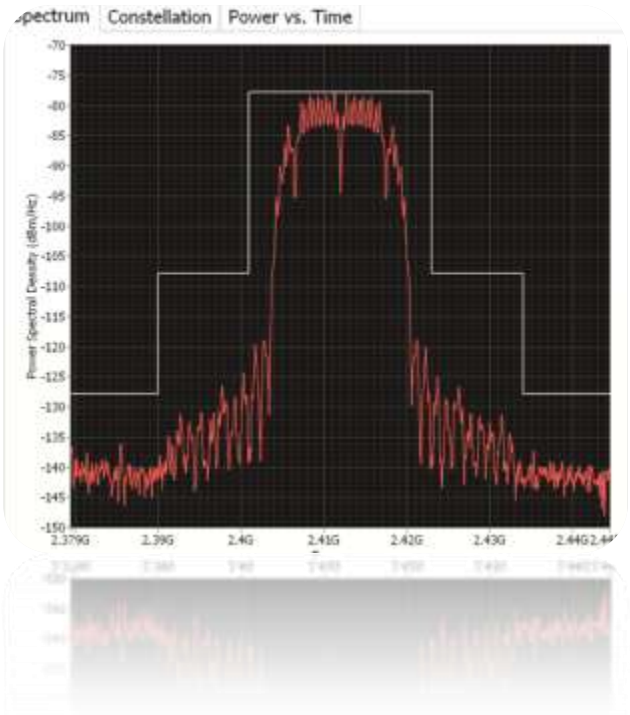
WLAN Toolkit



GPS Simulation Toolkit



WiMAX Toolkit



NATIONAL INSTRUMENTS

NI FlexRIO | Reconfigurable FPGAs for Test

NI PXI-795x PCI-based FlexRIO FPGA Modules

- Virtex-5 **LX** Series FPGAs
- **128 MB** onboard DRAM

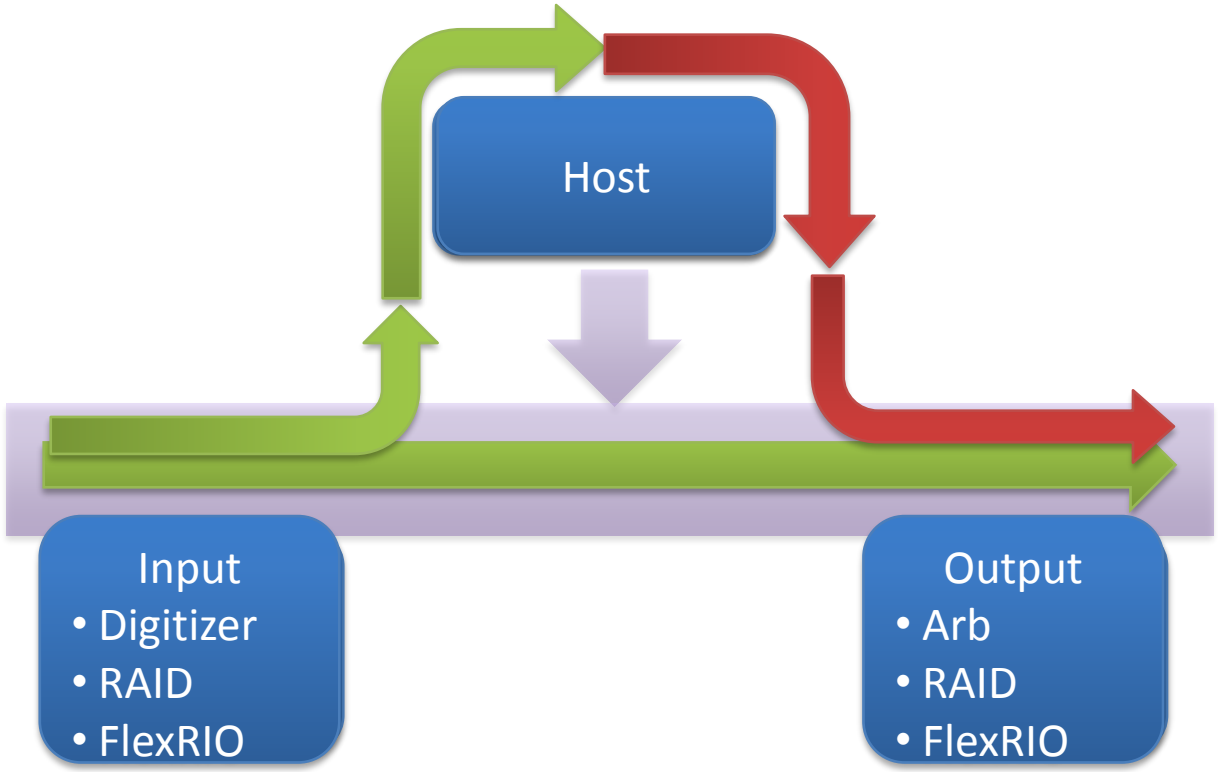
NI PXIe-796x PCI Express-based FlexRIO Modules

- Virtex-5 **SXT** Series FPGAs
- **512 MB** onboard DRAM
- **Co-processing** for other instruments

NATIONAL INSTRUMENTS

Data Streaming | Traditional Model

Peer to Peer Streaming | The NI Model



Peer-to-Peer Streaming demo

Jan Heinonen

NI FlexRIO | New Adapter Modules for Test

NI 5752 32-Channel Digitizer Adapter module

Optimized for nondestructive test and ultrasound applications:

- 50 MS/s with 12-bit resolution on all channels
- 100 Ω differential inputs
- AC coupling
- Selectable antialias filters
- Programmable time-variable gain control

NI 5781 Baseband Transceiver Adaptor Module

Implement custom RF modulation and demodulation, channel emulation, bit error rate testing, or spectral monitoring and jamming.

- Two 100 MS/s, 14-bit, differential, DC-coupled inputs and outputs (outputs 16-bit)
- 40 MHz bandwidth (-3 dB)

NATIONAL INSTRUMENTS

Do More

[Real-Time Test]

Stephan Ahrends
Business Development Manager

Control Systems Everywhere

Medical Devices

Industrial Machines

Power Generation Systems

White Goods

Aerospace

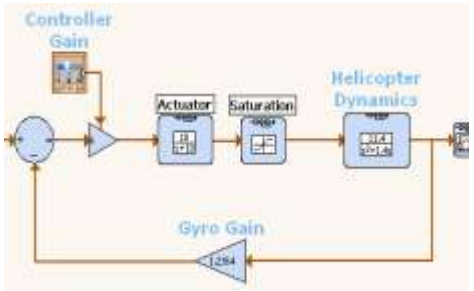
Automotive

NATIONAL INSTRUMENTS

RT Testing of a Helicopter Control

Helicopter Hardware

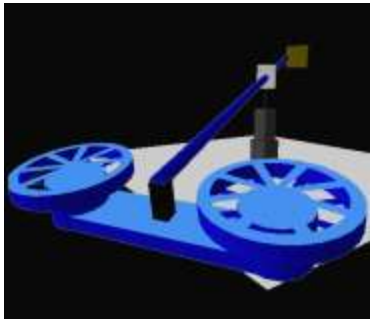
Helicopter Controller



NATIONAL INSTRUMENTS

RT Testing of a Helicopter Control

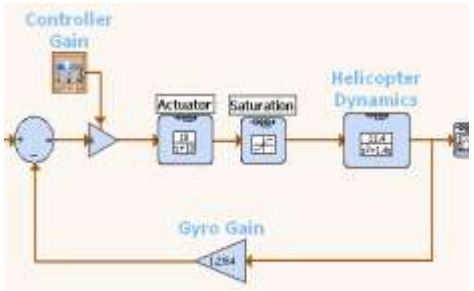
Helicopter Hardware **Simulation**



Actual Elevation Level
Elevation Level Setpoint
Actual Position
Position Level Setpoint

Left Motor Speed
Right Motor Speed

Helicopter Controller



NATIONAL INSTRUMENTS

NI VeriStand

Real-Time Testing and Simulation Software

- Run-time editable user interface
- User management
- Extendable
- Scalable
- Open architecture
- Real-time stimulus generation
- Data logging in real-time
- Configurable I/O
- Closed-loop control
- Deterministic model execution

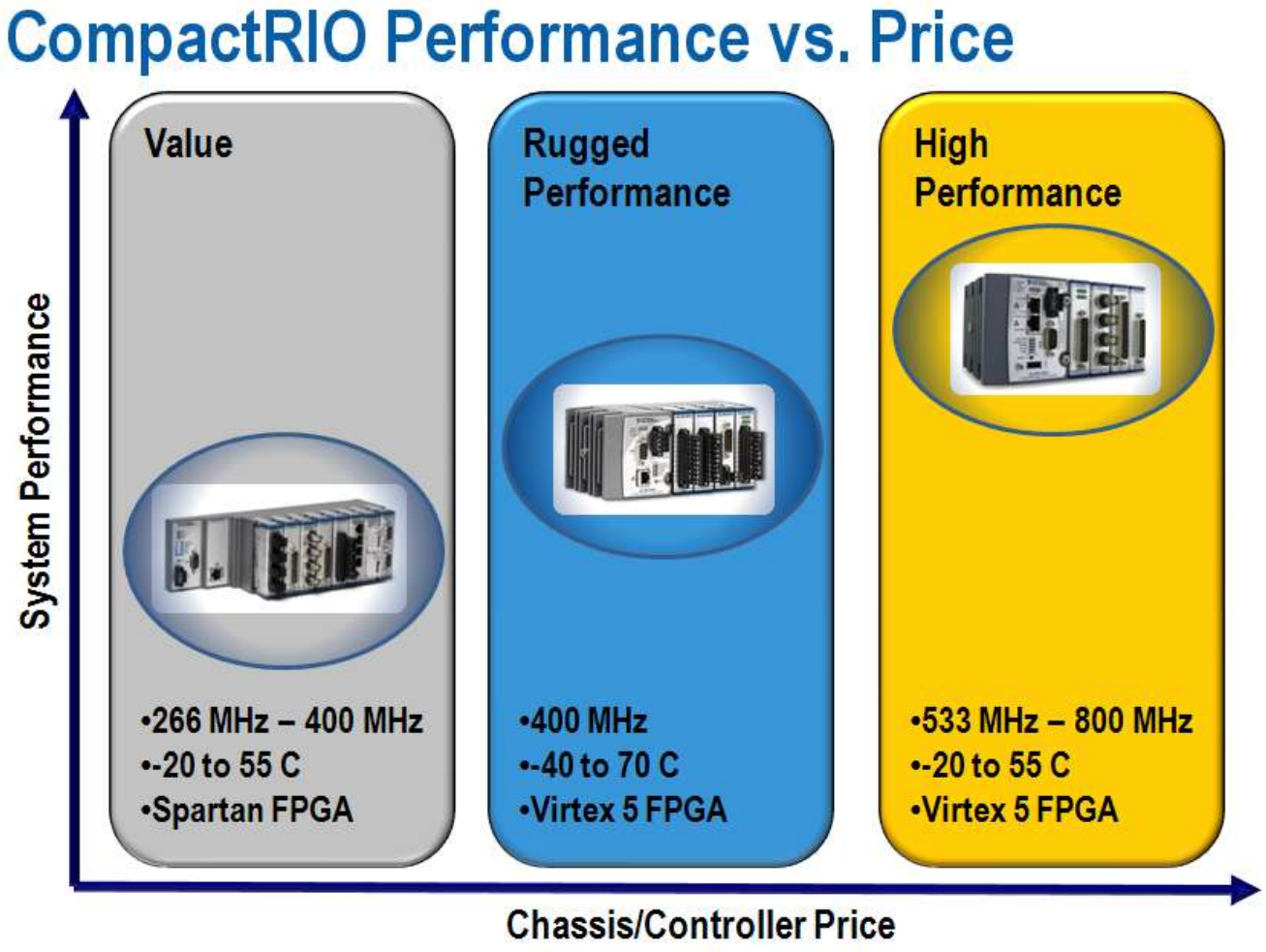
NATIONAL INSTRUMENTS

VeriStand demo

Do More

[Embedded Control]

CompactRIO the right platform for embedded control



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CompactRIO Evolution | Hardware & Software

cRIO 9023 and cRIO 9025

New Rugged Performance RT Controllers

cRIO 911x

Virtex-5 LX family CompactRIO Reconfigurable Chassis

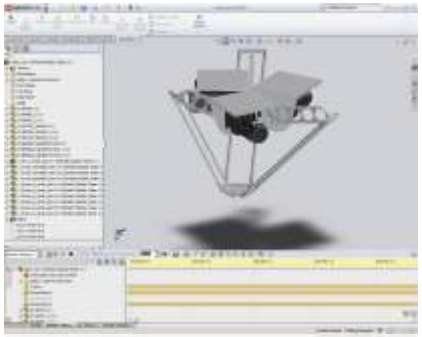
- Real Time Mathscript
- Vision Capabilities
- File I/O througput
- Model execution

- Math IP Fixed point
- Signal Processing and measurements
- Control
- MEMS integration

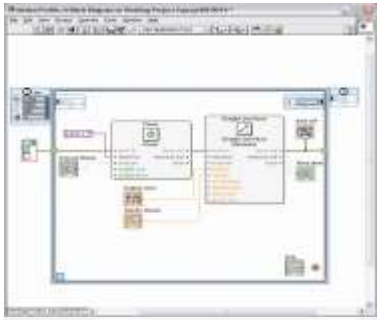
NATIONAL INSTRUMENTS

NATIONAL INSTRUMENTS LabVIEW 2009

CompactRIO Motion Control



New LabVIEW
SolidWorks Interface
Simplified digital prototyping



New LabVIEW
NI SoftMotion Module
Simplified motion

New C Series Drive
Interface Modules
Servo drives | Stepper drives

SolidWorks

NATIONAL INSTRUMENTS

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Delta robot demo

Aku Wilenius

Do More

[Robotics]

LabVIEW and Robotics World

LabVIEW Robotics 2009

LEGO® MINDSTORMS®
NXT LabVIEW Module

ImagingLab Library
for DENSO

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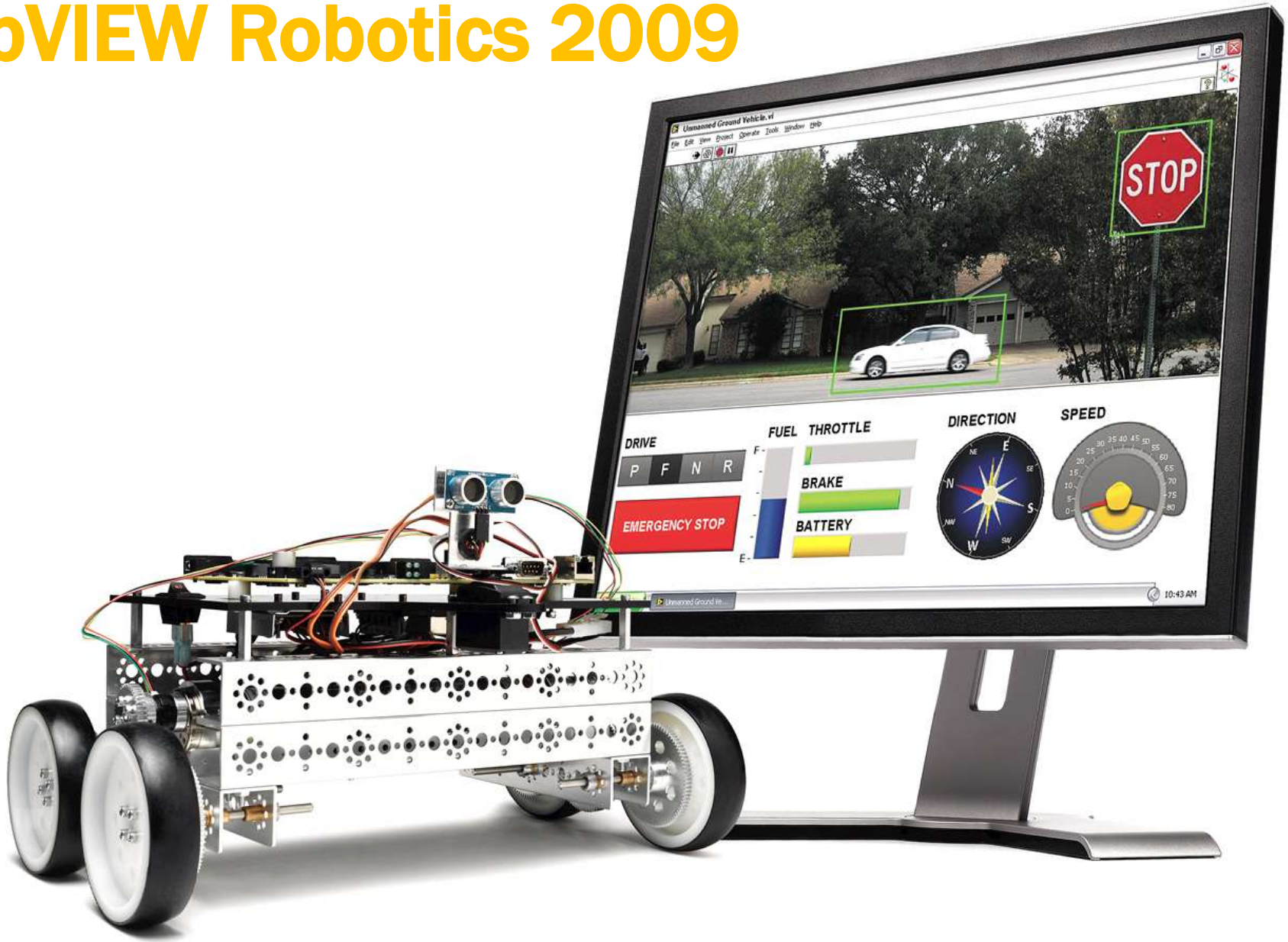
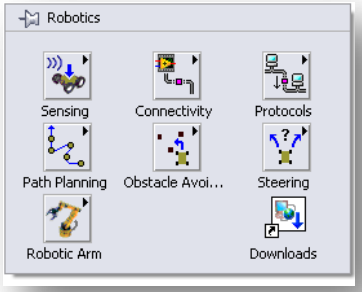
LabVIEW Robotics 2009

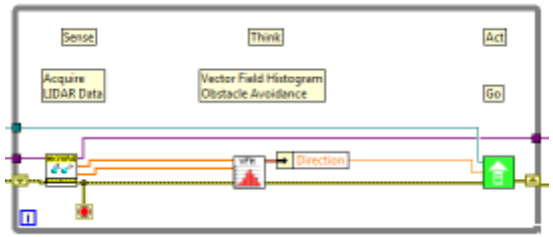


LabVIEW Robotics Key Offerings

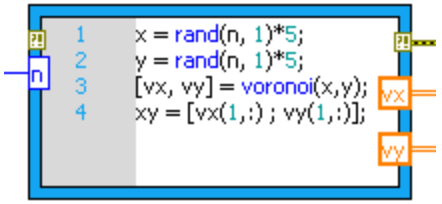
IP for navigation, steering, kinematics and more



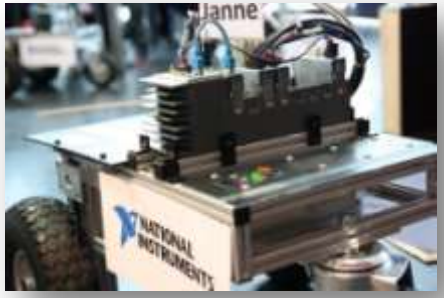
High-level **graphical programming**



Tools for integrating **text-based algorithms**

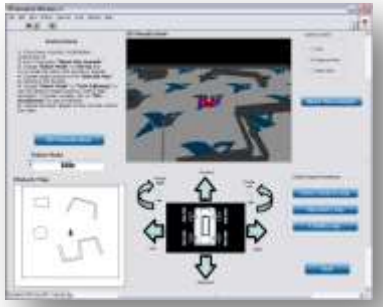


Deployment to Real-Time and FPGA hardware



Connectivity to sensors and actuators from top vendors

Examples of real-world applications



LabVIEW and Robotics World

LabVIEW Robotics 2009

LEGO® MINDSTORMS®
NXT LabVIEW Module

ImagingLab Library
for DENSO

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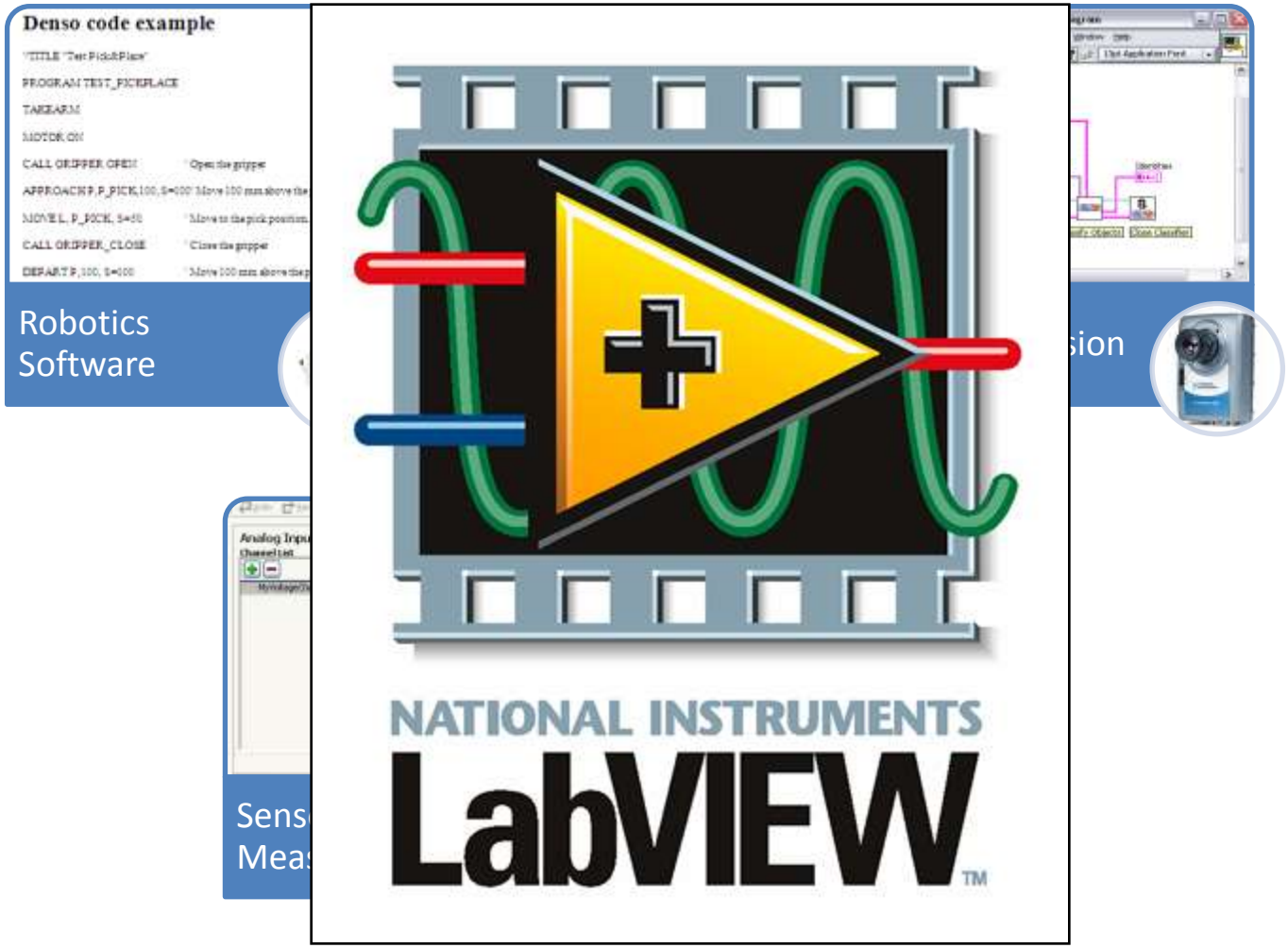
Advanced Robotics Requires a Lot Software

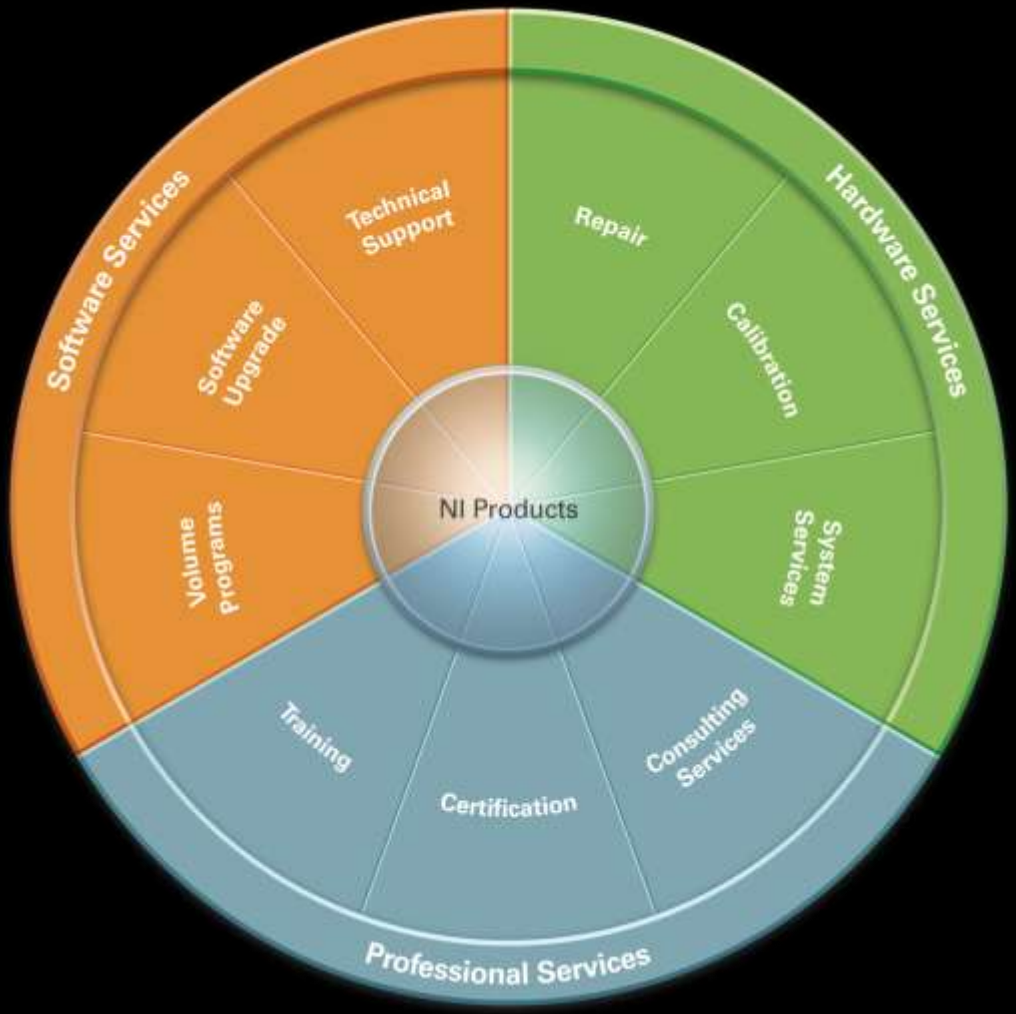


A Partnership in Innovation

Your Domain Knowledge
+
Graphical System Design
=
More Innovation

DESIGN → PROTOTYPE → DEPLOY

Ensuring Complete System Success



Do More

[with Graphical System Design]

Partner Introductions

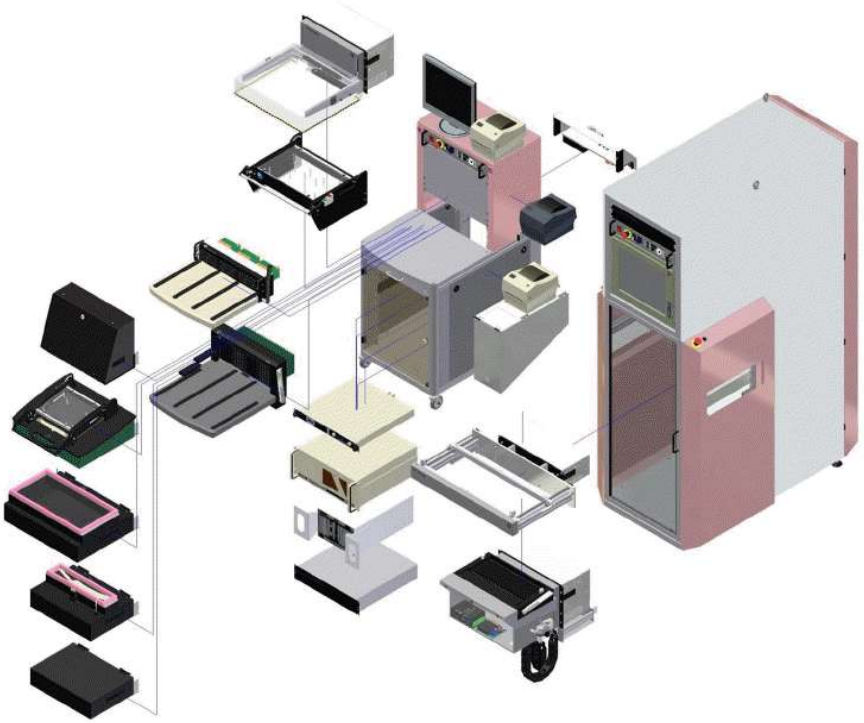
COLUMBIA

Your Partners in True-
Flexible, Reliable, Modular,
Re-usable Test Solutions &
Mass Interconnect Systems.

NI – Partner presentation
16h15 – Track 3

6TL´s true modular test systems save money and time

By 6TL Engineering and SA Sistel



NATIONAL INSTRUMENTS

CIM Industrial Systems A/S

Danish Company specialized in
Software Solutions and Test Solutions.

"Best in Europe"

CLA certifications
Europe
5 of 27

FLEXSTAND

New TestStand Operator Interface.

Win an iPod - fill in the competition
and deliver in exhibition to CIM

CIM Industrial
Systems A/S

COOL ENGINEERING

THE ART OF TESTING

member of Etteplan

- **Cool Engineering**'s business idea is to offer services regarding testing, mainly for the automotive industry.

- We **are specialised in climate testing,** simulation, evaluation, analysing and presenting the results. We are able to execute tests in our **in house laboratory** or in our contractor's test-rigs: Heat- and cooling performance, battery cooling and pressure-drop performance.

- We also perform **engine tests in our own engine test rig**, such as aging of catalysers and engine performance.

- **Cool Engineering develops and markets our own test equipments.** Our company possesses the expertise in areas such as mechanical design, electrical design, software programming.

- We deliver "turn key equipment" with the right quality, delivered at the right time. **Cool Engineering develops software for data acquisition systems** in a LabView™ based user interface. Cool Engineering is an Alliance Partner of National Instruments.

- We also offers: **Consultancy assignments** regarding testing, verification, design and simulations of climate comfort, engine optimization and **systems for electrical and hybrid vehicles**.

Exova METECH Measurements Solutions

We offer a complete measuring service solution – Metech Support Solutions

Exova METECH

NI ELVIS Design and Prototyping Platform
NI Multisim Circuit Design and Simulation
NI Ultiboard PCB Desing and Simulation

JJJ-Automaatio Oy

OptoFidelity Ltd.

PRODUCTS AND SERVICES

- Automated test and measurement systems for electronic industry
- Camera technology for visual quality control and for digital documentation
- R&D and consultant services for industry
- OEM-cameras and machine vision modules
- Machine vision solutions for demanding applications
- Electronics design for test systems

OptoFidelity RV1 RemoteViewer

– remote visual quality control tool

OptoFidelity
imaging fidelity experts


NATIONAL INSTRUMENTS
Select Alliance Partner
Prevas
As a Select Alliance Partner
of National Instruments we are
Committed to your success

Protacon

- Mittaus- ja informaatiojärjestelmät
- Teollisuusautomaatio
- Instrumentointi
- Sähköistys
- IT –ratkaisut ja ohjelmistot
- 170 ammattilaista kymmenellä paikkakunnalla

- 15 sertifioitua LabVIEW osaajaa
- Tuotannon ja tuotekehityksen testausjärjestelmät
- Värähtelymittaukset
- Kunnonvalvonta
- Kannettavat mittausjärjestelmät
- Kokonaistoimitukset

<symbio>