

Welcome to NIDays 2009 !

Gert Nilsson – Branch Manager NI Denmark

What We Do

Low-Cost Modular Measurement and Control Hardware



Productive Software Development Tools



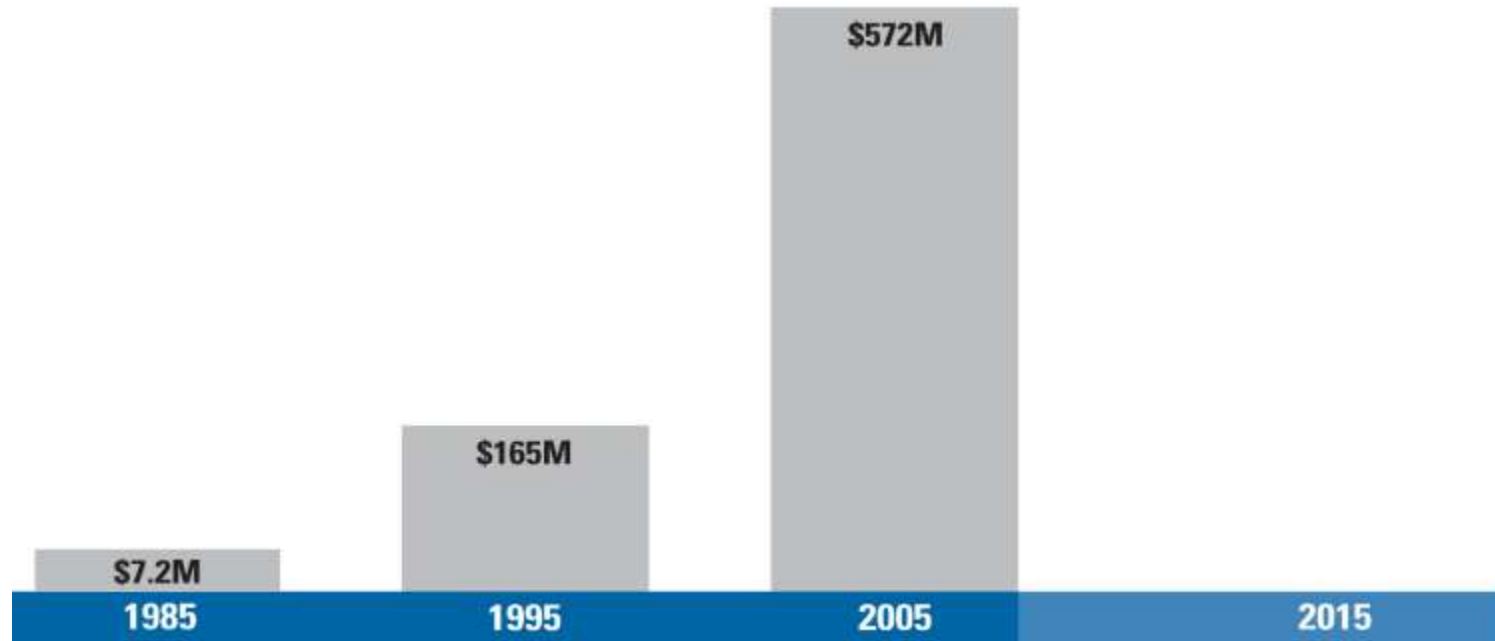
Highly Integrated Systems Platforms



Used By Engineers and Scientists for Test, Design and Control



National Instruments: Decades of Innovations



First Decade

1985: Self-financing with GPIB

Second Decade

1995: Virtual Instrumentation with GPIB, NI LabVIEW, and DAQ

Third Decade

2005: Measurement and Automation (Modular Instruments and systems – PXI, FieldPoint, and CompactRIO)

Fourth Decade

2015 : Test & Measurement and Graphical System Design

Leveraging Technologies to Solve Next Generation Engineering Challenges

Michael Schneider

Market Development Manager

NIDays 2009

Engineering Grand Challenges



Make solar energy economical



Provide energy from fusion



Develop carbon sequestration methods



Manage the nitrogen cycle



Provide access to clean water



Restore and improve urban infrastructure



Advance health informatics



Engineer better medicines



Reverse-engineer the brain



Prevent nuclear terror



Secure cyberspace



Enhance virtual reality



Advance personalized learning



Engineer the tools of scientific discovery

Today's Technology: Core Value

Multicore



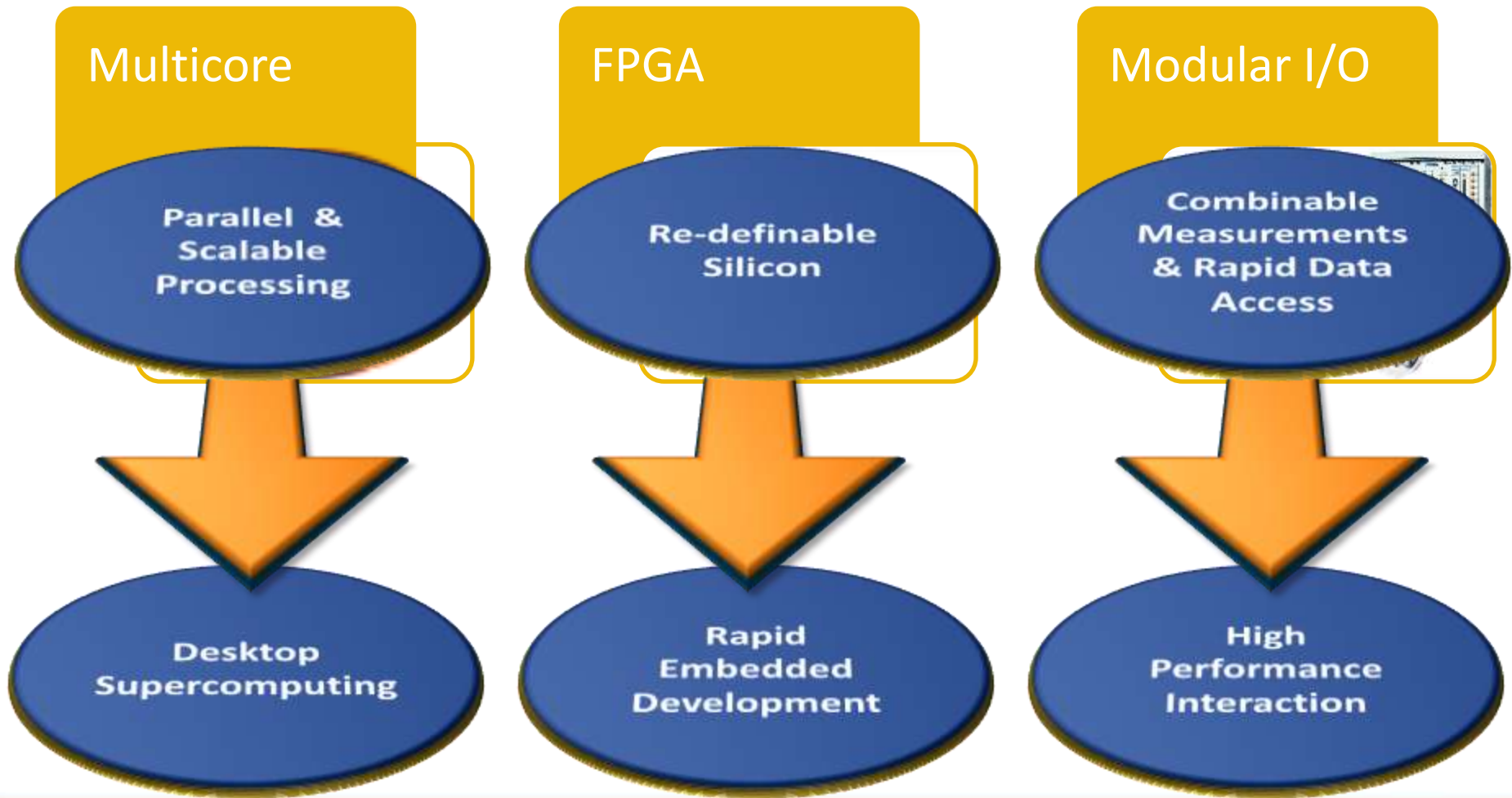
FPGA



Modular I/O



Today's Technology Potential

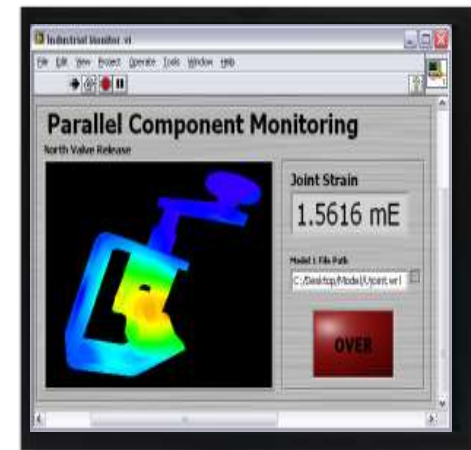
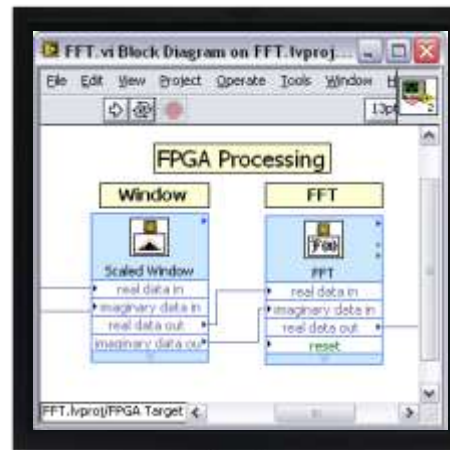
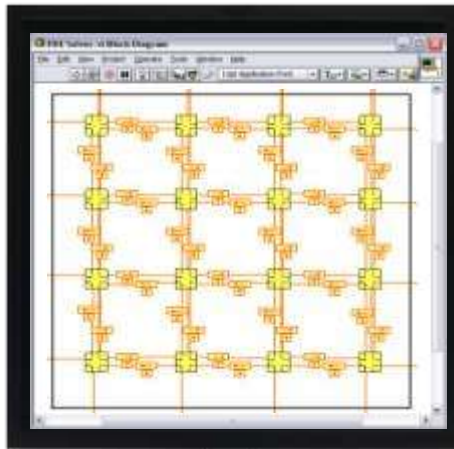


Access through Graphical Programming

Multicore

FPGA

Modular I/O



**Desktop
Supercomputing**

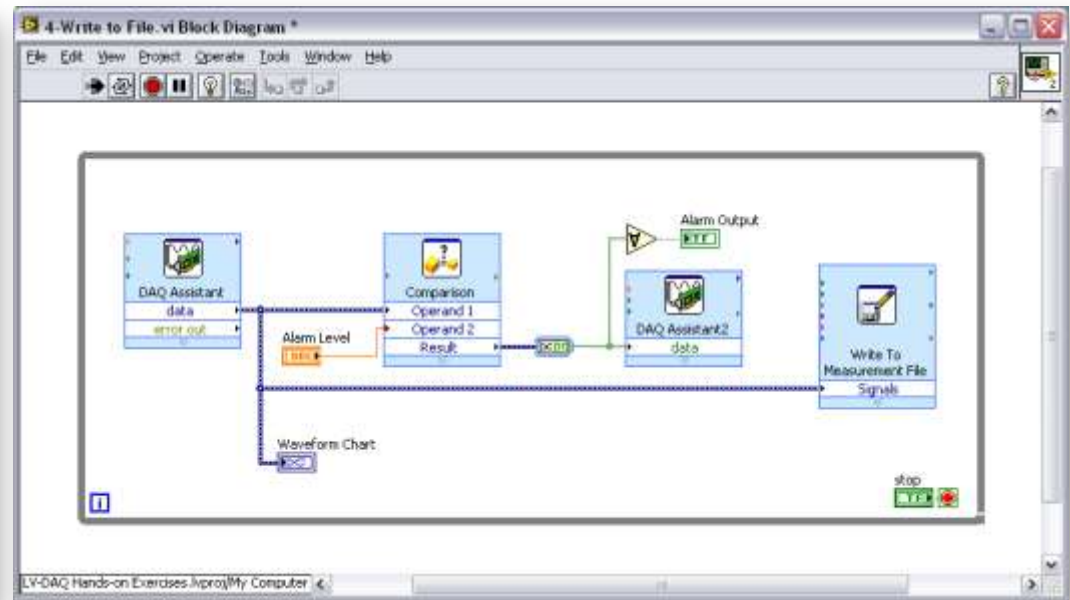
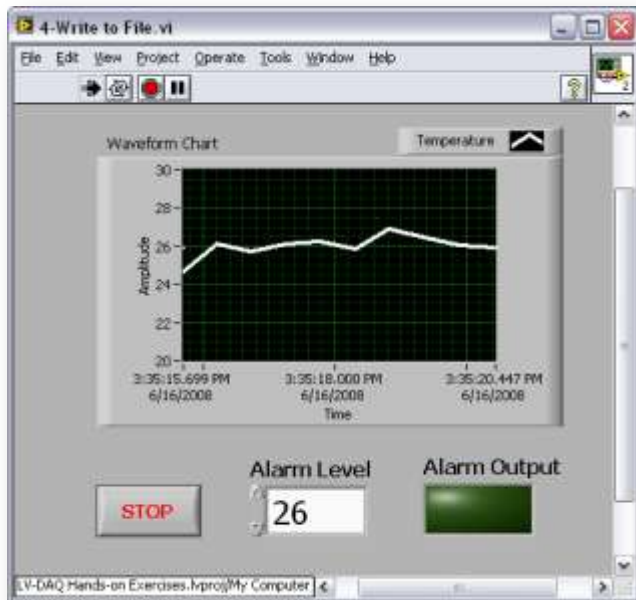
**Rapid
Embedded
Development**

**High
Performance
Interaction**

Graphical Programming:

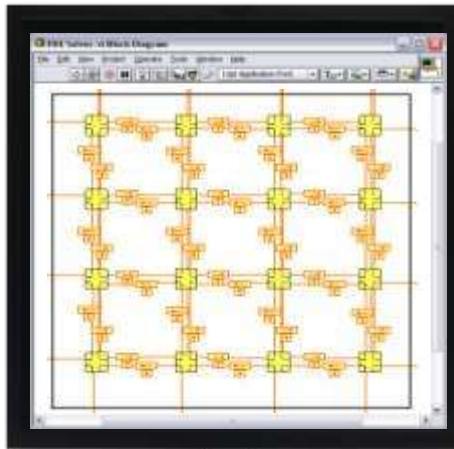
Simplifying Design of Complex Engineering Systems

- Symbolic
- Dataflow
- Hierarchical
- Interactive
- Inherent User Interface



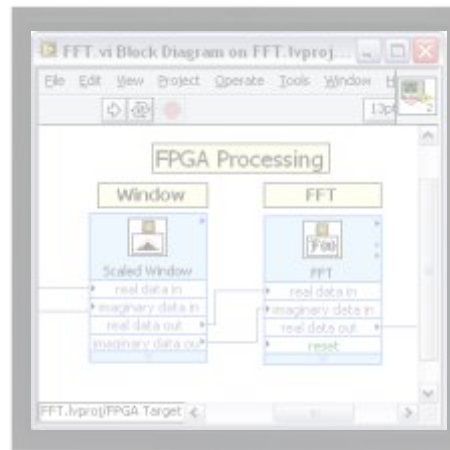
Access through Graphical Programming

Multicore



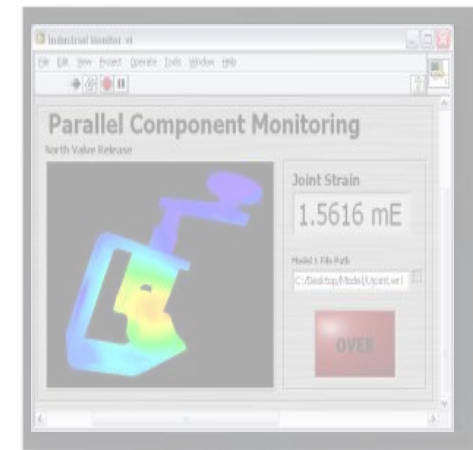
**Desktop
Supercomputing**

FPGA



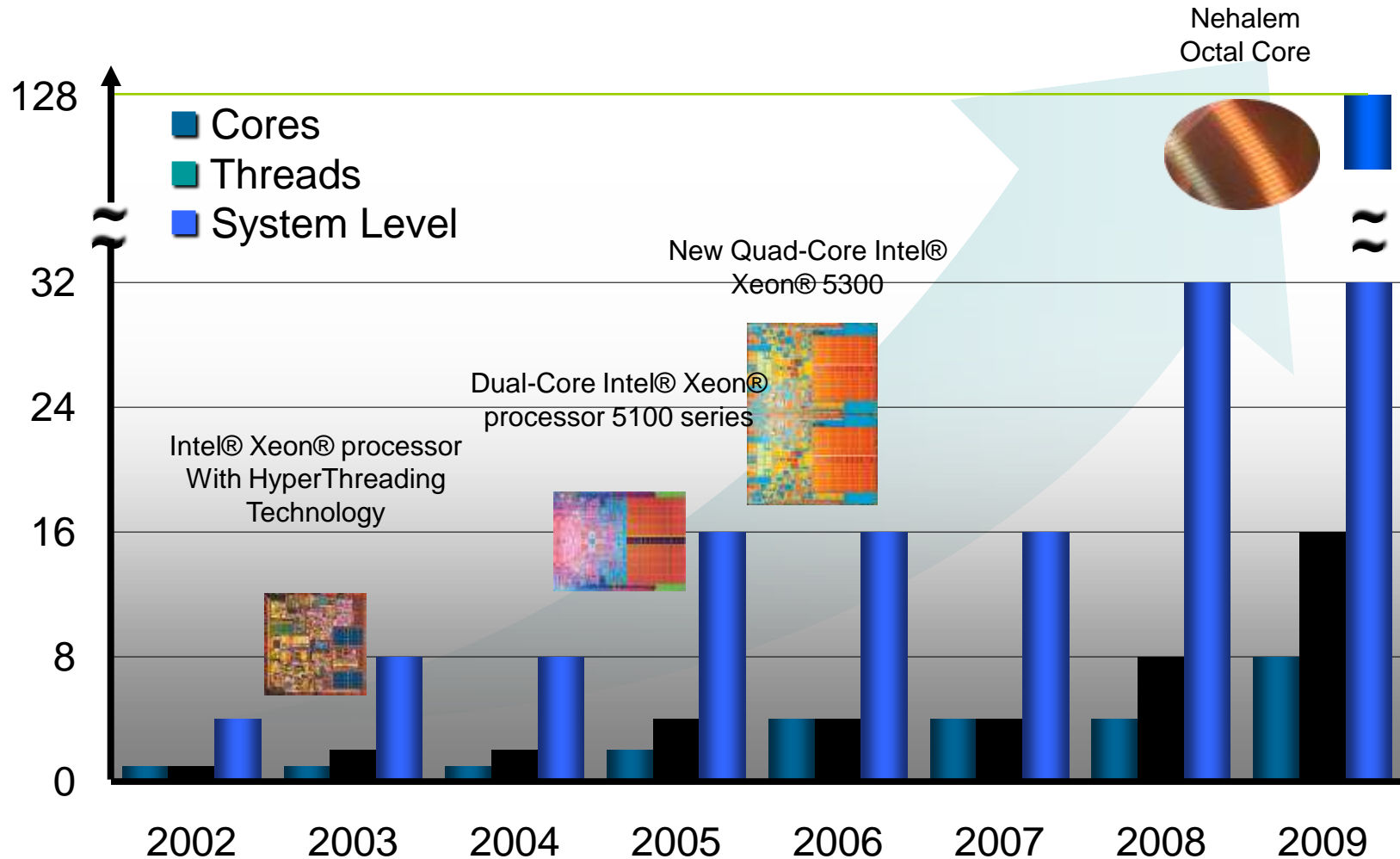
**Rapid
Embedded
Development**

Modular I/O

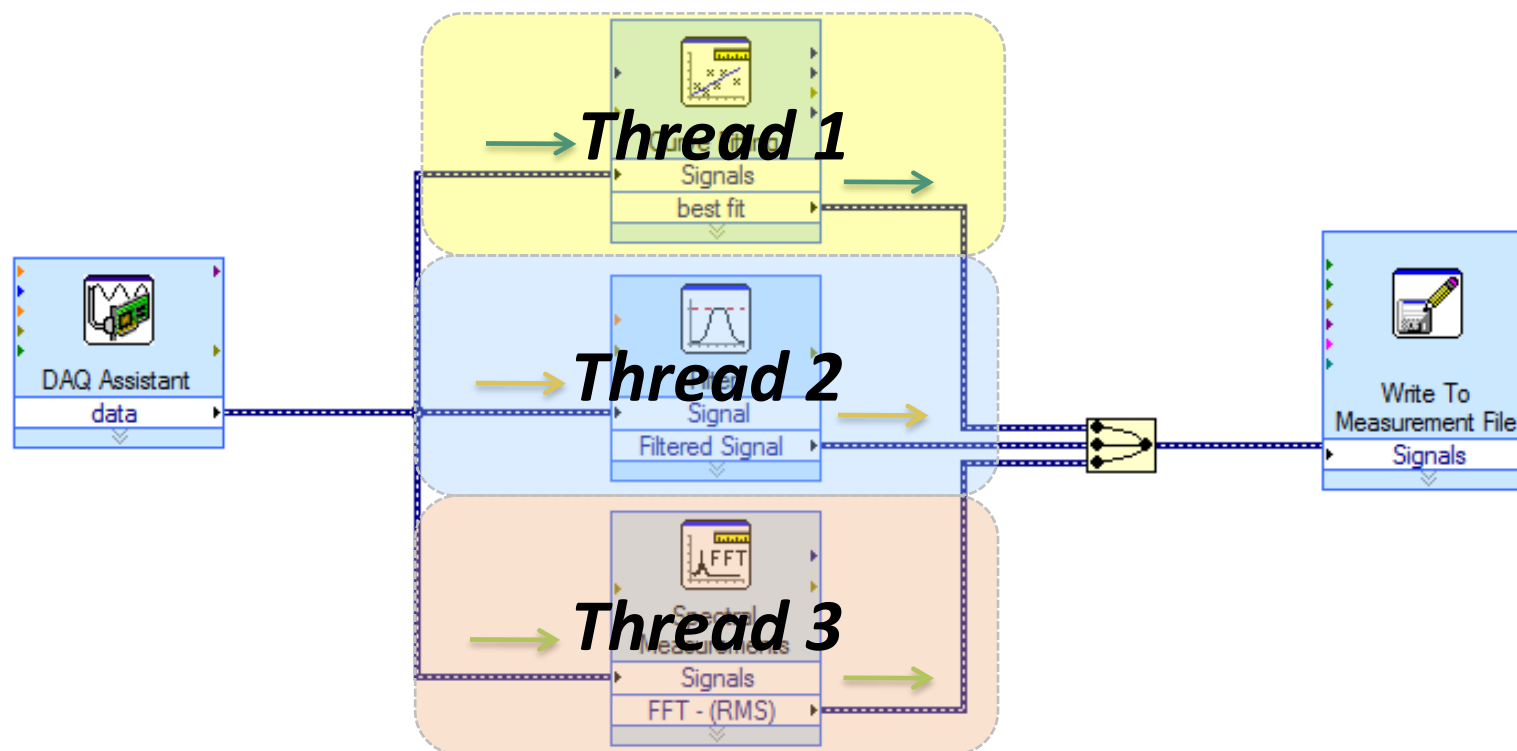


**High
Performance
Interaction**

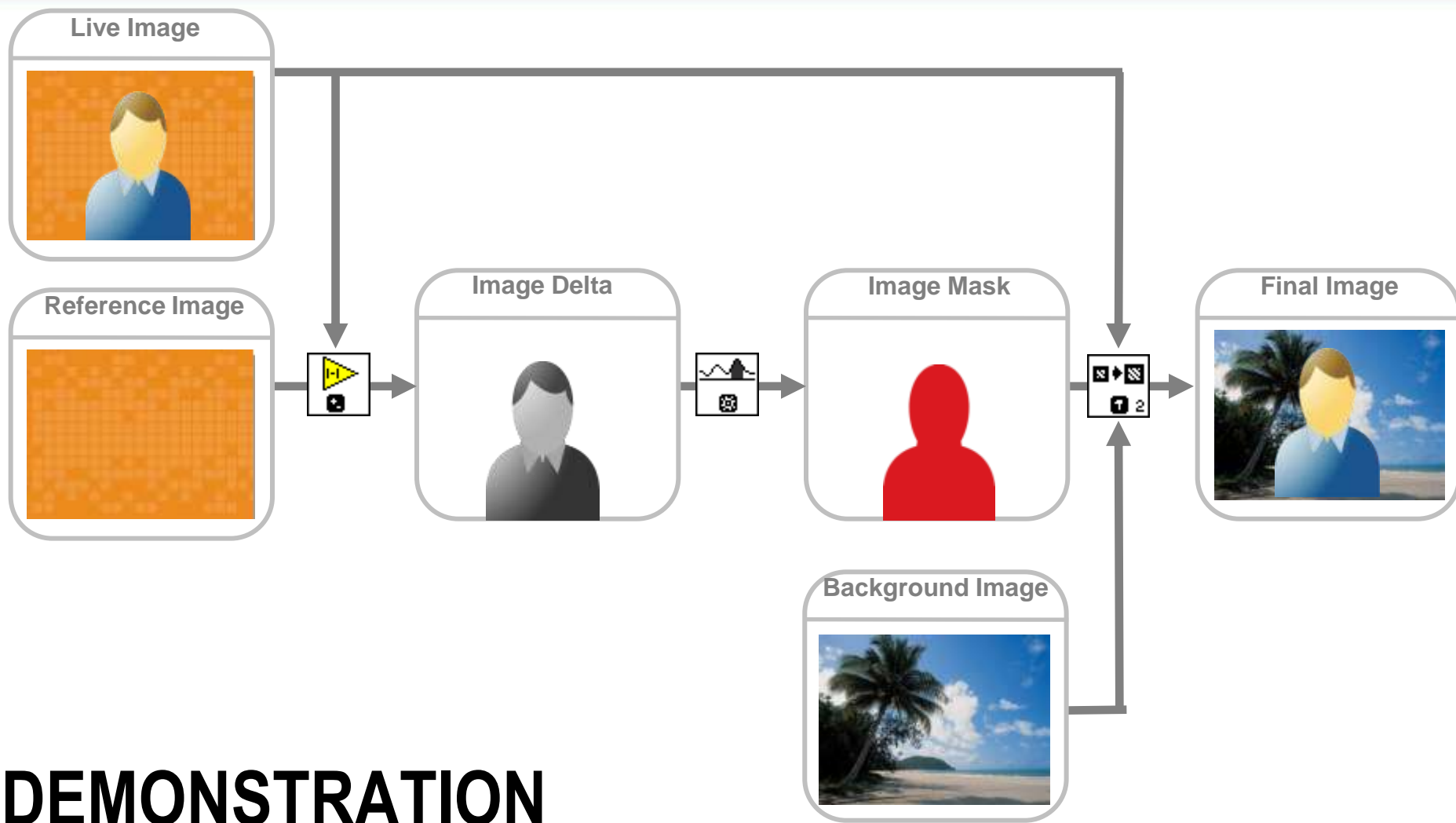
Multi-core: Scalable Parallel Processing



Realizing the Potential: Inherent Access to Automatically Scalable Parallelism



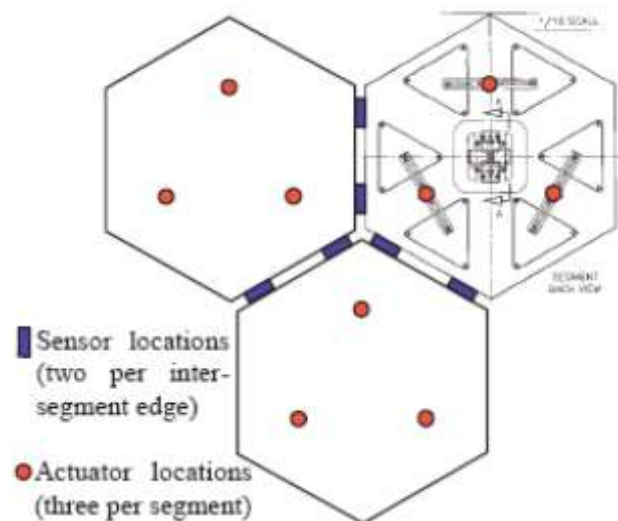
10 Year Anniversary of Multithreading



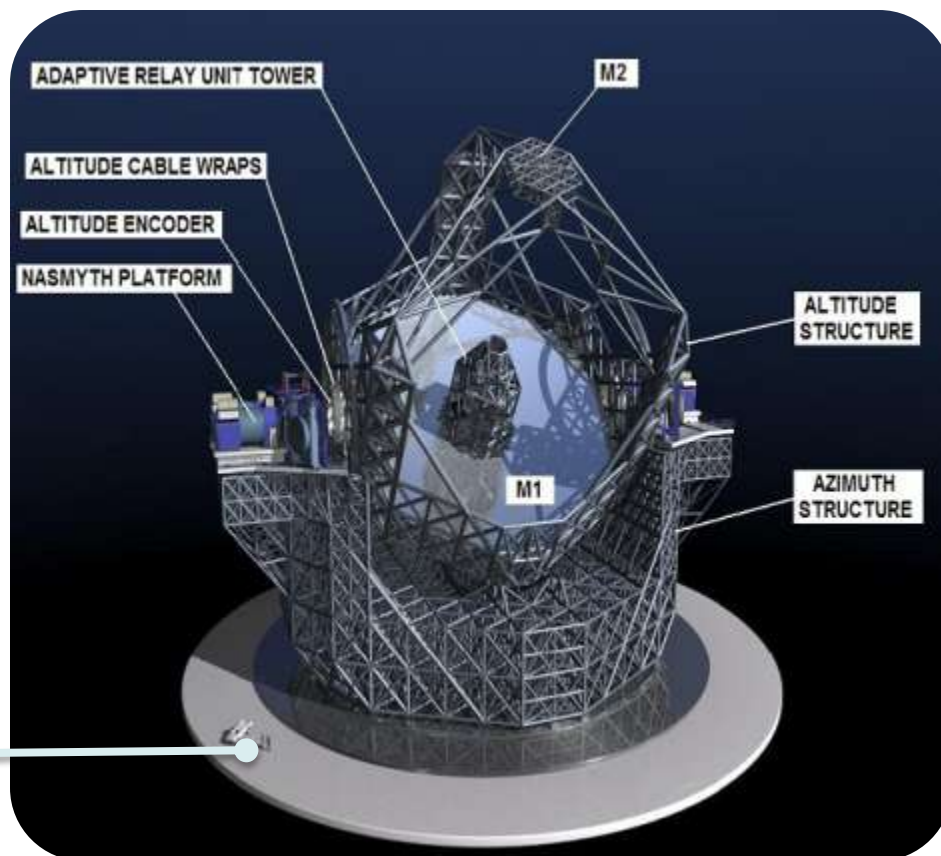
DEMONSTRATION

THE LABVIEW GREEN SCREEN

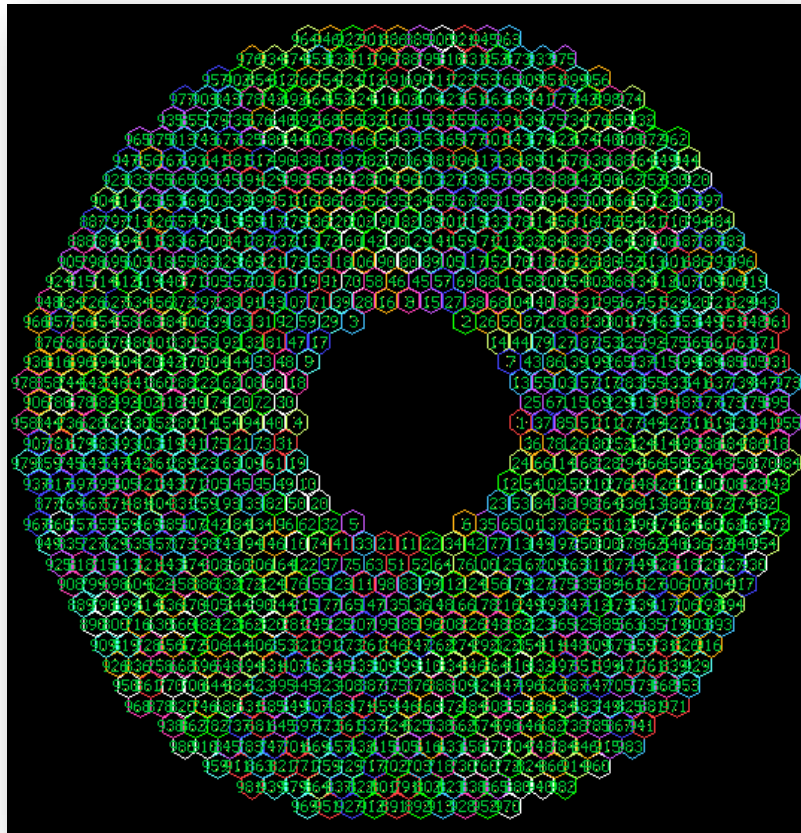
Case study: Extremely Large Telescope



Physicists are getting smaller these days!



Case study: Extremely Large Telescope



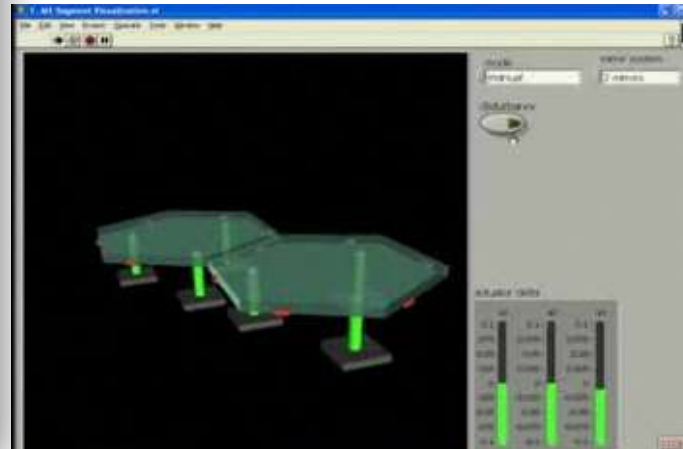
M1 – mirror

984 hexagonal mirrors

6 sensors each = ~6000 inputs

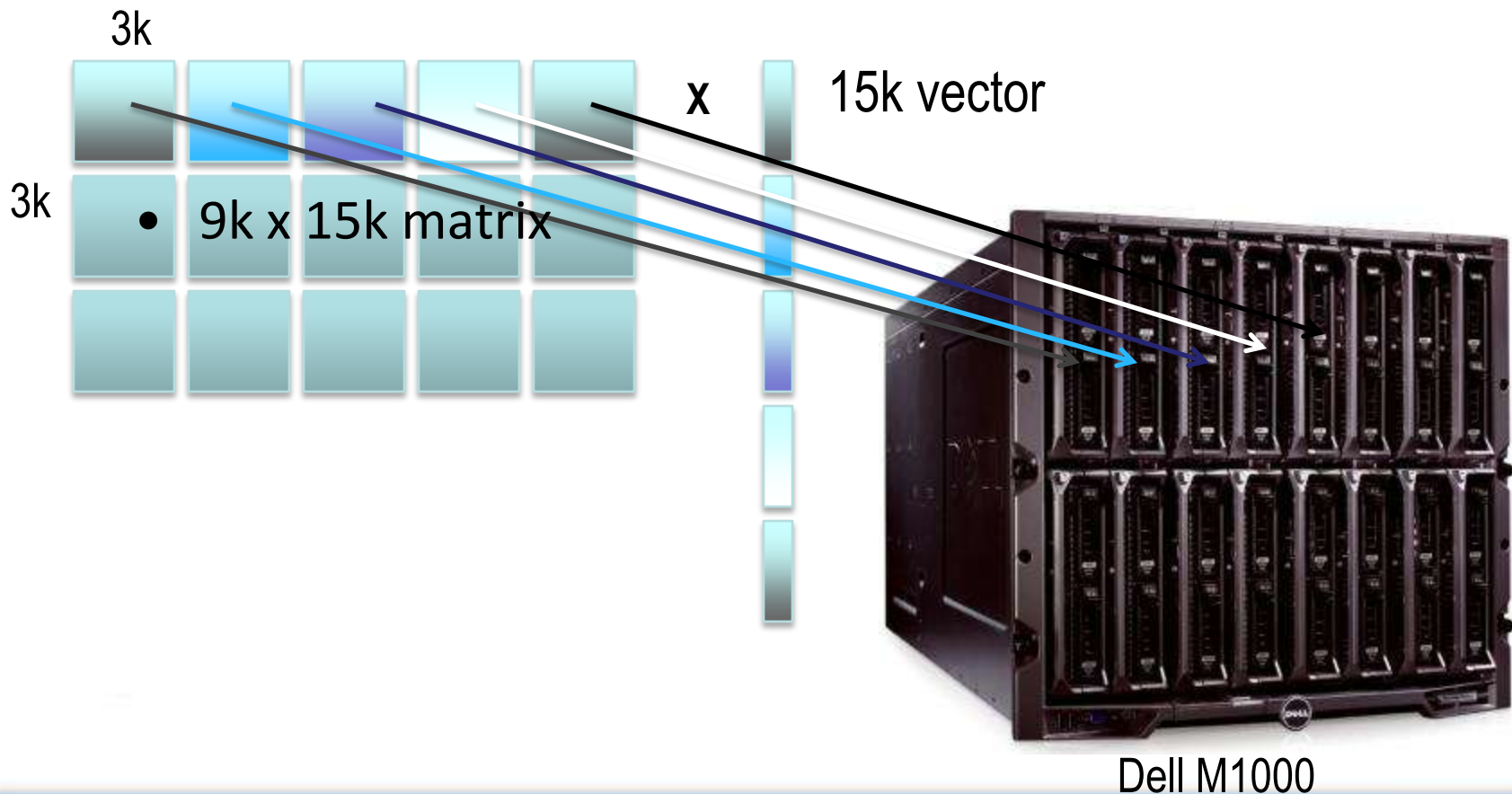
3 actuators each = ~3000 outputs

Control loop = 1 ms (1kHz rate)



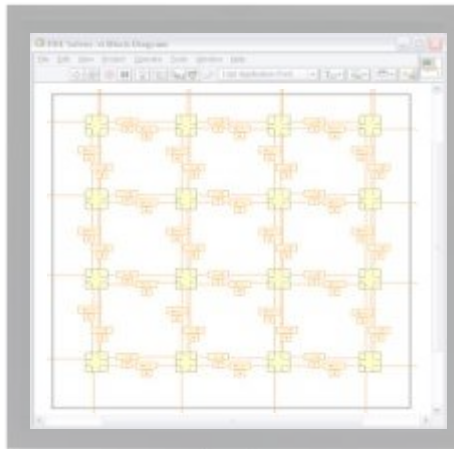
Adaptive Optics

Distributing LabVIEW computations



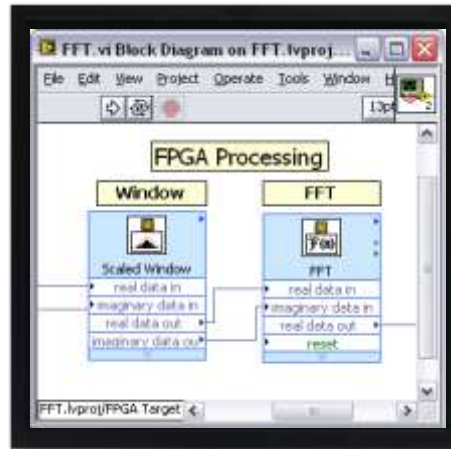
Access through Graphical Programming

Multicore



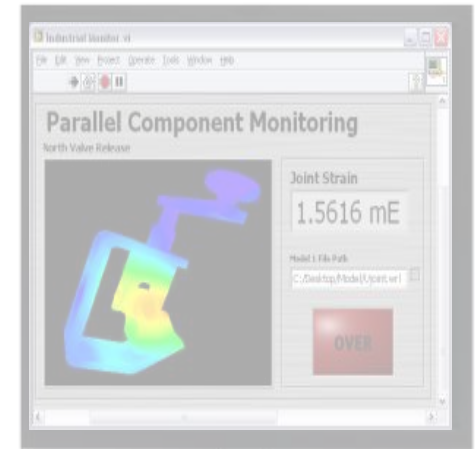
Desktop
Supercomputing

FPGA



Rapid
Embedded
Development

Modular I/O



High
Performance
Interaction

Advances in FPGA Technology

Size

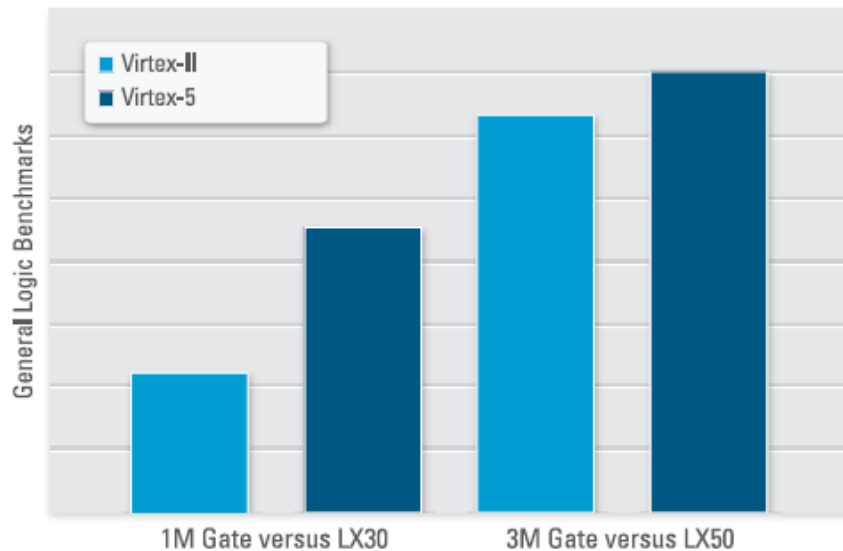


Figure 1. General logic benchmarks show that Virtex-5 FPGAs offer larger sizes when compared to Virtex-II FPGAs.

Speed

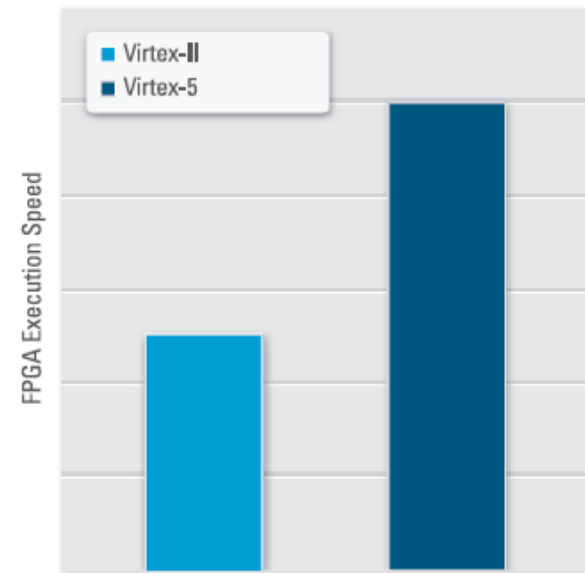


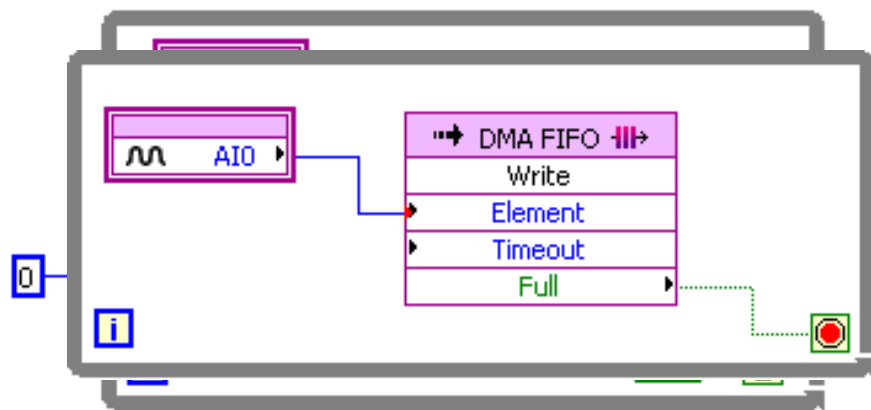
Figure 2. Execution speed benchmarks show that Virtex-5 FPGAs feature faster processing capabilities when compared to Virtex-II FPGAs.

Realizing the Potential: Simplify Access to FPGAs

Counter

Analog I/O

I/O with DMA

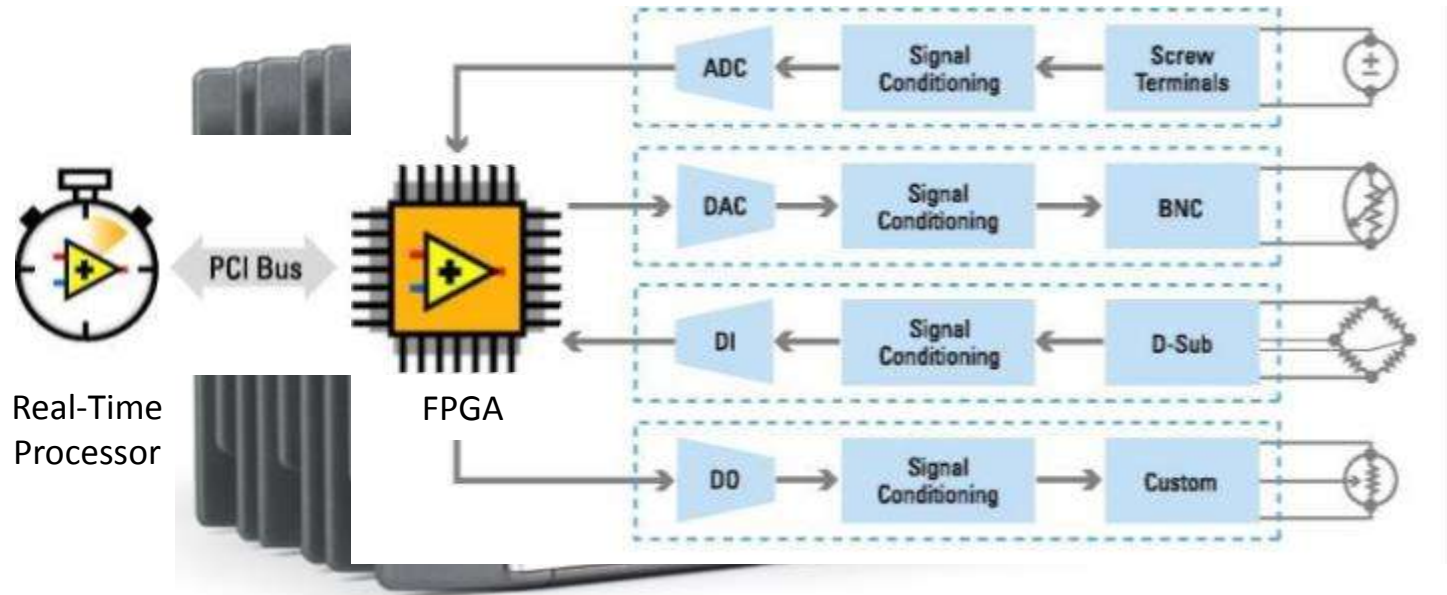


LabVIEW FPGA

[illegible]

VHDL ~4000 lines

Blending Technologies for New Architectures: CompactRIO



- **Reconfigurable FPGA** for high-speed and custom I/O timing, triggering, and control
- **I/O modules** with built-in signal conditioning for connection to sensors/actuators
- **Real-time processor** for reliable measurement, analysis, connectivity, and control

Case Study: CleantechMotors

Jesper Boie Rasmussen
CEO

The 100% Electric Jaguar



Case Study: CleantechMotors

Refine the present, drive the future

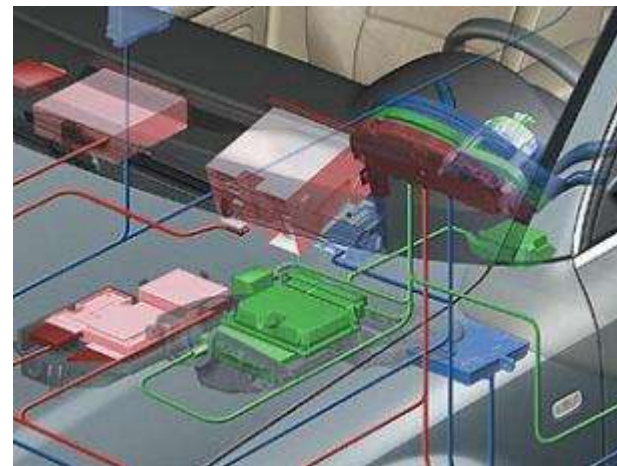
- **Electric** Luxury Limousine:
Jaguar XFE
- Topspeed 180km/h
- Range 150-400km*
- Motor: 200kW, 700V
- Battery: Li-ion 40kWh
- Other specifications as the original
- Production in 2009

* depends on driving speed

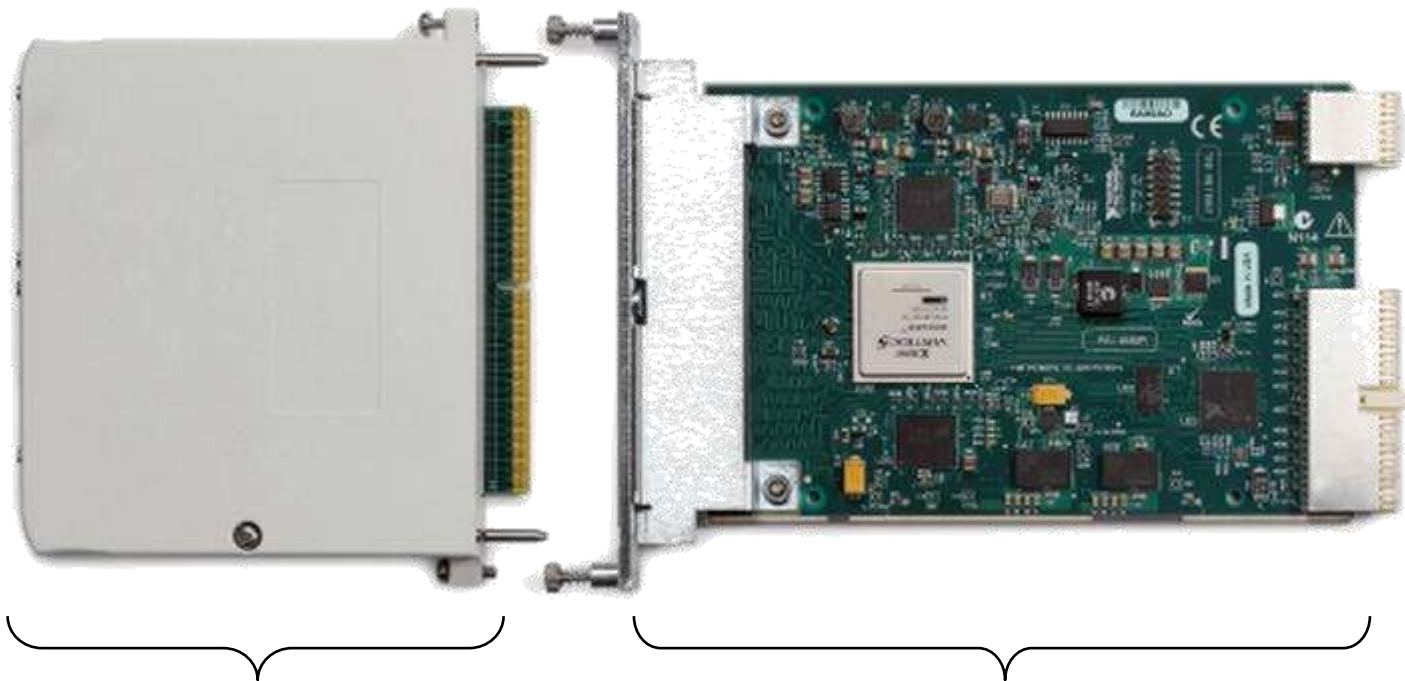


Case Study: CleantechMotors

- Challenge:
 - Communicating with the cars on-board computers
 - Communicating with new electric parts.
- Solution:
 - LabVIEW
 - Real Time PowerPC Compact RIO w. CAN-, D-sub- and AO-modules



Blending Technologies for New Architectures: FlexRIO



NI FlexRIO Adapter Module

- Interchangeable I/O
- Customizable by users
- Adapter Module Development Kit

NI FlexRIO FPGA Module

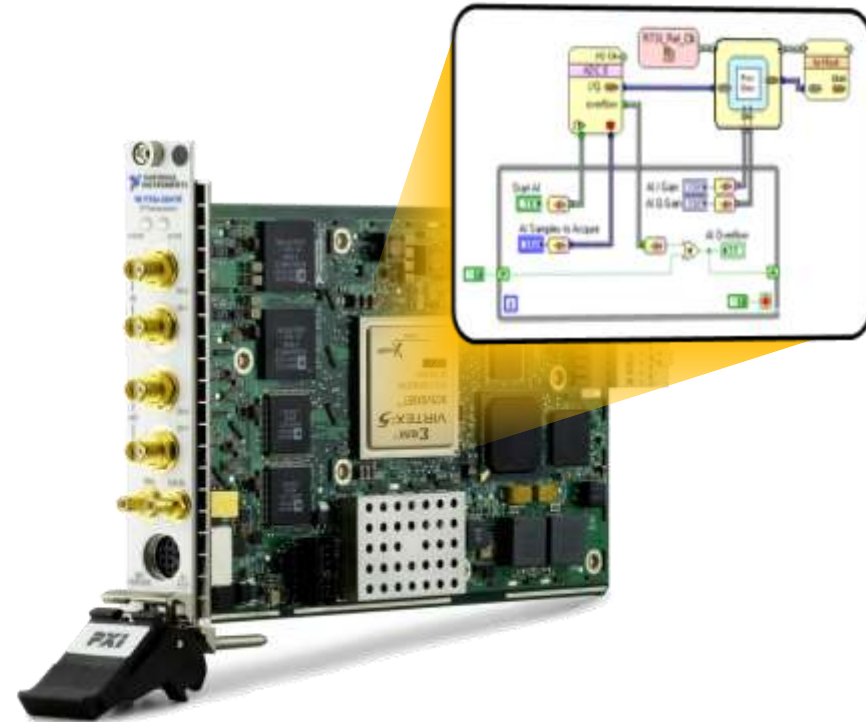
- Virtex-5 FPGA
- Up to 132 channels
- Up to 128 MB of DDR2 DRAM

Introducing NI FlexRIO

Sneak Preview:

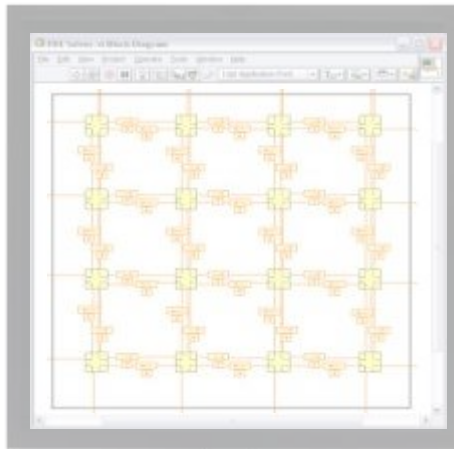
NI RIO for IF Communication

- PC-based Intermediate Frequency (IF) transceivers with reconfigurable FPGAs
- Programmed in LabVIEW and LabVIEW FPGA
- Targeted at RF Dynamic Test, Software-Defined Radio (SDR), and user-defined IF applications
- 2 AI channels, 14 bits, 100 MS/s
- 2 AO channels, 14 bits, 200 MS/s



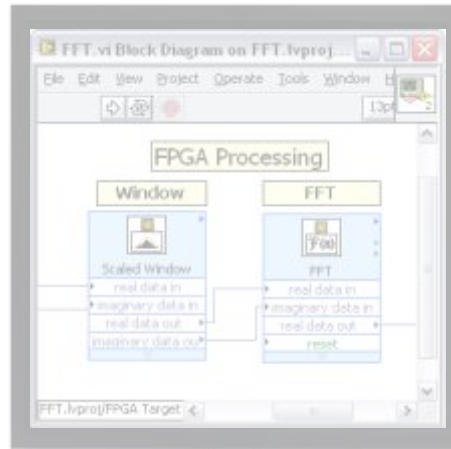
Access through Graphical Programming

Multicore



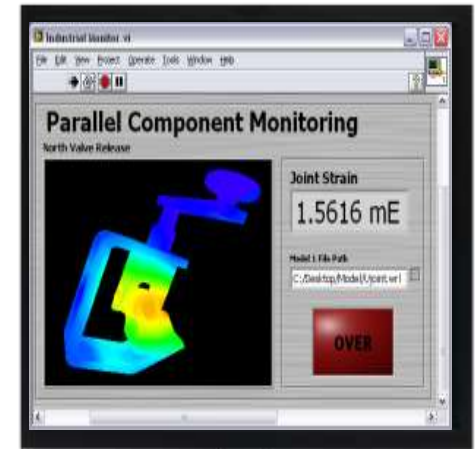
Desktop
Supercomputing

FPGA



Rapid
Embedded
Development

Modular I/O

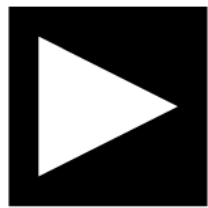


High
Performance
Interaction

Modular I/O:

Combinable Measurements & Rapid Data Access

- Combinable Measurements
 - Mix and match I/O to meet exact requirements
 - Access to leading edge measurement technology
- Rapid Data Access



**ANALOG
DEVICES**

the latest bus technologies
synchronization

**TEXAS
INSTRUMENTS**

- integrated through a single, unified software language

**PCI
EXPRESS**

**HI-SPEED
CERTIFIED
USB**



Modular I/O: PXI Platform



More than 1200 PXI Products from Over 70 Vendors

Modular I/O: C Series Platform



More than 60 Measurement modules

Case Study: København Zoo



Jens Frederik Broch

Begivenheder & arrangementer, Zoo

Katja Vinding Petersen

Skoletjenesten, Zoo



Case Study: København Zoo

- Formidling til publikum
- Skoleklasser
- Forskning



Case Study Demo: København Zoo

- USB-9234 og SignalExpress til lydoptagelser
- LabVIEW Applications anvendes til:
 - Signal Processing til at optimere de optagede lyde (filtrering, pitch ændring etc.)
 - Spektrogram display (Genkende karakteristika for forskellige dyreløde)



Introducing Wi-Fi Data Acquisition

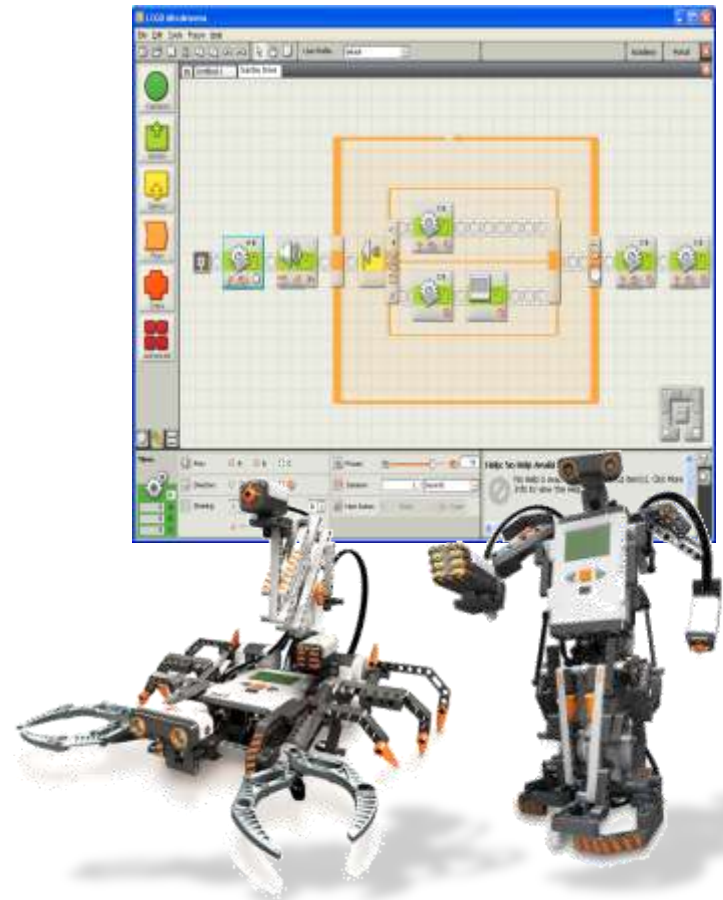
- IEEE 802.11b/g radio
- 10/100 Base-T/X Ethernet
- NI-DAQmx driver
- DC powered (9-30 VDC)
- C Series module support
 - NI 9211 (4-ch thermocouple)
 - NI 9215 (4-ch SSH $\pm 10\text{V}$ inputs)
 - NI 9234 (4-ch IEPE accelerometers)
 - NI 9237 (4-ch strain gauges)
 - NI 9219 (4-ch universal inputs)



POGO Stick DEMONSTRATION

Modular I/O: MINDSTORMS

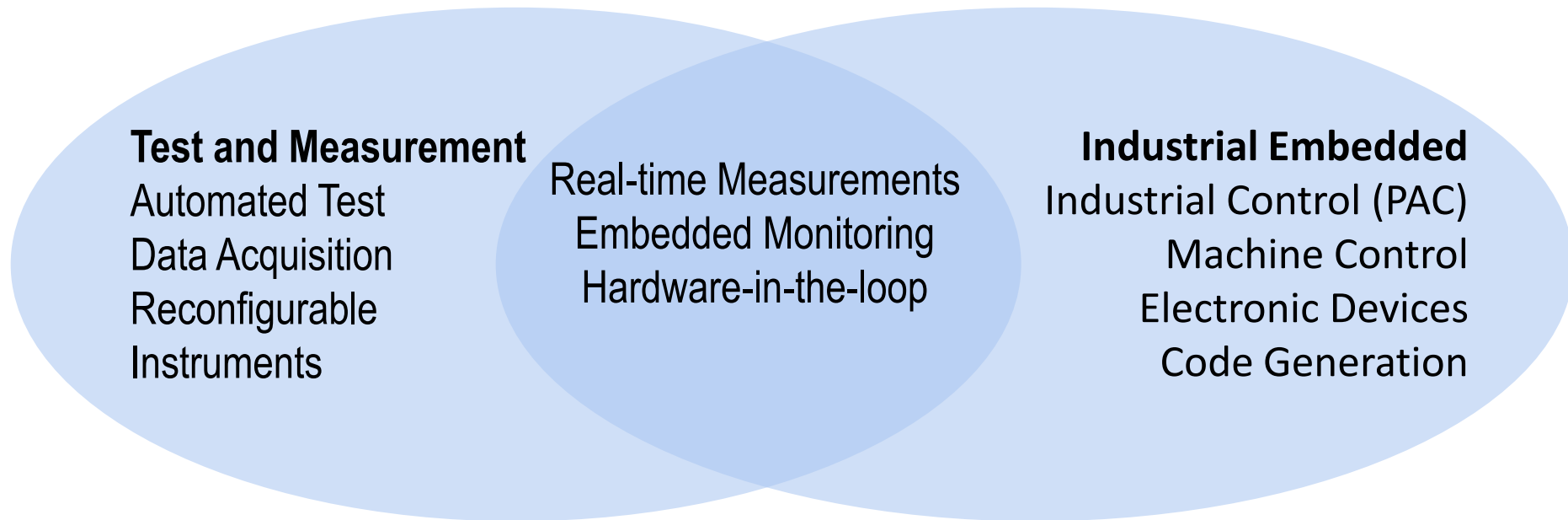
- Motors
- Sensors
 - Light, Sound, Ultrasonic, Touch, and Rotation
- USB 2.0 and Bluetooth



The Engineering Design Transformation

National Instruments Vision

Graphical System Design



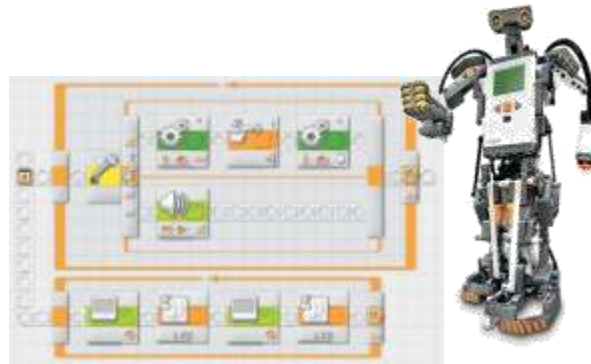
“To do for test and measurement
what the spreadsheet did
for financial analysis.”

“To do for embedded what the
PC did for the desktop.”

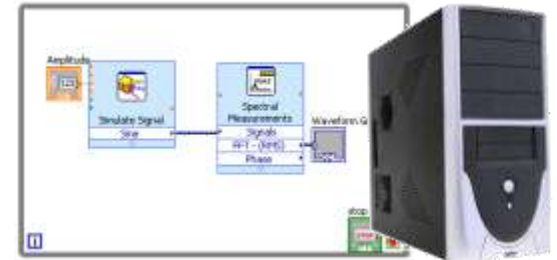
Graphical System Design: From Kindergarten to Rocket Science



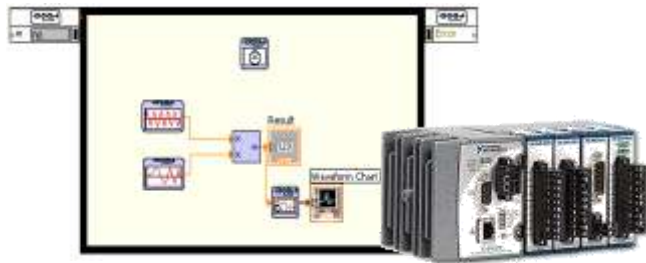
LEGO® Education WeDo Loop



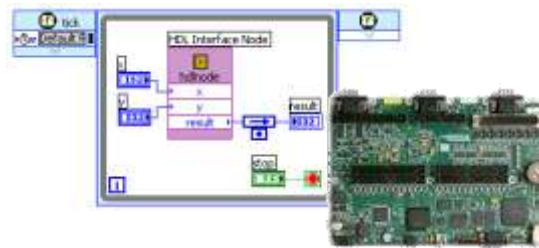
LEGO MINDSTORMS® NXT Loop



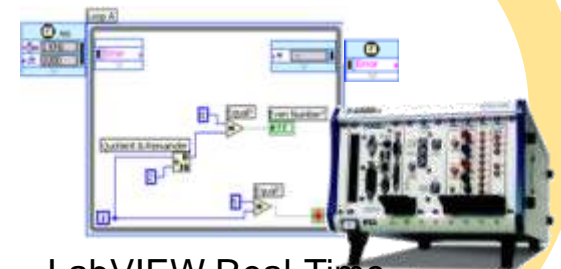
LabVIEW While Loop



LabVIEW Simulation Loop



LabVIEW FPGA
Single-Cycle Timed Loop



LabVIEW Real-Time
Timed Loop

Engineering Grand Challenges



Make solar energy economical



Provide energy from fusion



Develop carbon sequestration methods



Manage the nitrogen cycle



Provide access to clean water



Restore and improve urban infrastructure



Advance health informatics



Engineer better medicines



Reverse-engineer the brain



Prevent nuclear terror



Secure cyberspace



Enhance virtual reality



Advance personalized learning

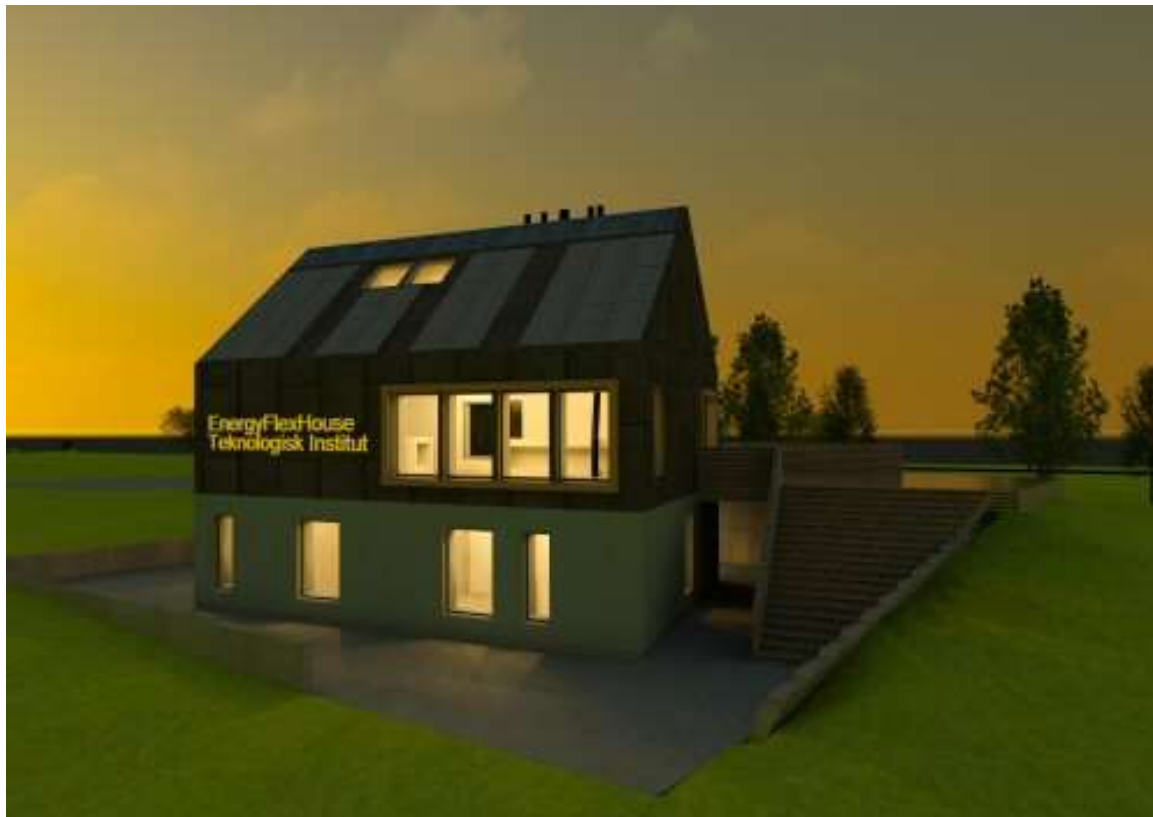


Engineer the tools of scientific discovery

Case Study: Energy FlexHouse

Peter Svendsen

Head of section, Teknologisk Institut



Case Study – EnergyFlexHouse

- Highly flexible facility for developing, testing and demonstrating overall innovative energy solutions for the building industry
- The idea is to continuously demonstrate and optimize existing building technologies in its interaction
- Consists of:
 - EnergyFlexHouse LABORATORY
 - EnergyFlexHouse FAMILY
- Approximately 500 measurements to document the different solutions
- DTI initiative towards the climate conference in copenhagen in december (COP 15)



**DANISH
TECHNOLOGICAL
INSTITUTE**



Case Study – EnergyFlexHouse

- In the project we use National Instruments solution
 - NI-LabVIEW Developer Suite with Real-Time option
 - Compact FieldPoint including cFP-2220 Real-Time controller
 - Numerous modules including:
 - cFP-AI-110 Analogue inputs
 - cFP-CTR-502 Counter inputs
 - cFP-TC-125 Thermocouple inputs
 - Etc.
- Stand-alone solution
Automated start-up
- Writes files to local disk
- File access through FTP-server
 - File extraction tool made in LabVIEW



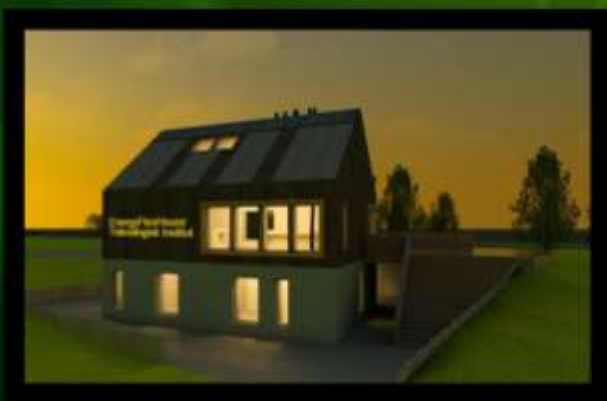


Ventilation
Lige nu: 80%
varmegenvinding



Lige nu: 40 watt
24 timer: 1,8 kWh

117 dage
Til: klimatopmøde
i København...



EnergyFlexHouse
TEKNOLOGISK INSTITUT

Engineering Grand Challenges



Make solar energy economical



Provide energy from fusion



Develop carbon sequestration methods



Manage the nitrogen cycle



Provide access to clean water



Restore and improve urban infrastructure



Advance health informatics



Engineer better medicines



Reverse-engineer the brain



Prevent nuclear terror



Secure cyberspace



Enhance virtual reality



Advance personalized learning



Engineer the tools of scientific discovery

Partner Introductions

NIDays 2009

Nyhedsbrev April 2009

Det seneste halve år har vi i 2C arbejdet på en række projekter og et udpluk af løsninger er beskrevet i dette nyhedsbrev. 2C har 15 ingeniører, der beskæftiger sig med udvikling indenfor mekanik (specielt produkter i

plast til volumenproduktion), elektronik, optik og software. 2C er Alliance Partner med National Instruments og anvender derfor LabVIEW i stor udstrækning. 2C kan levere mekanisk konstruktion i Solid Works,

ProEngineer Design Management Produktion
Software Optik Mekanik Automation
SolidWorks LabView Elektronik Inventor

Project Green Light

Igeniøren de seneste måneder har 2C arbejdet tæt sammen med iværksætterne bag Project Green Light. Projektet er blevet omtalt i tv, magasiner og aviser. Det går ud på at skabe den første europæiske producerede elbil i luksusklassen.

Udgangspunktet er en diesel-drivet Jaguar XF, hvor man erstatter den traditionelle brændselmotor med en el-motor. Den ombyggede model er døbt Jaguar XFe, og det er målet at den første prototype kan deltage i CO2 Race i august 2009.

2C bidrager til projektet med viden inden for styring og elektronik. Vi forventer, at netop de områder bliver udfordrende, når den nye el-motor skal køres sammen med bilens eksisterende elektriske system.

Seneste udvikling i projektet, er at dieselmotoren er blevet afmonteret. Nu skal bilen forbindes både mekanisk og elektrisk så den er klar til at få installeret el-motoren med tilhørende lithium-ion batterier.

Fortsættelse følger...



Jesper Boie Rasmussen står med sin Jaguar XF



Inspektion inden motoren afmonteres



Motoren afmonteret

Instrument til kvalitetskontrol

Her har 2C designet et positioneringsinstrument med høj præcision, som skal indgå i den løbende kvalitetskontrol af optiske elementer.



Testudstyr til medikoprojekt

Konceptstudier til testudstyr til en medikoteknisk virksomhed. 2C har leveret det endelige udstyr i 12 eksemplarer. Udstyret indeholder avancerede luftbærbare elementer kombineret med pneumatik og elektronik.



Test af system til in-line vejning

2C tester, med henblik på videreudvikling, et system til in-line vejning af breve i forbindelse med portalkontrol. Enheden vejer ca. 10 breve pr. sek.



Opgradering af HSM60

Opgradering af maskine (HSM60) til in-line kontrol af store ståfælg. Maskinen indeholder optiske sensorer til præcisionsopmåling. Konceptet der indeholder en omfattende signalbehandling og analysemetoden er udviklet og leveret af 2C.



CIM Industrial Systems A/S



- Test & Måling,
 - 2008: Vi skal have de bedste certificerede udviklere
 - 2009: LabView Architect 5 af 5 i dk, CLD 14 stk.

- Indlæg kl. 11:30:

NYHED!

FlexStand OI – Nyt produkt fra CIM

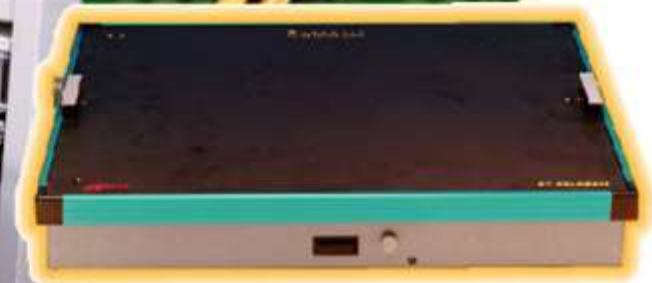
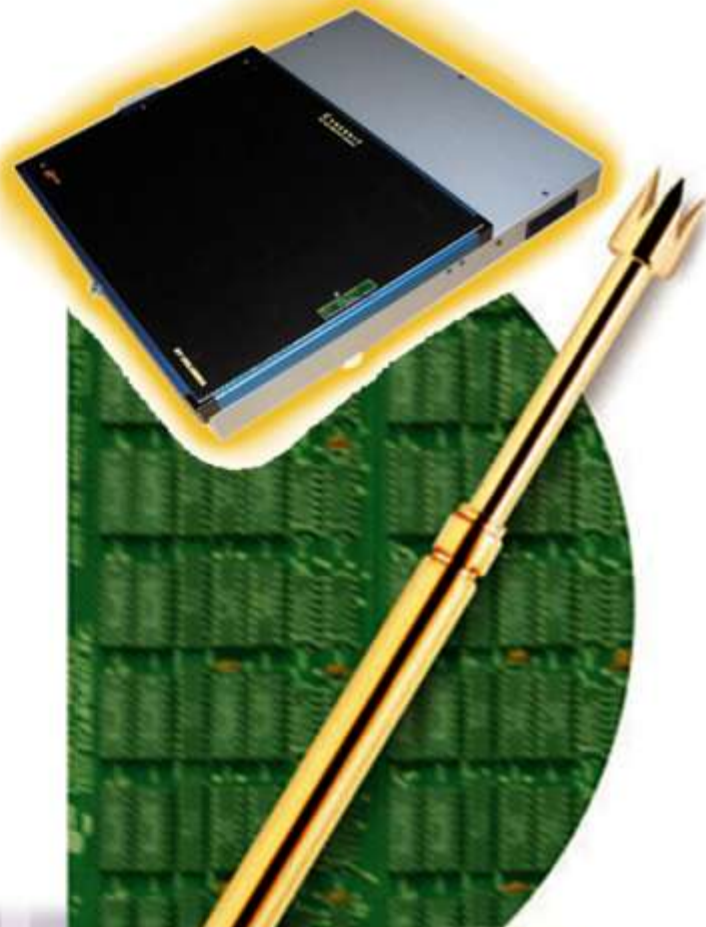
NYHED!

- Konkurrence - vind en ipod Se det blå "go cart" i posen
- Indlæg kl. 14:30: Embedded LV
- TestView supplement til Labview

WWW.CIM.AS



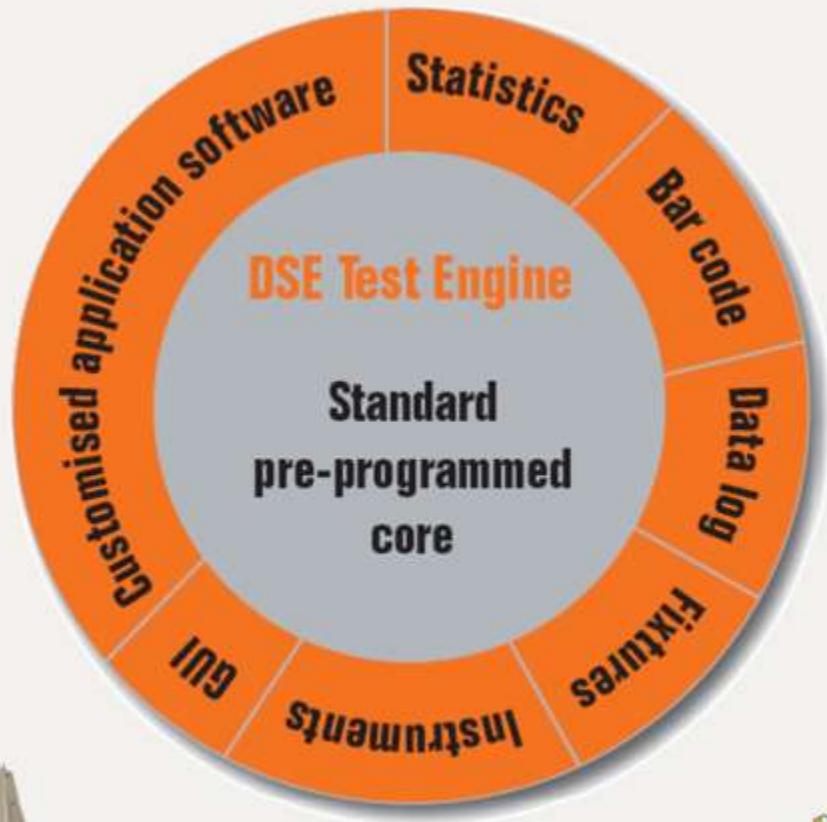
- Columbia has delivered testfixtures and Interface solutions from Virginia Panel corporation for the Nordic market since 1977.
- Columbia designs fixtures for function- and in-circuit test of all types of electronic units – on component- and board level as well as subsystems and finished product.
- Development of all fixturetechnics: vacuum, pneumatic or mechanical. The fixtures are built standalone, direct connected to the testsystem or integrated in the production line fully automatic.
- Knowledge, modern machine park and the best suppliers of material has made Columbia leading in the Scandinavian market.
- Columbia is agent for **Virginia panel Corporation**. VPC supplies reliable Interface solutions for any type of test platform, VXI,PXI,LXI,SCXI, Rack&Stack etc.


COLUMBIA


VPC Virginia Panel Corporation



- LabVIEW for FPGA: Practical experiences with deployment of signal processing algorithms (discrete cosine transform). (Track D 15:00)
- Living and Learning with LabVIEW: Follow our evolution in learning to use LabVIEW. Lots of diagram, including ugly ones, how we have evolved with better practices (Track D 13:30)
- RapidSensor: Helping SME's to prototype transducer/signal processing applications using LabVIEW FPGA.
- Partnering for testing, R & D, Innovationskupon and Eurostars.



Endevo



<flander>

Endevo

Part of Flander Group



Product & Application Groups:

Measurement Microphones

Array Solutions

Outdoor Applications

Low Noise Applications

Ear and Mouth simulators

Microphone Calibration Systems

Sound Intensity Probes



Features:

Direct, easy interface to NI instrumentation

IEPE & TEDS solutions

Dynamic range -2 dBA to 192 dB

Frequency range 0.5 Hz to 140 kHz

Use LabVIEW as analyser

Key expertise

xMove

Complex test solutions for electronic control units, used in automotive and other industry.

Application areas:

- Functional test
- Hardware In the Loop (HIL) test
- Repair test

HSDH-RT

High Speed Data Handling
- in **Real Time**
Complex solutions for telecom, defence and data applications.

Application areas:

- Simulators in general
- High speed data
- RF simulations and analyses

Large RT-Systems

Real Time systems used in control, measurement and test applications for a number of industries.

Main characteristics:



- Real Time
- Gbps data rate
- >20 interconnected computers
- Handling >2000 signals
- Scalable
- Distributed

The Göteborg design centre

- Engineering expertise in: LabVIEW, LabVIEW-RT, Multicore etc.
- Engineering expertise in: HW-design, FPGA, RF, interface design etc.

What Virinco do...

...we specialize in:

- Automatic Test Equipment
-  ➤ NI TestStand
-  ➤ Test Data Management

... helping customers to:

- Organize test & repair data
- Improve production **YIELD**
- Improve product **QUALITY**

Today's highlights

- >30 people took the CLAD Exam
- 18 Different technical/case study presentations
- 10 Partners in the exhibition area
- New Products Area
- 5 Try-it-Yourself demo stations
- “Quote of the Day”
- LEGO Mindstorms lottery – keep your lottery ticket
- Feedback forms
- USB sticks with presentations

