

# NIDays

WORLDWIDE GRAPHICAL SYSTEM DESIGN

## CONFERENCE



# Welcome to NIDays

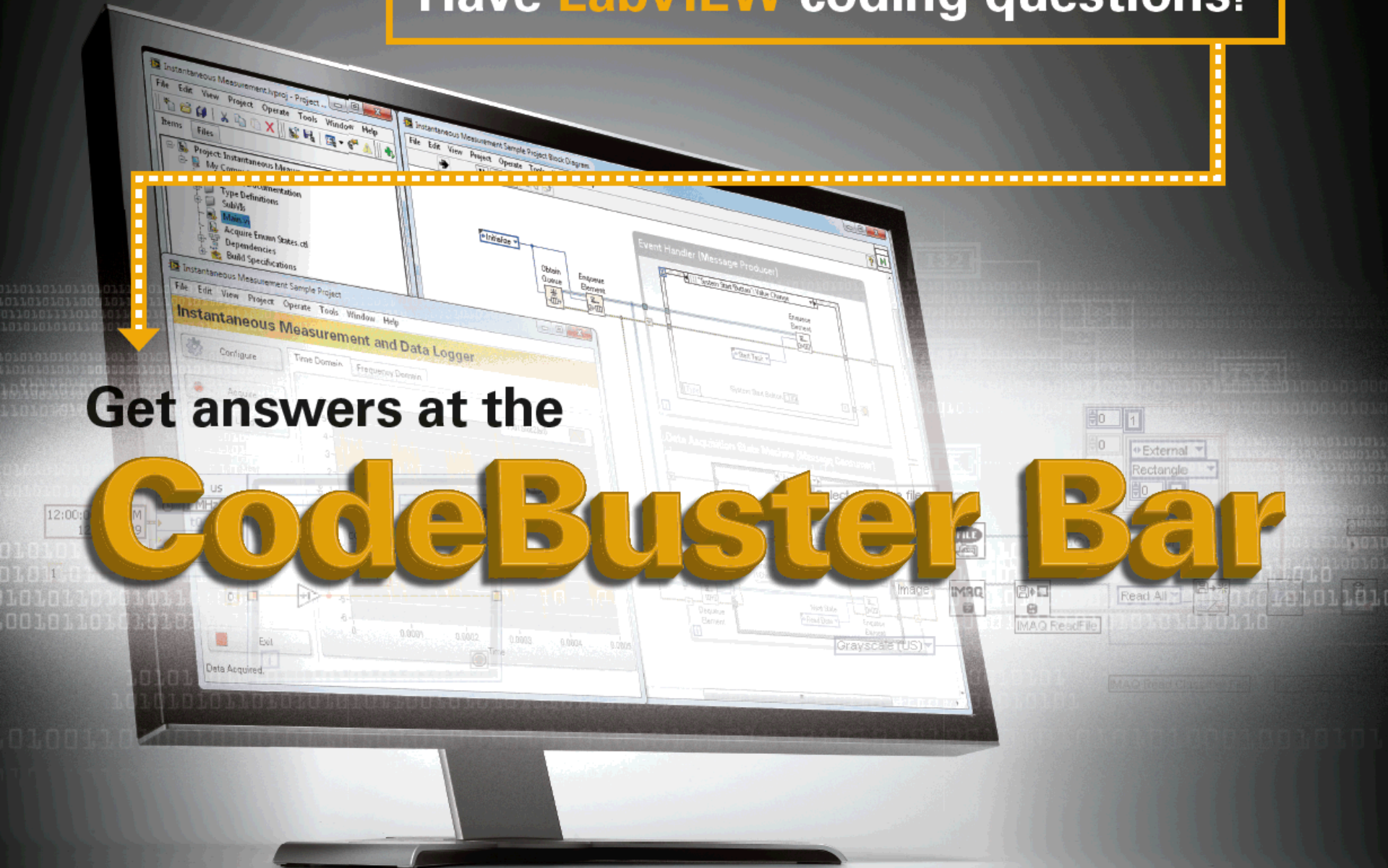
## THE LabVIEW Conference

Joris Donders  
Sales Manager NI Belgium

Have **LabVIEW** coding questions?

Get answers at the

**CodeBuster Bar**



# System Design for the 21<sup>st</sup> Century

Michael Neal

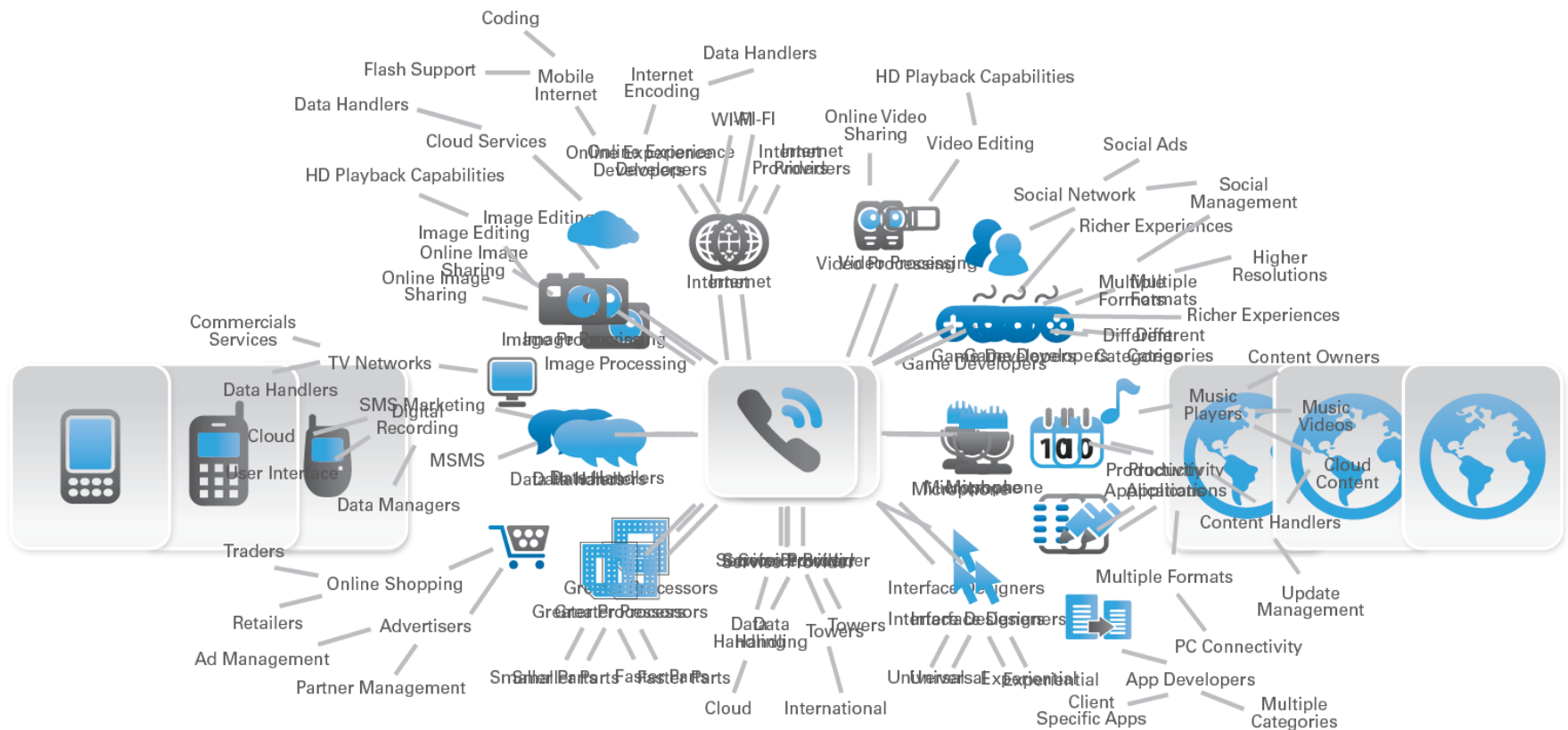
Senior Product Manager, LabVIEW



# Rapid Software Expansion



# Escalating Complexity Over Time

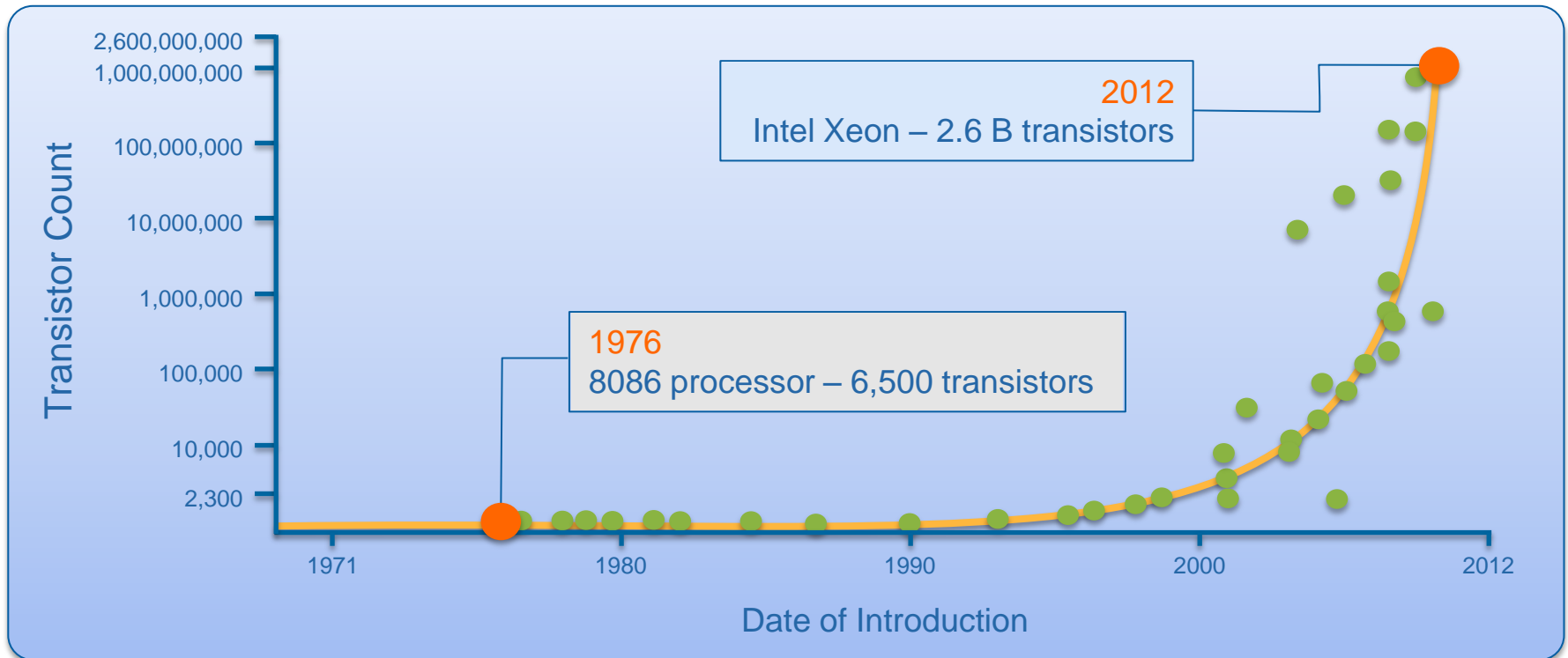


# Evolution of Instrumentation

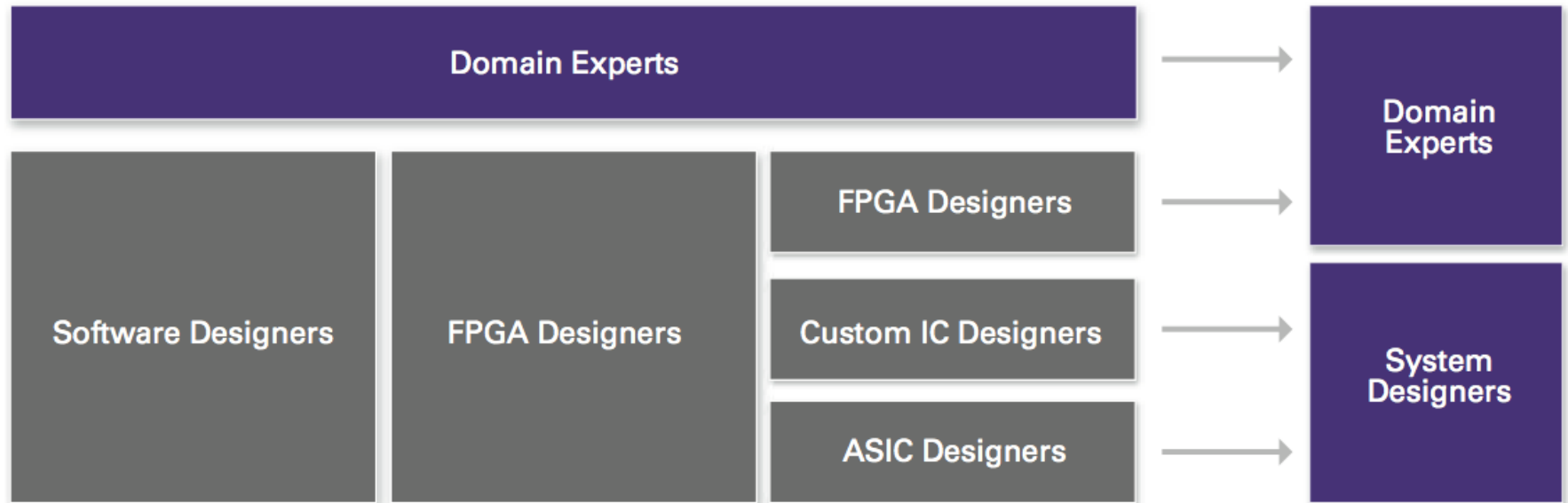




# Moore's Law



# Innovating More With Less



*“Innovation initiatives that were once handled by dozens a decade ago are now run by only handfuls...less apparently enables more.”*

—Michael Schrage, Harvard Business Review Blog Network

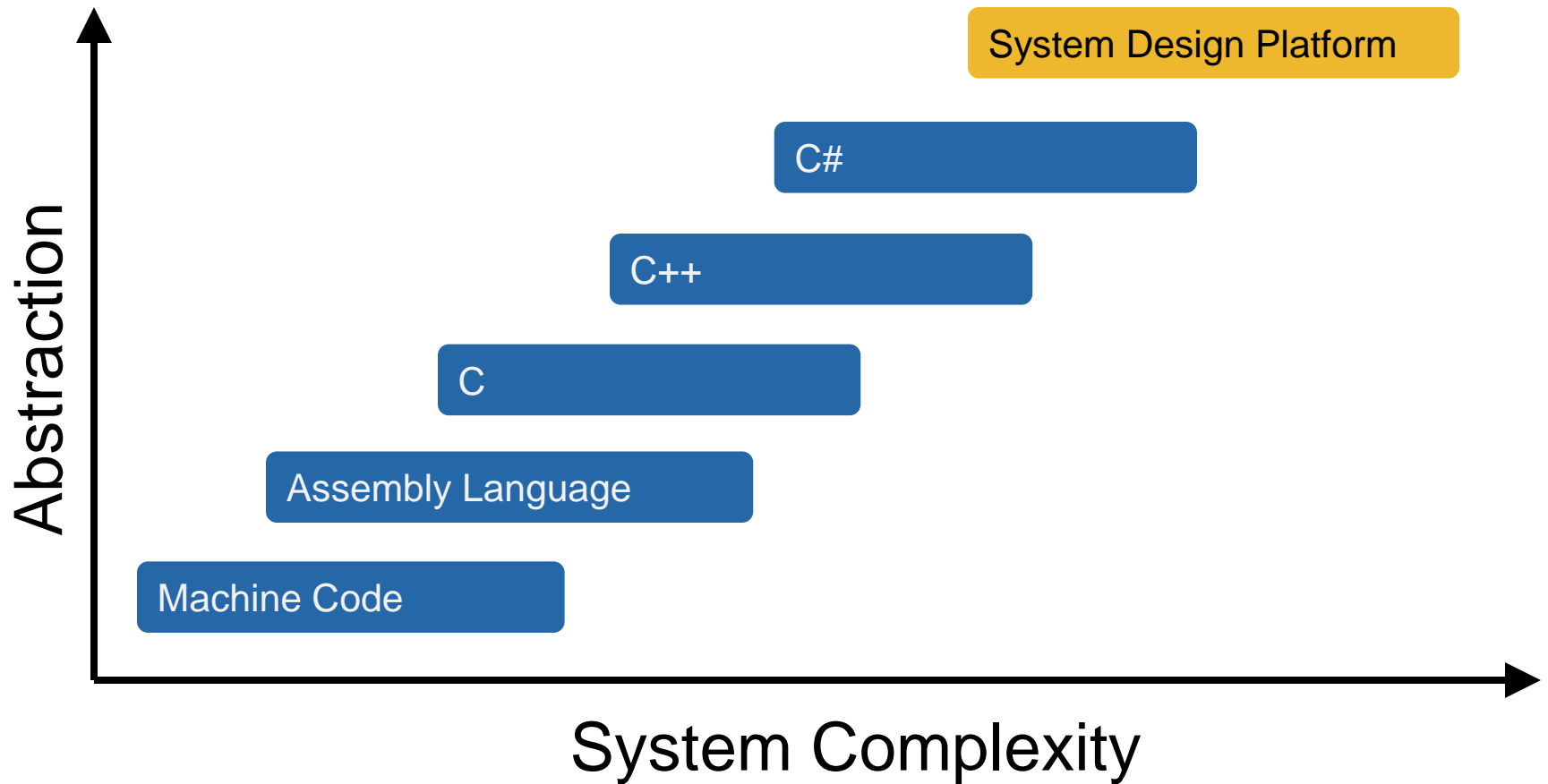
Number of  
Engineers

> 10 Million

Number of  
HDL Designers

~ 100,000

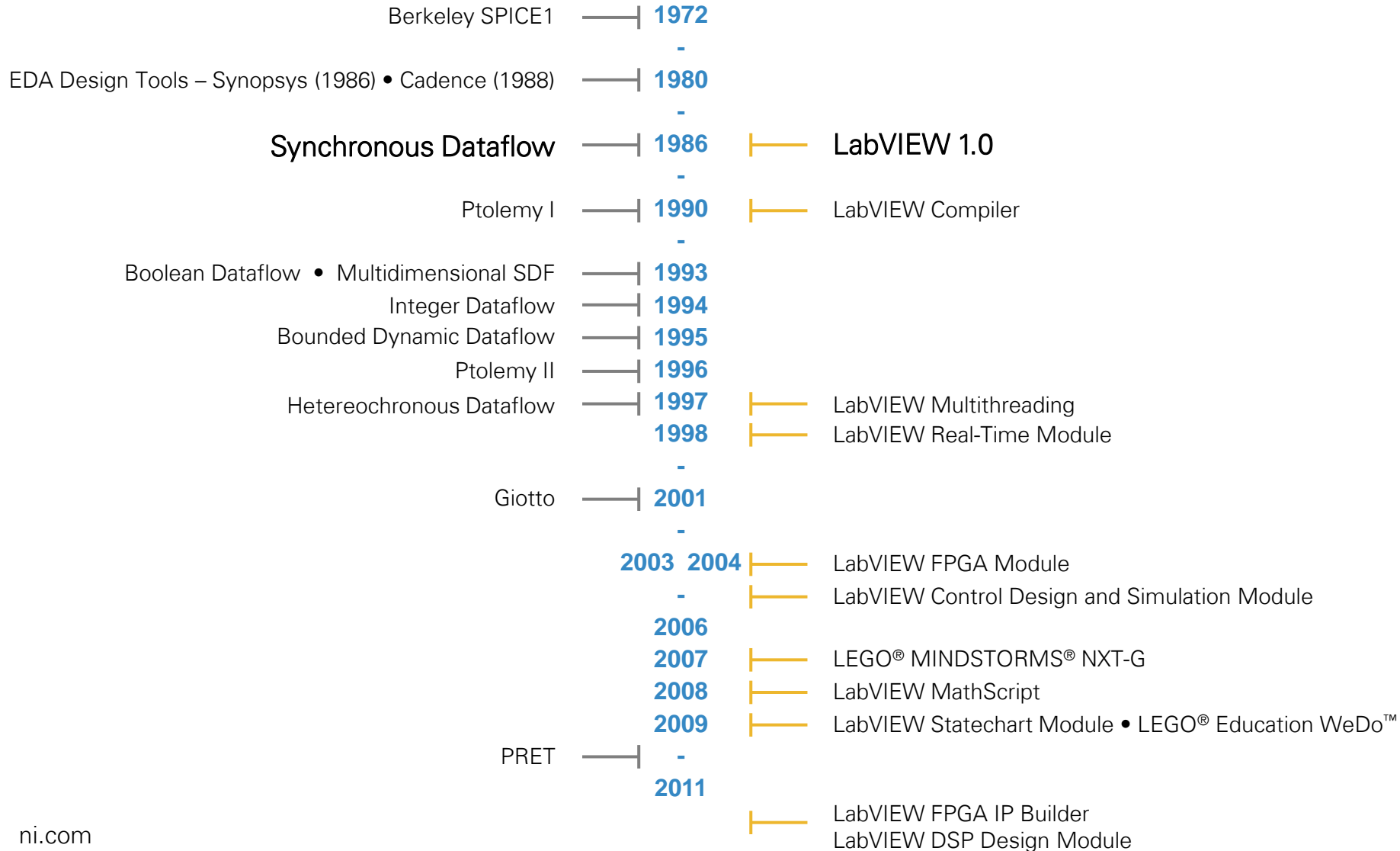
# Scalable Software Abstraction



# Academic Foundation to Strong Design

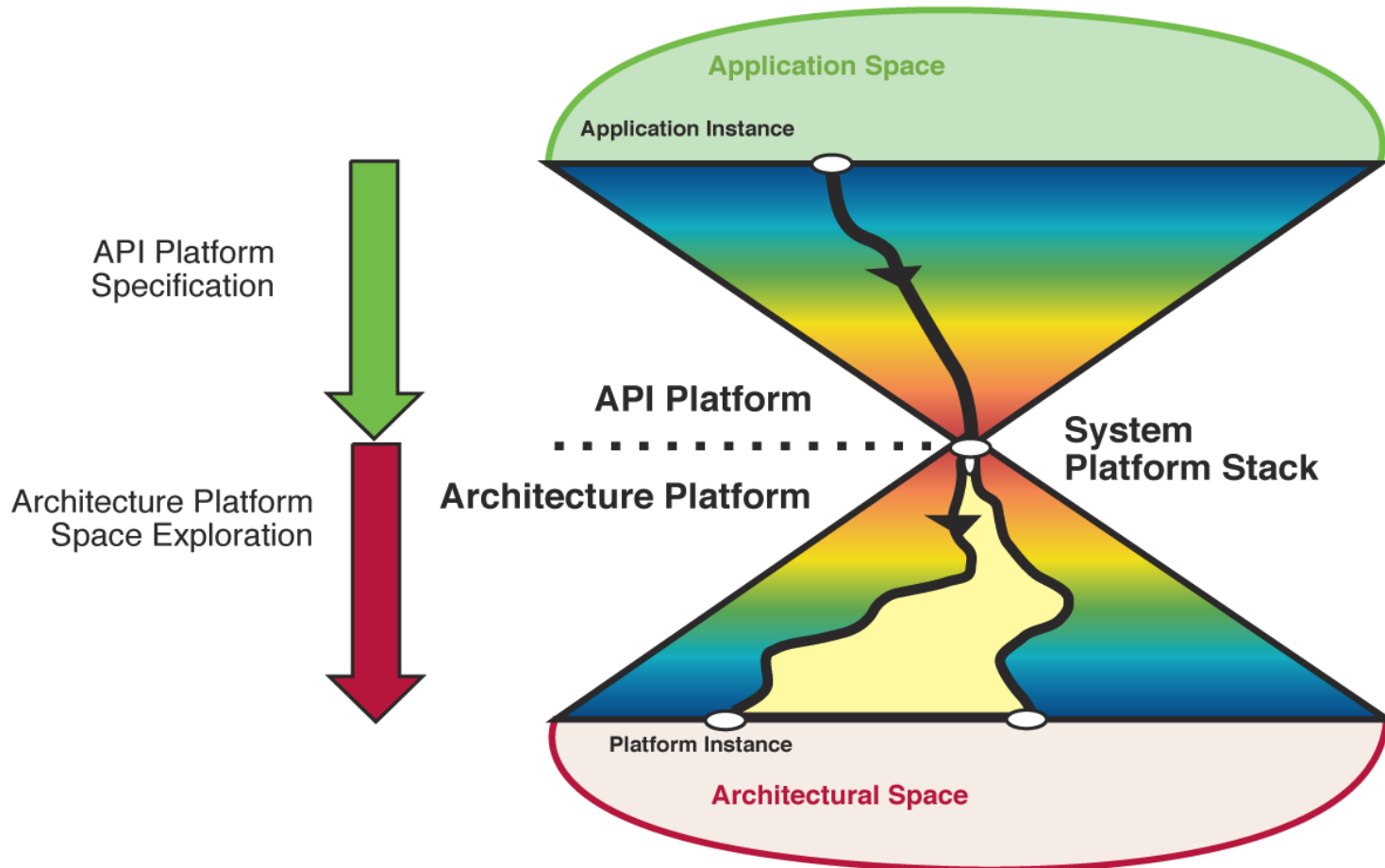
## University of California Berkeley

## National Instruments LabVIEW Dataflow



# University of California Berkeley

## *A Platform-Based Design for System-On-Chip*



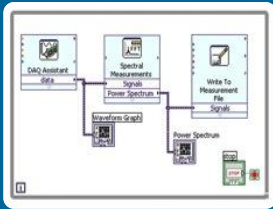
*A. Sangiovanni-Vincentelli, UC Berkeley. Defining Platform Based Design. EEDesign, Feb 2002*



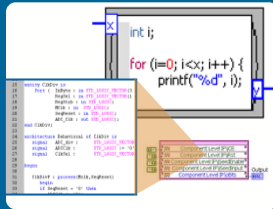
# Graphical System Design

## *A Platform-Based Approach for Measurement and Control*

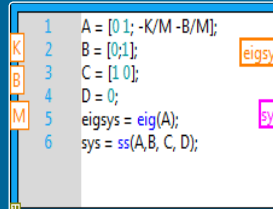
Data Flow



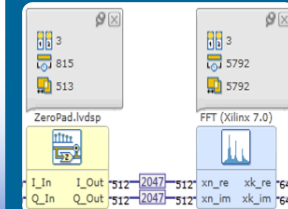
C/HDL Code



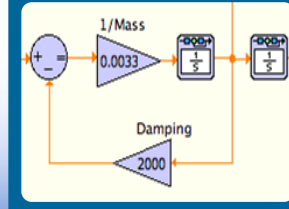
Textual Math



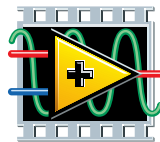
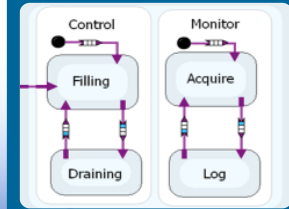
Multirate DSP



Simulation



State Chart



NATIONAL INSTRUMENTS  
**LabVIEW™**



Personal Computers



PXI Systems



NI CompactRIO



NI Single-Board RIO



NI USRP

# Graphical System Design

*A Platform-Based Approach for Measurement and Control*

Test



Monitor



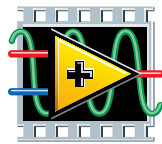
Embedded



Control



Mechatronics



NATIONAL INSTRUMENTS

# LabVIEW™



Desktops and  
PC-Based DAQ

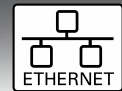


PXI and Modular  
Instruments



NI CompactRIO and  
Custom Designs

**GPIB**  
IEEE-488



**HI-SPEED**  
CERTIFIED **USB**

Open Connectivity  
with 3<sup>rd</sup> Party I/O

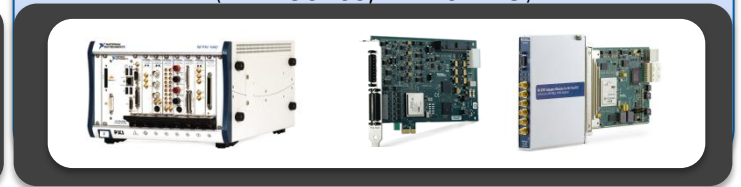
# LabVIEW Reconfigurable I/O (RIO) Architecture



NI CompactRIO and NI Single-Board RIO

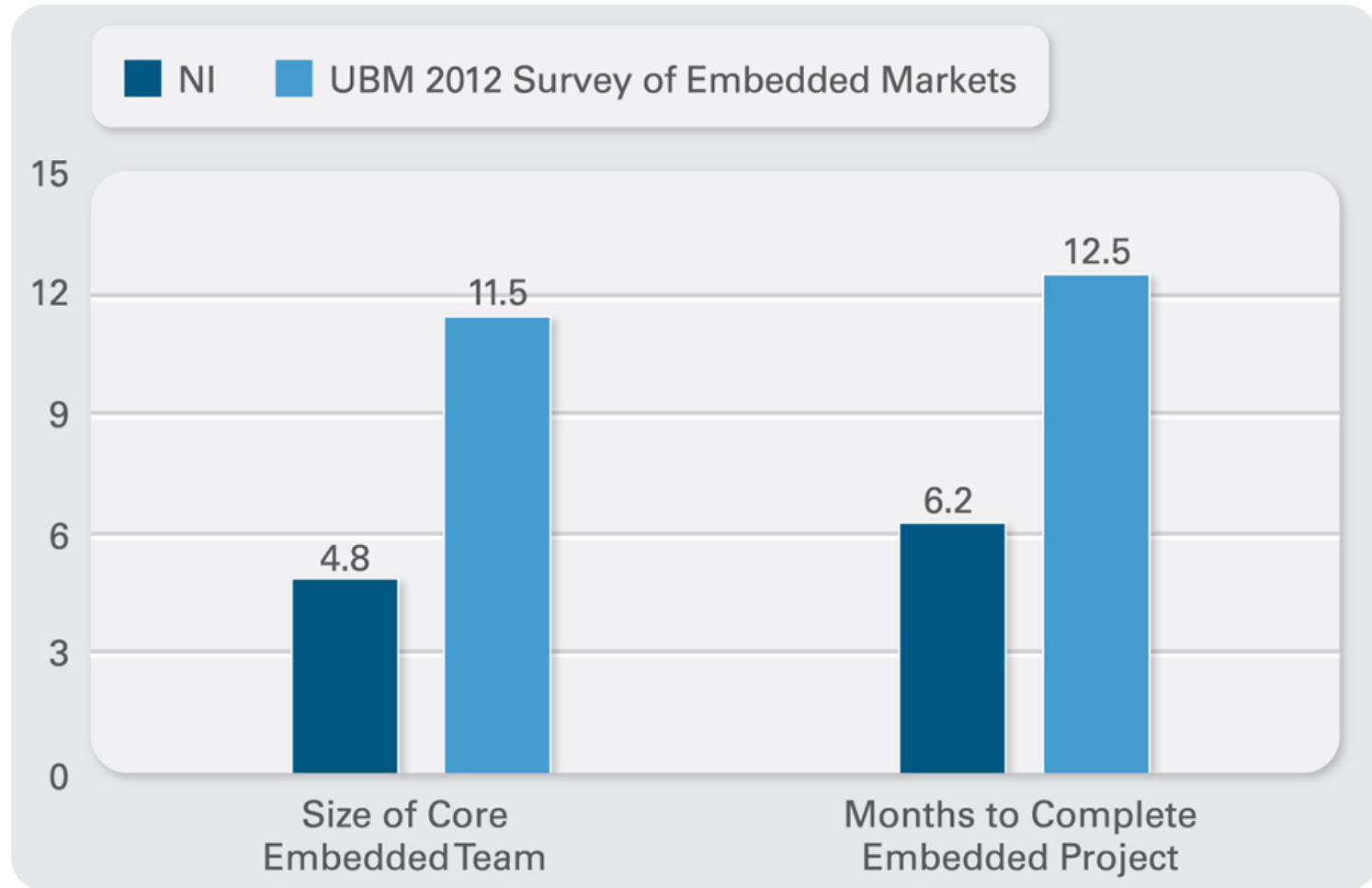


LabVIEW RIO in PXI, PC  
(NI R Series, NI FlexRIO)



# Smaller Teams Get to Market Faster

*Using the NI Graphical System Design Approach*







# Stand-Alone NI CompactDAQ

## *Embedded Measurements and Logging System*

NI LabVIEW  
System Design Software

NI DIAdem  
Data Management

NI-DAQmx  
Driver Software



External Devices  
USB, Ethernet, Serial,

>50 I/O modules  
Analog, digital, CAN, etc.

32 GB hard drive  
Log for 360 hours\*

Intel Core i7  
Dual-Core processing

Multiple OS Options  
Windows or Real-Time

High Data Throughput  
Stream up to 30 MB/s to disk





# Casper Klop

## Technical Marketing

# Wireless Everywhere



*"the proliferation of mobile devices, including smart phones and other mobile devices, will continue to be the key growth driver into the foreseeable future."*

*- Jessy Cavazos, Industry Director, Frost and Sullivan*

“The best way to predict the future is to invent it.”

Alan Kay, software pioneer

# Introducing the PXIe-5644R

*Worlds First Software Designed Instrument*

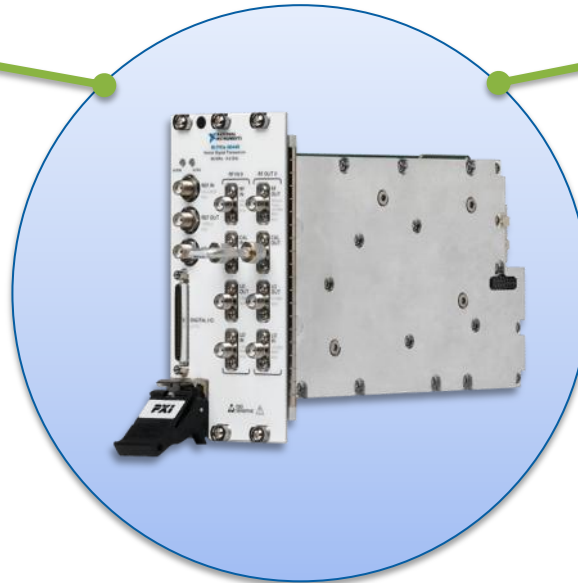




# Software-Designed Instrumentation

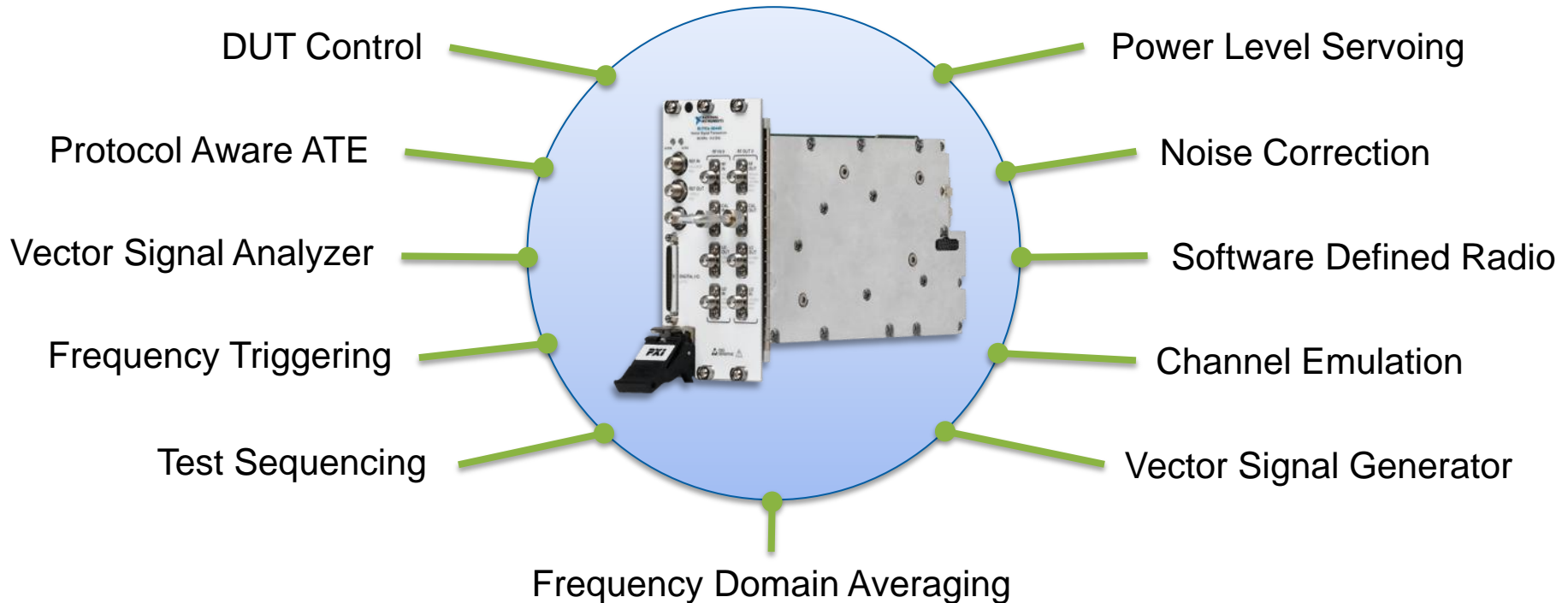
Vector Signal Analyzer

Vector Signal Generator





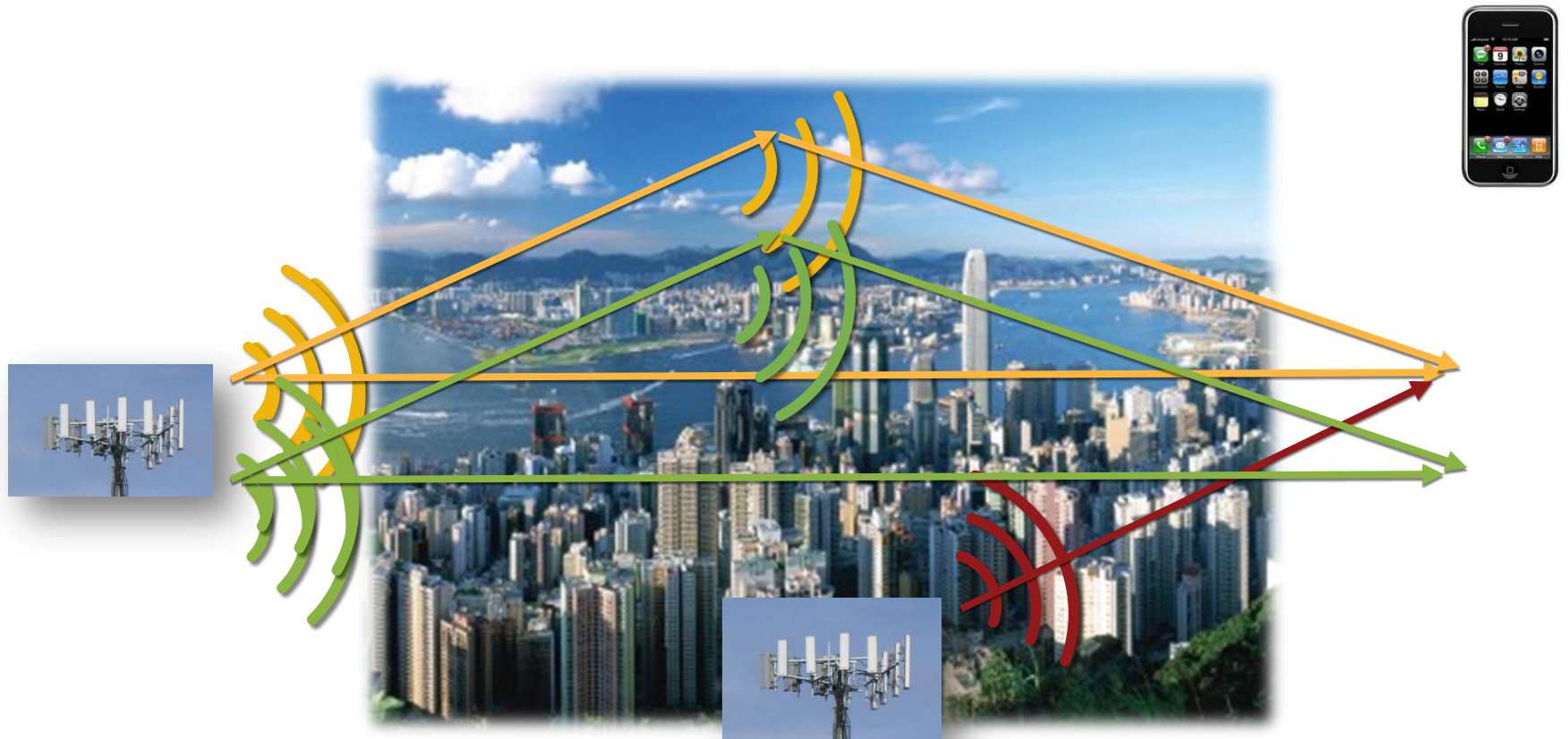
# Software-Designed Instrumentation



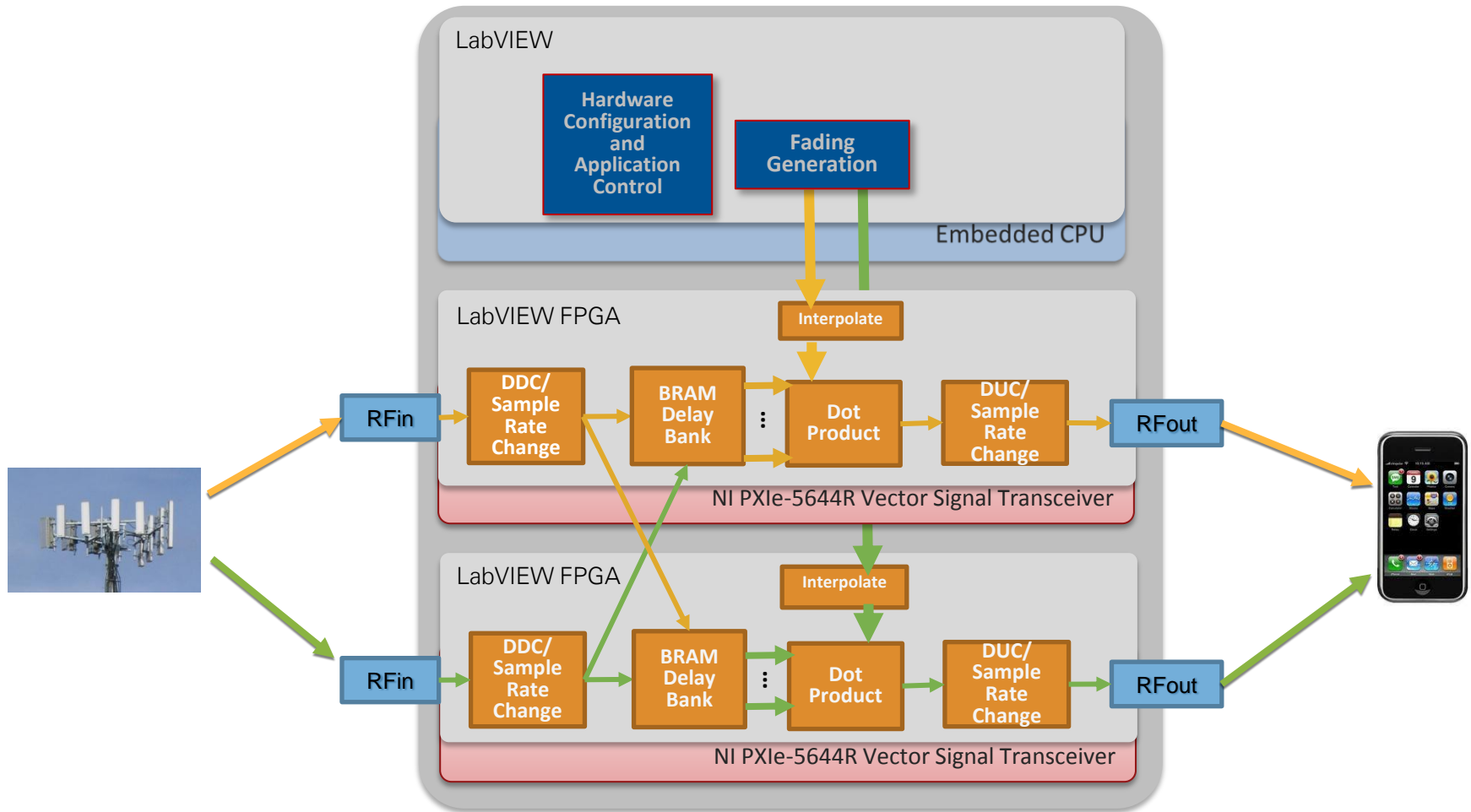
# Remco Krul

## Technical Marketing

# Radio Propagation Environment



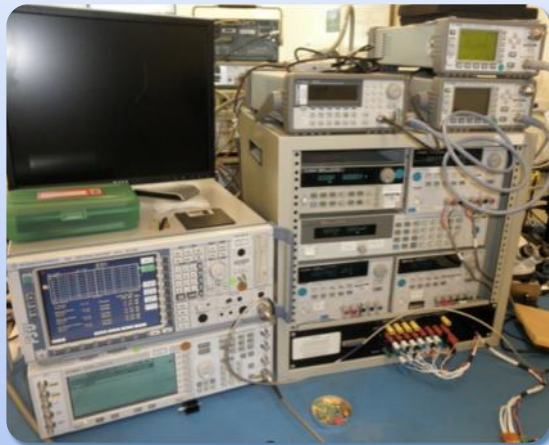
# Real-Time MIMO Channel Emulation



# Qualcomm Atheros – Evolution of Instrumentation

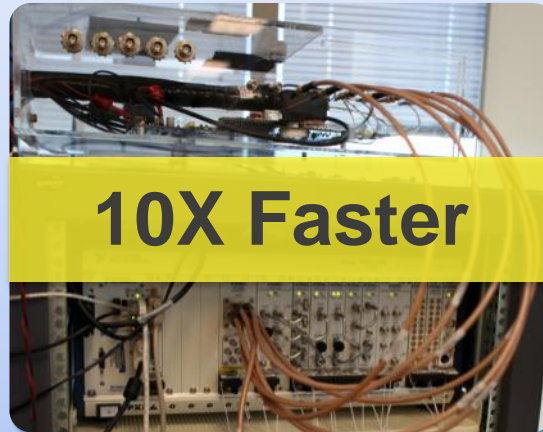
## EVM (dB) versus Average Output Power Chain

802.11a + b + g



**Early 2000s**  
Traditional Rack and Stack

+ 802.11n



**2007**  
NI PXI RF Instrumentation

+ 802.11ac

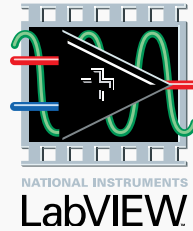


**2012**  
NI Vector Signal Transceiver

# Domain Experts from LEGO to Rocket Science



**LEGO** mindstorms  
education



**SPACEX**





Dragon Longitude	319.56	29.5744	269.959	-3.34089
-124.7 deg				
Dragon Altitude	Eccentricity	Ascending Node (deg)	True Anomaly (deg)	Perigee Altitude (km)
1867.1	0.997393	26.2622	180.002	-6369.82



