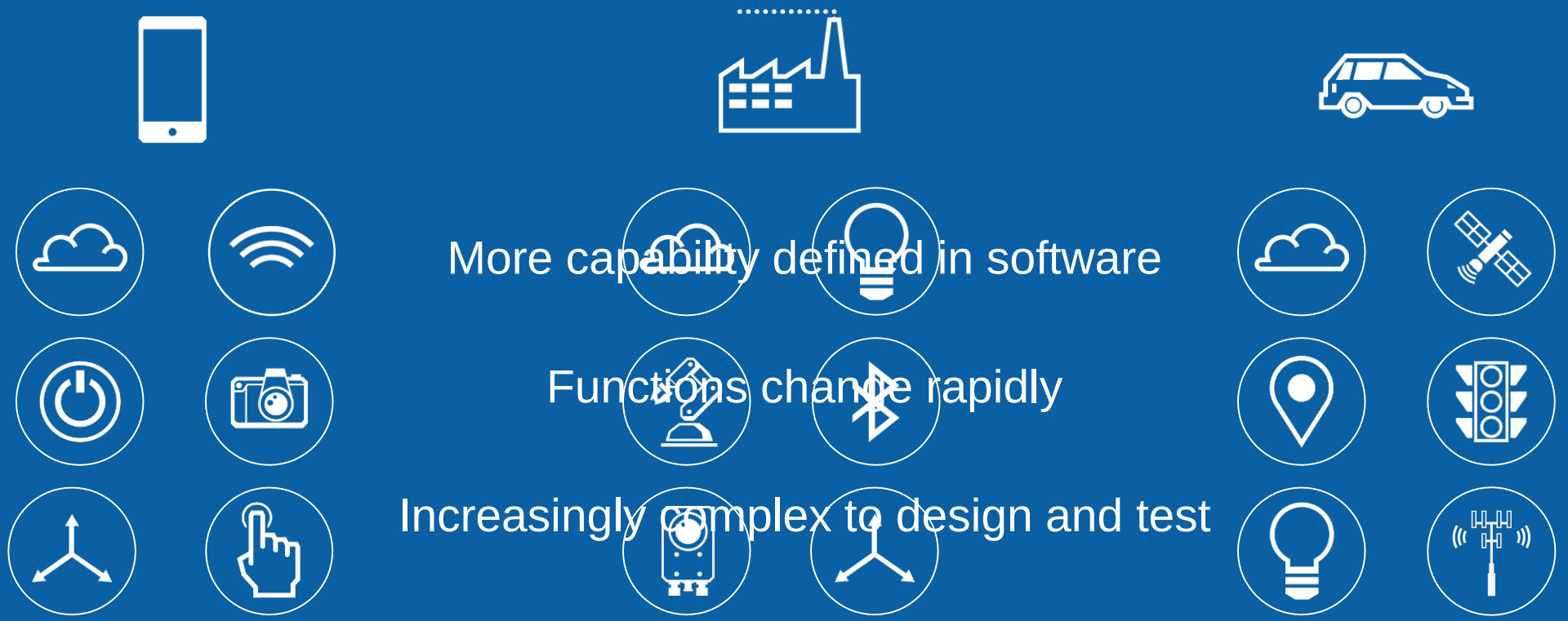

NATIONAL
INSTRUMENTS™

How a couple students from Debrecen measured one of the coldest places of the universe – National Instruments' Innovation Program

dr. László Ábrahám

Managing Director – NI Hungary

The World of Converged Devices



More capability defined in software

Functions change rapidly

Increasingly complex to design and test

NATIONAL INSTRUMENTS

Mission Statement

NI equips engineers and scientists with systems that accelerate productivity, innovation, and discovery.

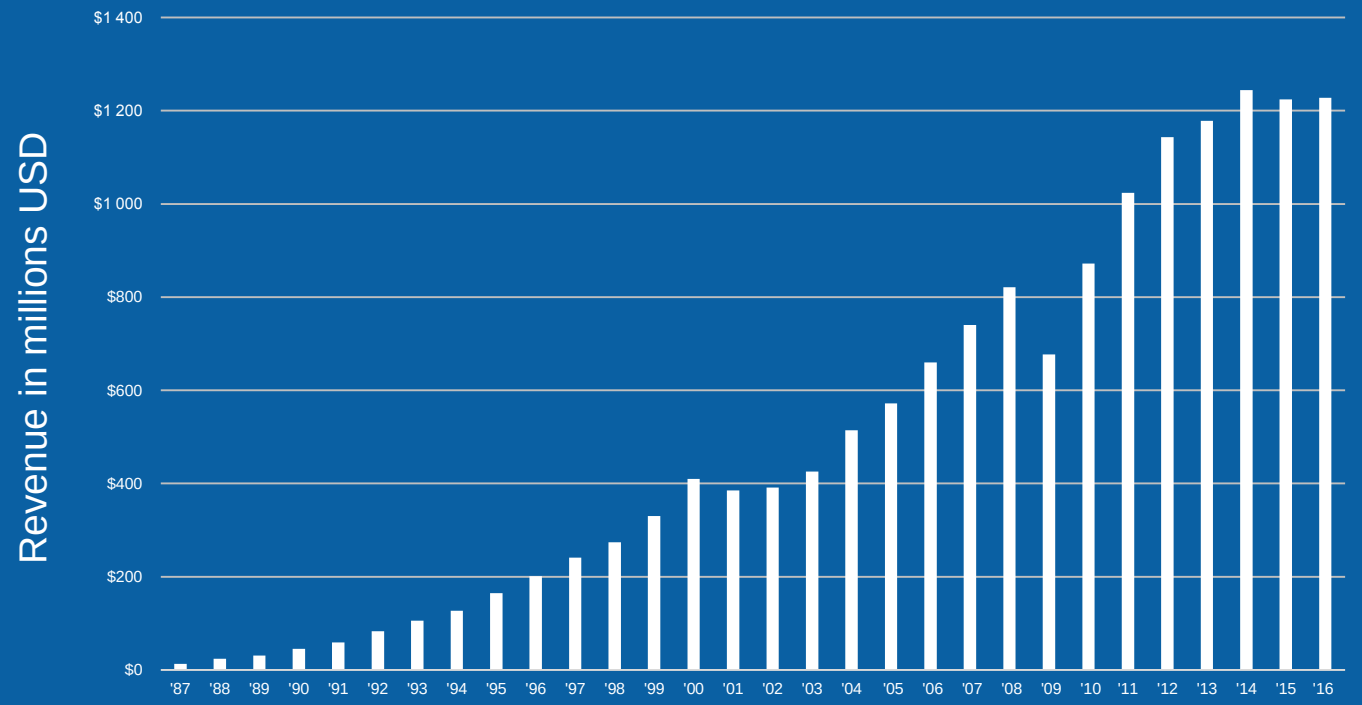
7,500+ EMPLOYEES
50+ COUNTRIES

$1.23
BILLION
IN 2016

35,000+
CUSTOMERS WORLDWIDE

OVER 18%
INVESTMENT IN R&D

Long-Term Track Record of Growth



NATIONAL INSTRUMENTS

Our Customers' Success

Industrial Machinery	Aerospace and Defense	Electronics and Semiconductor	Academic and Research
Industrial Machinery	Aerospace and Defense	Electronics and Semiconductor	Academic and Research
Wireless	Transportation and Heavy Equipment	Automotive	Energy
Wireless	Transportation and Heavy Equipment	Automotive	Energy

NATIONAL INSTRUMENTS

Have a good idea?

Is it hardware development?

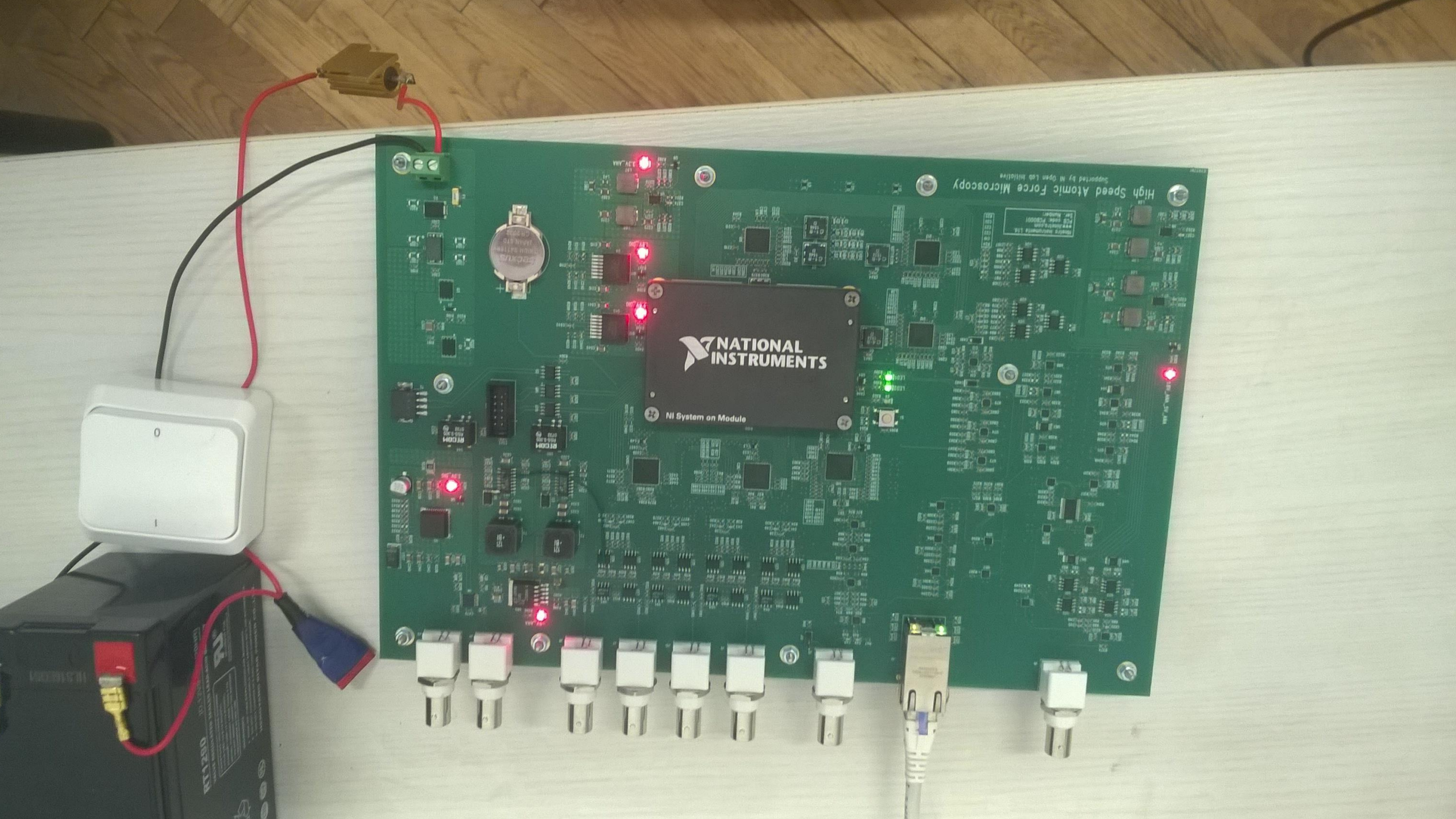
Would NI products help?

Innovation Program

NATIONAL INSTRUMENTS

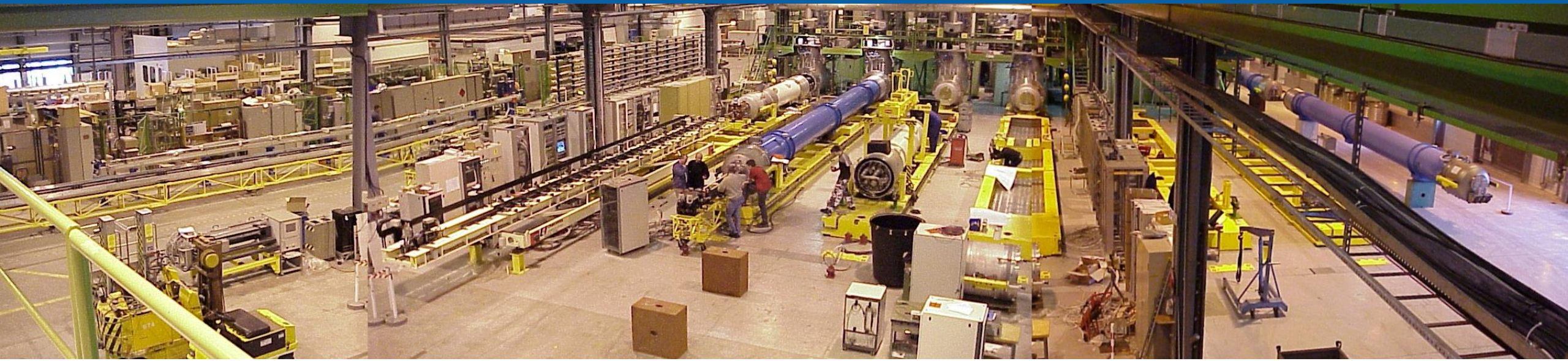
CERN - PACMAN

- Prototyping test benches for modules of the next generation of particle accelerators at CERN
- PACMAN works on aligning accelerator components on the nanometer level for the CLIC future potential accelerators


High Speed Atomic Force Microscopy
NATIONAL INSTRUMENTS
NI System on Module

CERN LHC

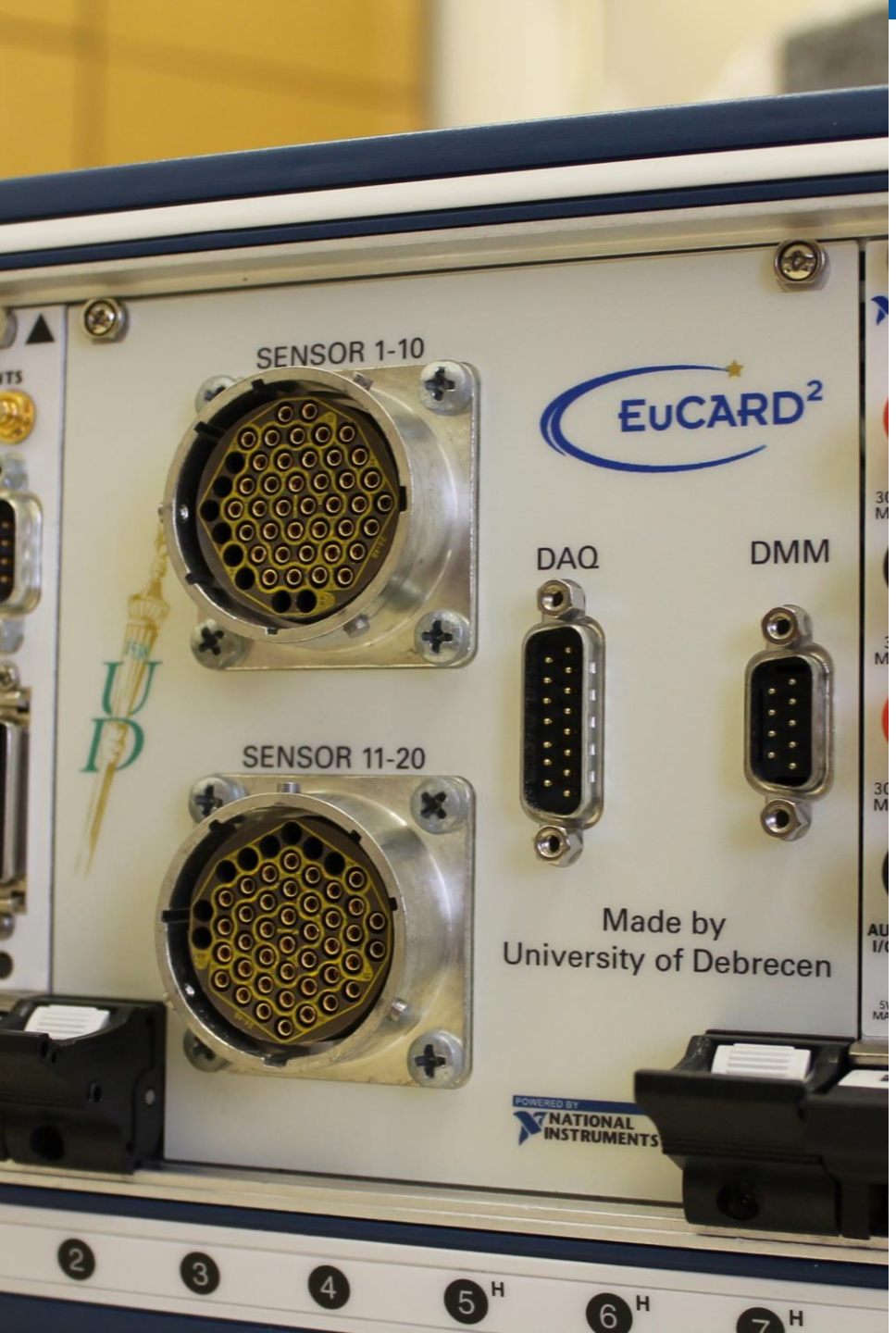
- The most powerful machine on planet Earth
- The LHC's main magnets operate at a temperature of 1.9 K (-271.3°C), colder than the 2.7 K (-270.5°C) of outer space



CERN SM18 Test Facility

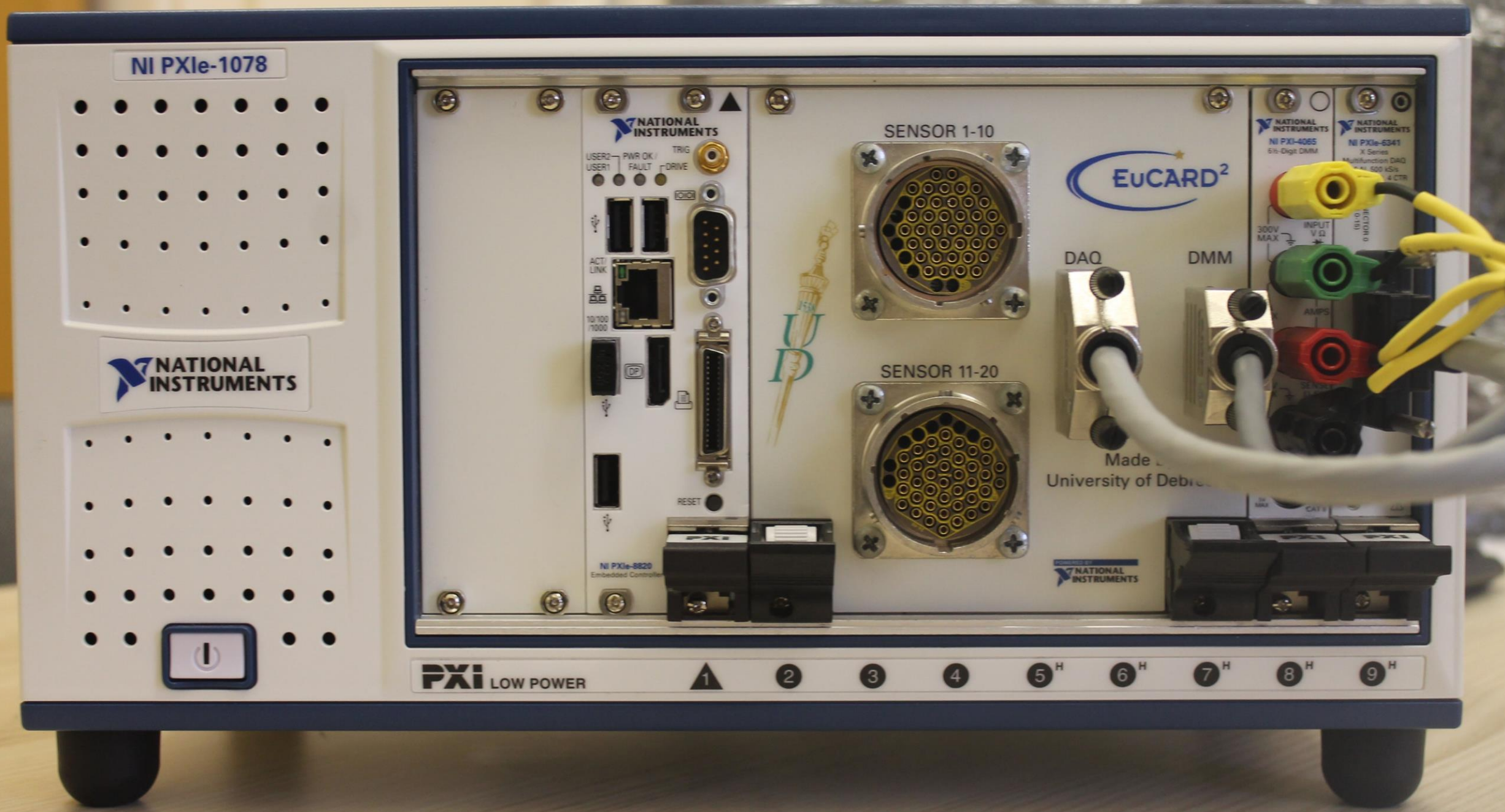
- Every LHC magnet is rigorously tested before lowering to the tunnel
- Tests include:
  - Liquid N_2 and He cooling to between 4,5 K and 1,8 K
  - Thermal cycling of the magnets
  - Isolation testing
  - High current load testing @ 14 kA
  - Magnetic measurements

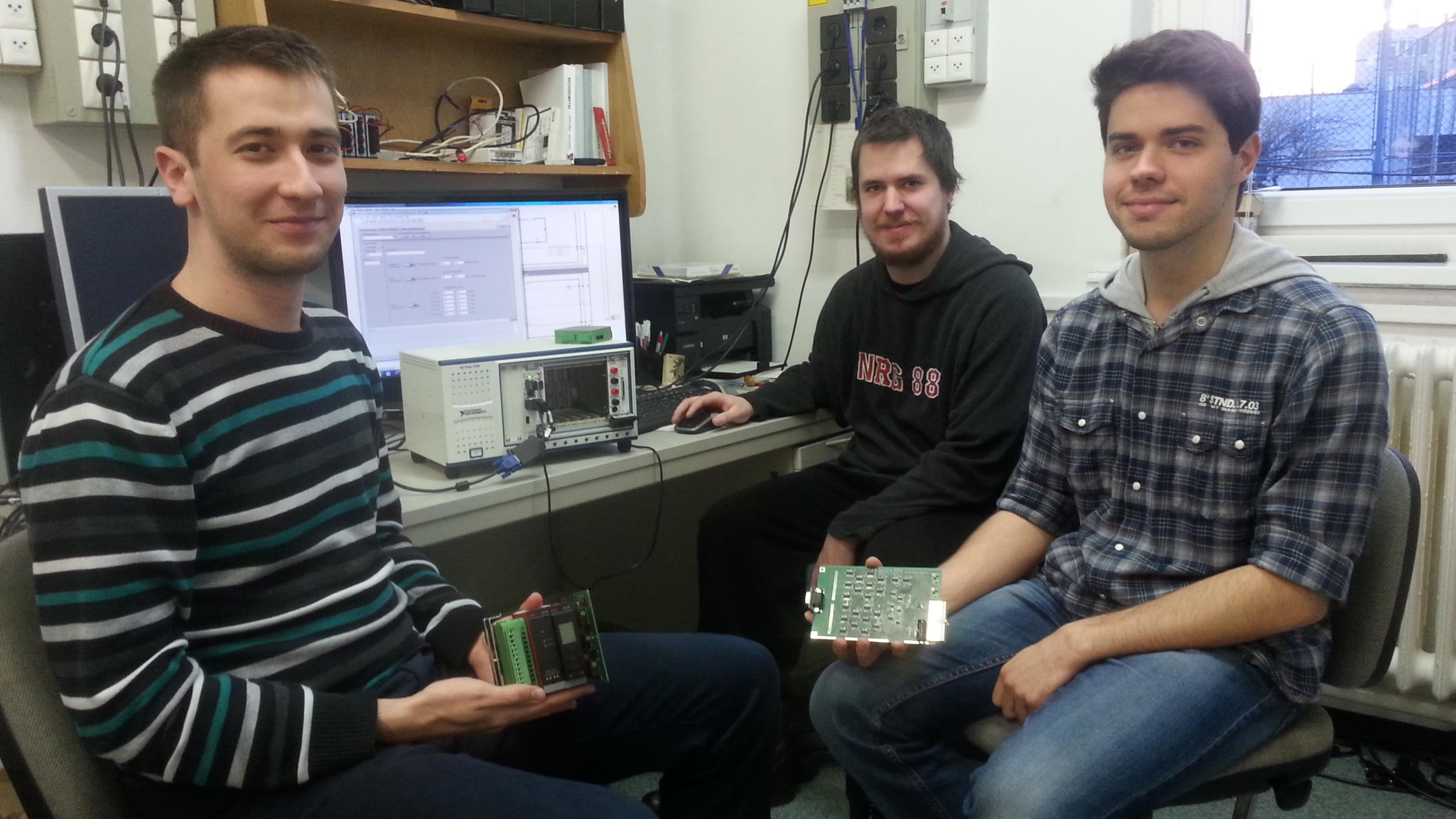
NATIONAL INSTRUMENTS

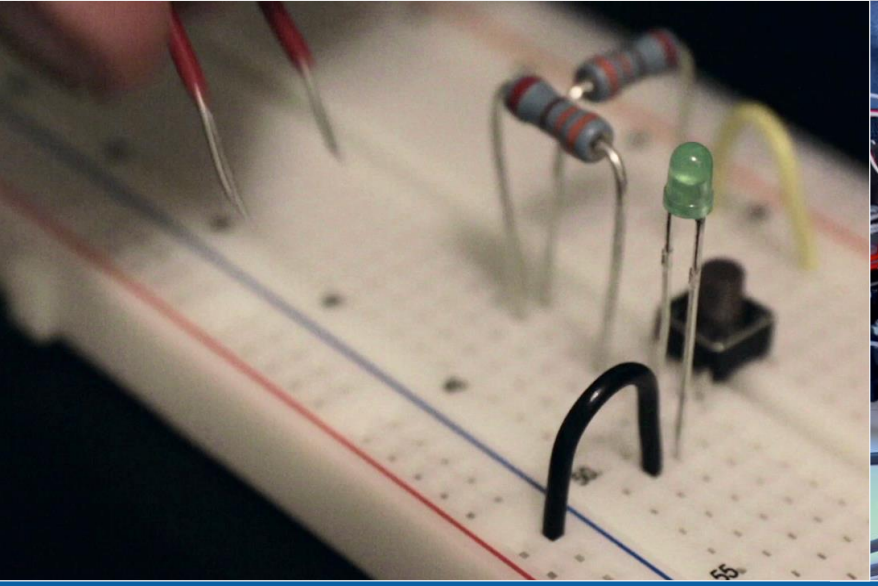


University of Debrecen's Measurement System

- Students and professors together designed and built a measurement system for SM18
- Measuring temperature from room temperature to 1.8 K
- 0,5% accuracy through full range
- Ability to sense 20 measurement points
- Remote control of the system possible
- Based on NI technology including own design as well


NI PXIe-1078
NATIONAL INSTRUMENTS
NATIONAL INSTRUMENTS
USER2
USER1
PWR OK / FAULT
TRIG
DRIVE
ACT/ LINK
10/100 /1000
RESET
NI PXIe-8820
Embedded Controller
SENSOR 1-10
SENSOR 11-20
EuCARD²
DAQ
DMM
NATIONAL INSTRUMENTS
NI PXI-4065
6½-Digit DMM
NATIONAL INSTRUMENTS
NI PXIe-6341
X Series
Multifunction DAQ
300V MAX
INPUT
AMPS
PXI LOW POWER
1
2
3
4
5 H
6 H
7 H
8 H
9 H





Together we are changing the world!

NATIONAL INSTRUMENTS™


NATIONAL
INSTRUMENTS™