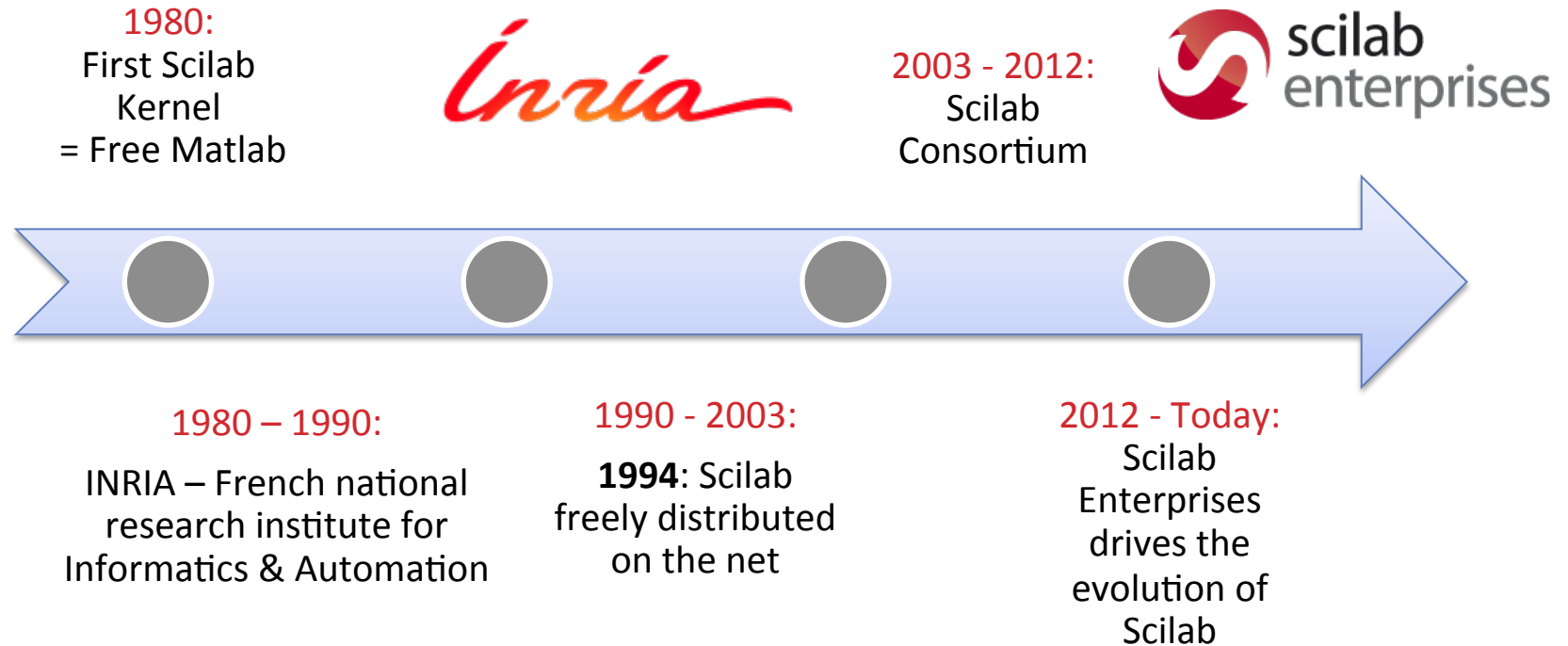


Webinar Scilab & Labview For Measurement and Test data analysis

Paul Bignier
Yann Debray
Scilab Enterprises
April 2016

- Scilab Introduction
- Scilab Labview Demos
- Scilab Use Cases

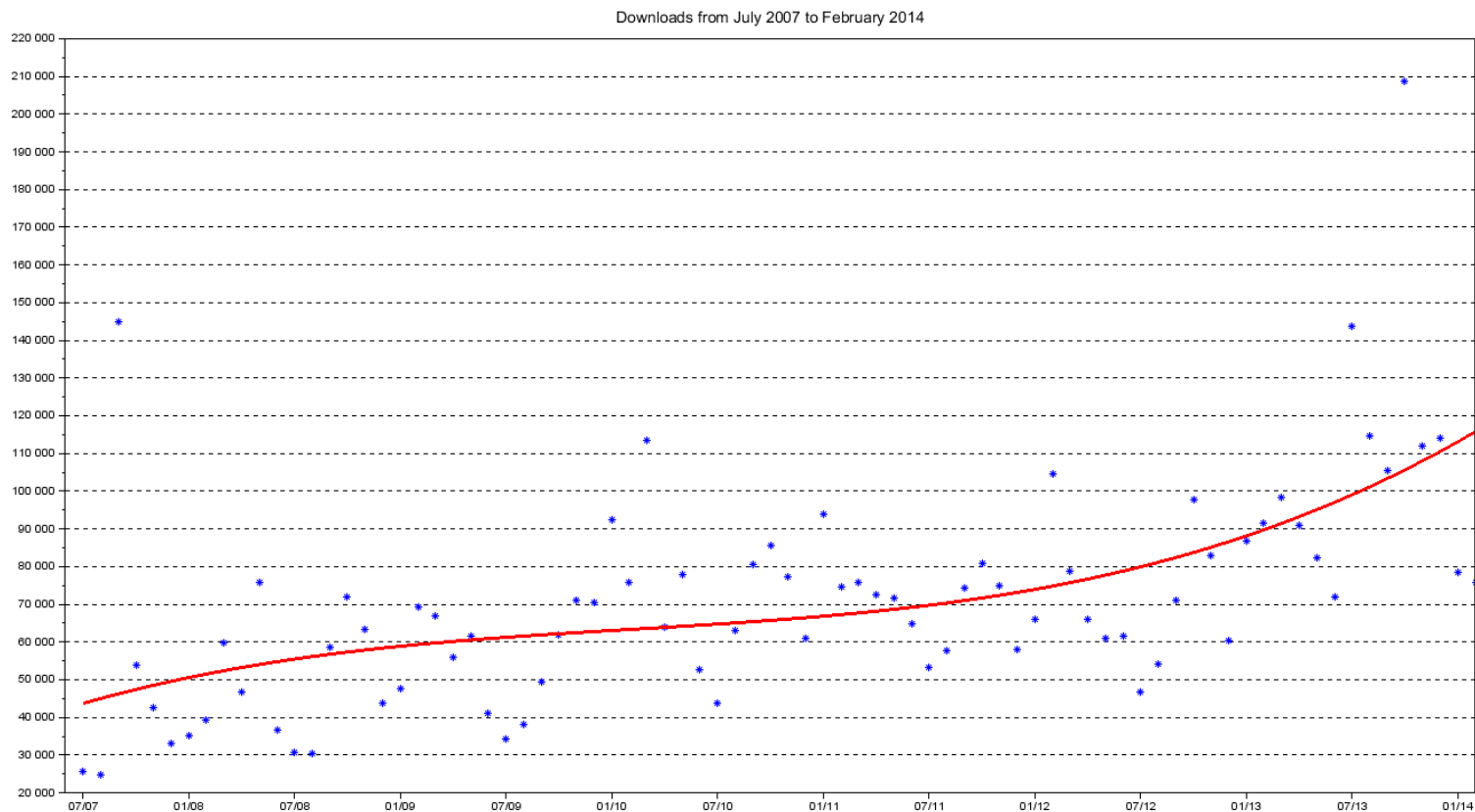
Scilab History



SciLab Today

From www.scilab.org

➤ ~ 100 000 monthly installations from 150 countries



Scilab Open Source Distribution

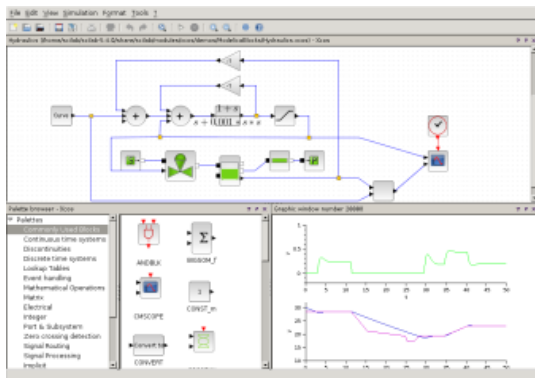
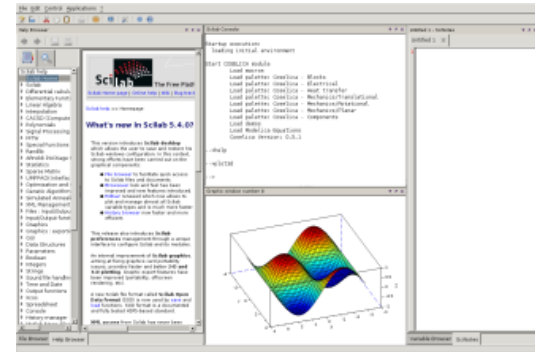
Workstation Software:

- Scilab
Powerful Computation Engine

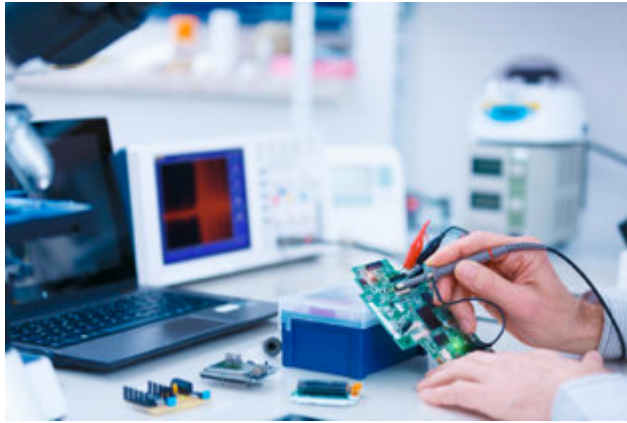
- Xcos
Dynamic Systems Modelling and Simulation

Server Software:

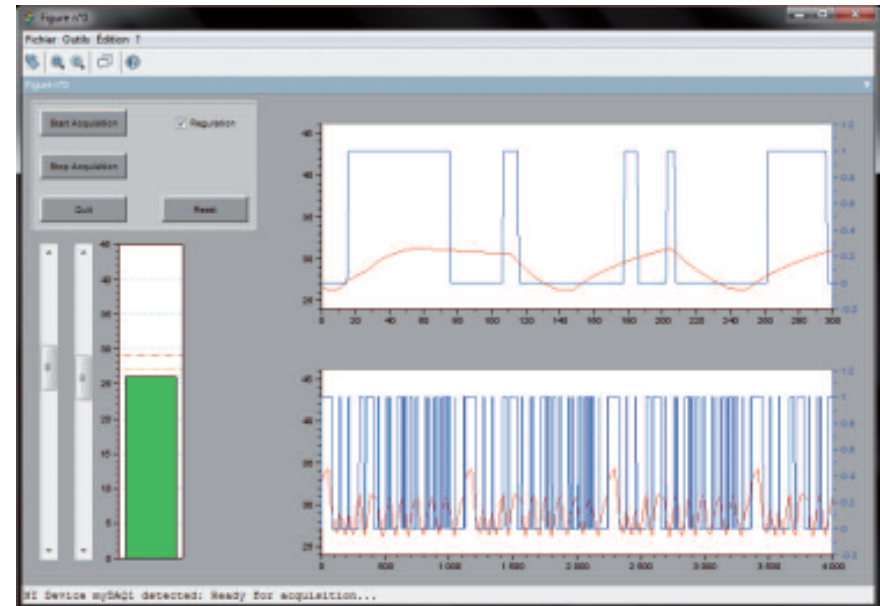
- ATOMS Server
Modules/Toolboxes Management



Signal acquisition and instrument control



„Real-time“ acquisition and control of temperature



Real-time temperature control application

Scilab Enterprises

Our Expertise at your Service

- Scilab Trainings
- Scilab Support and Maintenance
- Scilab Development (core Engine, modules, apps)
- **NEW** Cloud offering (WebApp deployment & more)



Main Scilab References

- Aerospace & Defense:
CNES, Airbus, Airbus DS, DLR, Safran, Dassault Aviation, DGA, Thales
- Automotive:
PSA, Renault, Leoni, Valeo, Continental, Faurecia, TMD Friction
- Metallurgy:
ArcelorMittal, Aperam, Alcan, Eramet
- Energy:
CEA, EDF, RTE, ABB, Total, IFP, Alstom...
- Chemical & Pharmaceutical :
Solvay/Rhodia, Sanofi
- Electronics, Test & Measurement:
Stmicroelectronics, Microchip, Xilinx, Dantec Dynamics

Scilab Labview Demos

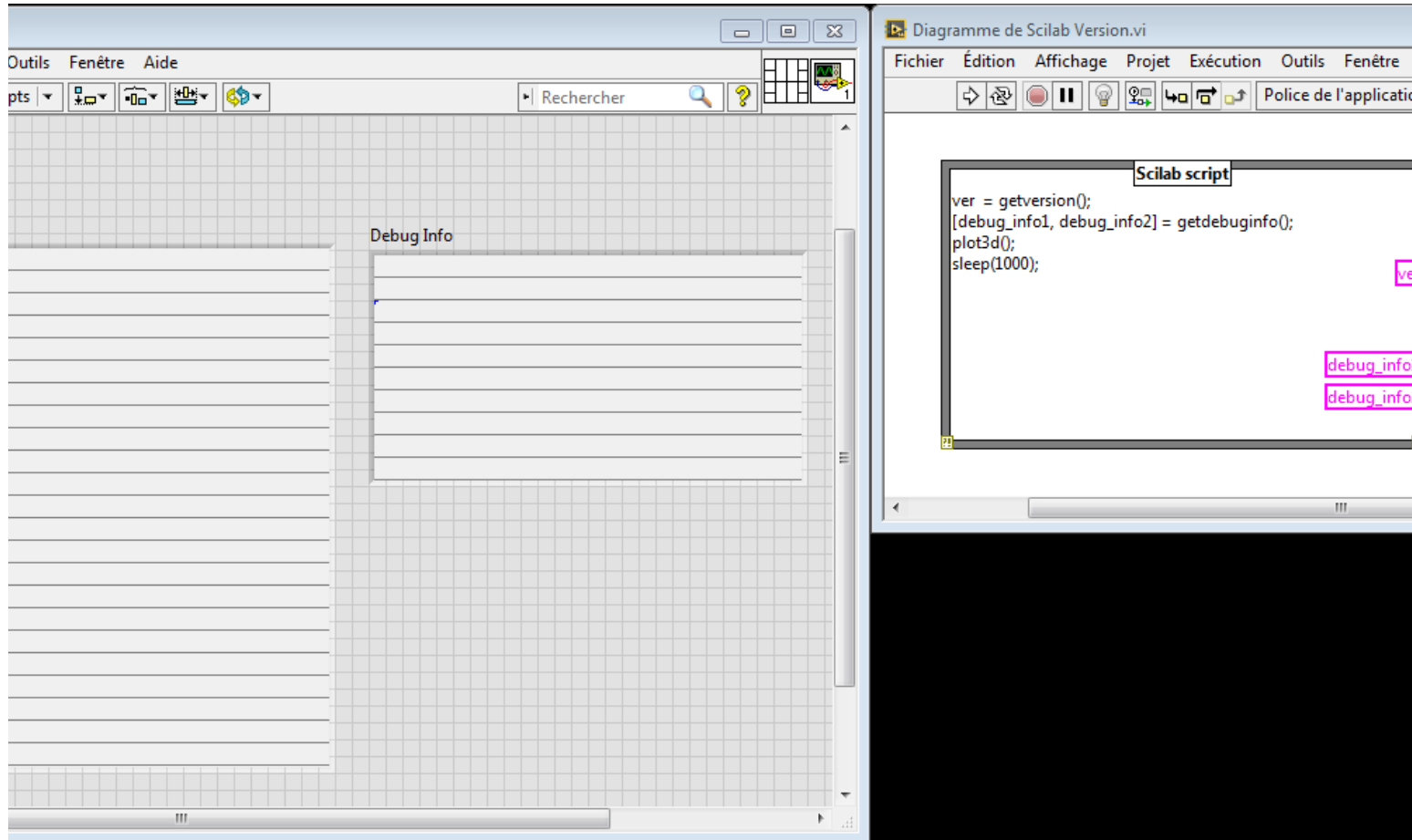


NATIONAL INSTRUMENTS

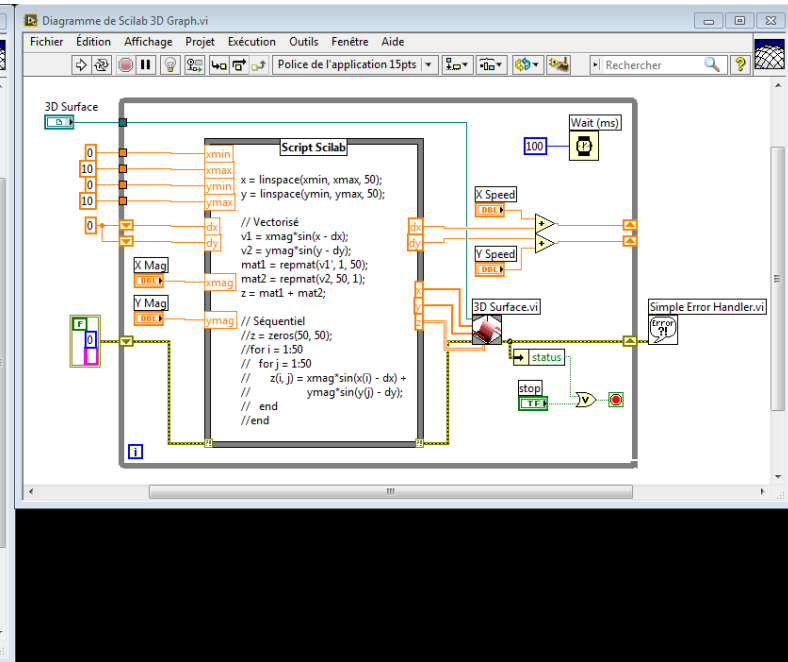
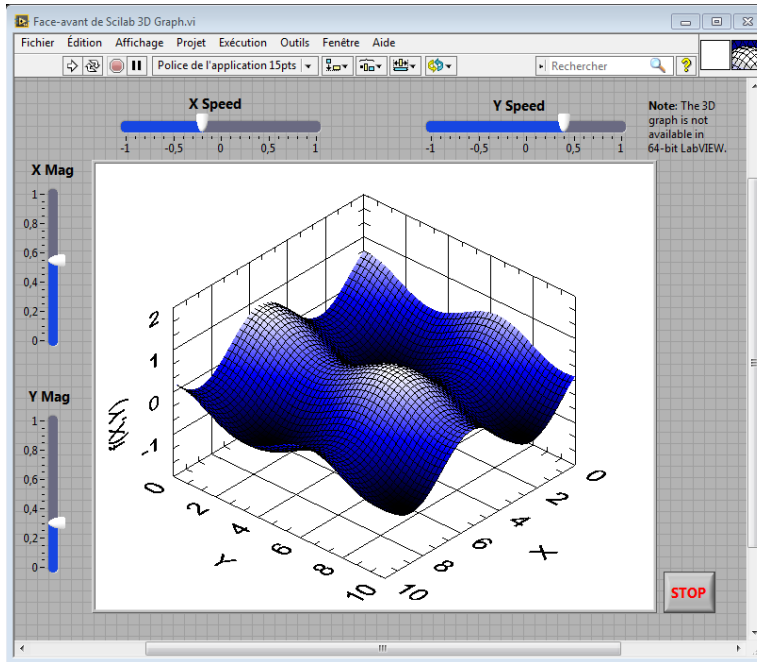
LabVIEW

Demo 1:

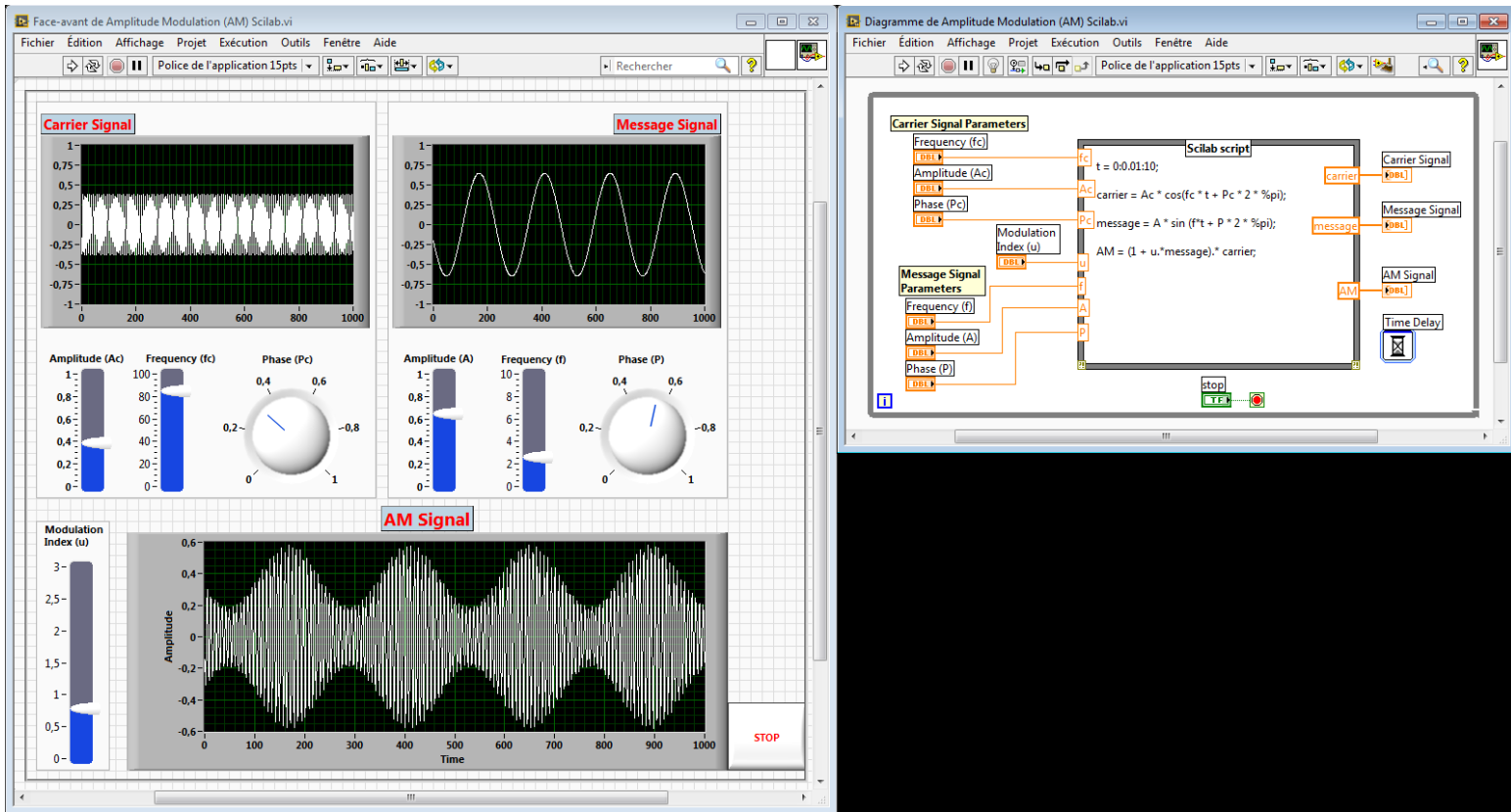
Data transfer between Scilab and LabVIEW



Demo 2: Embed Scilab graphics in LabVIEW



Demo 3: Vector processing for amplitude modulation



Demo 4: Tone recognition

The image displays two windows from the Scilab Tone Recognition application. The left window, titled "Face-avant de Lire et afficher [Scilab Tone Recognition.vi]", shows a waveform plot of "Tension" (Amplitude) over "Temps" (Time). Below the plot are control elements: a gain knob, a "STOP" button, and a list of parameters including "Fréquence NI" (440,003), "Fréquence Scilab" (440), "Note" (A-3), and "Taille de l'échantillon" (88200).

The right window, titled "Diagramme de Lire et afficher [Scilab Tone Recognition.vi]", shows the underlying Labview-style block diagram. It includes an "Assistant DAQ" block for data acquisition, a "Waveform Graph" for visualization, and a "Tone Extraction" block. A central "Scilab script" block contains the following code:

```

// Scilab ( http://www.scilab.org ) - This file is part of Scilab
// Copyright (C) 2013-2013 - Scilab Enterprises - Bruno JOFRET
//
// This file must be used under the terms of the CeCILL.
// This source file is licensed as described in the file COPVING, which
// you should have received as part of this distribution. The terms
// are also available at
// http://www.cecill.info/licences/Licence_CeCILL_V2.1-en.txt

tic();
toneChartPath = "C:";

frequencies = fEchant*(0:(nbEchant/2))/nbEchant;

moduleFftSignal = abs(fft(signal));
moduleFftSignal = moduleFftSignal(1:size(frequencies, "r"));
minSignal = 500;
moduleFftSignalFiltered = moduleFftSignal;
moduleFftSignalFiltered(find(moduleFftSignalFiltered < minSignal)) = 1;

[valeurPic, indicePic] = max(moduleFftSignalFiltered);

fundFreq = frequencies(indicePic);

toneChart = csvRead(toneChartPath+"toneChart.csv", ",", "double");
toneName = ["C", "C#", "D", "D#", "E", "F", "F#", "G", "G#", "A", "A#", "B"];
toneOctave = string(0:7);

[value, position] = min(abs(toneChart - fundFreq));

foundTone = toneName(position(1))+"-"+toneOctave(position(2));
amplitude = norm(signal, 2);
if amplitude < 20 then
    foundTone = "???";
end

bench = toc(); siz = size(signal, "r");
    
```

The diagram also shows various output indicators for "Amplitude", "Fréquence Scilab", "Note", "Bench", and "Taille de l'échantillon".

Scilab Use cases

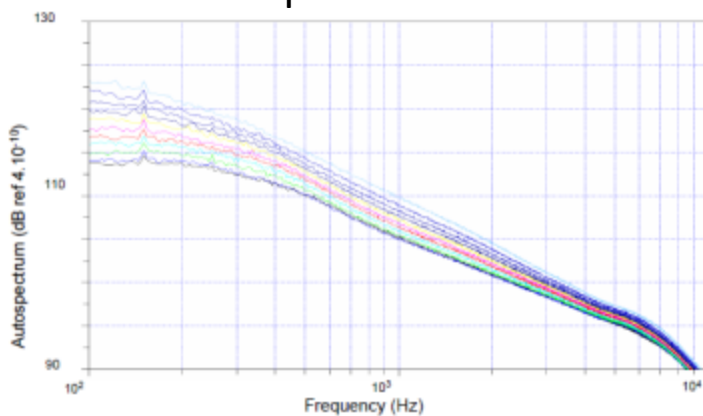


Post-treatment tools from aero-acoustic data

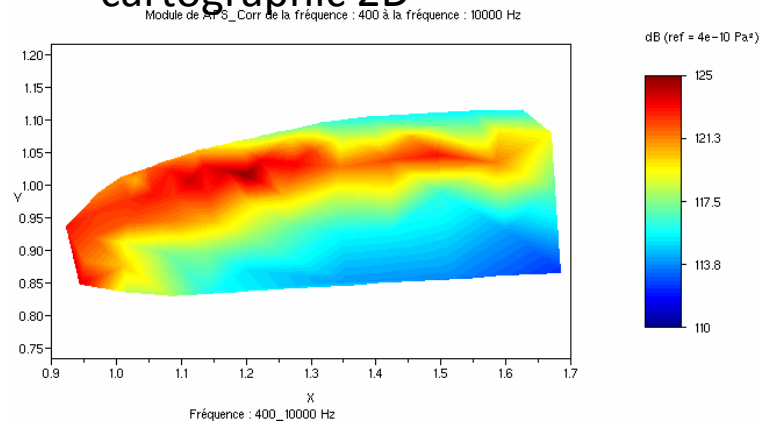


- Data acquisition (30 GB per test campaign)
- Conversion into spectral data (Fourier transform)
- Grid definition
- Correction matrix
- Display

■ Thin band spectrum

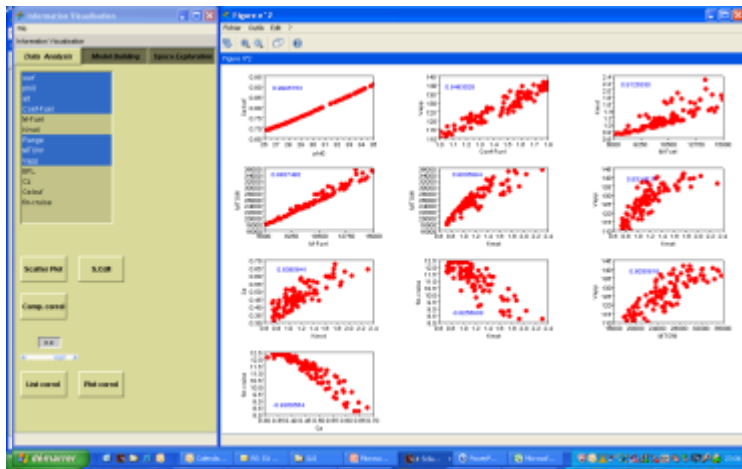
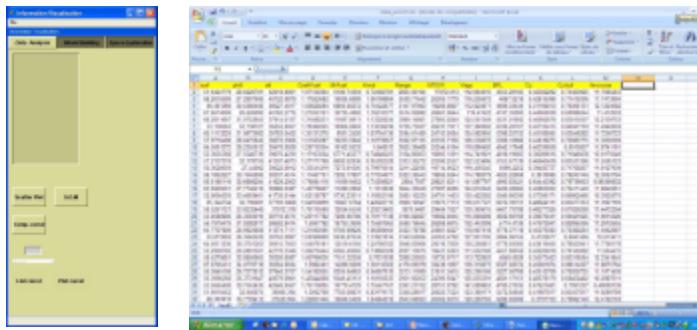


■ cartographic 2D

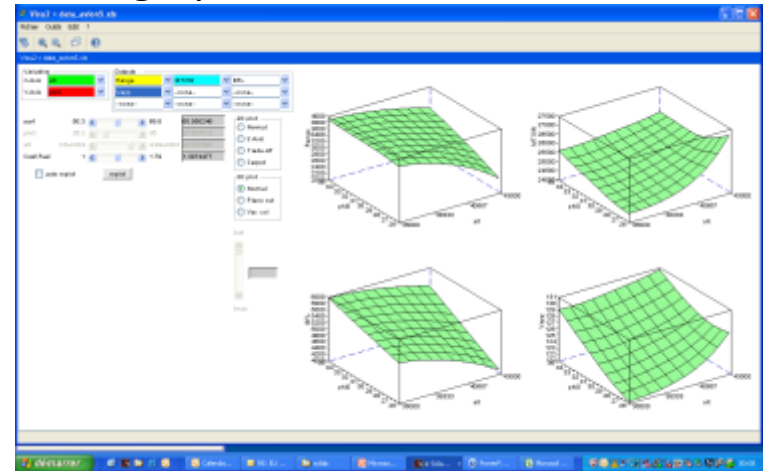


DoE, post-processing and visualization

Development of a GUI to explore simulation results (Excel imported)



GUI, graphics, advanced mathematics



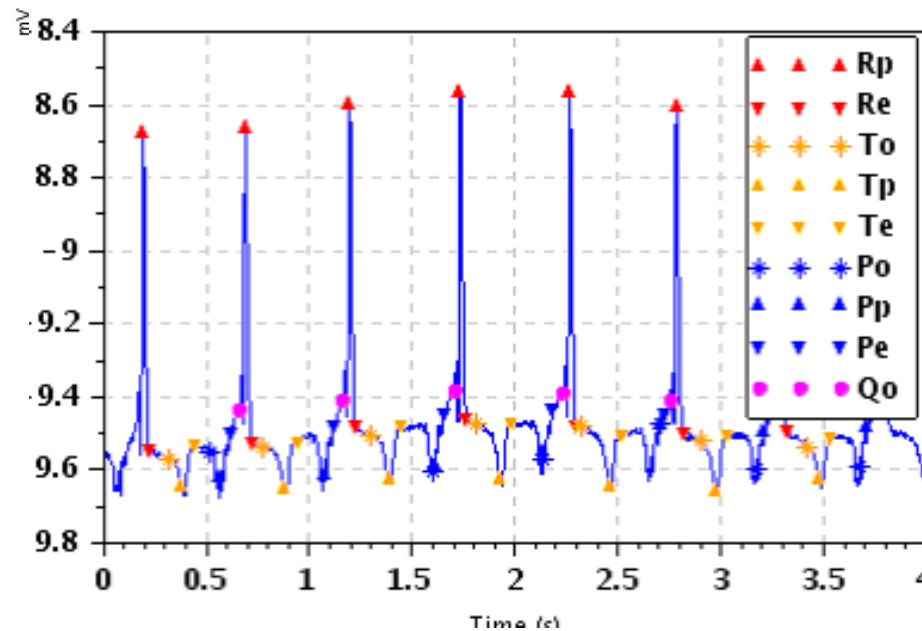
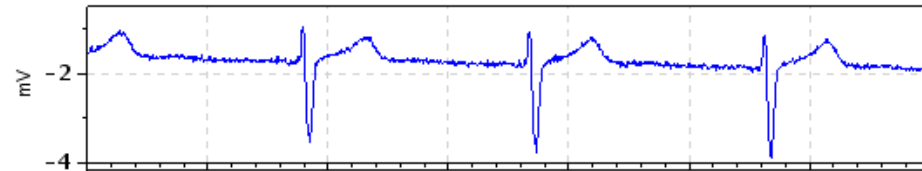
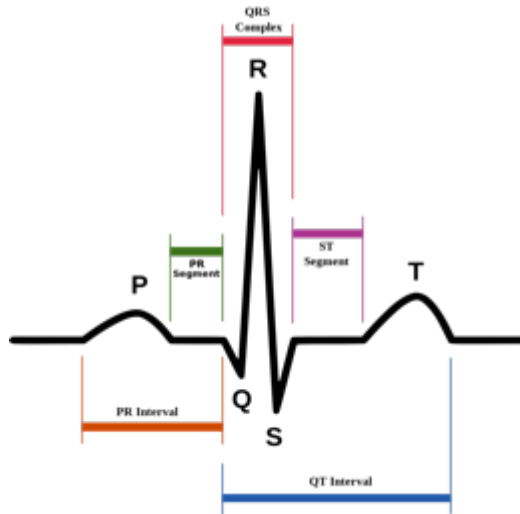
Modules used

- DACE (ATOMS): kriging
- NSGA2 : multi-objective optimization
- TOPSIS : multicriteria decision making (specific development)

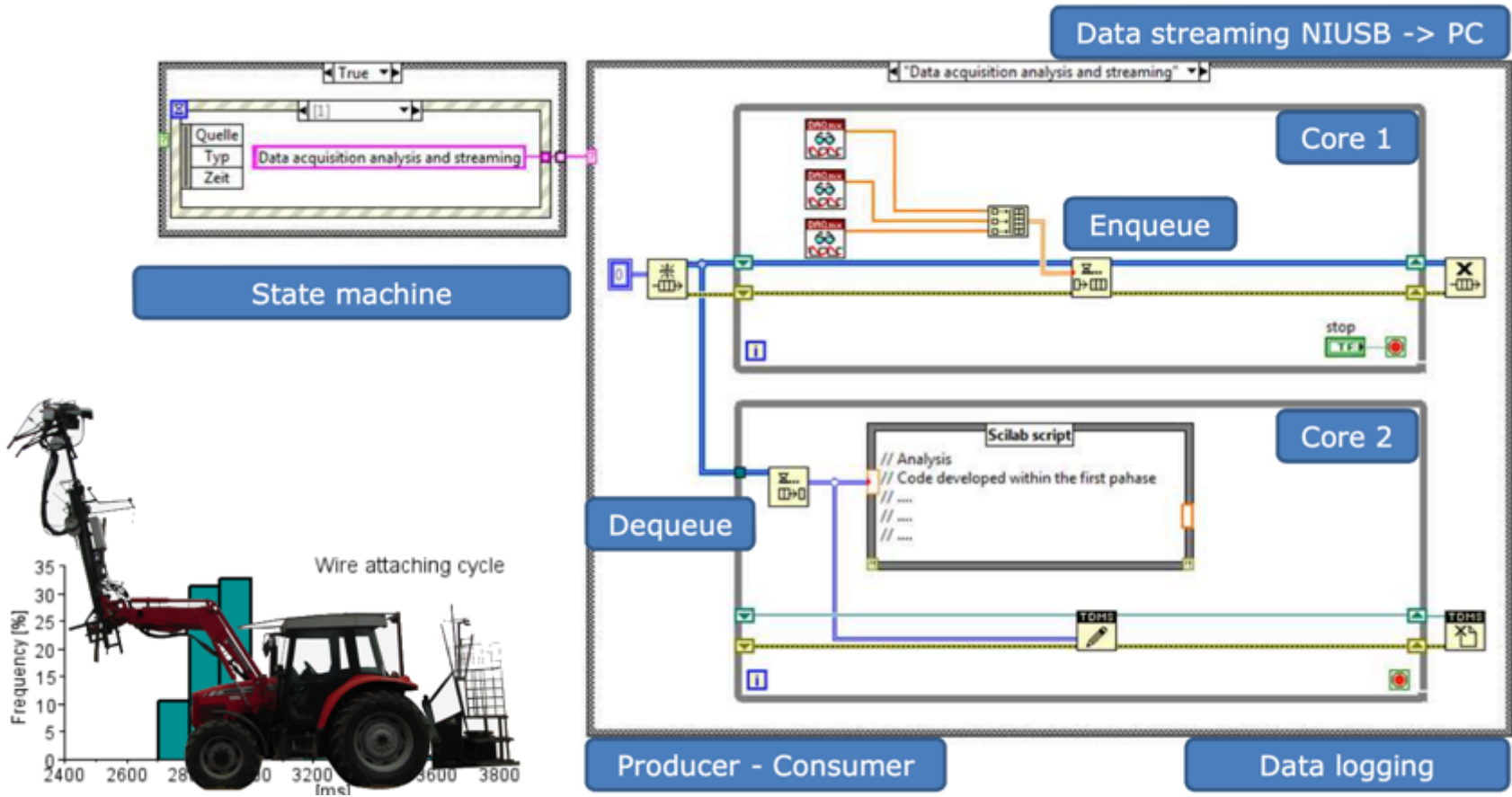
Cardiovascular wave analysis

Electrocardiography (ECG)
recording the electrical activity of the heart :

- Data acquisition
- Pre-treatment
- Detection and Analysis



Diagnostic tool for performance analysis during the testing of agricultural implements

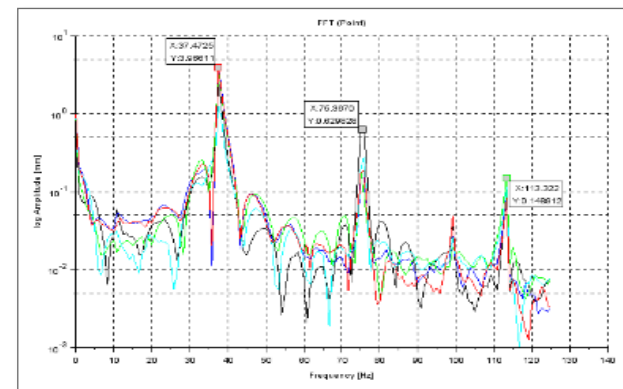


Materials and Structural Testing

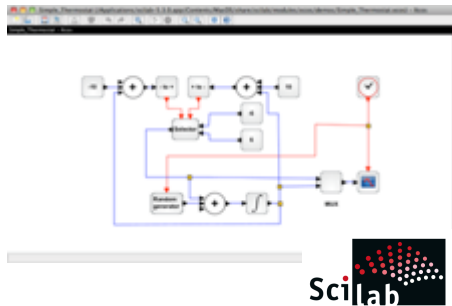


Dantec Dynamics GmbH is a leading supplier of non-contact optical surface measurement technologies. Dantec's Digital Image Correlation (DIC) solution measures shape, deformation, vibration and strain on almost any material and shape based on a 3D, fullfield, non-contact optical technique.

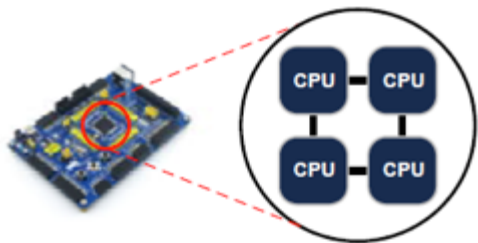
Applications: from microscopic investigations up to large scale civil engineering measurements.



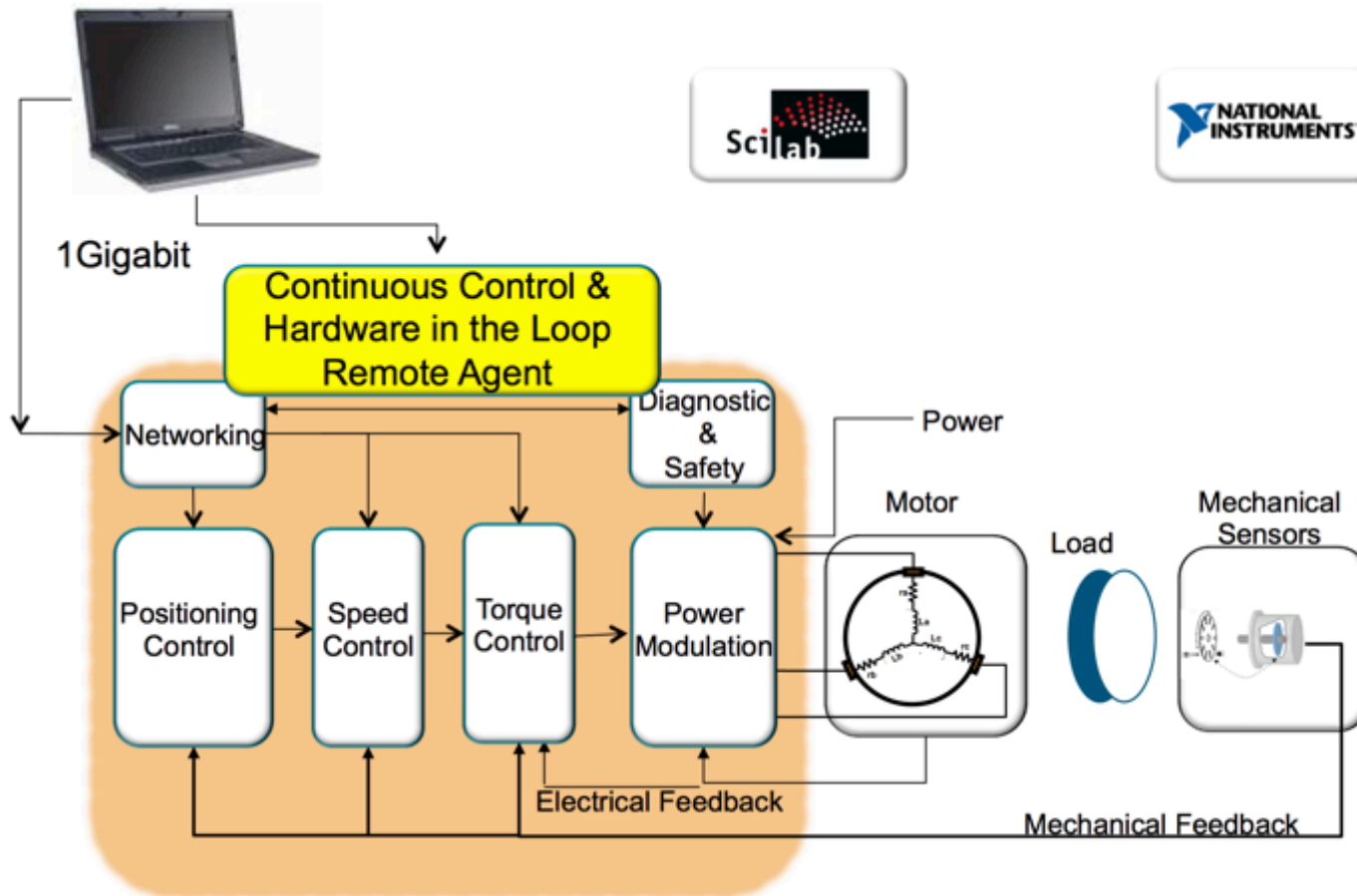
DLR Code generation for Air Vehicule Simulator



**Code Generation
and Deployment**



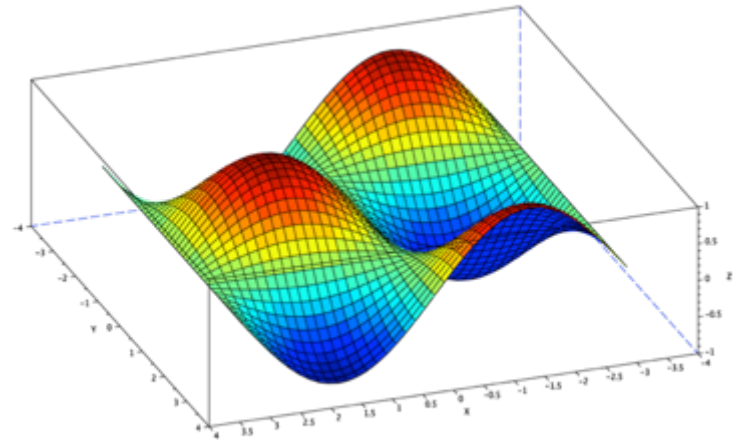
ZYNQ-7000 HiL – Electrical drive



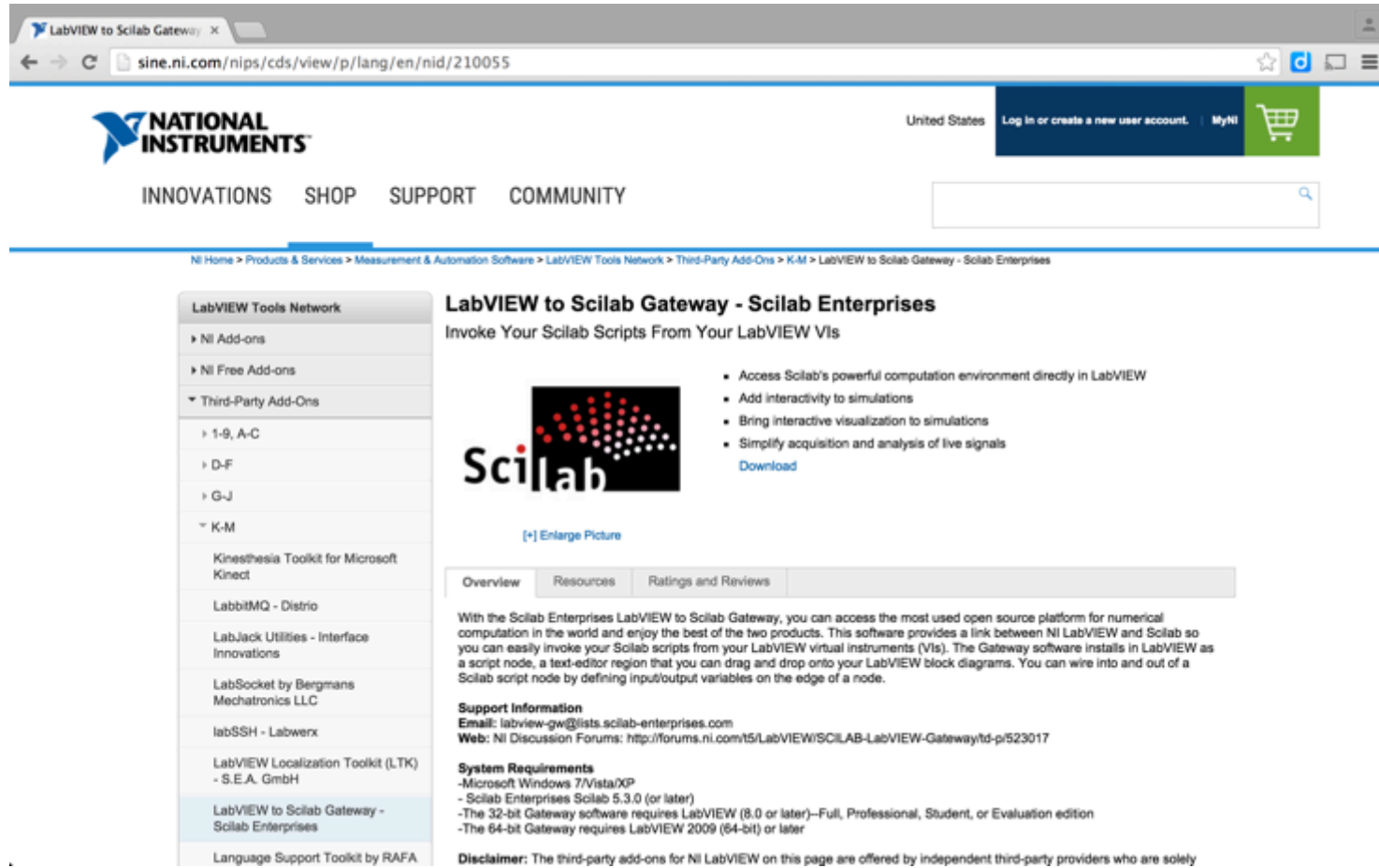
Thank you

www.scilab.org

www.scilab-enterprises.com



Download Gateway Scilab-Labview (1/3)




The screenshot shows a web browser window with the URL `sine.ni.com/nips/cds/view/p/lang/en/nid/210055`. The page header includes the National Instruments logo, navigation links for INNOVATIONS, SHOP, SUPPORT, and COMMUNITY, and a search bar. The main content area is titled "LabVIEW to Scilab Gateway - Scilab Enterprises" and features a sidebar with a list of products, a main description, a list of benefits, and system requirements.

LabVIEW Tools Network

- NI Add-ons
- NI Free Add-ons
- Third-Party Add-Ons
 - 1-9, A-C
 - D-F
 - G-J
 - K-M
- Kinesthesia Toolkit for Microsoft Kinect
- LabbitMQ - Distrio
- LabJack Utilities - Interface Innovations
- LabSocket by Bergmans Mechatronics LLC
- labSSH - Labwex
- LabVIEW Localization Toolkit (LTK) - S.E.A. GmbH
- LabVIEW to Scilab Gateway - Scilab Enterprises
- Language Support Toolkit by RAFA

LabVIEW to Scilab Gateway - Scilab Enterprises
Invoke Your Scilab Scripts From Your LabVIEW VIs



- Access Scilab's powerful computation environment directly in LabVIEW
- Add interactivity to simulations
- Bring interactive visualization to simulations
- Simplify acquisition and analysis of live signals

[Download](#)

[+] Enlarge Picture

Overview Resources Ratings and Reviews

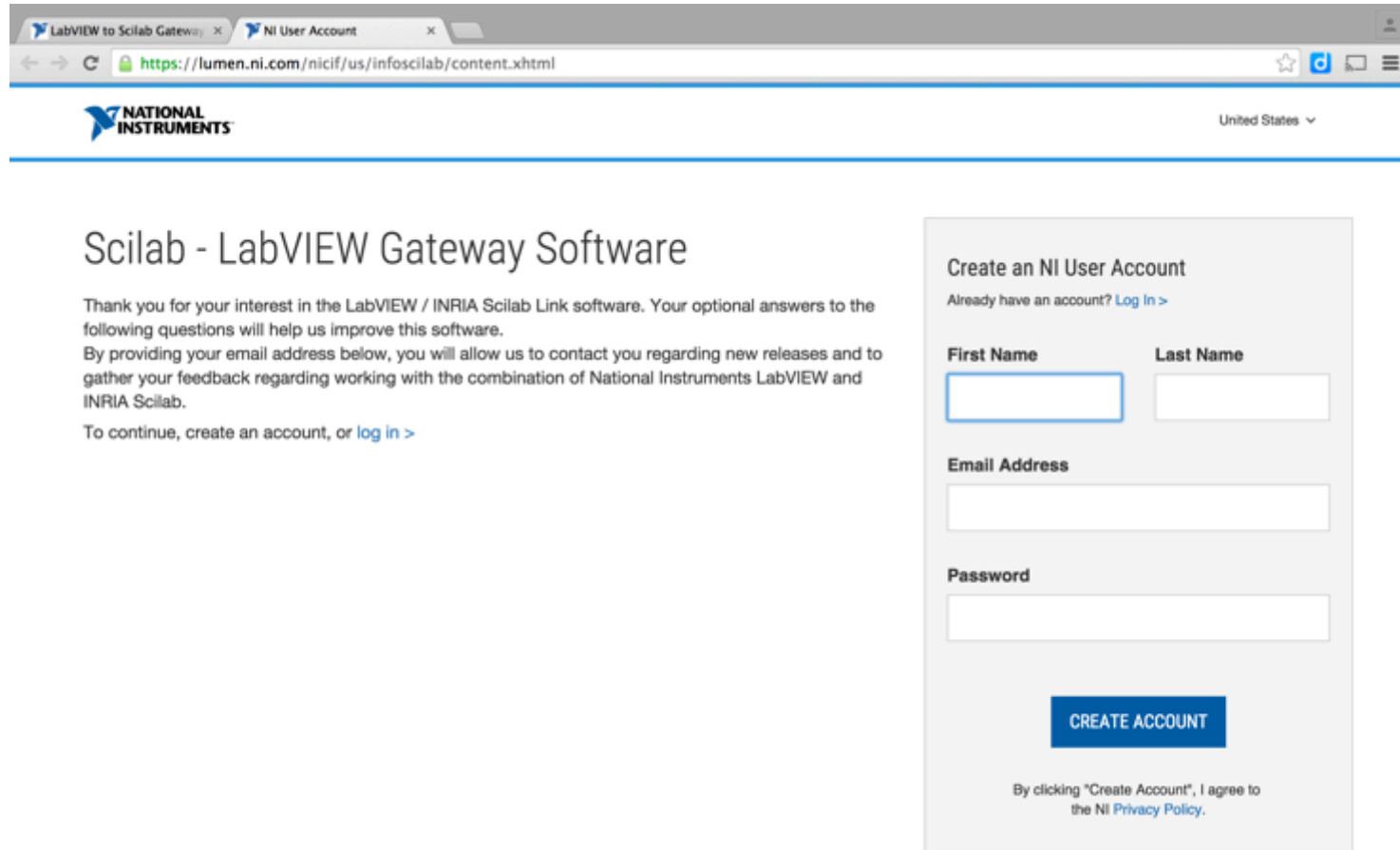
With the Scilab Enterprises LabVIEW to Scilab Gateway, you can access the most used open source platform for numerical computation in the world and enjoy the best of the two products. This software provides a link between NI LabVIEW and Scilab so you can easily invoke your Scilab scripts from your LabVIEW virtual instruments (VIs). The Gateway software installs in LabVIEW as a script node, a text-editor region that you can drag and drop onto your LabVIEW block diagrams. You can wire into and out of a Scilab script node by defining input/output variables on the edge of a node.

Support Information
 Email: labview-gw@lists.scilab-enterprises.com
 Web: NI Discussion Forums: <http://forums.ni.com/t5/LabVIEW/SCILAB-LabVIEW-Gateway/t5-p/523017>

System Requirements
 -Microsoft Windows 7/Vista/XP
 - Scilab Enterprises Scilab 5.3.0 (or later)
 -The 32-bit Gateway software requires LabVIEW (8.0 or later)–Full, Professional, Student, or Evaluation edition
 -The 64-bit Gateway requires LabVIEW 2009 (64-bit) or later

Disclaimer: The third-party add-ons for NI LabVIEW on this page are offered by independent third-party providers who are solely

Download Gateway Scilab-Labview (2/3)



LabVIEW to Scilab Gateway x NI User Account x

https://lumen.ni.com/nicif/us/infoscilab/content.xhtml

NATIONAL INSTRUMENTS United States

Scilab - LabVIEW Gateway Software

Thank you for your interest in the LabVIEW / INRIA Scilab Link software. Your optional answers to the following questions will help us improve this software.

By providing your email address below, you will allow us to contact you regarding new releases and to gather your feedback regarding working with the combination of National Instruments LabVIEW and INRIA Scilab.

To continue, create an account, or [log in >](#)

Create an NI User Account

Already have an account? [Log In >](#)

First Name

Last Name

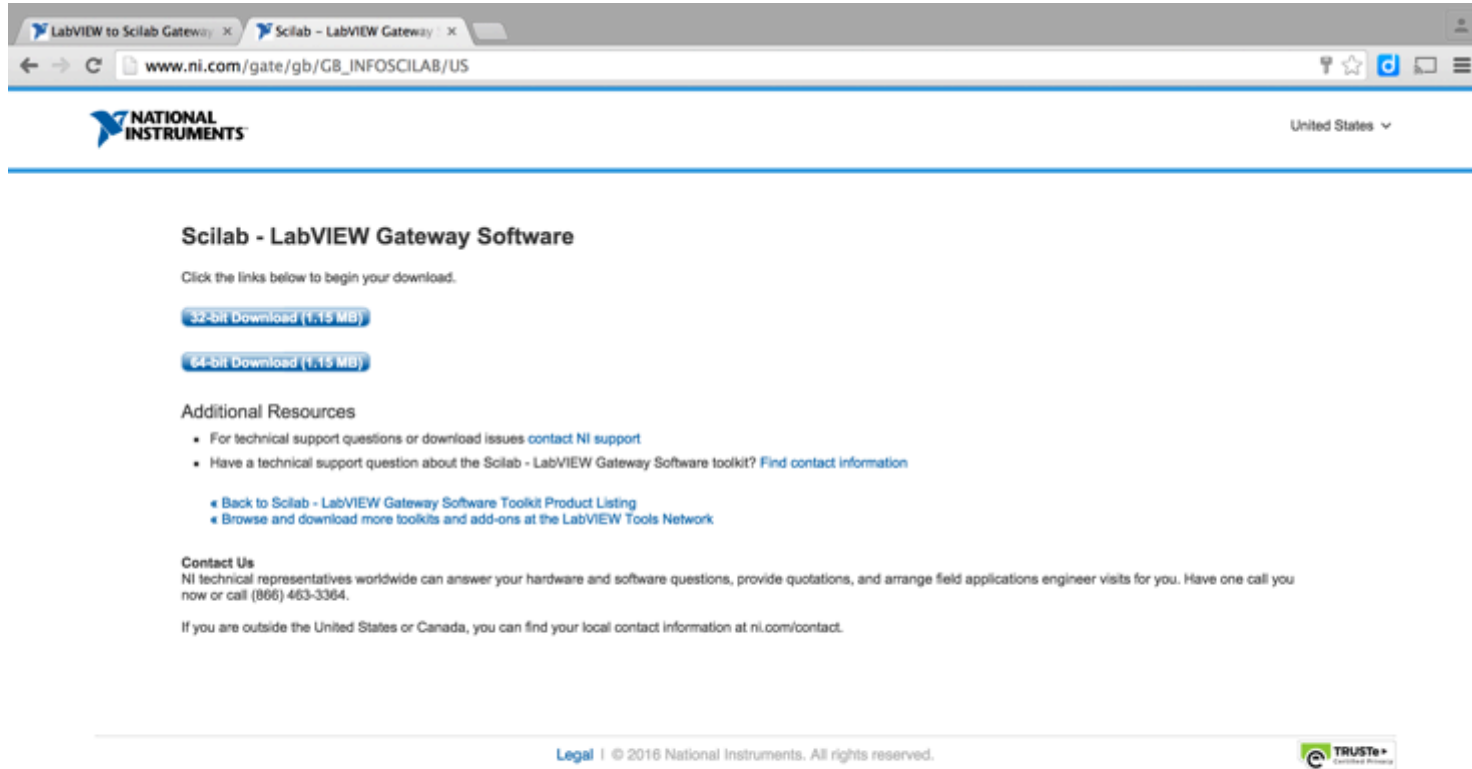
Email Address

Password

CREATE ACCOUNT

By clicking "Create Account", I agree to the [NI Privacy Policy](#).

Download Gateway Scilab-Labview (3/3)

A screenshot of a web browser showing the National Instruments website. The browser tabs are "LabVIEW to Scilab Gateway" and "Scilab - LabVIEW Gateway". The address bar shows "www.ni.com/gate/gb/GB_INFOSCILAB/US". The page header includes the National Instruments logo and "United States" with a dropdown arrow. The main content area is titled "Scilab - LabVIEW Gateway Software" and contains instructions to click links for 32-bit and 64-bit downloads (both 1.15 MB). It also lists additional resources, contact information, and a TRUSTe logo.

LabVIEW to Scilab Gateway x Scilab - LabVIEW Gateway x

www.ni.com/gate/gb/GB_INFOSCILAB/US

NATIONAL INSTRUMENTS United States v

Scilab - LabVIEW Gateway Software

Click the links below to begin your download.

[32-bit Download \(1.15 MB\)](#)

[64-bit Download \(1.15 MB\)](#)

Additional Resources

- For technical support questions or download issues [contact NI support](#)
- Have a technical support question about the Scilab - LabVIEW Gateway Software toolkit? [Find contact information](#)
- [Back to Scilab - LabVIEW Gateway Software Toolkit Product Listing](#)
- [Browse and download more toolkits and add-ons at the LabVIEW Tools Network](#)

Contact Us

NI technical representatives worldwide can answer your hardware and software questions, provide quotations, and arrange field applications engineer visits for you. Have one call you now or call (866) 463-3364.

If you are outside the United States or Canada, you can find your local contact information at [ni.com/contact](#).

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