MATLAB EXPO 2016

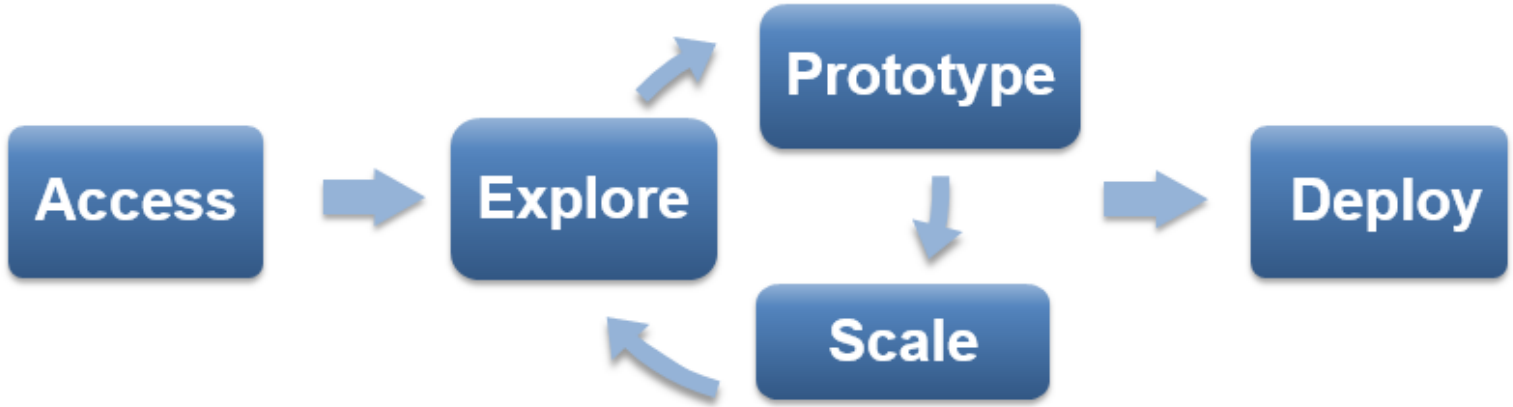
Messdatenerfassung mit MATLAB – so einfach geht’s

Dr. Frank Graeber

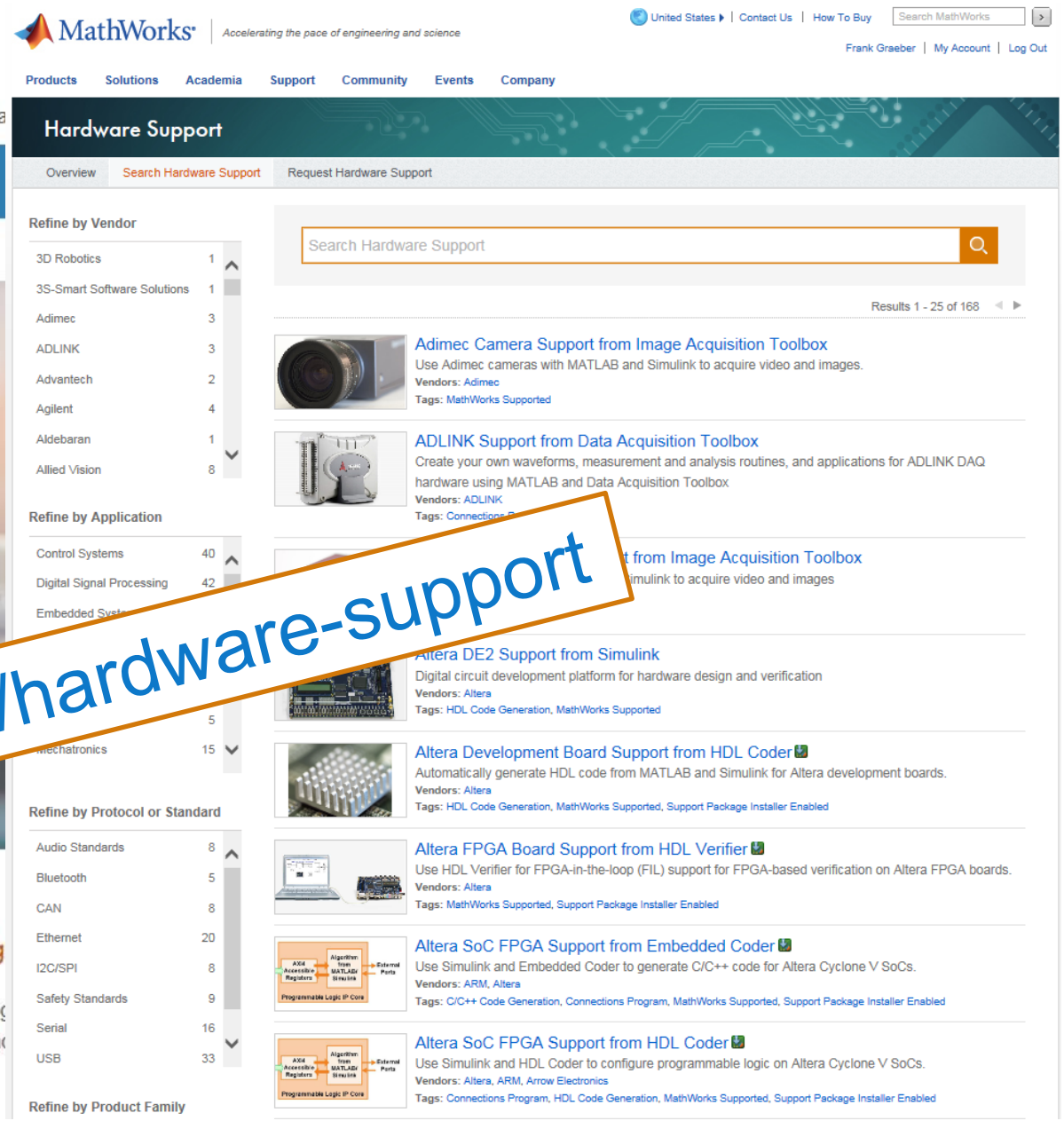
Typical challenges in Test & Measurement

- Integrating hardware not straightforward
- Multiple tools for accessing, analyzing and sharing data
- Data format conversions necessary

- Handling of streaming data
- Automation of workflow
- Application deployment

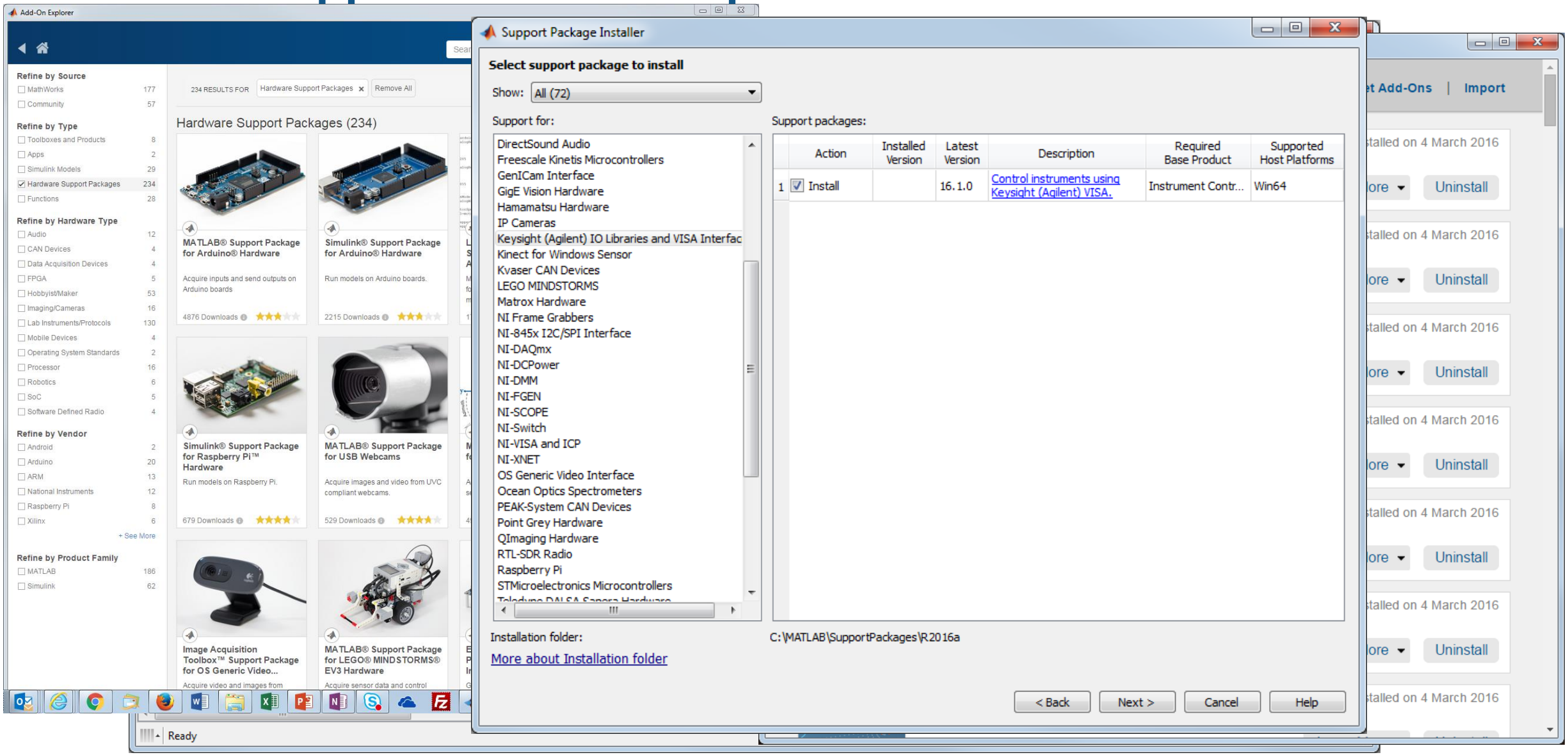


Hardware Support - Web Page



www.mathworks.com/hardware-support

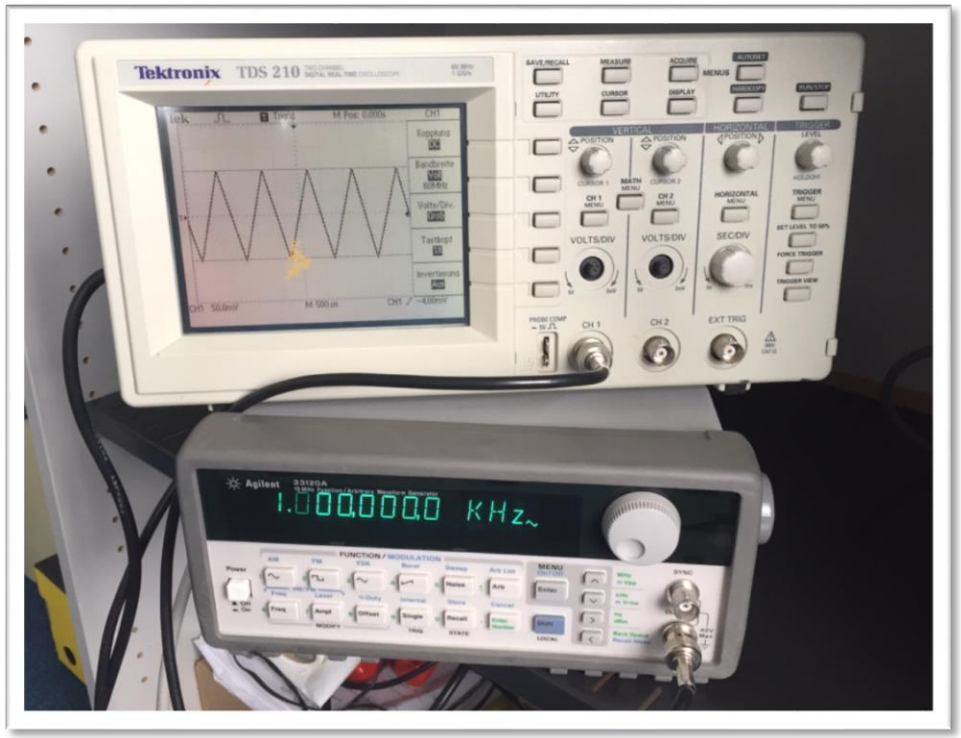
Hardware Support - Add-On Explorer

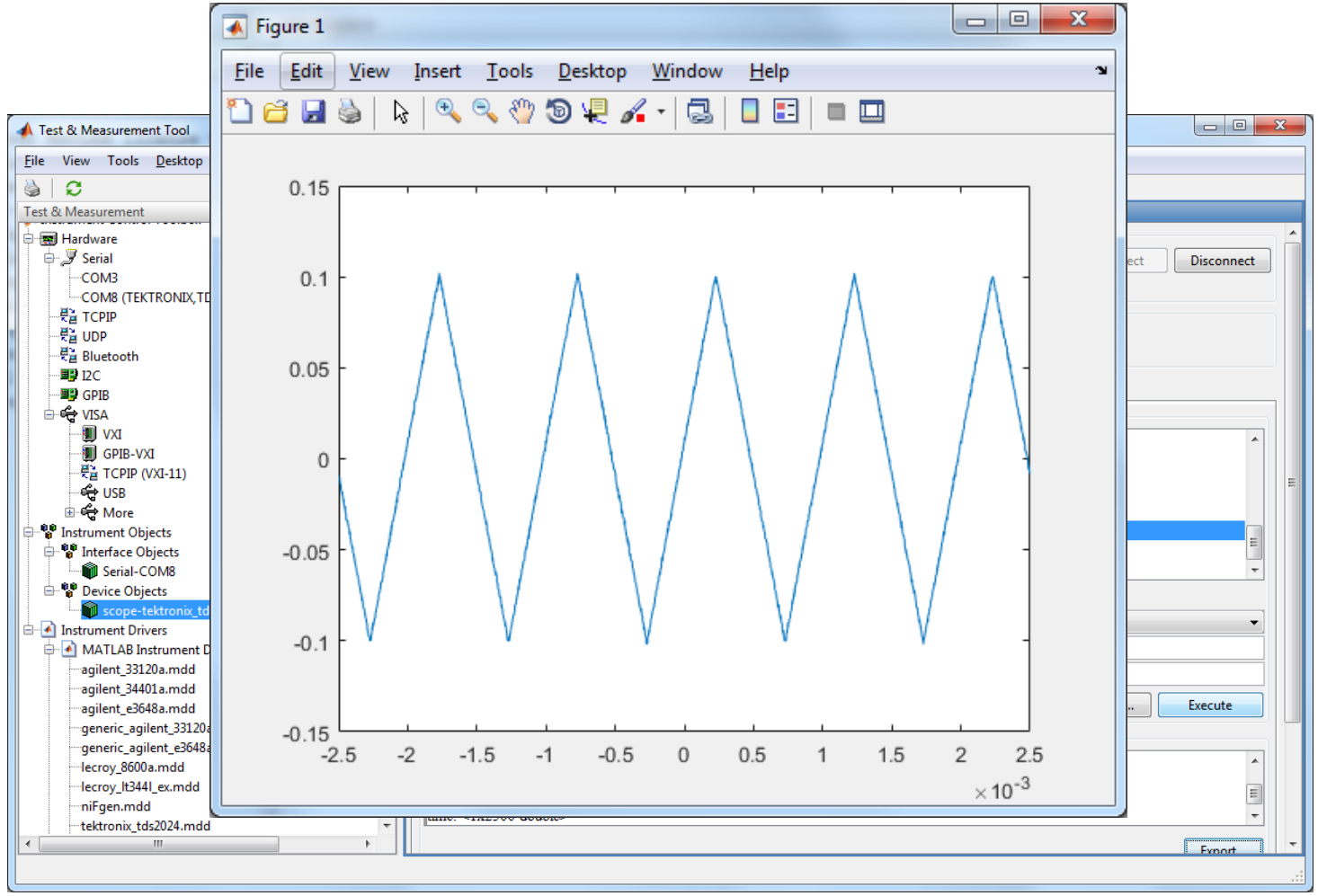


Example: Read Waveform from Instruments

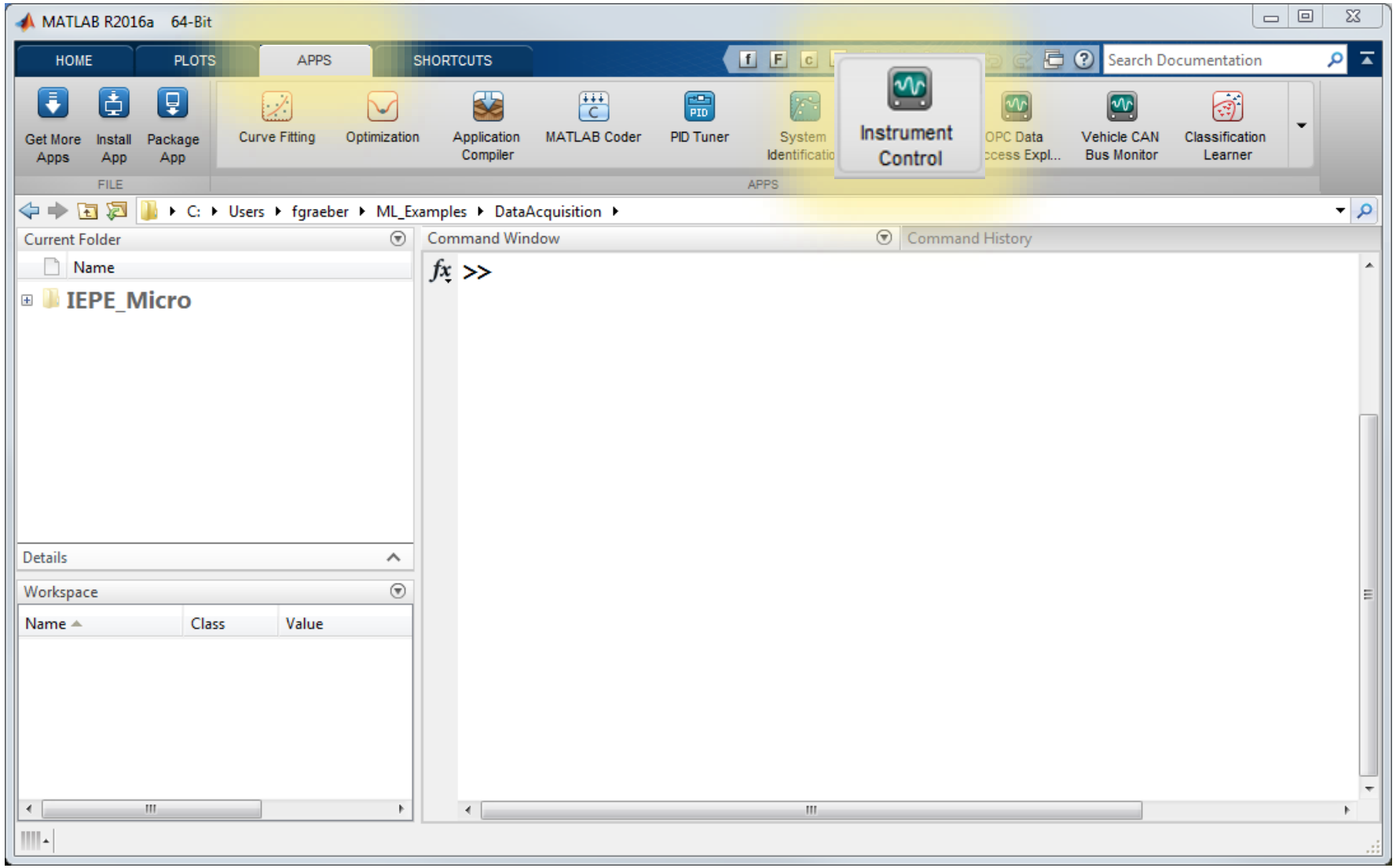
Use App for Instrument Connection

- Using MATLAB instrument driver
- Using SCPI commands

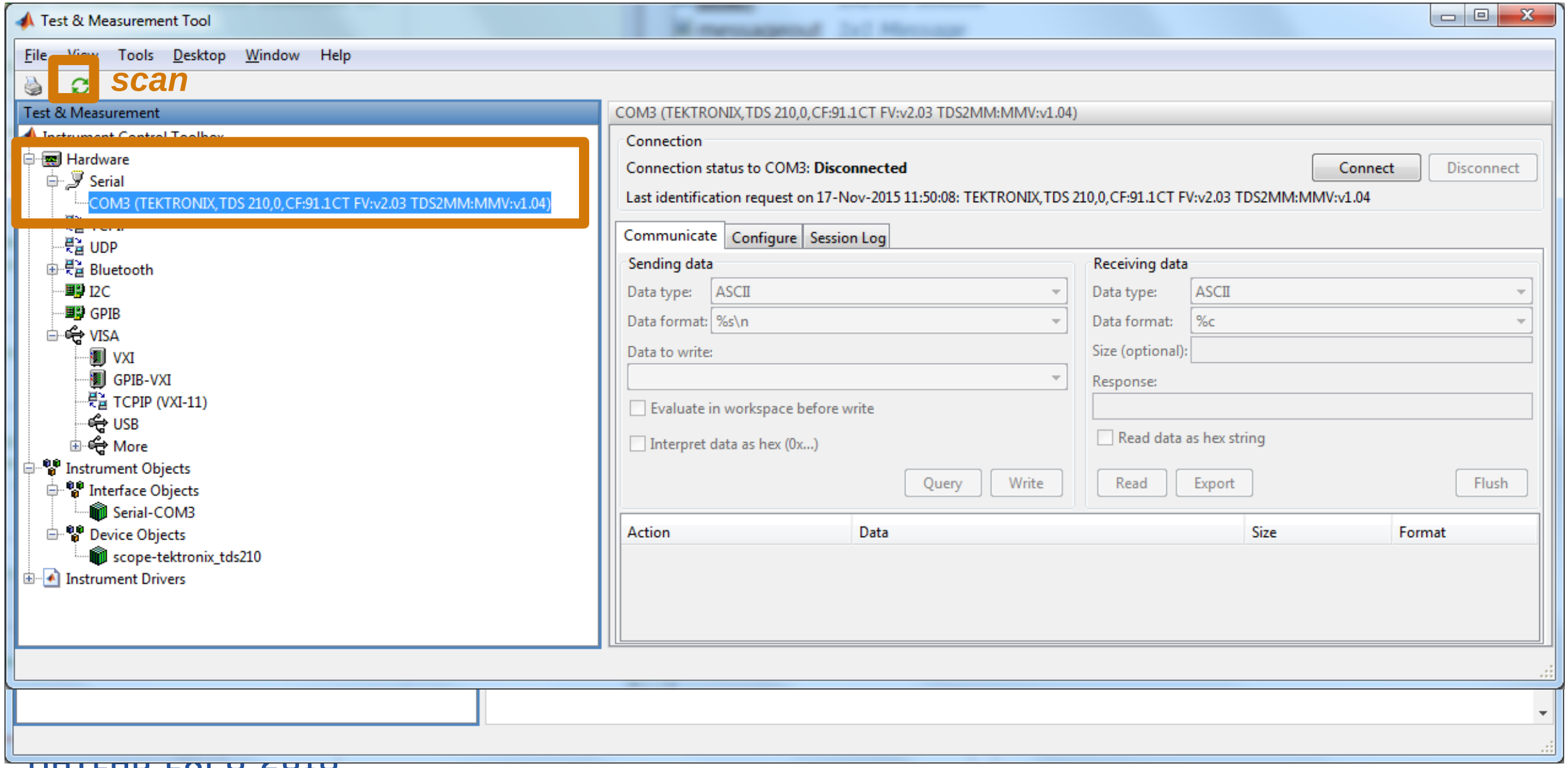




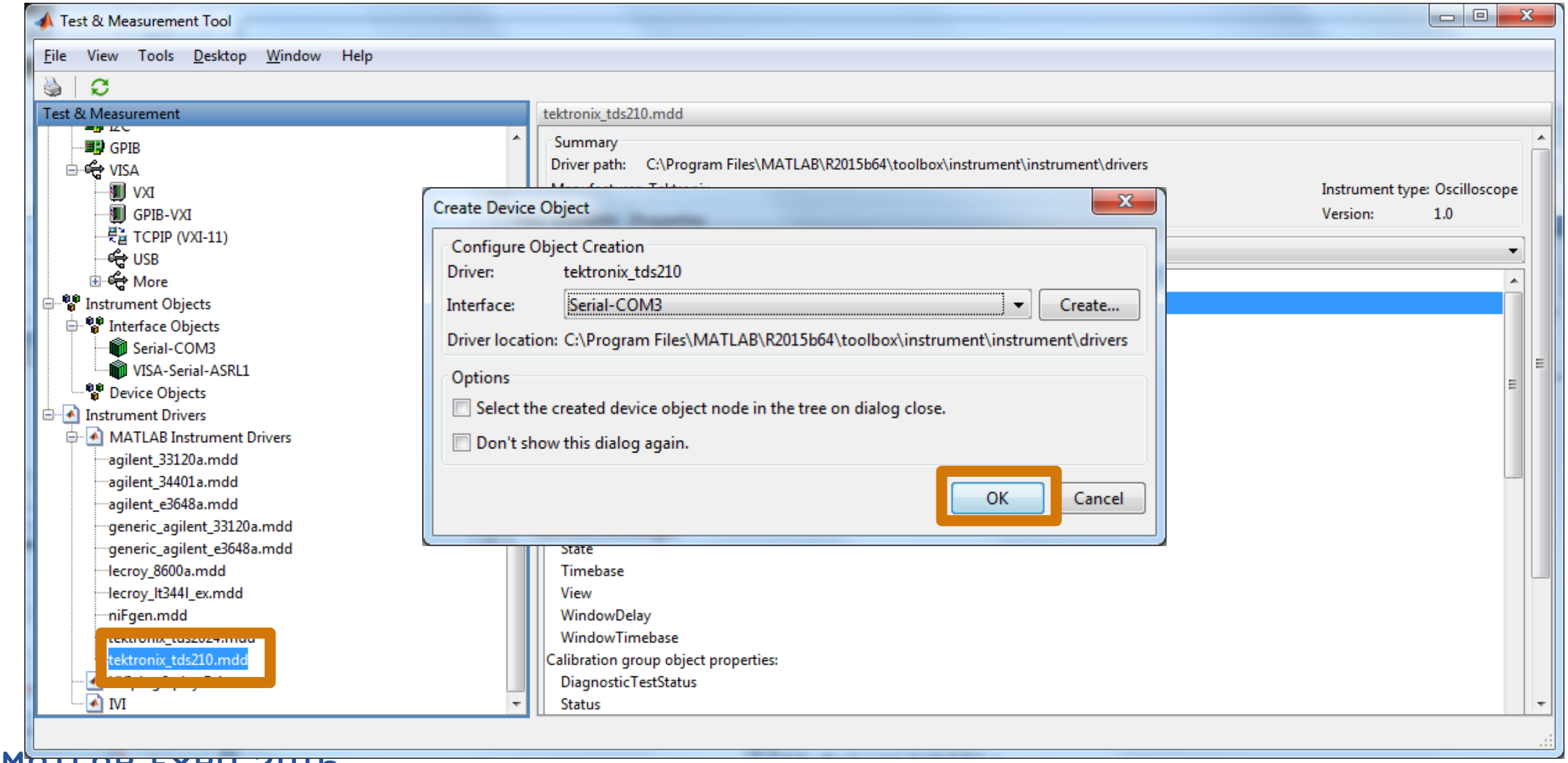
Instrument Control App



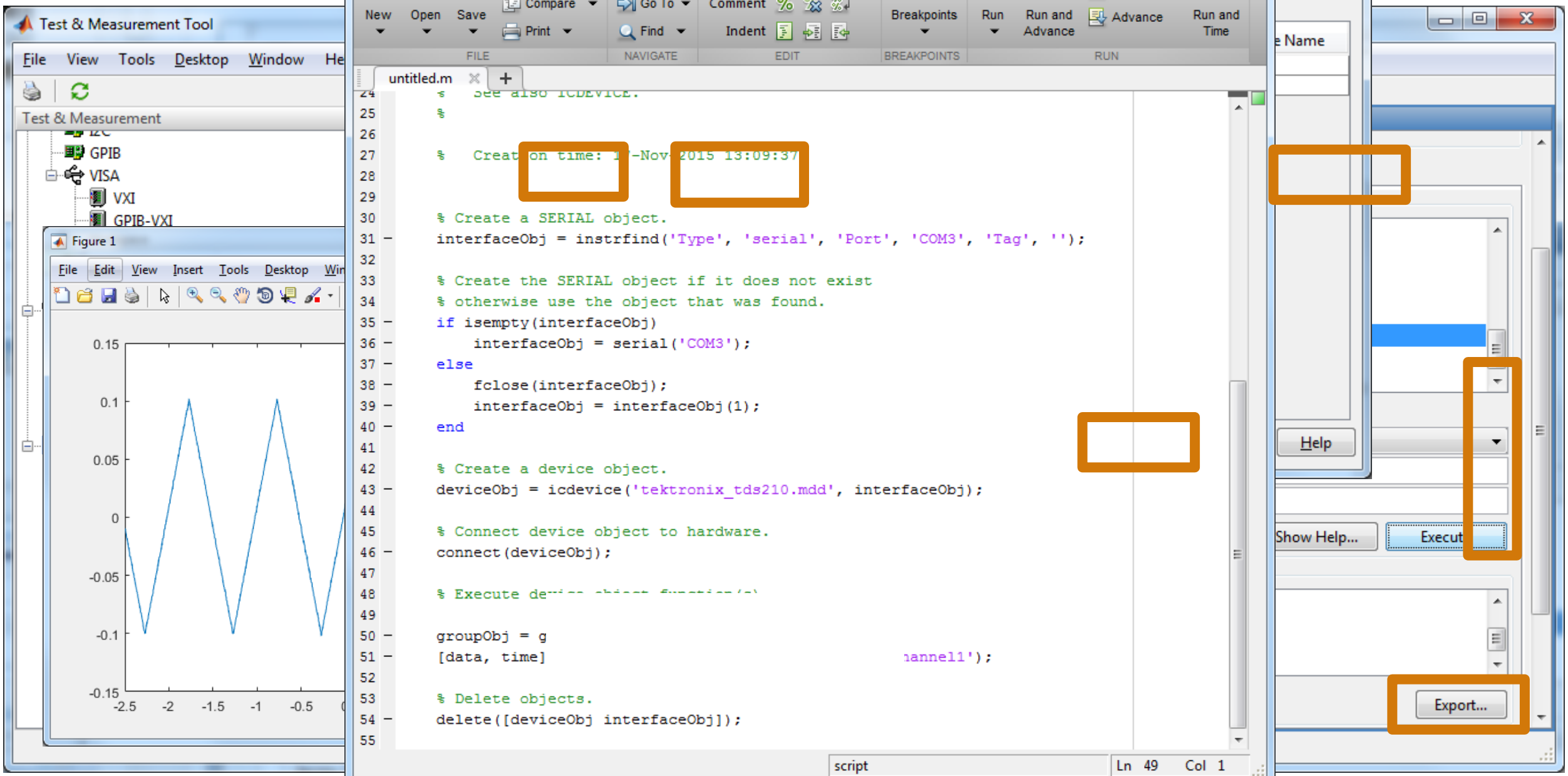
Set up Connection using MATLAB Instrument Driver



Select MATLAB Instrument Driver (*.mdd files)



Read Wavefo


Test & Measurement Tool
File View Tools Desktop Window He
Test & Measurement
GPIB
VISA
VXI
GPIB-VXI
Figure 1
File Edit View Insert Tools Desktop Win
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-2.5 -2 -1.5 -1 -0.5
Editor - C:\Data\Demo\MATLAB\Demo\TM\IEPEmicro\IEPE_NEW\untitled.m
EDITOR PUBLISH VIEW
New Open Save Find Files Compare Print
Go To Find
Insert Comment Indent
Breakpoints
Run Run and Advance Run Section Advance Run and Time
FILE NAVIGATE EDIT BREAKPOINTS RUN
untitled.m
% See also ICDEVICE.
%
% Creation time: 17-Nov-2015 13:09:37
% Create a SERIAL object.
interfaceObj = instrfind('Type', 'serial', 'Port', 'COM3', 'Tag', '');
% Create the SERIAL object if it does not exist
% otherwise use the object that was found.
if isempty(interfaceObj)
interfaceObj = serial('COM3');
else
fclose(interfaceObj);
interfaceObj = interfaceObj(1);
end
% Create a device object.
deviceObj = icdevice('tektronix_tds210.mdd', interfaceObj);
% Connect device object to hardware.
connect(deviceObj);
% Execute device object function(s).
groupObj = g
[data, time] channel1');
% Delete objects.
delete([deviceObj interfaceObj]);
script
Ln 49 Col 1
Name
Help
Show Help...
Execut
Export...

MATLAB Connects to Your Hardware Devices

Instrument Control

Instruments and RS-232 serial devices

Data Acquisition

Plug-in data acquisition devices and sound cards

Image Acquisition

Image capture devices

Vehicle Networks / CAN bus devices

CAN bus devices using CAN and XCP protocols

MATLAB

External Interfaces for connecting other devices

Instrument Control Toolbox

Enables MATLAB to configure, control, and transfer data with instruments such as oscilloscopes, signal generators, and spectrum analyzers

- Integrate instruments into MATLAB applications and Simulink models
- Interactive tool for detecting and controlling instruments
- Automatic code generation for faster and easier implementation
- Support for IVI, VXI plug&play, and MATLAB instrument drivers
- Support for common communication protocols

Data Acquisition Toolbox

Acquire and output data from data acquisition boards

- Immediately analyze live or acquired data in MATLAB and Simulink
- Configure hardware without leaving MATLAB
- Incorporate custom analysis into PC-based digital oscilloscope
- Ability to do “one-shot” or continuous acquisition
- Support multiple data acquisition devices and vendors

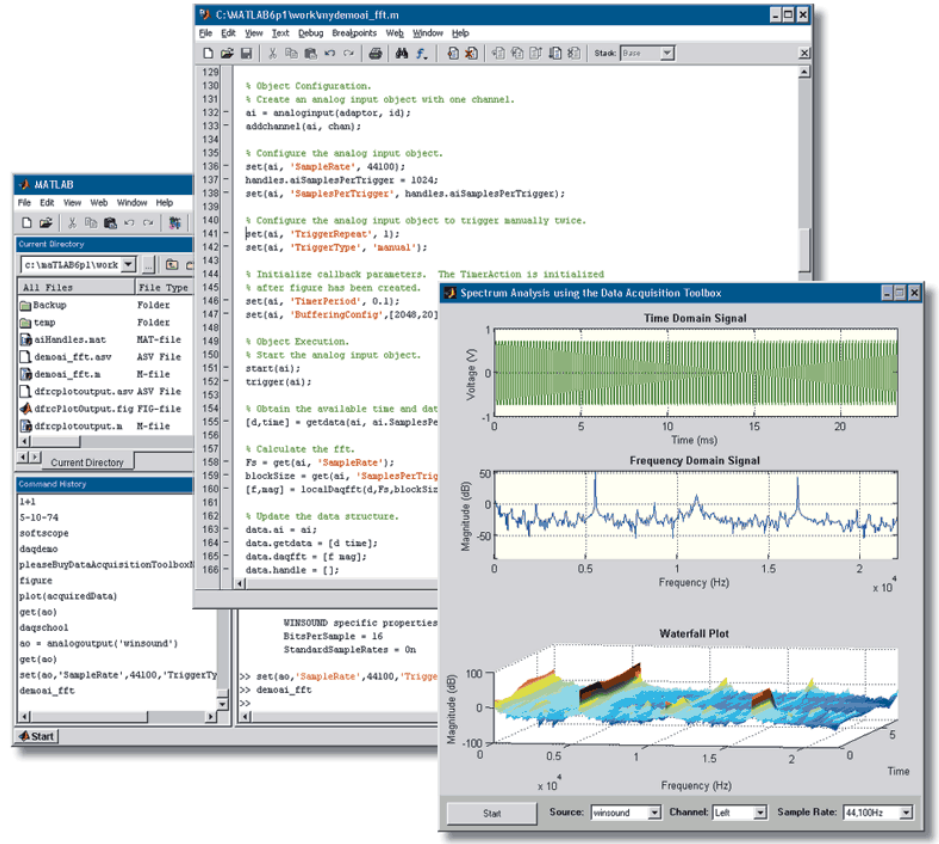
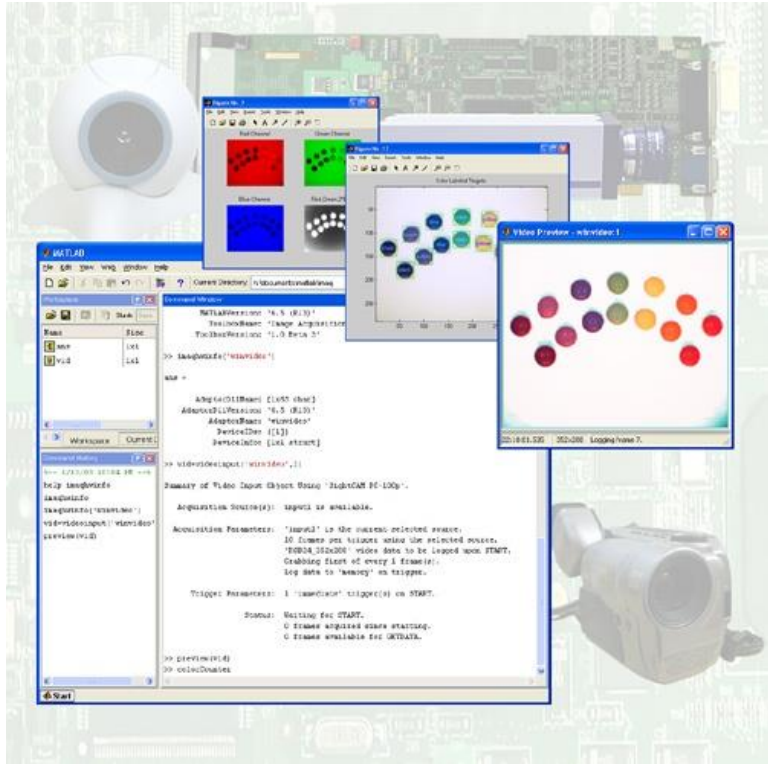


Image Acquisition Toolbox

Acquire images and video from industry-standard hardware

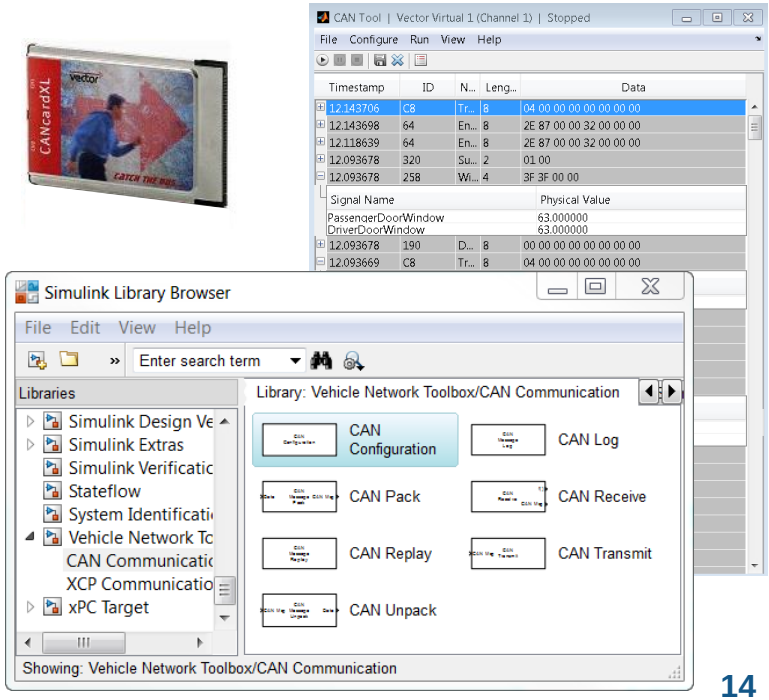
- Acquire live image and video streams directly into MATLAB and Simulink
- Configure hardware without leaving MATLAB
- Enable single-frame and streaming acquisition
- Permit immediate image processing and analysis
- Support multiple image acquisition devices and vendors



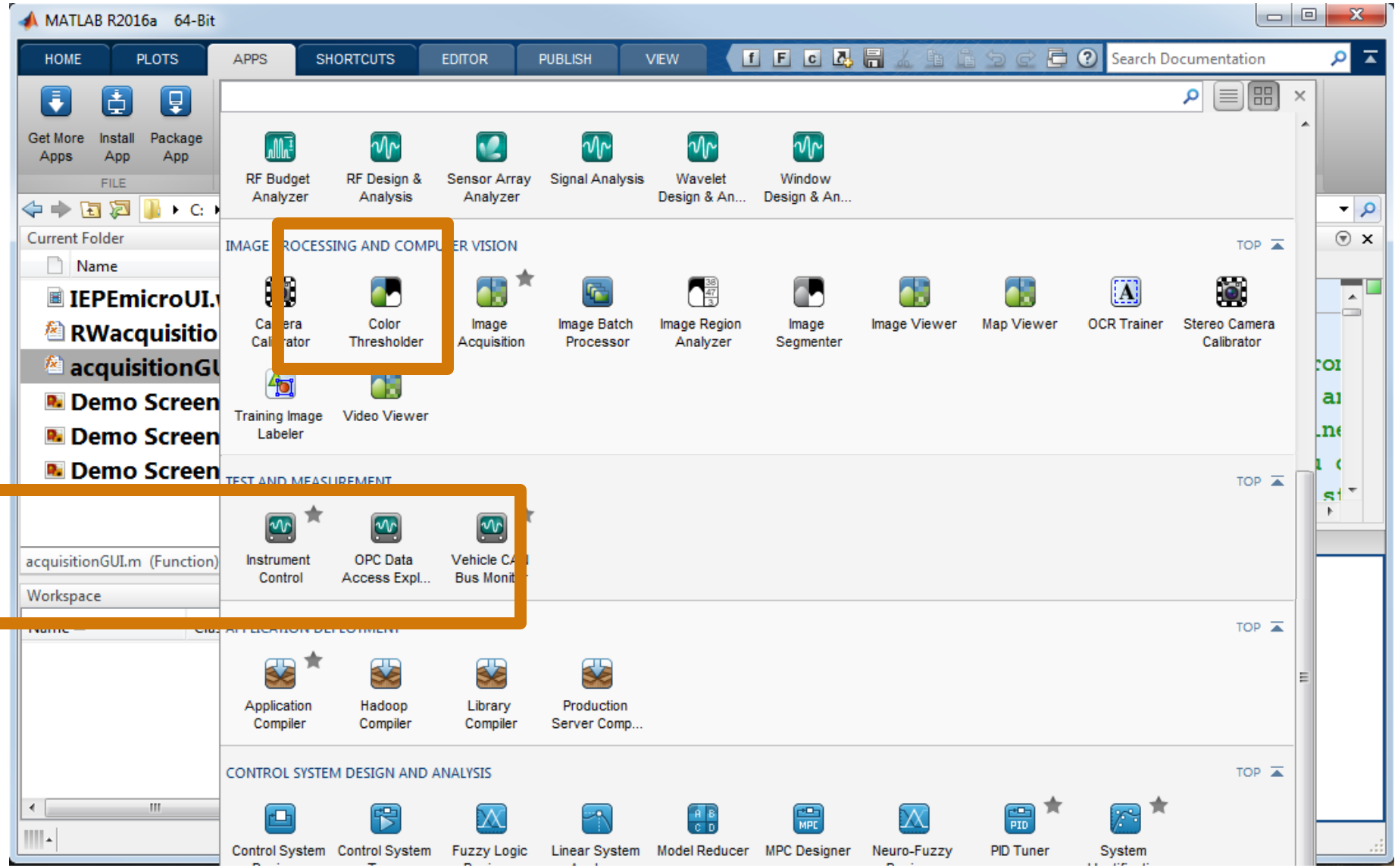
Vehicle Network Toolbox

Communicate with in-vehicle networks using CAN and XCP protocols

- MATLAB functions for transmitting and receiving CAN and XCP messages
- CAN and XCP Simulink blocks for interfacing Simulink to a CAN bus or ECU
- Bit packing and unpacking functions and blocks for simplified encoding and decoding of CAN messages
- CAN bus app for visualizing live CAN traffic
- Ability to filter, log and replay CAN messages
- Support for Vector, Kvaser and NI interface hardware
- Support for A2L Description Files and Vector CAN Database



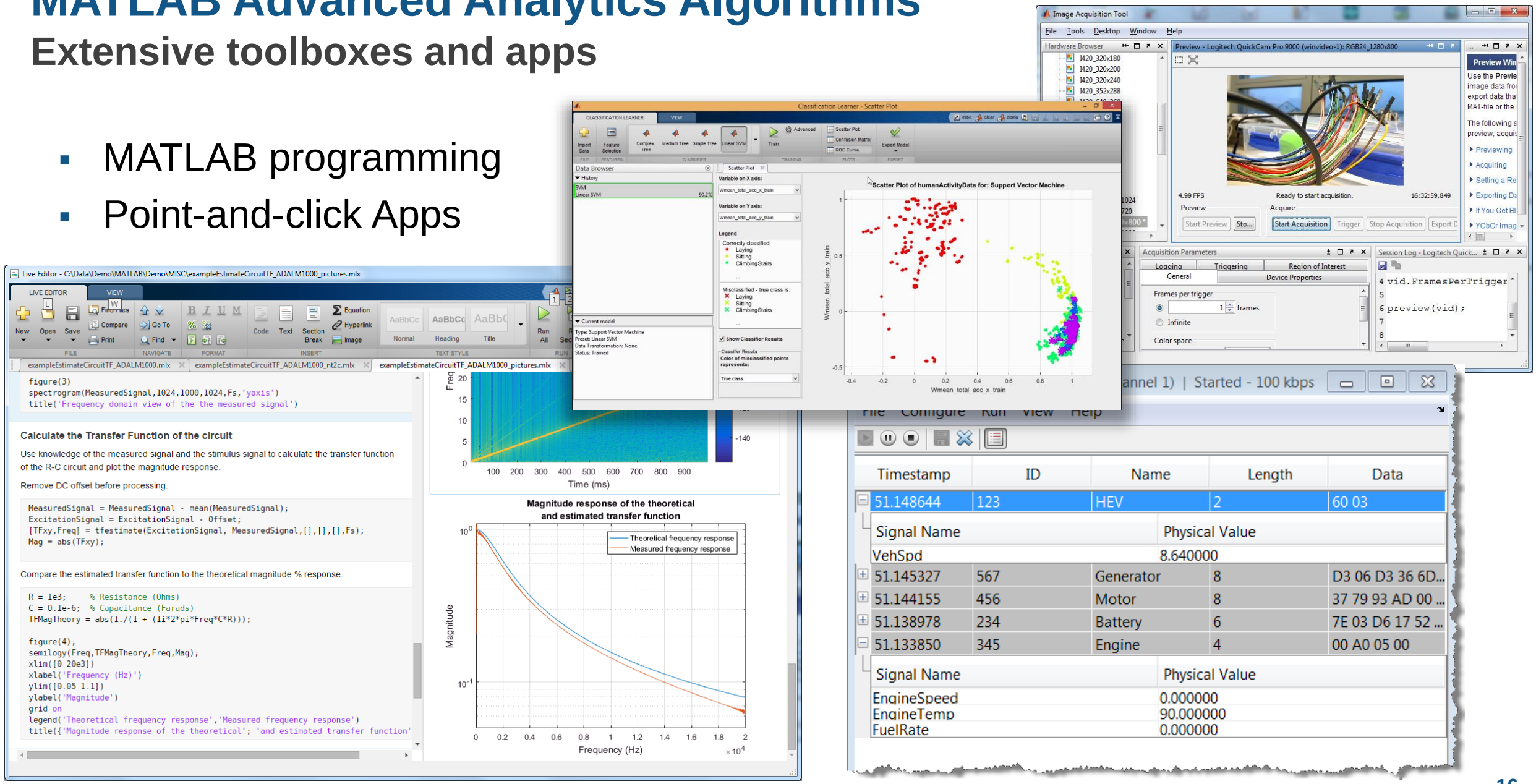
Test & Measurement Apps



MATLAB Advanced Analytics Algorithms

Extensive toolboxes and apps

- MATLAB programming
- Point-and-click Apps



Summary

- Easy driver installation through hardware support packages
- Data acquisition from a range of devices
- Handling, visualizing and processing data made easy
- One environment covering the whole Test & Measurement workflow