

ACOP.NET

Not just another GUI builder

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Hsinchu, 18. October 2018



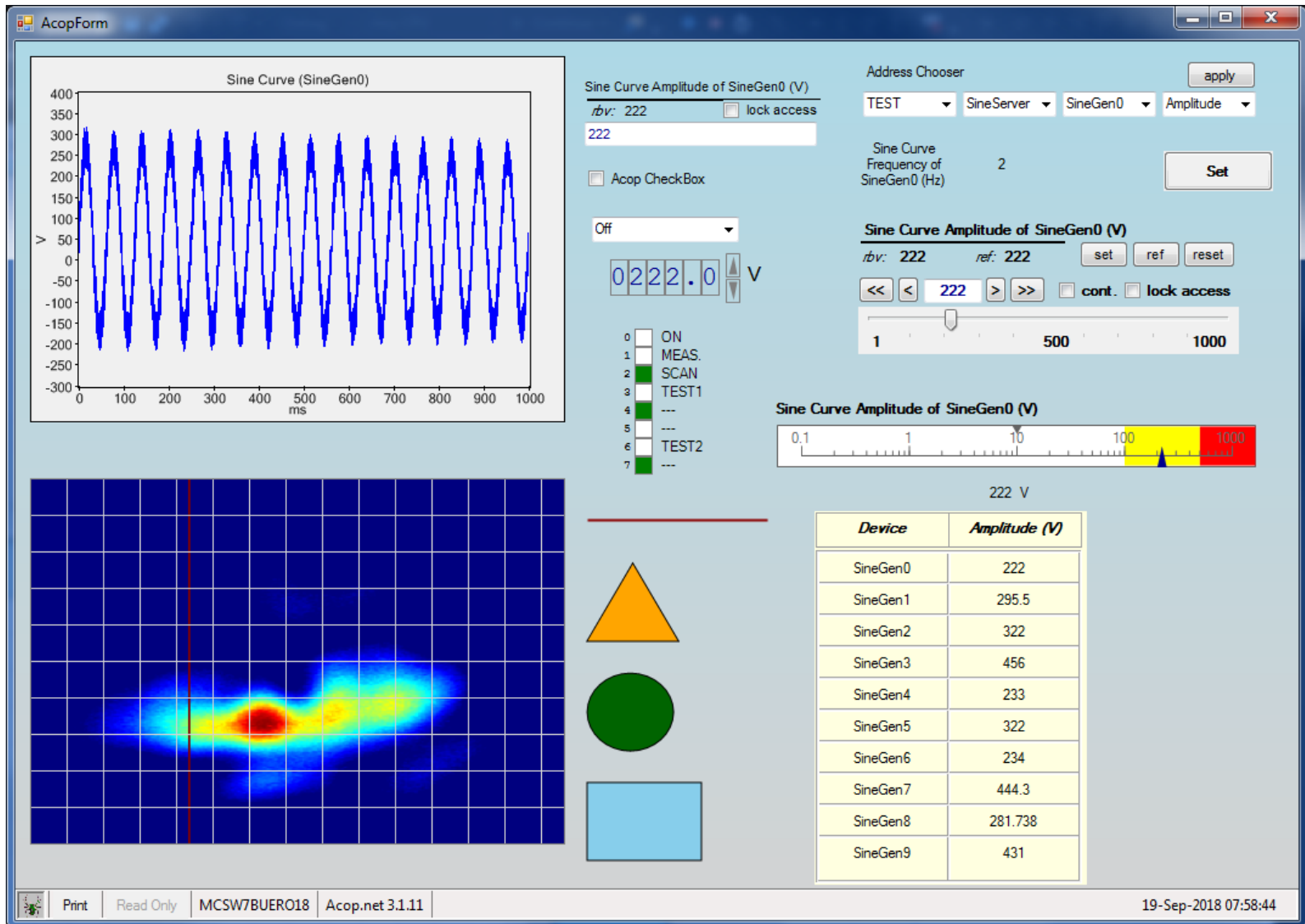
What is ACOP.NET?

- ACOP = Advanced Component Oriented Programming
- Rapid Application Development (RAD) tool for rich clients in .NET
- A set of smart User Controls for Microsoft Visual Studio
- Can be used for simple panel-style applications (no coding)
- Supports high level languages (C#, VB.NET, C++/CLI, F#)
- Project templates for C# , VB.NET and C++/CLI
- Control system independent

Why the .NET Framework

- Offers several programming languages (C#, VB.NET, C++/CLI, F#)
- Runs on Windows and Linux / Mac OS (with Mono framework)
- Popular in industry for business applications
- Also popular for web page server-side programming
- Scientific computing libraries (open source and commercial)
(e.g. Math.NET Numerics, ML.NET, Accord.NET, ...)
- **Visual Studio offers an excellent GUI builder!**

ACOP.NET palette of controls



ACOP.NET

Controls Properties / Events

- Two additional categories of properties
- Two additional categories of events
- Set the control display characteristics
- Set the control system input data
- Set the control system addresses
- Events to get data updates information and user input

Properties

[-] Acop.Display	
ButtonBackColor	Control
ButtonFlatStyle	Standard
IsToggleButton	False
LabelInSyncForeColor	DarkBlue
LabelOutOfSyncForeColor	DarkRed
PrimaryButtonText	Set
PrimarySetValue	100
SecondaryButtonText	Set
SecondarySetValue	
ShowErrorMessage	True
Target	
ToolTipText	
[-] Acop.Transport	
AddressEditor	Acop.AddressEditor
ApplyAcopLinkUpdate	False
ApplyEventOrder	exclusive
AutoLinkAttach	True
AutoLinkCapacity	0
AutoLinkUpdate	False
DefaultMonitorInterval	1000
LinkAddress	/TEST/SineServer/S
LinkContext	TEST
LinkDevice	SineGen0
LinkFlags	NONE
LinkInputValue	
LinkList	
LinkProperty	Amplitude
LinkProtocol	TINE
LinkServer	SineServer
LinkSubSystem	ALL

Events

[-] Acop.Display	
acopAnnotationCli	
AcopAutoScaled	
acopClicked	
acopDoubleClick	
acopMsDragged	
acopMsEnter	
acopMsExit	
acopMsMove	
acopMsPressed	
acopZoom	
[-] Acop.Transport	
acopLinkError	
acopLinkUpdate	

ACOP.NET

Design-time Address editor

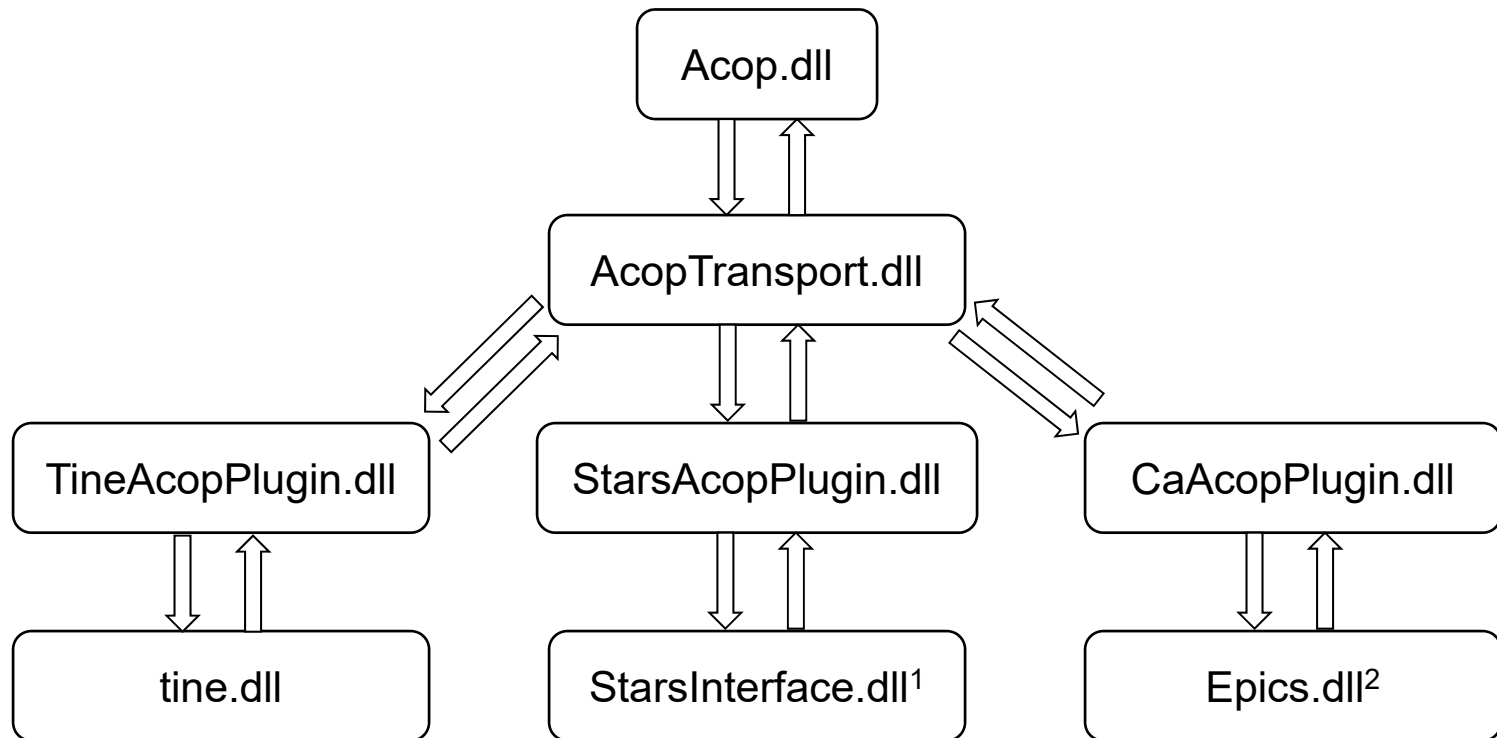
- Browse through the control system at **design time!** (if supported)
- If browsing is not supported, an input field can be used to add a control system address
- The default protocol and the browsing ability is set in the ACOP.NET config file

The screenshot shows the 'Link Properties' dialog box. It has a title bar 'Link Properties ...'. Inside, there are three dropdown menus: 'Protocol' (set to 'TINE'), 'Context' (set to 'MVS'), and 'Subsystem' (set to 'ALL'). To the right of these are 'OK' and 'Cancel' buttons. Below these are three more dropdown menus: 'Server' (set to 'MassSpectrum'), 'Device' (set to 'MS09'), and 'Property' (set to 'OffsetMass'). To the right of these is a small icon and the text 'MCA'. Below these are three input fields: 'Additional Flags' (set to 'NONE'), 'Input Value', and 'Error Value'. Below these are three more input fields: 'Capacity' (set to '0'), 'Interval' (set to '1000'), and 'Auto-Scale' (a dropdown menu). To the right of these are four checkboxes: 'Auto-Attach' (checked), 'Auto-Update' (checked), 'Auto-Trend' (unchecked), and 'Grouped Links' (unchecked). At the bottom left is an 'Add' button. At the bottom right is a large empty text area.

The screenshot shows the 'Link Properties' dialog box. It has a title bar 'Link Properties ...'. Inside, there is a 'Protocol' dropdown menu (set to 'CA'). To the right of this are 'OK' and 'Cancel' buttons. Below these is an 'Address' input field containing the text 'test_calc'. Below this are three input fields: 'Additional Flags' (set to 'NONE'), 'Input Value', and 'Error Value'. Below these are three more input fields: 'Capacity' (set to '0'), 'Interval' (set to '1000'), and 'Auto-Scale' (a dropdown menu). To the right of these are four checkboxes: 'Auto-Attach' (checked), 'Auto-Update' (checked), 'Auto-Trend' (unchecked), and 'Grouped Links' (unchecked). At the bottom left is an 'Add' button. At the bottom right is a large empty text area.

ACOP.NET

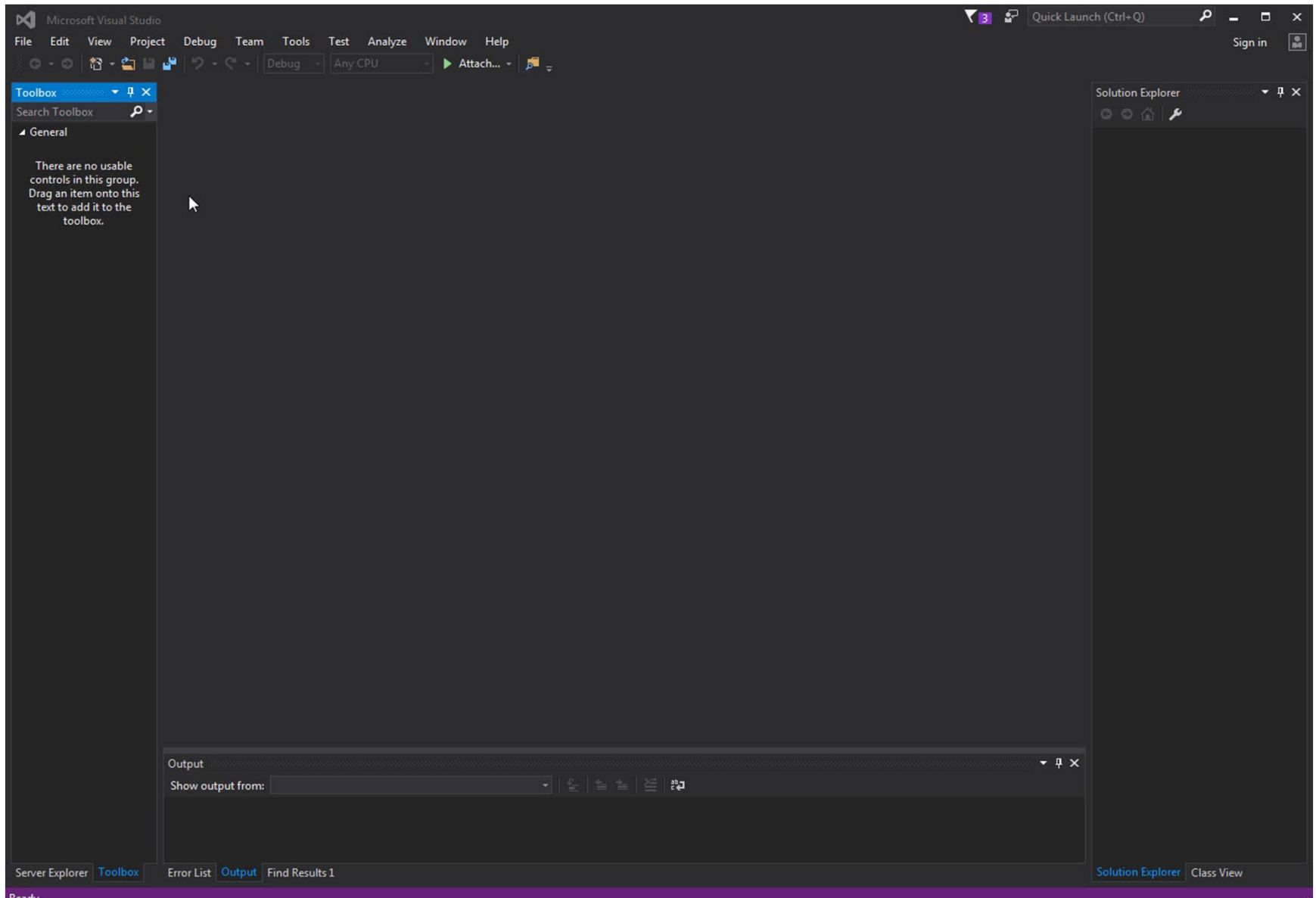
Connection to the Control system with plugins



¹ T. Kosuge, KEK

² G. Cox, STFC Daresbury Laboratory

Creating an ACOP.NET application

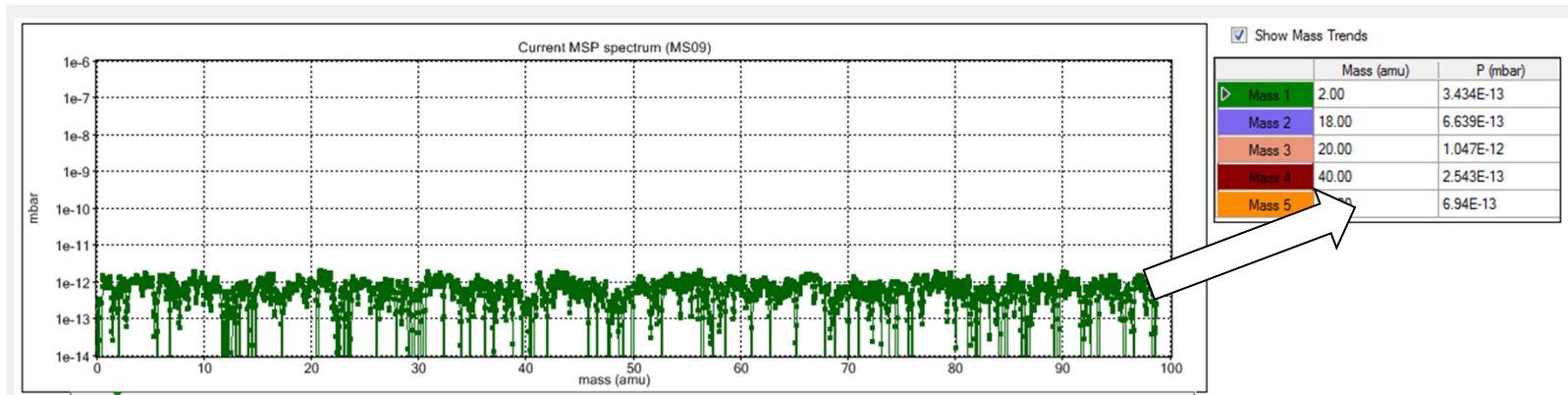


ACOP.NET vs. rich clients and panel builders

	Rich Clients	ACOP.NET	Panel Builder
Requires programming	Yes	No	No
Offers programming	Yes	Yes!	No
Extensible	Yes	Yes	Partly

Difference to pure panel builders

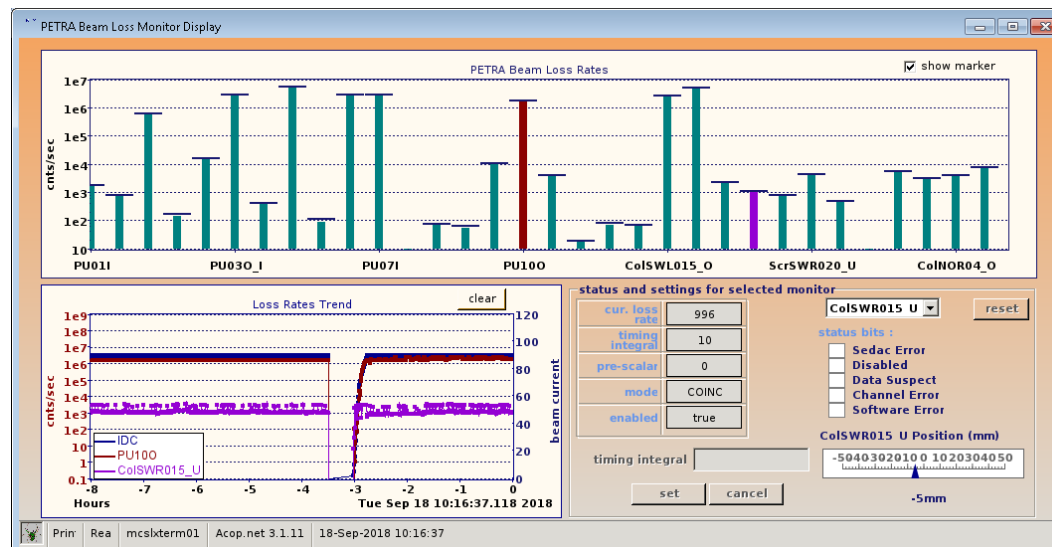
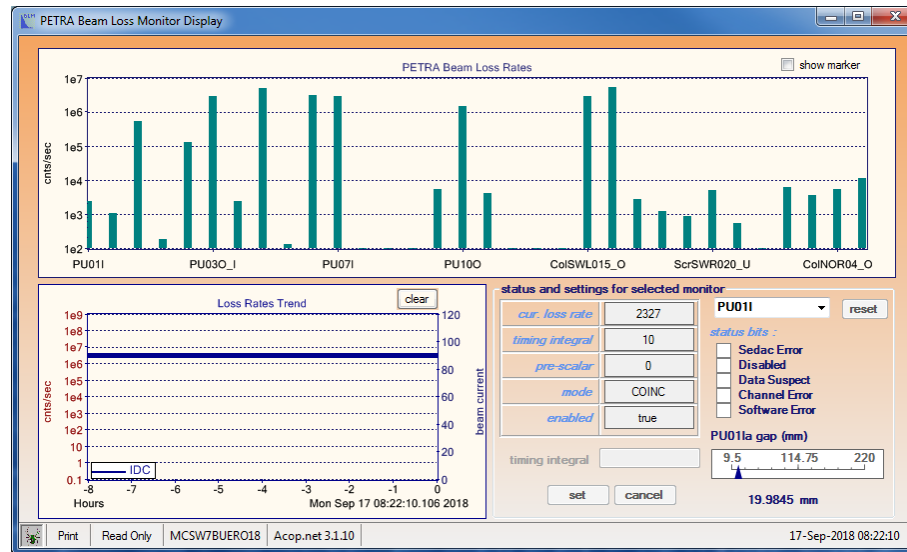
Use the ACOP control event to easily access the data from the control system



```
private void aScanChart_acopLinkUpdate(object sender, Acop.Link Ink)
{
    double[] massValues    = Ink.GetOutputXAxis();
    double[] pressureValues = Ink.GetOutputYAxis();
    ...
}
```

ACOP.NET application examples

PETRA Beam Loss Monitor Display

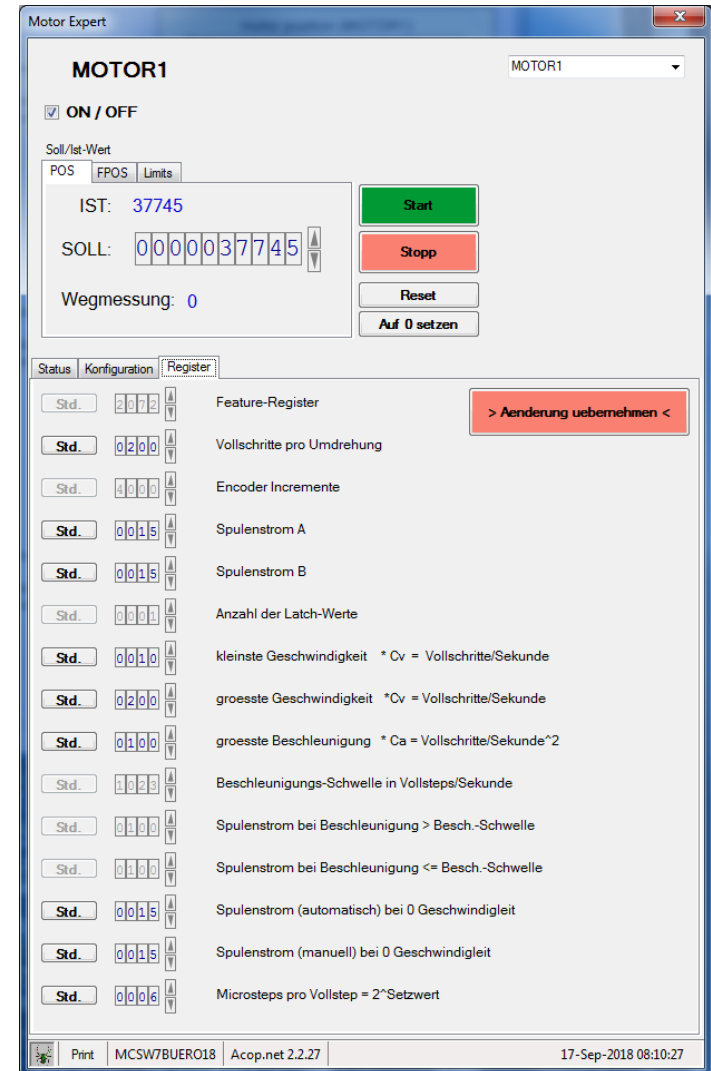
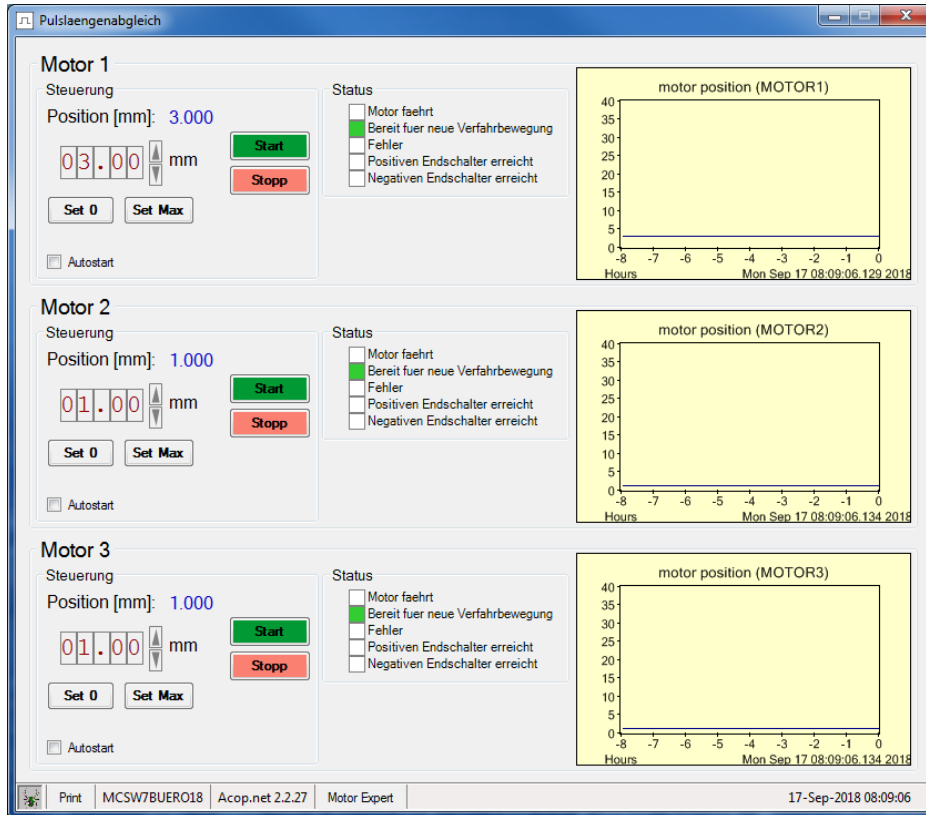


Runs with Mono on
Linux (X11 forwarding)

C#

ACOP.NET application examples

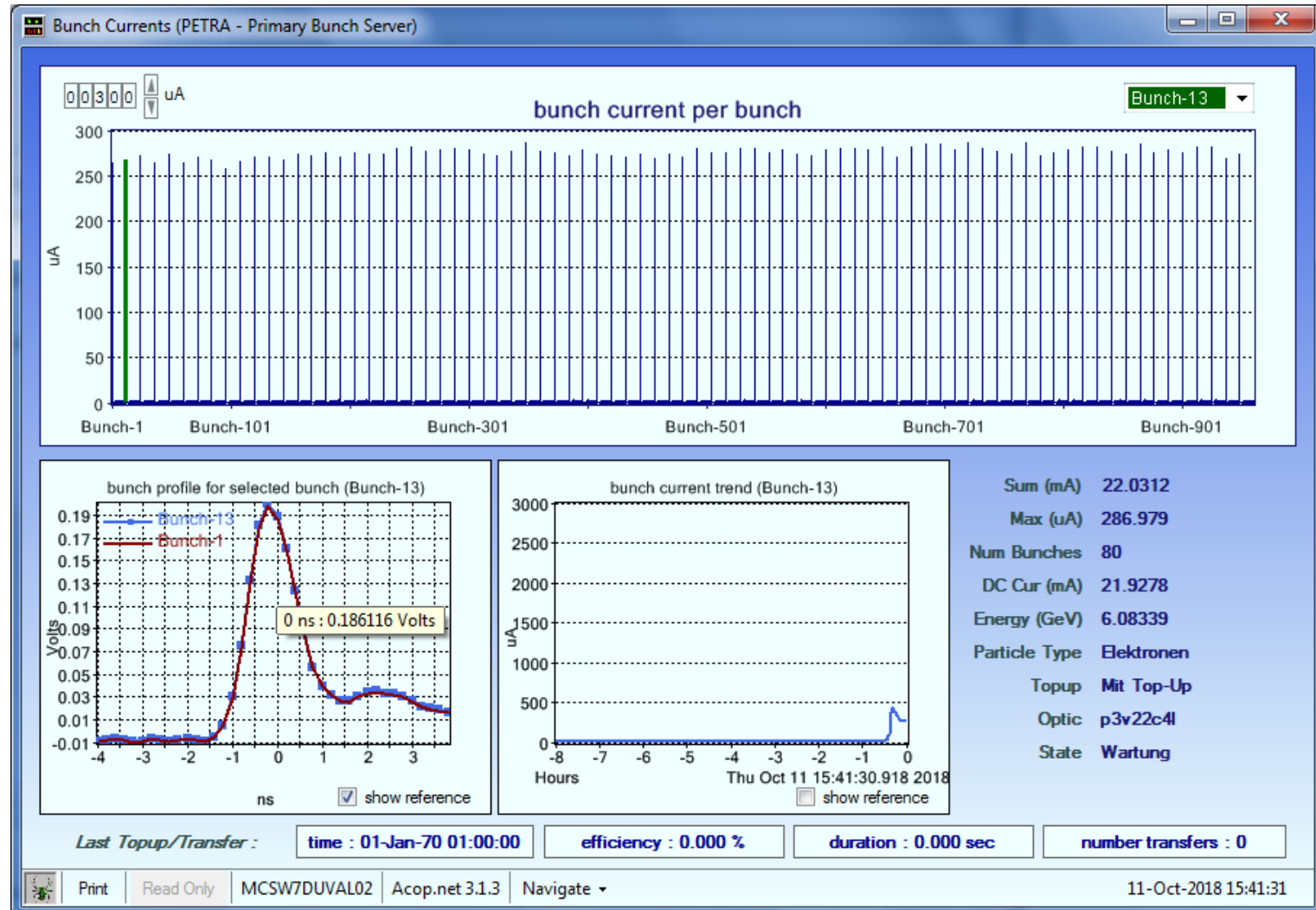
Motor control (Pulslaengenabgleich)



C#

ACOP.NET application examples

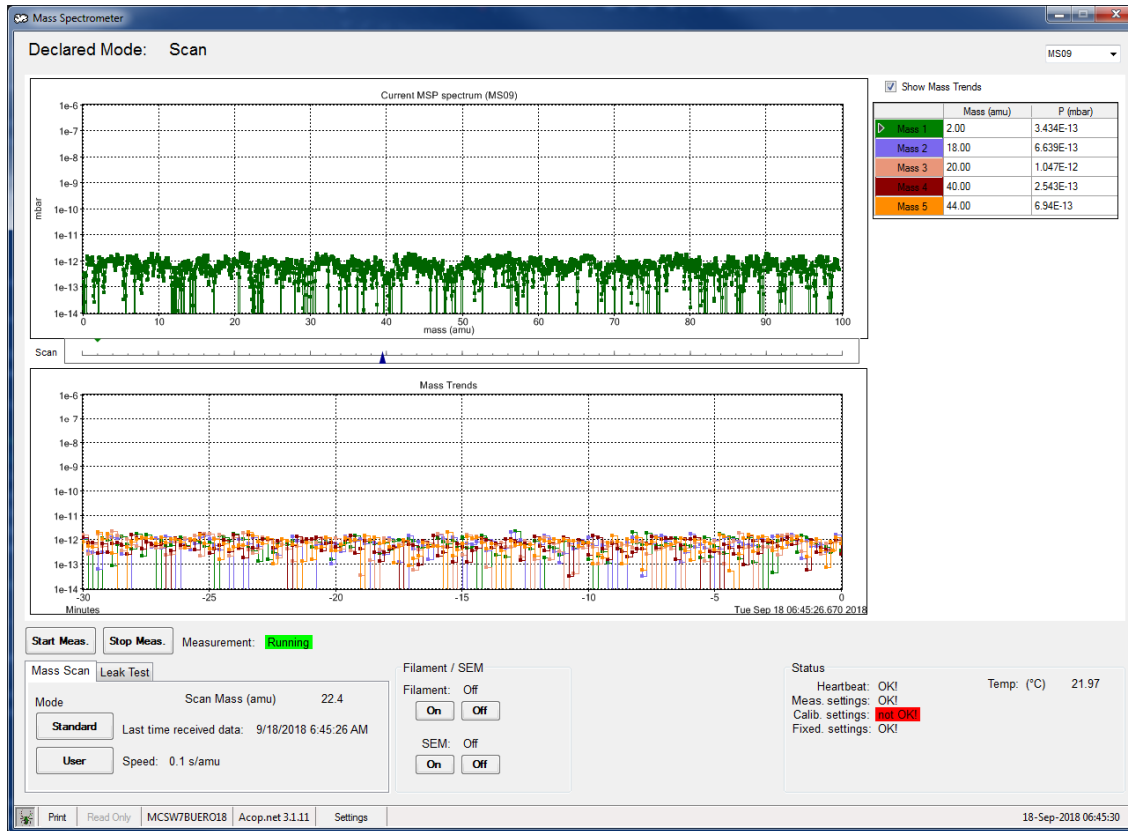
Bunch Currents PETRA3



C#

ACOP.NET application examples

Mass Spectrometer



Expert Settings

Settings for: MS09

Declared Mode: Scan

not changeable not changeable

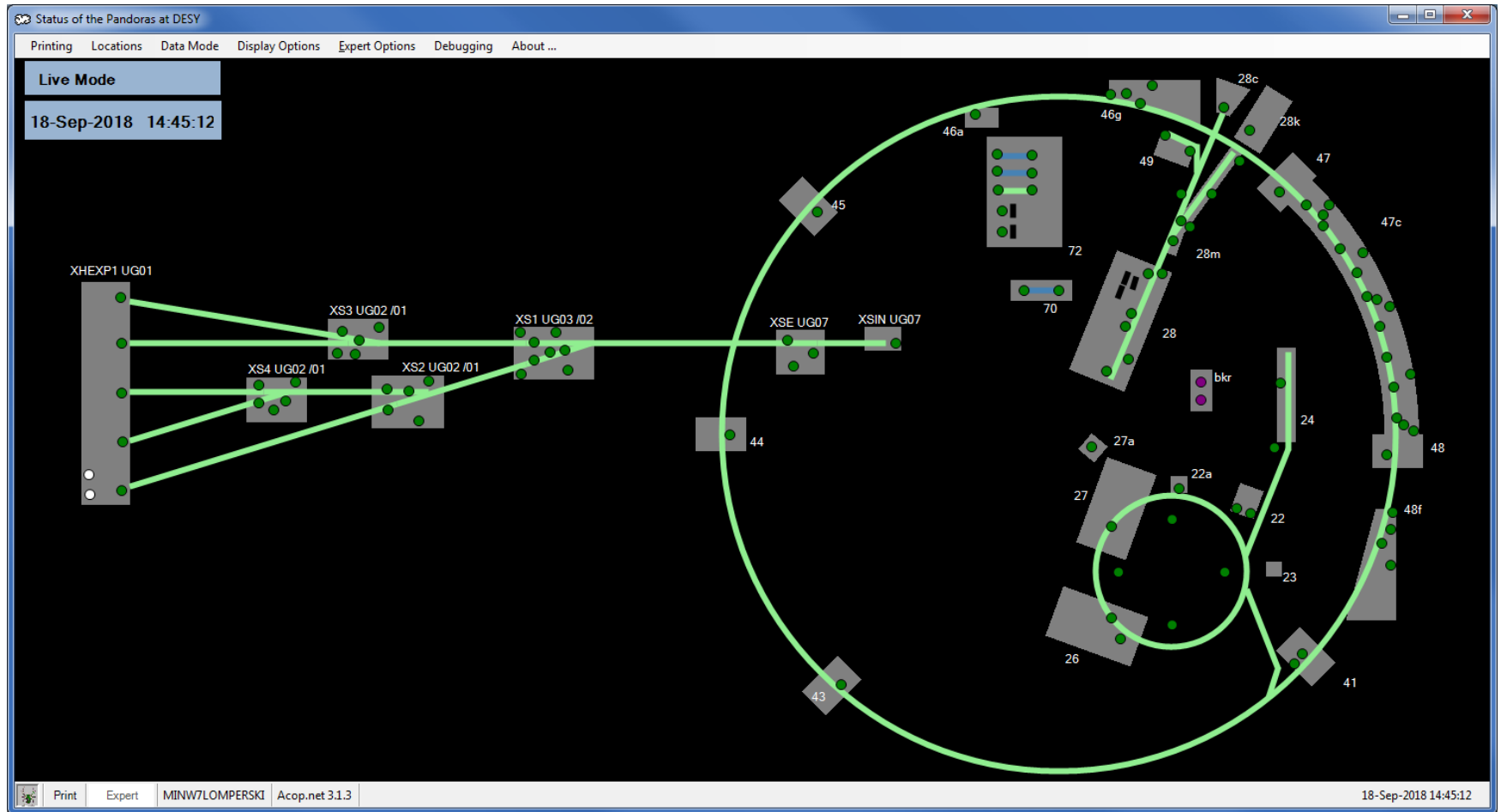
Settings	Ist	Standard	User
cycleBeginChan	0	0	0
cycleEndChan	0	0	0
cycleType	CYCLE	CYCLE	CYCLE
cycleSequence	Single	Single	Single
scanMode	Scan: Filtered	Scan: Filtered	Scan: Filtered
scanSpeed	0.1 s/amu	0.1 s/amu	0.1 s/amu
scanFirstMass	0	0	0
scanWidth	100	100	100
scanResolution	50	50	50
detectorType	C-SEM	C-SEM	C-SEM
disableChannel	Disabled	Disabled	Disabled
pauseCalibrate	1	1	1
cycleNumCycles	continuous	continuous	continuous
offsetMass	50.5	50.5	50.5

Set value: 0.1 s/amu

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ACOP.NET application examples

Status of the Radiation Monitors at DESY



Summary

- ACOP.NET covers the entire spectrum from simple designer panels to complex applications!
- You have a choice of programming languages!
- .NET has a very large community!
- Can be easily integrated into other control systems!
- ACOP.NET is **NOT** just another GUI builder!

Thank you

acop.desy.de