

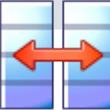
# INCA V7.1 – What's New

Includes SP1



- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - Standards
  - Usability
  - HW support
  - Add-ons
- INCA Product Family
- Phase out information
- General Notes

- Product information (Use cases, Sample applications, Customer value)
  - **Performance**
  - Functionality
  - Standards
  - Usability
  - HW support
  - Add-ons
- INCA Product Family
- Phase out information
- General Notes

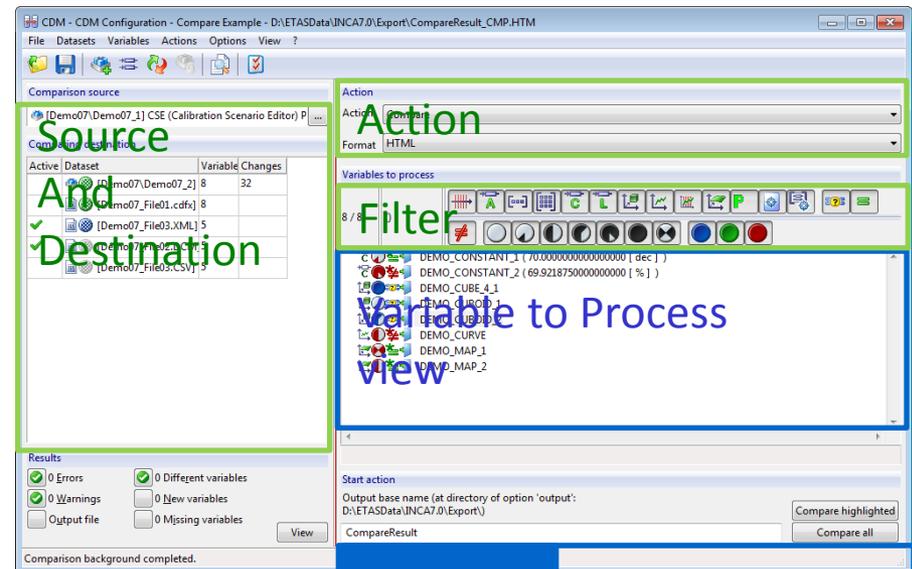


## The user needs to configure CDM

- Activate filter
- Add or remove source or destination data sets
- Select Actions
- CDM needs for these changes an update of the view “variables to process”

## The user is now able to configure CDM without wait time.

- CDM updates its “variables to process” view in the background.
- If the user changes more than one selection no additional wait time is necessary as CDM accepts the changes immediately
- A progress bar shows the user when
- CDM is ready to start output actions





## Data exchange with PaCo / CDF V2.0

INCA allows to optimize readability versus performance

- Full size
  - The files are optimized for readability. Each information in separate line and indented
  - Needed when simple text editors are used for reading
  - Size index = 100%
- Only carriage return + line feed
  - Each information in separated lines, no indentation
  - Readability in simple text editors possible, XML Editor preferred
  - Size index appr. 75%
- Condensed
  - All information condensed to one block
  - XML Editor necessary for readability
  - Size index appr. 70%



## **For test benches not only the testing time but also the configuration time is relevant**

The following INCA internal functionality is improved

- Adding Measurements
- Load only objects the test bench needs (*options*)
- Keep INCA experiments open for manual interactions after closing MCD-3MC session (*option*)

It is ensured that on test bench side the existing scripts are fully usable

- The interface MCD-3MC is not changed
- All improvements are INCA internal improvements
- The difference is the shorter configuration time of INCA and the possibility to tailor the database query results to the needs.



### Open Experiment

- For huge experiments (e.g. 10 layers, 500 parameters, 500 measurements) the opening time should be comfortable on a recommended PC system

Target: reduce the opening time by 50% compared to INCA V7.0

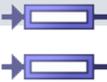
- The first opening time is less 10s, the second opening time less 2s
- INCA displays a progress bar while opening the experiment

### PC Resources

- Improved resources management for experiments with several layers
  - Resources ('GDI objects' and 'User objects') are only allocated, when the respective layer is selected
  - Resources of no longer selected layers are returned to the OS\*

Benefits: less resources usage, but still reasonable switching times, even huge layers can be combined within one experiment

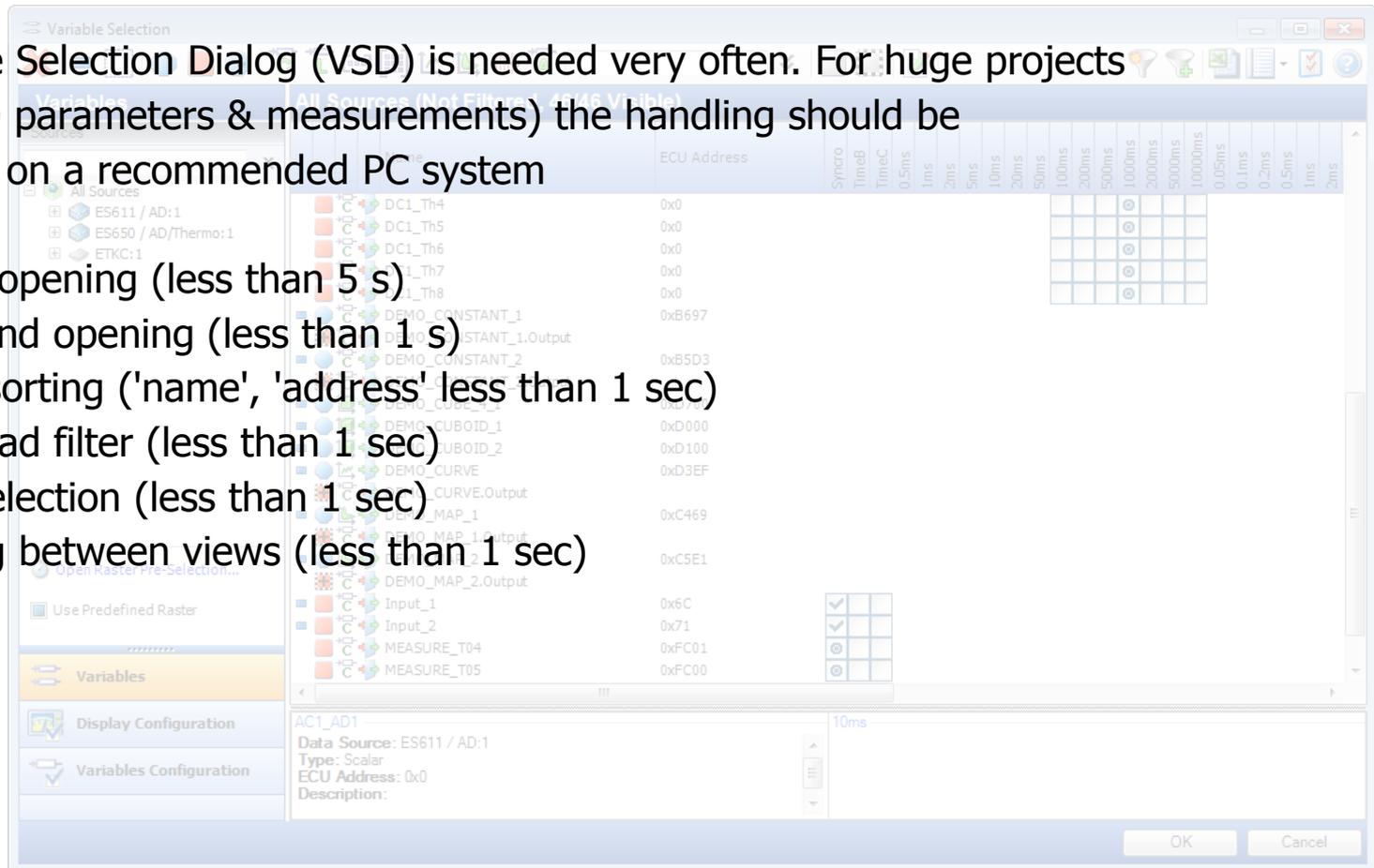
- \* Resources are not returned in case the loading of a layer exceeds a certain time limit, and the resources are not needed for the currently selected layer.  
For Oscilloscopes and Combined Editors the resources are not returned.



## VSD Improvements

The Variable Selection Dialog (VSD) is needed very often. For huge projects (e.g. 50.000 parameters & measurements) the handling should be comfortable on a recommended PC system

- The first opening (less than 5 s)
- The second opening (less than 1 s)
- Column sorting ('name', 'address' less than 1 sec)
- Type ahead filter (less than 1 sec)
- Device selection (less than 1 sec)
- Switching between views (less than 1 sec)





### Recording

The aim is to ensure the desired data throughput can be achieved. The aim is not to test if the data throughput can be achieved under all possible operating conditions of INCA.

#### – Boundary conditions

- Measure variable will be measured as record only. There will be no display instruments in the experiment environment.
- There will be no calculated signals
- There will be no recording triggers
- Limit of 2000 measurements per raster

#### Standard vehicle test

- 1 ECU with XETK connection (engine controller)
- 1 ECU with CCP (Transmission controller)
- 6 ES410 (all 10kHz sample rate)
- 2 ES420 all 10 Hz sample rate)
- 2xES411
- 1 CAN Mon (500kBaud CAN bus)

#### Vehicle with FlexRay

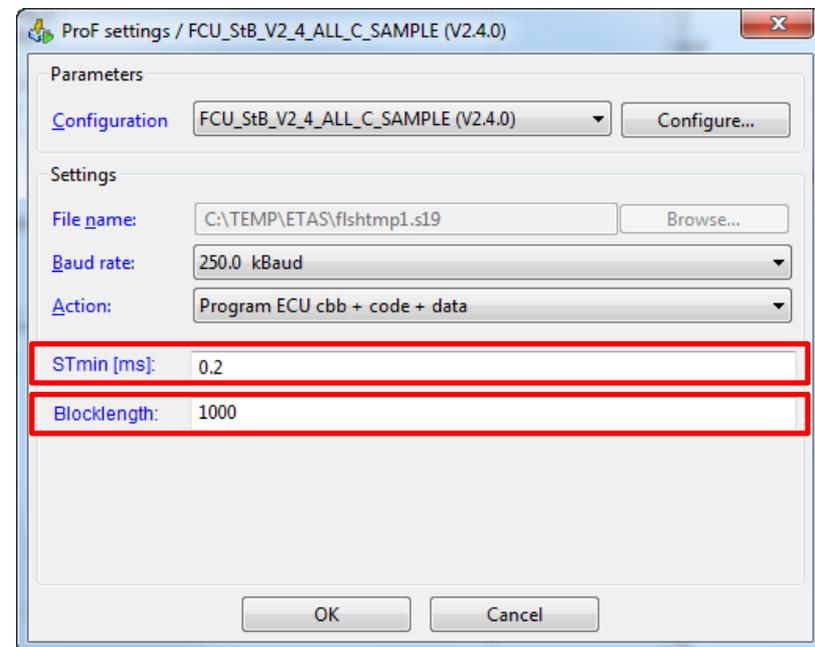
- 1 ECU with XETK (Engine Controller)
- 1 ECU with XCP over Flexray (Transmission Controller)
- 5 ES620 Modules measuring at 10Hz
- 4 ES610 modules measuring at 1KHz
- 1 ES611 measuring 6 signals at 2KHz
- 1 Flexray Monitor



## Individual parameter settings in the "Prof" tool

To optimize the flashing time it is possible to e.g. the following parameters individually

- Minimum Separation Time (STmin)
- Block Size (BS)



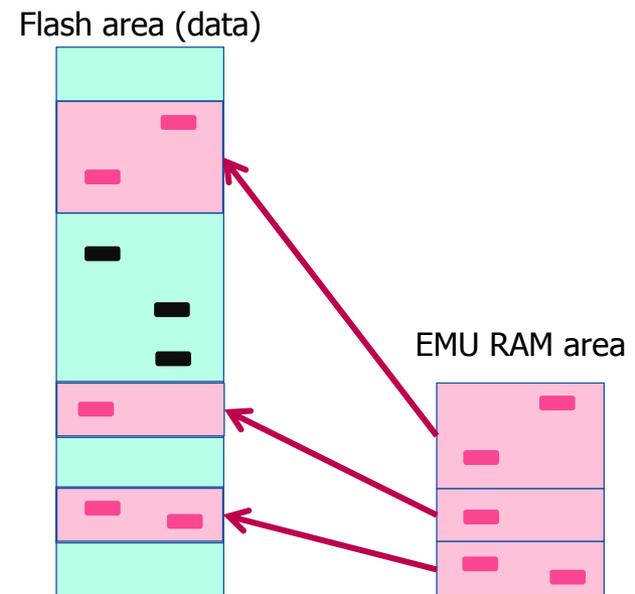
This feature is not available by default.  
The Edit Boxes must be added in the  
related "Prof Configuration"



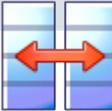
## ECU Processors support the possibility to configure the Emulation RAM

To emulate more parameters with less ECU emulation RAM it is necessary to optimize the usage. INCA supports now variable overlay sizes. This allows to cover more parameters with the given ECU RAM resources.

- Algorithm to find the optimum coverage
  - When initializing the Experiment
  - When calibrating parameters the first time
- Release of overlays when the parameter values are reset to reference page



[Available with INCA V7.1 SP1](#)



## **eCDM interface allows to transfer the Maturity Level with good performance**

In case of transferring A2L file + Hex file + Maturity information it reduces the effort to transfer in CDF only the parameter maturity level without the parameter values. The parameter values are already in the hex file.

- INCA accepts CDF files with maturity information (process meta data) only when
  - eCDM interface is used
  - CDF file is linked to an hex file

INCA uses then the values out of the hex file and the maturity level (process meta data) from the CDF file.

The Enterprise CDM System that sends the data must ensure that the maturity level fits to the values in the hex file!

The Enterprise CDM System that sends the data must ensure that the maturity level fits to the values in the hex file!

[Available with INCA V7.1 SP1](#)

- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - **Functionality**
  - Standards
  - Usability
  - HW support
  - Add-ons
- INCA Product Family
- Phase out information
- General Notes



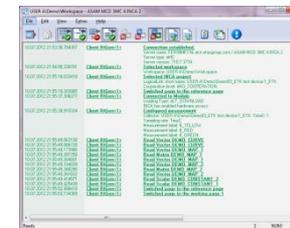
## MCD3 Logging

### New: Activity Logging

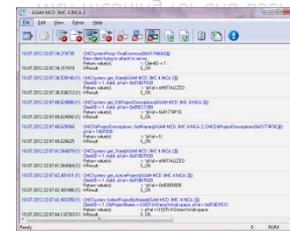
- Describes the high level protocol activity
- Enables the test bed user to solve issues them selves
- Enables much faster analysis of preconditions of an error (support / development)
- The level of logging can be configured independent for file and screen

### Interface Logging

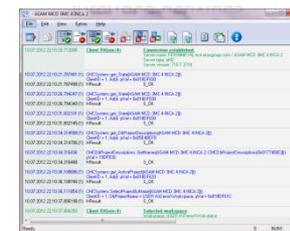
- Describes the low level protocol activity
- Represents the MCD3 COM interface traffic



Activity Log showing only actions with meaning for end user



Interface Log showing all DCOM interface activities



Combination Activity Log & Interface Log



### Option "Use only the configuration of current workspace"

The MCD-3MC interface allows to select any combination of database items. What leads to a very large number of combinations possible. The new option allows that INCA returns only the Logical Links of the defined INCA Workspaces instead of theoretically possible.

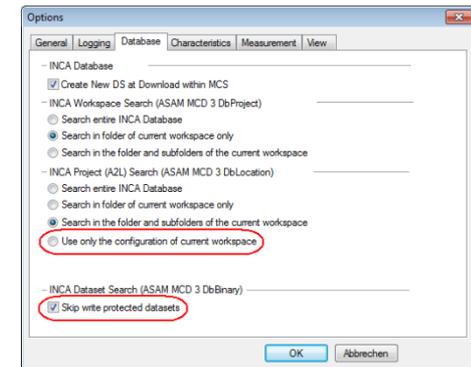
- Dramatically reduced the number of selectable variants
- Better support of end user at Logical Link selection
- Improved process stability
- Reduced database query time

### Option "Skip write protected datasets"

MCD-3MC selects available dataset from INCA. When MCD-3MC selects a write protected dataset INCA creates a copy to be able to write to. This causes a copy at any reconnect.

The new option allows to hide write protected DS on MCD3

- Uncontrolled growing of database is avoided



Database filter options extended

## Option "Connection Failure Behavior"

Serial ECUs initialize the WP usually from RP at power up

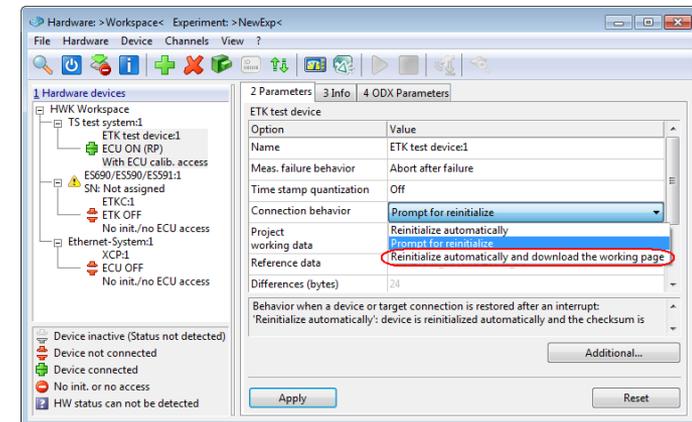
Use Case

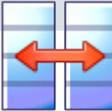
- Calibration has been done in the ECU (changes on WP)
- Power Fail of ECU (intended or unintended)
- INCA offers the possibility to reconnect automatically
- User has to enable calibration access by manual download

For automated use cases there was no way to overcome this situation without restarting the connection from scratch

A new "connection failure behavior" option provides an automated download at reconnection

- Power fail scenarios can be supported on test benches
- Convenience improvement for manual users





### CDM opens parallel to the Experiment

CDM - CDMConfig\Demo08\_1 - D:\TEMP\CDMddd\_LIST.TXT

File Datasets Variables Actions Options View ?

List source [Demo08\Demo08\_6] 17

No destination for list

Act Dataset [Demo08\Demo08\_6] 17

Variables & functions to process

0/2/1 0

DEMO\_CONSTANT\_1 (70.000000000000000)

DEMO\_CONSTANT\_2 (89.500000000000000)

DEMO\_CONSTANT\_3 (89.500000000000000)

DEMO\_CONSTANT\_4 (89.500000000000000)

DEMO\_CUBOID\_1

DEMO\_CUBOID\_2

DEMO\_CURVE\_1

DEMO\_CURVE\_2

DEMO\_CURVE\_3

DEMO\_CURVE\_4

DEMO\_CURVE\_5

DEMO\_CURVE\_6

DEMO\_CURVE\_7

DEMO\_CURVE\_8

DEMO\_MAP\_1

DEMO\_MAP\_2

Key

Address 0xD000

Byte order MSB\_LAST

Dataset 3 dim Cuboid

Longname

Project Demo08

Size \$x3 x \$y4 x \$z5

Values bounds (hard) [-32000...32000]

Values bounds (weak) [-32000...32000]

Values data type WORD

Values unit

Results

0 Errors

0 Warnings

0/0 New items (functions)

0/0 Missing it

List highlighted

List all

Comparison background completed.

- Compare RP and WP used in the Experiment
- Instant compare
- Filtering
- Function view
- Compare with other data sets / data exchange files
- Copy external data to the WP (while online)
- Data exchange files and data sets
- Detailed selection based on compare
- Copy all / copy selected
- List data exchange files
- Functions included
- Only different

Experiment: > Experiment< Hardware: > Workspace<

Experiment Edit View Variables Measurement Hardware Dataset Components E-Target ODX Instrument Window ?

WP: Demo08\_8

RP: Demo08\_6

Diff: 0

Combined Editor [2]

DEMO\_CURVE\_3 <Curve> [] x: Input\_1 [revs]

1.0000

0.8000

0.6000

0.4000

0.0000

0 1000 1840 2200 2800 3600

x: Input\_1 [revs]

z

x	0.6602	0.5000	0.5000	0.5000	0.5000	0.6602
z	0.6602	0.5000	0.5000	0.5000	0.5000	0.6602

Calibration Window [4]

DEMO\_CONSTANT\_1 70 [dec]

DEMO\_CONSTANT\_2 89.50 [%]

DEMO\_CONSTANT\_3 89.50 [%]

DEMO\_CONSTANT\_4 89.50 [%]

Combined Editor [3]

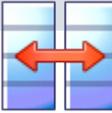
DEMO\_CURVE\_1 <Cube4( STD\_AXIS )> [%] x: [step]

y: [rpm] z1: [NU] z2: [NU]

z2	z1	y \ x	0.000	1.000	9.000	19.000
10.000	0.000	4.688	0.605	0.650	0.921	0.921
30.000	22.002	24.219	0.612	0.641	0.859	1.217
50.000	45.000	39.844	0.636	0.682	1.083	1.371
65.000	67.002	60.156	0.671	0.703	0.869	1.076
87.998	78.125	64.2	0.661	0.830	0.953	
100.000	0.645	0.751	0.885	0.978		
120.313	0.788	0.645	0.762	0.827		
139.844	0.838	0.659	0.790	0.818		
170.313	0.907	0.750	0.879	0.885		
200.000	0.887	0.830	0.940	0.953		

Measurement stopped

Max. buffer level: 0%



### Double click a parameter in CDM

- The EE shows the user the layer and editor where this parameters CDM is added
- The EE adds a new editor to a separate layer if this parameter is missing

### Edit a parameter in the EE

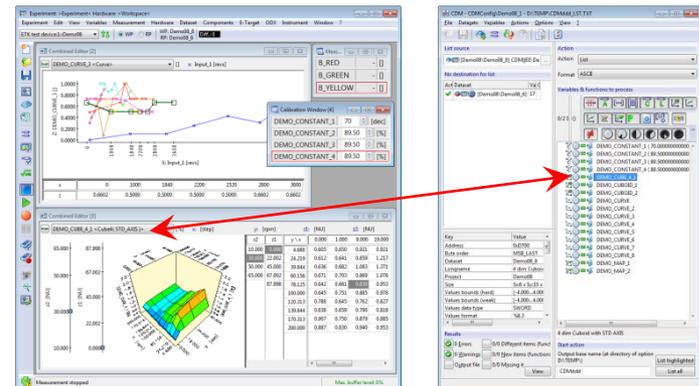
- CDM updates the value and compare result

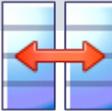
### Edit the WP values always in the EE

- All use cases of INCA are supported
  - Online ECU access (changes are immediately transferred)
  - Limited EMU RAM
  - Dependent parameter
  - Virtual parameter
  - Grouped ECU
  - ASAP3 / MCD3
  - MCE

### Value changes of parameters

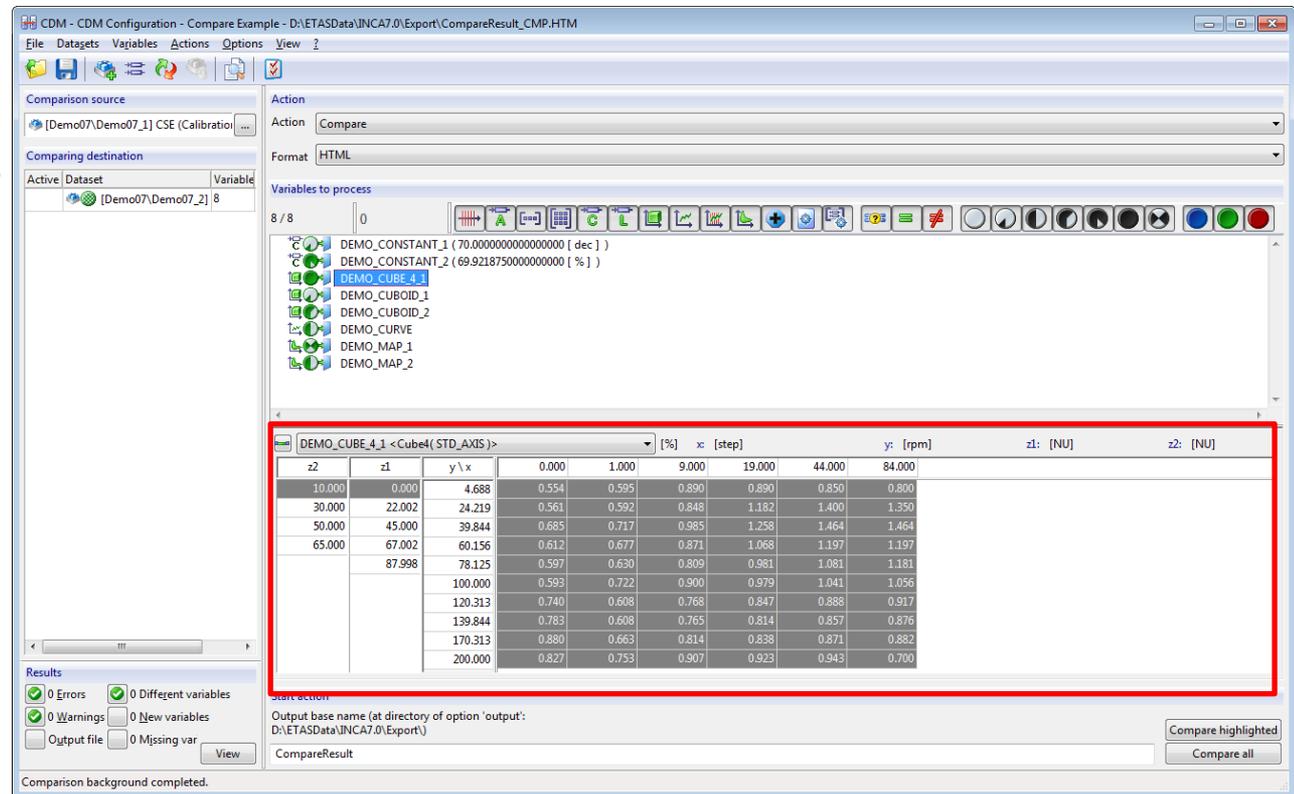
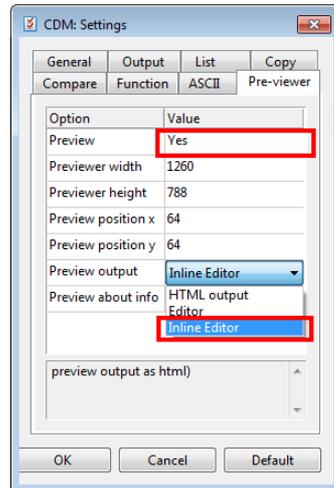
- Visualized in EE and CDM

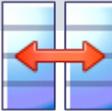




### CDM opens automatically an editor for the currently selected parameter

- CDM selects automatically the right editor for the selected parameter type
- The values are shown either in HTML output, Separate Editor or Inline Editor





### CDM opens automatically a browser for the currently selected parameter

- CDM shows all related information of the selected parameter

The screenshot displays the 'CDM - CDM Configuration - About Dialog' window. A red box highlights the 'Key' and 'Value' table, which provides detailed information about the selected parameter 'DEMO\_CUBE\_4\_1'. The 'CDM: Settings' dialog is also visible, showing various options for previewing and outputting data.

Key	Value
Address	0xD700
Byte order	MSB_LAST
Dataset	Demo07_1
Longname	4 dim Cuboid with STD AXIS
Project	Data Set Demo07
Size	5x6 x 5y:10 x Sz:5 x 54:4 x [ (6' 10' 5' 4' ) ]
Values bounds (hard)	[-4.000...4.000] / [8000h...7FFFh]
Values bounds (weak)	[-4.000...4.000] / [8000h...7FFFh]
Values data type	SWORD
Values format	%8.3
Values formula	CONV_TB2_1
Values formula Type	RAT_FUNC
Values name	DEMO_CUBE_4_1
Values unit	%
X-bounds (hard)	[-128.000...127.996] / [8000h...7FFFh]
X-bounds (weak)	[-128.000...127.996] / [8000h...7FFFh]
X-Data type	SWORD
X-Format	%8.3
X-formula	CONV_TB1_1
X-formula type	RAT_FUNC
X-Monotony	
X-name	DEMO_CUBE_4_1/x

z2	z1	y \ x	0.000	1.000	9.000	19.000	44.000	84.000
10.000	0.000	4.688	0.554	0.595	0.890	0.890	0.850	0.800
30.000	22.002	24.219	0.561	0.592	0.848	1.182	1.400	1.350
50.000	45.000	39.844	0.685	0.717	0.985	1.258	1.464	1.464
65.000	67.002	60.156	0.612	0.677	0.871	1.068	1.197	1.197
	87.998	78.125	0.597	0.630	0.809	0.981	1.081	1.181
		100.000	0.593	0.722	0.900	0.979	1.041	1.056
		120.313	0.740	0.608	0.768	0.847	0.888	0.917
		139.844	0.783	0.608	0.765	0.814	0.857	0.876
		170.313	0.880	0.663	0.814	0.838	0.871	0.882
		200.000	0.827	0.753	0.907	0.923	0.943	0.700



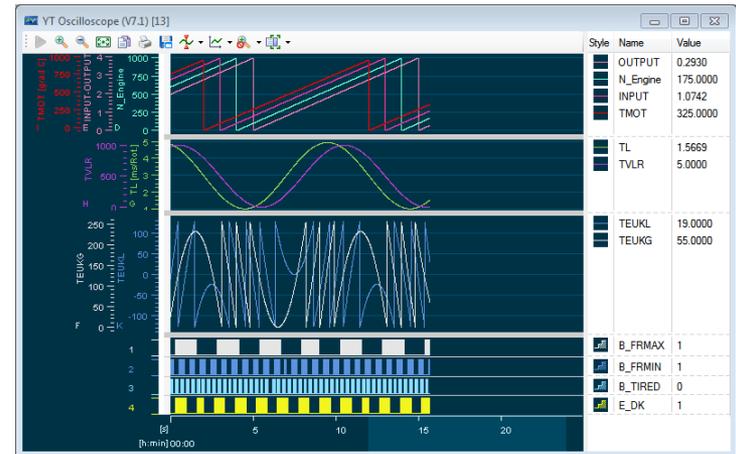
### Motivation for a new Oscilloscope technology

- Several customer requests for additional functionality and performance
- Overcoming limitations of existing implementations
- One common instrument

### Main characteristics of the new Oscilloscope

- No limitation for number of variables within one oscilloscope, and for number of oscilloscopes within one experiment <sup>1)</sup>
- Oscilloscope display is calculated using graphical processor <sup>2)</sup>

→ **More degree of freedom** and **higher performance** expected



### Notes:

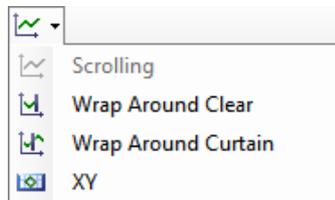
- 1) "Unlimited" means no fix or hard limitations in INCA SW. Physical limitations caused by the available PC resources are handled by INCA resp. the oscilloscope on a PC individual basis.
- 2) Broad variety of graphical boards can result in new side effects



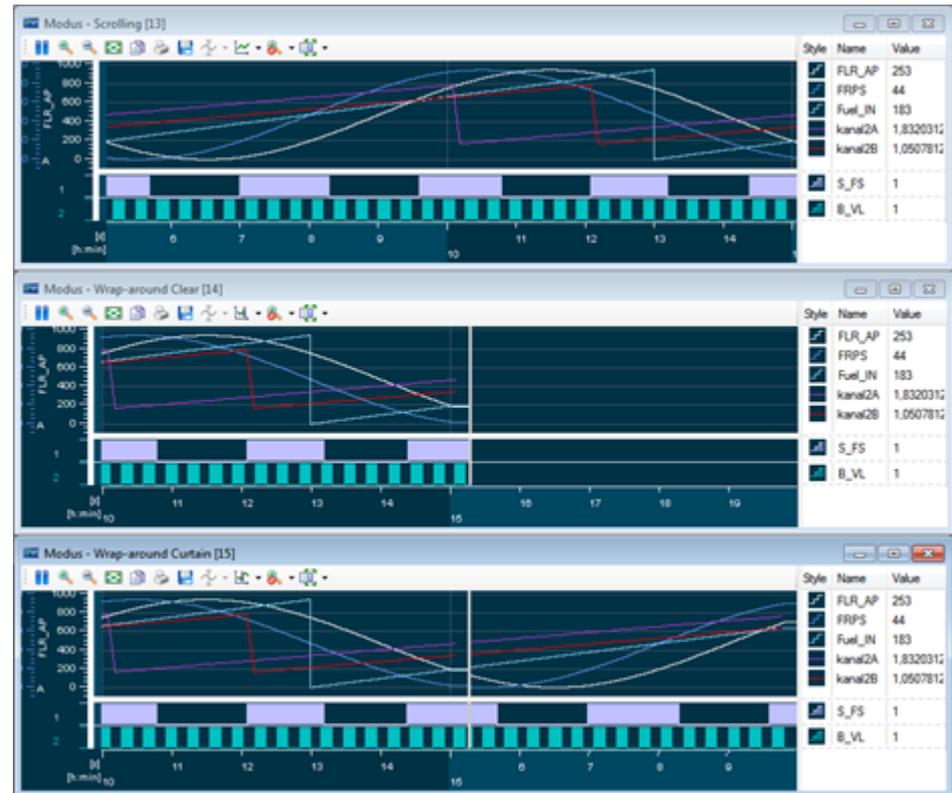
Different ways for data display to observe signal curves easily

- Three different display modes supported
  - Scrolling
  - Wrap-Around Clear
  - Wrap-Around Curtain

– Can be changed by means of toolbar



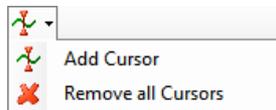
or within VSD – Display Configuration



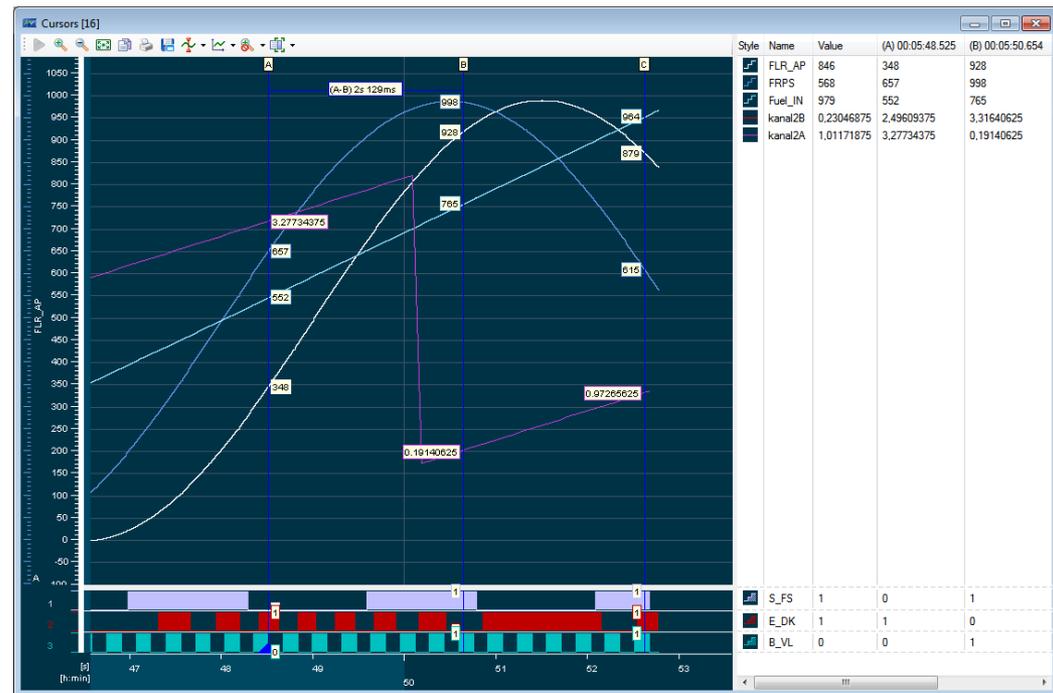
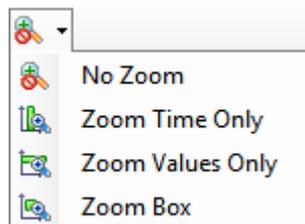


### Fast access to analyzing already during online visualization

- Data display can be stopped independently from data acquisition or recording
- Scrolling back via time axis \*
- Unlimited number of cursors
- Separate columns for cursor values
- Cursor value visible at signal curve
- Cursor differences can be shown
- Activation of cursors by means of toolbar



- Several Zooming possibilities



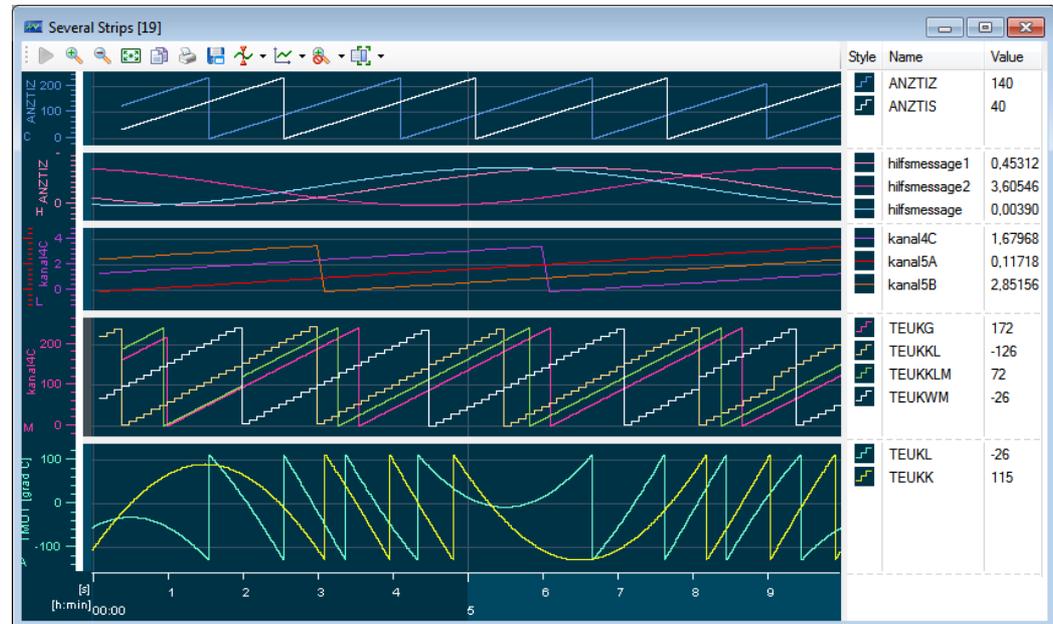
\* For INCA V7.1 when scrolling back, only data for last 120 seconds is available

## New Oscilloscope – Optimized Usage of Graphical Area



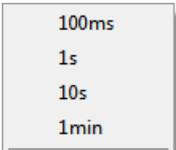
Highly customizable display enables a well-arranged appearance even when observing many signals

- Creation of separate **strips**
- Height of each strip adjustable
- Flexible assignment of signals to axes
- All strips use the same horizontal / time axis, i.e. are synchronized





### Several methods for axis adaptation to see the relevant ranges

- Both manual as well as automatic axis adaptation is supported
- “Zoom to Fit” 
  - One-time adaptation according to the values of the available samples
- “Dynamic Axis Adaptation”  Dynamic Axis Adaptation
  - Axis property by which the axis range is increased continuously if needed
- Axes ranges can be changed by the user manually
  - Scroll axis range: Click on the axis and move mouse up- or downwards
  - Zoom axis range: Same as above while CTRL-key is pressed
- Time axis adaptation
  - Quick access to predefined time ranges 
  - Zooming over time 
- All axes ranges can be set in VSD – Display Configuration

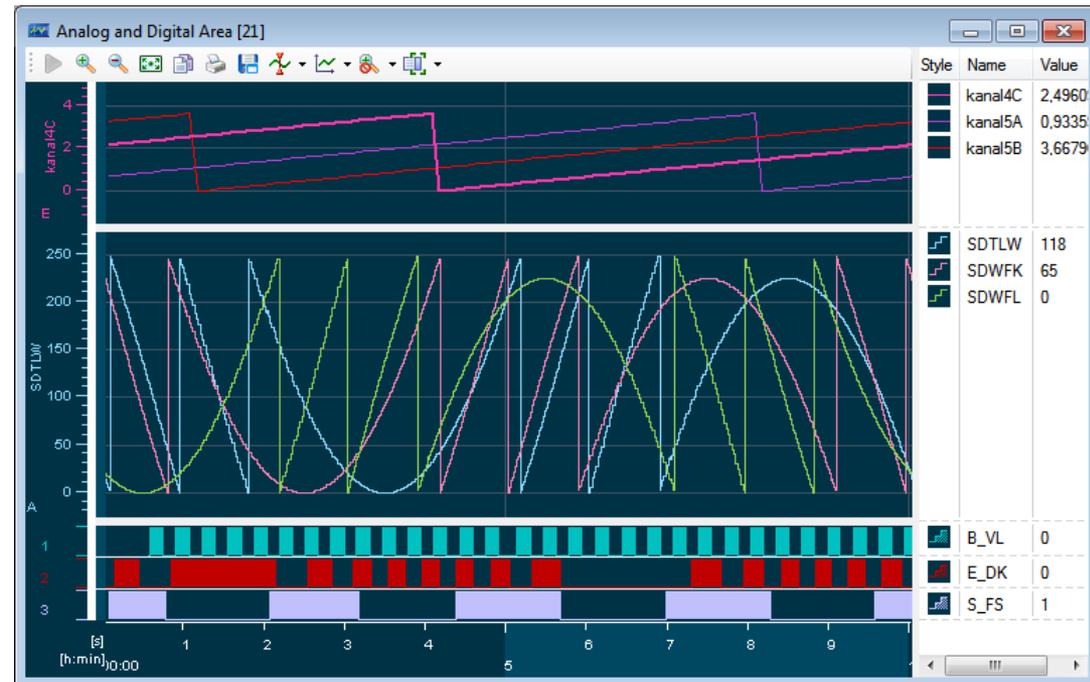
Time Axes							Y Axes									
Axis ID	Axis Text	Span(s)	Background Color	Foreground Color	Background Color 2	Timespan Overlap	Axis ID	Axis Text	Range	Dynamic Axis Adaptation	Background Color	Character Color	X Axis	Axis Unit	Rotation of Text	Axis Position
T1		10.00000					A	FLR_AP	-50.0; 1049.0	Yes			No		15.0	Left
							B	FRPS	-50.0; 1049.0	Yes			No		15.0	Left
							C	kanal2B	-0.20; 4.10	Yes			No		15.0	Left



## Improved readability for digital signals “Booleans”

- Oscilloscope manages “Analog Area” and “Digital Area”
- Automatic assignment of signals according to signal definitions in A2L file
- Manual shift of signal into other area is possible
- Special features in digital area
  - Just one signal per strip
  - Axis range limited to 0 - 1
  - By default filled signal curve
- Size of areas can be set by user
- Icons for better identification of variable types and line styles

-  Float signal, thin curve
-  Float signal, thick curve
-  Integer, Enumeration, Digital
-  Filled curve (from 0 to current value)



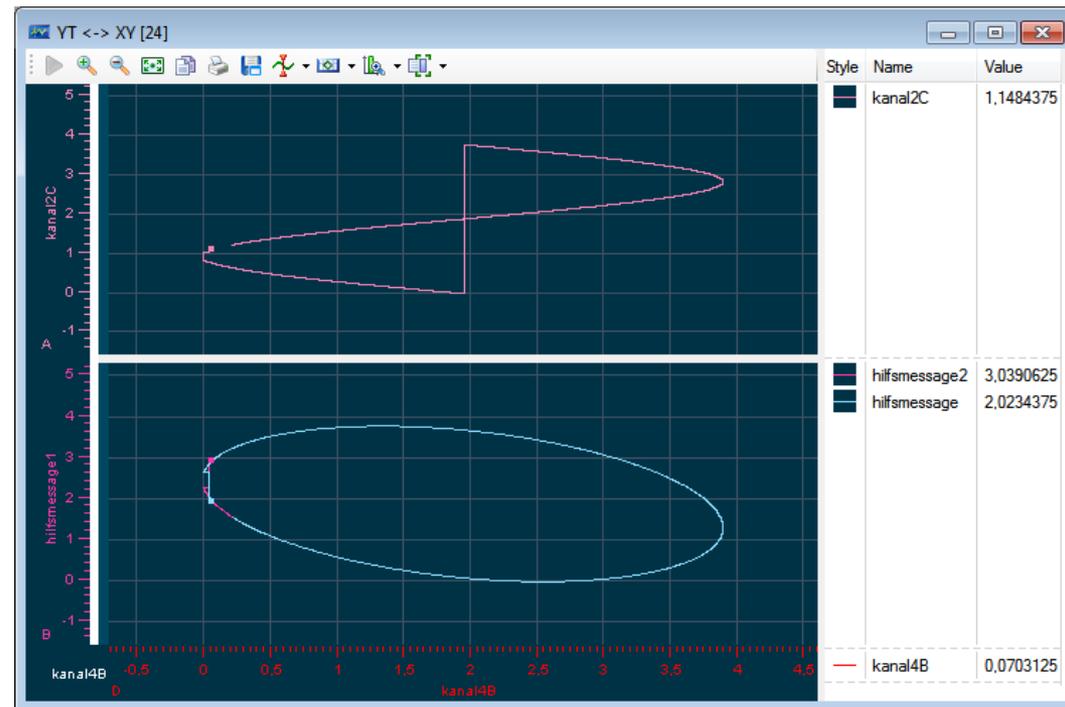


### Oscilloscope supports display over time “YT mode” as well as along a separate variable “XY mode”

- Besides the usual INCA possibilities, a switch from YT to XY oscilloscope is supported by drag&drop of the respective signal onto the time axis, or by selecting XY mode on icon bar

#### Note:

In XY mode only direct connection between data samples is possible. For variable having discrete values (like Enumerations, Booleans) no sample connection is possible

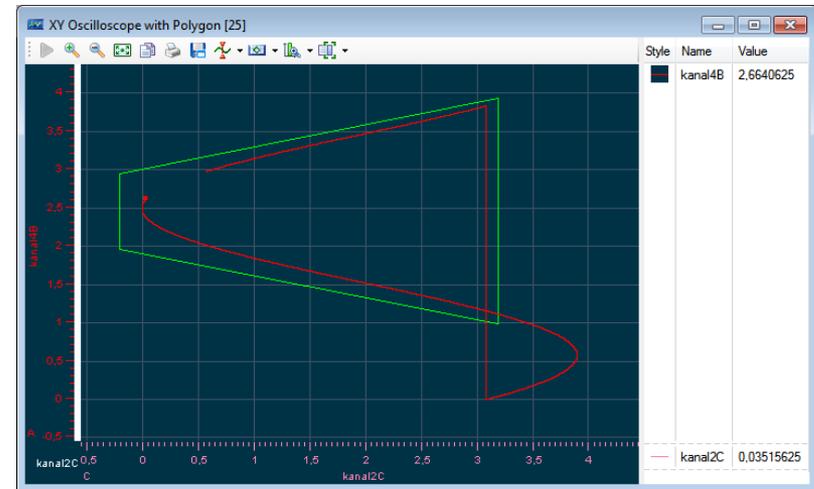
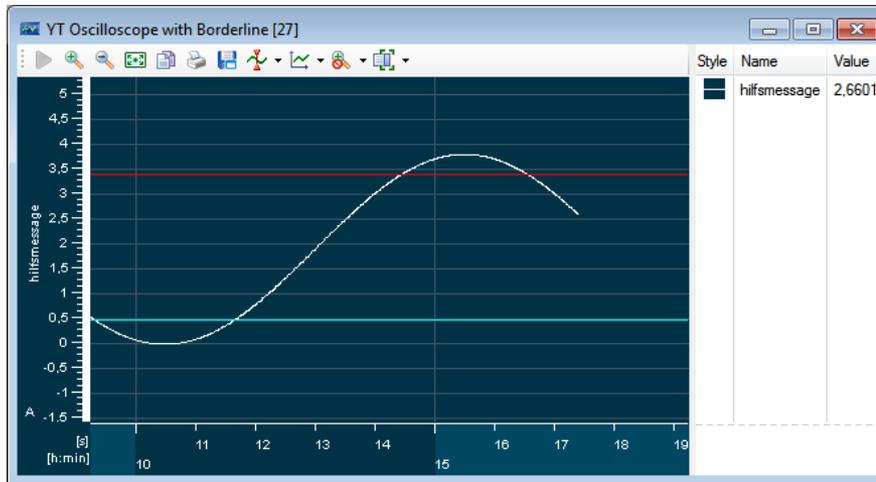




Behavior of signal values relative to a (fix) threshold “Borders”

– YT oscilloscope: horizontal border lines exclusively

– XY oscilloscope: horizontal, vertical, and polygonal border lines



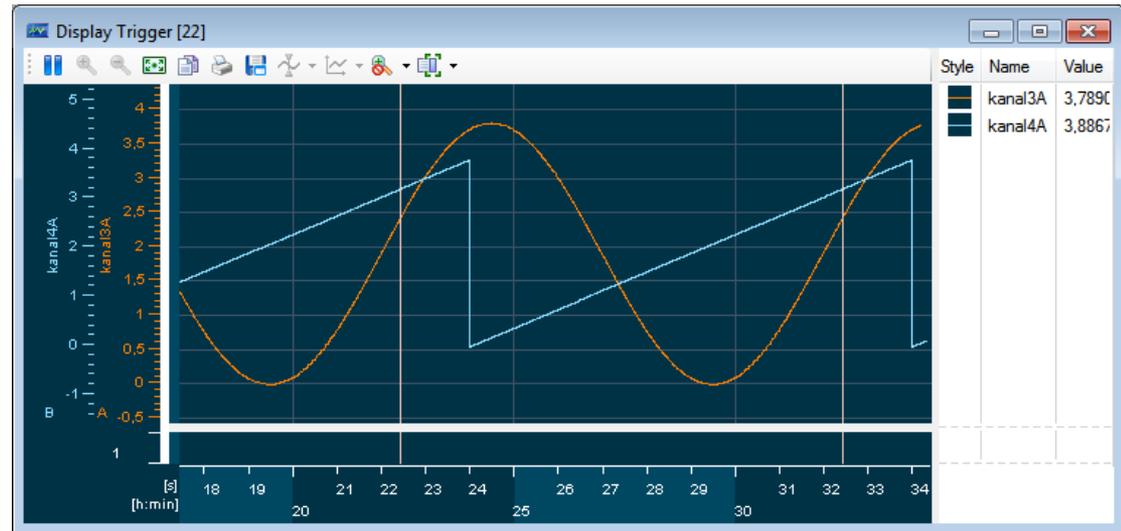
– Border line definition is done within VSD – Display Configuration

Border Lines						
Border Name	Type	Axis	Value	Color	Line Width	Visible
Border 1	Polygon	X: A	see Table	Green	Thin	Yes
Border 2	Horizontal Line	A	5	Red	Thin	No
Border 3	Vertical Line	X-A	1	Yellow	Thin	No



### Oscilloscope display can be started depending on a specific event

- All variables displayed in one YT or XY oscilloscope are selectable as input
- Simple conditions can be used directly in Display Configuration for trigger definition
- More complex conditions can be created by using Calculated Signals
- Repetitive triggering supported
- Analyzing Mode supported



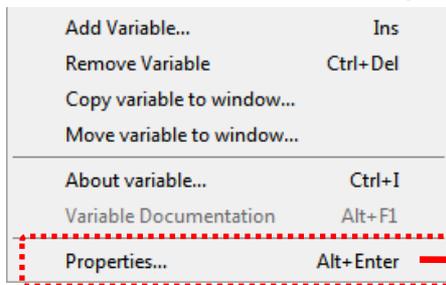
Display Trigger							
Name	Trigger Signal	Operator	Threshold	Pre trigger time [s]	Post trigger time [s]	Repetitive	
DisplayTrigger [22]	kanal3A	Rising edge	2.5	5.0	12.0	Yes	

Note: Display trigger definitions of oscilloscopes used in former INCA versions are not be migrated automatically for technical reasons.



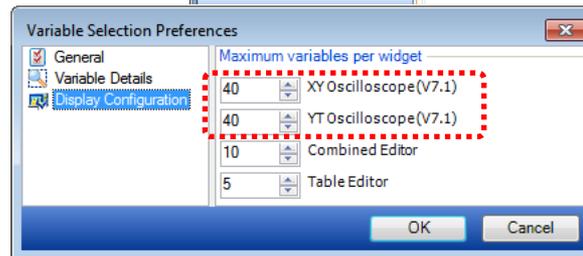
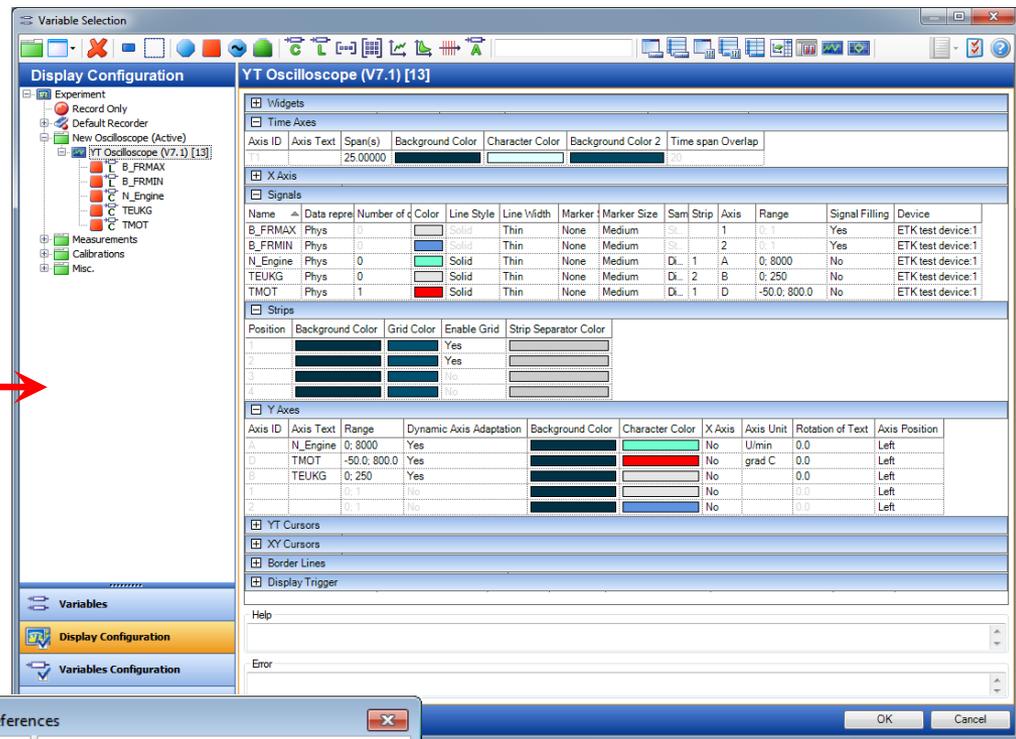
### Central place for all configuration settings

- Display Configuration is accessible via context menu entry 'Properties'



- General settings can be predefined within INCA User Options

- VSD preferences  allow to set default value for number of signals per oscilloscope





### Compatibility Table

	Experiment supporting new Oscilloscopes (V7.1)	Experiments supporting 'Outdated' Oscilloscopes
<b>INCA V7.1</b>	Complete usage of all new oscilloscope features. 	Only 'outdated' oscilloscopes can be used. Updating to new oscilloscopes possible at first start of experiment or later by starting conversion manually. Creation of a backup experiment is created. 
<b>INCA V7.0 and former versions</b>	Experiments are "[undefined]" resp. can not be imported. Experiment must be converted independent whether oscilloscopes are contained or not. Oscilloscopes will be replaced by measure tables. Conversion to be done in INCA V7.1.	Only Experiments supporting the 'outdated' oscilloscopes can be used.

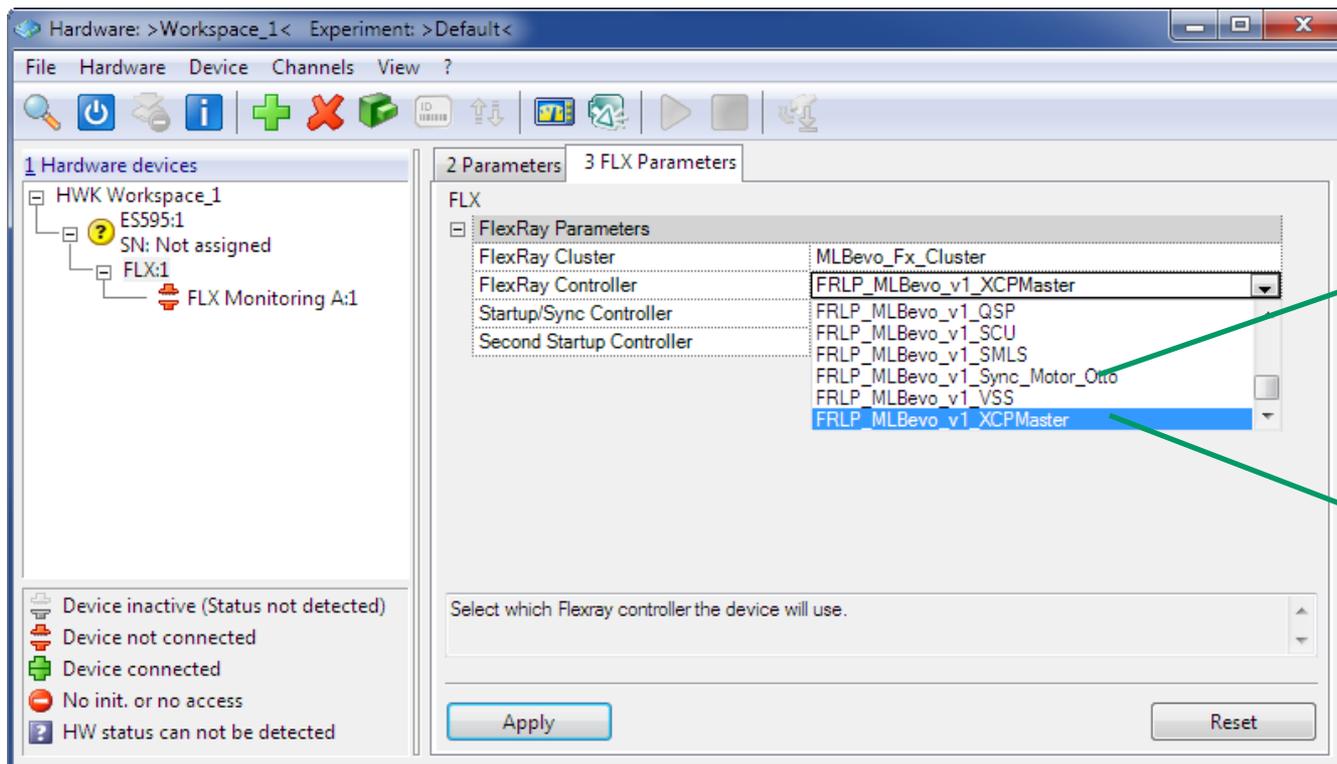
- Different Experiment Icons to represent used oscilloscope technology
- User option to define preferred technology for oscilloscopes
- 'Outdated' oscilloscopes will be converted upwards without loss \*

\* Exception: Display Trigger definition is not converted from 'outdated' to V7.1



## FlexRay controller selection dialog as in INCA V7.1

- 1) The default selection is a controller with „XCP“ in its name
- 2) The selected controller does **not** contain any STARTUP or SYNC functionality



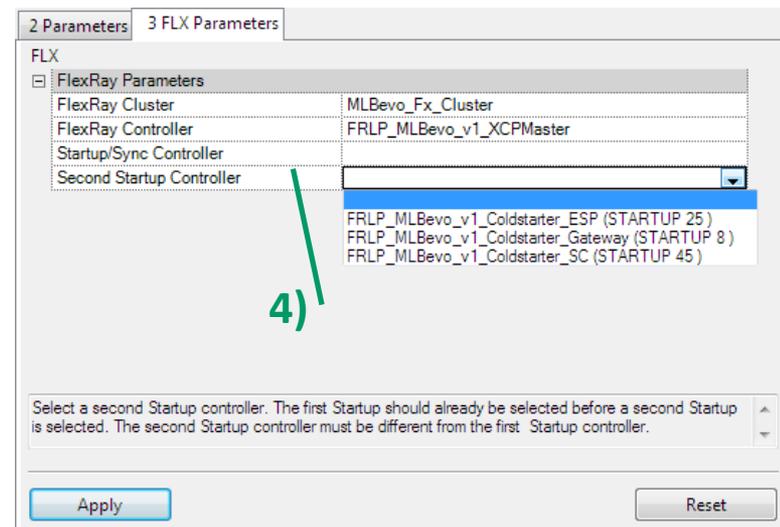
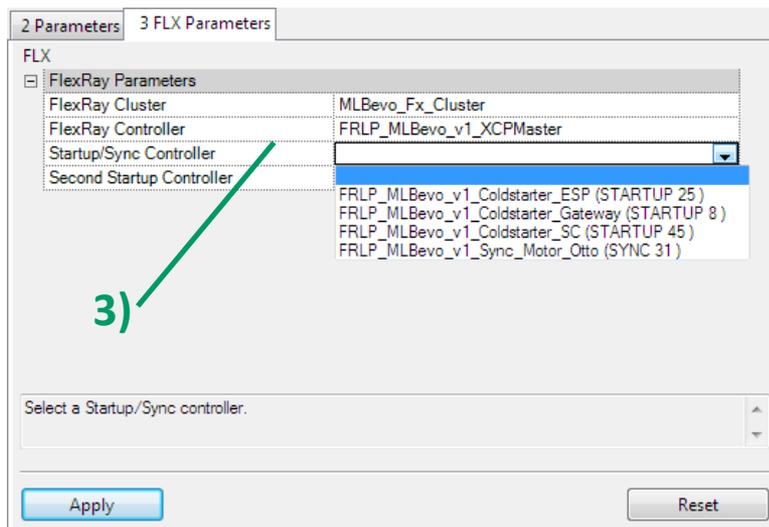


## FlexRay controller selection dialog as in INCA V7.1

**3)** For the STARTUP/SYNC feature, the user can independently select another controller

**4)** The ES595 is capable of making a second STARTUP. In this case an additional controller can be selected

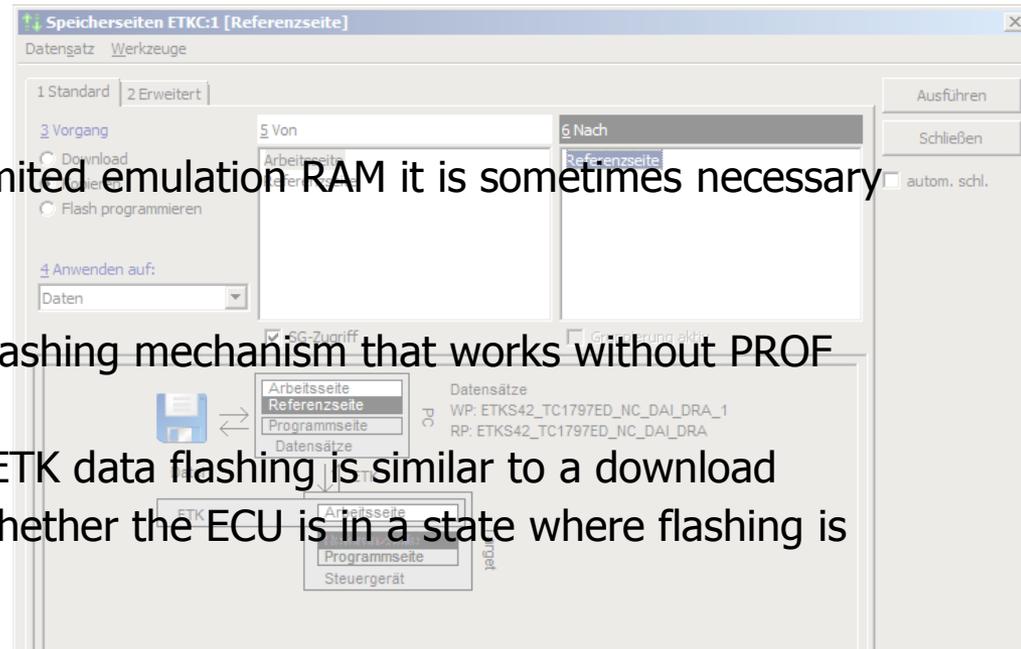
The second STARTUP property is not visible for other systems (E.g. ES520), but could easily be activated if the system supports a second startup



### Data Freeze

When the ECU supports only limited emulation RAM it is sometimes necessary to freeze (flash) the data

- INCA supports an ETK data flashing mechanism that works without PROF configuration
- For the user the handling of ETK data flashing is similar to a download
- INCA does upfront a check whether the ECU is in a state where flashing is allowed

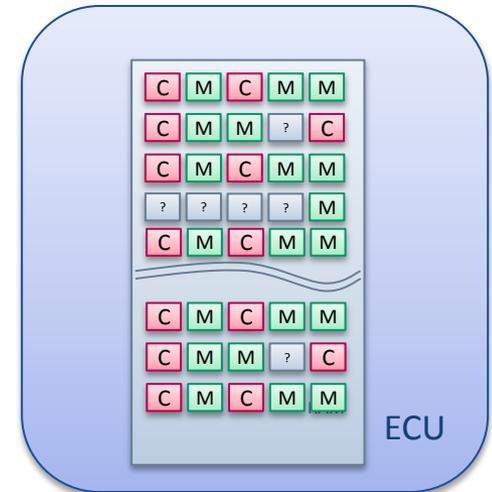


**INCA supports now ECUs with the following characteristic**

- Measurements and calibrations are mixed up in RAM
- No checksum for calibrations is possible / implemented
- No paging is implemented

**INCA is able to handle ECUs without memory segments  
INCA can handle DS with “unknown calibration values”****The following use cases are supported:**

- ECU coming with A2L  
(user starts with the data from the ECU)
- ECU coming with A2L and data file containing all calibrations (HEX, DCM, ....)
- ECU coming with A2L and data file containing a subset of all calibrations (HEX, DCM, ....)



## 4-byte memory addresses and 2-byte length keys

KWP2000 on CAN measurement in INCA makes use of the readMemoryByAddress service of the KWP2000 protocol. The service needs to be parameterized with an ECU memory address and the number of bytes to be read (address and length parameter).

- Additionally to ECU that need 3-byte memory addresses and 1 byte length key parameters INCA now supports ECUs that require 4-byte memory addresses and 2-byte length keys!

## How to switch between 3-byte and 4-byte measurement mode?

Use the parameter "KWP2000\_DIA" in the "ETASShared11\Devices\KWP2000\kwp2000.cnf" file:

- For 4-byte measurement:

```
KWP2000_DIA:,          KWP_4BytesMemAddr;
```

- For 3 byte measurement (default):

```
KWP2000_DIA:,          KWP2000;
```

## XCP on Ethernet Flashing

- The ProF control flow language is extended by the new services. Each service is usable with a dedicated ProF control flow command.

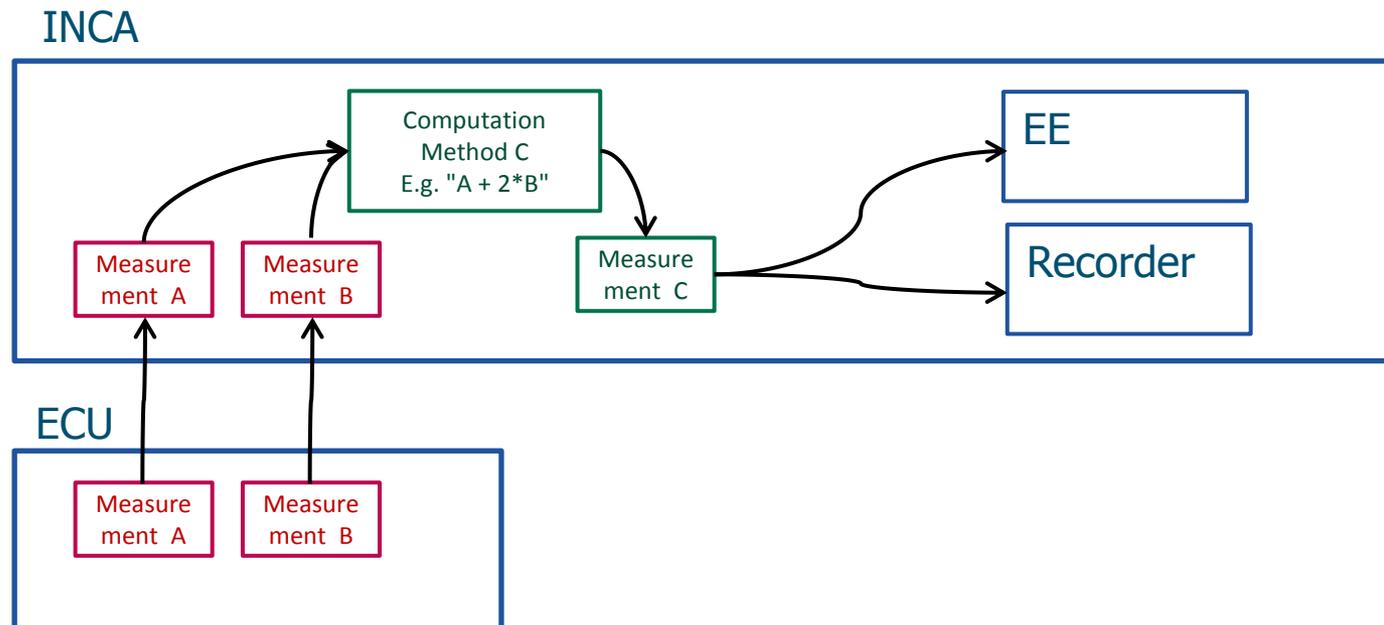
## XCP Flashing Timeout

- Adapt the timeout for XCP manually in the ProF user interface.
  - Useful when the ECU needs more time to clear memory than stated in the description. (The XCP specification is limited to 65535ms)



### Virtual Measurements

- With virtual measurements ASAP2 describes a possibility to calculate measure values dependent on one or more inputs. The virtual result is only available in the MC tool, not in the ECU.
- INCA allows the user to use the virtual measurement in the same way as "normal" measurements for recording or input in other calculations



- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - **Standards**
  - Usability
  - HW support
  - Add-ons
- INCA Product Family
- Phase out information
- General Notes

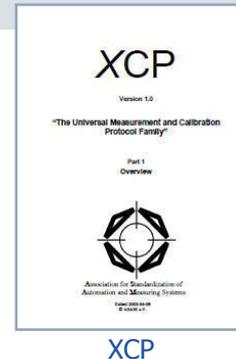


## Fibex 3.x for XCP on Flexray and Flexray monitoring

- Reading Fibex XML files into the INCA database
- MC with XCP on Flexray with Fibex bus description files
- Flexray monitoring with Fibex bus description files

From usability point of view there is no change to the current behavior





### Supported XCP1.1 Features

- **WRITE\_DAQ\_MULTIPLE** write multiple ODTs to a single DAQ.  
Used with Transport Layers that allow Payloads (MAX\_CTO > 10)
- **EV\_TIME\_SYNC** Transfer Externally Triggered Time stamp. Slave sends current timestamp
- **SLEEP** mode (Enter and leave sleep)
- **TIMESTAMP\_MODE** new resolution in GET\_DAQ\_RESOLUTION\_INFO (1PS, 10PS, 100PS)
- **ERR\_RESOURCE\_TEMPORARY\_NOT\_AVAILABLE** New ECU event response
- **Multiple Transport Layer Instances**

### Supported XCP1.2 Features:

- **DYNAMIC\_DAQ** raster check

### Partially supported features:

- **GET\_DAQ\_ID** (SET\_DAQ\_ID is not supported)

Current Dynamic DAQ does not have a raster check

Limit determined by ECU online based on

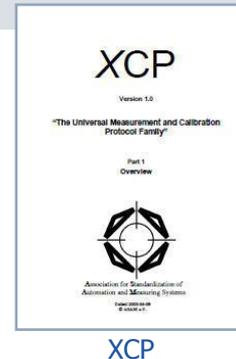
- (1) ECU memory consumption
- (2) ECU CPU load
- (3) Busload (mainly for CAN buses)

Offline Raster check implemented in INCA V7.1.0

– Based on XCP V1.2 standard

Factors and limits are added to a2I file

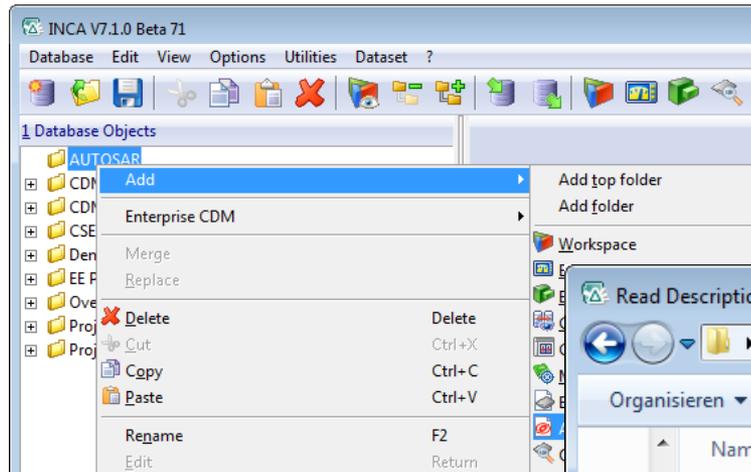
- Added to IF\_DATA XCPplus
- Raster check is calculated offline
- Even if the ECU is online the offline raster check is used in INCA



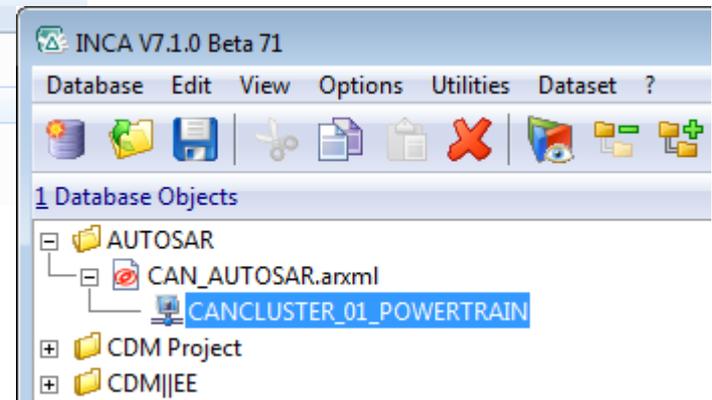
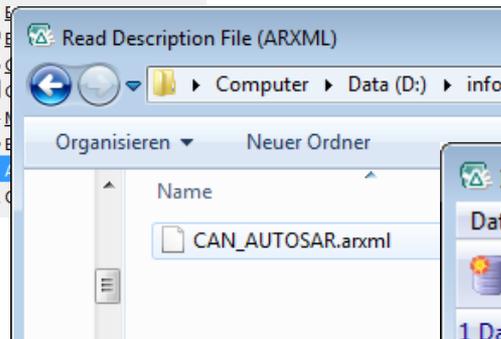


## AUTOSAR System Template

INCA accepts Can Bus descriptions descriptions of AUTOSAR

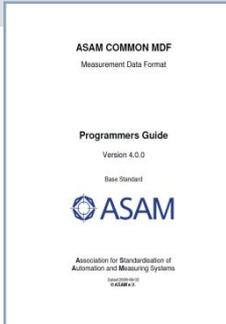
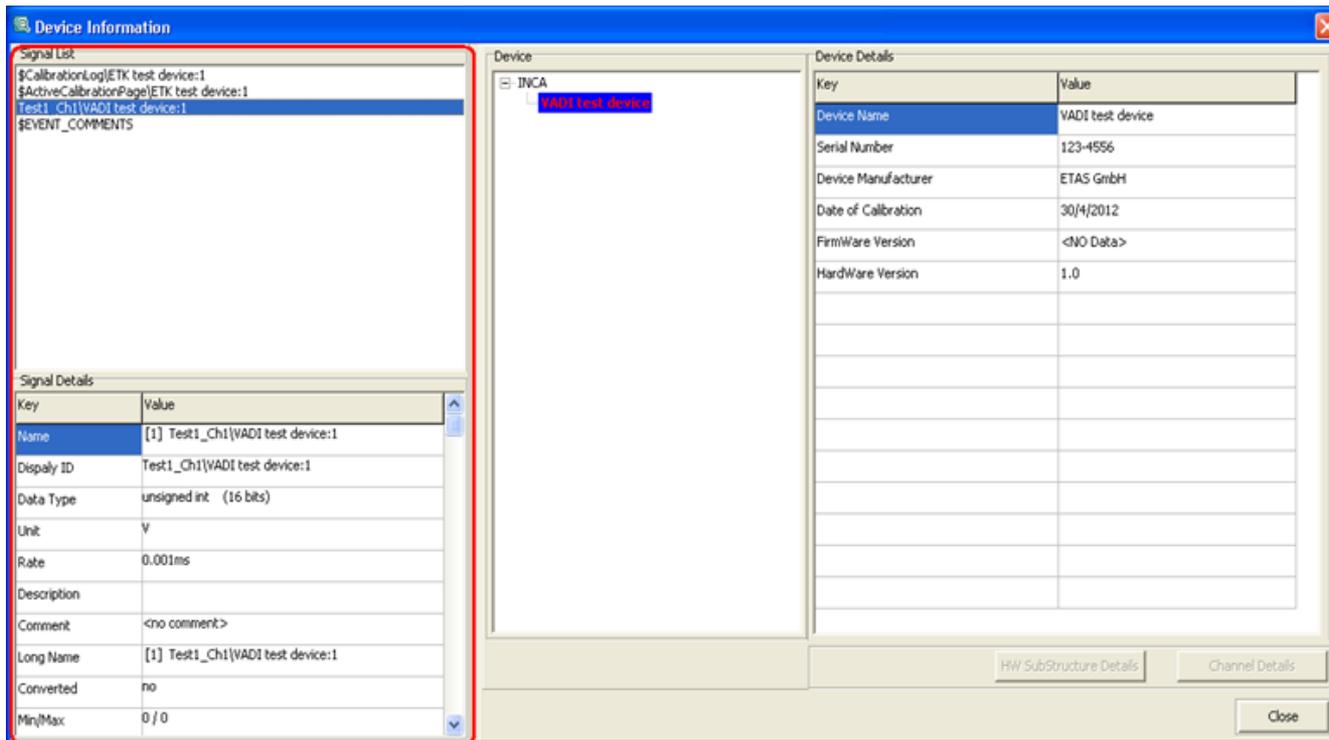


INCA extracts all CAN cluster and imports it in the INCA database



## Supported MDF V4.1 Features

- storing **Device Information** about the measurement environment



MDF

- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - Standards
  - **Usability**
  - HW support
  - Add-ons
- INCA Product Family
- Phase out information
- General Notes



## Video Tutorials

Learn INCA functionality by short video presentations

- Variable Selection Dialog (VSD)
- Recorder Configuration
- Trigger Configuration
- Experiment Preview in DBM
- Export / Import
- Oscilloscope V7.1
- Calibrations Scenario Editor (CSE)
- MDA



Product Family / Category	Product / Topic	Type	Title	Date
INCA	All	Webinars / Video	<a href="#">Webinar: CaliAV - Guided Calibration for INCA</a>	03/02/2012
INCA	INCA V7.0	Webinars / Video	<a href="#">INCA Recorder Manager - Recorder Configuration</a>	10/05/2011
INCA	INCA V7.0	Webinars / Video	<a href="#">INCA Recorder Manager - Trigger Configuration</a>	10/05/2011
INCA	INCA V7.0	Webinars / Video	<a href="#">Introduction to the INCA Variable Selection and Experiment Configuration Dialog</a>	12/21/2010

4 Documents

1

## Distribution Channels

- Internet: [www.etas.com](http://www.etas.com) -> Download center -> INCA & Webinar/Videos
- Internet: [www.youtube.com](http://www.youtube.com) -> search for etasgroup
- INCA DVD





### “About Variable” includes information about the Functional Version

- Representation of the A2L description to which functions a variable belongs

About Variable - ALIGN.KL\_ALTX\_xU16\_wU8\_aLN111\CDMT [CDMT\_1]

ALIGN.KL\_ALTX\_xU16\_wU8\_aLN111\CDMT [CDMT\_1]

About

Wichtungsfaktor fuer Kennfeldinterpolation  
1.0 \* hex  
f(hex) = -----  
256.410256410256

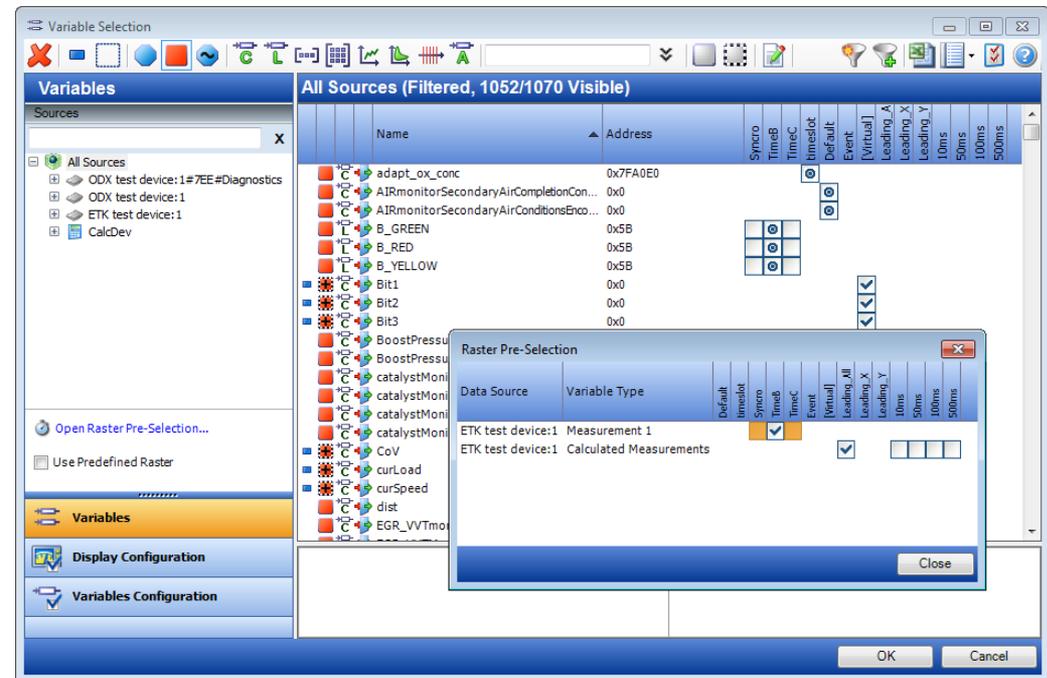
x: ALIGN.KL\_ALTX\_xU16\_wU8\_aLN111\CDMT [CDMT\_1]  
-50.0 + 1.0 \* hex  
f(hex) = -----  
1.0

Property	Value
Address	0x844500
Byte order	MSB_LAST
Dataset	CDMT_1
Defining Function	Function_ALIGN (GF02.12.04)
Functions	Function_KL_ALTX_xU16_wU8_aLN111 (GF02.12.04) Function_AAAAALL_SUBS (GF02.12.04) Function_ALIGN (GF02.12.04)
Groups	Group__ALIX Group__CHAR_TYPES Group__wU8 Group__CURVE Group__xU16
Longname	Wichtungsfaktor fuer Kennfeldinterpolation
Name	ALIGN.KL_ALTX_xU16_wU8_aLN111\CDMT [CDMT_1]
Project	CDMT
Size	5 [ 11]
Values bounds (hard)	[0.0000...0.9945] / [0h...FFh]

OK

### Raster Preselect and Predefined Raster are stored with the experiment

- Saved per HW device
- When mapping of HW and raster is done, this is also applied for the Raster Preselect
- Settings can be exported with the experiment
- If multi-raster option was set, but is not active on target system default raster will be selected





### **Window names and indexes are handled in VSD and EE**

- For unique names, an index is added to the default name
- Indexing is independent for measure windows, calibration windows, and customer instruments
- Next available number is taken, gaps are not filled

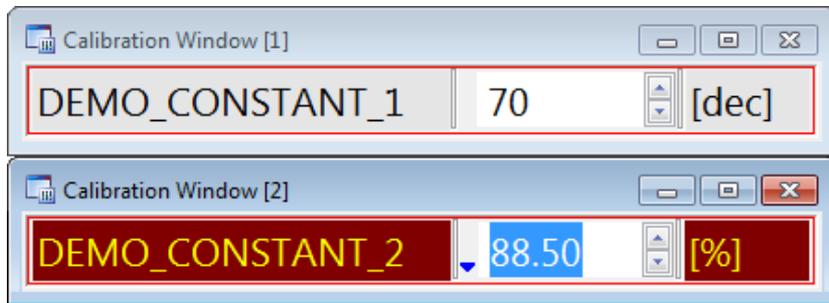
### **Window name is defined when creating the window**

- A change of the window type does not effect the window name
- When copying a window, the pasted window will keep the name plus the next available index

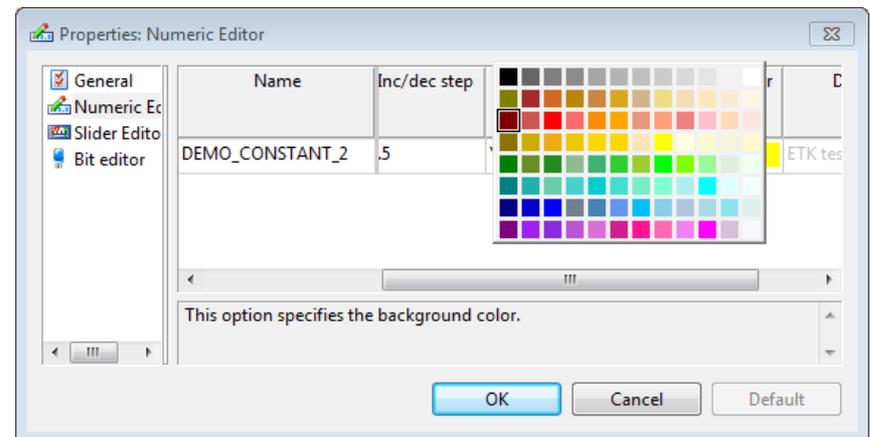


### User defined colors for Parameters

For better organization and readability INCA allows individual colors for the scalar parameters.



The colors for background- and text color can be selected in the editor properties



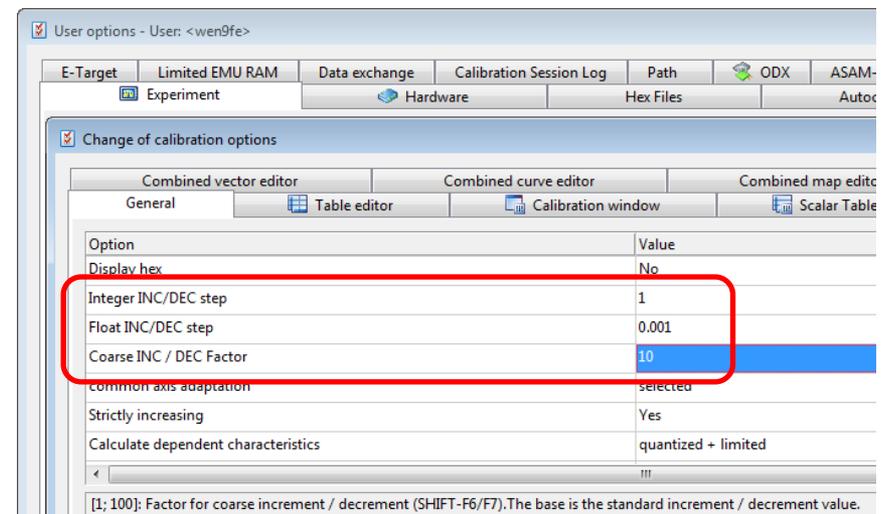


## Fine Calibration by means of F6 / F7

- For manual calibration INCA supports the hotkeys F6 / F7 to decrement or increment the value

## Coarse Calibration via SHIFT F6 / SHIFT F7

- To be able to do also coarse calibration INCA supports additionally the hotkey combinations SHIFT F6 / SHIFT F7 that decrements or increments the value by default 10 times
- INCA allows to adapt the decrements and increments steps by option





## Show or hide Unit

- New setting for Measure Table and Scalar Table to hide Unit column
  - Offered as Global User Option and in Table Properties
- Saves space e.g. in case no unit information is given for measurements
- In a table only the complete column can be shown or hidden

Measure table [3]	Value	Unit
anoU_ADF	-	[mV]
anoU_ADF	-	[mV]
counter1_u8	-	[]
N	-	[Ump]
N_EQUATION665	-	[Index]
N_ident	-	[]
MSA15.N_mS8_IN	-	[Ump]
MSA15.TMOT_mU8_IN	-	[øC]
N_S8	-	[Ump]
TEST_MEASUREMENT	-	[]
TL_EQUATION785	-	[RPM]
TL	-	[ms/Umdr.]
TMOT	-	[øC]
TMOT_ident	-	[]
VTAB_U8	-	[]

Properties: Measure table

Option	Value
Window title	Measure table
Show unit	Yes
	Yes
	No

This option specifies whether the unit is shown or not.

OK Cancel Default

Adjust measure options

Option	Value
Show unit	Yes
Sorting	No
Font used within the measure table	Segoe UI, Standard, 12

This option specifies whether the unit is shown or not.

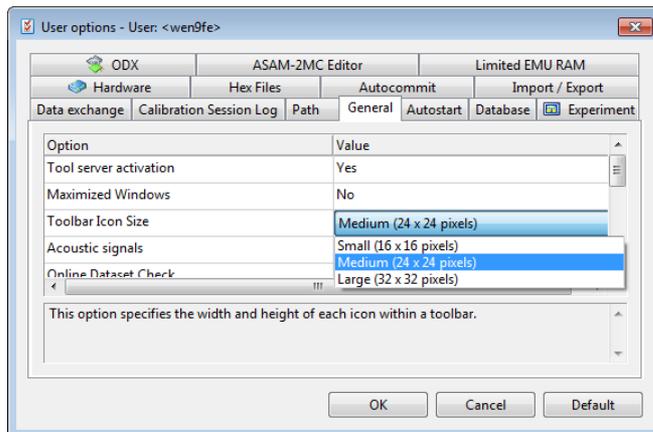
OK Cancel Default

Measure table [3]	Value	Unit
anoU_ADF	-	-
anoU_ADF	-	-
counter1_u8	-	-
N	-	-
N_EQUATION665	-	-
N_ident	-	-
MSA15.N_mS8_IN	-	-
MSA15.TMOT_mU8_IN	-	-
N_S8	-	-
TEST_MEASUREMENT	-	-
TL_EQUATION785	-	-
TL	-	-
TMOT	-	-
TMOT_ident	-	-
VTAB_U8	-	-

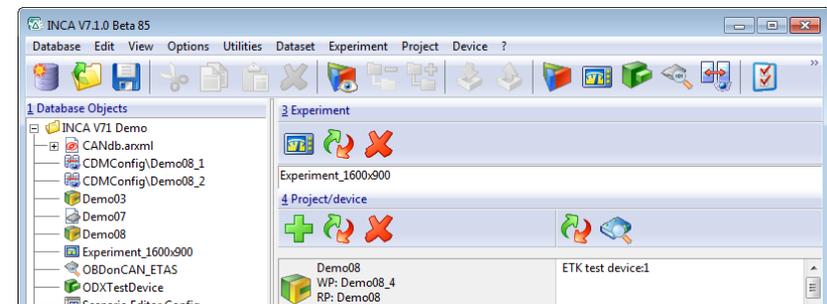
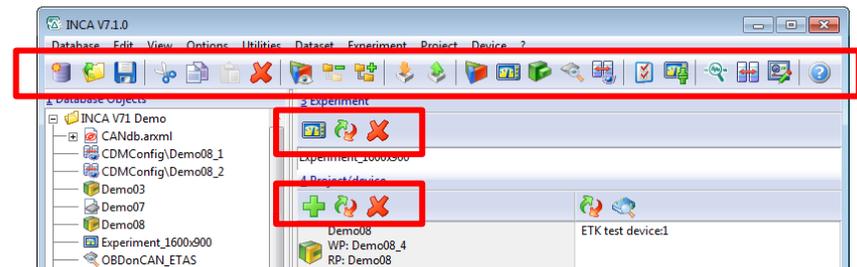
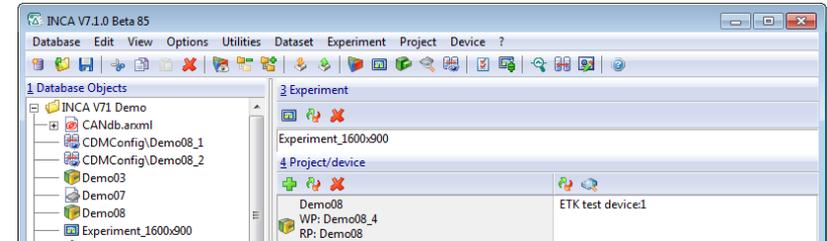


### Icon Size

- User can select preferred icon size
- Settings effects
  - Icons in toolbars of DBM, HWC, EE, CDM, ASAP2 Editor, VUI Editor, ...
  - Action icons in DBM



Hint: Icon size for the new oscilloscopes can be set by an independent user option





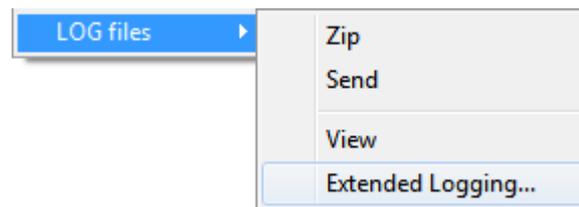
## Better Support in case of SW Issues

The improved Walkback Dialog pops up whenever an unhandled exception occurs in the software. Continue working is no longer 100% sure.

### New Walkback Dialog

- Ensure a safe working environment
- Backup of open work items
- Reduce the number of requested user interactions
- Provide more detailed information

New menu entry under  for instructions how to run “Extended Logging”

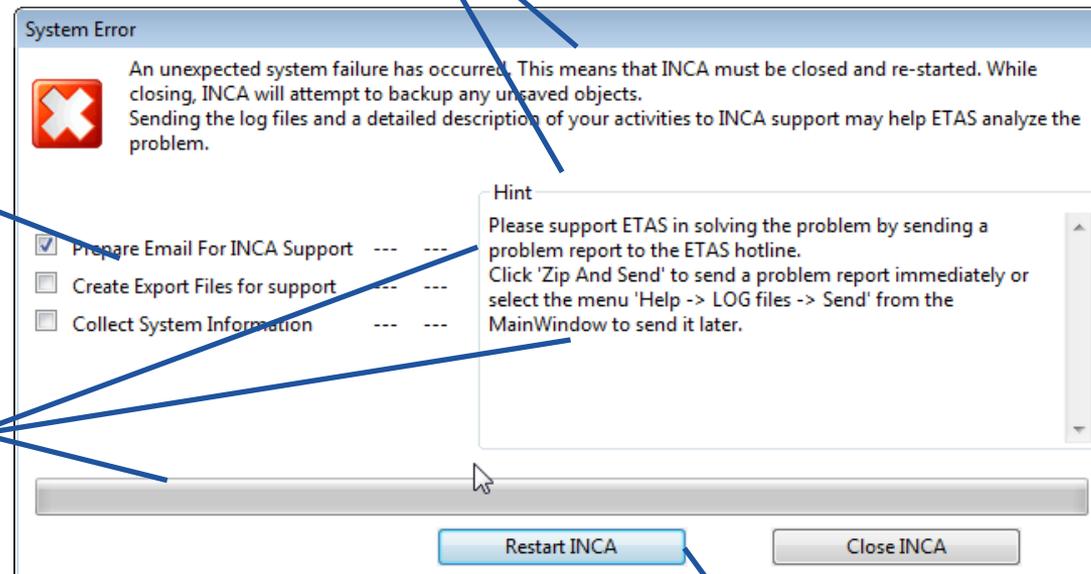




More detailed information what happened, and about the meaning of the options

Options to inform ETAS support, and to create and send INCA export files

Progress and status information



Automatic restart of INCA

- When closing INCA unsaved experiments and data exchange files are stored as separate auto-backups
- After Restart indication of saved objects is done
- In case of remote access, INCA warns to close remote access first

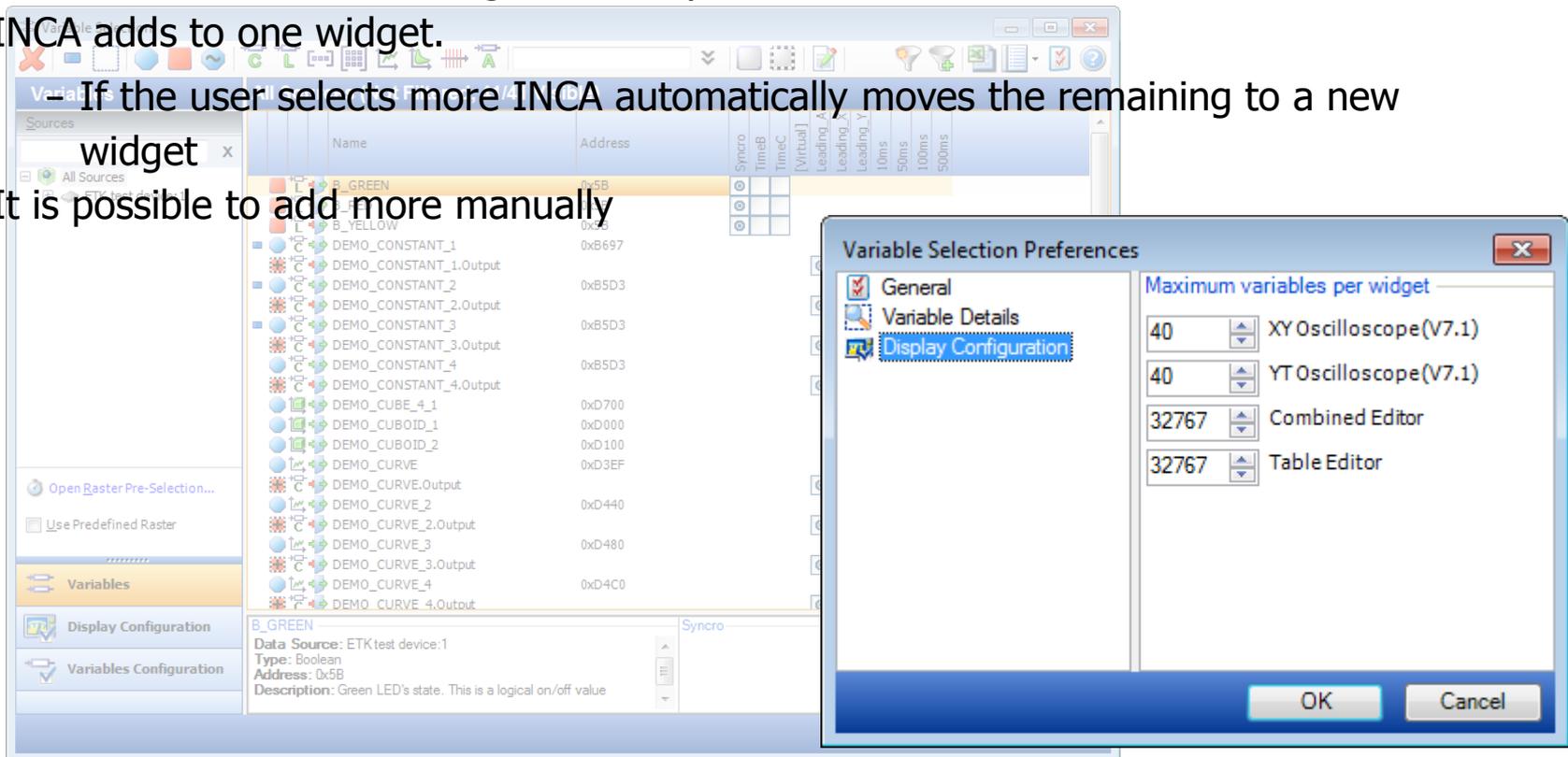


### Restrict the number of labels added automatically to one widget

- The Variable Selection Dialog allows to predefine the maximum number of labels INCA adds to one widget.

– If the user selects more INCA automatically moves the remaining to a new widget

- It is possible to add more manually



- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - Standards
  - Usability
  - **HW support**
  - Add-ons
- INCA Product Family
- Phase out information
- General Notes



### Kvaser modules

- Kvaser Leaf Professional HS (1xCAN)
- Kvaser USB Professional HS (2xCAN)
- Kvaser Memorator Professional HS (1xCAN)

Usage of the modules is locked by enable bits. Can be ordered at ETAS.



**Kvaser Leaf Professional HS**



**Kvaser USB Professional HS**



**Kvaser Memorator Professional HS**

Solution is backported to INCA V6.2.1 and INCA V7.0



### Vector VN16xx modules

- VN1610 - CAN to USB (2xCAN)
- VN1611 - CAN to USB (1xCAN, 1xLIN)
- VN1630 - 2xCAN or LIN Piggies
- VN1640 - 4xCAN or LIN Piggies

Usage of the modules is locked by enable bits, and no backport is planned





## Vector VN8900 modules

- VN8910 – Basis Module
- VN8950 – Plugin Module
- VN8970 – Plugin Module

VN8950 – 4 channel CAN/LIN  
(e.g.: 2xCAN & 2xLIN or  
3xCAN & 1xLIN etc.)

VN8970 – 8 channel FLX/CAN/LIN  
(e.g.: 1xFLX & 6xCAN or  
1xFLX & 1xCAN & 1xLIN or  
6xCAN & 2xLIN etc.)



Serial number mapping and search for hardware are supported. The usage of the modules is locked by enable bits



## Flexible I/O Module

### – ES930 Multi I/O device

#### – Input channels

- 4 x Thermo
- 8 x Analog Input
- 4 x Digital Input

#### – Output channels

- 4 x Analog Outputs
- 6 x Digital Outputs controlling:
  - 6 x Power Switches @ max. 5 A
  - 4 x Sensor Supply Output
  - 2 x user programmable LEDs





## Micro Measurement

- ES415 A/D Measurement Module
  - 4 Channel A/D
  - 100kHz sampling rate
  - Sensor power supply
  - Automatic cable and sensor configuration (TEDS)



	Feature	Characteristics
Mechanical	Dimensions (HxWxD)	51 x 40 x 139 mm / 2.0 x 1.6 x 5.5 in (front) 31 x 40 x 139 mm / 1.5 x 1.6 x 5.5 in (rear)
	Weight	350 g / 0.77 lb
Environment	Temperature range	- 40 °C ... 125 °C / -40 °F ... 248 °F
	Protection class	IP67
Power supply	Operating voltage	5 V ... 50 V DC
Sensor interface	Channels	4x with Sensor Supply
	Input voltage ranges	± 100 mV, ± 1 V, ± 10 V, ± 60 V
	Input resolution	16 bit
	Sampling rate	0,5 samples / s ... 100k samples / s (configurable per ch.)
	Filter	Anti-aliasing hardware (low-pass) filter Anti-aliasing digital filter with CIC 2nd order characteristic
	Sensor power supply	5 V ... 15 V / 30 mA (configurable per ch.)
	Sensor configuration	Optionally by Transducer Data Sheet (TEDS IEE 1451.4)
Host interface	Connection	100 Mbit/s Base-T Ethernet
	Protocol	XCP on UDP/IP

Support of ES415 will be available for INCA V7.0 as well

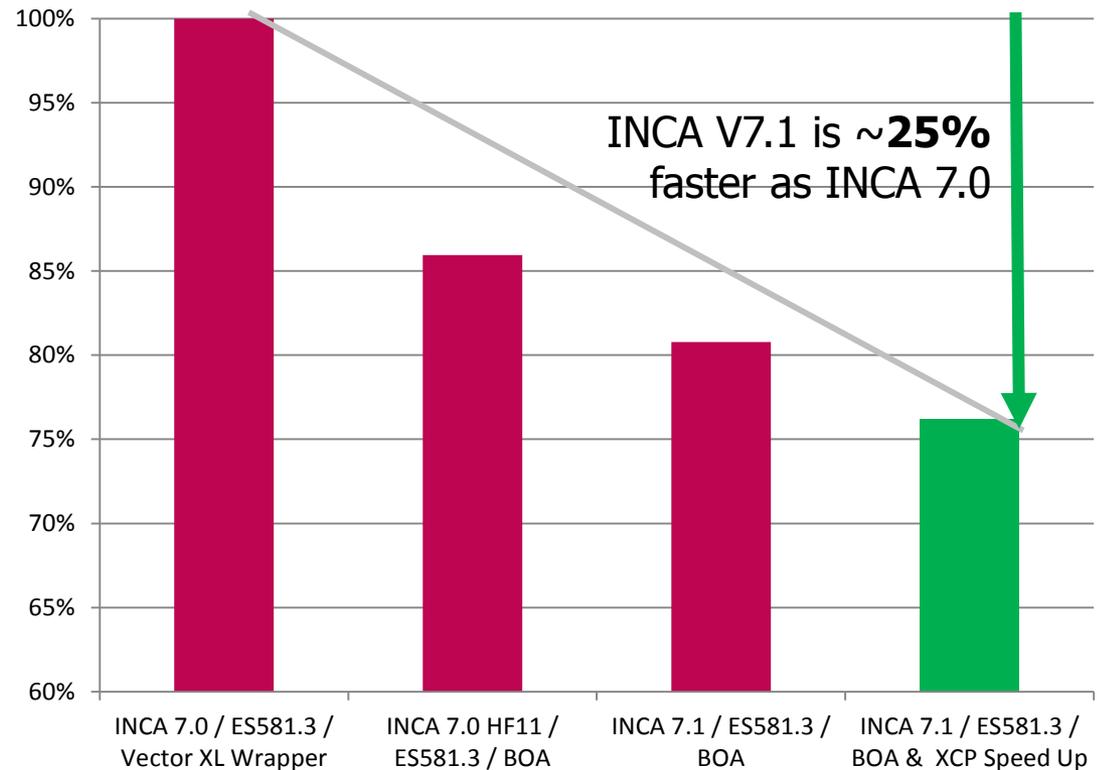


The performance of XCP operations involving upload and download commands in INCA is optimized.

**Handshake communication is transferred to the device firmware.**

The performance is improved for the following actions

1. Upload and download of data
2. Checksum calculation
3. Flashing



### Performance improvement – XCP Handshake mode

M9U: ME9u\_AML\_1\_2\_SerialProtocols / XCPonCAN\_M9U\_1.1 (V1.1)\* / tag\_20110215\_A\_MCE\_requirements\_KWP\_UDS\_counter



**New Baudrates:**  
**800.000 Baud**  
**666.666 Baud**  
**50.000 Baud**

**The following ETAS hardware will support the new baudrates:**

ES511, ES592, ES593, ES595, ES910.2, ES910.3, ES921, ES580, ES581, ES520

**The following ETAS hardware will not support the new Baudrates:**

ES690, ES590 and ES1222.

This is a technical limitation and cannot be solved without a hardware change to the devices.



Solution backported  
to INCA V7.0

- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - Standards
  - Usability
  - HW support
  - **Add-ons**
- INCA Product Family
- Phase out information
- General Notes



## INCA HWI-DK Hardware Integration Development Kit.

Software Development Kit to create Hardware Drivers for Integration of 3rd Party hardware in INCA.

**INCA HWI-DK  
replaces OHI SDK**

### Use cases of HWI-DK

- Development of bus controller drivers (OCD) for accessing CAN/LIN/FLX bus hardware
- Development of ASAP1b drivers for accessing a bus device hardware
- Development of ASAP1b drivers for accessing general measurement hardware

### Components of INCA HWI-DK:

1. HWC.DK (Driver Config. + Examples)
2. ASAP1b.DK (Drivers + Examples)
3. OCD.DK (Driver Framework, Drivers + Examples)



## INCA-MCE iLinkRT Interface

Extended by methods to read out axis points

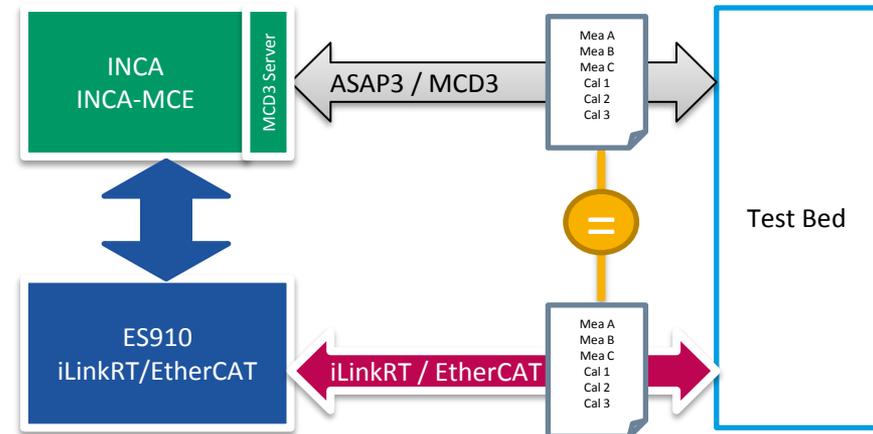
- Enables partial calibration of Curve/Map at dedicated axis points

	x	y	Process point ?	Process point ?
760	1480	2000	2480	3000
1.00	2.25	3.75	3.75	6.00
2.20	0.00	0.00	0.00	0.75
3.50	0.00	0.00	0.00	0.75
4.80	0.00	0.00	0.00	0.75
5.35	2.25	2.25	3.75	3.75
6.20	2.25	2.25	3.75	3.75

## Automatic selection of all labels

Used by ASAP3/MCD3 for the fast INCA-MCE-Link (iLinkRT or EtherCAT) is available for ASAP3, MCD-3MC V1.0.1, MCD-3MC V2.2

- Simplifies the configuration of INCA-MCE

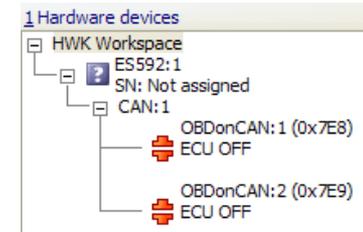




### ODX-LINK V1.5

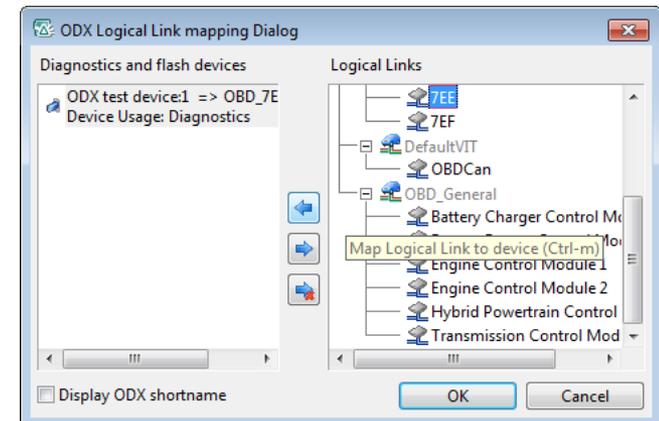
The ODX Project gets part of the INCA Workspace configuration

- Assignment of ODX Project and Logical Links is now done in the HW Configuration Editor and saved in the Workspace
- No ODX Project selection or configuration in the Experiment anymore



### ODX Configuration steps in HWC

1. Create a HW configuration with diagnostic devices ( e.g. OBDonCAN, UDS or KWP2000 devices )
2. Select „Configure ODX“... from the Toolbar or Hardware menu
  - i. Select an ODX Project from the INCA database to be used for the current Workspace
  - ii. Map ODX Logical Links to the available diagnostic devices





## Communication Parameters

ODX-LINK 1.5 can now be used without assigning an A2L file to the diagnostic device

- Communication parameters for UDS or KWP2000 devices are taken from the assigned Logical Link of the ODX Project.
- An A2L file is not required anymore, but it can still be assigned. (In this case A2L is the "master" and ODX communication parameters are ignored)
- The ODX communication parameters must conform to the ISO 22900-1 specification for ODX V2.0.1 ( specifies parameter names, values, units etc. )

## Usage

- When creating a KWP2000 or UDS device in the HW Configuration, just skip the assignment of an A2L file.
- Select an ODX Project for the Workspace and assign a Logical Link to the diagnostic device.



## Automatic Search

- New HWC function for searching connected ECUs that support OBD on CAN
- For each detected ECU, an OBDonCAN device can be added to the HW configuration automatically with correct OBD parameters ( Baudrate and CAN-ID ).
- The user does not need to configure the CAN-ID and Baudrate of the OBDonCAN devices by hand anymore, the Devices are automatically created and configured.
- The actual CAN-ID is displayed in brackets in the device name.

The following OBD ECUs were found.  
Please select those to add to the workspace.

Available HW devices

- ES592
  - SN: 9990010
    - CAN:2
      - OBDonCAN (0x7E8)
      - OBDonCAN (0x7E9)
      - OBDonCAN (0x7EC)

Options

Skip host interface selection on next search.

Hardware: >Workspace< Experiment: >Experiment OBD<

Hardware devices

- HWK Workspace
  - ES592:1
    - SN: 9990010
      - CAN:1
        - OBDonCAN:1 (0x7E8) ECU OFF
        - OBDonCAN:2 (0x7E9) ECU OFF
        - OBDonCAN:3 (0x7EC) ECU OFF

2 Parameters 3 Info 4 ODX Parameters

Option	Value
Name	OBDonCAN:1
Baud rate	500000
OBD use Short CAN-Id	active: Yes
OBD Short CAN-Id	0x7E8
OBD ECU-Id	0x0F

OBDonCAN

OBDonCAN:1

Baud rate: 500000

OBD use Short CAN-Id: active: Yes

OBD Short CAN-Id: 0x7E8

OBD ECU-Id: 0x0F

OBDonCAN

OBDonCAN:1

Baud rate: 500000

OBD use Short CAN-Id: active: Yes

OBD Short CAN-Id: 0x7E8

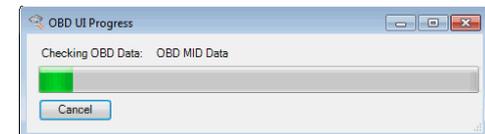
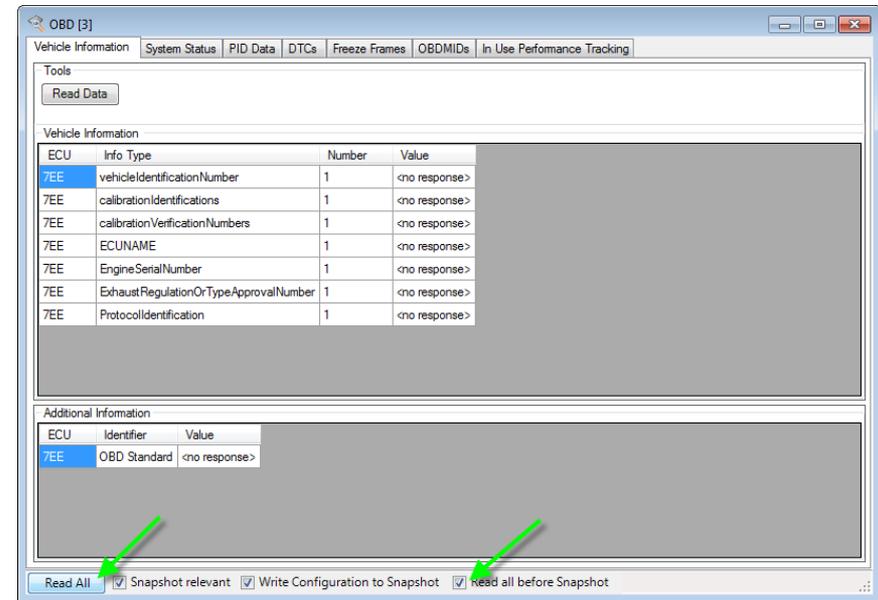
OBD ECU-Id: 0x0F

Apply Reset



## Read All Function

- New functionality of the OBD Window to read all supported OBD data of all connected OBD ECUs with one click on the new “Read All” button.
- All supported PIDs, OBD-MIDs, Monitors, Vehicle Information data, DTCs, etc. are automatically read.
- The Read All function can automatically be executed before performing a Snapshot in order to update all OBD data for the Snapshot ( configured via new checkbox ).
- Since reading all OBD data can take some seconds ( depending on the amount of supported OBD data and number of connected OBD ECUs ), a progress bar is displayed during the update.



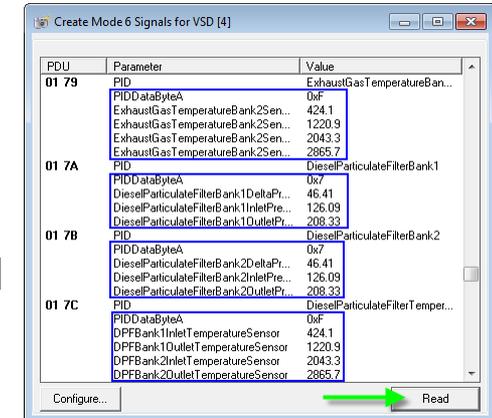
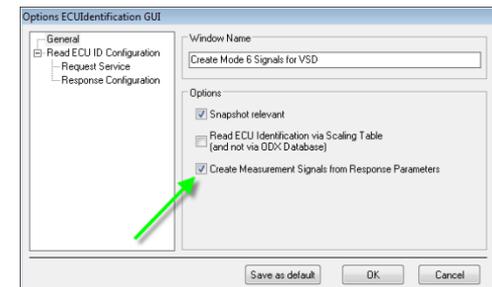


## Creation of Diagnostic Measurement Signals

- INCA and ODX-LINK allows to measure and record OBD data from the ECU with help of the ETAS ODX project for OBDOnCAN devices.
- If customers wanted to measure additional OBD data (e.g. OBD mode 6 data) or if they use their own ODX files (e.g. for UDS or KWP2000), no diagnostic measurement signals were available in the VSD
- With ODX-LINK 1.5, the user can now easily create Diagnostic Measurement Signals for any ODX project (UDS, KWP2000, OBD) within the INCA Experiment:

1. Just activate the creation of measurement signals ODX-LINK windows
2. Select the diagnostic service that requests the data to be added as signals to the VSD
3. Send the service(s) Diagnostic Signals will now be created for each ECU response parameter with physical value
4. Save, close and re-open the Experiment

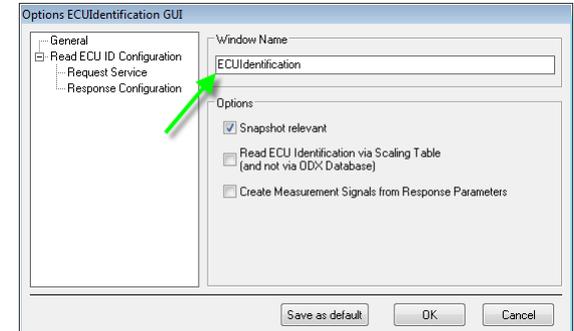
The new diagnostic measurement signals are now available in the VSD !





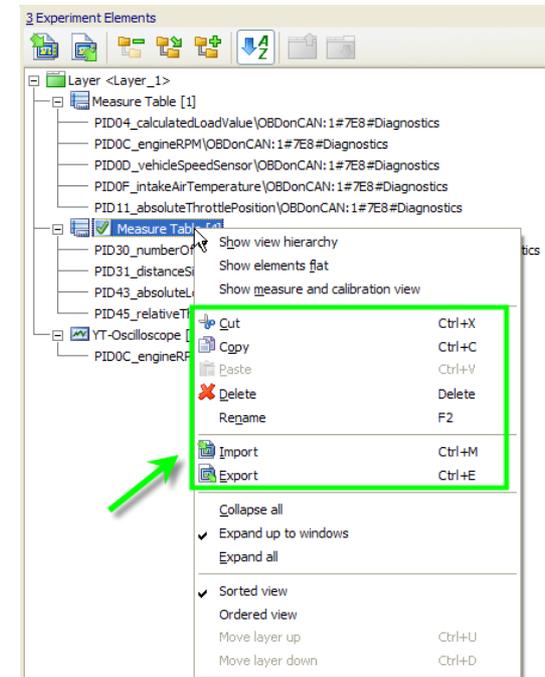
## Renaming ODX Windows

- All ODX-LINK Experiment windows can be renamed now



## Editing Experiment Elements

- Editing of Experiments in the Database view was not supported in previous INCA versions, when an ODX Project was assigned to an Experiment
- INCA V7.1 now supports all usual editing functions of INCA Experiments, e.g. cut, copy, paste, delete, rename, import, export of measurement windows and signals





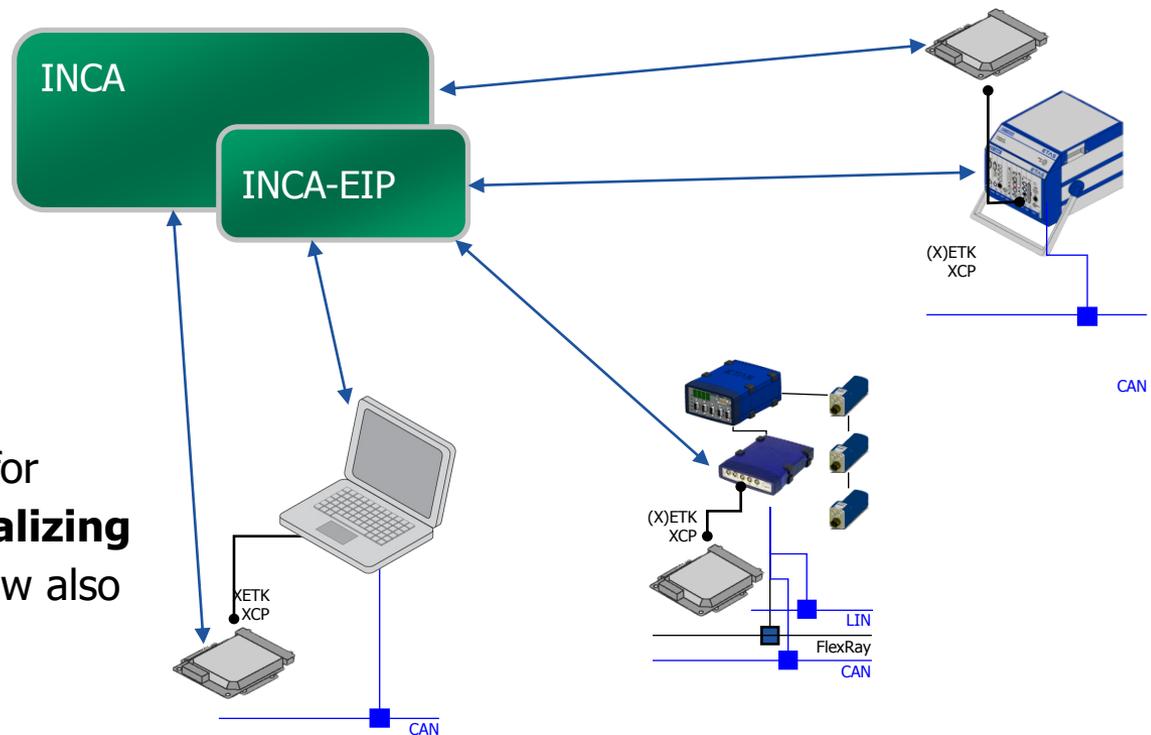
- 1. Support for WWH-OBD on CAN Diagnostics** (World-Wide Harmonized On-Board Diagnostics) according to ISO 27145:
  - WWH-OBD is the new On-Board Diagnostics standard, which is e.g. to be supported by all MY2014 Euro-VI Commercial and Heavy-Duty Vehicles.
  - INCA and ODX-LINK now support WWH-OBD diagnostics on CAN by providing a WWH-OBD ODX project with Diagnostic Signal List !
  - New PDX file: [ETASData/ODX1\\_5\\_0/Projects/WWH-OBD/WWH\\_OBDonCAN\\_ETAS.pdx](#)
  - The ODX project can be used with the DiagnosticServices, ECUIdentification, HexService DiagTroubleCode and Sequence windows of ODX-LINK.
  - Provides WWH-OBD Diagnostic Measurement Signals in INCA VSD, e.g. PIDs, IUMPR counters and DTCs. (Further signals can be added easily by using the ODX-LINK functionality of adding Diagnostic Measurement Signals.)
  - The ODX project can be used for the OBDonCAN and UDS on CAN devices.
- 2. Updated OBDonCAN ODX project** with latest SAE J2012 DTC list:
  - [ETASData|ODX1\\_5\\_0|Projects|OBDonCAN\\_ETAS](#)

[Available with INCA V7.1 SP1](#)



## Parallel Usage of Multiple Experimental Targets

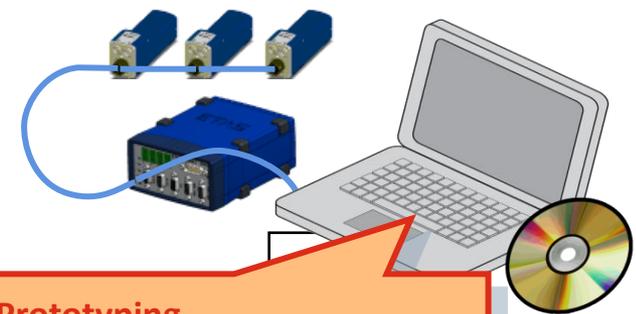
- INCA-EIP is able to access and control multiple Experimental Targets and ECUs at the same time
- Users can handle up to 4 experimental targets simultaneously (in parallel to ECU access)
- Multiple experimental targets can be combined in one group
- All features that are available for individual targets (e.g. **reinitializing data using the MPM**) are now also available for target groups.





## Support RTPRO-PC Experimental Targets

- Starting with the release of INCA-EIP V7.0.1, INCA-EIP supports **real-time prototyping on ETAS RTPRO-PC**, now also **including DaisyChain (e.g. ES930) support**
- This is different from virtual prototyping on Windows-PC



### Virtual Prototyping

- Non real-time
- Runs as fast as possible or with time scale
- No connection to the real world
  - no I/O
  - no communication buses
- Stimuli or plant model required
- For early validation and pre-calibration on the Windows® PC on the developer's desk

VP

### Rapid Prototyping

- Meets hard real-time conditions
- Interacts with the real world
- Comprehensive support for peripherals
  - analog and digital I/O etc.
  - communication buses
- For real-time prototyping and bypass applications
- Validation and calibration on the test bench or on the road

CAN

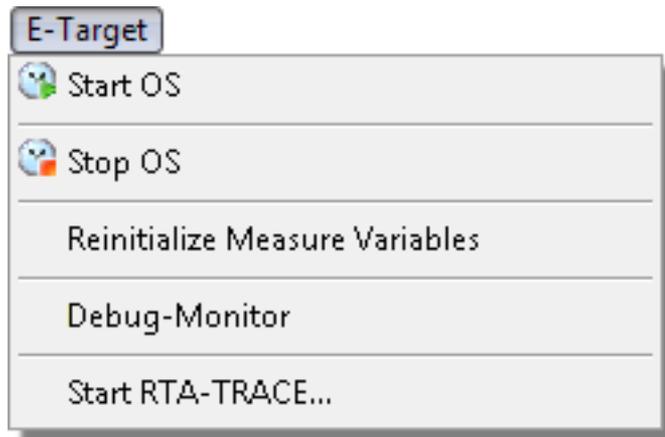
RP



### More versatile functionality for experimental targets

The E-Target Context menu offers two new functions

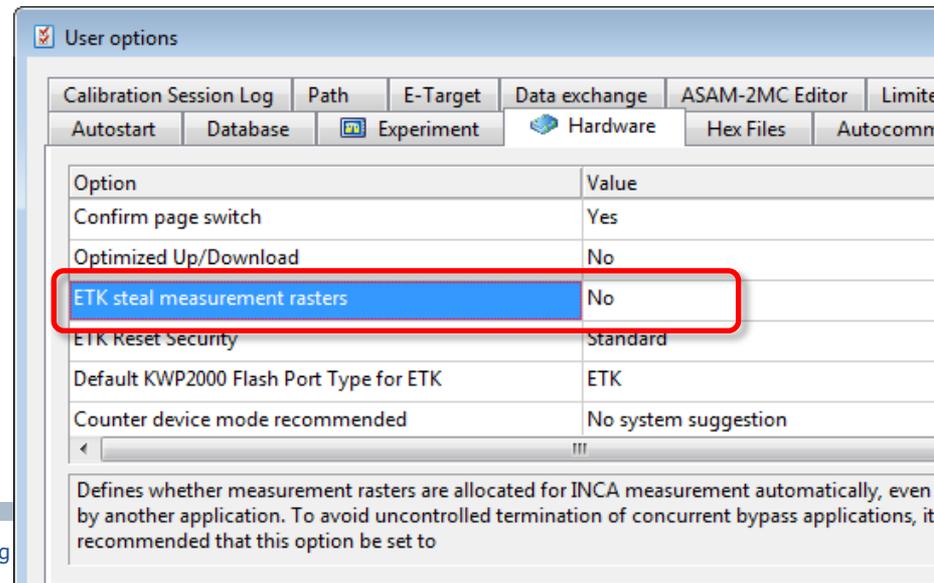
- **“Start RTA-TRACE”** allows users to start the real time logic analyzer RTA-TRACE on E-Targets directly from INCA
- **“Reinitialize Measure Variables”** allows users to reset model variables to their initial values without downloading the project to the target again and without changing parameter values





Improved online behavior of the experimental target within the overall system

- **Reset hardware driver lock by simple model download**
  - Up to INCA V7.0, a hardware driver lock requires a hardware reset
  - With INCA V7.1, a model download is sufficient
  - Works with models generated by
    - INTECRIO Integration Platform V4.2 and later
    - ASCET-RP V6.1.4 and later
    - INTECRIO-RLINK V1.0 and later
- **Coordinated access to measurement rasters** between INCA and prototyping model
  - Up to INCA V7.0, INCA occupies measurement rasters for M/C usage, even if they are in use by a rapid prototyping application
  - Starting with INCA V7.1, INCA behavior can be configured





New capabilities of the experiment environment for experimental targets (which were only possible for ECU targets so far)

- **Offline Experiment Preparation:** create instrument setups for experimental targets offline, i.e. without connection to the hardware system
- **Capability to measure Calibration Variables:** if parameter values change during model execution (e.g. adaptive characteristics), these value changes can now be measured by INCA-EIP
- **Capability to change the sizes of maps and curves:**  
the number of axis points of maps and curves can be changed within the range of the maximum allowed number.

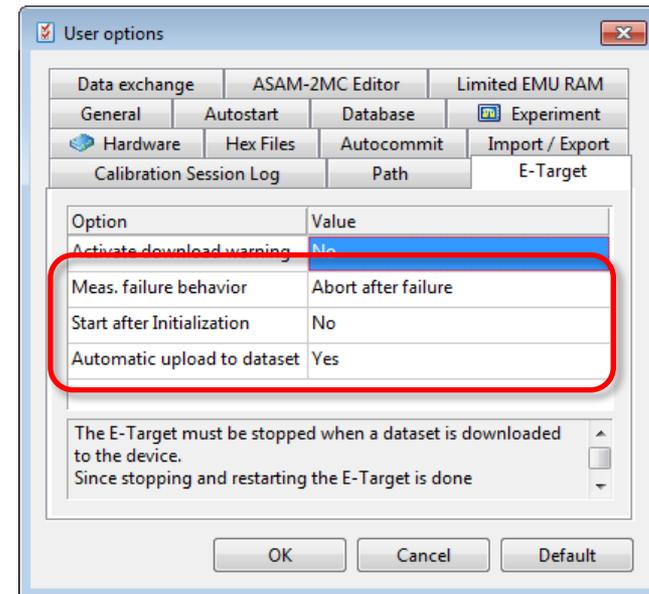
The screenshot shows the 'Combined Editor [2]' window with a 3D map titled 'GDI\_SIP.GDI\_SIP\_P.fuel\_pressure\_kf\_Table'. The map is a 3D surface plot with axes labeled 'GDI\_SIP\_Sp', 'GDI\_SIP\_P', and 'GDI\_SIP\_T'. A context menu is open over the map, listing various editing actions. The 'Y-Axis' option is selected, and a sub-menu is visible with 'Remove Y Axis Point' highlighted.

Y-Axis Breakpoints Setup...	Decrement y-axis point	Alt
	Increment y-axis point	Alt
	Edit y-axis point...	Ctrl
	Add y-axis point...	
	Remove Y Axis Point	



Minor modifications included in INCA-EIP V7.1

- **New EIP User Options** (which were only available in the parameters of the hardware configuration so far)

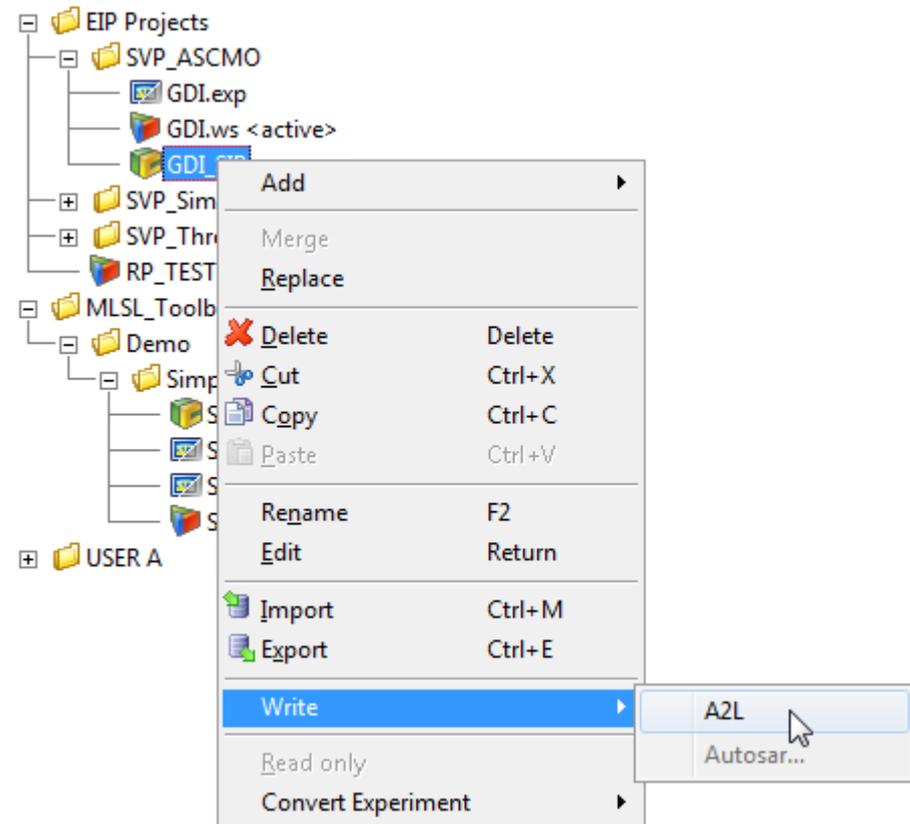


- **Recording of calibration time stamps during virtual prototyping** experiments had some known issues and has now been corrected



Several minor modifications were included in INCA-EIP V7.1

- **Writing the original A2L file**  
back to the Windows  
file system now also works  
for EIP projects





Several minor modifications were included in INCA-EIP V7.1

- INCA-EIP now allows consumption of **A2L files, which contain both an ASAP1B and an XCP configuration**
- Important Notes:
  - This feature is relevant for Bosch CC projects only, into which an XCP slave driver by means of an ETAS-Engineering solution.
  - This feature is **not part of the official INCA-EIP V7.1 feature set**. Only Bosch CC can use it. Other customers must not be pointed to the XCP slave capability, since this would jeopardize EIP sales.

## **INCA-MIP enhancements (1/2)**

- New API functions
  - IncaGetInstalledProductInfo
    - Provides information on all INCA versions that are installed on the system.
  - IncaGetInstalledAddOnInfo
    - Provides information on all add-ons that are installed for a given product and version.
  - IncaClose
    - Closes INCA after it has been opened with IncaOpen. After Inca-Close, another IncaOpen can be used to connect to INCA again (e.g. in order to connect to a different INCA version).
  - IncaGetRecordingMode
    - Indicates whether a signal is recorded in the default recorder or not.
  - IncaSetRecordingMode
    - Enables or disables the recording of a signal in the default recorder.

## **INCA-MIP enhancements (2/2)**

- Changed API functions
  - IncaOpen
    - The IncaOpen command gets a new, optional parameter 'version' to enable to launch a specific INCA version.
  - IncaAddMeasureElement
    - For the input argument groupName, an empty parameter [] can be used to use calculated signals or monitoring signals for measurement or recording.
  - IncaGetRecords
    - Two input arguments last and exact have been added. These specify if the latest or oldest records shall be transmitted, and if they should be also transmitted if less than the specified number of records are available.
  - IncaAddCalibrationElement
    - This function now also support calibration elements of the types axis or group axis. For group axes no interpolation of the dependent curves and maps is executed.

- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - Standards
  - Usability
  - HW support
  - Add-ons
- **INCA Product Family**
- Phase out information
- General Notes



### Device Information

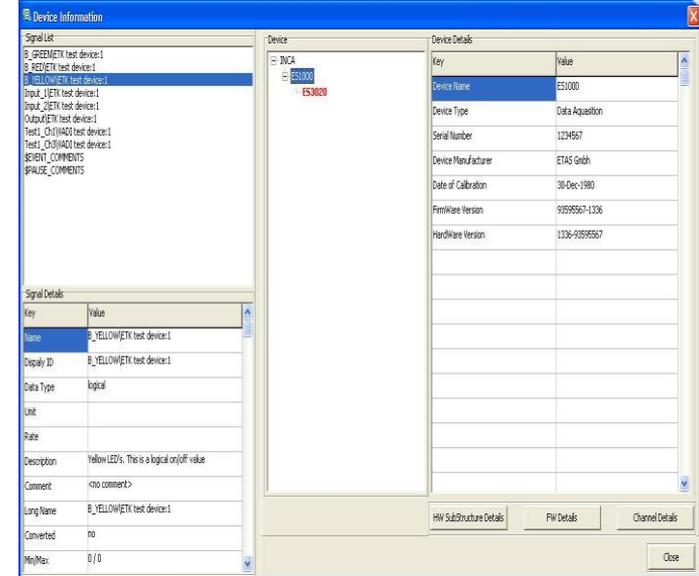
The device information contains the about hardware setup that was used for a Measurement and Calibration experiment.

Users can review - at some later point in time - the hardware setup that was used and know the concrete conditions that existed during the experiment.

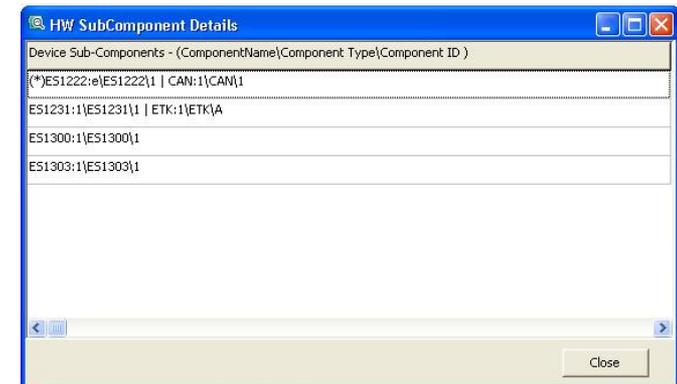
- Device Information (e.g. Device Type, Serial number, date of calibration etc. ) is recorded by INCA in a measure file
- This Device Information is displayed by MDA during the offline analysis session

### Note

- Device Information is recorded in measure file with MDF4 format



Device information window





### Visualization View for GPS Data

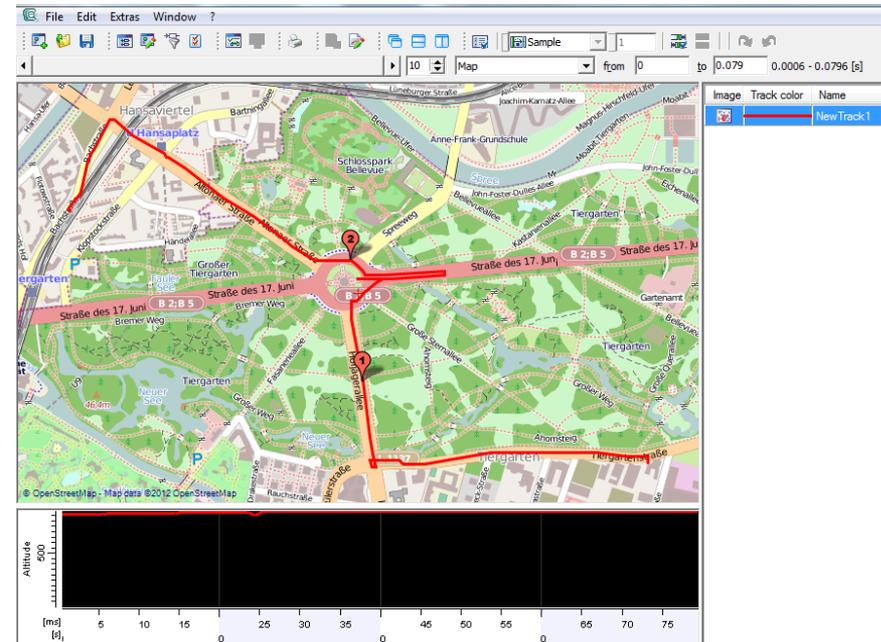
MDA visualizes the GPS signal data that has been recorded from a GPS mouse as driven route on a map

### New instrument "map view"

- GPS signals are automatically mapped (based on INCA mapping rules)
- Map view can be synchronized with y-t oscilloscope (analyze mode)
- Pin heads as cursor representation
- Multi track support
- Shown tracks can be configured by configuration dialog

### Notes

- Synchronization only with y-t-oscilloscope
- GPS data must be part of measure file
- ETAS offers a free to use implementation that uses Open Source Software (OpenStreetMap)
- Customer needs to take care of getting valid license from his MAP provider (Navteq, TomTom etc.)





### Customizable Toolbar

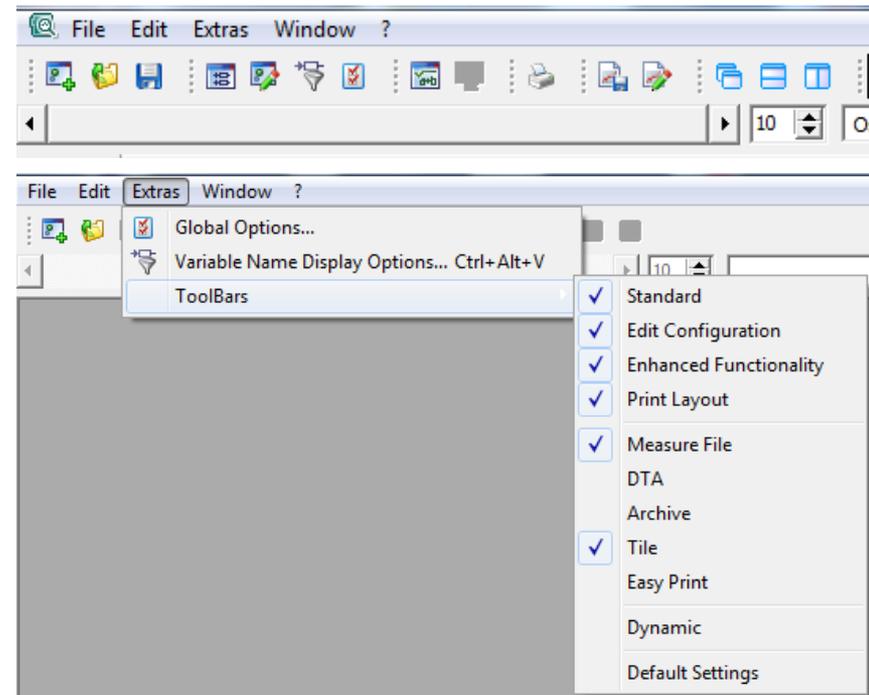
The MDA toolbar is customizable by selecting groups similar to standard software like MS Office

### Possible configurations

- Toolbar buttons with similar functionalities are grouped together.
- Dynamic toolbar appears only if the user distributes the signals in any view
- Toolbar button size is selectable (Small, Medium, Large)
- Drag and drop all the toolbars to change their positions

### Notes

- The user can only select a toolbar group; It is not possible to select single toolbar buttons
- The toolbars cannot be dragged outside the main menu area





## Long Names

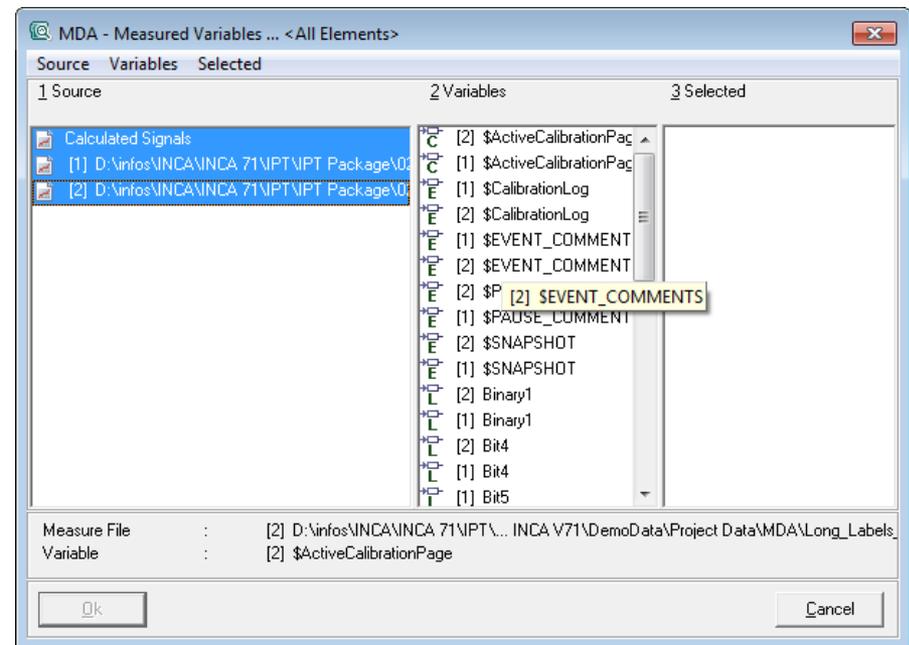
If signal name is long, it is not completely visible in the grid. Signals with similar long names cannot be distinguished easily

## Bubble help

- on mouse over to distinguish signals in an easy manner
- complete path and file name is shown as bubble help on mouse over
- complete path is shown in the status bar of an instrument

## Note

- works for Table view, Statistical view, MDR view, Variable Selection Dialog, Signal List and Configure Window





## Formula for Calculated Signals

Long path- and file-names of variables are difficult to read

### Index used for file name

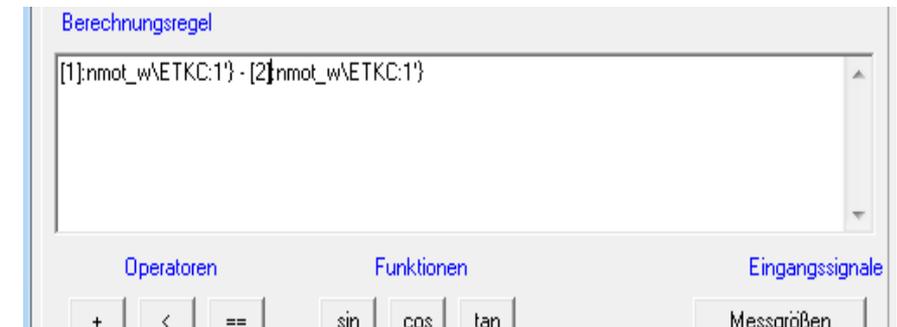
- Bubble help with mouse over to identify the respective file and path for a specific index
- Device name retained in the formula to distinguish same name of variables from different devices

### Note

- Index for file name is used only if "Source Identification" option is enabled in Global Options



Formula of Calculated Signal with path & file name; difficult to read!



Formula of Calculated Signal without path & file name; easy to read!



### Default Step Size of Analysis Cursor

The step size defines the time steps when the user moves the analysis cursor by cursor keys

### Option for Default Step Size for analysis cursors

- Default values for Sample and Time cursors (Global Options)
- These default values are applied to all views created new

### Notes:

- The default values are stored in the .ini file

Global Options

Show Mapping Information	Yes
Check loading out of default	No
From - To Decimal Setting	3
Number of Osc Horizontal Grid	10
Source Identification	Index
Select File Format	mdf 3.0 (*.dat)
Jump To Time Value	5
Go By Time Interval(s)	0.001

When the user creates new view (osci/table) the values set by the user in the global options are applied for the view and are reflected in the legend/configure window of the corresponding view.

Legend / Configure window

Show per-Div and Base	yes
Show Comments	view and print
X-Offset Time Interval(s)	0
Jump To Time Value	5
Go By Time Interval(s)	0.001
No of Osc Horizontal Grid Lines	10

Tool Bar

Effect of change in values in global options



### Reference between Axes and Signal List

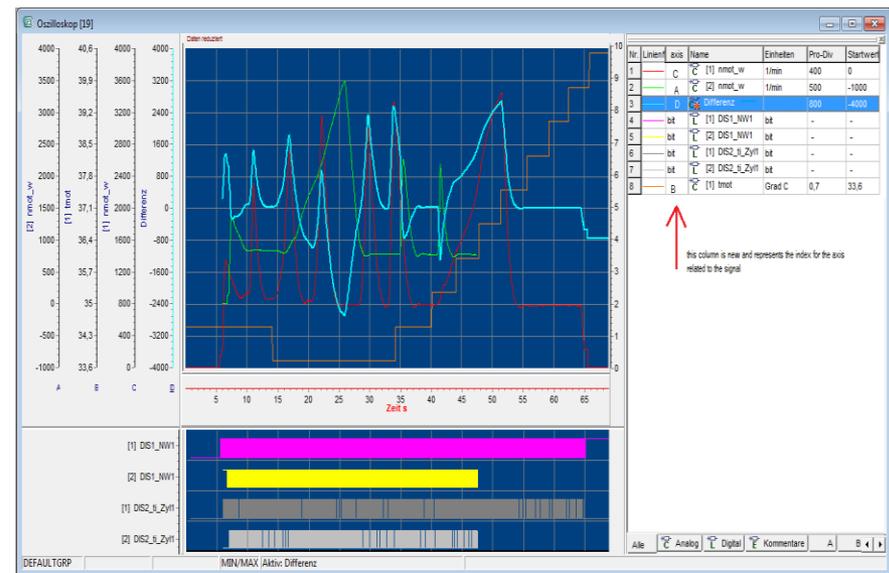
To easy see which axis belongs to which signal there is a reference needed

### Axis Index of Signal in the Signal List

- New column "Axis" added to Signal List displaying axis name of for each signal
- MDA offers context menu to activate/disable representation of axis column

### Note

- New column is added in the following tabs of the signal legend: all, analog, represented axis tabs



Signal List with column for Axis Index

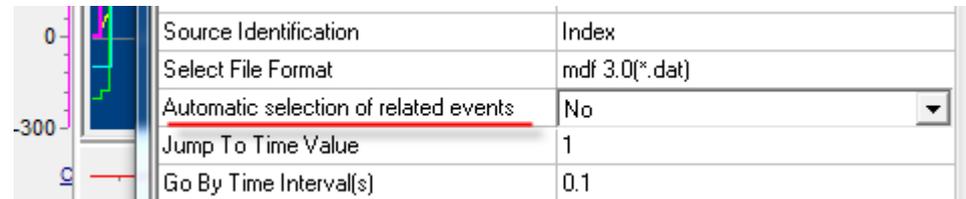


### Assignment of related Events

If user selects signals and distributes it on several views the related \$Variables like \$EVENTS, \$PAUSES, \$CALIBRATION LOG, \$Snapshot need also to be inserted into the oscilloscope view. This can be done automated or manually

### Option "Automatic selection of related events"

- Enable or disable the automatic selection of related events
- Works for oscilloscope view



Global Options dialog for automatic selection of related events

### Notes:

- User selection changes in this Global Option will be effective only after restart of MDA
- There are no changes in the other views (Table, Stat & MDR).



## Indexing

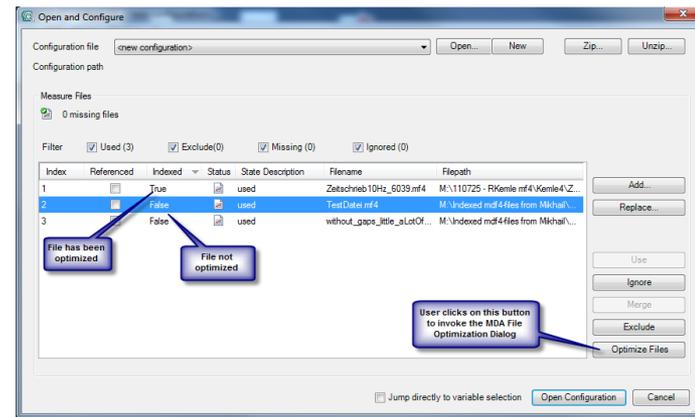
Indexing the measurement data allows high speed access

### Additional Index

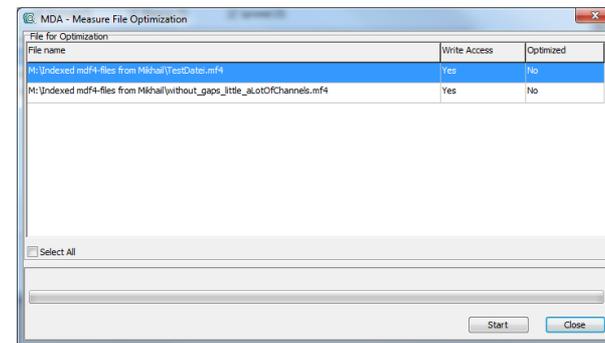
- Index track added to the MDF file
- Reading the measurement data via the index results in a significant performance improvement (time reduction)
- MDA can add the index also to already existing MDF files

### Note

- Indexing is currently only supported for MDF4 format



Open & Configure Dialog with button for optimizing files



Measure File Optimization Dialog



### Invalidation Bit

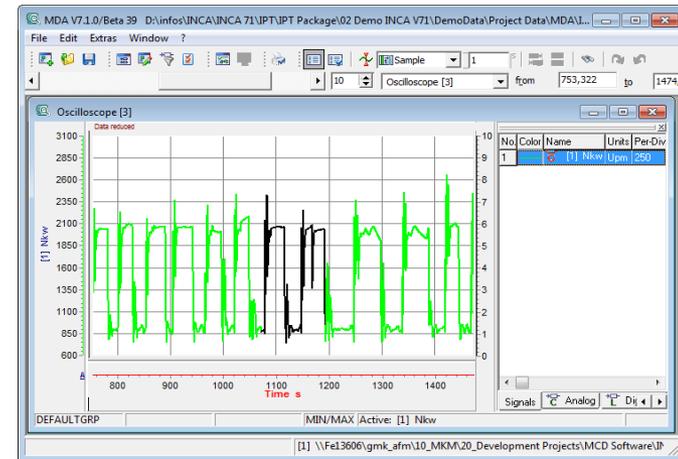
INCA / MDA marks measurement samples that are not consistent with an invalidation bit

### Visualization of invalid samples

- MDA visualizes invalid samples with a different color in the oscilloscope and table view
- A new overlay icon is displayed on the signal to indicate that some samples of the signal are invalid

### Note

- Invalidation Bit is only supported for MDF4 format



User Interface changes for signals containing invalid samples

Time [s]	[1] Nkw
1072.883200	872.00
1072.982664	873.00
1073.082558	877.00
1073.182902	881.00
1073.282566	883.00
1073.383399	887.00
1073.482573	892.00
1073.582737	890.00
1073.682551	889.00
1073.782665	887.00

Signals containing invalid samples for table view



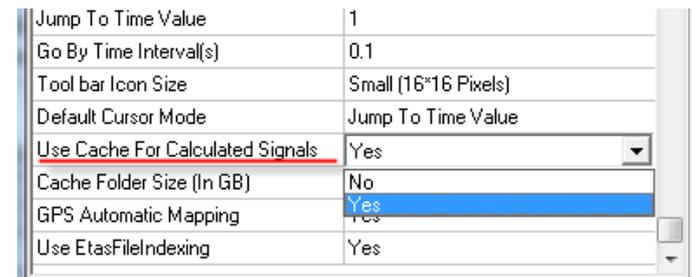
## Performance Improvement for Calculated Signals

The effort to compute the signals is reduced

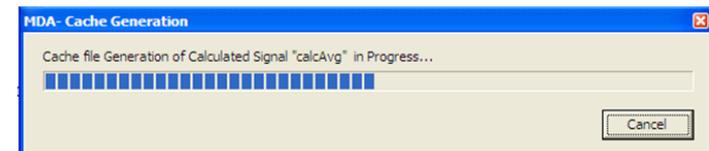
- Computations for Calculated Signals are cached in a separate file
- At loading time the configuration, caching of calculated signals is done as exclusive operation, before instruments (oscilloscope, table) are displayed
- MDA avoids re-computation of calculated signals
- Caching is configured by user from Global Options Dialog.
- Whenever a calculated signal is created or modified, exclusive cache generation will start based on the settings

### Note

- Cache file is in MDF4 format



Entry in Global Options Dialog

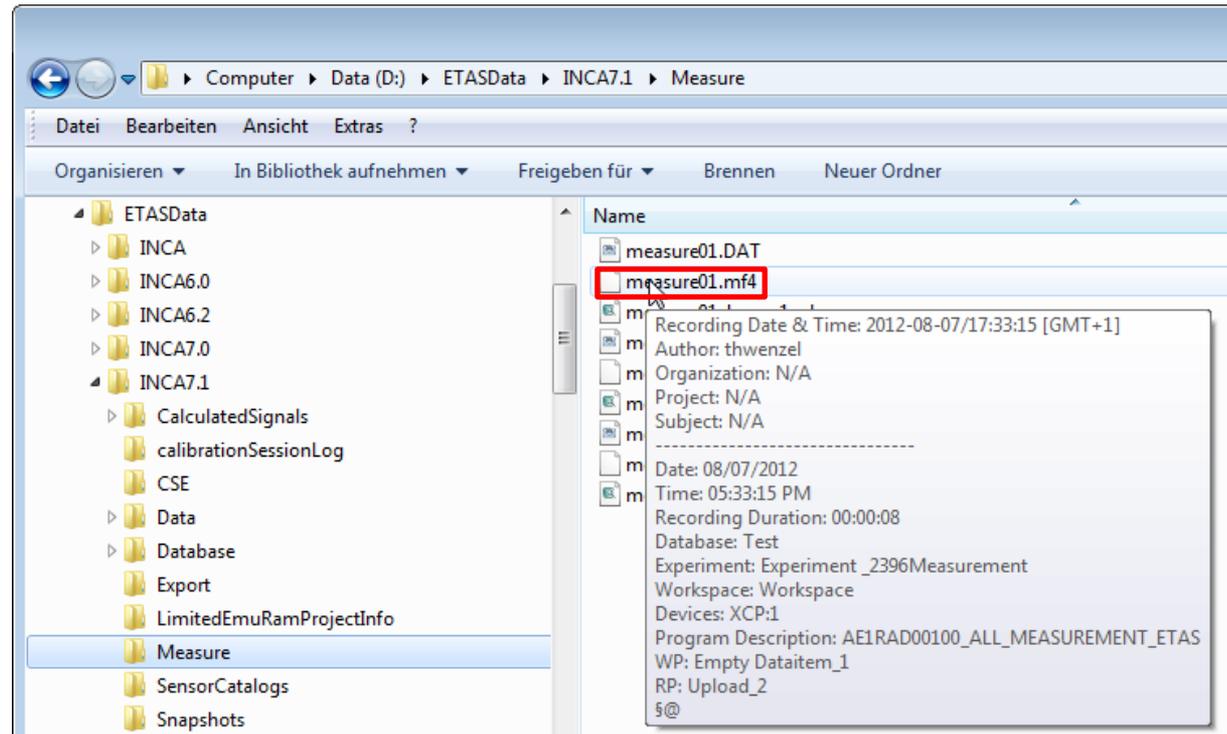


Progress bar dialog during cache generation



### Show details of MDF files in the Explorer

- The MDF shell extension extracts basic information from the MDF file and shows it with mouse over the MDF file
- 32Bit & 64Bit Version available



Optional installation

- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - Standards
  - Usability
  - HW support
  - Add-ons
- INCA Product Family
- **Phase out information**
- General Notes

**MAC:** Measuring and Application Unit – Compact series.  
It was a K-line and ETK interface

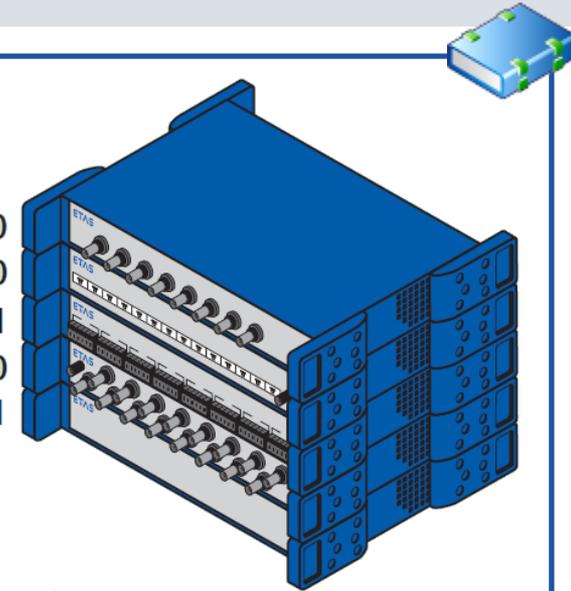


### ES3xx:

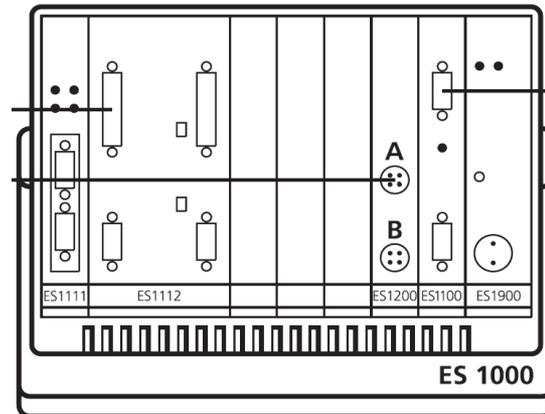
ES3xx hardware is disabled in INCA7.1

ES3xx AddOn has is removed from INCA.

- ES360
- ES320
- ES311
- ES310
- ES301

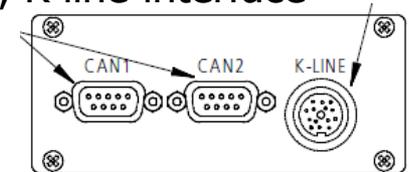


**ES1000.1:** Along with the ES1000.1 system, the following cards are also disabled:  
ES1200, ES1201,  
ES1207, ES 1208  
and ES1231

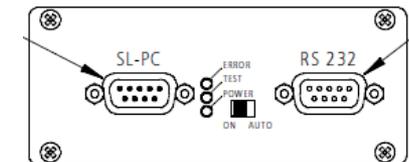


**SIC:** Serial Interface Compact. It was a CAN, K-line interface

Front:



Back:





### **ES710/ES715:** DriveRecorder

Support for the ES71x DriveRecorder series is discontinued with INCA V7.1.

ETAS continues to provide support for ES71x based on INCA V7.0 until the final phase-out of ES71x.

ES720, the successor product of ES71x, is continued to be supported with both, INCA V7.0 and INCA V7.1.





## ETK

No longer supported:

- ETK6\_1, ETKID\_ETK6\_2, ETK7\_0, ETK8\_2, ETKP1\_0, UETK2\_0, ETKS1\_1B, ETKS1\_1B2, ETKS1\_0A, ETKS1\_0B, ETKS1\_0C
- When initializing an ECU with such an ETK INCA shows an error message. Only offline working is possible \*)

\*) Use INCA V7.0 to work with such ECU / ETK

- Product information (Use cases, Sample applications, Customer value)
  - Performance
  - Functionality
  - Standards
  - Usability
  - HW support
  - Add-ons
- INCA Product Family
- Phase out information
- **General Notes**



### Links to Functionality Description of Service Pack 1

- [Support for WWH-OBD on CAN Diagnostics](#)
- [Updated OBDonCAN ODX project](#)
- [XCP on Ethernet Flashing / XCP Flashing Timeout](#)
- [ECU Processors support the possibility to configure the Emulation RAM](#)
- [eCDM interface allows to transfer the Maturity Level with good performance](#)



### Minimum System Requirements

- 2 GHz Processor, 2 GB RAM, and DVD-ROM drive \*)
- Graphics: at least 1024x768, 256MB RAM, 16bit color and DirectX 9

### Recommended System Requirements

- 3 GHz Quad-Core Processor, 4 GB RAM, and DVD-ROM drive \*)
- Graphics: at least 1280x1024, 1GB RAM, 32bit color and DirectX 9
- Windows 7 SP1 64Bit
- Investigation on performance showed
  - More Memory improves execution time of repetitive operations
  - SSD Harddisks improve the file access times

### Supported OS

- Windows XP SP3 or higher
- Windows Vista SP1 or higher
- Windows 7 SP1 or higher

\*) Needed for installation via DVD only  
Not necessary when installing via network



## Compatibility with other INCA versions

- INCA V7.1 introduces new functionality
- When designing and implementing this functionality, compatibility to other INCA versions has been taken into account
- Exchange of export files or databases with other INCA versions is possible
  - Easy, safe, and fast migration to INCA V7.1
  - Projects created in former INCA V6.x / V7.0 versions can be reused
  - Up and downward\* compatibility allows to use INCA in distributed development projects  
(e.g. OEM and suppliers using different INCA versions)

\* Known exceptions are:

Experiments updated to INCA V7.1 can not be used with former INCA versions.

A back-porting mechanism is available: oscilloscopes are replaced by measurement tables.



Additionally Installed Components	INCA V6.2.1	INCA V7.0	INCA V7.1
Windows Installer 3.1 (MSI-Installer 3.1)	X*	X*	-
.Net-Runtime-Environment	V2.0*	V3.5*	V4.0*
VCxRedist (Vcredist_x86.exe)	VC8	VC8+VC9	VC8+VC9+VC10
JAVA SDK Version j2sdk1.4.2_11	X**	X**	X**
Perl V5.8.6	X	X	X
MSXML5.msi (XML 6.0 Parser)	X*	X*	-
Parallel-Interface driver ParComm.sys	X	X***	-
ETAS Certificate	-	-	X
Direct X	-	-	V9
Others			
ETASShared	9	10	11
System-Requirements			
Windows 2000	X	-	-
Windows XP (32bit)	X	X	X
Windows Vista (32 bit)	-	X	X
Windows 7 (32 / 64 bit****)	-	X	X
<p>(*) This component is installed only when no or an older version is installed. If a newer version is already installed, it will not be touched. This is checked by a Microsoft installation routine.</p> <p>(**) This component is installed only with ODX LINK and ODX FLASH</p> <p>(***) Not installed for Windows 7</p> <p>(****) INCA uses the 32bit Compatibility Mode on a 64-bit operating system</p>			