EicasLab™

The professional software suite for automatic control design and forecasting

EICASLAB in a nutshell

excellence and passion in automatic control design

EICAS Automazione S.p.A.

User objectives and required performance

System Concept
Functional architecture, H/W e S/W

Like real-time

Algorithm and software development in interaction with a simulated plant

Real-time

Rapid Control Prototyping
Test and tuning on the real plant

Like real-time

Slow Motion
Final tuning

Automatic Code Generation for the target

Like real-time

Hardware in the loop
hardware testing with simulated plant

Real-time

Final Validation Tests

EICASLAB™

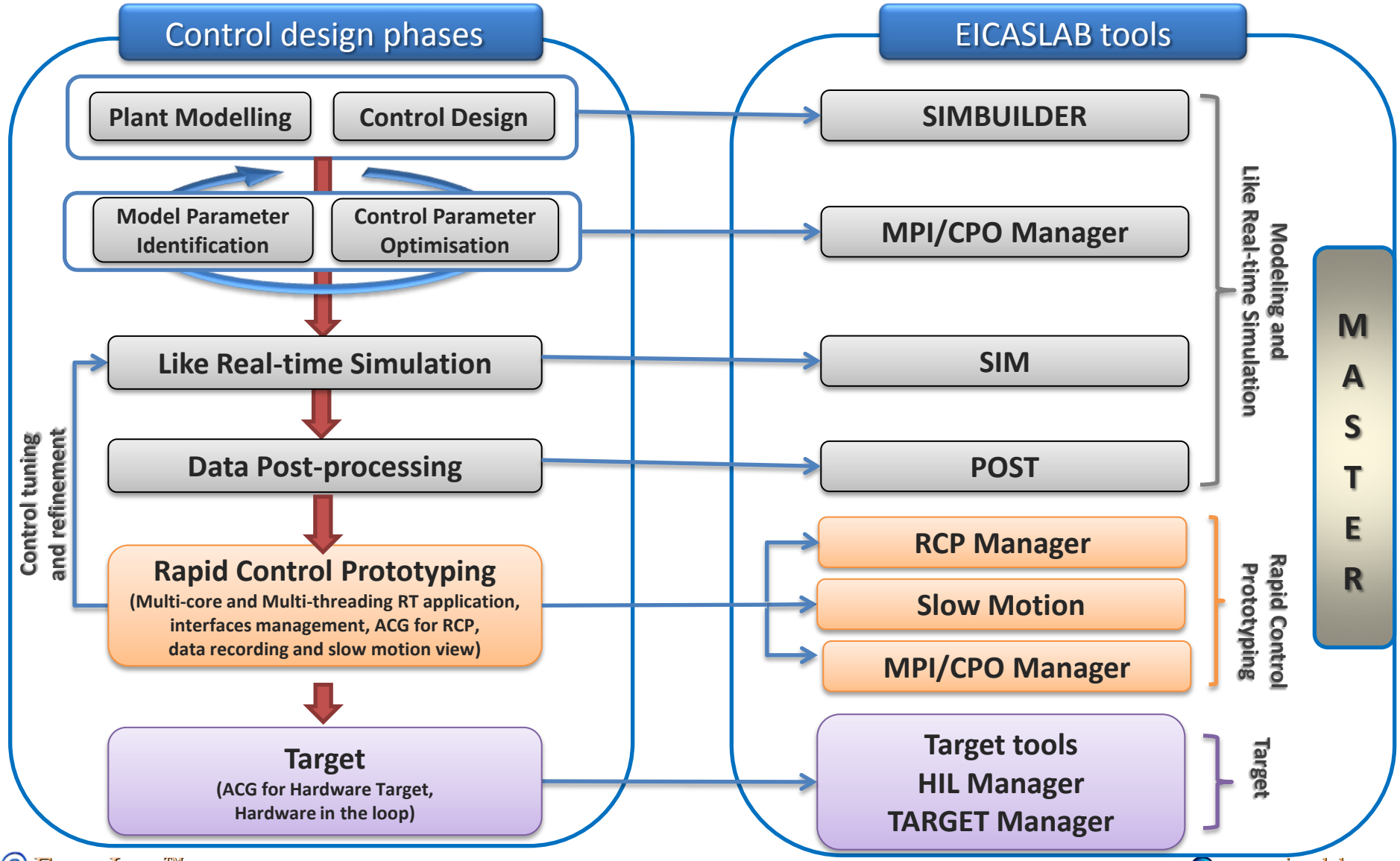
The professional software suite for automatic control design and forecasting

EICASLAB RCP Platform

Standard Multicore PC equipped with a RTOS (Real-Time Operative System) and the EICASLAB Suite

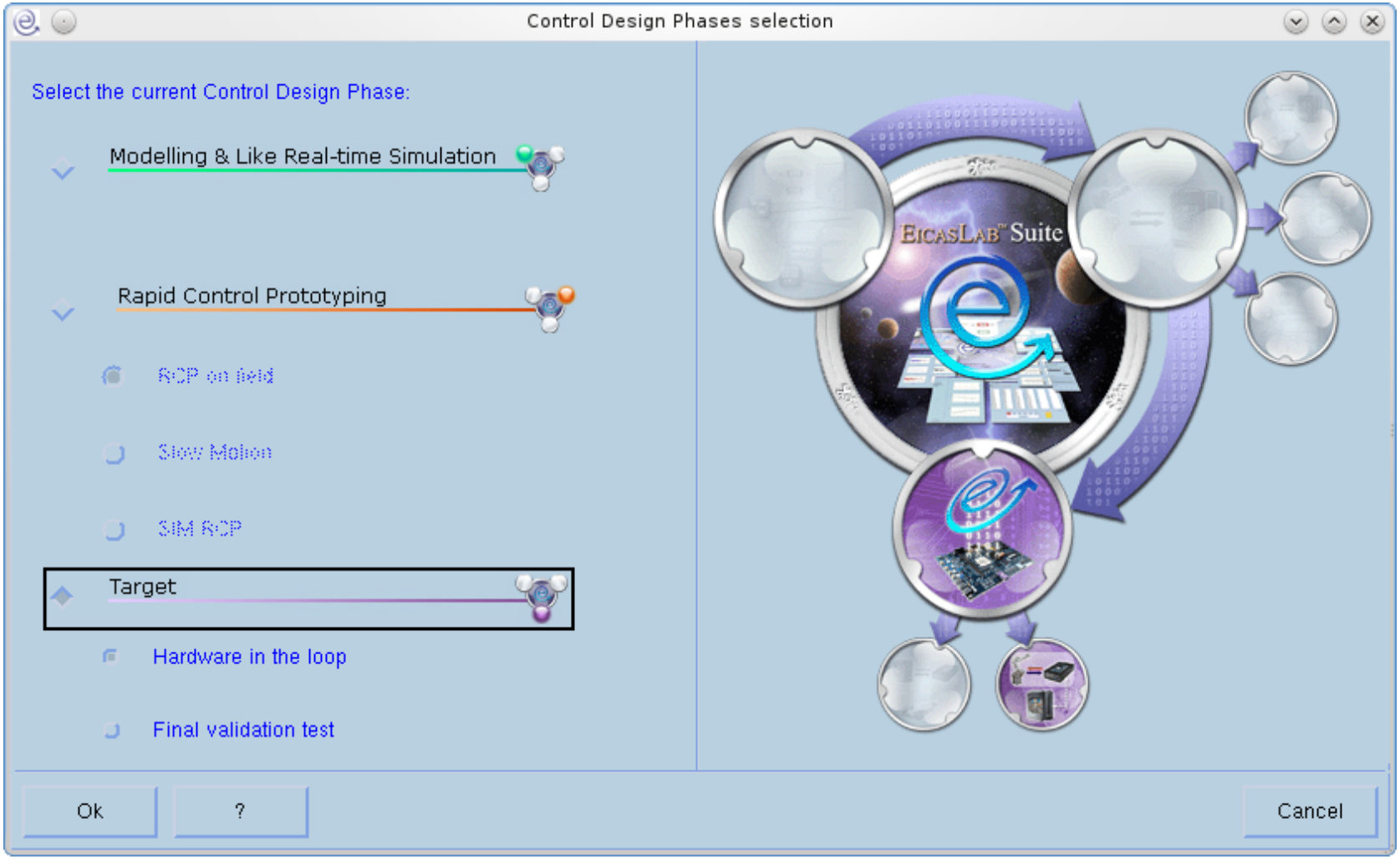
RCP=Rapid Control Prototyping

EICASLAB™ tools cover all the phases of the design process



Just one sw suite, Just one project!

You can build all control design phases in a single EICASLAB project



System concept and design

SIMBUILDER TOOL

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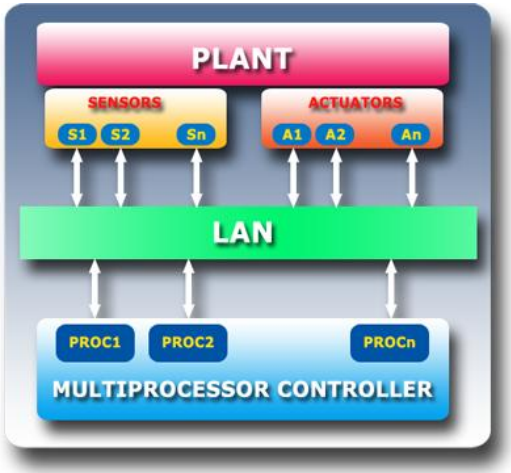
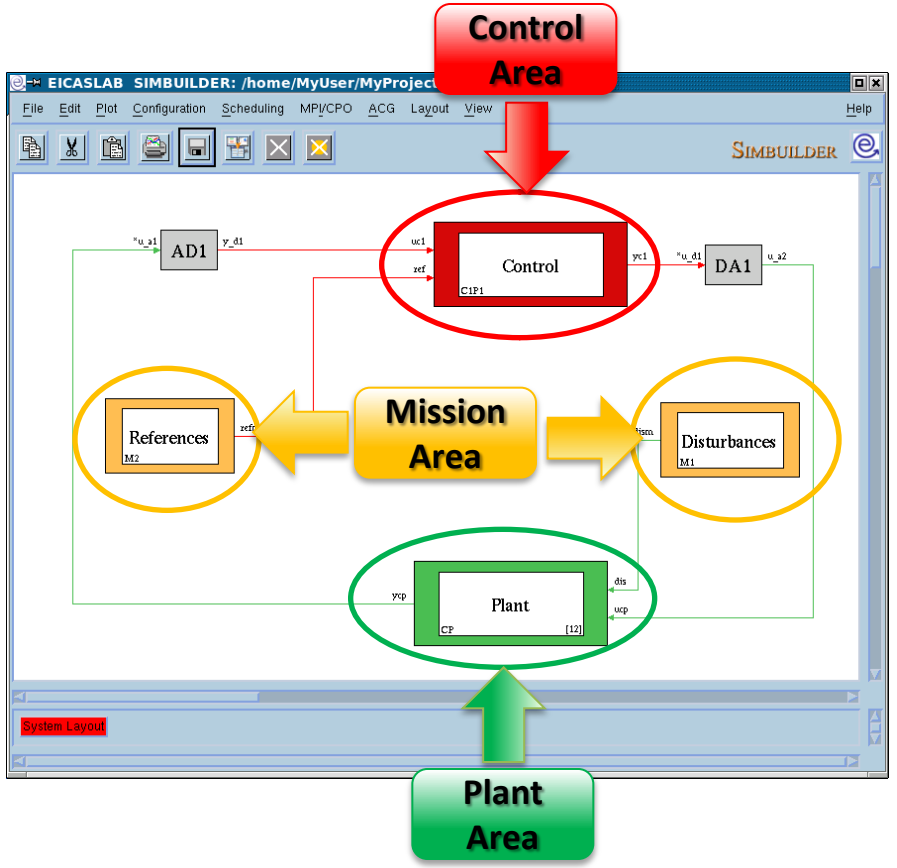
Starting from the requirements, the designer develops its own system concept



and define the architecture to be implemented

Multi processor control architectures at multi hierarchical levels



Pre-organized working areas

Plant, Control, Mission Areas

Modelling
The 2 model approach

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Accurate Model

Usually non linear, suitable for modelling the plant to be controlled

Plant Area

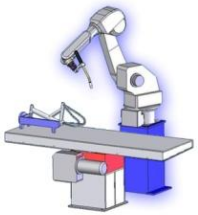
Model libraries for specific application sectors:

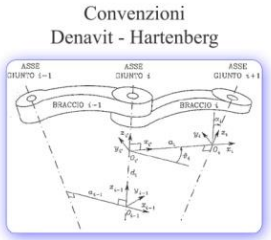
- Automotive

- Space

- Economy

- Robotics, machine tools





Simplified Model

Usually linear, suitable for designing the control

Control Area

In EICASLAB you directly design digital controls

In EICASLAB you can implement your desired control design methodology

Programming modes

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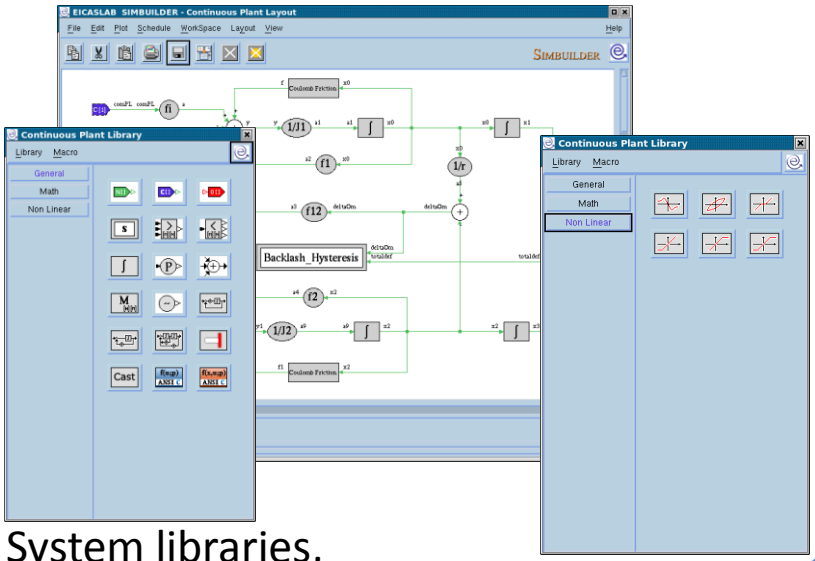
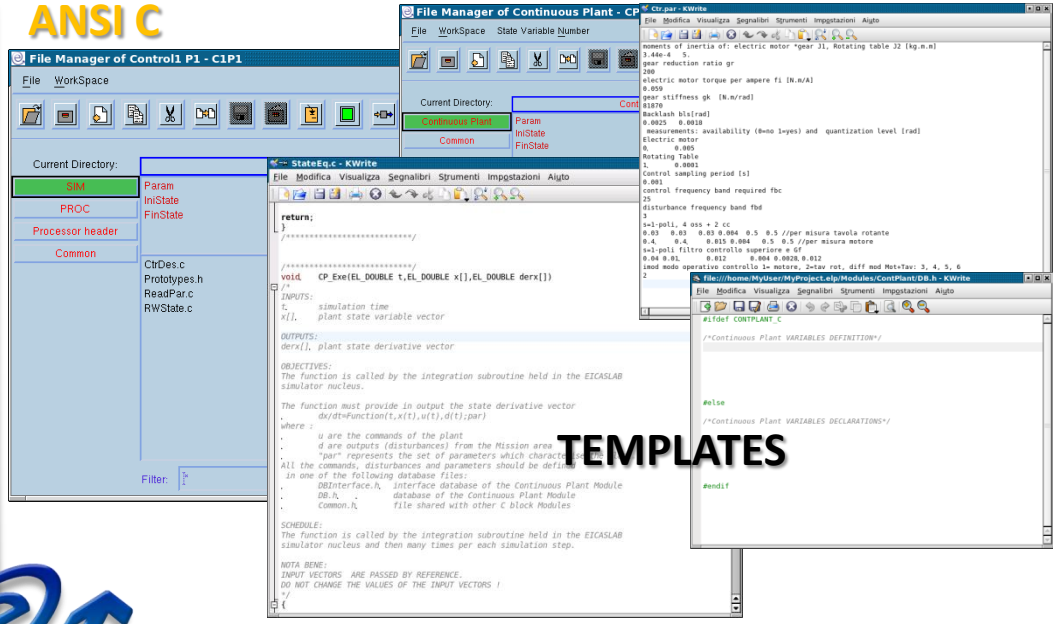
GRAPHICAL MODE



System libraries,
User libraries (macroblocks)

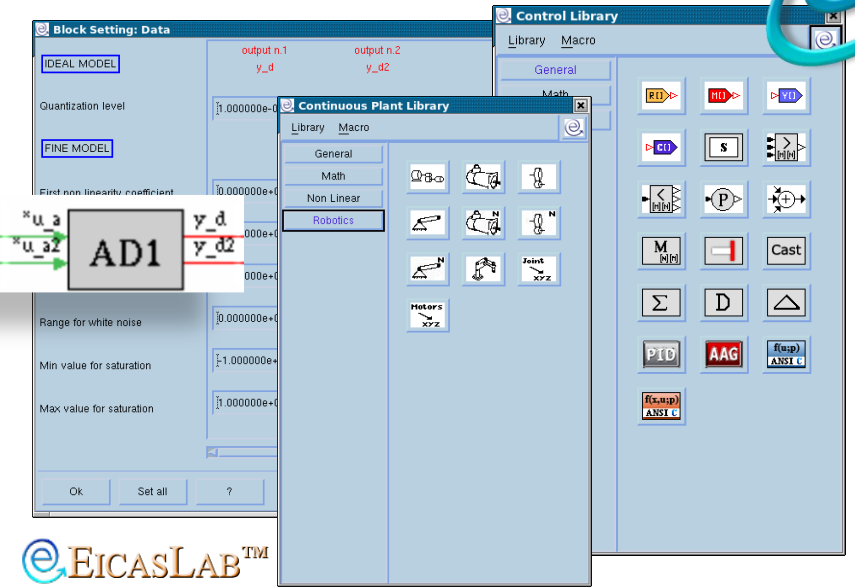
ANSI C

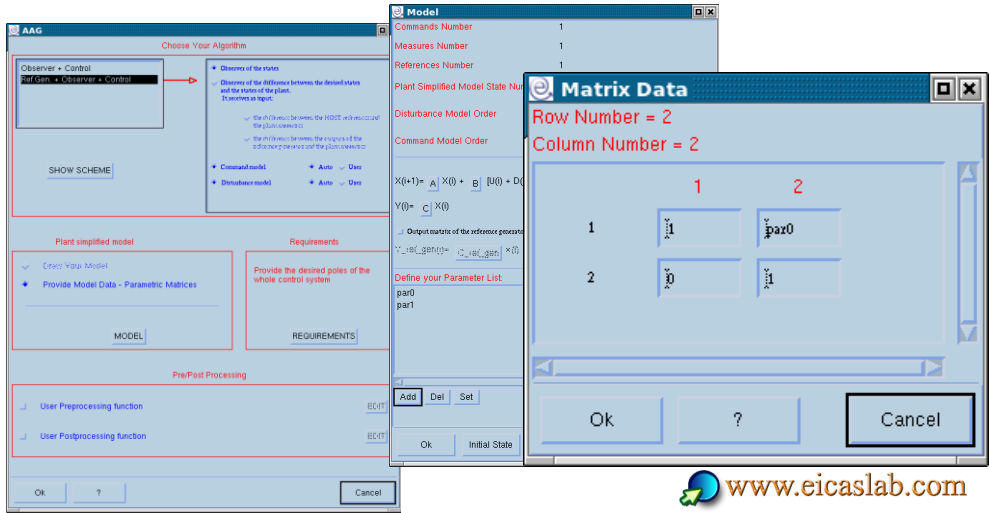


TEMPLATES

AAG

Automatic Algorithm Generation





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Activities scheduling

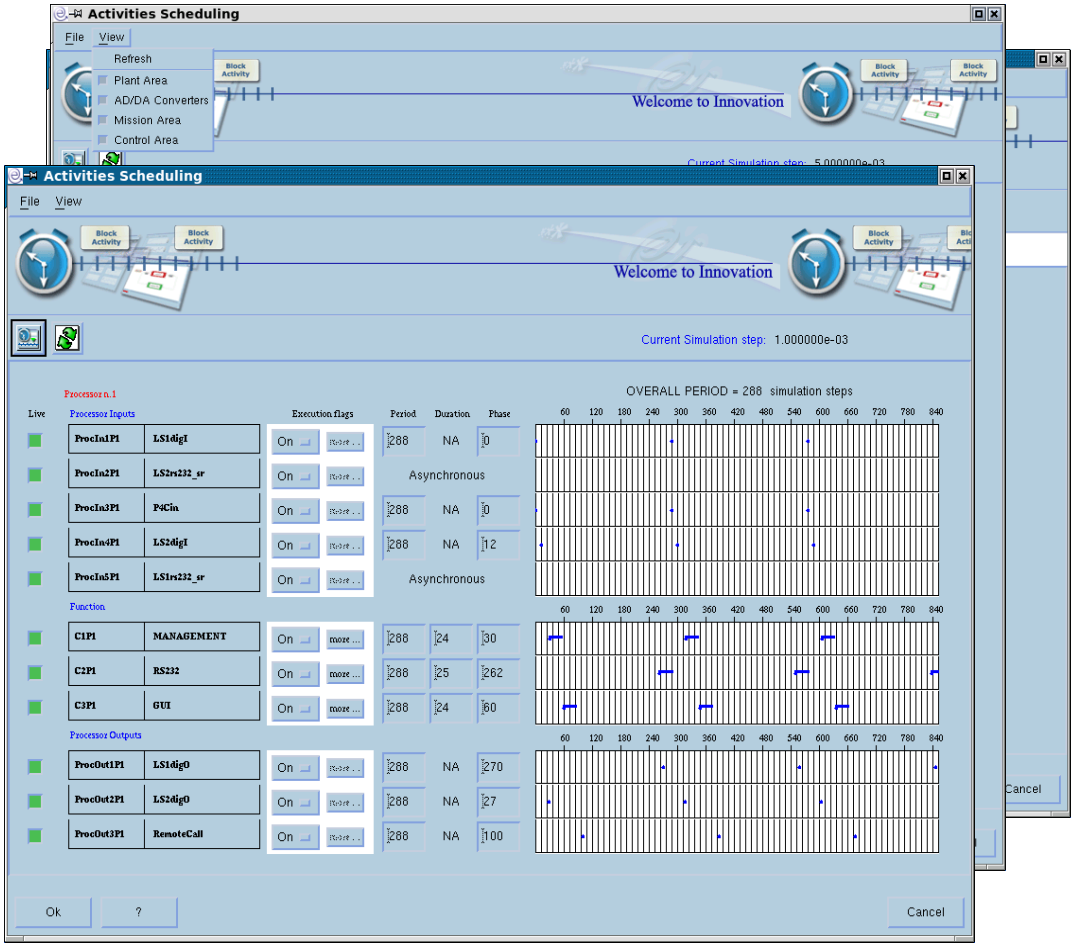
Like real-time

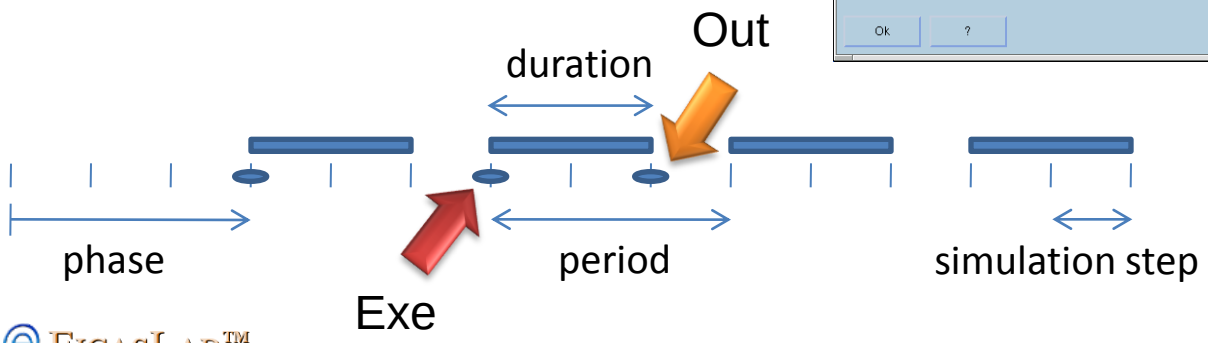
Activity (Task)

↔ **Ini** — Initialisation

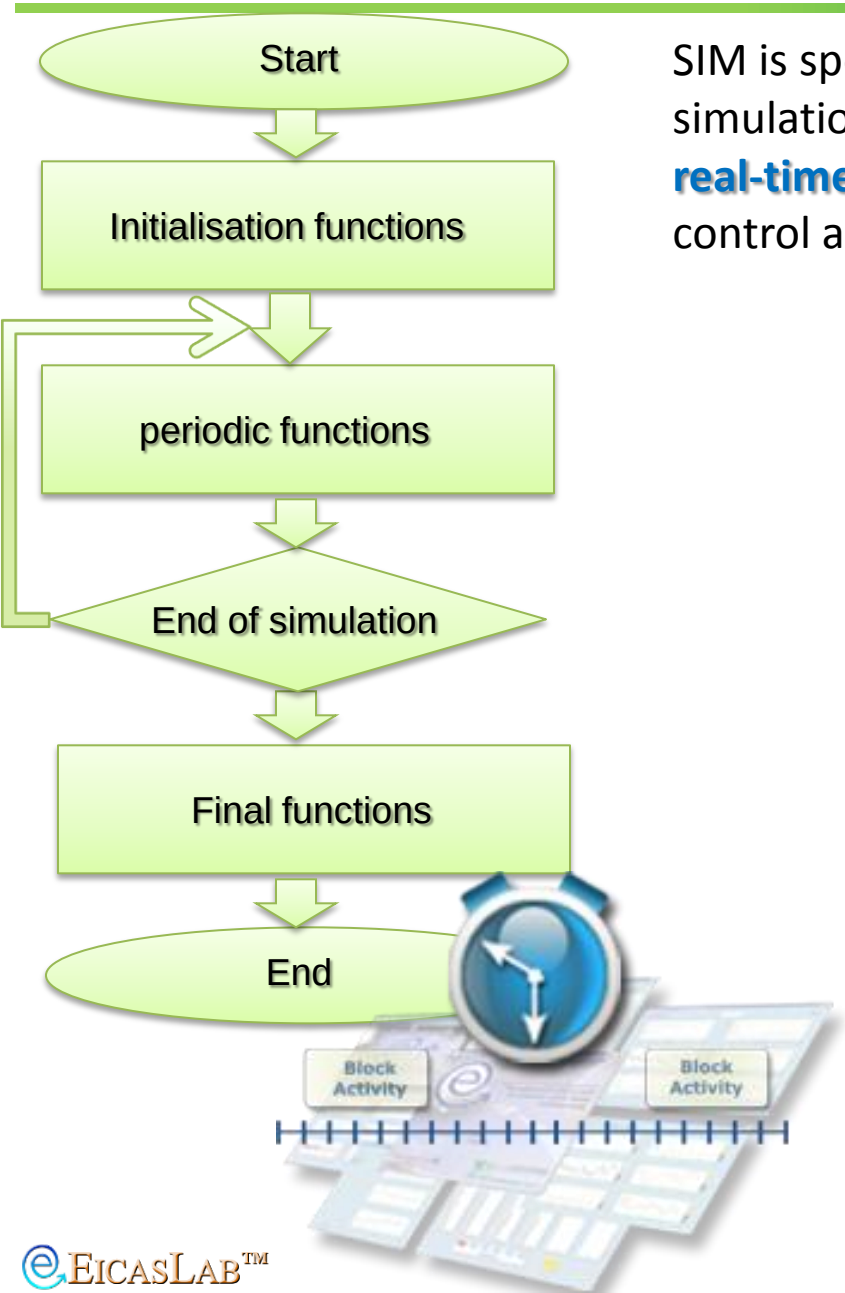
↔ **Exe, Out** — Periodical execution

↔ **Fin** — Conclusion

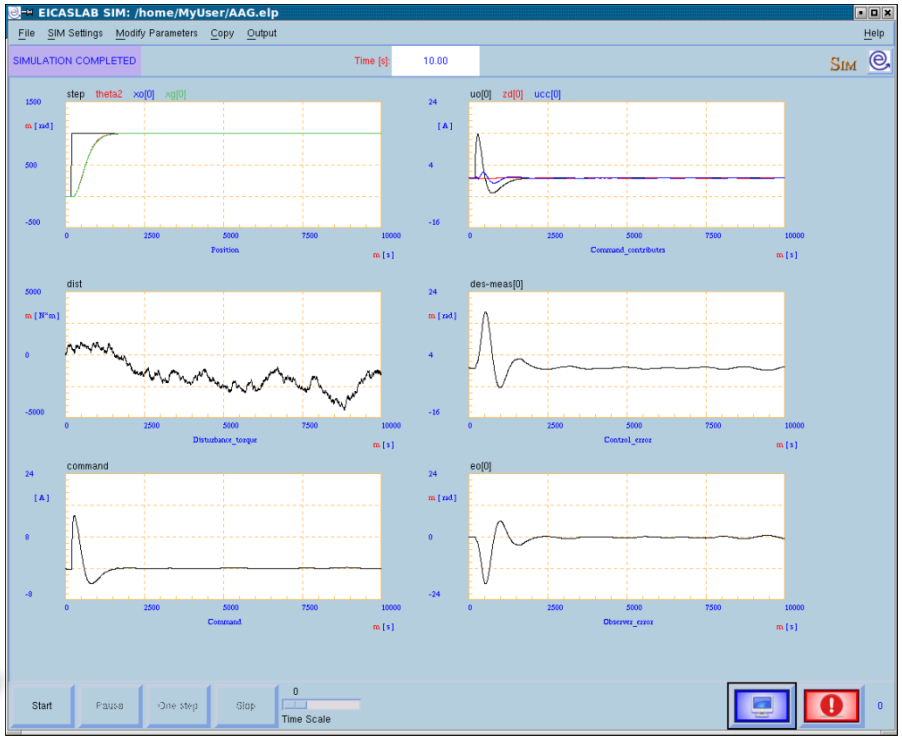




Like Real Time Simulation



SIM is specifically devoted to perform a professional simulation of the control system. Through the "**like real-time**" technique, SIM realistically emulates the control architecture designed in SIMBUILDER.



SIM allows to save on the PC disk all the desired variables for a further post-processing.

Post processing

POST TOOL

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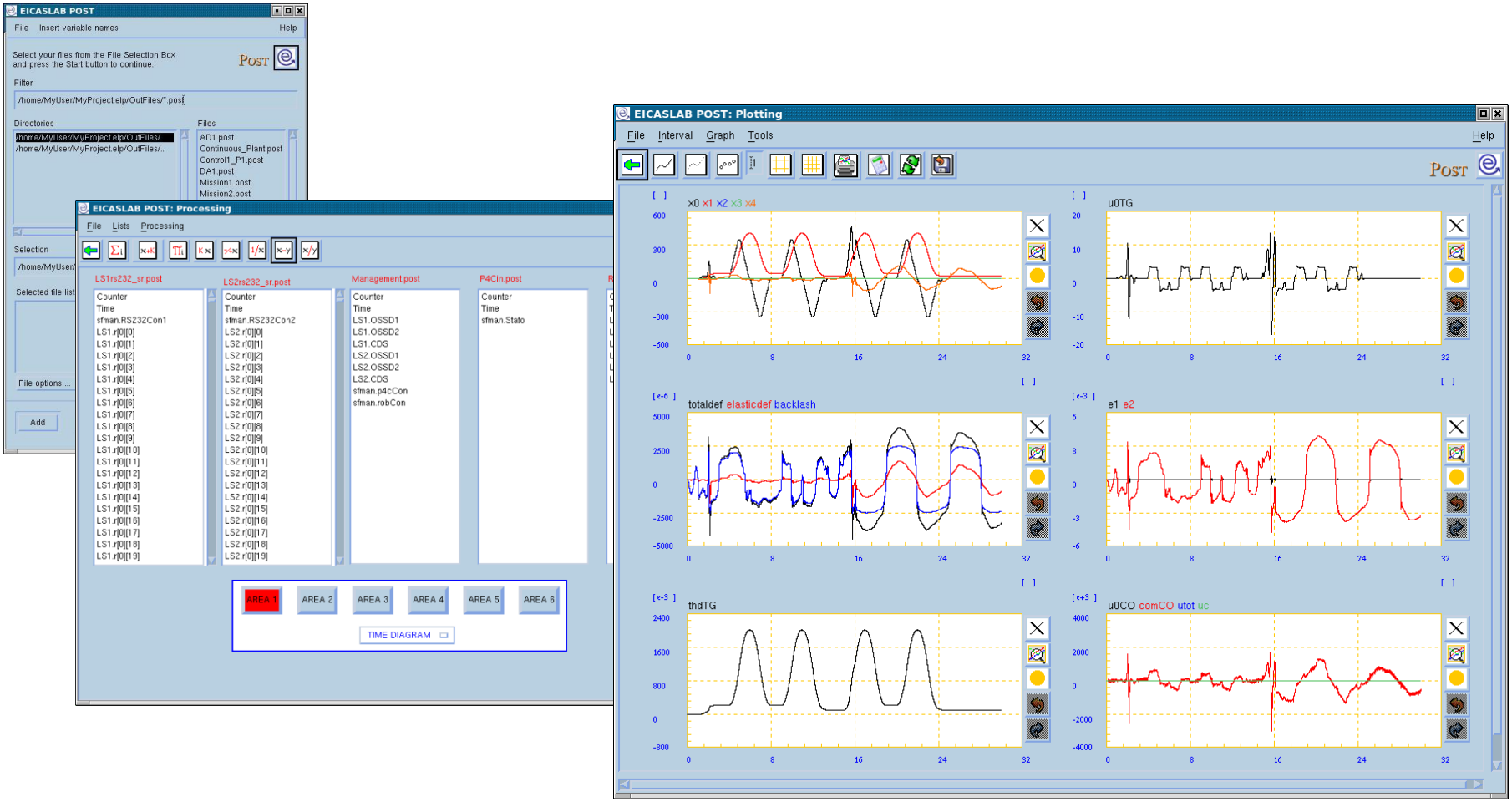
POST is the professional tool of the EICASLAB suite specifically conceived to perform the post-processing of data recorded during the like-real time simulation phase or during the experimental trial on field.



Rapid Control Prototyping in a nutshell

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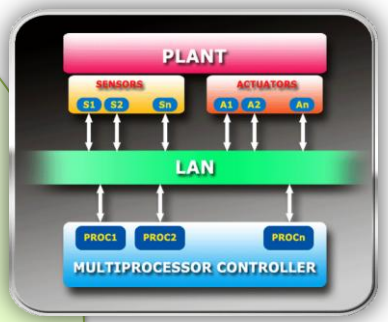
Slow Motion View

EICASLAB™

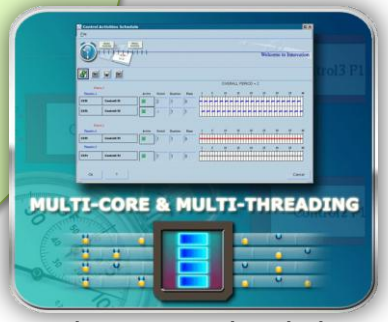
Multiprocessor Architecture



RAPID CONTROL PROTOTYPING

MULTI-CORE PC PLATFORM

Rapid Control Prototyping on Field



Real-Time Scheduling

Activity scheduling

SIMBUILDER TOOL

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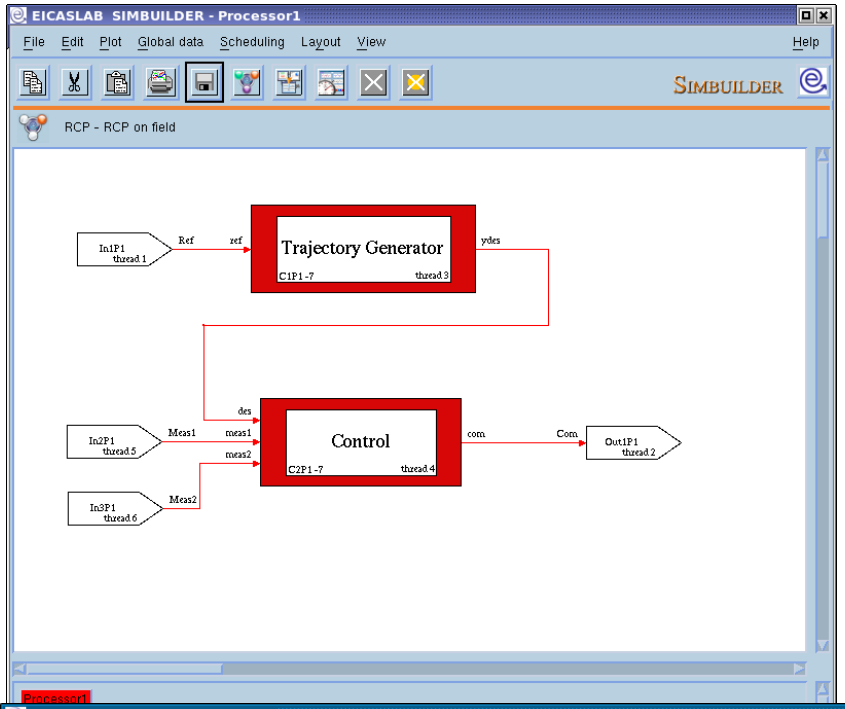
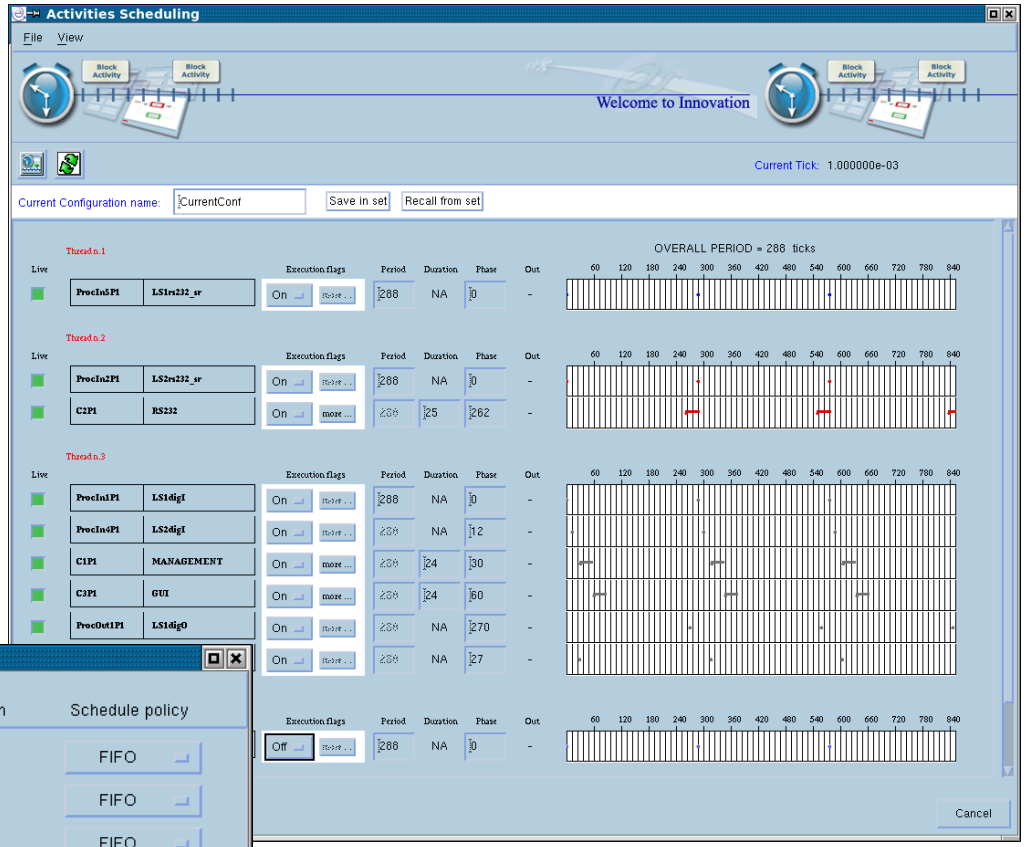
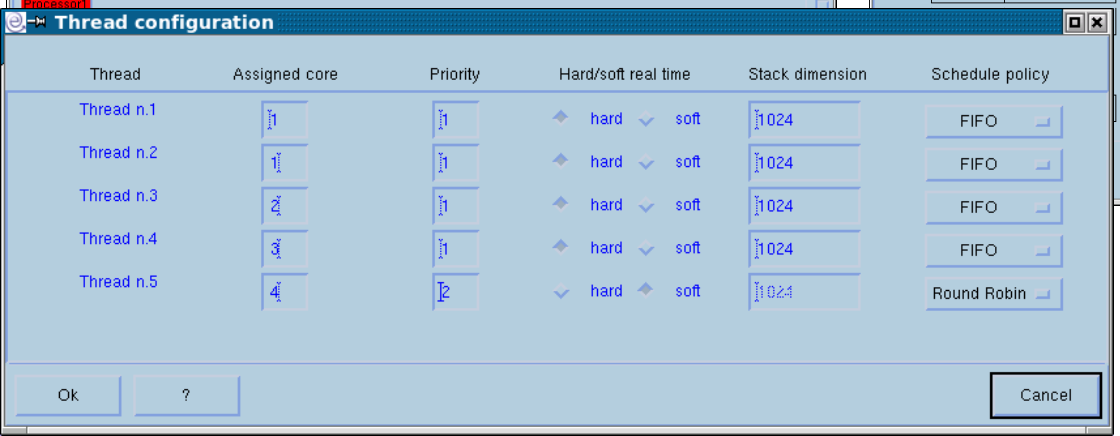
Rapid Control Prototyping

The activities are grouped on **threads**

The threads are assigned to the processors **core**





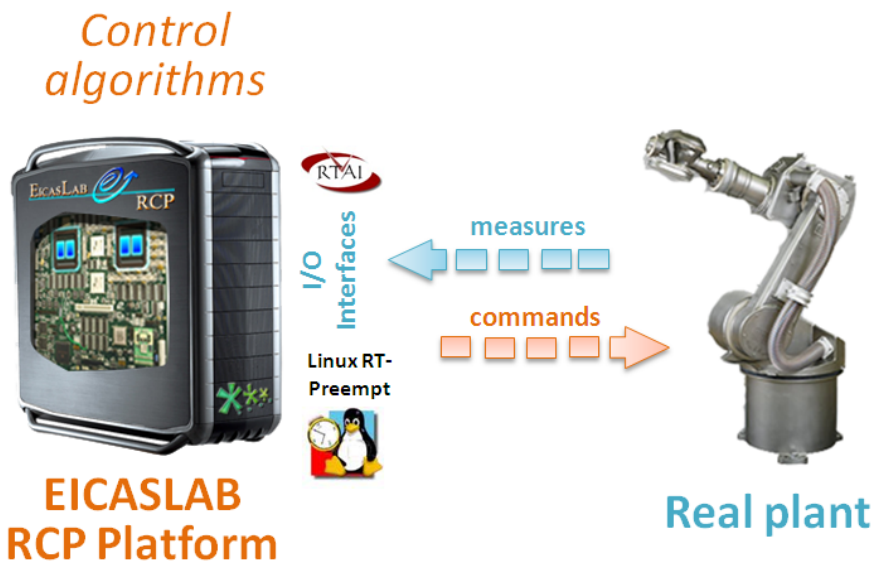


Rapid Control Prototyping Scenarios

STANDARD RCP

Classical RCP scenario

Rapid Control Prototyping scenario



EXTENDED RCP

RCP with Target Bridge

RCP with Bridge Target scenario

Slow Motion View

SLOW MOTION TOOL

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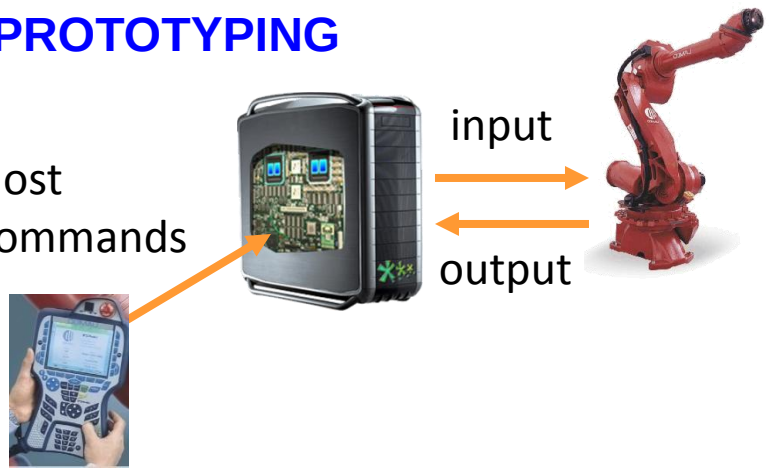
Slow Motion View analyses, step by step and variable by variable, the real-time control software run in experimental trials on the actual plant.

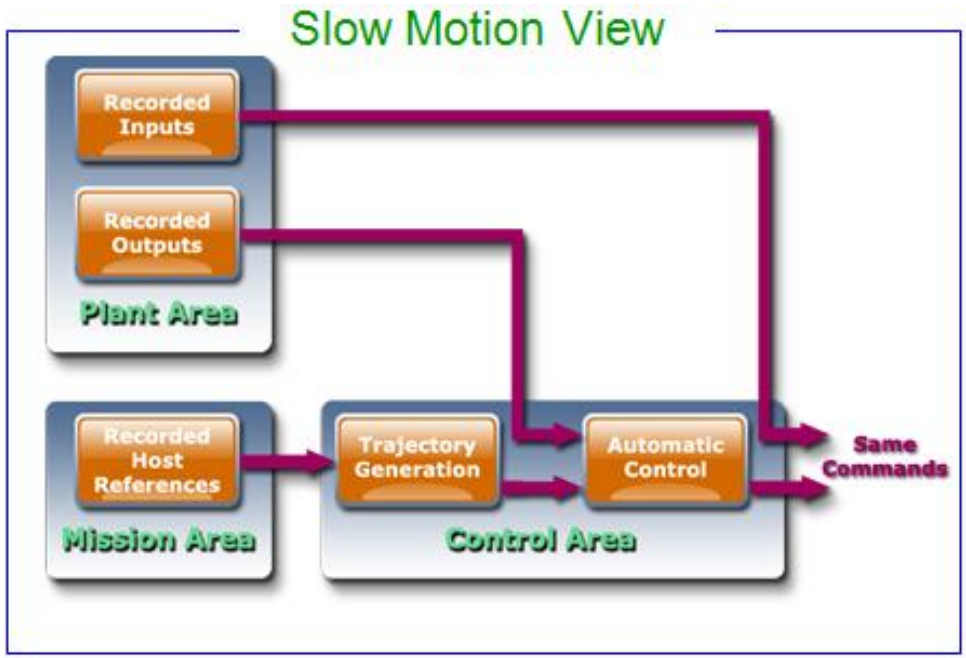
- **Record I/O plant**

REAL-TIME RAPID CONTROL PROTOTYPING

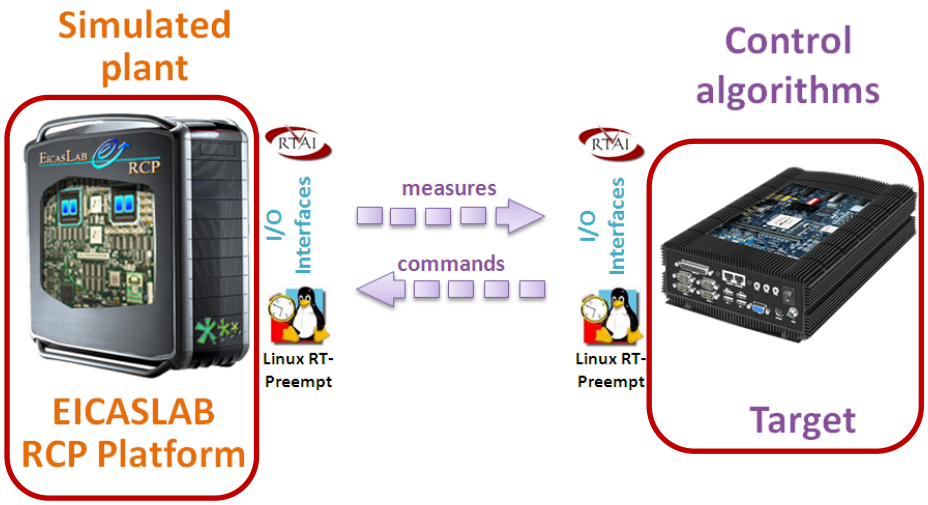


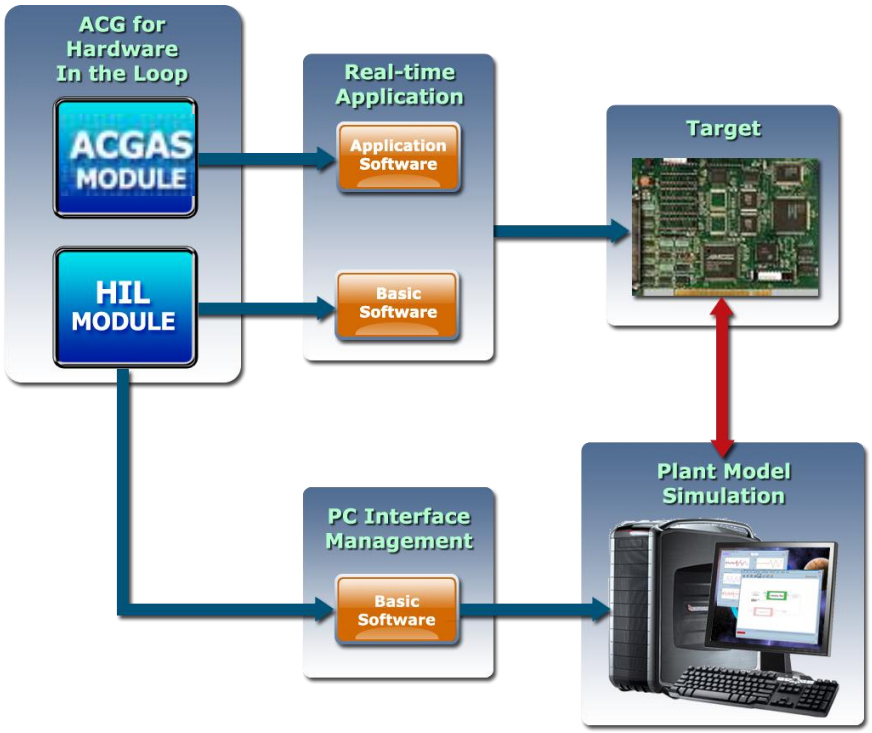
Repeat the trial as a MOVIOLA with

EICASLAB™



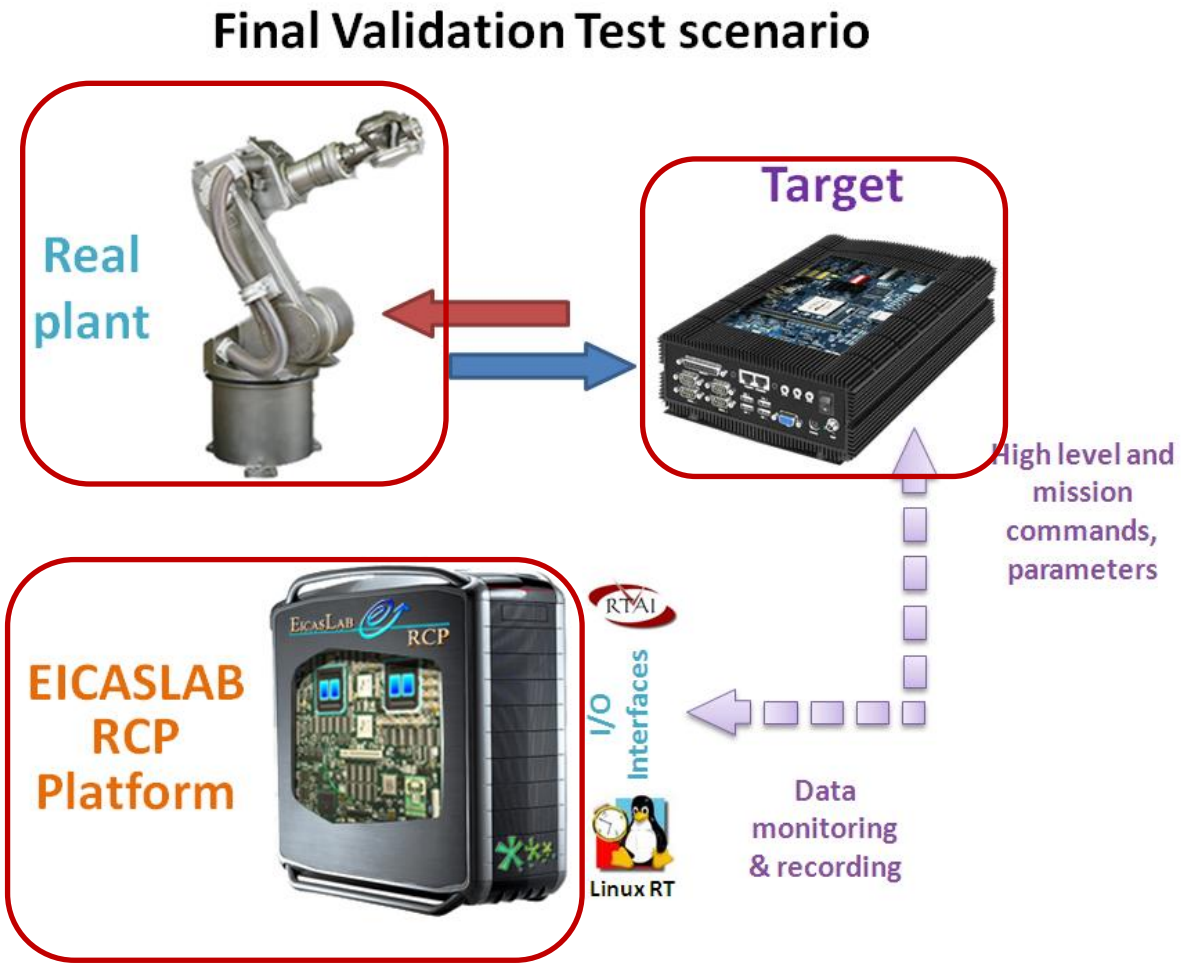
Hardware-in-the-loop





Once the control software code is installed in the final Hardware Target (ACG for specific Hardware Targets), the Hardware In the Loop (HIL) tests may be performed, consisting in piloting – instead of the actual plant - the plant simulated in EICASLAB™ and running on your PC, suitably configured and connected through the necessary hardware interfaces with the final Hardware Target.

Final Validation Tests



Final Validation Tests can be performed, by connecting again your target on the RCP Platform.

In this case the EICASLAB RCP Platform can be used to provide commands to the target and for monitoring the target variables.

Identification and optimisation

MPI/CPO MODULE

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The MPI/CPO module is specifically conceived to enable

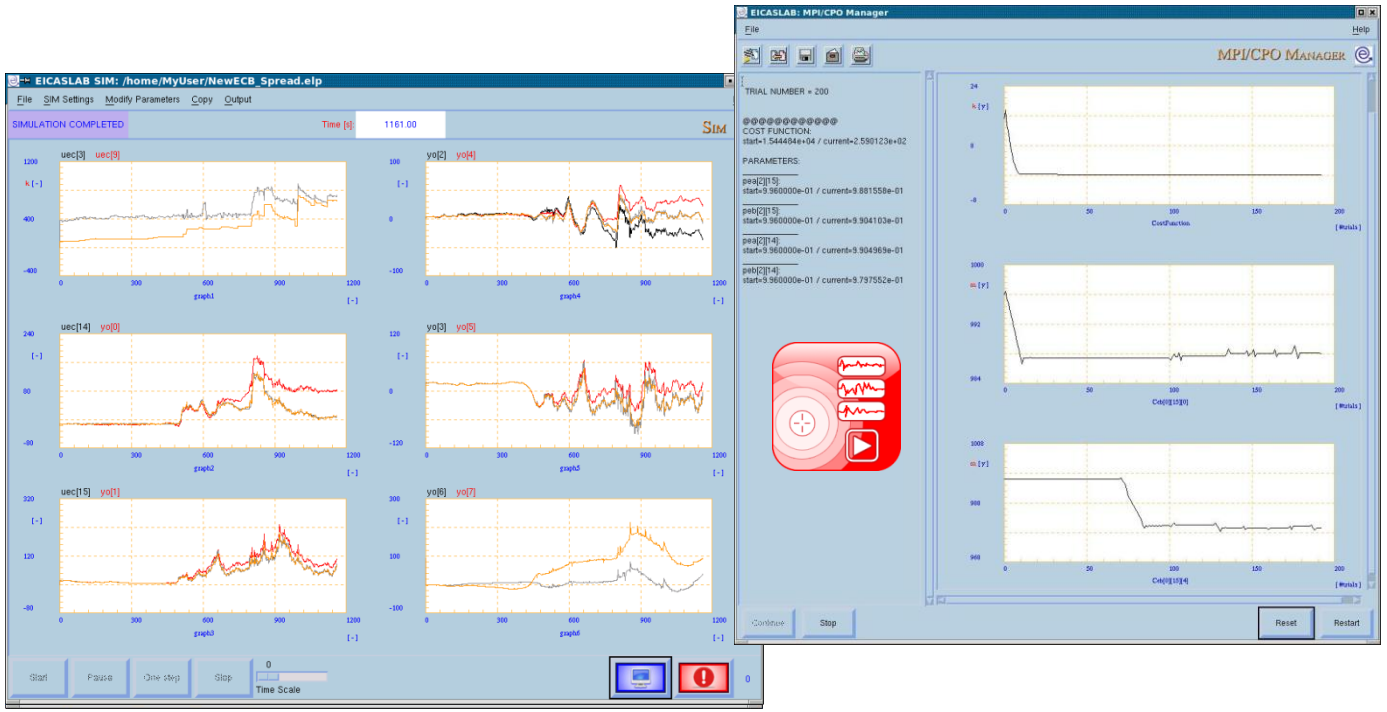
Model Parameter Identification

EICASLAB adopts an original identification method, oriented to estimate the optimal values of the simplified model from the control design point of view.

Control Parameter Optimisation

EICASLAB adopts a powerful algorithm of numerical optimisation that allows in short time to achieve the optimal values of a large set of parameters.

MPI/CPO Manager is the EICASLAB tool that manages this phase



Identification and optimisation

MPI/CPO MODULE

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The MPI/CPO module is available for being used in the following EICASLAB Operative Modes:

MPI/CPO MODULE

Modelling and like Real Time Simulation

➢As Add-On of the SIM Tool

Rapid Control Prototyping

➢As Add-On of the RCP Manager Tool

➢As Add-On of the Slow Motion Tool

IT INCREASES YOUR CAPABILITY TO OPTIMISE YOUR CONTROL THROUGH DATA ACQUIRED FROM THE TRUE PLANT

Automatic Code Generation: AS

ACGAS MODULE

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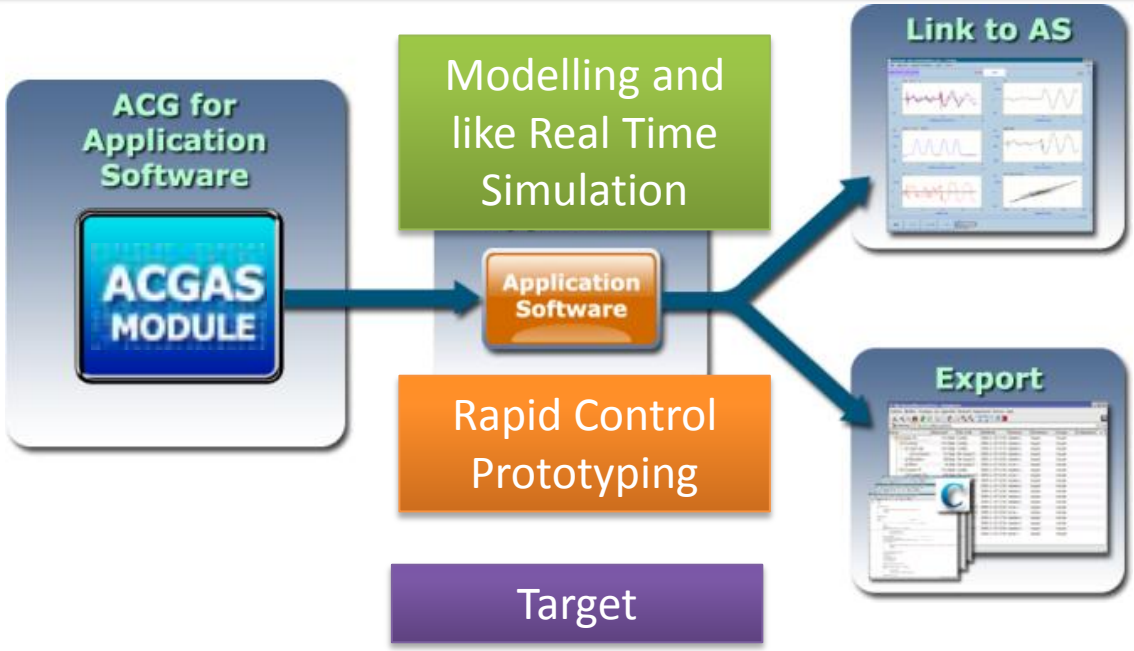
ACG for Application Software (AS)

It allows to generate the AS, that can be tested in a simulated environment using the SIM tool. The AS, running in like-real time simulation (phase Modelling & Like Real-Time Simulation), is the same one that will run during the tests of Rapid Control Prototyping and of hardware in the loop and Final Validation Tests on the final HW target.



Automatic Code Generation: AS

ACGAS MODULE

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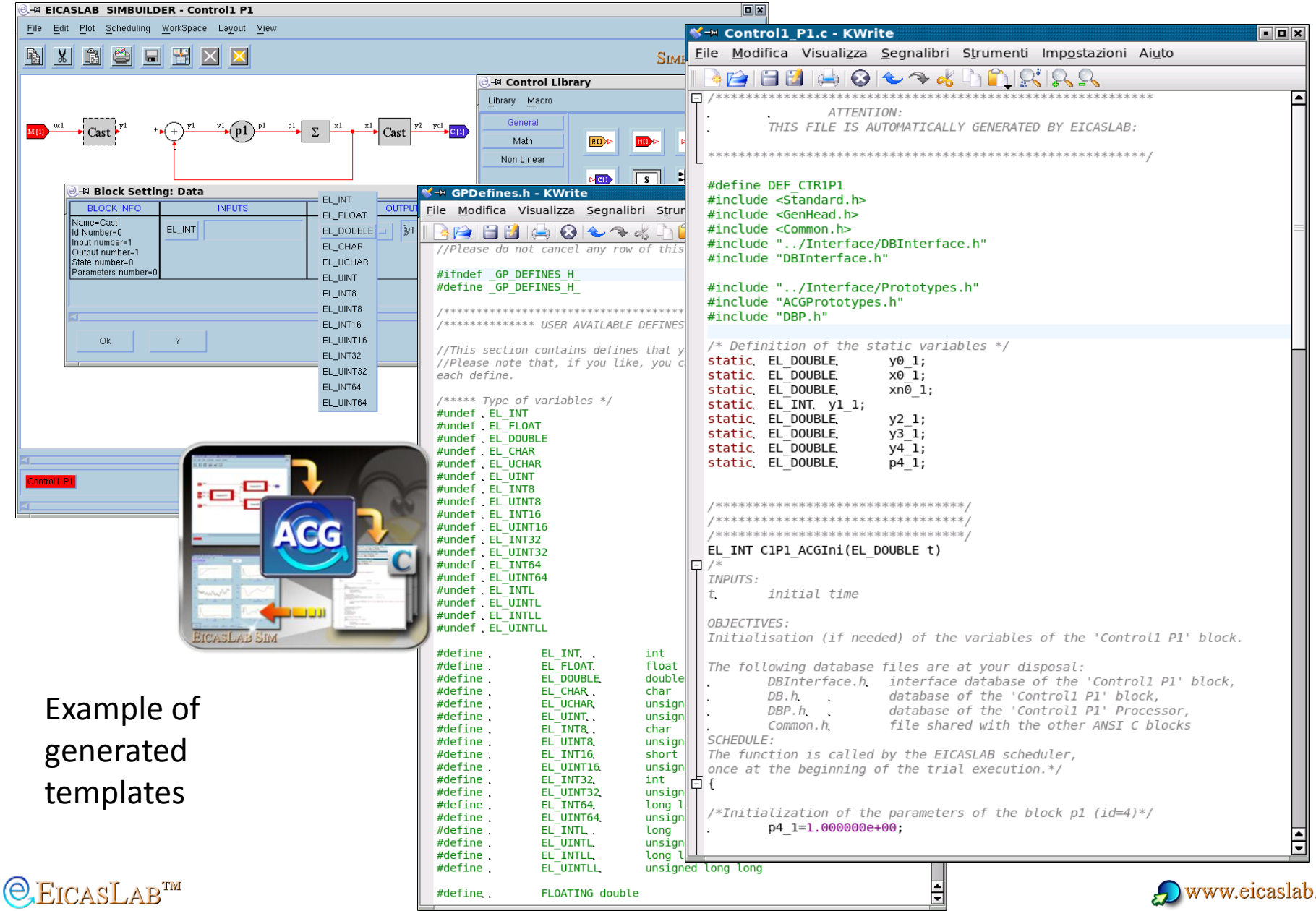

Example of generated templates

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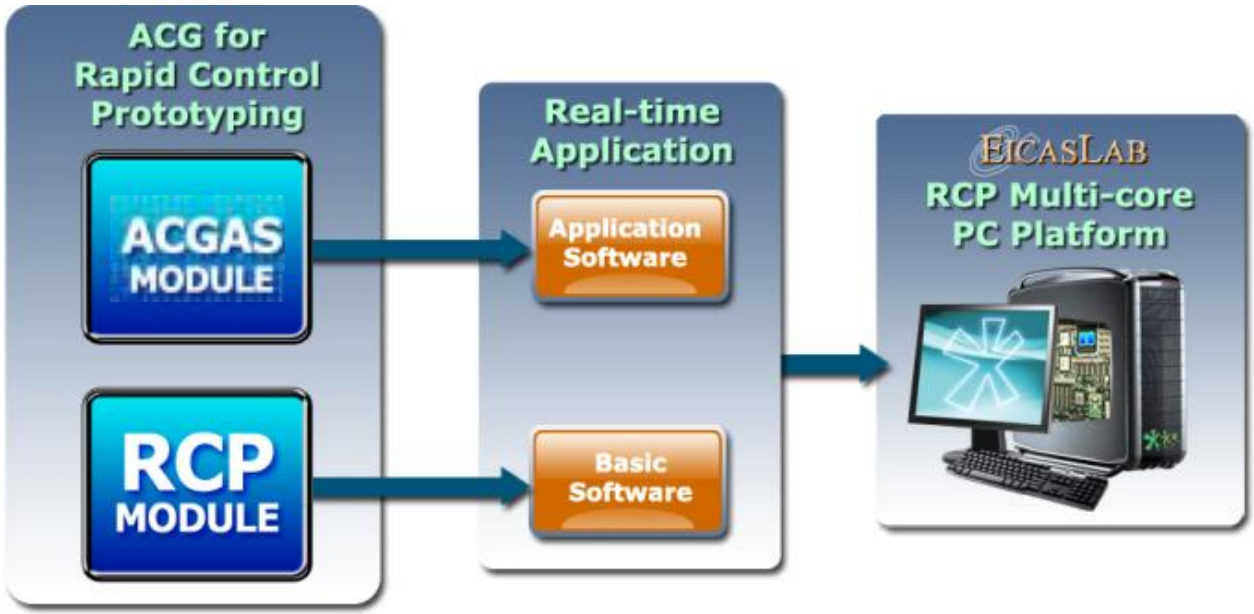
Automatic code generation – AS + BS for RCP

ACG for Rapid Control Prototyping (RCP)

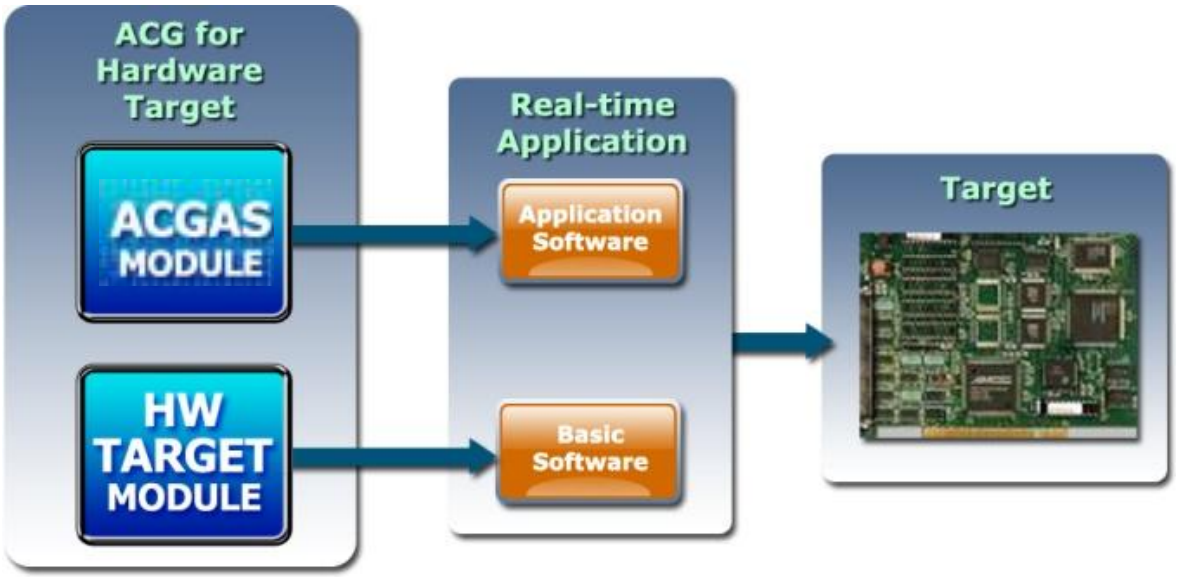
It allows to generate the complementary source code (BS=Basic Software) that, together with the AS, provides a Multi-core and Multi-threading RT application able to perform a complete RCP test.



Automatic code generation for the target

ACG FOR THE FINAL TARGET

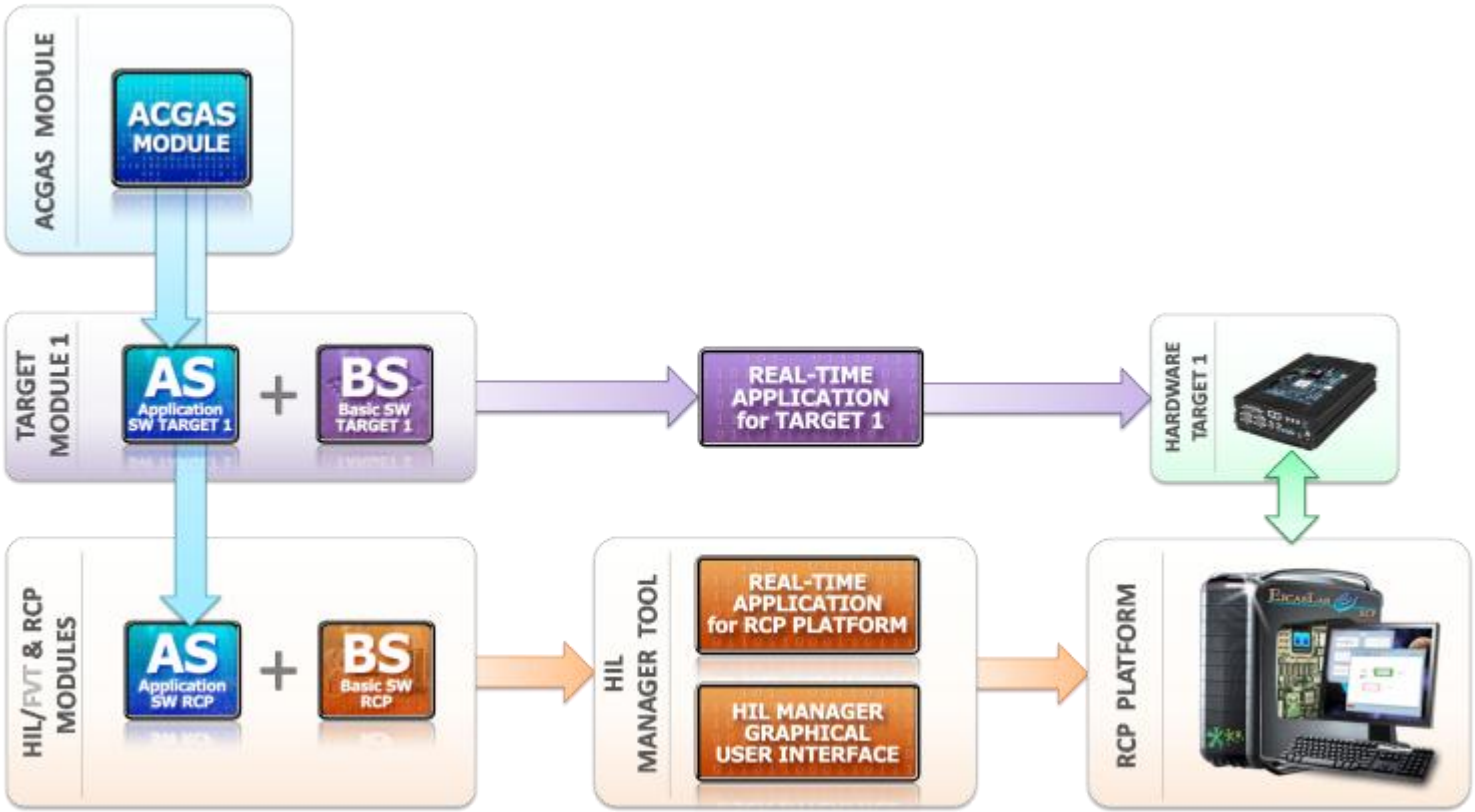
It allows to generate the target-dependent source code that, together with the AS, provides the real time program for desired HW target.



Automatic code generation for HIL

ACG FOR HARDWARE-IN-THE-LOOP

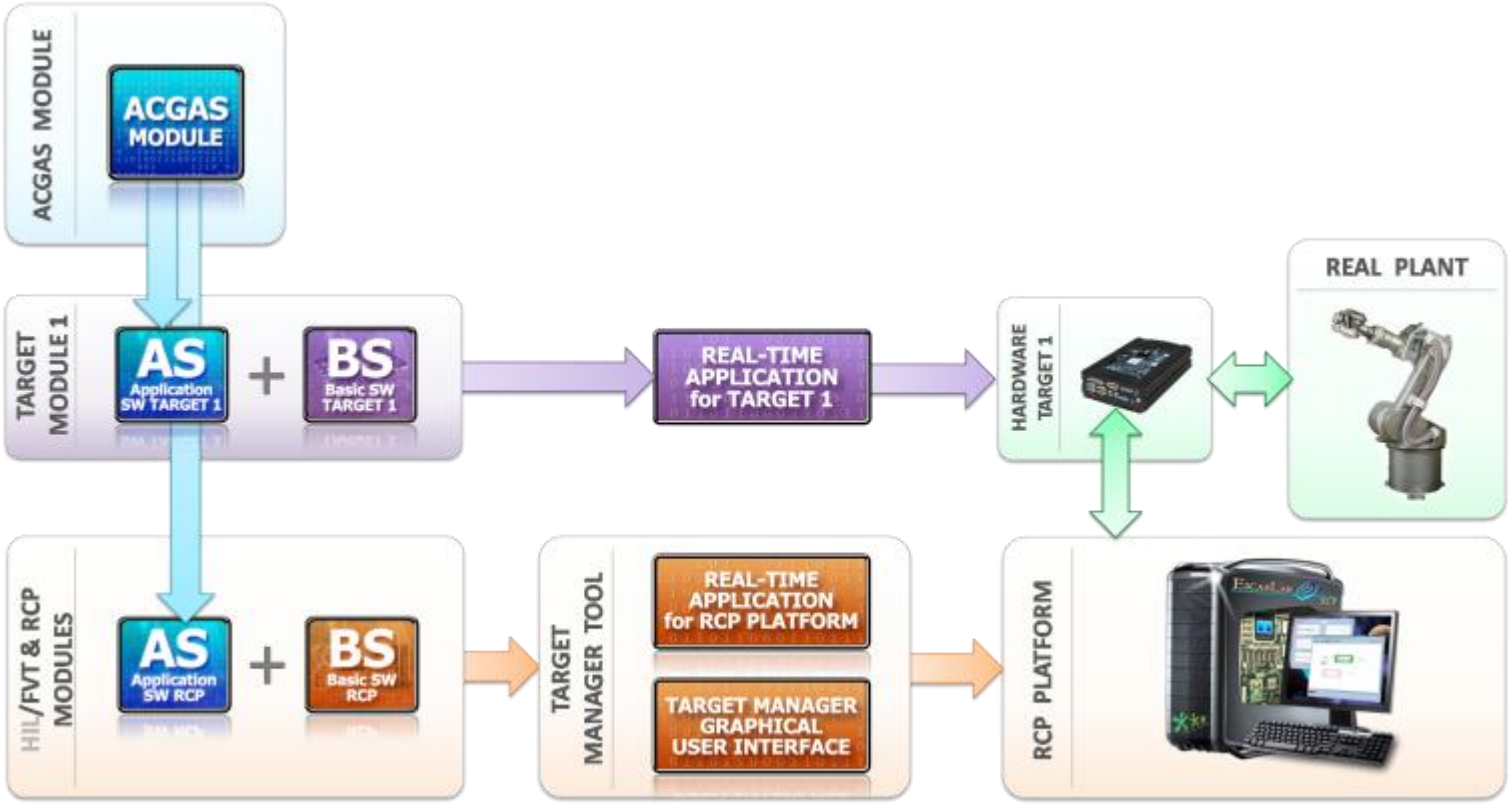
It allows to generate the BS which, together with the AS, allows to perform the Hardware-in-the-loop activities.



Automatic code generation for FVT

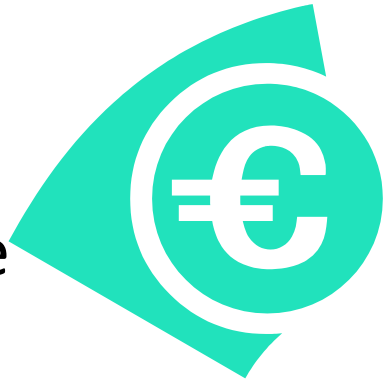
ACG FOR THE FINAL VALIDATION TESTS

It allows to generate the BS which, together with the AS, allows to perform the Final Validation Test activities.



EICASLAB™ : what business benefits?

EICASLAB™



- Just one suite, just one project!
- No need for deep mathematical knowledge
- Minimise the time to develop the control algorithm.
- Reduce costs of the control design.
- Design starting from plant datasheet only.
- No set-up in field.
- Larger freedom to the designer.
- Increase performance specially in complex control cases.

EICASLAB™ Commercial web site

excellence and passion in automatic control design

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Products

for Linux & for Windows

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