



INCODIO – C-Code Connector for INTECRIO

Competence Exchange Symposium ETAS, July 2005
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SYSTEMECS - The Company

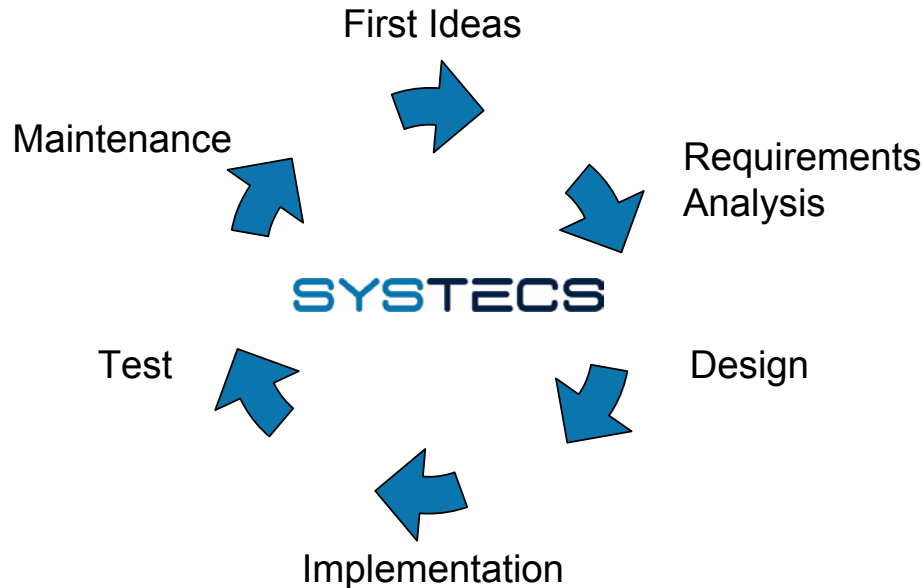
SYSTEMECS is a provider of **Software Engineering Services**

- Headquarter in Leinfelden, next to Stuttgart
- Experience in development of CAE-Tools since 1994
- 30 high qualified employees



SYSTECS – Partner for the Life Cycle of CAE-Tools

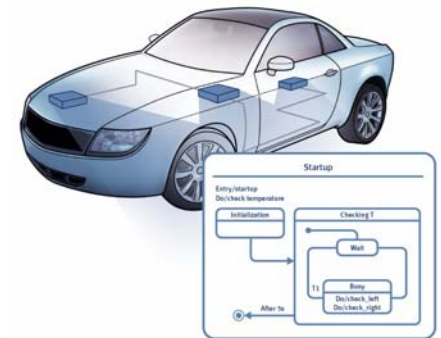
Our High Quality **Software Engineering Services** cover the full **Life Cycle** of Computer Aided Engineering (**CAE**) - Tools



SYSTEMECS – The Focus

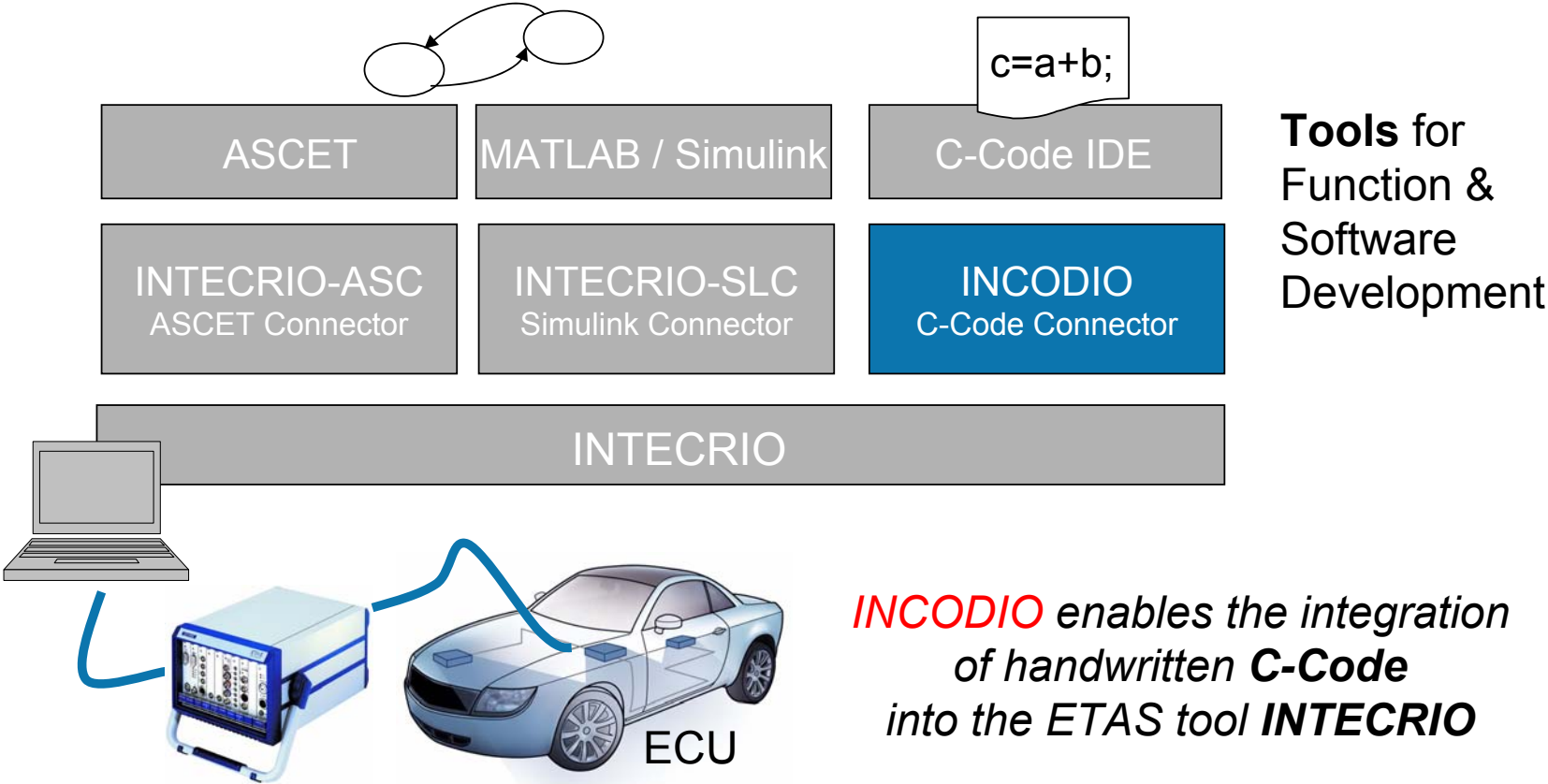
- **SYSTEMECS** is focusing on the **Development and Integration of CAE Tools**
 - Customers: **Automotive** Industry
 - Area: CAE-Tools for the Development of **Software for Vehicles**

- In **2006** SYSTEMECS will **extend its portfolio** from Software Engineering Services to **Software Products**
 - Products will base on **ETAS** open product interfaces
 - The first new product is called **INCODIO** !



ETAS

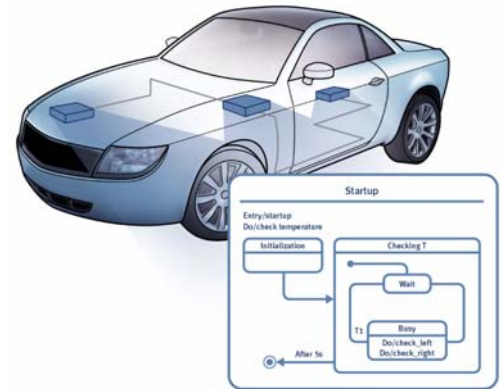
INCODIO – Extending the tool chain



INCODIO – Integrating C-Code in Model-based Development

- Which Customers will use **INCODIO** ?
 - Function Development Engineers at OEMs and their Suppliers who use **INTECRIO** for Model-based Rapid Prototyping

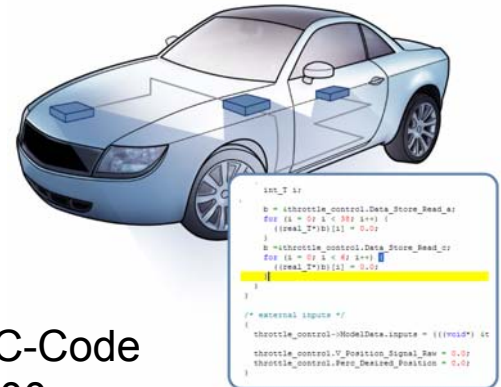
- **Value Proposition**
 - Comfortable migration from verified legacy C-Code to model based development
 - Easy integration of verified hardware related software components, e.g. I/O drivers
 - Avoiding quality problems when integrating legacy C-code, because of easy and safe software integration



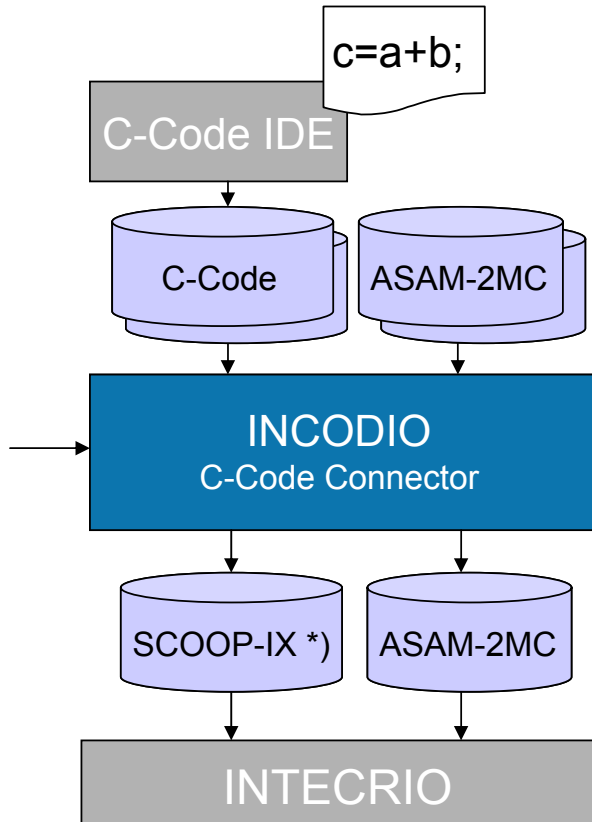
INCODIO – Rapid Prototyping for C-Code based development

- Which Customers will use **INCODIO** ?
 - Software Development Engineers at OEMs and their Suppliers who use **C-Code Development Environments** for Rapid Prototyping

- **Value Proposition**
 - Rapid design and verification of C-Code based vehicle functions
 - Edit, design and verification/validation of new C-Code functions on a dedicated Hardware, e.g. ES1000, ...
 - Avoiding quality problems when integrating C-Code, because of easy and safe software integration



INCODIO – How does it work?

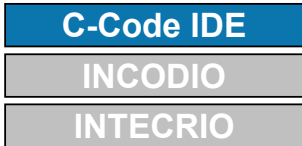


- **Reads C-Code and ASAM-2MC files**
- **Configures** and validates the parsed data (e.g. formulas or saturation values).
- **Generates Interface Description and ASAM-2MC files**
- **Extensibility** through customer specific AddOns

*) Source Code, Objects, and Physics Open Interface Exchange Language

INCODIO – Easy to use (1)

- Seamless integration of C-Code into INTECRIO
- Take your existing C-Code and drop it into INTECRIO...



```

UltraEdit-32 - [c:\throttle_control.c*]
Datei Bearbeiten Suchen Projekt Ansicht Format Spalte Makro Extras Fenster Hilfe
throttle_control.c | throttle_control_data.c | throttle_control_main.c

{
  int_T i;

  b = $throttle_control.Data_Store_Read_a;
  for (i = 0; i < 38; i++) {
    ((real_T*)b)[i] = 0.0;
  }
  b = $throttle_control.Data_Store_Read_c;
  for (i = 0; i < 6; i++) {
    ((real_T*)b)[i] = 0.0;
  }
}

/* external inputs */
{
  throttle_control->ModelData.inputs = ((void*) &throttle_control);

  throttle_control.V_Position_Signal_Raw = 0.0;
  throttle_control.Perc_Desired_Position = 0.0;
}

/* external outputs */
{
  rtM_throttle_control->ModelData.outputs = (&throttle_control);

  throttle_control.Abs_Error_Counter = 0.0;
  throttle_control.Abs_Error_Flag = 0.0;
  throttle_control.F_PWM_Frequency = 0.0;
  throttle_control.Perc_PWM_Dutycycle_1 = 0.0;
  throttle_control.Perc_PWM_Dutycycle_2 = 0.0;
}

/* parameters */
rtM_throttle_control->ModelData.defaultParam = ((real_T *)
&throttle_control);

/* data type work */

```

INCODIO – Easy to use (2)

- ④ Generate INTECRIO interface description
- ③ Configure variables and functions
- ② Optionally drop ASAM Files
- ① Drop(ped) Header and Source Files

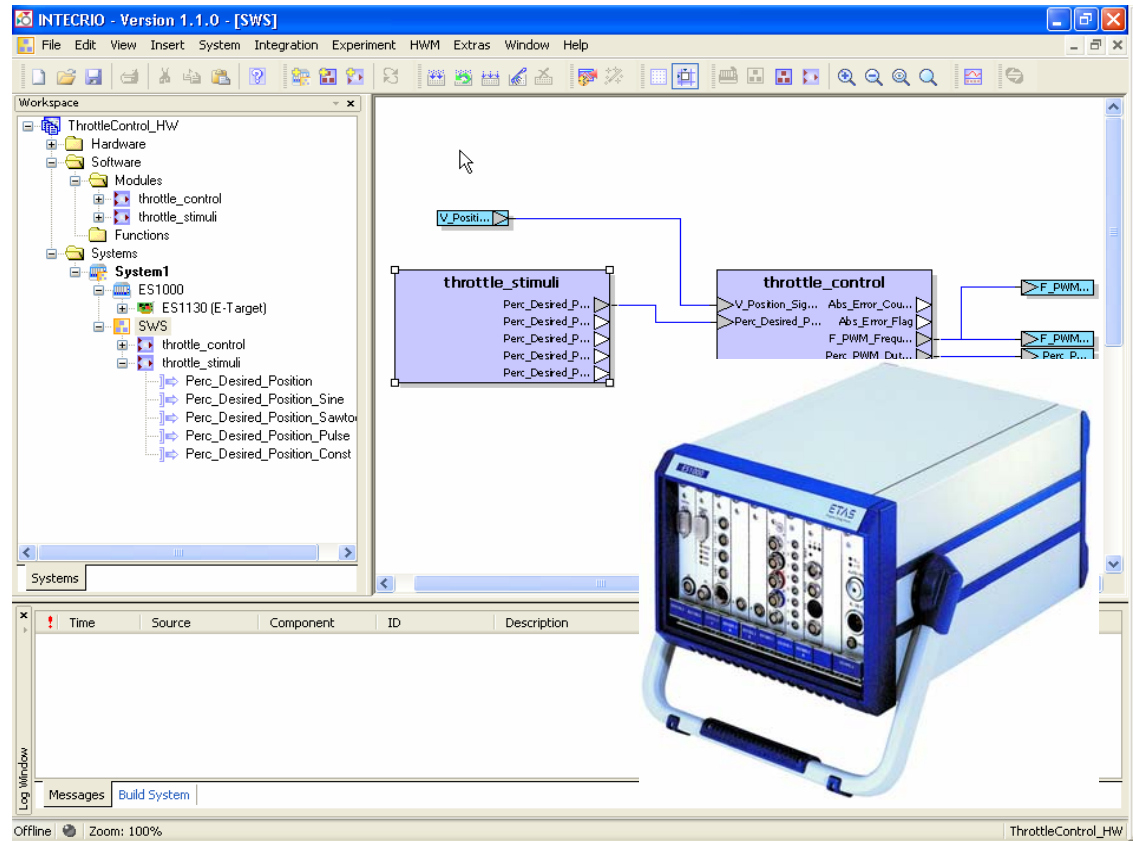
C-Code IDE
INCODIO
 INTECRIO

Enabled	Name	Identifier	Datatype	Modeltype	InitValue	Saturation	Direction	Usage	CompuMethod
<input checked="" type="checkbox"/>	Abs_Throttle_Pos_Offset_Value	Abs_Throttle_Pos_Offset_Value	float	continuous	2		none	calibration	COMPU_METHOD_1
<input checked="" type="checkbox"/>	V_Position_Signal_Raw	V_Position_Signal_Raw	float	continuous	0	min=-10.0; max=10.0	in	measurement	COMPU_METHOD_1
<input checked="" type="checkbox"/>	Perc_Desired_Position	Perc_Desired_Position	float	continuous	0	min=-100.0; max=100.0	in	measurement	COMPU_METHOD_1
<input checked="" type="checkbox"/>	Abs_Error_Counter	Abs_Error_Counter	unsigned int	continuous	0		out	measurement	COMPU_METHOD_1
<input checked="" type="checkbox"/>	Abs_Error_Flag	Abs_Error_Flag	unsigned char	boolean	0	min=0; max=1	out	measurement	COMPU_METHOD_1
<input checked="" type="checkbox"/>	F_PWM_Frequency	F_PWM_Frequency	float	continuous	0	min=0; max=1	out	measurement	COMPU_METHOD_1
<input checked="" type="checkbox"/>	Perc_PWM_Dutycycle_1	Perc_PWM_Dutycycle_1	float		0		out	measurement	COMPU_METHOD_1

INCODIO – Easy to use (3)

- ...and integrate it into INTECRIO
- C functions can now run on Rapid Prototyping System (e.g. ES 1000)

C-Code IDE
INCODIO
INTECRIO



INCODIO - Summary

- INCODIO...
 - Enables C-Code integration for model-based development & Rapid Prototyping for C-Code based development
 - Offers High Usability
 - Extensibility through customer specific AddOns
 - Avoids quality problems when integrating C-Code
- **INCODIO Roadmap**
 - **Prototype Q4 / 2005, Product in Q2 / 2006**

Contact

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