

ROBUST

ROBUST: Design of Robust Nanoelectronic Systems

ROBUST researches new methods and procedures for designing robust nanoelectronic systems. For the first time ever, the project defines quantitative measures of robustness. These metrics are determined by abstracting models of robustness and by applying new analysis methods suitable for the system level. Robustness metrics are employed for guiding and assessing static and dynamic optimization of robustness.

The results of ROBUST are methods and prototype tools that enable early consideration of robustness in the context of a top-down system design flow. The methods and prototypes are applied to a demonstrator design for evaluation purposes. They are made available to industrial research partners as a basis for integrating robustness into their design processes.

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Project partners:

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SANITAS: Enabling Safer Systems by a new Collaborative Verification Methodology across the Value Chain

The research project SANITAS targets the development and exploration of a new system verification methodology for the design of highly reliable next generation applications and products. SANITAS integrates several layers of the product development chain from the layer of micro- and nanoelectronic components up to the layer of final products into a holistic verification strategy. This, for the first time, provides a seamless verification process along the whole development chain which is capable of capturing the effects of micro-/nanoelectronic components and embedded software - the key drivers for building safe and reliable products - at an early stage of the overall development process. The technical goals of SANITAS include increasing the verification efficiency and effectiveness by moving to a higher level of model abstraction in conjunction with developing powerful verification mechanisms acting on that level. These mechanisms are complemented by techniques which enable a seamless integration into requirements management at the product level. Furthermore, SANITAS aims at developing a methodology which allows for a flexible generation of high level verification models or environments which can be efficiently used for an early validation of the overall system behavior. Within SANITAS the domain of industry automation is used as a showcase application.

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Robert Bosch GmbH
Siemens AG
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SyEnA: Synthesis-supported Design of Analog Circuits

Within the framework of the SyEnA project new automatable methods for analog circuit design are being developed for the first time; these include the whole design chain from the specification to the production plan. These methods are leading to a significant increase in quality and productivity as well as providing new opportunities for developing innovative complex systems. This paves the way for new types of products especially in the areas where safety is critical – in medical technology and automobile electronic. For example emergency systems with new types of intelligent sensory functions can help to prevent accidents or to save human lives with preventive medical diagnostics. The most significant technical objectives of SyEnA are:

- » To improve the specifications of analog circuits as well as to develop methods for producing and refining these and also for developing synthesis-compatible analog design descriptions.
- » To develop process techniques to design synthesis-supported analog circuits at various levels of abstraction.
- » To develop methods for synthesis-supported technology transfer.
- » To develop process techniques for the quantitative and qualitative evaluation of analog synthesis results.

For these developments particular value is attached to the suitability of the methods and tools for industrial purposes. SyEnA will be the first of the industrial ICT 2020 joint projects to transfer the innovations from an EDA cluster research project (SAMS) to this application. The systems, which could only be designed because of SyEnA, will form a “bridge” between the complex sensory functions that record the environment and the circuits which then process this information further. In this way the project makes an important contribution to assuring the project partners’ lead in innovations.

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IMMS gGmbH
Infineon Technologies AG
Melexis GmbH
MunEDA GmbH
Northrop Grumman LITEF GmbH
Robert Bosch GmbH
ZMD AG



Overview of EDA Projects in Germany

2010

In order to stimulate EDA research activities the BMBF (Federal Ministry of Education and Research) has established as part of its ICT 2020 research program an R&D program on design platforms for complex applied systems and circuits. In these ICT 2020 EDA-projects industry and research join forces with the public authorities to support those areas that are vital for the competitiveness of the German industry. There are five application fields with a potentially high added value, and with considerable potential for job creation: automotive/mobility, mechanical engineering/automation, health/medicine, logistics/services and energy/environment. Currently 12 EDA research projects are being funded by the ICT 2020 program, and these are described in this flyer.

In this funding program German semiconductor and systems companies, EDA companies, and research institutes work together on joint projects to find solutions for current and future design problems and challenges. The projects are often integrated with European funding programs like CATRENE or MEDEA+ and benefit from the resulting synergy effects. The task of the edacentrum is to coordinate the projects, promote their results, and establish a network for the EDA community, including the cooperation with German professional associations, such as GI, GMM, and ITG.

In research and development projects (**R&D projects**) the systems and semiconductor industry cooperates to make research possible which a company could not carry out all by itself. They tackle the particular challenges of the German industrial and business sectors in order to improve their position in international developments in science and business. The purpose of R&D projects is to benefit the German national economy by providing quick and effective results.

EDA cluster research projects aim at examining solutions for the medium and long-term EDA methods which will be used by the industry within the next 5 to 10 years. These projects are mainly performed by universities under guidance from the industry in order to stimulate EDA competences that will be significant for the industry in future.



**AutoSUN:
Design of Automotive Systems with Uncertainties**

Electronic systems within the automobile industry experience a steady increase in complexity. The development of novel electronic systems especially in a safety domain such as driver assistance systems is a big challenge. This growing complexity as well as the resulting necessity of a closer cooperation between car manufacturers, suppliers, and semi-conductor companies demands new concepts of system design. Therefore the project aims at investigating techniques for improving the design flow as well as methods for the protection of intellectual property (IP). The main goals are - Acceleration of capturing the specification - Acceleration of the simulation itself, in order to enable a simulation of the entire traffic scenario based on the specification - Development of techniques for verifying systems with analogue as well as digital hard and software - capturing and assessing assembly units with character with tolerances within this project. The complete chain from car manufacturer to supplier to semi-conductor manufacturer is represented as a project partner. In order to enable a mutual black box transfer of IP without exposing any internal IP-knowledge, the use of so called compiled customer models will be investigated.

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**Dionysys:
Design Technology for Radio Frequency Systems in Package**

In contrast to System-on-Chip (SoC) designs today there is no general design methodology for System-in-Package (SiP) designs, enabling a fast, secure and high quality design, available. The partners of the research project Dionysys funded by the BMBF started their cooperation to prevent future SiP projects from failing due to missing design flow support. The target of the project is the generation of a holistic view on an integrated system including package and radio frequency (RF) parts to enable a fast and mature design of a competitive SiP solution. Topics in the projects are the definition of the system concept by considering all different technologies used in an SiP, the involvement of electromagnetic simulations to analyse package and RF structures, the automated generation and verification of RF devices and finally investigations to handle the production test of the complex SiP's.

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Cadence Design Systems GmbH
CST GmbH
Infineon Technologies AG
IMMS gGmbH
Melexis GmbH
Schwarzer GmbH



HONEY: Methods for Analysis and Design Optimization of Yield and Reliability of Complex ICs Fabricated in Leading Edge Technologies

Achieving a fast product ramp, high yield and the required product reliability at the first design release are mandatory to ensure an economic manufacturing of highly complex ICs in leading edge technologies such as 65nm and below. Therefore yield and reliability aspects have to be considered already during the design phase of an integrated circuit. The main objectives of the HONEY project are to investigate and to provide abstract models, methods for circuit and system analysis, and systematic approaches to optimize yield and reliability of complex ICs in the areas of communication, automotive and industrial applications. The transfer of these methods to a potential design flow is the key step towards productive designs. Together with conventional methods for yield and reliability management this will enable product designers already in the concept and architectural planning phase of a new product development to consider cost sensitive yield and reliability aspects.

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RapidMPSoC: Rapid System Prototyping and Platform-Based Design for Mixed Signal Multi Processor SoC

RapidMPSoC deals with four topic areas to accelerate the Analogue/Mixed-Signal (AMS) Design, at a high level of abstraction.

The topic area „Technologically independent design of Analogue-IP on the behavioural level“, explores processes for A/D Converters. These would reduce both the costs of implementation, as well as the design costs of transition to a new technology, by around 20%.

The topic „Analogue architecture and interface to the Multiple Processor System“ deals with the cost and cost-estimation of the implementation at the algorithmic level, ensuring an efficient realisation through the definition and standardisation of algorithms, protocols and transfer methods. This aims to reduce the design time required for the specification by up to 30%.

In the area of „System design“, the focus is on the AMS sub-systems of a System-on-Chip (SoC), with consideration of the interfaces to the overall system. Through RapidMPSoC, a complete system simulation will be made possible, whereby the simulation speed is increased, at minimum by a factor of 10, while maintaining a comparable level of accuracy.

The „System verification“ topic focuses on the AMS sub-systems, while also taking into consideration all interfaces to the complete system. Through an assertion-based simulation process, the performance of the complete system verification is increased. Through it, a „right-first-time“ design is ensured, the numerous standards that need to be supported are made controllable, and the verification costs in the design process can be reduced by a minimum of 50%.

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