# Altreonic's System Design and Embedded Software Engineering Services

Altreonic's methodology and products have a long experience behind them. Our team has been managing or developing embedded products for years. Methodology and application specific know-how are winning combinations. Whether as coaching consultants or executing engineers, we can help you to get your products to market faster. Quality is our trademark, methodology and experience are our assets.

How do we operate?
Each project starts with a feasibility study together with the customer. It gathers requirements, develops specifications and derives the skills and resources needed. If this phase is successful, the development is started in close cooperation with the customer. Teamwork is the key.

IDEAS and CONCEPTS

⬇

(**DEFINE**)

⬇

(**DESIGN**)

⬇

(**MODEL**)

⬇

(**GENERATE**)

⬇

TRUSTWORTHY PRODUCTS
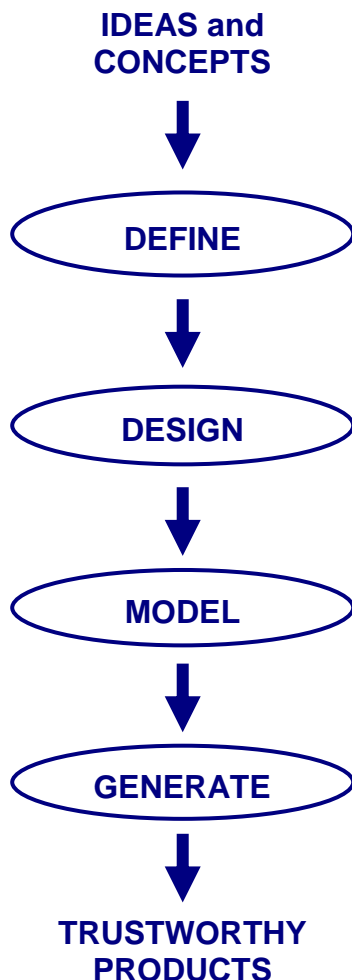
1. Creating an organization specific project GoedelWorks portal.

GoedelWorks is based on a formalized meta-model covering the design and workflow view in a systematic systems engineering methodology. It is implemented as an intranet based project portal.
The steps:

- Developing a written description of the steps involved in creating a product in your organization. It captures how the organization executes its projects, but it also collects crucial heuristic knowledge and might identify weak spots.
- Creating a first integrated cookbook portal
- Fine-tuning it using a real project.
- Support for maintaining and upgrading the portal.

Your benefit:

- Knowledge management
- Systematic and faster project execution
- Pre-certification according to applicable standards.

2. Embedded real-time programming

Embedded real-time applications are not easy to develop. At Altreonic we are at the core of this domain, having developed a unique network centric RTOS using formal methods. We know what real-time means and how to achieve it, we know what multi-tasking is and how to make it work.

3. Formal verification of software

Although this is still considered as the front-end of advanced embedded software engineering, we have the experience and know where the limits are. We also know how a combination of formal approaches and proven tools can provide a high level of trust.

From Deep Space to Deep Sea

www. Altreonic.com

Push button high reliability

Altreonic

RTOS
Formal development of a distributed RTOS, porting RTOS to new targets and boards, Development of application specific services for OpenComRTOS.

DSP
FFT-analysis for 3D tomography, real-time audio processing, pressure sensors, soft modems, speech codecs, acoustic and line echo cancellation, EEG and EKG signal processing, image processing (such as morphological blood analysis, print preparation).

Software engineering
Verification of closed software loop algorithms, CSP, TLA/TLC, RTOS formal modeling, protocol analysis, UML, SysML, SDL-RT, MISRA-C, Promela/SPIN, TLA+, UPPAAL, CBMC

Systems engineering
Reconfigurable and fault-tolerant tele-communcations satellite (based on 900 FPGA with softcores) , DAB channel decoder, DSP cPCI systems.

Project management
Code generators, OpenVE, Goedel-Works, BSP, IEC 61508

Portal developement
GoedelWorks

Languages and tools
C/C++, Java, Python, Assembler, Linux, Windows, Subversion, Matlab/Simulink, Eclipse, Modelsim, Vissim, Pascal, MathCAD, Plone, drupal, php, XML, Javascript, Phyton.

Processors
MicroBlaze, LEON3 (SPARCV8), MLX16, ARM, XMOS, PowerPC, 8051, ADI 218x, ADI21060, TS101, TI54xx, TI 67xx, Freescale 547/5249, NXP Cool-Flux, Intel80x86

4. Embedded DSP engineering

DSP systems are a demanding domain in embedded systems. They require high performance, low memory, low power and often execute complex algorithms. At Altreonic these requirements have been a guiding context for developing our methodology and our products.

5. Customer specific software engineering

Given the wide range of experience within our team, we deliver innovative solutions. We have know-how and experience in embedded systems programming, algorithm development, software verification, certification but we also have know-how and experience with embedded hardware. Our team is multi-disciplinary and routinely crosses software and hardware borders.

6. Training in systems and software engineering

Altreonic's methodology is unique, it covers the whole domain from early requirements capturing to validation until the product is ready for production.
Although we developed a coherent development environment, applying a methodology is first of all a mindset that seeks to formalize and therefore achieves better results in less time. You can train your own people in this mindset as well. These trainings are not just for engineers, but concern managers as well.

7. Training in real-time programming

Real-time programming is often considered to be difficult. This is partly due to the fact that real-time programming is often misunderstood. Even some commercial RTOS are not always suitable for hard real-time programming. We can teach your engineers what real-time is and how to achieve it. We can also teach them the pitfalls.
What makes these trainings unique is that we can use the formally developed OpenComRTOS. It is one of the smallest and highest performance RTOS in the world, enabling higher performance with less resources. It is also the only one which was developed for scalable multiprocessing from the start.