Altreonic NV

www.altreonic.com

UNIVERSAL SCALABILITY AND HIGH RELIABILITY WITH ALTREONIC

Altreonic history

- History goes back to Eonic Systems NV
  - Background in CSP and transputers
  - Developed parallel DSP Virtuoso RTOS
  - Acquired by Wind River Systems in 2001
- Open License Society (R&D) 2004
  - Developing a formalized systems engineering methodology
    - Unified semantics + interacting entities
  - Formally developed network-centric OpenComRTOS.
- Altreonic is a spin-off of OLS
Altreonic today

- Products:
  - **OpenCookbook**: web portal for full project support, customer tailored.
  - **OpenVE**: visual modeling/development of embedded software
  - **OpenComRTOS**: formally developed and verified network-centric RTOS
  - **OpenTracer**: visual profiling of applications
  - **OpenHardWare**: SIL3/4 controllers under development

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Unified Systems/Software engineering

- **OpenCookBook** ©
  - Formalised requirements & specifications capturing
  - Project repository

- **OpenVE** ©
  - Formalized modelling
  - Simulation
  - Code generation

- **OpenComRTOS** ©
  - Formally developed
  - Runtime support for concurrency and communication

- **SIL 3/4 Controller** ©
  - Control & processing platform natively supporting distributed concurrency & communication

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Rationale and market

- Growing need for dependability of embedded systems
  
  Trustworthy = Added Value.

- High reliability can be cost-efficient

- Integrated approach from Altreonic

- Customer base are system integrators

- Application markets:
  - Automotive (e-car).
  - Distributed control (machines, house robots)
  - Next gen. mobility platforms (e.g. 4G netbook phone)

Why Formalized?

- First time right
  - Less residual errors
  - Higher reliability
  - Less costs

- Testing will only demonstrate absence of certain errors.

- Formal verification can prove absence of any errors.
**Unique technology**

- Formalized, straightforward approach
- Full integration of tools
- **OpenComRTOS** unique features:
  - Network-centric RTOS
  - Formally developed and verified
  - Scalable yet very small and complete
    - 5 to 10 Kbytes/node
  - Real-time communication support
  - Heterogeneous target support
- Affordable cost

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**Step 1: Requirements & Specifications**

OpenCookbook

Structured team work over the internet
Step 2: Implementation Modeling

After simulation and model checking, select the application architecture and start development.

Step 3: Select processing modules

OpenVE: How are processors connected?
Application model

OpenVE:
How is the application structured?

Step 4: Generate C for OpenComRTOS

OpenVE: Code generation

Auto generated code is ~ 10 times more reliable than human generated code.
Step 5: Run and verify

OpenTracer

Verification and testing is needed to confirm the work was well done.

What happened?

Initial idea

Processor topology

Application architecture
Use case 1: mobility aids

Future of transport is consumer-friendly

- Elderly customer base
- Seamlessly Indoors ↔ Outdoors
- Active safety
- Optimal use of road network

Intelligent Transport Systems ITS, using cooperative Embedded Systems

- 100% trust-worthy
- Fault Tolerance
- Heterogeneous network support
- Scalability
- Cost-Efficiency
Use case 2: e-wheel control algorithm

Key characteristics:
- High Reliability (SIL3) → Fault Tolerance (SIL4)

All-in:
- Traction
- Braking
- Anti-slip
- Stability control
- Active suspension

Exploits transparent distributed operation of OpenComRTOS.

Software and Hardware redundancy enables fault-tolerant controllers 1-, 2-, 3-, 4-, n-wheel platforms

Altreonic SIL4 Controller project

Key characteristics:
- High Reliability (SIL3) → Fault Tolerance (SIL4)

Target market:

Technological competencies/partners sought:
- Input from Use cases / Application scenarios
- Control systems design competence
- System Simulation
What are we working on?

- Safety standards awareness in OpenCookbook
- Asynchronous 2-phase services for OpenComRTOS (feedback at application level)
- Protocol hubs (protocol composition OpenVE)
- Virtual C-machine (20 Kbytes)
- Dynamic resource scheduling
- SIL3/4 embedded controller

⇒ Enabling technologies for wide-spread use of safety engineering
⇒ Open to partnerships and joint projects

Conclusion

- Altreonic’s know-how; 20 years experience
  ⇒ Trustworthy partner

- Unique products for high added value
  ⇒ Trustworthy products and systems

- Open Licensing scheme = no risk
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