

### **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

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- Open License Society (R&D) 2004
  - > Developing a formalized systems engineering methodology

Unified semantics + interacting entities

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> 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

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OpenTracer: visual profiling of applications



28/02/2010

**OpenHardWare** 

SIL3/4 controllers under development

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#### **Unified Systems/Software engineering** Altreoníc **OPENCOOKBOOK**© Test harness **OPENVE** © Formalised requirements & Formalized modelling specifications capturing Modeling Simulation **Project repository** Activities capturing **Code generation** Formal Simulation Modeling Modeling Specifications Normalcases Test cases cases Architectural User Applications Requirements 92 Requirements F **OPENCOMRTOS** © checking Formally developed **Meta-models** Runtime support for concurrency and communication Unifying velopment, verification, Repository workplan Unified SIL 3/4 CONTROLLER © Semantics Control & processing platform natively supporting distributed Unified architectural paradigm: Interacting Entities concurrency & communication 28/02/2010

### **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:

28/02/2010

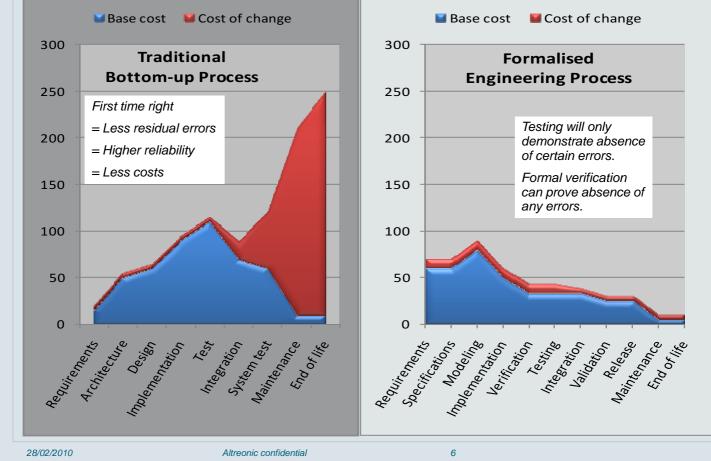
- Automotive (e-car).
- Distributed control (machines, house robots)
- Next gen. mobility platforms (e.g. 4G netbook phone)

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## Why Formalized?

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## **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

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- ➤ 5 to 10 Kbytes/node
- Real-time communication support
- Heterogeneous target support
- Affordable cost

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OpenComRTOS was one of the three final nominees for the:
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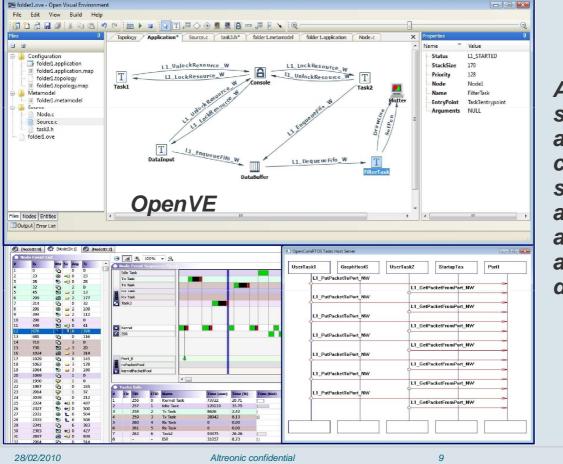
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#### After simulation and model checking, select the application architecture and start development

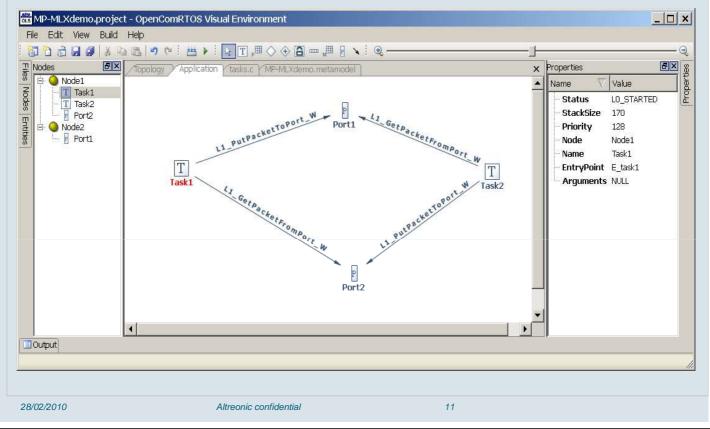
#### Step3: Select processing modules Altreoníc **OpenVE:** How are processors connected ? -win32\_node2 win32\_node1 Leon3\_node -٨ 🔀 Sendreceive\_3nodes.project - OpenComRTOS Visi - 0 × posix32\_node mb\_node Edit View Build Help 📇 🕨 i 🔯 🥥 🛰 🛰 Nodes 8× x -ties 20 28/02/2010 Altreonic confidential 10

### **Application model**



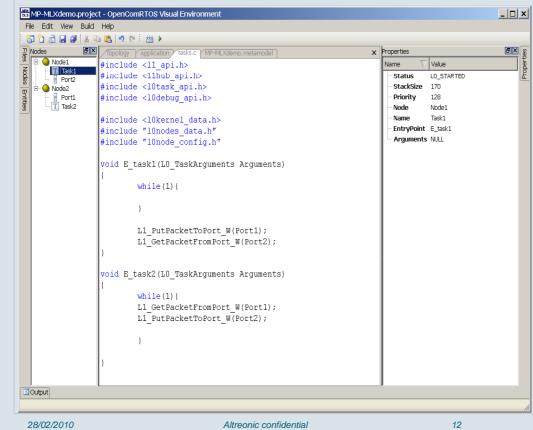
#### **OpenVE:**

#### How is the application structured ?



### Step4: Generate C for OpenComRTOS

#### **OpenVE:** Code generation



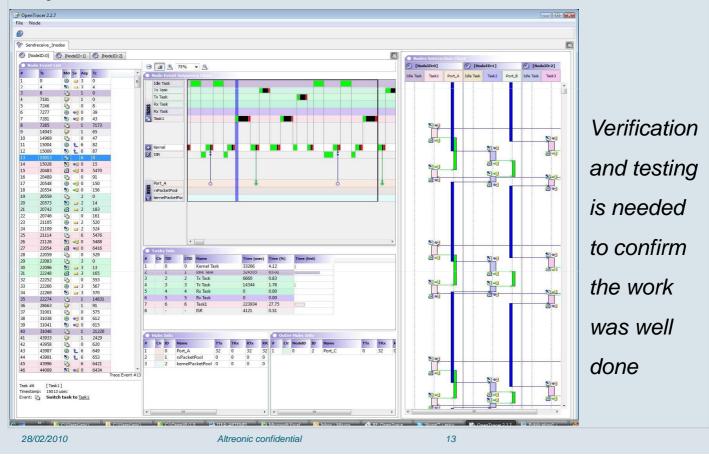
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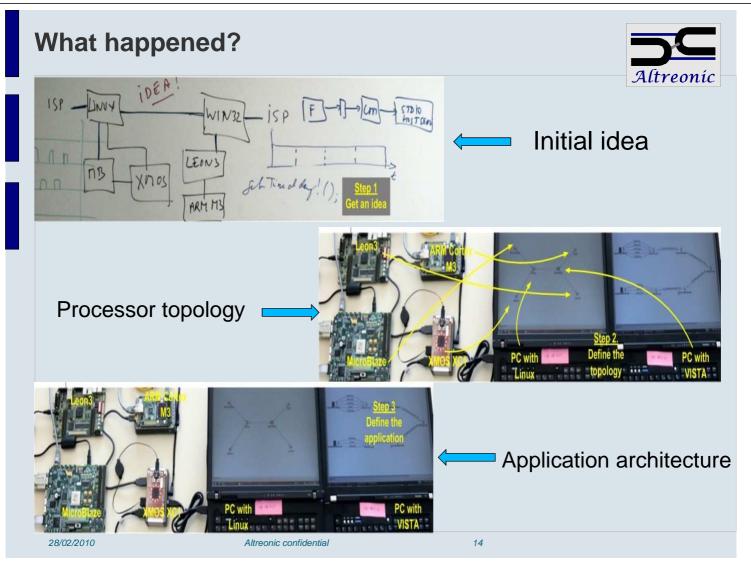
Auto generated code is ~ 10 times more reliable than human generated code.

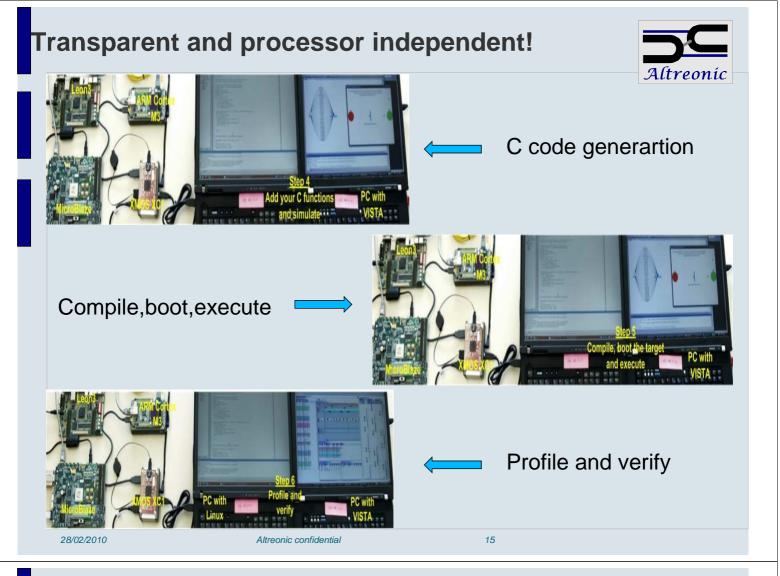
### Step5: Run and verify



### OpenTracer







### 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

- <u>100% trust-worthy</u>
- •Fault Tolerance
- Heterogeneous network support
- Scalability
- Cost-Efficiency

### Use case 2: e-wheel control algorithm





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### What are we working on?



- Safety standards awareness in OpenCookbook
- Asynchroneous 2-phase services for
   OpenComDTOS (feedback at application)
- 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

 $\Rightarrow$  Open to partnerships and joint projects

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## Conclusion

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• Altreonic's know-how; 20 years experience

=> Trustworthy partner

• Unique products for high added value

=> Trustworthy products and systems

• Open Licensing scheme = **no risk** 

### www.altreonic.com

28/02/2010