SYSMODEL

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System Level Modeling Environment for SMEs

Technoconsult
AuditData
DTU
KTH
Catena
TUT
DA-Design
Finnelpro
Novelda

SME involvement

Ivan Ring Nielsen, Technoconsult

Project No.: 100035

ARTEMIS

Consortium

|	
Technoconsult ApS (coordinator)	
Technical Univ. of Denmark	**AuditData A/S**
Royal Inst. of Technology	**Catena AB**
	Nito Telecom AB
Tampere Univ. of Technology	**Finnelpro Oy**
	DA-Design Oy
	Novelda AS

SMEs with a wide range of products

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Impulse radar

Phone cards

System design

ASIC design

Space applications

Audiometry
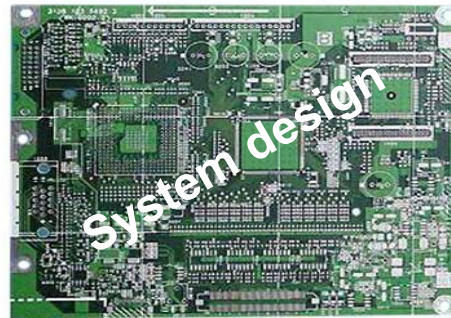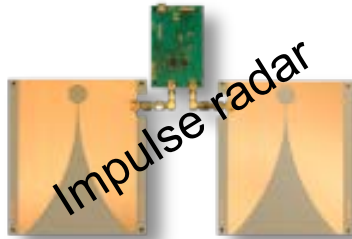
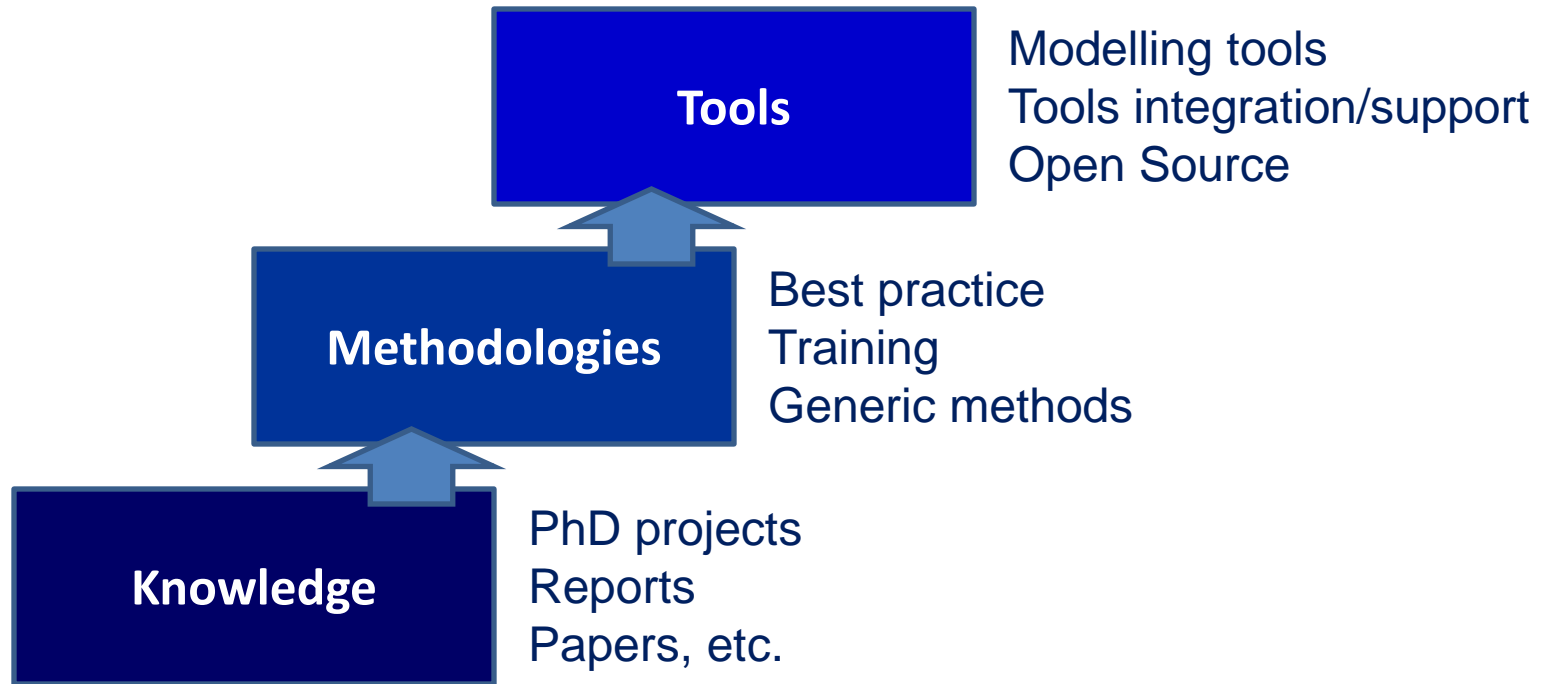**However, with common design problems**

Project objectives

Lack of design productivity!

Raise the level of abstraction for SMEs designing embedded systems by developing system-level modeling techniques:

- Provide SMEs with system level modeling tools

- Focus is on time and power critical, heterogeneous systems

- Allow cost-efficient mapping of applications onto an embedded platform

- While respecting constraints in terms of resources (time, energy, memory, etc.), safety, security and quality of service

Results for SMEs

Tools

Modelling tools
Tools integration/support
Open Source

Methodologies

Best practice
Training
Generic methods

Knowledge

PhD projects
Reports
Papers, etc.

Integration of SMEs

Input to requirement analysis

SystemC training

Defining productivity measures

Establishment of roadmap

Identification of cases

Modeling of subsystem

Hands-on training

Consultations

Design flow implementation

Productivity estimation

Preparatory work

Implementation

Cases

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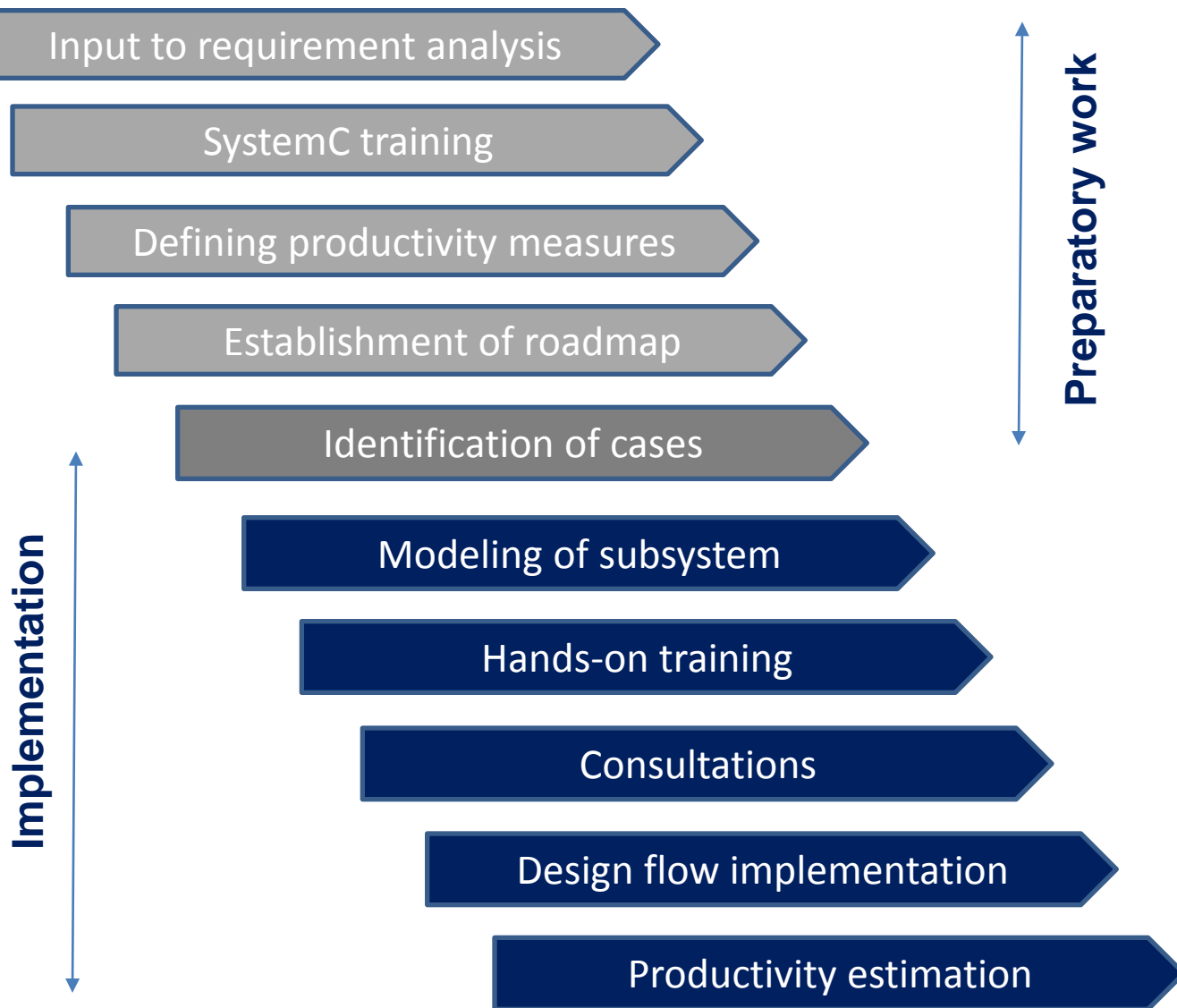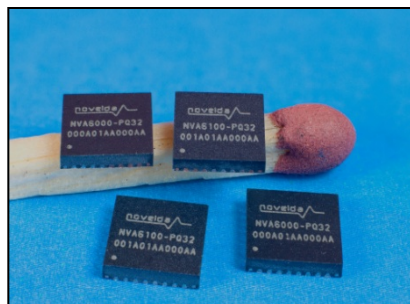
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AuditData A/S
Audio calibration device
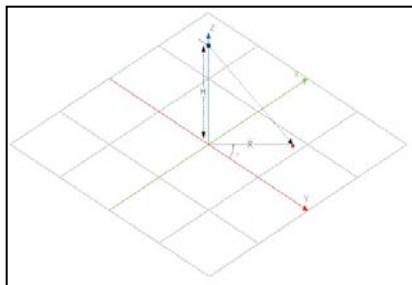

Novelda AS
Nanoscale impulse radio

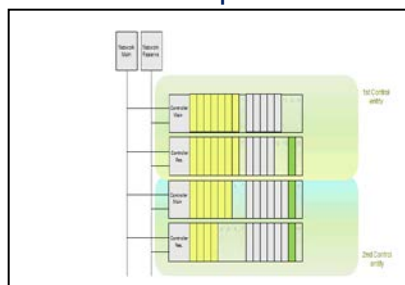**Nito Telecom AB**
Architecture for VoIP

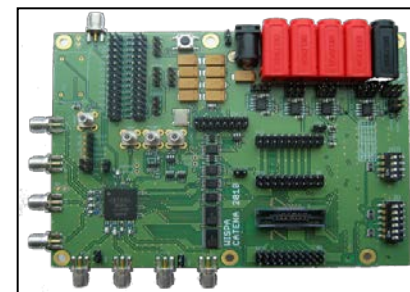**DA-Design Oy**
Device stabilization

Finnelpro Oy
UART-based protocol

Catena AB
WISPA platform

Y1: Productivity measures, case definition, SystemC training

Y2: Hands-on training, segmentation of system, model development

Y3: Design flow roadmap, productivity analysis, implementation

Focus on SME needs

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Segmentation:

SMEs working as subcontractors:

- Catena AB
- Finnelpro Oy
- DA-Design Oy

SMEs focusing on their own product development:

- AuditData A/S
- Nito Telecom AB
- Novelda AS

SME productivity metrics

$$\text{Productivity} \; = \; \frac{\text{Output}}{\text{Input}}$$

$$\text{Productivity} \; = \; \frac{\text{The total number lines of code in the organization}}{\text{\# people working on that code (incl. QA and Dev.)}}$$

Other measures: Quality
Time-to-market
Code size (LOC)
System size (Kb of binary code)
Defect density (Defects per 100 LOC)
Development effort (development time, hours)
Re-usability
Maintainability

Training of SMEs

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The major objective of the training is to increase company productivity with respect to the development of embedded systems

Project workshop to coordinate tasks (Feb. 2009)

    SystemC training course (May 2009)

      Modelling workshop (May 2010)

        Tutorial on platform modelling (Nov 2010).

            SYSMODEL hands-on workshop (Feb. 2011)
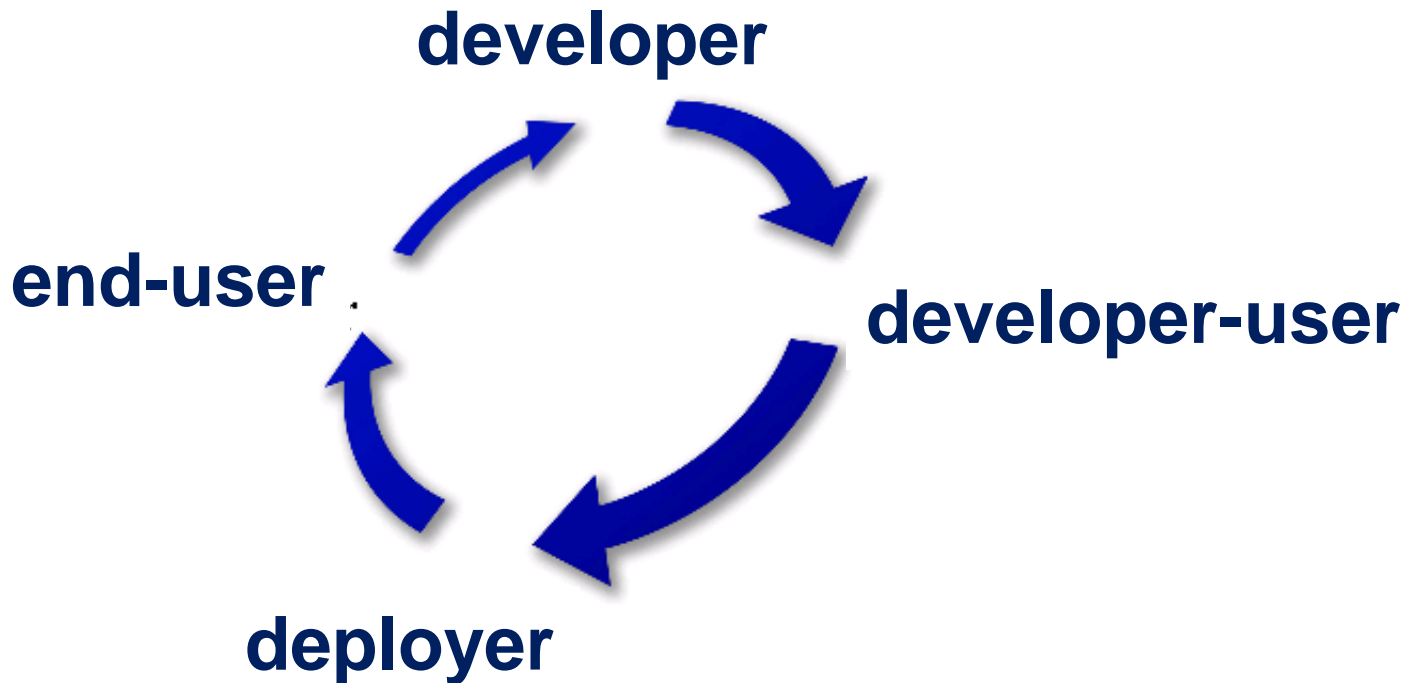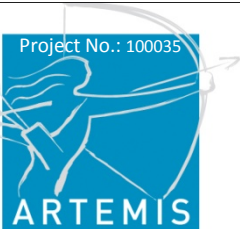
                ForSyDe modelling concept (May 2011)

Making it affordable for SMEs

developer

end-user

developer-user

deployer

Open Source based tools
Recognized standards (SystemC)
Training
Consultancy

Lessons learned

Define objectives for each SME early in the project

Define success criteria (measurable and visible productivity measures)

Provide training (basic as well as hands-on)

Guidance and tutorials to tools and methods

Understand the SME applications

Assign individual RTD partner to each SME

SMEs change organizational structure quite often (get the project rooted in the management)

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