

25 years of ITEA Roadshow – Germany

Bosch

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Bosch

The Bosch Group is a leading global supplier of technology and services in **four business sectors**.



Mobility Solutions



Industrial Technology



Energy and Building Technology



Consumer Goods

88.2

billion € revenues

421,300

Associates E2022

468

Regional companies in >60 countries

- IoT provider with innovative solutions for smart homes, Industry 4.0, and connected, sustainable and safe mobility.
- Expert in sensor technology, software, and services for connected, cross-domain solutions from a single source.
- Including artificial intelligence (AI), in all products and solutions, their function, development or manufacturing.
- Improving quality of life worldwide with innovative products and services: a technology “Invented for life.”
- ~94% of the company shares are held by Robert Bosch Stiftung GmbH, a charitable foundation, which operates on a non-profit, independent, and non-partisan basis across the areas of health, education, and global issues (e.g. peace, climate, migration, etc.). It has funded projects for approx. 2.2 billion € since its start in 1964.
- Bosch as a Group is active in ITEA since the beginning (ifc = ITEA funding company)
 - It has been involved in 27 projects + 3 labeled in 2023 (not started yet)
 - It received 6 Awards of Excellence

Some examples of successful ITEA projects

EMPHYSIS (Sep. 2017– Feb. 2021)

Embedded systems with physical models in the production code software

- Major goal: Bridge the gap between physics modeling & simulation, and embedded software development.
- Exchange of physics-based models through the new open eFMI standard.
- Model transformation and code generation techniques applicable to automotive safety critical embedded software.
- Working tool chain enabling better code with less effort for advanced physics-based control functions.

Winner ITEA Award of Excellence Special Vice-chairman's award 2021

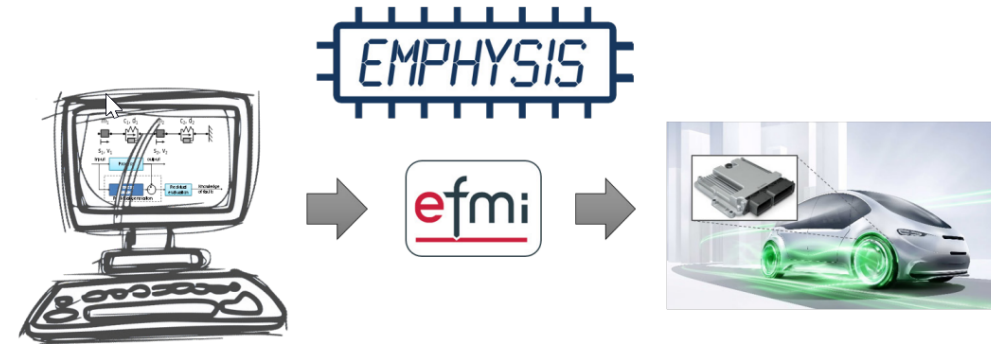


Some examples of successful ITEA projects

EMPHYSIS (Sep. 2017– Feb. 2021)

Societal impact: Ecology

- Accelerate the **transition to electrified** vehicles and development of eco-friendly drivetrains through reliable **model-based collaborative workflows**.
- **Reduced ecological foot-print** through optimised control functions and optimal control strategies.



An open standard bridging the gap between the physical modeling & simulation domain and the embedded software world.

Business impact: Productivity

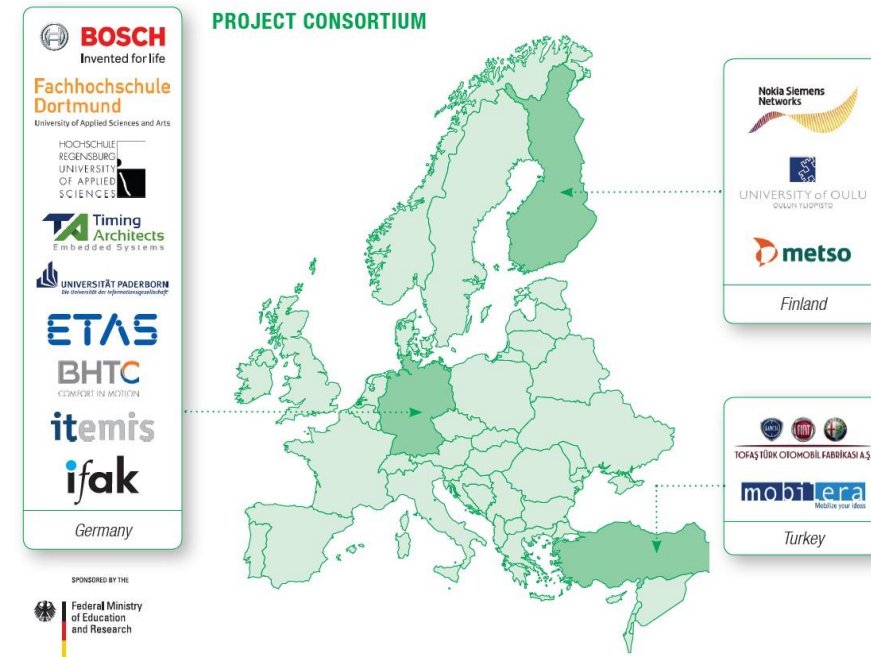
- Performance Assessment showed **productivity gains up to ~90%**.
- The **eFMI** as alternative non-proprietary exchange format for model-based function development.
- **13 tools** already supporting different parts of the eFMI standard.
- eFMI further developed by **Modelica Association** eFMI Project (<https://www.efmi-standard.org/>) with 14 industrial members (France, Germany, Japan, Sweden, South Korea, USA).

Some examples of successful ITEA projects

1. AMALTHEA (Jul 2011 - Apr 2014) and
2. AMALTHEA4public (Sep 2014 - Aug 2017)

1. Model Based Open-Source Development Environment for Automotive Multi Core Systems;
2. Enabling of Results from AMALTHEA and others for Transfer into Application and building a Community

- 1. Major goal: a **common meta-model for multi-core software and hardware modelling** that enables **integration of heterogeneous tools** in a custom tool chain to gain easy and efficient access to the overall characteristic of a multi-core system.
- The AMALTHEA platform is distributed under the **Eclipse open-source license (EPL)** and allows efficient data exchange between cooperating partners.
- 2. Major goal: to foster the **transfer** into application and to establish a **community** around an Eclipse-based open-source tool chain infrastructure.



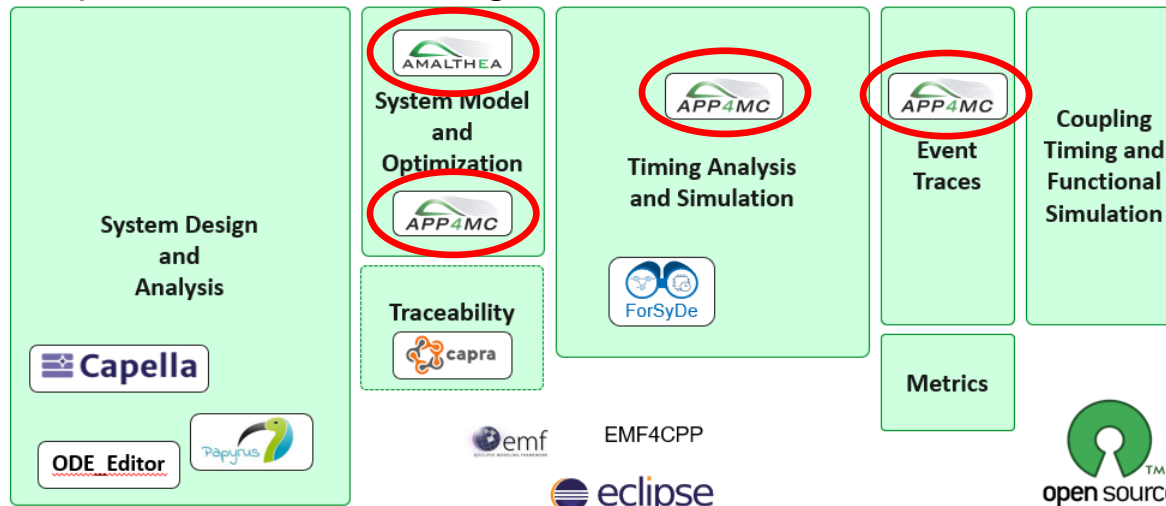
Some examples of successful ITEA projects

PANORAMA (Apr 2019 - Sep 2022)

Boosting Design Efficiency for Heterogeneous³ Systems

- It uses **model-based methods and tools** to master development of **heterogeneous** embedded HW/SW **automotive** and **aerospace** systems.
- Based in **open source**, it provides an environment for collaboration amongst diverse hardware and software technologies and teams, especially at the early stages of design.
- It supports **efficient design decisions** by defining evolving standards, tools and best practices for exchange of non-functional, formal models.

Design Flow for Systems Engineering: open source

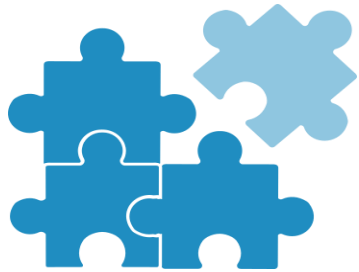


Winner ITEA Award of Excellence Standardisation 2022



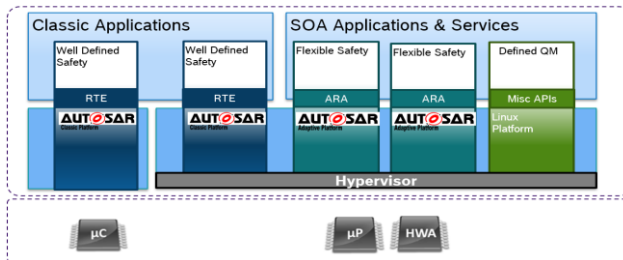
Some examples of successful ITEA projects

PANORAMA (Apr 2019 - Sep 2022)



Heterogeneous Functional Domains

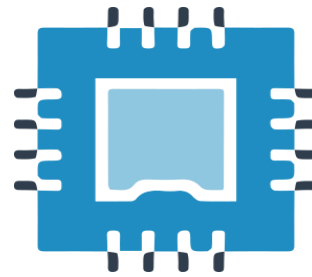
Integration of heterogeneous function domains



Business impact: **Productivity**

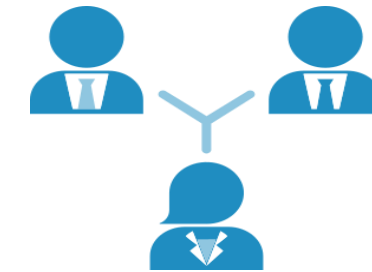
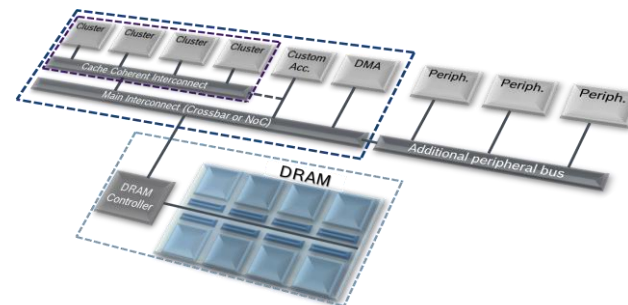
Maintainability: time reduction from 57 to 12 days

Efficiency: time reduction for the installation and integration of several tools from 8 to 0.8 hours



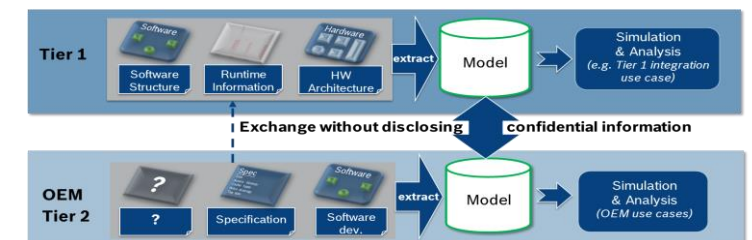
Heterogeneous Hardware

Integration of heterogeneous specialised hardware



Heterogeneous Teams

Integration of heterogeneous collaborating parties



Some examples of successful ITEA projects

Societal impact

- FIONA (Aug. 2013 – Jun 2016)
 - Framework for Indoor/Outdoor Navigation, tailored for the blind or sight-impaired
 - Focus on Design Thinking and **user experience**

Business impact

- EAST-EEA (Jul. 2001 – Jun. 2004)
 - **AUTOSAR** standard and its “derivatives”
 - Estimated usage in more than 50 billion ECUs worldwide
 - <https://itea4.org/project/impact-stream/east-eea-impact-story.html>

Winner
Achievement
Awards 2004

Unique aspects/benefits of the support of ITEA & DLR-PT

“Direct” benefits

- Highest quality **organisational support** (workflow, office, tools, contacts with BMBF)
- Highest quality **project support** (~500 yrs. of industrial experience at your service)
- Project **mentoring**: to better unveil the golden core of each project
- **Focus** on innovation and impact (exploitation, dissemination, standardization, patents, new companies, human capital)
- Mutual **trust** within the ITEA family

“Indirect” benefits

- Long-lasting, deep **connections** to research, academia, industry of any size (large, SMEs, start-ups)
- View and access to a **global market**
- **Life-long learning** (for all stakeholders)

Advice for Large industry participants

Advice 1: Come to the Project Outline Days (Sept. 12th and 13th in Berlin)

- **Get in contact** with the community, find ideas and challenges that are looking for partners

Advice 2: Ask the ITEA Office

- They always know the answer and are willing to **support** you, really at any time

Advice 3: Get involved with the Steering Group and/or the Board

- You and your organisation can **learn and contribute** a lot: large industries have a world-wide view and the market access needed for scaling results.

It's all about **HAPPINESS**

- There is nothing better than finding **enthusiasm and competence** coupled to make the world a better place 😊.

Contact details

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