

# Project EMPHYSIS wins ITEA Award of Excellence — AbsInt's Contribution

**September 15, 2021** — A new standard stemming from an award-winning research project: The eFMI standard will accelerate the model-based development of embedded software. As one of 25 partners from five countries around the world, AbsInt took part in the research project EMPHYSIS, one of four projects to win this year's ITEA Award of Excellence.



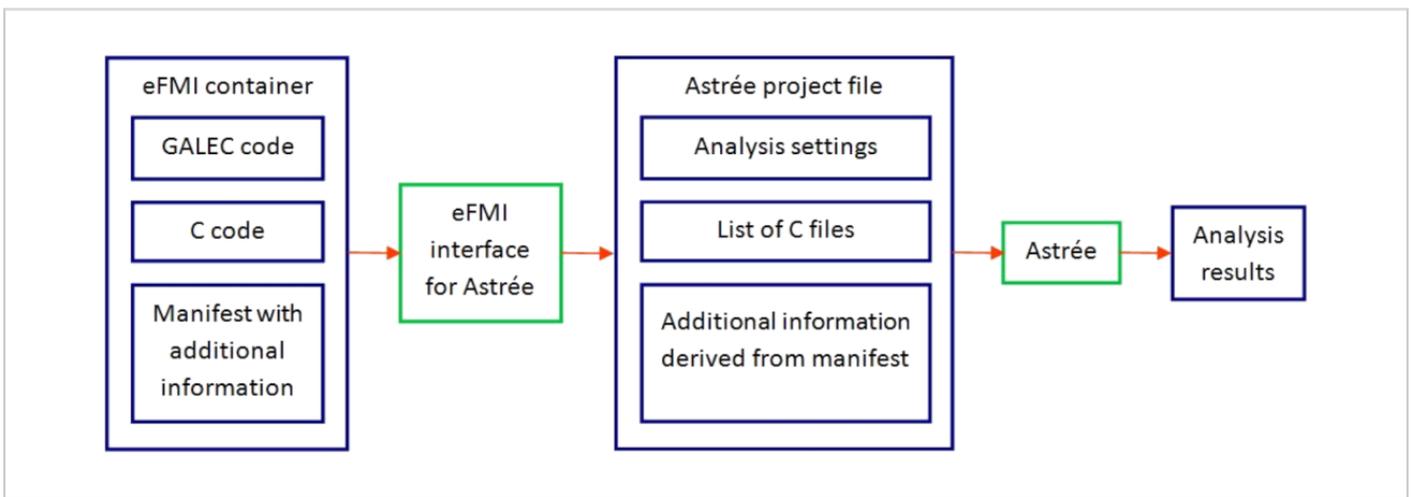
EMPHYSIS (Embedded Systems with Physical Models in the Production Code Software) was led by Bosch and set out to last for three and a half years (September 2017 to February 2021). Today, the joint achievement of the project partners is honored: The creation of a global standard for smart industry, the eFMI standard (embedded Functional Mock-up Interface), allows digital model exchange among manufacturers. It is based on the widespread FMI standard and covers the entire development process from a physics-based model to code running on an embedded system, thus enabling advanced control and diagnosis functions. A new Modelica Association project will further develop, standardize and promote eFMI, so that cost and time for the software development of embedded systems will be significantly reduced — resulting in up to 90% gains in productivity.

Technically speaking, what is innovative about eFMI is that it provides a target-independent intermediate format defined by an entirely new language, the Guarded Algorithmic Language for Embedded Control: GALEC. This new programming language is able to guarantee that an algorithm described in this language can be translated into code that has:

- static worst-case execution time;
- static a-priori known memory demand; and
- can be statically proven to have no illegal memory access.

In other words: The code now satisfies the hard requirements of automotive safety-critical embedded software, which makes it also applicable to many more, less regulated domains like robotics, industrial applications, and consumer goods.

AbsInt contributed to this achievement as a verification tool provider by developing a prototypical tool for coupling eFMI with the static analyzer Astrée. This coupling enables the automatic analysis of code implementing eFMI components with the goal of proving the absence of runtime errors (such as "index out of bound", "overflow", or "division by zero") and detecting violations of coding rules (such as MISRA-C rules). This contribution is an important step towards fully automated eFMI verification: the absence of critical runtime errors in the execution of physics-based models that are integrated in the embedded software via eFMI can now be guaranteed.



## About ITEA

ITEA is the Eureka Cluster program for software innovation, enabling a large international community to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society.

For further information, visit [itea4.org](http://itea4.org).

For interview requests, questions and additional information about ITEA and EMPHYSIS, please contact:

- EMPHYSIS Contact person  
Oliver Lenord, Robert Bosch GmbH — Project leader  
[oliver.lenord\[at\]de.bosch.com](mailto:oliver.lenord[at]de.bosch.com)
- ITEA Contact person  
Linda van den Borne-Toupet  
[linda.van.den.borne\[at\]itea4.org](mailto:linda.van.den.borne[at]itea4.org)

## About AbsInt

AbsInt provides cutting-edge development tools for embedded systems with a focus on validation, verification, and certification of safety-critical and security-relevant software. Key products include static analysis tools to check coding guidelines, for timing and stack usage analysis, and to detect critical programming defects in C/C++ code as well as the formally verified CompCert Compiler.

Founded in 1998, AbsInt is a privately-held company located in Saarbrücken, Germany. Our customers come from various industry sectors, including aerospace, automotive, healthcare and energy, and are located in more than 40 countries all over the world.

For further information, visit [absint.com](http://absint.com).

Press contact:

Sylvie Tritz  
+49 (681) 38 36 00  
[tritz\[at\]absint.com](mailto:tritz[at]absint.com)