



DECODER: DEveloper COmpanion for Documented and annotatEd code Reference

The European cooperative research project **DECODER** officially started on January 1st, 2019 and is coordinated by the Austrian company **TECHNIKON**. Under the technical lead of Virgile Prevosto (Commissariat à l'Énergie Atomique et aux Énergies Alternatives, CEA Tech List), the project team will develop a methodology and tools to improve the productivity of software development processes for medium-criticality applications in the domains of IoT (Internet of Things), Cloud Computing, and Operating Systems by combining Natural Language Processing techniques, Modelling techniques and Formal Methods. The combination is a novel approach that permits a smooth transition from informal requirements engineering to deployment and maintenance phases. The project runs for 36 months and receives funding from the European Union under the grant agreement number 824231.

Software drives our modern economy; it is indeed present everywhere, from critical infrastructures supporting societies, such as energy supply and transportation, down to the smart devices connecting us to the internet. Software development continues to be expensive due to the ever-increasing complexity of computing systems and because software engineering remains a young discipline where software is mostly handcoded. Software production is insufficiently supported by effective tools and oftentimes, engineers lack a systematic approach for the development and safe reuse of components and their associated knowledge (and artefacts). In addition, a typical development process requires interactions of many stakeholders, at very different abstraction levels, and often over ambiguous and/or incomplete documents. This makes the integration, and even more the maintenance of the system extremely difficult and costly.

To tackle these challenges, **DECODER** will

- 1) introduce new languages to represent knowledge in a more abstract manner
- 2) develop transformations leading from informal material into specifications and code and vice-versa
- 3) define and prototype a Persistent Knowledge Monitor for managing all relevant knowledge
- 4) develop a prototype Integrated Development Environment

Moreover, **DECODER** will focus on the following objectives:

Combine NLP,
software modelling
and verification
techniques

Improve safety and
security of medium
criticality
applications

Set up innovative
verification
techniques

Generalise the use of
innovative
verification
techniques to
modern applications

Provide
game-changing
assurance results

To reach these goals, **DECODER** will automate the transformation steps using existing techniques from Big Data (knowledge extraction), Model-Driven Engineering (knowledge representation and refinement), and Formal Methods (specifications and proofs). The project will produce a novel framework combining these techniques and demonstrate its efficiency on several use-cases belonging to the aforementioned domains.

The project expects an average benefit of 20% in terms of efforts on these use-cases and will provide recommendations on how to generalise the approach to other medium-criticality domains.

The **DECODER** partners are:

- TECHNIKON Forschungs- und Planungsgesellschaft mbH, Austria
- Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA Tech List), France
- Capgemini España SL, Spain
- OW2, France
- SYSGO AG, Germany
- TREE Technology SA, Spain
- Universitat Politecnica de Valencia, Spain



The official Kick-Off meeting took place on January 24th and 25th, 2019 and was hosted by TECHNIKON in Villach. For more information, please visit <https://www.decoder-project.eu>

Contact Information:

Project Coordinator:

Dr. Klaus-Michael Koch
TECHNIKON Forschungs- und
Planungsgesellschaft mbH

Burgplatz 3a
9500 Villach, Austria
E-Mail: coordination@decoder-project.eu

Scientific Lead:

Virgile Prevosto
Commissariat à l'Énergie Atomique et aux
Énergies Alternatives (CEA Tech List)

Nano-Innov, Point Courrier n°174
91191 Gif-sur-Yvette, France
E-Mail: virgile.prevosto@cea.fr