

## GOAL

To support experts in their daily decision making process, two self-developed algorithms are thoroughly tested regarding their applicability for various semiconductor products before they are finally integrated into the existing semiconductor production environment.

## Challenge

In order to enable cost and efficient support in decision making processes, two algorithms (TePEX and WHF) have been developed. For validation, they need to be thoroughly tested on a variety of semiconductor products before they are finally integrated into the existing environment of the semiconductor industry.

Based on that, requirements on the algorithms as well as on the environment have to be fulfilled. Due to this, KAI improves both of the self-developed algorithms dependent on the defined requirements and the end-user feedback (the experts of the semiconductor industry).

### TePEX – Test Pattern Extraction

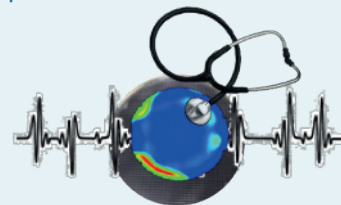
TePEX is used to detect patterns in wafermaps (electrical measurements of the devices on the wafer after semiconductor Frontend production) caused by test equipment malfunction.



*With TePEX, malfunctioning wafer testing equipment is detected before the yield is affected.*

### WHF – Wafer Health Factor

WHF is used to rate each wafer regarding its health. WHF is based on an ML-pipeline, which automatically detects and classifies each wafermap regarding pre-defined critical process patterns.



*With WHF, critical process patterns are detected at an early stage, before yield loss occurs.*

Both tools, TePEX and WHF, support the expert in taking faster decisions on maintenance actions or counter measures. With that, the production process is optimized and high quality semiconductor products are manufactured.

In the Arrowhead Tools project, TePEX and WHF are investigated regarding their support on automated decision making by judging the quality of manufactured products at an early stage. Hence, a reduction on the overall costs (saving of material, production steps, engineering costs) can be achieved.

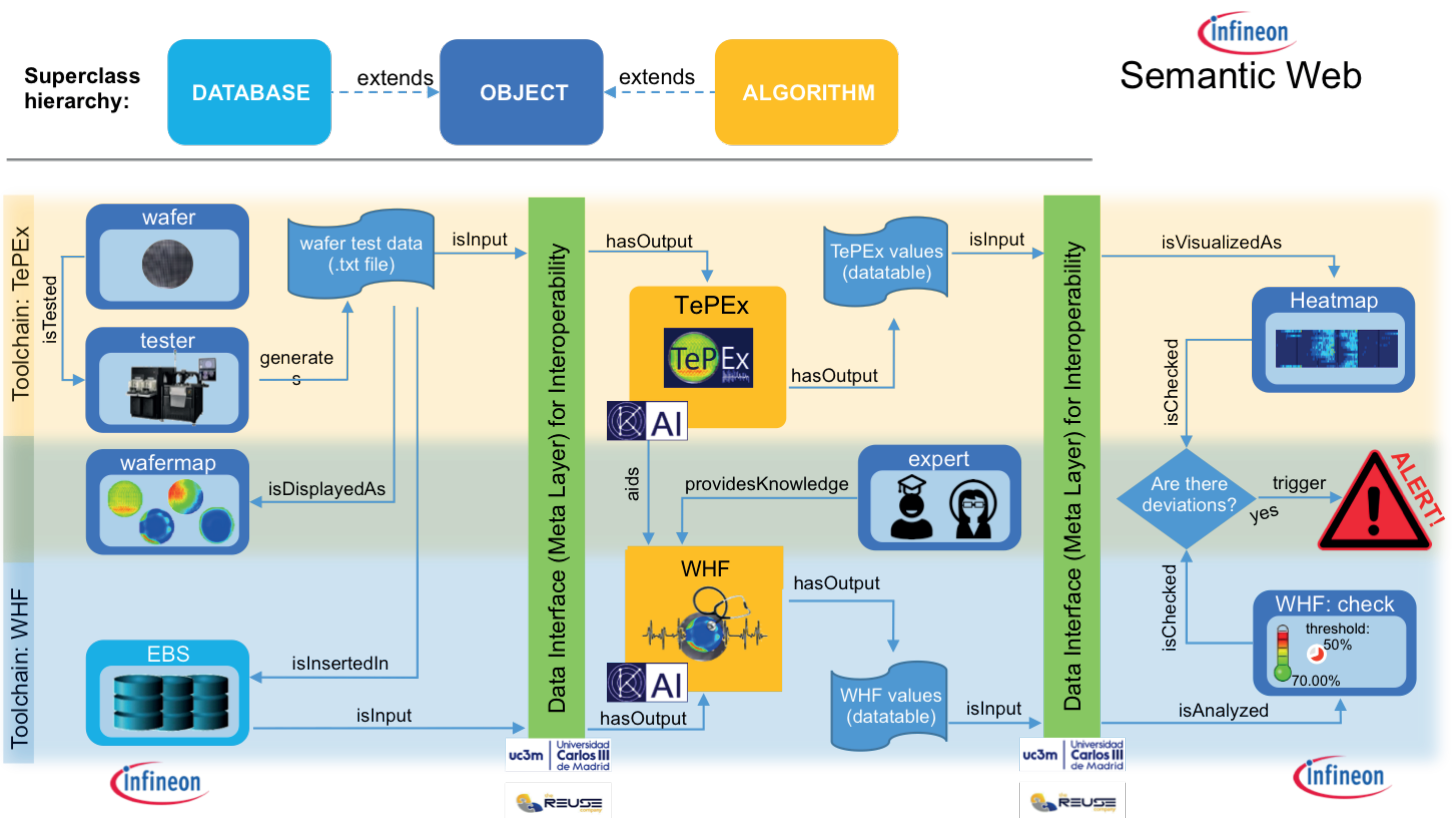


## Engineering Phases



## Results

Both self-developed algorithms, TePEX and WHF, are thoroughly tested and improved regarding their applicability for different semiconductor products, before they are finally integrated into the existing semiconductor production environment.



## Partner Data



*KAI Kompetenzzentrum Automobil- und Industrieelektronik GmbH is a well-established industrial research center with a large national and international network of partners. Additional to core competences in the area of power electronics reliability test concept development, advanced semiconductor materials research, Bayesian statistical lifetime modelling, data science and multi-physics FEM simulation, KAI maintains a well-equipped electronics laboratory as well as state of the art simulation computing resources and proven experience in the coordination of interdisciplinary research projects.*

Company contact: +43 5 1777 19900 · office@k-ai.at · www.k-ai.at

Contact with the project: Luleå University of Technology · info@arrowhead.eu · www.arrowhead.eu