

# ITALY DAY

## ABSTRACT TABLE OF PROJECT PROPOSAL

**PROJECT Nr. 4**

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|---|--|
| <b>SECTOR:</b>                                      | Automotive   |
| <b>PROJECT IDEA IN A HEADLINE:</b>                  | Multi-fidelity optimization of composite tanks for the automotive sector   |
| <b>INNOVATIVE POINTS:</b>                           | <ul style="list-style-type: none"><li>❖ enlightening of crash-proof composite methane tanks for the automotive sector;</li><li>❖ use of surrogate models in composite structural design</li><li>❖ development of optimized composite tanks</li></ul>   |
| <b>POTENTIAL BUSINESSES AND APPLICATION FIELDS:</b> | <ul style="list-style-type: none"><li>❖ methane tanks design &amp; manufacturing</li></ul>   |
| <b>CHARACTERISTICS OF POTENTIAL PARTNERS:</b>       | <ul style="list-style-type: none"><li>❖ universities/research centres for the development of FE models</li><li>❖ manufacturer/supplier for the tank</li><li>❖ material supplier</li></ul>  |
| <b>BRIEF PROJECT DESCRIPTION:</b>                   | <p>On the basis of finite element (FE) models of composite pressurized methane tanks for the automotive sectors, we will develop multi-fidelity multi-objective optimization processes aimed to enlighten the structures while assuring crash resistance in a wide range of impact events. Realistic 3-D crash analyses frequently result in extremely time-consuming calculations, despite the availability of high-performance computing platforms. In industrial applications, global optimization tools are available and fairly well supported for conventional problems. However, global optimization tools are based on evolutionary algorithms requiring a huge number of time-consuming FE simulations. In these cases, strongly reducing the number of FE calculations becomes crucial. To this aim, we will develop surrogate models to support the optimization in finding optimized structural layouts in reasonable computational times. A continuous information exchange between the FE and surrogate models will drive the optimization in order to guarantee a fast, reliable and effective convergence towards optimized and enlightened structural concepts.</p> |