ITALIA
Agenzia per la promozione all'estero e l'internazionalizzazione delle imprese italiane
(in gestione transitoria)

I T A L Y D A Y

ABSTRACT TABLE OF PROJECT PROPOSAL

PROJECT Nr. 3

SECTOR:	Aerospace
PROJECT IDEA IN A HEADLINE:	Multi-fidelity optimization of composite tanks for the aerospace sector
INNOVATIVE POINTS:	❖ material substitution for state-of-the-art metallic tanks ❖ use of surrogate models in composite structural design ❖ development of optimized composite tanks
POTENTIAL BUSINESSES AND APPLICATION FIELDS:	❖ composite tanks for launch vehicles for the aerospace sector
CHARACTERISTICS OF POTENTIAL PARTNERS:	❖ universities/research centres for the development of FE models ❖ manufacturer/supplier for the tank
BRIEF PROJECT DESCRIPTION:	On the basis of finite element (FE) models of filament wound composite pressurized vessels to substitute the state-of-the-art metallic tanks for the aerospace sectors, we will develop multi-fidelity multi-objective optimization processes aimed to both enlighten the structures and optimize the structural response. Realistic FE 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.