

Additive Manufacturing of Composites

FACT project



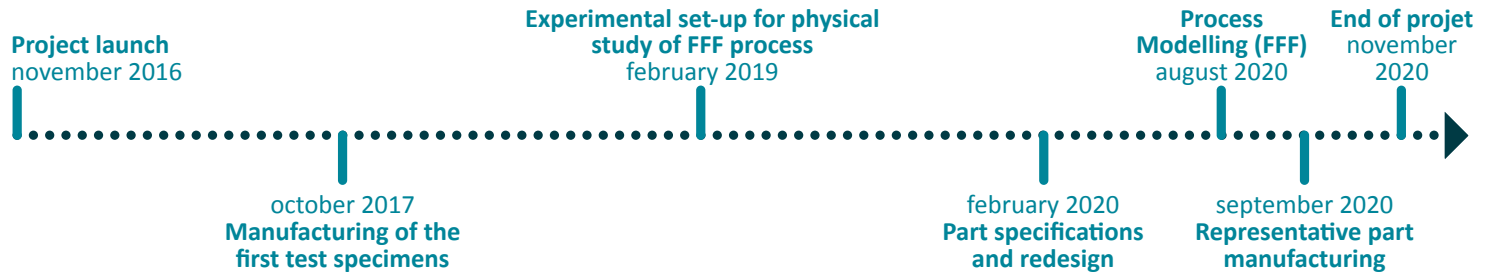
The project aims to evaluate two additive manufacturing technologies, laser sintering of powder material (LS) and material extrusion (FFF, FDM), applied to high temperature polymers out of the groups of PAEKs, especially PEEK (for FFF) and PEKK (for LS and FFF) with and without carbon fiber reinforcement.

Technical and economic impacts

- ▶ Improvement of mechanical properties
- ▶ Improvement of cost-benefit ratio
- ▶ Improvement of productivity

Keywords

Laser Sintering (LS) // Fused filament fabrication (FFF) // PEKK // PEEK
High performance plastics



INDUSTRIAL CONTEXT

Additive manufacturing technologies for polymers are fast-growing especially because of new more affordable machines and high visibility in the media. Nevertheless these technologies are still limited to non-functional parts because there is lack of process understanding and the available polymers are limited in properties. Especially materials with high usage temperatures and good flame resistance that are widely requested from the industry.

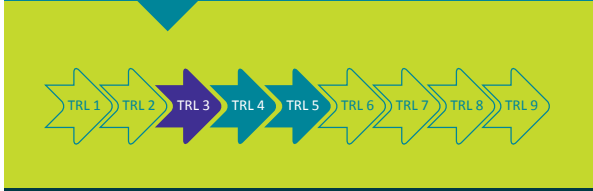
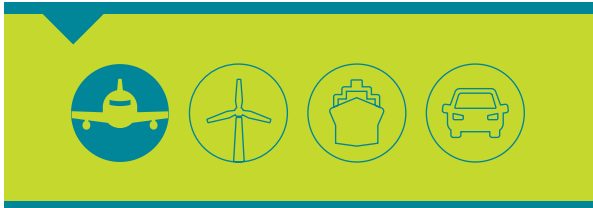
The increasing interest is explained by several advantages related to additive manufacturing but as these processes are recent developments some obstacles to the deployment in industries have still to be overcome.

INNOVATIVE FEATURES

- ▶ High performance plastic material development for additive manufacturing
- ▶ Process and process parameter optimization in order to improve the parts performances (mechanical) properties
- ▶ Conception guide for manufacturing of high performance composite parts by LS and FFF technologies
- ▶ Use FFF technology for manufacturing of large parts

INDUSTRIAL APPLICATIONS

The principal target market is the aviation domaine and especially the manufacturing of complexe parts that are produced in small series. The project aims to Improve the product performances, Product lightening, add new functionalities and design optimization for improvement of product features. The manufacturing cost should be reduced by reducing assembling material cost optimization and supply chain optimization.



Partners

- ▶ IRT JULES VERNE
- ▶ ARKEMA
- ▶ DEDIENNE
- ▶ LIEBHERR-AEROSPACE TOULOUSE
- ▶ ZODIAC ENGINEERING
- ▶ UNIVERSITÉ DE NANTES (LTN)
- ▶ ARTS ET MÉTIERS (PIMM)
- ▶ AIRBUS
- ▶ DAHER
- ▶ EOS
- ▶ SAFRAN
- ▶ CANOE
- ▶ CNRS (LTN & PIMM)

Equipments

- ▶ Laser sintering system for high-performance plastic
- ▶ 3D printers for high performance plastics
- ▶ Experimental set-up for physical studies

Budget

▶ 6 206 k€

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