TWENTY-THIRD INTERNATIONAL CONFERENCE ON COMPOSITE MATERIALS (ICCM23)

STUDY ON THE INFLUENCE OF PROCESS PARAMETERS ON SURFACE PROPERTIES OF ADDITIVELY MANUFACTURED PARTS

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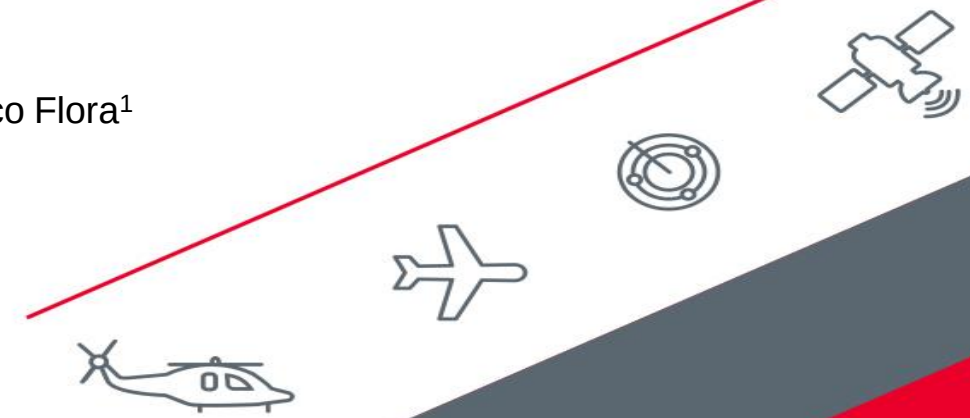
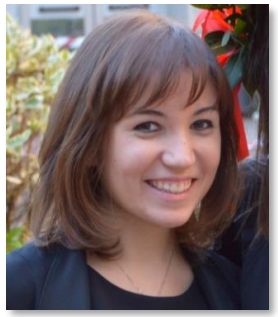


2 August 2023

Dr. Sara Varetti



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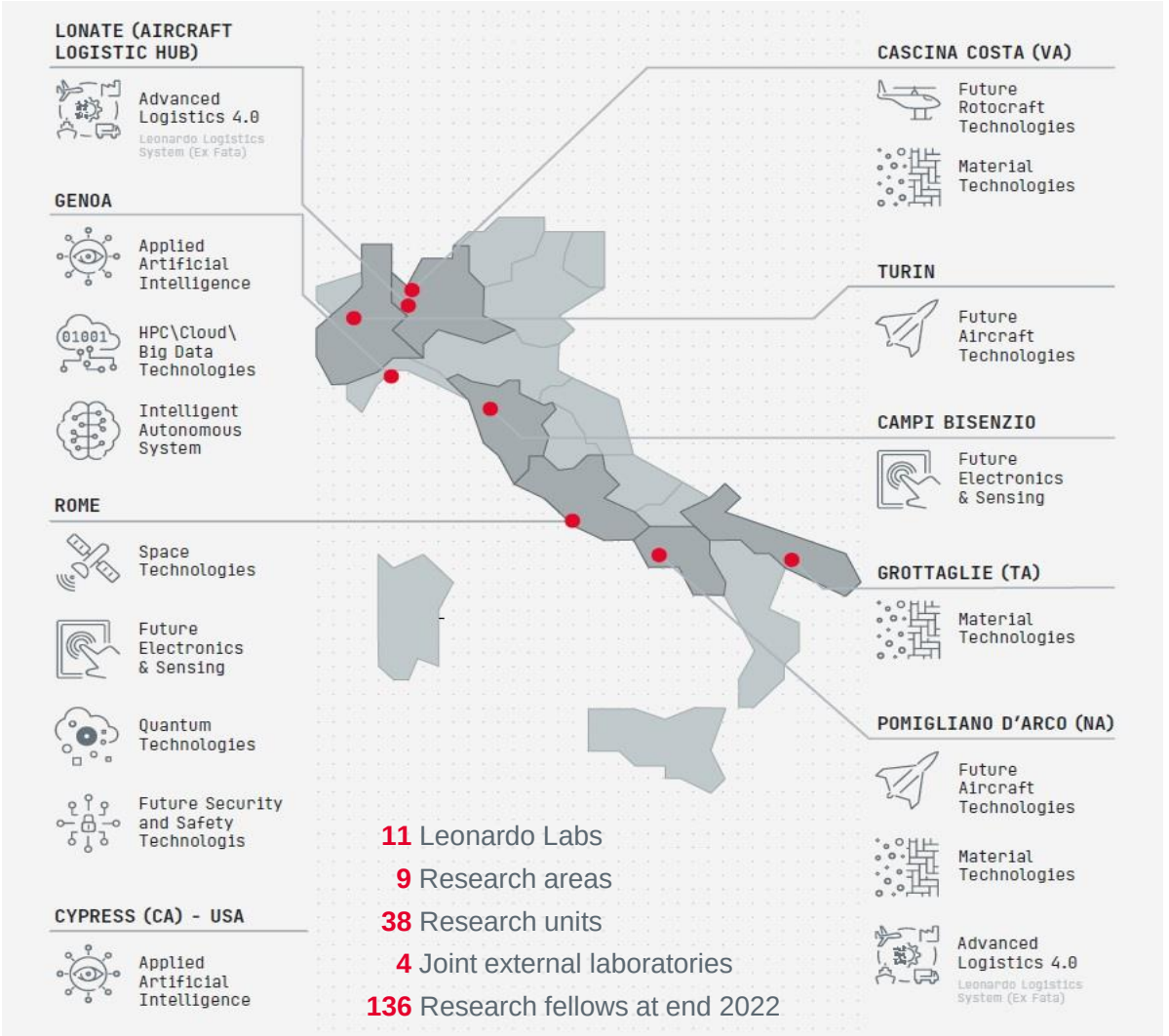


Additive Manufacturing Labs in Grottaglie and projects

KetaSpire® CF10 LS1 AM Filament
polyetheretherketone

Funded project:

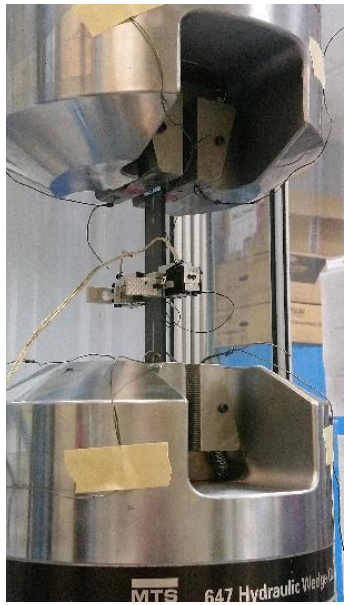
mimosa

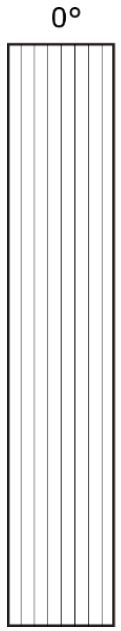
European Commission | Horizon 2020 European Union funding for Research & Innovation

Internal projects:

- Optimization of the process control
- Characterization of 3D printed technopolymers
- Topological optimization of structures
- Integration of 3D printing in aerospace
- Production of tools and structural elements from 3d printed technopolymers

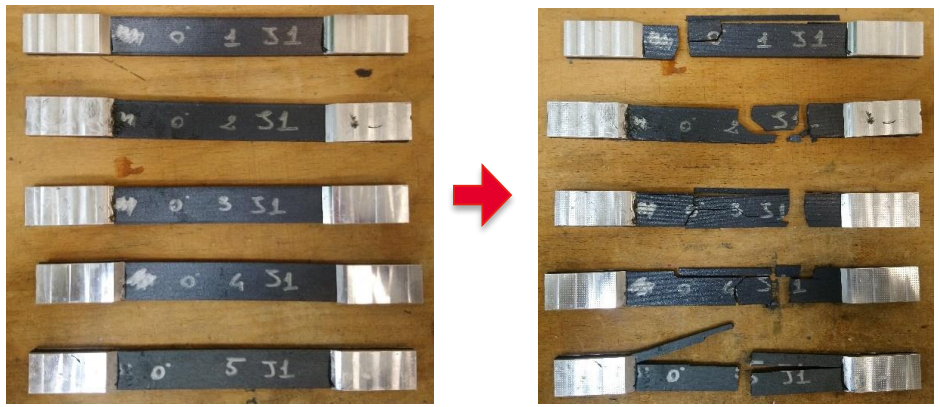
Results of tensile tests: UNT 0 deg

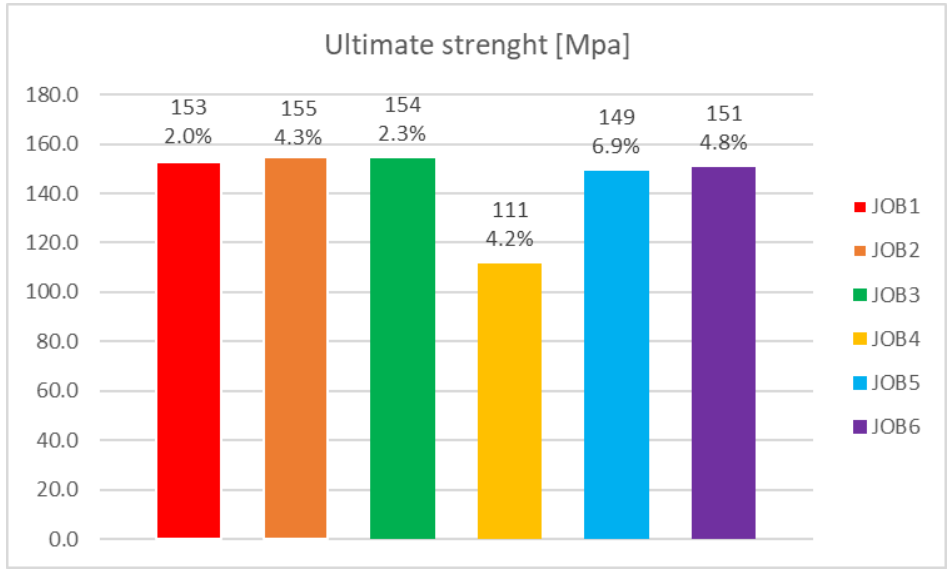


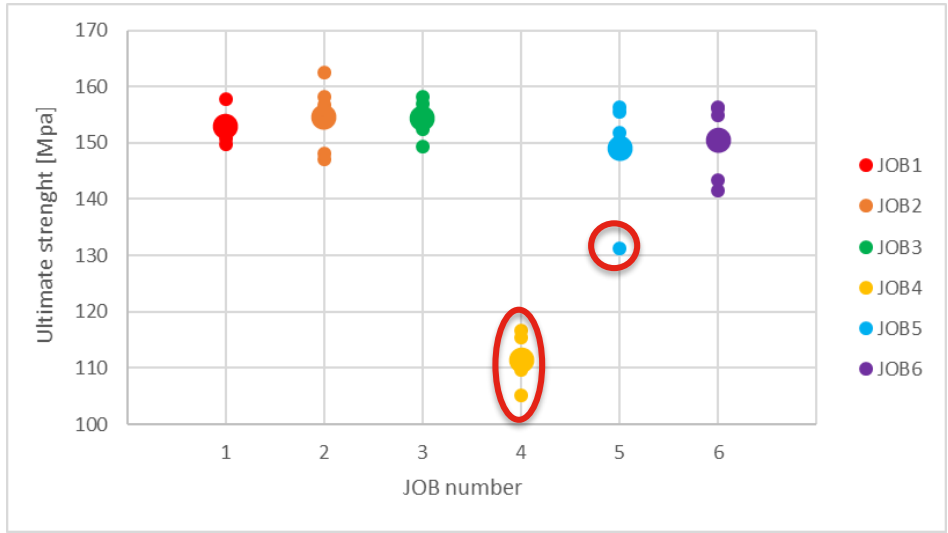


- Specimens dimension 254 x 25.4 x 4.05 (18 layers) mm
- **ASTM D3039** - consider 3D printed specimens as laminates
- Printing parameters:
  - Extruder Temperature: **450° C**
  - Chamber Temperature: **160-180° C**
  - Layer thickness: **0.225 mm**
  - Extruder diameter: **0.4 mm**
  - Printing speed: 1800 mm/min

Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Printer 1	Printer 1	Printer 1	Printer 2	Printer 2	Printer 2
Batch 1	Batch 2	Batch 3	Batch 1	Batch 2	Batch 3

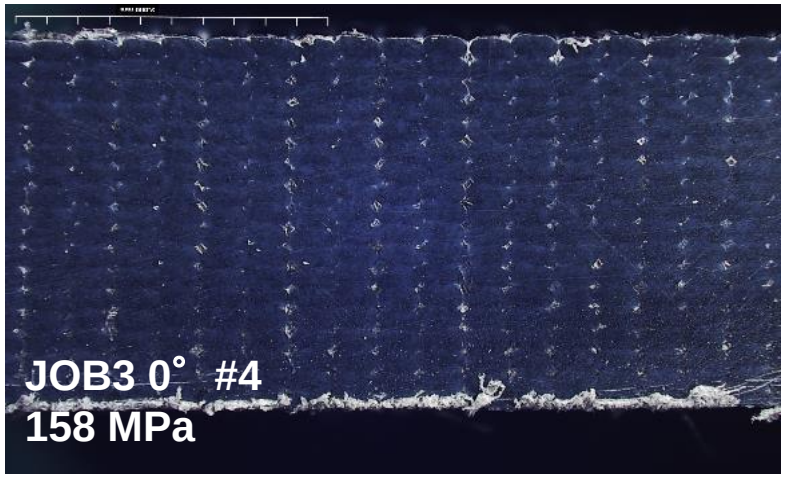


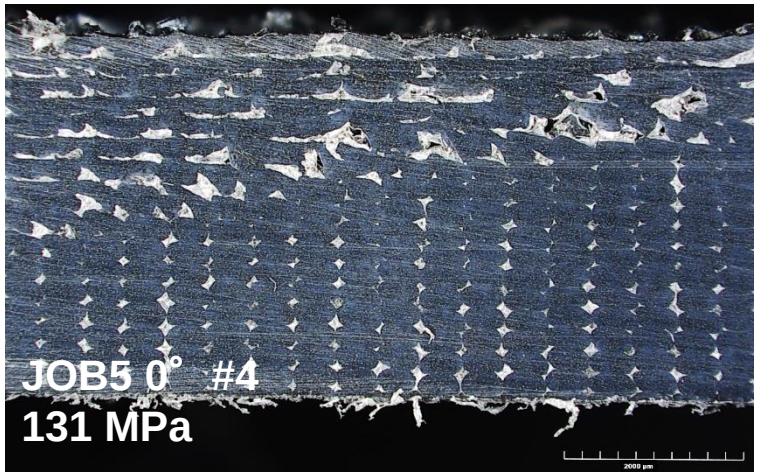


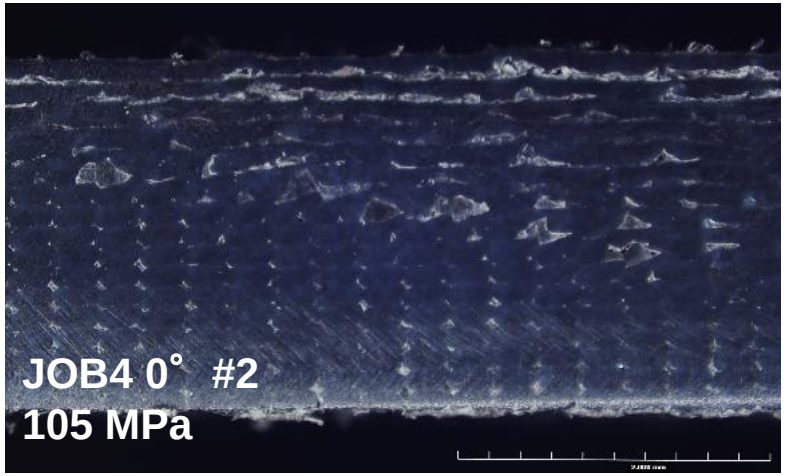


Optical microscope analisis: UNT 0 deg

- The cross section of a specimen with a good ultimate strength shows porosities between the filaments, but evenly distributed
- The specimens with lower strength are from Job 4 and one from Job 5: all have a high surface roughness
- The sections of these specimens have a high level of porosity concentrated in the area under the rough area







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