

DISRUPTIVE MANUFACTURING PROCESSES, METALURGY & MECHANICS

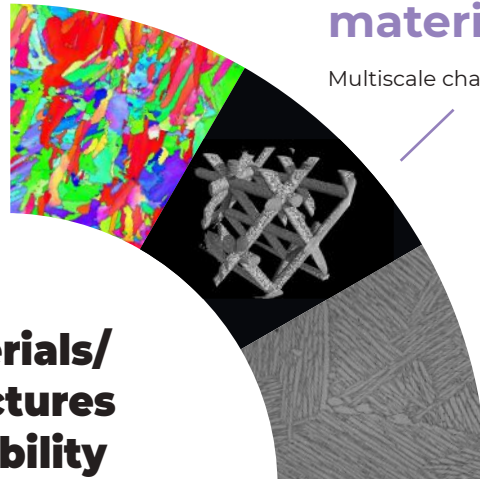
Processing

Additive manufacturing,
forging, heat treatments



Structures of materials

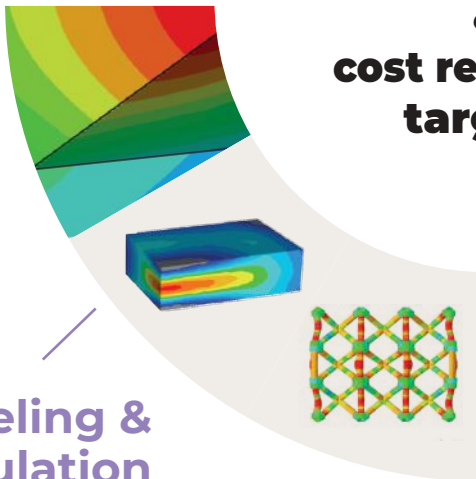
Multiscale characterization



**Materials/
Structures
durability
&
cost reduction
targets**

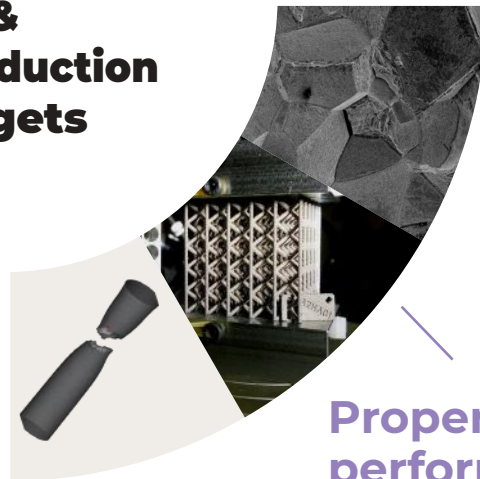
Modeling & simulation

Virtual testing, digital
twins, materials and
processes



Properties & performance

Durability, ageing, mechanical
performance




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Manufacturing

Dispersion mean LMD & EBM Technology: BEAM Modulo & Arcam Q20+ Machine

- To sustain materials and processes research activities covering the overall end-to-end process, from the building strategy to the characterization of final parts
- LMD working area: 600mm x 400mm x 400mm, 2 kW laser, 2 deposition nozzles, inert atmosphere
- EBM working area: 350mm x 380mm, retrofitted for material development (Ni alloys, etc.) with powder heating up to 1000°C



LBM Technology: OLLOPA Platform

- To study laser/powder interactions, develop in-situ monitoring systems, investigate new materials for AM
- LBM working area: 100mm x 100 mm x 40mm
- Laser power: 700 W
- Fully open parameters
- Alloys: Al, Ti, Ni, etc.



CLOSE-DIE FORGING PLATFORM

- To support the industrial development of optimized forging routes
- To reduce recurring cost and buy to fly ratio
- To support Design Office (Design to forge)
- To challenge M&P specifications
- 1000t
- Max load: 30kg \square 300mm x 50mm
- Speed range: [0.01mm/s-20mm/s]
- Static load: +/- 5% of target value
- Semi-automatic manipulator

Thermal Treatment

- To develop optimized thermal post-treatments and study phases transformations
- Thermal post-treatment ovens for Al alloys
- Thermal post-treatment furnaces for Ni & Ti alloys
- Ageing furnaces for Al & Ti alloys with inerting system
- High accuracy dilatometers
- Hot Isostatic Press with Uniform Rapid Quenching (URQ)
- HIP Pressure: 2000 bars / HIP Tmax: 1400°C
- Rapid quenching capability
- Max HIP workload: 170mm x 300mm h / 40kg

Characterization & testing


- To analyze and characterize materials
- To understand and make expertise on materials microstructures at different scales, chemical composition, mechanical properties, etc
- Metallography preparation laboratory
- Optical microscopy
- Confocal Laser scanning microscope
- Scanning electronic microscope with EDS
- Tensile Test machine (ambient and high temperature)
- Fatigue machine (ambient and high temperature)
- Micro hardness tester
- C-scan & RX μ CT Scan: \sim \varnothing 150 mm x h500 mm
- scan volume, 2 μ m minimum spatial resolution, max acceleration voltage: 20 kV

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