

# RAPID PROTOTYPING BY LASER SINTERING AND CNC MACHINING FOR THE PRODUCTION OF COMPONENTS

**Innovations and Benefits** - The EOSINT P700 facility is able to build polyamide components up to 700x380x580 mm by laser sintering (additive manufacturing). The technology allows the production of complex-geometry objects directly from the 3D CAD model, without the use of tools. Bulk material can range from fiber-reinforced polyamide (PA) powders, to improve the mechanical properties, to metal-additivated PA powders to improve the thermal conductivity.

In the automotive sector this technology is used to produce molds for series production of transparent plastics and fiber-reinforced composites (with polymer and ceramic matrix).

The rapid prototyping facility works together with the Conquest 2200, a five-axes CNC (Numerical Controlled Computer) machine which allows the production of components and molds (for compounds and light alloys, for the automotive and aerospace sectors) with a “subtractive” approach, ie operating over a volume of 2200 x 160 x 600 mm. The CNC machine is particularly suitable for processing light materials such as aluminum, wood and polymers.

**Uses** - Applications involve several manufacturing areas (packaging, automotive, aeronautics) both as processing intermediates (moulds) and final objects (e.g. biomedical, design objects) for the production of:

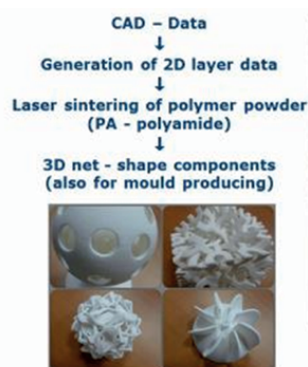
- surgical templates (autoclave sterilizable and certified for use in operating room);
- translucent plastic design objects (e.g. lamps or accessories);
- objects suitable for hot painting
- molds for ceramics, polymer and ceramic matrix composites;
- demonstrators and simulacra (e.g. for the design industry or for cultural heritage valorization);
- functional components for engines, thermal protection systems, structural components, thermal barriers.

The facility has been used within the EEE-CFCC, 2016-2018 project ([www.eee-cfcc.it](http://www.eee-cfcc.it)) “Economically and Ecologically sustainable Evolution of fiber-reinforced complex ceramic compounds” POR-FESR 2014-2020 Axis 1, Action 1.2.2 of Emilia Romagna Region.

## Past and Present Activities -

Collaborations with companies and technology centres: EOS Italia srl, Riba Composites srl, Carbo Line srl, Protosa (gruppo Sacmi), Tecnalìa (ES), Gaiker (ES). ENEA also participates in national and international platforms in view of the future KIC Manufacturing, in the framework of manufacturing and the new production concepts (Factory of the Future).

Patents: RM2014A000726; RM2014A000725.



**Characteristics: CUSTOM**

Thanks to its flexibility, the rapid prototyping service can be adjusted to different needs and contexts