



EXTRACT



The all-in-one gantry solution  
for additive and subtractive manufacturing



in partnership with



ENGLISH



## THE ALL-IN-ONE GANTRY SOLUTION

As a result of the partnership between Belotti and CEAD comes BEAD, the new **hybrid technology that integrates Large Scale Additive Manufacturing with the milling process in a single machining center.**

**BEAD exploits the best of both worlds** combining the speed and creative potential of 3D printing with the precision and reliability of a cnc center in a single system.

Through the integration of a **CEAD extruder** for additive manufacturing (of variable dimensions and capacity) in a **Belotti 5-axis CNC machining center**, BEAD allows the production of parts that are sufficiently oversized to be finished to the required tolerances with **times and raw materials consumption lower than traditional methods.**

The application potential of this solution is endless: the first sectors that are targeted are the marine, automotive and aerospace for which moulds, patterns, tools and final parts were produced.

**BEAD** is a solution that opens up very innovative production scenarios and at the same time **enhances the return on investment.**

**The new solution requires less space and programming than two separate systems**, and since the workpiece does not need to be machined on two machines, **handling and machining times are significantly reduced.**

### 3D PRINTING

Design freedom

Near net shape

Automation

Recyclable materials

### CNC MILLING

Smooth surface

Tolerances

Automation

Accuracy

## APPLICATION SECTORS



AEROSPACE



AUTOMOTIVE



MARINE



DESIGN

## TOP FEATURES

- **Integration of additive and milling processes** in a single hybrid solution
- **5-axis printing of complex geometries.** The **45 degree orientation of the extruder** enables to print also fully closed shapes without supports for undercuts, reducing printing time and improving interlayer adhesion, and to mediate mechanical and thermal properties of the material at needs
- **Extrusion output from 12kg/h to 80 kg/h** to satisfy the different industry needs and their relative build volumes
- **Maximum extrusion temperature up to 400°C** to print high performance materials
- **Electrospindle from 15 to 42 kW**
- **Milling accuracy** up to 0.01 mm/m (linear) and +/- 12 arcsec (rotational)
- **Milling toolchange positions from 8 to 60**



# MAIN ADVANTAGES

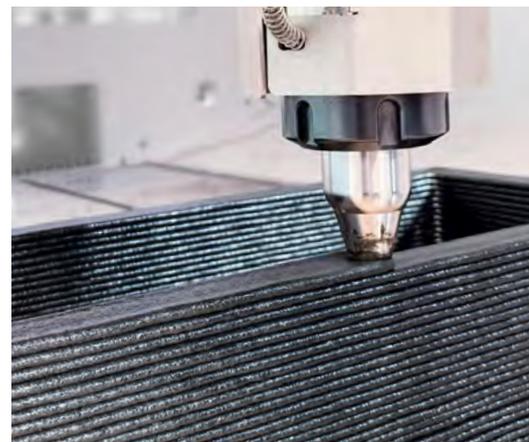
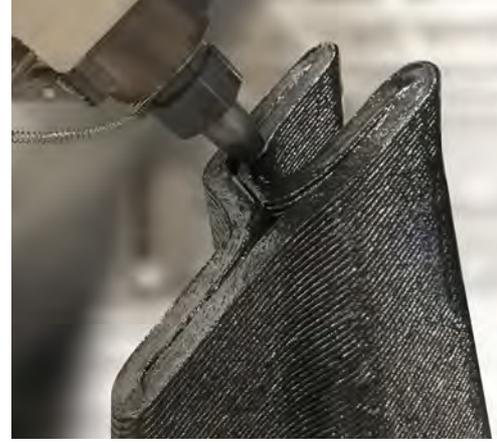
- **Manual labour elimination for a more automated process:** from a CAD geometry to the mould production without the making of a model
- **Lower investment and space optimization** with respect to the single technologies
- **Shorter lead times and reduced production costs**
- **Less used and waste material** for a more efficient production
- **Greater sustainability** thanks to the use of reusable and recyclable materials

Less manual  
labour

Shorter lead  
times

Lower  
investment

Less waste  
material



# MATERIALS

The 3D printing process uses **composite pellets** made of a **thermoplastic polymer matrix and different types of fibers as reinforcement**, from glass to carbon and natural fibers.

Polymers range from commodity (e.g. PP, PETG) to high performance materials (e.g. PESU, PEEK).

Differently from thermosettings, **thermoplastics could be recyclable and re-used**, making the process even **more sustainable** and **less environmentally impacting**.



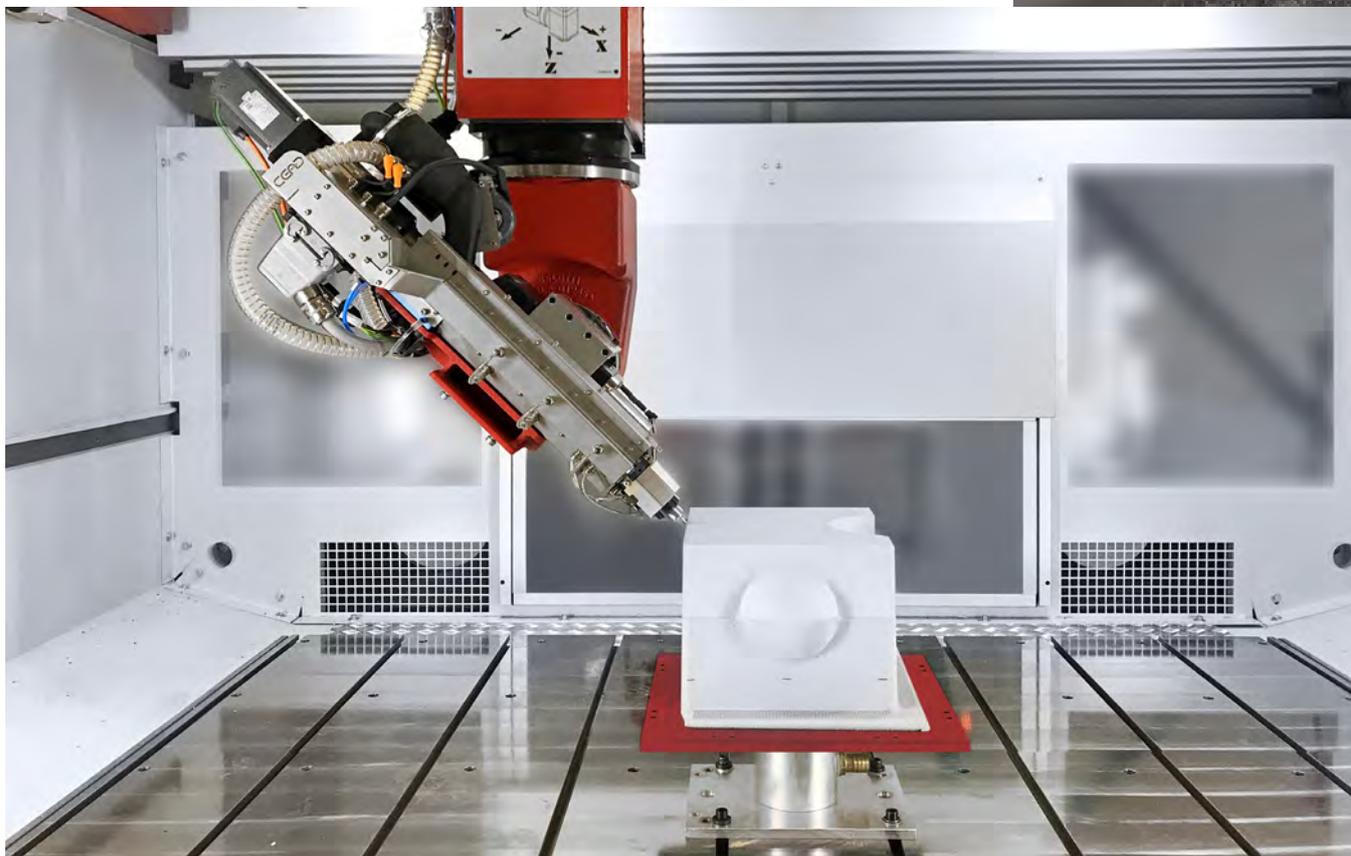
# MODELS

BEAD solution can be possible in **different configurations with variable build volumes, extrusion outputs and printing orientations**.

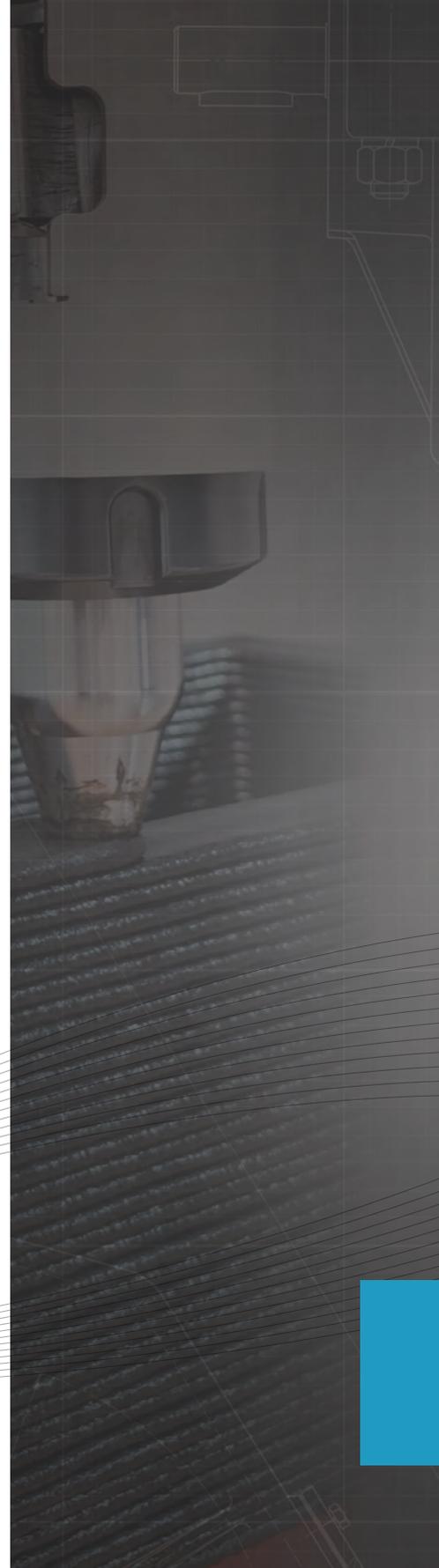
BEAD finds application in the aerospace, automotive, marine and design industries, allowing for the production of moulds, plugs and autoclave toolings through the use of different materials, from commodity to high performance fiber reinforced polymers.

# APPLICATIONS

Models and production tools: plugs, moulds, autoclave toolings for composite production.



45 degree extruder orientation and printing



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