



ETHNICON METSOVION  
POLYTECHNION  
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# Key Features



## Dual-Head Printing System

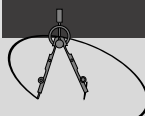
- **First Head:** Builds intricate geometry with semi-inorganic filaments such as ABS or PLA, blended with inorganic minerals and other additives, ensuring enhanced durability and performance.
- **Second Head:** Fills complex structures with binder additives and loose fill pastes, allowing the creation of cellular, lightweight designs with superior thermal and acoustic properties.

## Material Innovation

**Sustainability Focus:** Evaluates alternative binders and nano-additives to replace conventional cement-based materials, reducing environmental impact

**Advanced Materials:** The system supports innovative, eco-friendly materials that are durable and energy-efficient, aiming to reduce carbon footprints in the construction sector

Pilot Line 2 is an advanced 3D printing system for the construction industry, focusing on building retrofits. It combines material science, architectural design, and sustainability in one high-tech solution.



## Geometric Flexibility

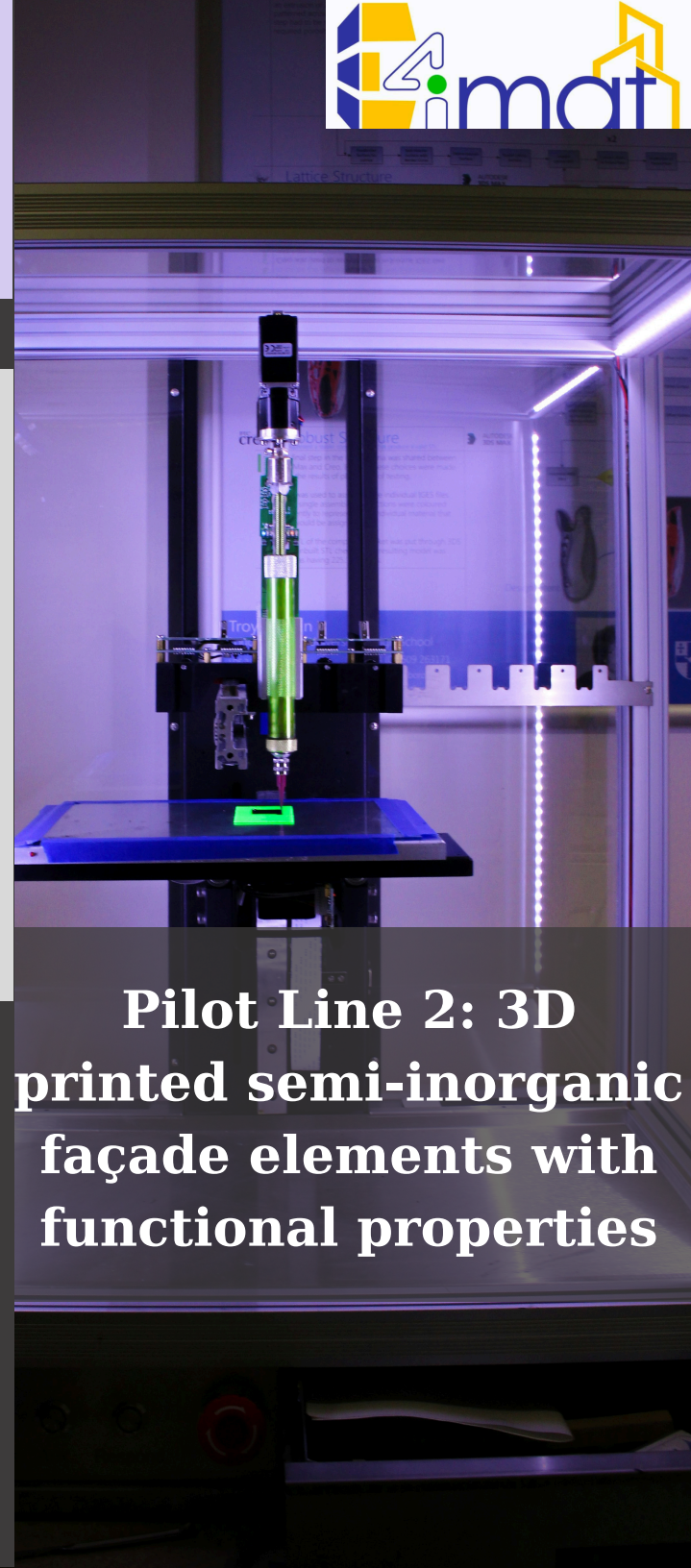
- **Complex Geometry:** Capable of producing complex shapes and customized designs that can't be achieved through traditional construction methods.
- **Customizable Inner Geometries:** Design elements with multi-functional inner structures
- **Embedded Components:** Integrate operational mechanisms directly into the printed elements



## Simultaneous 3D Printing & Extrusion

**Faster Production:** The system can produce up to one element per day depending on the size and complexity.

**Multi-Technology Integration:** The simultaneous processes enable the integration of different technologies (e.g., insulation, heat storage, acoustic management) directly into the printed element.



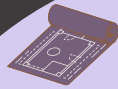
**Pilot Line 2: 3D printed semi-inorganic façade elements with functional properties**

# Applications



## Thermal Management:

- Designs can include features for thermal insulation and heat storage
- Enhances control of heat exchange between indoor and outdoor environments



## Architectural Advantages:

- Provides architects with the freedom to design complex and innovative structures.
- Suitable for creating bespoke architectural elements that meet specific aesthetic and functional requirements.



## Structural Strength:

- Maintains structural integrity while incorporating advanced functionalities.



## Building Retrofits:

- Focuses on producing 3D printed elements up to  $1 \times 1 \times 0.4 \text{ m}^3$ .
- Suitable for retrofitting existing buildings with advanced materials and designs.
- Targets building material manufacturers looking to innovate in the construction industry.





# Advantages



## Material Sustainability

- Emphasis on using environmentally friendly materials aligns with modern sustainability goals.



## Increased Production Efficiency

- The dual-head system and simultaneous processes significantly speed up the production of complex elements



## Enhanced Functionality

- Ability to integrate various functionalities within a single printed element, improving overall building performance



## Design Flexibility

- Offers architects and builders great freedom in creating customized and complex designs

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