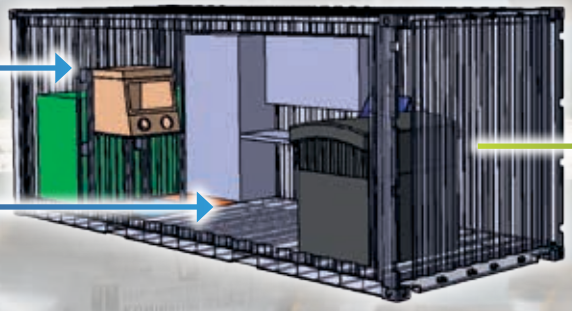
EUROPEAN DEFENCE AGENCY

Additive Manufacturing Feasibility Study & Technology Demonstration-The "AMFaD" project

AM DEPLOYMENT:
A Robust, Self-Contained, Autonomous and Connected Facility

SUPPORT AREA
- Air conditioning system
- Power generator

WORKING AREA
- Additive module: 2 printers
- Design software module
- Post-processing module
- Work spaces and storage



COMING OUT OF THE CONTAINER
- Spare parts
- Tools
- New parts on demand
- Etc.

Two PRINTERS: two different manufacturing technologies INSIDE!

- Material jetting 3D printer, using photopolymers of different ranges: from rigid to elastic, from opaque to translucent materials.
  Build size in mm: 330 × 330 × 200; Accuracy: +/- 0,02mm
- Material extrusion 3D printer (Fused Deposition Modelling type); embeds continuous fiber into printed carbon and nylon for an end-use composite part with the strength of metal.
  Build size in mm: 320 × 132 × 154; Accuracy: +/- 10 mm

Examples of products/parts:

WHAT is THERE FOR THE DEFENCE SECTOR?

The rise of Additive Manufacturing (AM)/ 3D printing technologies has created a variety of possibilities and potential benefits for the defence community:

NEW AND IMPROVED PRODUCTS FOR DEFENCE INDUSTRY
- Reduced lead time products
- Small series
- Customized products (less material/weight)
- Accesories

SUPPORT TO FIELD OPERATIONS
- Strategic and tactical planning
- Troops field support
- Humanitarian Aid/Catastrophe assitance
- Isolated operations

SUPPORT TO IN HOUSE OPERATIONS
- Maintenance and repairs
- Tools production
- "On demand" habitats
- Surgical planning
- Implants/Prosthesis/orthosis
- Support on training

ADVANTAGES

Manufacturing at the point of use: Reducing logistic support.

Innovation in design: freedom of design /**reducing the weight**/ increasing the performance.

Greater customization.

Cost-effective, quality solutions: produce spare parts on demand, reducing inventory stocks/ reduce assembly steps.

Materials: broad range.

METALS	PLASTICS	CERAMICS	RESINS	OTHER

THE TECHNOLOGY

ADDITIVE manufacturing (AM) has the potential to deliver radical change to many sectors, including the **Defence landscape**. It is defined as the process of joining materials to make objects /form a final product from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies, where material is removed from the product.

It introduces new possibilities for the entire DEFENCE sector!!

Existing AM processes

Powder bed fusion

Use of laser or electron beam to melt and fuse material powder together. There are several techniques (SLS, DMLS, EBM, SLM...)

Material extrusion

Extrusion of a wire of molten material deposited layer by layer

VAT Photopolymerization

Pre-deposited photopolymer in a vat selectively cured by light where required

Binder jetting

Uses two materials; a powder based material and a binder (usually in liquid form). Deposition of alternating layers of the build and the binding material

Material jetting

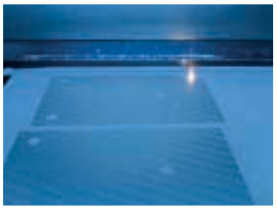
Material is jetted onto the build platform, where it solidifies and part is built layer by layer

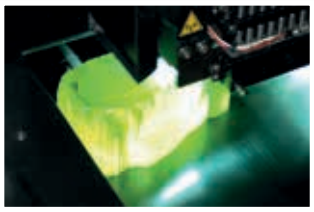
Direct energy deposition

Deposition and melting of powder feedstock, commonly used to repair or add material to existing components

Sheet lamination

Layers of adhesive paper, plastic, or metal laminates are successively bound/glued together and cut to shape





THE PROJECT

The **"AMFaD"** project aims at **raising awareness and promoting a better understanding of AM's application and potential in different military contexts and will contribute to its timely and effective implementation in defence specific areas.**

It was initiated in the framework of the CapTech Materials & Structures, within the EDA Research & Technology domain.

Project specific objectives

- To assess the areas where additive manufacturing can make a greater contribution to defence capabilities.
- To demonstrate the feasibility of AM technologies in defence.
- To raise awareness in the defence community.

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