



# Additive Manufacturing

3D-Printing Competence at Fraunhofer CML

**Did you ever want to try something but hesitated because you couldn't find a quick and easy way to make your idea come to life? Did you ever need a specific part to finish your design that was unavailable in stores? If so, Fraunhofer CML 3D-printing expertise may be the solution for you.**

3D-printing is a type of additive manufacturing and describes a process where the model of a component is first digitally sliced into 2D layers, and then traced on the printer's building platform with lines of material in a pre-defined manner to produce an entirely new 3D component.

A variety of materials such as polymers, metals, biological substances and ceramics can be used by different types of 3D-printers to build a part.

Hence, it offers a diverse range of possible applications and enables the production of parts with very complex geometries, where conventional subtractive manufacturing methods fail.

### Our Expertise

At Fraunhofer CML, we use different types of polymer 3D-printers in many of our projects to rapidly produce functioning prototypes that can be put to the test. Ideas can be easily put

to paper and produced within hours, reducing experimenting times by many folds.

In addition, it allows us to run through multiple design iterations before manufacturing a desired part or component from a different, more rigid and expensive material and make sure, everything works as intended.

Furthermore, the vast range of available materials and thus mechanical properties allows for experimentation of system behaviours under different conditions.

Therefore, it is possible to make and evaluate components of different flexibilities under consideration of the application needs.

In the diverse range of projects conducted at CML, we have acquired a great deal of expertise in making prototypes.

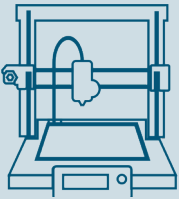
Here are only a few examples:

- **Specialised hinges and fixtures**
- **Watertight and light weight housings and containments**
- **Modular and stackable open design sensor cases**
- **Mock-ups and miniature models**
- **Robotic gripping structures**
- **Bio-inspired mechanisms such as firing catapults, reciprocating drills, extending sails**
- **Small-scale riblet-mimicking surface structures**
- **Customized mounts, holders and inserts**

### Your Benefit

Working with Fraunhofer CML offers you a great opportunity to investigate different solutions and even complex or innovative designs to make your process or product more time and cost-efficient.

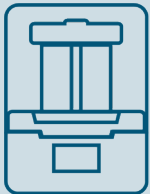
Thanks to our expertise in designing prototypes, we can evaluate your idea and respective mechanical requirements to choose the optimal printer, settings and material to produce your customized working prototype.



#### Ultimaker S5 & Prusa Mi3 FDA Printers

Our FDA printers run almost constantly as they are used to print all kinds of components ranging from screws and nuts, circuit board holders and aluminium profile inserts, over sensor and camera mounts, to components and parts used in our battery hot swap system.

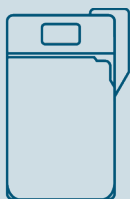
Specialty: • Rapid prototyping • Great range of filament materials



#### FormLabs Form3 SLA Printer

Our SLA printer is usually used to print small-scale and intricate parts of great mechanical stability and sturdiness. Thanks to its minimum layer thickness of 0.025mm, we were able to print small valve connectors for air pumps and minuscule plug connections.

Specialty: • High precision • Great range of rigid & flexible materials



#### FormLabs Fuse 1 SLS Printer

Our SLS printer is used for the construction of integrated mechanics for applications within the maritime environment. It can produce waterproof casings and special productions that can be used for example, on our SeaLion research platform developed in-house.

Specialty: • High precision • 'Print-in-place'