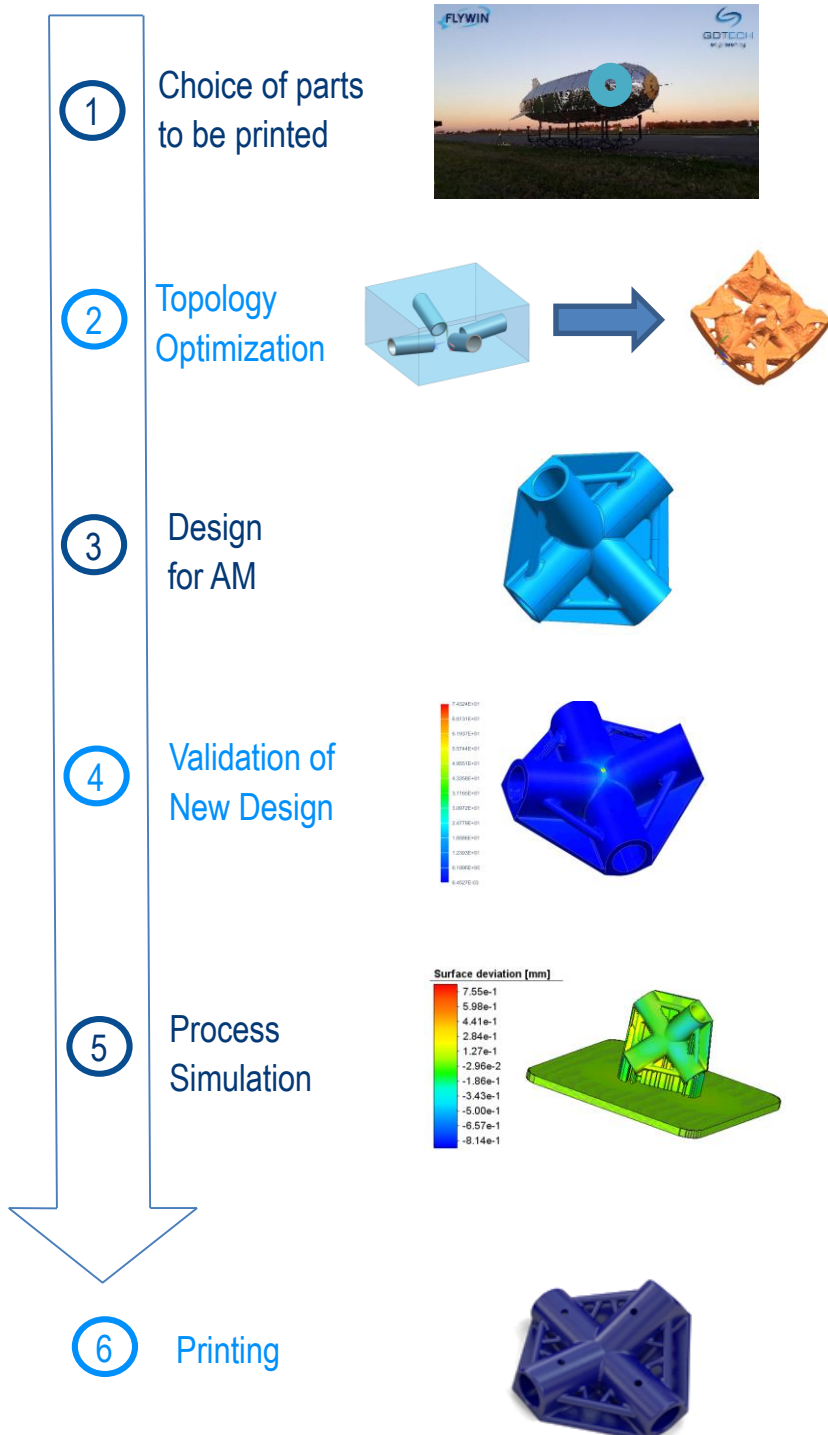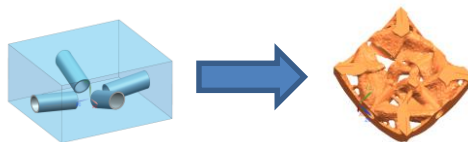# ADDITIVE MANUFACTURING MADE EASY

Assisting You through the Complete Design Process for metal Additive Manufacturing
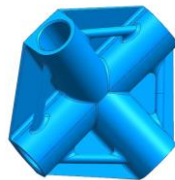
Additive Manufacturing is going mainstream because its larger design freedom enables the production of concepts considered unfeasible in the past. Nevertheless, in order to make a successful transition to AM, one must make sure to do it right from the start. GDTech can help you for one, few or all the necessary steps.

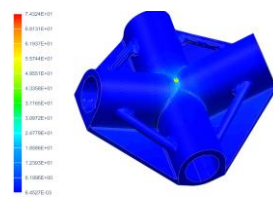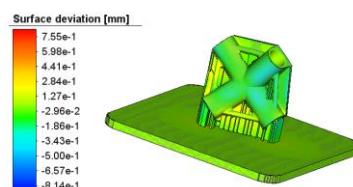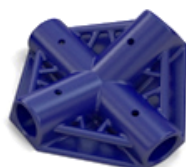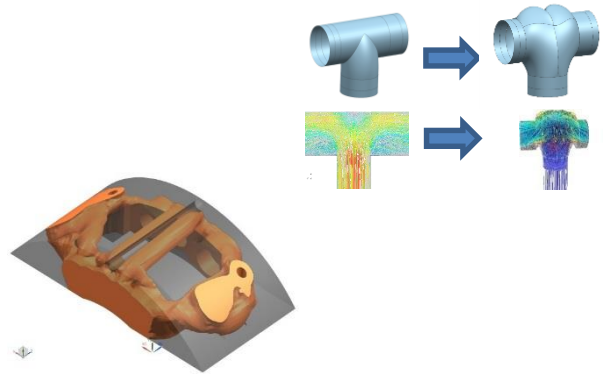|		
1 Choice of parts to be printed		A wise selection of the parts to be produced by AM is the first step for a successful and efficient design process. Take advantage of AM to lighten your parts, or regroup some of them to include more functions in one design.
2 Topology Optimization		Topology optimization, while not being mandatory in the process, enables you to really exploit the advantages of Additive Manufacturing and make sure each gram of matter is used at its best.
3 Design for AM		While Additive Manufacturing sets you free from classical DfM rules, it comes with its own set of prerequisites, that mostly depend on the printing strategy. Best practice is to rebuild a CAD model from the optimization results by integrating new manufacturing constraints. Ignoring these constraints is the best way to a printing failure or a greatly distorted part.
4 Validation of New Design		Your new design of the part including the necessary features to have a successful print should still perform as expected in its real environment. FEM simulations of the optimization load cases as well as extra load cases are carried out to guarantee the validity of the design.
5 Process Simulation		Printing processes can be quite tricky. Supporting strategy should be well thought in order to obtain the part as you designed it at the end. Process simulation will help you anticipate potential issues arising during the print and enable you to choose your supports wisely and even include some of them in the final design of your part. Anticipating potential problems before they become reality will make you gain time and money.
6 Printing		There we are, your part is now lighter, more efficient, integrating more functions, and the number of assembly operations is reduced. All that thanks to a well thought design process!

ADDITIVE MANUFACTURING MADE EASY

Topology Optimization:

Take advantage of GDTech's 20 years of experience in the field to get the most out of your structure. Mechanical, Fluid and Thermal properties can be optimized: higher stiffness or eigenfrequencies, lower pressure drops or better heat conduction are some examples of how topology optimization can enhance your parts and assemblies.
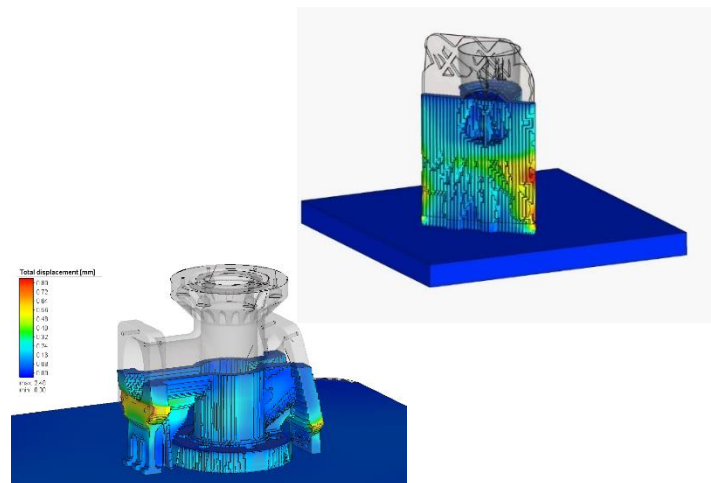
Designers naturally tend to reproduce or slightly modify the existing ones. Topology optimization will help you explore new ideas you would never have thought of and come up with revolutionary designs!

Process simulation:

Using the best strategy for the printing job reduces the risk of failures and of out-of-tolerances parts. But what exactly is the best strategy? What kind of supports should be used and where should they be attached? What is the ideal printing direction? Process simulation will help you answer all these questions, bypassing the waste of time, energy and powder typical of "trial and error in the printer method".

Since numerical simulation in general is the DNA of GDTech, it is very natural for us to tackle these issues with you and help you fine tune the design of both your parts and your supports to print them right first time!

Software packages available @ GDTech:

The complete design process is covered thanks to various commercial and in-house packages:

- Siemens Topol, 3DS Tosca, Ansys, Altair OptiStruct, OpenFoam (Fluids) et Oofelie (Multiphysics) for **Topology Optimization**

- Altair Inspire, Ansys SpaceClaim, Siemens NX, AutoDesk MeshMixer and Meshlab for **STL files cleaning** and **CAD rebuild**

- 3DS Catia V5, 3DS SolidWorks, Creo, Siemens NX and Rhino for **CAD DfAM**

- Siemens SAMCEF, MSC Nastran, ANSYS, 3DS Abaqus and Altair Optistruct for **FE Analysis Validation**

- MSC Simufact and Siemens NX4AM for **Process Simulation**

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