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Additive Manufacturing + Topology Optimization + Reverse Engineering: how to get lighter parts!

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Additive Manufacturing + Topology Optimization + Reverse Engineering: how to get lighter parts!

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Abstract:
Weight is the number one enemy in a lot of industries and particularly in Aerospace.
Two different technologies are becoming more and more mature: Additive Manufacturing Hardware (also known as 3D Printing) and Part topology optimization thru specialized finite Element Analysis Software. And the good news is that they make a perfect fit!
Goal is to design a part as lighter as possible but stiff enough.
Topology optimization can do the job but the result is usually a very organic shape far away from what a mechanical engineer has in mind.
Additive Manufacturing can create any possible shape where traditional methods, machining, molding, casting… have a lot more constraints.
So we could actually manufacture the ideal shape found by the topology optimizer.
The missing piece is to turn out a mesh (a set of triangles) into a CAD model that can match the mesh and refined for 3D printing or redesigned by an interpretation of the shape to match mechanical mindset. This is the job of reverse engineering tools.
CATIA do offer a solution for both approaches (the reality is that one must often combine both): in this presentation, you won't get a presentation of the capabilities of the tools but you'll get an illustration of many real industrial cases being successfully performed.

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