CP500043

L'OREAL : Modélisation d'outillages avec Fusion 360

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Learning objectives

- Discover new use cases around generative design
- Optimize the availability of products
- Reduction of manufacturing costs
- Acceleration of time to market

Description

LOREAL models its tools using Fusion 360. These tools are used to transport and assemble products offered for sale such as lipstick, mascara, shampoo, etc.

This process has been optimized using innovative technologies like Generative Design and has massively reduced manufacturing costs and time to market !

Thanks to this success, Fusion 360 will be implemented in all LOREAL factories in order to deliver radically optimized tools

Intervenant(s)

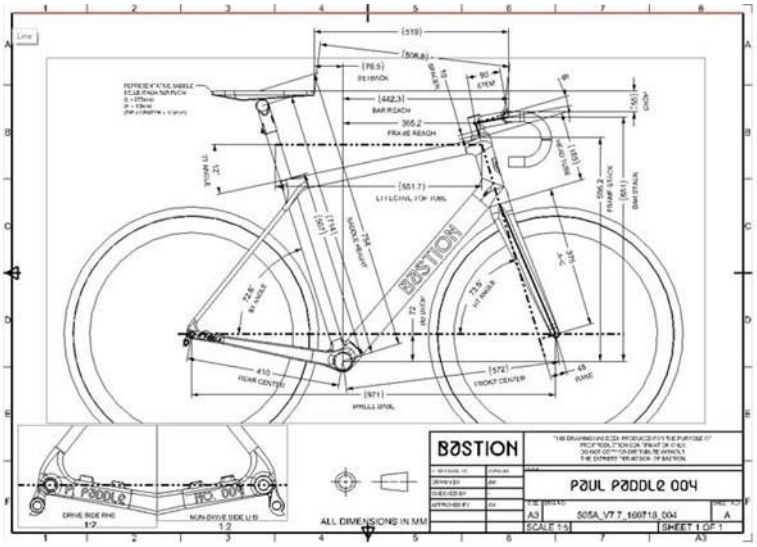
Matthew Forrester gets focus on the Research into new processes for packaging optimization - new designs, environmentally friendly materials and recyclability
His hobbies are 3D printing, designing and building racing cars - preferably all at the same time! Right now he got a position at LOREAL as Additive Manufacturing Director

Bertrand Masure
After several years' experience with SolidWorks reseller in France mainly based on Data Management and CAD Methodology, Bertrand joined the Autodesk MFG South Europe Team 9 years ago with a focus on supporting internal event and channel sales activities on the Product Design and Manufacturing Collection

Generative Design

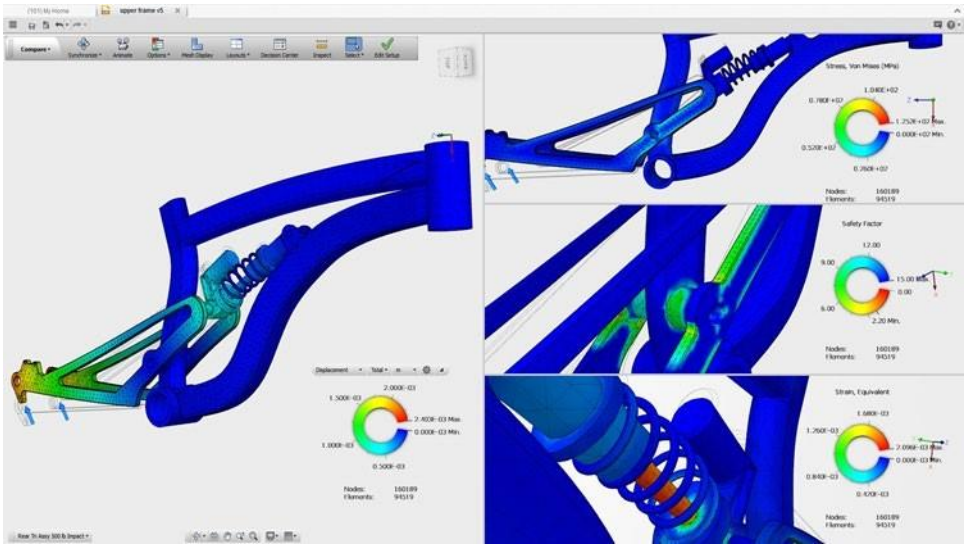
To power this technology requires a step change in software to drive not a function of the system, but the entire process.

So far in the history of engineering software, we've seen 3 waves of disruption, but thanks to these new trends, we're about to witness a 4th.

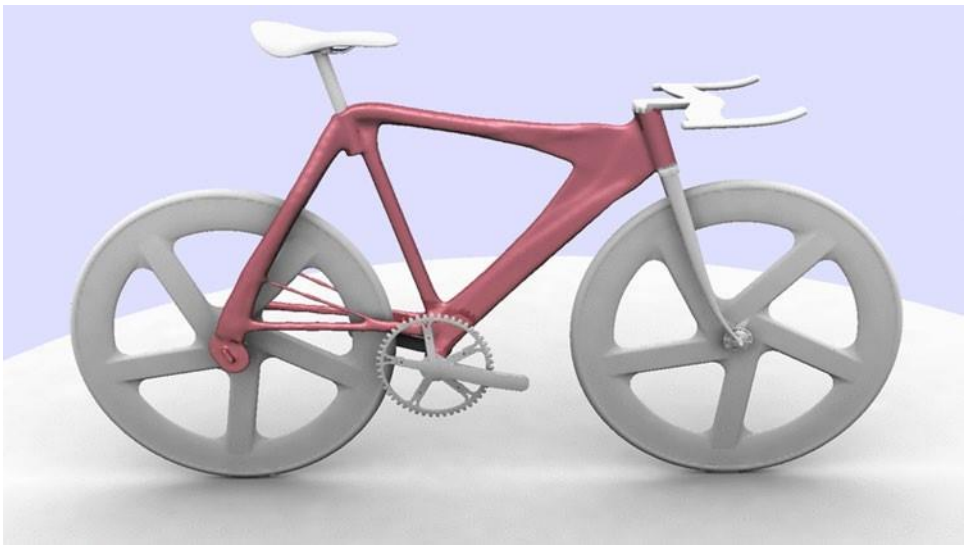


In the first wave of disruption, we saw 2D CAD revolutionize design through the ability to reuse and edit content.

In the second wave of disruption we saw 3D parametrics deliver massive leaps in productivity through it's ability to control change.



In the 3rd wave of disruption, we saw model based design equip engineers with the technology necessary to simulate behavioral characteristics of designs in order to improve product performance and quality.



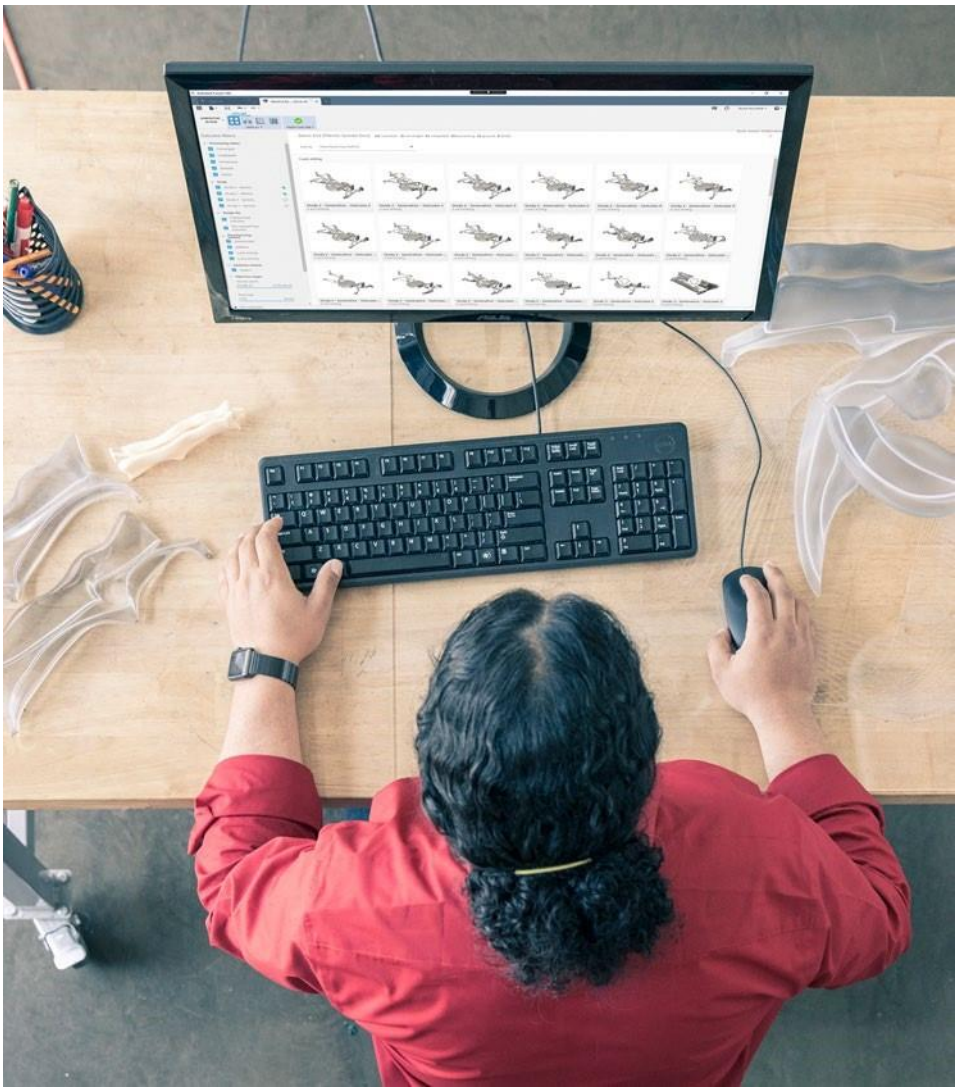
But in this next, 4th wave of disruption, we will witness the advent of a new technology that empowers engineers to automate the process of generating huge volumes of design and manufacturing instructions, optimized to the precise requirements of the customer and the manufacturing process being utilized, so that organizations can deliver not just one great product, but hundreds of thousands of uniquely optimized solutions, at scale, for an infinitely variable market demand.

This is what we call generative design and manufacture.

What is Generative Design

Generative Design is a design exploration technology.

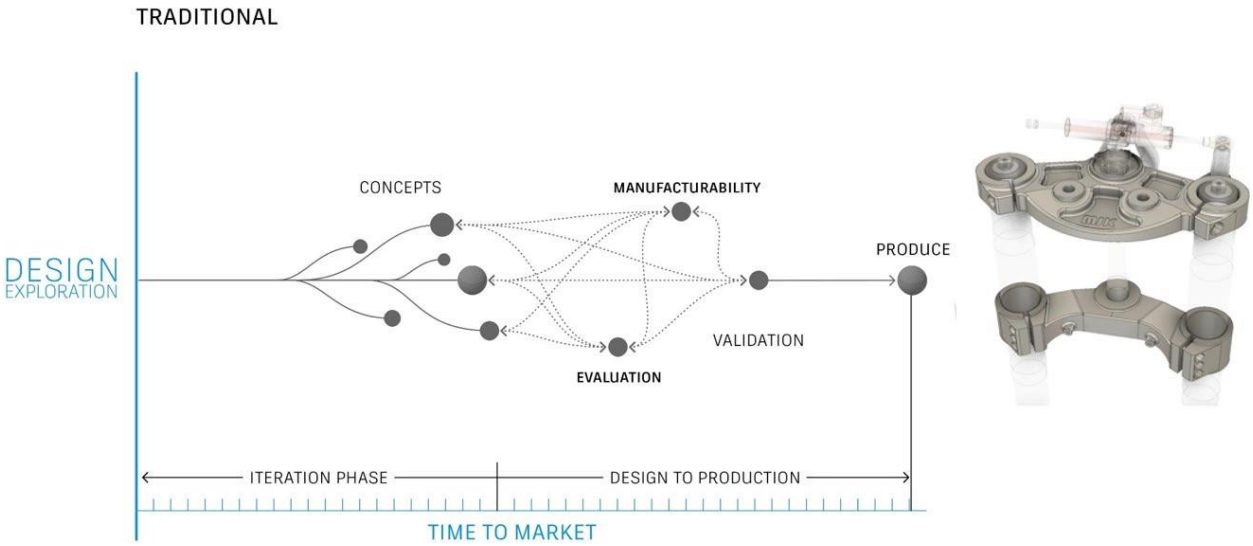
Simultaneously generate multiple CAD-ready solutions based on real-word manufacturing constraints and product performance requirements.



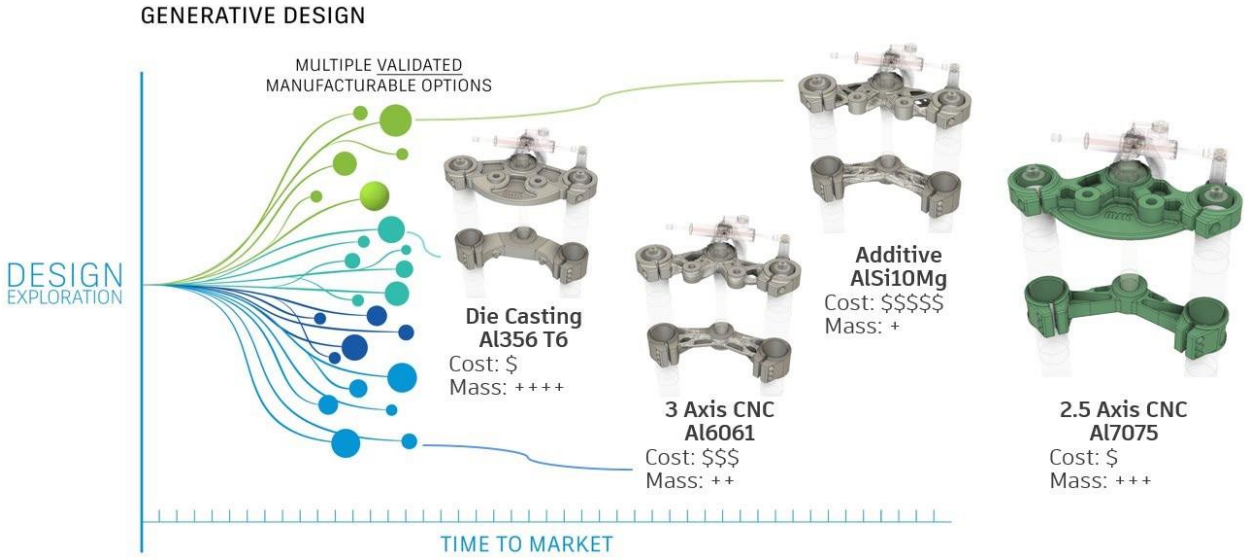
Designers or engineers input design parameters (such as materials, size, weight, strength, manufacturing methods, and cost constraints) into generative design software and the software explores all the possible combinations of a solution, quickly generating hundreds or even thousands of design options. From there, the designers or engineers can filter and select the outcomes to best meet their needs.

How Generative Design helps the product development process

In the traditional approach, we must evaluate and validate the manufacturability of few concepts before sending one of them to production.



This can lead to numerous iterations, feedback cycles and restarts, which elongates the time to manufacture.



Generative Design generates a wide range of designs that meet the requirements. The result is complex, high-performance structures that human designers would never have conceived.

Unlike topological optimization, the software explores all possible permutations of a solution, considering even today's production capabilities and technologies, quickly generating design alternatives.

What makes the design exploration unique is its ability to analyze all the possible variants of a solution and present the list of possible choices to the designer, who will be able to make an educated decision on tradeoffs for a given design challenge and produce it, reducing the time to go from the design to production and therefore, increasing the productivity and amplifying ability to innovate.

Why Generative Design?

Today, the design teams has less time to come up with new ideas and to conceptualize and there are challenges with tribal knowledge where just one or two people have all the ideas in their heads.

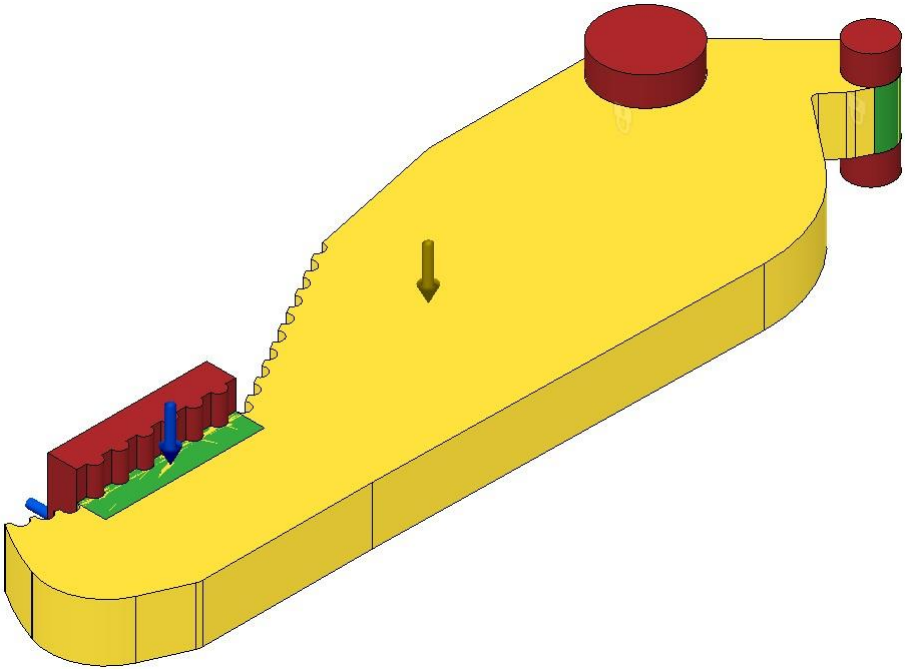
Downstream manufacturing processes are not considered during the design fase and late-stage changes are costly. So Why Generative Design?

For the first time, the computers are helping us, instead of us having to feed it every sketch, extrusion and stay on top on what can actually be manufactured.

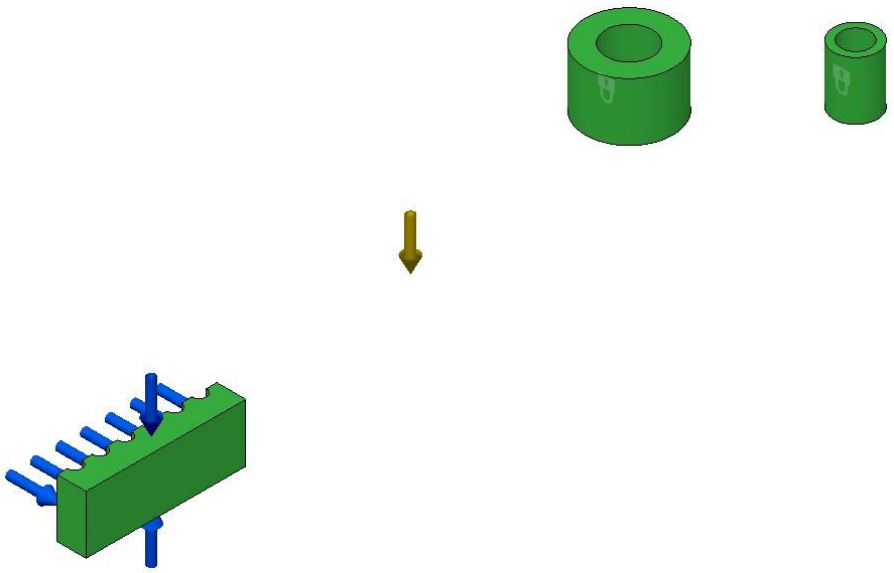
Generative Design provides cost and manufacturing options in the beginning, not in the end when 100’s of hours has been spent in the design process.

Generative Design offers more options to choose from. So the design engineers can do what they are good at, what is problem solving and using their skills to pick the best design for the task.

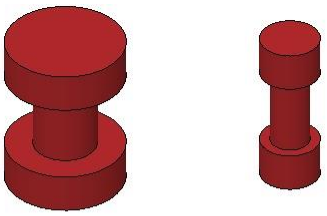
How Generative Design works

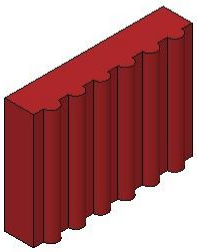


The first step for setting up a Generative Design study consists in creating the geometries of the Design Space. That is, the preserve geometry, the obstacle geometry and the starting shape (optional)

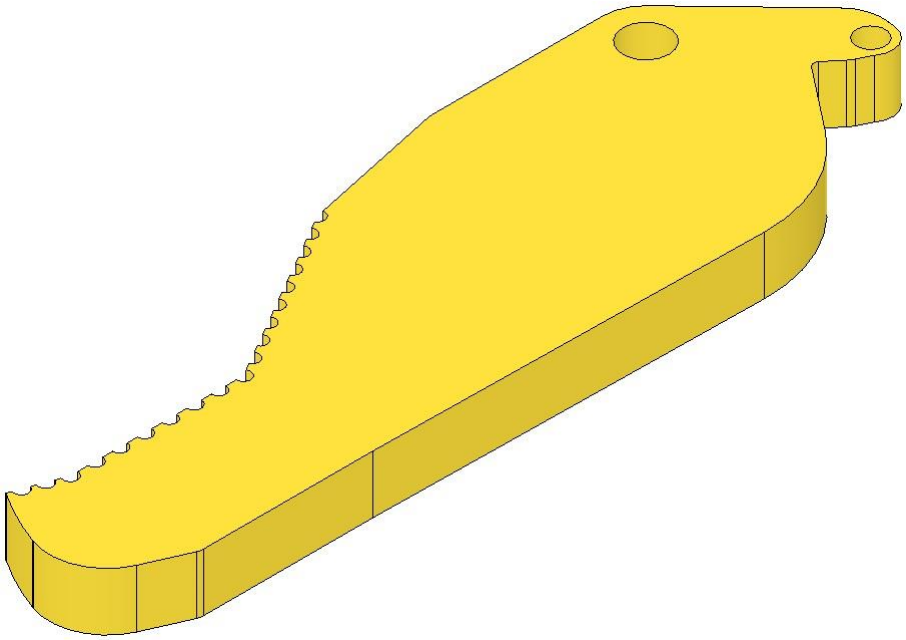


The preserve geometry typically includes the connection points to attach the design to other objects or interact with them or you interact with, such as handles. This is the geometry where you apply the loads and constraints for the study. This geometry is incorporated into the final design.

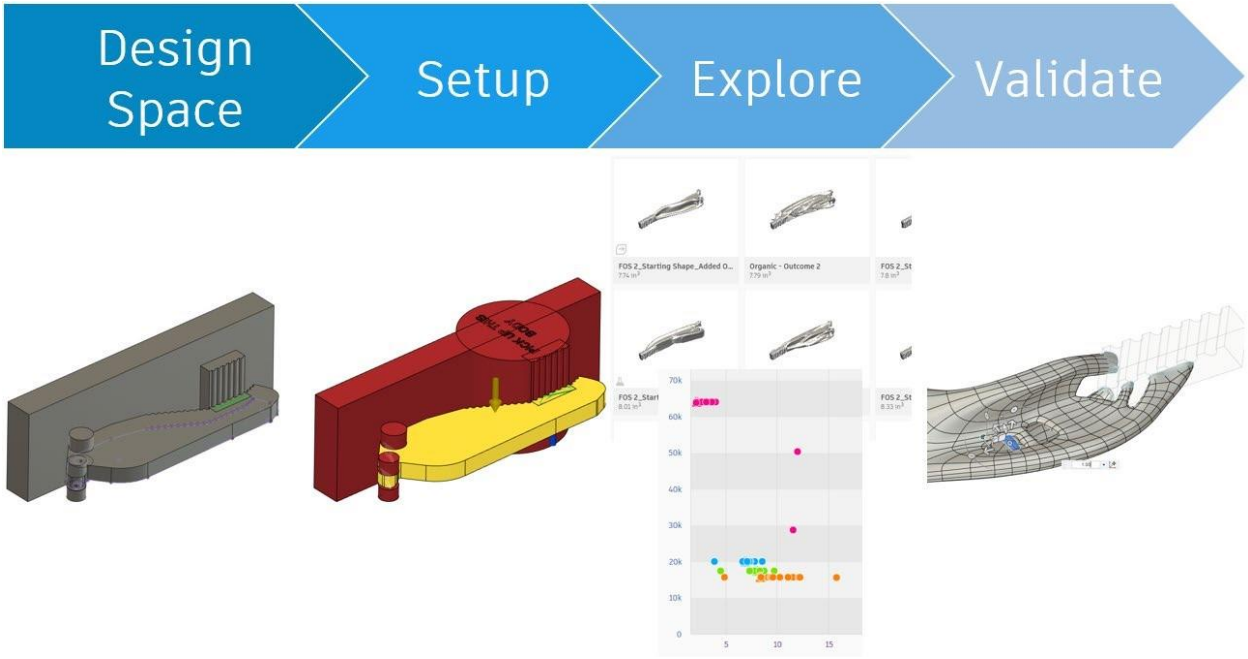




The obstacle geometry represents areas we want to avoid, because we need clearences for things like fastener and tool access, other components of the assembly, possibly the motion of some of them, etc. The solver does not add any material to these spaces.



The starting shape is the initial shape from which the solver generates the outcome. The starting shape is optional.



For completing the set up, the Design Conditions (Loads and Constraints), the Design Criteria (Optimization objectives and Manufacturing constraints) and the materials must be defined.

Based on that, Generaive Design generates the outcomes, from where it is possible to select the one(s) to be produced.

The model to be produced can be exported as a “CAD-ready” solid model, that can be still edited and validate in Fusion 360, Inventor or any other CAD software, for be prepared for the production.