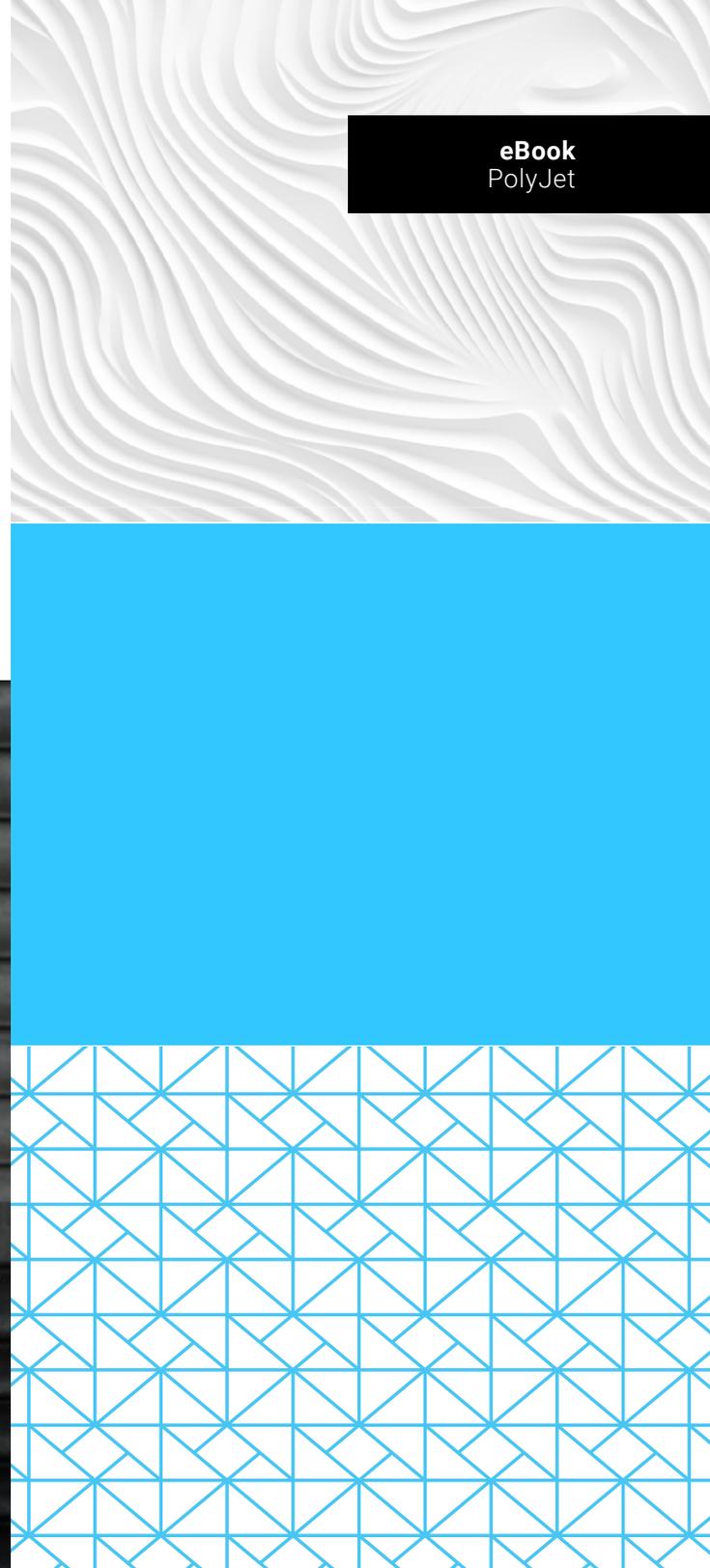




eBook
PolyJet

Make your Product Design Stand out with CMF

Vision Possible





What is CMF and how does it Enhance Product Design?

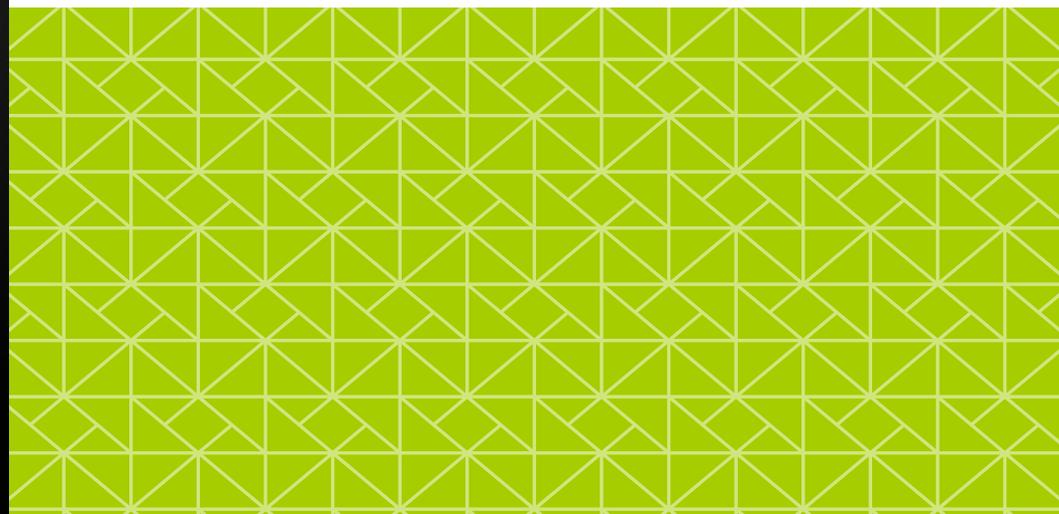
Creating a good first impression is always important, and this is especially true when it comes to product design goals. The exterior of any product, including the color, texture and graphics, is known as CMF (Color Material Finish). CMF plays a significant role in the user experience as well as a product's overall impression to stakeholders during the product design process. The way a product looks, feels, and functions, plays a large role in how likely customers are to buy it, and how it is perceived by stakeholders.





The Importance of a CMF Strategy

CMF design should be an integral part of the entire prototyping process from concept to completion. Many designers unfortunately spend most of their time on the functionality and shape aspects of the product development and leave CMF as an extra, or rather an afterthought. A high quality design cannot be achieved without thinking about CMF at the beginning of the process and investing similar efforts as those invested in the product's geometrical design. The shape and the CMF impact each other and are equally important for a successful design. In other words, the geometry should be tweaked during the development lifecycle to fit with the CMF and not only the other way around.





2D vs 3D and Design Communication

When it comes to communicating design intent, 2D flat screens are still the norm. While this may be acceptable for conveying shape, it falls short when it comes to capturing and comprehending multi-sensory CMF details. This is where physical CMF models come in; they allow designers to see and touch their design while providing a level of accuracy in communication that simply can't be achieved with on-screen rendering illustrations. A CMF model is not usually functional; it has texture, color and graphics, which are all aesthetic and user experience qualities that contribute to making a design stand-out. Holding a physical object in your hand provides a more immersive and realistic impression of its details, allowing for smarter and more accurate decision making, while raising the quality of the final product. Although many designers

and design managers understand this, they often do not have the opportunity to hold a CMF model before the final stages in the design process. This small but detailed representation can be very costly and time consuming, making it accessible only for those with deep pockets or unrealistic deadlines, leaving the remainder to make their finest design decisions by chance.

Digital CMF Modeling (3D printing)

So, what are the main values of expanding from traditional to digital CMF modeling? Perhaps the most significant are the drastic reductions in both modeling costs and time, in some cases, up to 80%. With digital CMF modeling, designers can make five times the amount of modeling iterations during the design process for the same CMF modeling budget, in less time. This leads to not only a shorter

design process but also to a faster product time to market. By creating more digital CMF modeling iterations, with the ability to make changes quickly and easily, better design decisions can be made, resulting in overall improved design quality vs making design decisions based on 2D rendering and single-color modeling. By implementing digital CMF modeling, product developers can spare costly design mistakes and raise decision-makers confidence. The end-to-end digital workflow of 3D printed modeling provides access to endless options and texture capabilities, without wasting time and effort searching and purchasing physical finishing materials. Furthermore, with an in-house CMF 3D printer, valuable IP remains safe since there is no need to share 3D files with external vendors.



Use Case: Traditional vs. Digital CMF Modeling

Car Key Fob Prototype

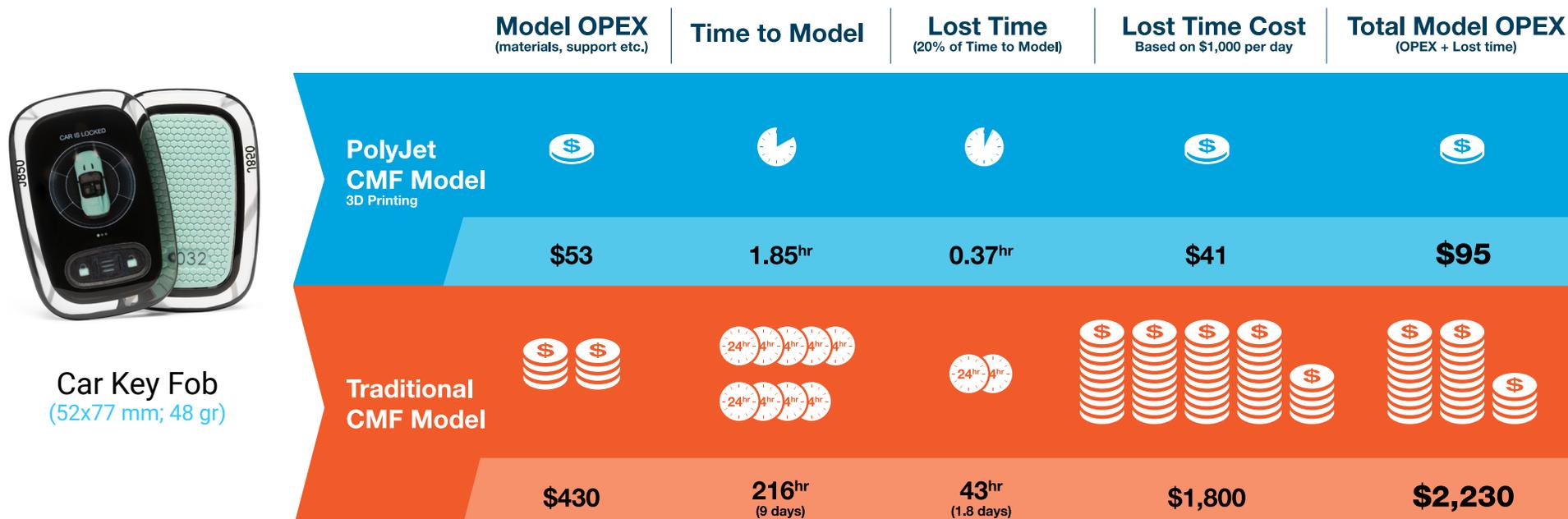
As you can see from this use case example, the direct cost (OPEX) for this CMF model of a car key fob, using Stratasys PolyJet™ 3D printing technology, is \$53 (including materials, labor, and post processing). This exact model, using traditional modeling technology, costs \$429 which is 8 times more expensive (based on the lowest quote received from a modeling service bureau).

In addition to the direct cost, there is an incremental loss due to wasted product design time. If we include only 20% of this loss (since one can perform other

tasks in parallel) then we reach a total loss of time cost of \$41, with the digital modeling process. This is in stark contrast to a substantially higher loss of time with traditional modeling that reaches a cost of \$1800, based on 9 days modeling and delivery times of the external service bureau. We all agree that time is money, in this case, when calculating only one hour out of five in lost time, we can see the value of the faster design processes with digital CMF modeling.

This specific use case shows the total actual cost (direct, plus lost time costs) for digital CMF modeling

with 3D printing is 23 times cheaper than traditional modeling methods. Many designers and design managers tend to ignore the time factor as it is more difficult to measure, however this is a real expense and, in many cases, it can be more significant than the direct costs themselves.



Tips for Perfect Product Design

The number of modeling iterations is not less important than the modeling quality. Having many iterations early on in the process allows designers to make corrective changes along the way, ensuring that the final product is accurate. However, if there is only one supreme model, that usually comes too late in the process, it's often difficult to make the necessary changes in time. This can ultimately lead to an inferior final product. That's why it's essential to strike a balance between modeling quality and the number of modeling iterations. By doing so, designers can be sure that their product will be both accurate and of high-quality.

Many consider that rendering illustrations are "good enough" for making design decisions, because this option is accessible and affordable. However, there is always a gap between on-screen perception vs. holding an actual model in one's hand. Rendering illustrations are convenient, however they should not be solely relied upon when making design decisions. Even if a model has been seen many times on-screen, holding it for the first time will always produce an element of surprise (both good and bad). With 3D printed models, any small details that were missed on screen can still be corrected.

If you're a designer who is interested in making the transition to digital CMF modeling and taking your designs to the next level, then feel free to contact your local Stratasys representative who will guide you through the seamless process of implementing these changes into your workflow.



Stratasys Headquarters

7665 Commerce Way,
Eden Prairie, MN 55344
+1 800 801 6491 (US Toll Free)
+1 952 937-3000 (Intl)
+1 952 937-0070 (Fax)

1 Holtzman St., Science Park,
PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)

[stratasys.com](https://www.stratasys.com)

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