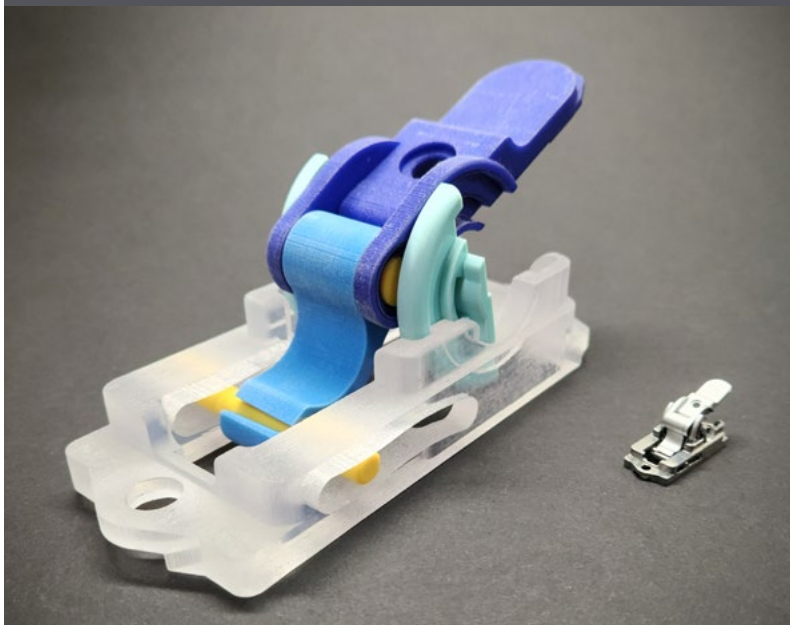
Microsoft Engineers and Model-Makers Utilize PolyJet™ Technology to Redesign Surface Pro 9's Kickstand Hinge

> "The primary objective has always been to identify the quickest and most efficient route towards validating a design solution. The J850 Prime has emerged as a leader in this domain, enabling a greater focus on the design aspect rather than the intricacies of fabrication.

Mike Oldani
Model-Maker, Microsoft



stratasys

Case Study

Customer Profile

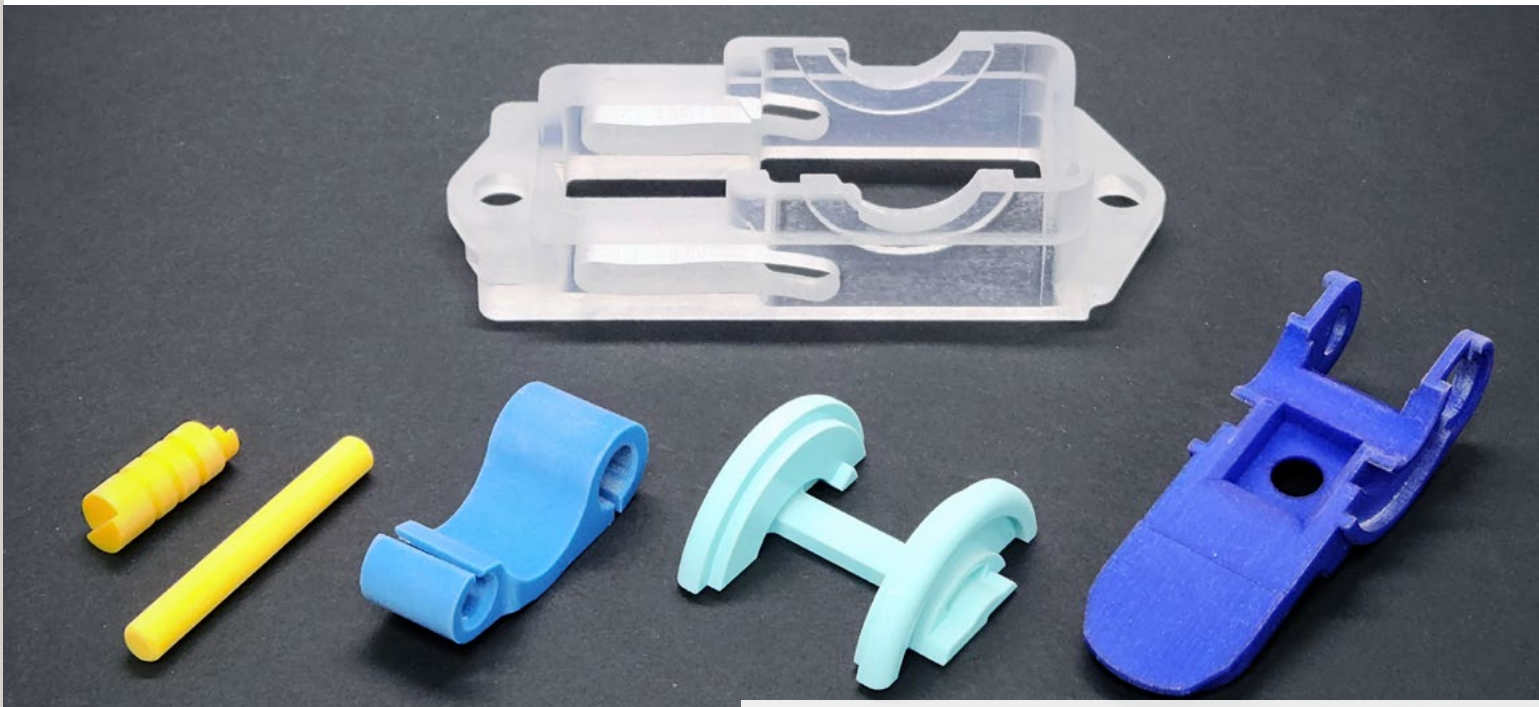
Located in Redmond, Washington—Microsoft's Advanced Prototyping Center (APC) is a 26,000 square foot prototyping facility sandwiched between the Industrial Design and Engineering groups. This team of highly passionate makers acts as the translator between concept and reality. Utilizing a multitude of manufacturing and prototyping tools, the APC focuses on efficiently creating solutions and prototypes to answer business questions. Following the mantra of "Fail Fast" the APC is responsible for quickly generating confidence in development decisions for Microsoft's designers, engineers, and partners. 3D printing plays an integral part in Microsoft's "Fail Fast" development process and PolyJet models are a part of our daily routine.

Challenge

Hardware development requires input from a wide range of subject matter experts to ensure the greatest chance of success for getting a product to market that fulfills the original design and engineering intent. The latest Surface Pro 9 is a fitting example of how different teams collaborate to engineer new and improved features for Microsoft devices, features like the easy to detach magnetic type-cover keyboards and the innovative refinement of the Surface Pro 9 kickstand hinges.

The kickstand is one of the iconic features of the Surface Pro 9. The hinges that attach the kickstand to the device play a crucial role in creating a premium user experience. Hinges need to be compact and lightweight, yet strong enough to support the device across a wide range of adjustable angles reliably with repeated usage. The latest iteration of the kickstand hinge was completely redesigned for Surface Pro 9 using fewer parts than previous versions, yet providing the same user experience, giving the users the ability to adjust the device to their preferred viewing angle. This smooth, almost infinite angle feature allows for great flexibility in various use settings, such as on a flight watching a movie, at home composing a Word doc, or creating art in and out of the studio using the Surface pen.

Developing a new Surface Pro hinge is an especially complex prototyping challenge due to the small size of the individual components which require precise engineering and access to tools that can produce parts with a high degree of accuracy. While traditional prototyping methods such as CNC machining or metal injection molding (MIM) can produce highly accurate parts, they are not efficient enough in terms of time and resources to quickly prototype and test multiple designs for these types of components, something that is crucial in today's product development landscape.



Exploded hinge

Solution

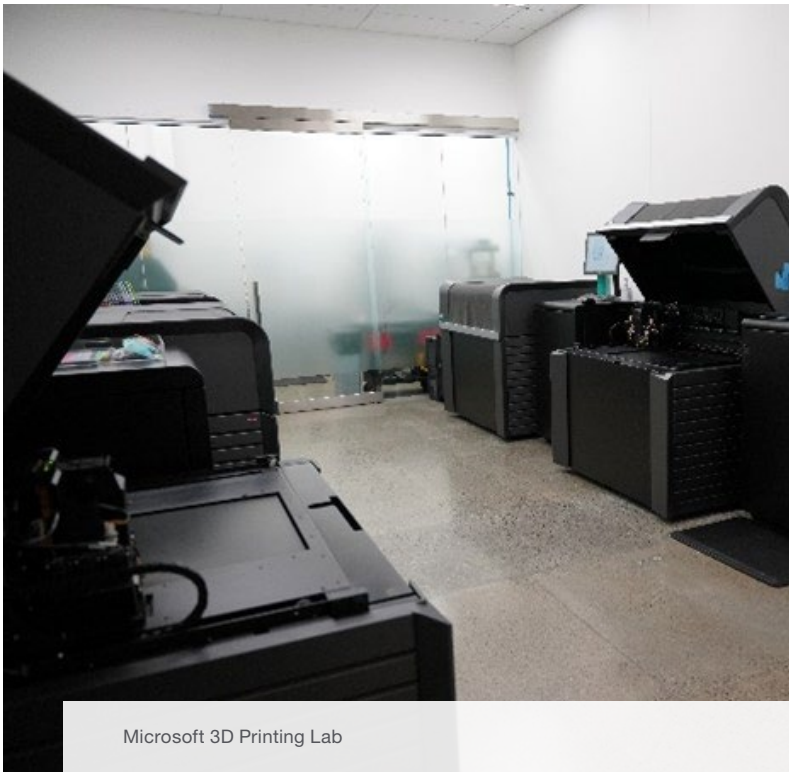
In the past, prototyping complex mechanical designs required a significant amount of time and resources. With the introduction of the Stratasys J850™ Prime printers, this process has become much more efficient. The J850's advanced dimensional accuracy allows for quick iteration of even small mechanical parts, providing a faster and more efficient solution to prototyping complex mechanical designs. Microsoft engineers and model-makers collaborated to develop a unique prototyping method, digitally upscaling hinge assemblies, and then printing these larger-than-life units. The accuracy of the parts off the J850 system meant there is little to no post-processing needed for assembling the prototype, allowing for rapid validation of designs. The J850 printer has proven to be an invaluable tool in the product development process, enabling precise fit checks of complex mechanisms designs, and range of motion studies. Couple that with its fast-printing speed the J850 has helped remove the bottleneck in product development for the designers, engineers, and model makers.

Business Impact

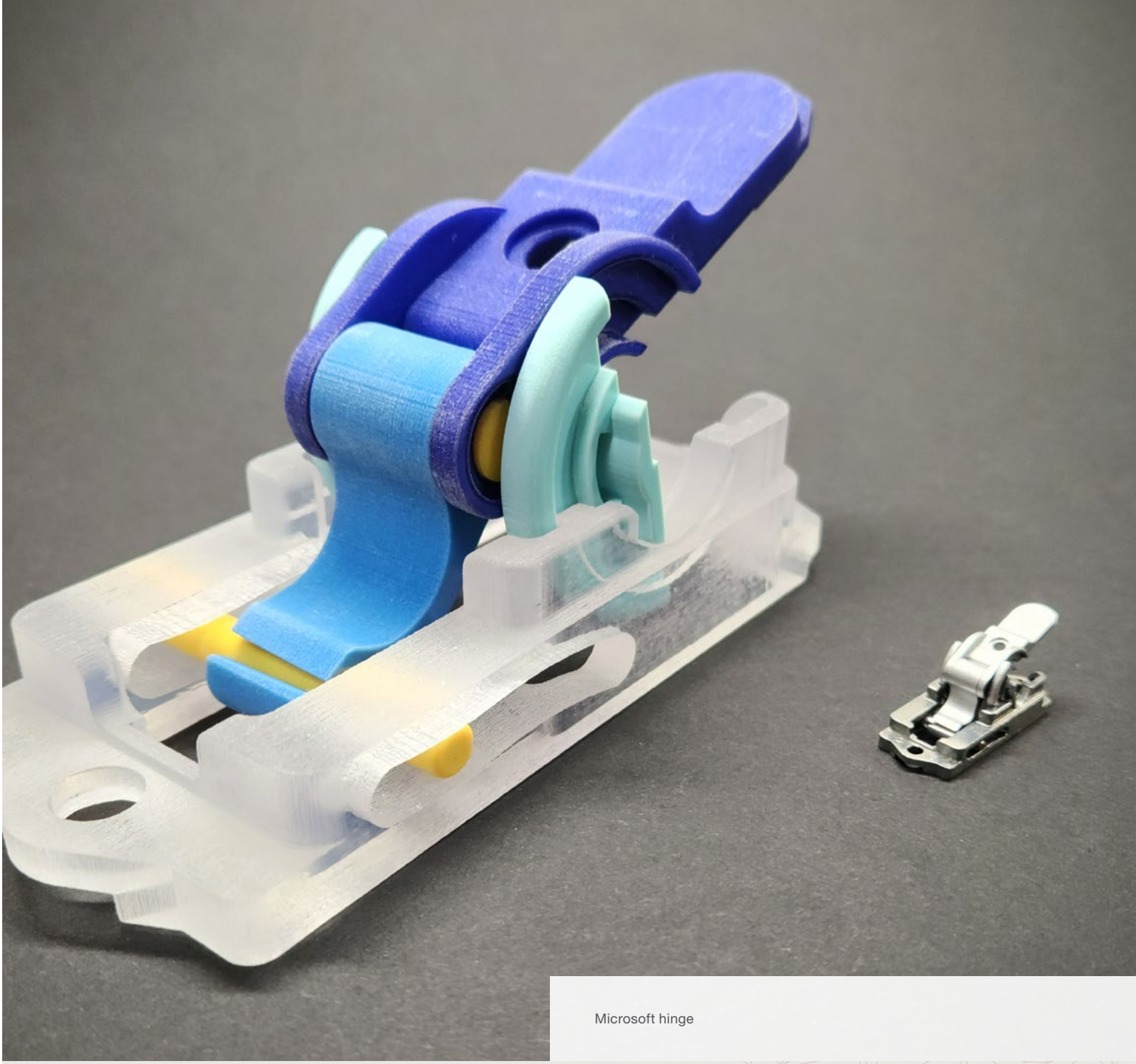
Surface devices are conceived from an idea, built many times over, and perfected before heading off for factory production. The J850 Prime has boosted confidence in the overall prototyping process expediting the turnaround time for precise parts, allowing engineers to become more deeply absorbed in the form and function of the design versus worrying about the details of a prototype construction. In the case of the Surface Pro 9's hinge, the ability to upscale and print components on the J850 has allowed for faster identification of potential failure points and enabled exploration of more innovative design paths, ultimately leading to a more premium user experience.

> "Part to part accuracy is crucial when developing mechanical features during product development. This ensures the prototype experience matches the design intent as closely as possible. Due to the vast improvement in accuracy from previous PolyJet printer generations, our mechanical engineers routinely ask that we print their parts exclusively on J850 technology.

Mark Honschke
3D Print Lead, Microsoft



Microsoft 3D Printing Lab



Microsoft hinge

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