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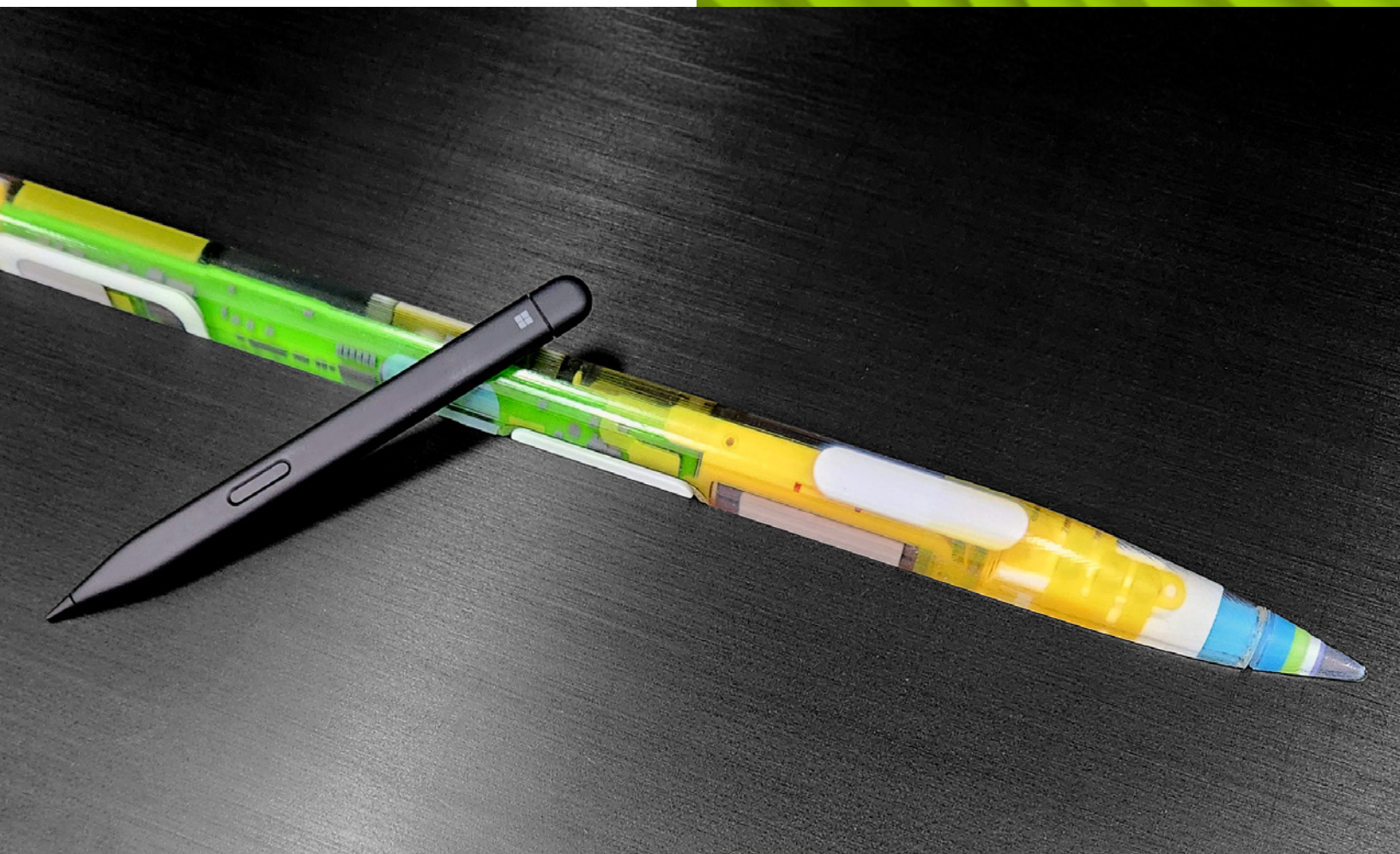
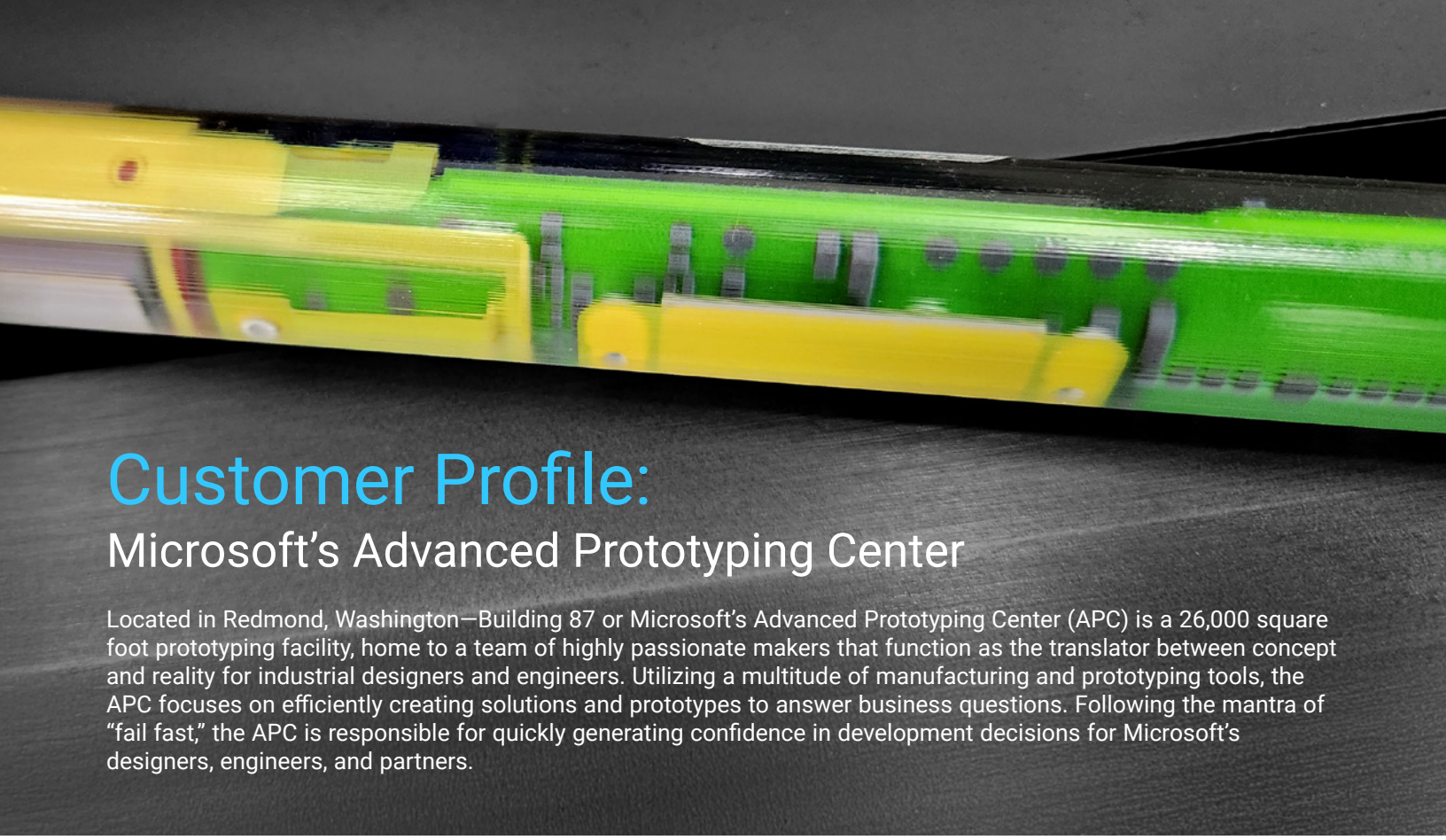
**CASE STUDY**
POLYJET

# Microsoft Enhances Design Precision with Clear, Multi-Color 3D Printing





# Customer Profile:

## Microsoft's Advanced Prototyping Center

Located in Redmond, Washington—Building 87 or Microsoft's Advanced Prototyping Center (APC) is a 26,000 square foot prototyping facility, home to a team of highly passionate makers that function as the translator between concept and reality for industrial designers and engineers. 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.

# Challenge:

## Surface Pen Development and Assembly Verification

Each new generation of Microsoft Surface Pen presents the hardware engineering teams the challenge of incorporating more technology into a smaller form factor. Features like the magnetic holder for convenient storage on the device, wireless inductive charging to eliminate plugs and wires, and the vibratory haptic feedback that simulates writing on paper add to the development complexity. As device complexity increases, so do the questions that need solutions. While industrial designers work to develop the Surface Pen's form, hardware engineers work to understand how the individual parts fit together into the subassemblies, often designed by different engineering teams across multiple disciplines, interacting within the Surface Pen's form factor. Industrial designers and engineers then need to integrate their work into a digital mockup. A digital mockup will be converted to a physical prototype, helping development teams understand the full assembly. Engineers and designers use physical prototypes to demonstrate a product's value to decision makers. Physical prototyping in years past could be a long and complicated process, but 3d printing technology advancements have significantly decreased time to part.

# Solution:

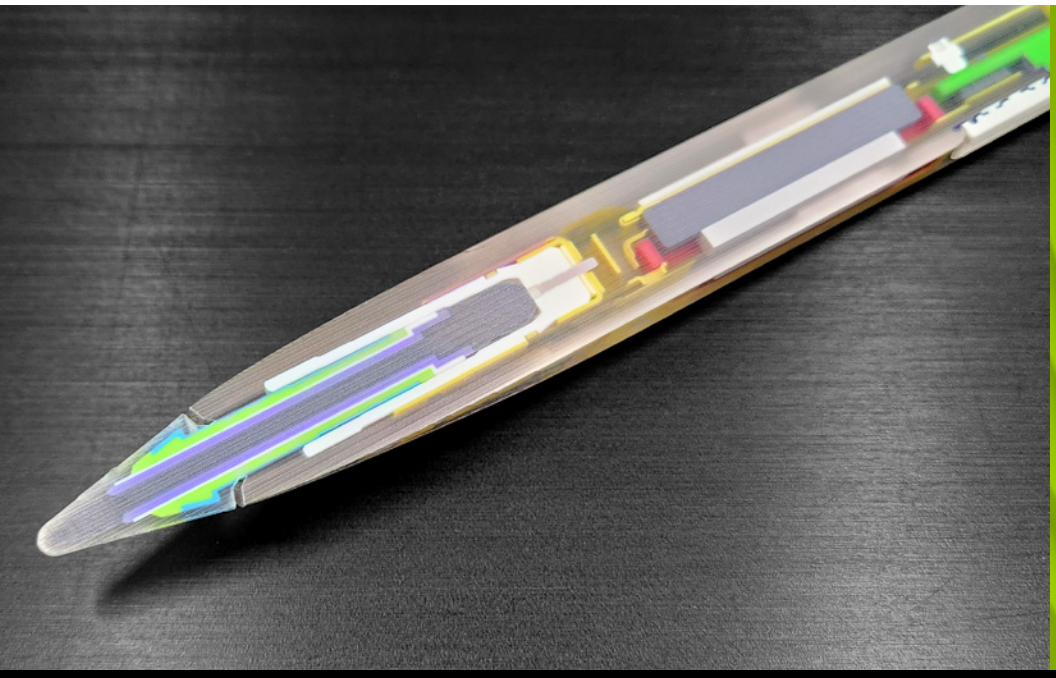
## Multi-Color Assembly Prints using Vero Ultra-Clear Resin

The Advanced Prototyping Center exists to help Microsoft engineers and industrial designers address development questions, and the Stratasys J850™ is one of the primary tools the APC uses to provide those answers. The Stratasys J850 Prime color 3D printer, with its high-resolution layers as thin as fourteen microns, used in conjunction with VeroUltra™Clear PolyJet™ resin, gives the APC the unique ability to convert digital assembly mockups into precise physical prototypes that closely represents the ideal product geometry. Many subassembly elements require precise gaps between parts, or specific placement within the Surface Pen's body to function correctly, and like the hinges that actuate Surface Pro kickstands, the Surface Pen has many components that have tolerances measured in microns. Parts at that scale make it challenging to visually understand how each part fits together and functions. The Stratasys J850 Prime, with its ability to print parts in color and digitally convert the data to any scale, can produce parts in many sizes, including larger than life physical models, giving the engineers a clearer view of the intended internal working of the production device.

# Impact:

## Faster Time to Market

At the beginning of the digital age, it was predicted that 3D modeling and VR would eliminate the need for physical prototypes in product development. However, as prototyping technology improved, simplifying the process, and reducing time to part, far from eliminating the need for physical prototypes the digital revolution increased the number of prototypes produced. These prototypes help to ensure that the path to production is as smooth as possible by eliminating issues that could cause delays. Modern production lines are very precise operations, and the production of the Microsoft Surface Pen is no exception. While there will always be slight deviations in the final assembly, the visual models produced on the Stratasys J850 Prime not only give the industrial designers a glimpse of the final product form, they also give the engineers an ideal reference to compare against the production units coming off the line.

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