Re-Shaping an Airplane's Wings to Improve Aerodynamic Efficiency

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Humans have always been fascinated by the idea of flight. From as far back as Leonardo Da Vinci and his famous sketch of a parachute, humans have been enamored by the idea of flight and have aimed to achieve it and make it better. The Wright Brothers, of course, made everyone's dream a reality and their legacy of scientific observation, meticulous testing, and insatiable curiosity can be traced directly to SpaceX as it readies itself to take us to the moon in reusable rockets. The Wright brothers are famous because they succeeded to make a man-made object fly, but what most people don't know is that they revolutionized the world of aviation by their ability to question everything around them. This project follows in their footsteps and seeks to study, just like they did, the issue of air pressure. Research shows that slightly tilting an airplane's wings upward will positively impact flow and wind pressure measurements during flight. Could we further curve the wings to improve their relationship to the air around them while a plane is in flight? Would this make a plane more efficient??This project specifically asks: Does curving a wing upward positively impact the flow and air pressure measurements that are experienced during flight? By using a virtual wind tunnel software, this project evaluated how the changes of a wing's curvature affected aerodynamic effectiveness. 3D modeling, 3D printing, and digital simulations were the tools of the project, which facilitate the creation of prototypes and provided the scenario for viable testing. Results showed that adding a slight curving to the design of the wing's profile did not improve its behavior in a wind tunnel simulation, not affecting its aerodynamic efficiency.

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