

Automated Carbon Fiber Plasma Treatment

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Location: Joby Aviation, Marina, CA



Plasma is an efficient solution for preparing carbon fiber for adhesion. However, the methods used by manufacturing facilities today may not be the most effective. Plasma can be harmful to technicians and imprecise if applied by hand.

This summer I had the opportunity to work with an amazing group of engineers to help design maintenance procedures, tooling retrofits, performance improvements, and deploy new processes/equipment during a summer internship. We managed to engineer an efficient, safe, and precise method of treating carbon fiber parts with an industrial 6-jointed robot arm. Some of the procedures include attaching a Plasma Nozzle to the end of this robot's arm and constructing a program that uses a 3D model of specific carbon fiber parts and their location

with respect to the plasma nozzle. We also used a mobile surface analyzer to measure the water contact angle on the carbon fiber surfaces to make sure we were achieving the desired surface preparation.

After multiple tests of surface-free energy, program errors, and distance measurements we managed to decrease the time it takes to treat these carbon fiber surfaces by over 80%, as well as get a consistent finish on the parts themselves, but most importantly we managed to eliminate the risk of plasma harm to workers bodies.

Erick Ayala

Major: Engineering

