Engine-ering the Future of Air Travel

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Air travel keeps the world connected; but despite its benefits, the sector accounts for 2.1% of global CO2 emissions. We designed and tested an experimental model for an electric aviation engine. Our modeled engine, created in Fusion 360, intends to replace a long-range engine similar to the GE9X or CFM LEAP-1B engines. In our model, air passes through a chamber containing tungsten fins heated with electricity and coated with a nano-layer to prevent oxidation. The heat from the fins heats the air and increases air pressure in the place of jet fuel. The model takes advantage of tungsten's high thermal and electrical conductivity, allowing the air to be burned without jet fuel. We tested the engine in a combination of Fusion 360 and ANSYS simulations and analyzed our model as a proof of concept to explore its thrust capabilities within our heating chamber. In simulations our engine could be a comparable substitute to the current engines, providing sufficient thrust while using currently available battery technology. Not only does the tungsten engine maintain the same aerodynamics as the current engines, but it is only slightly heavier, which is easily compensated by the power of the engine and the elimination of jet fuel weight. Our experimental model of an engine indicates that it could be a viable alternative that eliminates the use of jet fuel in engines, thereby reducing overall CO2 emissions. In the future, we hope to further test, model, and possibly even build a prototype engine in real life.

Awards Won:
Fourth Award of $500