RC Flying Car

Andrew Hood, Ethan Jacobs, Nicholas Jones, Joshua Phifer

ARKANSAS TECH UNIVERSITY

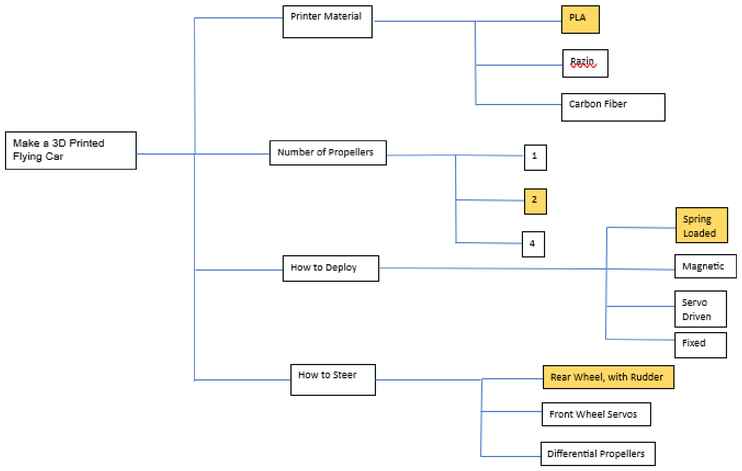
Introduction

For this project, the goal is to build a 3D printed RC flying car with actuating wings and to show the modularity and adaptability of using 3D printing to create a multifunctional RC flying car. The goal with the actuating wings is to showcase how adaptable and modular 3D printing is and to also have a drivable car. Also, with a multifunctional 3D printed flying car, an end user could customize the flying car to their desired needs or wants. The reason for choosing to build a flying car instead of just a plane or a car is that it is more versatile and there is nothing else like it available.

Project Purpose

The objective of this project is to design and build a 3D printed RC flying car with the purpose of displaying the ability to make a highly customizable multifunctional RC vehicle for specific purposes such as search and rescue, videography, or data collection.

Design Process/ Data Source(s)

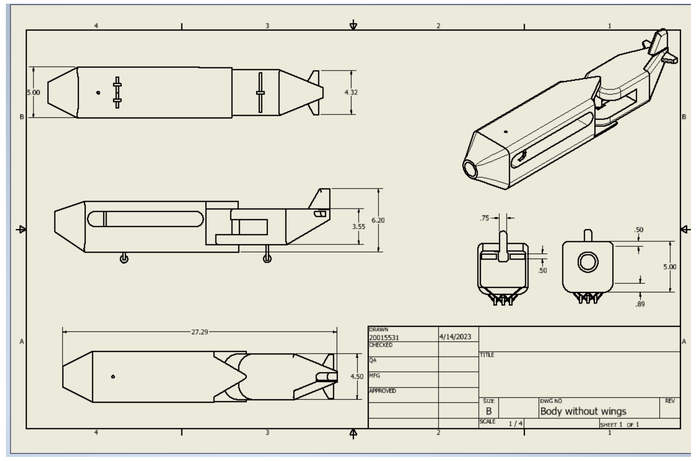


The figure above shows the process taken to decide how the design of the RC flying car would be built. We chose the final design based off cost, efficiency, and adaptability.

Design Process/ Data Source(s)

Spec Sheet	
Top Flight Speed	60 MPH
Top Altitude	400 Feet
Cruising Altitude	100 Feet
Flight Time	15 Minutes
Target Weight	2.2-2.42lbs
Top Ground Speed	35 MPH
Overall Length	16 inches
Wingspan	16 inches
Durability	Must be able to survive a free fall of 15 feet
Top wind speed	25 MPH
Turn Radius	8 Feet

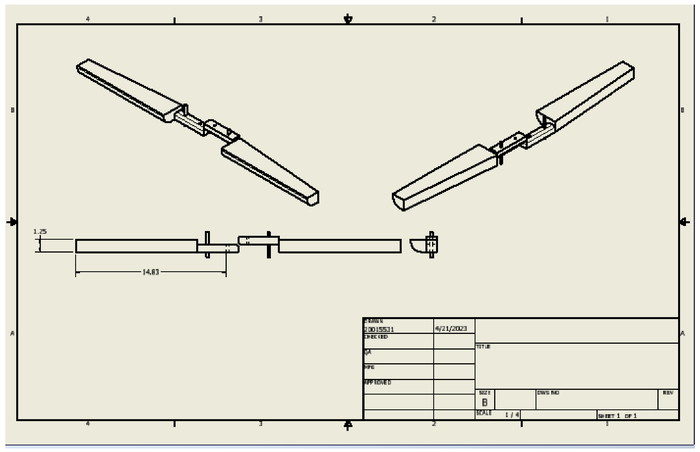
The figure above is the spec sheet that we designed for the RC flying car; these design requirements were goals that we set to achieve with the design of our project.



The design of this plane was modeled after the Boeing 737. The wingspan to length ratio is a scaled-down ratio of the Boeing. The idea behind this design was a single propeller remote control plane. The hole in the front of the plane is designed for a 1.5" diameter propeller motor. The idea behind the split design was to allow the airplane to function as a rear-wheel steering car while the wings are not deployed. There is a servo motor in the link between the front and rear body parts that will make the rear end of the plane swing left and right. The rear wheel will steer the plane in car mode. Once the wings are deployed the servo, would be programmed to make much finer movements. This would allow the rear rudder to control the direction of the plane while in the air. The wings are secured at 4 points to make them in-flight stable. There is a ¼" hole in each of the wings that a pin will fasten in. Next, there are pins fixed to the inner part of the wing. This will fit the carved-out slot to allow the torsional motion of the wings along the desired path. There is a spring that fits into the to force the wings outward. Finally, the wings are designed to have a small interference with each other, making them even more stable in flight. A servo is connected to an inner pin that will release the wings while in motion to deploy outward into a flight-ready position. The drawback of this design is that the two separate pieces cause excessive wind resistance. A more enclosed connection could be made to allow for a better flight. To counteract this flaw, aggressive fillets were designed on the body of the plane to allow the greatest aerodynamics possible for the current design.

Discussion

Without the RC flying car not being completed we weren't able to conduct any testing on it, however there still some things we can take away with what we have done. First, having access to a 3D printer with a higher resolution would make it easier to print higher quality parts, which would provide better tolerancing of parts and flight characteristics for the RC flying car. Another thing that was found was how the electronics for RC vehicles do not have a one size fits all solution. Also, depending on the wanted specs of the vehicle, the electronics could be the best way to adjust and get the desired specs.



Conclusion(s) / Implication(s)

The 3D printed RC flying car highlights a significant advancement in the field of additive manufacturing. Our design showcases the potential of 3D printing and RC flying technology to create innovative and practical solutions to real-world problems. We believe that this technology has the potential to transform the way we travel and explore the world around us. The possibilities of this innovation with the help of additive manufacturing are endless, with the goal of the project being set to display the adaptability of 3D printing, the implications of this could range from advancements in surveying, photography, and search and rescue. If we were to do this project again, we would change a few things. We could make the plane more aerodynamic by using the wind tunnel and researching wing designs to maximize lift. We would also find ways to make the body lighter and produce less drag.