Revolutionizing UAV Technology: Innovative Low-Cost Design for Data Collection and Surveillance

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Introduction

Explore our innovative UAV research, aiming to revolutionize design for better data and surveillance, blending lightness, affordability, and versatility.
Working prototypes so far, to be integrated in the final product:

- Brushless motors, main propulsion
- Small 9g servos, for flaps
- ESP32, camera, video, communication with base
- Gyro and magnetometer sensor, 3D stabilization
- GPS module, coarse direction commands
- Time-of-Flight, Ultrasound sensors, general distance sensors for navigation in tight spaces and landing/take-off

Figure 3: Brushless motors on a base, working with controllers connected with teensy processor (top left)
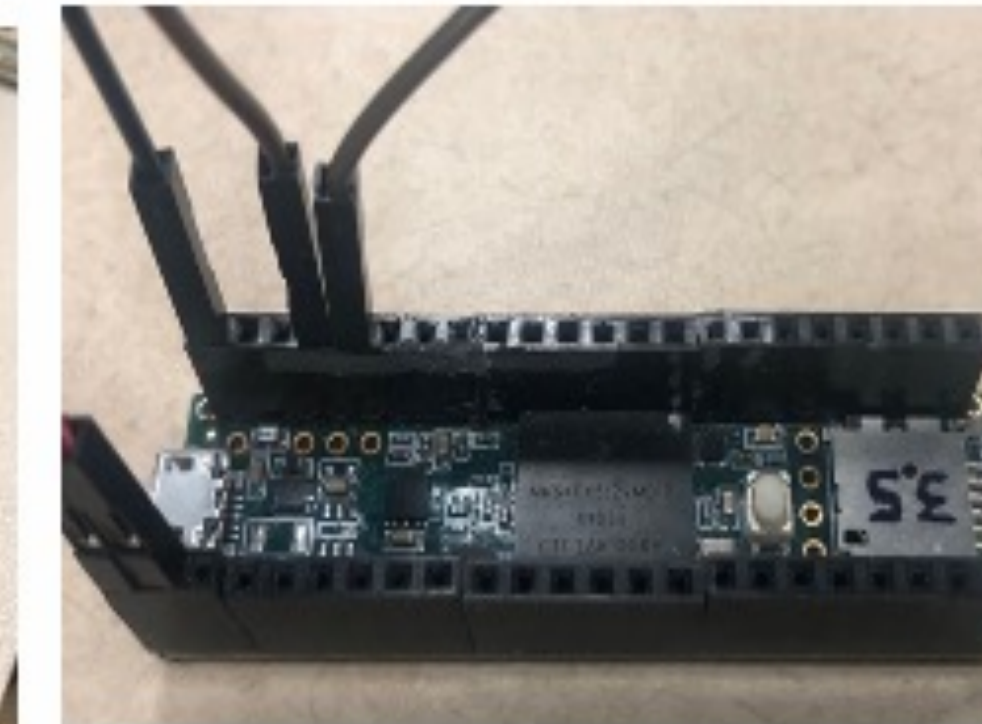

Figure 4: Teensy microcontroller used to control the sensors and motors (top middle)
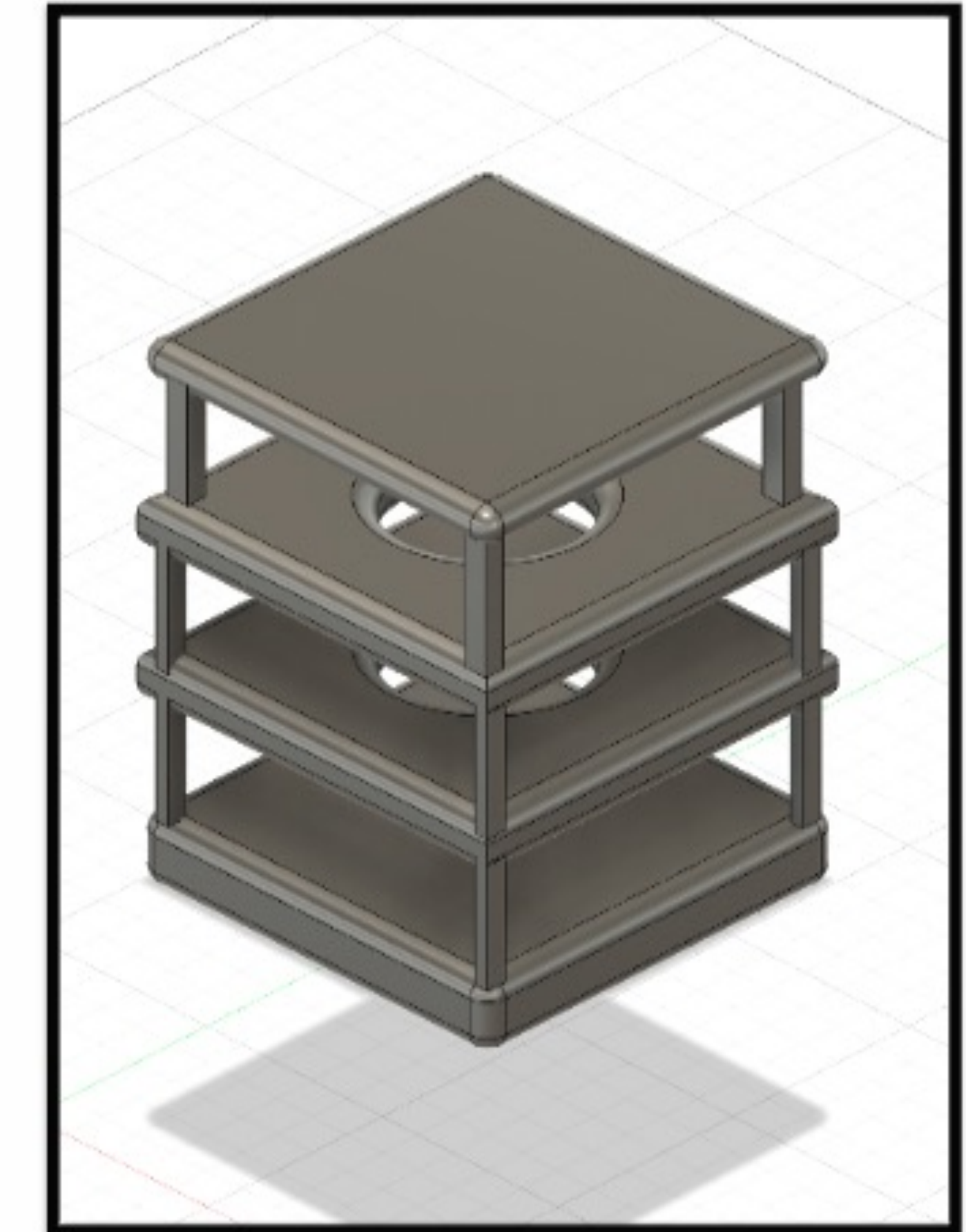

Figure 5: Base of the new design in Fusion 360, model base to be printed (top right)

Figure 1: prototype image of a UAV developed in the lab (on the left bottom)

Figure 2: prototype image of a UAV developed in the lab (on the middle bottom)

Future goals, steps:

- 3D Print the New Wingless Base Design: create an even more refined and robust base for the UAV
- Miniaturize the Frame: enhance portability and flight efficiency
- Expand Sensor Integration:
  - Enhanced GPS
  - ESP Technology
  - Responsive Torque Motors
- Assemble the Next-Gen Prototype

References

System Identification and Control of a VTOL Model Aircraft Using Short Data Records, Yiqiu Liu, Ashfaque B. Shafique and Konstantinos Tsakalis

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