Design of Autonomies delivery drone for medical supplies (Med-flight UAV)

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Course: Senior Design II - Team 26

Problem statement

This senior design project focuses on creating drone delivery for medical supplies between hospitals and pharmacies, a nuanced understanding of customer identification and their specific needs is paramount for the success and efficiency of the service. require a system that ensures cost-effectiveness and efficiency, underlining the importance of a drone delivery system that is economical in terms of both initial investment and ongoing operational costs. The aspects of secure delivery, cost, and travel range are particularly pertinent for this group. Secure delivery guarantees that high-value medical supplies reach their intended destination without loss or damage.

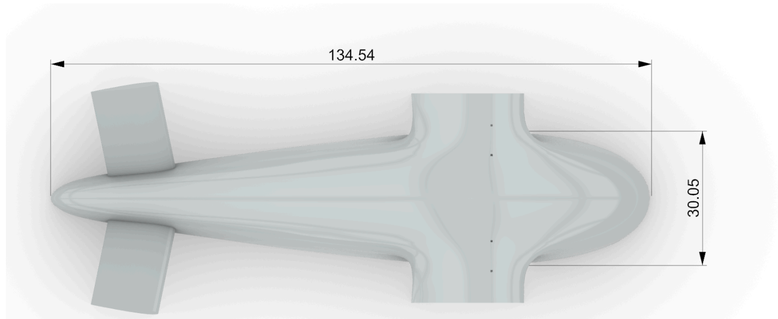
Constraints

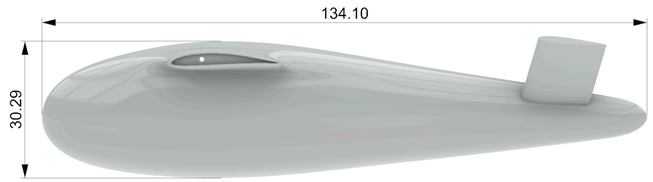
- Aviation Regulatory compliance
- Technical limitation
- Weather conditions
- Operational costs (6000 SR)

Target Specifications

- Minimum Payload Capacity 3kg
- Minimum Flight Duration of (35 Minutes)
- Minimum Flight Speed of (80 km/h)
- VTOL Design
- Medical Box with Isolation system
- Accurate GPS system

Prototype Design



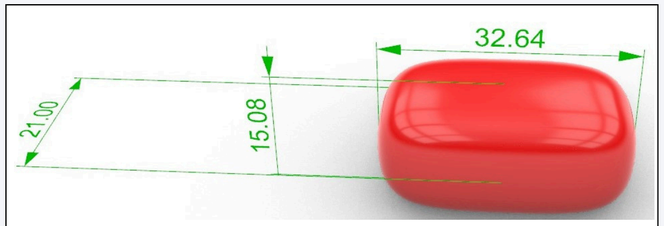


Testing / Validation

Three evaluation principles were applied to validate the design:

1. **Flight Mechanics**: Analyzed governing equations, including Cruise Endurance and Range.
2. **FEA Static Analysis**: Assessed structural integrity using Finite Element Analysis.
3. **CFD Analysis**: Examined aerodynamic drag and lift using Computational Fluid Dynamics.

Box Isolation System



- **Compact & Efficient: Maximizes space and maintains stable temperatures.**
- **Advanced Insulation: Features low-conductivity materials to reduce heat gain.**
- **Stable Cooling: "Maintains under 10°C in up to 40°C environments.**
- **Validated Design: "Proven to keep medical contents safe and cool during transit.**

Conclusion

The autonomous delivery drones represent a revolutionary advancement in healthcare logistics, offering unparalleled speed, efficiency, and reliability in transporting medical supplies. these drones have the potential to improve healthcare access and outcomes, particularly in remote or underserved areas. As technology continues to evolve, further enhancements in drone capabilities and regulations will only enhance their impact, making them a crucial asset in the future of medical supply delivery.