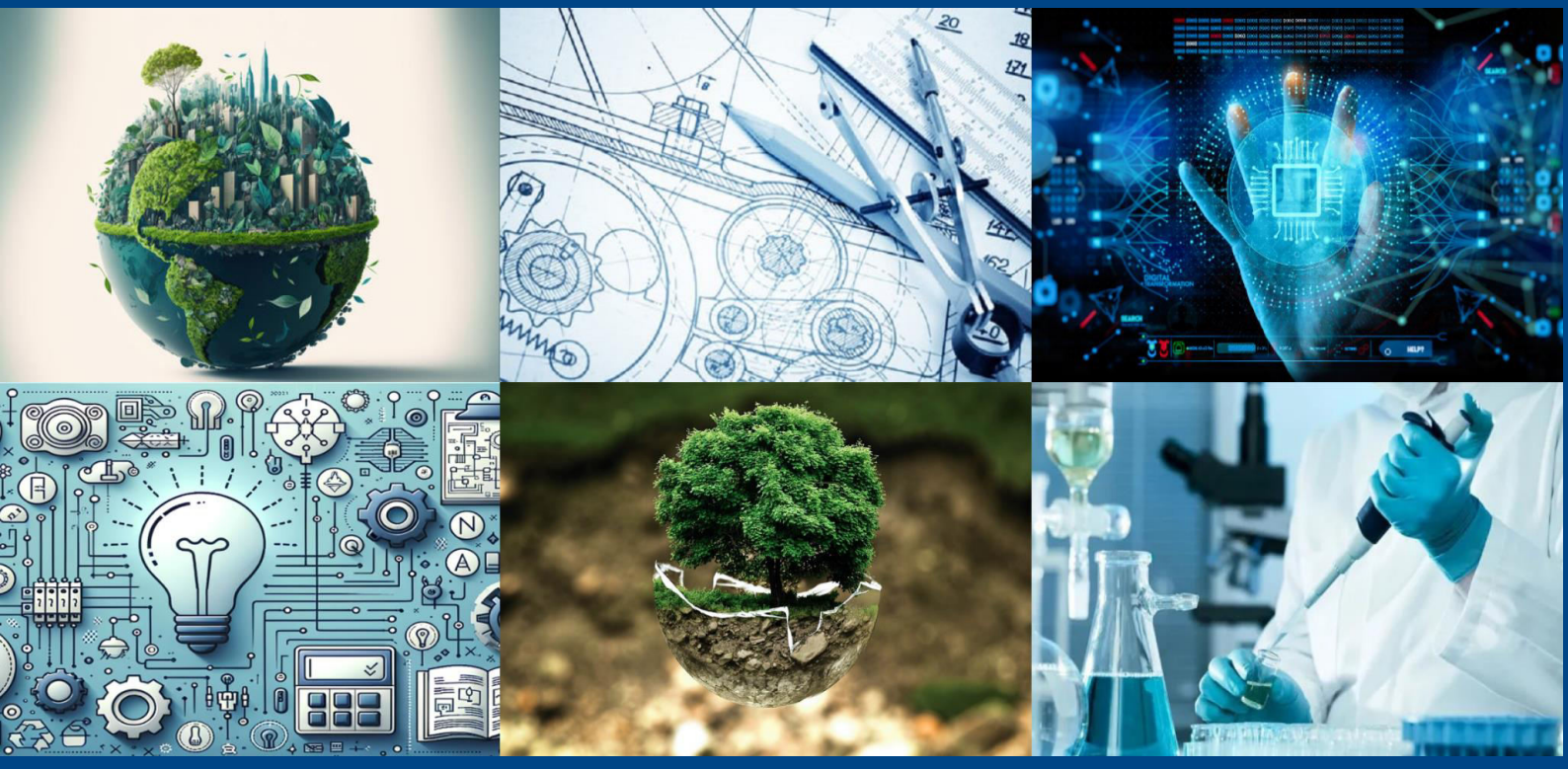
ISSN: 2582-7219

International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 3, March 2025

© 2025 IJMRSET | Volume 8, Issue 3, March 2025| DOI: 10.15680/IJMRSET.2025.0803155

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

HydroFlyer Drone

Deepa S[1], Anekka TS[2], Bhavana K[3], Kavya S[4]

Assistant Professor, Department of Computer Science and Business Systems, R.M.D. Engineering College, Kavaraipettai, Chennai, India[1]

Student, Department of Computer Science and Business Systems, R.M.D. Engineering College, Kavaraipettai, Chennai, India[2]

Student, Department of Computer Science and Business Systems, R.M.D. Engineering College, Kavaraipettai, Chennai, India[3]

Student, Department of Computer Science and Business Systems, R.M.D. Engineering College, Kavaraipettai, Chennai, India[4]

ABSTRACT: The HydroFlyer Drone is a revolutionary hybrid aerial-aquatic unmanned vehicle created for effortless functioning in both water and air surroundings. This ground-breaking drone features the most sophisticated propulsion technology, enabling it to launch from water bodies, fly with ease in the air, and land again on water with great accuracy. With waterproof sensors, adaptive AI-guided navigation, and a strengthened structure, HydroFlyer Drone is well suited for uses ranging from maritime reconnaissance, search operations, environmental observations, and offshore inspection. Having the capability of flying in double environments makes the drone more adaptable and useful as both a defense and civilian gadget. By tapping the benefits of advancements in aerodynamics, hydrodynamics, and AI control systems, the HydroFlyer Drone signifies a giant stride in drone technology, allowing for safer and more efficient operations in hostile environments.

I. INTRODUCTION

A HydroFlyer drone is a revolutionary watercraft that employs the use of hydrofoil technology in order to ride above water surfaces with minimal drag. In contrast to normal boats or aerial drones, HydroFlyer drones have wings submerged underwater that raise the body above the water, greatly minimizing drag and maximizing speed and efficiency. Such drones are usually powered by electric or hybrid propulsion systems, hence being eco-friendly and extremely efficient. With sophisticated navigation systems, AI controls, and GPS, they can work independently or be controlled remotely. HydroFlyer drones find applications in marine surveillance, search and rescue operations, monitoring of the environment, and even in water sports. The fact that they can move fast and steadily over water makes them worth their salt on both commercial and recreational fronts, providing a futuristic solution to water-based transportation and exploration.

II. WORKING PRINCIPLE

The operating mechanism of the hydroflyer drone software is built to seamlessly control the hybrid functionality of both air flight and water movement, providing stable and efficient operation in both environments. The software combines multiple systems, such as flight management, navigation, sensor information processing, and communication, to achieve real-time control and monitoring. In the first place, the flight control system stabilizes the drone under air and water use. Through algorithms that operate with motor speeds from sensor data such as accelerometers, gyroscopes, and barometers, the system produces a smooth ride and holds position in altitude. On air, it compensates for wind, velocity, and direction, but on water, it operates on hydrofoils or water thrust systems to steer over the water's surface. The software also includes navigation software that utilizes GPS information for accurate positioning. It constantly updates the drone's trajectory and coordinates to make it stay on course, whether it flies or glides over water. The drone can automatically change between flight mode and water navigation mode depending on the user's command or set parameters, controlled through a user interface. Obstacle detection and avoidance are also part of the functioning of the software. The drone takes readings from ultrasonic sensors or LiDAR to sense objects in close proximity and alter its course in real-time, preventing collision while flying and navigating in the water. Fail-safe modes, including automatic return-to-home or emergency

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

landing when major problems, such as low battery or signal loss, are experienced, are also a part of the software. Real-time telemetry is also an essential part, with the software sending information about the drone's status (e.g., battery condition, speed, altitude) to the operator through a communications system. This enables real-time monitoring and control. Finally, the software accommodates cloud connectivity for firmware updates over the air, data logging, and diagnostics to update the system and optimize its performance.

III. EXISTING SYSTEM

The current system of water drones is mainly composed of conventional boats, unmanned surface vehicles (USVs), and remotely operated underwater vehicles (ROVs). These systems utilize traditional hull designs that produce a high amount of water resistance, which restricts their speed and efficiency. Most of the current water drones utilize propeller-based propulsion, which requires more energy and has poor stability in turbulent water conditions. Moreover, conventional boats and USVs tend to be cumbersome, hard to handle, and need a lot of human monitoring, making them less efficient in autonomous operations. Another significant disadvantage of current systems is their high fuel usage, which raises operational expenses and adds to environmental degradation. Most water drones also do not have sophisticated AI-based navigation and real-time data acquisition capabilities, making them less applicable in surveillance, search and rescue, and environmental monitoring. Additionally, their poor performance in shallow or turbulent waters limits their application in some missions. The HydroFlyer drone overcomes these flaws by utilizing hydrofoil technology, minimizing drag, raising speed, and optimizing energy efficiency while embracing smart navigation systems to carry out missions autonomously or remotely.

IV. PROPOSED SYSTEM

The designed HydroFlyer drone system aims to surpass the shortcomings of conventional boats by utilizing hydrofoil technology, which minimizes drag and increases speed and efficiency. In contrast to traditional boats and unmanned surface vehicles (USVs), the HydroFlyer drone flies over the water surface through hydrofoils, reducing water resistance and enabling smoother, high-speed travel. The system operates through an electric or hybrid propulsion system, guaranteeing energy efficiency and environmentally friendly operation.The drone is fitted with AI-powered autonomous navigation, GPS tracking, and real-time data acquisition and storage, and is appropriate for use in marine surveillance, search and rescue, ecological monitoring, and recreational uses. Its sensors and obstacle detection systems enhance safety and operational accuracy, and its light yet robust construction enhances maneuverability in quiet and rough waters. Remote control features also allow flexible deployment for different missions. In all, the HydroFlyer drone system under proposal is a smart, high-performance, and environmentally friendly solution for water operations with enhanced speed, stability, and automation over current technology.

V. SOFTWARE REQUIREMENTS

Fligth Control System	Full system integration for both air and water operations
User Interface	Mobile app
Obstacle Detection and Avoidance	2-4 sensors

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

VI. HARDWARE REQUIREMENTS

Motors	2-4 motors
Battery	Lithium-ion or Lithium-polymer battery
Frame/Materials	High-strength plastic for frame and body
Navigation Sensors	High-precision GPS module,3-axis accelerometer

REFERENCES

1. Buadoin, J.-M.; Burgun, V.; Chanseau, M.; Larinier, M.; Ovidio, M.; Sremski, W.; Steinbach, P.; Voegtle, B. *Assessing the Passage of Obstacles by Fish. Concepts, Design and Application*; Onema: Paris, France, 2015. [**Google Scholar**]
2. Larinier, M. Environmental issues, dams and fish migration. In *Dams, Fish and Fisheries: Opportunities, Challenges and Conflict Resolution*; Marmulla, G., Ed.; FAO: Rome, Italy, 2001; pp. 45–89. [**Google Scholar**]
3. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327 22.12.2000 p. 1). *Eur. Community Environ. Law* **2010**, *327*, 879–969.
4. Biermayr, P. Renewable Energy in Numbers 2018: Development in Austria based on 2017 data [in German]. December 2018. Available online: **https://www.bmnt.gv.at/dam/jcr:939cb822-6f5f-41e3-bad4-6546feaf88e5/eEiZ2018-Brosch%C3%BCre.pdf** (accessed on 19 January 2020).
5. BMLFUW. Guideline to the construction of fish passages [in German]. Available online: **https://www.bmnt.gv.at/dam/jcr:6069bf1d-68b9-4a5d-8825-a4e9dac64ee6/Leitfaden%20zum%20Bau%20von%20Fischaufstiegshilfen_19_12_2012_final.pdf** (accessed on 19 January 2020).
6. Larinier, M. Location of fishways. *Bulletin Français de la Pêche et de la Pisciculture* **2002**, 39–53. [**Google Scholar**] [**CrossRef**] [**Green Version**]
7. Piper, A.T.; Wright, R.M.; Kemp, P.S. The influence of attraction flow on upstream passage of European eel (Anguilla anguilla) at intertidal barriers. *Ecol. Eng.* **2012**, *44*, 329–336. [**Google Scholar**] [**CrossRef**]
8. Larinier, M. Baffle fishways. *Bulletin Français de la Pêche et de la Pisciculture* **2002**, 83–101. [**Google Scholar**] [**CrossRef**]
9. Larinier, M.; Marmulla, G. Fish passes: types, principles and geographical distribution - an overview. In Proceedings of the Second International Symposium on the Management of Large Rivers for Fisheries, Sustaining Livelihoods and Biodiversity in the New Millennium, Phnom Penh, Cambodia, 11–14 February 2003; pp. 183–205. [**Google Scholar**]
10. Nordlund, B. Anadromous Salmonid Passage Facility Design. Available online: **https://www.westcoast.fisheries.noaa.gov/publications/hydropower/fish_passage_design_criteria.pdf** (acces sed on 19 January 2020).
11. Larinier, M. Fishways - general considerations. *Bulletin Français de la Pêche et de la Pisciculture* **2002**, 21–27. [**Google Scholar**] [**CrossRef**] [**Green Version**]
12. Powers, P.D.; Orsborn, J.F. *New Concepts in Fish Ladder Design: Analysis of Barriers to Upstream Fish Migration, Volume IV of IV, Investigation of the Physical and Biological Conditions Affecting Fish Passage Success at Culverts and Waterfalls, 1982-1984 Final Report*; Bonneville Power Administration: Portland, OR, USA, August 1985.
13. Williams, J.G.; Armstrong, G.; Katopodis, C.; Larinier, M.; Travade, F. Thiking like a fish: A key ingredient for development of effective fish passage facilities at river obstructions. *River Res. Applic.* **2012**, *28*, 407–417. [**Google Scholar**] [**CrossRef**] [**Green Version**]
14. Wagner, R.L.; Makrakis, S.; Castro-Santos, T.; Makrakis, M.C.; Dias, J.H.P.; Belmont, R.F. Passage performance of long-distance upstream migrants at a large dam on the Paraná River and the compounding effects of entry and ascent. *Neotropical*
15. *Ichthyol.* **2012**, *10*, 785–795. [**Google Scholar**] [**CrossRef**] [**Green Version**]
16. DWA. *Fact Sheet DWA-M 509. Fish Ladders and Fish Passable Structures - Design, Dimensioning, Quality Assurance*; German Association for Water, Wastewater and Waste: Hennef, Germany, 2014. [**Google Scholar**]

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com