Float Guard – Autonomous Drone for Flood Rescue and Emergency Aid Delivery

Mr. D. B. Patil[1], Mr. A. A. Desai[2], Ms. P. D. Gaikwad[3], Mr. P. M. Katkar[4],
Mr. Y. R. Tate[5], Mr. R. D. Salunkhe[6]

Lecturer, Department of Computer Engineering[1]
Students, Department of Computer Engineering[2-6]
Rajarambapu Institute of Technology, Rajaramnagar, India

Abstract: *Float Guard is a novel drone-based solution developed to address the critical challenges associated with water-based rescue operations. In situations involving floods, accidental drowning, or water-related disasters, victims are often stranded in inaccessible or hazardous environments where conventional rescue methods such as boats or helicopters are either delayed, limited by terrain, or pose high risk to human rescuers. Float Guard is designed to overcome these limitations by employing a cost-effective autonomous drone platform equipped with a wide array of features aimed at minimizing response time and maximizing rescue efficiency.*

The drone is capable of manually or autonomously navigating to victims and deploying a compact, non-inflated rescue tube that automatically inflates upon water contact. This mechanism allows the system to carry multiple flotation devices while maintaining a lightweight profile. The drone integrates real-time GPS tracking, live video transmission, a custom-designed lightweight frame constructed using ACP and carbon-nylon 3D-printed components, and mission planning capabilities for autonomous flight execution.

Float Guard is implemented in multiple stages, starting with manual operation, followed by pre-programmed mission execution, and advancing toward AI-powered victim detection and autonomous response. The inflation mechanism has been prototyped using both CO_2-based and chemical reaction-based approaches to ensure efficiency and reliability. This paper details the design and development process, system architecture, inflation strategies, field testing results, and outlines future enhancements including the integration of AI for intelligent real-time victim recognition and adaptive response.

Keywords*: Flood Rescue Drone, Emergency Response, Payload Deployment, UAV for Disaster Management, Autonomous Drone, Real-time GPS Tracking, Rescue Tube Inflation, Water Accident Assistance, Mission Planning, AI-based Victim Detection*