Multi-Purpose Unmanned Surface Vehicles for Surveillance and Rescue Operations

Brishti Sarkar[1], Shreya Banik[2], Somdatta Das[3]

[1,2,3] – Hooghly Engineering and Technology College – 176
Department of Electronics and Communication Engineering

Synopsis –

Disaster robotics has become a research area in its own right, with several reported cases of successful robot deployment in actual disaster scenarios. Most of these disaster deployments use aerial, ground, or underwater robotic platforms. However, the research involving autonomous boats or Unmanned Surface Vehicles (USVs) for Disaster Management (DM) is currently spread across several publications, with varying degrees of depth, and focusing on more than one unmanned vehicle—usually under the umbrella of Unmanned Marine Vessels (UMV).

Our project attempts to explore the possibility of designing and implementing an Unmanned Surface Vehicle (USV) in form of a Boat with a Surveillance Camera installed for search and rescue operations at Water bodies. This USV can be controlled over the internet using concepts of Internet of Things. The main Microcontroller will be NodeMCU for handling all the control features and sensor implementations. NodeMCU has an inbuilt microcontroller along with a Wi-Fi module ESP8266 12E. The boat will use DC motor and propeller for actuation and servo for Radar control. It has an onboard GPS for Location tracking and in case of any anomaly Quick response team can be sent at that location. The Power supply for the boat is divided into two parts- Li-ion 18650 batteries for delivering power at night and Solar Panels for charging those batteries whenever possible. This architecture for power delivery will ensure long mission times (months) without coming back to base station for recharging. An action camera with pan and tilt features will send live video feed over the internet to the base station. The boat can be controlled using an app or a webpage. It is expected to be manufactured at a low cost and multiple such USV can work in Collaboration to handle Disasters at waterbodies.

KEYWORDS – Unmanned Surface Vehicle (USV), Disaster Management (DM), NodeMCU, Internet of Things, Solar Power. GPS Tracking, 18650 Li-Ion, Surveillance Camera.