

ABSTRACT

Indonesia has many rivers that are crucial for life, but are vulnerable to flooding due to sediment buildup that causes changes in the riverbed contours. Manual measurements are ineffective for detecting changes at every point. Therefore, this research aims to develop an accurate and efficient riverbed contour measurement system using a linear movement method. This system consists of an End Device and a Gateway. The End Device uses a VL53L1X sensor to measure water depth, an INA219 sensor to monitor power, and a LilyGO TTGO LoRa32 microcontroller for long-range communication. Measurement data is displayed on an OLED screen and sent to the Gateway via LoRa P2P. The Gateway then transmits the data to the Blynk platform via Wi-Fi, enabling real-time monitoring on mobile or web devices. The data from Blynk is further processed using Microsoft Excel to generate river contour graphs. Test results show that the VL53L1X sensor can measure distance well, although accuracy varies depending on external factors such as light intensity and water turbidity. The LoRa communication system and Blynk platform work well in data transmission and display. Battery efficiency allows the device to operate for up to 26 hours. This system is expected to provide efficient and practical river contour information.

Keywords: *VL53L1X Sensor, LoRa, Blynk, IoT (Internet of Things), Linear Movement*