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| **Abstract:** |  |
| In the context of earthquake and flood disasters, effective communication remains a pivotal concern due to the vulnerability of conventional networks. In this paper a system has been designed and investigated to deploy LoRa based mesh networks in disaster-stricken areas using amphibious rovers. Thesystem was tested in urban environments as well as in simulations using the Meshtasticator simulator and OkumuraHata path loss model. Critical parameters such as communication range, SNR (Signal to noise ratio), RSSI (Received Signal Strength Indicator) rate, data transmission speed, bandwidth, frequency, and delay have been evaluated. The measured outcomes of this study were compared with other existing technologies proposed for disaster communication and management, indicate that fast deployment of Meshtastic LoRa is more reliable for operating at lower frequencies and hence for long-distance communication compared to other existing disaster communication technologies. The results of this study indicate the proposed system can operate at about 2-6 times the range with acceptable performance parameters and superior uptime.These findings not only enrich the discourse on disaster management strategies but also offer insights into crafting adaptive, feasible and resilient communication systems | |