Fig. 1. Data Transmission time vs Number of Robots

Adapted from [1]

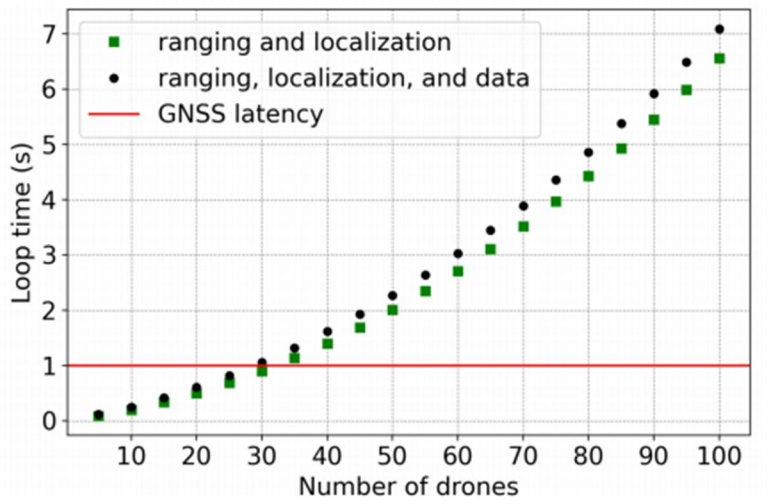

Fig. 2. Bandwidth Requirements vs Number of Robots

Adapted from [1]

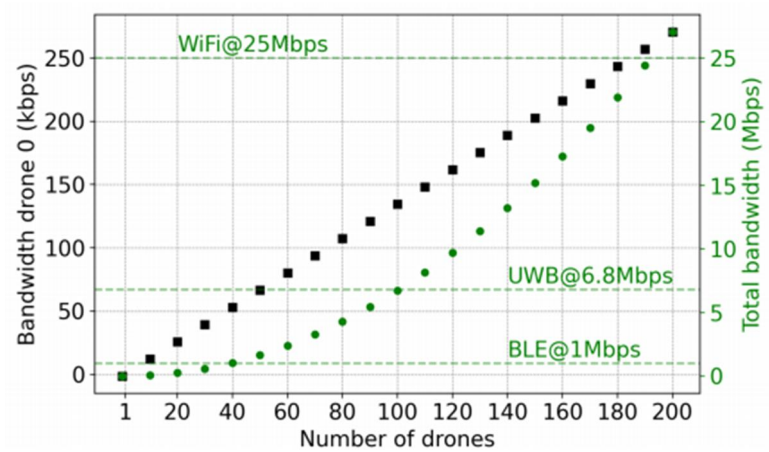

Fig. 2. Mapping Coverage vs Number of Robots

Adapted from [2]

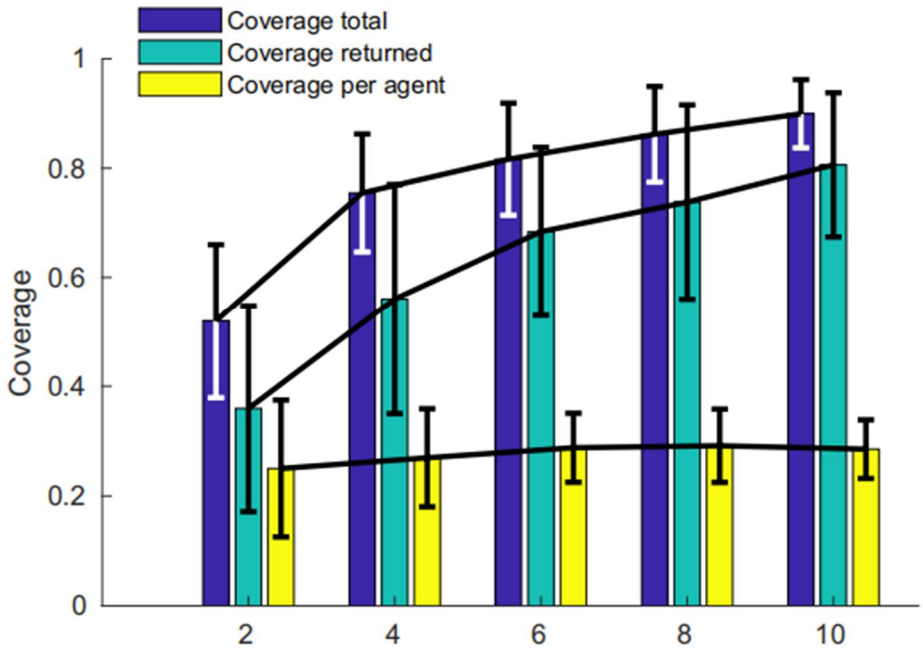

Table.1. System and Performance Comparison

	Mapping Accuracy	Battery free	Weight	Total Power	Computing Power	Reference
This work	<10-20cm	Yes	<3g	<50mW	<1mW	
1	<30cm	No	46g	8.96W	960mW	[1]
2	8-12cm	No	35.68g	10W	200mW	[2]
3	10-15cm	No	34.8g	5-10W	240mW	[3]
4	8-10cm	No	44g	5-10W	350mW	[4]
5	2.14cm	No	>2kg	100W	30W	[5]

REFERENCES

[1] Niculescu, Vlad, et al. "Ultra-Lightweight Collaborative Mapping for Robot Swarms." *arXiv preprint arXiv:2407.03136* (2024).

[2] McGuire, K. N., et al. "Minimal navigation solution for a swarm of tiny flying robots to explore an unknown environment." *Science Robotics* 4.35 (2019): eaaw9710.

[3] Friess, Carl, et al. "Fully Onboard SLAM for Distributed Mapping with a Swarm of Nano-Drones." *IEEE Internet of Things Journal* (2024).

[4] Niculescu, Vlad, et al. "NanoSLAM: Enabling fully onboard slam for tiny robots." *IEEE Internet of Things Journal* (2023).

[5] Shen, Hongming, et al. "PGO-LIOM: Tightly coupled LiDAR-inertial odometry and mapping via parallel and gradient-free optimization." *IEEE Transactions on Industrial Electronics* 70.11 (2022): 11453-11463.