

TEAM M033

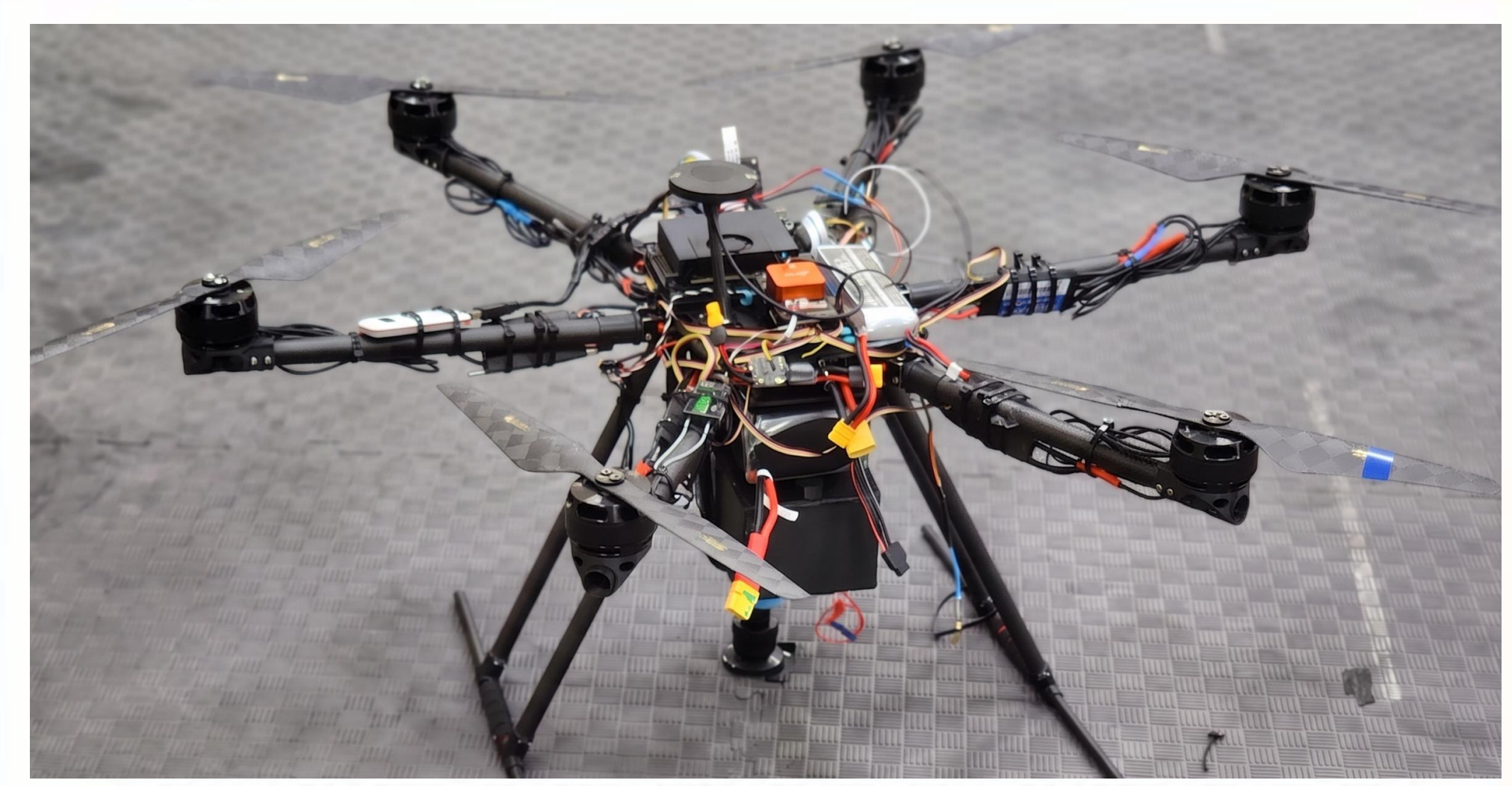
Autonomous Drone for Crowd Cooling via Water Mist

Ahmed AlSayegh (AE), Abdulaziz AlFaraj (CS), Jassim AlSayegh (AE),
Husain Al Muallim (CS), Hussain AlOmran (ME), Ali Al Rubh (COE)
Coach: Dr. Shujaat Khan



ICS
ME
AE
COE
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INTRODUCTION & OVERVIEW



Saudi Arabia experiences summer temperatures up to 45°C, creating a need for cooling solutions that are both efficient and reliable

- Autonomous crowd cooling
- Fine water mist cooling
- Adaptive outdoor operation
- Integrated AE,CS,COE,ME design
- Low-altitude autonomy

Integrated Drone System

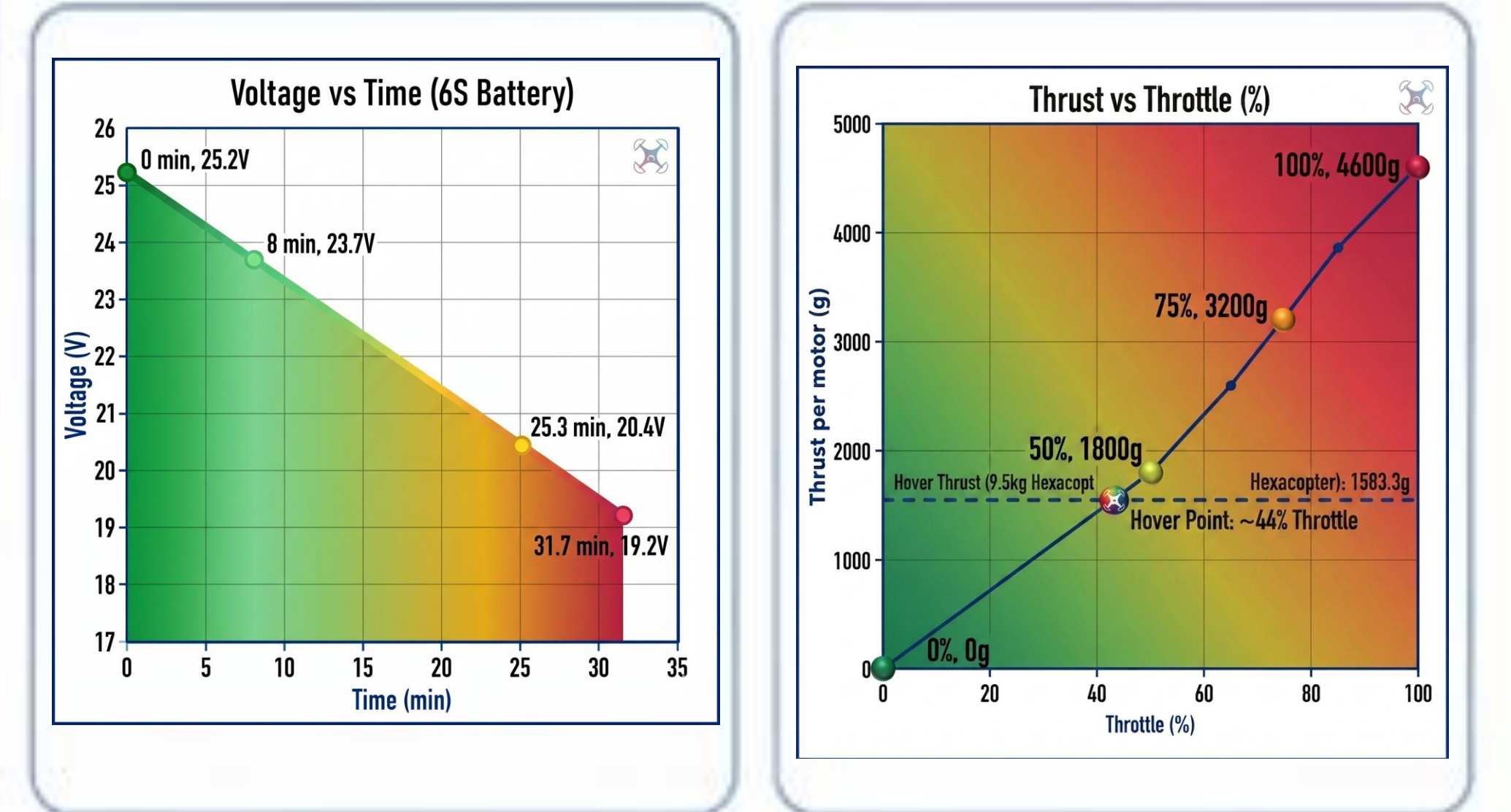


CONSTRAINTS & SPECS

Metric	Target	Target	Target
⚖️ MTOW	≤ 25 kg	💧 Water temp.	≤ 25°C
📏 Size	≤ 2 m × 2 m	🎯 AI accuracy	≥ 80%
🌡️ Temperature	up to 50°C	⬆️ Altitude	3–15 m AGL
🧠 AI model	≤ 1 GB	➡️ Flow rate	~0.3 L/min
📡 MAVLink size	≤ 256 bytes	🏠 Cooling area	10,000 m ²
🕒 Decision latency	< 3 s	📍 Docking	≤ 5 cm
⌚ RTT	< 2 s	🔌 Boot time	< 2 min
🔋 Flight time	15–25 min		

PERFORMANCE & VALIDATION

- 🕒 Mission time: 25.3mins
- 🔋 Hover current: 60 A
- ⚡ T/W at 85: %2.44
- 📈 RTT: 316.58ms
- 🎯 AI accuracy target: ≥80%
- 💧 Mass flow rate: 0.3 kg/min



Battery and hovering point analysis

APPLICATIONS & FUTURE WORK

- Hajj crowd cooling
- Public-event heat relief
- Smart-city cooling
- UAV/AI research platform
- Mobile cooling solution
- Reduces heat stress
- Targeted mist delivery

- Fine-tune YOLOv26n
- Validate altitude to 15 m
- Measure cooling swath
- Add self-docking
- Add self-refilling
- Run field tests

Computing Platform <p>Jetson Orin Nano</p>	Flight Controller <p>Orange Cube P4</p>	Carbon Fiber <p>Arms & Frame</p>	Motor & Propeller <p>U7 V2.0 Kv490 16×5.4</p>	Misting Nozzle <p>Water Tank</p>	Sensors <p>Water Level + Temp.</p>	Power System <p>6S Battery + PDB</p>
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