Lightning Talk Presentation

Date: 4/28/2026

Group: sddec26-11

OUR TEAM

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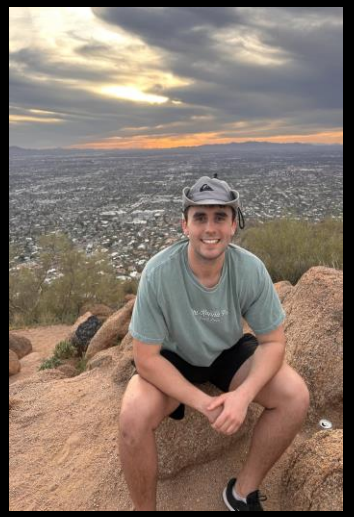
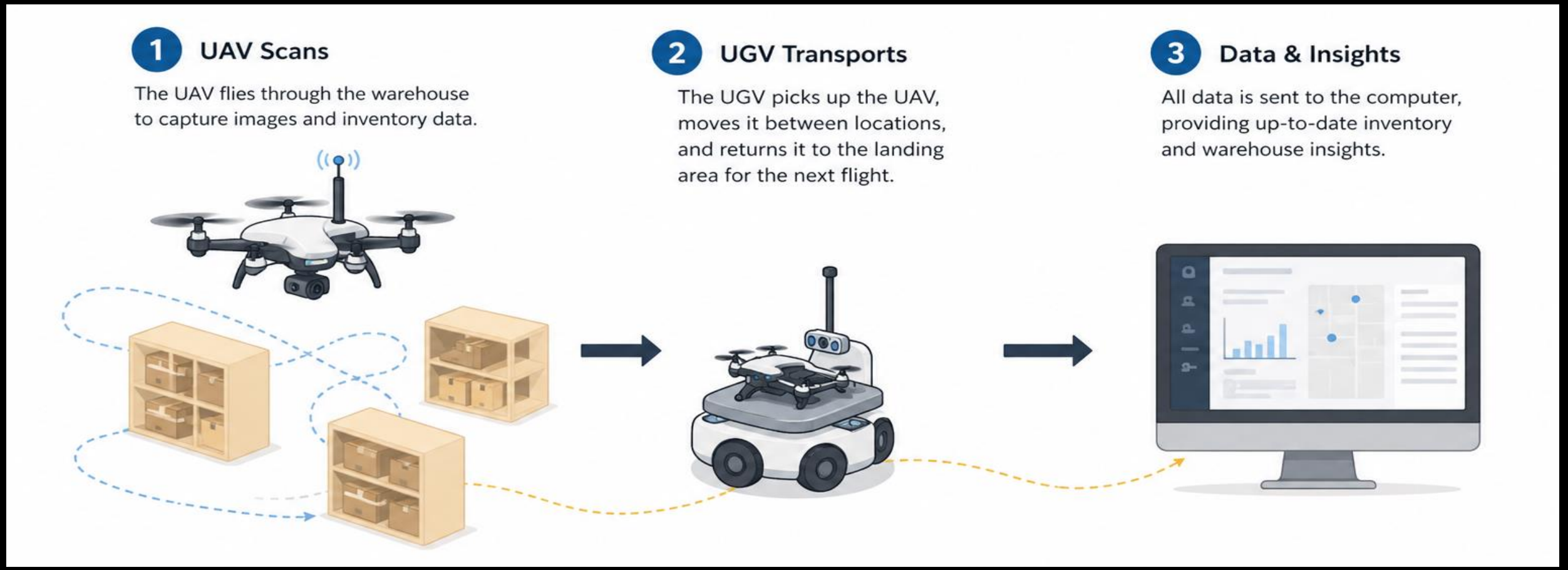


Jake Nickel[SE]

Mitch Fowler[EE]

OVERVIEW, MOTIVATION, USERS

- OVERVIEW: **Collaborative robotic system** using a UAV (drone) + UGV (ground robot)
- **Motivation:** Communicate through a **central system** in a **warehouse environment**
- **Users:** Warehouse workers and staff (operators)



PROFESSIONAL RESPONSIBILITY

Work Competency

- All team members contribute only within their domain (SE, CPRE, EE)
- System is validated through simulation before real-world deployment

Financial Responsibility

- Designed to be low-cost and open-source - accessible to small and mid-size warehouses
- Avoids vendor lock-in by using ROS2 and commodity hardware

NSPE Code of Ethics - Applied to CyFlyBot

- Public safety is paramount: obstacle avoidance and safe robots prevent injury
- Honesty: open documentation and transparent system behavior for operators

ETHICS - GOALS

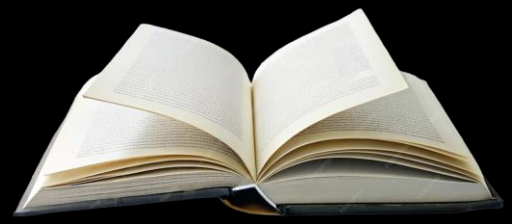
CyFlyBot addresses three core virtues:

- Safety
- Accessibility
- Usefulness

IEEE Code of Ethics - How we apply it:

- Honesty: system behavior and limitations are fully documented and disclosed
- Fairness: obstacle detection and safe zones prevent harm to people nearby
- Responsibility: open-source release helps the public understand and evaluate the technology

Safe



Accessible

Useful

ETHICS - SAFETY

The automation dilemma: Robots must improve efficiency of flow without causing hazards.

How we achieve safety:

- Robot handles high-risk tasks
- Real-time obstacle detection
- Controlled behavior and NO FLY zones
- All behaviors confirmed in Gazebo simulation

Ladder used to access high-shelves which is potentially dangerous

ETHICS - ACCESSIBILITY

Many automation systems are expensive, locking out smaller operators.

CyFlyBot is built differently:

- Fully open-source
- Affordable and vendor-independent
- Minimal user interaction needed
- Scalable design

Open-sourced

Low-cost

ETHICS - USEFULNESS

The automation dilemma in full: warehouse robots could eliminate jobs at scale. We believe the answer isn't to slow progress, but to be intentional about it:

- CyFlyBot targets repetitive, ergonomically harmful tasks workers already dislike such as taking inventory
- Workers are freed to take on supervisory, maintenance, and higher-value roles
- System is designed to assist, not fully automate: a human remains in the loop for large decisions or problems
- Transparent deployment: operators are informed of what the system can and cannot do

Stressed warehouse worker

Satisfied and happy warehouse worker

Q&A