

AUTOMATED AIRCRAFT MARSHALLER SYSTEM

TEAM
INVICTUS

• GOWTHAM M

• CHANDRU E

• CHEZHIYAN M



PROBLEMS STATEMENT

1



High Human Dependency & Error Risk

- Manual signals can be misread or miscommunicated.
- Fatigue and stress increase chances of mistakes.

2



Environmental Visibility Limitations

- Fog, rain, sunlight, and low light make signals hard to see.
- Poor visibility leads to delays and unsafe parking.

3



Safety Hazards & Operational Inefficiency

- Marshallers stand close to moving aircraft, risking injuries.
- Manual guidance slows operations and increases delays.



PROPOSED SOLUTION

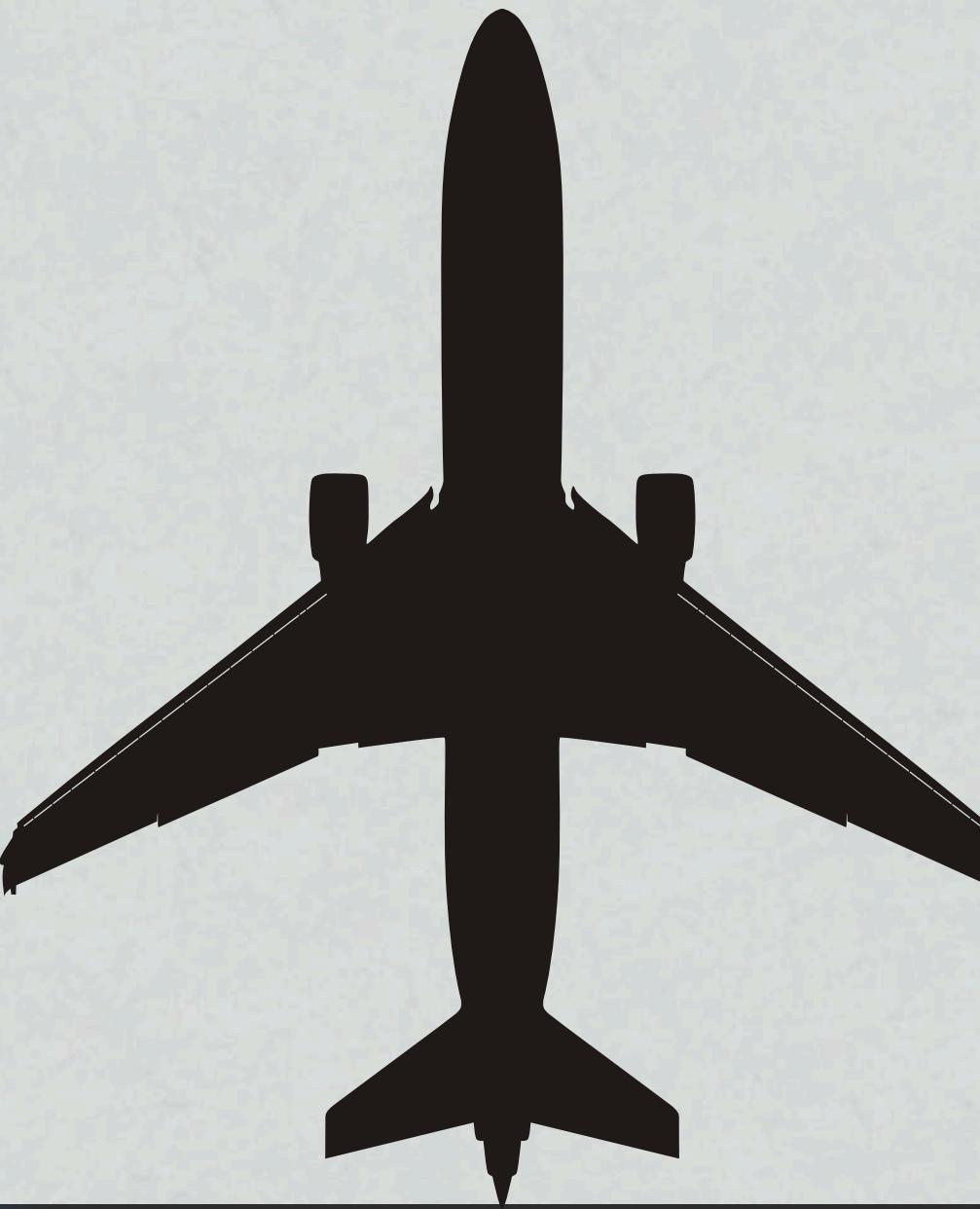
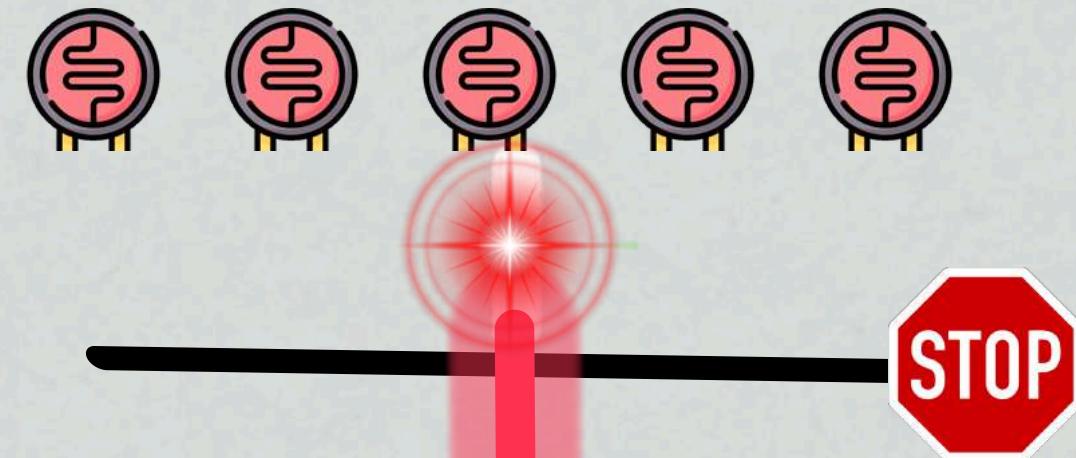
**1. Automated Laser–Sensor
Alignment System**



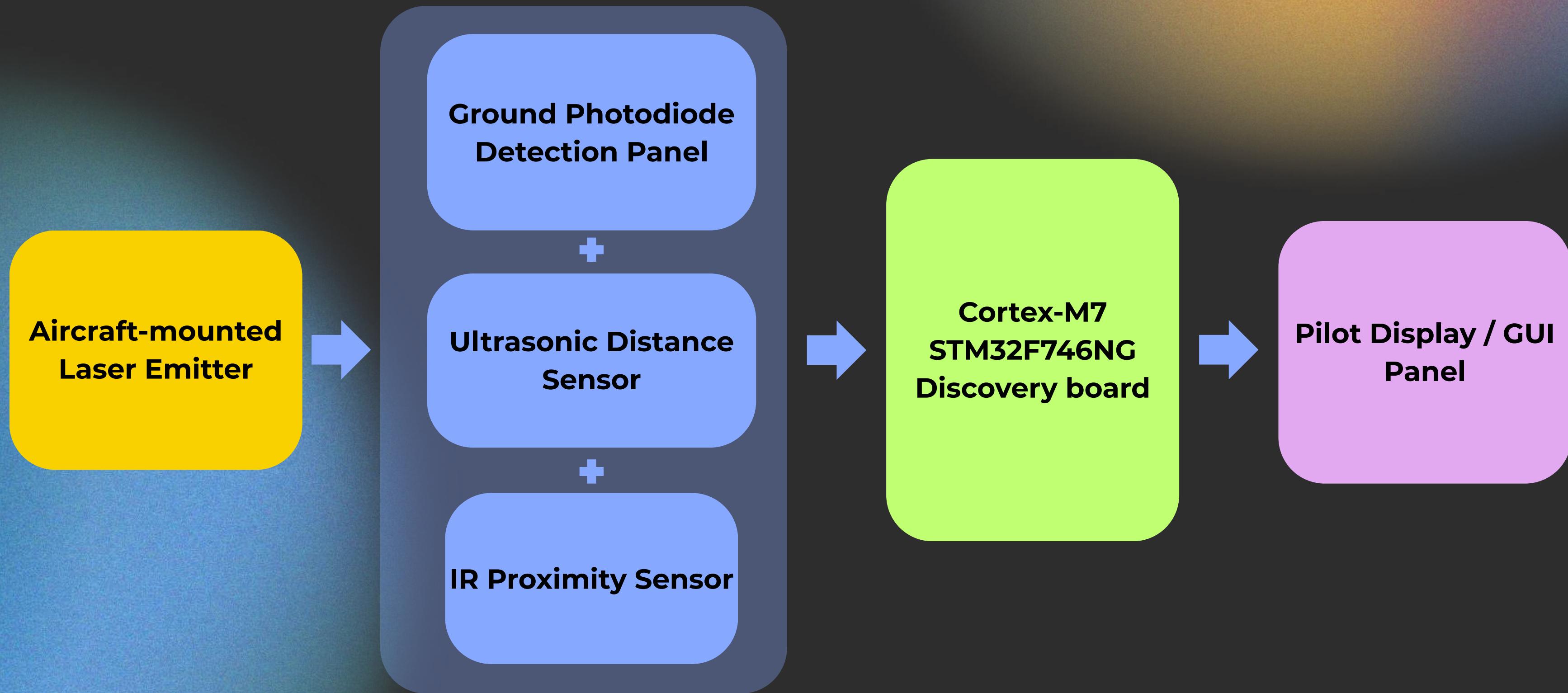
**2. Digital Pilot Guidance +
Distance Tracking**



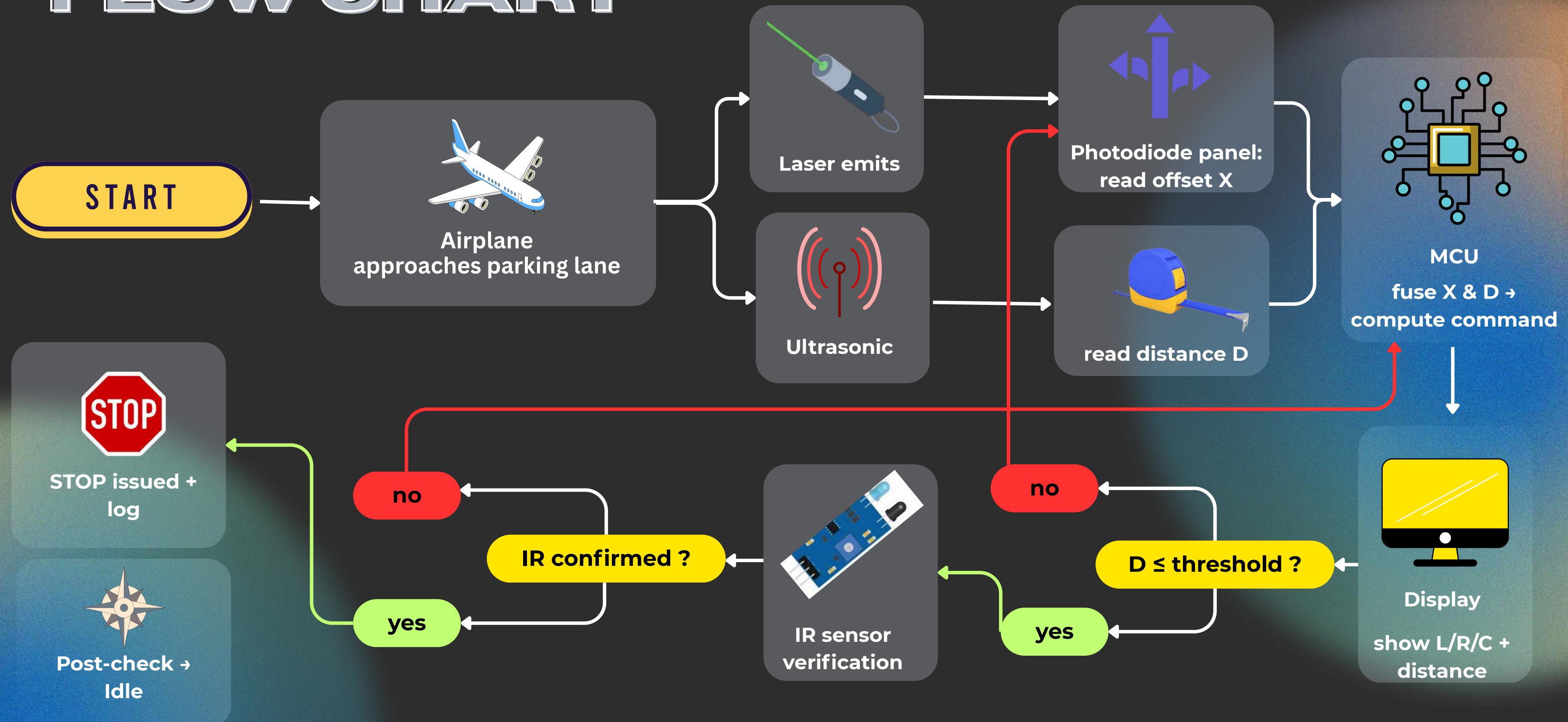
**3. Intelligent Proximity-Based
Auto-Stop Mechanism**



SYSTEM ARCHITECTURE

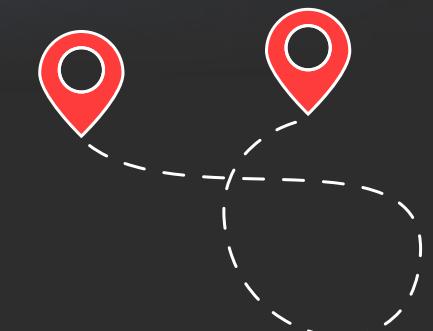
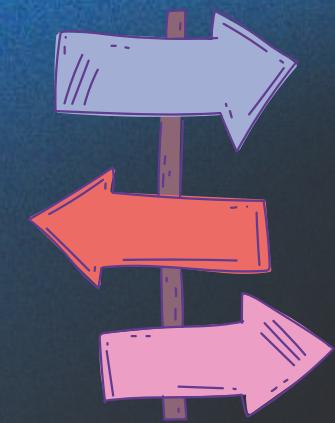


PROCESS FLOW CHART



HARDWARE & SENSOR LOGIC

Function	Component	Logic
Alignment	Laser + Photodiodes (LDR replaced with photodiodes for accuracy)	Center hit = aligned; beam shift = left/right deviation
Approach	Ultrasonic Sensor	Measures aircraft distance continuously during taxi-in
Stop Detection	IR Sensor + Ultrasonic	Triggers STOP when aircraft reaches final threshold point
Processing	STM32F746NG Discovery	Reads sensors, fuses data, computes guidance, updates display
Display	TFT / LED Digital Panel	Converts MCU commands into visual marshalling cues



REAL TIME APPLICATIONS

- **Small & Regional Airports**

Low-cost alternative to VDGs for accurate, safe aircraft parking.



- **Aviation Training Institutes**

Ideal for teaching marshalling, alignment, and ground-handling concepts.



- **UAV & Drone Testing Zones**

Supports autonomous landing, alignment, and docking trials.

- **R&D & Engineering Labs**

Suitable for testing sensor fusion, distance measurement, and automation algorithms.

- **Industrial Vehicle Docking**

Helps AGVs and warehouse vehicles achieve safe, precise docking.



- **Tech Expos & Demonstrations**

Highly visual prototype for showcasing smart automation systems.

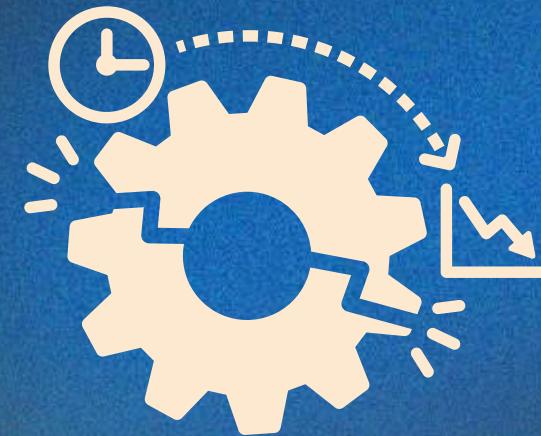
CONCLUSION



Developed a low-cost, portable automated marshalling system



Implemented laser-based alignment detection



Enabled real-time autonomous guidance and decision-making



Integrated LDR sensors, ultrasonic/IR sensing, and efficient microcontroller logic



Displayed clear marshalling outputs:
LEFT, RIGHT, FORWARD, SLOW, STOP

THANKS

Presented by
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