

Fixed-Wing UAV Integrated with (EMP) as a Counter-Drone System



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BACKGROUND

The growing use of drones for unauthorized surveillance and hostile activities poses a significant threat to critical infrastructure and public safety, highlighting the urgent need for innovative and cost-effective countermeasures

PROBLEM STATMENT

Existing counter-drone methods—such as signal jamming or missile interception—are often limited, expensive, or cause collateral damage. There is a clear need for a **reliable, reusable, and precise system** to detect and neutralize hostile drones without risking nearby equipment, people, or the environment.

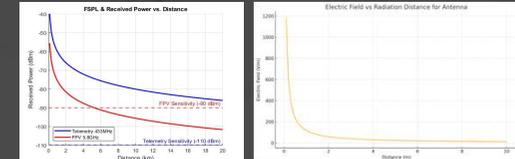
CONSTRAINTS

- Limited Microcontroller Computational power
- Aircraft Structure Withstands Catapult Impact
- EMP Does Not Affect Other Electronics
- Follow MIL-Standard

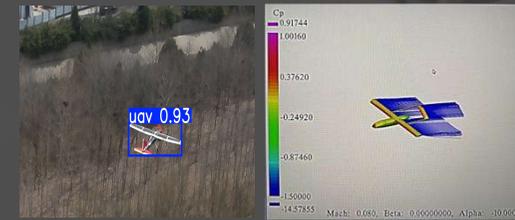
SPECIFICATION

- AI accuracy > 85%
- Cruise Speed > 90 km/h
- $T - T_{ambient} < 20\text{ C}$
- EMP range > 0.25 m
- Telemetry range 2 km
- Coverage rad of 1 km
- Endurance > 20 min
- Elimination out of 0.25 km radius
- Operation Time Gap > 30 min

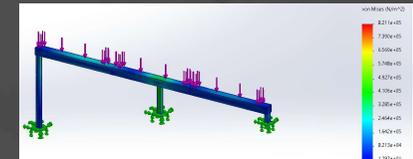
TEST & VALIDATION



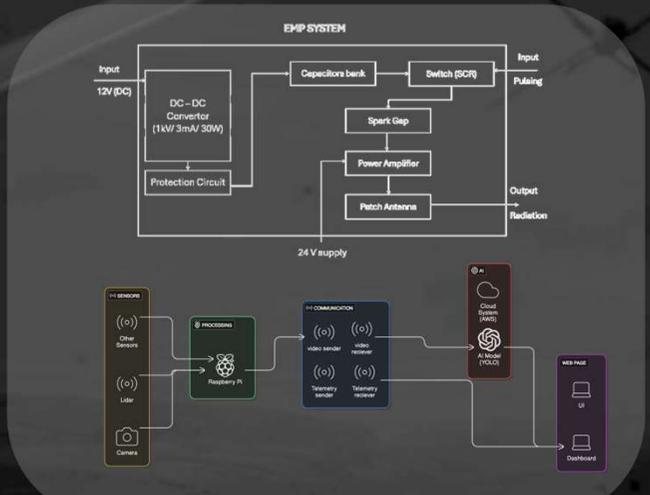
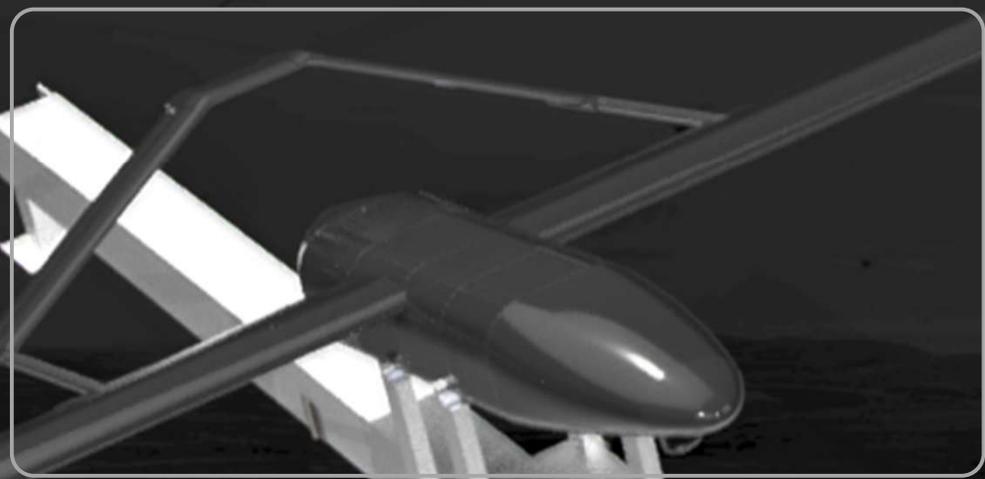
Input	Needed output	Actual output	Efficiency
12V	9	8.91	99%
12V	6	5.98	99.67%
30V	15	14.92	99.47%
30V	12	11.81	98.42%
30V	9	8.98	99.78%



Metric	Recall	Precision	mAP50	mAP50-95
result	0.98	0.99	0.99	0.86



PROTOTYPE



CONCLUSION

This solution enhances defensive capabilities with a cost-effective, efficient tool for military and border security applications