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# CAN SILENT SOLID-STATE PROPULSION BECOME THE NEW STANDARD FOR URBAN FLIGHT?

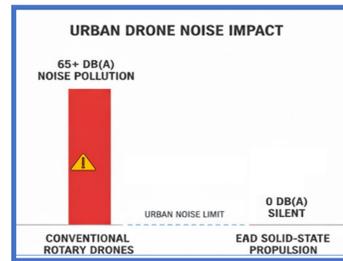
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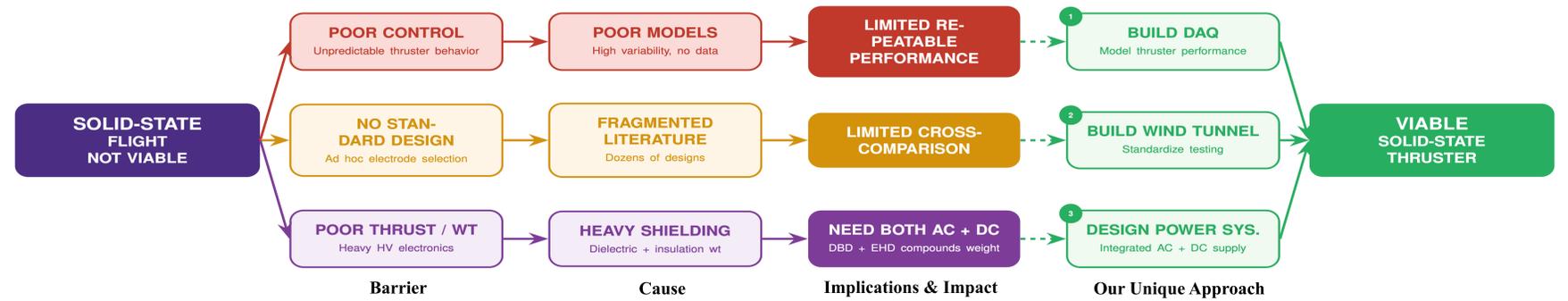
## MOTIVATION

### Dangers of Current Day Propulsion Systems

Today, aircraft rely on high-speed rotating machinery vulnerable to mechanical fatigue. Volatile fuels compound this risk, turning failures into catastrophic ones. Solid-state propulsion eliminates these risks: electric fields accelerate ionized air and generate thrust without moving parts, improving safety while still working with existing power systems.

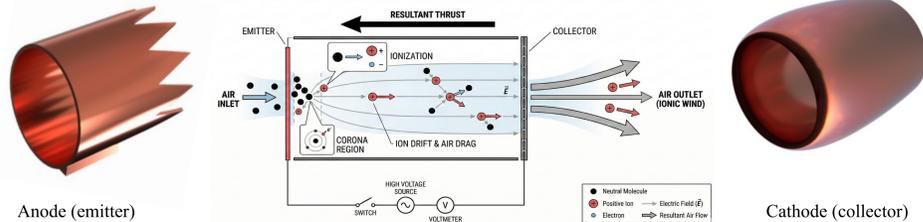


## PROBLEM AND OUR METHODOLOGY

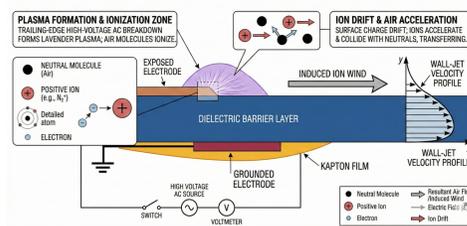


## FIRST PRINCIPLES

### EHD PROPULSION: BASIC WORKING PRINCIPLE



### DBD PLASMA ACTUATOR: BASIC WORKING PRINCIPLE

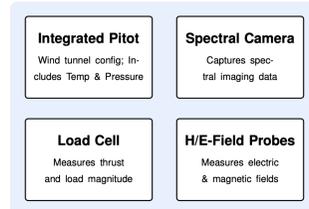


	Thrust	Efficiency
EHD Stage <sup>1</sup>	~10mN	~500 mN/W
DBD Stage <sup>2</sup>	~97mN	0.97mN/Wm
Drone Hover (small, <500g)	~4.9 N	~100mN/W

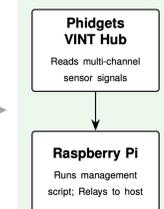
- Masuyama, K. & Barrett, S.R.H. (2013). "On the performance of electrohydrodynamic propulsion." *Proceedings of the Royal Society A*, 469(2154).
- Moreau, E. (2007). "Airflow control by non-thermal plasma actuators." *J. Phys. D: Appl. Phys.*, 40,

## OUR DAQ & POWER SUPPLY

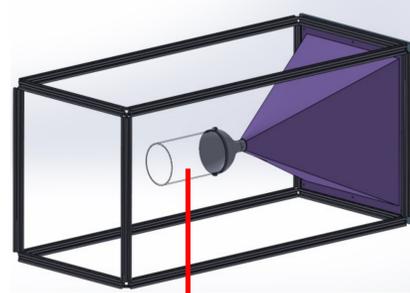
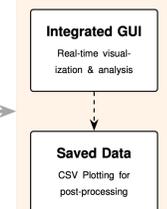
### Data Acquisition (DAQ) architecture Sensor System



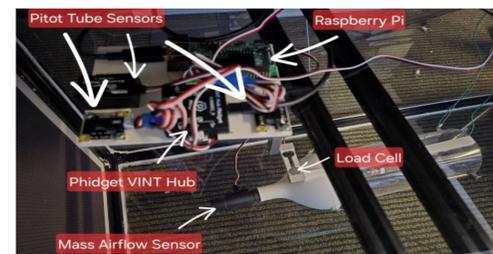
### Sensor Manager



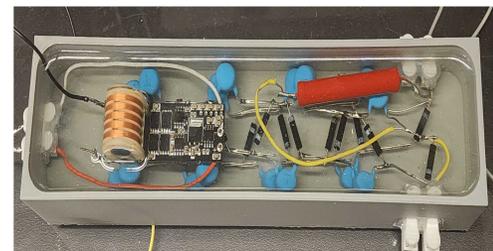
### Host Computer



Custom test fixture for electrode geometry testing : addressing limited cross-comparison problem

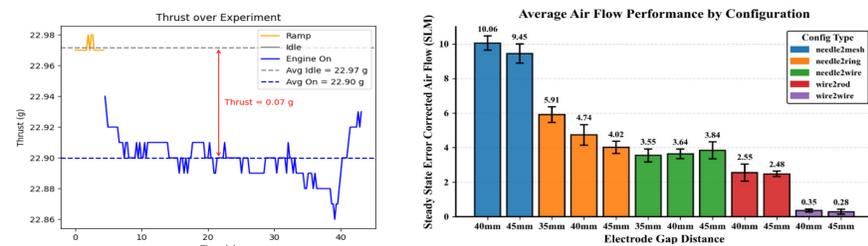


High voltage sensing and monitoring capability: collecting data to build high-fidelity model



Power supply: Compatible with existing drone powertrain : addressing requirement for airborne ready AC-DC power supply

## RESULTS



~|0.68| N/W of thrust generated  
10.06 SLM peak airflow at 40 mm electrode gap  
Needle emitters outperform wire 2.5x

We have submitted our results for presentation at the International Conference On Plasma (ICOPS) 2026



## FUTURE WORK

### Better Systems for the Future

The next phase of this research will focus on integrating DBD and EHD technology into a full wing assembly, culminating in a functional model aircraft. Achieving this would mark a significant step toward a new era of simpler, safer aerial systems.

