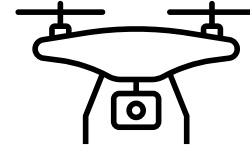


# ग्रहण



# hydrogen

Magic Myna - Hydrogen FCPS  
for  
Unmanned Aerial Vehicles and beyond

Presented by : Sunil S Nair

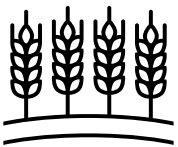
@ Team Magic Myna

# Drone / UAV Industry (India Perspective )

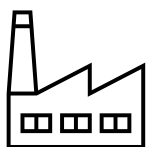
- ▶ The Indian Drone Industry is poised for a rapid growth from USD 10 Million in 2021 to USD 1.25 Billion by 2026. (Indian Drone Sector Projection - Ministry of Civil Aviation)
- ▶ Major Focus Sectors as shown below

“ Our Aim is to make India the World’s  
Drone Hub by 2030 “

Hon’ble Prime Minister Shri Narendra Modi  
unveiling Drone Policy 2021



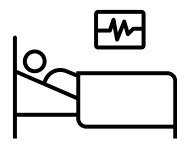
Agriculture



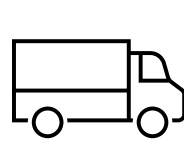
infrastructure



Mining



Healthcare



Logistics



Mapping



Rescue & Emergency



# About Magic Myna

**Magicmyna** is a Bangalore based start up with a mission to innovate, develop, deploy products and technology aimed to democratize and scale the usage, and application of Airmobility solutions in India and beyond.



Backed by in-house R & D and manufacturing facility in Coimbatore and partnering with India's Leading technology entity CSIR- NAL, Bengaluru we provide innovative solutions for Agriculture, Healthcare, Logistics and infrastructural sectors.

# Drones - Technology Advancements



## Power Pack

Advancements has resulted in  
Increased Endurance  
Heavier Payloads



## Sensors

Integration of  
Sensors  
GPS/ NAVIC,  
Cameras , LIDAR,  
Thermal Imaging  
solutions



## Autonomous

AI powered  
capabilities -  
Autonomous Flights  
Obstacle Avoidance  
Object Tracking



## Communication

Enablement of  
internet supported  
real time data  
transmission and  
remote control  
irrespective of  
location

# Issues faced by existing Powerpacks



Lower Energy Density



Endurance constraints



Raw material availability



Life cycle constraints

# Hydrogen as a Solution



Clean , Sustainable



High Energy Density



Zero Pollution



Raw Material abundance



Higher Endurance

# Hydrogen Powered Drones - Enhanced Market Potential



Heavy Payload Capacity



Extended Flight Time



Rapid Refuelling



Remote Operations capabilities



Ease of integrating with existing infrastructure and platforms



Ideal for use in disaster management drones



## Where R&D meets the Industry - CSIR-NCL ,CSIR-CECRI - Magic Myna Initiative

- ▶ In its quest for cleaner and green energy alternatives , Magic Myna has partnered India's prominent Hydrogen pioneers namely CSIR- NCL and sister entity CSIR -CECRI .
- ▶ Through a collaborative initiative , we intend to deliver a pathbreaking solution based on H<sub>2</sub> Fuel stacks .
- ▶ The same shall be incorporated into Magic Myna Drones built in ToT collaboration with CSIR-NAL



# Comparison - LiPo Vs Hydrogen FCPS

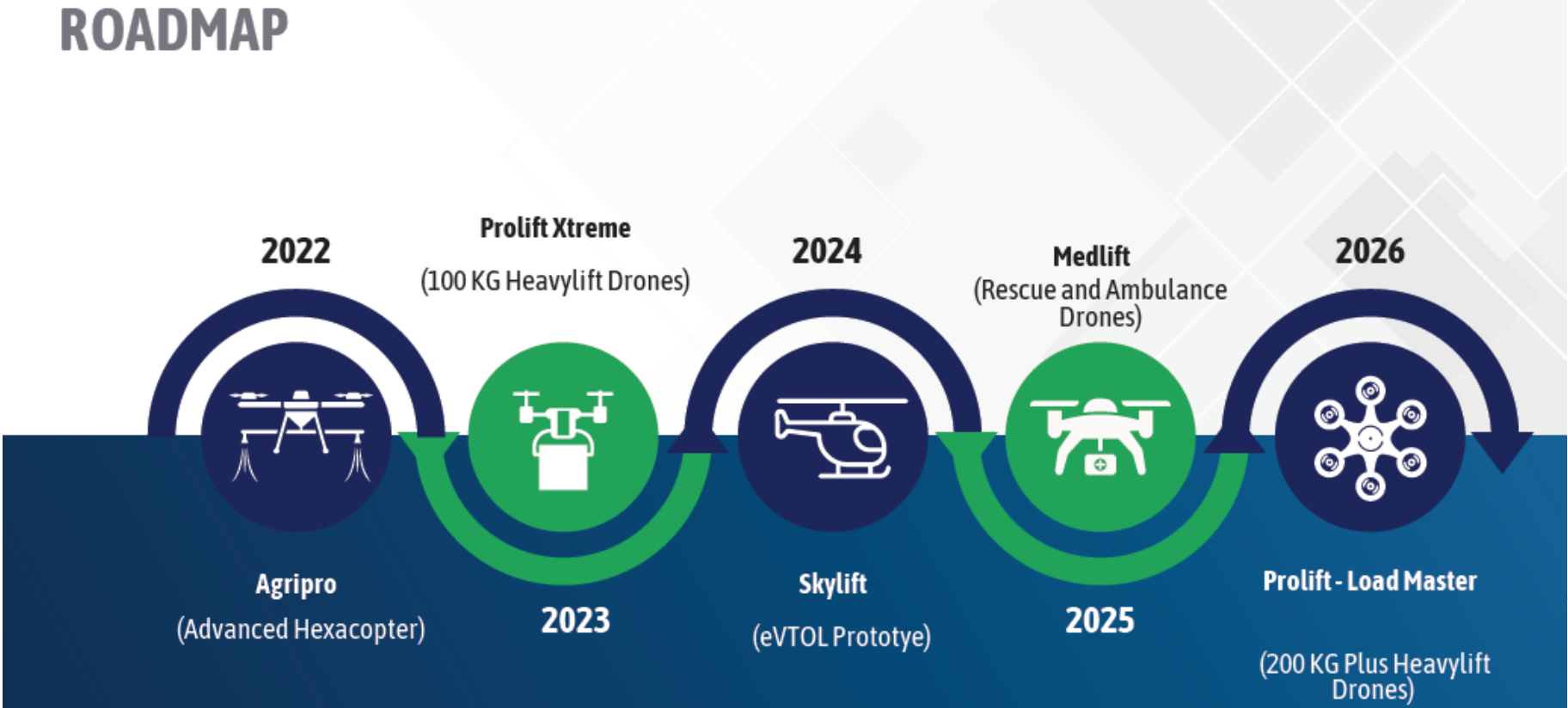
Properties	Lithium Polymer Power Pack	Hydrogen Fuel Cell Power Systems
Energy Density	Inability to store large amount of energy in small volume resulting in short endurance.	Store larger amount of energy in small volume resulting in Long endurance.
Recharge/ Refill Time	Longer recharge time	Shorter Refill by replacement of H2 cylinder/ cartridge
Cell Voltage	3.7 to 4.2 V / Cell	0.6 to 0.7 V / Cell
Life Cycle	300 Cycles	Unlimited and repairable
Operating Temperature	0 Deg to 45 Deg Celsius	60 Deg to 80 Deg Celsius (PEMFC)
Environmental Impact	End of life cycle disposal issues owing to Lithium and other hazardous polluting chemicals.	Produces Water vapour as the byproduct.

# Plans Ahead

- ▶ To co create and deploys India's first indigenously built Hydrogen FCPS based Small, Medium and Heavy category UAV's by 2024
- ▶ Develop India's First Hydrogen FCPS based "eVTOL"
- ▶ MedLift and 200 Kg Heavy Lift Drones by 2025.

# Roadmap for Hydrogen FCPS based UAV's

## ROADMAP



*Thank You*

