

# ENERGYOR “PLUG & FLY” FUEL CELL SYSTEMS POWER UAVS FOR UP TO 10 HOURS

Montreal, Canada: EnergyOr Technologies Inc., a leading developer of proton exchange membrane (PEM) fuel cell systems, recently unveiled its latest generation of advanced fuel cell system technology for long endurance Unmanned Aerial Vehicle (UAV) applications.

The **EPOD EO-210-LE** and **EO-210-XLE** are lightweight, rugged UAV propulsion systems designed specifically for extended flight endurance under the most demanding weather conditions. Their performance has been optimized over the last four years based on extensive flight testing in several different UAV platforms, including the EO-360-UAV Demonstrator designed and built by EnergyOr. The **EO-210-LE** and **EO-210-XLE** are fully integrated and include all of the necessary subsystems to provide reliable and efficient “turn-key” UAV propulsion power.

These hybrid UAV power systems were designed to take full advantage of fuel cells for their high energy density and LiPo batteries to provide short bursts of power during take-off, climb and severe weather conditions. The outcome is that UAVs powered by EnergyOr’s fuel cell systems have a flight endurance that is two to three times longer than those powered by the best rechargeable batteries (LiPo).

The **EO-210-LE** and **EO-210-XLE** offer a proprietary power management system which includes in-flight battery charging to ensure high



The EPOD Series of UAV Fuel Cell Systems from EnergyOr – the Latest Innovation in “Plug & Fly”

power levels are always available, a modular design for optimal UAV integration, low heat and noise signature, exceptional system efficiency, and a system level energy density of over 450 Wh/kg.

EnergyOr has achieved numerous successful flights with operational UAVs from two leading Israeli UAV manufacturers where 5 hours flight endurance was attained using the **EO-210-LE**. The **EO-210-XLE** provides 8 to 10 hour flights for similar sized UAVs.

## About EnergyOr

EnergyOr Technologies, incorporated in 2002, was the first and only company to fly a fuel cell powered UAV in Canada (May 2007), and in December 2007, performed the first fuel cell flights ever in Israel. EnergyOr provides **total** system solutions which include hydrogen

delivery systems, portable hydrogen filling stations and system integration services.

EnergyOr has also developed an advanced fuel cell Auxiliary Power Unit (APU) to replace the gasoline generator for UAV ground control stations and other electrical needs (computers, mobile phones, etc.).

EnergyOr recently displayed its fuel cell technology at the Association for Unmanned Vehicle Systems International (AUVSI) Exposition in Washington, D.C.

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### Fuel Cell UAV Propulsion Systems for Extended Flight Endurance

#### EnergyOr Technologies Inc.

EnergyOr Technologies Inc. is a fuel cell systems company with a strategy to focus on premium niche markets where we can apply our state-of-the-art fuel cell technology.

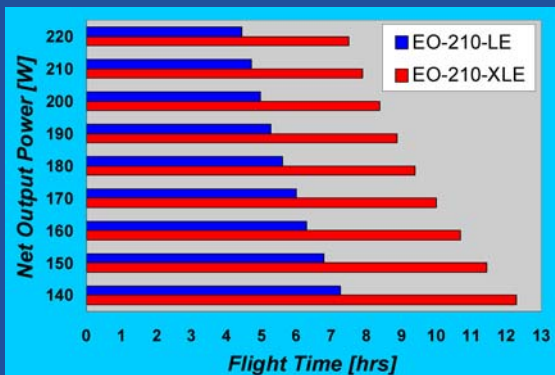
Our objective is to provide customers with simple to use, "turn-key" fuel cell systems. From engineering analysis & detailed component design, to systems integration & qualification testing, we strive for excellence at each and every stage.

We produce lightweight and compact PEM fuel cell systems suitable for many premium markets, including but not limited to unmanned aerial vehicles (UAV), portable power field units and custom system development.



Our fuel cell systems are designed for the power and energy requirements needed for **operational** UAVs, which include not only propulsion power, but power for payload, avionics, etc.

#### Superior Flight Endurance



The EPOD Series of UAV Fuel Cell Systems from EnergyOr – the Latest Innovation in "Plug & Fly"

### Energy & Power On Demand

The EO-210-LE and EO-210-XLE are the latest generation of advanced fuel cell system technology from EnergyOr. These lightweight and rugged UAV propulsion systems are designed specifically to deliver extended flight endurance under the most demanding of weather conditions.

Built with the end-user in mind, the EO-210-LE and EO-210-XLE are fully integrated and self-contained to include all of the necessary subsystems to provide reliable and efficient UAV propulsion power that won't let you down. Their design has been optimized based on extensive UAV flight testing in several different platform configurations from two leading UAV manufacturers and in widely varying environmental conditions.

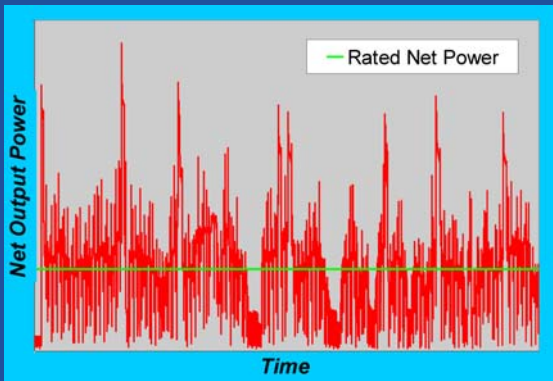
In an operational UAV platform (10 kg take-off weight), the EO-210-LE has provided power for all onboard systems to achieve 5 hours flight endurance. Similar in architecture to the EO-210-LE, the EO-210-XLE has been designed to provide 8 to 10 hours of flight endurance for similar sized UAV airframes.

EnergyOr has focused on providing complete fuel cell system solutions and engineering services so that our products can be integrated and deployed easily. Our advanced portable hydrogen filling station allows users to refill flight tanks rapidly and safely, at home or in the field. The EO-210-LE and EO-210-XLE are effectively "Plug & Fly".

## EPOD

EnergyOr Technologies inc. is offering advanced fuel cell / battery hybrid propulsion systems for electrical unmanned aerial vehicle (UAV) platforms, specifically designed for extended flight endurance and operation in severe weather conditions.

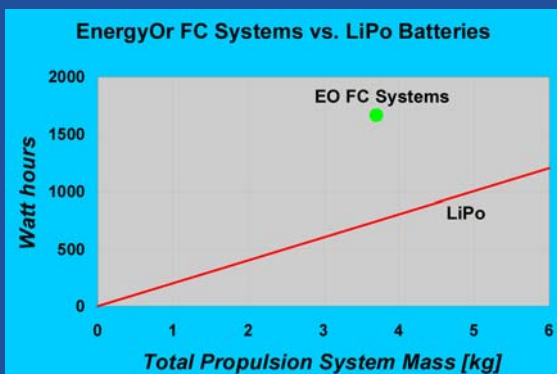
After five generations of fuel cell system development and testing in several UAV platforms, EnergyOr has come to understand the “real” requirements of operational UAVs. The EO-210-LE and EO-210-XLE can provide more than just steady state power, and are ready to tackle the most demanding UAV flight power profiles.



The output voltage range of the EO-210-LE and EO-210-XLE is similar to that of an 8 - 10S LiPo battery pack, which eliminates the need for any power conditioning between the fuel cell system and your propulsion motor (i.e. a heavy and inefficient DC/DC converter is not required).

## EnergyOr FCS vs. LiPo

EnergyOr’s fuel cell systems provide more than double the energy available from rechargeable lithium polymer (LiPo) batteries, the existing electric UAV propulsion technology of choice.



## EO-210-LE / EO-210-XLE System Features

- Hybrid battery for peak power demands
- In-flight battery charging to ensure high powers available in the most demanding weather conditions
- Modular design for optimal UAV integration
- System level energy density of over 450 Wh/kg
- Exceptional system efficiency for longer flight endurance
- Low heat and noise signature

Technical Specifications		EO-210-LE	EO-210-XLE
System Performance	Rated Net Output Power	210 W	
	Max. Continuous Net Output Power	250 W	
	Peak Net Output Power (Take-off)	850 W	
	DC Output Voltage Range	30 – 45V	
	System Efficiency @ 210 W	> 50%	
	Design Lifetime	500 hours	
Environment	Ambient Temperature (Max.)	40°C	
	Flight Altitude	1000 m	
Physical	Total System Mass (including H2 Delivery System + H2)	2.95 kg	3.65 kg
	Dimensions / Volume	Fully Configurable Depending on UAV Airframe	

\*Specifications are subject to change without notice

## NO FUZZY MATH!

What separates the EO-210-LE and EO-210-XLE from the competition? ...**SYSTEM EFFICIENCY**. We have designed our fuel cell systems for operation at very high efficiency, and the specific energies quoted (i.e. Watt-hours) are at a usable power level that will actually fly your UAV, **nothing less**. Basically, this means we produce more power with less hydrogen, making our fuel cell systems lighter.

## What’s Included

- Fully Integrated Fuel Cell Stack
- Hybrid LiPo Batteries
- Electronic Controller & Power Distribution Board
- Proprietary Power Management System including battery charging
- Air Delivery & Cooling Subsystems
- Hydrogen Valves
- Hydrogen Delivery System with Regulator & Integrated Pressure Sensor
- EnergyOr Developed Graphical User Interface (GUI) for system monitoring while on the ground, or in the air
- On-board Data Acquisition and/or Data Link for all Fuel Cell System parameters
- Portable Hydrogen Filling Station

## Other Product Configurations

Depending on your specific UAV platform and mission requirements, EnergyOr Technologies can provide a custom configuration to meet your needs. Our fuel cell / battery hybrid UAV propulsion systems are highly configurable due to their modular design and can be quickly integrated into your UAV airframe.