BALLARD®
power to change the world®

FCair™

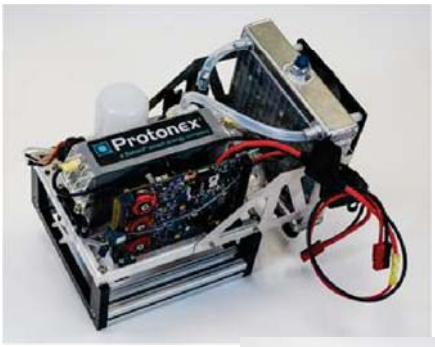
FCair™ UAV Power Systems

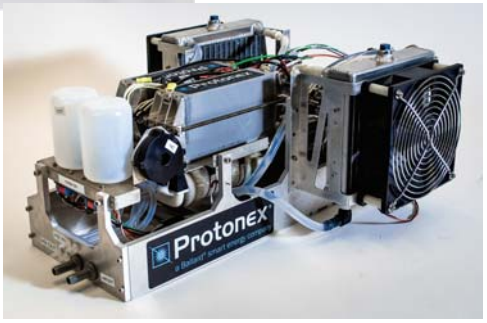
Commercial UAV operators struggle with limited mission duration, range, reliability, and noise. They are frustrated managing, charging, and transporting batteries; and by the cost of maintaining small engines. FCair™ Fuel Cell Power Systems provide up to 3 times more run-time than the best batteries, and 5 times the reliability of small engines - and they run on clean hydrogen gas. All of this means you get:

- Faster refueling for less down time
- No battery or cable jumble
- Better cold weather endurance
- Better high altitude performance
- Quiet operation

Key benefits of working with us:

- You receive a complete system: 600 or 1200 watt hydrogen fuel cell, control electronics, heat exchanger, and integrated battery power hybridization.
- Our liquid-cooled system delivers reliable operation in hot or cold weather, and in high or low humidity.
- Reduce your risk and get off the ground quicker with our integration support and unmatched experience with UAV platforms and systems.
- Our team's decade-long defense heritage and experience brings proven and reliable military-grade technology to commercial applications.





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SPECIFICATIONS

	600W	1200W
Variants		
Fully hybridized system (battery and charger included)	FCair™ 600h (012-894)	FCair™ 1200h (013-184)
Non-hybridized system	FCair™ 600 (013-360)	FCair™ 1200 (012-662)
Electrical		
Continuous Net Output Power (fuel cell only)	0 – 650 W[a]	0 – 1300 W[a]
Maximum Net Output Power (fuel cell w/ battery)	1000 W[a]	2000 W[a]
Recommended Hybrid Battery Configuration	6S Lithium Polymer (LiPo)[b]	
Output Voltage	6S LiPo[c]	
Input Voltage	6S LiPo[d]	
Output/Input Power Connectors	PowerPole PP15/45	
Physical		
Weight	1.8 kg[e]	4.0 kg[e]
Dimensions (L x W x H)	9.5-in x 6.7-in x 5.5-in[f]	17.0-in x 10.5-in x 6.5-in[f]
Standard Mounting Fasteners	4 x 6-32 UNF[g]	8 x 8-32 UNF[g]
Fuel		
Hydrogen Purity	SAE J2719 or better	
Hydrogen Supply Pressure	12-18 psig	
Hydrogen Consumption Rate	53 g/kWh @ 200 W Net[h]	53 g/kWh @ 400 W Net[h]
	63 g/kWh @ 650 W Net[g]	63 g/kWh @ 1300 W Net[g]
Hydrogen Supply/Exhaust Fitting	1/8-in ID barb	
Communication		
Communication Interface	RS-232	
Environmental		
Ambient Temperature	5 to 45°C[i]	
Standard Operating Altitude	0 to 15,000 ft[j]	
Relative Humidity	0 to 100%	
Durability		
Service Life – Fuel Cell Stack Replacement	3,000 hrs	
Overhaul Interval – Balance of Plant Component Replacement	1,000 hrs	

[a] Higher power output possible, contact Protonex for more information

[b] Other configurations possible, contact Protonex for more information

[c] For 6S LiPo configuration, 24.5 V at full battery charge and < 625 W net, will follow battery voltage otherwise

[d] Input power required for start-up (< 20 W) and health maintenance during operation

[e] Includes heat exchanger as well as control/power management electronics

[f] Flexibility to modify system layout if desired

[g] Customization possible, contact Protonex for more information

[h] See brake specific fuel consumption (BSFC) plot

[i] Extension of range possible in both directions, contact Protonex for more information

[j] Power de-rating begins at 5,000 ft reaching a maximum of 10% at 15,000 ft