

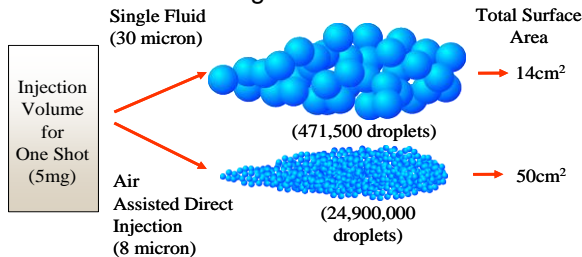
Proven UAV Heavy Fuel Engine Technology

FlexDI™ – Spark Ignited Heavy Fuels

FlexDI™ is production-proven direct fuel injection technology able to offer an advanced Spark Ignition solution for heavy fuel engines including JP5, JP8 and JetA1. FlexDI™ is also able to be used for spark ignited Diesel applications.

FlexDI™ offers:

- Unique solution applicable to both 2 & 4 strokes
- Spark ignited Kerosene and Diesel; for UAVs JP5, JP8, JetA, JetA1 (theatre-proven) and gasoline operation with no change to engine calibration
- High specific power; greater than 70kW/L
- Low fuel consumption; 30%+ reduction during cruise conditions
- Cold start capability; demonstrated to -30°C
- Proven environmental capabilities: -30 to +49°C, up to 20,000ft DA, 0-100% relative humidity
- Noise compliance to MIL-STD-1474D
- Automatic altitude compensation
- Electronic oil metering



What Orbital brings to the UAV market

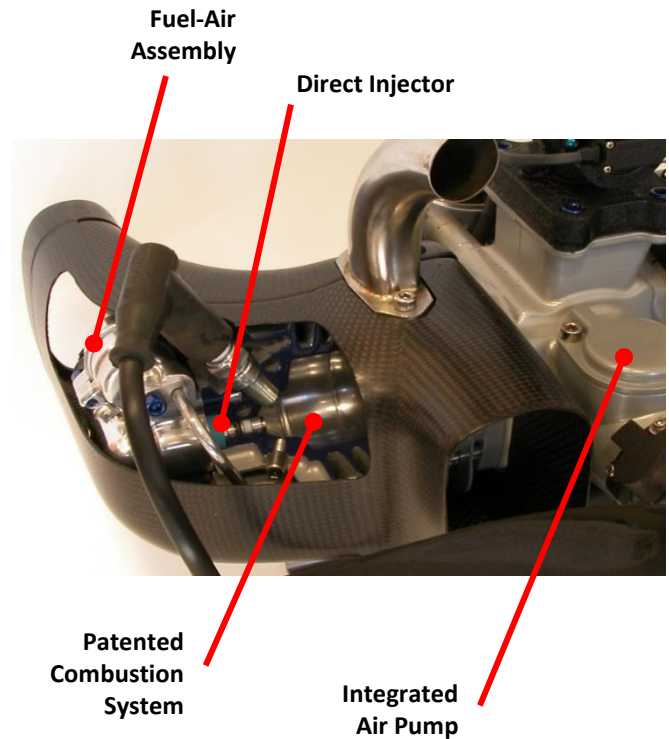
More than 30 years of proven experience dedicated to engine design and prototype manufacture, EMS calibration and optimisation, testing for performance, emissions and fuel consumption.

- Engine calibration dynamometers
- Propeller stand facilities
- Altitude simulation facilities; up to 20,000ft capability depending on engine capacity

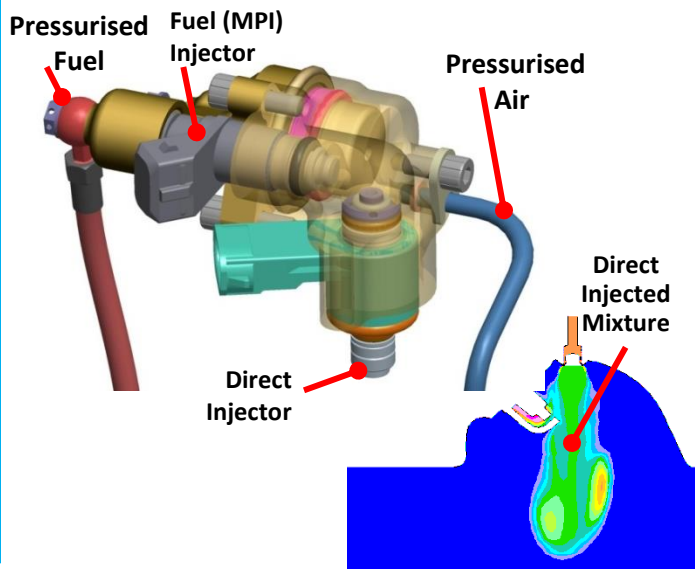


Orbital's Propeller Stand Facility

Key Components – SUAS Heavy Fuel Engine



How does it work?



Proven UAV Heavy Fuel Engine Technology

FlexDI™

Our Track Record



- 2002-2003
 - Initial R&D development
- 2003-2004
 - Barrus (50Hp diesel-kero-gasoline)
 - Publication of technical capability papers
- 2005-2008
 - Mercury JP Optimax released
<http://www.mercurygovsales.com/technology/optimaxjp.php>
 - Polaris 4S MV800 (JP8/Gasoline)
- 2009-2012
 - Various UAS customers (undisclosed)
 - Internal R&D funded engine design
 - AAI/Textron: Orbital HF on Aerosonde (2012)
- 2013+
 - Gen2 Orbital HF SUAS engine development and production supply



FlexDI™ 2-Stroke UAV Engine Typical Data

Configuration	Single cylinder	2-cylinder Boxer
Cooling system	Air	Air
Power range (kW) [hp]	1.8 – 3.7 [2.4 – 5.0]	3.3 – 23 [4.4 – 30]
Capacity range (cc)	35 - 85	70 - 500
Specific performance* (kW/kg) [hp/lb]	0.62 - 0.92 [0.38 – 0.56]	0.60 - 1.61 [0.37 – 0.98]
Specific fuel consumption at cruise (g/kWh) [lb/hp.hr]	330 – 310 [0.54 – 0.51]	340 – 300 [0.56 – 0.49]
Durability TBO (hrs)	250 - 500	300 - 500

* Weight calculations based on dry weight including complete engine assembly, fuel system, intake system, ignition system, on-engine lubrication system, ECU, engine electrical harness. Does not include exhaust system or generator.

Insitu Orbital 2.4kW Heavy Fuel Engine



Orbital supply FlexDI™ engines to Insitu

•“Insitu is proud to partner with **ORBITAL UAV** to bring our customers increased mission reliability and capability with more affordable life cycle costs. **ORBITAL UAV** is the leading small unmanned aircraft vehicle reciprocating internal combustion engine supplier in the industry, and the **ORBITAL** designed engine sets a new standard for unmanned aircraft propulsion”.

•Ryan M. Hartman, President and CEO, Insitu Inc., a subsidiary of The Boeing Company



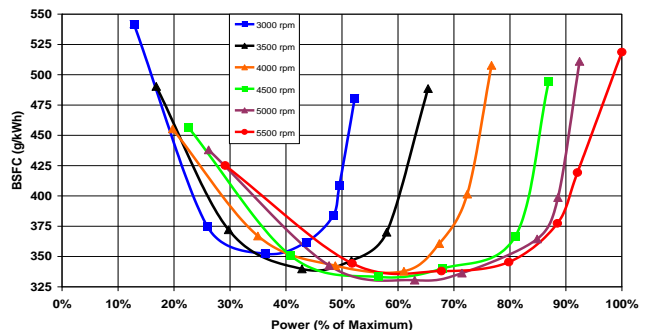
2-Cylinder Boxer HFE



Complete solutions utilising world class design processes, latest CAE tools and in-house test and validation.

FlexDI™ has Superior Fuel Consumption

Orbital HFE - Typical Fuel Consumption vs % Maximum Power



3 to 250+hp
Heavy Fuel Engines

State of the Art Unmanned Aerial Vehicle Engines

USA: Bob Schmidt
bschmidt@orbitalcorp.com.au
PH: +1 810-441-1457

Australia: Geoff Cathcart
gcathcart@orbitalcorp.com.au
PH: +61-89441-2311