Everything RCV architecture and engineering is known for is now available. Single or twin cylinder, off the shelf or customized specifically for your unmanned system.

Heavy Fuel UAV Engines
- 1 kW to 6 kW
- Single & Twin Cylinder
- Fuel Injection
- 4-Stroke

EFI Engine Control System
- Compact ECU
- Gasoline/JP8
- Single & Twin Cylinder
- Integrated Pump
- Proven Software
RCV Engines Ltd has a compact fully integrated electronic injection management ECU. The ECU has been developed for use on small engines operating in unmanned systems, hybrid and portable power applications. The ECU comes complete with fuelling system suitable for operation with either gasoline or heavy fuel.

The fuel system is based around a lightweight pump driven by a brushless motor with spill back pressure regulator allowing fuel to return to the tank. The standard fuel system is suitable for engines from 1 kW to 15 kW, a larger capacity pump can operate engines up to 40 kW. The pressure regulator can be set to give fuel pressures between 2 and 5 bar. Fuel pressure is directly monitored and compensated for by the ECU.

**Overview**

- Lightweight/compact/waterproof ECU casing
- Altitude compensation relative to pressure/temperature
- Integrated fuel system
- Twin injector drivers with up to three injectors/driver
- Twin ignition drivers permitting dual spark operation
- Servo drivers for cooling and throttle control
- Field proven control software and user interface
- RS232 and CAN bus communications
- Inbuilt data logger

**Applications**

- Unmanned Systems
- Portable Power
- Hybrids

**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>300 g (0.66 lb)</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>12 VDC (28 VDC Available on Request)</td>
</tr>
<tr>
<td>Typical Power Draw</td>
<td>20 W Including Ignition</td>
</tr>
<tr>
<td>Engine Power Range</td>
<td>1 tp 15 kW (Up to 40 kW with Upgraded Fuel Pump)</td>
</tr>
<tr>
<td>Fuel Injector Drivers</td>
<td>2 Drivers (Up to 3 Injectors/Driver)</td>
</tr>
<tr>
<td>Ignition Drivers</td>
<td>2</td>
</tr>
<tr>
<td>Ignition Type</td>
<td>High Energy Inductive</td>
</tr>
<tr>
<td>Servo Drivers</td>
<td>2</td>
</tr>
<tr>
<td>Communications</td>
<td>Serial RS232 &amp; CAN Bus</td>
</tr>
<tr>
<td>Engine Temperature Inputs</td>
<td>2</td>
</tr>
<tr>
<td>Load Mapping</td>
<td>Manifold Pressure or Throttle Potentiometer</td>
</tr>
<tr>
<td>Environmental/Altitude</td>
<td>Atmospheric Pressure &amp; Temperature Monitoring</td>
</tr>
</tbody>
</table>

RCV Engines can either supply the existing ECU unit, or configure the ECU for a specific platform or application. Subject to confidentiality arrangements 3D CAD data can be made available for installation studies. RCV can also design and supply a suitable loom. Production ECUs are available please contact Northwest UAV for more information.
HEAVY-FUEL UAV ENGINES

RCV Engines Ltd has a range of multi-fuel UAV engines that can operate equally well on gasoline or heavy fuel. The RCV combustion system is based on a unique patented revolving valve, that generates a high level of turbulence for good mixture preparation and creates an ideal compact combustion chamber for heavy-fuel operation.

**APPLICATIONS**
- Fixed wing
- Hybrid
- Helicopter
- Portable power

**OVERVIEW**
- Four-stroke cycle for low emissions and fuel consumption
- Large valve breathing area gives high power with a wide power band
- Reliable combustion and power on heavy-fuel from 8:1 to 15:1 AFR
- Excellent starting over a wide temperature range -20°C to +40°C
- Resistant to detonation – heavy-fuel operation without de-rating
- No combustion chamber hot spots - minimizing carbon build up
- High reliability, low maintenance with long MTBO:
  - No injectors in the combustion chamber to carbon up

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th></th>
<th>RCV20 Inline</th>
<th>RCV DF35</th>
<th>RCV DF70</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>20 cc Single Cylinder</td>
<td>35 cc Single Cylinder</td>
<td>70 cc Twin Cylinder</td>
</tr>
<tr>
<td><strong>Power (JP8)</strong></td>
<td>1.0 kW (1.3 hp) at 9000 rpm</td>
<td>2.2 kW (3.0 hp) at 8500 rpm</td>
<td>4.2 kW (5.7 hp) at 8500 rpm</td>
</tr>
<tr>
<td><strong>Weight Complete</strong></td>
<td>0.9 Kg (2 lb)*</td>
<td>2.0 Kg (4.4 lb)*</td>
<td>3.0 Kg (6.6 lb)*</td>
</tr>
<tr>
<td><strong>Combustion System</strong></td>
<td>Revolving Valve, 4-stroke</td>
<td>Revolving Valve, 4-stroke</td>
<td>Revolving Valve, 4-stroke</td>
</tr>
<tr>
<td><strong>Cooling/Lubrication</strong></td>
<td>Air Cooling / Oil in Fuel 1:25</td>
<td>Air Cooling / Oil in Fuel 1:25</td>
<td>Air Cooling / Oil in Fuel 1:25</td>
</tr>
<tr>
<td><strong>Fueling</strong></td>
<td>Low Pressure Manifold Injection with Altitude Compensation</td>
<td>Low Pressure Manifold Injection with Altitude Compensation</td>
<td>Low Pressure Manifold Injection with Altitude Compensation</td>
</tr>
<tr>
<td><strong>Heavy-Fuel Starting</strong></td>
<td>Cold Start Assisted with Installed Cartridge Heaters</td>
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<td>Cold Start Assisted with Installed Cartridge Heaters</td>
</tr>
<tr>
<td><strong>Fuel Consumption</strong></td>
<td>350 g/kW.hr (0.58 lb/hp.hr)</td>
<td>330 g/kW.hr (0.54 lb/hp.hr)</td>
<td>350 g/kW.hr (0.58 lb/hp.hr)</td>
</tr>
<tr>
<td><strong>TBO</strong></td>
<td>150 hours (VTOL) / 300 hours (Fixed Wing)</td>
<td>250 hours (VTOL) / 500 hours (Fixed Wing)</td>
<td>150 hours (VTOL) / 300 hours (Fixed Wing)</td>
</tr>
</tbody>
</table>

**OPTIONS**
- Capacity/Power: 10 cc to 20 cc / 17 cc to 100 cc / 1 kW to 6 kW
- Rotation: Clockwise or Anti-Clockwise Viewing the Prop Drive
- Starting: Starter Generator
- Cooling: Mechanical Fan / Cowling / Electric Fan / Water Jacket

RCV Engines has complete design control and can either supply an existing unit or configure an engine for a specific platform or application. Subject to confidentiality agreements 3D CAD data can be made available for installation studies. RCV can also evaluate which engine is the most suitable for a specific application. Production engines are available please contact Northwest UAV for more information.

*Engine application is dependent on airframe factors including: Aerodynamics, propeller, and operational concept. Please contact NWUAV for guidance.*
The Custom Engine Test Cell (CETC) is completely self-contained, transportable, and customizable to meet your application. The CETC is available in twenty or forty feet container lengths and includes everything needed to test your UAV propulsion systems. Also available is a towable Mobile Test Stand (MTS) model.

**Hardware**
The CETC is completely self-contained including sound dampening wall insulation. The CETC can be housed inside or outside of your facility with the appropriate duct work. Optional hatches can be provided which allow testing with the entire airframe.

**Digital Acquisition System**
The Data Acquisition (DAQ) provides a wealth of options for data to be collected including temperatures, pressures, position feedback, and analog and digital signal monitoring.

**Capabilities**
- Remote monitoring and control
- Simple and intuitive interface to minimize training
- Programmable engine tests for consistency and repeatability such as:
  - Acceptance testing
  - Engine tuning/fuel economy mapping
  - Engine/propeller power and torque mapping
  - New/overhauled engine break-in
  - Durability/endurance evaluation (FAR 33)
  - Over-speed testing
  - Throttle response evaluation

**Custom Built**
NWUAV’s CETC can be custom built for your specific application and to your requirements. We offer delivery and setup worldwide and will train your personnel how to perform engine testing with the CETC.

**Purchase or Lease the CETC.** The CETC is approved for export. On-site turn-key engine test solutions, with NWUAV operators available.

**System Components**

**System Control Software** – NWUAV has developed custom software that provides safety features and an intuitive interface while seamlessly managing all of the data flows for your project.

**Fuel System** – The low pressure fuel system is compatible for use with standard gasoline and a variety of heavy fuels.

**Cooling System** – The cooling system consists of two heavy duty blowers with speed controllers interfaced to the System Control Software for automatic speed control or manual controls.

**Exhaust** – The purpose of the exhaust fan is to continuously exchange air in the CETC, both removing the exhaust and maintaining the atmosphere for engine intake systems.

**Exhaust Gas Analyzer System (optional)** – The gas analysis system is capable of measuring four gases; carbon monoxide (CO), carbon dioxide (CO₂), hydrocarbons (HC), and oxygen (O₂). This allows operators to better understand what is happening with the combustion process.

**Camera System** – The camera system consists of four-pan tilt zoom (PTZ) cameras and a DVR. This allows the safety of remote monitoring from the comfort of a control room while also providing a detailed visual record of events.

**Safety System** – The CETC is equipped with multiple emergency stops that disable fuel and ignition to the engine.