

Testing and R&D for chemical propulsion systems

Propellants

- Liquid and gaseous oxygen
- Liquid and gaseous methane
- Subcooled propane
- Kerosene
- Gaseous hydrogen
- Nitrous oxide
- Alcohols
- Liquid nitrogen

- Thrusts up to 40kN
- Extensive data acquisition and control systems
- Propulsion system and test rig design and development

Testing services

- Engines and thrust chambers
- Injectors
- Igniters
- E-pumps and turbopumps
- Heat exchangers
- Gas generators
- Tanks
- Valves



Company profile

Founded in 2001 and operating at our test facility in Westcott, UK since 2009, Airborne Engineering Ltd (AEL) provide design and test services to the aerospace industry and academia, with a specific focus on chemical propulsion testing. We operate two state-of-the-art propulsion test facilities, supporting rocket engines and subsystems using a variety of liquid and gaseous propellants. We have tested a wide range of engines and engine components, as well as novel propellants, materials, and manufacturing techniques.

Our in-house expertise in electronic instrumentation, control systems, and software gives us a competitive edge in providing fast turnaround, complete testing solutions to our customers. This unique combination of capabilities has allowed us to become one of Europe's key propulsion research facilities, with 50 different engines tested for customers in 2025 alone.

Capabilities

Propulsion research

- Rocket engine testing and analysis
- Test rig and instrumentation design
- Mechanical/thermal design and CAD
- Mathematical modelling
- Injector and nozzle geometry testing
- Propellant testing
- Materials testing
- Pump testing



A custom-designed dual-cooled LOX/LCH4 engine additively manufactured from GRCop-42/Inconel-718 to support an ESA research programme



Instrumentation cabinets with 360 channels at 10kHz sample rate

Instrumentation and control

- High sample rate, high channel count data acquisition systems
- Manual and automatic valve actuation
- High bandwidth closed-loop control
- In-house electronics and software engineering, including embedded software and FPGA gateway
- Automatic data reduction and report generation

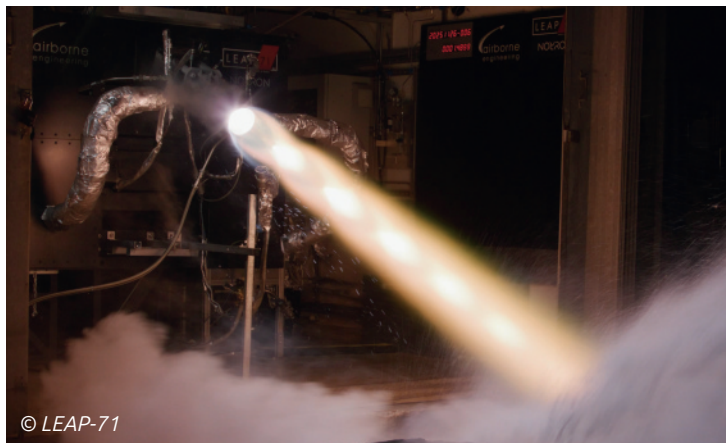
Test facilities

Testing capabilities

- **Liquid oxygen:** up to 8kg/s, 95 bar, 200L tank
- **Liquid methane:** up to 4kg/s, 145 bar, 200L tank
- **Subcooled propane:** up to 7kg/s, 145 bar, 200L tank
- **IPA/kerosene:** up to 2kg/s, 90 bar, 20L tank
- **Nitrous oxide:** up to 3kg/s, 90 bar, 50L tank
- Thrusts up to 40kN
- Custom and modified feed systems on request
- Multiple inert gas purges



Our J1 and J2 test facilities at Westcott, UK



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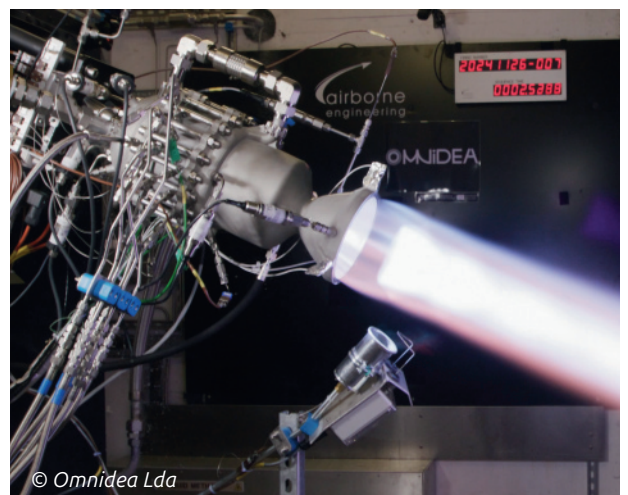
LEAP-71's 20kN LOX/LCH4 thrust chamber assembly

Efficient test programmes

- Dedicated and experienced test operators
- Responsive booking and availability
- Rapid data processing
- Fast test rig reconfiguration
- Flexible programming of test sequences
- Massflow control of propellants
- On-site workshop and welding

Data acquisition system

- Extensive data acquisition for customer equipment:
 - Static and dynamic pressure sensors
 - Thermocouples, RTDs, and thermistors
 - Strain gauges and load cells
 - Accelerometers
- Facility cinematography and high-speed cameras
- Flexible support for complex redlines and aborts
- Real-time data display and rapid post-firing turnaround



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Omnidea's DE-1 25kN LOX/LCH4 thrust chamber assembly



The Exploration Company's DM1 engine, using LOX/LCH4 propellants and powered by electric pumps

© The Exploration Company SAS



Orbex's first stage S1 engine thrust chamber assembly, using LOX and subcooled propane propellants

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