

Lotus Engineering

Efficient Performance







Efficient Performance – essential for tomorrow’s world

Improving efficiency while maximising performance has always been at the heart of the Lotus philosophy. This has particular relevance today when there is a pressing need to slow the decline of fossil fuel reserves and reduce emissions.

As a car manufacturer, Lotus understands the need to find efficient and cost-effective solutions to meet these challenges while maintaining a viable business case. We are therefore ideally placed to help our clients produce environmentally friendly vehicles and powertrains that do not sacrifice the performance expected by consumers.

Our approach for minimising the CO₂ impact of transport is based on investigating improvements in the three complementary areas of engine efficiency, alternative drivetrains and reducing the CO₂ footprint of the fuel that the vehicle runs on.



Turbocharger impeller

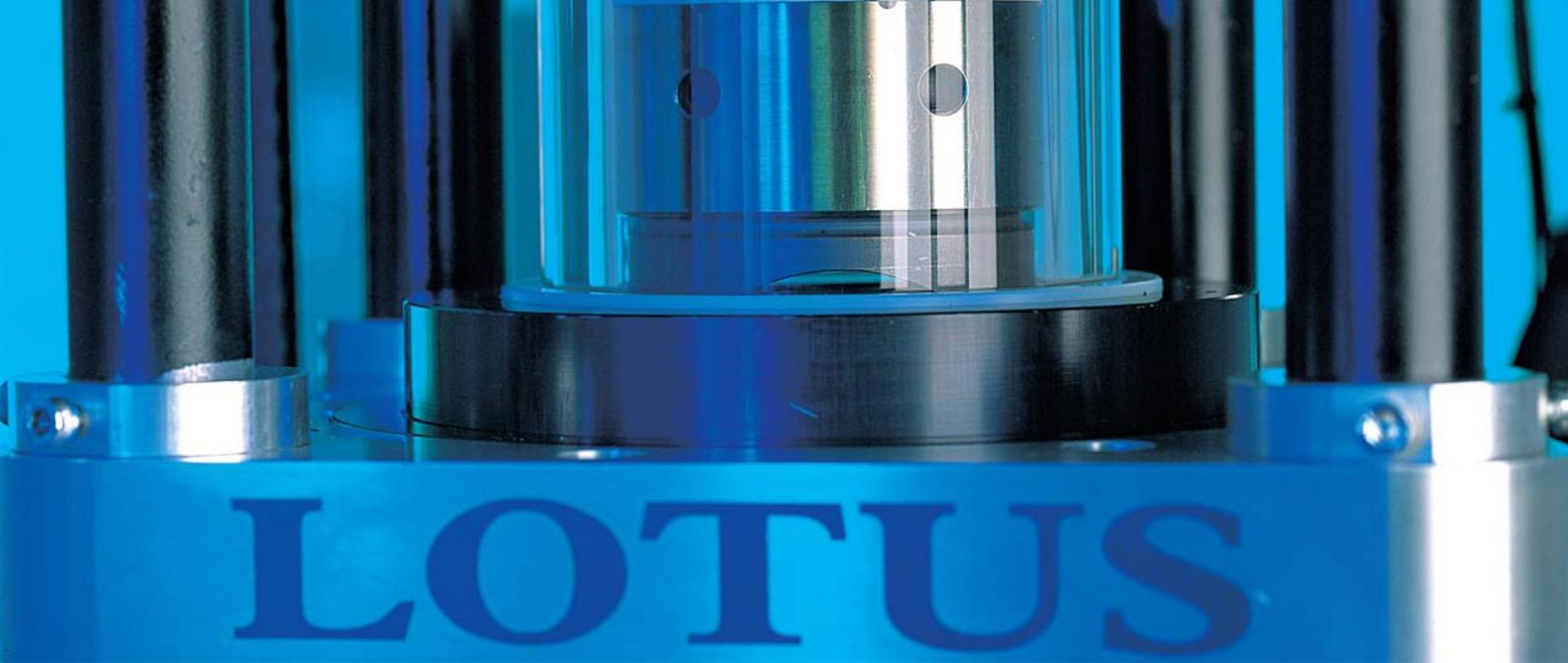
Driving down CO₂

While there is currently much investigation into alternative forms of propulsion, making conventional gasoline and diesel engines more efficient remains a priority.

Downsizing – using smaller, more efficient but more powerful engines – is recognised as an important route to making vehicles greener. Pressure charging, combined with direct injection and new valvetrain technologies, is fundamental to effective downsizing. Lotus' impressive track record on pressure charging makes us expert in this field.

However, the engine is integral to the driving experience. Our approach is to resist the temptation to downsize too aggressively at the expense of driveability and responsiveness. There is the expertise within Lotus to produce cost-effective downsized, low-CO₂ engines that make vehicles that are a pleasure to drive.

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Lotus optical research engine

Using technology for cleaner engines

Variable valvetrains, just one area in which Lotus is an acknowledged expert, is another technology integral to downsized engines of the future. One of our core skills is understanding how best to integrate these and other technologies into a production-ready form.

Already several vehicle manufacturers are producing engines with Lotus' cam profile switching tappet system, providing widespread reduction of CO₂ emissions.

Our knowledge of combustion, engine design, calibration and production places Lotus at the forefront of highly efficient, downsized engine development, at a time when the market is demanding engines of this type.

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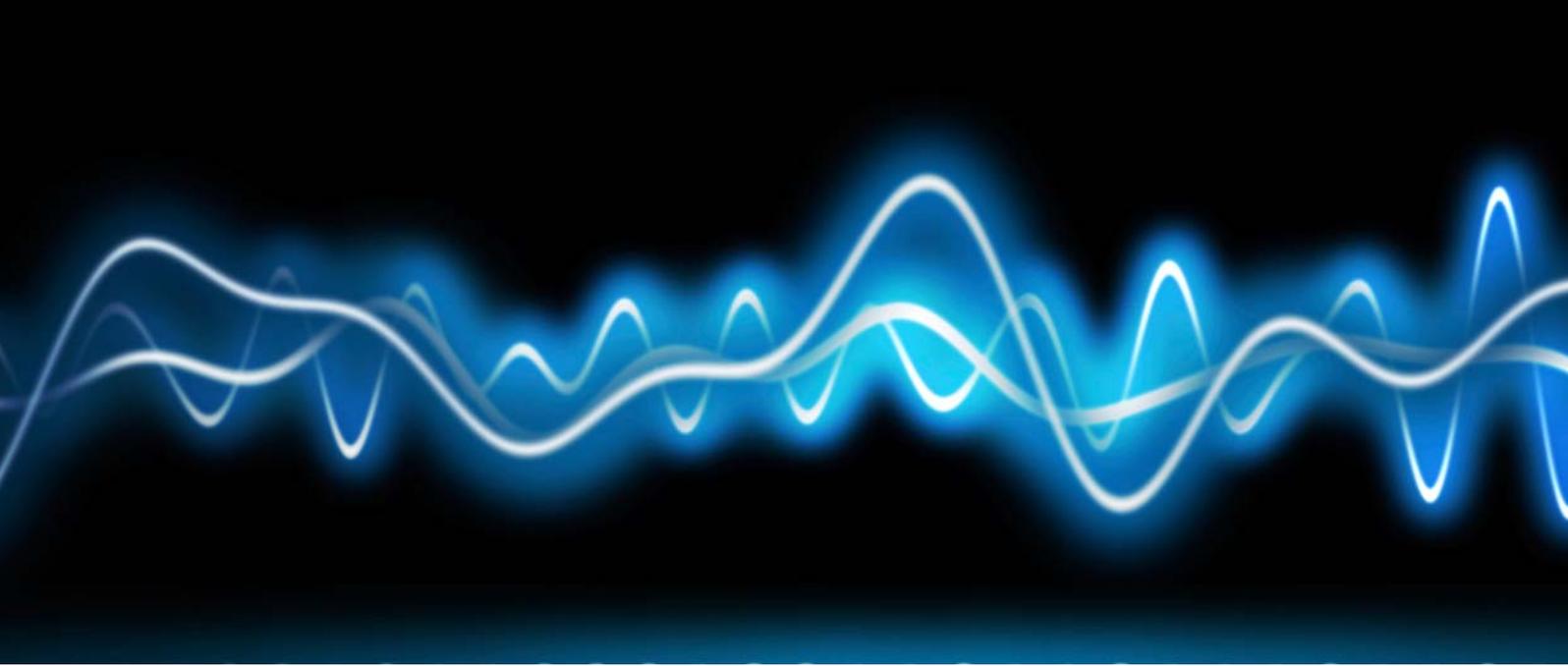


The diverse challenges of hybrids

While Lotus and the automotive industry as a whole work to make cleaner engines, other technologies have started to offer green alternatives.

The challenges posed by hybrid powertrains are well suited to the wide variety of expertise within Lotus.

Our experience in control systems, electrical integration and engine design combine well with the 'whole vehicle' knowledge we have as a car manufacturer. This holistic approach has led to practical, efficient hybrids, viable for production.



Applying our skills to electric vehicles

As market demand grows for greener cars, we are heavily involved in the rapid emergence of electric vehicles. Within this field there is a variety of new technologies and approaches, often from outside the traditional automotive arena.

Electric vehicles present another opportunity for Lotus' combined skills to shine. They pose challenges on many fronts, ranging from unconventional packaging, control systems, software and strategy, through to wider-ranging manufacturing issues.

Our ability to integrate next generation technologies using a whole-vehicle perspective not only helps our clients deliver their green promise, but also creates desirable, customer-focused vehicles.

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The vital role of alternative fuels

There is no doubting the effectiveness of new technologies in cutting CO₂ emissions, but they are often costly solutions. Lotus believes that there is a complementary and potentially more viable initial step to CO₂ reduction – a change to greener, more sustainable fuel sources.

Alternative fuels may also be better suited to some geographic regions than advanced engine or drivetrain technologies.

Many different alternative fuels have been researched and applied by Lotus, including compressed natural gas, alcohol fuel blends and bio-diesels.

These and other alternative fuels can have an immediate impact on CO₂ reduction. And they also require lower investment from vehicle manufacturers than improving conventional engine and drivetrain technology to cut CO₂ emissions.

265E BIO-FUEL

Lotus Exige 265E Bio-fuel

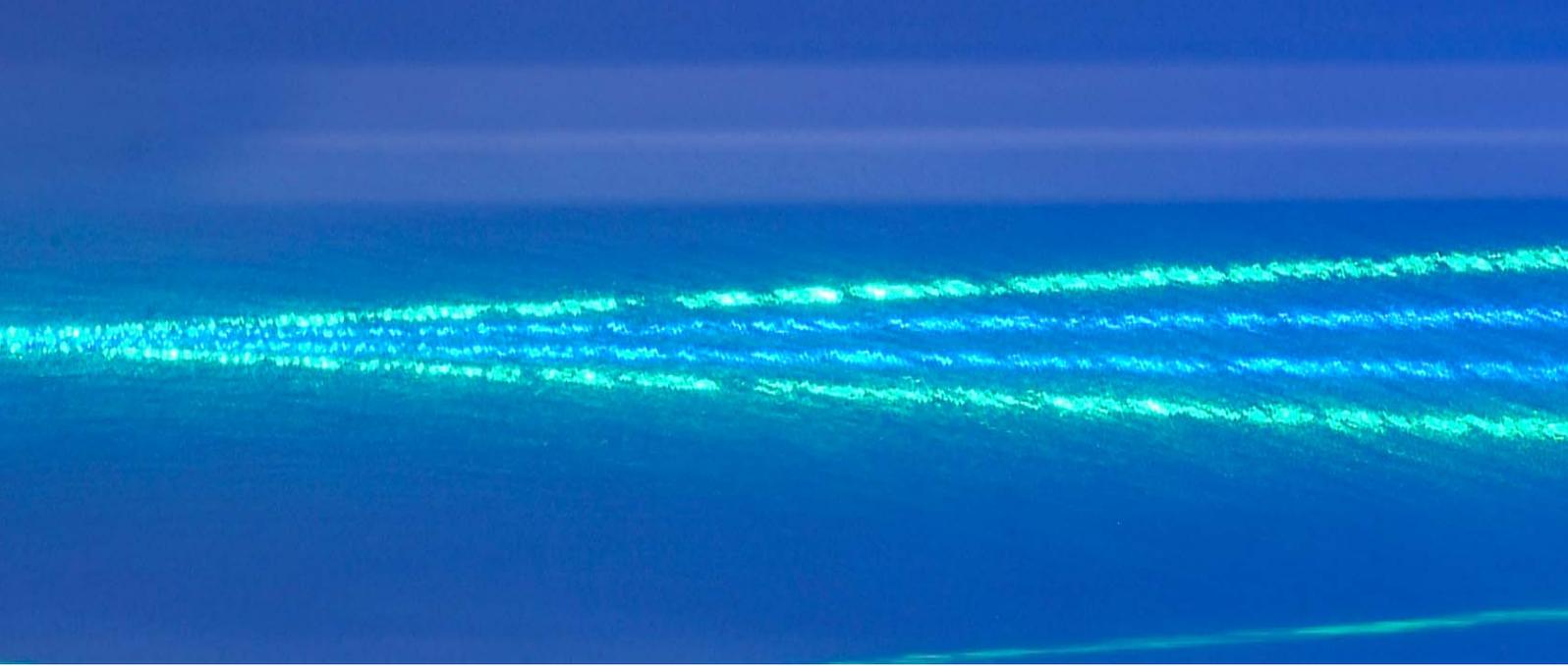
Bringing 'green' and 'performance' together

Used correctly, renewable alternative fuels can increase engine performance – exciting, green performance cars are a reality.

Lotus has proven expertise of enhancing performance using alternative fuels, and we offer a viable and immediate solution for green sports cars. We have created biofuel-compatible engines with flex-fuel calibration that comply with emissions regulations while operating on alcohol or gasoline.

To ensure we have a clear, rational view of the issues surrounding alternative fuels, we are part of a network researching how the supply chain can be implemented. We believe that renewable and alcohol fuels can begin to supplant conventional fossil-based fuel sources.

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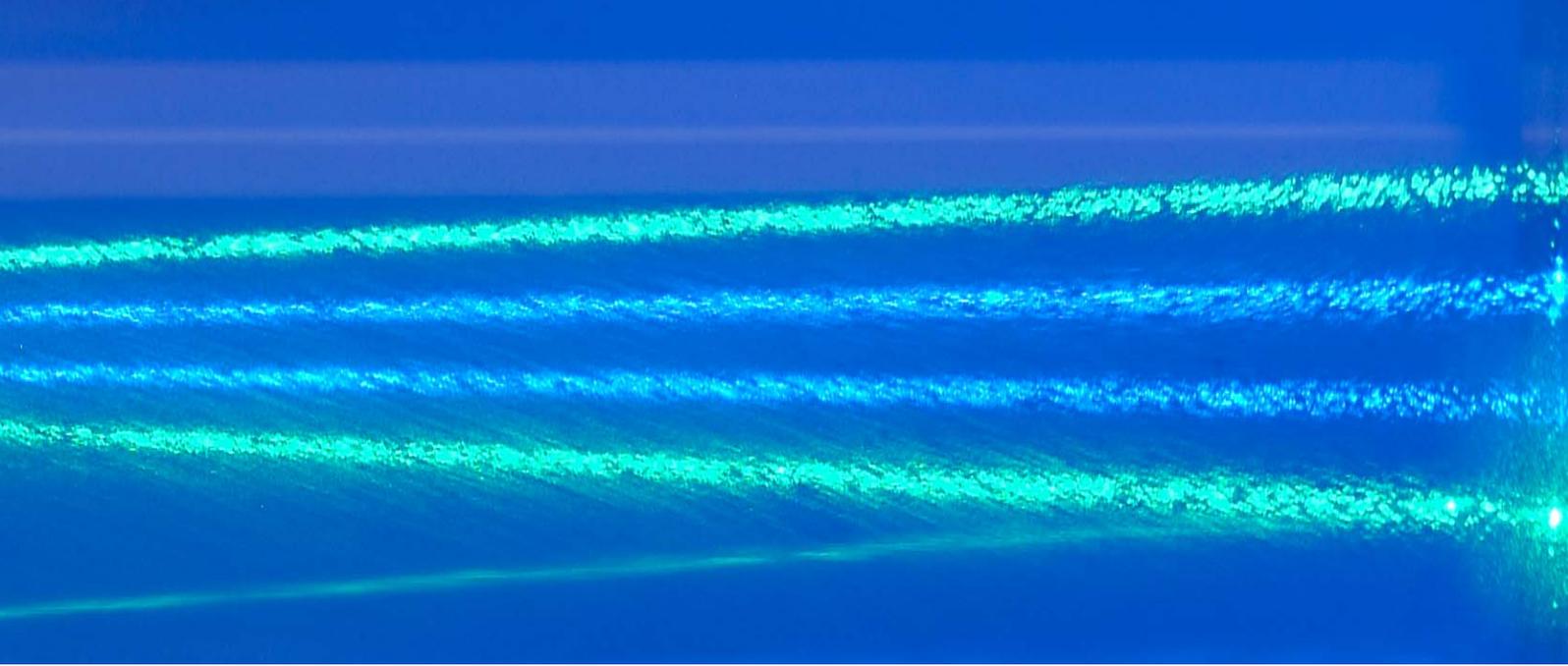


Research that benefits the whole industry

Engine research continues apace at Lotus and it has a direct impact on the research activities of much of the industry. Lotus Active Valve Train (AVT™) systems and optical access research engines are in use at many vehicle manufacturers and universities around the world.

Investigations into concepts including multistage combustion and air hybridisation using fully variable valvetrains will lead to even greater efficiency.

To exploit the advantages of alternative fuels and improved combustion techniques, we are researching truly flex-fuel engine concepts that can run on many different fuels, efficiently and cleanly. It is an important, exciting focus for Lotus as we help shape a greener future.



Optical access research engine lasers

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