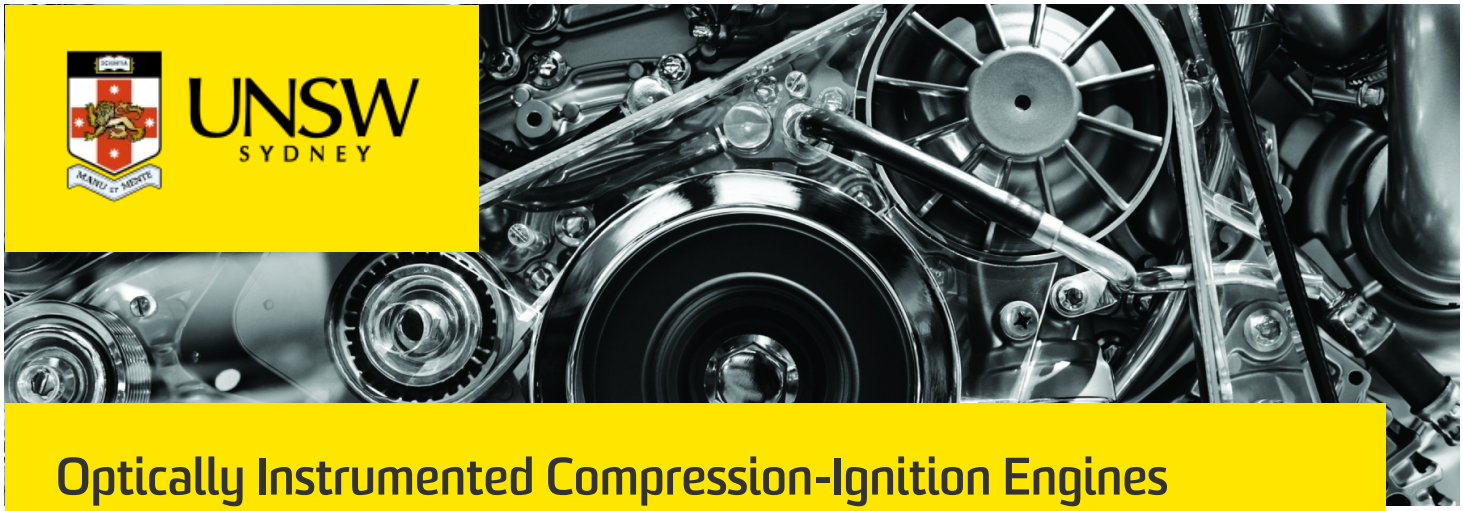

Optically Instrumented Compression-Ignition Engines

Enhancing and optimising propulsion systems for navy fleets, ground vehicles and unmanned aeroplanes capable of running on various fuel types, using optically-accessible compression ignition engines and laser-based two-dimensional imaging of the flames and pollutants inside.

More Information

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Competitive advantage

- Readily available optical CI engines and laser-based imaging techniques/tools
- Full details of in-cylinder phenomena, not guess-and-check through trial-and-error tests
- Images and movies obtained from a running engine at realistic conditions and thus directly relevant to real-world applications

Impact

- Through flame visualisation and air pollution species imaging, fuel injection strategies required for specific fuel types are identified and tested for practical applications. The results achieve extended range and lower infrared signature

Successful applications

- In-cylinder soot distribution imaging of US Office of Naval Research Global's (ONRG)'s biodiesel fuelled CI engines
- Development of soot particle sampling technique for structural analysis in US Army's diesel engines
- Fundamental ignition process and high-temperature reaction visualised in US Army's multi-fuel capable CI engines for UAS propulsion

Capabilities and facilities

- Group 3 (55-1320 lb) and Group 4 (>1320 lbs) CI engines with full optical access
- Dye and Nd:YAG lasers, high-speed intensified CMOS camera, and intensified CCD camera
- Fully trained postdoctoral researchers and postgraduate research students

Our partners

- Vehicle Research Lab, Army Research Laboratory, USA
- US Office of Naval Research Global