

Web-Based Electric Power Frontier Lecture Series

Endowed Chair of Frontier Technology for Electric Energy
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Graduate School of Science and Technology, Kumamoto University

CONTACT <http://www.cs.kumamoto-u.ac.jp/kifu/>

LECTURE TITLE

Directed Energy Systems for Flow and Flight Control

TIME

2014, January 22(Wed.), 7:10am - 8:40am (Glasgow, United Kingdom)
16:10pm - 17:40pm (Japan time)

INSTRUCTOR



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ABSTRACT

Techniques currently used to control the manoeuvrability and trim of high speed vehicles, e.g. deflected canards, flaps and fins, lack responsiveness and a broad control envelope. Another critical design issue for high speed vehicles is flow control of strong-shock interactions which may adversely affect vehicle structural integrity and aerodynamic performance via localised regions of high heat transfer and surface pressure.

Directed energy technologies using lasers, microwaves or their combination can result in dramatic changes in the design of future aerospace vehicles as they have the potential to replace traditional flow and flight control systems and rectify the aforementioned design issues. The expected impact is also major in the many applications areas, e.g. transport technologies, wind tunnel, turbulence and atmospheric research, flow diagnostics, instrumentation, turbo-machinery, aero-acoustics, suppressors and muzzle brakes design, ramjets, gas turbines, pulse detonation engines, scramjets, automobile exhausts.

The lecture will provide an overview followed by a case study where pulsed lasers are used to manipulate Edney IV interactions, to reduce drag, to suppress unsteadiness or to alter the characteristics of shock boundary layer interactions.