

## Gas Turbine Combustion Alternative Fuels And Emissions Third Edition

Offers an understanding of the basic physical, chemical, and aerodynamic processes associated with gas turbine combustion and their relevance and application to combustor performance and design. This book details practical approaches to combustor design for the clean burning of alternative liquid fuels derived from oil shades, tar sands, and coal.

Aviation Fuels provides up-to-date data on fuel effects on combustion performance and use of alternative fuels in aircraft. This book covers the latest advances on aviation fuel technologies, including alternative fuels, feedstocks and manufacturing processes, combustion performance, chemical modeling, fuel systems compatibility and the technical and environmental challenges for implementing the use of alternative fuels for aviation. Aviation fuel and combustion researchers, academics, and program managers for aviation technologies will value this comprehensive overview and summary on the present status of aviation fuels. Presents an overview on all relevant fields of aviation fuels, including production, approval, fuel systems compatibility and combustion (including emissions) Discusses the environmental impacts and carbon footprint of alternative fuels Features a chapter on electric flight and hydrogen powered aircraft and how its implementation will impact the aviation industry

Blending fuels with hydrogen offers the potential to reduce NOx and CO2 emissions in gas turbines, but doing so introduces potential new problems such as flashback. Flashback can lead to thermal overload and destruction of hardware in the turbine engine, with potentially expensive consequences. The little research on flashback that is available is fragmented. Flashback Mechanisms in Lean Premixed Gas Turbine Combustion by Ali Cemal Benim will address not only the overall issue of the flashback phenomenon, but also the issue of fragmented and incomplete research. Presents a coherent review of flame flashback (a classic problem in premixed combustion) and its connection with the growing trend of popularity of more-efficient hydrogen-blend fuels Begins with a brief review of industrial gas turbine combustion technology Covers current environmental and economic motivations for replacing natural gas with hydrogen-blend fuels

Combustion Instabilities in Gas Turbine Engines

Operational Experience, Fundamental Mechanisms and Modeling

Fuel Effects on Operability of Aircraft Gas Turbine Combustors

Gas Turbine Combustion, Fourth Edition

Stationary Gas Turbine Alternative Fuels

**Everything you wanted to know about industrial gas turbines for electric power generation in one source with hard-to-find, hands-on technical information.**

**There has been a remarkable difference in the research and development regarding gas turbine technology for transportation and power generation. The former remains substantially florid and unaltered with respect to the past as the superiority of air-breathing engines compared to other technologies is by far immense. On the other hand, the world of gas turbines (GTs) for power generation is indeed characterized by completely different scenarios in so far as new challenges are coming up in the latest energy trends, where both a reduction in the use of carbon-based fuels and the raising up of renewables are becoming more and more important factors. While being considered a key technology for base-load operations for many years, modern stationary gas turbines are in fact facing the challenge to balance electricity from variable renewables with that from flexible conventional power plants. The book intends in fact to provide an updated picture as well as a perspective view of some of the abovementioned issues that characterize GT technology in the two different applications: aircraft propulsion and stationary power generation. Therefore, the target audience for it involves design, analyst, materials and maintenance engineers. Also manufacturers, researchers and scientists will benefit from the timely and accurate information provided in this volume. The book is organized into three main sections including 10 chapters overall: (i) Gas Turbine and Component Performance, (ii) Gas Turbine Combustion and (iii) Fault Detection in Systems and Materials.**

**Industrial Gas Turbines: Performance and Operability** explains important aspects of gas turbine performance such as performance deterioration, service life and engine emissions. Traditionally, gas turbine performance has been taught from a design perspective with insufficient attention paid to the operational issues of a specific site. Operators are not always sufficiently familiar with engine performance issues to resolve operational problems and optimise performance. **Industrial Gas Turbines: Performance and Operability** discusses the key factors determining the performance of compressors, turbines, combustion and engine controls. **An accompanying engine simulator CD** illustrates gas turbine performance from the perspective of the operator, building on the concepts discussed in the text. The simulator is effectively a virtual engine and can be subjected to operating conditions that would be dangerous and damaging to an engine in real-life conditions. It also deals with issues of engine deterioration, emissions and turbine life. The combined use of text and simulators is designed to allow the reader to better understand and optimise gas turbine operation. **Discusses the key factors in determining the performance of compressors, turbines, combustion and engine controls Explains important aspects of gas and turbine performance such as service life and engine emissions Accompanied by CD illustrating gas turbine performance, building on the concepts discussed in the text**

**Gas Turbine Emissions**

**Performance and Operability**

**Production, Usage and Impact of Biofuels**

**Advanced Combustion and Aerothermal Technologies**

**Technology and Control**

*Gas turbine engines will still represent a key technology in the next 20-year energy scenarios, either in stand-alone applications or in combination with other power generation equipment. This book intends in fact to provide an updated picture as well as a perspective vision of some of the major improvements that characterize the gas turbine technology in different applications, from marine and aircraft propulsion to industrial and stationary power generation. Therefore, the target audience for it involves design, analyst, materials and maintenance engineers. Also manufacturers, researchers and scientists will benefit from the timely and accurate information provided in this volume. The book is organized into five main sections including 21 chapters overall: (I) Aero and Marine Gas Turbines, (II) Gas Turbine Systems, (III) Heat Transfer, (IV) Combustion and (V) Materials and Fabrication.*

*Biojet fuels have the potential to make an important contribution towards decarbonising the aviation sector. Biojet Fuel in Aviation Applications: Production, Usage and Impact of Biofuels covers all aspects of this sustainable aviation fuel including aviation biofuel public policies, production technologies, physico-chemical properties, combustion performances, techno-economics of sustainable fuel production, sustainability and energywater-food (EWF) nexus. This must-have book also charts the current state of the industry by discussing the relevant industry players who are currently producing alternative aviation fuels and flight tests, while also providing a glimpse of the future of the industry. This comprehensive book is written for undergraduate students, postgraduate students, researchers, engineers and policy makers wanting to build up knowledge in the specific area of biojet fuel or the broader fields of sustainable energy and aeronautics. Reviews major aviation and biojet fuel policies, legislations, initiatives and roadmaps around the world Features existing and emerging biojet fuel production pathways from various feedstocks Highlights the key properties of biojet fuels that ensures inter-operability with conventional jet aviation fuel Discusses the economic aspects of the biojet fuel industry and the barriers preventing its commercialisation Examines the sustainability of biojet fuel from a life cycle assessment, energy balance and EWF nexus point of views*

*This revised edition provides understanding of the basic physical, chemical, and aerodynamic processes associated with gas turbine combustion and their relevance and application to combustor performance and design. It also introduces the many new concepts for ultra-low emissions combustors, and new advances in fuel preparation and liner wall-cooling techniques for their success. It details advanced and practical approaches to combustor design for the clean burning of alternative liquid fuels derived from oil shades, tar sands, and coal. Additional topics include diffusers, combustion performance fuel injection, combustion noise, heat transfer, and emissions.*

*Gas Turbine Combustor Design Problems*

*Lean Combustion*

*Gas Turbine Combustion*

*Flashback Mechanisms in Lean Premixed Gas Turbine Combustion*

In summarizing the results obtained in the first five years of the National Jet Fuel Combustion Program (NJFCP), this book demonstrates that there is still much to be learned about the combustion of alternative jet fuels.

Comprehensive text on renewable fuels- key to a net-zero carbon future. Detailing how they are made and used, including case-studies.

Leadership in gas turbine technologies is of continuing importance as the value of gas turbine production is projected to grow substantially by 2030 and beyond. Power generation, aviation, and the oil and gas industries rely on advanced technologies for gas turbines. Market trends including world demographics, energy security and resilience, decarbonization, and customer profiles are rapidly changing and influencing the future of these industries and gas turbine technologies. Technology trends that define the technological environment in which gas turbine research and development will take place are also changing - including inexpensive, large scale computational capabilities, highly autonomous systems, additive manufacturing, and cybersecurity. It is important to evaluate how these changes influence the gas turbine industry and how to manage these changes moving forward. Advanced Technologies for Gas Turbines identifies high-priority opportunities for improving and creating advanced technologies that can be introduced into the design and manufacture of gas turbines to enhance their performance. The goals of this report are to assess the 2030 gas turbine global landscape via analysis of global leadership, market trends, and technology trends that impact gas turbine applications, develop a prioritization process, define high-priority research goals, identify high-priority research areas and topics to achieve the specified goals, and direct future research. Findings and recommendations from this report are important in guiding research within the gas turbine industry and advancing electrical power generation, commercial and military aviation, and oil and gas production.

A Symposium

Gas Turbine Engineering Handbook

Progress in Gas Turbine Performance

High Efficiency, Low Emission, Fuel Flexible Power Generation

Aircraft Propulsion and Gas Turbine Engines

A significant addition to the literature on gas turbine technology, the second edition of Gas Turbine Performance is a lengthy text covering product advances and technological developments. Including extensive figures, charts, tables and formulae, this book will interest everyone concerned with gas turbine technology, whether they are designers, marketing staff or users.

Techno-Economic Challenges of Green Ammonia as an Energy Vector presents the fundamentals, techno-economic challenges, applications, and state-of-the-art research in using green ammonia as a route toward the hydrogen economy. This book presents practical implications and case studies of a great variety of methods to recover stored energy from ammonia and use it for power, along with transport and heating applications, including its production, storage, transportation, regulations, public perception, and safety aspects. As a unique reference in this field, this book can be used both as a handbook by researchers and a source of background knowledge by graduate students developing technologies in the fields of hydrogen economy, hydrogen energy, and energy storage. Includes glossaries, case studies, practical concepts, and legal, public perception, and policy viewpoints that allow for thorough, practical understanding of the use of ammonia as energy carrier Presents its content in a modular structure that can be used in sequence, as a handbook, in individual parts or as a field reference Explores the use of ammonia, both as a medium for hydrogen storage and an energy vector unto itself

Improved gas turbine combustion performance will require the effective utilization of alternative fuels and advanced combustor concepts. Further understanding of spray combustion processes including fuel evaporation and flame propagation is required. Research is underway which features a high pressure and temperature non-vitiated air system to provide air at simulated gas turbine inlet conditions. A special fuel injection system was designed to produce monodisperse sprays for the purpose of evaporation and eventual combustion experiments in our newly developed test facility. This report represents a summary of the engineering activities during the first year (of a two year contract) which was focused on the construction of a combustion test facility in which the evaporation and burning rates of jet fuels can be measured as a function of inlet conditions and fuel properties. A large heat exchanger facility which supports this research can deliver continuously non-vitiated air at flowrates up to 1 kg/sec and 600 kPa at temperatures from 300 to 900K. Details of the evaporation/combustion test section are described. Also included are the design of the fuel injection system and test results of the injector showing monodisperse sprays with drop diameters of approx. 70 micrometers.

Commercial Aircraft Propulsion and Energy Systems Research

Atomization and Sprays

Research Test Facility for Evaporation and Combustion of Alternative Jet Fuels at High Air Temperatures

Industrial Gas Turbines

Gas Turbine Performance

Lean Combustion: Technology and Control, Second Edition outlines and explains the latest advances in lean combustion technology and systems. Combustion under sufficiently fuel-lean conditions can have the desirable attributes of high efficiency and low emissions. The book offers readers both the fundamentals and latest developments in how lean burn (broadly defined) can increase fuel economy and decrease emissions, while still achieving desired power output and performance. This volume brings together research and design of lean combustion systems across the technology spectrum in order to explore the state-of-the-art in lean combustion. Readers will learn about advances in the understanding of ultra-lean fuel mixtures and how new types of burners and approaches to managing heat flow can reduce problems often found with lean combustion (such as slow, difficult ignition and frequent flame extinction). This book offers abundant references and examples of real-world applications. New to this edition are significantly revised chapters on IC engines and stability/oscillations, and new case studies and examples. Written by a team of experts, this contributed reference book aims to teach its reader to maximize efficiency and minimize both economic and environmental costs. Presents a comprehensive collection of lean burn technology across potential applications, allowing readers to compare and contrast similarities and differences Provides an extensive update on IC engines including compression ignition (diesel), spark ignition, and homogeneous charge compression ignition (HCCI) Includes an extensive revision to the Stability/Oscillations chapter Includes use of alternative fuels such as biogas and hydrogen for relevant technologies Covers new developments in lean combustion using high levels of pre-heat and heat recirculating burners, as well as the active control of lean combustion instabilities

Aircraft Propulsion and Gas Turbine Engines, Second Edition builds upon the success of the book ' s first edition, with the addition of three major topic areas: Piston Engines with integrated propeller coverage; Pump Technologies; and Rocket Propulsion. The rocket propulsion section extends the text ' s coverage so that both Aerospace and Aeronautical topics can be studied and compared. Numerous updates have been made to reflect the latest advances in turbine engines, fuels, and combustion. The text is now divided into three parts, the first two devoted to air breathing engines, and the third covering non-air breathing or rocket engines.

Modern gas turbine power plants represent one of the most efficient and economic conventional power generation technologies suitable for large-scale and smaller scale applications. Alongside this, gas turbine systems operate with low emissions and are more flexible in their operational characteristics than other large-scale generation units such as steam cycle plants. Gas turbines are unrivalled in their superior power density (power-to-weight) and are thus the prime choice for industrial applications where size and weight matter the most. Developments in the field look to improve on this performance, aiming at higher efficiency generation, lower emission systems and more fuel-flexible operation to utilise lower-grade gases, liquid fuels, and gasified solid fuels/biomass. Modern gas turbine systems provides a comprehensive review of gas turbine science and engineering. The first part of the book provides an overview of gas turbine types, applications and cycles. Part two moves on to explore major components of modern gas turbine systems including compressors, combustors and turbogenerators. Finally, the operation and maintenance of modern gas turbine systems is discussed in part three. The section includes chapters on performance issues and modelling, the maintenance and repair of components and fuel flexibility. Modern gas turbine systems is a technical resource for power plant operators, industrial engineers working with gas turbine power plants and researchers, scientists and students interested in the field. Provides a comprehensive review of gas turbine systems and fundamentals of a cycle Examines the major components of modern systems, including compressors, combustors and turbines Discusses the operation and maintenance of component parts

Compatibility of Alternative Fuels with Advanced Automotive Gas Turbine and Stirling Engines. A Literature Survey

Biojet Fuel in Aviation Applications

Advances in Gas Turbine Technology

Renewable Fuels

Gas Turbines for Electric Power Generation

The development of alternative liquid fuels has shifted from fuels such as ethanol and biodiesel, which are often created from food sources, to more advanced feedstocks, such as Algae, and synthetic fuels, such as Fischer-Tropsch diesel and other "renewable" fuels. This study was designed to characterize the physical combustion performance of ethanol, biodiesel, and an algae-derived "Hydrotreated Renewable Diesel." The physical properties of the fuels were characterized in order to describe the atomization behavior. In addition, Gas Chromatography/Mass Spectrometry provided insight into the chemical composition of each fuel. A swirl-stabilized research combustor was used to conduct experiments to simulate gas turbine combustion, and emissions and lean stability limits were measured. At cold-flow conditions, ensemble laser diffraction provided measurements of atomization characteristics, and high-speed cinematography provided additional insight. Most of the fuels had similar atomization characteristics, despite having a wide range of physical properties, which is attributed to the atomization strategy used in this work. However, biodiesel did exhibit larger droplets (5 microns larger on average), indicating that viscosity does have some effect on prompt atomization. Due to the nature of its production, the Hydrotreated Renewable Diesel performed similar to the conventional petroleum fuels, suggesting a high degree of interchangeability with conventional fuels. Ethanol, with the highest oxygen content, and the lowest heating value produced the lowest NOx emissions. Among the fuels examined, differences in emissions were attributed to differences in the evaporation and chemical behavior; with alternative fuels showing benefit over the

conventional fuel.

Gas Turbine CombustionAlternative Fuels and Emissions, Third EditionCRC Press

Modern societies require energy systems to provide energy for cooking, heating, transport, and materials processing, as well as for electricity generation. Energy systems include the primary fuel, its conversion, and transport to the point of use. In many cases this primary fuel is still a fossil fuel, a one-use resource derived from a finite supply within our planet, causing considerable damage to the environment. After 300 years of increasing reliance on fossil fuels, particularly coal, it is becoming ever clearer that the present energy systems need to change. In this Very Short Introduction Nick Jenkins explores our historic investment in the exploitation of fossil energy resources and their current importance, and discusses the implications of our increasing rate of energy use. He considers the widespread acceptance by scientists and policy makers that our energy systems must reduce emissions of CO2 and other greenhouse gases, and looks forward to the radical changes in fuel technology that will be necessary to continue to provide energy supplies in a sustainable manner, and extend access across the developing world. Considering the impact of changing to an environmentally benign and low-carbon energy system, Jenkins also looks at future low-carbon energy systems which would use electricity from a variety of renewable energy sources, as well as the role of nuclear power in our energy use. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

The Influence of Alternative Fuel Composition on Gas Turbine Combustion Performance

Reducing Global Carbon Emissions

Alternative Fuels and Emissions, Third Edition

Environmental Protection and Pollution Reductions

Energy Systems

*The primary human activities that release carbon dioxide (CO2) into the atmosphere are the combustion of fossil fuels (coal, natural gas, and oil) to generate electricity, the provision of energy for transportation, and as a consequence of some industrial processes. Although aviation CO2 emissions only make up approximately 2.0 to 2.5 percent of total global annual CO2 emissions, research to reduce CO2 emissions is urgent because (1) such reductions may be legislated even as commercial air travel grows, (2) because it takes new technology a long time to propagate into and through the aviation fleet, and (3) because of the ongoing impact of global CO2 emissions. Commercial Aircraft Propulsion and Energy Systems Research develops a national research agenda for reducing CO2 emissions from commercial aviation. This report focuses on propulsion and energy technologies for reducing carbon emissions from large, commercial aircraft— single-aisle and twin-aisle aircraft that carry 100 or more passengers—because such aircraft account for more than 90 percent of global emissions from commercial aircraft. Moreover, while smaller aircraft also emit CO2, they make only a minor contribution to global emissions, and many technologies that reduce CO2 emissions for large aircraft also apply to smaller aircraft. As commercial aviation continues to grow in terms of revenue-passenger miles and cargo ton miles, CO2 emissions are expected to increase. To reduce the contribution of aviation to climate change, it is essential to improve the effectiveness of ongoing efforts to reduce emissions and initiate research into new approaches.*

*Reflecting the developments in gas turbine combustion technology that have occurred in the last decade, Gas Turbine Combustion: Alternative Fuels and Emissions, Third Edition provides an up-to-date design manual and research reference on the design, manufacture, and operation of gas turbine combustors in applications ranging from aeronautical to power generation. Essentially self-contained, the book only requires a moderate amount of prior knowledge of physics and chemistry. In response to the fluctuating cost and environmental effects of petroleum fuel, this third edition includes a new chapter on alternative fuels. This chapter presents the physical and chemical properties of conventional (petroleum-based) liquid and gaseous fuels for gas turbines; reviews the properties of alternative (synthetic) fuels and conventional-alternative fuel blends; and describes the influence of these different fuels and their blends on combustor performance, design, and emissions. It also discusses the special requirements of aircraft fuels and the problems encountered with fuels for industrial gas turbines. In the updated chapter on emissions, the authors highlight the quest for higher fuel efficiency and reducing carbon dioxide emissions as well as the regulations involved. Continuing to offer detailed coverage of multifuel capabilities, flame flashback, high off-design combustion efficiency, and liner failure studies, this best-selling book is the premier guide to gas turbine combustion technology. This edition retains the style that made its predecessors so popular while updating the material to reflect the technology of the twenty-first century.*

*Lower pollutant emissions and broader multifuel flexibility are driving forces for advancing aircraft, vehicular, and industrial engine performance and versatility. Both are inherently connected with the design of the fuel injector and combustor system. The traditional concerns, improving durability and fuel economy over the life of the engine, remain additional requirements.\*\*This volume offers a comprehensive treatment of modern practice aimed both at those in the field and newcomers interested in research and development for gas turbine combustors. Detailed description and assessment of a range of combustor design models and methods\*\*Specification and evolution of fuels and fuel injectors\*\*System models for fuel effects on engines and airframes\*\*Evaluation of laser-based measurement techniques for combustor flow field studies*

Modern Gas Turbine Systems

Techno-Economic Challenges of Green Ammonia as an Energy Vector

GAS Turbine Combustion, Second Edition

Chemical Energy Resources

Advanced Technologies for Gas Turbines

**The Gas Turbine Engineering Handbook has been the standard for engineers involved in the design, selection, and operation of gas turbines. This revision includes new case histories, the latest techniques, and new designs to comply with recently passed legislation. By keeping the book up to date with new, emerging topics, Boyce ensures that this book will remain the standard and most widely used book in this field. The new Third Edition of the Gas Turbine Engineering Hand Book updates the book to cover the new generation of Advanced gas Turbines. It examines the benefit and some of the major problems that have been encountered by these new turbines. The book keeps abreast of the environmental changes and the industries answer to these new regulations. A new chapter on case histories has been added to enable the engineer in the field to keep abreast of problems that are being encountered and the solutions that have resulted in solving them. Comprehensive treatment of Gas Turbines from Design to Operation and Maintenance. In depth treatment of Compressors with emphasis on surge, rotating stall, and choke; Combustors with emphasis on Dry Low NOx Combustors; and Turbines with emphasis on Metallurgy and new cooling schemes. An excellent introductory book for the student and field engineers A special maintenance section dealing with the advanced gas turbines, and special diagnostic charts have been provided that will enable the reader to troubleshoot problems he encounters in the field The third edition consists of many Case Histories of Gas Turbine problems. This should enable the field engineer to avoid some of these same generic problems Higher operating efficiencies, fewer pollutant emissions, and low capital investment have made gas turbines a dominant technology for new power generating capacity in the U.S. and worldwide. This book offers gas turbine users and manufacturers a valuable resource to help them sort through issues associated with combustion instabilities. In the last ten years, substantial efforts have been made in the industrial, governmental, and academic communities to understand the unique issues associated with combustion instabilities in low-emission gas turbines. The objective of this book is to compile these results into a series of chapters that address the various facets of the problem. The Case Studies section speaks to specific manufacturer and user experiences with combustion instabilities in the development stage and in fielded turbine engines. The book then goes on to examine The Fundamental Mechanisms, The Combustor Modeling, and Control Approaches.**

**The development of clean, sustainable energy systems is a preeminent issue in our time. Gas turbines will continue to be important combustion-based energy conversion devices for many decades to come, used for aircraft propulsion, ground-based power generation, and mechanical-drive applications. This book compiles the key scientific and technological knowledge associated with gas turbine emissions into a single authoritative source.**

**Design of Modern Turbine Combustors**

**Alternative Fuels**

**Experimental Investigation of Physical Combustion Characteristics for Alternative Liquid Fuels**

**Aviation Fuels**

**New and Renewable Energy Technologies for Sustainable Development**

The second edition of this long-time bestseller provides a framework for designing and understanding sprays for a wide array of engineering applications. The text contains correlations and design tools that can be easily understood and used in relating the design of atomizers to the resulting spray behavior. Written to be accessible to readers with a modest technical background, the emphasis is on application rather than in-depth theory. Numerous examples are provided to serve as starting points for using the information in the book. Overall, this is a thoroughly updated edition that still retains the practical focus and readability of the original work by Arthur Lefebvre.

The International Conference on New and Renewable Energy Technologies for Sustainable Development held in Ponta Delgada, Azores (2002), Portugal, has provided technology specialists and hardware developers with the opportunity to discuss, review and demonstrate the research directions, the design methodologies, and the production techniques leading to cost- effective energy technologies for sustainable development. This dialog provides the context for more detailed technical presentations and panel discussions on energy systems, renewable resource exploitation, and the engineering design and optimisation for minimum resource consumption. The papers included in this volume are selected from those presented at the conference reflecting to present the state-of-the-art developments in the field. The selection of papers presented in this volume has enlightened various fields of scientific and economic development which should merge efforts in the understanding of the sustainable development concept and technological implications. The book will be of particular interest to engineering practitioners, product developers, researchers, and also economists, political scientists and government administrators exploring the multifaceted relationship between renewable energy technologies and sustainable development. Keynote lectures frame the technical and policy issues confronting the sustainable development movement and enrich the dialog between various segments of the community.

Here readers will find a summary of proceedings at a highly important NATO workshop. The ARW Advanced Combustion and Aerothermal Technologies: Environmental Protection and Pollution Reductions, was held in Kiev, May 2006. The workshop was co-directed by Profs. N. Syred and A.Khalatov, winners of the NATO Scientific Prize 2002, and was organized by the Institute of Thermophysics (Ukraine) and Cardiff University, UK. The primary workshop objective was to assess the existing knowledge on advanced combustion and aerothermal technologies providing reduced environmental impact.