**AIR WARFARE**

**History, Theory and Practice**  
By P Gray


**AIR POWER**

**A Global History**  
By J Black


There are currently many books and accounts about air power available. Dr Peter Gray's book goes much further than all of them. It accurately describes itself as a textbook. It draws upon an impressively large number of sources and bibliography to offer the student a series of detailed discussions on various aspects of the subject. It covers in some depth air power's evolution, history, theory and practise. It looks at the political and legal aspects, the ethics and morality of air campaigns over the decades, reviews the huge body of literature on the subject, looks at many of the influential leaders and practitioners over the years, such as Mitchell, Douhet, Trenchard and Portal and discusses how to study and write about it.

It also features case histories at the end of each chapter, dealing in depth with subjects such as the Allied bomber operations of WW2 and the NATO air campaign Operation Allied Force against Milosevic in 1999 over the fate of Kosovo.

The in-depth analysis of various aspects of the subject might make the book a bit hard going for the average enthusiast but it is nevertheless a highly recommended read for academics, students and practitioners of air power alike.

Jeremy Black's book provides a highly-detailed account of air power, its achievements and shortcomings, in the 20th and 21st centuries. Described as one of the foremost scholars of military history, Jeremy Black's book provides a highly-detailed account of air power, its achievements and shortcomings, in the 20th and 21st centuries. It tackles the subject in chronological chapters and every page is packed with information. There is ample evidence of much research and a broad knowledge of air power from its earliest beginnings to the present day.

One point of order though; it is claimed by one reviewer as the go-to book for air power studies. In fact it is only one of a number of books dealing with the subject published in recent years. That said, Jeremy Black gives a detailed analysis of air power in the two World Wars and in a host of regional and counter-insurgency conflicts stretching back from the present time to the 1920s and 1930s. The book is to be praised, in particular for giving equal attention to both the more traditional debates, such as strategic bombing and aircraft carriers vs battleships and to managerial, doctrinal and technological aspects. For example, there are chapters on airlift, aircraft procurement and logistics, subjects that are frequently overlooked in other studies. There are the seemingly inevitable minor errors, such as saying the P-47 Thunderbolt entered service in 1944, when it actually appeared in 1942 and began flying combat missions from UK in spring 1943 (p 132).

Nevertheless, the book comprehensively covers the record of military aviation's contribution to victory in a number of conflicts. It also makes the point that, especially with the recent record of wars in the Middle East and Afghanistan, including today's prevailing political and military turmoil in Iraq, Libya and Syria, governments would do well to exercise caution before adopting the mantra that air power alone can win today's and tomorrow's conflicts.

Mike Bratby
MRAeS
De Havilland Comet 1949-97 (All Marks)

An insight into the design, construction and operation of the world’s first jet airliner
By B Rivas


This book is about the ‘design, construction and operation’ of the world’s first jetliner, BOAC’s Comet written by an expert in British jets and manufacturer de Havilland Aircraft Company. However, the Comet story is much more than a engineering manual; the Comet was a national icon, launched in 1952 by a young Queen Elizabeth and supported by an aging Prime Minister Churchill, hopeful that these sleek, shining passenger jets would be a lucrative export, saving the country from its considerable war debts and giving hope to a war weary public still enduring food rations.

The Comet was a remarkable achievement by Britain’s largest employer, the government-sponsored aviation industry which launched the jet age years ahead of American competitors, despite a huge disparity in available resources. In the event three major crashes in its first two years of service, grounded the Comets, allowing the tardy Americans to eventually take over the jet age starting with Boeing’s bigger 707’s and rival Douglas DC-8 jets.

This latest book about the Comet is written for a specific audience of aviation specialists, targeted by the title Owners’ Workshop Manual. It reads like a manual, with lists of parts and electronic features, description of production methods and schematics, lots of lists, including passenger manifests. What’s missing is an organised, coherent narrative, providing context and clarity to a general audience.

The book includes chapters that silo subjects with what reads like unfinished paragraphs. Descriptions of the Comet’s design and production acknowledge what would become fatal flaws with incomplete phrases, describing the punch rivets around window cutouts as “having far-reaching consequences that were unforeseen.” That kind of descriptions raises more questions than answers, answers found way later in the book. For example, the explanation of how these rivet holes in the Comet’s fuselage became a source of cracks from metal fatigue comes more than 70 pages after its initial mention. The example also ignores the larger issue of how design teams don’t always collaborate with production shop workers, just as Rivas aptly points out a lack of co-ordination between conflicting pilots’ training manuals or different types of stress tests done by the manufacturer and the Royal Aircraft Establishment (RAE) experts. It was all so new then for a jet which went from drawing board to passenger service so quickly.

The most compelling writing in this book is about the mysterious crashes of the British wonder jet, crashes which killed 78 people and prompted another number of firsts, this time concerning insights into an independent crash investigation beyond relying on the modifications by manufacturers. The innovations behind the Comet and crash investigations should be recognised by a much broader audience, as the passenger jet truly transformed the now flying public and kick-started globalisation. This book addresses the hows of building, flying and testing the Comet but not the bigger story of the whys and the whats which would coherently explain to general readers about one of the most transforming inventions of the 20th century passenger jet travel.

Susan Walker
Associate Professor of Journalism
Boston University
[Granddaughter of Major Frank Halford, inventor of the de Havilland Ghost engines used in the first Comets]
Progress in Aeronautics and Astronautics Vol 252
By J Hsu and R Curran

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Advances in Systems Engineering is a well-presented series of distinct but related papers around the theme of systems engineering and systems of systems integration (SOSI). It seeks to address the many challenges and implications of complex modern engineering systems through a collection of processes, models and cases of application within the field of aeron and astronautics, thus allowing the reader to grasp the complexities surrounding systems implementation.

The opening chapter provides succinct definitions, characteristics and comparisons between systems, systems of systems (SOS) and SOSI – including the many challenges, concerns, influences, and implications of these. SOS interoperability is a point in case, where the difficulties and consequences of not getting it right are highlighted, as well as routes to how it can be achieved. The definitions, challenges and requirements relating to SOS and SOSI are easily understood by a non-technical audience.

Chapter 2 adopts a socio-technical perspective of systems emphasising the importance of the behavioural (economic, human and social) impact affecting system performance. The chapter introduces the reader to the origins of socio-technical systems research from the end of the 19th century to the present day, culminating with the influence of social media. A substantive discussion on furthering the systems engineering and lean program management in the light of costly defence programmes with extended development lead times and schedules. The findings from two comprehensive studies in Lean systems engineering (LSE) and Lean Programme Management (LPM) are summarised in the form of enablers for systems engineering and program management. Arguments against outsourcing and subcontracting are voiced in terms of diminishing efficiency, as in the example case of the Boeing 787.

The final chapter provides a solid overview of lean systems engineering and lean program management in the light of costly defence programmes with extended development lead times and schedules. The findings from two comprehensive studies in Lean systems engineering (LSE) and Lean Programme Management (LPM) are summarised in the form of enablers for systems engineering and program management. Arguments against outsourcing and subcontracting are voiced in terms of diminishing efficiency, as in the example case of the Boeing 787.

The six chapters of Advances in Systems Engineering achieve the editor's objectives of communicating specific advances in the field of systems engineering. The nine years work in preparing this book will pay off. Smart manufacturing systems are becoming system of systems due to the growth of different technologies and processes involved in today's industrial sectors. Industrialists are further challenged by the business needs to deliver product lines and not just items of production. The rise of innovative methods of production has significantly changed the production sectors. A similar trend has also been identified in production line engineering (PLE) in which system attributes such as quality of service (QoS) do not stack up linearly when legacy systems are combined architecturally differently.

The development of multidisciplinary methods for complex system design and analysis is of major importance to the worldwide community of system engineers. With this book the systems engineering community will benefit from technical methods for enhancing data management and exploitation and from the improved method for cross disciplinary collaboration with a variety of stakeholders. This book is a good example of using and improving existing tools and technologies to facilitate the multidisciplinary study, which will stimulate the development of new applications in various areas of the system engineering.

**With this book the systems engineering community will benefit from technical methods for enhancing data management and exploitation**

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**Dr Susan Grant**
Brunel University

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**Fire prevention, aviation, rail and power distribution.**

Chapter 4 is a substantial discourse on the model-based systems engineering MBSE approach to systems engineering. The potential of the MBSE approach and the systems modelling language SysML are highlighted prior to the detailed steps in the application of the MBSE approach to the design of a small spacecraft are presented. An objective of the chapter is to demonstrate the mechanics of the MBSE approach and its added value over the use of traditional document approaches.

The penultimate chapter revisits complexity and challenges involved in system of systems integration, in modern aircraft today. The authors present a mix of quantitative and qualitative methodologies which convincingly may allow designers and decision makers to reach a meaningful way to trade technology infusion with design requirements of modern aircraft.

The potential of the MBSE approach and MBSE approach to the design of a small spacecraft are presented. An objective of the chapter is to demonstrate the mechanics of the MBSE approach and its added value over the use of traditional document approaches.