CAS’ Reading List 2015
Front cover image:
Painting titled 'The Battle of Britain' by Paul Nash (1889-1946). An abstracted aerial view of a wide flat landscape including the mouth of a river. Above the sky is full of aircraft contrails and smoke plumes, while to the upper right aircraft are flying in formation. From a series of paintings commissioned by the Air Ministry during World War II. (Dated 1941)
Photograph Courtesy of Wikimedia.
Foreword

Welcome to my Reading List for 2015. This Reading List comes to you at the midway point on the road to Future Force 2020, whose roadmap was borne out of the Strategic Defence and Security Review of 2010, and will now be refined by the recently announced review of 2015. The RAF has been defined over the last 5 years by operations and transformation, much as it has been since 1990 when a backdrop of global instability and emerging threats to the UK’s national interests formed after the end of the Cold War. This has generated multi-faceted problems requiring our Service to meet numerous and diverse global challenges, often at a moment’s notice.

In doing so, we have demonstrated our agility and readiness as a Service, and our value to the nation. The RAF has led NATO air operations in support of the Libyan people, taken a prominent role in the multinational coalition in Iraq against so-called Islamic State and provided air power to assist numerous humanitarian and disaster relief operations including in the Philippines, Nepal and at home in the UK. Working closely with our strategic partners, the RAF has also supported French operations in Mali and Central African Republic, made a significant contribution to NATO’s air policing mission over the Baltic States and provided the Air Security Plan for the successful London Olympics in 2012. All has been achieved while delivering our four core air and space power roles in support of the International Security Assistance Force mission in Afghanistan.

The RAF of today therefore, as it has done since its inception almost one hundred years ago, continues to play a leading role in the delivery of air power. But to remain relevant in the future, we must ensure that our investment in the Physical and Moral Components of Fighting Power is matched by that in our Conceptual Component. Since 1918, it has been our “thought leadership” in the air environment that has been fundamental to the RAF’s success as the custodians of UK air power. This must not change as we go forward, for it is our expertise in this thinking that allows us to provide credible and affordable choices to the nation in times of crisis and assist our partners and allies, who continue to value our ideas, experience and air power expertise. We must never stop learning, actively seeking out the views of others if we are to retain professional mastery of our environment. I therefore commend this Reading List to you as a good starting point to develop your professional understanding. For it is from here that the new generation of equipment we are putting in place will be turned into battle-winning capabilities by the people of the RAF.

This year’s shortlist starts with two titles on people and leadership, before moving on to a recent historical analysis of Gulf War One as well as honest reflections on the West’s performance in Gulf War Two and Afghanistan. The list then offers an examination of the strategic use of air power by Colonel John Olsen in Air Power Reborn, before a wider look at statecraft and strategy by the venerable Henry Kissinger. The Reading List concludes with a look to the future, with three titles which examine the challenges of the Future Operating Environment, cybersecurity and space.
Taking the time to think about the future of air power and where we are going as an air force is vital if we are to maximise our contribution to the UK’s defence and security and the rules-based international system which is at the heart of our nation’s prosperity. Doing so will engender adaptability, creativity and resilience in how we do our business and meet the challenges that this second century of air power will no doubt offer. As ever, the books here have been carefully selected to offer depth, breadth, insight and interest. I challenge each of you – regular, reserve, civil servant and contractors of the RAF Whole Force and beyond – to read at least a small selection of these titles as there is undoubtedly something in here for everyone.

Air Chief Marshal Sir Andrew Pulford KCB CBE ADC RAF
Chief of the Air Staff

Image opposite:
WAAF plotters pictured at work in the underground Operations Room at HQ Fighter Command, Bentley Priory, in north-west London, as senior officers study the unfolding events from the viewing deck above.
UK Crown Copyright / MOD. Courtesy of Air Historical Branch (Royal Air Force).
Contents

Thinking Fast and Slow 2

Wind in the Wires 4

Why We Lost - A General’s Inside Account of the Iraq and Afghanistan Wars 6

The Unseen War: Allied Air Power and the Takedown of Saddam Hussein 8

High Command: British Military Leadership in the Iraq and Afghanistan Wars 11

World Order: Reflections on the Character of Nations and the Course of History 13

Airpower Reborn: The Strategic Concepts of John Warden and John Boyd 15

Strategy and Defence Planning: Meeting the Challenge of Uncertainty 17

Cybersecurity and Cyberwar: What Everyone Needs to Know 20

It’s Only Rocket Science: An Introduction in Plain English 22

Contents of CAS’ Reading List 2011 25

Contents of CAS’ Reading List 2012 26

Contents of CAS’ Reading List 2013 27

Contents of CAS’ Reading List 2014 28

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Thinking Fast and Slow

By Daniel Kahneman

Publisher: Penguin, 2011
ISBN: 978-0-141-03357-0, 499 pages

Reviewed by Squadron Leader Nigel Jones

At first glance it may seem unusual to have a book on psychology featured in the CAS’ Reading List. However, this book deals with something that we all undertake on a daily basis – decision making. Thinking Fast and Slow is a book about how we think and endeavours to explain why we have the capacity for both making brilliant decisions and serious errors of judgement.

The author of this book, Daniel Kahneman, is Emeritus Professor of Psychology and Public Affairs at Princeton University and has, since 1970, held posts at the Hebrew University in Jerusalem, the University of British Colombia and at Berkeley (University of California). In addition to this he has put his skills into practice working with the military; during his national service in the Israeli Army he helped perform selection tests for candidates for officer training, and later trained Israeli Air Force flying instructors. He describes how both experiences helped him to understand and develop concepts which he explores in this book.

If you have read books such as Blink by Malcolm Gladwell, and Bounce by Matthew Syed you will be familiar with some of the concepts discussed in this book. Kahneman discusses and explores the concepts with the academic rigour you would expect of a Princeton professor and Nobel Prize winner. The main body of the book is just over 400 pages long, but it is broken down in to five manageable sections each made up of short chapters which introduce the psychological concepts which Kahneman wants to discuss whilst supporting the reader in understanding for themselves. Throughout the book he engages the reader with exercises and real-world examples which bring the concepts discussed to life and ensures active reading. This is one of the (many) strong points of the book. In addition the book also references further reading should you wish to delve deeper into the concepts it introduces.

The first part of the book introduces the theory that all human brains are made up of two characters, or systems as Kahneman describes them: ‘System 1’ being the automatic, unconscious, intuitive almost effortless element (reading body language, answering simple questions such as 1+1 etc); ‘System 2’ is the deliberate, reasoning, concentrating, effortful side (learning a new task, complex maths problems such as 17 x 24 etc). He highlights why we all, especially under stress, try to shortcut ‘System 2’ thinking. Understanding this concept is at the heart of the book and throughout the other four parts Kahneman highlights how our System 1 & 2 thought processes can be fooled and how we may guard against this.
Part 2 examines Heuristics and Biases. He explains how we are primed to learn and make judgements through association, past experience and causality - looking for patterns that we are familiar with. These are processes that our ‘System 1’ is comfortable with, but this can lead to misplaced overconfidence and inaccurate decisions. He makes the case for a need to train our ‘System 2’ brain to support us in making more effective judgements. Anyone involved in Human Factors training will be making frantic notes throughout this section.

Part 3 examines how the interaction of the two Systems when combined to the Heuristics and Biases discussed in Part 2 can lead to overconfidence which is based on an illusion of understanding and validity. This is an illusion that a person or process that has worked well in a specific situation will easily transfer to another. Kahneman drawing on his own and others’ work shows why this is not always the case and shows how this overconfidence may be mitigated. Klien’s *premortem* process which is described at the end of this section would be a useful addition to any Project Management meeting.

If there is a difficult section of the book, it is Part 4, which deals mainly with economic theory and the interaction of human thinking processes. This section is centred around ‘Prospect Theory’ which Kahneman developed with Amos Tversky and for which he was awarded the Nobel Prize for Economics. It is worth the effort of reading though as it gives real examples of how over optimism and ignoring evidence that does not fit our experience do impact on our decision making.

The final section is the concluding element of the book and examines new research on how our experiencing and remembering selves may not be aligned, and how this might mean that we may be predisposed to repeating mistakes. It also summarises the main themes of the book and concludes by encouraging organisations to play their part in supporting individuals in their development.

Overall this is an excellent and very readable book which introduces some complex psychological concepts in a manner which makes them understandable through practical examples. As stated in the first paragraph this is applicable to anyone involved in decision making in the RAF. However, it is essential reading for anyone involved in projects, recruitment and selection or training and education.
Duncan Grinnell-Milne’s *Wind in the Wires* might, at first sight, appear to be another of the many memoirs produced by pilots following the First World War, but there are a number of elements of his story which are different. Shot down and taken prisoner only a few weeks after reaching the front line, Grinnell-Milne spent two years in captivity before escaping, then successfully agitating for a return to the front.

Barely mentioning his time as an infantry officer in 1914, Grinnell-Milne describes his joining the Royal Flying Corps (RFC) and the training regime faced by early military aviators. The primitive nature of instruction, coupled with a lack of knowledge of some of the basics of flying that we take for granted today are clear. It is odd, 100 years on, to read how a budding aviator could proclaim that a training flight had to be curtailed because there was ‘no lift in the air’ without being met with hoots of derision, or to comprehend the heavy losses in flying training which were accepted with little comment by trainees and instructors alike, even if this did not extend to a callous lack of sympathy for casualties of the almost endless litany of training accidents which accounted for so many of the RFC’s losses during the war.

Flying training was reformed from 1916 onwards, eventually improving both the quality and the chances of survival of those sent to the front line. By this point, though, Grinnell-Milne was long gone from the training system, joining 16 Squadron in France at the start of October 1915. His time with 16 Squadron was not entirely happy; his flight commander, referred to only as ‘Growl’, was a formidable and unsympathetic man, and the squadron commander, ‘Stuffed Shirt’, was reserved and aloof, a man whom his junior officers found unapproachable. Although Grinnell-Milne saw some redeeming features in his commanding officer, they were few and far between and paled into insignificance compared with his lack of drive and inability to inspire his subordinates.

It does not take much research to realise that this unimpressive figure was Major Hugh Dowding, now remembered as the man behind Fighter Command’s victory in the Battle of Britain. ‘Stuffy’ Dowding’s nickname suggests that he had not changed by 1940, but by then, the moniker was often used with affection. Grinnell-Milne perhaps identifies the characteristics which led to Sir Hugh Trenchard describing Dowding as a ‘dismal Jimmy’, and which made Dowding a difficult colleague for fellow senior RAF officers in due course. It is tempting to suggest that his early reluctance to engage with his peers and his dusty, often uncompromising manner when he did, never changed, with both positive and negative consequences for his command during the war.
Grinnell-Milne’s observations about his awkward first days in the mess bar with the image of almost every RFC mess being a welcoming environment, perhaps hinting at some of the tensions within the squadron which their commanding officer had not dispelled, or possibly at an initial reluctance of more experienced personnel to become friendly with pilots whom they knew might very well be dead or missing within a matter of days or weeks of their arrival at the squadron.

This was the fate which befell Grinnell-Milne, forced to land behind German lines on 1 December 1915, and captured – just, it would appear, as he had begun to settle in with his squadron and to make friends in the mess. Although only serving with 16 Squadron for two months, the book is vivid in its portrayal of life for a young army cooperation pilot in 1915, offering a number of insights that other accounts do not fully capture, dealing as they do with the later stages of the war. Grinnell-Milne offers a brief account of how he came to be taken prisoner, but passes over his time in captivity (already described in his *An Escaper’s Log*, written 7 years before *Wind in the Wires*); fewer than twenty pages deal with this two-year period, culminating in escape (entertainingly and self-deprecatingly covered) a brief internment in the Netherlands and finally, return to Britain.

Grinnell-Milne explains the frustrations encountered upon his return in April 1918, with the newly-formed Air Ministry seeming reluctant to post an escapee back to the Western Front and the incredulity from fellow officers who were either unable to comprehend why he wished to return to the front line, or who found it strange or even a matter for criticism, that he had allowed himself to be captured. Finally, he was granted his wish, and posted to 56 Squadron – an elite unit, renowned as a result of the actions of a number of its pilots such as Albert Ball and Thomas McCudden. That Grinnell-Milne ended up as a member of a fighter squadron after initial service as an army cooperation pilot is explained by a series of amusing and pithy anecdotes in which he explains how, through the destruction of correspondence recommending his appointment to the staff of a training squadron and further sleight of hand involving deliberately spilled ink, his name was included on a list of pilots (retyped with his name at the top after the original had been rendered illegible by the decanted ink) to be sent to France to serve on fighters - also giving a flavour of the relatively short conversion to type that was required during the First World War: no lengthy OCU courses in the RAF of 1918, even if holding brought frustrations that might be recognised today.

The final chapter deals with Grinnell-Milne’s experiences of the closing rounds of the war. Although the reticence and modesty which underpin the book remain, the intensity of the fighting even at that late stage can be divined: in nine weeks, six of 56 Squadron’s pilots were killed, four wounded and another four forced to land behind enemy lines and taken prisoner out of a pilot strength of 18. The book concludes with Grinnell-Milne’s taking command of 56 squadron after the armistice and overseeing its disbandment, with little fanfare, in the early days of 1919. The account here is poignant, with the squadron slowly losing aircraft and personnel, finally closing with little ceremony as its few remaining members dispersed on the appointed date.

*Wind in the Wires* is one of the most effective memoirs for capturing ethos and camaraderie of the air service, highlighting a number of features which persist in the RAF. Although dealing with events of 100 years ago, Grinnell-Milne’s reflections on leadership, morale, the dangers and intensity of combat operations are still relevant and worth reflecting upon today.
"I am a United States Army General, and I lost the Global War on Terrorism. It’s like Alcoholics Anonymous; step one is admitting you have a problem. Well, I have a problem. So do my peers. And thanks to our problem, now all of America has a problem, to wit: two lost campaigns and a war gone awry."

Thus opens this insightful, thought-provoking and enjoyable book; a book which, although it falls short of actually answering its title question, nonetheless deserves praise for its visceral honesty and depth of analysis. Although clearly one man’s very personal view, unstinting in both praise and criticism of fellow soldiers, the book provides an intelligent antidote to the plethora of recently published self-congratulatory works praising the ‘surge’ strategy and the rise of the ‘Coindinistas’ led by now-discredited General David Petraeus.

Daniel Bolger retired in 2013 as a US Army Lieutenant-General, having served 35 years. He earned a PhD in history at the University of Chicago and has both taught history at West Point and published a number of books on military subjects. He commanded a one-star advisory mission and the 1st Cavalry Division on operations in Iraq, and, at three-star, commanded the NATO Training Mission (Afghanistan) from 2011-2013.

*Why We Lost* is well stocked with a number of adeptly-written tactical vignettes that demonstrate the skill, bravery and resourcefulness of American and allied soldiers and the effective tactical leadership by Sergeants, Captains and Lieutenant Colonels. However, above that tactical excellence, Bolger suggests that there ‘yawned a howling waste’. His premise is that Generals demonstrated poor strategic and operational leadership, were unable to develop a sound strategy or apply operational art effectively, despite years of training and education, and have instead encouraged the popular narrative that the wars were unwinnable and that civilian leadership was at fault. Not only were military leaders unable to offer imaginative ideas to the political leadership, says Bolger, but the experience of General Stanley McChrystal, sacked after an ill-advised media interview, discouraged anything other than straightforward ‘same as before’ strategy suggestions. This was compounded, in the author’s opinion, by the burgeoning counterinsurgency or COIN ‘cult’, led by its messiah, David Petraeus, for whom it is clear Bolger has little regard.

Bolger’s central thesis is that the US Armed Forces were not designed for success in a drawn out counterinsurgency. The preferred strategy must be a short decisive conflict (‘shock and awe’) to achieve limited ends and then followed by withdrawal; a limited conflict using superior forces to contain and kill terrorist adversaries. Bolger suggests that further
engagement, if it is to be successful, requires the US occupiers to view Iraq/Afghanistan as a ‘future 51st State’ and for the nation to commit to a long-term presence of decades - building infrastructure, training soldiers and police and building governance - demonstrating the will to ‘remain forever’, akin to the occupation and rebuilding of South Korea, Germany or Japan. In both Iraq and Afghanistan, the political will and popular support were insufficient for such a commitment and the adversaries were able to ‘sit it out’ until the inevitable US withdrawal. Faced with such a realisation, strategic options were narrowed to tinkering with force levels in an attempt to set the conditions for escape. The ‘shiny objects’ of counterinsurgency theory provided hope, wrapped in the hype and slick presentation skills of its supporters, but again, without time, ended up delivering far less than promised.

Although generally well-balanced, Bolger adopts a somewhat hectoring tone occasionally and he makes his personal opinions of individuals clear – which can be somewhat jarring against the background of a sound academic argument. His initial absolution of US political leadership is also not followed through or supported and he fails to fully make the case how, in a nation where civilian control of the military is sacrosanct, and, indeed, where military advice was ignored or countermanded, blame for the debacles cannot genuinely be placed at the feet of the elected leadership. That said, his analysis is compelling and refreshingly self-critical, and those who have read the many other offerings on these two campaigns will be enthused by Bolger’s alternative approach.

*Why We Lost* is a valuable addition to the canon of literature coming from recent conflicts and is a must-read if only for its alternative thesis. It is more than that though, and the combination of well-written tactical vignettes, intelligent analysis and personal insight make this an interesting, enjoyable but intellectually challenging read. Military professionals cannot fail to understand the author’s central message - well-trained, well-equipped, tactically excellent forces failed because of the over- confidence and lack of humility exhibited by their leaders. Hubris has been discussed since Roman times; we still need to be reminded ‘thou art mortal, Caesar’.
The Unseen War: Allied Air Power and the Takedown of Saddam Hussein

By Benjamin S. Lambeth

Publisher: Naval Institute Press, 2013
ISBN: 978-1612513119, 435 pages

Reviewed by Squadron Leader Keith Slack

The Unseen War analyses the contribution of the air campaign to the major combat phase of Operation Iraqi Freedom (OIF) in 2003. By doing so, Benjamin S. Lambeth aims to contribute to this particularly large subject field by re-balancing the existing scholarship that has so far focussed primarily, but not exclusively, on the land element of the campaign, as well as the pre- and post-war operational, strategic and political context. He argues that the three-week campaign must be viewed as an operation by joint and combined forces, employing capabilities in the air, land, maritime, space and, perhaps most importantly, the information environment like never before.

The book is entitled The Unseen War due to the author’s assertion that the contribution made by air power lacked visibility during and since the campaign. The author states that this was caused by a greater number of media personnel in the Allied Land Component’s force elements, resulting in much of the reporting of the campaign consisting of media releases, personal accounts, footage and photographs that primarily reflected activity conducted by the Land Component. Lambeth aims to further explore this unseen side of the conflict by making air power’s contribution to the campaign much more visible and more widely acknowledged.

Lambeth is a Senior Research Associate at the RAND Corporation whose research has focussed on analysis of air warfare, military planning and military strategy. He has authored publications on Israel’s air operations against Hezbollah; the evolution of Air Force-Navy integration; carrier air power; the use of air power in Operation Enduring Freedom and Operation Allied Force; the transformation of American air power; and, finally, Russia’s air power demise. The publication of The Unseen War by this preeminent author provides yet another comprehensive and thorough analysis of such an important and recent air campaign. The research conducted to inform the analysis is extensive and includes first-hand and personal access to many of the principals involved during the execution of the campaign. This supporting evidence is mainly from primary sources which are assimilated by the author into a coherent narrative to achieve his aims and support his argument. In this respect, the access afforded to Lambeth makes this book an especially useful contribution to the subject field whilst also being well-referenced and written in a style that is easy to read, yet factually detailed, with interesting personal accounts from the campaign included throughout the narrative.

The Unseen War is structured into chapters that discuss the geo-political context following 9/11, the political decision-making and military planning that ensued, a detailed analysis of the air offensive, the contribution made by Allied forces, key accomplishments and problems that were encountered. The analysis presented in these chapters is followed
by a conclusion that articulates the author’s main contention that the campaign was so uniquely different to previous campaigns that the Allies, led by the US, were heading toward a new era of warfare. Lambeth argues that there were major technical developments in weaponry, the ‘application of mass precision’, improved sensor connectivity, a plethora of new ISR capabilities not previously available, constructive cooperation between the Components (most notably with Special Forces) and an intense training and exercise programme in the decade before OIF. He further argues that these factors culminated in a joint and combined campaign where ‘counterland air attack’ moved doctrinally beyond solely the classic supporting roles of Close Air Support and Air Interdiction to destroying the enemy’s ground force directly and independently, not in the supporting role but as the overall main weight of effort. This is argued to have resulted in a new era of warfare because it ‘heralded the final mastery of high intensity conventional warfare’.

The book is apolitical with only a cursory mention of the political decision-making that led to the war in the first place and the disastrous strategic consequences of not fully considering or developing post-conflict stabilisation as part of the overall plan. Some may argue that analysing the three-week campaign in isolation is a major limitation of the analysis in this book. In balance, whilst it is not the primary focus of this book, the author does devote an entire chapter to the road to war. Moreover, the author also recognises that labelling OIF as a successfully executed combat plan is in stark contradiction to many commentators who argue it failed to take into account the requirement to plan for a complete regime takedown and the post-conflict environment.

Lambeth also recognises that the three-week campaign significantly benefited from ten years’ worth of northern and southern no-fly zone enforcement. As a direct result of these operations, the Allied forces already had a detailed intelligence picture and were able to opportunistically – and under Operation Southern Focus systematically – degrade Iraqi air defences and command and control. Without these precursor operations, a baseline intelligence picture would have needed to be developed and the opening salvo would have had to target many more of Iraq’s air defence and command and control sites. The end result, as Lambeth quite rightly acknowledges, is that the campaign may have taken longer and the targeting effort to achieve air dominance would have been more complex.

These important considerations aside, there remains obvious merit in Lambeth’s analysis of the combat phase of operations in isolation; the book provides a detailed analysis of a high-intensity campaign conducted in the 21st Century and specifically leaves the pre- and post-war considerations to others. In conclusion, the main lesson identified by Lambeth is that, despite the exemplary performance by US Central Command (CENTCOM), its components and Allies, even ‘the most capable air weapon imaginable can never be more effective than the strategy it is intended to underwrite’.

*The Unseen War* is an essential read for anyone interested in understanding how a truly joint and combined operation consisting of all elements of national power is directed, planned and conducted. Military professionals and individuals interested in military history will benefit most from this book because it describes adeptly how conventional military force can be applied to systematically dismantle a State’s military capability. Following just over 10 years of lower-intensity counterinsurgency conflicts, it is the detail encapsulated in this book that now needs to be remembered and
re-learned in anticipation of the next high-intensity conflict where – as the author suggests – the stakes may be significantly higher.
The decade from 2000 to 2010 proved to be uniquely challenging for the British military, which found itself engaged in two deeply unpopular conflicts thousands of miles from home, lacking compelling narratives for either beyond their formative stages, often tactically sound but strategically adrift. Major General (Retd) Christopher Elliott, a Visiting Professor at Cranfield University and Associate Fellow of the Royal United Services Institute, used his time as a research fellow at Oxford and Reading Universities to investigate the role of the Ministry of Defence's High Command in Britain’s Iraq and Afghanistan campaigns, and in doing so has written a thought-provoking critique of strategic competence at the highest levels that pulls no punches. Drawing on his own military experience (including as a Brigade Commander, Director of Military Operations in the MOD and Director General of Doctrine and Development) and a raft of interviews with senior military officers and academics, Elliott paints a picture of competent and well-intentioned people suffocated by a ‘system’ that they were unable or unwilling to tame and let down both by politicians and by their own shortcomings. This is a book for those seeking answers to what went wrong in Iraq and Afghanistan, as well as those seeking to better their understanding of strategy in contemporary warfare.

Elliott tackles his subject in 3 parts, with over half of the book dedicated to researching the context, conditioning factors and nature of the Iraq and Afghanistan wars. Spending so much time on ‘what happened’ at the expense of ‘why it happened’ and ‘what to do about it’ may seem imbalanced, and indeed there is a feeling of ‘ground rush’ at the end of the book, but this is a detailed and thorough analysis of what shaped the UK’s armed forces in the preceding two decades, including the risks taken in the Falklands, the peace dividend sought by politicians at the end of the Cold War, the stunning success of the 1991 Gulf War and the swing towards liberal interventionism and the so-called doctrine of ‘responsibility’ during the 1990s. Where once vital national interests were the benchmark for committing forces to battle, Britain’s armed forces were to be a ‘force for good’ whilst relying on increases in firepower and technology to offset manpower reductions which would later prevent the UK from fielding sufficient troop numbers to conduct counter-insurgency warfare.

The book provides a brilliantly insightful picture of how the MOD works, a complex system where the interplay between military officers, politicians and civil servants demands constant consultation and adjustment in the search for consensus; a process of ‘blanding’ which often draws all traces of innovation from important pieces of work whilst consuming time and effort which should be spent on analysis. As the UK pursued a strategic aim of supporting America a number of themes emerged: Britain’s short attention span; the lack of consensus over the use of state power to fight terrorists;
the strategic contradictions of seeking short wars whilst choosing long-term campaign aims; and how low numbers of combat troops forced a reliance on technology and firepower which alienated the host nation populations.

Most telling of all, using the abandonment of Basra and the deployment to Helmand as examples, Elliott exposes the lack of discussion of critical actions between the Chief of the Defence Staff (CDS) and his Service Chiefs of Staff (COS), stifling strategic debate. Two odd bifurcations emerge, according to Elliott: at the top, decisions were sometimes forced upwards, taken between CDS and the Prime Minister and presented as ‘done deals’ for implementation by the COS; and at the bottom, the actions of tactical commanders were frequently allowed to drive the strategy. In between, those in the MOD were often guilty of tuning their resource requests to ‘what the market would bear’ rather than demand full resourcing of the campaigns. Part one concludes with a useful analysis of strategy: what it isn’t – policy – as well as what it should be – iterative, adversarial, culturally aware, far-sighted and tuneable. Helpful as this is, it would have been better placed earlier in the book, allowing the reader to draw their own conclusions as they progressed. That said, the eight contradictions in UK strategy postulated by Elliott, and the reasons for them going unchecked, ought to be kept close at hand by all future strategists.

Seeking explanations in Part two Elliott dissects decision making in the MOD, finding over-complication, caveats, inadequate resourcing and loss of clarity at every turn. Clearly no fan of the Permanent Joint Headquarters (PJHQ) at Northwood, he describes confusion over where operational command lay and a tendency for CDS to discuss matters with PJHQ that should have been COS business. Frustrated, the COS found other outlets for their opinions, including the media, weakening their relationships with CDS further. Were these senior 4-star officers even fit for the role they filled, Elliott wonders, given the generalist nature of their careers? No CDS during this period had a university education, and most had not completed the advanced courses designed to prepare officers for such senior appointments. Against a backdrop of Whitehall short-termism and inadequate resourcing the number of contradictions and questions not asked are, in Elliott’s view, indicative of the military poorly preparing people for the top jobs.

In the final, rather short section the question asked is ‘what is to be done?’ Recognising the dangers of the urgent trumping the important, constant demands for consensus, and leadership by consent, Elliott advances eight problems to be overcome including a need for proper analysis and audit trails of decisions, fixing compromised command and control structures and improving the institutionally poor contextual understanding throughout the MOD. The re-introduction of war cabinets, speaking truth to power and a full review of MOD structures and processes are all recommended, but perhaps the single most important call is for a focus on strategic literacy, inculcated throughout the careers of those likely to reach the upper echelons of command in the British military. The tenet that one often learns more from seeing something done badly than seeing it done well perhaps highlights a contradiction in Elliott’s excellent work; the book’s title suggests an investigation of command and leadership, but he has inadvertently produced one of the better narratives on the conduct of strategy in recent times. In an election year, this book should be read and digested widely, but especially by those politicians, civil servants and military officers charged with leading the MOD through another Defence Review and into whatever operational challenges lie ahead for our armed forces.
Henry Kissinger’s *magnus opus* could not be more timely, with Russian irredentism, Chinese expansionist maritime claims, and the Jihadist threat to the post-colonial state order in the Middle East and North Africa all combining to threaten the wider world order. Meanwhile its traditional US-led guardians seem reluctant to defend it after a decade of failed liberal nation-building in Iraq and Afghanistan. Kissinger defines ‘world order’ as ‘the concept held by a region or civilization about the nature of just arrangements and the distribution of power thought to be applicable to the entire world’ and in *World Order* explores if it is possible to translate divergent regional concepts into a common system. Kissinger’s view still counts, forty years after serving Presidents Nixon and Ford, as Hillary Clinton’s 2000-word *Washington Post* review of *World Order* shows. But this is Kissinger the academic, the international relations theorist, or as Niall Ferguson calls him, the grand old man of applied history, whom ‘for nations history plays the role that character confers on human beings’.

*World Order* is a sweeping and concise narrative of the European, East Asian, Islamic and American conceptions of world order. Kissinger examines the ascendancy of the modern European state in the post-Westphalian world order and the associated balance of power system that emerged, with Britain acting as the offshore balancer until the collapse of the system in 1914. For Kissinger Russia is an enigma: ‘Its absolutism, its size, its global spanning ambitions and insecurities stood as an implicit challenge to the traditional European concept of international order built on equilibrium and restraint’. Under President Putin it continues to do so.

Other regions developed entirely separately as the technology of the time did not encourage or permit the operation of a single world system. Thus China was the centre of its own world system. In the region between China and Europe a third order ruled, destined to expand over the regions populated by infidels, ‘the realm of war’, until the whole world was unified under Islam. Islam was ‘at once a religion, a multi-ethnic super-state, and a new world order’.

Meanwhile, in the ‘New World’, settlers dreamed of escaping Europe’s sectarian conflicts and corrupted sovereigns, creating as the Governor of Massachusetts preached, ‘a city upon a hill’, the exceptional nation, with freedom as its ideology. Secure behind two oceans, continental expansion was the Americans’‘manifest destiny’. Over time the US developed competing foreign policy doctrines; isolationism versus interventionism. When the US became involved in the world order it did so as the ‘indispensable nation’ defender of the order Europe designed and after 1945 leading the construction of rules-based international system.
Kissinger identifies the challenges facing the world order. Rising powers in regions that played a minimal role in creating the world order now question its validity. While European nations did not apply concepts of sovereignty to their colonies, when the colonies became independent they did so as nation states. Now transnational political Islam risks a ‘disintegration of [that post-colonial] statehood into tribal and sectarian units’ and ‘confrontation akin to, but broader because of globalisation, to Europe’s pre-Westphalian wars of religion’. Kissinger is critical of Saudi Arabia thinking it could ‘support and manipulate radical Islam abroad without threatening its own position at home’ and doubts Iran’s motivations in negotiating with the West. Meanwhile China, who Kissinger was instrumental in introducing to the world order, struggles to reconcile its ancient traditions and new role as a superpower, in an East Asia full of rising powers. And while the Europeans have constructed a post-Westphalian system of pooled sovereignty to contain Germany, it has ‘consciously and severely limited the element of power in its new intuitions’ and risks cutting itself off from geopolitics. Nuclear proliferation, cyber warfare and the use of social networks for information warfare all make the world order more fragile.

Kissinger’s brief (fourteen page) conclusion is the US must lead in the reconstruction of a world order that rests on ‘commonly accepted rules that define the limits of permissible action and a balance of power that enforces restraint where rules break down’. Surprisingly perhaps given Kissinger’s reputation as a realist hawk, he also recognises America’s special role as the defender of liberal norms and that it is most effective when combining its idealism and traditional concepts of balance of power. To do this, the US leadership must be clear in what it wants to achieve and how to achieve it, presumably a veiled criticism of President Obama’s apparent lack of strategy.

This magisterial work should appeal to anyone interested in world politics. Despite its breadth and scholarship it is easy to read. This is most definitely not an abstract work of international relations theory but international history, with many colourful vignettes. His conclusions are pessimistic but much more nuanced than Huntingdon’s Clash of Civilisations thesis. The future will show whether Kissinger is right, but thus far, World Order, published in September 2014, has been prescient: Putin’s Russia and events in the Middle East have followed the script. But Kissinger doubts today’s leaders’ ability ‘to rise above the urgency of day-to-day events’ to achieve what is required to maintain world order. The absence of foreign policy debate in the 2015 British general election campaign, despite the challenges to the international order, seems to prove his point.
The advent of precise, all-weather air effects was demonstrated convincingly in the 1991 and 2003 Gulf Wars and appeared to offer a new and attractive alternative to the traditional, land-centric approaches to warfare that had previously dominated military strategy. The prospect of quick and easy victories at very little cost seemed to be a reality, created by the technological superiority of the USA and its Allies in the air. However, the long and painful entanglements in counterinsurgency operations in Iraq and Afghanistan that subsequently followed relegated air capabilities to a supporting role; air mobility and intelligence, surveillance and reconnaissance were the priorities, and the kinetic use of air power was largely confined to close air support or non-decisive, protracted attrition of a decentralised enemy’s fielded forces. The consequences for the RAF have been marked, not least in producing an imbalanced force structure: in the 2010 Strategic Defence and Security Review, for example, risk was consciously taken against combat air capability to fund the necessary enablers. In addition, the 2013 Parliamentary vote on Syria demonstrated that the popular and political appetite for any intervention, especially where there may be a commitment of ‘boots on the ground’, is severely limited, indicating that new ways of employing military capabilities will have to be found if armed force is to remain a viable lever of national power.

This is the context that Airpower Reborn seeks to address. The authors advocate a different conceptual approach to warfare that unashamedly emphasizes air power’s unique ability to achieve strategic effects directly. The editor, Dr John Andreas Olsen, has emerged in recent years as one of Europe’s most influential and widely publicised air power thinkers; indeed, he has previously featured in the Chief of the Air Staff’s Reading List in 2010 as editor of the History of Air Warfare and in last year’s list with Air Commanders. Olsen has the credibility that comes from being both a leading academic and a current military practitioner, filling the post of general deputy director in the Norwegian Ministry of Defence as a colonel in the Royal Norwegian Air Force while also acting as visiting professor at the Swedish National Defence College. In this volume he edits the work of six leading air power theorists, including luminaries such as Frans Osinga, Colin Gray and John Warden himself. The thrust of the argument advanced is that future warfare should capitalise on the potential of air power that was demonstrated so decisively at the beginning of the century. Drawing particularly on the theories of Boyd and Warden, the authors argue that the application of air power must transcend the purely military sphere and instead be informed by an understanding of adversaries as complex, multi-dimensional systems. Consequently, the aim should be strategic-level systemic paralysis, not approaches based purely on tactical-level military destruction or attrition on the battlefield, which, it is argued, has proved to be ineffectual and even counterproductive in recent campaigns.
The book is divided into five chapters. Peter Faber begins by presenting a historical perspective on air power theory and strategy, tracing their evolution from the 1920s to the 1980s. The second and third chapters contain in-depth examinations of the strategic concepts developed by John R. Boyd and John A. Warden in the 1980s and 90s, but with a particular emphasis on their contemporary relevance. The final two chapters seek to set the theory and strategy of modern air power in context: theory, it is asserted by Stephens and Gray, is the basic paradigm; strategy represents its generic, mechanism-centred application; and campaign plans constitute the specific steps that must be taken in any given situation.

The authors have a clear agenda: to look beyond recent land-centric campaigns to the wider opportunities offered by modern air power. They acknowledge the essential role of advanced technology in improving air power capabilities, but also emphasize the importance of cultivating and harnessing the intellectual acumen of airmen to think more conceptually about the most effective application of air power. They postulate that modern air power can offer political decision-makers more and better options, but only if the underlying strategy links the application of air power directly and coherently to the desired end-state, rather than limiting its employment to the battlefield.

To develop such strategies, Olsen et al assert, a dynamic and vibrant environment for mastering aerospace history, theory, strategy, and doctrine is required within a setting in which air power experts have the opportunity to communicate their narrative to politicians, the media, and fellow officers. This is an ambitious and optimistic – if perhaps utopian – manifesto, but one that is gaining increasing currency as air leaders understand they have to be more proactive in making the case for air power. It is no coincidence, for example, that the Chief of the Air Staff has put the conceptual component at the heart of the RAF’s current Command Plan.

Airpower Reborn is an essential and surprisingly accessible read for all airmen and airwomen and is unashamed at ‘doing what it says on the can’. While there will be those who regard the clarion call for a return to air power for strategic effect as being a little too shrill, it is clear that new thinking, doctrinal rebalancing and a cultural shift are all required in the post-Afghanistan, post-campaigning strategic context of 2015 and beyond. Recent operations in Libya and against the so-called Islamic State in Iraq indicate that future interventions in the new era of contingency may well be either confined to air capabilities alone, or at least air-led. What is indisputable – as is clearly and compellingly articulated in this book – is the requirement for air practitioners to engage with the issues at an intellectual level: both to make the case for air capabilities, which is particularly relevant given the impending Strategic Defence and Security Review; and to ensure that air power is used to best effect. For too long, airmen and airwomen have been guilty of focusing on excellence in delivery rather than on the most imaginative and innovative application of air power to achieve the desired strategic outcome. The theories of Boyd and Warden are now over 30 years old: this book may not provide entirely new answers – and in a sense, arguably offers ‘old wine in new bottles’ – but, nevertheless serves a useful and entirely worthwhile purpose by reappraising air power theory in the modern strategic context. It is highly recommended, not least for stimulating the new thinking that will be necessary to promote the air power renaissance that is required if military force is to remain as an effective and useful lever of power.
Strategy and Defence Planning: Meeting the Challenge of Uncertainty

By Colin S. Gray

Publisher: OUP Oxford, June 2014
ISBN: 978-0198701842, 240 pages

Reviewed by Group Captain Sean O’Connor

‘The dishes that the kitchen of strategic history will serve up for the pleasure or pain of politics will be unique in detail but the ingredients that made them will be well known.’

In his new book, Professor Gray suggests that planning for future security is a vital and enduring national task in which failure can incur grave consequences. He argues that the specifics that lead to future events are by definition unknowable, so any attempt to conduct forward defence planning must be based largely on guesswork. Gray sets out a framework for analysis that uses ends (politics), ways (strategy), means (military) and their underpinning assumptions as a guide to understanding the nature of uncertainty. His central thesis is that a developed understanding of the continuity and change inherent in human nature, its politics and what has gone before (strategic history) will enable defence planning to be ‘good enough’.

This book is an exploration of what happens when strategy meets the real world of planning for future defence needs. It is well structured and examines the nature of strategic thought in a process that is, or should be, led by politically driven demand. Chapter 1 defines the challenge posed by uncertainty in a realm that often demands unobtainable predictive detail. It cautions against the use of applying the wrong lessons from historical studies, an over-reliance on metric analysis and applying social science models in an attempt to bring certainty to the unknowable. It is about fully appreciating the nature of uncertainty and thus sets the groundwork for the rest of the book. Chapter 2 deals with context and the strategic approach to planning, drawing on 3 interconnecting variables: politics, strategy and history. Through his erudite analysis of rationality versus reasonability, Gray exposes the ‘false god’ of assumptions that may in fact be falsely-known ‘knowns’. Chapters 3 and 4 address the historical context where Gray introduces a methodology to study a non-linear history with its epochs of surprise, shocks and contingency, in order to discern plausible patterns for anticipation. The answer to the most relevant question in defence planning, the ‘so what’, takes shape in Chapters 5 and 6, where Gray considers the mission of defence planning within the civilian political process that provides legitimacy. Matters of resource prioritisation, prudence and the impact to available military means are well covered, before he proposes an analytical guidance framework for would-be defence planners. This includes the safeguards required to understand what is ‘right enough’ within an acceptable ‘tolerance of error’ and includes a very useful analysis of the freedoms, but often ignored, pitfalls afforded through ‘adaptability’. In his final Chapter, Gray explores the relationship of defence planning between the poles of ‘prudence’ and ‘paranoia’ in order to bring the strands of the book together and then proposes 6 cogent dicta that, if truly understood, should minimise the likelihood of ‘unsurvivable error’ in
defence planning. His conclusion conveys a sense of the difficulty in planning in a ‘present’, that some characterise as ‘deep peace’, for a future that a study of history tells us is likely to be anything but.

This is a timely and persuasive book in the field of strategic studies, because it highlights the fundamental problems inherent in many of the assumptions and supporting processes which characterise our contemporary planning activities. It is a scholarly piece of work but is designed to be an accessible educational text that does deliver against this ambitious title. It is the third in a series of linked works by the author, its predecessors being: The Strategy Bridge: Theory and Practice (2010) and Perspectives on Strategy (2013). Although, this book can be read without the previous volumes, the reader would benefit from a grounding in international relations theory and some background in strategic studies if they are to gain the most from it. Gray’s rhetoric and logic are clear and his ‘General Theory of Strategy’ is well founded, unambiguous and hard to contest. Gray cites three foundational works as ‘classics’ that have enduring significance for the strategist: Sun-Tzu, The Art of War; Thucydides, The Landmark Thucydides and Clausewitz On War. Whilst he draws heavily and appropriately on Clausewitz for links to politics and aspects of competition, friction and chance as enduring characteristics of conflict; places Thucydides triptych of fear, honour and interest as the dominant explanations of human political behaviour in strategic context; he barely mentions Sun-Tzu’s writings. One would have expected to see some references to Sun Tzu’s basic philosophy that war is a grave concern that must be thoroughly studied alongside the need for self-knowledge of one’s own physical and mental limitations. This omission does not, however, unhinge Gray’s argument and the book cites many appropriate anchor texts in the field of international relations and strategic studies to support his case.

This book has wide utility for any operational or strategic level planner. Arguably, never before has the gravity of the questions ‘so what’ and ‘to do what’ been so eloquently explained. It is squarely about the ‘art’ not ‘science’ required to plan effectively and Gray’s accessible style can be easily assimilated in one reading. That said, read it, reflect and then read again and its true value is revealed. For it is the clear signposting and hooks into the deeper defence related study areas that anyone seeking to develop their own strategic thinking will find invaluable. Additionally, there is much for the air power exponent to draw from, with repeated forays into the strategic planning context of the 1930s that by luck, judgement or a good measure of both, set the conditions for the air defence system of the 1940s to be ‘good enough’ to repel the Luftwaffe. Gray also notes that the defence of national airspace is an enduring, non-discretionary task within which the planner’s conundrum remains how much defence is enough? Finally, this book should be required reading before getting to grips with the strategic context explored in the 5th edition of Global Strategic Trends (GST 5: DCDC, 2014) and its sibling doctrine publications on future, joint and environmental operating contexts.

Professor Colin S. Gray is one of the foremost Western scholars for advancing strategic thought; he has written numerous books, chapters in edited volumes and papers. He is Professor of International Relations and Strategic Studies and the Director of the Centre for Strategic Studies at the University of Reading, and a Senior Associate to the National Institute for Public Policy and an external researcher for The Strategic Studies Institute (SSI). A dual citizen of the UK and United States, Gray has served as a defence adviser both to the British and American governments, serving in the Reagan
Administration’s General Advisory Committee on Arms Control and Disarmament between 1982 and 1987. Whilst the later provides a unique lens from which to view strategy, it does not colour his arguments.
Cybersecurity and Cyberwar: What Everyone Needs to Know

By P.W. Singer and Allan Friedman

Publisher: Oxford University Press 2014

Reviewed by Squadron Leader Paul Withers

Cybersecurity and Cyberwar is a wide ranging and detailed examination of the issues related to the cyber environment. The authors were motivated to write the book after hearing a senior leader in the US Department of Defense struggle to articulate the importance of cyberspace, having only been capable of describing the complexity of the problem as ‘all this cyber stuff’. The main premise of the book is to address ‘the cybersecurity knowledge gap and the dangers it presents’. Singer and Friedman assert that the gap is partly generational but also due to cybersecurity sitting in a ‘no man’s land’ between those who understand the technology and those who understand the broader policy and operating environment.

Peter Singer has developed a reputation for expertise in the implications of unmanned and autonomous systems and is perhaps best known for his book Wired for War: The Robotics Revolution and Conflict in the 21st Century (see CAS’ Reading List 2011). He is a former Senior Fellow at the Brookings Institution and is currently a strategist at the public policy ‘think tank’, New America Foundation. Allan Friedman has a similar background in think tanks, having also been a Brookings Fellow and crucially has an academic background that spans both Computer Science and Public Policy. The book is written with academic rigour and published by a prestigious publishing house but is clearly not written solely for academics. The authors highlight the condition known as ‘the glaze’, that ‘unmistakable look of profound confusion and disinterest that takes hold whenever conversation turns to workings of a computer’. They contrast ‘the glaze’ with the rolling of the eyes displayed by the ‘computer savvy’ who see the world through a technological lens, but may not appreciate the bigger picture. The content and style of Cybersecurity and Cyberwar produce a text that is accessible for both extremes of audience and everyone in between.

Singer and Friedman structure the text in a Question and Answer format, with the answer to each question being a combination of eloquent explanation, historical analysis and first-hand experience from a range of Subject Matter Experts. The book is split into three main parts, with Part I addressing ‘How it all Works.’ The authors explain the terminology and concepts behind cyberspace in an easy to absorb manner, managing to distil the technical detail into a story encompassing history and topography, rather than the underpinning computer science. Doctrinal purists might argue with the precision and completeness of some of the definitions given, but they are nonetheless thought provoking and challenging. Crucially they draw out the issue that cyberspace is as much a human sciences challenge as it is computer science. Despite the technical nature of a cyberspace exploit, it is more often than not the human factors associated with an attack that prove to be the weakest link. This is illustrated through their discussion of often
quite sophisticated ‘phishing’ attacks through to the 2008 attack known as Buckshot Yankee, where a soldier picked up a flash drive in a car park and introduced it into US Central Command’s network. The drive contained malicious software originating from a Foreign Intelligence Service and led to a 14 month clean-up operation.

The first part of the book provides the reader with the foundation of knowledge that allows them to move on to ask the key ‘so what?’ question in Part II, ‘Why it all matters’. This part examines the implications of cybercrime, cyberespionage and hacktivism, before moving onto the areas that should raise the specific interest of the military audience: conflict in and through cyberspace. Singer and Friedman draw out some of the lessons of notable historical events in Estonia, Georgia, the Stuxnet attack on Iran, and the Israeli integration of air power with Computer Network Operations during Operation Orchard. They discuss what this means for the conduct of warfare, including issues around ‘cyber weapons’ and the associated ethical and legal implications. Two case studies of military approaches to cyber warfighting are offered through examination of the US and China before going on to question the ‘cult of the offensive’ in cyber warfare, arguing for the importance of cyber defence.

Part III of the study looks at ‘What we can do about it’, addressing some of the practical measures to address cyber security challenges, whilst explaining the limits of the State and the partnership that needs to exist between the public and private sectors. Of key concern is the ‘Human Capital Crisis in Cyber Security’, overcoming an acute shortage of skilled and educated cyber professionals that affects industry and government across the developed world. It offers some insight into addressing the problem for the UK military, which suffers from the same challenge in microcosm - growing and retaining Cyber Warfighters.

This book retains the engaging and often humorous style that has been a feature of Singer’s previous work. The authors manage to examine the serious issues with appropriate gravitas and academic rigour whilst still capturing the ‘whimsy’ of the Internet and elements of popular culture. Where there was previously a paucity of credible, non-sensationalist literature, this book adds to a growing body of work that is grounded in reality but adds insight. This is a good book for anyone who wishes to be both educated and entertained. However, for those airmen and women who are serious about developing their understanding of the cyberspace environment, this is another important book. If we accept the vital importance of cyberspace threats and opportunities for air power, this book will help equip the practitioner to engage in the conceptual and practical development of the cyberspace environment. It should be studied alongside Healey’s ‘A Fierce Domain’ (see CAS’ Reading List 2014) and Rid’s ‘Cyberwar Will Not Take Place’ (see Air Power Review Vol 16 No 3). Airmen and women undoubtedly have a great deal to offer in the development of cyberspace operations, but in order to contribute both conceptually and operationally, they must develop a credible understanding and an intuitive feel for the cyberspace environment. *Cyberspace and Cyberwar* is an excellent book and will assist in closing the ‘knowledge gap’.
It’s Only Rocket Science: An Introduction in Plain English

By Lucy Rogers

ISBN: 978-0387753775, 368 pages

Reviewed by Squadron Leader Angharad Boyson

Dr Lucy Rogers seeks to undo the perception that rocket science is understandable to only those people who are highly intelligent and have been extensively educated and trained in the field. She explains ‘in everyday terms, just what is involved in launching something into space and exploring the universe outside of our own small planet’. The aim of the book is to demystify the ‘science behind getting man-made objects into space’.

Dr Lucy Rogers has a PhD, is a Chartered Engineer and Fellow of the Institution of Mechanical Engineers, a Fellow of the Royal Astronomical Society and Fellow of the British Interplanetary Society, a member of the Association of British Science Writers and of the Women’s Institute, has attended the Singularity University Graduate Studies Program, based at the NASA Ames Campus in California and has worked as a rocket scientist. Her credentials for writing are impeccable and she certainly uses this background to write definitively about rocket science.

The book covers design of rockets, spacecraft and missions, how to move and navigate in space, how the human body can survive in space, how to spot satellites from the Earth, where spacecraft can go and what the future may bring.

After an introduction, the chapters on Rockets and Spacecraft and Space Missions are very comprehensive and achieve the plain English goals. However, these chapters - and some later elements of the books - would benefit from more reference to previous and current spacecraft and missions that the reader may recognise. The next chapters are perhaps the most technical, discussing Movement in Three Dimensions, Propulsion Systems and Navigation in Three Dimensions. These introduce and explain well the fundamental differences of moving and navigating in an additional dimension to the two we routinely encounter on Earth.

The section on communication will be broadly familiar to anyone that has experience with radio communication, but includes some handy hints and tips on how an amateur can communicate with the International Space Station with nothing more than a transmitter, an amateur radio licence and information available from the NASA or Amateur Radio on the International Space Station websites. Additionally, there is a useful Appendix, Practical Information for Observing Satellites, which would be of particular use to any budding young astronomers.
The chapter that will be of most appeal to those interested in going into space - Humans in Space - covers a fascinating range of subjects from the physiological issues of acceleration, vibration and sound to the consequences of living in freefall, how to deal with space sickness, how to eat and drink and how astronauts go to the toilet (which may or may not put off some budding astronauts or commercial space travellers).

From there, the book covers Observing Satellites which details more than just how to optically track satellites from the Earth, covering the different equipment, its evolution and the categorising system used. The penultimate chapter, Where to Go, describes the Sun, the Planets and their satellites, dwarf planets and small solar system bodies, interspersed with snippets about which missions have gathered information about these bodies and if there are future missions planned to gather more. This is the kind of chapter a secondary school student preparing an in-depth study of the Solar System and its bodies would find invaluable and would certainly provide a useful reference guide for anyone requiring information on those bodies.

In the final chapter, The Future, future vehicles and space techniques are discussed. To the uninitiated some appear fantastical and from the realms of Science Fiction - propulsion by laser, space fountains and sky hooks - but they are all clearly articulated and give a sense of how different the future of space exploration could be. Whilst Dr Rogers strives to demystify the field, there are occasional terms used early on in the book that would benefit from an earlier definition to the reader who truly does not know anything about rocket science. For instance, geosynchronous orbits are mentioned in the Introduction and whilst there is a basic definition in the Glossary, it is only in Chapter 4 (Movement in Three Dimensions) that a fuller explanation of geosynchronous orbits and the relative merits against other orbits appears.

It is difficult to fully understand the projected readership of the book. In some ways, it seems to be aimed at young adults with a keen interest in space, perhaps thinking of a career in the (or a related) field. However, despite using plain English, the language does seem to be more advanced than one would reasonably expect that age range to deal with. The readership could be adults with a broad interest in space exploration, but the level of somewhat dry detail seems to undermine this. Those readers expecting an element of narrative - perhaps a book that is signposted by the history of human space exploration - will be disappointed. Although some vignettes are used throughout the book, there are rather less than would be expected by someone picking up the book looking for a read that is as enjoyable as it is informative. That said, does the book meet the aim of explaining space and our exploration of it in plain English? Yes, and very well. By the end of the book, the reader is well versed in terminology and concepts that prior to reading would seem esoteric knowledge and the preserve of the highly trained and intellectual.
Contents of CAS’ Reading List 2011

**Strategy in the Contemporary World: An Introduction to Strategic Studies**  
By John Baylis, James Wirtz & Colin S. Gray (Eds)  
Publisher: Oxford University Press

**Cyber War: The Next Threat to National Security and What To Do About It**  
By Richard Clarke & Robert Knake  
Publisher: ECCO Press

**Just War: The Just War Tradition: Ethics in Modern Warfare**  
By Charles Guthrie & Michael Quinlan  
Publisher: Bloomsbury, London

**The Secret State: Preparing for the Worst 1945-2010**  
By Peter Hennessy  
Publisher: Penguin Books, London

**The Battle of Britain: Five Months that Changed History, May - October 1940**  
By James Holland  
Publisher: Bantam Press

**7 Deadly Scenarios: A Military Futurist Explores War in the 21st Century**  
By Andrew Krepinevich  
Publisher: Bantam Press

**Military Orientalism: Eastern War Through Western Eyes**  
By Patrick Porter  
Publisher: Hurst & Company, London

**Thinking about Nuclear Weapons**  
By Michael Quinlan  
Publisher: Oxford University Press

**Descent into Chaos**  
By Ahmed Rashid  
Publisher: Penguin

**Wired for War: The Robotics Revolution and Conflict in the 21st Century**  
By P W Singer  
Publisher: Penguin
Contents of CAS’ Reading List 2012

Afghanistan: How the West Lost its Way
By Tim Bird and Alex Marshall
Publisher: Yale University Press

A Question of Security: The British Defence Review in an Age of Austerity
By Michael Codner and Michael Clarke (Eds)
Publisher: I B Taurus

The Arab Spring: Rebellion, Revolution and a New World Order
By Toby Manhire
Publisher: Guardian Books

Conceptualising Modern Warfare
By Karl Erik Haug & Ole Jørgen Maaø
Publisher: Hurst & Company

War over the Trenches: Air Power and the Western Front Campaigns 1916-1918
By E R Hooton
Publisher: Midland Publishing

Losing Small Wars: British Military Failure in Iraq and Afghanistan
By Frank Ledwidge
Publisher: Yale University Press

Can Intervention Work? Amnesty International Global Ethics Series
By Rory Stewart and Gerald Knaus
Publisher: W W Norton and Co

Ethics, Law and Military Operations
By David Whetham
Publisher: Palgrave Macmillan

British Naval Aviation: The First 100 Years
By Tim Benbow
Publisher: Ashgate

Inside Steve’s Brain: Business Lessons from Steve Jobs, The man who saved Apple
By Leander Kahney
Publisher: Atlantic Books

Arnhem Myth and Reality: Airborne Warfare, Air Power and the Failure of Operation Market Garden
By Sebastian Ritchie
Publisher: Robert Hale
Contents of CAS’ Reading List 2013

**Airpower for Strategic Effect**  
By Colin Gray  
Publisher: Air University Press

**Global Air Power**  
By John Andreas Olsen  
Publisher: Potomac Books Inc

**The Second World War**  
By Antony Beevor  
Publisher: Weidenfeld and Nicholson

**The RAF’s Air War in Libya: New Conflicts in the Era of Austerity**  
By Dave Sloggett  
Publisher: Pen and Sword

**The Leadership, Direction and Legitimacy of the RAF Bomber Offensive from Inception to 1945**  
By Peter Gray  
Publisher: Continuum

**Behavioural Conflict: Why Understanding People and their Motivations Will Prove Decisive in Future Conflict**  
By Andrew MacKay and Steve Tatham  
Publisher: Military Studies Press

**The Art of Action: How Leaders Close the Gaps between Plans, Actions and Results**  
By Stephen Bungay  
Publisher: Nicholas Brealey Publishing

**The Changing Character of War**  
By Hew Strachan and Sibylle Scheipers  
Publisher: Oxford University Press

**The Upside of Turbulence: Seizing Opportunity in an Uncertain World**  
By Donald Sull  
Publisher: Collins Business

**The Future of Power: And Use in the Twenty-First Century**  
By Joseph Nye  
Publisher: Public Affairs
Contents of CAS’ Reading List 2014

Boyd: The Fighter Pilot who Changed the Art of War
By Robert Coram
Publisher: Back Bay Books

Air Commanders
By John Andreas Olsen
Publisher: Potomac Books inc

British Generals in Blair’s Wars
By Jonathan Bailey, Richard Iron and Hew Strachan
Publisher: Ashgate Publishing Limited

The Sleepwalkers: How Europe Went to War in 1914
By Christopher Clark
Publisher: Penguin

The Bombing War: Europe 1939-45
By Richard Overy
Publisher: Allen Lane

Conflict After the Cold War: Arguments and Causes of War and Peace
By Professor Richard Betts
Publisher: Pearson

European Air Power: Challenges and Opportunities
Edited and with an introduction by John Andreas Olsen
Publisher: Potomac Books

Strategy: A History
By Sir Lawrence Freedman
Publisher: Oxford University Press

Out of the Mountains: The Coming Age of the Urban Guerrilla
By David Kilcullen
Publisher: Hirst and Company

A Fierce Domain: Conflict in Cyberspace, 1986 to 2012
By Jason Healey
Publisher: Cyber Conflict Studies Association
The views expressed by the reviewers in this list are theirs and theirs alone.
Inclusion of a particular book within the reading list should not be taken to mean that
the Royal Air Force or the Ministry of Defence endorses the contents. Manuscripts with
challenging and even contrarian views will be included in order to stimulate thinking,
discussion and debate.