

KDP
 erbil

PUK

Effects Based Operations: A case for the primacy of Effects

Baghdad

Zone

Iran

By Ryan Clow

Zone
 B

The term Effects Based Operations, or EBO, is becoming prevalent in the lexicon of many Western militaries. As the limitations of the current Objective-based approach to operational planning are revealed, an alternative is being sought. Effects — versus Objectives — may well become the central consideration for the planning, execution and evaluation of military operations.

As established leaders in the field of Western military concept development, the United Kingdom (UK) and the United States (US) are grappling with the concept of EBO in an attempt to define that concept and determine its implications. However, neither country currently practices what could be called EBO.

This paper will provide an assessment of the US and UK EBO concept development with a view to contribute some basic thoughts on EBO, and will focus on one small, yet important aspect — the 'identification' of effects.

The US view of Effects Based Operations

The United States Joint Forces Command (USJFCOM) has defined EBO as:

*'A process for obtaining a desired strategic outcome or 'effect' on the enemy, through the synergistic, multiplicative, and cumulative application of the full range of military and non-military capabilities at the tactical, operational, and strategic levels.'*¹

Carl Vinson
 Battle Group



F-16 with LITENING pod

EBO put simply, are those operations that are planned, executed, assessed and adapted as a result of a comprehensive understanding of the operational environment in order to influence or change behaviour or capabilities by exploiting the integrated application of selected Instruments of Power to achieve directed objectives

The US definition is a good starting point for the discussion in that it relates EBO to a well-understood concept (levels of command). However, it fails to provide a precise definition of what EBO are. Additional definitions of Effects Based Planning² and Effects Based Targeting³ do provide greater amplification and clarity to the American body of thought that seemingly culminates in an Effects Based Strategy.⁴ Some pertinent aspects should be retained from the US body of thought, particularly in terms of revising the current operational planning process 'non-lethal', or more aptly non-kinetic⁵ targeting and the use of all available and relevant resources (both military and non-military) to facilitate successful national power projection.

The UK view of Effects Based Operations

In an initial concept paper⁶ the UK took a slightly different approach to providing a definition, that is, the British established a 'conceptual framework of Effects' and sought clarification of their ideas in a more extensional manner by associating four definitions:

'Strategic Aim: A single, unambiguous purpose attained by the achievement of one or more objectives.

Objective: The intended state of affairs to be achieved by the aggregation of specified Effect(s).

Effect: The physical or cognitive consequences at any level within the Strategic environment of one or more military or non-military actions.

Action: The process of doing or acting at any level.⁶

That paper emphasised the inter-dependency of these four definitions and their aggregates in order to produce an Effects Based Approach.⁷ Regrettably, the British paper seemed to fall short in providing a precise definition of a complex concept. To be fair in criticism, the subject paper had a limited purpose: to achieve consensus on these terminologies and their relationship. In that respect, the document is rich in describing the complex relationship between Effects and the levels of command. More importantly, it contains a simple, yet brilliant paragraph on the classification or characteristics of Effects as being intended/unintended, desired/undesired, decisive, enabling, instantaneous/delayed, localised/distributed, permanent or temporary, or a combination thereof.⁸ These observations allow for an appreciation of the careful consideration required in order to ensure the Effect achieved is the desired Effect.

In a more recent paper, the UK has refined their body of thought and provided greater fidelity:

'[EBO] put simply, are those operations that are planned, executed, assessed and adapted as a result of a comprehensive understanding of the operational environment in order to influence or change behaviour or capabilities by exploiting the integrated application of selected Instruments of Power to achieve directed objectives'.⁹

The entire body of thought is similarly rolled-up into what has been called the 'Effects Based Approach' in order to produce a 'common way of thinking that promotes an outcome-based (versus activity based) approach'.¹⁰ Similar to the initial UK paper on the subject, the revised version contains another simple, yet brilliant paragraph on an Effects Based Planning (EBP) process (analysis, planning, execution, assessment) that highlights the requirement for EBP to be conducted in an integrated rather than linear fashion.¹¹

The crucial detail to take from both the US and UK approaches is that they appear to ultimately subordinate Effects to Objectives. This creates the

impression that desired Effects must be identified or formulated after Objectives. It is the assertion of this paper that this is the wrong approach. Rather, the identification of Effects should come before Objectives are established, particularly at the strategic level. The early identification of effects (before objectives) contributes to EBO in three primary ways: comprehensive operational planning (Effects Based Planning), flexible command and control (Effects Based C2) and capable targeting (Effects Based Targeting).

The primacy of effects

Noting the perceived shortcomings in the UK and US definition, as well as the assertion that there may be a critical distinction to be made from the US and UK approach in terms of the identification of Effects, the following is put forth as a more analytical definition of EBO:

'Effects Based Operations are those operations that identify the desired Effect(s) at the outset of the planning process. Desired Effect(s) will then act as the primary means to convey strategic intent to ensure the selection of appropriate objectives and actions in order to achieve the preferred end-state.

Critical to accepting this definition of EBO is an agreement that there is an intrinsic link between the strategic intent, end-state and Effects. The acceptance of this connection may seem rudimentary to the point of being unworthy of note, except that it is a decisive point as to whether the concept of EBO in this paper will be understood as it was intended. To begin the explanation, few would argue with the assertion that an Effect is considered to be the result of an action: cause and Effect. Further, it could be safely stated that any *intended* action is done for a purpose: an Objective. Essentially, that Objective is really an attempt to ensure that a *desired* Effect is produced. To be able to formulate that Objective it is argued that prior knowledge of, and a *desire* for, the resulting Effect is required. It is therefore suggested that the cause should not only result in an Effect on the basis of action, but that the desire for that Effect must help in determining both the action (cause) *and* the Objective as critical parts of a sum: the end-state. In this process, the Objective



A Jaguar of No 41 Squadron RAF on patrol over northern Iraq

The preferred end-state is achieved by successful action that in turn achieves the Objective(s)

should be seen as nothing more than a means to translate desired Effects into action so that the Effect(s) is achieved and ultimately the end-state. In the end, the value of Effect(s) in the whole process is really nothing more than the means to communicate the strategic intent (the intent being intrinsically linked the end-state). In conclusion, whilst Objectives and Effects are both means to an end, Effects must be identified before Objectives.

In terms of military operations, the strategic intent should be formulated and then described to the subordinate levels of command in terms of Effects.

From that point, Objectives — at the operational level — should be established that support the desired Effects. It is important to note that this train of thought assumes one or more Objectives may be required to achieve an Effect. Tasks (or actions) are then derived at the tactical level based on the Objectives. Looking at it in reverse, the preferred end-state is achieved by successful action that in turn achieves the Objective(s). Tying it all together, the aggregate of the Objectives satisfies the desired Effects and the culmination of the desired Effects is the strategic intent.



Allied troops in Fallujah

Without a clear strategic aim/intent that can be translated into action, the economy of effort is lost

A potential criticism of this line of thought that may be raised is that this explanation simply renamed what are currently known as Objectives and now calls them Effects. Not so. The critical difference between Effect and Objective in this sense is in terms of the Measurement Of Effectiveness (MOE). MOE is critical to all military plans: however it appears to be one area in which many militaries fail. The proposed difference is that Effect is command descriptive for the wide breadth of required action and Objectives are the measurable framework for those actions in order to provide MOE for the

operation. For example, if the strategic intent is something like 'negate the global terrorist threat' and the desired strategic Effect is to 'marginalise the appeal of terrorists to regional populations', then Objectives (coupled with tactical level Effects) should be formulated that attempt to do things such as disrupt recruiting, decrease retention and degrade the operational effectiveness of terrorist elements in order to produce measurable results to indicate achievement of the desired strategic Effect. Rationale for this distinction will be made when the Global War on Terror is discussed later.



A terrorist bomb destroys a bus killing many in London, July 2005

A prime example of a strategic aim/intent that must be supported by a new approach to operations is seen in the Global War on Terror (GWOT). Terror may be assessed as a threat to global security as it manifests in varying, yet equally serious forms, in most regions of the world

Effects Based planning

Selection and maintenance of the *aim* as a principle of war is crucial. Without a clear strategic aim/intent that can be translated into action, the economy of effort is lost. Further, it appears impossible to measure success or failure. Properly applied, EBO, and specifically the early identification of Effects, would allow for more comprehensive operational planning by providing a means to communicate guidance in concise, yet non-restrictive terms.

Objective-based planning processes were excellent at dealing with the world they were designed for with characteristics such as conventional manoeuvre forces, contained Area of Operations (AO), clear 'phasing' of operations, identifiable enemies and distinct roles for state and non-state actors. The reality faced when planning past operations was relatively simple. The approach of identifying Objectives and then achieving them worked well in the set-piece world. Then came failed states,

insurgency, religious fundamentalism, mass media, more lethal weapon systems, weapons of mass destruction, cheaper weapons, interest groups, Non-Government Organisations (NGOs) the Internet . . . *et cetera, et cetera*. The predictability and stability that characterised Cold War-era military operations is gone. Therefore, it is argued that there is a need to update the Operational Planning Process¹² based on the assertion that modern militaries cannot employ a planning process that compartmentalises the threat and, as a result their operations, into limited Objectives that are clearly defined by time and space.

A prime example of a strategic aim / intent that must be supported by a new approach to operations is seen in the Global War on Terror (GWOT). Terror may be assessed as threat to *global* security as it manifests in varying, yet equally serious forms, in most regions of the world. The ability to produce comprehensive Objectives as the primary means for command guidance in the GWOT seems inadequate due to the protracted nature of the threat. The same Objectives are not necessarily applicable or transferable between the various regionally based threats, not to mention they do little to deal with the trans-national threats. Formulating a sufficient number of Objectives appears to be so large a task as to be a worthless endeavour. The sheer number of strategic Objectives required to adequately address all the regionally based threats would make command of the GWOT too intensive to be effective. The solution would be economy of effort, especially in the early stages of plan development, to clarify the strategic aim / intent. Clear, concise communication of the strategic aim by identifying desired Effects (that are in turn translated into regionally based Objectives) would provide a more comprehensive approach to planning by achieving that greater economy of effort.

Effects Based C2

With respect to Command and Control (C2), it is argued that EBO, specifically in terms of the early identification of Effects, would provide a more effective command relationship than the current Objective-based approach. By identifying Effects as the starting point for plan development it

would allow for centralised command in the plan development phase and decentralised execution of that plan beginning with the formulation of objectives. This command relationship would provide sufficient direction, but is not so rigid as to limit the freedom of action of subordinate commands. The command style is envisioned to be similar to the concept of *Auftragstaktik*.¹³ This fluidity in command would become important in modern military operations that are of a highly complex nature¹⁴ and would require quick operational transitions and / or simultaneous, but apparently disparate actions in the same area of operations such as articulated in General Krulak's (USMC) concept of the 3 Block War.¹⁵

Currently, there appears to be a critical piece of the puzzle missing in order to allow strategic command to effectively conduct EBO — what is an Effect? The USJFCOM On-line Glossary defines an Effect as:

'The physical, functional, or psychological outcome, event, or consequence that results from specific military or non-military actions'. The UK stance appears similar, yet their original paper stated 'there is no intention to produce an exhaustive list of Effects'.¹⁶

Resolving the question as to what constitutes an Effect is seen as an imperative in the development of EBO, particularly in terms of increasing C2 familiarity and comfort with the concept. In fact, the potential problem created by a lack of clarity as to what is an Effect appears to go beyond the point of whether the C2 structure can become effective at EBO. It may not come down to the case of being able to identify the correct Effect the situation requires, but to identifying an Effect at all!

Whilst the British approach that avoids limiting potential Effects appears pertinent, a more precise definition as to what is an Effect, or better yet a list of criteria for something to be considered an Effect, similarly appears to be an imperative for both the development and conduct of EBO. Without this critical piece of the puzzle, the potential may be lost to provide appropriate strategic level command guidance as it would likely be characterised as being



Troops board an RAF C-17 flight to Pristina, Kosovo

Historically, many Western militaries have been good at deploying conventional, kinetic-type military power . . . What we have not done enough of, is to deploy adequate force-multiplying capabilities such as Human Intelligence (HUMINT) and Psychological Operations (PSYOPS) specialists

too broad to provide adequate direction or too provisional and prescriptive so as to appear as an Objective. Either way, in terms of C2, the concept of EBO would be rendered ineffective.

Effects based targeting

Historically, many Western militaries (for example Canada) have been good at deploying conventional, kinetic-type military power. As a result, we appear to have fallen into a trap. Regardless of the role (e.g. war-fighting, peacekeeping) the same troops are generally sent

(for example Canada). What we have not done enough of, is to deploy *adequate* force-multiplying capabilities such as Human Intelligence (HUMINT) and Psychological Operations (PSYOPS) specialists.

Effects based targeting offers a more robust and realistic view of the inter-dependencies and relationships inherent in the modern battle-space. The 'new' way to think of targets is a massively complex problem to wrap one's mind around because it involves targeting the non-tangible



An F-117 releases a pair of Laser Guided Bombs

A reality of modern military operations, and arguably any modern power projection, is that expeditionary forces simply cannot deploy, blow things up and return home. Rather, an integrated approach to power projection, such as EBO, that employs all military capabilities, both kinetic and non-kinetic, in concert with all applicable national tools to project power and influence is the new reality

such as 'morale' and 'cohesion' versus buildings and tanks. In this proposal, effects based targeting means more than identifying an enemy Centre of Gravity (CoG) as being something like 'cohesion' in your orders and leaving it at that — you have to target that CoG with action. And, that action cannot be based on Objectives alone. In terms of targeting, the Objective based approach to targeting lends itself to the existence of a phenomenon akin to what Walter Lippmann

called 'blind spots'¹⁷, or a view of the world inconsistent with reality. The early identification of desired Effects would arguably create the mind-set required in order to understand complex realities of the modern AO. That is, an identified effect that is transferable across the entire AO (refer back to GWOT) and that allows for consideration of inter-dependencies and inter-relationships. This inclusive view can be expected to increase the overall effectiveness and capability of targeting.

This type of targeting is not new. However, it is a true and stark assertion that no modern Western military can categorically state that they are effective in this type of targeting. Air power and the increased accuracy of weapons, together with such capabilities as PSYOPS, deception operations (OPDEC) and the exploitation of HUMINT, have produced tunnel vision, and eschewed those other capabilities that may negate, supplant or support the use of kinetic force. It appears the reluctance to change or consider 'new' things (that have in reality been practiced since the beginning of war) is the problem. Part of our reluctance may be that by incorporating more 'non-traditional targets' the purpose for engaging a target, or the desired Effect, could also change and require us to wander into the relatively 'unknown'. It could be argued that it really isn't the unknown, but rather return to an old concept and a better way to accomplish what we are attempting to accomplish currently.¹⁸

Wrapping our heads around some potential strategic Effects such as 'convince', 'influence', 'persuade' or 'marginalise', especially in terms of 'weaponeering' and 'damage assessment' will take some time. EBO is put forth as the means to meld the two actions (kinetic and non-kinetic) together and allow for the more capable targeting. In the beginning, this will likely mean that non-kinetic and kinetic capabilities will each 'bite off' their piece of the Effect and formulate independent, yet hopefully co-ordinated, Objectives. However, as EBO becomes more familiar the level of integration in targeting between kinetic and non-kinetic is expected to increase. The obvious conclusion that many have come to is that eventually we wouldn't have non-kinetic or kinetic operations anymore, but rather EBO.

Conclusion

The ultimate value of EBO is that it may provide militaries with means to maintain pace as a relevant state tool for the projection of national power. This is not to say that militaries are expected to be marginalised anytime soon. However, with the modern day realities of shrinking budgets, limited manpower and

tenuous public support for war, the call to arms in the historical sense (circa 20th Century) may be coming to an end for many nations. Some Western governments are changing the way they view geo-political situations and are considering alternate methods in an effort to project power and exert their influence. This shift may lead to a time when the military, in the conventional sense, ends up on the sidelines more often than not. A reality of modern military operations, and arguably any modern power projection, is that expeditionary forces simply cannot deploy, blow things up and return home. Rather, an integrated approach to power projection, such as EBO, that employs all military capabilities, both kinetic and non-kinetic, in concert with all applicable national tools to project power and influence is the new reality.¹⁹

There is an increasing urgency to define EBO. For many Western militaries, the impetus is the Provincial Reconstruction Team (PRT) concept. In Canada, we have arrived at that decisive point in that we are in the process of deploying a PRT to Afghanistan. Canada has never faced a task quite like PRTs, one that will require a high degree of co-ordination between kinetic and non-kinetic military action, and include the added complexity of incorporating non-military actors and actions in areas of diplomacy and development. The ability to translate the strategic intent into action will be paramount and EBO is arguably critical to the way forward.

[The opinions expressed are those of the author and do not reflect those of the Department of National Defence or the Government of Canada.]

Notes

1 United States. Joint Forces Command. On-Line Glossary. [cited 17 January 2005]. Available on-line: <<http://www.jfcom.mil/about/glossary>>

2 An operational planning process to conduct EBO within Rapid Decision Operations. EBP is results-based *vice* attrition-based. EBP closely mirrors the current joint planning process, yet focuses upon the linkage of actions to effects to objectives [my italics]. EBP changes the way we view the enemy, ourselves, and what is included and emphasized in the planning process. EBP uses a flexibly-structured battle rhythm that leverages a collaborative knowledge environment and capitalizes on the use of fewer

This type of targeting is not new. However, it is a true and stark assertion that no modern Western military can categorically state that they are effective in this type of targeting. Air power and the increased accuracy of weapons, together with such capabilities as PSYOPS, deception operations (OPDEC) and the exploitation of HUMINT, have produced tunnel vision, and eschewed those other capabilities that may negate, supplant or support the use of kinetic force. It appears the reluctance to change or consider 'new' things (that have in reality been practiced since the beginning of war) is the problem. Part of our reluctance may be that by incorporating more 'non-traditional targets' the purpose for engaging a target, or the desired Effect, could also change and require us to wander into the relatively 'unknown'. It could be argued that it really isn't the unknown, but rather return to an old concept and a better way to accomplish what we are attempting to accomplish currently.¹⁸

Wrapping our heads around some potential strategic Effects such as 'convince', 'influence', 'persuade' or 'marginalise', especially in terms of 'weaponising' and 'damage assessment' will take some time. EBO is put forth as the means to meld the two actions (kinetic and non-kinetic) together and allow for the more capable targeting. In the beginning, this will likely mean that non-kinetic and kinetic capabilities will each 'bite off' their piece of the Effect and formulate independent, yet hopefully co-ordinated, Objectives. However, as EBO becomes more familiar the level of integration in targeting between kinetic and non-kinetic is expected to increase. The obvious conclusion that many have come to is that eventually we wouldn't have non-kinetic or kinetic operations anymore, but rather EBO.

Conclusion

The ultimate value of EBO is that it may provide militaries with means to maintain pace as a relevant state tool for the projection of national power. This is not to say that militaries are expected to be marginalised anytime soon. However, with the modern day realities of shrinking budgets, limited manpower and

tenuous public support for war, the call to arms in the historical sense (circa 20th Century) may be coming to an end for many nations. Some Western governments are changing the way they view geo-political situations and are considering alternate methods in an effort to project power and exert their influence. This shift may lead to a time when the military, in the conventional sense, ends up on the sidelines more often than not. A reality of modern military operations, and arguably any modern power projection, is that expeditionary forces simply cannot deploy, blow things up and return home. Rather, an integrated approach to power projection, such as EBO, that employs all military capabilities, both kinetic and non-kinetic, in concert with all applicable national tools to project power and influence is the new reality.¹⁹

There is an increasing urgency to define EBO. For many Western militaries, the impetus is the Provincial Reconstruction Team (PRT) concept. In Canada, we have arrived at that decisive point in that we are in the process of deploying a PRT to Afghanistan. Canada has never faced a task quite like PRTs, one that will require a high degree of co-ordination between kinetic and non-kinetic military action, and include the added complexity of incorporating non-military actors and actions in areas of diplomacy and development. The ability to translate the strategic intent into action will be paramount and EBO is arguably critical to the way forward.

[The opinions expressed are those of the author and do not reflect those of the Department of National Defence or the Government of Canada.]

Notes

1 United States. Joint Forces Command. On-Line Glossary. [cited 17 January 2005]. Available on-line: <<http://www.jfcom.mil/about/glossary>>

2 An operational planning process to conduct EBO within Rapid Decision Operations. EBP is results-based vice attrition-based. EBP closely mirrors the current joint planning process, yet focuses upon the linkage of actions to effects to objectives [my italics]. EBP changes the way we view the enemy, ourselves, and what is included and emphasized in the planning process. EBP uses a flexibly-structured battle rhythm that leverages a collaborative knowledge environment and capitalizes on the use of fewer

formal joint boards. It employs virtual, near-simultaneous planning at all echelons of command. Ibid.

3 The focus of the targeting process is to produce COAs that will change the enemy's behaviours and compel him to comply with our will. The behavioural changes we attempt to create are the result of effects that flow from the employment of our lethal and non-lethal capabilities. Thus, effects-based targeting is distinguished by the ability to generate the type and extent of effects necessary to create outcomes that facilitate the realization of the commander's objectives. Ibid.

4 The coherent application of national and alliance elements of power through effects based processes to accomplish strategic objectives. Ibid.

5 For the purposes of this paper, although quite simplistic, the term non-kinetic should be considered all non-manoeuve or supporting elements such as Intelligence and Information Operations. Kinetic should be taken to mean all manoeuvre elements such as infantry, armour, artillery as well as the applicable air and naval assets.

6 United Kingdom. Ministry of Defence, *The UK View of Military Effects (Draft 1 * Level)*. 2004. p. 2

7 *The UK View of Military Effects (Draft 1 * Level)*. p. 1

8 *The UK View of Military Effects (Draft 1 * Level)*. p. 5

9 United Kingdom. Ministry of Defence. *UK Military Effects-Based Operations-An Analytical Concept*. (2005). p. 2.

10 Op Cit. p. 5

11 Op Cit. p. 7

12 The Canadian Forces (CF) Operational Planning Process, or OPP, resembles most Western military planning processes. The OPP is a coordinated staff process used by a commander to determine the best method of accomplishing assigned tasks and to direct the action necessary to accomplish the mission. It consists of 5 phases: Initiation, Orientation, COA Development, Plan Development and Plan Review. Canada. Department of National Defence, *CF Operational Planning Process*, B-GJ-005-200/FP-000.

13 Mission-oriented command, or what the Germans call 'Auftragstaktik' is a . . . leadership and command philosophy that demands decisions and action at the lowest level of command where there is an intimate knowledge of the situation and the commander's intention in beginning of an operation. The mission order is merely a technique that is used to implement and execute mission-oriented command. Lt Col John Silva, *Auftragstaktik-It's Origin and Development*, Infantry (Sep-Oct, 1999). p. 6-9 (excerpts). [cited 17 January 2005] Available on-line: <http://www.baldefcol.pims.org/documents/bdcol_auftragstaktik.html>.

14 Paul Martin, the Prime Minister of Canada, stated that a 3-D approach — the integration of diplomacy, defence and development — will serve as the model for Canada's

involvement in international crises in the future. Canada. Office of the Prime Minister. PM announces measures to support Canadian Forces abroad, News Release, (14 April 2004). [cited 20 January 2005] Available on-line: <<http://pm.gc.ca/eng/news.asp?id=173>>

15 'On October 10, 1997, General Krulak articulated his vision of the three-block war in a speech before the National Press Club. He predicted [that] in one moment in time, our service members will be feeding and clothing displaced refugees, providing humanitarian assistance. In the next moment, they will be holding two warring tribes apart - conducting peacekeeping operations — and, finally, they will be fighting a highly lethal mid-intensity battle — all on the same day . . . all within three city blocks.' Cited in Reuben E. Brigety's paper *From Three to One: Rethinking the "Three Block War" and Humanitarian Operations in Combat*. Found on-line at <http://atlas.usafa.af.mil/jscope/JSCOPE04/Brigety04.html>. Cited 20 Jul 2005

16 Op. Cit. However, in an updated version of the same paper the statement is qualified by the additional comment that a list of more frequently applicable effects may be appropriate; an issue that will be investigated in the future.

17 For a discussion of the concept of 'blind spots' see Walter Lippmann. *Public Opinion*. New York: Free Press, 1965. Chap VIII.

18 The argument that this new type of targeting is essentially based on an older way of thinking refers to the many lessons identified and lost from Sun Tsu, Napoleon, Ghenghis Khan et al.

19 This is essentially the thrust of the UK's Effects Based Approach.

This article has been republished online with Open Access.

Ministry of Defence © Crown Copyright 2023. The full printed text of this article is licensed under the Open Government Licence v3.0. To view this licence, visit <https://www.nationalarchives.gov.uk/doc/open-government-licence/>. Where we have identified any third-party copyright information or otherwise reserved rights, you will need to obtain permission from the copyright holders concerned. For all other imagery and graphics in this article, or for any other enquires regarding this publication, please contact: Director of Defence Studies (RAF), Cormorant Building (Room 119), Shrivenham, Swindon, Wiltshire SN6 8LA.

 **ROYAL
AIR FORCE**
**Centre for Air and
Space Power Studies**

OGL