

# One of the Basic Questions of Warfare: The Levels of Control of Airspace

CSENGERI János<sup>1</sup>

*In my essay I present the conceptual appearance of the levels of the control of the air, from the early 2000s until present day. As a result, from present day on we can be familiar with some new ideas about the possession of the airspace and we may use new concepts. I submit the framework of fighting and achieving control of the air and demonstrate through some questions the problematic ideas and thoughts about air dominance.*

**Keywords:** *control of the air, air dominance, air superiority, air supremacy, counter-air operations*

## Introduction

During my work at the university, at the presentations about the air force operations of military officers who return to the school bench in order to finish their qualifications (besides many other things) the question of the dominance over the airspace continuously arises, which topic results in many debates. Due to only the wide-spread world view of these days, nota bene, that the fight for the dominance of the airspace means the first phase of warfare, it (falsely) entails the conclusion in the presenters that the corps of the air force is above the ground forces or the navy. In my opinion, this conclusion is not correct. In the following paper it will turn out that this activity is accomplished indirectly in the interest of ground and other operations, for the development of further successes, that is, we speak about a supporting task of protective final result that we execute in a defensive manner.

In my paper, that is, the levels of the dominance over the airspace will be the protagonists. The new investigation of the topic is not only justified by the above mentioned debates, but also by the renewal of the air force doctrines of the past (2–3) few years. The current American, British, American and NATO doctrines are all new editions in which new concepts and somewhat different approaches from earlier appear. Learning from the experiences of my further research, I would like to present aspects that have been dealt with less up to now.

In the article I tangentially must mention some details of air operations, since this is the activity within the framework of which we fight for the possession of the airspace.

## The Basics

Similarly to general practice, I also begin with the presentation of earlier writings and pieces of literature. We can find a considerable quantity of works by both Hungarian and foreign authors on the topic. Several of them are relevant parts of different wars, and less of them deal with the theory itself. I myself chose the last topic to speak about.

<sup>1</sup> [National University of Public Service; Hungary, Budapest; e-mail:csengeri.janos@uni-nke.hu](mailto:csengeri.janos@uni-nke.hu)

For example, in the Hungarian literature I would like to mention the work by the authors Ruttai, Kálmán, Krajnc entitled “A légtér feletti ellenőrzés képességének szintjei” (The levels of control of the airspace) [11: 125–131] from 2002, and among others, also by the above authors the “Légierő Hadművelet Elmélet I. kötet (egyetemi tankönyv)” [1] from 2000, and as a foreign source, my starting point is the work entitled “AJP 3.3 Joint Air and Space Operations Doctrine” published in 2000.

Several foreign writings (journal articles) do not diversify the levels of dominance over the airspace and apply the different degrees as synonyms of each other. Oddly enough, some of them mix the levels of the possession of the airspace with the concept of air operation, concretely the concept of “air superiority” with the “*offensive and defensive counter-air operations*”, creating confused concepts with it. Like this the expression “*offensive air superiority*” and “*defensive air superiority*” came into existence [13: 969–975] [14: 82–96] these fortunately (according to my experience up to now) are not very wide-spread.

The earlier doctrines (Air Force Basic Doctrine – USA; [16] AP-3000 Air Power Doctrine – GBR; [21] AJP-3.3 Joint Air and Space Operations Doctrine – NATO [19]) and the Hungarian pieces of literature define three levels of the degree of the possession of the airspace:

Table 1. The conceptual appearance of the dominance over the airspace in the technical literature at the very beginning of the 2000s. [11] [1] [19]

	Ruttai, Krajnc, Dudás [11: 130]	“Légierő Hadművelet Elmélet” (Air Force Operation) [11: 48] [11: 58]	AJP 3.3 [19: 4–1] [19: 4–2]
Favourable air situation	<i>“It means the state when the air force of the opposite party at a certain part of the battlefield is not able to limit the activity of the other party with effective counter-activity.”</i>	<i>“The opposite air endeavours are not enough to unfavourably influence our own success.”</i>	<i>“A favourable air situation is one in which the extent of the air effort applied by the opponent’s air assets is insufficient to prejudice the success of friendly maritime, land or air operations.”</i>
Air superiority	<i>“When the air force of the opposite party is not able to limit the activity of the other party with effective counter-activity at any part of the battlefield.”</i>	<i>“In a given time or in a defined territory of the operational area the opposite air force is not able to continuously and persistently have effects and its freedom of actions is also limited.”</i>	<i>“Air superiority is that degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea and air forces at a given place and time without prohibitive interference by the opposing force.”</i>

Air supremacy	<i>“When the air force of the opposite party is already unable to effectively resist or influence the results of operations.”</i>	<i>“Our own air force is capable of activity against the enemy without an obstacle, and the offensive air force is not able to considerably endanger our own potential any longer.”</i>	<i>“Air supremacy is that degree of air superiority wherein the opposing air force is incapable of effective interference.”</i>
---------------	---	---	---

We can establish that the appearing concepts as for the possession of the airspace (Table 1) are essentially the same. We can observe one difference: between the concepts *“favourable air situation”* and *“air superiority”* appearing in the work by the authors Ruttai, Krajnc, Dudás, compared to the textbook and the AJP 3.3. Namely, in the journal article the favourable air situation appears as a state that, according to the definition of the two other sources, is the definition of air superiority.

In the diagram below (Figure 1) I did my best to portray the levels of the dominance over the airspace. First we have to notice that, any level of air dominance expresses how (in a certain degree) the activities of the countering air force can influence our own air, land or maritime efforts.

On the left side we can see the favourable air situation: since the concept does not define any temporal or spatial frame here, we have to interpret it onto the whole area of operation, that is, the blue colour symbolizes that our own troops or the effects of our activity can be present at the whole concerned territory. The red contour expresses that we can be reached by enemy effects at any place, but they are unable to obstruct our operations solely with the help of their air force. In the middle I portrayed air superiority where we in a given time and space (blue squares) possess the airspace, but in these parts of space we can also count on air strike or influences (smaller red squares). Finally, on the right side, we can see the schematic portrayal of air supremacy where we dominate the whole airspace, but with time we can encounter the movement of the enemy air force, their disturbing activity, perhaps its attack. Furthermore, we can also establish that none of the levels guarantees the complete victory, they only describe in what degree the attack of the enemy air force will have (a decreasing) effect on our activities.

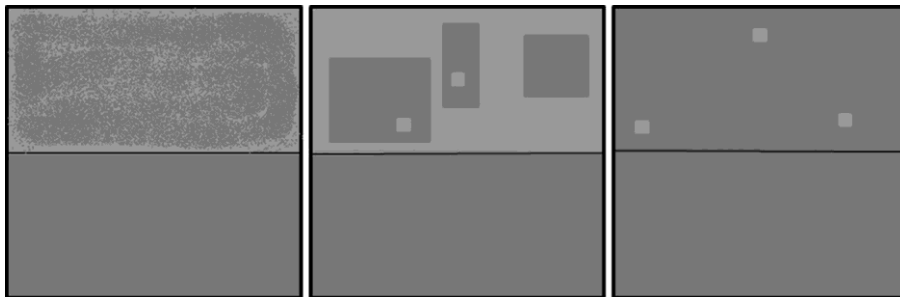


Figure 1. The portrayal of the levels of the dominance over the airspace – schematic diagram.  
[Source: the author’s own edition]

Several theoreticians who deal with air force – already in their theoretical works published in the early period of aviation – conceived the essential nature of air dominance in future armed conflict where already flying assets, that is, air force would be applied. Those whom we can mention (without the demand of completeness, selecting from among the authors of the beginning of the 20<sup>th</sup> century and later periods) are: the Italian general Giulio Douhet, [6: 11] the British Air Marshall Lord Hugh Trenchard, [3: 19] the American colonel of aviation Philippe F. Mellinger, [2: 750] the American colonel of aviation John A. Warden III, [10] etc.

If someone is interested in the topic more deeply and is curious how it is thought about in details, illustrated with historical examples, conflict analyses, the following pieces of literature can be useful:

- John C. Slessor: *Air Power and Armies*, [9: 1–60]
- Arthur W. Tedder: *Air Power in War*, [4: 29–52]
- Craig C. Hannah: *Striving for Air Superiority*, [5]
- John A. Olsen: *John Warden and the Renaissance of American Air Power*, [8: 64–82]
- John A. Olsen (Ed.): *A History of air Warfare*. [7: 127–155]

### Thoughts about the Levels of the Possession of the Airspace

After presenting the essential pieces of literature, I would like to make some observations and statements, and I examine a few questions to which I will not be able to give exact answers in all of the cases.

In this part of the research paper, at least, I would like to explain some aspects of the terminology. As it was already outlined by the three authors Ruttai, Krajnc, Dudás, it is much more advised to use the expressions the “*levels of possession of the airspace*”, “*levels of airspace dominance*” or “*levels of control of the air*” because with the terminology or “*air-space control*” we can cause confusion, since the airspace control most of the times means the observation of the airspace with radio-location pieces (radars).

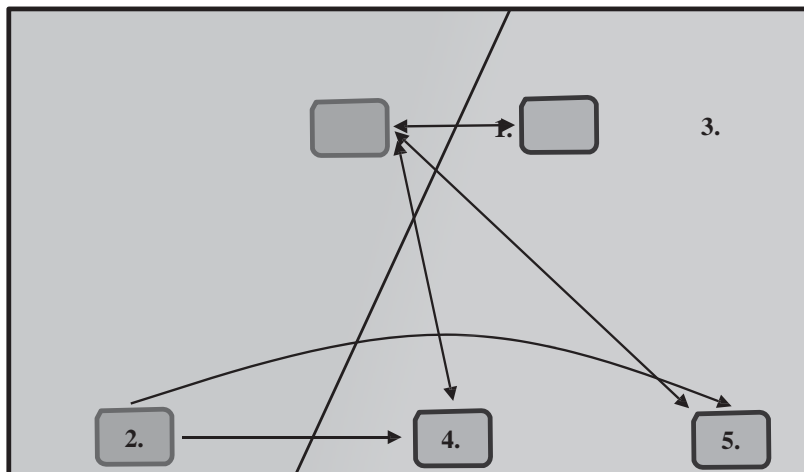


Figure 2. The relation of the participants of offensive air opposition – schematic diagram.  
[Source: the author’s own edition]

We do not only execute the fight for the dominance over the airspace for the sake of the support of own operations of the air force, but for both the provision of the freedom of manoeuvre of the land forces and the navy. [20: 0401] Consequently, the fight of any level of dominance in the airspace should be treated as a joint task and intent of all of the armed forces. In point 0403, paragraph “g” of the above referred, current NATO Allied Joint Doctrine for Counter-Air we can read that among the tool of offensive counter-air (the aim of which is some degree of possession of the airspace above the enemy area) is also the land and maritime fire support, including artillery, the support of the organic air force of the land and/or marine forces with controlled and non-controlled ground-to-ground missiles. Among the tasks of offensive counter-air, beside the “fighter sweep” and the “escort” we can find two types of task in which the troops of the land forces and the navy can definitely effectively cooperate. One of them is “attack operations”, the other is “the suppression of enemy air defences” whose targets are surface or underground objects that we can destroy with the help of the above mentioned sources with great effectivity, which contributes to the possession of the airspace to a large degree. These targets are the following: aircraft stationing on the ground, airports, aircraft carriers, tactical ballistic missiles, cruise missiles (certainly, in the state before their launch), rocket launching devices, electronic warfare systems, air command and control systems, and so on.

The other type of air warfare is “defensive counter air operations”, in this case the aim is to preserve dominance over the airspace above the own territories, that is, the prevention of the activity of the enemy that they should be able to obstruct any level of possession defined up to now. Characteristically, the targets will be the above enumerated, but our own vehicles, furthermore, we have to expect attacks arriving from other directions (enemy land and naval fire support).

On Figure 2 I schematically present the participants of the offensive counter-air operation. The arrows that can be found at the end of the lines connecting the elements symbolize the relations of impacts. The elements are the following:

1. Our own air assets: fixed- and rotary-wing air vehicles, aircrafts that are definitely suitable to suppress the enemy air defence, unnamed aerial vehicles (UAVs);
2. Own surface-to-surface guided missiles, cruise missiles, special operation forces, surface fire support (artillery, navy);
3. The adversary air assets: fixed- and rotary-wing aircraft, unnamed air vehicles;
4. Tactical ballistic missiles of the enemy, their surface-to-surface guided missiles, launching and control systems of unmanned air systems, their ground-based air defence;
5. The airports of the enemy with their essential infrastructural elements (runways, taxiways, navigation systems, logistical institutions), aircrafts stationing on the ground and finally command, control, communication elements. [20: 0403]

The greatest problem – in my opinion – with the definition of the level of dominance that there are no concrete measuring numbers or ratios with which we can express to which degree we possess the airspace. Mainly not in the mirror of the fact that in the NATO Allied Joint Doctrine for Counter-Air, we find a statement after the definition of the levels that conceives in the following way: “It should be understood that neither air superiority nor air supremacy implies that losses will not be inflicted by an enemy. It is the level of interference in relation to achieving the objective caused by the enemy’s air operations that is the focus.” [20: 0201]

Some questions that we can pose after all of this:

1. From where do we know that we have reached a certain level?
2. From where do we know which level we have reached?
3. If it seems that we have reached it, is it possible that the enemy simply does not employ their air and air defence vehicles, just protect them?
4. Is it necessary at all that we should fight for some level?
5. With what kind of system of assets do we fight for the possession of the airspace?

In the following parts of the paper I make an attempt to find the answers to the questions, although it seems that it is not possible to give an exact definition to all of them.

1. It is evident that before we start fighting against the enemy we will have information about them and we will do further reconnaissance and intelligence activities. As a basis for the air operations, in the first step we try to take control over the airspace. Based on our previous information (that will be refuted or specified during the operations) we will gain a fairly sharp image about the air force and air defence potentials of the opposite party. As we assess the results of the strikes and operations with it, we will already be able to calculate for the level that we gained, and for the fact that with the help of the rest how strong resistance we have to count on. In homeland airspace, at the beginning of the conflict we make an evaluation of what degree we possess and dominate our own airspace. In the future, following the chain of thoughts above, we continuously re-examine whether we maintain this dominance or our influence has decreased.
2. Together with the previous paragraph we have partly answered this question. Between the favourable air situation and the air superiority, the essential difference is that while in the case of favourable air situation, the enemy is able to disturb our activity to a larger degree, in the case of air superiority (true, only in relevant place and/or time) the enemy is unable to effectively obstruct our activities. That is, it can be concluded from the information and enemy sources how large the air danger is we have to operate in, and like this it can be decided whether we have already obtained the air superiority that has become the basic condition of several operations by today.
3. If we consider only the activities done by the enemy (and we do not consider the difference between the original and the destroyed air potentials), then in certain cases we can evaluate the evolved situation in a way that we dominate the airspace. It can take place if the enemy, in order to protect them, does not deploy their air force and air defence vehicles, as a “*passive defensive counter-air*” measure (moving, concealing, disguising) so that they could be able to apply them in a further period of the war. We can evaluate it as air superiority, since in a given time they do not operate against us effectively, but it is necessary to calculate with the fact that in the future the remaining weapon systems will mean further threat to us.
4. Perhaps the chain of thoughts should have been begun with this question. The possession of the airspace above the territory of the enemy must be fought for, but at least it must be possessed. Without any offensive counter-air activity we cannot state that we are the lord in a certain part of the space. However, we have to define the level of intensity of the operations, since against a weak or non-functioning air force it can be enough to apply only smaller force. As part of a composite air operations, the possession of the airspace can be realized with the help of certain aircraft selected for this task within the group, and it can be achieved with the help of “*fighter sweep*” or

“escort” aircrafts selected for the task. At first, we obtain the local air superiority, then we extend it to the whole operational area, realizing the dominance over the airspace. The definition of intensity is important, because if we mobilize too many sources to this aim, we superfluously occupy our aircraft that could also execute other (attacking) missions.

According to certain views, the disposition over the airspace is not a key task, if we possess a small number of air force. In this case, we have to apply the available forces for “strategic air operations” and “air interdiction operations”, and like this, we can achieve more serious results for the whole war. Namely, the small number of air vehicles cannot fight effectively against a more serious enemy. Still if we are selected for the execution of air warfare operations (during which, beside insignificant results, we would soon lose these of our forces), we can speak about wasted sources. [12: 55–63] If the Hungarian Air Force should face an air force that has a larger number than it does alone, then it would be appropriate for us to use this kind of warfare method.

5. In the first two points of the elements of Figure 2, I have already described most of the vehicles in the fight for dominance, however, all of it must be supplemented with an effective command-control systems and different electronic and information warfare vehicles.

## The Conceptual Appearance of the Level of the Possession of the Airspace in Current Doctrines

United Kingdom of Great Britain and Northern Ireland – *UK Air and Space Doctrine 2013*.

In the newest British air and space force doctrine, the concept redefined as the “control of the air” that can be found at the role of “control of the air” is a new concept for the dominance over the airspace. No levels are separated from each other, only a general concept is conceived, but at the description of the aim of the role it is called the most important role, explained with the fact that the freedom of manoeuvre and action is provided by this. [22: 3-3-3-6]

Concept: “Freedom, over a given period of time, to use a volume of airspace for our own purposes while, if necessary, denying or constraining its use by an opponent.” [22: 3-3-3-6] It is interesting to observe that the British do not classify

the disposition over the airspace

as the result of air warfare, but an earlier result has become a role today, and the air warfare has shifted into a kind of subordinated role. It serves for realization, so the aim, the possession of the airspace was highlighted. This tendency can later overwrite the logical system in the doctrine, and in a few years the effects may be highlighted, and the activities will be subordinated to them. For example: breaking the will of the enemy (as an expected effect) – the operations necessary to achieve it are: strategic air operations, air interdiction.

The United States of America – *Air Force Doctrine Document 1, 2011*.

Similarly to the British doctrine, the American one does not layer the levels of dominance either. The concept of air superiority has remained the same definition as in the edition of 2000 of AJP 3.3. Another similarity is that the air warfare operations appear in the subordination of air superiority as a central air force function. [17: 45]

What I would stress here – reinforcing what was described about the British doctrine – is that in this edition it is already established, at the chapter about the use of the doctrine, that



the expected effect is the significant factor, and not the way we achieve it or the asset by which it is realized. [17: 5]

North Atlantic Treaty Organization – *AJP 3.3 (a) Allied Joint Doctrine for Air and Space*

*Operations*

From among the doctrines outlined as new in the present paper, it is the oldest, it was published in 2009, and at the moment a new version is being elaborated. [15: A-1] In the doctrine itself, the levels of the possession of the airspace do not appear, only as aims at the air warfare operations, [18: 1-6] they do appear in the in the NATO publication that outlines the counter-air operations themselves, in *AJP 3.3.1*. [20: 2-1] There is no difference in the definitions compared to the earlier *AJP 3.3*.

Commonwealth of Australia – *The Air Power Manual*

I deliberately left the Australian doctrine to the end, since we can encounter most novel- ties here. Not only do we find the levels, but also new definitions were published. They do not only interpret the question of dominance in a way as to how much we are above the enemy, but two further concepts that express what neutral or negative state has evolved to our disad- vantage in the fight for the airspace were also defined.

Table 2. The concepts of dominance over the airspace appearing in the Australian doctrine of air operations. [Based on 23: 52]

The level of possession of the airspace	Air supremacy	Air superiority	Air parity	Unfavourable air situation
Definition	“Air supremacy exists when adversary air power and/or air defence capabilities are incapable of effective interference, unbounded by time and location.”	“Air superiority exists when operations can be conducted at a given location for the desired duration without effective interference by adversary air power and/or air defence capabilities.”	“Air parity exists when control of the air is being contested and no force has been able to obtain an air power advantage and/or air defence dominance over another.”	“An unfavourable air situation exists when operations can expect to encounter prohibitive interference from adversary air power and/or air defence capabilities.”

It can be seen also based on Table 2 that two new concepts were introduced. The content of air dominance and air superiority did not change, but favourable air situation left the terminology. The state in which the fight for the airspace is still in progress, or the parties cannot overwhelm each other in air dominance can be called “*air parity*” from here on. If we can count on considerable, even hindering counter-activities, in this case we can name this state with the definition “unfavourable air situation”.



That is, if two large-sized air forces with nearly equal potential fight against each other, where the fight for the airspace will not be decided in a few hours or days, air parity will evolve. Furthermore, in a case where a small air force is forced to face a larger one and applies the tactics outlined above, that is, they do not execute air warfare operations, but attack immediately in the depths of the enemy, then they will have to operate in unfavourable air situation, beside the air force and ground based air defence threat from the part of the enemy.

## Summary

In my work I presented the interpretation of the levels of possession of the airspace at the beginning of the 2000s, and after the “wave” of the renewal of the doctrines that has taken place not long ago, it became necessary once again to outline these concepts, mainly because we can discover new concepts in them. As far as I know, the newest air and space power doctrine of NATO is being elaborated also at the moment, and not even a draft version is available of it, so it remains a question how the topic of the dominance over the air force will appear in it.

I did my best to, with the help of figures, make the differences between the levels observable, and I included the concepts in charts that help the reader to clearly distinguish them from each other.

I made an attempt to answer questions that often arise in this topic. I highlighted that the goal of the dominance over the airspace is to guarantee not only the freedom of action of the air force, but also the troops of the ground forces and the navy, not in a smaller degree than the first one. In accordance with all of this, in fighting for dominance (in two types of mission from among the four ones) the two last corps can also take their own part and must also take their own part. In the lack of that certain “defensive umbrella” it is not only the land forces that have to be patient when beginning their activity, but also the offensive troops of the air force, since without them there is vulnerability to a large degree.

## References

- [1] KURTA G. (Ed.): *Légierő hadművelet-elmélet I. kötet*. Budapest: Zrínyi Miklós Nemzetvédelmi Egyetem, 2000.
- [2] KRAJNC Z., JENEI I.: „Tíz állítás a légierővel kapcsolatban” – Philippe S. Meilinger légierő értelmezése. *Repüléstudományi Közlemények*, XXV 2 (2013), 749–760.
- [3] SZÜCS P., KRAJNC Z.: Hugh Trenchard légierő értelmezése. *Repüléstudományi Közlemények*, XXVI 1 (2014), 18–24.
- [4] TEDDER, A. W.: *Air Power in War*. London: Hodder and Staughton, 1947.
- [5] HANNAH, C. C.: *Striving for Air Superiority*. Laredo: Texas A and M University Military History Series, 2002.
- [6] DOUHET, G.: *A légiuralom*. Budapest: Zrínyi Miklós Katonai Akadémia, 1971. [7] OLSEN, J. A. (Ed.): *A History of Air Warfare*. Dulles: Potomac Books, 2010.
- [8] OLSEN, J. A.: *John Warden and the Renaissance of American Air Power*. Dulles: Potomac Books, 2007.
- [9] SLESSOR, J. C.: *Air Power and Armies*. Oxford: Oxford University Press, 1936.

- [10] WARDEN III., J. A.: *The Air Campaign – Planning for Combat*. Washington D.C.: National Defense University Press Publication, 1988. (Air Superiority – The Concept)
- [11] RUTTAI L., KRAJNC Z., DUDÁS Z.: A légtér feletti ellenőrzés képességének szintjei. *Repüléstudományi Közlemények*, 2 (2002) Különszám, 125–131.
- [12] D'ODORICO, J. C.: Air superiority: A sine qua non? *Air and Space Power Journal*, 19 3 (2005), 55–63.
- [13] YILDIZ, K., BICIL, M., AKKAYA, S., İSTEK, Y.: Concepts for air supremacy & essential capabilities for modern air superiority assets. *Scientific Research & Education in the Air Force – AFASES*, 1 (2012), 969–977.
- [14] CONIGLIO, S.: Air supremacy options. *Military Technology*, 34 7 (2010), 82–96. [15] *AAP-47, Allied Joint Doctrine Development*. Edition A, Version 2. Brussels: NATO Standardization Agency, 2013.
- [16] *Air Force Basic Doctrine, Air Force Doctrine Document 1*. Alabama: Headquarters Air Force Doctrine Center, Maxwell AFB, Agency for Standardization, 1997. [17] *Air Force Doctrine Document 1*. Maxwell: LeMay Centre, 2011.
- [18] *AJP 3.3 (a) Allied Joint Doctrine for Air and Space Operations*. Brussels: NATO Standardization Agency, 2009.
- [19] *AJP-3.3 Joint Air and Space Operations Doctrine*. Brussels: NATO Military Agency for Standardization, 2000.
- [20] *AJP-3.3.1 (B) Allied Joint Doctrine for Counter – Air*. Brussels: NATO Standardization Agency, 2010.
- [21] *AP 3000 British Air and Space Power Doctrine*. 4<sup>th</sup> Edition, London: British Ministry of Defence, Air Staff, 2003.
- [22] *Joint Doctrine Publication 0-30 UK Air and Space Doctrine*. London: Ministry of Defence, The Development, Concepts and Doctrine Centre, 2013.
- [23] *The Air Power Manual*. 6<sup>th</sup> Edition, Canberra: Air Force Development Centre, 2013.