

# How raf turned the tide against german luftwaffe



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Current practices of air warfare in the world have developed drastically. It cannot be denied the world today is at the advent of an 'arms race' where some countries develop and acquire latest fighter air assets either for the purpose of territorial defence or to some extent, show of military might. In the wake of the new millennium, air power is evidently becoming the dominant factor in offensive and defensive military actions across the globe.

Historically, the struggle for air superiority began in what seemed to be the first and major air campaign during World War II. It was launched by the German Luftwaffe towards Britain's Royal Air Force (RAF) during the summer of 1940. This large scale air offensive was called the 'Battle of Britain'. This famed air campaign has caught the attention and generated much interests among military researchers the world over simply because the 'Battle of Britain' is seen to be the turning point in military aviation history.

The battle officially began on the 10th of July 1940, shortly after the Germans successfully invaded France. It ended on 31 October, 1940. It is proclaimed as the first battle to be decided purely in the air and was the first real test of using air power as a defensive and offensive weapon. The 'Battle of Britain' is an effort by the Germans to invade Britain through the use of air superiority. The task of the Luftwaffe was to weaken the Britain's air defense before any successful amphibious assault or land invasion can take place. However, the RAF successfully defended Britain against the German attack by the effective and efficient use of defensive and offensive counter-attack through the projection of air power. Over the course of the battle, the Germans were eventually defeated.

## **RESEARCH PROBLEM**

This research will focus on how RAF turned the tide of war against the superior German Luftwaffe.

## **AIM**

To examine the factors that led to the success of RAF against the German Luftwaffe during the Battle of Britain.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **Battle Of Britain Overview**

‘ Never in the field of human conflict was so much owed by so many to so few.’

British Prime Minister Winston Churchill paid tribute to the British airmen of the Royal Air force (RAF) Fighter Command with these words in a speech to the House of Commons. These brave airmen are generally credited with saving Britain from a German invasion in the summer and fall of 1940, and they no doubt played a pivotal role in the defense of Britain (Colville, 1985). The importance of their skillful and determination performance in the famed Battle of Britain is universally recognized (Buckley, 1999).

However, another group of people was also instrumental to the defense Britain. The inventors and developers of some remarkable new technological advances were equally decisive in protecting Britain from German invasion (M. D, 2000). Radio Direction-finding And Ranging (RADAR), Identify Friend or Foe (IFF), and a remarkable Fighter Control System were essential element

of the defense, as were developers of the Spitfire and Hurricane aircraft (Bungay, 2000).

The gravity of the coming air battle was clear to all concerned, on both sides of the English Channel. Bungay (2000) discovered that if the British were successful in repelling Germany's air attack, it would be almost impossible for the Germans to launch an invasion attempt. On the other hand, if the Luftwaffe defeated Britain fighters and gained air superiority, it would be equally impossible for Britain to successfully defend against attack. If the Luftwaffe successfully defeated RAF's Fighter Command, German bombers could then destroy Britain's ground defenses, leaving Britain at the mercy of the Wehrmacht (Bellamy, 2009). Clearly the Battle of Britain would be among the most decisive encounters of World War II.

Air Chief Marshal Sir Hugh Dowding, Commander-in-Chief of the RAF's Fighter Command estimated that he would need a minimum of fifty two squadrons' fighters to defend Britain from invasion. By the end of the Dunkirk evacuation, Fighter Command's effective fighting strength had been reduced to twenty six squadrons, half of the force he though would be required to protect Britain (Bellamy, 2009).

Hitler had hope to avoid the necessity for an invasion of England and put out several peace feelers to London, which were clearly rejected by Winston Churchill. Following the rejection of Hitler's ' appeal to reason' in July 1940, the German high command felt there was no other recourse than to let guns speak. In July 1940, Hitler issued Directives No. 16, which stated:

“ Since England, inspite of her hopeless military, shows no signs of being ready to come to a compromise, I have decided to prepare a landing operation against England, and, if necessary, to carry it out.

Thus Operation Sea Lion, as Germany named its plan for the invasion of England, was set into motion. Expecting some three months of good weather prior to the arrival of the autumn storm season that would make the invasion impossible, the Luftwaffe began preparing to execute the plan. The tried and true formula of destroying of the enemy air force, followed by the rapid advance of ground forces supported by aggressive air attacks had worked well from the Poland campaign onwards, this was planned method to be employed in the invasion of England (Deighton, 1980). The only difference in the German estimate was that since the RAF was the largest air force yet encountered, its destruction would take longer than the usual 12 to 48 hours allotted to previous air forces (Battle of Britain Historical Society , 2007).

## **ANALYTICAL FRAMEWORK**

### **IV**

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From our observation, there are two factors that led to the success of RAF against the German Luftwaffe during the Battle of Britain. The first factor is Integrated Air Defence System (IADS) and the second factor is Aircraft Technology. This two factor will be discussed in the next chapter which contain all the element that contribute to successful of the RAF.

## CHAPTER 3

### DISCUSSION

#### Figure 1: IADS Organization Structure

#### INTERGRATED AIR DEFENCE SYSTEM

Nowadays battlefield, duel between the IADS and the suppression of enemy air defence is consider the most important factor that determine the accomplishment of the battle.

An integrated air defense system (IADS) is a system of command, control, communication and intelligence (C3I) that integrates all anti-aircraft sensors such as radar, visual observation post, airborne early warning aircraft (AEW) as well as anti-aircraft weapons for instance of interceptors, air superiority fighters, anti-air-aircraft artillery (AAA) and surface-to-air missiles (SAM) (Buckley, 1999). The control is more or less decentralized more often depending on the particular national doctrine. Malaysian doctrine is concerned with de-escalation, however allowing a fighter pilot to pursue the final attack under their discretion. In the other hand, Soviet and Iraq doctrine were more centralized and creating less flexibility for the pilot.

Battle of Britain witnessed the first operational IADS ever implemented without any computer assistance other than in the defenders brains, although the term itself had not yet been invented during that era (Bungay, 2000). The biggest mistake that the Germans did is not seeing the British system as a system. They overlooked the most critical and vulnerable part which is the command and control center that integrates the sensors and weapons. Germans often consider airfields, radars, and others as enemy vital

point, even though some of the German radars of the time were more advanced, but were not as well integrated (Cox, 1991).

During battle of Britain, Integrated Air Defence System has been established based on these 4 primary elements. This is consist of Radar (Air Defence), Anti-aircraft-artillery, the Observer Corps and the balloon command (Deltaweb International Ltd 2004, 2005). Moreover, the anti-aircraft-artillery command is capable of conducting the searchlight operations which very useful during German night raids.

## **Radar**

The main factors that contribute the success of the air defences during the Battle of Britain were the early warning system known as Radio Detection and Ranging (RADAR).

### **Picture 1: Radar Operator**

British realize that improvement in early warning techniques is equally important, coherent with the development of a new generation of fast monoplane fighter aircraft to prevent an air attack (M. D, 2000). Since Britain was so close to the continent and combat air patrol (CAP) missions were too expensive to deploy constantly, some method was required to warn the defences as quickly as possible as the approach of any hostile air raid.

The first science of the detection and location of aircraft by radio beams made such a swift progress from the first experiments in February 1935 that exactly five years later a series of coastal radar stations layer the east and south sides of the country was operational (Feltus, 2001). At 10, 000 feet, intruders could be detected at ranges of 50-120 miles. As ranges for low-  
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flying aircraft were much shorter, a string of Chain Home Low stations to detect aircraft flying at 1, 000 feet and below was built after the war began.

The Germans made a strenuous attack on radar stations in Kent, Sussex and the Isle of Wight on 12 August and a few uncoordinated raids thereafter.

Apart from the impenetrability in destroying the open, network structures of the transmitting and receiving masts, the Germans never fully understood the crucial role of radar to the British and, therefore, did not place the highest of priorities on its demolition (Bungay, 2000).

Radar was the eyes of Fighter Command, even though it would have been unable to see incoming raids early enough to direct defending fighter to intercept. But its efficiency was greatly enhanced by being only one element of, and integrated into, a sophisticated command and control network which received the raw information of radar plots and rapidly applied it to direct the use of precious resources of pilots and aircraft to the best possible effect.

### **Anti Aircraft Command**

It is formed on 1 April 1939 and its late entry on the scene was to handicap it all over the Battle. At the end of July 1940, it had only a half of the heavy and less than a third of the light anti-aircraft guns considered essential even before the Germans occupied France and the Low Countries. It was used to protect aircraft factories, airfields, ports, naval bases and industrial areas, but priority had to be given to the first of these. From 7 September, when the Germans launched their assault on London, many guns had to be switched immediately to its defence.



The anti-aircraft forces were incorporated with Fighter Command and operational control was in the hands of Air Chief Marshal Dowding who had an outstanding working relationship with the head of Anti-Aircraft Command, Lieutenant-General Sir Frederick Pile. The anti-aircraft guns shot down approximately 300 German aircraft during the battle.

Searchlights. Operated with the gun defences, were active against German raids which flew over Britain on most nights from the beginning of June onwards. They were more plentiful than guns, nearly 4, 000 being available towards the approved total of 4, 128. In daylight they had the important function of reporting air activity to the gun operations rooms.

## **Picture 2: Observer Corps**

### **Observer Corps**

A group of civilian volunteers formed in 1925 which had a crucial role to play. The series of coastal radar stations was very effective at plotting raids of incoming hostile aircraft, but it was blind once hostile raiders crossed the coast. Inland, the whole responsibility of the accurate tracking of German aircraft relied on the Observer Corps.

Enthusiastic, mostly voluntary and required to be on duty outdoors in all weathers, members were also largely self-taught in the crucial skills of aircraft recognition and height assessment. When the war broke out, there were 30, 000 observers and 1, 000 observation posts which were manned constantly (Deltaweb International Ltd 2004, 2005). Information went first to an Observer Corps Centre and then straight to Group and Sector Operations

Rooms. The system is rather effective when the weather was fine, however it will degraded when rain and low cloud were present (Bellamy, 2009).

## **Ballon Command**

This unit was formed in November 1938 to operate barrage balloons over the most exposed targets. The development was rapid that, by the end of July 1940, 1, 466 balloons were in service, 450 of which were required to defend London itself (Bellamy, 2009). The main objective of the balloons was to force German aircraft to fly higher in order to reduce bombing accuracy and thus bringing them within range of heavy anti-aircraft guns. Balloons were principally effective against dive bombers.

## **The RAF Fighter Command And Control System**

Command and Control is defined as an application of power and guidance by an appointed commander over a military force in order to achieve fulfilment of a mandated mission. Often called as C2, it involves the effective and efficient employment of personnel, equipment, communications, facilities, and procedures employed by a commander through as series of activities that involve planning, directing, coordinating, and controlling forces and operations directed towards mission accomplishment. In its employment in military operations, C2 has been considered as a force enabler (Deighton, 1980).

Command and control encompasses three categories, namely personnel, technological element and processes. The category on personnel covers all aspects of the human resource requirement, while, the technology element includes the equipment communications, and facilities that are essential in

the conduct of the mission. It is imperative that the commander must be able to coordinate and integrate all these elements to make them ready, competent and available at all times when the mission or the situation warrants.

The Fighter Command of Great Britain's Royal Air Force was established in July 1936 under the command of Sir Hugh Dowding. This was part of RAF's reorganization efforts in reaction to the growing tension brought about by Germany's expansion in Europe. With the Fighter Command headquarters stationed at the Bentley Priory in Stanmore, Middlesex, this unit was established along with the other RAF components namely: the Bomber Command and Coastal Command. At the heart of the British air defence is a complex fighter control system known as the 'Dowding System', the brainchild of RAF Fighter Command's leader (Colville, 1985).

In the Dowding System, Fighter Command was divided into four groups, each of which taking responsibility in guarding a specific geographical area of Britain. Number 10 Group is responsible for Wales and the south-west of England; Number 11 Group controlled London and the south-east; Number 12 Group covered the Midlands, East Anglia and northern England up to Yorkshire and Lancashire; and Number 13 Group covered parts of northern England and southern Scotland and Northern Ireland.

Each Group is further subdivided into several sectors. Each sector consists of at least one airfield each and a Sector Control Station. These Sector Control Stations reported to its respective Group Headquarters which the Group, in turn, reports to the Headquarters of Fighter Command. This Headquarters is

located underground and it serves as a filter and communications center. It collects, collates and synthesizes the reports from each radar station and through a large map table; they plotted the course of each raid as well as the course of each RAF interceptor flight. Thus, giving commanders a real time picture of what was happen all over the country which aid in decision making.

The RAF Fighter Control System or “ Dowding System” provides for a big picture of the real time situation over British territory particularly in times of German air raids. All the radar stations, the observer corps posts and Observer Corps Centre, the balloon barrage stations, fighter airfields, direction finding stations, direction finding triangulation stations, anti-aircraft guns, Sector Control Stations, Group Headquarters, and the Fighter Command Headquarters Filter and Operations Room were linked into an integrated system that brings forth all available weapons into the command and control of military commanders and it enabled Britain to efficiently manage its limited number of fighter planes and pilots. The system was able to utilize radar information and situational awareness fully well in order to accurately direct fighters towards the right place at the proper time to negate German fighters and attack the bombers.

### **Figure 2: RAF Fighter Control System (Dowding System)**

This system also provided for unity in effort as upon warning from the Sector Controllers, balloons are hoisted into place and these balloon barrages forced German bombers to fly higher thus sacrificing bombing accuracy. Sector Controllers also alarms the anti-aircraft guns along the probable route of the bombers to be ready when the enemy aircraft came within range. And <https://assignbuster.com/how-raf-turned-the-tide-against-german-luftwaffe/>

on a more important level, the Sector Controller gives the signal for the scramble fighters from his sector airfields and directs them to the actual location of the incoming raid. This provided for efficiency and effectiveness for the RAF forces as this paved the way for the conservation of aircraft and pilots as much as possible. This system also enabled the Fighter Command to save on fuel and time instead of resorting to the costly and ineffective aerial coast patrols.

## **AIRCRAFT TECHNOLOGY**

It is summer autumn 1917 when southwest England was attack by German Gotha's bombers. At that time British Army's Royal Flying Corps is hopeless and unable to counter the attacks. This devastating attack have resulted the establishment of Royal Air Force (RAF). After this attack, with the support from the public, Britain practicing independent concept of air power, revolutionize the air force and ready for waging war against her enemy.

General Sir Hug Trenchard took the command on April 1, 1918 after the RAF established as an independent service.

During World War One (WWI), many military strategists strongly recognized the bomber as the leading weapon of modern warfare. Italy's General Giulio Douhet said:

“ A nation which has command of the air, can bomb the interior of an enemy's country so devastatingly that the physical and moral resistance of the people would also collapse. An aerial fleet capable of dumping hundreds of tons of bombs can easily be organized; therefore, the striking force and magnitude of an aerial offensive, considered from the standpoint of either

materiel or moral significance, are far more effective than those of any other offensive yet known”.

Brigadier William ‘ Billy’ Mitchell of the United States said of the remarkable potential of tactical blitzing:

“ Air power holds out the hope of the nations that in the future air battles taking place miles away from the frontiers will be so decisive and of such so far-reaching effect that the nation losing them will be willing to capitulate without resorting to further contest on land or water. Aircraft operating in the heart of the enemy’s country will accomplish their object in an incredibly short space of time once the control of the air has been established, and the month or even years of contest of ground armies with a loss of millions of lives will be eliminated in the future”.

Speaking in the House of Commons in 1932, Stanley Baldwin, the former and future British Prime Minister, said:

“ I think it is well for the man in the street to realize that there is no power on earth that can protect him from being bombed. Whatever people may tell him, the bomber will always get through. The only defence is offence, which means that you have to kill more women and children more quickly than the enemy if you want to save yourselves. I just mention that, so that the people may realize what is waiting for them when the next war comes”.

Up to this stage, British mentality was, there is no solution in implementation of any kind of defences against the bomber attack. The only oneself defence

was strategic avoidance towards German's bomber fleet which dominated Britain's air sovereignty between these two major wars.

During this era, the civilian designers have the opportunity on achieving and inventing the technology advances, new materials, new engine and manufacturing methods in aeronautical industries while RAF were too focused on bomber problem and as a resulted, they were left behind in these revolutionary change and advancement in aircraft design and production (Bungay, 2000). Due to this matter, RAF was stick to their old big plane, powered by air-cooled radial engine which capable of only 174 mph as Britain's first line fighter until 1936 (Deltaweb International Ltd 2004, 2005).

In 1933 Sir Edward Ellington become the Chief of Air Staff, followed by Sir Hugh Dowding at 1936 who appointed as Commander-in-Chief of the Fighter Command. These two RAF's general believed that it is crucial to defeat bomber attacks as they lead RAF and Britain to prepare for the incoming battle. By modernizing RAF's fighter fleet, at the end of 1937, the Fighter Command squadron was equipped with the new asset, Hawker Hurricane. The aircraft was combined with the advanced features such as retractable landing gear and enclosed cockpit. The Hurricane also able to be easily and rapidly produced in existing facilities due to its tubular metal structure and fabric skin.

The invention of Hurricane was the leading factor of the next generation RAF, from the biplanes of the past (WWI Era) towards the sophisticated Spitfires of the 1940s. Although the German's fighter, Messerschmitt Bf109 was totally outclassed the Hurricane, this Britain's beast achieved remarkable success in

the Battle of Britain. Almost 1, 715 Hurricanes joined this battle and it was claimed eight per cent of German's aircraft shot down by Fighter Command. Yet the Hurricane has its limitation in terms of speed and rate of climb other than being powerful and capable of sustaining extensive combat damage. Due to these limitations, Hurricane was assigned to attack the German's bombers while Spitfires assigned to attack their fighter escorts.

The Supermarines Spitfire was a true beauty of the RAF. This sexy piece of machine was designed by Reginald Mitchell, civilian aircraft designer, which the most remarkable and famous aircraft during World War II. It was revolutionized in several ways which featured new and complex manufacturing techniques. It was designed with the state of the art aerodynamic structure in order to perform outstanding maneuverability against the German's aircraft.

With its tight turning radius, wash-out effect for the wing, amazing flight control response and new Roll Royce engine that can exceed 400mph, it's a total beauty to fly but a beast to the enemy. With these factors, it's proven the Spitfire outclassed the Bf109. The invention of Hawker Hurricane and Supermarines Spitfire was a great investment for Britain in order to maintain the sovereignty of the airspace and to avoid German achieving air superiority as what they did on Poland and France in 1939.

## **CONCLUSION**

By combining radar, an existing technology that others had been unable to effectively employ, with their ingenious Fighter Control System and a fleet of capable fighter aircraft, the British created a comprehensive defence which



ultimately defeated Germany's onslaught. The application of technology and innovation clearly saved Britain from defeat by a military superior force.

The historical significance of successfully implementing strategic technology is as important today as it was during the Battle of Britain and it parallels the needs of a 21st century military. However, just as the British victory in the Battle of Britain actually started with inventions and innovations developed in the mid 1930's, the status of the RMAF's future as a defensive power may very well depend on technological development decisions made today.

Battle of Britain has indicated a major milestone in the development of IADS operation concurrently with enhancement of aircraft technologies based on discussion from the previous chapter. The history itself shows how significant the IADS operations and the crucial of having proper integration of all those air defence elements in order to attain and achieve any victory of air campaign.

## **RECOMMENDATIONS**

The RMAF faces an entirely different and potentially more difficult situation in the 21st century than the RAF faced in 1940. While the RAF had a clearly identified threat and even knew basically when and how the German Luftwaffe would attack, the RMAF in today's world is faced with a much more ambiguous situation. Although defensive in policy and nature, RMAF must constantly retain the ability to militarily protect the country's interest primarily through air superiority and with the support of land and maritime forces. In essence, the RMAF must maintain its level of readiness to carry out

current roles and face any eventualities, from peacetime engagement to peacekeeping to small scale and regional conflicts.

Despite the ambiguity explained earlier, the RMAF must prepare for the future with the clarity and unity of purpose that Britain's RAF was prepared to defend its homeland from the German Luftwaffe. Focused innovation and technology will enable the RMAF to win and resolve period of tensions and conflicts in the future just as they enabled Britain's RAF to prevail in 1940.

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