

Did Allied Air Interdiction Live up to Expectations in the Italian Campaign 1943-1944?

By Wg Cdr F Spence

For the purpose of this essay, Air Interdiction (AI) is defined as 'air action conducted to destroy, disrupt, neutralise or delay an enemy's military potential before it can be brought to bear effectively against friendly forces'. Although air power had been employed on missions of this type since World War I, the term AI first came into general use during the Italian campaign of World War II.¹ While it is recognised that the strategic bombing campaign against industrial targets by heavy aircraft (such as the B-17 Flying Fortress) in Europe had a distinctly AI flavour, its impact was far beyond the battlefield

and is excluded from this essay. However, when these same aircraft were employed against interdiction targets within the Italian theatre, they played an identifiable role and are included in this analysis.

Throughout this study, research preference has been given to documents dating from the immediate post-war period compiled by the Air Historical Branch (AHB) including some translations of German papers and interviews. Where possible, both expectations and results have been drawn from these contemporary

sources. Following an introduction to AI strategy in Italy, this essay will consider AI in 5 sequential operations: HUSKY; AVALANCHE; SHINGLE; STRANGLE and DIADEM. In each case, expectations will be defined and an assessment of success derived both from a mixture of contemporaneous Allied judgements and the impact as perceived by the Germans.

This paper will reveal that AI doctrine and capabilities were not fully understood at the commencement of this campaign and that expectations were excessively optimistic. However, as experience grew, a better understanding of the art-of-the-possible developed, resulting in a more mature and realistic application of this pivotal aspect of air power. Ultimately, as will be demonstrated, AI came very close to meeting expectations but fell short of its full potential.

AI Strategy in Italy

Colonel Klaus Strange (German Movements Control Italy) recognised the importance of secure lines of communications (LOCs) for both protagonists in the campaign:

'Sea traffic was important to the Western Powers as rail traffic was to Germany. The shipping routes were the arteries by which the Allies delivered the supplies on which their lives depended; the railways were the nerves by which vital impulses were brought to the German prosecution of the war. Thus it was a matter of life and death for both sides to maintain their supply-lines in order'.²

For the Allies, a successful AI campaign required a comprehensive understanding of the Italian rail network. Throughout the length of the country, the geography required that all lines passed over numerous bridges, viaducts and tunnels offering many vulnerable points which could be exploited.³ Additionally, multiple nodes were identified as essential target sets by Professor Zuckerman, scientific advisor to Air Chief Marshal Sir Arthur Tedder, Commander of the Mediterranean Air Command. In his report, 'Air Attacks on Rail and Road Communications',⁴ Zuckerman contended that owing to the limited accuracy of tactical

attacks, the best method of disrupting the rail system was through the strategic effects produced by carpet bombing critical nodes, like marshalling yards which contained concentrated sub-target sets of locomotives, rolling stock and repair facilities. He further contended that a more tactical approach of cutting individual lines would require a much greater weight of effort to achieve the same disruptive effect. He did, however, acknowledge that such tactical missions had their place: "railway and road bridges are uneconomical and difficult targets, and in general do not appear to be worth attacking except where special considerations demand it in the tactical area".⁵ In sum, Zuckerman suggested that strategic results would outweigh such immediate tactical benefits for less effort, but recognised that the delay between strategic cause and battlefield effect would make it difficult to prove this definitively. However, through an analysis of the Messina to Sicily Ferry Service, he was able to demonstrate a month-on-month reduction in the flow of materiel to Sicily; in July 1943 it was just 10% of that observed in January.⁶

While Zuckerman's findings represented a valid theory, derived from detailed analysis of air interdiction results in Italy during 1943, it must be considered within the context that it was written. During the period of his report, the Germans were pouring men and materiel into Italy and thence onward to Sicily on a vast scale. Zuckerman's assertion that the railway system became "inadequate to deal with the enemy's military needs",⁷ would seem to be validated by the German High Command in July:

'... in view of the great difficulties regarding supplies for a relatively small German force on Sicily, it cannot be expected that we shall be able to hold the island indefinitely (the main reasons for the difficulties are: the low traffic-capacity and the vulnerability of the railways in Southern Italy; the uncertainty of sea transport and the possibility of a blockade of the Straits of Messina)'.⁸

However, even before Zuckerman's proposals were published, considerable opposition to his theories was evident; critics accused him of overstating the difficulty of destroying bridges

An RAF Spitfire being serviced on a Sicilian airfield alongside an abandoned Messerschmitt Bf 109



Operation HUSKY, the invasion of Sicily, commenced on 10 July 1943 and the Allied Armies rapidly gained control of the island, pushing the defending forces into the northeast, from where they withdrew across the Messina straits to mainland Italy

while underestimating the time required to repair them.⁹ Additionally, Brigadier General Partridge (Twelfth Bomber Command) proposed “. . . it may be possible for the enemy to move the relatively small amount of traffic needed for military supply without using extensive marshalling yard facilities”.¹⁰ In substantiation of this proposal, German records show that only 5% of peacetime capacity was required to maintain a static defence,¹¹ and in such instances, the military trains were often marshalled well away from traditional railway centres. Thus, two schools of thought

developed, those in favour of Zuckerman’s ‘transportation theory’ and those who backed an ‘interdiction plan’ that concentrated on cutting railway lines. From an analysis of this controversy one thing is clear, a combination of the two schools could bring about the tactical success required at the front and the strategic paralysis of the entire German supply system in Italy. Certainly as the campaign progressed the Allies possessed sufficient assets for both tasks and developed the technical expertise to conduct the former with sufficient accuracy and economy of effort.

Operation HUSKY

Operation HUSKY, the invasion of Sicily, commenced on 10 July 1943 and the Allied Armies rapidly gained control of the island, pushing the defending forces into the northeast, from where they withdrew across the Messina straits to mainland Italy. While months had gone into the planning of HUSKY, the decision to follow this with an invasion of mainland Italy was formulated rather more quickly. Plans to counter a German evacuation were not really considered until 31 July when the possibility of evacuation first came to light and it was not until 3 August that General Alexander (Deputy Commander in Chief) was persuaded, by ULTRA¹² derived information, to take action. Signalling his naval and air commanders, "you have no doubt co-ordinated plans to meet this contingency . . ."¹³ His expectations were of a joint interdiction of the evacuation. He was to be severely disappointed as neither Admiral Cunningham nor Tedder had any such contingency plans.¹⁴

As the Army was in no position to overrun the German retreat on the ground, and the Navy was unable to contend with it at sea (owing to well-founded concerns relating to significant coastal defences)¹⁵ the whole responsibility fell to the Air Component — namely Air Vice Marshal Coningham's Tactical Air Force (TAF). Intelligence analysts of the time correctly calculated that the Axis evacuations would be made at night, ideal operating conditions for Coningham's tactical Wellington bombers. This tactical AI effort did indeed disrupt the evacuation (Operation LEHRGANG), so much so that the Germans were forced to cross the straits by daylight from 13 to 16 August. This is where Coningham's gravest error of judgement was revealed. On 11 August, he had released the Strategic Air Force (SAF) B-17 aircraft, which he had had on hold for nearly a week, from their commitment to join the interdiction effort. Doubtless he was under pressure to release them for strategic tasking at the earliest opportunity and he considered that, as the German evacuation was expected to be conducted at night, his TAF assets were best placed for the task. He was right, but the successful night AI so harassed the enemy that they were forced to

recourse to daylight operations to maintain their momentum.

Following the switch to daylight operations, a staff officer of the TAF wrote that "the immense concentration of the flak on both sides of the narrows makes it impossible to go down and really search for targets with fighter-bombers. It also greatly restricts the use of light bombers".¹⁶ What Coningham really needed for a comprehensive AI effort against the retreating forces were the Strategic B-17s that he had recently relinquished. These aircraft were configured for daylight operations out of the reach of the flak that hindered the lighter TAF forces. By a twist of fate, on 13 August, just as Coningham's intelligence staff were advising him of the Germans' switch from night to day, the entire B-17 force was conducting a determined raid on rail targets in Rome, part of a greater interdiction campaign on the mainland. For reasons that remain obscure, but which probably relate to logistic and crewing issues, the B-17s remained unavailable until 17 August, by which time LEHRGANG was complete.¹⁷

Without doubt, other errors of judgement were made in all 3 environments. In his book 'Air Interdiction in Three Wars', Eduard Mark suggested that, "the cautious, even plodding, strategy pursued by the Allies in their conquest of Italy made the success of LEHRGANG possible, if not certain".¹⁸ To judge the failure of this interdiction as a purely air failing is premature. This was an operation conducted on land, sea and air, yet the final responsibility for defeating LEHRGANG fell solely to air power. With a better approach to joint planning, success would have been far more likely. Had the Allied command recognised the strategic impact of a successful German withdrawal earlier, B-17s could have silenced the coastal guns allowing the navy to enter the straits. Additionally, with greater direct air support, the Army could have advanced with more vigour on land.

The jury is still out on this issue, just one of the controversies surrounding the Italian campaign. What is certain is that the overall interdiction effort on forces retreating from Sicily did not live up to



Troops come ashore at Salerno, July 1943

Approved in July 1943, Operation AVALANCHE (amphibious landings at Salerno) commenced on 9 September. Expectations were high, with both Americans and British too readily accepting that the inevitable fall of the fascist Italian regime would cause the Germans to withdraw their forces from Italy following major Allied landings

expectations. However, these expectations were late in being articulated and over-ambitious in relying entirely on air power for this crucial task. The 60,000 troops and 13,700 vehicles evacuated would soon be confronted again on the mainland, while the 40,000 tons of supplies shipped back would provide a cushion against subsequent Allied AI endeavours during Operation AVALANCHE in September.

Operation AVALANCHE

While Churchill had always favoured follow-on enterprises in the Mediterranean, it was only the strategic delay to Operation OVERLORD that

finally enabled him to convince Eisenhower to press their advantage with an invasion of Italy. Approved in July 1943, Operation AVALANCHE (amphibious landings at Salerno) commenced on 9 September. Expectations were high, with both Americans and British too readily accepting that the inevitable fall of the fascist Italian regime would cause the Germans to withdraw their forces from Italy following major Allied landings.¹⁹ For AVALANCHE, the air forces were instructed to 'isolate the battle area'.²⁰ While air and sea routes were all but sealed owing to air activity, the isolation of land LOCs was a tougher nut to crack. Having failed to capture any significant enemy

forces on Sicily, great hopes were originally held of cutting off the German armies in 'the toe of the boot' and preventing them from escaping.

German records indicate that significant disruption of the Italian rail network was being experienced by August 1943.²¹ However, there were generally sufficient supplies for replenishment and even for the building-up of a reserve.²² Most of this still travelled by rail (albeit in a disrupted manner) supplemented by limited coastal shipping; additional supplies had also been recovered during LEHRGANG. However, fuel supplies were critical at this stage, and when distribution was disrupted, it had a predictable effect on the ground battle as, despite sufficient stocks in the rear, localised shortages persisted. The Germans attributed these shortages to the Allied air interdiction effort on the road and rail networks.²³

The German 10th Army under Von Vietinghoff bore the brunt of AVALANCHE. The AI campaign on mainland Italy had continued almost unabated since the beginning of the year and, prior to the landings, great care had been taken so as not to highlight the amphibious objectives. Although Von Vietinghoff was established in the area prior to the invasion, his forces were not as well supplied or as mobile as he would have liked. His Chief of General Staff wrote at the time that:

"the first decisive consequence [of the Allied AI effort] was that the traffic on the roads was delayed considerably as a result of the enemy air supremacy and the fuel which would have enabled the armoured and motorised formations to reach the battlefield in good time could not be delivered to them. For this reason, 16th Panzer Division had to continue the battle alone longer than had been intended and reinforcements arrived by small instalments".²⁴

In his own study of the campaign, Von Vietinghoff recalled that at the end of the first day of fighting, he was not dissatisfied with the situation:

"In spite of great Allied superiority, 16th Panzer Division had managed to prevent the enemy from gaining any substantial initial successes...the first

units of the 29th Panzer Division were expected during the coming night . . . and, if they arrived in time, there was hope of a favourable outcome".²⁵

However, his study subsequently acknowledged that the shortage of fuel at this time was "an important, perhaps decisive influence on the course of the battle at Salerno" and that it caused even the most advanced reinforcement units of 29th Division to be delayed by 36 hours.²⁶ By 14 September, the last reinforcements had arrived, but intensive Allied air attacks made movement on or towards the battlefield extremely difficult; by 16 September a German withdrawal had been approved.

At Salerno, the delayed arrival of key German units was pivotal to the ability of the Allied landings to be fully established and exploited. Perhaps for the first time, the effect of AI was immediately apparent at the tactical level. While there would always be calls for additional Close Air Support (CAS) in such situations, it was AI that most impacted on the enemy's ability to resist. Complete isolation of the battlefield may not have been delivered as was sought but sufficient disruption and delay was created to generate space and time in the Allies favour. However, that the Germans retreated at their own pace is perhaps the greatest indictment of the failure of AI to stem the flow away from the battlefield.²⁷ Although the enemy was not trapped in the 'toe' as hoped nor the battlefield isolated, the enemy was prevented from bringing his forces to bear at the beachheads at a rate greater than which could be handled by the landing forces. In these terms AI proved invaluable at Salerno. Similar success would soon be called for again further to the north at Anzio.

Operation SHINGLE

The AI campaign in support of Operation SHINGLE (the amphibious landing of 2 Divisions behind the Gustav line at Anzio) aimed to retard the advance of German divisions from the north towards the Allied beachheads²⁸ in line with a general confidence that 'AI could cripple Italy's railroads sufficiently to make a major [enemy] concentration impossible'.²⁹ A general Air Directive was issued on 30 Dec ' . . . to attack enemy



The final counter-attack commenced on 28 February but '[the] stubborn resistance of Allied ground forces and the damage and delay caused by air attacks had blunted the force of the attack...

communications in such a manner as to impose maximum disruption to enemy supply lines to the battle area and to support the ground and naval operations by every means possible from the air'.³⁰ Any critique of this air operation must be judged against the fact that only 23 days were available for detailed planning and that preparatory AI strikes commenced just two days later.³¹

Air aspects of SHINGLE were enabled by the extensive airfield structure captured from the retreating Germans in the south of Italy, Sicily, Sardinia and Corsica; at the peak, 2903 aircraft participated.³² There were three phases to the Allied AI plan: from 1 – 14 January, a disruption

of rail communications in central Italy combined with deception operations in the North; from 15 – 21 January, an all-out effort to isolate the battle area by increasing attacks on both railways and roads north of Rome and those leading to Anzio; and from D-day (22 January) onwards, a continued isolation of the battle area. Throughout, the TAF was focused on targets in central Italy while the SAF concentrated on targets to the north.³³

Owing to Allied AI of roads and railways, Major General Wolf Hauser recalled that the first counter-attack, planned for 28 January, was delayed until 3 February.³⁴ This timing coincided with a period of bad weather that reduced the ability of

air power on either side to influence the battle. When the weather improved, control of the air was heavily contested by the Luftwaffe with significant tactical successes being made by German ground forces. However, the Allied deception to the north resulted in some German doubt and was a key factor in this initial success not being pressed home immediately.³⁵ Regardless, by 12 February, the Germans held master positions for an all-out drive that, if successful, would cut the Allied beachhead in two and prevent their evacuation. The main problem for the Germans was to build up sufficient forces to carry their plan forward.³⁶ To counter this, AI played a critical role. The second, and largest, German counter-attack on 16 February (in which Hitler demanded the elimination of 'this abscess' in three days)³⁷ showed early promise but by 19 February shortages of ammunition, water and reinforcements had taken their toll. Exhausted, the enemy withdrew on 20 February to reorganise;³⁸ a clear indication of AI affecting his plans. The final counter-attack commenced on 28 February but '[the] stubborn resistance of Allied ground forces and the damage and delay caused by air attacks had blunted the force of the attack . . . From [1 March, the] German strategy could be perceived to have shifted gradually from the offensive to the defensive'.³⁹

During SHINGLE, it was apparent that the AI campaign was having an effect, as the prolonged attacks on the Germans' logistic tail constricted their availability of fuel and ammunition. Indeed, retrospective statistics suggest that the Germans were only able to fire one artillery shell for every 12-15 of the Allies.⁴⁰ 'The third major landing on Italian soil had been executed and like its forerunners, had only been secured by a narrow margin'.⁴¹ Thus, SHINGLE failed to achieve the rapid success desired by Churchill. However, AI proved to be a decisive factor in slowing the German counter-attacks and reducing their ferocity; AI created the 'narrow margin'.

In his report on SHINGLE, the Air Commander-in-Chief, General Baker, concluded that "military critics have not appreciated what air forces can and cannot do and the true influence of the weather in placing a ceiling on their capabilities". Baker's final observation was that the better weather in the spring would allow the containment of German

divisions in Italy and "so cut them up that they will be of little use elsewhere".⁴² Operations STRANGLE and DIADEM were planned to do just that.

Operation Strangle

Operation STRANGLE marked the watershed between Zuckerman's 'transportation strategy' and the alternative 'interdiction strategy'. Central to STRANGLE was 'an attempt to force the Germans into retreat by attacking their railroads at about 100 miles from the front so as to increase the strain on the enemy's already inadequate motor transport'.⁴³ The directive of 18 February 'Operations in Support of DIADEM [including STRANGLE]' sought to break the Italian stalemate solely through an aerial siege of the Gustav Line to the point where the 17 to 20 German divisions in the south of Italy became insupportable forcing a withdrawal to at least the Pisa-Rimini line.⁴⁴ In deference to Zuckerman, the SAF would continue to target six rail-centres in the north of the country, but tactical forces would switch their main effort to cutting enemy LOCs.

This switch of main effort can be explained by a maturing intelligence analysis that recognised that: the marshalling of military trains was seldom conducted in marshalling yards; the vast stocks of engines and rolling stock rendered attacks against them irrelevant; and that the enemy's static defence was still being supplied, despite 8,258 tons of Allied bombs being dropped on marshalling yards over the preceding 19 weeks.⁴⁵ Additionally, technical advances now rendered bridges vulnerable to less than 200 tons of bombs compared with 500 to 1,000 tons during the period of Zuckerman's study.

STRANGLE commenced on 19 March, when sufficient tactical aircraft became available for the revised concept of operations. Certainly, on 20 March, the Germans noted a change in AI tempo and tactics, particularly with respect to the fighter-bomber contribution.⁴⁶ The intensity of these tactical attacks resulted in significant disruption along much greater lengths of track owing to precision attacks on bridges, trains, track and the electrical and communications supply systems. Whereas the strategic bombing effort had been fairly predictable owing to the limited target

sets, the fighter and medium bomber threat was omnipresent resulting in disruption over the entire rail and road networks, creating the need for a much more reactive and responsive repair system. Critically, it also demanded that gaps in the lines be linked by motor transport, thus eating into precarious fuel reserves.

With Allied air supremacy by day, it was only at night or during bad weather that German logistics could regenerate. During this period, it was recognised by the Germans that ‘... all these troubles arose from the new air offensive. The difficulties multiplied and seemed to become insurmountable’.⁴⁷ However, in a typically resilient manner, additional railway engineers were imported and an improved air defence infrastructure was created, resulting in occasional logistic respite when traffic was kept moving for hours or even nights at a time.⁴⁸

The TAF report on STRANGLE concluded that ‘there was no doubt as to the complete tactical success’.⁴⁹ However, despite this tactical acclaim, strategic hopes that air power could be employed unilaterally to isolate the battlefield and force a general retreat were not fulfilled. The German perception of the combined effects of strategic bombing, tactical interdiction and armed reconnaissance of STRANGLE was less debatable; the capacity and manoeuvrability of the German 10th and 14th Armies fell severely short of their expectations and they were concerned that their supplies would prove inadequate once the predicted Allied spring offence commenced. By the start of Operation DIADEM, German stocks of critical items were still at a lower level than those planned for the start of STRANGLE, two months previously.⁵⁰

Operation DIADEM

In a letter sent to Air Chief Marshal Portal (Chief of the Air Staff) during the height of STRANGLE, Air Marshal Slessor (Deputy Commander Mediterranean Allied Air Forces) stated: “...we have now made it impossible for the Hun to act offensively, as he did against the [Anzio] beachhead in February. But we have not yet succeeded in making him pull out, and I don’t think we shall by air action alone: what we have done ... is to make it impossible for him to resist

successfully, a determined and sustained offensive by the ground forces”.⁵¹

Operation DIADEM was conceived to fulfil this requirement by ending the stalemate in Italy and capturing Rome. The Air Component was required to ‘render it impossible for the enemy to maintain his forces on [the Gustav] line in Italy in face of a combined Allied Offensive’.⁵² In AI terms, therefore, it differed from STRANGLE in that the effort was conducted in coordination with a ground offensive which placed additional consumption demands on the Germans. While the Germans had sufficient logistic support for a static defence, it was calculated that the additional 1,000 tons per day required to oppose the Allied ground offensive would generate a critical situation, especially with respect to fuel, which would curtail German mobility near the front.⁵³ However, by concentrating their offensive on a narrow frontage, the Allied scheme of manoeuvre failed to fully exploit the German motor transportation crisis, despite the increased demands of heavy fighting.

Conceptually, DIADEM was a continuation of STRANGLE, though the interdiction line increased to 140 miles in depth to further increase the demands on the fragile motor transport and fuel situation. Additionally, and in accordance with the ground advance, AI was required to interdict forces retreating from the front. In this realm, intensive patrols of armed reconnaissance aircraft added to the action ensuring a continual harassment across the battlefield by day.⁵⁴ The ability of the enemy to conduct re-supply at night or in bad weather, by both land and sea routes, had long been recognised but the Allied air forces were poorly placed to improve the continuity of their AI action. While improved tactics, incorporating flare-dropping aircraft, were successfully employed, filling the AI void at night was inadequately resourced; only four squadrons, of Bostons and Baltimores, plus the occasional Wellington were assigned to these duties.⁵⁵ In terms of expectation, DIADEM certainly broke the stalemate of the campaign and great advances were made by the Allies; Rome fell on 5 June. However, compared to the promise recognised previously, AI during DIADEM appears disappointing at first glance. All the lessons from

previous operations had been applied, technical advances had been incorporated and these factors, combined with contrived battle consumption ought to have rapidly produced the predicted collapse of the German logistic system. However, while the under-resourced night effort was partly to blame, the absence of total and immediate collapse should not be considered as a failure of AI but as a malfunction of the joint planning process, which failed to marry together the ground and air plans, to best exploit the AI induced motor transport crisis. Although DIADEM did live up to expectations, disappointingly, AI failed to reach its full potential, despite all the building blocks having been recognised.

Conclusion

The modern understanding of AI was born in the Italian campaign and it was required to mature very rapidly. Initially, excessive expectations were made of it while it was undergoing tactical, doctrinal and technological growth.

Early in the campaign, Zuckerman's theory was influential in determining target sets and provided a methodical and logical structure to the initial AI effort which sought to stem the strategic flow of forces into the theatre in general and Sicily specifically. During HUSKY, the need for a joint approach to interdiction planning was revealed as the Germans successfully evacuated Sicily with minimal losses in broad daylight. Although the limitations of unilateral AI were highlighted by this failure, faith in its potential remained, as evidenced by the increasing demands placed upon it in subsequent operations.

AI in AVALANCHE and SHINGLE revolved around delaying and disrupting German advances towards vulnerable bridgeheads. Such amphibious operations presented the enemy with an immediate need to counter attack as strongly and rapidly as possible. In both cases, the key to success was to win the logistic competition to build sufficient forces faster than the enemy. At Salerno, it was the AI induced delay and disruption of the 29th Panzer division that really foiled the Germans' ability to counter attack and repel the landing. At Anzio, it was a general reduction in the fighting capacity of the Germans in and approaching the

battle area that eventually won the day – but only just. In both cases, AI failed to completely isolate the battlefield as had been expected, but its delaying contribution was central to Allied survival.

The nature of AI during STRANGLE and DIADEM was different as the Germans were entrenched in static defensive positions. Here, AI effort was aimed at depleting German fighting capacity and restricting their freedom of manoeuvre to such an extent as to force a withdrawal. In both operations, AI proved capable of inflicting significant disruption to the flow of goods into the area, but isolation remained an elusive expectation. The anticipated spontaneous German withdrawal under the combined pressure of AI and land offensive (a wholly realistic expectation at this stage) failed to materialise as rapidly as expected, owing to the limited front that the Germans had to defend and supply.

In his summary of the Spring Offensive (dated 18 June 1944), Slessor recognised the things that AI could not be expected to do:

“It can not by itself defeat a highly organised and disciplined army . . . It can not enforce a withdrawal by drying up the flow of essential supplies . . . It can not prevent entirely the movement of strategic reserves to the battlefield. . . In short, it can not absolutely isolate the battlefield from enemy supply or reinforcement”.⁵⁶

Armed with these realisations, it is evident that the expectations of AI in the Italian campaign were overambitious and perhaps even impossible. However, within a coordinated joint effort, AI held great promise.

Bibliography

AHB RAF Narrative Vol I (First Draft - undated) The Italian Campaign 1943-1945; Planning and Invasion to the Fall of Rome. Air Historical Branch Narrative Collection Vol I.

AHB RAF Narrative Vol II (First Draft - undated) The Italian Campaign 1943-1945; Operations Jun 1944 – May 1945. Air Historical Branch Narrative Collection Vol II.

AHB Translation of German Documents Vol 9 (circa 1948) – Various authors and translators.

Corbett, Gp Capt IS (1992), *Air Interdiction in Support of the Land Battle* (unpublished HCSC 5 Essay).

Dews, Edmund & Kozaczka, Felix, (1981), *Air Interdiction: Lessons From Past Campaigns* (California, The Rand Corporation).

Eggington, Maj Jack, B, (1994), *Ground Maneuvre and Air Interdiction: A Matter of Mutual Support at the Operational Level of War* (Alabama, Air University Press).

Gooderson, Ian (1998), *Air Power at the Battlefield; Allied Close Air Support in Europe 1943-1945*, (London, Frank Cass).

Gooderson, Ian, (2003), *Cassino 1944*, (London, Brassey's).

Hallion, Richard, P, (1989), *Strike from the Sky; the History of Battlefield Air Attack 1911-1945*, (Washington, The Smithsonian Institution Press).

Lesser, Ian, O, (1990), *Interdiction and Conventional Strategy: Prevailing Perceptions*. (California, The Rand Corporation).

Macksey, Kenneth, (1978), *Kesselring; The Making of the Luftwaffe*, (London, B T Batsford).

Mark, Eduard, (1994), *Aerial Interdiction; Air Power and the Land Battle in Three American Wars*, (Washington, Center for Air Force History).

Orange, Vincent, (1990), *Coningham; a Biography of Air Marshal Sir Arthur Coningham* (London, Methuen).

Orange, Vincent, (2004), *Tedder; Quietly in Command* (London, Frank Cass Publishers)

Sallagar F. M. (1972), *Operation "STRANGLE" (Italy, Spring 1944): A Case Study of Tactical Air Interdiction*. (California, The Rand Corporation)

Smith, Major, Paul, A, (1998), *Bombing to Surrender: The Contribution of Air Power to the Collapse of Italy, 1943* (Alabama, Air University Press).

Terraine, John, (1985), *The Right of the Line: The Royal Air Force in The European War 1939-1945* - Scepter Edition (Hodder & Stoughton, Great Britain).

Notes

¹ Sallagar (1972) p 1.

² AHB Translation Vol 10 (1947) – VII/100 p 8.

³ *ibid* p 9.

⁴ AHB Vol I App 19.

⁵ *id.*

⁶ *id.*

⁷ *id.*

⁸ AHB Translation Vol 10 (1947) – VII/100 p 5.

⁹ Mark (1994) p 94.

¹⁰ AHB Vol I p 308.

¹¹ *ibid* p 308.

¹² Top Secret, deciphered intelligence gleaned from German Enigma transmissions.

¹³ Mark (1994) p 67.

¹⁴ *id.*

¹⁵ A study of the naval losses in the Dardanelles in 1914 would explain his concerns.

¹⁶ Mark (1994) p 74.

¹⁷ *ibid* pp 71-72.

¹⁸ *ibid* p 77.

¹⁹ *ibid* p 84.

²⁰ AHB Vol I p 142.

²¹ AHB Translation Vol 10 (1947) VII/100 p 2.

²² *ibid* p 4.

²³ *ibid* p 7.

²⁴ *ibid* p 7.

²⁵ *ibid* VII/97 p 15.

²⁶ *ibid* pp 12-13.

²⁷ AHB Vol I p 145.

²⁸ *ibid* pp 237-238.

²⁹ Mark (1994) p 114.

³⁰ *ibid* p 238.

³¹ *ibid* p 237.

³² *ibid* p 259.

³³ *ibid* p 240.

³⁴ AHB Translation Vol 10 (1947) VII/99 p 7.

³⁵ AHB Vol I p 254.

³⁶ *ibid* p 255.

³⁷ *ibid* p 258.

³⁸ *ibid* p 263.

³⁹ *ibid* pp 266-267.

⁴⁰ Marc p 137.

⁴¹ AHB Vol I p 268.

⁴² *ibid* App 16.

⁴³ *ibid* p 148.

⁴⁴ *ibid* p 149.

⁴⁵ *ibid* p 149.

⁴⁶ AHB Translation Vol 10 – VII/100 p 14.

⁴⁷ *ibid* p 15.

⁴⁸ *id.*

⁴⁹ AHB Vol II p 21.

⁵⁰ marc p 190.

⁵¹ Terraine 1985 p 594.

⁵² AHB Vol I p 326.

⁵³ Mark (1994) p 184.

⁵⁴ AHB Vol II p 11.

⁵⁵ *ibid* p 25

⁵⁶ AHB Vol II -APR 5 p 1.

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