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INTEGRATED BATTLE CONCEPTS AND THE QUEST FOR OPTIMISED JOINT WARFIGHTING

Sqn Ldr EJ FLYNN RAF
Abstract

Integrated battle concepts are nothing new. However, recent operations have seen a rekindling of interest in Air-Land Integration. The USA is developing an AirSea Battle Concept in response to the emerging anti-access/area denial threats and the US, UK and China are all beginning to investigate cross-domain integration, that is integration across maritime, land, air, space and cyber. This paper examines the extent to which Air-Land Integration and Air-Maritime Integration Concepts contribute to joint warfighting. Using extensive available literature to conduct case studies and a study of contemporary integrated concepts supported by interviews, it concludes that Air-Land Integration and Air-Maritime Integration do contribute to joint warfighting. However, their, ‘bi-environmental’ focus is too narrow for contingency operations and cross-domain integration should be pursued as a preference.
1-INTRODUCTION

...the…military needs to take jointness to the next level in this century with operational concepts and ideas for fighting across Service boundaries in a truly joint fashion. Joint concepts supporting this...would explore how these forces truly fight together as co-equal entities rather than simply next to each other with one in support of the other.¹

The need to integrate air, land and maritime assets is nothing new. British military operations have historically been Joint.² However, history demonstrates that periods of conflict result in better integration followed by a reversion to single-service introspection once peacetime training and contingency postures are resumed.³ Recent operations in both Iraq and Afghanistan have reignited interest in Air Land Integration (ALI)⁴ and much has been written on the matter in specialist journals and staff college papers.⁵ ALI as a concept is nothing new, yet lessons were relearned during operation TELIC (the UK’s contribution to recent operations in Iraq).⁶

There is also a growing recognition that these conflicts have impacted Air-Maritime Integration (AMI). Although maritime aviation has made a significant contribution in recent theatres of operation, it has been at the expense of, ‘maritime manoeuvre and sea control,’⁷ and skillsets for broader contingency operations.⁸ Operation ELLAMY (the UK’s contribution to recent operations in Libya) reinforced the need for contingency skillsets and capabilities as well as testing the capability decisions made in the 2010 Strategic Defence and Security Review.⁹

⁶ Smyth, “From Coningham to Project Coningham-Keyes,” 1.
The Future Air and Space Operating Concept (FASOC) recognises that future operations are likely to need, ‘cross-domain integration,’\(^{10}\) signalling that ALI and AMI are no longer sufficient. Equally, given the historic precedence, the drawdown of UK forces from Operation HERRICK (the UK’s contribution to operations in Afghanistan), may once again result in the demise of hard won ALI lessons. This paper, therefore, aims to identify the extent to which Air-Land and Air-Maritime Battle concepts contribute to joint warfighting. In order to do so, two historic case studies will be completed; the first on the North Africa Campaign in the Second World War (WW2) and the second, more substantial one, on the 1982 Falklands Conflict. Current United States (US), Chinese and UK concepts will then be examined. This paper will then discuss how these concepts might apply to the UK today in the context of the financial climate, capability and return of the military to a contingency posture following the drawdown from Operation HERRICK

The North African campaign of WW2 was selected because it was the campaign from which emerged a system that influenced ALI for the rest of the war and beyond.\(^{11}\) Many of the ALI concepts developed during the campaign were incorporated into doctrine and standard operating procedures after WW2.\(^{12}\) It is therefore the formative ALI campaign. The Falklands Conflict in 1982 required integration across maritime, land and air environments. It also happened in the wake of defence cuts\(^ {13}\) at a time when the UK’s concepts were set by the context of the Cold War.\(^{14}\) The recent cuts announced to defence and the cross-domain nature of the operation make it a useful comparator to today’s climate of fiscal austerity and a forthcoming return to contingency postures.

The case studies will draw on the wide body of published literature available on both campaigns, focusing on those relevant to the air campaign, and in particular ALI and AMI, to analyse the extent to which these concepts contributed to the joint fight. Each case study will highlight the context and the ALI/AMI concepts and systems in place during the campaign from a British perspective. The leadership, key relationships, education and training, and logistics and equipment are discussed to draw out the areas that contributed to integration of Air with Land and Maritime elements. The case studies will not provide a chronological examination of the campaigns but aim to identify the elements that facilitated integration. In addition, it is not possible within the confines of this paper to discuss the contribution of every platform type to the campaigns in question. The case studies therefore focus on those aspects which contributed most to integration.


\(^{13}\) Dr Stuart Griffin, *Joint Operations: A Short History* (Training Specialist Services, 2005), 133.

The current integration concepts for each of the US, China and the UK will then be examined to highlight the driving factors behind them. The examination will draw on both published concepts and commentaries where available to assist in identifying the extent to which they are likely to contribute to enhancing joint warfighting. The US was chosen as the UK’s key ally and China as a key rising power. It was not possible to include a wider examination of EU partners within the scope of this paper.

Finally, the concepts will be discussed in terms of their applicability within a UK context. Interviews were conducted with seven military personnel who were either involved in conceptual work, were currently employed in ALI posts at the operational or tactical level, or had command or staff experience during ELLAMY. This spread was chosen to capture the breadth of thinking on how integrated battle concepts contribute to joint warfighting.

This paper will conclude that whilst ALI and AMI do contribute to joint warfighting, they are insufficient as standalone concepts. They must become part of a broader concept of cross-domain integration to facilitate the best use of military effect across all domains and with allies and civilian partners. In addition, equipment capability and training are required to enable the concepts to be realised. All concepts require practise and development otherwise historical lessons will be relearned. Concepts will always be influenced by the strategic security issues of the day; therefore, with shrinking forces it will be difficult to maintain integration procedures for every eventuality. As a result, retaining pockets of expertise will be key to enabling contingent joint warfighting capability.

**Definitions**

NATO's Joint Air Power Competence Centre proposed the following ALI definition in 2010:

> Air Land Integration (ALI) is the focussed orchestration and application of the full range of Air and Land capabilities within a joint force to realise effects. ALI considers all elements in a given battle space, regardless of the component to which they belong, operating together to achieve a common aim.\(^{15}\)

It is assumed that Maritime and cross-domain integration terms may be substituted into this definition.

The conceptual component contributes to the fighting power of Armed Forces by providing the, ...coherent intellectual basis and theoretical justification for the provision and employment of Armed Forces.\textsuperscript{16}

A concept can be defined as:

\ldots untried and unverified ideas cast in a medium to long term timeframe developed in response to either changes in the strategic or security environment or focused on emerging technology.\textsuperscript{17}

\textsuperscript{16} United Kingdom. Developments, Concepts and Doctrine Centre. \textit{British Defence Doctrine. JDP 0-01.} (Shrivenham: DCDC, 2010), 4-4
\textsuperscript{17} United Kingdom. Joint Doctrine and Concepts Centre. \textit{The Relationship Between Policy, Doctrine and Concepts. JDN 003/02.} (Shrivenham: JDCC, 2002), 4.
Operations in North Africa during WW2 offered:

For the British Army...practical experience and training in war of inestimable value, for the RAF it was the school of a system of air support which would have decisive significance.¹⁸

The ALI system which was developed provided the basis for ALI in both Sicily and Normandy.¹⁹  In addition, the RAF and the Fleet Air Arm conducted AMI operations over the Mediterranean and coastal ports throughout the campaign.²⁰

In 1939, the role of British air power in North Africa was to defend Egypt due to its strategic position on the Suez Canal.²¹  Italy declared war on Britain and France on 11 June 1940. As a Mediterranean power with a foothold in East Africa, the Italians were able to halt the sea lines of communication across the Mediterranean Sea forcing British supply lines to be re-routed or stopped.²² British Prime Minister, Winston Churchill, was clear on the strategic value of North Africa in reopening the Mediterranean and facilitating an invasion of Italy. He was adamant that Britain would, ‘fight...for Egypt.’²³ Hitler was preoccupied with his designs on Russia and the British were able to react to the Italian advance into Egypt in September 1940. These actions initiated over two years of advance and retreat across the deserts of North Africa.²⁴

There was no ALI or AMI concept in the lead up to the outbreak of WW2. During the First World War (WW1), the use of air power evolved from reconnaissance to artillery spotting and close air support.²⁵  By the end of WW1, many air power advocates saw integration with land forces as a crucial role for air power.²⁶  However, the fiscal austerity of the interwar years led to inter-service rivalry. The fledgling RAF developed Air Control methods for policing the British Empire²⁷ and strategic bombing concepts which ensured its survival as an independent service.²⁸  There was disagreement between the services as to how air power should be employed and poor

comprehension of the utility of air power in both the Army and the Royal Navy (RN). Therefore, at the outbreak of WW2, the RAF had limited ALI concepts and structures on which to call. The lessons of WW1 had been forgotten and those associated with the ALI needed in policing the Empire ignored.

Separated by the English Channel from continental Europe, Britain relied on the RN and RAF for protection at the outbreak of WW2. It was not until the disaster of the Battle of France and the evacuation of British forces from Dunkirk in 1940 that the need for ALI was recognised. Dunkirk highlighted that ALI was:

…an ad hoc arrangement of unsuitable equipment, inadequate preparation and a general lack of understanding between air and ground commanders as to how tactical air forces should be employed.

As a result, trials were initiated in the UK and the subsequent Wann-Woodall report (the trials had been conducted by a Group Captain AH Wann and Colonel JD Woodall) led to the establishment of Army Cooperation Command (ACC) to implement the recommendations. A signals network was engineered to pass requests for air support, RAF and Army headquarters were collocated, liaison officers established and a system of coordination created. However, these developments were not shared in a timely manner with those fighting in North Africa where a parallel system developed. In the aftermath of Dunkirk, the only British ground troops engaged in combat with the Axis powers were those in North Africa. It was there that the principles of ALI were tried and tested in combat. It was not until 1942 that the UK and North African systems were merged after a team schooled in the UK gained operational experience during the battle of Gazala.

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33 Terraine, The Right of the Line, 347.
35 Gooderson, Air Power at the Battlefront, 24.
37 Gooderson, Air Power at the Battlefront, 24.
39 Gooderson, Air Power at the Battlefront, 25.
41 Gooderson, Air Power at the Battlefront, 26.
The system for providing ALI that was developed did not occur instantaneously. It evolved throughout the campaign. In 1940, when Italy first advanced into Egypt, support to the army was lower in priority for the RAF than offensive action against enemy airfields and enemy ports. There was a basic system in place for cooperation between the RAF and the Army. However, to conserve the limited available air assets, agreement was reached that the Army would not call for air support unless attack by Italian forces was imminent. Operation COMPASS, the British offensive against the Italians between December 1940 and February 1941, gave an early indication of what could be achieved by ALI. Air superiority allowed land forces to outflank the enemy. Liaison between the two services was excellent; the Land and Air Headquarters were collocated. Lessons were also identified. Airbases needed to be made mobile and combat identification (CID) improved. The entry of Germany’s Afrika Korps into the North African campaign in early 1941 saw the British lose their advantage. In 1941, operations BATTLEAXE and BREVITY were launched to relieve Tobruk and valuable ALI lessons were learned in retrospect. The operations highlighted failures in CID, communication networks, provision of a bomb-line and a lack of joint training. There was disagreement over how to employ air power most effectively in support of the land battle. As a result, a joint committee was convened to overhaul the existing system of ALI. A joint conference followed in Cairo in September 1941 which resulted in the issuing of an Air Support Directive. The Directive gave agreed definitions, organisations, communications networks and detailed the system for requesting and providing air support. It was issued jointly by the Army and RAF headquarters and matured through joint exercises.

The system was put to the test during Operation CRUSADER which aimed to push the enemy from Cyrenaica. Air superiority was gained and the operation ultimately succeeded. The planning and execution of the air contribution to the operation proved the new system. However, further lessons were identified. Air superiority alone was not sufficient to achieve victory; the Army still had to defeat the enemy ground troops. There was a need to reduce the time lag between air support being requested and it being delivered. CID was still an issue and there was a clear need for

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44 Strawson, “The Shape and Course of the Mediterranean War 1940-43,” in *The End of the Beginning*, 16.
47 ibid.
fighter-bomber aircraft development. However, the system was evolving and proved itself in retreat as well as advance.

The ALI system reached a pinnacle in development at the battle for Alam el Halfa in September 1942. The system had matured and the crews were experienced and familiar with the battle ground. As a result, the RAF relentlessly attacked enemy forces before and during the battle in support of a combined Air-Land plan.

Cooperation between the air and maritime environments also took place. Success in the Mediterranean required superiority at sea which could not be achieved without air power. Malta was key to British success in the Mediterranean. The sea lines of communication to Malta could only be secured by a combination of control of the air and the surface fleet. The RAF and Fleet Air Arm (FAA) cooperated to attack ports and axis shipping targets in the Mediterranean. Whilst remaining under RAF control, the RAF’s 201 Group was allocated to naval cooperation as its primary role. In addition, FAA assets contributed to supporting land elements and FAA Albacores carried out bombing of enemy units during the battle of Alam el Halfa. However, single service rivalries and ignorance over how best to employ air power in support of the maritime forces raged.

The ALI system developed was only successful due to political support and the leadership of the military commanders. Churchill issued unequivocal direction to his Air and Land commanders the day after the Cairo conference in 1941, stating:

Never more must the ground troops expect...to be protected against the air by aircraft...the idea of keeping standing patrols of aircraft over moving columns should be abandoned...no air superiority will stand any large application of such...practise. Upon the military Commander-in-Chief Middle East announcing that a battle is in prospect, the Air Officer Commanding-in-Chief will give him all possible aid irrespective of other targets, however attractive.

Therefore, the political direction was clear.

54 ibid., 377.
57 Macmillan The Royal Air Force in the World War, 149.
60 Orange, Tedder, 143-144.
61 Tedder, With Prejudice, 169.
With no nominated Joint Force commander, it was essential that the single service commanders in North Africa cooperated.\textsuperscript{62} The appointment of Air Marshal Tedder as Air Officer Commanding-in-Chief Middle East in May 1941 marked a turning point for ALI in North Africa and beyond.\textsuperscript{63} Despite Churchill’s reservations,\textsuperscript{64} he was to prove the architect of the ALI system that developed. Tedder was a co-operator and sought to utilise air, land and maritime assets to achieve the desired endstate.\textsuperscript{65} He recognised that there was a lack of cooperation between the three services and that the campaign required joint operations.\textsuperscript{66} He lamented that the Navy Headquarters remained 125 miles away and was not collocated with the Land and Air headquarters in Cairo.\textsuperscript{67} Tedder was focused on his role supporting the army; he:

\begin{quote}
...outshone every other air commander...in his ability to foresee, prepare for, and meet every demand of the ground forces.\textsuperscript{68}
\end{quote}

Tedder had an ability to build relationships. He got on well with General Wavell and General Auchinleck, the two General Officer Commanding-in-Chiefs with whom he worked in North Africa.\textsuperscript{69} He also recognised the need to appoint the right people in key roles. He selected Air Vice Marshal (AVM) ‘Mary’ Coningham as Commander of the Desert Air Force (DAF) for his ability to cooperate with the other services\textsuperscript{70} in place of AVM Collishaw who he considered a, ‘bull in a china shop.’\textsuperscript{71} Tedder and Coningham each possessed complementary strengths and shared a mutual respect for one another.\textsuperscript{72} Tedder was an academic and excellent staff officer\textsuperscript{73} whilst Coningham was a decorated war hero with a flamboyant character.\textsuperscript{74} The entire ALI system was, ‘inspired by Tedder and executed by Coningham.’\textsuperscript{75} Tedder instructed to Coningham to, ‘get together,’\textsuperscript{76} with his Army counterparts immediately; this he did and collocated his headquarters with those of the 8th Army.\textsuperscript{77}

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\textsuperscript{63} ibid., 130.
\textsuperscript{64} Orange, Tedder, 121.
\textsuperscript{66} Orange, Tedder, 134.
\textsuperscript{67} ibid., 135.
\textsuperscript{68} Macmillan, The Royal Air Force in the World War, 132.
\textsuperscript{69} Terraine, The Right of the Line, 340.
\textsuperscript{70} Orange, Tedder, 148.
\textsuperscript{71} ibid., 127.
\textsuperscript{72} Orange, “The Commanders and the Command System,” in The End of the Beginning, 38.
\textsuperscript{73} Macmillan, The Royal Air Force in the World War, 130.
\textsuperscript{74} Orange, Tedder, 148.
\textsuperscript{75} Owen, The Desert Air Force, 86.
\textsuperscript{76} Orange, “The Commanders and the Command System,” in The End of the Beginning, 39.
\textsuperscript{77} Orange, Coningham, 79.
\end{flushright}
Tedder and Coningham were the lynchpines, evolving procedures, developing a communications network, reorganising their staffs and collocating headquarters.\textsuperscript{78}

However, the appointment of Lieutenant General Montgomery as the Commander 8th Army in Aug 1942 was the final piece needed to mature ALI still further.\textsuperscript{79} Respected by both Tedder\textsuperscript{80} and Coningham,\textsuperscript{81} Montgomery also recognised the need for cooperation.\textsuperscript{82} He stated that:

\begin{quote}
...you cannot operate successfully unless you have the full support of the air. If you do not win the air battle first, you will probably lose the land battle...There used to be an accepted term of “army cooperation.” We never talk of that now. The Desert Air Force and the Eighth Army are one...If you knit together the power of the Army on the land and the power of the Air in the sky, then nothing will stand against you and you will never lose a battle.\textsuperscript{83}
\end{quote}

However, these relationships required constant attention. Prior to Montgomery’s arrival, the headquarters of the DAF and the 8th Army had become dislocated during the retreat in the first battle of Alamein; Montgomery collocated them again.\textsuperscript{84} However, Montgomery’s egotism meant that his relationship with both Tedder and Coningham began to sour towards the end of the campaign in North Africa.\textsuperscript{85} Coningham’s replacement, AVM Broadhurst subsequently reenergized the relationship and enabled ALI tactics to be further matured.\textsuperscript{86} In contrast, the command relationships were never quite as good with the RN.\textsuperscript{87} The naval headquarters remained located 125 miles away from the Air and Army headquarters and this hampered both decision making and understanding.\textsuperscript{88}

Furthermore, with the entry of the USA into the war, Tedder’s ability to build allied relationships proved critical.\textsuperscript{89} The planning and execution of Operation TORCH, the Anglo-American landings in Morocco and Algeria, in 1942 saw many of the ALI lessons relearned. The experience gained by Tedder was ignored, the theatre geographically split and planning done in isolation by the different commanders.\textsuperscript{90} It took Tedder’s direct approach with Eisenhower, the US commander, to

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\textsuperscript{79} Orange, Coningham, 106.
\textsuperscript{80} Tedder, With Prejudice, 347.
\textsuperscript{81} Orange, Coningham, 106.
\textsuperscript{83} Terraine, The Right of the Line, 380.
\textsuperscript{84} ibid., 374-379.
\textsuperscript{86} Nigel Hamilton, Monty. Master of the Battlefield 1942-1944 (Great Britain: Coronet, 1985), 55 and 197-198.
\textsuperscript{88} Orange, Tedder, 135.
\textsuperscript{89} Terraine, The Right of the Line, 378.
\textsuperscript{90} ibid., 390.
\end{flushleft}
highlight the resulting lack of cooperation. Tedder’s attendance at the Casablanca conference in January 1943 was critical in unifying air power under a single air commander.\footnote{ibid., 392-395.}

Both airmen and soldiers had to be educated. A lack of understanding of the employment of air power and of the mutual supporting/supported relationship between the RAF and the Army was an issue throughout the campaign. Tedder realised early on that the desert campaign involved a war for airfields.\footnote{Owen, \textit{The Desert Air Force}, 56.} Given that airfields are land based, the land battle had a direct impact on the ability of the RAF to conduct air operations.\footnote{Terraine, \textit{The Right of the Line}, 313.} However, he also accepted that the process of education would take time and that it was not possible:

\begin{quote}
...in a few weeks [to] remedy the result of over twenty years of neglect,...to educate the Army, which...had not troubled to study or even think about the air aspect.\footnote{Tedder, \textit{With Prejudice}, 163.}
\end{quote}

Newly arrived US personnel required education. During a lull in fighting at Alamein in 1942, US Army Air Force (USAAF) personnel were attached to RAF Squadrons and Headquarters to gain exposure to the procedures developed by the RAF.\footnote{Owen, \textit{The Desert Air Force}, 120-121.} Tedder sent Coningham to Tripoli to brief senior American and British officers on ALI. Coningham stated:

\begin{quote}
...it needs a life time of study and specialisation for a sailor, a soldier or an airman to learn his profession...In plain language, no soldier is competent to operate the Air, just as no airman is competent to operate the Army.\footnote{Orange, \textit{Coningham}, 133.}
\end{quote}

Tedder was also acutely aware of the impact that the failures in Crete and Greece had on the Army and RN’s attitude towards air power in general and the RAF in particular. After the fall of Crete, Tedder was conscious that there was potential for some to conclude that the RAF was entirely at fault, not realising that the loss of airfields had meant that the required air support could not be provided.\footnote{Tedder, \textit{With Prejudice}, 106-107.} He felt that the hatred for the RAF was due to a lack of understanding about the need for airfields.\footnote{Orange, \textit{Tedder}, 139.} He was frustrated by the failure of many army commanders to understand that airfields required protection.\footnote{ibid., 173.} This was highlighted during the first battle for Alamein when security for the airfields was withdrawn when the situation turned against the British.\footnote{Terraine, \textit{The Right of the Line}, 374.}
contributed to the eventual formation of the RAF Regiment in February 1942 who were dedicated to the task of defending airfields.\textsuperscript{101}

Coningham also faced a constant battle in educating the other services. There were senior Army officers who thought that air power should be at the disposal of land commanders and on call to attack targets close to land forces.\textsuperscript{102} Similar education was required for the RN. Admiral Cunningham, the Commander-in-Chief of the Mediterranean Fleet, demanded control of flying squadrons to dedicate to maritime operations believing that there was insufficient air cover during operations over Crete and Greece.\textsuperscript{103} Cunningham disagreed with the concept of centralised command and control of air assets and sought something similar to Coastal Command.\textsuperscript{104} The resolution was a compromise; 201 Group was designated as a naval cooperation group whilst remaining under RAF control.\textsuperscript{105}

Logistics and equipment also impacted ALI and AMI. Limited air resources were reapportioned to Greece to cope with the crisis there in 1941.\textsuperscript{106} The resupply lines were long and the system of maintenance and repair required complete overhaul. Therefore, AVM Dawson was appointed in mid-1941 to advise on, and resolve the, issues.\textsuperscript{107} When Dawson arrived there were only 200 serviceable airframes, by October 1942 there were 1500. Of the 858 aircraft issued to squadrons between September and October 1942, 378 had been repaired in theatre thanks to the overhaul of the maintenance system led by Dawson.\textsuperscript{108} In addition, the appointment of Air Commodore Elmhirst to handle the administration and logistics saw the reorganisation of the DAF into a sustainable, mobile force.\textsuperscript{109} Both aspects contributed to ensuring more aircraft were available to support the campaign.

Equipment capability provided another impediment to ALI and AMI. Tedder noted that the aircraft the British had were inferior in performance in comparison to German aircraft.\textsuperscript{110} As the campaign progressed so equipment was re-roled to make best use of available assets. This saw the development of the fighter-bomber, designed to save time in responding to Army requests for support and to free up the light bombers to operate against targets more suited to medium level.\textsuperscript{111} Hurricanes were used in this role against shipping from Malta and the Spitfire made its debut in this

\begin{footnotes}
\footnote{Macmillan, \textit{The Royal Air Force in the World War}, 188-189.}
\footnote{Orange, \textit{Coningham}, 112.}
\footnote{Orange, \textit{Tedder}, 135.}
\footnote{Terraine, \textit{The Right of the Line}, 343.}
\footnote{ibid., 344.}
\footnote{ibid., 334-335.}
\footnote{Ibid., 340-341.}
\footnote{Orange, “The Commanders and the Command System,” in \textit{The End of the Beginning}, 35.}
\footnote{Terraine, \textit{The Right of the Line}, 361.}
\footnote{Owen, \textit{The Desert Air Force}, 89.}
\end{footnotes}
role during Operation CRUSADER. Yet, in 1918 the RAF had been the first air force to utilize fighter-bombers, it was a capability lost in the interwar years.

ALI in North Africa during WW2 did not happen by accident. As well as implementing a system for requesting and proving air support, the Army and RAF commanders shared the same messes, the air and land operations rooms were adjacent to each other, a common supply chain was used, air transport was provided for all three services by the RAF, and the forward headquarters was sited to meet the needs of both Land and Air commanders. These principles remained for future campaigns. Furthermore, training was carried out to ensure that the system was well practised.

However, the system was never perfect. Poor CID remained an issue and systems were developed to try and alleviate this, including signals on the ground in the form of large letters and marks on friendly forces' vehicles. CID was especially difficult when the two armies clashed as demonstrated during Operation CRUSADER when poor communications, confusion on the ground and inter-meshing of troops from both sides made it, and determining the bomb-line, very difficult. Overall the cooperation achieved in the North Africa campaign required, 'time, good will and constant attention.' Indeed, no system is successful without good key relationships.

Despite the success of ALI during the North Africa campaign during WW2, the underlying lack of trust between the RAF and the Army soon resurfaced and bickering was common place by 1944. However, the ALI systems and organisations that emerged from the North African Campaign in WW2 shaped ALI for the rest of the War. The US developed their ALI doctrine and created an independent air force based on the experience they gained during the North Africa campaign. The system also influenced the creation of Tactical Air Forces (TAFs). Evidence of the influence of the system developed in the deserts of North Africa in WW2 could be seen in the Cold War TAFs aligned with the British Army of the Rhine (BAOR) and RAF Germany.

118 ibid., 65 and 75.
121 ibid., 39-40.
However, as shall be shown in the next case study, the TAF concept was not necessarily suited to every conflict.

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Melvin, “The Land/Air Interface an Historical Perspective,” in *Air Power* 21, 179.
On 2 April 1982, Argentina invaded the Falkland Islands and South Georgia in the South Atlantic Ocean. The conflict that followed saw the British launch Operation CORPORATE to successfully retake the Falkland Islands from the Argentinians. The Task Force deployed was joint, something that was deemed uncommon in 1982. In addition, the nature of the conflict required the integration of maritime, land and air assets. Air power was key throughout the conflict and all the roles of air power were employed.

British Harriers were outnumbered 6:1 at the start of the campaign yet still managed to achieve local air superiority. Operation BLACK BUCK saw Vulcan bombers, supported by air-to-air refuelling aircraft, bomb the runway at Port Stanley. These missions demonstrated that the British had the ability to reach the Argentine mainland. Nimrod Maritime Patrol Aircraft flew 130 sorties from Ascension Island monitoring the Argentine Navy and providing Anti-Submarine Warfare (ASW) support for the RN when in range. Strategic air transport, based from Ascension Island, moved cargo and passengers including casualty evacuation and prisoner-of-war transfers. Tactical Air Transport provided maritime airdrops to support the Task Force. F4 Phantom aircraft were deployed to Ascension Island to provide Air Defence. Rotary Wing assets provided, ‘air transport, casualty evacuation, reconnaissance and limited fire support.’ It is outside the scope of this paper to cover the contribution of each of these aspects in any detail; therefore, the remainder of this section will focus on the integration of air power provided by Harriers and Rotary Wing assets.

128 Julian Thompson, 3 Commando Brigade in the Falklands: No Picnic (Barnsley: Pen & Sword Military, 2008), xix.
130 Group Captain Peter W Gray, “Air Power: Strategic Lessons from an Idiosyncratic Operation,” in The Falklands Conflict Twenty Years on, 255.
132 Burden and others, Falklands The Air War, 187.
133 Air Chief Marshall Sir Peter Squires, “Foreword,” in, Falklands Air War, authors Chris Hobson with Andrew Noble (Hinckley: Midland, 2002), 6; British Air and Space Power Doctrine, AP 3000 describes the four roles of air power as: control of the air; air mobility; intelligence and situational awareness; and, attack.
134 Hobson, Falklands Air War, 19.
135 ibid., 160.
137 ibid., 160.
138 ibid.
139 ibid., 159-160.
140 Burden and others, Falklands The Air War, 417.
The conflict happened as the British military was undergoing cuts following the Nott Defence Review of 1981. The aircraft carriers were for sale (HMS Invincible was to be sold to Australia whilst HMS Hermes would be bought by India) and the Vulcan bomber aircraft was being phased out. These were just the latest in a long line of defence cuts. The decline in defence capability in Britain had been going on for more than a decade. The British military footprint had been reduced significantly in the 1960s and 70s in line with decolonisation as she withdrew from the Middle and Far East. Had the conflict happened much later, Britain would not have had the assets to undertake CORPORATE. The Nott review had been guided by the preoccupation with Cold War scenarios and integration with NATO structures which dominated military concepts of the time. Anything else was deemed unnecessary. The official government lessons from the campaign acknowledged that the British armed forces were,

organised and equipped for operations in the NATO area against the Warsaw pact. In the South Atlantic they…were constantly in demand to perform unfamiliar tasks which were important to the operation.

In 1982, there was little formalised Joint doctrine available and there was scepticism over that which did exist. British military operations have historically had a Joint element; but, the Cold War provided an, ‘overwhelming strategic imperative,’ which drove the concepts of the day. Therefore, the British military was focused on NATO and its associated Cold War responsibilities almost to the exclusion of all else. An expeditionary operation 8000 miles away to recover two small, British territories was not, ‘envisaged, nor planned for, nor considered to be a precedent for the future.’ There was certainly no scope to accommodate such a concept within the budget.

There were ALI and AMI concepts, albeit not necessarily ones suited to those the British would need in the Falklands. It was routine for the RAF’s GR3 Harriers and Rotary Wing aircraft to

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142 Dr Stuart Griffin, *Joint Operations: A Short History* (Training Specialist Services, 2005), 133.
143 Hobson, *Falklands Air War*, 18.
147 Sir John Nott, “A View from the Centre,” in *The Falklands Conflict Twenty Years on*, 57.
148 Hobson, *Falklands Air War*, 18.
151 ibid., 283.
152 ibid., 282.
154 ibid., 254.
operate in support of the Land environment, both in in support of the BAOR and beyond.\textsuperscript{155} However, none of these concepts foresaw the use of GR3s in AMI. Apart from a short trials period long prior to CORPORATE, the GR3 had never embarked on an aircraft carrier.\textsuperscript{156} CORPORATE was the first time since WW2 that RAF aircraft had conducted operations from aircraft carriers.\textsuperscript{157} Equally, the GR3 pilots were well practised at Close Air Support (CAS).\textsuperscript{158} Their expertise proved decisive in turning the battle for Goose Green in the favour of the British.\textsuperscript{159} CAS provided by GR3s silenced the Argentinean artillery which had been pinning 2 Para down.\textsuperscript{160} It was described by Ethell and Price as a, ‘textbook example of a close air-support [sic] mission.’\textsuperscript{161}

In contrast, ground attack or CAS missions were not roles the RN Sea Harrier (SHAR) squadrons trained for,\textsuperscript{162} nor was the SHAR optimised for such missions.\textsuperscript{163} However, realising that they would be required to conduct the air-to-ground role, the SHAR squadrons did conduct relevant training on their way south.\textsuperscript{164} Whilst they did employ the expertise of their RAF exchange pilots in developing their skillsets\textsuperscript{165} there is also evidence that they dismissed standard RAF CAS procedures as being too complicated.\textsuperscript{166} This ad-hoc approach also contributed to a lack of standardisation between the squadrons and disagreement over which procedures should be used.\textsuperscript{167}

In contrast, RN Commando helicopters\textsuperscript{168} existed to support Royal Marines both at sea and on land.\textsuperscript{169} Therefore, their concepts were fairly mature. However, regardless of the established concepts, the British had not fought a major combat operation for a considerable period. The RAF had not been involved in any major combat action since Suez in 1956.\textsuperscript{170}

The SHAR and GR3s arguably achieved impressive results (28 SHARs and 14 GR3s deployed over the conflict completing over 1200 and 150 operational sorties respectively).\textsuperscript{171} However, there

\begin{thebibliography}{99}
\bibitem{ibid} ibid., 253.
\bibitem{Burden and others} Burden and others, *Falklands The Air War*, 371.
\bibitem{Pook} Pook, *RAF Harrier Ground Attack Falklands*, 105.
\bibitem{Burden and others} Burden and others, *Falklands The Air War*, 192.
\bibitem{Morgan} Morgan, *Hostile Skies*, 17.
\bibitem{Morgan} Morgan, *Hostile Skies*, 32-32 and 50-51.
\bibitem{Ward} Ward, *Sea Harrier Over the Falkland*, 104.
\bibitem{ibid} ibid., 80-84, 105.
\bibitem{ibid} ibid., 193.
\bibitem{Hobson} Hobson, *Falklands Air War*, 154.
\end{thebibliography}
were some surprising examples of poor integration and a lack of confidence in capabilities. On 25 May, HMS Coventry was sunk. The Combat Air Patrol (CAP) was called as the raid was detected; however, they had their engagement with the attacking aircraft broken off twice to allow HMS Broadsword and then HMS Coventry to engage. Ship-borne weapon malfunctions and manoeuvring mistakes lead to both ships being hit, HMS Coventry mortally, whilst the enemy aircraft escaped undamaged.\textsuperscript{172} The SHAR had not been allowed to deal with the threat.\textsuperscript{173} Although CAS was decisive at Goose Green, it was not without issue. With the odd exception, the Forward Air Controllers (FACs) generally had a poor reputation amongst the GR3 pilots. Peacetime exercises had highlighted problems in quality of personnel (non-ground attack aircrew), communications (the GR3 air-to-ground communications were poor), poor choice of initial points by FACs (making target identification difficult), and indiscernible target marking.\textsuperscript{174} CID was an issue both for Land and Air forces. The terrain meant that locating and identifying troops on the ground was difficult.\textsuperscript{175} British troops on the ground also found CID difficult and fired back at British aircraft;\textsuperscript{176} however, given the Landing Force Commander’s briefing to his troops to shoot down any low flying aircraft,\textsuperscript{177} this was perhaps understandable if lamentable.

Despite having a more mature system of employment, tasking of Rotary Wing assets was often not much better. The sinking of the Atlantic Conveyer on 25 May saw the loss of critical rotary wing assets, including all but one Chinook which was airborne at the time.\textsuperscript{178} This significantly changed the plans for the amphibious landings.\textsuperscript{179} Allegedly, the RN gave consideration to pushing the one remaining Chinook, which had landed on the already crowded HMS Hermes, into the Atlantic Ocean on the pretence that there was insufficient space to accommodate it.\textsuperscript{180} Fortunately, this did not occur; however, it provides further evidence of a lack of appreciation of how vital this asset was to the campaign.

Thereafter, the Rotary Wing assets became even more critical. However, once the amphibious landings had happened, all Rotary Wing coordination seemed to cease and Wessex crews were individually seeking tasks ashore.\textsuperscript{181} In addition, Rotary Wing assets remained ship based after the initial landings. As the ships moved out from San Carlos Water where the landings were taking place to reduce their exposure to attack, the Rotary Wing assets often found themselves out of

\textsuperscript{172} Burden and others, \textit{Falklands The Air War} 201.
\textsuperscript{173} Pook, \textit{RAF Harrier Ground Attack Falklands}, 86.
\textsuperscript{174} ibid., 54, 201-203.
\textsuperscript{175} Morgan, \textit{Hostile Skies}, 236.
\textsuperscript{176} ibid., 284.
\textsuperscript{177} Ward, \textit{Sea Harrier Over the Falklands}, 257.
\textsuperscript{179} Thompson, \textit{3 Commando Brigade in the Falklands}, 84-85, 88.
\textsuperscript{180} Pook, \textit{RAF Harrier Ground Attack Falklands}, 87.
range of the Land assets that needed their support.\textsuperscript{182} However, once all assets were ashore, things began to improve and the Mobile Air Operations Team (MAOT), whose role was to allocate rotary wing assets, was employed to good effect coordinating Rotary Wing assets.\textsuperscript{183}

Best use was not made of all available rotary assets. The Wessex was never employed in its gunship role to support troops in contact during the conflict.\textsuperscript{184} Units unused to working with rotary assets also hampered operations having not practised procedures; although, these issues were quickly overcome.\textsuperscript{185} When reinforcement platforms arrived towards the end of the conflict, the situation improved markedly in terms of direct support to land forces.\textsuperscript{186} However, the Wessex crews in particular felt that their tasking was suboptimal.\textsuperscript{187}

At times there was a disappointing lack of co-ordination in supporting functions too. Intelligence was scarce throughout the campaign but it appears that it was not fused or shared effectively. The GR3 had a photographic reconnaissance capability; yet, an apparent lack of understanding of the capability of photo reconnaissance assets within the RN command led to poor tasking.\textsuperscript{188} This also contributed to a subsequent lack of useful photographs with which to inform the planning for the amphibious campaign to the extent that,

\begin{quote}
...for the first time probably since Gallipoli in 1915, an amphibious operation was to be mounted with no air photographs of the enemy.\textsuperscript{189}
\end{quote}

The poor sharing of intelligence was in part due to the lack of systems available to communicate it effectively; but, it was also due to a lack of liaison between force elements.\textsuperscript{190} The fusion of intelligence was inadequate and aircraft were often given tasks based on poor or unverified intelligence.\textsuperscript{191} This caused friction between force elements as well as putting limited air assets at unnecessary risk.\textsuperscript{192}

The requirements for increased crew numbers during CORPORATE meant that many Squadrons were re-roled or reconstituted at short notice. Some pilots were sent to the South Atlantic with minimal experience on the SHAR but with extensive previous Air Defence or GR3 experience. However, their lack of experience on-type, and minimal conversion times, meant that not all

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operating procedures had been covered. This led to difficulties operating weapons systems in the heat of battle.\textsuperscript{193} Equally, the Rotary Wing operators found that these hastily brought together crews and squadrons brought a wealth of experience that they were able to put to good effect.\textsuperscript{194}

The Task Force Commander, Admiral Fieldhouse, was based at Northwood in the UK with three deployed commanders in the South Atlantic (Read-Admiral Woodward as Commander Carrier Battle Group, Commodore Clapp as Commander Amphibious Task Group and Brigadier Thompson as Commander Landing Task Force Group).\textsuperscript{195} The lack of a clearly nominated, deployed Joint Task Force commander caused considerable friction.\textsuperscript{196} This was compounded by the physical separation of the deployed commanders. Woodward sailed ahead from Ascension Island with the Carrier Group whilst Clapp and Thompson were embarked behind as part of the Amphibious Group.\textsuperscript{197}

Furthermore, the selection of Woodward as Commander of the Carrier Battle Gp was curious. As a submariner, he had no experience of, ‘aircraft carriers, air groups or amphibious warfare.’\textsuperscript{198} Yet, he was in the lead, deployed command position for an operation which required: the recapture of South Georgia using air and amphibious assault; the establishment of air and sea control around the Falkland Islands; and, an amphibious assault to recapture them.\textsuperscript{199} Woodward himself recognized that he lacked relevant experience:

\ldots I was aboard a 29,000-ton aircraft carrier, which was almost strange to me – in all my time to date, I had spent only one week at sea in carriers.\textsuperscript{200}

He, along with others, thought Vice Admiral Reffell, Flag Officer Third Flotilla (which included both the amphibious ships and aircraft carriers) who had previously served as, ‘Commodore Amphibious Warfare,’\textsuperscript{201} was the most likely candidate for the position. He was also arguably better qualified to undertake the role.\textsuperscript{202} However, Woodward was conducting exercises with his Flotilla off Gibraltar when the Argentinian invasion took place and was, therefore, commanding the Flotilla closest to the Falkland Islands.\textsuperscript{203} Finlan suggests that his relationship with Fieldhouse, a

\textsuperscript{193} Morgan, \textit{Hostile Skies}, 174-175, 194.
\textsuperscript{195} Thompson, \textit{3 Commando Brigade in the Falklands}, 24.
\textsuperscript{196} ibid., 24-25; Vice Admiral Sir Jonathon Band, “British High Command during and after the Falklands Campaign,” in \textit{The Falklands Conflict Twenty Years on}, 34; and, Adm Sandy Woodward with Patrick Robinson, \textit{One Hundred Days. The Memoirs of the Falklands Group Commander} (Annapolis, ML: Bluejacket Books, 1997), xxii-xxvii.
\textsuperscript{197} Alastair Finlan, \textit{The Royal Navy in the Falklands Conflict and the Gulf War}, (London: Frank Cass, 2004), 75-79.
\textsuperscript{198} ibid., 74.
\textsuperscript{199} Smith, \textit{Battle Atlas of the Falklands War 1982}, 47.
\textsuperscript{200} Woodward, \textit{One Hundred Days}, 88.
\textsuperscript{201} Thompson, \textit{3 Commando Brigade in the Falklands}, 14.
\textsuperscript{202} ibid., 25.
\textsuperscript{203} Woodward, \textit{One Hundred Days}, 69-73.
fellow submariner, may also have played a part in his selection. Regardless, Woodward’s lack of experience in integrating Air into his battle plans was soon obvious. Ward highlights that,

Had the Command in the Falklands understood the Sea Harrier and its capabilities better, the aircraft could undoubtedly have been used to greater effect.

Woodward quickly recognised the value of his Land advisor in ensuring Maritime-Land integration. However, he tasked one of his Group Warfare Officers (GWOs) with doubling as his air advisor. The individual was a RN Commando helicopter pilot by background and Woodward believed he therefore knew how to deal with the, ‘prima donna,’ attitudes of aviators. Yet, as Commando helicopter pilot, he would have lacked knowledge of both Air Defence and Fast Air support to the Land environment. There was no dedicated Air Component Commander or an RAF Advisor of senior rank (one Wing Commander was deployed later with General Moore). There was a lack of understanding at the highest level as to how to employ organic RN air power. This was highlighted when, having lost two Harriers to an accident the previous day, followed by difficulties recovering aircraft in fog, Woodward declared,

I decided that we were getting absolutely nowhere with aviation and I was going to have to get on with the war largely without it for a while…

Despite such statements, all of the deployed commanders recognised that a sufficient level of control of the air was critical to the amphibious landings. However, the intended level of air supremacy was never achieved. The Argentinians had numerical superiority and, despite high losses, their superior numbers allowed them to continue to harass British Forces. Whilst sufficient control of the air was achieved to allow the landings to take place and to ensure that British troops could break out from the beachhead, the lack of complete supremacy impacted the plans for the amphibious landings. All stores had to be offloaded to the shore when the intent had been to keep them afloat. The air threat to the ships was too high for them to remain close to the shore.

204 Finlan, The Royal Navy in the Falklands Conflict and the Gulf War, 74-75.
205 Ward, Sea Harrier Over the Falklands.
206 Woodward, One Hundred Days, 85-86.
207 ibid.,118.
208 Dr Stuart Griffin, Joint Operations: A Short History (Training Specialist Services, 2005), 138-139.
209 Woodward, One Hundred Days, 181.
210 Thompson, 3 Commando Brigade in the Falklands, 14, 25, 27; and Woodward, One Hundred Days,98.
211 Hobson, Falklands Air War, 19.
212 ibid., 153.
213 Thompson, 3 Commando Brigade in the Falklands, 32.
Commanders were guilty of micromanaging air power. Flying programmes were changed without notice during the journey south and training scenarios were unrealistic. Staff officers with no SHAR experience were deciding exactly what sorties should comprise of and duty periods were split inequitably between squadrons. There seemed to be little recognition of the effects of cumulative fatigue on all aircrew and the risks to crew and aircraft that resulted. However, in contrast, and slight contradiction, the carriers were kept at a safe distance from the shoreline for the majority of the time to minimise the risk to the carriers and their aircraft. This lack of understanding was clear on the initial arrival of the GR3s aboard HMS Hermes. On landing, the GR3 crews were immediately tasked with conducting a training sortie. This was despite not having been fully briefed on procedures and at a time of day that would have required night landings, none of the pilots having conducted night deck landings before. They were subsequently stood down again without explanation. Debriefings were also micromanaged. Individual missions often required separate debriefings to the senior flying operations officer, the ship’s captain and the Flag Officer before any aircrew debriefing or mission analysis had taken place. The GR3s were tasked, in a seemingly ad-hoc manner, by up to three different chains of command. There was a sense that, ‘the task force’s tasking and reporting was at best chaotic.’

Inter-service and inter-unit rivalry hampered the effective integration of air power. There were those in the RN who dismissed the BLACK BUCK raids, carried out by RAF Vulcans to bomb the runway at Port Stanley, as ‘the Air Force just trying to get in on the act.’ Several published memoirs cover the hostility between the RAF and RN. Inter-ship and inter-unit rivalry existed between the two aircraft carriers and the two RN SHAR squadrons initially deployed. Personal rivalries also existed. One pilot is quoted as having said that,

The Captain [of HMS Hermes] was fighting four wars…against the crabs [RN terminology for RAF personnel],…against [HMS] Invincible,…against the admiral and…against the Argentines!

214 Finlan, The Royal Navy in the Falklands Conflict and the Gulf War, 167.
215 Ward, Sea Harrier Over the Falklands, 161-182, 251.
217 Finlan, The Royal Navy in the Falklands Conflict and the Gulf War, 89.
218 Pook, RAF Harrier Ground Attack Falkland, 36-37
219 Morgan, Hostile Skies, 273.
220 Pook, RAF Harrier Ground Attack Falklands, 53-54.
221 Morgan, Hostile Skies, 147.
222 The Falklands Seminar. A Gathering of the Senior Commanders and Politicians who Directed the Course of Events of the Falklands War 1982 (Shrivenham: JDCC, 2003), 29-30
223 Pook, RAF Harrier Ground Attack Falklands, 180-181; and Ward, Sea Harrier Over the Falklands, 251.
224 Ward, Sea Harrier Over the Falklands, 126, 138-139, 142 and 161-162.
225 Morgan, Hostile Skies, 291.
However, at the tactical level the pilots shared a common understanding. The exchange officer programmes between the SHAR and GR3 fleets had built relationships which aided air integration.226

The location of the Falkland Islands and South Georgia in the South Atlantic posed a logistical challenge. The islands are situated some 8000 miles from UK227 and over 3500 miles from the only staging location on Ascension Island.228 As well as creating a very long logistics tail, this limited the number and types of aircraft that could be operated to those that could operate from ships (such as the Harrier and rotary wing assets) or had the range to operate from Ascension Island.229 The embodiment of refuelling probes onto some aircraft types did partially relieve these issues by extending the range of Nimrods, Hercules, Victors and the Vulcan.230

The location of the carriers, often up to 250 miles from the Islands,231 limited the time on station of each CAP, sometimes to as little as just 30 minutes.232 An absence of Airborne Early Warning (AEW) assets coupled with radar limitations on both ships and SHARs meant that a higher number of CAPs had to be maintained than would otherwise have been necessary.233 To maintain three CAPs at any one time required eighteen airframes (a pair on each CAP, a pair on recovery and a pair outbound to relieve those on CAP).234 This was compounded by a policy of high level CAPs for SHARs flown from HMS Hermes which required them to loiter high above San Carlos, only engaging enemy aircraft after they had attacked the ships as opposed to the lower level CAPs flown from HMS Invincible which had a far higher success rate in intercepting enemy aircraft before they hit their targets.235 After the landings, a Forward Operating Base was created near the beachhead which significantly improved the time each aircraft could spend on CAP or CAS missions.236

The strategic imperative and the budgetary cuts taking place in 1982 meant that the air capability available was not optimised for the campaign in the Falklands. The British lacked sufficient air platforms237 and began the conflict with the fewest, ‘number of operational aircraft carriers and

226 Pook, RAF Harrier Ground Attack Falklands, 37.
227 Dr Stuart Griffin, Joint Operations: A Short History (Training Specialist Services, 2005), 136.
229 Hobson, Falklands Air War, 18.
230 ibid., 20.
231 Burden and others, Falklands The Air War, 190.
232 Finlan, The Royal Navy in the Falklands Conflict and the Gulf War, 90.
233 Burden and others, Falklands The Air War, 190.
234 ibid., 190.
235 Ward, Sea Harrier Over the Falklands, 356.
236 Burden and others, Falklands The Air War), 190.
carrier aircraft since the First World War. The SHAR was not procured to undertake air-superiority missions. Neither Harrier variant had been tested in battle. Numerous modifications were hastily carried out on various air platforms. GR3s were modified for carrier operations and weapons modifications were rushed through. After the conflict, there was formal recognition of the need for AEW, equipment for Close Air Support and an enhanced air reconnaissance capability. The carriers and the majority of embedded modifications were retained and an AEW capability procured.

238 ibid., 266.
241 Hobson, Falklands Air War, 20.
242 United Kingdom. Secretary of State for Defence. The Falklands Campaign: The Lessons, 20-34.
US

The US AirLand Battle concept was first incorporated into Army Doctrine in 1982. However, modern US Army doctrine has now evolved to one of, ‘unified land operations,’ which proffer the Army’s contribution to integrated operations with US and coalition militaries as well as other government departments. Similar to the UK, the US has seen a renewed interest in ALI, particularly Close Air Support (CAS), following the recent conflicts in Iraq and Afghanistan. The ALI needed for these conflicts saw further development of the concept and effective systems for utilising CAS to support Special Operations Forces (SOF).

The US is also developing an AirSea Battle (ASB) concept. Integration of USAF and UN air strike capability had already been reinvigorated thanks to the experiences gained in Iraq and Afghanistan over the last decade. The concept was initiated in 2009 in response to the emergence of challenges to the US’ ability to project military power. This challenge has been coined as ‘anti-access/area-denial’ (A2/AD). US military supremacy has led potential adversaries to seek ways to deny the US access to theatres of operation other than by confronting their superior military. ASB seeks to address this by integrating Air, maritime, cyber and space capabilities.

In response to this same threat, the US released the ‘Joint Operational Access Concept (JOAC),’ in January 2012. It envisages the ASB, and other specific concepts, being nested underneath it to provide greater detail on specific requirements. Its central idea is, ‘cross-domain

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245 ibid., 10.
246 Steve Call, Danger Close. Tactical Air Controllers in Afghanistan and Iraq (College Station, TX: Texas A&M University Press, 2007), xiii.
247 ibid., 26-29
synergy," that achieves complementary utilisation of capabilities to establish the required superiority across all domains to enable the freedom of action.

The concept is not new but it acknowledges that the A2/AD threat is not something that the US has been required to address in recent history but may have to in future. The concept responds to both the 2010 Quadrennial Defense review and the National Military Strategy which recognize that the US must develop ways to ensure access to strategically important regions. However, it is still very much a concept and has not yet been included in either strategy or doctrine.

The US, ‘Capstone Concept for Joint Operations: Joint Force 2020,’ (CCJO) provides a broader concept to address the contemporary security challenges following over a decade of operations in Iraq and Afghanistan. It supports US defence strategic guidance and aims to develop debate about how best to meet the security challenges out to 2020. It acts as the bridging element from defence strategic guidance to lower level concepts and doctrine. It envisions, ‘globally integrated operations,’ where capabilities are integrated across domains in combination with allies.

The cross domain theme is prevalent throughout the CCJO. It highlights that training and exercises must ensure that common tactics, standards and procedures (TTPs) are employed to enable cross-domain integration. Moreover, the concept is designed to inform ideas and to be the catalyst for thinking about how the US military should operate to meet the challenges of the contemporary security environment.

By having a capstone concept for joint operations supported by more detailed specialised concepts, such as the JOAC, the US set out concepts that can be debated and developed into doctrine and reality. This does not mean that ALI, or indeed ASB, is irrelevant, they form part of a whole which is focused on cross-domain integration. However, as the experience in Iraq and

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254 ibid., ii.
255 ibid., ii.
256 ibid., 39.
259 ibid., iii.
262 ibid.
263 ibid., 4-16.
264 ibid., 12.
265 ibid., iii.
Afghanistan proved, having concepts and mature tactical doctrine are insufficient when they are not practised.

**China**

Chinese interest in air power concepts was awakened following the 1991 Gulf War. Their air power concepts were lagging behind the West’s and lessons were learned which reignited air power thinking. The deployment of US aircraft carriers in the vicinity of Taiwan following Chinese intimidation in 1996 gave further incentive for reinvigoration of conceptual thinking on air power. In the 1990s, the Chinese developed, ‘integrated coordination,’ a concept based around joint operations between the services, management of long-range bomber groups and integration between air units at different locations. However, a lack of suitable equipment and training, and a primary role still focused on providing Air Defence over Chinese cities hindered the development of such concepts in the 1990s.

Today, the Chinese are investing heavily in air power. The concept of integration appears repeatedly throughout published Chinese concepts on the use of airpower. The driving factors for these concepts are, ‘territorial integrity, asserting sovereignty, threat perception and technology diffusion.’ They have established a concept for the employment of air power on joint operations. Air power forms part of their, ‘firepower warfare,’ concept in which air power and artillery are used in conjunction. The Chinese see future operations being joint operations and their, ‘close coordination concept,’ involves air, land and maritime forces. They see future conflicts being an,
...integrated struggle for air, space, information, electromagnetic and network superiority.\textsuperscript{276}

However, there are still a lack of joint exercises and inadequate command and control systems which hamper Chinese integration concepts from maturing.\textsuperscript{277} Nevertheless, the Chinese have developed integrated concepts which are achievable through a combination of planning and training.\textsuperscript{278}

It can be deduced that the Chinese concepts are moving towards cross-domain integration. Their inclusion of information and network superiority within their concepts suggests that they are including the emerging cyber domain within their vision of future integrated operations. These concepts are derived within a Chinese context and are being used to drive investment and modernisation. If coupled with training, this will potentially provide mature, integration to meet China’s security needs.

**United Kingdom**

The UK’s High Level Operational Concept (HLOC) is the,

> Conceptual framework for UK Joint operations and the development of associated capabilities out to 20 years.\textsuperscript{279}

It recognises that military effect will take place across all domains and that effect will be optimised when integrated cross-domain.\textsuperscript{280} Furthermore, each of the Future Operating Concepts for Maritime, Land and Air all recognise the need for cross-domain integration. The Future Air Operational Concept (FASOC) acknowledges that the UK has been focused on ALI for the last decade.\textsuperscript{281} Threats in the littoral and the emergence of anti-access concepts as well as the expansion of the space domain and emergence of the Cyber domain mean that, ‘bi-environmental,’\textsuperscript{282} integration is no longer sufficient. Cross-domain integration is required.\textsuperscript{283}

The Future Land Operating Concept (FLOC) recognizes the need for integration with air\textsuperscript{284} and maritime\textsuperscript{285} as well as alluding to wider integration across all domains, services and partners.\textsuperscript{286}

\textsuperscript{276} Roger Cliff, “The Development of the PLAAF’s Doctrine,” in *The Chinese Air Force*, 156.

\textsuperscript{277} ibid., 50.

\textsuperscript{278} Ibid., 265.


\textsuperscript{280} ibid., 1-1.


\textsuperscript{282} ibid.

\textsuperscript{283} ibid., 2-7

\textsuperscript{284} United Kingdom. Developments, Concepts and Doctrine Centre. *Future Land Operating Concept. Joint Concept Note 2/12*. (Shrivenham: DCDC, 2012), 4-8.

\textsuperscript{285} ibid., 4-11.
Similarly, the Future Maritime Operational Concept (FMOC), recognizes that integration across environmental, ‘seams,’ is increasingly required and will be achieved by, ‘sub-seam concepts…and regularly scheduled Joint and Combined exercises.’ However, both imply, but do not specifically mention, cross-domain integration. Therefore, whilst the underlying reasoning behind each of the environmental concepts is one of cross-domain integration, the lack of common terminology risks divergence of thought and approach at sub-concept level and beyond.

The 2010 Strategic Defence and Security Review announced a restructuring of the armed forces that would, amongst other things, provide integrated capabilities across the 3 traditional environments. It also highlighted Cyber as a domain alongside the traditional maritime, land and air domains. Therefore, cross-domain integration is aligned with the strategic direction.

Furthermore, in 2012, a paper on, ‘How We Fight,’ was circulated. The paper focused on integrated forces and the Development, Concepts and Doctrine Centre (DCDC) is now using the principles of the paper as a basis for a Joint Operational Concept (JOC) which is due for publication in the near future. The JOC, set in the context of readiness for contingency and Future Force 2020, should provide the framework for permanent cross-domain integration.

The new British Air and Space Power Doctrine (to be designated JDP 0-30) details the application of air power as part of a cross-domain concept. It states that:

> Our conceptual focus must...shift from bi-lateral cooperation to genuine, cross-domain integration, where a joint and multinational approach is intuitive and automatic.

This cross-domain integration covers not just integration with maritime and land but also cyber and space.

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286 ibid., conc-1.
288 ibid.
290 ibid.
292 ibid., 1-10
294 Air Commodore Alistair Byford, outgoing Assistant Head Air Developments, Concepts and Doctrine Centre, interview with author, April 18, 2013.
295 ibid.
297 ibid., 48-57.
The drawdown from HERRICK and emerging security trends, within the context of a shrinking military force, are focussing the UK on cross-domain concepts. The fact that the principle is in broad alignment with US thinking in particular is useful in terms of working with allies to mature the concept into a workable reality.

**Concepts into reality**

There is already extensive and detailed supporting NATO and UK doctrine available on ALI and AMI. Operation TELIC saw many ALI lessons relearned; skillsets had been lost. This led to the initiation of Project Conningham-Keyes to rectify the shortcomings. The project produced numerous ALI initiatives including the formation of the Joint Air Land Organisation (JALO), a tri-service organisation focused on ALI.

This focus on ALI concepts has seen ALI organisations mature and adapt to the needs of current operations. The Air Operations Coordination Centre (Land) has evolved into the Air Support Operations Centre (ASOC). Doctrinally, the ASOC, ...allocates support tasks to its associated and subordinate TACP and facilitates CAS [Close Air Support], AI [Air Interdiction], Suppression of Enemy Air Defences (SEAD), air mobility and ISR [Intelligence, surveillance and reconnaissance] missions within its assigned area of control.

However, on Operation HERRICK, the ASOC fills three posts within the deployed US Air Support Operations Squadron (ASOS). These posts provide integration, and dynamic re-tasking, of CAS

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300 Smyth, “From Coningham to Project Coningham-Keyes,” 1.

301 ibid., 17-18.

302 Wing Commander Dougie Donnelly, Officer Commanding Air Support Operations Centre, interview with author April 10, 2013.

assets to support the land objectives.\textsuperscript{304} The current role supports the current fight. It does so very effectively and the system is mature.\textsuperscript{305}

The Air Battle Training Centre (ABTC) is another organisation that has evolved as a result of Operation HERRICK. Originally set up as a capability concept demonstrator, it has evolved into a provider of synthetic pre-deployment training to land units on integrating ISTAR and joint fires.\textsuperscript{306} This facility is the, ‘gold standard,’\textsuperscript{307} of synthetic pre-deployment training and provides scenarios that cannot be replicated in the live, training environment. The exercises run at the ABTC have expanded to accommodate the requirements of a wider HERRICK-focused audience and are designed to be mutually beneficial to both soldiers and airmen where possible.\textsuperscript{308}

However, all of these organisations have been developed using a, ‘singular frame of reference:’\textsuperscript{309} COIN operations on Operations TELIC and HERRICK. There is a generation of airmen and soldiers who have not experienced combat of any other kind. This was evident in Operation ELLAMY (the UK’s contribution to the campaign in Libya) where personnel, familiar with HERRICK TTPs, tried to approach ELLAMY in the same way.\textsuperscript{310} The UK’s maritime contingent lacked practise in integrating with air power, despite extensive work-ups. Initially, the operation lacked a practised framework for AMI, especially when it came to generating and sharing a recognised operational picture and integrating fires. Whilst personnel at the tactical level worked through the obstacles to improve integration, procedures, understanding and relationships had to be built from scratch.\textsuperscript{311}

There were other obstacles to overcome too. Apache helicopters operated from HMS Ocean. They were not modified for maritime operations at the outset of the campaign and operated under emergency clearances. Therefore, not only were the crews untrained in operating under the direction of the Combined Air Operations Centre (CAOC) and from a ship, the aircraft platform was also limited in how it could be operated.\textsuperscript{312} Furthermore, ELLAMY was a conflict where the Land component comprised of rebel forces opposing the established regime. This raised a new series of questions on how to integrate with unfamiliar ground forces, who have limited training and limited

\textsuperscript{304} Donnelly, interview with author April 10, 2013.
\textsuperscript{305} Brigadier Allison, Commanding Officer Joint Air Land Organisation, interview with author April 9, 2013.
\textsuperscript{306} Wing Commander Steve Chapman, Officer Commanding Air Battle Training Centre, interview with author April 11 2013.
\textsuperscript{307} Allison, interview with author April 9, 2013.
\textsuperscript{308} Chapman, interview with author April 11 2013.
\textsuperscript{309} Group Captain Johnny Stringer, Commanding Officer RAF Coningsby, interview with author, April 11, 2013.
\textsuperscript{310} ibid.
\textsuperscript{311} Commander Colin Williams, Commanding Officer HMS Liverpool during Operation ELLAMY, interview with author April 18 2013.
\textsuperscript{312} Byford, interview with author, April 18, 2013.
The nature of the Land component made CID very difficult and a number of blue-on-blue incidents occurred as a result. Differing Rules of Engagement (ROE) of the participating nations further hampered integration. ROE impacted on how platforms could be used and, again, the lack of practise hampered initial operations at the tactical level. The starting point was not ideal.

Therefore, ALI was still required during ELLAMY, just in an entirely different context to that which had been envisaged. It is also clear that personnel were unpractised at ALI and AMI outside a HERRICK context. The focus on ALI for Operation HERRICK had reduced expertise and readiness to conduct other types of ALI and had seen wider AMI largely fall out of practise. Proxy land forces, an unexpected operation and the requirement to integrate across domains in a way that had not been envisaged all impacted AMI and ALI during ELLAMY.

AMI had simply not been practiced whilst the focus was on HERRICK due to limited assets. As far back as 2009, the then Joint Force Harrier (JFH) Force Commander recognised that the withdrawal of the Harrier from HERRICK in 2009 would allow JFH to address some of the skills fade that had crept into the force as a result of the focus on HERRICK. Whilst the Harrier was withdrawn from service in 2011 following the 2010 SDSR, this serves to highlight that the focus on one conflict and one particular type of ALI has been at the expense of wider integration skills.

HERRICK has undoubtedly provided valuable lessons for ALI and something of a, ‘high watermark,’ in ALI has been achieved. However, the discussion above also highlights that there is danger of learning the wrong ALI lessons from HERRICK. It is but one scenario whilst the ALI concept provides a broader perspective. There is a danger that some may perceive ALI as depicted by their experience on HERRICK alone. Long term, such a view would potentially see the manner in which air power is defined narrowing and with it the policy choices air can offer and the training undertaken. In a shrinking military, it is vital air power offers the broadest possible policy options. Equally, ALI and AMI lessons must be learned from recent conflicts. As the UK withdraws forces from HERRICK over the next year, there will be a need to reconstitute skillsets

313 ibid.
315 Williams, interview with author April 18 2013.
316 Wing Commander I Middleton, DDS Deputy Director (Air), interview with author April 18, 2013.
319 Chapman, interview with author April 11 2013.
320 Middleton, interview with author April 18, 2013.
321 Stringer, interview with author, April 11, 2013.
that have been a lower priority. This will undoubtedly see some loss of focus on ALI. There will also likely be fewer resources available for training due to the current economic climate.\textsuperscript{322}

Those involved in conceptual work and or ALI organisations fully recognise the need to move to a cross-domain integration concept. JALO is already shifting focus to encompass both land and maritime in its remit.\textsuperscript{323} The ASOC is planning for support to the Future Force 2020.\textsuperscript{324} The ABTC is working to develop and broaden its synthetic capabilities.\textsuperscript{325} The need for joint training and education on cross-domain integration is recognised\textsuperscript{326} and the structures to enable the on-going development of conceptual thinking are in place.\textsuperscript{327}

Furthermore, the creation of the Joint Forces Command (JFC) to, ‘strengthen the focus on joint enablers and joint warfare,’\textsuperscript{328} provides an opportunity to progress cross-domain integration.\textsuperscript{329} The need to integrate with allies as we come to rely on them more for certain capabilities, and the limitations that may impose, is recognised.\textsuperscript{330} The lessons from Operation ELLAMY, and the French experience of operations in Mali, on integrating with Proxy forces is being captured and a joint UK/French concept note is being produced.\textsuperscript{331}

The SDSR announced a reduction in the size of the UK’s military and saw some capability gaps appear.\textsuperscript{332} This potentially leaves a gap in capability that will hamper integration. Despite these gaps, a, ‘seed-corn,’\textsuperscript{333} capability is being retained by the preservation of skillsets through exchange programmes with allies. The personnel involved in these programmes will ensure that the UK retains a level of expertise where there are current equipment capability gaps. In addition, the reduction in personnel numbers will likely see a commensurate reduction in ALI specialist posts which will need to be managed.\textsuperscript{334} There is a risk that the resource constraints force a choice between ALI or AMI if we retain a focus on bi-environmental integration.\textsuperscript{335} The, ‘seed-corn,’

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\bibitem{322} Allison, interview with author April 9, 2013.
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\bibitem{324} Donnelly, interview with author April 10, 2013.
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\bibitem{333} Allison, interview with author April 9, 2013.
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\bibitem{335} Middleton, interview with author April 18, 2013.

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expertise and Joint exercises will become critical to maintaining the ability of the UK to integrate across domains and with allies.  

336 Allison, interview with author April 9, 2013.
ALI and AMI do contribute to joint warfighting; however, not in isolation. In addition, as they only focus on two environments, they risk failing to contribute to wider integration. In particular, the recent focus on ALI in support of Operation HERRICK, whilst reinvigorating the concept, needs to be balanced with the integration requirement associated with wider contingency options. A cross-domain integration concept is therefore the best option to enhance joint warfighting and deliver effect. However, to stand the best chance of success, the concept must be relevant, resourced, exercised and articulated in a common language.

The Campaign in North Africa in WW2 demonstrated that a lack of defined ALI or AMI concept is not a bar to achieving successful integration. However, the consequence of not having a concept in use was demonstrated during the evacuation from Dunkirk. In addition, the time to develop a capability from an initial concept was significant, it was two years between the Italian invasion of Egypt in September 1940 and the pinnacle of ALI demonstrated during the battle for Alam el Halfa in September 1942. Without a concept, no thought had been given to the optimal air platforms that might be required to facilitate the tasks associated with supporting land forces. Therefore, suboptimal equipment and insufficient mass were prevalent during the early phases of the campaign.

In addition, without a concept, little thought had been given to the use of airpower in support of the land campaign nor had thought been given to the support that the air component would need. Not only did this hamper operations, it meant that there was a significant deficit in understanding which led to frictions between Maritime, Land and Air commanders. The subsequent articulation of a concept through both Churchill’s direction and the Air Support Directive provided a common vision and direction which allowed the system to be matured. However, the development of the concept into a system was not, by itself able to achieve integration. Personal relationships were needed as was leadership and a willingness to cooperate. It is of note that, even having developed a successful method of achieving integration, single-service rivalries still surfaced towards the end of WW2. Moreover, the same detailed system of integration did not seem to be apparent for AMI. Whilst AMI was carried out, there does not appear to have been the same level of AMI as there was ALI. Regardless of the reasons for this, it highlights that a bi-domain concept can be to the detriment of other domains.

The Falklands Conflict highlighted that, when concepts are in place, they are driven by the strategic imperatives of the day. In a resource constrained environment, there was a need to prioritise defence spending. In addition, the most significant security threat at the time was deemed to come from the Warsaw pact. Therefore, defence was focused on countering that threat with limited resources. This guided concepts, procurement decisions and TTPs. Therefore, when
the Task Force sailed south, it was to attempt an operation for which it was not practised nor equipped. In the circumstances, exchange RAF and RN pilots provided the equivalent of the, ‘seed-corn,’ capability being employed to cover present capability gaps. With the SHAR squadrons being faced with undertaking ground attack sorties, a role they were not practised in, the experience of the RAF exchange pilots from the GR3 force, and the RN pilots who had served on exchange on the GR3 force, were invaluable in creating a capability. Whilst this was not ideal, it proves that the capabilities can be reconstituted.

In contrast, the lack of ALI and AMI concepts relevant to the scenario could be seen in terms of the lack of TTPs in place. Whilst these were overcome, it led to frustrations, misunderstanding and a lack of standardization which was especially evident in the different ways the two carriers operated during the conflict. The lack of relevant concepts also meant that the entire system of ALI and AMI was unpractised. When coupled with a commander with scant knowledge of air power, it is unsurprising that so many frustrations occurred and that such ignorance was displayed. Relevant exercises and training would undoubtedly have seen some of the issues that occurred worked through in peacetime. A practised concept may also have led to either a larger pool of commanders with relevant experience or an acknowledgement of the skillsets required of the commander who would be required to lead such a mission. However, ultimately, with an ALI and AMI concept in existence, there was an ability to adapt as best as possible. The pilots’ skillsets were there and were used.

There are some parallels with ELLAMY. With a military that was focused on HERRICK, the concepts for ALI and AMI were not optimized for employment on ELLAMY. In particular, the skills fade in AMI meant that familiarity with TTPs took time to develop as did the level of trust required to allow for effective integration. However, the basic concepts and skillsets were there and enabled obstacles to be overcome reasonably rapidly.

ALI and AMI concepts have provided the guidance for the employment of military capability and the procurement for equipment. However, focusing on ALI or AMI will not optimize joint warfighting. Current concepts are focused on cross-domain integration. With the emergence of Cyber and Space, coupled with a growing reliance on allies, this is the best concept for the future. ALI and AMI do contribute to joint integrated warfighting and will continue to do so; but, the reducing military mass of Western nations in general means that separate concepts may force a focus on one or the other to the detriment of overall capability. Equally, that is not to say that they should not exist as sub-concepts. Certainly, with the volume of doctrine available to facilitate ALI and AMI and recent operational experience highlight that the principles will be called upon again and again. As nations look to address emerging security threat such as A2/AD and harness emerging
technology in Cyber and Space, the ability to integrate across domains will become ever more critical.

Concepts will always be shaped by both the contemporary security environment of the day and the financial climate; however, integrated concepts are critical to enabling and facilitating joint warfare. With a smaller military, the focus on cross-domain integration should also provide the greatest opportunity for air power to remain an instrument that provides broad policy options. The broader focus will force a broader base of practised concepts. However, if the concept of cross-domain integration is to be realised, resource and training will be required. The publishing of the UK’s JOC will be the next step towards realising cross-domain integration in the quest for optimised joint warfighting.
TO: EMILY FLYNN  
SUBJECT: Approval of ethics application  

Dear Emily, 

KCL/12/13-307 – ‘Integrated Battle Concepts and the Quest for Joint Warfighting’ 

I am pleased to inform you that full approval for your project has been granted by the WSG Research Ethics Panel. Any specific conditions of approval are laid out at the end of this email which should be followed in addition to the standard terms and conditions of approval, to be overseen by your Supervisor: 

- Ethical approval is granted for a period of one year from 03/04/2013. You will not receive a reminder that your approval is about to lapse so it is your responsibility to apply for an extension prior to the project lapsing if you need one (see below for instructions). 
- You should report any untoward events or unforeseen ethical problems arising from the project to the panel Chairman within a week of the occurrence. Information about the panel may be accessed at: http://www.kcl.ac.uk/innovation/research/support/ethics/committees/sshl/reps/index.aspx 
- If you wish to change your project or request an extension of approval you will need to submit a new application with an attachment indicating the changes you want to make (a proforma document to help you with this is available at: http://www.kcl.ac.uk/innovation/research/support/ethics/applications/modifications.aspx 
- All research should be conducted in accordance with the King’s College London Guidelines on Good Practice in Academic Research available at: http://www.kcl.ac.uk/iop/research/office/help/Assets/good20practice20Sept200920FINAL.pdf 

If you require signed confirmation of your approval please forward this email to rec-lowrisk@kcl.ac.uk indicating why it is required and the address you would like it to be sent to. 

Please also note that we may, for the purposes of audit, contact you from time to time to ascertain the status of your research. 

With best wishes, 

Rosie Pearson – Research Support Assistant 
On behalf of 
WSG REP Reviewer
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**Official Publications**


**Articles**


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