Ministry of Defence

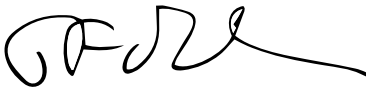
Joint Doctrine Note 1/20

Air Manoeuvre

Joint Doctrine Note 1/20

Air Manoeuvre

Joint Doctrine Note (JDN) 1/20, dated June 2020,
is promulgated as directed by the Chiefs of Staff



Head Doctrine

Authorisation

The Development, Concepts and Doctrine Centre (DCDC) is responsible for publishing strategic trends, joint concepts and doctrine. If you wish to quote our publications as reference material in other work, you should confirm with our editors whether the particular publication and amendment state remains authoritative. We welcome your comments on factual accuracy or amendment proposals. Please contact us via:

Email: DCDC-DocEds@mod.gov.uk Telephone: 01793 31 4216/4220

Copyright

Distribution

All DCDC publications, including a biannual DCDC Publications Disk, can be demanded from the LCSLS Headquarters and Operations Centre.
LCSLS Help Desk: 01869 256197 Military Network: 94240 2197

Our publications are available to view and download on defnet (RLI) at:
https://modgovuk.sharepoint.com/sites/defnet/JFC/Pages/dcdc.aspx

This publication is also available on the Internet at: www.gov.uk/mod/dcdc

Preface

Purpose

1. Air manoeuvre is a joint activity. Joint Doctrine Note (JDN) 1/20, *Air Manoeuvre* enables the single Services to develop coherent doctrine, to enhance our air manoeuvre capability. This JDN will:

- propose a definition for air manoeuvre;
- define the attributes, forces and employment of air manoeuvre;
- provide principles, planning and operational considerations for air manoeuvre; and
- provide considerations for airborne and air assault operations.

Context

2. The ubiquitous nature of the air domain can be exploited by forces in other domains to achieve a position of advantage. Perhaps this is most evident when considering the potential contribution manoeuvre through the air makes to operations conducted in the land domain. These operations can be categorised as those launched from the land domain into the land domain and those launched from the sea into the land domain. This JDN will explore and explain the fundamental principles of conducting such manoeuvre irrespective of starting locality. The forces landed by air from both the land and maritime domains have commonalities – light forces with limited organic protection, mobility, firepower and sustainment. Both are required to plan and execute operations with another domain, therefore such operations are inherently joint by nature. Their planning and execution require matching available air assets to the force structure to be moved in conjunction with, or with the threat of, fires. The ground and air plans must be integrated – neither element can be planned in isolation.

3. For the purposes of clarity, this JDN encompasses the full range of air manoeuvre techniques used by the UK Armed Forces and with a land forces bias. A force deployed from the sea, can inevitably become a land force ashore (indeed in amphibious doctrine the ground force deployed to conduct an amphibious action is termed a 'landing force').[1] This JDN therefore accounts for this eventuality but focuses on what some might view as purist air manoeuvre, that from the land domain into the land domain.

Audience

4. JDN 1/20, *Air Manoeuvre* is aimed at commanders and staff involved in planning and executing air manoeuvre operations.

Structure

5. JDN 1/20 is divided into five chapters.

- Chapter 1 introduces air manoeuvre, its attributes, types of air manoeuvre operations, their forces and employment.
- Chapter 2 covers the principles of air manoeuvre and the planning process.
- Chapter 3 details operational considerations for air manoeuvre.
- Chapter 4 covers planning and executing airborne operations.
- Chapter 5 covers planning and executing air assault operations.

1 There are subtle nuances to this, but the essence is that after terminating an amphibious operation, it is entirely plausible for the force landed, drawn from the maritime domain, on termination of the amphibious action, to be reassigned to conduct land domain operations.

Linkages

6. This JDN should be read alongside a number of publications to provide wider context. These include:

- Allied Joint Publication (AJP)-3.1, *Allied Joint Doctrine for Maritime Operations*;
- AJP-3.2, *Allied Joint Doctrine for Land Operations*;
- AJP-3.3(B), *Allied Joint Doctrine for Air and Space Operations*;
- Allied Tactical Publication (ATP)-3.2.1, *Allied Land Tactics*;
- ATP-49, *Use of Helicopters in Land Operations;*
- Joint Doctrine Publication (JDP) 0-10, *UK Maritime Power*;
- JDP 0-20, *UK Land Power*;
- JDP 0-30, *UK Air and Space Power*;
- Royal Navy Book of Reference 4487 Volume 2.2, *Amphibious Warfare*;
- Army Doctrine Publication, *Land Operations*; and
- United States Army Field Manual 3-99, *Airborne and Air Assault Operations.*

Contents

Chapter 1

Chapter 1 introduces air manoeuvre, its attributes, types of air manoeuvre operations, their forces and employment.

1

> “All forces possess an ‘air flank’. Great **advantage over the opponent** can be gained by exploiting this flank and denying him the capacity to do so. Forces can be moved by air, greatly **enhancing the surprise, reach and tempo** of the overall manoeuvre. Forces can be deployed from depth into depth at unexpected speed and direction; they can be moved by air, to battle into battle and in battle. Each occasion demands different considerations dictated by the proximity of the enemy and the mode of transport.”
>
> General Rupert Smith KCB, DSO, OBE, QGM

Chapter 1

The fundamentals of air manoeuvre

Section 1 – Introduction

1.1. The concept of manoeuvring in the air flank, or vertical envelopment, originated in the latter years of World War 1 as armies sought to manoeuvre in the third dimension to bypass continuous and deep defences. The Soviet concept of deep operations involved airborne forces securing key terrain for the rapid manoeuvre of armoured forces hundreds of miles behind the front. Air manoeuvre provided operational success for the Germans in 1940 but the risks were exposed in their 1941 invasion of Crete and for the Allies in Operation Market Garden in 1944. The development of helicopters after World War 2 provided a better means for tactical air manoeuvre, with the agility to redeploy or recover ground forces. The advent of missile air defence systems threatened the tactical viability of airborne forces, whilst the jet engine gave them the reach to be employed strategically. Today, land forces manoeuvring by air transport and helicopters provide opportunities for inter- and intra-theatre manoeuvre faster than ground and maritime-surface forces, but with threats, which must be understood by joint commanders. Joint Doctrine Note (JDN) 1/20, *Air Manoeuvre* proposes the definition for air manoeuvre as:[1]

> the movement of land forces by air to positions of advantage.

1 Neither Joint Doctrine Publication (JDP) 0-10, *UK Maritime Power*, JDP 0-20, *UK Land Power* or JDP 0-30, *UK Air and Space Power* define air manoeuvre. Air manoeuvre is mentioned in Allied Joint Publication (AJP)-3.3, *Allied Joint Doctrine for Air and Space Operations*, section 1.5.3 paragraph 3b stating: 'Intra-theatre fixed and rotary wing air assets provide time-sensitive air transport aircraft to a commander, and enable the conduct of air manoeuvre operations; the air delivery of combat power to seize ground or installations via air assault, airdrop or air-land.' This is not a North Atlantic Treaty Organization (NATO) term or recognised in NATO's land doctrine. It does not include air mobile or independent helicopter tasks and confines airborne operations to intra-theatre air transport operations.

1.2. All three services can deliver aspects of air manoeuvre with their own organic capabilities to achieve outcomes for Defence across maritime, land and air domains. Thus, air manoeuvre may be conducted solely by a Service or by two or more Services to create effects and achieve advantage in one or more domains. Air manoeuvre uses multiple domain effect to achieve tactical, operational or strategic advantage using an amalgam of capabilities from one or more Services.

1.3. An attack by air power is different to air manoeuvre, the distinction being the use of land forces. Combat aviation is part of land forces, they can use ground as though they were a terrestrial vehicle but exhibit some of the attributes of air power. Combat aviation can conduct independent manoeuvre beyond the reach of other ground forces across the geographic framework of deep, close and rear. It can also create effects integrated with other land component ground forces or create cross-domain effects integrated with air, maritime or cyber domains.

1.4. This publication is subdivided into three main areas: airborne operations; air assault operations; and aviation operations. Whilst the first two similarly require integration of air and landing forces from the maritime and land domains, specifically task organised for a ground/land-orientated mission or task, the three rarely exist in isolation.

Section 2 – Context

Air power

1.5. Air power can influence the behaviour of actors and the course of events through four roles: control of the air; intelligence, surveillance and reconnaissance; attack; and air mobility. Air mobility has three mission types: airlift; air-to-air refuelling; and personnel recovery. Airlift is the ability to transport personnel, equipment and materiel; it is divided into: hub and spoke operations;[2] airborne operations; aeromedical

2 Hub and spoke operations use strategic and tactical air transport aircraft to conduct inter- and intra-theatre air movement respectively. See JDP 0-30, *UK Air and Space Power*, paragraph 3-20a(1) for further details.

evacuation;[3] and special air mobility operations. Although UK air power is predominately delivered by the Royal Air Force, the Royal Navy Fleet Air Arm and British Army aviation elements are also important contributors. This publication will describe air transport aircraft and helicopters as air forces.

1.6. Air power often has unrivalled height, speed and reach. Aircraft can manoeuvre faster than vehicles or ships allowing enemy forces and terrain to be more easily bypassed. Air forces will often be able to exert military influence with more agility and ubiquity than land and maritime forces, but they do not rival the persistence or the lift capacity of land and maritime forces.

Land power

1.7. The distinguishing characteristic of land power is the ability to exert control within the land environment and to influence the behaviour of actors and the course of events on land.[4] Maritime and air power can exert considerable military influence but cannot engage people directly or secure terrain. Land power can exert decisive control and influence on actors and the course of events overland.[5] Whilst land power has excellent presence and persistence, it is dependent on maritime and air power to deploy, sustain, redeploy or recover. The presence of a large force and enablers in a theatre of operations may be a political constraint.

1.8. Land forces are described by the North Atlantic Treaty Organization (NATO) as heavy, medium and light. Heavy forces trade strategic mobility to maximise firepower and protection due to the large number of armoured vehicles and high logistic demand. Alternatively, light forces lack firepower, protection and operational mobility but have excellent access to complex terrain, for example, mountains, jungles and buildings.

3 See AJP-4.10(B), *Allied Joint Medical Doctrine for Medical Support* for further details.

4 The four functions of land power are: fight; engage; secure; and support. The attributes of land forces are: soldiers; presence; persistence; and versatility. JDP 0-20, *UK Land Power*.

5 The term 'land power' applies to all elements of the UK Armed Forces operating in the land environment, mainly the British Army but also including the Royal Marines and Royal Air Force Regiment. JDP 0-20, *UK Land Power*.

The small logistic demand of light forces makes them strategically agile.[6] Airborne and amphibious forces are specialist light forces that are selected, organised, equipped and trained for air manoeuvre.[7]

Maritime power

1.9. Maritime power projection is the threat, or use, of national power from the sea to influence events. It exploits sea control and maritime manoeuvre to achieve access to threaten or project force ashore using a combination of amphibious forces, embarked aircraft, land attack weapons, cyber capabilities, electronic warfare and special forces. Amphibious forces are central to the UK's maritime power projection.

1.10. There are many ways in which maritime power can contribute to a joint operation (shape, reassure, deter, coerce, disrupt, project, support, limit and recover). Maritime power can provide persistent and versatile military capability, free of the liability of extensive host-nation support, to launch operations into the land domain from the sea. It may be the decisive component and, once partial sea control is achieved, offers a mobile, responsive and persistent base for military operations. But to fully appreciate the utility of maritime power it is also necessary to understand the littoral, particularly when considering how maritime power can be projected onto land from the sea. As well as those land areas (and their adjacent and associated air space) being susceptible to influence from the sea it also applies conversely: those areas of the sea susceptible to engagement from the land, by both land and air forces.

Manoeuvre

1.11. Manoeuvre is the employment of forces through movement in combination with fire, or fire potential, to achieve a position of advantage in respect to the enemy to accomplish the mission. This involves the physical positioning of forces in the air, on the land and at sea. Through the manoeuvrist approach it offers the means of concentrating force or the threat of force decisively in time and space to achieve shock and surprise, and create opportunities to exploit.

6 Army Doctrine Publication (ADP), *Land Operations*, paragraph 7-09.
7 ADP, *Land Operations*, paragraph 7-10.

1.12. **Land manoeuvre** is the combination of ground, air and information manoeuvre enabled by manoeuvre support. Both ground and air manoeuvre can be decisive and support each other.[8]

1.13. **Littoral manoeuvre** exploits the access and freedom provided by the sea as a basis for operational manoeuvre from which sea-based amphibious forces can influence situations, decisions and events in the littoral regions of the world.[9] Littoral manoeuvre is conducted by a task-organised amphibious force comprising a landing force and a tailored air group launched from naval ships.

1.14. **Joint theatre entry** (JTE) requires generating and projecting high readiness joint forces into a new or emergent theatre of operations to conduct operations in response to an emerging crisis. JTE may require gaining and maintaining access to a joint operations area by air. The entry force may have to seize and establish a lodgement to build up forces independent of land manoeuvre.[10] As previously stated amphibious forces are highly suited to conducting JTE, but if separated by time or space from the lodgement area, an airborne operation may be the only means to conduct JTE.

Soldiers deploying from a Merlin helicopter

8 ADP, *Land Operations*, paragraph 8-18.
9 JDP 0-10, *UK Maritime Power*, paragraph 4.15.
10 Joint Doctrine Note (JDN) 1/17, *Joint Theatre Entry*, paragraph 1.6 and 1.8.

Section 3 – Types of air manoeuvre

1.15. Air transport aircraft and helicopters exhibit different characteristics and therefore have different strengths and weaknesses for employment. Successful air manoeuvre will often combine different types of operation within the same time and space to mitigate risk. The types of air manoeuvre are considered below.

1.16. **Airborne operations.** Airborne operation is defined as: an operation involving movement of forces and capabilities into an area by air.[11] Airborne operations may be conducted solely with air power to deter, demonstrate, attack or conduct JTE. The range and readiness of airborne forces give them a unique ability to influence strategic events in a way that tactical air manoeuvre cannot. Airborne operations are covered in further detail in Chapter 4; they can be categorised as either airdrop or airland.

a. **Airdrop.** Airdrop is defined as: delivery of personnel or cargo from aircraft in flight.[12] Personnel and equipment can be dropped separately or together at varying altitudes determined by threat. In contrast to airland, airdropping personnel and equipment negates the requirement for an airfield, but it does require the force to assemble on landing.

b. **Airland.** This involves personnel and/or cargo being moved by air and disembarked, or unloaded, after the aircraft has landed. Airland is the preferred method of insertion as it requires less preparation and training, forces can unload and assemble faster, there is less risk from injuries and weather and loads can be moved more efficiently.[13] The airfield must be the objective, or nearby.

1.17. **Helicopter operations.** Helicopters contribute to offensive, defensive, stability and enabling actions through five core roles: transport; attack; direction and control of fires; reconnaissance and tactical screening; and specialised tasks. The use of helicopters in land operations is covered in Allied Tactical Publication-49, *Use of Helicopters*

11 NATOTerm.
12 NATOTerm.
13 Air Publication 3002, *Air and Space Warfare*, paragraph 909.

in Land Operations.[14] Helicopter operations as part of air manoeuvre mainly comprise the following.

a. **Air assault operations.** An air assault operation is defined as: an operation in which assault forces, using the firepower, mobility and total integration of helicopter assets, manoeuvre on the battlefield under the control of the commander to engage and destroy enemy forces or to seize and hold key terrain.[15] Air assault operations can be conducted from ships as part of littoral manoeuvre. Air assault operations are covered in further detail in Chapter 5.

b. **Airmobile operations.** An airmobile operation is defined as: an operation in which combat forces and their equipment manoeuvre about the battlefield by aircraft to engage in ground combat.[16] Unlike air assault, airmobile operations do not integrate attack and reconnaissance helicopters with support helicopters to assault an objective and so require less training and preparation. Airmobile planning may not require the same level of integrated planning as air assault planning but can benefit from using the same planning process.

c. **Aviation operations.** Combat aviation forces can conduct manoeuvre across the geographic framework of deep, close and rear, employing both their own weapons and integrating joint fires and cross-domain effects such as cyber. This may be for a discrete operation, such as an attack to disrupt an uncommitted enemy force, or may be integrated with other ground manoeuvre elements to present an adversary with multiple dilemmas in time and space. Combat aviation can be used to create cross component effects, such as force projection from the maritime component onto land or to conduct discrete operations for the joint force. It is most effective when employed with joint fires, air power and other multi-domain effects.

14 Allied Tactical Publication-49(G), *Use of Helicopters in Land Operations*, Chapter 1.2.
15 NATOTerm.
16 NATOTerm.

Section 4 – Attributes of air manoeuvre

1.18. Air manoeuvre sits between air and land power and reflects their attributes as well as being distinct. Air manoeuvre relies on the 'exploitation of air power's inherent flexibility, and reach to deliver a particular load'.[17] Described as 'inherent qualities that create or limit effect by military power', attributes can distinguish the application of military power in different domains as well as provide greater understanding of their strengths and weaknesses. In this section, the air manoeuvre attributes of the two principal capabilities that enable air manoeuvre are considered: air transport aircraft and helicopters.

1.19. **Height** allows vertical envelopment and is therefore the most fundamental attribute of air manoeuvre. It permits both enemy and terrain to be bypassed. Greater height reduces the threat from ground fire and it may also offer greater chance of achieving surprise by being out of audible range if the enemy lacks surveillance radar. Helicopters operating at altitude have reduced lift and speed.

1.20. **Speed** allows a force to project combat power rapidly, increase tempo, create surprise and reduce exposure to hostile fire.[18] On average air transport aircraft fly twice as fast as helicopters at the altitude to achieve air manoeuvre effect.[19] Helicopters may fly more slowly than air transport aircraft but they are likely to be quicker into action. Unless launched from an amphibious force, projecting helicopters over long distances is likely to require considerable logistics support. Helicopters self-deploying require refuelling and subsequent maintenance, both of which require additional coordination and planning. Or, if flown forward by air transport aircraft (should it be available), time to disassemble and reassemble.

17 Sebastian Ritchie, *Arnhem: Myth and Reality: Airborne Warfare, Air Power and the Failure of Operation Market Garden*, 2011, page 13.
18 JDP 0-30, *UK Air and Space Power*, paragraph 3.3.
19 The average speed during air manoeuvre operations at altitude of the Apache, Wildcat, Merlin and Puma is calculated as 120 knots compared to 210 knots for the Hercules.

1.21. **Reach** is significantly different for air transport aircraft and helicopters. The average helicopter range is 400 nautical miles whilst some air transport aircraft can fly over ten times as far. Air-to-air refuelling facilitates projecting thousands of troops by air transport aircraft over 10,000 miles; helicopter range can be extended by air or ground refuelling but would require a very complex operation to achieve the same range and scale.[20]

1.22. **Access** is being able to intervene at the time and space of choosing. The air domain is ubiquitous but linked to the maritime and land domains. Exploiting the speed and reach of air power can generate strategic-level access. At the operational and strategic levels, access can be restricted by transnational agreements, for instance, flight clearances and territorial waters. Equally, transnational agreements permit the free use of international waters and airspace to enable access perhaps via indirect routing. Access is also required at the tactical level, where the main constraint on deploying forces by air is the threat of defensive counter-air systems, as well as the large area required to land airborne forces. In contrast, helicopters are vastly superior in their ability to land in restricted areas and concentrate force in groups organised for combat (it is accepted that specialist parachute techniques allow smaller forces to concentrate in restricted areas).

1.23. **Persistence and presence** allow land forces to engage and secure people and terrain when air and maritime power cannot. Air power can offer quick effect without becoming committed. Maritime power can poise without being committed. Applying land power requires commitment but this is only possible when political decision-makers accept 'boots on the ground'. Air manoeuvre can exploit a land forces' persistence with air and maritime forces' ability to be poised to act quickly and extract before becoming a liability. This is perhaps best exploited by helicopters because they provide military planners with a high degree of control when concentrating force for deployment or recovery. The ability to control the level of commitment is best demonstrated when conducting

20 During Exercise Bright Star in 1983, the United States projected 1,000 paratroopers on a non-stop round trip of 12,000 miles with C141 Starlifters, which had only half the range of the C-17 aircraft. K. Chapman, *Military Air Transport Operations*, 1989, page 49.

a raid where relative superiority and logistical support considerations can be mitigated by the surprise, reach and tempo of the manoeuvre. An airborne force, once committed, requires considerable resource to sustain or withdraw, by contrast helicopters allow a landing force to be quickly redeployed or withdrawn.[21]

1.24. **Agility** is the best discriminator between operations involving air transport aircraft or helicopters; 'a parachute has no reverse gear'. Extracting an airborne force is far more tactically challenging due to the force being concentrated in one airhead with surprise lost after the first of what might be several airlifts. The tactical mobility of helicopters enables the associated troops to influence a wider area of the battlefield than they could achieve on foot alone. In part, this is because helicopters can permit troops to be quickly re-tasked, relocated or extracted. In combination, an airborne force operating with helicopters in support provides a balance of speed, reach and agility.

1.25. **Lift capacity** is a constraint of air power compared to land and maritime power. Therefore, all air manoeuvre forces will exhibit the limitations of light forces compared to medium and heavy forces.[22] Air transport aircraft can carry heavier and larger cargo than helicopters allowing the delivery of more personnel and materiel as well as vehicles with greater firepower, mobility and protection. The lack of helicopter capacity further inhibits deploying combat power because more lifts are required to deploy a task organised force in comparison to air transport aircraft. In turn, this influences the overall air plan because the longer deployment phase places more demands on achieving the necessary control of the air. There is a trade-off for helicopter movement in that the control it brings to the concentration of force must be balanced against the longer time it takes to create that concentration of force (as compared to deployment by air transport aircraft).

21 'During the Battle of Oudna, Tunisia in November/December 1942 2PARA were dropped dozens of miles behind enemy lines as the Allies advanced. The ground operation was cancelled and the battalion was effectively abandoned by the chain of command. After a fortnight evading a German armoured pursuit it regained the front line having lost over 260 officers and men from a force of 560.' Peter Harclerode, *Para!*, 1992, page 42.

22 ADP, *Land Operations*, paragraph 0710(b).

Operation Junction City, Vietnam

Operation Junction City was a corps-level search and destroy mission in South Vietnam in February 1967 that involved the air assault of eight infantry battalions in 249 helicopters into blocking positions on the first day. 173rd Airborne Brigade staff identified a battlegroup airborne assault would save 60 UH-1D (Huey) helicopters for two and a half hours and six Chinooks for three and a half hours, thereby increasing the overall lift capacity. 726 paratroops were dropped from 13 C-130 aircraft in ten minutes supported by ten C-130s dropping vehicles and supplies. Operational security was preserved by preparing to drop into another operational area, the correct detail being released to the battalion 12 hours before jumping.

'Consideration should be given to the employment of airborne forces in intra-theatre operations whenever significant advantage in tactical surprise can be gained by the sudden, undetected, mass delivery of troops. The shifting of operations from one location to another about the country requires considerable air movement and positioning of forces before operations can begin. When multiple units are involved in operations, there is always a greater demand for helicopter lift than there are helicopters to provide support. Often a significant advantage can be gained by introducing airborne forces directly into an operation.'

173rd Airborne Brigade post operational report

1.26. **Vulnerability** is another constraint of air power. Air manoeuvre is a high-risk activity as both air transport aircraft and helicopters are vulnerable to air- and surface-based threats. To be used effectively they both require a degree (in time and space) of friendly control of the air to be established over their operating areas. Air transport aircraft can fly higher than helicopters reducing exposure to ground fire but helicopters are better at using terrain for protection and concealment. They have also demonstrated their robustness on battlefields against surface threats.

1.27. There are advantages and disadvantages of conducting air manoeuvre with either air transport aircraft and helicopters. The attributes discussed above are summarised in Table 1.1.

Attribute	Consideration
Height	Air transport aircraft can fly at higher altitudes than helicopters. Height can reduce surface threats and increase defensive aid suite effectiveness; greater power enables air transport aircraft to operate in hot and high conditions that can constrain helicopter operations.
Speed	Air transport aircraft have twice the speed of helicopters. Air assault forces are likely to react quicker at the tactical level than airborne forces.
Reach	Air transport aircraft have up to ten times the range of helicopters; they are easier to refuel and can travel thousands of miles non-stop.
Access	Airborne forces have the advantage of greater range but may be restricted by access, basing and overflight permissions; they require large drop and landing zones. Helicopters can access smaller landing sites in complex terrain, for example, urban, forest or mountain.
Persistence	Airborne forces require considerable effort for sustainment or withdrawal by air. Air assault forces can quickly redeploy or recover once deployed.
Agility	Airborne forces lack tactical mobility once deployed. Air assault forces can quickly redeploy or be re-tasked.
Lift capacity	Air transport aircraft can carry tanks whereas helicopters can only lift lighter vehicles.
Vulnerability	Air transport aircraft use height to avoid surface threats but may be more exposed to complex anti-access and area denial (A2AD) systems. Helicopters can use terrain for concealment and protection.

Table 1.1 – Considerations for employing air transport and helicopters

Section 5 – Air manoeuvre forces

1.28. Air manoeuvre employs fixed-wing aircraft and helicopters to project, sustain and recover combat, combat support and combat service support forces, as well as providing intelligence, surveillance and reconnaissance, fires, and command and control. There are a number of forces that contribute to air manoeuvre.

a. **Airborne forces.** Airborne force is defined as: a force composed primarily of ground and air units organized, equipped and trained for airborne operations.[23] An airborne force must have an airdrop capability to mitigate no proximate runway for airland operations.

b. **Air assault forces.** Air assault forces are light forces trained to integrate the firepower and mobility of helicopters to manoeuvre about the battlefield with integral vehicles and equipment loaded internally or externally to the helicopters. Amphibious forces conduct air assault as an intrinsic element of amphibious operations.

c. **Combat aviation forces.** A combat aviation force normally consists of helicopters that deliver attack, reconnaissance and lift functions, and may also include organic unmanned aircraft systems. It might team with other air platforms to enhance the lethality and survivability of the force. A combat aviation force can conduct independent manoeuvre, integrating cross-domain capabilities to create effects across the battlefield. It can also be combined with a landing force to conduct air assault operations. Not all elements of the force are required for all operations and air mobility out of contact may only require transport helicopters.

d. **Air transport.** Inter-theatre airlift is provided by heavy strategic air transport supplemented by chartered airlift and tactical air transport when required.[24] Hub and spoke operations efficiently move personnel and materiel on mass before conducting intra-theatre movement with smaller more agile tactical air transport. For that reason, tactical air transport crews are trained to conduct airdrop and airland operations, which tends to be configured with defensive aid suites and counter anti-access and area denial capabilities. Once forces deployed by tactical air transport have secured a suitable lodgement, strategic air transport may deliver a follow-on force.

23 NATOTerm.
24 Air Publication 3002, *Air and Space Warfare*, paragraph 904.

Section 6 – Employing air manoeuvre

1.29. Air manoeuvre can be employed in all tactical activities: offensive, defensive, enabling and stability. Forces deployed by air manoeuvre are optimised to be light and do not have the same levels of mobility, firepower, protection and sustainment as medium and heavy forces. Commanders must understand the threats to the force from land and air whilst recognising that employing air manoeuvre offers considerable opportunities for surprise, reach and tempo not available to other land forces.

1

Secure a lodgement

1.30. Air threat dependent, air manoeuvre may be the only way to secure a point of entry and lodgement for subsequent operations when sea or land lines of communication cannot be established in time or space. Air assault may be vital in securing a lodgement from the sea as part of littoral manoeuvre allowing adversaries to be outflanked or enveloped by air and sea. An airborne operation may be the only option to secure a landlocked lodgement beyond the range of helicopters. When a modern airliner can deploy a light role infantry battalion over 9,000 miles in a day, landing strategic air transport and civilian charter aircraft onto a secure airhead may achieve a decisive advantage.

A paratrooper moving to his assembly point

Operation Northern Delay, Iraq

In March 2003, shortly before the invasion of Iraq, Turkey denied the United States (US) military forces land access through Turkey into Iraq. US Central Command's intent was to open the northern front of Iraq to 'hasten the Iraqi regime's rapid collapse, protect critical Iraqi oil fields, and protect the Kurdish population from atrocities.' Following the longest low-level insertion by US C-130 aircraft from Romania via Jordanian airspace, US special forces secured an airstrip at Bashur. This was followed by 996 paratroops from the US 173rd Airborne Brigade flying from Italy, to secure a lodgement.

Bashur was a landlocked objective, far from coastal waters and ship-based support, located in hostile Iraq, and strategically distant to the continental US. Following the airborne operation, follow on forces from 1st Infantry Division were air landed over five nights in 62 C-17 sorties. This included 2,175 passengers, approximately 3,060 short tons of cargo and 408 vehicles into Iraq. This heavy force consisted of Abrams tanks, Bradley fighting vehicles and M113 armoured personnel carriers, as well as organic fire support assets and elements of a forward support battalion. These heavy forces were ready to counter the Iraqi armoured divisions to their south. The operation provided the US with strategic and operational surprise, further enhancing the deterrent factor of the operation and fixing ten divisions north of Baghdad.

This operation is noteworthy as a joint theatre entry for at least three reasons: the airborne operation was conducted in response to anti-access issues; it demonstrates strategic responsiveness; and it demonstrates the unique capacity of airborne forces to secure a lodgement and rapidly build combat power in a landlocked and remote territory.

Kyle Lear
Airborne Joint Forcible Entry: Enduring Options for US Global Response

Seize and hold

1.31. Air manoeuvre forces can seize vital ground and key terrain to block the advance of enemy forces during the vulnerable phases of an amphibious landing or obstacle crossing. Air manoeuvre forces have a limited ability to hold their objectives and will need a rapid link-up with the advancing force. During World War 2 the invasions of Sicily and Normandy, and the crossing of the Rhine, were all supported by air manoeuvre which prevented German armour reaching the Allied landing areas. Applying air manoeuvre can seize key terrain, protect the build-up of combat power and contribute to the rapid advance or breakout of ground manoeuvre forces.

Operation Agricola, Kosovo

The spearhead of the British deployment into Kosovo was a helicopter-borne force from 5th Airborne Brigade based south of the Macedonian border, comprising two infantry battalions, and supporting artillery, logistic troops and engineers. Their main task in the initial phase was to secure the 'Kacanik Defile' (a terrain feature) and the road leading from Pristina to Skopje, to prepare the way for follow-on forces. Central to this task was facilitating forward passage of lines for the British 4th Armoured Brigade, as well as brigades from Italy, Germany and France.

Prior to the operation, a Phoenix unmanned aerial vehicle had flown over the area of the Kacanik Defile for three days. Both helicopter and electronic warfare assets had suppression of air defence as their priority tasks, which was also a second priority for artillery assets after close support.

The operation commenced at 0500 on 12 June 1999 and was completed by eight Chinook and six Puma helicopters flown by the Royal Air Force, with US Army Apache helicopters in support. In less than three hours approximately 1,400 personnel had secured the Kacanik Defile for the subsequent forward passage of lines with the 4th Armoured Brigade.

Raid

1.32. A raid is a deliberately planned operation to assault the objectives followed immediately by a planned withdrawal. The range, speed and surprise of approaching from an unexpected time and direction, combined with the ability of helicopters to quickly withdraw the raiding force, makes air manoeuvre forces well suited to raiding. Combat aviation can also conduct raids without the requirement to deploy ground troops, as successfully demonstrated during the raid on Brega during Operation Ellamy. Although their objectives may be limited, airborne forces can raid over great distances and quickly land a large force, albeit their withdrawal will likely be more hazardous.

Operation Thunderbolt, Entebbe

In June 1976, 248 passengers were hijacked by terrorists on an Air France plane from Tel Aviv and diverted to Entebbe airport in Uganda. Non-Israelis were flown to Paris leaving 94 Israeli passengers and 12 aircrew. Based on Israeli intelligence, 100 Israeli soldiers flew 2,500 miles in four C-130 aircraft, much of it below 100 feet to avoid detection. They were accompanied by two Boeing 707 aircraft, one with medical facilities that stayed at Nairobi after the C-130s refuelled; the other carried the commander circling over Entebbe.

On 4 July, the force air landed at Entebbe airfield; a force of 29 commandos raced to the terminal building in a black Mercedes and Land Rovers, similar to the Ugandan President's entourage. Whilst storming the buildings the commandos rescued all bar four hostages. Meanwhile, a security force supported by air landed armoured personnel carriers secured the airfield, runways and aircraft, refuelled the C-130s and destroyed Ugandan fighter jets on the ground to prevent pursuit. During the withdrawal Ugandan soldiers shot at the Israelis killing an officer before the force took off. The ground operation lasted 53 minutes, the assault only 30. All hijackers present, and between 33 and 45 Ugandan soldiers were killed.

Reserve

1.33. Air manoeuvre forces are well suited to being held in reserve where their speed and reach give them unrivalled agility to pre-empt or counter an enemy threat or to exploit a favourable friendly opportunity. Ground and air units must be at commensurate levels of readiness. This demands commonality in doctrine, training and commitment of resource. Helicopters are naturally suited to tactical reserve tasking due to the ease with which helicopters can be loaded and staged to quickly deploy a concentrated light role land force. Airborne forces are better suited for deployment at longer, strategic ranges but consideration to do so must account for potential link-up with other forces as a counter for extended distances and inherent lack of firepower, mobility and protection.

Operation Mincemeat, Sicily

As Allied amphibious forces closed in on Sicily on 9 July 1943, Hitler was warned on the impending invasion and placed his strategic reserve, the 1st Parachute Division in southern France, on alert for immediate air movement. Two days later as the Allies began to break out from the beachheads, Field Marshall Kesselring, as theatre commander, determined that the British 8th Army must be blocked from crossing the plains of Catania and immediately dispatched the commander of the 3rd Parachute Regiment with orders to personally reconnoitre the landing zone. With a small advance party, they organised transport and logistics and relayed the dropping zone coordinates just before the transport aircraft took off. Within 24 hours a light brigade had dropped and landed on the front line, reinforcing the hard-pressed Hermann Goering Division.

As Montgomery rushed to seize key terrain for his advancing army, he dispatched the 1st Parachute Brigade by air and 3 Commando Brigade by sea to secure bridges at Primosole and Lentini unaware that they were now defended by Fallschirmjäger (German paratroops). British paratroops jumped onto the same drop zones 24 hours later, and like the commandos, were immediately attacked by the Fallschirmjäger, including signallers, clerks, cooks, mechanics and drivers. With heavy losses and little ammunition, paratroops and commandos relinquished their bridges

before the arrival of the 50th Infantry Division after dusk on 14 July; as the advancing force had been significantly delayed. Despite several attacks by infantry and armour, supported by artillery and fighter bombers, the Fallschirmjäger, reinforced by another regiment, were able to block the 8th Army. The Germans conducted an orderly withdrawal from Sicily, departing Catania on 5 August having already forced Montgomery to divert his advance through the mountainous Sicilian interior.

The operation demonstrates the utility of air manoeuvre to rapidly reinforce and counter-attack. It is impossible to be strong everywhere but when a main effort is identified, air manoeuvre may be the fastest response. It also highlights the strengths and vulnerabilities of light forces with and without a reliable line of communication. Light forces can hold key terrain against armoured forces when correctly supported and sustained.

Deter and demonstrate

1.34. Speed, reach and access make air manoeuvre forces well suited to deter and demonstrate without being committed. A public or private demonstration of capability, readiness and intent by an airborne force able to react to events thousands of miles away offers strategic influence to politicians. The posture, profile and presence of an air manoeuvre force can be used to demonstrate national resolve and deter an adversary without becoming involved in a conflict. Airborne forces are used by many countries as strategic reserves; air movement alone may be sufficient to deter aggression. A task-organised air manoeuvre force can cover several theatres and quickly redeploy to another theatre if already committed. A non-committed helicopter force may deter at the tactical level with greater capacity than a lightly equipped airborne force. When mounted from ships the access, poise and persistence is considerably increased giving an amphibious force operational deterrence.

Operation Restore Democracy, Haiti

On 31 July 1994 the United Nations Security Council adopted Resolution 940 permitting a US-led force to restore the government of President Aristide following a military coup in 1991. Coup leader General Cedras received a US delegation including former President Carter and retired General Colin Powell. Cedras was shown a video showing 3,900 paratroopers from the US 82nd Airborne Division loading at Pope Air Force Base. He was then told the video was two hours old and that the force of 100 aircraft was flying over the Atlantic Ocean to conduct a forced entry airborne assault.

Cedras was told that if the dictator did not concede to the legitimacy of the democratic elections and step-down then Haiti would be under US control by sunrise. Recent interventions by the 82nd Division into Grenada in 1983 and Panama in 1989 added credibility to the threat. Following Cedras' advice, President Jonassaint agreed to peacefully receive the US forces and retire. The airborne force returned to Pope Air Force Base and a US peacekeeping and stabilisation force was quickly deployed by air and sea.

A force poised to launch may aid diplomatic efforts as in Haiti or force dialogue. Demonstrating the capability and intent to deploy a land force by air makes air manoeuvre a powerful force to deter aggression. Its greatest use is its inherent flexibility, it can be applied right up until the last minute before being recalled.

Non-combatant evacuation operations and humanitarian assistance and disaster relief

1.35. Helicopters will often be essential to reach dangerous locations. The time and resources needed to move helicopters into the affected region can be reduced by operating from amphibious shipping if geography allows. Being organised and equipped for air movement and held at high readiness, airborne forces are ideally suited to conduct non-combatant evacuation operations and provide humanitarian assistance and disaster relief. A combination of airborne and amphibious forces may provide the best balance of speed and efficiency.

Operation Palliser, Sierra Leone

In early May 2000, the Rebel United Front (RUF) advanced on Freetown during a long-running civil war. On 5 May, the Cabinet Office agreed to deploy an operational liaison and reconnaissance team to Sierra Leone in response to the threat to the lives of British citizens and other entitled persons. Concurrently, the spearhead lead element, based on 1st Battalion Parachute Regiment (1 PARA) battlegroup, reduced its notice to move on 6 May, moving to the Joint Air Mounting Centre that evening, and flying to Dakar, Senegal on 7 May. C Company prepared and executed a tactical air landing operation onto Lungi airfield in Sierra Leone that day. By 8 May the battlegroup had established an evacuation handling centre in Freetown and the evacuations began that night. The support by four Chinook helicopters, that had self-deployed over 6/7 May, was essential in evacuating entitled persons over the three-mile-wide Tagrin Bay to the evacuation point at Lungi airfield.

The unexpected arrival of a thousand British troops helped to stabilise the situation. The RUF were deterred from entering the capital after a costly attack on the Pathfinder Platoon at Lungi Lol. Consequently, the joint commander, Brigadier Richards, decided not to withdraw after the non-combatant evacuation operations but sought to reinforce and assist the United Nations mission and Sierra Leone Army. HMS Illustrious and 42 Commando, embarked on HMS Ocean, were tasked to reinforce. Arriving off the coast on 14 May the presence of Harrier jets and a secure line of communication allowed British troops to conduct stabilisation operations. Having conducted a relief in place with 1 PARA on 26 May, 42 Commando with greater mobility, firepower and protection were able to operate deeper in the country.

The rapid projection of ground forces by air, supported by helicopters and quickly reinforced by maritime forces ultimately led to a ceasefire with the RUF. An enduring training mission was established as part of a whole of government support to the Sierra Leone government helping President Kabbah declare the civil war over in 2002.

Key points

- Air manoeuvre exploits the air flank to increase surprise, reach and tempo of the overall manoeuvre.
- Air manoeuvre combines the potential strength of air, land and maritime manoeuvre.
- Understanding the relative strengths and weaknesses of air transport aircraft and helicopters allows the best air manoeuvre capability to be chosen for the desired effect
- Air manoeuvre can be a high-risk activity that seeks to mitigate the vulnerability of maritime, land and air forces when conducting intra- and inter-theatre manoeuvre.
- Air manoeuvre can secure lodgements, seize key terrain, be a highly agile reserve, deter and conduct non-combatant evacuation operations, and humanitarian assistance and disaster relief.
- Commanders must truly understand the threats to the force and mission as well as the considerable opportunities, to succeed.

Notes

Chapter 2

Chapter 2 covers the principles of air manoeuvre and the planning process.

> Strategically, **time and space are relative**, and as the history of war has shown again and again a handful of men at a certain spot at a certain hour is frequently a far more **powerful instrument** of war than ten times that number on the same spot twenty-four hours later.

Major General J F C Fuller CB, CBE, DSO

Chapter 2

Air manoeuvre planning

Section 1 – Principles

Sound intelligence

2.1. Compared to ground manoeuvre a higher-level of knowledge and confidence for intelligence preparation of the environment is vital to air manoeuvre as commanders and personnel have no 'feel' for the environment. Building up combat power is a high-risk activity, being able to tailor the force to the mission is vital when sustained by air power. An accurate understanding of the enemy will guide all elements of subsequent mission planning including force ratios, the prioritisation of capabilities and command decisions. Air manoeuvre should never be mounted without understanding the air threat. Understanding human terrain may allow information and manpower to be sought from indigenous sources and transport, rations and water to be procured locally. Detailed knowledge of terrain allows forces to move rapidly from landing areas to objectives. Accurate forecasting of the weather will mitigate failure of the air movement and landing plan for the duration of the operation, not just the assault.

2.2. Air manoeuvre planning may have little access to intelligence, surveillance and reconnaissance (ISR) from the land domain and may be reliant on air, space and cyber to develop understanding. The deeper the operation, the higher the level of ISR assets needed; for joint theatre entry, a lack of national intelligence assets may preclude an airborne operation. Special or advance force operations may offer the best opportunity for ground truth; however, the risk of compromise may be too great and commanders may have to rely on an ISR soak.

Unity of effort

2.3. Unity of effort is divided into vertical and horizontal integration, which can be explained as unity of command and cooperation.[25] A united command ensures neither maritime, land or air interests undermine mission success. After the invasion of Sicily, the Allies recognised the need for unity of command in air manoeuvre, the responsibility for their employment 'should not be delegated to lower headquarters since positive coordination can be ensured only by the one agency in control of all elements'.[26] Whilst an air assault may not be split across Services like airborne operations, uniting ground and helicopter forces may be no less challenging. A clear and unified chain of command must be established early between air and land forces.

2.4. As a principle of war, cooperation requires sharing dangers, burdens, risks and opportunities. It is vitally important that the cooperation between air and ground forces should be the closest possible at all levels. It is fundamental to allow the whole operation, including the ground tactical action and the airpower responsibilities of delivery, reinforcement, supply and offensive support to be planned and carried out as an entity. Exchanging liaison officers throughout planning and execution is vital to keep both forces fully apprised of each other's intentions. Back briefs by the ground tactical commanders and air mission commanders to the higher commander during the planning process are key to maintaining balance; joint mission briefs share understanding across commanders and staff. Personal relationships developed in training are key to mutual understanding and sharing risk.

25 Army Doctrine Publication (ADP), *Land Operations*, paragraph 6-12.
26 Sebastian Ritchie, *Arnhem: Myth and Reality: Airborne Warfare, Air Power and the Failure of Operation Market Garden*, 2011, page 54.

Operation Mercury, Crete

The German invasion of Crete was commanded by General Student, the chief of German paratroops (Fallschirmjäger); an experienced infantry officer and fighter pilot in World War 1. The Fallschirmjäger were part of the Luftwaffe and General Student also had command of the troop carrier aircraft. Unity of command allowed General Student to make a critical decision at the decisive point in the battle to win the campaign. By accepting heavy casualties amongst his troop carrier aircraft, in effect crash landing them onto Maléme airfield under fire, he could deliver follow-on forces to secure a lodgement and build up combat power. Failure to have taken this decision would have seen the scattered and decimated paratroopers from the assault wave isolated and destroyed in detail by the British Empire troops.

'... because responsibility rested with Student, no one in the troop-carrier command resented the fact that his decision was final… to secure a decisive advantage in the land battle, it is better if the man on whose shoulders final responsibility rests has the power to issue orders to troop-carriers as well as battalions.'

Maurice Tugwell, *Airborne to Battle*

Simplicity

2.5. Simple plans and clear, concise orders minimise misunderstanding and confusion.[27] Simplicity relies on good intelligence and the need for limited objectives. Air manoeuvre operations are complex because they attempt to synergise air plans by fixed- and/or rotary-wing aircraft providing ISR, command and control, mobility and fires. A complex ground tactical plan may need to change as the situation evolves during preparation and air movement; trying to adjust a complex landing plan at the last minute will only create confusion.

2.6. The complexity of the air plan is compounded by the confusion and chaos resulting from assembling a ground force in battle against the

27 Allied Joint Publication (AJP)-3(C), *Allied Joint Doctrine for the Conduct of Operations*, paragraph 1.21.k.

pressure of time with fragile communications and absent commanders. The loss of aircraft, before or after take-off, combined with scattered troops requires redundancy in allocating troops to tasks. The increased friction of air manoeuvre demands a simple plan, more so than in conventional operations. It needs to be clearly understood by all ranks who will be expected to act on their own initiative to achieve the higher commander's intent without seeking direction. The airborne assault in Normandy in June 1944 is a good example where clearly understood objectives, detailed intelligence and initiative allowed scattered paratroopers to have disproportionate effect and achieve their objectives.[28]

Control of the air

2.7. Control of the air is a function of air power underpinning freedom of action in the air, land and maritime domains.[29] Small-scale air assaults may be launched without air superiority but for larger air assaults and airborne operations control of the air is likely to be a major multinational operation by the air component. Absolute control of the air is not essential; at least temporary and local air superiority is an absolute necessity. The time that control of the air can be maintained will affect the air movement, landing plans and strike windows, and therefore the basing and time between waves which impacts on concentration of force. Control of the air enables the air component to attack fielded enemy forces helping to protect and isolate the landings. Local and temporal control of the air also requires the suppression of enemy air defences. Even the most heavily supported air manoeuvre operations are vulnerable and require a risk calculation before execution, as demonstrated by the losses sustained during the crossing of the Rhine in March 1945.[30]

28 Paratroopers were scattered up to 35 miles with only 15% of one division landing close to its objectives. *Ad hoc* teams were formed often deep in the enemy's rear area creating havoc as they fought their way back to their objectives.
29 Joint Doctrine Publication (JDP) 0-30, *UK Air and Space Power*, paragraph 3.8.
30 Operation Varsity is one of the most successful Allied airborne operations of World War 2. Despite the Germans being subjected to a massive barrage of 3,500 guns and 5,561 bombers before the assault over 40% of troop carriers were badly damaged and the parachute brigade suffered 15% casualties.

An Apache attack helicopter taking part in Exercise Clockwork in Norway

2.8. It is not just the transit that is important, air support must include providing fire power and delivering reinforcements and supplies to any landing force. Planners must consider the air force's ability to compensate for the landing force's lack of firepower and sustain it until withdrawn or linked-up with a ground force. Air-delivered artillery and mortars will have minimal ammunition. This should be mitigated by fires from aircraft, attack helicopters and naval gunfire support. Without recce and command vehicles, or robust headquarters, greater situational awareness and control can be provided by airborne ISR and command and control platforms. Air power must be integrated as a force multiplier to offset the lack of ground forces.[31]

Surprise

2.9. Surprise limits our opponents' reaction time by affecting their ability to make decisions, is a significant way of seizing the initiative and is transient and must be exploited rapidly.[32] The speed, reach and access

31 Coordinating suppression of air defence, defensive counter-air, close air support and air interdiction within a composite air operation is a major undertaking; land commanders must plan air manoeuvre as a truly joint operation and not perceive the air force as only providing the means to manoeuvre.
32 JDP 0-01, *UK Defence Doctrine*, 6th Edition, Annex 2A.

achieved by air manoeuvre seeks to achieve surprise by the direction, timing and tempo of the assault. Every minute after landing is likely to see the enemy reinforced. Surprise creates relative superiority which will allow the force to secure its objectives and be reinforced before being outnumbered.

2.10. The utility of air manoeuvre will be lost if the enemy is prepared, therefore operations security is essential to catch the enemy off guard. Modern media may report troops leaving bases or arriving in overseas bases; protagonists will be able to monitor through the space and cyber domain the movement of air and maritime forces. Routine deployment exercises, deception and the timing of the assault are essential to catch a prepared enemy off guard. Without the element of surprise, lightly armed and outnumbered air manoeuvre forces have little chance of success.

Speed and boldness

2.11. To avoid the loss of surprise and relative superiority, speed must be underpinned by boldness to overcome limited opposition quickly; it is essential therefore to move as quickly as possible regardless of the enemy reaction. This must be tempered by the need to protect the landing force from culminating on route to the objective, a balance between bypassing and being delayed must be struck. Relative strength shifts by a factor of nine in the favour of the landing force in the time it takes to secure objectives: they can expect to defeat a prepared defence by a force a third their size and then conduct a hasty defence against a hasty attack by a force three times their size.[33]

2.12. Airborne and air assault troops are light in firepower, mobility and protection, so speed and aggression are vital to generate favourable relative strength where a decision is sought. Similarly, combat aviation will inevitably have more tasks than resources, so speed and a bold approach to operations not only guarantees success, but also returns the capability for reuse as soon as possible. The value of speed and boldness was well demonstrated on D-Day by the attack on the Merville Battery which was launched when only 150 of the 700 men dropped reached the

33 *Staff Officer Handbook*, page 3.6.5_8.

rendezvous; heavy casualties were acceptable to destroy German guns which would have enfiladed the beach assault.[34]

Concentration of force

2.13. Concentration of force is sufficient fighting power at critical points and times. As surprise and initiative are lost from the landing, rapid concentration of force, in space and time, is fundamental to maintain relative superiority; and achieve success. Relative superiority must be achieved at the pivotal moment in an engagement, for airborne and air assault operations this is the point after landing when the enemy is able to counter-attack. Limited helicopter lift capacity during air assault operations is mitigated by delivering troops in waves, but this disperses them in time; conversely, paratroops are dispersed spatially, so planning and time must be allocated to assemble the force after landing. A Defence Science and Technology Laboratory (Dstl) study found that within the battlegroup scale of air manoeuvre operations, larger operations were more successful. Airborne and air assault operations should aim to deliver a battlegroup in a single wave to achieve surprise. The higher command must allocate or bid for sufficient aircraft to permit mass. Combat aviation operations require the same concentration of force and mass: as with main battle tanks, the 'more you use, the fewer you lose'.

2.14. Ground troops should be landed as close to their objectives as possible; suitable landing sites and enemy defences will constrain. However, large defended objectives may require the force to land and assemble out of contact before conducting a conventional infantry attack. Despite greater agility and access, air assault will face the same considerations of landing within direct and indirect fire of the objective.

> 'Anyone who is careless in respect to time and space will be annihilated.'
>
> Generalmajor Hellmuth Reinhardt

34 T. B. H. Otway, *Airborne Forces: The Second World War 1939-1945 Army*, 1951, page 180.

Sustainability

2.15. Sustainability may be the deciding factor in assessing the feasibility of a particular operation. As a principle of war, sustainability is universal. However, air manoeuvre is unique because of the lack of secure lines of communication. The build-up of logistics and distribution networks is an essential prerequisite for any operation, but during air manoeuvre this must be instantaneous and concurrent to combat. It will not be possible to deliver large quantities of vehicles and munitions by air movement; airborne and air assault forces must be light by design, adaptable and reliant on air and maritime power (if in range) as already discussed. Sustainment is wider than merely supplies – it is about maintaining the wider ability to continue fighting, replacing personnel and materiel as required.

2.16. Air manoeuvre can be sustained in three ways:

- from the air, which is resource intensive but is the only option for deep operations – as demonstrated by the successful second Chindit mission in Burma;
- with the delivery of sufficient supplies during the insertion to allow the force to be self-sufficient; or
- with reliance on a rapid link-up with land or maritime forces to provide a secure line of communication.

After the poor air-delivery of materiel and the intensity of combat during the invasion of Normandy in 1944, the airborne divisions were sustained by their proximity to the amphibious force, which provided artillery and logistics during the battle.[35]

35 'In Operation Neptune, the 101st Airborne Division could not have maintained itself much over 24 hours without support … The timely arrival of the 4th Division relieved the airborne troops of concern for their front to the North and East and allowed the elements to reform around Hiesville. The previous conception that an Airborne Division can maintain itself independently for two or three days should be revised downward for action in 'FORTRESS EUROPE'.' Sebastian Ritchie, *Arnhem: Myth and Reality: Airborne Warfare, Air Power and the Failure of Operation Market Garden*, 2011, page 66.

Operation Musketeer, Suez

Following the nationalisation of the Suez Canal in July 1956 an Anglo-French force was assembled to seize the canal. The initial plan called for 40 and 42 Commando to come ashore at 0450 hours on 6 November 1956 followed by an airborne assault by the 3rd Battalion Parachute Regiment (3 PARA) at 0715 hours onto the El Gamil airfield securing the west of the Canal whilst French marines and paratroopers secured the east. Ground forces were commanded by the French General Gilles from a Noratlas aircraft with communications to the overall Commander of the Fleet and reserves in Cyprus.

Forty-eight hours of air attacks destroyed the Egyptian air force far quicker than planned leading to the airborne assault being advanced 24 hours to prevent reinforcement. 3 PARA secured the airfield throughout 5 November, cleared Egyptian beach defences and provided machine gun support to 42 and 45 Commando's landing on 6 November. Facing light opposition, the marines were followed at 0500 hours by four landing craft tanks that landed 14 waterproofed Centurion tanks of C Squadron, the 6th Royal Tank Regiment (6 RTR) in four and a half feet of water.

At 0520 hours 45 Commando was ordered to land within the beach area already secured by the marines. In 89 minutes, 22 helicopters flew in a total of 425 men and 23 tons of stores in four waves from the carriers situated nine miles offshore. This was followed by the 2nd Battalion Parachute Regiment (2 PARA) landing at 1230 hours linking up with B Squadron 6 RTR and pushing south to secure the lodgement.

In many respects this was a remarkable operation. It was the first time in history that helicopters had been used in this manner during an amphibious operation. The United States Marine Corps had pioneered developments in this field, but had not yet had the opportunity to put them into practice on the battlefield. Even given the improvised nature of the British force, and the rather conservative way in which it was used, the potential for helicopters to add speed and flexibility to amphibious operations was readily apparent.

Section 2 – Organisation

2.17. **The landing force.** The rapid build-up of combat power is vital to air manoeuvre as forces may be outnumbered after the initial assault. Detailed planning is required to ensure the correct personnel and equipment arrive in the desired order in accordance with the commander's plan. There are three echelons.

a. **Assault forces** conduct the parachute, airland or air assault to secure initial objectives and/or establish the airhead.

b. **Follow-on forces** are required when there are insufficient aircraft or the inability to drop or land heavy equipment in the assault.

c. **Rear forces** are those elements not required in the objective area. It may deploy by air, sea or land when the units are to stay in the field for sustained operations. Air manoeuvre units should have the full capabilities of light units when linked up with their rear echelon.

Paratroopers conducting a long-range insertion by C-130 Hercules aircraft

2.18. **Reserves.** It is important to retain a reserve to reinforce success at a critical moment; the arrival of the air-landed 5th Mountain Division at Maleme airfield was decisive in winning the battle of Crete.[36] Consideration must be given to deploy the reserve into the operations area or hold in the departure airfield, on ship or in a staging area. This should be based on time to deploy, predicted weather and control of the air.

Section 3 – Planning

2.19. **Planning process.** Joint air assets are highly sought after, but as they are generally limited in numbers there is potential to fragment the joint air effort as components compete for them. The agility and ubiquity of air power allows it to be centrally controlled at a higher level than land forces. Air manoeuvre planning must be centralised and precise, and takes more time than that for other operations. Time must be made available for air-ground operations preparation, planning and rehearsals. Air assault planning is conducted using the combat estimate (seven questions) in accordance with the *Planning and Execution Handbook*. Airborne planning for a more deliberate airborne assault may require the airborne task force to use the tactical estimate (six-step process) to integrate the planning by the air transport force with the tactical estimate used by the ground force.[37] Commonality of outputs and briefs between the tactical and the combat estimates allow synchronisation between maritime, land and air staffs as described below. Geography is a constraint; ideally forces and their headquarters will be collocated on ships, in marshalling/staging areas or airfields. If this is not possible data communications may overcome separation but it may be best for planning teams to collocate away from their forces during preparation.

36 Maurice Tugwell, *Airborne to Battle: A History of Airborne Warfare, 1918-1971*, 1971, page 114.

37 Note the UK does not currently have a joint planning process below campaign planning, so the tactical estimate may have to be adopted and adapted for airborne operational planning.

2.20. **Planning time.** Air manoeuvre planning may be conducted at haste to exploit opportunities. The commander must allow adequate time to marshal the air and landing forces and ensure all subordinates units, particularly aircrew, are thoroughly briefed. Viable standard operating procedures and previous training significantly reduces briefing time. This is best achieved by articulating clear requirements and engaging early with the Air Support Operations Centre. However, planners must also be flexible enough to accommodate shorter notice tasks using aircraft available at higher readiness states.

2.21. **Planning support.** For air assault and aviation operations the Joint Helicopter Command Air Manoeuvre Planning, Training and Advisory Team provides advice and staff support to the formation staff.[38] The helicopter force will be generated with sufficient liaison officers and planning staff to support brigades and battlegroup staff conducting air manoeuvre planning.

2.22. **Parallel planning.** To achieve unity of effort in air manoeuvre, the air and ground tactical plans must be developed in parallel. Integration and synchronisation of planning is vital to deliver a plan that provides the greatest chance of success whilst balancing the risk between air and land forces. Liaison officers should be exchanged early between headquarters to keep staff appraised of planning developments. Failure to do so may result in divergent plans based on false assumptions, unequal ownership of risk or unnecessary constraints. There are several vital touch points that allow commanders and staff to coordinate.

a. **Intelligence preparation of the environment brief** must include ground intelligence (G2), engineer intelligence and air intelligence (A2) updates by intelligence staff or liaison officers. This should also include naval intelligence (N2) for littoral manoeuvre or air movement through maritime airspace.

b. **Missions analysis brief** allow key deductions from forces to be shared through liaison officers.

38 16 Air Assault Brigade and 3 Commando Brigade are uniquely staffed with a wider range of established air posts to support air manoeuvre planning.

c. **Commanders' backbrief** allows the ground tactical and air mission commanders to brief the higher commander, key staff and each other on key deductions from intelligence preparation of the environment and mission analysis, outline their concept of operations, points for clarification, requests for information and risks.[39] A pre-meeting by the ground tactical and air mission commanders may allow frictions to be resolved beforehand.

2.23. **Coordination.** Confirming understanding of the air manoeuvre plan across all force elements is achieved by the following.

a. **Joint mission brief.** The higher headquarters coordinate the briefing of ground and air concept of operations. Conditions checks and abort criteria are agreed. The result of the joint mission brief is a finalised air movement plan, landing plan, air routes, pick-up zones and landing zones.

b. **Joint mission orders.** After unit orders, joint mission orders allow forces to brief each other's staff and subordinate commanders on their part within the concept of operations and coordinate the detail for the loading and landing plans.

c. **Rehearsal of concept.** The rehearsal of concept should include all pilots taking part in the operation. As a minimum the serial leaders should attend. The rehearsal of concept must cover the air movement and landing plans.[40]

2.24. **Mission execution checklist.** The mission execution checklist permits brief, informative radio transmissions on crowded radio networks. Execution checklists use brevity codes to represent critical points in the scheme of manoeuvre. If the air mission commander and lift flight leaders have air movement tables or the execution checklist in their possession, they can continue the mission without radio communications.

39 *Planning and Execution Handbook*, page 3-54.
40 This may be conducted by the higher headquarters or jointly by the ground tactical commander and air mission commander's staff.

2.25. **Conditions check.** Conditions check is a pre-designated list of go/no-go criteria that are valuable in air manoeuvre operations due to their complexity and the distances involved. These are basic requirements that must be met to allow the mission to take place; some will be matched to decision points. These criteria are developed during the planning process and refined during wargaming, then briefed at the end of the joint mission orders, along with the abort criteria. There are two conditions checks that can be used.

a. **Initial conditions check** is usually conducted in the higher headquarters to review the go/no-go criteria. It gives the ground tactical and air mission commanders the opportunity to recommend the execution of the mission to the higher commander. All staff principals and liaison officers are represented in person when possible and by video-teleconference or conference call when necessary. It must be completed before aircraft depart to collect the ground force.

b. **Final conditions check** is conducted near the pick-up zone control command post or in flight for airborne operations. It should be conducted between the ground tactical and air mission commanders, who should be on the same aircraft. They review the latest friendly, terrain and weather, enemy situation and the abort, delay and divert criteria.

2.26. **Abort, delay and divert criteria.** Abort criteria are considerations, based on risk assessment, that occur when a change of one or more conditions in the objective or landing areas threaten mission success. As such, they are the friendly force information requirements that require the command to decide to continue, abort, divert or delay the mission. The joint mission brief defines abort criteria and the commander monitors them throughout. Examples could be changing weather, aircraft failure, discovery of enemy air defence or not having the minimum troops required on the ground to complete the mission. An abort decision can apply to elements of, or the whole mission. A divert decision would usually involve switching to an alternate landing area.

Strategic airlift of an Apache helicopter

Section 4 – Reverse planning process

2.27. Air manoeuvre operations are planned in reverse order but executed in six phases (see Section 5). The operation may not simply follow the sequence outlined in the various plans as the air movement plan may deliver advanced, assault and follow-on forces over all six phases of the operation. Due to the constraint of time, plans are not completed in sequence but in parallel as outlined in the joint planning process in Section 2. As the air movement plan develops it may become apparent that sufficient lift is not available in the assault phase to secure all objectives and the landing and ground tactical plans may change. Liaison is key to save time. Only when the ground tactical plan has been confirmed can the others be finalised. Due to the complex nature of air manoeuvre planning, much of the detail should be standardised as standard operating procedures/standard operating instructions and kept in templates which can be rapidly modified based on the ground tactical plan. Reverse planning is conducted in the sequence detailed below.

2.28. **Ground tactical plan.** This is the basis for all other plans and must be finalised first. It must have simple objectives which contribute to achieving the commander's intent and securing an airhead for follow-on forces, if required. Lift capacity and aircraft capabilities are key details

required at the start of planning. The ground tactical planning is treated as a conventional tactical action. Commanders and staff must understand the special conditions as detailed in the principles in Section 1 paying attention to achieving concentration of force and sustainment during the assault phase. Compromises will have to be made by combat, combat service and combat service support units to achieve the mission with limited lift capacity. This will include considerable austerity and the versatility of personnel and vehicles during the vital moments to achieve relative superiority.

2.29. **Landing plan.** This links the air movement plan to the ground tactical plan. It is finalised after the ground tactical plan. It sequences the arrival of forces into the area of operations, ensuring they arrive at designated locations and times to execute the ground tactical plan. Landing and assembling personnel, with their vehicles and equipment in tactical groupings, is essential to achieving concentration of force and mission success.

2.30. **Air movement plan.** Air movement is defined as: air transport of units, personnel, supplies, equipment and materiel.[41] Although the air transport aircraft or helicopter force will start planning after receiving the warning order, the air movement plan can only be finalised after the ground tactical and landing plans. The plan includes the period from when forces load until they exit the aircraft.

2.31. **Staging plan.** A staging area is defined as: an area located between the mounting area and the objective area through which all or part of the forces pass after mounting, for the purpose of refuelling, regrouping, training, inspection and distribution of troops and materiel.[42] Air assault operations are launched from a staging area; an airborne operation may pass through a staging area if unable to fly direct to the objective area or to reduce time between waves. A staging area has the main advantage of extending the range and duration of an air manoeuvre operation, though operational surprise may be lost. It also allows reception, staging, onward movement and integration to take place as well as building up resources and shortening the lines of communication.

41 NATOTerm.
42 NATOTerm.

The force is, therefore, prepared, but not committed. This may deter or be part of a deception plan.

2.32. **Marshalling plan.** Marshalling is defined as: the process by which units participating in an amphibious or airborne operation, group together or assemble when feasible or move to temporary camps in the vicinity of embarkation points, complete preparations for combat or prepare for loading.[43] An air assault operation is unlikely to conduct marshalling unless there is a preliminary air movement. Marshalling for an airborne operation includes all activities from receiving a warning order to assembling at the departure airfield ready to load. It must consider: moving personnel and materiel to the departure airfields; feeding and accommodation; dispersal and protection measures; planning, briefing and rehearsals; rigging of personnel and materiel; and communications.

Section 5 – Operational sequencing

2.33. Air manoeuvre is generally executed in six phases which can be modified for specific operations, for example, a raid may not stabilise a lodgement or introduce follow-on forces.[44] When considering air assault as part of littoral manoeuvre the phases will reflect those of amphibious operations.[45] Phases are not distinct sequences but will overlap.

2.34. **Phase 1 – Preparation and deployment.** This phase includes marshalling, planning, rehearsing, staging and air movement. Coordinating concurrent activity across unit bases, marshalling areas, departure airfields, ships, staging bases and the objective area will require robust communications.

43 NATOTerm.
44 These phases mirror operational phasing in United States (US) Army Field Manual 3-99, *Airborne and Air Assault Operations*, to aide integration with US forces as part of a joint theatre entry.
45 Royal Navy Book of Reference (digital) 4487 Volume 2.2, *Amphibious Warfare*. There are seven phases of amphibious operations: planning; embarkation; rehearsal; movement to objective area; shaping operations; action; and termination and subsequent operations.

2.35. **Phase 2 – Shaping operations.** This phase includes gathering intelligence, including the possible deployment of advance forces; suppression of enemy air defences; preparatory fires; information activities and battle damage assessment.

2.36. **Phase 3 – Assault.** This phase includes the landing and ground tactical plans covering the assembly of the assault echelon, securing of initial objectives and, when necessary, establishing an airhead. Airborne fires are essential to protect the landings, assembly, movement to objectives and assault. The assault should achieve surprise and concentrate force to maintain relative superiority and rapidly secure objectives.

2.37. **Phase 4 – Stabilisation of the lodgement.** The assault echelon is reinforced to secure its objectives and expand the airhead to establish a lodgement and a secure line of communication. Efficient control of the landing zones ensures aircraft spend the shortest time on the ground and troops move quickly to their objectives.

2.38. **Phase 5 – Rapid delivery of follow-on forces.** When building up forces for subsequent operations, additional ground forces will be air landed, including medium and heavy forces with greater lethality, mobility and firepower. This is analogous to the build-up phase in obstacle crossing operations.

2.39. **Phase 6 – Link-up, reinforce or withdraw.** Commanders and staff must be clear on the end state of an air manoeuvre operation. Once committed ground forces must withdraw whilst they retain the freedom to manoeuvre, be reinforced by medium or heavy forces as part of joint theatre entry, or link-up with ground or maritime forces. The duration that airborne and air assault forces can be sustained until link-up, reinforcement or withdrawal will depend on the intensity of combat. To conduct subsequent operations, airborne and air assault forces must be sustained by a ground line of communication and link-up with elements from their rear echelon to provide additional mobility, firepower and protection. Link-up operations require careful control measures and methods of combat identification according to war fighting doctrine. Sustainment planning will be highly dependent on knowing how the operation will terminate or transition to a subsequent operation.

Key points

- Air manoeuvre requires timely, accurate and specific intelligence.
- There must be detailed and coordinated planning between air and ground forces under a joint commander to share risk.
- There must be a simple plan with limited and clearly understood objectives.
- Temporal and local control of the air is essential to manoeuvre, support and sustain the ground force.
- Without surprise, lightly armed and outnumbered air manoeuvre forces will have little chance of success.
- Speed and boldness are required to maintain relative superiority to seize objectives once surprise is lost.
- Force must be concentrated in time and space by landing as close to objectives as possible, as quickly as possible.
- Accurate sustainment planning must ensure the force remains light by design without culminating.
- The commander must plan for the force to be reinforced by heavier follow on forces, link-up with advancing forces or withdrawn whilst there is the freedom to do so.
- Air manoeuvre forces are organised as assault, follow-on and rear echelon forces.
- Air manoeuvre operations are planned in reverse as the ground tactical plan, landing plan, air movement plan, staging and loading plan and marshalling plan.

Chapter 3

Chapter 3 details operational considerations for air manoeuvre.

> “Where is the prince who can so afford to cover his country with troops for its defense, as that ten thousand men **descending from the clouds** might not in many places do an infinite deal of mischief before a force could be brought together to repel them?”
>
> Benjamin Franklin, 1784

Chapter 3

Operational considerations

Section 1 – Command

3.1. **Chain of command.** A clear and unified chain of command is established under the air manoeuvre task force commander subordinated by the ground tactical commander and air mission commander from the air transport or helicopter force.[46] It is vital to establish command relationships and responsibilities within the joint force for air manoeuvre and agree criteria and authority for launching and aborting. These relationships may include, but are not limited to, the composite air operation, littoral and ground manoeuvre forces.

3.2. **Coordination.** The ground tactical and air mission commanders should fly in the same aircraft to coordinate decision-making. Fixed- and rotary-wing aircraft can provide airborne command and control platforms able to rebroadcast but also serve as command posts. An airborne command post will mitigate the lack of command and control during the landing phase, a commander may have better situational awareness and connectivity by remaining airborne throughout the landing and subsequent phases.[47]

46 For a battlegroup air assault, the air assault task force commander is likely to be a brigade commander, with an infantry battalion commanding officer as ground tactical commander and Army Air Corps regiment commanding officer as air mission commander. For air assault as part of littoral manoeuvre the ground tactical commander will be the commanding officer of the lead commando group. For battlegroup airborne operations Commander 16 Air Assault Brigade is the task force commander with a parachute or airland battalion commanding officer as ground tactical commander and a tactical air transport squadron commander as air mission commander.

47 The Boeing E-3D Sentry airborne warning and control system can provide the command element during projection. The E-3D Sentry can communicate with the package aircraft and can reach back to its command, giving better communication reach during air movement.

Operation Silver Bayonet, Vietnam

'Some commanders used their helicopter as their personal mount. I never believed in that. You had to get on the ground with your troops to see and hear what was happening. You have to soak up first-hand information for your instincts to operate accurately. Besides, it's too easy to be crisp, cool, and detached at 1,500 feet; too easy to demand the impossible of your troops; too easy to make mistakes that are fatal only to those souls far below in the mud, the blood, and the confusion … I would put my fire support team overhead, in the battalion-command helicopter with Matt Dillon [battalion operation officer] coordinating. From 2,500 feet overhead Dillon would have radio contact with 3rd Brigade Headquarters, with the battalion rear command post at Plei Me, and with all the company pick-up zones. He could monitor all that was said over the battalion command network. Jerry Whiteside would direct the artillery and the rocket gunships. Charlie Hastings would deal with the Air Force fire support. And Mickey Parrish would deal with Bruce Crandall and the helicopter people.'

General Hal Moore

3.3. **Communications.** Aircraft, ships and ground forces should be able to communicate directly, but complications caused by range and terrain masking requires a robust command and control plan. Command and control aircraft can provide additional radio rebroadcast capabilities and more liaison officers. However, the higher command must be aware that command and control aircraft are unlikely to be available beyond initial insertion of air manoeuvre forces, so the communications plan must be able to endure using other methods (for example, high frequency, tactical satellite or radio rebroadcast). The higher command must ensure that all force elements are supported by sufficient information technology and bandwidth. Air transport aircraft and helicopter forces rely heavily on information technology for mission planning and equipment support functions; they require voice and data links to air intelligence, the Permanent Joint Headquarters (PJHQ) and Air and Space Warfare Centre.[48] Secure communications between aircraft and back to bases,

48 Bandwidth and physical space for communications equipment is extremely limited on board ships, so information flow must be efficient. This requires using common types of equipment and message formats between all aircraft types and ships in the task force, which is not currently available.

keep commanders updated and allow flexibility in execution; this is important when aborting or moving to alternative landing areas.[49]

Section 2 – Inform

3.4. **Area of intelligence interest.** The area of intelligence interest may be in the deep battlespace; commanders may have to request assets outside of their own command to conduct an intelligence, surveillance and reconnaissance (ISR) soak of landing areas and air movement corridors. Fixed- and rotary-wing, piloted and remotely piloted aircraft will all be able to contribute to intelligence collection. However, consideration must be given to transmitting and processing information in the absence of real-time air-to-ground links. ISR support for large-scale air manoeuvre will rely on early tasking through air operation staff for inclusion in the air tasking order.

3.5. **Information requirements.** Single-Service intelligence staff must have reachback to intelligence fusion centres and joint intelligence assets. Intelligence must be shared between forces to develop an accurate ground, maritime and air picture. Information requirements for air manoeuvre include:

- mission-planning system mapping and imagery;
- identifying air defence assets to advise the operational risk management process;
- environmental and meteorological information;
- the location and state of landing areas and air movement corridors;
- specific legal and policy direction on rules of engagement and targeting directives;

49 Using a voice radio network is currently the only way to promulgate situation updates to helicopter aircrews during a mission. This may require commanders to dedicate one of the embarked helicopters to voice reporting and communications relay.

- specific airspace management information; and
- options for forward arming and refuelling points.

3.6. **Intelligence collection.** The operational circumstances will shape the composition of the intelligence assets supporting air manoeuvre. It is likely to be a combination of organic advance force operations and external ISR assets. The intelligence, surveillance, target acquisition, and reconnaissance (ISTAR) team must help the commander understand the intelligence opportunities that can be expected from advance force operations and external ISR assets: how responsive they will be once employed; their threat of compromise or loss; how likely it is they will be reallocated to other tasks; and the quality, and quantity, of output they can be expected to achieve in the time available? The commander can then give direction on the level of risk deemed acceptable to achieve the best possible intelligence within the available time. The ISTAR plan can then be shaped appropriately, but not before.

3.7. **Ground.** Inter-visibility studies must be conducted for air movement corridors and landing areas to assess vulnerability to enemy fires and reduce threats to air movement. Detailed assessments must be conducted of cover, obstacles, killing areas and approaches to maximise movement from landing areas to objectives.

Soldiers marshalled towards Chinook helicopters

3.8. **Enemy.** Commanders must be able to assess how enemy locations and capabilities could affect the air movement, landing or ground tactical plans through surveillance, fires or counter-attack. Likely enemy courses of action, approaches and reaction times must be understood, paying particular attention to armoured threats. A detailed assessment by engineer intelligence of the time required for the enemy to deny key terrain like bridges is key.

3.9. **Weather.** Adverse weather can severely limit air manoeuvre but can be mitigated by accurate forecasting, flexible planning and procedures. Advice on flying parameters must be sought from aircrew but generic considerations are below.

a. **Extreme heat and cold.** High temperatures or density altitudes degrade aircraft engine performance and lift capability. Freezing rain and ice can have catastrophic consequences on rotary aircraft, they also affect the serviceability of aircraft on ships; this can be mitigated by marinisation.

b. **Wind.** Personnel and materiel can be airdropped in high winds but at risk of damage and dispersion which must be understood and tolerated by commanders. Dust, sand or snow blown across pick-up and landing zones, can be hazardous. High winds, gusting and crosswinds will affect landing by fixed- and rotary-wing aircraft. Winds will often drop at last light making the timing of an operation key.

c. **Visibility.** Air manoeuvre is best conducted at night or during weather conditions that allow aircraft both to operate and obscure enemy observation to facilitate deception and surprise. Fog, low clouds, heavy rain and other factors will limit visibility and may prevent dropping or landing; to a degree this has been mitigated by station keeping equipment and navigational systems.[50] Battlefield obscuration and illumination may also affect visibility and must be considered when planning fires.

50 The only UK aircraft with this capability is the C-130 Hercules.

d. **Moon state.** Some aircraft and crews will not be able to operate in low or no-moon periods without infrared or white light. This can be mitigated by a force package providing artificial illumination. Planners must consider the direction of approach to pick-up and landing areas as moon angle will affect aircrew flying with night vision goggles.

Operation Market Garden

Major General Williams, United States (US) Army Air Force, was a senior planner in the 1st Allied Airborne Army responsible for Operation Market Garden's air plan. He had been intimately involved in planning the airborne invasions of Sicily, Normandy and the south of France, less than a month before. Williams had seen the devastating impact enemy flak had had in dispersing, diverting and destroying troop-carrying aircraft in Normandy, when some ground units could only assemble a tenth of their force. He knew that airborne troops needed to drop with their vehicles and anti-tank guns to survive against armour and had seen the casualties in France caused by high winds.

Based on accurate meteorological forecasting he predicted fog would prevent an early lift on 17 September 1944 and that range and servicing issues would prevent a second lift that day. Knowing the limitations of the air crew's ability to fly at night, reducing the risk of the weather by taking-off mid-morning and allowing time to service aircraft, Williams crafted a simple but robust plan. According to the commander of 1st Airborne Division it was 'easily the most successful and accurate [airlift] of any previously achieved either in operations or on exercises'.

Many historians and soldiers have argued that a second lift on the first day could have changed the outcome of the battle. As forecast, there was fog on the morning of 17 September which would have delayed the aircraft lifting until when scheduled. Fog would continue to hamper operations over the next three days.[51]

51 Sebastian Ritchie, *Arnhem: Myth and Reality: Airborne Warfare, Air Power and the Failure of Operation Market Garden*, 2011, page 183.

Section 3 – Prepare

3.10. **Readiness.** Airborne forces are held at very high readiness for rapid inter-theatre movement; although it may be possible to conduct some reception, staging, onward movement and integration (RSOI) at a forward mounting base, they must maintain a level of fitness that alleviates the absence of acclimatisation and full RSOI.[52] Amphibious forces are likely to be acclimatised and able to conduct RSOI on ships whilst transiting to the joint operations area. Very high readiness force elements must have RSOI procedures worked into their deployment plans.

3.11. **Activation.** Time management and good battle procedure ensure subordinates have time to plan and prepare. Adhering to the one third/two thirds rule for battle procedure will ensure subordinates can plan, brief and rehearse. However, a compressed timeline in air manoeuvre requires parallel planning to maximise concurrent activity. Orders may flow down the chain of command but confirmation may have to flow up finishing with task force rehearsal. A well understood and synchronised planning timeline is essential. To allow rapid deployment, plans must be as detailed as time permits, but based on well-practiced procedures, templated orders and standard operating procedures. Well-established procedures should include recall, packing lists and readiness checks of personal administration and vaccinations.

3.12. **Force generation.** Force generation for littoral operations may be conducted from the UK or from a deployed amphibious task force. However, embarking support equipment and personnel may require the task force to go via a port, affecting the planning timeline. Troops, equipment and aircraft assigned to air manoeuvre may not necessarily be collocated within the task force, due to a rapid, unplanned embarkation or due to availability of space, particularly for vehicles.

3.13. **Equipment packs.** Projecting the airborne and air assault forces requires the issue of priming equipment packs, including ammunition, medical equipment, spares and consumables. The first line priming

52 Commanders must exercise judgement when applying Joint Service Publication (JSP) 539, *Heat illness and cold injury prevention and management* to training in the UK and not transfer the risk to the force when deployed or risk to mission.

equipment packs is scaled at three days consumption. Second and third line packs are deployed once forward logistic elements are in position to receive them. Helicopter forces also require deployed spares packs to be held at first line to enable maintenance.

Section 4 – Project

3.14. **Movement *versus* manoeuvre.** Movement is the most effective and fastest way into a theatre; personnel and materiel are moved in the most efficient way and not for combat as forces are largely unaffected by the adversary's area denial countermeasures. The force will start to manoeuvre tactically and disperse to mitigate anti-access countermeasures and reach a position of advantage.

3.15. **Air movement.** Air movement offers the fastest means to transit forces to any theatre of operations. Air forces may deploy the entry force directly to the airhead or via a forward mounting base. Direct deployment is the fastest way to reach a theatre which may be suitable to demonstrate or deter. Deploying via a forward mounting base allows the entry force to conduct RSOI if drawn from multiple locations, for example, land forces from the UK and air forces from several theatres. Deploying from a forward mounting base allows a faster build-up of forces in the lodgement but will be slower to reach the lodgement than flying direct. Commanders will have to balance range, lift capacity and time when conducting air manoeuvre as part of joint theatre entry.

3.16. **Littoral manoeuvre.** Shipping will generally position within a fixed operating box for ease of surface and air assault operations prior to, and during, ship to objective manoeuvre. Positioning must balance the need to create effect ashore whilst mitigating the threat to the amphibious task force. The range at which helicopters will be launched to an objective will depend on a variety of factors.[53] While aircraft performance will not be affected by altitude on launch, it will still be affected by temperature, wind and air pressure. To mitigate the conflicting requirements of landing

53 For example, coastal defences and shallow water will drive the launch point away from the coast. The distance of the objective inland, as well as availability and speed of both surface and air lift, will push it closer.

craft and helicopters, landing craft may be moved to other amphibious ships or embarked prior to conducting air manoeuvre. The decision to disembark helicopters and their life support largely depends on the ability of the shipping to remain in close proximity, driven by the maritime threat. Long ship-to-shore transits will favour forward basing. Logistic challenges ashore, such as fuel availability and poor maintenance conditions, will see helicopters operate more efficiently from afloat.

3.17. **Anti-access and area denial.** Anti-access and area denial (A2AD) capabilities will be used by an adversary to prevent or limit entry and manoeuvre within an operational area. A2AD will force the commander to transition from movement, when forces are concentrated and moved with maximum efficiency, to manoeuvre when forces are dispersed and ready to fight. A2AD systems make manoeuvring large numbers of fixed- or rotary-wing aircraft behind enemy lines a high-risk activity. A deep penetration as part of land manoeuvre or joint theatre entry will require activity across multiple domains, including space, and cyber and electromagnetic, to overcome enemy A2AD.[54]

Enabling littoral manoeuvre – an Apache helicopter lands on board HMS Queen Elizabeth

54 Joint Doctrine Note 1/17, *Joint Theatre Entry*, Chapter 3.

3.18. **Helicopter movement.** During airborne operations the ground force will lack mobility once deployed, which can be mitigated by helicopter support. Helicopters can self-deploy, though this will have an impact on aircraft hours, maintenance and crew rest. Helicopters can be air moved by air transport; however, planners need to consider rebuild times, which vary significantly by helicopter type, along with the ability to project aircraft engineering capabilities and sustain them. Helicopters can be shipped to the forward mounting base or sea port of disembarkation; this is slower and requires aircraft to be protected from the elements. However, it can deliver many aircraft in a single journey.[55] Helicopters can launch from military shipping, depending on levels of training, proximity to the target and the ability to establish and sustain command and control, and lines of communication. Helicopters require specific equipment and their aircrews require collective training to operate from shipping on an enduring basis.

3.19. **Forward arming and refuelling point.** The range of helicopters can be increased by establishing forward arming and refuelling points (FARP) or forward refuelling points when re-arming is not required. An airland arming and refuelling point provided by air transport aircraft can be established on a suitable landing site or airfield. Helicopter range can also be extended using internal or external fuel tanks although the additional endurance must be balanced against the loss of lift; this may be acceptable if using forward air refuelling equipment to refuel other helicopters. A FARP can be established ashore by landing craft delivering supply vehicles and fuel bowsers; they will need to be refuelled at sea until a bulk fuel installation is established to pump fuel from the ship. To support an attack helicopter regiment, two or three FARPs are required to maintain operations to keep up with a moving front line or avoid detection and destruction; this will require battlespace. The use of a FARP may require a lead time beyond the planning cycle of a brigade. FARPs vary in size but could fit within a 100 metre diameter clearing.

55 Aircraft should not all be carried on the same ship to prevent their loss in the event of it sinking. The Atlantic Conveyor was sunk in 1982 resulting in the loss of all but one of the Chinooks on board that were destined for the Falklands Task Force.

Section 5 – Operate

Air integration

3.20. The joint force air component commander will establish a headquarters with several key divisions and an embedded air operations centre. The air operations centre produces the air tasking order, airspace control order, air defence plan and special instructions.

3.21. The air operations coordination centre reports to the air operations centre and provides air expertise to the amphibious task group's maritime air operations cell and the corps, or possibly division headquarters. It allocates support tasks to its associated tactical air control parties and integrates the liaison and coordination functions relating to joint air and space operations.

3.22. The air support operations centre is the senior fielded air component within the senior land formation, typically a division. It provides the full range of air command and control functions at the tactical level and is the UK's principal air command and control agency for controlling joint air operations supporting ground forces. It coordinates close air support (CAS) and processes immediate requests for air support to ground manoeuvre forces. Under some circumstances, the brigade air staff officers may be further augmented by the air support operations centre.

3.23. Control of the air will depend on the range, size and duration of an air manoeuvre operation. The air force may conduct offensive and defensive counter-air missions. Offensive counter-air missions will seek to dominate the adversary's airspace preventing the launch of threats to the force, either in the air or on the ground. Defensive counter-air missions include protecting airfields and escorting aircraft. Control of the air missions may be complemented or combined with attack missions providing air interdictions, CAS, close combat attack (CCA) and strike, coordination and reconnaissance. A package of aircraft to achieve a defined mission may be controlled by the air operations centre as a composite air operation. Integrating fixed- and rotary-wing aircraft requires careful consideration due to different operational parameters.

Fires

3.24. Air manoeuvre is reliant on airborne fires to offset its limited organic firepower and its vulnerability when landing. All commanders must be able to employ CAS and CCA. During the initial stages of an assault before adequate ground communications can be established, coordination and control of fire support may be accomplished from an airborne command and control platform through the tactical air control parties (TACPs). Fire support planning, coordination and execution for air manoeuvre are more complex than ground manoeuvre because:

- ground forces are quickly placed in direct contact with the enemy;
- initial operations are decentralised and communications can be limited or non-existent;
- landing areas contain a high density of aircraft;
- units lack firm knowledge of the situation, especially locating friendly and enemy forces; and
- initially, artillery support in the airhead is limited.

3.25. Indirect fires can be provided by artillery and mortars organic to the airborne or air assault forces. Artillery and mortars can be airdropped, air landed or moved by helicopter. Ammunition quantities will always be limited by air movement – it will take time to recover airdropped artillery with limited vehicles. Artillery can also be provided by: advancing forces (if in range); long-range rocket or missiles; or naval gunfire support. A firebase can be established in proximity of the objective by a preliminary move by air, land or sea.

3.26. CAS provides firepower to destroy, suppress, neutralise, disrupt, degrade, fix or delay enemy forces in close proximity to friendly ground or amphibious forces. CAS requires terminal attack control by a joint terminal attack controller on the ground or forward air controller (airborne) in the air. All requests for fires must be included early within the air tasking cycle.

Operation Silver Bayonet, Vietnam

The 1st Battalion, 7th Cavalry was tasked to conduct an air assault at the base of the Chu Pong massif, south of the Ia Drang Valley on 14 November 1965. To support this, a battery of 105mm guns were moved into a landing zone by Chinook helicopters, 15km east of the objective. These guns fired on the objective immediately prior to the air assault and continued to provide fire support throughout the operation.

Historical Branch (Army)

3.27. CCA is a coordinated attack, typically by attack helicopters, against targets that are in close proximity to friendly forces. CCA is ideal to support ground forces but attack helicopters may be out of range from the objective. In most instances, the attack helicopters may already occupy holding areas, attack by fire positions or be in overwatch of the ground force as it begins its assault. Any element in contact can request CCA, a joint terminal attack controller is not required. When providing support to ground forces, attack helicopters will operate on that force's command network unless directed otherwise. The ground commander owning the terrain clears fires during the CCA by giving aircrew the location of enemy and friendly forces. The ground commander deconflicts the airspace between indirect fires, CAS, unmanned aircraft systems and the CCA aircraft. For danger close fire, the ground commander accepts responsibility for increased risk.

3.28. **Unmanned aircraft systems.** Due to their size, unmanned aircraft launch and recovery restricted operations zones should not be planned near indirect fire units, helicopter assembly areas, or FARPs if possible. Special consideration should be given to planned employment of an organic unmanned aircraft system near a landing zone. If required due to the tactical mission, small unmanned aircraft systems should be clearly separated by a defined terrain feature from the landing zone area, and the approach and exit routes of aircraft.

Manoeuvre support

3.29. Airborne and air assault forces have limited ground mobility so manoeuvre support is reduced but remains critical to maintain freedom of manoeuvre. Embedding manoeuvre support elements in assault forces will help to maximise surprise and speed during operations by crossing and breaching obstacles. Establishing landing areas is critical but this rapidly transitions to enabling mobility, creating counter-mobility and protection. Manoeuvre support may be needed to create pick-up and landing zones, planners should not be constrained by obstacles. Airfield damage repair is a vital capability to enable air manoeuvre.[56] Follow-on forces can be tailored to increase manoeuvre support when establishing the lodgement. Helicopters could need significant engineering support, which erodes manoeuvre support.

Battlespace management

3.30. **Airspace management.** During air manoeuvre many aircraft operate near the landing areas and it is critical that procedures are in place to deconflict airspace between aircraft and indirect fires. A portion of airspace can be delegated to a land formation; this enables faster decisions. Air manoeuvre may use air corridors, air routes, transit corridors and slow aviation asset flight routes to move aircraft.[57] Airspace control measures include the following.

a. **The coordination level** is a procedural method to separate fixed- and rotary-wing aircraft by determining an altitude below which fixed-wing aircraft normally will not fly.

b. **High-density airspace control zone** (HIDACZ) is airspace of defined dimensions, designated by the airspace control authority, in which there is a concentrated employment of numerous and varied weapons/airspace users.

56 Further detail can be found in Chapter 4.
57 Slow aviation asset flight routes are described in Allied Joint Publication (AJP)-3.3.5 B, *Allied Joint Doctrine for Joint Airspace Control*, page A-7.

c. **Restricted operations zone** (ROZ) is airspace of defined dimensions, designated by the airspace control authority in response to specific situations and/or requirements, within which the operation of one or more airspace users is restricted.

d. **The air tasking order** provides identification friend or foe codes and laser codes, as well as covering frequency management. The air manoeuvre force is responsible for liaising with the air operations centre to ensure that the requirements for all force elements (notably helicopters) are reflected in the air tasking order special instructions.

3.31. **Amphibious battlespace management.** Amphibious battlespace management is planned in the command ship and executed in the combined operations room by the ship to objective manoeuvre cell, supporting arms coordination cell and the group warfare officer. A standing operational task air helicopter order covers all airspace control measures, within the amphibious objective area.

A Royal Marine rigid inflatable boat slung beneath a Royal Air Force Chinook helicopter

3.32. **Land battlespace management.** Land battlespace management combines air and ground measures. Airspace management is the integration and use of airspace by indirect surface-to-surface, air-to-surface, surface-to-air weapons and air platforms. Aircrew will require ground force mapping and a common grid area reference system for objectives to quickly identify friendly and enemy locations. Detailed planning is required to establish control measures to allow the freedom for air interdiction outside the airhead and controlled fires within. The land

component may not control the airspace above it. Therefore, all activity in or through the air, must be coordinated between all battlespace users.[58]

Operation Moshtarak

On 13 February 2010, the International Security and Assistance Force (ISAF), in cooperation with units of the Afghan National Security Forces (ANSF), initiated an operation intended to remove the Taliban from the town of Marjah and other remaining strongholds in central Helmand province.

The operation itself began with the launch of command and control Sea King aircraft, followed by conditions-setting US and UK attack helicopters to ensure the security of helicopter landing sites. Precision infrared flare drops by KC-130 and A-10 aircraft ensured helicopter landing sites were suitably lit, with imagery provided to the Bastion Joint Operations Centre by three unmanned aircraft/remotely piloted aircraft lines and four Tornado aircraft.

In total, 37 helicopters from three nations lifted troops into the area of operations. The operation commenced at 0400, and in the space of two hours 1,200 combined force troops were delivered into 16 helicopter landing sites across Nad-e-Ali and western Babaji, previously secured by ISAF and ANSF special operations forces. The insertion was carried out in 11 waves during darkness and was completed as planned by first light.

Waves were sequenced and separated by time and height, with each national element having its own allocated airspace. Additionally, a discrete corridor was established for the use of medical evacuation and supporting aircraft.

Historical Branch (Army)

58 Allied Tactical Publication (ATP)-3.3.5.1, *Joint Airspace Control Tactics, Techniques and Procedures.* Land battlespace has four aspects: manoeuvre; fire support coordination measures; air defence requirements; and airspace control. Land battlespace management controls are split into terrain management (restrictions on movement, boundaries and so on) and fire support coordination measures, (restrictions and freedoms in using joint fires).

Section 6 – Protect

3.33. **Combat identification.** Combat identification applies to control of the air, air defence and interaction with aircraft and ground forces. Combat identification consists of three related elements: situational awareness; target identification; and tactics, techniques and procedures (for example, an appropriate weapon control state and rules of engagement). Air identification can be achieved using positive or procedural means and effective battlespace coordination. Air defence can be coordinated with battlespace management measures supported by identification friend or foe systems.

3.34. **Air threats.** Air threats are identified by air intelligence (A2) with access to the air operations coordination centre and by reachback to the Air and Space Warfare Centre in the UK to conduct immediate analysis on air threats. This will determine if UK aircraft are able to mitigate the threat with existing weapons or defensive aid suites, or whether the threat will significantly affect air operations. The higher command will therefore be able to determine the feasibility of the mission prior to starting detailed planning.

3.35. **Air defence.** Large forces and aircraft concentrating on ships, in marshalling and staging areas or airfields must be protected by air defence assets in addition to any defensive counter air missions. Dispersal and concealment can only protect the force until loading. Air defence assets must also be quickly deployed to landing areas. Air defence of the amphibious task force will normally be allocated to a destroyer that will verify the identity of all aircraft entering, or launching into, the amphibious objective area.

3.36. **Suppression of enemy air defence.** Priority for fires must be the suppression of enemy air defences (SEAD) along flight routes and near landing zones. All available fire support is used to suppress or destroy enemy weapons including CAS, CCA, artillery, mortars and naval gunfire. Radar and communications suppression and jamming should also be integrated. All SEAD activity should be synchronised on the mission execution checklist. SEAD should be conducted across multiple domains and it can be categorised as follows.

a. **Operational area system suppression** comprises operations within an operational area against specific enemy air defence systems to degrade or destroy their effectiveness. It targets high payoff air defence systems whose degradation most affects the enemy's total system.

b. **Opportune suppression** is a continuous operation involving immediate attack of air defence targets of opportunity. It is normally unplanned suppression, includes aircrew self-defence, and attacks against targets of opportunity.

c. **Localised suppression** can occur throughout the area of responsibility or joint operations area and can be conducted by all components. However, it is limited in time and to geographical areas associated with specific ground targets.

d. **Corridor suppression** is planned joint SEAD focused on creating an air defence artillery suppressed corridor to manoeuvre aircraft for air attack, airlift operations (including airborne and special forces operations) and personnel recovery.

3.37. **Defensive aide suites.** Air manoeuvre aircraft are susceptible to many weapons systems but tactics and equipment can mitigate their effectiveness. Air platform protection measures, including defensive aids, jammers, exhaust suppression and expendable countermeasures, can defeat many modern weapons. Continual weapons development requires continual upgrade of air platform protection systems. Commanders must consider the assessed threat in theatre balanced against the capabilities of defensive systems, taking advice from the deployed subject matter experts and/or the Air and Space Warfare Centre.

Section 7 – Sustain

Logistic support

3.38. Air manoeuvre forces must be 'light by design' to project efficiently by air, but also easily sustainable, particularly during joint theatre entry. Fewer and lighter equipment platforms free up valuable logistic bandwidth, otherwise taken up by fuel and spares. This 'spare' bandwidth can then be used to: deploy more mission-specific troops; concentrate effort on other combat supplies, such as ammunition; reduce air sorties; or simply de-risk a fragile line of communication. Reducing demand increases sustainability of air manoeuvre operations. Demand for air manoeuvre can be reduced by the following.

a. Careful analysis of the most likely consumption rates day by day, rather than a daily average, will reduce the overall sustainment requirement.

b. Sustaining forces by air despatch reduces the need for logistic support vehicles and staff to conduct ground convoys. This is predicated on control of the air.

c. Resourcing locally to reduce pressure on the support chain. Local resource sections and specialists will enable forces to live off the land by providing safe water, food, vehicles and ammunition, for example.

3.39. Sustaining the ground force is one of the major constraints on the endurance of an air manoeuvre force. A reliable line of communication must be established quickly by a combination of air, sea or land. Depending on the intensity of operations, an airborne force is likely to be sustainable for 24-72 hours from the assault. Up to 50% of the assault air transport aircraft may be required to sustain daily operations by airdrop or airland. Air assault operations will demand similar sustainment for the ground force by internal or underslung loads; in addition, the helicopter force will consume considerable amounts of fuel and ammunition. The amphibious task force can sustain short- to medium-term air assault

operations before being resupplied at sea or in port. Weather and A2AD will affect sustainability by air and sea.

3.40. Sustainment is a major consideration when deploying helicopter forces. Sustainment beyond two days will be drawn from second and third line enablers, or a joint combat service support. Ground manoeuvre brigades have no organic combat service support capability to sustain helicopters. The capacity of the aviation fuel supply, and the quality of the fuel within it, delivered through the Defence Support Network, is a critical factor in maintaining the tempo of air manoeuvre operations. Delivery of aviation fuel by air may be feasible, but at significant demand to air transport aircraft. Fuel may be supplied by ship but most likely by ground lines of communication. Fuel procured from contractors or the host nation will need quality control. If the land force is advancing, helicopter sustainment will most likely need to be moved by vehicle. Planners must note that attack helicopter ammunition requirements are significant and will require a substantial number of palletised load system vehicles.

Health service support

3.41. Operating at reach places considerable demand on medical support to airborne and air assault operations. Airborne forces must deploy with Role 1 and Role 2B capabilities, air assault forces should be able to conduct helicopter casualty evacuation to Role 2E or Role 3 facilities. Aeromedical evacuation may be essential to recover casualties to Role 4 care.[59]

3.42. Aircrew and troops must both be adequately rested to operate most effectively. Aircrew duty day and flying hour limits are covered by policies and procedures. If those limits are exceeded during a single period, then degraded aircrew performance or limited aircrew availability can be expected on following days. Planners must ensure that ground forces land rested and fed; this is vital for long flights when nutrition and

59 The functions and capabilities of military health care required to maintain the health of the force at certain, defined levels are described by roles (Role 1, Role 2, Role 3 and Role 4). This is covered in detail in AJP 4-10, *Allied Joint Doctrine for Medical Support,* Chapter 2, Section 4, paragraphs 2.43 to 2.46. The medical requirements for airborne and air assault operations are different and covered further in Chapters 4 and 5.

hydration are essential to ensure troops arrive 'fit to fight'. A considered in-flight nutrition plan will also offset the lack of supplies airborne and air assault forces deploy with.

Equipment support

3.43. Due to their mechanical complexity, aircraft require regular maintenance, which is resource intensive. Planners must not expect 100% availability of aircraft, rates will vary by type, role and age. Maximising force at the risk of availability will add complexity to a plan that can only be partly mitigated by the bump plan.[60] Helicopter forces provide their own first line equipment support including basic repair and maintenance. First and second line aircraft maintenance can be conducted while embarked on a ship. Where necessary, some third line tasks may be undertaken to maintain aircraft availability; this includes battle damage repair. Depending on the aircraft contractual support arrangements, some aircraft can only receive first line maintenance. This is sometimes referred to as 'forward and depth' maintenance, where depth covers second to fourth line activities.

Infrastructure support

3.44. The heavy emphasis on fuel, ammunition and spares requires ground lines of communication. Hard standings are preferred with covered and well-lit engineering environments. These offer the best opportunity for timely maintenance. There is also a significant requirement for information technology, connectivity and bandwidth for engineering and mission planning. Accurate forecasting of helicopter activity, based on effective planning, will allow for proactive sustainment.

60 A bump plan ensures that critical personnel and materiel are delivered in accordance with the priorities set by the commander and not affected by aircraft availability.

Key points

- Coordination between air and ground forces must be established early, supported by liaison and robust communications.
- Sharing information between Services and headquarters is vital to develop an accurate intelligence picture and inform risk management.
- The impact of weather must be fully understood for the duration of the operation.
- Airborne and amphibious forces are held at high readiness to rapidly project into theatre from land or sea.
- Staging through a forward mounting base or from ships extends the range and duration of air manoeuvre.
- Detailed planning is required to integrate air power and fires to enable air manoeuvre.
- Air manoeuvre requires a degree of control of the air to be successful.
- A large air manoeuvre operation will require extensive resourcing to achieve control of the air.
- Air manoeuvre forces are light by design, creating vulnerabilities that must be mitigated.
- Helicopter operations require considerable resourcing.

Notes

Chapter 4

Chapter 4 covers planning and executing airborne operations.

> Airborne warfare lies exactly on the dividing line between **air power** and **ground force** responsibility.
>
> Maurice Tugwell
> *Airborne to Battle: A History of Airborne Warfare, 1918-1971*

Chapter 4

Airborne operations

Section 1 – Introduction

4.1. Airborne forces are ideally placed to conduct a rapid crisis response against a less capable enemy. The advantages of height, speed and access allow an airborne force to bypass land or sea obstacles to achieve surprise by the unexpected time and direction that force can be concentrated at decisive objectives. The limitations of lift capacity and vulnerability will require considerable planning, joint coordination and resourcing for large-scale airborne operations against a capable enemy.[61]

4.2. The inability to deliver the mass of conventional ground forces and the threat from air defences may force parachute forces to drop several miles from their objectives. Selection and training of personnel is required to mitigate the risk of parachute operations. Airborne operations may be mounted at haste, with little rest or nutrition; low-level flying and parachuting is physically debilitating. Paratroopers land exhausted and isolated behind enemy lines; this is exacerbated by the dispersed and chaotic nature of jumping at night. Self-discipline and high morale are required to assemble quickly and move at speed from drop zones before surprise is lost.

4.3. A lack of vehicles will require paratroopers to carry their organic heavy equipment, weapons and ammunition when light forces would not. Lacking firepower, reserves and logistics, paratroops must be bold to overcome delaying forces to seize objectives before they can be reinforced by the enemy. This will require a higher than average level of fitness and controlled aggression for combat, combat support and service support troops. With limited manpower, there must be the versatility to re-role when and where the need is greatest, for example, infantryman on the gun line or signallers repairing runways. Paratroopers

61 It is recommended that joint tactics, techniques and procedures (JTTP) are written into a JTTP publication due to the close integration of 16 Air Assault Brigade and the air mobility force needed for airborne operations.

land in limited numbers, isolated and behind enemy lines; they must have high morale to fight from the beginning. All must be capable soldiers as there is no front line.

4.4. Airborne operations use a reverse planning process as detailed in Chapter 2. This includes: the ground tactical plan; the landing plan; the air movement plan; the staging plan (only if forward mounting); and the marshalling plan.

4.5. Airborne operations are executed in six phases, which will overlap.

- Phase 1 – preparation and deployment.
- Phase 2 – shaping operations.
- Phase 3 – assault.
- Phase 4 – stabilisation of the lodgement.
- Phase 5 – rapid delivery of follow on forces.
- Phase 6 – link-up, reinforce or withdraw.

The four stages of planning, as outlined in the reverse planning process, may overlap some, or all, phases. Detailed considerations for reverse planning are covered in the following sections.

Paratroopers landing on a busy drop zone

Operation Barkhane

Operation Barkhane is a French anti-terrorist operation spanning Africa's Sahel region. From 7-13 April 2015, during Operation Kounama 2, French forces conducted an offensive reconnaissance operation in the 'three borders' region of northern Niger.

Having identified that helicopters lacked the range and capacity to deliver the 90-strong force, the commander decided to insert by parachute. To mitigate the high altitude the paratroopers deployed their reserve alongside their main parachutes to slow their descents. A single, empty helicopter flying at maximum range deployed to conduct casualty evacuation but was not needed.

Deploying at night the force covertly occupied positions to dominate key routes over the Salvador Pass. The force was self-sufficient for four days before linking up with a mounted ground force of around 50 French soldiers and 30 Niger soldiers from Madama. Several insurgent logistics sites were found and destroyed.

Subsequent operations, Kounama 4 (20 July to 1 August) and Kounama 5 (19-29 August) also featured company-level parachute operations linking up with a ground force to disrupt insurgent lines of communication.

www.defense.gouv.fr

Section 2 – Ground tactical plan

Command

4.6. The commander must select as few assault objectives as possible based on the mission size and type of enemy force. A simple plan will be easily adapted and executed by *ad hoc* groups in the vital stages of the landing before situational awareness and command and control can be established. The commander must have a clear list of go/no-go criteria and decide the minimum force levels required. The commander must consider the best location for situational awareness, communications

and survivability. The airborne task force commander should consider commanding from a ground or airborne command post or remaining at the departure airfield or staging base with better connectivity and intelligence feeds.

4.7. Command posts must be able to operate with minimal personnel and equipment and without vehicles until air landed. There must be redundancy to mitigate losses whilst avoiding duplication. Command posts will have to rely on concealment and security by proximity to manoeuvre units, alternatively command post security can be provided by the reserve, until deployed. A battlegroup may use its step-up command post to control drop zone clearance and reception of a follow-on force whilst the commanding officer controls the assault from their tactical command post. The brigade tactical command post may wish to collocate with the battlegroup step-up command post for redundancy and security.

Intelligence

4.8. Airborne forces will not begin operations with the same understanding of their battlespace as a deployed ground force. Detailed intelligence will be needed and large numbers of maps and imagery will need producing and distributing. Lack of intelligence can be mitigated by advance forces inserting in small numbers covertly from high altitude and offset by many miles into unmarked restricted drop zones behind enemy lines. The commanders will need updates from advance forces during the air movement to inform the final conditions check including weather, runway status, enemy activity and battle damage assessment from pre-fires. Advance force locations must be recorded as no-fire areas and coordination points established to brief commanders after landing. Advance forces pose a high risk of compromise which may be replaced by non-organic and organic image, signals and human intelligence drawn from multiple domains.

4.9. Airdropped unmanned aircraft systems can be a force multiplier for airborne forces which may lack the mobility or soldiers to observe all areas of interest. They can cover dead ground between ground forces and survey areas too dangerous for ground forces, for example, objectives and

landing areas. Unmanned aircraft systems when combined with fires can be particularly effective to mitigate the force's lack of mass.

Manoeuvre

4.10. **Airhead.** Ground tactical planning starts with selecting the assault objectives, this will likely involve securing an airhead for airdrop or airland of follow-on forces. The airhead is likely to be vital ground until sufficient force has been deployed or the link-up achieved; therefore securing the airhead is a priority. An airhead line is then drawn around the objectives and forms the basis for the defence plan. There should be sufficient drop zones and landing zones to allow the rapid build-up of combat power, preferably inside the airhead to ensure interior lines of communication. The airhead must have sufficient depth for defence and be large enough to provide dispersal from chemical, biological, radiological and nuclear contamination and conventional fires.

4.11. **Method of attack.** Commanders must balance the risk to air and ground forces landing near enemy positions against the loss of surprise and lack of mobility in landing away from the objective. There are three methods of attack.

a. **Land on.** Troops land in assault order within direct fire of their objectives. This is suitable for shock action but relies on surprise.[62]

b. **Land near.** Troops land outside of direct fire but within indirect fire range of their objectives allowing them to assemble out of contact but close enough to maintain the shock of surprise.[63]

c. **Land off.** Troops land outside of observed enemy indirect fire to complete an orderly assembly before manoeuvring to their objectives. This may be the only option due to enemy air defences near the objectives or a lack of suitable landing areas.

62 This method worked well at Eben Emael when Fallschirmjäger landed on the Belgian fortifications but was disastrous at Crete when landing on prepared and well-concealed defensive positions with some battalions sustaining 80% fatalities.
63 This was successfully done during Operation Market Garden when United States (US) paratroopers captured the Grave and Veghel bridges before the Germans could react.

4.12. **Boundaries.** Subordinate units must rapidly clear assigned areas within boundaries to secure objectives and the airhead. Boundaries must: provide space to manoeuvre in the attack and defence; not divide likely enemy avenues of approach; include dominating key terrain; and not be divided by obstacles. Coordination points must be established on boundaries to allow safe liaison between flanks when communications fail and link-up with advancing ground forces.

4.13. **Airfield damage repair.** To guarantee joint theatre entry at a point of our choosing, air manoeuvre forces must have a viable airfield or create a temporary alternative. Repairing and sustaining runways is vital to mission success and air manoeuvre combat engineer specialists provide one of the most important joint theatre entry capabilities in ultra-lightweight airfield damage repair. They can repair an existing runway by airdropping parachute-trained personnel, airfield damage repair equipment and materiel. After the assault they can airland more (often heavier) equipment and materiel to maintain or enhance the runway and airfield fixed- and rotary-wing aircraft.

Fires

4.14. Artillery can be airdropped or air landed but without the conventional stocks of ammunition expected of ground manoeuvre forces. This can be mitigated by mortars, air power and, where possible, naval gunfire until withdrawal or link-up allows offensive support from advancing ground forces. Air support is ideal to support, screen and guard forces and increase the deep battle; ideally integrated with unmanned aircraft systems. Outside the airhead a fire support coordination line should be drawn to give greater freedom for air power to conduct air interdiction tasks on avenues of approach. Mortar ammunition and artillery systems should be dropped within range of objectives as there will be little time or transport to move gun and mortar lines. When objectives are beyond the indirect fire from the drop zone, staff must plan how much ammunition can be moved by prime movers and soldiers.[64]

64 A rifle company can typically carry enough mortar ammunition for one 81mm mortar.

Air delivered stores from an C-17 aircraft

4.15. During the early stages artillery and mortars will not have dedicated vehicles and will be dependent on pre-planned moves. This makes them vulnerable to counter-battery fire. Unmasking and allocation of indirect fire will be a key decision for commanders to mitigate vulnerability and the lack of ammunition. Fixed positions are also inherently risky for the direct fire assets; the anti-tank and heavy weapons must be mobilised to guard the large perimeter of any airhead. Work to make locally sourced vehicles more technical by adding crew served weapons is vital until sufficient vehicles have been air landed.

Protection

4.16. The need to rapidly secure objectives, combined with the weight constraints of airlift and airdrop, may require commanders to take risk with levels of individual and collective protection at the start of an airborne operation. Due to the inability to airdrop sufficient quantities of defence stores, protection can be provided by dispersal, concealment and digging. Engineers and pioneers should be proficient in using natural and local materials from residential and industrial buildings and the construction of abatises on avenues of approach through woods and forests. Operations security will be maximised by using line, ultra-high frequency and data when static. Protection for smaller detachments and command posts can be provided by collocating with larger groupings for

mutual support. Vehicles should be stripped to the minimum to reduce weight for air movement; applique armour and protected mobility vehicles should be brought in with follow-on forces. 'Don't be seen, acquired or engaged' should be the principal protection measures for airborne forces.

Sustainment

4.17. **Supply.** The time between the assault and the arrival of the follow-on force, link-up with ground forces or withdraw will drive the sustainment plan. The assault force should deploy to be self-sufficient; this does not mean all supplies are carried. Detailed planning will be required early by logistic staff to reduce troop weight to ensure they are light enough to rapidly secure objectives. Paratroops must stay within the all-up-weight of the parachute; everything else will need to be airdropped during the assault. Reduced rationing and local purchase or scavenging will be key to reducing the demand on aircraft. Lack of resource requires all ranks to improvise to provide items such as food, water and vehicles.

4.18. **Air despatch.** Airborne forces are dependent on air despatch to deliver anything not carried until a landing site is available. Air cells will need to agree on the priority for allocating container delivery systems, door bundles, wedge stores and heavy drop platforms for heavy equipment and vehicles. Detailed staff tables ensure all available space and weight is used after larger items like vehicles have been rigged; extra rations and water can easily be added but will seldom be the priority. Time and space must be allocated for rigging in the marshalling airfield or staging base. Time and manpower must be allocated to clearing the drop zone, food and water may have to be left on drop zones for subsequent recovery. Paratroopers will have to carry ammunition for mortars and machine guns to support attacks.

4.19. **Transport.** A limited number of vehicles will be airdropped with the assault force primarily to move artillery and mortars, power command posts, resupply and evacuate casualties. Vehicles must be versatile to move quickly between tasks, for example, powering command posts, then pooled to move the mortar line within range of the objective and dump supplies for fires support groups; during the attack they will resupply and evacuate casualties. A lack of vehicles is mitigated by

helicopters self-deploying via forward arming and refuelling points or with internal fuel tanks to provide tactical mobility and casualty evacuation.

4.20. **Medical.** Casualty treatment and evacuation is delivered by means of the Operational Patient Care Pathway, from point of wounding through to definitive care. Role 1 teams must deploy with the battlegroup to provide triage and pre-hospital emergency care. A Role 2B medical treatment facility can be airdropped to offer stabilising surgery. Securing an airhead is vital to rapidly provide airland additional medical support and evacuate casualties. The scale of aeromedical evacuation is based on the need to evacuate the maximum number of casualties and the severity of their injuries. During the airland, air movement and medical staff should consider all aircraft being equipped for casualty evacuation if the air line of communication cannot be guaranteed.

'The most vulnerable period of any air landing is the interval between the jump and assembling of the force into organized units under a unified command.'

Generalmajor Hellmuth Reinhardt

Section 3 – Landing plan

4.21. The landing plan starts when soldiers depart their aircraft and is complete when units have assembled ready to secure their objectives. To develop the landing plan commanders must know the following.

a. The commander's priorities for each objective; the priority, sequence and method for delivering each echelon.

b. The airlift tactics as agreed by the joint force air component commander and air mission commander based on competing priorities for air power; composite air operations and formations; the degree of control of the air in time and space; lift capacity and radius of action.

c. The landing area study, conducted concurrent to the ground tactical plan by air force and engineer staff, considering: location, size, shape, orientation and hazards.

d. The task organisation of parent and subordinate units and the ground tactical plan.

4.22. The ground tactical and air mission commanders will have a different view of risk. A compromise may be found if options are not discounted early, allowing the overall commander to balance risk to ground and air forces with risk to mission.[65] The landing plan comprises five elements: the sequence of delivery; method of delivery; place of delivery; time of delivery; and assembly plan.

Sequence of delivery

4.23. Separation of forces will be driven by the time required to turn aircraft around and possibly re-role from airdrop to airland. The time between waves may preclude advance forces due to the risk of compromise or the difference in lift capacity required by high- and low-level paratroops. Intervals between waves can be reduced by staging or forward basing. Forces are organised into four echelons:

- the advance force;
- 'alpha' echelon comprising the assault force;
- 'bravo' echelon comprising the remaining elements from the assault force and airborne forces needed to secure the objectives and/or expand and establish the airhead/lodgement; and
- 'charlie' echelon comprising forces needed for subsequent operations, which may be from another formation.

65 An increase in 10% casualties may be acceptable by landing in a drop zone covered in small trees to avoid losing 30% combat effectiveness from fighting through an enemy delay to secure objectives. Despite casualties on landing, dropping into olive groves in Crete in 1941 gave German paratroopers the advantage of assembling and departing the drop zone in Prison Valley without being seen.

Method of delivery

4.24. **Airdrop** allows quick, nearly simultaneous delivery of large groups of paratroops without needing to land. Dropping personnel and materiel requires time and expertise to prepare, is not an efficient use of aircraft lift capacity and consumes time and manpower to recover materiel. However, aircraft spend less time on task, do not need to land, have unrestricted access and are less vulnerable to enemy ground fire. Airdrop has two categories.

a. **Personnel airdrop.** Paratroops use static line parachutes to jump at very low height, reducing training, air safety and vulnerability of aircraft and paratroops to ground fire. With greater training specialists can use static line or freefall techniques to parachute from high altitudes with steerable canopies to land in restricted areas closer to objectives on land or sea.

b. **Materiel airdrop.** Vehicles, equipment and stores are dropped from fixed- or rotary-wing aircraft – known as air dispatch. Some supplies can be free dropped without parachutes. As well as supporting air manoeuvre, air dispatch has utility sustaining ground manoeuvre, particularly over extended or tenuous lines of communication or for humanitarian assistance and disaster relief.

4.25. **Airland** is the most economic use of airlift, allowing troops to land and fight together with minimal training or preparation of materiel and with limited impact from the weather and risk of injury. Airland is constrained to needing a landing site, which may deteriorate with heavy use and weather. It also requires longer to deliver a ground force than airdrop making it vulnerable to enemy ground fire and it needs an airlift control element and the ability to support airfield operations. There are three categories of airland.

a. **Assault airland** is conducted by assault troops landed by tactical airland aircraft onto an airfield or tactical landing zone to secure an objective. This is a high-risk operation and will rely on surprise and probably airborne fires. A high level of training is required by aircrew and troops.

b. **Rapid airland** is conducted after either a parachute or airland assault, landing the remainder of the airborne force by tactical airland aircraft to secure and expand the airhead to receive follow-on forces.

c. **Follow-on airland** is conducted once the airhead is secure to receive strategic air transport and chartered aircraft allowing the economical build-up of combat power including heavy land forces.

Place of delivery

4.26. Selecting landing areas is a joint responsibility. The air mission commander is responsible for the precise delivery of personnel and materiel to the landing area and selecting approaches. The following should be considered.

a. **Ease of identification.** The drop zone should be easy to spot from the air allowing aircrew to use terrain features as aids to navigation.

b. **A straight-line approach.** A straight-line approach for each drop zone is needed for at least ten miles, or about four minutes at drop airspeed.

c. **Enemy air defences.** Enemy air defences and strong ground defences should be avoided and troops landed outside of observed indirect fire. Air movement over hostile territory should be minimised.

d. **Weather.** Ground fog, mist, haze, smoke and low-hanging cloud conditions can interfere with the aircrew's observation of landing areas, visual signals and markings. However, they do offer excellent cover for blind or area drop zones. Excessive winds affect operations.

e. **Terrain.** Obstacles on a drop zone do not prevent paratroopers from landing but increase jump casualties. A covered landing area will help conceal the assembly. A landing

area near a good road network expedites moving personnel and materiel but offers the enemy an avenue of approach that must be defended.

4.27. **Passes.** Aircraft should aim to drop its entire load in one pass. Repeated passes are dangerous, result in piecemeal delivery and an unnecessarily complicated plan, violating the principles of concentration of force and economy of force. However, multiple passes can be made over areas without anti-aircraft systems.

4.28. **Drop zones.** Units can land successively on the same drop zone, on separate drop zones, or on adjacent areas within a large drop zone. Adjacent drop zones can be arranged as either: offset and parallel when aircraft share a flight route then split at an initial point; or parallel on-line where aircraft stay in the same route but drop on a subsequent drop zone which eliminates a change of direction between drops. Drop zones that require intersecting air traffic patterns should be avoided whenever possible. They require joint suppression of enemy air defence for multiple routes instead of one. Commanders must select alternate landing areas to compensate for possible changes.

Soldiers move off under the cover of Apache helicopters

Time of delivery

4.29. The airborne assault should be conducted during limited visibility to protect the force and to surprise the enemy, but this may not be possible if part of a larger shaping operation. Night airborne operations greatly increase the chance of surprise, survivability and reduce the chance of attack by enemy aircraft during the air movement. Daylight operations provide better visibility from the air and ground, more accurate delivery, quicker assembly, and more effective friendly fires than night operations.

4.30. Time and space are linked when achieving concentration of force. A deep narrow formation can drop its payload in a small area over a longer time to allow a quicker assembly; conversely a wider formation can drop over a larger area in a shorter time but will result in a dispersed force. The time interval between delivery of the assault echelon and the follow-on echelon depends on: the availability of aircraft; the capacity of departure airfields; the number of aircraft sorties that can be flown on the initial airborne assault; the availability of drop zones or landing zones within the objective area; and control of the air.

Assembly plan

4.31. Cross loading. Cross loading, the technique of splitting vital equipment across various aircraft, is intended to allow the greatest speed of reorganisation on landing and to reduce the consequences of the loss of an aircraft. The ground tactical plan dictates the cross loading but in making their plan the commander must consider the capacity of the aircraft, the size of the landing areas and the tasks given to subordinates. No matter the size of the force being dropped it will be dispersed over several kilometres unless dispatched in multiple passes; since the success or failure of the mission can depend on how fast the airborne force can regain its tactical integrity, tactical cross loading and rapid assembly are vital. Cross loading and parachuting at night result in paratroops being separated from commanders. A high standard of self-discipline and morale is required to ensure all ranks, lost and

separated, quickly assemble as formed units ready to fight.[66] Paratroops can assemble on the assault objective, on the drop zone, or adjacent to the drop zone. Assembly areas should be determined by proximity to objectives. To land as close to their assembly area as possible groups must be loaded across multiple aircraft.

4.32. **Assembly procedure.** A fast assembly must consider proximity to objectives and terrain. A simple plan may have a few assembly check points that are easily manned and located but will take longer for some to assemble as they must walk further; large groups are also vulnerable and require time to organise. Alternatively, more assembly check points may be harder to man but will require less movement across the drop zone and will create formed units more quickly. Units assemble in a similar but opposite way to the withdrawal, individuals and small groups move to check points manned by an officer or non-commissioned officer with communications who direct towards company and platoon rendezvous points. Identification aids are used to identify individuals and assembly check points to speed up assembly.[67] Commanders report their strength to higher headquarters; once the unit has assembled the minimum force it should move to secure its objectives. Assembly procedures should be well rehearsed by day and night and recorded in standard operating procedures. The likelihood of commanders being lost or separated compounded by poor communications places a need for initiative at all levels to take command in pursuit of the higher commander's intent.

66 Paratroopers from 6th Airborne Division were scattered over Normandy. Despite being behind enemy lines for the next month individuals and groups infiltrated back to their units or conducted sabotage in the enemy's rear area.

67 Units can use visual, audible, electronic, natural or individual aids; for reliability and ease of recognition, units combine these and should be prepared for day and night, especially for drops at dawn or dusk. Individuals can wear distinctive patches, coloured armbands or helmet bands to identify individuals and help assemble units. Supply and equipment containers are identified by simple, distinctive markings. All these procedures should be prescribed in higher headquarters standard operating procedures.

Section 4 – Air movement plan

4.33. The air movement plan includes the period from when forces are loaded until they exit the aircraft. Although the air mission commander is solely responsible for executing the air movement stage, the airborne task force commander normally exercises responsibility for the airlift plan, to include priority of airdrop and airland sorties, the preparatory fires plan, and the ground tactical plan in the airhead.

4.34. **Air movement table.** The air movement table forms the principal part of the air movement plan. It includes the following information:

- departure airfield and number of aircraft for each serial;
- chalk numbers and aircraft tail numbers for each aircraft, serial and departure airfield;
- unit and commanders' details for each airlift serial; number, type and employment method for each aircraft;
- details for airborne units and commanders;
- load station and take-off times; primary and alternate landing areas for each serial;
- P-hour[68] for the lead aircraft of each serial; and
- remarks such as special instructions, key equipment, and location of key members of the chain of command.

4.35. **Desired order of arrival.** There will be considerable competition within the ground force for lift capacity for personnel and materiel. Subordinate units will be allocated seats within aircraft driven by the commander's priorities and similarly airdrop for vehicles, equipment and stores must be based on the capabilities the commander needs for the mission. To aid planning, prioritisation is agreed by the commander in the desired order of arrival staff table (DOAST).

68 P-hour is defined as: in airborne operations, the time at which the lead parachute element arrives or is due to arrive over the point of impact to begin operations. NATOTerm.

4.36. **Types of air movement.** Planners must understand whether the air movement is administrative or tactical when determining how to load the aircraft. For an assault or rapid airland, personnel and equipment are organised, loaded and transported to accomplish the ground tactical plan; follow-on airland personnel and equipment are arranged to expedite their movement and to conserve time and energy.

4.37. **Cross loading.** The cross loading plan developed in the landing plan is applied across the movement plan to ensure paratroopers exit the aircraft nearest their assembly area or the airdropped vehicles and equipment they must recover. Key commanders and platoons must be separated to mitigate the loss of an aircraft.[69] Sections and teams should be kept together to aid cohesion in fighting on the drop zone and to provide complete weapon systems, for example, mortar and anti-tank. Similar redundancy should be factored into dropping materiel due to the risk of loss or damage.[70] Each aircraft should be self-sufficient for command and control in case they are dropped wide.

4.38. **Manifesting.** Manifesting conferences confirm the air movement table by finalising the loading plan and confirming the landing plan. Its purpose is essentially to finalise the allocation of troops and materiel to available aircraft. Staff must ensure final copies of manifests are available to those accountable for air movement and assembly. The ground force must be quickly informed of personnel and materiel not delivered.

Paratroopers emplaning in a United States C-130 aircraft

69 Commanders should jump with their radios or with their signallers.
70 For example, separate radios, mortars, anti-tank weapons, ammunition bundles, and other critical equipment or supplies.

Operation Leopard, Kolwezi, 1978

At first light on 13 May 1978, a force of 2,000 members of the Front for the National Liberation of the Congo (FNLC) seized the rich mining town of Kolwezi in Zaire. About 3,000 European mine workers and their families were taken hostage as Zairean soldiers fled. On 16 May, 2e Régiment Etranger de Parachutistes (2REP) and the Belgium Parachute Commando Regiment were put on alert. Consequently, a message was intercepted from the FNLC commander ordering the hostages killed and the mine destroyed. At 0220 on 18 May 2REP was ordered to depart for Solenarza airbase. Moving in French, United States (US) and civilian aircraft, 2REP arrived in Kinshasa just before midnight, and the commanding officer was given eight hours for preparation and planning based on intelligence from the defence attaché.

Having been delayed by fog, two broken aircraft and a flat tyre, the first wave of 400 legionnaires were reorganised; with their equipment bags bastardised to attach to US parachutes they took off in four Zairian C-130 aircraft and a French C-160 aircraft at 1040. The four-hour flight took five hours as the lead C-130 got lost; after two dry runs, to verify the drop zone, the jump began at 1540 on 19 May. Unable to conduct safety checks due to cramped conditions the legionnaires, exhausted after three days without sleep, jumped as Zairian pilots failed to slow to jump speed and narrowly avoided flying through descending men.

In high wind speeds and at 1,500m above sea level the legionnaires landed hard in gardens, trees and houses, many were lost in elephant grass but the unit assembled in ten minutes despite being under fire from the FNLC. Despite opposition, including captured armoured cars, all objectives were secure by last light. The second wave had flown by DC-10 to Kamina, only one hours' flight from Kolwezi. After a series of delays the second wave arrived over Kolwezi after dark, concerned about fratricide and with the town secure it aborted back to Kinshasa. Early the next day the second wave dropped and the Belgians air landed to secure Kolwezi airport. Over the next two days an international airlift evacuated 2,200 Europeans and 3,000 Africans. 60 Europeans and 100 African were massacred, the FNLC lost 400 killed and 1600 captured for 5 French killed and 25 wounded.

Operation Leopard demonstrated the speed and reach that air manoeuvre can offer politicians reacting to a crisis. It also highlights the flexibility and interoperability needed to conduct such an operation and the large commitment of air power which included twenty US C-141s and a C-5 behind the scenes.

Thomas Odin, *The French and Belgium intervention in Zaire in 1978*

Section 5 – Marshalling plan

4.39. Marshalling begins when the airborne force is warned to conduct an airborne operation and is complete when aircraft are loaded. Efficient marshalling is based on established procedures, practiced regularly on exercise. Deployment sequences should be written in standard operating procedures. Efficient battle procedure conducted during marshalling should include planning, briefing and rehearsals. A detailed timetable is required to permit inspections and loading of materiel, briefings and loading of personnel.

4.40. **Marshalling areas and departure airfields.** Threats must be clearly understood to decide whether to mitigate them through dispersal or to concentrate which may make administration, physical protection and isolation (for operations security) easier. Ground and air forces can be concentrated at the departure airfields, a marshalling area or a combination. Marshalling areas are located near the departure airfields to limit movement. Operations can be mounted from the UK, an overseas military air base or a staging area. Planners must consider:

- transport, accommodation and feeding;
- communications, planning and briefing facilities;
- the rigging, storage and loading of materiel for airdrop; and
- training and rehearsal areas.

4.41. **Marshalling and airfield control.** A marshalling area control group is generated from personnel from the higher formation not conducting the airborne operation and movement staff to provide real-life support. A departure airfield control officer may be nominated to liaise with the

marshalling area control group and departure airfield control group. If using a forward mounting base the theatre commander will be responsible for logistic support; for austere locations this will be drawn from an expeditionary air wing. The Royal Air Force will also generate an airlift control element[71] to coordinate and control aircraft at the departure airfield including movement control, loading/unloading and aeromedical evacuation. Another airlift control element will accompany the assault force to replicate the activities during the airland within the airhead. The airborne task force will generate an arrival/departure airfield control group to ensure personnel and materiel are moved from the marshalling areas and loaded according to the air movement plan, controlled around active runways, offloaded and released to assembly areas or marshalled for collection. The arrival/departure airfield control group works closely with the airlift control element.

4.42. **Bump plan.** A bump plan ensures that critical personnel and materiel are delivered in accordance with the priorities set by the commander and not affected by aircraft availability. The bump plan should follow the desired order of arrival staff table as agreed in the manifest conference. Manifests must indicate key personnel and materiel and they should be easily identified by markings to aid their relocation from unserviceable aircraft. The bump plan should take account of the minimum force levels set by the commander.

71 Previously referred to in the UK as the tactical airlift control element but standardised with the US for greater interoperability. This may be drawn from Royal Air Force personnel serving within the airborne force.

Key points

- Paratroopers must be selected and trained for the unique requirements of airborne operations.
- The airhead is likely to be vital ground until sufficient combat power has landed.
- Establishing and maintaining a runway is likely to be a priority task.
- Airborne fires will de-risk the vulnerability of the assault force during the landing.
- Airdrop allows quick, nearly simultaneous delivery of large groups of paratroops without needing to land.
- Airland is the most economic use of airlift, allowing troops to land and fight together with minimal training or preparation of materiel and with limited impact by weather and risk of injury.
- Detailed planning by ground and air staff is needed to ensure personnel and materiel land in accordance with the commander's priorities.
- Marshalling procedures must be well rehearsed and understood to rapidly project airborne forces efficiently.

Chapter 5

Chapter 5 covers planning and executing air assault operations.

> Strategic air assault is wasted if it is dissipated piecemeal in **sporadic attacks** between which the enemy has an opportunity to **readjust** defenses or **recuperate**.
>
> General Henry H. 'Hap' Arnold, United States Army Air Forces

5

Chapter 5

Air assault operations

Section 1 – Introduction

5.1. Land operations are not fundamentally changed by integrating helicopters with infantry; however, tempo and distance are changed dramatically. An air assault operation may be a decisive operation or shaping operation within land or littoral manoeuvre. It gives a commander the ability to conduct tactical actions at reach, free from the constraints of the terrain and over a wider area than that afforded to purely ground forces; examples include littoral manoeuvre, river crossings, seizure of key terrain and raids.

5.2. An air assault is employed most effectively in environments where limited lines of communication are available to the enemy, where they lack air superiority and effective air defence systems. Air assault forces always fight as a combined arms team. Air assault planning must be centralised and precise; execution must be aggressive and decentralised.

5.3. The ground tactical plan for an air assault operation contains essentially the same elements as other attacks but differs in that it is prepared to capitalise on speed and mobility to achieve surprise. Assault echelons are placed on or near the objective and organised to be capable of immediately seizing objectives and rapidly consolidating for subsequent operations. If adequate combat power cannot be introduced quickly into the objective area, then the air assault force must land away from the objective and build up combat power. The air assault force then assaults like other light forces and the effectiveness of the air assault operation is diminished.

5.4. Air assault operations use a reverse planning process as detailed in Chapter 2. This includes: the ground tactical plan; the landing plan; the air movement plan; and the staging and loading plan.

5.5. Air assault operations are executed in six phases, which will overlap.

- Phase 1 – preparation and deployment.
- Phase 2 – shaping operations.
- Phase 3 – assault.
- Phase 4 – stabilisation of the lodgement (if required).
- Phase 5 – rapid delivery of follow on forces (if required).
- Phase 6 – link-up, reinforce or withdraw.

The four stages of planning, as outlined in the reserve planning process, may overlap some, or all, phases. Detailed considerations for reverse planning are given in the following sections.

Operation Telic 1, Al Faw

On the night of 20 March 2003 the men of 3 Commando Brigade waited in Kuwait and on ships in the Gulf, ready to embark in over 80 helicopters to assault. After days of bad weather, with low cloud and blown sand, the weather and light conditions were touch and go, but the imperative to seize the oil infrastructure intact meant there was no scope for delaying the launch options. The start of operations was set for 2200 local time and was preceded by a short but intense air bombardment onto known enemy positions, combining the effect of Joint Direct Attack Munitions dropped from United States (US) FA-18 aircraft with the firepower of AC-130 Spectre gunships.

40 Commando and US forces landed as planned on their three objectives, capturing some 230 prisoners for no loss. Meanwhile, simultaneous landings from air and sea were made onto the gas/oil platforms out to sea. With the best part of an Iraqi armoured division known to be based in and around Basrah, it was vital to ensure that no counter-attack could be mounted to threaten 40 Commando's tenuous foothold on the peninsula. A second aviation assault by 42 Commando in US Marine Corps helicopters was planned to launch an hour after 40 Commando. Preceded by Cobra helicopter gunships to sweep their landing sites, 42 Commando was to land just north of the town of Al Faw, destroying the

enemy artillery which threatened the oil infrastructure, thereby securing 40 Commando's flank. For an hour and a half, the landing sites were subjected to an intense bombardment by artillery and naval gunfire from four artillery batteries positioned on the eastern edge of Bubiyan Island, and from three UK ships and one Australian ship.

42 Commando's insertion started badly in appalling visibility, made worse by blowing sand and smoke from fires started the previous day. Tragically, the US CH-46 Sea Knight helicopter carrying the headquarters of the Brigade Reconnaissance Force crashed as the assault formation turned out over the Brigade assembly area to start their run in over the sea. With the cloud base dropping still further, the insertion was aborted, forcing the Brigade headquarters rapidly to identify other aviation assets and plan a new insertion for 42 Commando at dawn, using Royal Air Force Chinook and Puma helicopters. Although the landing took place six hours late, onto insecure landing sites, and in some cases miles away from those originally intended, all objectives were secured, demonstrating 3 Commando Brigade's inherent flexibility. The all-arms cooperation between the commando groups and the marine expeditionary unit, the ships and helicopters from the Amphibious Task Group, the tanks and other elements of 1st (UK) Armoured Division, and the AC-130 Spectre gunships and coalition close air support sorties that all supported the amphibious operation provided useful lessons for the all-arms approach to littoral operation.

Operations in Iraq, Lessons for the Future

A platoon secure a helicopter landing site and await extraction by Jordanian Black Hawk helicopters

Section 2 – Ground tactical plan

Command

5.6. Unity of effort and a clear chain of command and support relationships ensure the air assault force fights as a cohesive, coordinated, combined arms team. It can be commanded by the ground tactical commander or air mission commanders; it may be necessary to appoint additional leaders.

a. **Attack helicopter lead.** An attack helicopter lead will coordinate all attack helicopter tasks and the integration and control of all ground and air fires; they could also be the air mission commanders.

b. **Support helicopter lead.** The support helicopter lead will coordinate all transport helicopter tasks and liaise with the pick-up zone control officer; they could also be the air mission commanders.[72]

72 Allied Tactical Publication (ATP)-49, *Use of Helicopters in Land Operations*, page 3-18. Note that the North Atlantic Treaty Organization (NATO) refers to transport helicopters whereas in the UK they are designated support helicopters.

5.7. Each chalk commander and the embarked ground tactical commander should have communications with their aircrew. Communications between troops in different helicopters may be achievable if the aircraft have radio capacity to set up an 'assault frequency' net for the embarked commanders to use.

Intelligence

5.8. In addition to Intelligence considerations for air manoeuvre already covered in Chapter 3, air assault operations should include:

- enemy visual or electronic surveillance of landing zones, flight routes and pick-up zones;
- enemy air defence weapons and ability to interdict or interrupt air assault operations;
- terrain masking that decreases effectiveness of enemy air defence weapons allowing covered ingress and egress; and
- cover for reconnaissance and attack helicopters to observe, control indirect fires and conduct attack by fire.

Manoeuvre

5.9. Lift capability is the single most important variable in determining how much combat power can be introduced into the objective area. The ground tactical plan will capitalise on speed and mobility to achieve surprise. Maximising combat power in the assault, to heighten the surprise and shock effect, is especially important if the air assault force plans to land on or near the objective. The methods of attack are as follows.

a. **Land on.** The assault echelon lands within direct fire of the objective with intimate close combat attack fires to eliminate enemy forces, immediately seize objectives and rapidly consolidate for subsequent operations. The air assault force should have enough combat power to seize initial objectives and protect the landing zones until follow-on echelons arrive in the objective area. Consider landing

on or near the objective when: the mission is to seize key terrain; there are suitable landing zones near the objective; there is accurate intelligence on the enemy and terrain (especially landing zones); and the weather is favourable.

b. **Land near.** As above but the assault echelon lands outside of direct fire of the objective but within range of enemy indirect fire. This mitigates the risk to troops and helicopters when landing.

c. **Land off.** If adequate combat power cannot be introduced quickly into the objective area, the force lands away from the objective to build up combat power and then assaults like light forces. The air assault force commander must properly allocate the logistics to sustain the task force until follow-on forces arrive. If unable to land within indirect fire of the objective, attack helicopters and integration of fires may not be required. The air assault mission may be unnecessary allowing an air mobile operation to be conducted with less risk, planning and resources.

Fires

5.10. **Preparation fires.** It is desirable to make the initial assault without preparation fires to achieve tactical surprise. Planned fires for air assault operations should be intense and short but with a high volume of fire to maximise the surprise and shock effect. Preparation fires should begin as the first aircraft of the first lift crosses the release point and end just before the first aircraft lands. Some fires may cause craters, downed trees, fires and landing zone obscuration. Illumination can interfere with night vision goggles causing unsafe conditions. Where an air assault is executed across extended distances, preparation fires by close air support or attack helicopters may be the only option. The locations of all friendly forces in the area must be known and consideration given to collateral damage.

5.11. **Assault fires.** Attack helicopters normally offset their position from the flank of the friendly ground force. This helps to ensure that rotor wash, ammunition casing expenditure, and the general signature of the aircraft do not interfere with operations on the ground. Attack helicopters can provide intimate fires but their positions must be deconflicted with ground

troops by either: separation by a grid line or terrain feature; a designated attack by fire position/area; or 'call clear' to exit an area for other aircraft.

Protection

5.12. Deception for air assault operations can be achieved using organic helicopters and troops; an airmobile operation taking place on a flank could mislead the enemy as to the true objective. However, this goes against the principle of delivering concentration of force in space and time which may result in loss of surprise and sufficient combat power. Deception may be better achieved by using ground manoeuvre forces within a divisional scheme of manoeuvre. False preparations can be fired into areas other than the objective or landing zone area to deceive enemy forces if rules of engagement allow.

Sustainment

5.13. **Logistics.** Helicopter forces may have a significant number of personnel and materiel, requiring transportation to move and sustain. There will be high fuel and ammunition consumption rates which will take time to build up.

5.14. **Casualty evacuation.** The air mission commander controls casualty evacuation flights to quickly deconflict airspace and fires over the combat aviation network. While assaulting aircraft may backhaul wounded from the landing zone, the time required to load and unload casualties could desynchronise the air movement table. Designating separate casualty evacuation aircraft may prevent delays to follow-on lifts or the last serial of the final lift can pick up casualties before the conclusion of the air assault. If air assault crews evacuate casualties, they must know where to take them and how to rejoin remaining lift aircraft for subsequent lifts. To maximise flying mission hours, casualty evacuation aircraft should support an air assault at the latest possible time. Evacuation aircraft should support short-distance air assaults from the pick-up zone or brigade support area. Over long distances, aircraft may stage at a forward arming and refuelling point or hold in a restricted operations zone to expedite the pick-up of casualties.

Battle of la Drang, Vietnam

'I had to maximize the impact of the eighty men who would be on the ground alone during the first critical half-hour. Standard operating procedure in the new science of airmobile warfare dictated that the lead elements scatter out over 360 degrees and secure the entire perimeter. Not this time. I had been thinking about a new technique that seemed tailor-made for this situation. Bravo Company would assemble in a central location in the landing zone as a reserve and strike force. Four seven-man squads would be sent out in different directions to check out the perimeter and surrounding area. If one of those squads encountered enemy forces I could then shift the rest of the company in that direction and carry the fight to the enemy well off the landing zone.'

'The hairiest part of any operation was always the air assault. We had to time the flight and the artillery so close. When the choppers were one minute out the last artillery rounds had to be on the way or you get Hueys landing with the shells. We always sweated because if you shut down the artillery too soon the enemy could be up and waiting when the choppers came in. This one was precisely on time.'

Harold G. Moore and Joseph L. Galloway,
We Were Soldiers Once ... and Young

Section 3 – Landing plan

Landing zones selection

5.15. Landing zones selection is based on technical advice from the air mission commander or the aviation liaison officer against several criteria.

a. **Capacity.** Size, shape, slope, surface and surroundings of the landing zone determine how much combat power can be inserted at one time and the need for additional landing zones or time separation between serials.

b. **Types of loads.** External loads generally require larger landing zones than landing zones for personnel alone.

c. **Elevation.** The altitude of potential landing zones may not be supportable due to operating restrictions of certain aircraft.

d. **Cover and concealment.** Select landing zones to deny enemy observation and acquisition of friendly ground and air elements while they are on route to, from or in the landing zone.

e. **Obstacles.** If possible, the air assault task force should land on the enemy side of obstacles when attacking to negate their effectiveness. The air assault task force should consider using obstacles to protect landing zones from the enemy at other times.

f. **Identification from the air.** If possible, landing zones should be easily identifiable from the air or marked by friendly reconnaissance forces that have reconnoitred the landing zone.

g. **Approach and departure routes.** If possible, approach and departure air routes should avoid continued exposure of aircraft to enemy fire.

h. **Alternates.** An alternate landing zone should be planned for each primary landing zone to ensure flexibility to support the mission.

5.16. **Number of landing zones.** Many landing zones increases the tactical risk and complexity of the operation as well as the difficulty of setting conditions at each landing zone before landing. The air assault force commander should plan for one primary landing zone and one alternate landing zone according to the manoeuvre force regardless of proximity to the objective. The considerations are detailed below.

a. Single landing zones require less planning and rehearsal time and allows concentration of combat power and supporting fires in one location. They reduce the number of air routes in the objective area, making it more difficult for the enemy to detect the air assault

and requiring fewer attack helicopters for security. Command and control is simplified, as is sustainment.

b. Multiple landing zones avoids grouping units in one location and reduces the possibility of aircraft and troop congestion in one landing zone, which creates a lucrative target for enemy mortars, artillery and close air support. They allow rapid dispersal of ground elements to accomplish tasks in separate areas which makes it difficult for the enemy to determine the size and location of the assault echelon and forces them to fight in more than one direction. They reduce the enemy's ability to detect and react to the initial lift.

Landing zone operation

5.17. **Landing zone update.** Just before the start of the air movement and just before the lift aircraft reach the release point, the attack/reconnaissance helicopters or unmanned aircraft system provide a landing zone update to the air assault force commander, ground commander, and air mission commander of the status of enemy activity on the landing zone. The landing zone is considered 'cold' if no enemy activity is observed and the air assault is executed as planned. If the landing zone is 'hot' the attack/reconnaissance helicopters make a recommendation to use the alternative landing zones.

5.18. **Hot landing zone.** A detailed and rehearsed plan is required to react quickly to a hot landing zone. Careful consideration of the options and the risk to the mission and force should be taken beforehand, they include the following.

a. Fighting through the objective which is a high-risk option but may be necessary within the wider mission if time is critical. Because the landing zone is on the objective, fighting for control of the hot landing zone is critical to accomplishing the mission and continuing the assault is the priority.

b. Diverting to an alternative landing area but at the risk of losing surprise and having insufficient combat power to approach the

objective. This may occur for a second wave and be essential to link-up with the assault wave.

c. Delay through slowing air speed or race-tracking in which all serials orbit at their current position until the landing zone is cold based on vulnerability and endurance.

d. Abort.

5.19. **Landing formation.** Aircraft should land as close to cover and concealment as possible to reduce exposure. The landing zone formation should be the same as in the pick-up zone to provide an understanding of the formation and the location to other groupings. The landing site is laid out in a location where helicopters will not fly directly over aircraft on the ground. The layout of the site also depends on the landing space available, the number and type of obstacles.

5.20. **Landing zone clearance.** The lead elements are responsible for clearing the landing zone to support follow-on lifts; the most common method is to assign assault objectives, which requires subordinate units to move through an assigned area to clear enemy forces before reaching their final objective.

Soldiers awaiting pick-up by Chinook helicopter

5.21. **Off-loading.** The separation between serials and the number of serials that can fit into the landing zone at one time are critical planning considerations when determining the aircraft exiting method. Soldiers must be careful to avoid the main and tail rotors of the aircraft they are exiting and the rotors of other aircraft in their serial. Dependent on the number and location of helicopter doors there are three methods for exiting most helicopters.

a. **One-side off-load.** This is the slowest method, exposing soldiers and aircraft to direct and indirect fire for longer. It simplifies mission command and establishing zones of responsibility on the landing zone. The door gunners on the opposite side of the aircraft can engage enemy positions during off-loading and door gunners of follow-on serials can engage enemy on the far side of the landing zone.

b. **Two-side off-load.** This is the quickest method but masks both door gunner fires while soldiers exit the aircraft, increasing vulnerability to enemy direct fire. It simplifies control and establishes zones of responsibility on the landing zone.

c. **Rear ramp off-load.** Soldiers exit from the rear ramp and move out from the aircraft and drop to a prone fighting position, establishing 360° security until the aircraft lifts to depart the landing zone.

5.22. **Exiting the landing zone.** The unit will need to decide whether to exit the landing zone by conducting a one-side or two-side rush. The unit may plan a one-side landing zone rush away from a potential enemy position, allowing the door gunner closest to the enemy position to continue firing while soldiers exit the other side of the aircraft; soldiers will be vulnerable to indirect fire as it takes longer to unload. A two-sided rush is quicker and less vulnerable to indirect fire but more difficult to plan and control due to its complex aircraft cross-loading plan. It masks fires of both door gunners while departing the landing zone, which increases vulnerability to direct fire while moving off the landing zone.

Section 4 – Air movement plan

5.23. The air movement plan begins when helicopters cross the start point and ends when they cross the release point. The air movement plan schedules the movement of personnel and materiel from the pick-up zone to the landing zone within airspace restrictions. It provides coordinating instructions regarding air routes, aircraft speeds, altitudes, formations and the planned use of attack and reconnaissance helicopters. The plan is developed by the air assault force and supporting aviation unit staffs in coordination with technical assistance and recommendations from the brigade aviation element, air mission commander and the aviation liaison officer. Helicopters will be at their most vulnerable when approaching the land over the sea as there is no terrain to mask their approach.

Air routes

5.24. **Start point and release point.** The air route starts at the start point and ends at the release point. The location of start points and release points are usually three to five kilometres from the pick-up zones and landing zones to allow adequate flying time for executing the flight's on route procedures. The distance from the pick-up zone to the start point allows the aircraft to achieve the desired airspeed, altitude and formation after lift-off. The distance from the release point to the landing zone allows the flight leader to reconfigure the formation and execute a tactical formation landing.

5.25. **Air control points.** Air control points designate where the air route changes direction using identifiable topographic features or points marked by electronic navigational aids. When large groups of aircraft are employed, dispersion is achieved by using multiple routes. However, with large serials, it is often necessary to use fewer routes or even a single route for protection.

5.26. **Slow aviation asset flight routes.** Slow aviation asset flight routes (SAAFR) will be established below the coordination level to route helicopter traffic in direct support of ground operations, their dimensions dictated by mission requirements. Air routes maximise use of terrain, cover and concealment to minimise exposure to enemy observation,

target acquisition, and direct fire. They should be as short as is tactically feasible according to mission variables to reduce flying time and be easily navigable, particularly for night or adverse weather operations. They should avoid turns more than 60 degrees to facilitate control of the aircraft formation when formation flying is required or if sling loads are involved; built-up areas and overflying ground forces which may interfere with their supporting fire or mask friendly fires. To reduce vulnerability of the air assault force, air routes facilitate rapid approach, landing and departure from selected landing zones.

5.27. **Formations.** Many factors dictate the flight's formation, such as terrain, enemy situation, visibility, weather, altitude, speed, type of aircraft mix and the degree of control required. The pick-up zone route and landing zone may all place different constraints on formations. The flight leader should try to minimise changing formations.

5.28. **Terrain flight modes.** A specific on route flight altitude is not designated and is usually below the coordinating altitude. Pilots may use one or some combination of the three terrain flight modes as dictated by the mission variables.

a. **Nap-of-the-earth flight** is conducted at varying airspeeds as close to the Earth's surface as vegetation and obstructions permit. A weaving flight path remains oriented along the general axis of movement and takes advantage of terrain masking.

b. **Contour flight** is conducted at low altitudes, conforming to the Earth's contours. Relatively constant airspeeds and varying altitudes as dictated by terrain and obstacles characterise it.

c. **Low-level flight** is conducted at constant altitudes and airspeed dictated by threat avoidance. Its intent is to facilitate speed and ease of movement while minimising detection. This mode of flight is used when there is a low threat level and fires along the air route can suppress known or suspected enemy positions.

5.29. **Airspace management.** Helicopters will operate under the coordinating level; air corridors may be designated for their use to prevent being fired on by friendly forces. A general axis of advance, extending toward the enemy; air control points and report lines all help control airspace. Air defence staff should assist in route planning, but the supporting helicopter force is responsible for completing the routes and submitting them to the higher headquarters airspace control element for inclusion on the airspace control order.

Operation Mincemeat, Sicily

By far the most serious schism was caused by the refusal of the airmen to provide the navy with the flight paths to be used by the troop carrier aircraft to transport the airborne and glider troops to Sicily. For their part, the air force was sceptical of the proposed airborne operations and predicted heavy aircraft losses. When the problem went unresolved [Admiral] Cunningham became equally intransigent by refusing to provide assurance that the navy would not fire on the unarmed air convoys. Even though the problem had existed for weeks no solution was forthcoming until nearly D-Day, despite the fact that the US airborne commander, Major General Matthew B. Ridgway, warned that unless the navy was able to provide satisfactory guarantees he would recommend against the airborne operation.

Ridgway's warnings went unheeded and it was not until after the convoys departed for Sicily that the air routes were finally revealed on 7 July, a mere three days before D-Day and far too late to ensure that all naval and ground forces were alerted. No satisfactory reason has emerged for this delay but the episode was one of the worst examples of inter-Service cooperation of the war. The dire warnings were not exaggerated and had they been heeded the tragedy which occurred on D+1 might have been averted.

Carlo D'Este, *Bitter Victory*

Soldiers conducting a night attack

5.30. **Suppression of enemy air defences.** The air mission commander plans air routes to avoid known or suspected enemy air defence positions. A period of focused immediate suppression of enemy air defences (SEAD) is planned against threat systems along the ingress and egress routes and at each landing zone. The start time for each SEAD mission may be calculated if the assault aircraft's on route airspeed and start point time are known. Naval fires can provide SEAD and ship air defence missiles may be able to engage enemy aircraft overland.

5.31. **Air assault security.** Unmanned aircraft systems should observe the air routes and landing zones beginning well before launch to provide early warning. Just before the launch of the air movement phase, attack/reconnaissance helicopters fly the route in an advance to contact. They can conduct a relief of reconnaissance helicopters on station and make the final landing zone update. During the assault they can screen, guard or attack by fire.

5.32. **Air movement table.** The air movement table[73] regulates the sequence of flight operations from pick-up zone to landing zone. The air operations staff and aviation liaison officer begin work on this document

73 For amphibious operations this is known as the 'helicopter employment and assault landing table'.

after the initial planning conference to understand the constraints. The table ensures that all personnel and materiel are accounted for and every aircraft is fully loaded, correctly positioned in the flight, and directed to the right landing zone. The air movement table should include: aircraft allocation; number and type of aircraft in each serial; departure point; route to and from loading area; loading, lift-off and landing times; and the refuel schedule for all lifts if required.

Section 5 – Loading and staging plans

5.33. To load an effective air assault force aboard helicopters, commanders and staffs must know the exact composition of the force, the essential characteristics of the types of helicopters to be used for the operation, and the methods of computing aircraft requirements. Maximum cargo load is affected by altitude and temperature and differs widely according to topography and climatic conditions common to specific zones or areas of military operations. Cargo loads vary based on the location of, approaches to, and exits from landing zones.

5.34. Loading and staging is a collaborative effort between the ground force and the helicopter force. Insertion and extraction plans are developed during the planning process and coordinated with all supporting units at the initial planning conference or joint mission brief.

Loading plan

5.35. **Pick-up zone selection.** The loading plan ensures that personnel and materiel are loaded on the correct aircraft and moved from the pick-up zone to the landing zone in the priority order designated by the commander. Planners should identify primary and alternate pick-up zones able to accommodate all helicopters types and loads (internal and underslung). Multiple pick-up zones avoid concentrating forces in one area but require more personnel and coordination; they should be masked by terrain from enemy observation. Each pick-up zone should be accessible to vehicles but not be reliant on transport to move troops. If possible, each pick-up zone should accommodate all aircraft at once. Surface conditions should be free from potential hazards.

5.36. **Pick-up zone control.** A pick-up zone control officer is designated for each pick-up zone to organise, control, and coordinate operations in the pick-up zone.[74] The pick-up zone control officer is responsible for establishing a control party with support personnel from subordinate units; clearing and securing the pick-up zone; establishing communications with loading units and helicopter units; inspecting personnel and material for loading; guiding chalks to landing points; providing air traffic control; managing heli-handling teams; and marking and executing the bump plan. The supporting helicopter unit must ensure that aviation expertise is present on the pick-up zone and provide guidance on the pick-up zone setup, considering aircraft factors.

5.37. **Tactical loading.** The tactical integrity of teams and sections must be preserved by loading on the same aircraft; platoons should be in the same serials to land at the same time, in proximity. The loss of an aircraft is mitigated by not loading key personnel and critical equipment together. Crews, weapons and ammunition are loaded together and prime movers accompany every towed item. Helicopters loaded internally can fly faster and are more manoeuvrable. Helicopters loaded externally fly slower at higher altitudes and are less manoeuvrable but can be loaded and unloaded more rapidly than internally loaded helicopters.

5.38. **Lifts, serials and chalks.** A lift is complete each time all aircraft assigned to the mission pick up personnel or materiel and set them down on the landing zone. A serial is a tactical grouping of two or more aircraft under the control of a serial commander and separated from other tactical groupings within the lift by time or space. The use of serials may be necessary to maintain effective control. Multiple serials may be necessary when the capacity of available pick-up zones or landing zones is limited. If several acceptable air routes are available, the commander may choose to employ serials to avoid concentrating their force along one air route. Each time there is a new lift, a new serial begins. A chalk comprises personnel and materiel moved by a specific aircraft. Counting within the serials is continuous up to the total number of aircraft in the lift.

74 The pick-up zone control officer may be the unit air operations officer or at company level, the second in command.

5.39. **The bump plan.** Essential personnel and materiel are annotated on the air movement plan to ensure they can be moved from an unserviceable to a serviceable aircraft, at short notice, and arrive on the objective area on time. Bumped personnel report to the pick-up zone control party where they are regrouped and rescheduled for later delivery to appropriate landing zones.

Staging plan

5.40. The staging plan organises the movement of personnel and materiel into position for the forthcoming air assault. The staging plan prescribes the proper order of arrival of ground forces at the pick-up zone and what actions they must complete to prepare for loading. Preparations for loading are conducted in assembly areas. All vehicles and equipment to be lifted should be properly configured, inspected, and ready to load before the aircraft arrive at the pick-up zone.

5.41. **Preparation.** Chalk commanders verify the air-loading table to ensure it is properly completed, making changes to the manifest before arriving to the pick-up zone.[75] All materiel to be underslung is pre-rigged and inspected by the chalk commander who then completes all necessary inspection records and conducts rehearsals for loading and offloading the aircraft. Personnel arrive shortly prior to the helicopter to be loaded. This prevents congestion, preserves security, and reduces vulnerability to enemy actions on the pick-up zone.

5.42. **Land pick-up zone operation.** Upon arriving at the pick-up zone area, commanders' check-in with the pick-up zone control party. Chalk commanders are briefed, and their air-loading tables or manifests are inspected by the pick-up zone control party. Personnel and materiel are weighed to ensure they meet the 'all up' weight. Overweight loads are sent to a designated frustrated cargo area to download equipment before being re-weighed. All items to be loaded are inspected. A chalk guide from the pick-up zone control then leads it into position on the pick-up zone.

75 It should contain a list, prepared by the aircraft chalk leader, of soldiers (by name) and equipment to be loaded on each chalk. This ensures that information on personnel and equipment onboard is available if an aircraft is lost.

5.43. **Deck operations.** One of the key limiting factors in littoral operations is 'deck tempo'. This is the speed at which it is possible to complete a deck cycle of range,[76] launch and recover aircraft. The main constraint is that there are many more aircraft than deck space available. Efficient sequencing of loads and troops is essential to maintain deck tempo. The number of helicopters required to provide an escorted move of a company group in one lift may require three range and launch cycles to be completed from the ship providing the helicopter landing platform. Ranging and launching can take more than 30 minutes, during which time the aircraft that have already launched will need to stay airborne. The first aircraft launched are likely to need refuelling before they can depart on the mission. This can be reduced to two launch cycles by spreading aircraft onto other ships, known as spare decks.

5.44. **Helicopter underslung load carrying equipment.** Helicopter underslung load carrying equipment is always in high demand. Planners must identify how this equipment from the assault serials will be recovered to the pick-up zone and inspected for subsequent serials.

76 Move an aircraft from a stowed position, such as the hangar, to a deck spot and configure it for flight.

Key points

- Air assault dramatically increases the tempo and distance of land manoeuvre.
- Air assault relies on speed, fires and mobility to achieve surprise by landing on objectives.
- A light force can land off the objective to build up combat power out of battle but the utility of the air assault is lost.
- Integrating attack helicopters is essential to the air assault.
- Detailed planning of the landing will increase tempo and reduce vulnerability to indirect and direct fires.
- Air routes must be planned in detail to protect the force from enemy air defences and synchronise activity.
- Careful control of pick-up zones or deck operations are needed to ensure all personnel and materiel are swiftly and efficiently staged and loaded.

Notes

Lexicon

Section 1 – Acronyms and abbreviations

A2AD	anti-access and area denial
ADP	Army doctrine publication
AJP	Allied joint publication
ANSF	Afghan National Security Forces
ATP	Allied tactical publication
CAS	close air support
CCA	close combat attack
DCDC	Development, Concepts and Doctrine Centre
DOAST	desired order of arrival staff table
Dstl	Defence Science and Technology Laboratory
FARP	forward arming and refuelling point
FNLC	Front for the National Liberation of the Congo
HIDACZ	high-density airspace control zone
HMS	Her Majesty's Ship
ISAF	International Security and Assistance Force
ISR	intelligence, surveillance and reconnaissance
ISTAR	intelligence, surveillance, target acquisition, and reconnaissance
JDN	joint doctrine note
JDP	joint doctrine publication
JSP	joint Service publication
JTE	joint theatre entry
JTTP	joint tactics, techniques and procedures
MOD	Ministry of Defence
NATO	North Atlantic Treaty Organization

PJHQ	Permanent Joint Headquarters
ROZ	restricted operations zone
RSOI	reception, staging, onward movement and integration
RTR	Royal Tank Regiment
RUF	Rebel United Front
SAAFR	slow aviation assets flight route
SEAD	suppression of enemy air defence
TACP	tactical air control parties
US	United States

Section 2 – Terms and definitions

This section is divided into two parts. First, we list definitions modified in this publication which will be updated in JDP 0-01.1, *UK Terminology Supplement to NATOTerm*. We then list endorsed terms and definitions used in this publication.

Modified definitions

air manoeuvre
The movement of land forces by air to positions of advantage. (JDN 1/20)

Endorsed definitions

air assault operation
An operation in which assault forces, using the firepower, mobility and total integration of helicopter assets, manoeuvre on the battlefield under the control of the commander to engage and destroy enemy forces or to seize and hold key terrain. (NATOTerm)

airborne force
A force composed primarily of ground and air units organized, equipped and trained for airborne operations. (NATOTerm)

airborne operation
An operation involving movement of forces and capabilities into an area by air. (NATOTerm)

airdrop
Delivery of personnel or cargo from aircraft in flight. (NATOTerm)

airmobile operation
An operation in which combat forces and their equipment manoeuvre about the battlefield by aircraft to engage in ground combat. (NATOTerm)

air movement
Air transport of units, personnel, supplies, equipment and materiel. (NATOTerm)

marshalling
The process by which units participating in an amphibious or airborne operation, group together or assemble when feasible or move to temporary camps in the vicinity of embarkation points, complete preparations for combat or prepare for loading. (NATOTerm)

P-hour
In airborne operations, the time at which the lead parachute element arrives or is due to arrive over the point of impact to begin operations. (NATOTerm)

staging area
An area located between the mounting area and the objective area through which all or part of the forces pass after mounting, for the purpose of refuelling, regrouping, training, inspection and distribution of troops and materiel. (NATOTerm)

Designed by the Development, Concepts and Doctrine Centre

Published by the Ministry of Defence
This publication is also available at www.gov.uk/mod/dcdc