Why Airdrop?

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The study of airdrop has been largely confined to issues around the insertion of an airborne force. This has resulted in airdrop's doctrinal purpose becoming misaligned with the reasons why the capability is employed. This article answers the question, 'why airdrop?', examining the utility of airdrop now compared with its original purpose. Using case studies where an airborne force was not directly involved or where the duration of airdrop operations outlasted the initial manoeuvre, combined with an analysis of the doctrine, command, organisation and development trends, the reasons why to airdrop are explored. The article concludes that the reasons why to airdrop are misrepresented in doctrine that describes it only as an emergency method of delivery when there is no other means available. It shows that developments in aircraft and airdrop technologies have altered the risk benefit equation of airdrop. The answer to the question, 'why airdrop?' is, therefore, airdrop as a means to maximise the survivability of the aircraft, increase the speed direct to the point of delivery or assist a land force in remaining concealed and should be employed as a means to minimise the risk to the transport system.

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Introduction

Since 2001, the United States (US) has considerably increased the amount of airdrop resupply in Afghanistan, with the amount of materiel airdropped increasing exponentially.[1] Between 2006 and 2010 the amount airdropped by the United States Air Force (USAF) rose from 3.5 million pounds per year to over 60 million pounds per year.[2] Despite being active in Afghanistan and Iraq, Australia, however, has only provided resupply by airdrop once.[3] Involved in the same conflict, operating with similar military structures and planning philosophies, why is there such a stark difference in the use of airdrop between the two nations? Although airdrop is expensive and imposes a greater aircrew training burden than airland resupply, properly employed airdrop can save lives.[4] If the reasons for employing airdrop are not understood, the costs can never be justified and lives may be needlessly lost. This makes it imperative to understand the capability airdrop provides and to answer the question: 'why airdrop?'.

Airdrop was designed as – and remains – a means to fulfil the logistics requirements of an airborne force, specifically its need for resupply when isolated from ground lines of communication (GLOC) and displaced from a suitable airfield or landing zone (LZ). The underlying principle was that airland was always preferable to airdrop.[5] This meant that airdrop has only ever been considered an emergency means of resupply.[6] Helicopters made Second World War style airborne assault by parachute and glider largely redundant,[7] and as the perception of airdrop resupply was linked to the deployment of an airborne force, there has been a reduction in the focus on airdrop doctrine as a whole.[8] This article limits the discussion of airdrop to the delivery of stores by parachute, and deliberately delinks the airdrop of stores by parachute from the delivery of an airborne force by parachute. It examines the utility of airdrop now compared with its original purpose, contrasting the concept of airdrop as a method used by an aircraft to gain access to fulfil a land logistics demand to that of a tactic to maximise the survivability of the delivery aircraft. It shows that the capability is misunderstood doctrinally, and while the basic benefits of airdrop are unchanged, developments in aviation and other military technologies have altered the risk benefit equation on why to employ airdrop.

Research Methodology

To delink airdrop from the employment of an airborne force, the research for this article concentrated on case studies where either an airborne force was not directly involved, or where the duration of airdrop operations outlasted the initial manoeuvre which prompted employment of that airborne force. Central to the article's thesis is the idea that reasons for employing airdrop have been articulated poorly, particularly in doctrine. While the doctrinal position shows established understanding of the capability, interviews were conducted to provide insight into the decision-making on when, why and how airdrop has been used and – importantly – why it has not. Additionally, developments to airdrop capability were used to identify what characteristics of airdrop commanders were seeking to either engineer away or capitalise upon. In doing so another perspective was gained on the reasons behind the decision to airdrop.

Using the above methodology, this article first examines the history of the capability, answering the question, 'why airdrop?' across two studies: the Second World War; and Vietnam. Following the examination of history it then examines the use of airdrop in the recent US-led conflict in Iraq and current US and North Atlantic Treaty Organisation (NATO) missions in Afghanistan. Answering 'why airdrop?' through these lenses highlights changes in the need for airdrop and how technological developments have influenced the decision on why to airdrop. The second part of this article examines current doctrine, command, organisation and development of airdrop. The US is used as the reference case for this study as it is by far the most prevalent user and developer of airdrop capability, and publishes the most complete set of unclassified doctrine. Additionally, Australia's approach to airdrop is examined as providing a useful counterpoint, presenting a fundamentally different experience in how it has used or not used airdrop, while being involved in the same conflicts.

Thesis

This article demonstrates that the purpose of airdrop has remained largely unchanged – it is a means to gain access to otherwise unreachable areas. However, technology has provided new methods of gaining that access and Van Creveld highlights new methods and vehicles lead to new and different costs and benefits.[9] Therefore, while the need may be the same, the factors preventing access are not. As such, the elements of the equation to decide to airdrop also differ.

Developments in aircraft and airdrop technologies have altered the risk benefit equation of airdrop. Through accurate high-altitude and very fast low-level airdrop the military risk of the logistics chain can be effectively eliminated.[10] Hannah and Ronsick highlight that, 'No one ever anticipates the need for sustainment by airdrop, but in today's world, everyone knows it exists.'[11] In the Second World War, the primary factor denying access was the terrain. Since then, the threat to aviation has increased in every conflict, requiring adaptation in technology and tactics.[12] The primary factor now denying access to an air element is the enemy threat and there is a need for the air component to realise airdrop can be a safer method of delivery than airland – unlike airland, airdrop allows the air asset freedom of manoeuvre.[13] This article concludes that before the question 'why airdrop?' can be answered, the organisation or commander that answers the question must be able to assess the costs and benefits across the entire transport continuum. It is only then that it is possible to answer 'why airdrop?' – airdrop to maximise aircraft survivability, increase the speed of delivery direct to the point of need or because of the secondary benefit it can provide to a land force's concealment?

The History of Airdrop

Prior to the Second World War military airlift was neglected almost to the point of being completely ignored,[14] and there was little development of dedicated resupply airdrop.[15] The Second World War is important in our considerations, because it is then that airdrop became a viable capability.[16]

The Soviets were the prime developers of airdrop capability. They did not employ airdrop en-masse during the war due to lacking air superiority. While the USSR conducted numerous operations involving airdrop, apart from the battle of Rzhev and Demiansk in 1942, they were all essentially self-contained drops of men and their equipment with little to no resupply after the insertion.[17] Demiansk was arguably the first use of a planned airdrop sustainment in the European theatre. The operation's failure only reinforced the Soviet pre-war view that airdrop brought high risk to the mission and should only be used in emergencies.[18]

The Germans also invested significant pre-war effort in developing airdrop and entered the war with an articulated doctrine. This doctrine stated that airdrop could only be used temporarily, and then only as the first or last part of the operation. Further, it described airdrop as generally only justified as part of an entry operation, in combination with airborne forces, to secure an airhead, its primary planning factor being the absence of a runway at the location to be supplied. German doctrine presented the problems of airdrop as: cost; high planning time; inefficiency; loss of goods to damage; inaccuracy and the absence of backhaul.[19] These constraints on airdrop resulted in there being very few occasions where it was employed and resulted in the German view that the capability was only to be used when there was no other means available.[20]

German thinking was echoed in the US, UK and Europe, shown by the fact that with the exception of the routine clandestine airdrops to resistance fighters, airdrop resupply by the allies in Europe was only ever used in emergencies. Furthermore, when it was employed the loss of stores, either through damage on landing or because they landed outside the drop zone (DZ), dominated analysis.[21] Thus, the predominant view of planners in the European theatre was negative, reinforcing notions that airdrop was not a general means of resupply, but only useful when required by an airborne force.[22]

In Burma, airdrop was used routinely due to geography. This in turn led to a different impression of success. There were still significant losses of stores, but as there was no other way to enable the operations, the capability was viewed positively.[23] Airdrops were described by the troops as presents 'like father Christmas, down the chimney.'[24] Influenced by operations in New Guinea,[25] 'transport aircraft [in Burma] became ubiquitous, and upon their efficiency and their capacity the whole strategy for war in South-East Asia was founded.'[26] Such widespread use makes the Burma theatre a useful case study to answer the question of 'why airdrop?' in the Second World War.

Air transport capability remained underdeveloped by the allies,[27] and because of technological limitations, airdrop was significantly constrained in what it could provide.[28] Nevertheless, General Slim's Burma campaign has been described as 'the singular World War II operation that required, not just benefited from, air mobility for access.'[29] Within Burma, roads were impassable during the monsoon, and where roads did exist even tracked vehicles were significantly restricted by the terrain and vegetation. The only reliable passage was on foot, by mule or by air – with air limited by the paucity of useable airfields.[30]

Major General Wingate's initial Chindit operation was the first time resupply was achieved solely through aerial delivery, primarily airdrop. With the Chindits out of range of their GLOC and in contact with the enemy, airdrop was the only option. Although the operation was a failure, the resupply effort succeeded and proved the concept of airdrop, strengthening commanders' resolve to support the idea and enabling future success in theatre.[31] The use of airdrop continued, with the second Arakan campaign in 1943 planned to be totally reliant on air for logistics.[32] This was highlighted through the command-developed tactic of the 'admin box.' Here, Allied forces planned to engage the Japanese forces by securing a small isolated and defendable area that could be resupplied by airdrop. During the campaign, this tactic's employment over a 17-day siege (with over 3000 tonnes of supplies airdropped), facilitated the force's survival while reinforcements transited to the location.[33] This planned effort displayed a subtle change in the use of airdrop. While still used out of necessity, the planned nature of airdrop operations was contrary to the idea that they were justified only in emergencies.

Burma also highlighted the limitations of airdrop at the time. During the second Chindit expedition in 1943, growing Japanese understanding of airdrop tactics led to accurate targeting of the dropping aircraft by anti-aircraft artillery (AAA). Airdrop became too hazardous by day and weather made even night drops extremely dangerous.[34] Regardless, airdrop resupply provided substantially greater efficiency and effectiveness compared to road movement, freeing the army from land-based logistical constraints with a single aircraft providing the equivalent logistics effect of 54 trucks.[35] In spite of this, airdrop was still viewed as more expensive than road movement,[36] and the command did not believe there was a direct benefit of airdrop over airland resupply.[37] This is evidenced by Slim's decision to switch resupply from airdrop to airland during the 1944 Rangoon offensive when air assets became scarce. To achieve this, LZs had to be created and improvised,[38] an operation requiring substantial resources and often resulting in airfields only useable for one day. Deterioration to LZs occurred so quickly that aircraft began incurring damage while landing during the first day, with the LZ unusable by day two.[39] Therefore, in Burma, the understood answer to the question, 'why airdrop?', was that airdrop should be used when a ground force was isolated from GLOCs or displaced from airfields.[40]

Examining aircrews' views of airdrop and the decision-making process underpinning the tasking in Burma, is instructive. Aircrews described the main hazard to aircraft as the weather, followed by mortar and ground fire when operating low level or on the ground.[41] However, planning and control of airdrop missions were held within the G4 and, as noted, the decision on whether to airdrop or airland was made based on the availability or otherwise of an airfield. The role of the air component was simply to coordinate which and how many aircraft would execute the mission. Even the siting of DZs was a land function, which often resulted in failed missions and refused drops because the DZs were situated in locations inaccessible because of terrain or enemy action.[42] Importantly, weather did not significantly hinder airdrop operations but did affect airland because of the effect it had on airfield conditions. Taylor highlights that this knowledge was not used by the G4 who were oblivious to the different effects weather

had on airdrop and airland, continuing to plan airland missions whenever there was a runway rather than looking for the best method given the conditions.[43] Therefore, in Burma, as in all other theatres of the Second World War, airdrop was seen as a method of delivery only to be used when there was no other option. Despite data showing it could be more efficient and reduce risk to aircraft and aircrews even Slim viewed airdrop as an issue of geography and not justifiable if an alternate means of supply existed.[44]

Vietnam

Vietnam was a completely new fight for the US requiring a new logistics system. Forces were distributed with no defined front, operating from isolated base camps with no logistics stockpiles.[45] The US was further hampered by a lack of collective knowledge with the first official USAF doctrine in 1953 containing no mention of airdrop.[46] While Korea saw the limited use of helicopters for medical evacuation it was in Vietnam that the birth of the helicopter in a full military role occurred.[47] As discussed, at the conclusion of the Second World War airdrop was viewed as a capability to solve the problem of supplying a location without an airfield. Helicopters provided another means to achieve this but, in Vietnam, remained significantly limited by technology and the extreme threat to operations at low level. As such, they were only used for essential airmobile operations, evacuation of wounded and supply to isolated locations too small for airdrop technology of the day.[48] Thus, in Vietnam it remained possible to discuss airdrop as the only means to resupply an isolated location that did not have a fixed wing LZ.

American involvement in Vietnam regularly featured airdrop,[49] and while looking at the US effort in Vietnam holistically provides insight, two specific operations allow a focused study: Khe Sanh and An Loc.[50] Khe Sanh shaped the future US use of aerial resupply and tactical airlift thinking,[51] while An Loc provides the ability to examine the application of the lessons drawn from Khe Sanh in a similar environment.

Khe Sanh was one of the most impressive examples of the use of logistics to enable a battle.[52] The base contained a dedicated DZ near the runway, but the view that airland was cheaper than airdrop saw the logistics plan factored on landing all goods, with airdrop available in emergencies.[53] The airstrip at Khe Sanh, though, exposed aircraft to specific risks on landing and damage was common. The geography of the airfield required aircraft to spend extended periods manoeuvring on the ground. While smaller types could minimise taxi time, any time on the ground exposed aircraft to indirect fire.[54]

The Khe Sanh siege lasted 70 days, during which 6000 US marines held off approximately 18,000 attackers.[55] The enemy could reach the entire base with indirect fire,[56] and a fortnight into the siege seven C-130s had been damaged by enemy fire whilst on the ground, with another lost to enemy fire on approach.[57] Enemy fire increased so markedly with the approach of an aircraft that aircraft became known as 'mortar magnets.'[58] By week three of the siege, the air component commander ended C-130 airland operations, significantly limited landings by

all other types and switched to airdrop. This decision was met with resistance by the land force which was concerned about increased cost and reduced efficiency. Conversely, the move was insisted upon by the air component to increase aircraft survivability. The decision was completely opposed to all established doctrine.[59]

The move to airdrop allowed the air component to develop new tactics and methods to minimise time in the enemy's Weapon Engagement Zones (WEZ) and increase survivability. At the start of the battle, the only airdrop method available was the container delivery system (CDS). Unlike airland, CDS allowed aircraft to vary their approach path. Although they remained inside the WEZ of small arms and AAA and had to fly at a slow and vulnerable speed, the mortar threat was removed. Unfortunately, CDS was unable to deliver large quantities of stores. To overcome this, two additional methods were rapidly developed: Low Altitude Parachute Extraction System (LAPES) and Ground Proximity Extraction System (GPES). Both methods allowed significantly more stores to be delivered and although they placed the aircraft back in the mortar threat it was for a much shorter period than an airland delivery. The most critical airdrop development in Vietnam though, was non-visual airdrop in instrument meteorological conditions (IMC). Primarily developed to provide mission assuredness in bad weather, IMC drops greatly enhanced aircraft survivability. As the enemy's weapons all required visual tracking aircraft in cloud could not be targeted.

Mets argues the air component drew two lessons from Khe Sanh: the need for self-contained IMC airdrop with precision from high-altitude to increase aircraft survivability; and a requirement to develop vertical lift to minimise exposure to ground fire by enabling randomisation of approach and departure paths.[60] Khe Sanh marked a change in the reason to airdrop in that geography may not be the primary determinate with aircraft survivability now an independent reason to airdrop vice airland.

After Khe Sanh and the Tet offensive the requests for airdrop decreased and with that came a loss of experience and qualified aircrews who understood the benefits airdrop provided. By the time of the battle of An Loc in 1972 many of the lessons of Khe Sanh had already been lost or discarded.[61] Mets suggests:

> [t]he problem with aerial delivery lay not so much in the area of technology, but rather in the matter of policy. The Air Force [had] long been urging the Army to accept new [airdrop technologies] as standard procedures. The army, in effect, [held] a veto power over the development of all new areal delivery systems because it [was] responsible for the acquisition of the equipment.[62]

The cost of new equipment resulted in the USAF requests not being actioned by the Army. By 1972 ground based air defence (GBAD) had matured with radar and infrared targeting more common. This meant conducting airdrop operations in IMC became almost as hazardous as in visual conditions.[63]

During the battle of An Loc the US initially attempted to use helicopters for resupply. This resulted in significant aircraft losses. Airdrop was then attempted, but the tactics and procedures used placed the fixed-wing aircraft at similar risk with comparable loss rates. Consequently, the air component developed the Ground Areal Delivery System (GRADS) to take aircraft out of the AAA WEZ, enabling airdrops to be conducted at 6,000 to 9,000 feet. This, though, markedly reduced accuracy: only six of the first 116 GRADS CDS drops were recovered. Despite constant pressure from the land component to return to conventional low-level airdrop, GRADS continued until the introduction of the SA-7 into theatre. The increased WEZ of the SA-7 rendered the GRADS system unusable and the air component was forced to return to low-level drops. Again, the air component and not the capability owner, land, drove development to overcome the threat, introducing high-speed low-level airdrops. While partially successful this technique again reduced the accuracy of the airdrops and increased the cost to the Army. An Loc, like Khe Sanh, highlighted that the need for, and methods of, airdrop can be as much about aircraft survivability as any other factor.[64] Weather and enemy firepower thus entered the equation of why to airdrop, and began the development of airdrop technologies focussed upon increasing aircraft survivability.[65]

Iraq and Afghanistan

Iraq and Afghanistan mirror the conditions of Burma in the non-contiguous nature of the theatres,[66] and the terrain in Afghanistan makes air the only effective way to move.[67] These similarities have brought some of the previous lessons of airdrop to the fore again, providing an opportunity to examine the effect changing technology has had on the question, 'why airdrop?'

Afghanistan is not without unique challenges, all of which combined to require the operation to be completely established by air for the first time in US history.[68] Iraq and Afghanistan also present a conflict in which helicopter and tilt-rotor craft provide a reliable and capable means of stores delivery – an alternative to airdrop.[69] In both theatres, there was a choice to be made when a ground force was isolated without access to a fixed wing LZ – airdrop or vertical lift.[70] Examining Iraq and Afghanistan highlights a paradigm shift for both the USAF and US Army. The Army has had to move out of the mind-set that it is easier to use organic ground transportation while the USAF has had to understand that airlift and airdrop is not only for emergency and time- critical supplies.[71]

Airdrop and air mobility now underpin the American military posture; in Afghanistan the US airdropped over 85 million pounds of stores in 2011 alone.[72] This was not always so. In Iraq, a country dominated by large open areas, locating a DZ only a few kilometers outside urban areas would have provided an area free from all conceivable indirect fire as well as surface to air missile systems (SAMS). This would have allowed aircraft almost complete freedom of maneuver in approach, maximizing aircraft survivability.[73] However, just as in Vietnam, the US Army and Air Force looked at the problem independently. Ireland highlights this point, citing the absence of airdrop into the 'Sunni triangle' in 2004. Here, the results of single service

thinking were shown by the experience of an Artillery Battalion which, due to the improvised explosive device (IED) threat, had to increase the armour on its logistics vehicles and re-task combat units to protect logistics patrols. The result was a substantial deterioration in combat mission effectiveness. Their 22-kilometre resupply route became a 72-hour return journey. The land component did not see a need for airdrop, while the air component refused to airland because of the risk. Airdrop could have been conducted with significantly lower risk and greater efficiency than the method employed.[74]

The IED threat saw a shift to helicopter resupply, however, with an increase in helicopter losses to man portable SAMS (MANPADS) on landing, resupply in Afghanistan changed again and in 2004 moved to airdrop.[75] The first attempts included airdrops to the 10th Mountain Division with 76 airdrops of food and water being conducted. Sorties were flown twice a week and at least two aircraft were hit by enemy ground fire in the initial missions. This resulted in a change of tactics to low-level drops to mitigate the threat while meeting the DZ requirements. This did not provide any substantial improvement in survivability and an operational needs statement for a precision high-altitude system was developed.[76] Repeating the experience of Vietnam, the Army, due to perceptions of need and the high cost of new ADE, did not support the development.[77] As the Army owned the capability, the final version of the need statement highlighted the requirements of small DZs and the IED threat as driving the need for precision, not aircraft protection.[78] Therefore, despite the stated reasons behind the development of precision airdrop systems (PADS) the main drivers were lowering the forward logistics footprint, aircraft survivability and the protection of helicopter assets by reducing their need to enter hostile environments.[79] In this instance, airdrop was employed to protect ground forces and helicopters, independent of the cost to the airdrop aircraft. Therefore the question, 'why airdrop?', again changed. Airdrop was not used as a means to access a location inaccessible by other transport, but was employed to mitigate the risk to part of the transport system.

The process of how to request an airdrop is critical to the discussion on why to use it, since the cost benefit analysis alters depending on the reference point of the decision maker, with disadvantages carrying more weight than advantages in decision making.[80] In Afghanistan the process begins with the end user who, after determining airdrop as the required method, submits a request to the G4.[81] With the cost of an airdrop estimated to be about ten times that of land or sea transport, the decision to drop or not is often primarily driven by the financial cost.[82] However, the prevalence of airdrop to non-airborne forces has shown a change in thinking as airdrop is not simply about resupplying isolated airborne forces. The vast quantity of materiel airdropped demonstrated that, in Afghanistan, the air force has become more relevant to army operations. In turn, the US Army has become more reliant on air and is beginning to trust a delivery mechanism not organic to its command.[83]

American pilots have described aspects of the environment in Afghanistan as the biggest threat – altitude, heat, darkness, brown-out and weather. While most of these threats can be

mitigated if the aircraft remains at high-level and does not have to land, reducing this risk is not part of the decision process with the end-user driven by financial considerations.[84] Ireland concludes this is a problem with US doctrine, primarily in the lack of information on the process of integrating the army and air force parts of the airdrop capability. USAF doctrine only deals with the process after a request to drop has been obtained, while army doctrine does not cover why to request a drop.[85] Afghanistan and Iraq, therefore, add another complexity to the question of why to airdrop – who asks the question matters. For aircrew, airdrop is preferred as it allows the aircraft to avoid the main threat. For the land component, airdrop is a means to save lives in convoys, but then only if the cheaper option of vertical lift or airland is not possible.

Doctrine, Command, Organisation and Development

'Doctrine represents the basic and enduring beliefs and principles that guide the use of aerospace forces in military action. It ordains how we intend to operate and fight.'[86] As command is the 'art of decision-making'[87] requiring an understanding of the capability and an ability to balance risk, accurate doctrine is essential.[88] As already discussed, the quality of airdrop planning has eroded due to the lack of understanding of what the capability brings. Tokar argues that 'Airdrop operations more than other operational and logistic endeavours are inherently joint,' yet airdrop remains a joint capability managed on single service lines.[89] This has led to adverse effects on force structure and doctrine.[90]

Doctrine

Practitioners argue that there is no good joint doctrine on airdrop, with most understanding passed by word of mouth.[91] Airdrop, as a subset of tactical airlift, was a product of the land component's need for battlefield mobility and with the air component's focus on strategic air power, American doctrine largely developed by default.[92] With tactical airlift often overlooked for strategic airlift, most US airdrop doctrine exists in land publications.[93] Nevertheless, airdrop cannot be delinked from its method of delivery, the aircraft. Tokar argues that it is dangerous to plan to use a resource without the knowledge of its capabilities and limitations.[94] While the primary purpose of airdrop is supporting the land component, it is a joint logistic function, requiring joint oversight and understanding.[95] Despite this, the highest level of US logistic doctrine does not directly discuss airdrop.[96] The only joint publication dealing directly with it is Joint Publication 3-17 (JP 3-17), which limits the applicability of airdrop and implies a need to avoid it due to the threat posed to the aircraft.[97] At the joint level then, US doctrine says little on why to airdrop, only implying that it should be avoided – a position not justified by its historical employment.

American joint doctrine is in stark contrast to US-endorsed NATO doctrine. In the Military Concept of Employment (CONEMP) for Precision Airdrop Systems, NATO outlines six scenarios for the employment of PADS. Each of these clearly articulates that the underlying reason to airdrop at high-altitude versus airland or airdrop at low-level, is the reduction in threat to the aircraft.[98] In direct conflict with JP 3-17 the NATO CONEMP outlines:

> [t]he great advantage of delivery from high altitudes lies in allowing the aircraft to fly out of range of ground based threats including small arms and MANPADS…Further, the higher altitude allows the load to exit the aircraft from a greater horizontal offset distance from the desired point of impact, decreasing again the likelihood of the aircraft coming under hostile fire.[99]

NATO, then, provides a qualified answer to the question of 'why airdrop?'; that is, use PADS to increase survivability of the aircraft. This reason is consistent with the history outlined in the first part of this article.

The Australian perspective on joint doctrine appears slightly better than the American having joint airdrop doctrine. However, Australian Defence Doctrine Publication 3.9 (ADDP 3.9) concentrates on the employment of an airborne force and only briefly deals with airdrop in support of this activity. As outlined by Group Captain Kourelakos, Australian doctrine is significantly lacking.[100] There is little to no air doctrine on airdrop and disparate groups wrote ADDP 3.9, none of which looked at the capability holistically or attempted to deal with the logistics considerations.[101] Air Commodore Oddie describes Australian airdrop doctrine as having 'no strategic foothold,'[102] and Air Vice Marshal Evans argues Australian doctrine on airdrop has not been well developed or accepted at high levels.[103] This results in there being no clearly defined need for airdrop with no resources permanently allocated. Despite tactical doctrine and procedures existing, this does not justify resource or provide understanding of the larger risk benefit equation. Therefore, expenditure for airdrop has to be justified every time its employment is planned.[104] Australian joint doctrine then says little on why to airdrop, except when in support of an airborne force.

In environmental and tactical level US doctrine, the reasons for airdrop become more specific. From the air environment USAF doctrine focusses on efficiency, which leads the primary discussion to be about airland.[105] USAF doctrine lauds airland, describing it as the most efficient, safest and cheapest method of delivery.[106] Where information on why to airdrop is provided, it ties airdrop to entry operations and specifically describes it as a method of delivery only to be used in extremis or if surprise is required.[107] As American doctrine assigns overall responsibility to determine whether to airdrop to G4 staff, doctrine provides little guidance to them on the benefits to air in deciding to airdrop.[108] Therefore, US land doctrine must be examined to determine the American doctrinal answer to the question 'why airdrop?'

American land doctrine cites aerial delivery as the mode of choice as US forces become smaller and more distributed on operations.[109] However, its comparison of the advantages and disadvantages of airdrop and airland provide the planner with a bleak picture of airdrop. It reiterates the Second World War and Vietnam view that airdrop is only useful as a means of last resort, with the articulated advantages of airland appearing to exceed those of airdrop.[110] This bias is further expanded with airdrop expressed as an emergency means of supply only. Airdrop is seen as expensive and unwarranted if there is another means available. FM 4 20.41

acknowledges that there is a paradigm shift required to see aerial delivery as per any other means of delivery – a request for stores, not a request for a specific transport asset with a predetermined method.[111] This paradigm shift is highlighted by the recent decision to move from the system where the end user specifically requests airdrop to a generic request for supply with the higher headquarters G4 determining if airdrop is to be used. However, the same logic can be used to move the decision past the G4 and to the transportation system – at the US strategic level Transportation Command (TRANSCOM), or at the tactical level into the Air Mobility Division within the Air Operations Centre. This would allow the transport system to decide the best method to produce the required logistics effect.

US doctrine further highlights single service thinking on airdrop through its description of sling load operations. The single service nature of sling-load operations is highlighted as a contrast to the joint operation of airdrop with the conclusion that being single service provides a more responsive, easier to plan and hence more desirable method of delivery.[112] US land doctrine then paints a mixed picture, describing airdrop as becoming a method of choice while only to be used in emergencies.

Lieutenant Colonel Armstrong suggests that Australian tactical level doctrine is weak on airdrop, and the situation has now become worse with the retirement of conventional airborne capability removing the perceived direct link to the army.[113] To logisticians, Australian doctrine instructs that after the initial assault, airland of supplies is always preferred,[114] and guidance is given to solve problems in the following order – road, helicopter, airland then airdrop.[115] AVM Evans argues that most of Australia's recent doctrine and planning is based on what has been done in Afghanistan. The problem with this is that Australia chose what forces it wanted to send to theatre and what roles these forces would perform. He highlights that Australia knows it has the luxury of calling on alliance partners to provide what it does not have, advocating this can be an extremely dangerous cycle, resulting in a force structure that can only do what you chose to do last time. In Afghanistan there is almost a complete absence of airdrop by Australian assets. Australian forces on operations are regularly using airdrop but as Australia chose not to deploy airdrop assets, coalition and contractors are providing this support and not the RAAF.[116]

Australian planning methodologies also rely on mission analysis. As airdrop capability requires elements outside the air mobility system, a decision to request supporting assets in this early phase of planning must be undertaken.[117] To do this, doctrine must enable the commander to understand the capability. As Gp Capt Kourelakos points out, Australia is holding onto a Second World War mind set of airdrop only supporting a large airborne force during theatre entry. He argues that while the Australian need has changed, the doctrine and understanding of the capability have not.[118] If airdrop assets have not been requested in the mission analysis phase of planning, planners tend to look for ways to solve problems with the resource they have rather than revisit the initial analysis.[119] This was highlighted in Iraq, as AVM Evans notes, in that the capability he could plan on using was factored around what was there and not what he needed.[120]

Unlike NATO doctrine, there is no clear guidance in the US or Australian doctrines on why to airdrop. This presents a major problem in that the cost of airdrop is clearly articulated but not the benefits.[121] The doctrinal position on airdrop has therefore remained virtually unchanged from the Second World War – airdrop when there is no other means.

Command and Organisation

Within the US, airdrop capability has been tied to airborne and special forces. This is evidenced by all airdrop capability either being organic to these units or distributed to the Quartermaster department of an established brigade or division, when specifically requested. This scenario has remained effectively unchanged from the end of the Second World War.[122] The placement of the capability organic to the end user sees the receiving unit deciding how to deliver stores, including the aircraft type, the means (airdrop or airland) and the method (PADS or conventional airdrop). FM 4 20.41 lists planning considerations for the type of airdrop to be a factor of: what must be dropped, the accuracy required, the threat and the ADE available.[123] While academia argues the sole purpose of airdrop is to support the land component, and defines the need in terms of being when 'the operational situation demands an airborne assault of troops and air-drop equipment,' the question remaining unanswered is, 'whose operational need?'[124]

In the Australian system, Commander ALG is responsible for the air transport system, charged with providing air mobility to the Austrian Defence Force.[125] However, the air transport system encompass more than the airlift aircraft that he has under command. It also includes the terminal and the MHE,[126] which for airdrop is provided by the Australian Army's 176 Air Dispatch Squadron (176 AD SQN).[127] Further complicating the issue, when airdrop is decided as the means of delivery, 176 AD SQN is assigned in support of the land unit receiving the airdrop.[128] This scenario almost directly mirrors the US system and again brings into question who the reference point is for determining operational need.

Focused on the land component's operational need, airdrop is generally characterised as being unresponsive. While it is true that rigging a load takes time, particularly as the load complexity increases, this aspect is eliminated if the airdrop is pre-planned, or becomes insignificant if the mission is conducted over a long distance. The implication is that rotary wing is more responsive for short distances and, therefore, another reason must be found to airdrop.[129] Airdrop must compete in cost, speed, reliability, simplicity and manpower and to the G4, located within the in-theatre land component, airdrop appears uncompetitive.[130] Benney argues that there is no understanding if it is more effective or efficient to airland trucks into an LZ and drive to the point of need or fly overhead and airdrop. There is also no clear comprehension of joint risk – in an IED threat area how far is too far to drive, versus putting an aircraft overhead with a low threat of MANPADS and airdropping?[131] Without the ability to refocus the reference point outside G4 staffs, this understanding is unlikely to occur, as highlighted by AVM Evans' recollections of his time as commanding officer of 37 Squadron in the lead up to the Australian intervention into East Timor. He recounts that airdrop was

never considered despite the early intelligence estimates, 'look[ing] terrifying…a couple of snipers located at Dili airport could have completely destroyed the entire airland operation. Airdrop could have been a means to overcome this.'[132] Therefore, with the reference point fixed within a theatre's land component, the answer to, 'why airdrop?', will only ever be 'to overcome an otherwise inaccessible location'.

Benney highlights that US command and control of airdrop is all about the Army need and that there is a requirement to revisit this structure, suggesting the method to deliver precision munitions as a possible model.[133] This view is supported by Herring's thesis advocating the introduction of an on-call airdrop capability to deliver critical stores similar to the on-call delivery of munitions through close air support (CAS).[134] Air Cdre Oddie considers airdrop to be a specialist response. To be effective it needs to be treated similarly to the concept of bombing, with a joint targeting cycle deciding when the specific method of airdrop needs to be applied. It must, though, remain predictable and responsive with procedures similar to CAS adopted to allow on-call response.[135] This method would change the reference point allowing the operational need to be viewed holistically across the entire spectrum of the aerial resupply continuum, from fixed wing airland, through helicopter vertical lift to airdrop. The decision on which part of the continuum to use could be based on a risk analysis of what is safest for the delivery asset while providing the resupply effect required.[136]

There is another problem in disconnecting airdrop from its means of delivery in that readiness levels can become separated. While Australia has had some problems accessing terminal services because of differences in readiness to the aircraft, Mortis argues that this has become a significant problem in the US.[137] Airdrop support organisations are located in the low readiness arms of the services despite their primary doctrinal role being to enable entry operations.[138] As noted by Lt Col Armstrong's experience in Afghanistan that it was easier to get contractors and coalition partners to conduct airdrops than the RAAF.[139] Therefore, the question of why to airdrop can be made for the wrong reasons when essential components of the capability are delinked organisationally.

Airdrop Development

While airdrop began as a means to supply isolated airborne forces, its employment developed slowly to include operations where airdrop was selected as the preferred means of delivery despite others being available. The doctrinal position, airdrop when there is no other means, remains virtually unchanged with organisational structures based around airborne and special forces. Examining current development of airdrop technologies offers a means of addressing this conflict of ideas, showing the underlying reasons of why to airdrop.

As discussed, in Vietnam and Afghanistan developments in airdrop to increase the survivability of aircraft were largely unsupported by the land component due to their limited direct gain with increased cost. Betson argues this problem is only becoming worse with technologies to improve aircraft survivability increasing the cost and decreasing responsiveness.[140] This situation

was exemplified in 1998 when the major developments in airdrop technology were, bar one exception, exclusively of benefit to the Air Force. The most pronounced of these, the Advanced Precision Aerial Delivery System, was not progressed by the Army due to the high cost and low-payload of the technology – aircraft survivability was not part of their primary remit.[141] It is for this reason that Benney highlights the primary driver of all airdrop development in the US is now TRANSCOM, the owner of the transport system and not the Army, the capability owner.[142]

Thompson argues that logistics by air is in some ways easier than land because it is harder for the enemy to interdict, but brings with it complexities often not understood by the other environmental components.[143] Further, Van Creveld proposes the theory that despite substantial increases in range, speed and capacity of transport the distance an army can move per day has remained relatively fixed since the end of Second World War.[144] Therefore, the need for new and inventive airdrop technology has, for the land component, been relatively unjustified. The principal developments in US airdrop are currently: precision technologies, high-speed low-level, airdrop from helicopters, low-cost ADE and humanitarian and disaster relief (HADR) airdrop.[145] As Australia is effectively not participating in any airdrop development,[146] it is these US developments that will be investigated.

Of the five areas being developed in airdrop, all bar low-cost ADE have been brought about by the needs of the USAF and three are primarily related to the aircraft survivability: precision technologies, high-speed low-level airdrop and airdrop from helicopters.[147] To land, a fixed wing aircraft must overfly the final quarter-mile of ground directly off the end of the runway without manoeuvering. This procedure places a significant burden on the ground element to secure large amounts of terrain for hours while still exposing the aircraft to high risk. This is not the case for airdrop where the approach path can be varied and the aircraft manoeuvered up to the release point. Even more advantage is gained if the aircraft can conduct the drop from high-altitude or at low-level from high-speed.[148] Increased accuracy is only important as it allows higher altitude drops in order to reduce the risk to the aircraft while providing the same accuracy that was being obtained through dropping from low-level at slow-speed.[149] Similarly for a helicopter to land, while there is more flexibility on the direction of approach, the helicopter must still be low and slow, thereby increasing its vulnerability to both enemy and environmental hazards.[150] Additionally, unlike an airfield, an established DZ does not need to be changed to maintain security for the aircraft as simply altering the direction of approach will afford substantially more protection to an aircraft conducting a drop than would be received from an aircraft returning to a previously used LZ.[151] This is most strikingly shown by the loss of two British C-130s, one each in Afghanistan and Iraq. The first was destroyed by an anti-tank mine buried under the runway at Lashkar Gar in 2006,[152] and the second by an IED placed on the runway at an LZ in Maysaan Province in 2007.[153]

High-altitude airdrop also gives benefits beyond increasing survivability of the aircraft. Through precision technology, providing guided and steerable parachutes, airdrop can be

conducted with offset from the DZ. This in turn assists the ground force in remaining concealed, ensuring resupply does not compromise the commander's ability to generate surprise.[154] This often makes airdrop more attractive to Special Forces,[155] as shown by the original reasons for the establishment of NATO's Joint Precision Airdrop Capabilities Working Group (JPACWG) that explicitly linked precision airdrop technology and special forces.[156] Therefore, the development trends in precision technologies, high-speed low-level airdrop and airdrop from helicopters all describe survivability of the aircraft as a primary reason to airdrop with secondary advantages gained through benefits to the ground force's concealment and ability to generate surprise.

Unlike the three paths of development already discussed, low-cost ADE clearly has financial imperatives, reinforcing the already stated importance of the financial cost and not, of itself assisting in finding the reasons to airdrop. While a non-warlike application such as HADR airdrop may appear out of place with the other airdrop methods, dealing with survivability, this is not the case. Distribution of aid must be controlled due to the risk to delivery crews from rioting and violence and that protection is also required from potential hazards associated with the disaster, such as nuclear fallout. Airdrop provides a means to control this distribution, providing the required force protection. With airdrop, stores can be delivered without placing troops on the ground.[157] While the main advantage airdrop brings to HADR is in meeting the immediacy of need, as airdrop is often able to get stores to the point of need quicker than any other mechanism and can be independent of any infrastructure at the delivery point. The advantage in force protection cannot be overlooked,[158] particularly in the reaction to a nuclear, biological or chemical (NBC) event. For example, if the Fukushima disaster had resulted in a serious radiation leak then airdrop would have enabled the delivery of stores while keeping the aircraft and aircrew out of the threat.[159] The development trend in HADR airdrop then clearly shows airdrop not just as a method of delivery when nothing else can provide the service. Instead airdrop for HADR provides a method to capitalise on the air power characteristic of responsiveness[160] while providing a secondary benefit of force protection to the aircraft and aircrew.

Conclusion

Airdrop is a capability that can save lives, yet is poorly understood.[161] It is imperative that the reasons for airdropping are accurately captured in doctrine, providing commanders with the insight required to know when to employ the capability.

In the Second World War, airdrop's employment was limited to a method to overcome an otherwise impossible logistic problem – reaching a force inaccessible to land transport or airland aviation. German and Allied forces in Europe only ever used airdrop as a last resort, but in the Pacific, specifically in Burma, it was a routine method of delivery. Primarily a product of the theatre's geography, airdrop underpinned Slim's operations. Planners still only employed airdrop out of necessity, but operations were pre-planned and in some circumstances airdrop was both more effective and efficient than road transport.

The Second World War also suggested that airdrop could provide benefit in mitigating some risks and reducing attrition, from enemy action – be that AAA or indirect fire against LZs – and from weather conditions at lower altitudes, even if airdrop technology meant that low-level flying could not be avoided. Although not considered in the decisions on why to airdrop, the Second World War data indicated that it could provide a safer and more effective means of supply. Yet the underlying reason for airdrop remained a factor of geography or lack of other means of access. In the Second World War, no matter the theatre, airdrop was not the preferred option if alternatives existed.

Without a conventional front, and with helicopters removing the need for airborne insertion of troops by parachute, the reasons to airdrop changed in Vietnam. The Khe Sanh operation was planned with airland as the primary means of support, but when enemy fire made landing too hazardous the air component was forced, against the wishes of the ground commander, to cease airland operations and begin airdrop. This represented a fundamental change to the answer of the question, 'why airdrop?' In an attempt to increase aircraft survivability, at Khe Sanh, airdrop became the delivery method of choice despite the presence of an airfield.

While the move to airdrop at Khe Sanh provided some protection from enemy fire, airdrop technology prevented the delivery of sufficient stores. The result was that the air component was required to rapidly field new methods and ADE. The expense of these new methods meant that the Army, the capability owner, did not support their continued development and by the battle of An Loc airdrop had returned to slow-speed, low-level CDS. The threat of improved AAA and the SA-7 missile drove the air component to develop new methods and technologies to protect its aircraft. The Vietnam war showed airdrop could be justified as a method of choice to ensure aircraft survivability, rather than simply to provide access to an otherwise isolated land force.

By the early 21st Century, helicopter technology had improved, and vertical lift provided planners with a direct alternative to airdrop. The lack of a runway was no longer a reason to justify airdrop. With the doctrinal position still reflecting Second World War conceptions, airdrop was almost non-existent in Iraq and only gained prominence in Afghanistan in 2004 following a string of attacks against helicopters and the increased IED threat to land forces. Since then, airdrop in Afghanistan has undergone a vast increase in usage. Just as in Vietnam, though, the organisational structure managing this capability initially stifled development and forced the air component to step in and insist on new technology. The introduction of PADS added the nuance of how to airdrop as well as when to drop becoming an important consideration. The decision to airdrop became one based on what provided the lowest risk delivery method to the transport system.

Afghanistan highlighted that who asks the question, 'why airdrop?', matters. While airdrop began to be recognised as having the potential to reduce military risk, the net result of the question being asked by an organisation outside the transport system meant cost became a

primary determinant. This issue remains – airdrop is expensive and is still employed if vertical lift or airland is not available.

This fits in with the concerns noted above about the absence of clear guidance on why to airdrop in either American or Australian doctrine. Indeed, where doctrine discusses reasons to airdrop these are often contrary to those found in examining the employment of the capability. At the joint level, US doctrine advocates the avoidance of airdrop, describing it as a method that decreases aircraft survivability, while Australian doctrine is poorly developed offering no guidance on reasons to airdrop other than in support of an airborne force.

American tactical level doctrine on airdrop focuses on efficiency, with airland resupply always the preferred option. While US land doctrine highlights the need for a paradigm shift in how airdrop is perceived, guidance remains that airdrop is a costly, emergency option. Australian tactical doctrine, too, always prefers airland to airdrop. It is in danger of defining what is required based on what it has chosen to do in Afghanistan, rather than on broader considerations.[162] The incredible difference in the airdrop figures between Australia and the US is not based on different needs but instead a result of the lack of understanding of the reasons to airdrop.

The only clear doctrine on airdropping comes from NATO, where scenarios clearly define when PADS airdrop, in place of airland, vertical lift or conventional airdrop, is preferred. This is only part of the story and notwithstanding how airdrop has been employed, doctrine has remained unchanged from the end of the Second World War, advocating airdrop only when there is no other means.

Command and organisation arrangements of airdrop capability are also lacking. In both America and Australia, airdrop capability has been delinked from its method of delivery, the aircraft, effectively splitting the transport capability in half with airlift controlled by the air force and airdrop organisations by the army. With airdrop defined as being about the operational need, the brigading of airdrop agencies outside the transport system brings into question the reference point for whose operational need airdrop is to meet. When focused on the land component, airdrop appears unresponsive and costly and it becomes difficult to assess holistic risk to the transport system. The decision on whether to airdrop or not must be made through assessing the operational need and risk across the entire transport system. Delinking airdrop from airlift also brings issues of readiness levels between different parts of the same capability as evidenced both in the US and Australia with the airdrop terminal often at lower readiness than the airlift. When these factors are combined, the decision to airdrop can be made for the wrong reasons.

Development trends also showed the effects of the conflict of ideas between how airdrop is described and employed. Although the US airdrop capability system is owned and funded by the Army, TRANSCOM is the main driver of airdrop development, as the Army primary remit

does not include aircraft survivability. While development has focused on methods to increase aircraft survivability – something that by itself reinforces the understanding that airdrop can be justified solely on the grounds of providing aircraft and aircrew survivability – development trends allow an investigation of the secondary benefits to airdrop. Analysing the development of PADS, high-speed low-level and rotary wing airdrop shows that minimisation of risk to the entire transport system has become the primary driver for airdrop. Through the guided and steerable parachutes required for PADS technology, offset airdrop has become possible. This assists ground forces in remaining concealed and ensuring they can maintain surprise so while the question, 'why airdrop?', is primarily answered by the need to protect aircraft, secondary benefits to the land force also matter, and in certain circumstances may be sufficient justification alone.

HADR development also provided insight. Fundamentally a method to capitalise on the air power characteristic of responsiveness, it allows rapid delivery directly to the point of need without the requirement for any local infrastructure. Even in a non-warlike environment, there is risk to military forces and it is here that HADR airdrop provides a secondary benefit. In keeping with the idea of airdrop providing a degree of force protection to the aircraft and aircrew, airdrop provides a means of delivery without placing troops on the ground. Particularly relevant in a NBC event, PADS technology could allow an aircraft to remain at high-altitude, clear of any threat. Overall development trends in airdrop provide the clearest picture on the question 'why airdrop?' Airdrop provides an alternative means of delivery focused on force protection of the airlift asset, while speed of delivery direct to the point of need, maintaining surprise and adding concealment are also considerations.

Through an examination of the history of airdrop employment, its current use, the doctrine, command, organisation and development this article has sought to illustrate why airdrop matters and why to choose it as a method of delivery. Airdrop is not simply a method applicable only when airland or vertical lift is not available, but is a means to maximise aircraft survivability of the aircraft, increase the speed direct to the point of delivery or assist a land force in remaining concealed, but this is not well understood. It is, therefore, critical to ensure the person answering the question 'why airdrop?' can view the risk to the entire transport system. Only then will the answer to the question move from the current doctrinal position, where airdrop is a method of last resort only. Airdrop provides the required logistics effect while minimising the risk to the transport system, but until doctrine catches up, this critical factor will continue to be dangerously downplayed.

Notes

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[102] Air Cdre John Oddie, interview with the author, March 11, 2013. Air Cdre Oddie (Ret'd) has extensive air mobility experience. He has operated combat support helicopters with the RAAF and RAF and was a Helicopter Tactics Instructor at 18 Squadron. He has also served as the Executive Officer 37 Sqn RAAF and Commanding Officer 36 Sqn, flying C-130 aircraft, the Officer Commanding No. 86 Wing, when it was responsible for all (fixed wing) tactical air transport in the RAAF, as well as Commander Air Lift Group. Air Cdre Oddie also commanded airlift on operations as one element of his duties as Deputy Commander Joint Task Force 633, the Australian Contingent to the Middle East Area of Operations (Iraq and Afghanistan) in 2011.
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[113] Lt Col Ron Armstrong, interview with the author, March 15, 2013. Lt Col Armstrong has served in all areas of the Australian Defence Force's (ADF) aerial delivery capability. He has Commanded No. 9 Force Support Battalion (the Australian Army's unit responsible for transport, including air dispatch) and served as the Officer Commanding No 176 Air Dispatch Squadron (the ADF unit responsible for providing all airdrop capability).
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[116] Ibid.
[117] Evans, interview with the author.
[118] Kourelakos, interview with the author.
[119] Wg Cdr David Howard, interview with the author, March 11, 2013. Wg Cdr Howard is currently the Divisional Air Liaison Officer responsible for coordinating RAAF support to the Australian Army. Wg Cdr Howard has also served as the Deputy Director of the Air Mobility Control Centre, the Staff Officer Capability Development for Air Lift Group, the 3 Brigade Air Liaison Officer and has experience as a C-130 pilot.
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[133] Benney, interview with the author.
[134] Hering, "Flexible Precision."
[135] Oddie, interview with the author.
[136] Evans, interview with the author.
[137] Wg Cdr James Hogg, interview with the author, March 7, 2013. Wg Cdr Hogg is the Deputy Director of the RAAF's Air Mobility Control Centre. In this role he is responsible for the tasking and control of all air mobility missions.
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[150] Christopher Rife, interview with the author, March 19, 2013. Mr Rife has extensive operational experience in airdrop as a USAF loadmaster with operations in the US's Air Force Special Operations Command using all forms of airdrop employed by the USAF as well as airdrop training in Air Mobility Command. Mr Rife is currently the Deputy Operational Manager for the High Speed Container Delivery System Joint Capability Demonstration.
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