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PRECISION AIRDROP - THE FUTURE OF AERIAL RESUPPLY

Since barely a decade after manned flight began, high priority military stores and equipment have been delivered by air. In early 1916 the Australian Half Flight in Mesopotamia attempted to sustain the British force besieged at Kut el Amara by this means, and during World War II aerial re-supply featured significantly in a number of campaigns. The concept was fundamental to the Berlin Airlift, and became almost commonplace in Korea and Vietnam where units were often isolated in mountainous or jungle terrain. Aerial re-supply was less visible for much of the Cold War, in the absence of a large-scale conflict, although it was still used in the many regional wars fought in the period. In the kind of operations increasingly undertaken today in places such as Afghanistan, with units once more operating in dispersed and isolated mode, aerial re-supply is receiving renewed emphasis.

Aerial re-supply, or airdrop as it is called today, is the delivery of supplies and equipment to surface forces from an aircraft in flight. Airdrop supplements traditional logistics by delivering ready-to-use supplies and equipment to forces in the field. Traditionally there are three basic types of airdrop. First is **Free Drop,** which is the delivery of non-fragile items without the use of parachutes or other retarding devices. Items delivered by free drop require careful preparation to prevent damage from landing shock such as flexible containers or padding.

Second, **High Velocity Airdrop,** uses airdrop containers to deliver supplies. The containers have Energy Dissipater Material (EDM) attached to the underside of the load and a stabilising device, such as a ring slot parachute, attached to the top of the load. The stabilising device minimises the oscillation of the load and creates just enough drag to hold the load upright during descent so that it will land on the EDM. The design rate of descent for high velocity drop is 21 to 27 m/sec (70 to 90 ft/sec).

Third, **Low Velocity Airdrop,** delivers supplies using a parachute. Loads are prepared by either packing in airdrop containers or by rigging them to platforms or skidboards. The load is attached to cargo parachutes, which retard its descent and minimise landing shock. The design rate of descent for low velocity drop is 8 m/sec (28.5 ft/sec) or less.

To drop supplies with any degree of accuracy using traditional airdrop methods an aircraft must make its approach at or below 2,000 feet above ground level at 120 – 150 knots over a suitable drop zone. At this height and speed, aircraft are vulnerable to small arms fire, man portable air defence systems and other surface-to-air missiles. Larger aircraft are more vulnerable because of the longer time required to dispense their larger load.

New Guinea, Jan 1944. Members of No 4 Squadron prepare a storepedo of Christmas comforts on an Australian Wirraway.

The Joint Precision Airdrop System (JPADS) aims to provide a safe, rapid and accurate high altitude delivery system to re-supply surface forces. Currently, JPADS can deliver up to 20,000 lbs of supplies (efforts to increase this to 60,000 lbs are already underway) with an accuracy of 100m circular error probable (CEP) and can be launched from up to 35,000 feet with a range of about 45km. The system consists of a steerable parachute, steering actuators, an airborne guidance unit and mission planning equipment. Some versions also have active in-air collision avoidance systems that facilitate simultaneous deployment of multiple packages. The JPADS is guided to a drop zone by either the airborne guidance unit using pre-set coordinates or guided to a ground beacon. Some variants can also be flown using a manual controller.

These evolving airdrop delivery systems provide several advantages over current delivery methods across the spectrum of conflict. Being able to airdrop from high altitude allows the delivery aircraft to fly above normal

enemy ground fire increasing its probability of survival. The high altitude of the drop and the types of parachutes used by JPADS ensures that the aircraft can carry out the airdrop from a safe stand-off distance, away from enemy ground threats located near the drop zone.

Low velocity airdrop from a C-130 with the energy dissipater material and unopened parachutes clearly visible.

The improved accuracy of delivery means that the size of the drop zones can be significantly reduced thereby increasing the number of possible drop zones. Improved accuracy also increases the probability of the cargo reaching its intended target and reduces the need for sequential drops or very long drop zones. JPADS can transmit its current position back to the aircraft, which could be relayed to the ground forces providing them with the exact landing location.

JPADS can also be used for individual re-supply, the precision emplacement of unattended ground sensors and small munitions deployed from military aircraft. Being self-guided, a JPADS container can be delivered in or above weather that would normally preclude a successful drop due to lack of visual contact with the ground.

Security of ground forces is also improved due to reduced aircraft noise through increased stand-off range. Improved accuracy and confirmation of delivery translates to reduction in time spent searching for lost stores because of inaccuracies. Moreover, even after the drop, if the intended drop zone proves untenable, the stores can be manually steered to prevent them falling into enemy hands.

This means that the JPADS is like a stand off weapon, in that it allows the aircraft to remain outside the weapon engagement zone both vertically and horizontally. Further, as drop zones need no longer be marked for visual identification by aircrew, along with increased stand off ranges, they become far more ambiguous to identify, making the location and timing of a drop far more difficult to predict and therefore more secure. This ambiguity is further enhanced by dropping in inclement weather or at night. JPADS could allow for time sensitive airdrop with standardised loads dropped on request to allow a land commander to maintain his operational tempo. The introduction of JPADS would also allow, for the first time, accurate re-supply of manoeuvre forces as they could request re-supply in a way similar to how close air support is currently requested. With further refinement in guidance and reduction in the CEP, it would even become possible to deliver critical stores to a ship at sea.

While airdrop is far more expensive than either ground or sea transportation in terms of dollars per kilogram delivered, having an effective and accurate airdrop option will expand the combat capabilities of our ground forrces. JPADS will ensure that air power will be able to provide a truly responsive, flexible and versatile aerial re-supply capability.

- *Airdrop of supplies is still essential for operations today.*
- *JPADS will allow precision delivery of stores and supplies to manoeuvre forces whilst improving aircraft survivability.*
- *Improving the Air Force's airdrop capability will enhance surface forces' ability to conduct operations.*

Wars are waged with weapons, but they are managed through supplies and logistics.

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